



**SfP-982063 MANAGEMENT OF SECURITY RELATED  
R&D IN SUPPORT OF DEFENSE INDUSTRIAL  
TRANSFORMATION**

**PROJECT PROCEEDINGS OF  
RESEARCH REPORTS BY  
MACEDONIAN TEAM**

**July, 2009**

**SFP-982063 MANAGEMENT OF SECURITY RELATED R&D  
IN SUPPORT OF DEFENSE INDUSTRIAL  
TRANSFORMATION**

## TABLE OF CONTENTS

SfP-982063 MANAGEMENT OF SECURITY RELATED R&D IN SUPPORT OF DEFENSE INDUSTRIAL TRANSFORMATION.....	2
TABLE OF CONTENTS .....	3
PART I: PROJECT AT THE GLANCE .....	4
PROJECT OVERVIEW .....	4
OBJECTIVES .....	5
METHODOLOGY .....	5
PROJECT STRUCTURE .....	6
CRITERIA FOR SUCCESS .....	9
PARTICIPATING INSTITUTIONS .....	11
Participants.....	11
PROJECT DIRECTORS .....	13
Participants.....	<b>Error! Bookmark not defined.</b>
PROJECT TEAMS .....	19
Macedonian Team.....	19
Bulgarian Team - UNWE.....	22
Bugarian Team - IPP .....	24
Romanian Team .....	26
PART II: PROJECT PROCEEDINGS OF RESEARCH REPORTS AND PRESENTATIONS BY MACEDONIAN TEAM.....	27
THE MACEDONIAN DEFENSE MARKET AND TRANSFORMATION.....	27
DEVELOPMENT OF A MACEDONIAN LOGISTICS SERVICES FIRM.....	37
DUAL-USE AND CONVERSION OF MILITARY-RELATED R&D IN GERMANY	43
SECURITY AND DEFENSE R&D MANAGEMENT: POLICY, CONCEPTS AND MODELS OF REPUBLIC OF MACEDONIA .....	53
MACEDONIAN SECURITY AND DEFENSE R&D MANAGEMENT: ICT POLICY AND STRATEGY .....	66
CURRENT ECONOMIC CRISES AND CHALLENGES FOR DEFENSE BUDGETS	77
R&D NATIONAL POLICY IN THE REPUBLIC OF MACEDONIA ACCORDING TO THE SECURITY RELATED AND GENERALLY R&D SCENE – CURRENT STATUS AND SHORTFALLS .....	85
PART III: PROJECT REPORTS BY MACEDONIAN TEAM .....	102
COMPARATIVE OBSERVATION OF DEVELOPED COUNTRIES REGULATIONS AND PRACTICES - GERMANY .....	102
SECURITY AND MILITARY R&D NATIONAL POLICY IN REPUBLIC OF MACEDONIA (PROPOSAL).....	162
DUAL-USE AND CONVERSION OF MILITARY-RELATED R&D IN GERMANY	43

# **PART I: PROJECT AT THE GLANCE**

## **PROJECT OVERVIEW**

The main objective of the project is to study and give practical recommendations for the transformation of security and defense related R&D management into a more comprehensive and integrated defense industry system in support of new network enabled capabilities needed in the fight against terrorism and new security threats.

The main objective of the project is to study and give practical recommendations for the transformation of security and defense related R&D management into a more comprehensive and integrated defense industry system in support of new network enabled capabilities needed in the fight against terrorism and new security threats. Thus a new Concept and Model for defense R&D management will be elaborated to serve as an integrator of National Defense and defense industries. Its purpose is to help in the transformation and internationalization of presently fragmented and nationally oriented defense industries and as side effect to solve challenging social problems stemming from defense industry crisis. The national and regional defense industries are isolated and a new level of regional cooperation as well as international cooperation is needed. The main objective of the project is to study and give practical recommendations for the transformation of security and defense related R&D management into a more comprehensive and integrated defense industry system in support of new network enabled capabilities needed in the fight against terrorism and new security threats. Thus a new Concept and Model for defense R&D management will be elaborated to serve as an integrator of National Defense and defense industries. Its purpose is to help in the transformation and internationalization of presently fragmented and nationally oriented defense industries and as side effect to solve challenging social problems stemming from defense industry crisis. The national and regional defense industries are isolated and a new level of regional cooperation as well as international cooperation is needed. The R&D, superiority in sectors of technology and intellectual property are important assets of the Defense Industry. Their management and further improvement are inevitable prerequisites for future success. The management of R&D activities is comprehensive and has to be steered within a strategic framework which is based on security needs and economic prospects. Ad-hoc employment state support has to be reoriented toward a strategy for support and building of specific R&D advantages. The strong practical result will be the R&DCM. The Model shall explicitly show the specific average advantages which the Defense Industry can benefit and/or the scientific areas which have to be developed and supported if there is a gap between the current level of capabilities and politically adopted concepts. Therefore the setting-up of requirements for new R&D activities in the participating nations will be based on the respective national capabilities assessment and will improve the relations between the nations and between their administration and business.

As NATO member countries Bulgaria and Romania need a NATO-compatible Defense R&D Concept and Model which is the basis for development and further improvement of areas such as Military Codification and NATO Standardization, management of Joint Projects and setting-up the requirements for the Defense Industry. Other nations in the SEE region may wish to follow suit.

## **OBJECTIVES**

The main four project objectives are:

1. To develop a NATO integrated R&D Concept and Model (R&DCM) as an incremental tool for the improvement of the national R&D management system, which includes the following tasks:

- To develop a methodology for further scientific analysis and research on the topic
- To explore NATO and developed countries best practices and regulations
- To explore Defense Industry Transformation processes in Bulgaria, Romania and Macedonia
- To formulate a Concept for Management of Security Related R&D in Support of Defense Industrial Transformation
- To formulate a Model for Management of Security Related R&D in Support of Defense Industrial Transformation
- To standardize continually information available according to NATO AC/135 in order to integrate assets and capabilities into the NATO Master Catalogue of References for Logistics (NMCRL )

2. To develop and strengthen the common policy framework of internationally coordinated R&D policy in the defense industry sector as a prerequisite for steady economic growth and effective security. The policy framework has to be accepted politically and based on a stable relationship between Armed Forces and Defense Industry. It has to be coordinated with the operational requirements, defense industrial capabilities, and the capacity of R&D management as an instrument for re-engineering their balance.

3. To elaborate a Defense R&D Management Network for Scientific Cooperation (NfSC) in the SE European region.

Such a network will facilitate the development of further international agreements, regulations, contracts, and partnership in the sphere within the Atlantic Alliance and the framework of already existing international organizations and forums. It will promote cooperation and specialization, help to exploit potential synergies and skills and prevent illegal development, production and export of armament. The process of knowledge sharing throughout the NfSC as well as the studies based on the R&DC Model will be supported by establishing a database with appropriate structure and procedures.

4. To establish a Centre of Excellence (CoE) for training and educating practitioners and young researchers of the participating nations in the use of modern methods, practices and tools in the sphere of R&D management in support of the Defense Industrial Sector transformation by means of information/information exchange, seminars, training, modern IT and distance education.

## **METHODOLOGY**

In relation to the objectives the logical steps of the project are building upon each other:

1. Fulfill of Objective 1 requires several steps of implementation. It is planned first to develop a methodology for analysis and research on the topic. Next step will be collecting and systematizing information on NATO's and developed countries's experience. The list of countries contains ones with well established security related R&D management systems as well as smaller countries. This will include their practices and

regulations exploration. The task will be to identify best practices that can be applied in the Bulgarian, Romanian and Macedonian model. The third step will be exploration of Defense Industry Transformation processes in Bulgaria, Romania and Macedonia. A concept and a model for Management of Security Related R&D will be the last step.

2. The second objective includes four steps which are logically connected with all others objectives of the project. The first step includes a stock taking study of the environment of security related R&D. It is based on case-studies on best NATO practices and Bulgaria, Romania and Macedonia. Having in mind the results from the first step a concept for a policy framework will be elaborated. The third step includes discussion and tailoring the elaborated general policy framework according to their national needs and specifics in R&D management. The last step

of the objective is the dissemination of the results in publications, seminars and the implementation of the policy framework.

3. Establishing the NfSC (objective 3) consists of two main areas&ndash; the Network and the database. The Network consists of three elements&ndash; web-space, mailing list and the core. The internet site of the project provides web presence, as well as, presentation of the activities and results. The mailing list includes similar non-Project research organizations and end-users and it assures close connection with other interested organizations and researchers. The mailing list will be moderated. The core of NfSC &ndash; the Project Partners&rsquo; Intranet and groupware directory&ndash; provides the day-to-day work management and co-ordination. The second area&ndash; the database&ndash; will focus on the R&DC Model requirements and the users&rsquo; requirements. The model requirements will be set-up according to specific information inputs and outputs defined during the research phase. The database users&rsquo; requests for specific information (areas/domains of science and industry, documented knowledge, patents, procedures, R&D laboratories, production capabilities and growth potential, persons involved in R&D etc.) will be included in the database structure. In order to keep integrity of the two areas of the NfSC a core team of moderators will be established.

4. The implementation of Objective 3 includes five steps which are conducted either consecutively or in parallel. Accomplishment of the objective starts at the beginning of 2007 with CoE Institutional Setting Development and CoE Website Development. These two tasks run in parallel. After their accomplishment working packages for training and education will be elaborated. The education will start at the end of 2007. Managers from defense organizations and other specialists with interests in the field of R&D management from Bulgaria, Romania and Macedonia will take part in it. The last two tasks&ndash; Teaching and Learning Activities and Collaboration between Research Organizations will be fulfilled during the education process.

## **PROJECT STRUCTURE**

The project will be implemented in three phases:

1. During the first phase (12 months) the analytical part of the project will be accomplished. Teaching materials for education of practitioners and young researchers will be prepared and tested.

The Project organization will make first steps to establish a Network for Scientific Cooperation for Defense R&D Management in the SEE and Black Sea Region. The analytical part of the project will include analyses in the following directions: currently used procedures for defense operational requirements formulation and defense industrial

capabilities identification, and the existing capacity of R&D management in the defense industrial sector of the participating nations.

Based on the results of the analyses a new, NATO compatible Concept and Model for Defense R&D Management (R&DCM) will be developed. The teaching materials will cover topics on parameters of a new R&DCM and on modern methods, practices and tools in the sphere of the R&D management in support of the Defense Industrial Sector transformation. Parallel to the Concept research during Phase I the Network System Architecture, the Network Technical Architecture and database Logical Model will be set-up. Integrated development of the Network Activities and database Design will assure the interoperability between Project Partners. Procedures, interaction and a specified set of requirements will be set up during this phase. The Network and database will be installed and tested. They will be adapted to NATO standards according to NATO AC/135 and deliverables for the NMCRL will be transferred sequentially. The NfSC's public web-space will be provided by an internet site of the project, which will include the mailing list of the partners and end-users. The project web-page will use the standard NATO SfP header and footer and title, according to § 6.4 (Publications and Visibility of SfP Projects) of the "guidelines for projects". The site and mailing list will be established and maintained by UNWE-Sofia during the first three months of the Phase I.

2. During the second phase (12 months) a Centre of Excellence in Defense Industry Transformation and Integration will be established and a set of information exchanges, seminars and negotiations will take place. Bulgarian, Romanian and Macedonian practitioners and young researchers will attend these meetings. They will discuss the new R&DCM, new methods, practices and tools in the sphere of R&D management and parameters of the Network for Scientific Cooperation. As a result of the discussions the R&DCM will be further developed and installed in the participating nations. The first seminar in the near CoE is planned for the end of the second phase.

3. During the third 12 months partners will organize a set of advanced seminars on the same topics. In addition to selected participants from the second phase, practitioners and young researchers from SEE and the Black Sea region will participate in these seminars. This will widen and enhance the network of cooperation in defense R&D. The Centre of Excellence will coordinate the educational activities including the web-based modern IT training and distance education. Through the day-to-day discussions with partners and with end-users the R&DCM will be finally improved and installed as a centerpiece for the coordinated transformation of national defense industries.

The table below shows the detailed SfP-982063 Project Plan activities in following dimensions:

Timetable / Milestones / Deliverables / Reporting.

Milestone \ Year		1 <sup>st</sup> year				2 <sup>nd</sup> year				3 <sup>rd</sup> year			
Month:		1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12
<b>1.</b>	<b>Concept and Model Development</b>	■	■	■	■	■	■	■	■	■	■	■	■
1.1.	Research methodology development	■											
1.2.	NATO and developed countries practice exploration		■										

1.3.	Bulgarian, Romanian and Macedonian defense industry transformation exploration												
1.4.	Concept development												
1.5.	Model development and demonstration												
1.6.	Final improvements of the model and demonstration												
<b>2. Security related R&amp;D Policy framework Development</b>													
2.1.	Stocktaking Study of the R&D Environment												
2.2.	Elaboration of policy framework concept												
2.3.	Discussion about national needs and specificities												
2.4.	Dissemination, publication and implementation												
<b>3. Scientific Co-operation Network</b>													
3.1.	Site Design, E-mail List installation, groupware installation and promotion												
3.2.	Network architecture research												
3.3.	Database structure and procedures development												
3.4.	Hardware and software procurement and installation												
3.5.	Database software installation, promotion and testing												
3.6.	Collecting data and database maintenance												
<b>4. Establishing of Center of Excellence</b>													
4.													



4.1.	CoE institutional settings development												
4.2.	CoE website development												
4.3.	Work packages for training and education development												
4.4.	Teaching and learning activities												
4.5.	Collaboration between scientific partners												
<b>Deliverable:</b>		<b>1.1.</b>	<b>1.2.</b>		<b>1.3.</b>	<b>1.4.</b>	<b>1.5.</b>		<b>1.6.</b>			<b>1.7.</b>	
<b>Reporting:</b>				<b>2.1.</b>		<b>2.2.</b>		<b>2.3.</b>		<b>2.4.</b>		<b>2.5.</b>	<b>2.6.</b>

Deliverables:

- 1.1. Written and approved Methodology
- 1.2. Comparative Research on Developed Countries Regulations and Practices
- 1.3. Concept for R&D; Case-studies
- 1.4. Model for R&D (Interim Version); General concept of policy framework
- 1.5. Comparative Research on Regulations and Practices in Bulgaria, Romania and Macedonia
- 1.6. Teaching Materials; Three documents on R&D policy framework, concerning Bulgaria, Romania, Macedonia
- 1.7. Concept and Model for R&D (Final Version)

Reporting:

- 2.1. 1st Progress Report
- 2.2. 2nd Progress Report
- 2.3. 3rd Progress Report
- 2.4. 4th Progress Report
- 2.5. 5th Progress Report
- 2.6. Final Report

## CRITERIA FOR SUCCESS

The list of criteria, presented here describing the effects of the project. The list includes criteria in four groups, relevant to the Project Objectives, as follows:

1. Research and Development Concept and Model
2. Common Policy Framework
3. Network for Scientific Co-operation and database
4. Centre of Excellence

The definitions allow for straightforward quantification of project results and a formula to assess the overall performance of the project team. The respective weights of the four groups of measures are:

1. Research and Development Concept and Model: 30 %
2. Common Policy Framework: 20 %
3. Network for Scientific Co-operation and database: 20 %
4. Centre of Excellence: 30 %

Highest is the weight of R&DC Model and Centre of Excellence, thus leading to the most important deliverables of the project.

## PARTICIPATING INSTITUTIONS

### PARICIPANTS



**Institute for Techniques of Intelligent Systems at the Federal Armed Forces University**

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D-85577 Neubiberg,  
München



**University of National and World Economy**

*Department "National and Regional Security"*

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Bulgaria



**Bulgarian Academy of Sciences - Institute for Parallel Processing**

*Department of Mathematical Methods for Sensor Data Processing*

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**National Defense University**  
**The National Defense College**

Panduri st. 68-72 5th district, Bucharest  
Romania



**European University**  
**Faculty of Economics**  
**Anton Popov BB, Skopje**  
**Macedonia**

## PROJECT DIRECTORS

### PATICIPANTS



**Heinrich Buch**

*NATO country Project Director (NPD)*  
Colonel G.S.(ret.)  
Dipl.sc.pol., cand. PhD  
Teaching International Politics at  
Universitaet der Bundeswehr Muenchen



**Prof. Dr Tilcho Ivanov**

*Partner country Project Director (PPD)*  
Department “National and Regional Security”,  
University of National and World Economy  
Sofia  
Bulgaria



**Prof. D.Sc. Stoian Markov**

*Project Co-Director*  
Institute for Parallel Processing  
Bulgarian Academy of Sciences  
Sofia  
Bulgaria



**Iulian Fota**

*Project Co-Director*  
Director, National Defense College  
Ministry of Defense  
Bucharest  
Romania



**Dr. Zoran Ivanovski**

*Project Co-Director*  
Faculty of Economics,  
European University  
Skopje  
Macedonia



### **Heinrich Buch**

Colonel G.S.(ret.)  
Dipl.sc.pol., cand. PhD  
Teaching International Politics at  
Universitaet der Bundeswehr Muenchen

- 1940, 19 Oct** born in Pforzheim, Germany
- 1959** joins the Bundeswehr, Army, Airborne Infantry
- 1972-1974** 15th Army General Staff Course, Führungsakademie der Bundeswehr, Hamburg
- 1974-1976** Institute for Security Policy, Assistant to LtGeneral Prof. Count of Baudissin
- 1977-1979** Universität der Bundeswehr Hamburg, Assistant to Prof.Dr. Haftendorn, chair International Politics
- 1979** Degree of Diplom-Politologe at the University of the City of Hamburg
- 1979-1981** G3 Defense Policy and Strategy (INF, Net Assessment), Federal Armed Forces Office for Studies and Exercises, Bergisch Gladbach
- 1981-1983** MOD Bonn, Planning Staff of the Minister, desk officer for Strategic Arms Control: INF and SALT/START, White Paper (1982) 1983
- 1984-1989** Deutscher Bundestag, Bonn, Minority Staff Leader Armed Services: Forces, Armaments and Budget Planning
- 1990** NATO Defense College Rome, Senior Course 76, Committee 8
- 1990-1994** NATO-HQ Brussels, Staff of the German Military Representative, NATO Military Committee: Head Department 6 (WEU) and German Rep ARMY BOARD of NATO's Military Agency for Standardization; supervision of all German Army delegations to NATO's operational standardization working parties. Chairman for "Allied Joint Operations Doctrine" (AJP-1) and for "NATO Standardization Doctrine" (NAC-approved), contributions to NATO Command Structure and STANAVFORMED.
- 1993-1994** WEU-HQ Brussels, Member of the Permanent Western European Union Council, German Deputy Military Delegate: leading contributor for NATO-WEU Embargo Operation SHARP GUARD (Adriatic Sea), for the WEU Embargo Operation on the Danube and for the WEU Combined Joint Task Force (CJTF) concept.
- 1994-1998** Head of the German Military Operations Research Division in Ottobrunn near Munich, Amt für Studien und Übungen der Bundeswehr: Concept "armed forces in the information age" (1994), commissioner for all German military simulation and combat

simulation tools, responsible to MOD for the operational staff and industrial studies of the Bundeswehr; international cooperation in combat simulation and NATO – RTO / SAS-Panel.

**since 1999**

retired

**1999-2007**

Academic publications, security policy and defense analyses  
Studies: MOD, NATO-NC3A, EU-Commission industry  
Consultant: industry and politics  
Academic teaching for the ESDP-seminars (2004-2007) at the chair for International Politics of the Universität der Bundeswehr München.



**Prof. Dr Tilcho Ivanov**

Department “National and Regional Security”,  
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**1960-1963**

Military Air Force School, Pleven, Cadet

**1964-1968**

Technical University, Sofia, Student

**1968**

Master's Degree from Technical University, Sofia

**1968-1972**

Bulgarian Civil Aviation, Sofia, Pilot

**1973-1984**

Institute for Civil Aviation, Sofia, Researcher, Senior Researcher

**1973-1974**

Specialization on Operations Research, University of National and World Economy, Sofia

**1978**

Ph.D., Academy of Management, Moscow

**since 1985**

University of National and World Economy – Sofia, Vice Dean,  
Head of Department 'National and Regional Security'

**1992**

Specialization on Defense Resources Management, California,  
Monterey

**1997**

Professor on Economics and Management, University of National  
and World Economy, Sofia

**1998**

Ministry of Defense, Institute for Advanced Defense Study, Sofia,  
Director



**Prof. D.Sc. Stoyan Markov**  
Institute for Parallel Processing  
Bulgarian Academy of Sciences  
Sofia  
Bulgaria

Stoyan Markov is a Professor at the Bulgarian Academy of Sciences, and Doctor of Science awarded for the thesis "High Performance Computer Systems", 1989.

Prof. Stoyan Markov is Head of "Mathematical Methods for Sensor Information Processing" Department.

### **PROFESSIONAL EXPERIENCE**

- 1967-1971** Research and Project Institute of Automation (NIPIA)
- 1971-1972** Deputy Director of the Computer Center, Ministry of Chemistry
- 1975-1976** Deputy Head of Management Department at the Council of Ministers
- 1976-1979** First Deputy Minister of Telecommunication
- 1980-1985** Associate Professor, Central Institute for Computer Research and Design
- 1979-1985** Secretary of State of Electronic Industry
- 1985-1991** Deputy Director of the Centre for Information and Computer Science at the Bulgarian Academy of Sciences
- 1986-1988** First Deputy Prime-Minister and Minister of Research and Technology
- 1988-1990** Chairman of the State Committee of Standardization
- 1990-1991** Guest professor at the Institute of Cybernetics, Kiev, Ukraine
- 1992-1993** Guest professor at the European Laboratory for Particle Physics (CERN), Geneva, Switzerland
- 1993-1994** Consulting scientist of signal processing and image treatment, Salonika, Greece
- 1995-2000** Chairman of CROWN-SAPI Holding AG.
- 2001** Visiting Scientist, CERN, Switzerland
- 01.11.2004** Professor at the Institute for Parallel Processing, Bulgarian Academy of Sciences

### **RESEARCH GRANTS**

- 1982** Awarded the National Scientific Prize Winner in Computer Science





**Iulian Fota**

*Project Co-Director*

Director, National Defense College

Ministry of Defense

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Romania

**Mr. Iulian Fota, MEng, Professor** is the **Director of the National Defense College of Ministry of Defense from Bucharest, Romania, since 2005.**

*Mr. Iulian Fota* has been the *Head of the Defense Section of the Romanian Mission to NATO and WEU at NATO HQ, Brussels, Belgium* between 1998 and 2001. He also has been Parliamentary Expert on Defense and International Relations Issues at the National Peasant Christian Democrat Group in the Chamber of Deputies, Parliament of Romania (1994– 1996); Assistant to the State Secretary for Defense Policy, Ministry of Defense, Romania (1997-1998) and Senior Adviser on the Department for European Integration and Defense Policy from Ministry of Defense, Romania (2002-2005).

*Since 2002* he is also *Associate Professor* at the *Faculty of International Relations, from National School for Political Studies and Public Administration (SNSPA).*

Having a multidisciplinary security related educational background graduating: Civil Engineering Faculty (1990); National Defense College (1993); Faculty of International Relations from National School of Political Studies and Public Administration (1996); College of International and Security Studies on Center for European Security Studies "George C. Marshall" from Garmisch, Germany (1998) and NATO Defense College from Rome, Italy (2005), he is *frequently invited* to participate *as an expert* on *international conferences and seminars* organized by the Atlantic Council Foundation (USA), World Policy Institute (USA), CSIS, Council of Europe, "Europe 2000", Project on Ethnic Relations, NATO Defense College, EU-Institute for Security Studies, Institute for Strategic Studies (China), "HANNES SEIDEL" Foundation (Germany), "George C. Marshall" Center for European Security Studies, etc.

*Mr. Iulian Fota* is member of TEAM EUROPE Romania-group of experts working with the Delegation of European Commission in Bucharest for informing the Romanian public opinion about EU. He was *one of the first representatives* of civil society who organized national and international conferences and workshops on *civil-military relations* and democratic control on armed forces.

*Mr. Iulian Fota* has published many articles for the leading Romanian newspapers (Curentul, Ziua, Romania Libera) on issues like *international relations, national and international security, defense*. He contributed with different studies for books published by Institute for Defense Studies and Military History (Romania), NATO Defense College (Rome), Centre for European Security Studies (Netherlands), Geneva Centre for Democratic Control on Armed Forces (Geneva). He is currently invited by *Romanian TV stations* to comment the most relevant international relations events.



**Dr. Zoran Ivanovski**  
Faculty of Economics,  
European University  
Skopje  
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- 1988** Bachelor Degree, Economy Faculty, University “St. Kiril and Methody”, Skopje
- 1989-2005** Professor at the Military academy “General Mihailo Apostolski”-Skopje, Ministry of Defense Republic of Macedonia
- 1997** Masters Degree, Economy Faculty, University “St. Kiril and Methody”, Skopje
- 2003** Ph.D., Faculty of Philosophy, Institute for defense and peace studies, University “St. Kiril and Methody”, Skopje
- 2005** Faculty of Social Science, Skopje
- 2005** European university – Republic of Macedonia

*Dr. Zoran Ivanovski* is a professor at the Faculty of Economics at the European university – Republic of Macedonia.

At present *Dr. Zoran Ivanovski* is a Chancellor of European University - Republic of Macedonia.

## PROJECT TEAMS

In this sub-section of the Report you can see information about Teams working on the SFP-982063.



**Macedonian Team**

[European University - Skopje](#)



**Bulgarian Teams:**

[University of National and World Economy](#)

[Institute for Parallel Processing](#)



**Romanian Team**

[National Defense College](#)

### *Macedonian Team*

Participants

*First Private University - European University*



Lieutenant Colonel **Elenior Nikolov**, MSc, PhD student

Mr. Elenior Nikolov was born in 1968 in the Republic of Macedonia. He graduated at the Military Technical academy in Zagreb in 1992. Signed postgraduate studies at the Mechanical Engineering faculty in Skopje and during 2000 was committed in M.Sc. of Technical Science with the topic "Investigation of combustion chamber in spark ignition engine from the view of super fast undetonated combustion". Commander of technical platoon in Logistic company and Logistic battalion. Held classes with cadets who were finishing their military education at the Institution for officer education in Skopje. Practice assistant on Internal combustion Engines and Vehicles /1996-2002/ and assistant on Internal combustion Engines and Vehicles and Armour Fight Vehicles at the Military Academy "General Mihailo Apostolsky" in Skopje / since 2001/. Currently he is committed as Ph.D. at the Mechanical Engineering Faculty, University "St. Cyril and Methodius", Skopje.



Professor **Aleksandra Stankovska**, Ph.D. European University – R.M, Skopje.

Ms. Aleksandra Stankovska was born in 1977 in Skopje. She graduated in bachelor degree at the department of Business Economics – Financial Accounting – Banking Management and in masters degree in Financial Management at the Economic Institute at the University “St. Cyril and Methodius”, Skopje. In 2008, she has achieved Ph.D. at the Economic Institute, University “St. Cyril and Methodius”, Skopje. She participate in trading program in banking and finance, organized by " Banking & Finance Center –Skopje" in cooperation with "Bankakademie International Trading and Consultancy Services"–Frankfurt. Also, she participated in trading auditing program: „Auditing - International Auditing Standards". She worked as a financial assistant at the International Rescue Committee – Macedonia /2000 – 2002/, younger assistant for economics subjects and participate in international financial research and portfolio management at the “MM - College” – Skopje. In the course of 2002 -2007, she worked as an assistant on economic subjects : “ International Business Law”, “Financial markets and Institutions”, “Financial Management”, “Securities & Portfolio Management”, “Foreign Exchange Policy” at the “European University” – Skopje. Since 2008, she is working as professor in the field finance (Investment Management, Banking & International Finance) at the “European University” – Skopje.



Major **Mitko Bogdanoski**, MSc, Ph.D.student

Mr. Mitko Bogdanoski was born in 1977 in Struga, Republic of Macedonia. He graduated as an Officer for telecommunication at the Military Academy “General Mihailo Apostolsky” in Skopje in 2000. He finished his postgraduate study at the Faculty for Electrical Engineering and Information Technology - Skopje, Institute of telecommunication, and committed in M.Sc. of Technical Science with the topic “IEEE 802.16e – 3G Interworking”. He finished several specialized courses and exercises in USA, Germany, Spain and Turkey. At the present he is working as an officer in the Ministry of Defense – Army of the Republic of Macedonia. He Held classes with cadets who were finishing their military education at the Institution for officer education in Skopje at the area of communication and electronic warfare. Currently he is working at his Doctoral Dissertation at the project which is entitled “Security Improvement Methods in Wireless Communication Networks” at the Faculty for Electrical Engineering and Information Technology - Skopje, Institute of telecommunication. At present he works as a chief of planning, training and operations in the EW Center in the Army of Republic of Macedonia.



**Major Robertino Contev, MSc**

Mr. Robertino Contev was born in 1971 in Veles, the Republic of Macedonia. He graduated in Electronic warfare at the Military High school, Sarajevo and Belgrade and at the Political Science Faculty of the University “Ss. Cyril and Methodius”, Skopje in 1997. He attended Postgraduate study for Peace and Progress, University “St. Cyril and Methodius”, Skopje /2001-2004/. In 2006 he graduated on Command Staff Academy in Germany. In 2008 he graduated on Postgraduate Study on peace and progress in Skopje. He has 18 years of military service. He took several specialized courses and exercises in Germany, Bulgaria, England and Spain. In the period 2007-2009 he worked in the SEDM-CC and MPFSEE PMSC Secretariat as Chief of PMSC Section. At present he works as a staff officer for Military Cooperation in JHQ Lisbon. During his career he has taken active participant in preparing of NATO documents and analyses – IPP, PARP, MAP, active participation in a few conferences, high level SEDM meeting, MPFSEE PMSC and SEDM – CC meeting, planning conferences and expert meeting as well as in few international projects. Since 2000 he has published more than 10 articles in the newspaper “ODBRANA”.



**Captain Maja Moneva, MSc student**

Ms. Maja Moneva was born in 1977. She graduated at the Faculty of Economy in Skopje in 2001. Finished postgraduate studies on European Study in 2004. She also took several specialized courses. She worked as financial manager at the Financial department of the Ministry of Defense – Special Forces of ARM /2001 – 2003/. At present she is a manager of Informatics system and financial department of the Ministry of Defense – Military Hospital. She is in charge of the budget planning, conducting and controlling of the realization of budget, performing regular financial analysis and reports.



**Elena Stoichkova, BSc, MSc student**

Elena Stoichkova was born on 5 April 1984 in Skopje, Republic of Macedonia. In June 2007 she graduated from the First Private University European University - Republic of Macedonia at the Faculty of Economics at the Department of Bank Management.

In the academic year of 2006/2007 she worked as a demonstrator at the Faculty of Economics for the subject of Securities and Portfolio Management.

In September 2007 she was elected Junior Teaching Assistant for a group of subjects in the field of Finance and Banking.

Subjects: Securities and Portfolio Management, Financial Management, Foreign Exchange Policy and Public Sector Economy.

She is currently enrolled in the postgraduate studies at the Faculty of Economics at the European University – Republic of Macedonia at the department Financial and Tax Management.

Her areas of scientific occupation include: financial instruments, financial analysis, financial organizations, public sector economy.

## ***Bulgarian Team - UNWE***

### Participants

#### ***University of National and World Economy***

#### ***Department of National and Regional Security***



#### **Stephan Hristov, PhD Professor**

Dr. Stefan Hristov is Professor at the University of National and World Economy (UNWE), Sofia, Bulgaria. He has been working in UNWE since 1974 after defending his PhD dissertation in Russia on the problems of forecasting. Stefan Hristov has been teaching strategic management, business management, operations management, project management, strategic marketing, industrial marketing and other subjects to the students in various bachelor's and master's degree programs. During the past few years he is an author of the following books: Strategic Management (2000), Strategic Management for Business (2003, 2006), Business Management (1998), Strategic Marketing for Business (2005), Strategic Marketing (1998, 2002), Strategic Marketing in the Organization (2001), etc. He has published more than 88 scientific articles and participated with 82 scientific papers in national and international conferences. His current scientific areas of interest are the contemporary methods for strategic decision making and the strategies applied in the collective system for security and defense.



#### **Georgy Pavlov, PhD Associate Professor**

Dr. Georgy Pavlov is Associate Professor at the University of National and World Economy, Sofia since 2002. He holds a M.Sc. degree in automatics and Ph.D. degree from The Technical University (TU) of Sofia. Associate-professor of Design & Development Information systems (1988) at the Military Research Development Institute of General Staff of Bulgarian Armed Forces, currently-Defense Advanced Research Institute, "G. S. Rakovski" National Defense College. During the period May 2001 - January 2002 he was Head of "Defense resource management" section in this Institute.

He is lecturing for bachelor and master degree students in UNWE as well as in the New Bulgarian University and National Defense College.

His main areas of interest are design of command and control systems, information systems, modeling and simulations.

In the SfP-982063 he is responsible for activities on research objective 3 – to develop a Network for Scientific Co-operation and Database.



**Tsvetan Tsvetkov, PhD Associate Professor**

Associate Professor Tsvetan Tsvetkov works for Department of National and Regional Security, University of National and World Economy, Sofia since 1992. His main scientific interests are in innovation and investment management, quantitative technique, project management and risk management. Assoc. Prof. Tsvetkov took part in several national and international research projects on defense and security economy and management, innovation management etc. He delivers lectures for bachelor and master degree students in UNWE, as well as in the New Bulgarian University and International Business School – Botevgrad.

In the SfP-982063 he is responsible for activities on research objective 1 – to develop a NATO integrated R&D Concept and Model (R&DCM).



**Dimitar Dimitrov, PhD Associate Professor**

Dr. Dimitar Dimitrov is Associate Professor at the University of National and World Economy (UNWE), Sofia, Bulgaria, currently Director of Department 'National and Regional Security' (since 2007). He has been working at UNWE since 1988. His main scientific interests are in security and defense economics, defense industry restructuring, civil-military relations, defense economic analysis, defense and security policy. He coordinates Objective 2 of the Project.

Dr. Dimitrov took part in several national and international research projects on defense and security economics and management in cooperation with SIPRI, Sweden, BICC, Bonn, Germany and CESS, Groningen, The Netherlands, University of Cairo, Egypt, EU COST A25 Action, etc. He is awarded with Ford Foundation Research Fellowship (2000- BICC,Bonn) and Volkswagen Foundation Research Fellowship (1997 – CESS, Groningen). He is teaching bachelor and master degree courses at UNWE as well as at the New Bulgarian University - Sofia.



**Georgy Penchev, Assistant Professor**

Mr. Georgi Penchev is Assistant Professor since April 2005. He is working in DNRS since 2002 when he started his Ph.D. thesis on Defense Armament Acquisition System. His main areas of interest are defense procurement and acquisition, economics of public sector, management of defense, public tenders, innovations and investments, business process management. His responsibilities are related to Objective 3, as well as, to administrative support, hardware/software procurement and maintenance. He is also maintainer and Super Administrator to the Site, Gropware and Mailing List.





**Konstantin Poudin**, Assistant Professor

Assist. Prof. Konstantin Poudin is a Ph.D. student at the Department “National and Regional Security”- UNWE. His thesis is dedicated to the social and economic aspects of the process of professionalization of the Bulgarian Armed Forces. Konstantin Poudin’s scientific interests are in the field of HR management in defense and security, management of defense and security, security policy . He is one of the young researchers working on Objective 1 and Objective 2. He took part in the elaboration of Defense R&D Management Concept and Model. He studied the Italian experience and the Bulgarian practice. At present, Konstantin Poudin is working on elaboration of Defense and Security R&D management policy framework.

***Institute for Parallel Processing:***



**Violeta Bogdanova**

Violeta Bogdanova is a Senior Researcher at the Bulgarian Academy of Sciences - Institute for Parallel Processing, Sofia, Bulgaria.

University Degree: Engineer of Automation, High Chemistry and Technology Institute, Sofia, Bulgaria, 1976.

Researcher in Radar Signal and Data Processing at the Institute of Special Electronics, Radar Department, Sofia, Bulgaria, 1989.

Senior Researcher in Radar Signal and Data Processing at the Institute for Parallel Processing, Bulgarian Academy of Sciences, Sofia, Bulgaria.

Her professional experience and research interests are:

Mathematical models and software for different types of air-Defense & marine radar simulators; Multiple sensor data fusion algorithms and software for an air traffic control system; Probability Multi-Hypothesis Tracking algorithm and Expectation maximization method; Image processing.

She is a member of Bulgarian Automatic and Control Systems Society.



**Milen Nikolov**

Milen Nikolov was born in 1977. He received the Master of Sciences (M.Sc.) degree from the Technical University of Sofia, Exploiting of Avionics, 2001.

He is a PhD student at the Bulgarian Academy of Sciences – Institute for Parallel Processing.

His scientific areas of interest are Ultrasound Imaging, Signal Processing, Image Processing.

## ***Romanian Team***

### Participants

#### ***National Defense College***



*Associate Professor **Elena Lacatus, Ph.D., NSE MSc***

Dr. Elena Lacatus is Associate Professor at POLITEHNICA University of Bucharest (UPB), Romania. She has been working on Special and Emerging Technologies since 1985 firstly, in Automotive and Aeronautical Industry and afterward in micro and nanotechnologies special applications. Dr. Elena Lacatus is a permanent collaborator of the National Defense College on Security through Technology and Emerging Technologies Security Challenges related issues. During the past eighteen years she taught students from Politehnica University of Bucharest on Special Forming Technologies, Thin Layers and Nanostructured Materials, Management of Technological Systems' Maintenance, etc. She has published more than 64 scientific papers on international conferences proceedings, some of them under NATO and UNESCO patronage. Presently, she is a permanent consultant on emerging technologies for security and defense systems.



*First Lieutenant **Liviu-Cristian Matache***

First Lieutenant Liviu-Cristian Matache graduated in Engineering in Ammunitions, Missiles, Propellants and Explosives at the Military Technical Academy in Bucharest in 2002. Master of Systems Engineering Degree in Ammunitions and Explosives at the Military Technical Academy in Bucharest in 2004. At present he is a PhD student in Mechanical Engineering at the Military Technical Academy in Bucharest. He works as a scientific researcher to Test, Evaluation and Scientific Research Weapons Systems at the Centre of Military Equipment and Technologies Research Agency ([www.acttm.ro](http://www.acttm.ro)), Ministry of Defense, Romania.



*First Lieutenant **Marius Marmureanu***

First Lieutenant Marius Marmureanu graduated in Engineering in Ammunitions, Missiles, Propellants and Explosives at the Military Technical Academy in Bucharest in 2002. Master of Systems Engineering Degree in Ammunitions and Explosives at the Military Technical Academy in Bucharest in 2004. At present he is a PhD student in Aerospace Engineering at the Military Technical Academy in Bucharest. He works as a scientific researcher to Test, Evaluation and Scientific Research Weapons Systems at the Centre of Military Equipment and Technologies Research Agency ([www.acttm.ro](http://www.acttm.ro)), Ministry of Defense, Romania.

# **PART II: PROJECT PROCEEDINGS OF RESEARCH REPORTS AND PRESENTATIONS BY MACEDONIAN TEAM**

## **THE MACEDONIAN DEFENSE MARKET AND TRANSFORMATION**

**Elenior Nikolov MSc<sup>1</sup>, Mitko Bogdanovski MSc<sup>2</sup>, Robertino Chontev MSc<sup>3</sup>, Zoran Ivanovski PhD<sup>4</sup>**

### **SUMMARY**

Macedonia's accession to the North Atlantic Treaty Organization (NATO) requires restructuring as well as modernization of the Macedonian Armed Forces in compliance with the NATO standards. Along with the outlined plan for the modernization of the Armed Forces within a timeframe that spans from 2004-2013 there is also a separate Strategic Defense Review (SDR). Its main task is to perform a thorough reassessment of the state of the armed forces and to outline the guidelines for their long-term development in conformity with the new security environment and the available defense resources.

The upgrading of the communication/information systems will be one of the main focuses of the campaign, as well as strengthening the operative capabilities of the deployable forces. The modernization of the armament/equipment of the Army, and Aviation WNG. Development of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance Systems (C4ISR) is another priority.

For the sake of development of the structure and capabilities, defense assumptions should be adopted most urgently, which relate to operational capability, readiness, scale of effort and concurrency for operations. The development of the structure of forces and capabilities should be in accordance with the requirements and structure of forces and capabilities established in this political framework, especially the priorities, missions of defense and tasks of Macedonian army. This process is to include planning for the capabilities and training of the reserve component of the Macedonian army and the civilian defense.

By the end of 2004, strategies is adopted for the management of defense at all levels of decision making, as well as in the areas that relate to personnel (including also education of civilian experts), its professionalization, qualifications, career with equal opportunities for all, as well as adequate ethnic representation in the Macedonian army, training and education, including the civilian personnel in the ministry of defense, interoperability, modernization and procurement, logistics, standardization, as well as development of

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<sup>1</sup> Military academy "General Mihailo Apostolski" - Skopje

<sup>2</sup> Macedonian Army, Land Forces

<sup>3</sup> Ministry of Defense, Department of planning and bilateral cooperation

<sup>4</sup> European University, Faculty of Economy - Skopje

strategies for improvement and interoperability of the intelligence capabilities and crisis management.

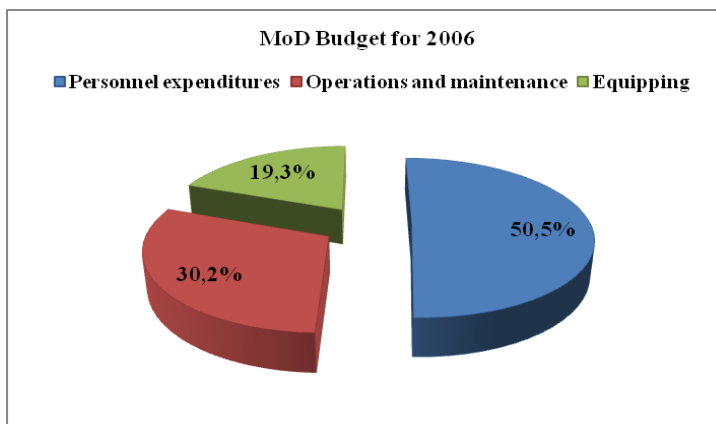
Besides these, in the remaining parts of the Strategy there is guidance and positions concerning certain specific areas.

Revision, changes and supplements to the Strategic Defense Review in procedure, manner, and activity as it is done now are and should be carried out every year. The changes and amendments are submitted for adoption to the Parliament of the Republic of Macedonia.

Both American and European major defense industry companies are already on the list of strategic partners of the Macedonian Ministry of Defense (MoD). Other positive developments determining their successful performance on the Macedonian market are the availability of qualified specialist to support their operations and the lack of restrictions, tariff/ non-tariff barriers in importing defense industry commodities and dual use commodities in the country.

## MARKET HIGHLIGHTS AND BEST PROSPECTS

For the execution of the armament and equipment modernization strategy, the Macedonian government plans a steady defense budget within **2.1-2.4%** of the national GDP to be disbursed by 2007. The allocation of resources, and thus the planning of the structure of forces and capabilities should be conducted in such a manner that by 2007 the expenses relating to personnel, including food, clothing and similar expenses for maintenance of equipment and infrastructure should be brought down to between 65-70% of the available budget. Of this the total expenses for personnel should be around 50% of the available budget. For training and exercises, readiness, operations and operational capabilities, equipment and modernization, quality of life, research and development of equipment and infrastructure and provision of realization of the competencies of the ministry of defense the allocation should be 30-35% of the available budget and up to 1.5% for science and research.



At the latest by the end of this year, the assessment of the tasks of the ARM, the structure of forces and equipment and the desired capabilities should be completed. At the latest by 2004 all the activities for full implementation of the system for multi-year planning, programming and budgeting and planning for forces, funds and capabilities on a 5 and 10 year basis are completed. This should develop capacities for analysis and prioritization according to the circumstances and the environment of RM. According to this plans

should be produced and implemented for procurement (by establishing standards for thorough analysis of expenses in relation to the benefits-achievements and the alternatives), equipment, personnel, interoperability, structure and capabilities, maintenance (whole life cycle), ability to regenerate forces and levels of training. In 2004 financial means started to be directed towards future forces and capabilities according to the new plans. Financing is planned on all activities related to those areas of activities, infrastructure, equipment and weapons, which according to the current and future plans are to be removed from the defense and the Macedonian army;

With the signing of the protocols in the future (we hoping during 2008) for Macedonia's accession to NATO, the issue of armament and equipment modernization and compliance with the NATO standards becomes increasingly important. A detailed plan, covering the period 2004 - 2013, was developed to achieve the main priorities of the modernization of the Armed Forces of Republic of Macedonia. An assessment of the defense industry capabilities and a joint Macedonian-American Force Modernization Study were completed in the course of the preparation of the plan.

These two studies outlined the interconnection among the national strategy, the national security concept, and the military doctrine. They served as a backbone for determining the required operational capabilities (ROC). The ROC's determine the concept vision of the capabilities that a type of service or unit should possess in order to fulfill the assigned military tasks resulting from the mission and goals of the unit per the National Military Strategy. The main ROC's are defined as follows:

- ✚ ROC .1: The creation of fully equipped, highly mobile, combat ready, sustainable, NATO interoperable units and formations for rapid deployment in multinational peace support operations.
- ✚ ROC .3: The creation of fully equipped, interoperable sustainable forces to assist civil authorities during natural or man-made disasters and to conduct humanitarian operations and actions for prevention and neutralization of terrorist threats.
- ✚ ROC.4: The creation of fully equipped, interoperable, sustainable combat ready Forces capable of executing the spectrum of national missions and tasks in peacetime and international conflict to include war.

The main projects are divided into three time periods and four main goals according to the requirements for the completion of the operational needs of the Armed Forces.

The time periods are as follows:

- ✚ Current period: 2007
- ✚ Mid-term period: 2004-2007
- ✚ Long-term period: 2008 –2013

The above-mentioned time frame and terms of references are undergoing a Strategic Defense Review (SDR). An updated program will be announced shortly after the completion of the SDR in 2004. The preparation of the SDR was called for by the need for thorough reassessment of the defense and armed forces state. The SDR sets the guidelines for their long-term development in conformity with the new security environment and the available defense resources.

Main goals (spread throughout the current timeframe):

- ✚ Modernization of the Land Force.
- ✚ Modernization of the Aviation WING
- ✚ Modernization of the logistic system.

- ✚ Development of command, control, communications, computers, intelligence, surveillance and reconnaissance systems.

### **Modernization of the Land Forces (LF)**

The main focus of the Land Forces modernization process is the modernization of the Deployable Forces. The Deployable Forces include Peacekeeping Forces under the auspices of NATO. The key responsibility of the Deployable Forces is to react immediately and provide the Macedonian national contribution to the Multinational Peacekeeping forces for Southeast Europe (MPFSEE).

Three categories of modernization are emphasized within the framework of these formations:

- ✚ Reorganization of headquarters on all levels.
- ✚ Upgrade of technology: This includes mainly communication and information systems for command and control FICIS (Filed Integrated Communications Information System).
- ✚ Education: The education of these formations will be based on Western staff procedures and skills. Priorities include deciphering NATO maps and radio/telephone procedures, understanding the basic objectives of the NATO supported mission, and acquiring of English fluency.

### **Modernization of the Aviation WING**

The main priority for the Air Force modernization is the heightening of the operative capabilities. The goal is to achieve operative compatibility with NATO. This includes:

- ✚ Modernization of the deployable forces intended to participate in the joint operations under the auspice of NATO. The deployable forces consist of 1 aviation WING (Mi-17s, Mi8s, UH-40 and Mi-24s).
- ✚ Modernization of the Mi-17s, and Mi-24s
- ✚ Modernization of the communication/information systems and navigation systems at airports (ASOC – Air Surveillance Operational Center).

### **Development of the Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance Systems (C4ISR)**

- ✚ Development of policy and strategy towards building C4I systems.
- ✚ Development of information systems for security types in the MoD and Macedonian Army (MA).
- ✚ Development of information systems for the MoD, General Staff, and Aviation wing's administrations as well as for the archive modernization.
- ✚ Development of an automated information system for the Macedonian Army (MA).
- ✚ Development of the automated system for human resource management.
- ✚ Development of an information system "Logistics".
- ✚ Development of an information system for planning, programming and budgeting.
- ✚ Development of internet information sites for the MA.

## **Modernization of the Logistic System**

The main priority for the modernization of the Logistic System is to achieve the NATO standards of conserving and supplying POL on the basis of single fuel at location of warfare.

## **COMPETITIVE ANALYSIS**

### **Bodies and their functions in the MoD/General Staff that are managing R&D/innovation process**

Bodies in the MoD/General Staff which are managing R&D/innovation process are The Military academy and Section for R&D of the production of weapons and military equipment in the frame of the Sector for Logistic in the MoD.

#### ***The Military academy “General Mihailo Apostolski”***

##### ***- Status***

The Military Academy of the Republic of Macedonia was established by Law which is in accordance with the Law on Higher Education and The Law on Research Work in the Republic of Macedonia. The Military Academy was verified by the Ministry of Education and Science as tertiary level educational and research institution, which gives it the same status as other faculties and makes it part of the educational system of the Republic of Macedonia. The degrees issued by the Military Academy are valid in the country and they give officers an equal education status as other graduates from civilian universities.

##### ***- Mission***

The Military Academy is the only tertiary-level military educational institution in the Republic of Macedonia. Its main task is to educate, train and provide further development for officer personnel for ARM, and to engage them in research in the field of defense in accordance with the law.

##### ***- The scientific and research work***

The scientific and research work at the Military Academy is organized and carried out within the scientific - educational disciplines that are taught at the Academy in accordance with the annual and long-term scientific research programs.

The scientific and research work is essential for the improvement of education and teachers' professional development.

The teaching staff of the Academy, the associates and a certain number of cadets who are particularly talented and motivated in their fields participate in scientific research projects.

The Military Academy is engaged in research projects for its own needs, for the needs of the Ministry of Defense, the General Staff of the Army and others. The scientific and research work is carried out in the following fields: military history, military strategy and tactics, military geography and topography; logistics; ballistics; computer science, operational research and other technical and military fields. Master's and Doctoral theses written by the teaching staff and associate staff are also considered as research projects of the Academy.

#### ***Section for R&D of the production of weapons and military equipment in the frame of the Sector for Logistic in the MoD.***

Its function is: informative support to the leading authorities in the MoD in the creating of the policy for equipping of the MoD by weapon and military equipment from the domestic industrial resources, cooperation with the Sector for Special Production in the Ministry of

Economy by overseeing the situation of the domestic industrial capacities and preparation of the relevant legal documents, preparing the regular analyses for technical – technological capacities and regular analyses for the personal management capacities of the production subjects that are dealing with R&D of the production of weapons and military equipment

*SDR 2 Phase, 2004.* The R&D issue is only generally considered within the 5<sup>th</sup> part of the SDR - Equipment and Modernization Plan.

### **Domestic Production and Privatization**

In order to implement the ambitious reform objectives, the Ministry of defense has introduced a modern defense planning and management system that will ensure continuous force development and efficiency in the use of the taxpayer's money. In that direction, the high priority has been and will be the continuing of the implementation and improvement of a multi-year planning, programming, budgeting and execution system, providing appropriate development of strategy and forces with optimal use of the budget.

According to the Production and Turnover of Armament and Military Equipment Law (published on 15 July, 2002), articles 9 and 10, D & R of new armament and military equipment technologies is committed under the base of a D & R program which is adopted by the Government of the R Macedonia on the proposal by the Ministry of Economy in cooperation with the Ministries of Defense and Interior. The D & R of the new armament and military equipment can be committed by public science institutions, enterprises producing armament and military equipment and other science institutions that are dealing with science – research activities, in accordance to the existing laws. The program is financed from the budget of the R of Macedonia. The Ministry of Defense doesn't possess science – research and producing capacities. Therefore the Ministry of Defense for its own needs is contracting products and services with the factories that are part of the Economy system, eligible and verified for this purpose. Within the Ministry of Economy exists a Sector for Special Production that is the pillar body for coordination of R & D activities. In the budget of MoD/Sector for Logistic – Section for R & D of the weapons and military equipment is planned an amount of 50 000 Euros per year for R & D. The R & D issue is only generally considered within the 5<sup>th</sup> part of the SDR – Equipment and Modernization Plan.

The Republic of Macedonia is not “giant” manufacturer of armament and military equipment and therefore the Republic of Macedonia is not a big exporter of defense technologies. There are only two factories producing some military equipment and armament (“Suvenir” – producing munitions and repair of small weapons and “Eurocomposit”- producing equipment for personal protection as helmets and bulletproof personal equipment) and one factory for repairing and maintenance of the military equipment and armament factory - “MZT Specijalni vozila” (factory that repairs the artillery armament and light combat vehicles). At the beginning of 2005 the factory “Suvenir” was bought by “Olympicos Industry”. The restarting of the production is expected followed by extending of the small ammunition production program- appropriate to NATO standards. In the next period the factory “Eurocomposit” should be sold and its privatization is to be expected in the near future. According the factual situation there is no strict and designed concept for defense industry transformation.

According to the SDR (April 2004) the Macedonian defense industry will maintain expertise in the following production areas:



- ✚ Ammunitions and parts for light armaments (pistols, light machine guns, submachine guns, howitzer), towed and anti-armored systems, modifications on armored vehicles, and military electronic equipment.
- ✚ Dual use articles and commodities such as radio equipment, communication systems, radars, optic mechanical and optic electronic devices.
- ✚ Military apparel, protection devices, tents, gas masks, etc.
- ✚ Defense products' overhaul, maintenance devices, and spare parts.

The involvement of the domestic industry will be encouraged wherever there is an economic rationale for that. Equipping from external sources needs to be connected to the compensation requirement (offset programs) wherever there is an economic rationale and legal possibility.

The modernization and procurement of new equipment is one of the most important thing for the new capabilities and capacities of the Macedonian army. The equipment must fit the desired capabilities and capacities of the Macedonian army, to be NATO compatible and to provide for unification and standardization and to be procured transparently and in accordance with the budget projections given in this Strategy.

The equipment plans should be based exclusively on our budget funds. Should the allies and the partners help us speedier achievement of the desired level of equipment will be possible. The equipment should be carried out in accordance with the priorities and dynamics, which provide primarily equipment of the declared units by 2007, then the Special Forces unit and the remaining of the Macedonian army for which the equipment process will last until 2013. In this, it is very important to stop immediately the funding of the equipment which is rear marked for disposal.

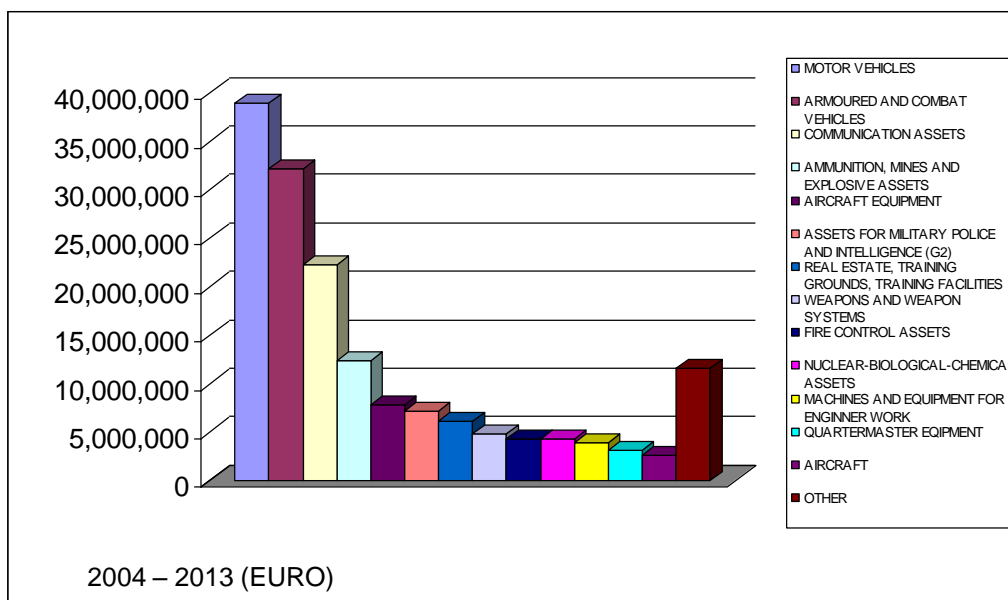
*Defense Acquisition System Policy, December 2005.* The implementation of the Policy implementation will be regulated with Acquisition Rulebook and Instructions for certain functional areas in acquisition. This policy formulates vision for the method of ensuring the materiel needs in defense, defines the basic principles and guidelines in the area of equipping and procurement of material and services, establishes basis for definition of procedures and methodologies for Defense Acquisition System (DAS) of the Ministry of Defense (MoD), provides latitude for inclusion of the domestic economy in the acquisition process thus assuring more stable support to the equipment and technology transfer in the future and promotes cooperation with allied countries and organizations in the field of cooperative logistics.

- Regulation (instruction manual) for acquisition of the materials (equipment – armament and military equipment, material – munitions, spare parts and small inventory) for the needs of the defense system of Republic of Macedonia, 2006. This document formulates the multidisciplinary system of measures, postulates and procedures that are to be planed and performed by the responsible subjects and bodies in the MoD within the process of the defense system material acquirement.

The detailed and individual plans and programs which refer to equipment with all details contained in the elaborated documents of the second stage of the SDR, are adopted by the end of 2004 by the President of the Republic of Macedonia in the capacity of Supreme Commander, and the Minister of Defense.

The total survey of equipment procurement is defined, which is the result of the detailed document of the second stage of the SDR by categories of equipment and values expressed in Euros, as follows.

### Equipment that is to be procured for ARM purposes in the period 2004-2013



The privatization process of the defense sector is being conducted by the Macedonian Privatization Agency in association with the Ministry of Economy and the Ministry of Defense. Working groups of experts are assigned to each specific privatization project. Some of the main companies from the defense sector that are being prepared for privatization at this point of time are: “Samokov”-Makedonski Brod and “Eurokompozit”-Prilep.

### Third Country Imports

The MoD will use an integrated management structure in the Defense Acquisition System characterized by clearly defined roles and responsibilities, lines of responsibility, authority and accountability. The Republic of Macedonia will be the immediate responsible decision maker for the acquisition process. The MoD will provide a highly skilled personnel in management, technical and business disciplines. To ensure this the MoD will establish education, training, and experience standards for each acquisition position based on the level of complexity of duties carried out in that position.

The MoD has cooperation with the global defense electronics company ELBIT systems from Israel. Is purchased equipment for night vision for helicopters and is negotiating for other similar equipment for Aviation WING, ASOC, UAV (Unmanned Air Vehicles). There is possibility for investment in Macedonia by this company.

The major European defense industry companies (such as Asalsan - Turkey, Crypto age – Switzerland, EADS, Siemens) are active on the Macedonian market. Together with the major US defense industry companies they are included in the list of strategic partners of the Ministry of Defense.

## **U.S. Market Position and Share**

U.S. defense firms such as Johnson Controls, Lockheed Martin, Raytheon, General Dynamics, Avaya, Motorola and Harris are well presented on the Macedonian market. Some of them have signed framework memorandums with the Macedonian Ministry of Defense for cooperation, exchange of information, establishment of working groups, strategic partnering arrangements, etc.

Furthermore, American IT firms such as Lucent Technologies, Cisco Systems, Oracle, IBM, Hewlett Packard, and Dell are playing active roles in lobbying for U.S. defense sector firms.

## **MARKET ACCESS**

The Macedonian Public Procurement Act contains a clause that enables the Government of Macedonia to bypass the normal public tender process for major acquisitions deemed to be of a critical and strategic nature. Essentially is enabled the Ministry of Defense to select a preferred vendor and to negotiate with them directly.

### **Import Climate**

There are no restrictions, tariff, and non-tariff barriers on importing defense industry commodities. The defense industry commodities are subject to duty free import regime regardless of the country of origin. Their trade is stimulated by the Law on the Control of Foreign Trade Activity in Arms and Dual-Use Commodities and Technologies.

One exception is applied to exports of dual use commodities from Macedonia. These commodities and the export firms are subject to licensing by the Ministry of Economy through the interagency state commission consisting of representatives of the Ministry of Economy, Ministry of Defense, Ministry of Interior, and Ministry of Foreign Affairs.

With the introduction and progress of the offset operations concerning the defense industry cooperation it is expected that the Macedonian government may consider introduction of other import benefits. These benefits include:

- ✚ Exemption from VAT for investment equipment, weapons, and special products that are imported by foreign investors, importers, and local partners. A value added tax (VAT) of 18 % is currently assessed at the time of customs clearance on all imports of defense sector products and commodities.
- ✚ Application of relieves in the regulation for the classified information in order to relief the investments in the defense industry.

### **Distribution/Business Practices**

The suppliers of defense sector and dual use equipment should consider the long-term development of the defense market in Macedonia and armed forces restructuring reform process in general. Practice has shown that successful distribution of defense sector equipment in Macedonia is done through a representative agent or distributor, preferably someone with extensive experience, good knowledge of the market/ defense sector, and contacts within the Ministry of Defense. Another prerequisite is good understanding of the licensing procedures as far as dual use commodities are concerned.

A positive booster for the defense sector market development in Macedonia is the available human resources. There are many young military specialists who are familiar with the latest high-tech developments. Also, there are laid off military officers undergoing prequalification programs as part of the overall armed forces modernization program.

## Financing

The financial sources for modernization of the armed forces will be allocated from:

- ✚ The Ministry of Defense budget
- ✚ The National budget
- ✚ Financial resources from international cooperation programs such as Partnership for Peace Trust Fund – CNAD (Conference of National Armaments Directors), NAMSA (NATO Maintenance and Supply Agency), RTO (Research and Technology Organization, NATO Science Committee, EU-WEAG (Western European Armaments Group), other regional organizations (OCCAR, LOI, etc.), bilateral cooperation, and regional cooperation in South Eastern Europe.

Indirect subsidy through implementation of energy-saving heating sources – installation of gas-transfer lines to reduce the current expenditures for electric power, fuel, and coal.

Sale of excess military infrastructure and partial allocation of the funds for infrastructure modernization.

## USEFUL WESITES

Ministry of Defense: [www.morm.gov.mk](http://www.morm.gov.mk)

Ministry of Economy: [www.economy.gov.mk](http://www.economy.gov.mk)

Macedonian Government: [www.vlada.mk](http://www.vlada.mk) ; [www.investinmacedonia.com](http://www.investinmacedonia.com)

11 Oktomvri-Eurokompozit: [www.eurokompozit.com.mk](http://www.eurokompozit.com.mk)

Brako Veles: [www.brako.com.mk](http://www.brako.com.mk)

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# DEVELOPMENT OF A MACEDONIAN LOGISTICS SERVICES FIRM

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## ABSTRACT

*There is a distinct need for the inclusion of the topic of “Logistics” into ongoing initiatives of the Government of the Republic of Macedonia in order to faster the economic development of the country and at the same time to stay on the track to the EU and NATO.*

*Logistics and its role as an enabler, revenue generator, as well as an inhibitor, play a key and critical role in commerce and government. Its insertion into the investment environment will provide critical connectivity between several major components of government and industry that are associated with manufacturing, regulation, trade, and distribution, to name a few areas. In the global economy customer-oriented business environment, superior supply chain performance is a prerequisite to becoming and staying competitive.*

*Key words: supply chain management, logistics, education, contractors, support, public-private partnership, efficiency*

## INTRODUCTION

In its abstract sense, the word “logistics”, like the other abstraction “strategy”, “tactics”, “economics”, and “politics” is not susceptible to a single, simple and permanent definition. Since World War II the term logistics has frequently been used to apply to civilian activities. However, we can find great number of different definitions and realized evolution that lead towards military dimensions of logistics.

Logistics is defined as process of planning for and providing goods and services. Under the term international logistics we understand the process of planning for and providing goods, facilities and services for the support of the military forces and civilian economies at the international level. National logistics is the process of planning for and providing goods and services for the support of a nation’s military forces and its operations, a nation’s civilian economy and its international obligations and requirements. Civilian logistics is the process of planning for and providing goods and services for the support of the civilian economy. Military logistics has to perform the same as civilian, but for the support of the military forces.

The Republic of Macedonia has developed and adopted Logistic Concept<sup>5</sup> that recognized public – private partnership as an essential component of security and defense policy.<sup>6</sup> It

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<sup>5</sup> The National Concept for Logistics Support of the Defense and the Army of the Republic of Macedonia

<sup>6</sup> That document defines the directions of the transformation of the logistic system, and provides opportunity part of the logistics functions to be executed by specialized private companies. This decision is wholly compatible with the decision of the government and its activities for implementation of the reforms of the public administration, for defining and devastation of

enables significant share of operational and investment costs of government expenditures for security and defense could be provided by implementation of public-private partnership. There is no doubt that it also gives opportunity for faster development of the economy in the country especially by using best practices from the business sector in the sphere of security and defense and vice-versa.

Both sectors- Army and bussines sector have benefits of implementation of contracting logistics. There should be no doubt that implementation of contracting logistics means reductions of the fixed and variable expenditures in the ARM<sup>7</sup> and can help in decreasing the number of personnel and creation of wholly operational system, where logistic system as well as aquision can functione properly. In fact, it will enable implementation and use of best bussines practices in MoD and ARM.

On the other side, implementation of the system of contracting logistics will generate also great benefits for the business sectors, which will be able to perform their immanent characteristics and efficiently realize principles of contemporary management and financing. Logistics system of the Army is well developed, logisticians are well educated and skilled workers, which can be, guarantee for their influence on business circles and processes.

This is the main idea in the effort of developing Macedonian Logistics Service Firm, which could perform many different but compatible tasks as logistics support of the Army, support of business sector, consultancy, education and training of logistics personnel for the business community etc.

It is yet to be fully realized, within these communities, that Logistics and its role as an enabler, revenue generator, as well as an inhibitor, plays a key and critical role in commerce and government. Its insertion into the enabling environment mix will provide critical connectivity between several major components of government and industry that are associated with manufacturing, regulation, trade, and distribution, to name a few areas. In the global economy customer-oriented business environment, superior supply chain performance is a prerequisite to becoming and staying competitive.

To put logistics into perspective, at the macro-level annual global logistics expenditures exceed \$3.5 trillion USD, nearly 20% of the world's GDP, making logistics one of the last frontiers for major corporations to significantly increase shareholder and customer value. In the US, total logistics activities make up 15-20 percent of finished product costs. Moreover, at the heart of every effort to improve organizational logistics performance is *supply chain efficiency*.

At times there is confusion surrounding the terms logistics and supply chain management (SCM)<sup>8</sup>. However, it can be explained that the supply chain is the network of facilities (warehouses, factories, terminals, ports, stores, and homes), vehicles (trucks, trains, planes, and ocean vessels), and logistics information systems (LIS) that are connected by an enterprise's supplier's suppliers and its customer's customers.

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functions which are not core logistics functions in MoD and ARM, as well as directions and activities determined in Annual National Program of the Republic of Macedonia for NATO membership, Strategic Defense Review and the measures that has to be executed for reduction and transformation of the civilian and military personnel in MoD and ARM.

<sup>7</sup> ARM – Army of the Republic of Macedonia

<sup>8</sup> Supply Chain Strategy, Edward Frazelle, 2002, Chapter 1.

Logistics is what happens within the supply chain. Logistics activities (customer response, inventory management, supply, transportation, and warehousing) connect and activate the objects in the supply chain. Each one of the things listed in this explanation make up Logistics and by their size provides some insight as to the impact of Logistics on the economy of Macedonia and the region.

The challenge for Macedonia, Logistics, is to develop capacities (companies and government agencies) in order to improve the performance of the organizations they support which can lead in final term of impede progress in the whole country. Strengthening that kind of institutions will also help the country to receive also grants and loans, including government ministries and executing agencies as well as nongovernmental organizations. It is a key to improving the efficiency and effectiveness of development assistance.<sup>9</sup>

That is why it is critical at this point in Macedonia's reform process to ensure that Logistics is, first included in the enabling environment mix, and secondly it is brought into the mix in a pragmatic, systematic way that addresses its multiple components.

Consequently, in any effort to diagnose and improve the performance of an organization, in this case Logistics, it requires an understanding of the forces outside the organization that can facilitate or inhibit that performance. Enabling environments support effective and efficient organizations and individuals, and creating such environments is becoming an increasingly important aspect of development assistance.<sup>10</sup>

The enabling environment is made up of the administrative, technological, political, economic, socio-cultural, and stakeholder factors. More specific, the enabling environment is a set of conditions, often inter-related, that impact on the capacity of citizens and civil society organizations to engage in development processes in a sustained and effective manner, whether at the policy, program or project level. They include legal, regulatory and policy frameworks, as well as the previously mentioned political, socio-cultural and economic factors. All of these conditions and factors are to be addressed and, put into the context necessary for Logistics to be acknowledged and inserted into an enabling environment initiative.

## **BUSINESS CONCEPT**

Macedonian Logistics Service Firm stated goal has to be to contribute to wealth creation and sound and sustainable development of society. Its objective is to generate new knowledge and solutions for their customers, based on research and development in technology, the natural sciences, medicine and the social sciences.

However, the basic task of each company is profit maximization but it must be realized through its effort to optimize its support efforts in Macedonia, in the area of Logistics. Final goal for the company is to become a reputable service provider that can make interpret the requirements, engage and understand the enabling environment conditions and factors, and know how to develop and implement Logistics for profitability and sustainment, as well as support economic development of the country.

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<sup>9</sup> *Organizational Assessment, A Framework for Improving Performance*, Charles Lusthaus, Marie-Hélène Adrien, 2002, Chapter 2.

<sup>10</sup> "Enabling Environment for Civic Action", World Bank Group, 2003

Macedonian Logistics Services (MLS) provider is to be a private company working in collaboration and in association with an established regional logistics services provider, which offers a full range of business logistics services. It will have a direct connection to the Macedonian Transport Association, Macedonian University System, Regional Transport and Logistics Associations, as well as Macedonian and Regional Manufacturers. The MLS will provide a range of Logistics services. In the area of Logistics Consultancy services will include strategic planning, project assessment, development, and management, individual process design and modeling, and implementation. The area of Education and Training will include collaboration with the Macedonian and Regional education foundation that provides Supply Chain Management curriculum and instruction and professional development, and will seek to install standards and certification. The area of Technology Insertion includes the Radio Frequency Identification, automated logistics systems that provide asset visibility and accountability, and automated warehouse and distribution system. In the area of National and Regional Integration the MLS Company will seek to bring together all those associated with Logistics at the national and regional levels to raise the awareness and gain the support needed to make Logistics effective and efficient.

At this time, there are several key areas that can be exploited immediately in Macedonia reference Logistics. They are, the banking sector's needs for cash management, the health sector's need for medical logistics, the government's need to integrate the national procurement system, the need for the development of a national distribution hub, the need for improved production logistics, the need for automated inventory control for asset visibility and accountability, and the need for SCM curriculum development and instruction within the functional areas.

The basic idea is that Macedonian logistics services firm offers a range of services to the commercial, government, and educational sectors. It has to be capable to offer support to the Army as well as to the business sector. However, in order to be efficient it is necessary to connect the education base with the commercial and government sectors that can provide education and training, consultancy, and IT insertion.

It means necessity of developing training and education on SCM, Transportation Logistics as well as importance of bringing commercial logistics through the various facets of SCM into the bilateral enabling environment mix.

The crucial problem in development of that business idea will be challenges with the change of mentality of the people who cannot get rid of communist legacy.

There are also other reasons that can jeopardize realization of that idea and make that company profitable (government/laws, change mindset, business environment).

How to make this idea operational? Government has to entertain working with a "developing" logistics services consultancy providing its "credibility and financial backing" through working arrangements. However, the best way is to make Government shareholder in that company with maximum 49% of equity capital. Government investments can be in fixed assets (buildings like warehouses, restaurants, laundry services, gas station, maintenance capacities, but also in vehicles, computers etc).

In order to make significant progress in human resources management, this MSC has to find partner (universities in the country) to work SCM and educate efficient personnel for the business sector. There is no doubt that to successfully compete in today's fast-paced business world, supervisors and managers trained in supply chain management are essential. They lead the teams responsible for the flow of goods and services throughout our global economy. These leaders must effectively and efficiently manage the activities



of warehousing & logistics, sales and marketing, control and governance of their products and services to their customers.

The Syllabus of that educational program has to provide a framework that allows participants to integrate and apply proven supply chain management strategies within their scope of responsibility, by examining managerial behavior, organizational strategies, incentive alignment, legal considerations, operational execution and other management topics. The Logistics and Supply Chain Management, together, integrate all the activities involved in the procurement, storage, movement of goods, and payment from the initial supplier to the final customer. It means that whole business cycle depends on efficient functioning of SCM.

The educational program has to provide orientation, training, and practical application of the theory, concepts, systems, processes, and technologies used in the functions of logistics and its supply chain, with a focus on their integration and management.

The training courses have to provide the student with the knowledge and skills associated with current practices in Logistics and Supply Chain Management areas that include:

- ✚ Purchasing, transportation, warehousing, and inventory management,
- ✚ Operations, quality control, and project management, information technology and supplier relationships,
- ✚ Organizational development, staffing and supervision, and outsourcing.

## CONCLUSION

Using the fundamental elements of logistics (requirements, procurement, and distribution) and the basic aspects of command (organization, planning, execution and supervision), the logistic support of the Army, forms a bridge between the economic system of the nation and the operations of the combat forces. Logistics is an art, a science, a process. The logistics process is at one and at the same time the economic element of military operations and the military element of economy. Good programming and financial management should be the bases of logistics support.

On the other side, efficient use of logistics experiences in business sector can create possibility of better engagement of economic and industrial resources of the country.

National economy can be analyzed through several aspects in context of defense. First, economy represents material-technical base for military capabilities of the state, which dues to the level of economic development. Second, economy can be factor of limitations for the level of equipping of the armed forces, their structure, arms, etc. Third, economic conditions determined conducting of military operations and waging of war, which means that in final instance they determined development of art of war, strategy, art of operatic and tactics. Fourth, defense in turn has influence on economy and determined production of material-technical means for the defense.

We can conclude that national economy develops under influence of defense strategic needs as sustaining of armed forces, military production etc., which are also logistical focuses. Logistics play key role to ensure that combat forces and combat support forces are supplied with what they need to accomplish the mission on the real time, place and with necessary quality, in the process of achieving this. However, at the same time, the Logistics and Supply Chain Management, together, integrate all the activities involved in the procurement, storage, movement of goods, and payment from the initial supplier to the final customer. It means that whole business cycle can be improved through efficient SCM.

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# DUAL-USE AND CONVERSION OF MILITARY-RELATED R&D IN GERMANY

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## ABSTRACT

*Scarce resources, technological dynamics, and political pressures, combined with the converging demand profiles of civilian and military technologies, all support the recourse to a 'dual-use strategy,' whereby a technology is developed first for the civilian sector and then used for military purposes. For some planners 'dual-use' is a magic word that keeps the paths for further military-technological developments open. In Western Europe, as well as in the United States, the dual-use strategy aims at combining military interests in cheap and effective armament technologies with commercial interests in the high-tech sector. Research programs like EUREKA, ESPRIT and EUCLID have been designed as dual use from the beginning.*

## SUMMARY

This paper examines the structure and practices of and conditions surrounding the German defense industry. These factors are largely shaped by the transformation of Germany's armed forces (Bundeswehr), an industry-wide trend toward increased transatlantic collaboration, and a desire to compete on a standardized European basis (Europeanization) with less interference imposed by national regulations. What is commonly referred to as "transformation" describes a process by which the German armed forces are becoming a more flexible expeditionary force, charged with international peacekeeping, counter-terrorism activities and contributing to global stability. This transformation requires the German defense industry to change as well. The industry is undergoing a period of intense consolidation (a decrease from 1,000 to just 200 companies). At the same time, there is a demand for network-centric technology, and, despite the increased role required of the German armed forces today, the defense budget remains under consistent pressure with USD 38.34 billion allotted in 2007. At only 1.3% of Germany's GDP, this contrasts significantly with the defense budgets of the United States and the UK, both of which exceed 3% of GDP.

Over 90% of products and technologies are introduced into the German market via trade shows. ILA Berlin Air Show is Germany's largest defense-related trade show and also one of the largest in Europe. Organized by the BDLI (German Aerospace Industries Association) and Messe Berlin, the bi-annual show is a major marketing platform for the industry. Suppliers of equipment for the aerospace industry, air transport companies, airlines, military, border protection forces, police, and many others attend the show. Particularly important are the equipment/engines/ materials manufacturers, commercial aviation groups, military aviation representatives and their technical equipment suppliers. ILA is held bi-annually on the area of Airport Schönefeld.

## CHRONOLOGY OF THE DUAL-USE STRATEGY AND ITS IMPACT ON R&D CONVERSION

The specific character of Germany's dual-use strategy was already outlined in 1986 by the then Permanent Secretary in the BMBF, Hans-Hilger Haunschildt: Given the importance of modern technologies for military as well as for civilian applications, both domains of responsibility, the BMBF (former BMBF) and the BMVg, are closely working together in some subfields. The dominant basic technologies (are) often identical, e.g. the fundamental physical technologies, the materials sciences, the machining technologies, the semiconductor technology or data processing. Especially Germany and Japan have successfully demonstrated after the war that civil technological developments do not need the detour via government-funded military research and development. The primary civilian way also works.

The philosophy that civilian R&D should be planned for the fulfillment of military goals has been realized in various programs, in particular, in the space program (e.g., by using civil satellites for military reconnaissance and communication) and in the 1989 concept for future information technologies. In 1990, the German government stated that dual-use is a basic ingredient of its research policy: 'The Minister of Defense bases as a matter of principle his science and technology programs on civilian science and technology. Only when unavoidable the civilian scientific-technological base is complemented by specific programs.

The German government has repeatedly announced its intention to include military requirements early within civilian R&D programs and then exploit the results in 'add-on programs' for military applications. This implies not only those converging civilian and military development paths are used, but also that civilian research will be adapted to military purposes. Based on this strategy a 'grey area' of civil-declared but military-used R&D could develop. An essential element of this strategy is closer cooperation between the BMBF and the BMVg: With the BMBF the dialogue about research and technology cooperation must be intensified and deepened. The R&T activities with the potential for dual-use applications must be coordinated more thoroughly in advance between both ministries and initiated jointly, if necessary. So-called add-on programs of the BMVg are only possible, in principle, if the BMBF or/and the industry have created the appropriate basis.

In the context of the dual-use policy, diversification, which is a strategy to mix civilian and military R&D, will be more probable than irreversible conversion. In this way, military objectives could profit from both civilian and military R&D activities and, even more, the reshaping of powerful military R&D programs is always possible. Obvious impacts of this diversification strategy in the field of arms production and arms industry are:

- ✚ the persistent option for militarily useful outputs of diversified R&D;
- ✚ reversibility of 'conversion' activities;
- ✚ continuation of secrecy for parts of R&D;
- ✚ persistent distrust.

As a result of the dual-use strategy, civilian R&D is increasingly amalgamating with military R&D. The R&D work of the BMVg, which cannot fund basic research, is increasingly based on civilian resources, which in turn are also influenced by military purposes. In Germany the dual-use strategy could result in expanding the influence of the military on some part of civilian R&D.

The extended notion of military-related science and technology is, in general, contrary to further disarmament and conversion efforts, as it further blurs the differences between civilian and military R&D and allows the performance of military R&D under a civilian cover. The spin-offs from the military to the civilian sector have been disappointing; now the transfer into the opposite direction, or 'spin-on' is organized. Civilian R&D has become a priority for the military, which can use the outcomes for its own parallel military R&D. The question is to what degree the dual-use concept leads to a clandestine militarization of R&D in Germany, which would undermine efforts for conversion and disarmament in the longer run.

Experience from the leading organization for applied research in Germany, the Fraunhofer Society, reveals that conversion of military R&D can be successfully implemented in similar high-level technologies, such as information or environmental technologies.

On the other hand, recent development in dual-use technologies may be a serious barrier to research conversion.

For four years now, Germany has had some experience with the problems of restructuring former military bases. The majority of these sites need ample creativity from local and regional authorities - as well as initiatives, technical know-how and assistance from scientists and companies and support from the state - for many reasons, including contamination.

The KONVER program installed by the European Union can only help in a few cases and in some respects. Ultimately, the German federal government is required to give conversion a higher priority through legal acts and financial resources.

Conversion still faces strong from the parochial interests of privileged groups who are not willing to accept pure market-oriented restructuring. These obstacles based, on a conservative 'military culture', can be overcome only by long-term, reliable (and profitable) civil options as well as the intellectual willingness to change.

## **MARKET OVERVIEW**

### **German defense industry in light of Europeanization**

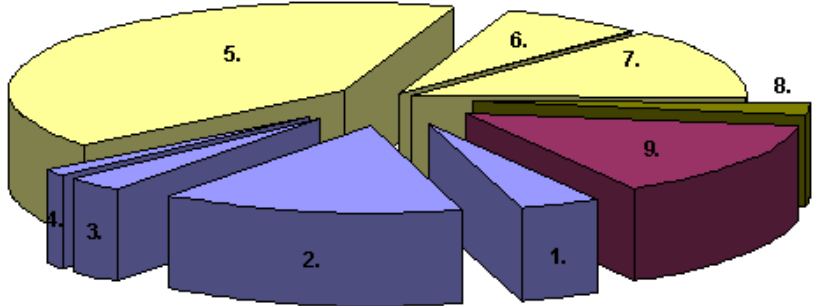
In 1999, the Federal Ministry of Defense entered into a strategic partnership with the German defense industry in the form of a framework agreement, which more than 600 companies have since joined. The aim is to make the German armed forces more economical, with non-core military competencies in the hands of civilian contractors. To implement the framework agreement, a company by the name of g.e.b.b. was created. (g.e.b.b. stands for "corporation for development, procurement and operation." (<http://www.gebb-mbh.de>))

As the driving force for increasing efficiency, it focuses on supporting the Federal Ministry of Defense with private industry know-how for the conversion of service functions within the German armed forces and implementing partnerships with private companies. Wholly owned by the German government, g.e.b.b. in turn is part-owner of companies that supply the German armed forces with logistical and training services.

In an effort to create one voice expressing their collective concerns and interests, the German defense companies are united under the umbrella of the Defense Industry Committee (AVW). The committee believes that a strengthened American-German partnership as well as ongoing Europeanization are key to the growth of the German defense industry. In contrast to some of their foreign competitors, German defense

companies receive no state subsidies and have to comply with stringent export regulations when trying to enter the global markets. The German defense industry has an interest in creating level playing field in the European market by eliminating the interference caused by national regulations, recognizing that many future defense policy impulses will come from both NATO and the European Union (EU).

According to study by the German Federation of Industries “SKI 2010 – Armed Forces & Industry,” some 25% or USD 8.2 billion of the defense budget was used for investments and procurement in 2005, a percentage that should rise to 45% in 2010. R&D expenditures accounted for little more than 1% or some USD 400 million of the defense budget. According to the 2007 defense budget of the German Armed Forces, investment-related spending will be slightly lower. Please see chart below:



German Defense Budget 2007	EUR bln	USD bln
<b>Defense-related expenditures</b>		
1. Research, development & testing	1.11	1.49
2. Military procurement	4.16	5.57
3. Military facilities	0.81	1.09
4. Other investments	0.29	0.39
<b>Operating expenditures</b>		
5. Personnel	11.69	15.66
6. Maintenance	1.98	2.65
7. Other	3.67	4.92
<b>8. Operating revenues</b>	<b>0.63</b>	<b>0.84</b>
<b>9. Pension expenditures</b>	<b>4.04</b>	<b>5.41</b>
<b>Budget total</b>	<b>28.38</b>	<b>38.03</b>

Source: Federal Ministry of Defense, The 2007 Defense Budget

**MARKET TRENDS**

Some 98% (USD 5.5 billion of the USD 5.6 billion total spent) of all military procurement contracts go to German companies or joint ventures with German participation. Another 1.2% (USD 67.4 million) goes to other EU members, the remaining 0.8% (USD 44.9 million) to other nations, including the United States. As these figures indicate that direct unilateral participation is somewhat difficult, it has become increasingly popular to participate in the German defense industry by way of government-to-government program

partnerships and multinational joint ventures. Also, a lot of the finished products being provided to the German armed forces (e.g., airplanes and helicopters) are equipped with U.S. technology.

It is safe to assume that U.S. manufacturers of defense equipment get a much larger indirect share of the market than the above-mentioned 0.8% through supplying parts and systems to German/European companies.

In mid-2006, the EU adopted a code of conduct requiring defense contracts to be awarded on the basis of Europe-wide invitations to bid. Compliance is monitored by the European Defense Agency (EDA), whose mission is to develop joint defense capabilities, cooperate on armaments, and liberalize the market as well as to promote defense-related research and development. Political demands calling for a sustained improvement in European defense collaboration had been voiced for years but national self-interests routinely prevented action being taken.

## **SUPPLIERS & COMPETITION**

### **European Aeronautic, Defense and Space Company (EADS) – Ottobrunn, Germany (<http://www.eads.com>)**

EADS is the largest aerospace company in Europe and the second largest worldwide. The company is active in the fields of civil and military aircraft, space, defense systems and services. In 2006, EADS generated revenues of USD 52.90 billion. EADS group includes the commercial aircraft manufacturer Airbus, the world's largest helicopter supplier Eurocopter and the space company Astrium. The defense-related divisions include military air systems, military transport aircraft, and defense and security. EADS holds a 37.5% interest in MBDA, the second largest guided manufacturer of guided missiles worldwide.

### **Rheinmetall DeTec AG – Dusseldorf, Germany (<http://www.rheinmetall-detec.de>)**

Rheinmetall DeTec AG, the defense technology arm of the Rheinmetall group, is Europe's leading supplier of technology for ground forces. It has five divisions: land systems, air defense systems, weapon ammunition, defense electronics and public security. With 6,800 employees in locations throughout Europe, North America, Asia and the Middle East, Rheinmetall DeTec generated revenues of USD 1.9 in 2006. The company is best known for developing the main armament for the LEOPARD 2 main battle tank, its Fox NBC Reconnaissance System, and most recently, under the company PSM GmbH, its fifty-fifty joint venture with Krauss-Maffei Wegmann, the PUMA infantry fighting vehicle.

### **Krauss-Maffei Wegmann – Munich, Germany (<http://www.kmweg.de>)**

Krauss-Maffei Wegmann (KMW) is a Germany-based defense manufacturer with worldwide sales. The company produces tanks, artillery systems, air defenses, infantry vehicles, wheeled armored vehicles, armor protection and other military engineering equipment, such as mobile bridge builders. KMW employs 2,800 people and provides products and technical services in 29 countries. Sales in 2006 increased by 70% to over USD 1.35 billion. The company is best known for the LEOPARD line of main battle tanks. Recent projects include the BOXER APC and the PUMA infantry fighting vehicle, a fifty-fifty joint venture with Rheinmetall DeTec AG. KMW is currently designing the LEOPARD 2 for Peace Support Operations (PSO) to address the changing global security environment. LEOPARD 2 tanks are delivered to armed forces in 13 countries. KMW's

armored scout car FENNEK is also in high demand. The German Army has meanwhile received 116 armored scout cars, along with four artillery observation vehicles. Overall, the current contract covers 202 FENNEK vehicles for the German Army and 410 vehicles for the Dutch Army, which will be delivered before the end of 2008.

**ThyssenKrupp Marine Systems AG – Hamburg, Germany** (<http://www.tk-marinesystems.de>)

ThyssenKrupp Marine Systems (TKMS) is the leading European provider of naval vessels, such as submarines and surface combatants. The German parent company, ThyssenKrupp, has a huge international presence, with annual sales of over USD 48.3 billion and some 120,000 employees worldwide. TKMS belongs to ThyssenKrupp’s “Technologies” division. TKMS was formed in 2005 through the merger of six shipbuilding companies in three European countries, most in operation for more than 100 years:

ThyssenKrupp Marine Systems (TKMS) shipyards		
Germany	Blohm + Voss GmbH	Hamburg
	Blohm + Voss Repair GmbH	Hamburg
	Nordseewerke GmbH	Emden
	Howaldtswerke-Deutsche Werft AG (HDW)	Kiel
	Nobiskrug GmbH	Rendsburg
Sweden	Kockums AB	Malmo
Greece	Hellenic Shipyards S.A.	Athens

Blohm + Voss was founded in 1877 and looks back on a corporate history of 130 years. The company produces a wide array of ship components, including turret and hull casings and add-on armoring. Blohm + Voss employs 1,110 people and had annual revenues of USD 540 million in 2006.

**Thales Group – Siegburg, Germany** (<http://www.thalesgroup.com/germany>)

Headquartered in France, Thales Group is a global electronics company delivering information systems for aerospace, defense and security. The largest shareholder is the French government with a 27.1% share. Thales employs 60,000 people in 50 countries and generates annual revenues of USD 13.8 billion. The company maintains a significant presence in Germany. Thales’s German business divisions include air systems, land and joint systems, naval systems, and simulation & defense services. The company’s product range focuses on so-called C4ISR technologies (command, control, communications, computers, intelligence, surveillance and reconnaissance). Thales participates in numerous European cooperation projects, such as Eurocopter Tiger, Eurofighter EFA, BIGSTAF (broadband integrated command post communications network), Frigate 124 and Corvette 130.

## END-USERS

Germany’s armed forces are divided into five branches: Army (5 divisions), Navy (2 flotillas), Air Force (3 divisions), Joint Service Support Command, and the Central Medical Service. These branches (the Army, Air Force and Navy in particular) are all



characterized by a recent reduction in personnel and equipment (the Air Force alone has reduced its aircraft from 700 to around 250). The German military has to procure select defense systems that focus less on conventional warfare and more on flexibility, maneuverability, deployability and most importantly, force protection capabilities. Defense technologies that meet these criteria have best potential in the future.

One such example is the PUMA Infantry Fighting Vehicle. The PUMA was designed to be rapidly deployable by the future A400M military transport plane, thanks in part to its detachable modular armor packages.

Technical transformation and reduction of staff also requires a restructuring of personnel. The German armed forces today have about 250,000 service members divided into three force types:

- ✦ NATO Response Force (NRF) – contains 35,000 soldiers whose mission is to conduct high-intensity peace enforcement operations, typically as part of a multi-national (joint) force in “network-centric” operating environments.
- ✦ Stabilization Forces – contains 70,000 soldiers whose mission is to conduct worldwide stability operations in low-intensity conflict environments, namely nation-building and peacekeeping. These forces maintain the ability to conduct war fighting operations should the environment escalate beyond that.
- ✦ Support Forces – contains 147,500 soldiers whose mission is to conduct support of all current operations as well as routine operations within the homeland.

## **MARKET ACCESS**

### **Business Practices**

Suppliers of defense equipment who are interested in entering the market must make a special effort to visit Germany periodically. They should be prepared to provide company and product information in German as this is considered a sign of genuine interest in the market. It is also important to include technical instructions for installation, operation and maintenance of equipment pieces, and after sales service.

When entering into negotiations with potential partners, companies should be aware that a representation or distribution agreement is governed by the conditions set forth between the parties. Germany applies the “freedom of contract theory” by which the contracting parties may establish any stipulation, condition or undertaking provided that it does not violate German law, morals or public policy. Additional information on how to enter the German market can be obtained in the “Country Commercial Guide” for Germany, which is available through the U.S. Export Assistance Centers and our CS Germany website:

<http://www.buyusa.gov/germany/en/download.html>

### **National Procurement**

**Federal Office of Defense Technology and Procurement (BWB) – Koblenz, Germany**  
(<http://www.bwb.org>)

Based in Koblenz, the BWB is the purchasing agent of the Germany Army and, as such, the largest technical authority in Germany. It is responsible for the implementation of all armament projects with the exception of IT projects. For the latter, the Federal Office for Information Management and Information Technology of the German Armed Forces (IT-AmtBw) was set up in April 2002. An additional area of responsibility consists in the

disposal of waste material. The BWB is supported by seven technical centers and three research institutes. These agencies provide technical support for project management and conduct technical and scientific investigations, tests, studies and market analyses. The naval arsenal ensures maintenance and repair work for naval ships and boats.

The BWB and its agencies are subordinate to the Directorate General of Armaments at the Federal Ministry of Defense. Contact info can be found on page 10 under Key Contacts, Government Agencies.

## **European Procurement**

### **European Defense Agency (EDA) – Brussels, Belgium (<http://www.eda.europa.eu>)**

The EDA was established in July 2004 "to support the Member States and the Council in their effort to improve European defense capabilities in the field of crisis management and to sustain the European security and defense policy as it stands now and develops in the future." The objectives behind the EDA are to streamline EU defense capabilities by developing Europe's military strength, eliminating R&D overlaps, promoting armaments cooperation, creating a competitive market for defense equipment and strengthening the industrial technology base. The EDA is seen as a major contributor to military planning in the EU as defense ministers now have an instrument capable of shaping the political debate on the European Security and Defense Policy (ESDP). Currently, the emphasis lies on improving R&D cooperation between EU countries, promoting further collaboration and streamlining European military spending.

Further information on procurement: <http://www.eda.europa.eu/procurement.aspx>

### **Organisation Conjointe de Coopération en matière d'Armement (OCCAR) – Bonn, Germany (<http://www.occar-ea.org>)**

Established in 1996 by the defense ministers of France, Germany, Italy and the UK, OCCAR's aim is to provide better management of existing and future collaborative armament programs. According to the "OCCAR Convention," OCCAR can place and manage contracts and employ its own staff. In support of the Convention, OCCAR has developed a comprehensive set of management procedures (OMP) and an organizational structure that will enable it to handle collaborative program management. Current programs managed by OCCAR include A400M (tactical and strategic airlifter), BOXER (multi-role armored vehicle), COBRA (weapon locating system), FREMM (European multi-mission frigate), FAFS (next generation of surface-to-air anti-missile system), and TIGER (anti tank helicopter). It is planned to integrate a range of other programs and enable the involvement in early phase activity e.g., Technology Demonstration Programs (TDPs).

## **TRANSATLANTIC DEFENSE COLLABORATION PROGRAMS**

A good example for transatlantic cooperation is the Medium Extended Air Defense System (MEADS), a U.S.-German-Italian joint venture to deploy a next-generation mobile missile defense system. Other ongoing partnerships include the Air Ground Surveillance (AGS) and Rolling Airframe Missile (RAM) programs. The bulk of consolidation within the German defense industry is nearly complete while transatlantic partnerships are becoming more commonplace. The German defense industry is eager to promote U.S.-German program partnerships akin to that of MEADS, RAM and AGS. The current development

presumes that U.S. manufacturers will have better opportunities by joining multilateral program partnerships than entering the market on their own.

### **Medium Extended Air Defense System (MEADS)**

MEADS is a surface-to-air defense system designed to be strategically deployable and tactically mobile. Set to be fielded in 2014, it is developed by MEADS International, a joint venture that combines the technological capabilities of Lockheed Martin (United States), EADS LFK Guided Missile Systems (Germany), and MBDA Missile Systems (Italy). MEADS took on a new level of significance at the ILA Berlin Air Show 2006 as a good example of transatlantic cooperation. It will replace Patriot and Nike Hercules missile systems. For Thomas Enders, CEO of EADS, MEADS is the most important transatlantic armaments project since the 1980s. Real demand on both sides of the Atlantic, mainly due to the war in Iraq and the war on terrorism, will be critical to guarantee the long-term success of the project. MEADS was nearly stopped by the German parliament (Bundestag) in 2005, but the Bundestag eventually recommitted to its 25% share in the nine-year, USD 3.4 billion design and development program.

An initial Risk Reduction Effort (RRE) contract was first awarded in 2001 from a tri-national source selection committee under the NATO Medium Extended Air Defense Management Agency (NAMEADSMA). After a three-year RRE period, the system's capabilities were successfully demonstrated in May 2004. Since then, the project has been underway in the design and development (D&D) phase. Throughout the defense industry, MEADS is widely expected to become a model for future transatlantic defense contract collaborations.

### **Alliance Ground Surveillance (AGS)**

The AGS program has been in the works at NATO since the early 1990s. It consists of manned and unmanned aerial platforms as well as ground control stations designed to provide real-time situational awareness to decision-makers during NATO operations. The international defense consortium Transatlantic Industrial Partnership for Surveillance (TIPS) that was determined to best meet NATO's requirements includes EADS, Galileo Avionica, General Dynamics Canada, Indra Sistemas (Spain), Northrop Grumman (United States) and Thales (France). A USD 30.9 million definition phase contract was awarded in April 2005. Since then, negotiations have begun to finalize the design and development (D&D) contract. AGS is expected to cost USD 5.4 billion in total, the most expensive and technologically sophisticated program ever undertaken by NATO.

### **Rolling Airframe Missile (RAM)**

RAM was designed to provide surface ships with an effective, low-cost, lightweight, self-defense system that will provide an improved capability to engage and defeat incoming antiship cruise missiles (ASCMs). It is an exclusive joint venture between the United States and Germany. RAM is considered as a NATO cooperative agreement and governed by a memorandum of understanding (MOU) between Raytheon (United States) and RAMSYS (Germany). RAMSYS is a joint company formed of EADS GmbH and Diehl BGT Defense. Nevertheless, the initial fielding, RAM Block 0, was determined to have several shortfalls after undergoing operational evaluation (OPEVAL) tests. The upgrade, RAM Block 1, was then implemented in order to eliminate these discrepancies.

With the signing of the second MOU, an amendment has been added to develop a software package that will allow for the targeting of additional threat profiles to include helicopters, aircraft and surface vessels.

## **Euro Hawk / Global Hawk**

In January 2007, the Federal Office of Defense Technology and Procurement (BWB) in Koblenz tasked Eurohawk GmbH in Immenstaad on Lake Constance with the development and construction of a Euro Hawk demonstrator system. The Euro Hawk is an unmanned aerial vehicle meant to replace the electronic reconnaissance aircraft version of the BR-1150 Breguet Atlantic from 2010 onwards. Part of the electronic reconnaissance will be the detection of radio and radar signals. The Euro Hawk is based on the RQ-4B Global Hawk aerial reconnaissance systems used by the U.S. Air Force.

The United States and Germany cooperate on ensuring that their Global Hawk and Euro Hawk UAV systems will be compatible in the future. With an airborne endurance of 30 hours and signal intelligence mission system, Euro Hawk meets the German Air Force's requirements for a high altitude, long endurance (HALE) signal intelligence (SIGINT) system. The delivery of the demonstrator system is scheduled for 2010.

## **CONCLUSIONS**

Germany's dual-use strategy for R&D could lead to an emerging use of civilian technologies for military purposes, thus undermining efforts at irreversible conversion of R&D. Dual-use concepts are particularly problematic because they could counteract the conversion process by pursuing military interests while simultaneously seeking economic competitiveness in the civilian market. Transparency in military-related R&D is an important prerequisite for a comprehensive program on efficient conversion. The lack of information and the secrecy about detailed budget figures and the purpose and institutions of military related research are serious obstacles to pursuing R&D conversion. To overcome the blurring of the lines between civilian and military paths of the scientific development, new tools of science and technology assessment have to be introduced and used by decision-makers in the national and international arms control communities.

An 'ambivalence analysis' could reveal nodal points, which permit the analyst to distinguish between different paths of scientific evolution, and could open alternatives for decision-making. External decision points also need to be identified to weaken the influence of the military on civilian R&D.

Additionally, preventive arms control measures and restrictions on military-related R&D in the international sphere are necessary to overcome the shortcomings of an isolated and unreflective promotion of R&D, thus preventing new technological arms races, new arms exports, and any ongoing use of science and technology for future wars.

# **SECURITY AND DEFENSE R&D MANAGEMENT: POLICY, CONCEPTS AND MODELS OF REPUBLIC OF MACEDONIA**

**Elenior Nikolov MSc<sup>11</sup>, Mitko Bogdanovski MSc<sup>12</sup>, Robertino Chontev<sup>13</sup>**

## **ABSTRACT**

A short overview given below, related to military R&D policy, but not limited only at this area, especially having in mind the item 2 and item 4 of this paper, depicts the low level of financial support as well as even low level of consideration of using developed R&D capacities advantages within the industrial process (military/civilian). A proper way ahead could be increasing of national (governmental) funds dedicated on R&D capacities, especially in the industrial process, based on the priorities mentioned in item 8 or a consolidated version of these main priorities appropriate to national industry (state or private sector), but not limited only on the relying on these funds. It will be grate advantage to use also the International Organizations, Nongovernmental Organizations, multilateral cooperation projects and bilateral cooperation programs funds for this purpose i.e. supporting the industrial R&D projects as it is case with some agricultural projects, electrical power and water supply projects, clean environment (ecological) and communities confidence building projects. etc. It is to convince the projects allocation funds decision makers on the benefit of some industrial R&D and technological development projects.

## **INTRODUCTION**

Macedonia's accession to the North Atlantic Treaty Organization (NATO) requires restructuring as well as modernization of the Macedonian Armed Forces in compliance with the NATO standards. Along with the outlined plan for the modernization of the Armed Forces within a timeframe that spans from 2004-2013 there is also a separate Strategic Defense Review (SDR). Its main task is to perform a thorough reassessment of the state of the armed forces and to outline the guidelines for their long-term development in conformity with the new security environment and the available defense resources.

The upgrading of the communication/information systems will be one of the main focuses of the campaign, as well as strengthening the operative capabilities of the deployable forces. The modernization of the armament/equipment of the Army, and Aviation WING, Development of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance Systems (C4ISR) is another priority.

For the sake of development of the structure and capabilities, defense assumptions should be adopted most urgently, which relate to operational capability, readiness, scale of effort and concurrency for operations. The development of the structure of forces and capabilities should be in accordance with the requirements and structure of forces and

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capabilities established in this political framework, especially the priorities, missions of defense and tasks of Macedonian army.

The Strategy is adopted for the management of defense at all levels of decision making, as well as in the areas that relate to personnel (including also education of civilian experts), its professionalization, qualifications, career with equal opportunities for all, as well as adequate ethnic representation in the Macedonian army, training and education, including the civilian personnel in the ministry of defense, interoperability, modernization and procurement, logistics, standardization, as well as development of strategies for improvement and interoperability of the intelligence capabilities and crisis management.

The current Strategic Defense Review works on the basis not of a nonexistent conventional threat, but of a considerable internal terrorist and insurgent threat. Cross-border criminal activity should figure prominently in these calculations, as should plans to stop trafficking and organized crime networks from further eroding the authority of the Macedonian state. The lingering ethnic tension signals to NATO that Republic of Macedonia still requires significant external assistance, from both Europe and the United States, in order to embrace its original reform policies and goals and that continued international engagement and the bi-ethnic composition of the ruling coalition in Republic of Macedonia will help to reduce the threat of a return to the open conflict experienced in 2001. However, the acknowledgment of the achieved results accomplishing all NATO membership criteria (including political stability and contribution to regional and worldwide stability ) given to Republic of Macedonia during NATO Summit in Bucharest 2008 presents Republic of Macedonia in an another light - as more contributing country than an user of foreign assistance.

Achieving NATO interoperability and contributing to the organization's future operations are priority goals for Republic of Macedonia, even though currently the ARM's capability is limited in both of these areas. Still, Republic of Macedonia now contribute a motorized infantry company, a medical squad, an aviation detachment with two utility helicopters, and an engineering platoon for Multinational Peace Force South-East Europe (MPFSEE)/ Southeast European Brigade (SEEBRIG).

In order the deployment tasks to be accomplished more successfully some of the key priorities for defense modernization and procurement include:

- ✚ T72 tanks modernization ,
- ✚ Transport aircraft,
- ✚ More advanced helicopter gunships,
- ✚ Radio-telecommunication and surveillance equipment.

## **STRATEGIC ORIENTATION ON DEFENSE INDUSTRIAL TRANSFORMATION**

The R&D issue is only generally considered within the 5<sup>th</sup> part of the SDR (strategic Defense Review) - Equipment and Modernization Plan (SDR 2 Phase, 2004).

The basic document dealing with defense industrial transformation is the SDR (Strategic Defense Review 2004), especially presumed in the third phase of this document so called - Program for Transformation of the Defense and the Army of the Republic of Macedonia. There are eight chapters:

1. Basis for the force structure, capabilities and capacities of the defense of the army

2. Personnel, current status and projections
3. Equipment
4. Training
5. Maintenance
6. Budget
7. Declared forces
8. Estate conversion

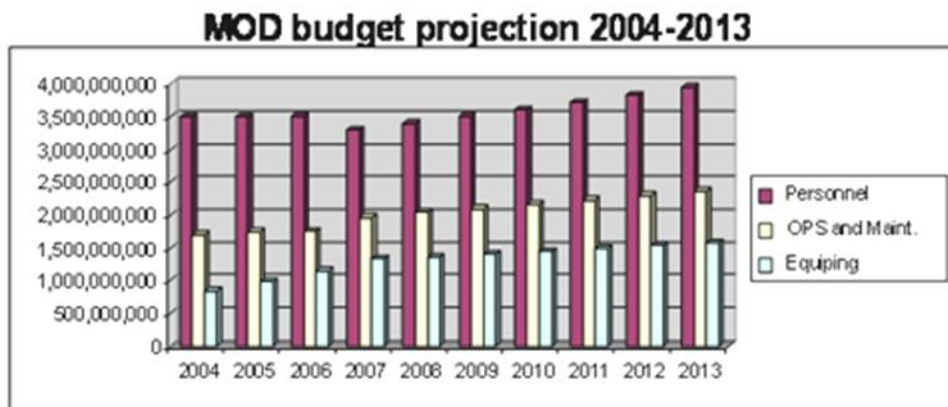
Chapter V consists of the next three paragraphs:

- The quality maintenance of equipment is an important element of combat readiness of the ARM and potential saver of funds. The maintenance system must be built as in the member states of NATO, simultaneously building a system of *integral logistics support* as envisaged in the basic documents developed in the second stage of SDR.

- The plans, programs, rules, instructions, etc. that relate to maintenance, were approved by the Minister of Defense, i.e. the Chief of the General Staff of the ARM, each within his competences. For the new equipment they are to be approved immediately after its introduction in use.

- Considering the analyses in the documents relating to maintenance prepared in the framework of the second stage of the SDR process, the overall equipment which is to be maintained and the dynamics for procurement of new equipment, as well as the budget projections, the principal structure is to be observed of expenses and needed funds for maintenance of the equipment in accordance with the projection for the force structure, the capabilities and the equipment of the ARM for the period 2004-2013.

Table No. 1



**MOD Budget distribution in percents 2004 - 2013**

Category	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<b>Budget</b>	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Personnel expenditures	57.86	56.12	54.72	49.96	50.00	50.00	50.00	50.00	50.00	50.00
Operation & maintenance	28.14	28.04	27.33	29.78	30.00	30.00	30.00	30.00	30.00	30.00
<b>Equiping</b>	14.00	15.84	17.95	20.26	20.00	20.00	20.00	20.00	20.00	20.00

Within the chapter VI is given a table (presented below) on the MoD budget projection 2004-2013. Having in mind the presented resources distribution and percentage allocation of the categories, it is obvious that *there are no strict resources dedicated to R&D*. There is

no view on the subcategories within the main categories. This issue – R&D could be matter whether in the frame of Maintaining or in the field of Equipping.

In accordance to have more clear depicted view on the Acquisition System in Macedonian MoD below are presented two crucial documents:

- *Defense Acquisition System Policy, December 2005*. The policy implementation will be regulated with Acquisition Rulebook and Instructions for certain functional areas in acquisition. This policy formulates vision for the method of ensuring the materiel needs in defense, defines the basic principles and guidelines in the area of equipping and

procurement of material and services, establishes basis for definition of procedures and methodologies for Defense Acquisition System (DAS) of the Ministry of Defense (MoD), provides latitude for inclusion of the domestic economy in the acquisition process thus assuring more stable support to the equipment and technology transfer in the future and promotes cooperation with allied countries and organizations in the field of cooperative logistics.

- *Regulation (instruction manual) for acquisition of the materials ( equipment – armament and military equipment, material – munitions, spare parts and small inventory) for the needs of the defense system of Republic of Macedonia, 2006*. This document formulates the multidisciplinary system of measures, postulates and procedures that are to be planed and performed by the responsible subjects and bodies in the MoD within the process of the defense system material acquirement.

Referring to complementary issues related to *R&D management*, SDR (Strategic Defense Review 2004) includes elaboration given in the table No 2 and No 3.



*Table No.2. Different documents for implementation of SDR in connection with R&D management (Numbers remain original from the SDR document).*

	<b>Subject</b>	<b>Further actions</b>
5.	Revision of the existing document and adoption of the Strategy for development of the Global communication-information system at MOD	Revision of the Strategy for development of the Global communication-information system at MOD, finalisation, amendments to it and its adoption.
9.	Elaboration of a logistic concept	The logistic concept should offer basic-widest definition on the logistic support to the defense of RM, should define the basic tasks-functions of the support, the principles of implementation of the support, the competencies and responsibilities (principal scheme of the logistic support), as well as the most general yardsticks – criteria for the success of the logistic support on each level separately
11.	Elaboration of a strategy for military education and science and training in defense and professional specialisation	According to the SDR and the Programme on transformation, the system of military education and science and training on defense and professional specialisation needs to be restructured and reorganised.
30.	Regulation for acquisition (providing equipment) of MS with ARM	The Regulation for acquisition should define the basic principles, phases and elements that are to be fulfilled for each acquisition – provision of equipment, including the procedures for procurement. The documents that would follow this regulation would be the regulation (instruction) for procurement and regulation (instruction) for integral logistic support.
31.	Regulation for procurement	The Regulation for procurement should define the classification of materials, the procurement processes (planning, reception and distribution, handling (disposal) and transfer – disuse), the principles of their implementation, competencies and responsibilities.
32.	Regulation for maintenance	The Regulation for maintenance should define the procedures, levels, competencies and the most general resources (temporary and operational) for maintenance. It should be a general frame based upon which the plans for maintenance (contents, scope and duration of the works, etc.) will be made. It should also define the most general criteria for the maintenance success.
43.	Law on determining trade companies of special importance to the defense	Legal basis for passing it is article 91 paragraph 2 of the Law on Defense. The type of act is the Bylaw which would closely define the trade companies of special importance to the defense.

Table No.3. Regulations and Programs for some R&D management

	Subject	In charge and supporting authorities & Further activities				
1.	Regulation for the kind of equipment and livestock that the citizens, trade companies, government owned companies, institutions and services are obliged allow the MOD utilize for ARM needs and Protection and Rescue Forces during war or state of emergency, as well as when executing exercises in peace time  ----- Regulation on the organizational position of state government subjects as well as other subjects that continue working in wartime conditions	Civilian Defense and CM Sector	Personnel and Legal Issues Sector, MOI, Finance and Resource Manag. Sector and Rescue and Protect. Agency	6 months after adopting the Defense Law Amendments	RM Government	
2.	Program – elaborate for introduction of a Logistic Automated Information System in MOD	C-4	Logistics Sector, G-4, GS	01.10.2006.	MOD	31.12.2007

### **ROLE AND PLACE OF SECURITY RELATED R&D IN THE NATIONAL SYSTEM OD R&D.**

The research activities are performed and organized by a network of institutions comprising of: 4 universities, several research institutes active in various fields and R&D units in industry. An important R&D organization is the Macedonian Academy of Sciences and Arts.

Within the governmental sector, the other ministries covering different aspects of R&D are: the Ministry of Agriculture, Forestry & Water Supply, and the ministries of Economy, Health, and Ecology. The Ministry of Education and Science is responsible for higher education (planning; organization; financing; development of the network of institutions; development of academic and administrative staff; verification of professions and profiles; accreditation; diploma recognition - ENIC Centre); other global issues.

Within the Parliament, a Committee for Education and Science deals with legal issues of education and science.

The National Agency for Evaluation of Higher Education and the National Accreditation Board are the main bodies responsible for quality assurance in higher education. The Ministry of Education and Science administers the distribution of the state budget for higher education jointly with the Ministry of Finance.

An important scientific organization is the Macedonian Academy of Sciences and Arts, which goal is to stimulate the development of sciences and arts.

**- Governmental bodies that are dealing with R&D innovation policy of the country:**

- The Commission for Special Production oversees the situation and the development of the production of weapons and military equipment in peace; development and preparation of the basic and additional capacities intended for production of weapons and military equipment, as well as production of medical materials and other products, equipment and services for the needs of the defense.

- Within the Ministry of Economy - Sector for Special Production is the focal point dealing with special production and plays the coordination role for other institutions and agencies (Ministries).

**- Info- Security related R&D issues**

In the present time of modern informational and communication societies, the administrative tasks are more and more supported by the informatics technology. Numerous working processes are electronically controlled, and huge quantities of information are stored in a digital form, electronically processed and transferred through the computer networks. The Ministry of Defense, together with the ARM General Staff follow these trends and with the great development in this field in the last years, they inevitably start facing the fact that the success of the achieved results will depend on ability to protect the integrity, confidentiality and accessibility of data and systems which they rely on. The security of informatics implies realization of the abovementioned tasks, by undertaking preventive measures for protection of classified information that are kept, processed or transferred by informatics means, but also realization of the actions undertaken in situations when their security is violated. These problems are not regulated and at the moment, MOD and ARM General Staff come across this difficulty, which results in their *uncoordinated and incidental coping with the same*. There are huge gaps in providing appropriate protection of the communicational-informatics systems, even from the stage of their planning and implementation until the stage of their usage. There are no determined measures for protection which have to be applied, minimum security structure that should take care of their implementation, low education of the personnel, etc.

The Instructions will more closely regulate the criteria, measures and procedures for performing security checks of legal and physical entities and MOD and ARM members who are to be given a security certificate and license for access to the classified information, types of security checks for obtaining a certificate, measures and activities for establishing the working positions and appointing persons as users of classified information.

The Directorate will make the Instructions in compliance with the completion of the procedure from the preparation of sub-legal acts, according to article 30 of the Law on Classified Information upon the production of the Bylaw on Industrial Security by the Government of Republic of Macedonia.

Based upon article 9 of the Law on Classified Information and the Regulations for physical security, security of the persons and industrial security of the Government of Republic of Macedonia, and in compliance with the national concept of security and defense of RM the preparation of the assessment for threat to foreign classified information that are in use with MOD is in progress.

**Table No.4 Documents for MoD Industrial Security presumed by SDR 2004**

No	Title of the activity – document	Prepared by	Approved by	Timeline	Reviewed by – approved by the basic steering group	Passed by	Timeline for implementat.
1.	MOD Industrial Security Manual	DBKI	Security and Intelligence Sector, C-4	February 2005	January 2005	February 2005	2005

## **SECURITY RELATED R&D POTENTIAL**

The main own innovation potential of military science development and R&D policy of the MoD and General Staff are the Military academy, the Military Hospital and other institutions in the Army. Material and financial support is from the MoD budget funds. Responsible institution in MoD (Department for training and education and R&D policy) should make plans and programs and should held A Law for R&D policy within the Army.

***The Military Academy of the Republic of Macedonia*** was established by Law which is in accordance with the Law on Higher Education and the Law on Research Work in the Republic of Macedonia.

The Military Academy was verified by the Ministry of Education and Science as tertiary level educational and research institution, which gives it the same status as other faculties and makes it part of the educational system of the Republic of Macedonia.

The degrees issued by the Military Academy are valid in the country and they give officers an equal education status as other graduates from civilian universities.

The Military Academy is the only tertiary-level military educational institution in the Republic of Macedonia. Its main task is to educate, train and provide further development for officer personnel for ARM, and to engage them in research in the field of defense in accordance with the law.

Section for R&D of the production of weapons and military equipment, in the frame of the Sector for Logistic in the MoD, provides: informative support to the leading authorities in the MoD in the creating of the policy for equipping of the MoD by weapon and military equipment from the domestic industrial resources, cooperation with the Sector for Special Production in the Ministry of Economy by overseeing the situation of the domestic industrial capacities and preparation of the relevant legal documents, preparing the regular analyses for technical – technological capacities and regular analyses for the personal management capacities of the production subjects that are dealing with R&D of the production of weapons and military equipment.

On the 1<sup>st</sup> of July 2003 the Law on ***the Police Academy*** came into effect. This law provides the Police Academy with a leading role concerning research and education in the field of policing and other areas of security.

Police academy want to enhance its educational role by delivering basic and further education of national and international acknowledged quality and by the evaluation,

dissemination, production and application of scientific knowledge in the field of policing and other areas of security.

Police academy want to become a *centre of excellence* in our part of the world as well as belonging to the top five Police Academies in Europe. It considers itself responsible for remaining up-to-date in the field of research and education. Its police education is recognized on national and international level. This means that it will meet national and international quality standards. Its diplomas will be recognized all over Europe and they will facilitate participation in studies abroad. Being a centre of excellence will provide the Macedonian police and the other agencies in the field of security with state-of-the-art expertise. In this way we can serve the police and the other agencies in our field of security of our country in the best way.

*Table No. 5. Human resources in R&D in Macedonia (in general)*

Country	2001	2002	2003	2004
Republic of Macedonia	2909	2869	2589	n.a

In 2002, the gross HE (Higher Education) expenditure on R&D - ratio of the GDP was 0.11. Out of 100% gross expenditure for R&D, 40.9% goes to research conducted in the HE sector. Support from the National Budget: national and international research projects, grants for postgraduate and doctoral studies in the country and abroad, R&D meetings, participation of academics in the international meetings, study visits abroad, programs of the public research institutes, equipment, R&D literature etc

The Higher Education Development and Financing Council (HEDFC) was established by the Government in October 2003. The Council is responsible for development and implementation of measures and criteria for financing of HE (institutions, investments in HE, student grants and loans etc.). It prepares programs for development of HE to be submitted to the Government for adoption.

In accordance with sources for financing, R&D can be financed through:

- ✚ own resources of institutions,
- ✚ companies resources,
- ✚ state budget,
- ✚ international financed projects.

Budget contribution to R&D is limited (scarce resources) and in 2002 it was 0,44% from governmental budget. In accordance with EU suggestion and directives from Barcelona it has to be from GDP, and in case of the Republic of Macedonia it actually means only 0,11 % from GDP. On the other side funds coming from business community are 0,02%, while EU directives are 2%. It means that in the Republic of Macedonia *business sector provides 100 times less than countries from EU*. We can conclude that if continues in that way, we could not expect faster development of R&D in Macedonia.

*Comment: Having not enough established R&D/innovation system in the private sector and low interest in the private sector for R&D it couldn't be possible to provide faster development of science.*

## ROLE OF THE STATE INSTITUTIONS IN THE FORMULATION AND EXECUTION OF R&D POLICY

There isn't a written innovation strategy of the country.

Laws and regulations that regulate R&D and innovation processes in the country are:

- ✚ Law on Science and R&D policy;
- ✚ Law on Macedonian Academy of Sciences and Arts;
- ✚ Law on Higher Education in The Republic of Macedonia;
- ✚ Law on Encouraging and Supporting the Technology Development;
- ✚ Law on Technical Culture;
- ✚ Law on Industrial and Intellectual Property Protection, and several regulations and instructions;

Acts of other organs of high education domain are:

- ✚ *Statute* of Inter universities conference of the Republic of Macedonia,
- ✚ *Guidance* for securing and examine the quality of high educational institutions and the academic personnel of the Republic of Macedonia (Evaluating Agency)

The laws related to research arrange the system, principles, public interest, forms of organization and management of this kind of activities as well as the ways of stimulating and supporting their development, scientific personnel and other issues related to them. The system of scientific activities involves scientific research, qualification and training of personnel for research work and research infrastructure.

Basic principles of performing scientific activities are inviolability and protection of the human personality and dignity and they are also based on the following principles: freedom of scientific creativity, autonomy and ethics of researchers during their scientific work and use and application of the results, diversity of scientific ideas and methods, international cooperation.

These laws also define the public interest of the scientific research in the field of national and cultural identity of Macedonian people and others living in the Republic of Macedonia. It also determines research as a general condition for the economic, social, cultural and environmental development of the country. Research which is in function of increasing the scientific level and transfer of knowledge as well as in the field of defense and security is defined also a five-year Program for development of these activities is being prepared.

The law related to *technology development* stimulates and supports this kind of development in the country as well as the programming of this activity and its financing. This law defines the technology development as:

- ✚ development of own technologies,
- ✚ progress of the country upon the independent economic base,
- ✚ modernization of the existing production capacities,
- ✚ establishing innovation and technology centers,
- ✚ building necessary technological infrastructure, transfer of knowledge through a continuous superstructure of the skills.

It is to be noted that the role and position of the industry has significantly decreased in the domain of research and development due to different reasons. Besides difficulties, yet the

country has managed in achieving significant results in certain scientific areas, for example *seismology*.

The Ministry of Education and Science is in a final phase of assigning new regulations regarding financing the scientific research, and also, is finalizing a draft proposal for a new Law on Science and Development. The Law will bring the national legislation closer to the European regulations. Reorganizations of research activities will take place, enabling support of higher number of research projects of applied character. This will encourage university-enterprises cooperation and contribute to establishment of new R&D centers in the companies.

*Table No. 6. Scientific research and technological development laws.*

Country	Law	Remarks
Republic of Macedonia	Law on Scientific Research (“Official Gazette of the Republic of Macedonia”, no 13/96 and 29/02)	It regulates the system, the principles, the public interest, the forms of organization and management of research.
	Law on Macedonian Academy of Sciences and Arts (“Official Gazette of the Republic of Macedonia”, no. 13/96)	It defines the Academy as highest autonomous scientific and art institutions in Macedonia.
	Law on stimulation and facilitation of the Technological Development (“Official Gazette of the Republic of Macedonia“, no. 98/00)	It regulates the stimulation and facilitation of the technological development, programming and financing the related activities.

## **PERSPECTIVES AND IDEAS FOR CHANGE OF THE R&D POLICIES FOR THE REPUBLIC OF MACEDONIA**

In the field of R&D in the Republic of Macedonia, the *main priorities* are as follows:

- ✚ Further development of the academic research network,
- ✚ Renovation of the research equipment,
- ✚ Stimulation of the promoting new research and development units within the economy,
- ✚ Systematic and continuous supply of foreign reference literature and providing access to electronic scientific data bases,
- ✚ Upgrading the library information system,
- ✚ Strengthening the present technology development capacities,
- ✚ Establishment of new technology transfer centres in a view of more efficient integration of research and business entities,
- ✚ Providing favorable working conditions for the research entities with unacceptable conditions.

## FINANCIAL ASPECT OF SCIENCE AND TECHNOLOGY IN MACEDONIA

### Budget contribution in R&D

YEAR	BUDGET	PART FOR SCIENCE	%
1998	830 million EUR	5 million EUR	0.62
1999	690 million EUR	6.1 million EUR	0.94
2000	1.05 billion EUR	4.3 million EUR	0.39
2001	910 million EUR	5.2 million EUR	0.58
2002	1.18 billion EUR	5.2 million EUR	0.44
2003	915 million EUR	5.0 million EUR	0.54
2004	923 million EUR	5.1 million EUR	0.55

### R&D intensity (%) of GDP by sector of performance

TYPE OF EXPENDITURE	1998	1999	2000	2001	2002	2003	2004
GERD (Gross domestic expenditure on R&D)/GDP	0.43	0.35	0.44	0.32	0.27	0.22	0.25
BERD (Expenditure on R&D in the Business sector)/GDP	0.05	0.04	0.03	0.02	0.01	0.003	0.015
GOVERD (Government intramural expenditure on R&D)/GDP	0.15	0.16	0.15	0.16	0.15	0.14	0.12
HERD (Expenditure on R&D in the Higher Education)/GDP	0.23	0.14	0.27	0.13	0.11	0.08	0.11

The number of researchers in 2002 was 1519. For their activities in last five years were spent 0.2% of GDP per year.

## CONCLUSIONS

Considering the fact that level of budget expenditures for R&D is still not sufficient, we can identify the need for changes and searching new sources as urgent.

Public-Private partnership should be seriously considered as a additional element of R&D Concept and Policy, that can provide funding and development of necessary capacities and support of R&D Projects in the Republic of Macedonia.

Government still shows low level of trust to private companies' capacities for R&D in security sector as well as their bigger involvement and functions in security area. Full implementation of the Concept of Logistic Support for the Republic of Macedonia and ARM can provide progress in that way. It will help not only to improve the situation in security sector, but also will bring additional influence to economic development of the country.



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# MACEDONIAN SECURITY AND DEFENSE R&D MANAGEMENT: ICT POLICY AND STRATEGY

Capt Mitko Bogdanoski, MSc<sup>14</sup>, Capt Robertino Contev<sup>15</sup>, Maj Elenior Nikolov, MSc<sup>16</sup>

*... "An invasion of armies  
can be resisted. But not an  
idea whose time has come..."*  
Victor Hugo

## ABSTRACT

Macedonia's work toward developing adequate communications infrastructure and skills necessary to access and participate in the emerging global information infrastructure has been impeded by transition shocks and a poor economic climate.

Poor material conditions preclude access to, and knowledge about, the Internet in many sectors of society. Computer resources remain insufficient and the Internet is generally inaccessible for most citizens due to relatively high costs. This situation particularly affects young people attending schools which are insufficiently equipped to teach and expand student's IT skills.

Afforded little opportunity to develop efficient and accountable management systems and good practice regarding public service, local authorities have begun to lag behind in terms of development stakes. In spite of this, in 1996 the Government initiated a process of decentralization of local government. The municipalities have been limited in their policy and decision-making powers and have had limited control over resources. The new process of local authority reform currently underway is in preparation for transfer of competencies and financial resources, planned by the government in order to create sustainable and viable local governments in line with European standards.

To encourage activities impelling the country towards an information society and digital economy, in July 2000, the "e-Macedonia for all" initiative was started by the former President Boris Trajkovski. It was followed by the preparation of the "e- Declaration 2002", a document with specific recommendations for accelerating development of an information society and digital economy in the country, officially adopted by Parliament and recognized as a national priority, in July 2002. The document specifies the following six gaps which the country needs to close in order to advance: (i) bringing together private sector and Research and Development community; (ii) creating an enabling environment for a pro-active adaptation and use of ICT by government and businesses; (iii) establishing new e-government services for citizens and businesses; (iv) improving regulatory framework; (v) protecting intellectual property rights, and (vi) developing needed competencies and skills. At the end of 2002, the government established the Commission

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<sup>14</sup> MoD, ARMY, Land Forces

<sup>15</sup> MoD

<sup>16</sup> MoD, Military Academy "gen. Mihajlo Apostolski"

for Information Technology (CIT), charged with determining a National ICT Strategy and Action Plan which will establish development guidelines and priorities. One of the main objectives of this body is consolidation of the efforts that have so far been invested in the development of Information Society and to increase the speed of implementation of actions according eSEE Agenda and Declaration of Principles and Plan of Action adopted during the first phase of WSIS (World Summit on the Information Society) held in Geneva in December 2003. The *CIT's Working Program for the period 2003-2007* (as of September 2003) which is in accordance with *eEurope+ Agenda* describes goals and activities of the Commission and its objectives, including National e-Strategy, and prioritizes e-Commerce, e-Government, e-Tender, Internet kiosks, access to government-held information, legal environment, use of ICT in health, culture, science.

One of the activities undertaken by the CIT, based on its scope of work, working program and responsibilities, is a *Strategic Partnership Agreement between the Macedonian Government and Microsoft Corporation* signed in December 2003, according to which the Macedonian Government will access the company's licensed software. In return, Microsoft reportedly will invest US\$6 million in the next four years in the country, in order to help implement its applications in the government institutions and will support the implementation of e-governance services.

The Macedonian government has been actively involved in the SEE Europe initiative, under the auspices of the Stability Pact, which aims to better integrate the South Eastern Europe (SEE) countries into the global, knowledge-based economy. The latest document "*SE Europe Agenda for the Development of the Information Society*," adopted in October 2002, in Belgrade, has been accepted by the Macedonian government which is thereby committed to the Agenda items. One commitment adopted National Information Society Strategy and Action Plan, based on the eSEE Agenda, and National Information Society Policies with clear goals and responsibilities. According to previous, there is need for realization of a Global Communication – Information System for Ministry of Defense and the Army of Republic of Macedonia requirements.

## **1. NATIONAL INFORMATION SOCIETY POLICY (NISP)**

The Information Society is a product of the changes in utilization of the new information and communication technologies. The global communications, the e-commerce and the Internet are advantages of the developed world, ensuring more wellbeing, development and democracy.

The world in the new millennia is characterized by the process of globalization which is a result of the technology development and the liberalization policy. In that world, the information is the crucial resource, and the knowledge and the ability to learn and improve is a key to competitive advantages.

The Republic of Macedonia, through the **National Information Society Policy (NISP)** is involved in the global development processes.

The process of development of the NISP is based on the reality and the needs of the local environment, on the realistic assessments of the capabilities, resources and the potentials of all entities in the building of the Information Society.

NISP is a document which is integrated with the other development strategies in the state, supported by all political entities by a consensus, in order to provide for the implementation of all designed programs, projects and initiatives to move towards the Information Society. At the same time, this document contributes towards linking the

activities in the area of the information and communication technologies (ICT) in Macedonia with the programs, projects and the structural funds of the EU.

NISP provides for efficient implementation and usage of the ICT in all entities in the Republic of Macedonia, which will provide an incentive for the competitiveness of the Macedonian economy, transparency and efficiency in the operation of the Government and the participation of the citizens in the building of the Society.

Building and development of the Information Society is defined and emphasized in several documents accepted by the Republic of Macedonia: the Action Plan of the European Commission eEurope 2005, the Final Declaration of the World Summit of the Information Society (WSIS) Geneva 2003, the Action Plan of the IT Committee 2003-2007, the Strategic Partnership Agreement between the Microsoft and the Government and the adopted Declaration of the Assembly of the Republic of Macedonia "e-Declaration 2002, Recommendations for Accelerated Development of the Information Society and the digital economy in the Republic of Macedonia as a national priority", as well as other agreements and conventions ratified by the Republic of Macedonia.

## **1.1 BASIC GUIDELINES**

### ***1.1.1 INFRASTRUCTURE***

Provided state-of-the-art, easily accessible and affordable ICT infrastructure, available under equal and non-discriminatory conditions, through:

- Affordable prices for Internet access and other electronic communications services;
- Continuous and sustainable support for the ICT infrastructure;
- Introduced protocol for electronic communications between the business entities, citizens, the public administration and the non-governmental sector.

### ***1.1.2 E-BUSINESS***

The introduction of e-business should facilitate the economic development by providing better economic efficiency, competitiveness and profitability through:

- Significantly re-organized and upgraded business processes, with adequate models for implementation of e-business in the companies, and
- Electronic networking between the business entities, citizens, the public administration and the non-governmental sector.

### ***1.1.3 E-GOVERNMENT***

Efficient and transparent operations of the Government open for citizen's participation, which will provide for better electronic services for the citizens and the business community, through:

- enabling citizens to participate in the Information Society;
- ensured level of on-line transactions in the provision of electronic services offered by the Government;
- political, institutional and regulatory framework.
- continuous development of a national ICT network of state institution aiming towards efficient and safe exchange of official information and data;
- ensuring new, better and lower-cost services which stimulate economic and social prosperity.

#### ***1.1.4 E-EDUCATION***

Development of modern and flexible education and research system and support for the ICT orientation in the education, science and culture:

- significantly increased level of ICT literacy of the citizens;
- introduction and harmonizing of the e-Education standards;
- structural and content development and increased presence of the ICT education on all levels;
- promotion of modern and flexible forms of education assisted by the ICT; life-long learning, distance learning, vocational training etc.
- continuous development of the national academic research network as a pillar of the modern and efficient action of the education entities on the national and the global level.

#### ***1.1.5 E-HEALTH***

Establishment and improvement of the links between the stakeholders in the health sector and creating a more flexible environment for permanent upgrade of services, through the establishment of:

- unique encoding system and electronic identification;
- harmonized technology platforms and data exchange based on defined protocols;
- electronic services for the citizens and creating prerequisites for telemedicine.

#### ***1.1.6 E-CITIZENS***

For the citizens of the Republic of Macedonia to be stakeholders of the Information Society, it is necessary:

- to build coherent policies for all sectors to offer e-services which will be unified, standardized, user-friendly, independent of the software platform, available to all citizens regardless of their location and the social status, taking into consideration the needs of the citizens;
- continuous creation of enabling environment and good governance practice, so that the citizens can use the ICT tools to participate in the overall social processes, as well is the process of decision-making on the local and the national levels.

#### ***1.1.7 LEGISLATION***

Adoption of legislation which will be in conformity with the international conventions and agreements to which the Republic of Macedonia has acceded or has ratified, and legislation which will be fully harmonized with the EU directives on Information Society and Knowledge-Based Economy.

The legislation will especially provide:

- De-monopolization of the electronic communication services market and prevention of the restriction of competition;
- Protection of the intellectual property rights, databases, security of the information and privacy of data;
- Protection from cyber crime;
- Electronic business.

## **2. NATIONAL STRATEGY FOR INFORMATION SOCIETY DEVELOPMENT AND ACTION PLAN**

Beginning with the National Information Society Policy (NISP) of the Republic of Macedonia through the process of preparing the Strategy for Information Society Development and the Action Plan, the urgency for rapprochement of the Republic of Macedonia towards the Information Society is promoted, entailing national engagement of all key entities in the Republic of Macedonia.

Creation of the Strategy and the Action Plan started from Macedonian reality and local environment requirements, based on realistic skills assessment, resources and potentials of all entities in the Information Society building process.

Today, the globalization courses have divided the world in two zones: stagnation and development zone, which have a decisive impact on the position of individual countries, as well as on their subjectivity. Those countries that failed in the articulation of resources needed for the development by using modern Information Communication Technologies will nevertheless remain in the stagnation zone, failing to keep up the pace with the modern world.

Where the Republic of Macedonia shall be in the following period, shall depend on the application and implementation of the Strategy for Information Society Development.

The process of creation of this strategic document is supported by UNDP and FOSIM through implementation of the Project for Formulation of the National Strategy on Information Technologies for Development.

The Strategy and the Action Plan have been prepared in accordance with the obligations undertaken by the Republic of Macedonia:

- Declaration accepted by Member States of the Stability Pact for Southeastern Europe, signed in Ljubljana on 4th June 2002;
- Agenda for Information Society Development for the countries of Southeast Europe, adopted in Belgrade 20th October 2002;
- Conclusions of the Ministerial Conference for Electronic Administration, Athens, 2003;
- Declaration adopted by the Assembly of the Republic of Macedonia "E-Declaration 2002, Recommendations on accelerated development of Information Society and Digital Economy in the Republic of Macedonia as national priority";
- Action Plan of the Committee for Information Technology 2003 - 2007;
- Action Plan and Declaration of the World Summit on Information Society, Geneva, 2003;
- Adopted concept for E-Government by the Government of the Republic of Macedonia, 2004.

In the process of preparation of the Strategy, the following EU documents and recommendations were used:

- The Council of Europe, Lisbon Summit in March 2000, established the basic building blocks of e-Europe, a concept that represents an obligation not only for EU Member States, but also for candidate states for EU membership;
- European Commission Action Plan, eEurope+2003;
- European Commission Action Plan eEurope2005, and
- Draft Action Plan of the European Commission, i-2010.

The Strategy and the Action Plan are accepted and adopted by the Parliament of the Republic of Macedonia, on the basis of which the responsibilities shall be defined for all entities in the process of building the Information Society. This document contributes towards linking the activities in the Information and Communication Technologies (ICT) domain in the Republic of Macedonia with the programs, projects and Structural Funds of the European Union.

According to the structure, the document consists of two components: Strategy and Action Plan for Information Society Development, whereas the Strategy comprises of the basic development directions divided in 7 pillars (Infrastructure, E-business, E-Government, E-education, E-health, E-citizen, Legislation). Each of these pillars is built around the current state of affairs, objectives, strategic measures and responsible authorities with List of Priority Projects, programs, initiatives or pilot projects. The areas relating to Public and Private Sector Reforms are a separate part of the document, as well as the priority areas for achieving sustainability of the Strategy for Information Society Development, starting from the need of having long-term sustainability of the Information Society development in the Republic of Macedonia, where the priority areas entailing actions for achieving the objectives are defined and explained. Priority projects and defined measurable indicators are provided in the Action Plan, listed according to the same timetable of the previously stated pillars.

The Strategy should provide for efficient implementation and ICT practice for all entities in the Republic of Macedonia, through realization of priority projects defined in the Action Plan.

### **3. ICT STRATEGY IN MINISTRY OF DEFENSE**

According to the abovementioned and in accordance to our aspiration to be part of NATO military and political structure, which presumes to follow and to use the newest ICT, and in accordance to the purpose of achieving the interoperability and compatibility with NATO structures within the C3 area, through accomplishment of partnership goals, we are faced with the necessity of the establishment and implementation of a Global Communication – Information System for Ministry of Defense of the Republic of Macedonia.

The development of the Internet in the MoD is running phase by phase, according to the so called “**Project Internet**”. At this moment, internet concept consists of more VLAN, like main building of MoD, other outside MoD locations at the area of Skopje, with the main purpose of data sharing between the user connected to this network and a permanent continuing access to the Internet to be allowed as well. The concept of e-mail addresses is provided for all users on this network. In order to provide better security the users are notified on the domains. They are getting access to an e-mail communications, automatic updating of antivirus software and secure control of specific activities, for all users. Second level of security improvements is made by a so called “**Intrusion Detection System**”, which automatically notices and prevents all unauthorized attacks. Whole network is protected by existing of PIX Firewall, what is additionally WAN network improvement from external attacks. The connection with global Internet network is established through leased link with 6Mb/s.

Global Communication – Information System (GCIS) in MoD and Macedonian Army through the highest priority “**Optical Digital Telecommunication System**” is a primary and basic technical – technological infrastructure of the territory of the Republic of

Macedonia in stationary working conditions and presents fundament for developing the mobile communication systems.

The aim of this project is to enable effective working of C-4 (Command, Control, Communication and Computers) system including all other information systems that are included in defense structure of the Republic of Macedonia as follow:

- Making own, single, integrating, autonomous and functional CIS,
- Achieving full compatibility and interoperability,
- Secure, updated, relevant and on time information,
- Fast, continuous and effective exchange of information and data,
- Achieving of automatic working of the administrative process,
- Fast and effective decision making and
- Multiplexed and integrated transfer of all kinds of information.

The system is completely own infrastructural solution for MoD and the Army requirements and it presumes that this system will provide complete optical connection between all infrastructural objects in the MoD and the Army. The definition of the functionalities of ODTS is based of the Strategic Defense Review and Dynamic plan for accomplishing of the activities and obligations coming from SDR and the Strategy for developing of GCIS for MoD and Army as well.

Because of its specificity and complexity, this project is long-term, which means that its realization is going by phases and after its completion it could be supposed that the most recent ICT technical - technological solutions will be implemented. The unification of informatics communication protocol and telecommunications networks is foreseen.

A financial construction is needed for successful realization of this project, implementation of the system for long-term planning. Programming and budgeting is used with precise definition of the resources indispensable for execution of any individual phase of the project, dynamic and all remained resources and additional sources needed for providing financial assets.

From this aspect, big amount of the resources are provided phase by phase through FMF (Foreign Military Financing) fond and bilateral cooperation with our strategic partner - USA Government. In this context, realization of this project is leaded through the primary USA Government contractor – UNISYS - US Federal Government Group - authorized company for realization of this project.

The project started with its first phase at the beginning of 2002 by definition and foundation of the optical infrastructure within the larger territory of Skopje.

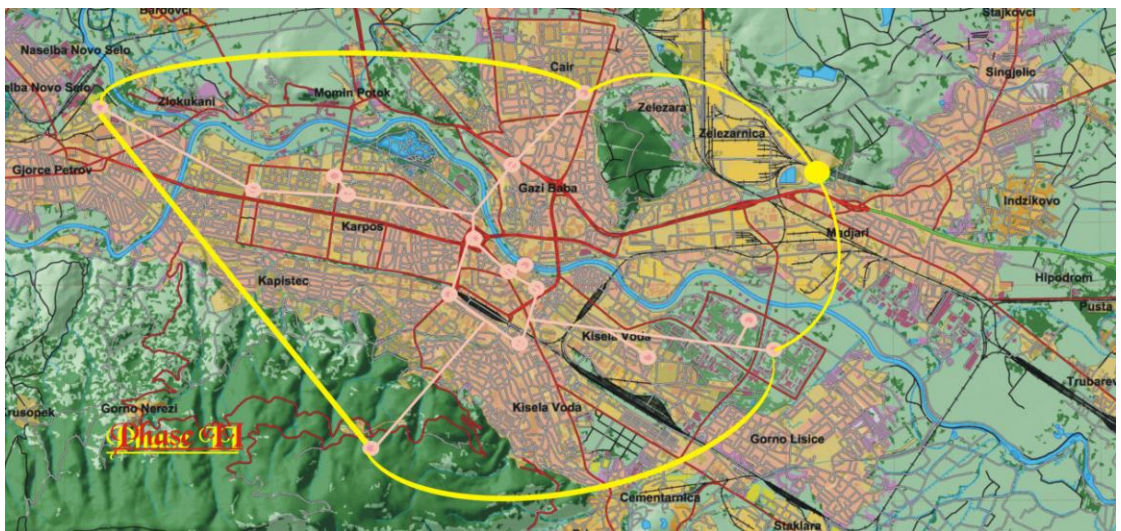
By finishing of the first phase, all objects of the MoD and Army within the larger territory of Skopje were optically connected, providing prerequisites for meeting of all IT MoD and the Army requirements.





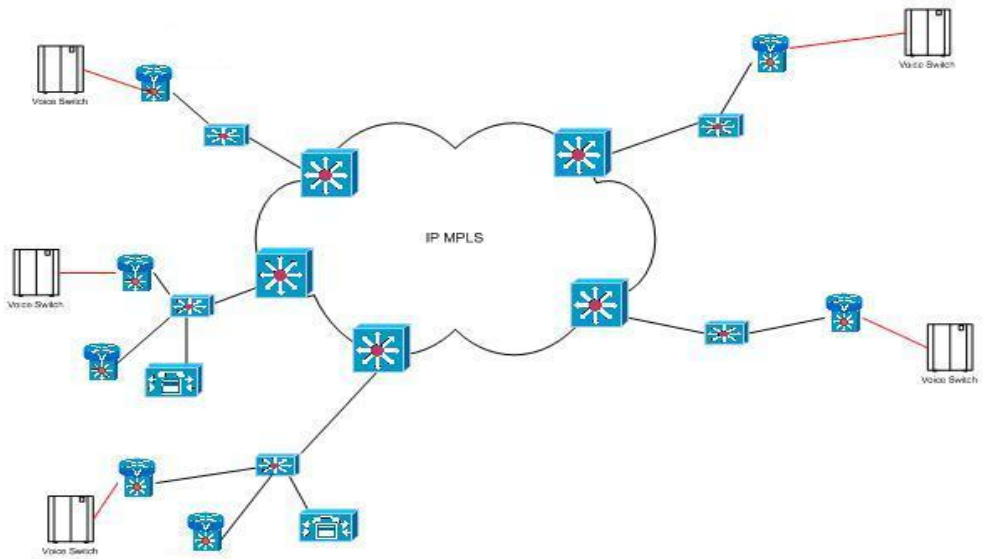
*First Phase of the ODTS Project*

At this moment is finishing the 2<sup>nd</sup> phase of the project i.e. the complete active network equipment is established, a new monitoring center for communication network control is constructed with adaptation of existing system hall in the MoD and at this moment operative measures are taken over integration of the Army and MoD LAN networks, their interconnection and usage of new services.

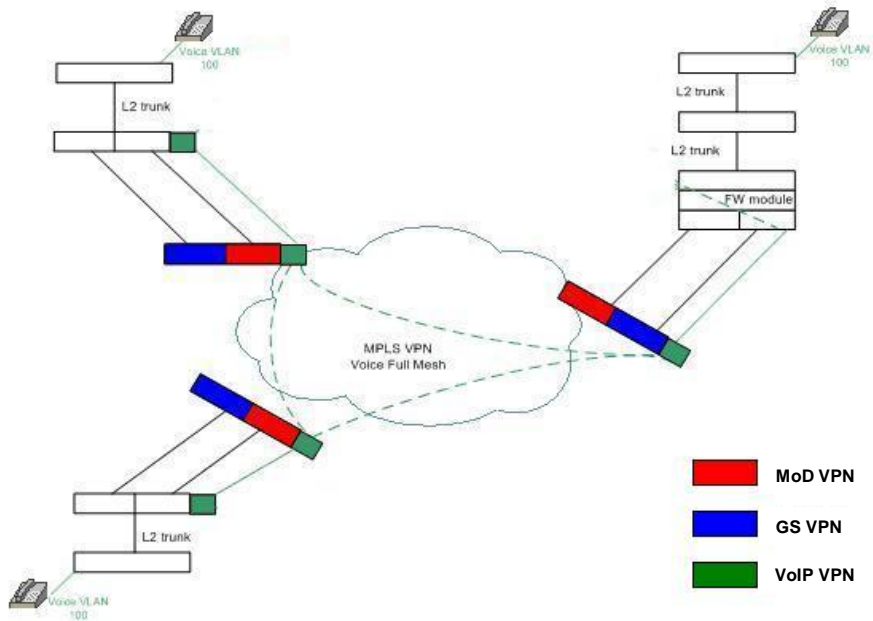


*Second Phase of the ODTS Project*

In the 2<sup>nd</sup> phase, a new achievement and ICT solutions, like MPLS (Multi Protocol Label Switching) and VoIP (Voice over IP) are used, which means better services quality that will be offered by this system.



*Topological description of the MPLS and VoIP network*



*General description of the VPN functionality*

In the third phase it is planned interconnection between LAN of the ARM and MoD as well as providing of connection and redundancy of following locations:

- Military location Cojljija;
- Barrack Petrovec - WING;
- Air Support Operation Center.

All these locations are to be connected with the other capacities of the Global WAN network. From the aspect of passive connection there is intend an optical infrastructure to be established. In context of network redundancy, an obtaining radio link will be established which will be located at Petrovec and Vodno (Stationary Signals Node). All necessary administrative procedures are in procedure in order this phase to be finalized.



*Logical scheme for connection of the locations out of Skopje in the larger territory of Republic of Macedonia*

By finishing of the third phase further extensions and development of required system capacities are considered. The completely connection of all capacities of the Army of Republic of Macedonia at the entire Macedonian territory in global system is foreseen, in one WAN network with connection of all buildings in the barracks and all other Army buildings, also connection of Defense Section of RM and realization of LAN networks after implementation of reform activities and their structure reorganization according to Strategic Defense Review.

For connection of the locations to the larger territory of Macedonia in global system from physic connection aspect it is planned already constructed optical infrastructure of the “Macedonian Telecommunications” or some other telecommunication services provider to be used through implementation of the IPVPN concept and other security concepts.

## SUMMARY

The accelerated penetration of information and communication technologies including Internet and e-commerce in all areas of human activity is rapidly changing the way we live, work and do business. Imperative of the countries with low level of ICT access and usage is to apply policies for reducing the digital divide. In this sense it is very important to monitor indicators that reflect ICT sector and ICT usage in enterprises and households with internationally accepted methodologies and with clear definition of ICT products and services.

Global Communication – Information System (GCIS) in MoD is going forward. Right now there are preparations for new applicable projects which are closely connected with ODTS.

Main purpose of these projects will be realization of the following systems:

- Personal Management Information System (currently in phase of realization);
- Document Management System;
- Logistic Automated Information System;
- Planning, Programming and Budget Execution System;
- Geographic Information System;
- Training and Education System.

Generally considered, the main benefit of the high ICT access is the more transparent information distribution giving chance to the people to be as much as possible independent (overcoming the previous info monopoly nevertheless governmental or political elites) and able to use this information in a very inventive way v.v. R&D. It prevails a feeling it is our generation big chance to utilize this information technology society advantage for good of people wellbeing and to assert common efforts in order to prevent its abusing (as it was case with black powder, atom energy etc).

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# CURRENT ECONOMIC CRISES AND CHALLENGES FOR DEFENSE BUDGETS

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## ABSTRACT

*Current economic crises ask prudent and strong actions from the governments in order to prevent hard consequences that challenge their national economic systems. They usually make massive budget interventions in financial and real sector in order to generate additional demand in the economy as well as to stimulate economy.*

*Budget distribution allocates financial resources for wages (public administration), current expenditures and capital expenditures.*

*Budget has to provide additional demand and spending in national economy in order to prevent appearance of recession and to compensate lost foreign direct investments (FDI). It is especially necessary for small economies where budget spending affects the rate of economic rise.*

*It is obvious that because of current economic crises governments have problems to realize planned fiscal revenues and budget expenditures. Many governments already announce budget cuts. The question of scope of military expenditures is already raised through public and academic debate. The range of the debate oscillate between defense spending as a great stimulus and doubts and concerns about it.*

**Key words:** *crises, economy, stimulus, defense budget, expenditures, PPP*

## INTRODUCTION

World face great challenge in terms of economic crises. At the same time, governments create budgets in order to reply to the strategic challenges facing the economy, making massive intervention in finance and real sector of economy.

Beside this new war against crises, governments have to provide public services and rate of economic rise promised to the people during their election champagne. It is also necessary highlighting the importance of infrastructure in delivering not only public services that meet people's needs and expectations, but also economic prosperity and growth.

This paper analyses in broad terms the changing investment needs and challenges for the Government of the Republic of Macedonia in terms of economic crises; sets out a range of approaches that have been developed to address complex procurement issues; outlines the role of private finance and the important contribution it can make; illustrates the key principles and drivers of value for money that public sector procurers need to use to evaluate a broad range of procurement approaches; and sets out how the Government is developing a more risk-based, systematic approach to the scrutiny of major projects, while providing support to them and further enhancing the skills of the public sector.

This study outlines the Government's approach both in order to assist public sector procurers and to act as a basis for further dialogue between the public and private sector on

how the Government can best meet its investment needs and help drive value for money solutions in complex procurement.

However, because of economic crises, many governments already announce budget cuts. This study will highlight part of debate about role of defense expenditures as a great stimulus and doubts and concerns about it.

## **1. NEW ROLE AND ORGANIZATION OF PUBLIC SERVICES**

The basic task or ambition of each government is to provide high quality of public services that can respond to people's need. Governments develop new strategies in order to transform public services and to provide value for money.

World face great challenge in terms of economic crises. In the same time, governments create budgets in order to reply to the strategic challenges facing the economy, highlighting the importance of infrastructure in delivering not only public services that meet people's needs and expectations, but also economic prosperity and growth.

Governments are trying to secure value for money in its procurement of significant assets, infrastructure and long-term service provision. In doing so, it recognizes the continually evolving needs of the public sector, and the changing approaches to complex procurement that have been developed over the past 15 years, and that will continue to develop. Governments have obligation always to consider possibilities of using PPP (Private-Public Partnership) as well as Private Finance Initiative (PFI) when plan procurement or capital budgeting. It outlines a framework for infrastructure procurement that is designed to drive value for money across the full range of procurement approaches and ensure the effective scrutiny of key projects, while continuing to improve public sector procurement and commercial skills. Through this, governments have to build the techniques and processes for PFI and apply them across a wider procurement spectrum.

Considering ideas and practices about full implementation of PPP and PFI as a strategic decision and vision of the Government of the Republic of Macedonia, it is hard to say that Government move step forward from declarative ideas for their implementation. It dues on hard public perception that such arrangements are causes for frauds, corruption and still communist legacy that somebody can make profit using public assets. However, it is crucial, especially in terms when budget constraints are obvious and expected that Government have to implement PPP and PFI in order to finance and fulfill planned capital investments. There is no alternative, especially when becomes obvious that FDI will miss.

Starting from basic trade off in economy, risk-return, Government has to provide fair return for investors risk and it can attract not only domestic but also foreign investors.

## **2. THE INFRASTRUCTURE CHALLENGE - INFRASTRUCTURE PROCUREMENT: DELIVERING LONG-TERM VALUE**

The Government has an objective to deliver high-quality public services. To achieve this, sustained increases in investment and new approaches are needed to meet the new challenges especially in terms of crises. Strong and dependable public services also lay the foundations for a flexible and productive economy.

This chapter briefly analyses Government's investment plans to deliver public services, in terms of the direction (sectors) of the Government's investment plans for the future and

how the Government intends to reform its framework for the most complex procurement projects to harness the full range of procurement approaches and drive value for money.

The environment in which public services operate has been transformed by far-reaching social, economic and technological developments over the past decade. Changing demographics and patterns of work and life, the impact of globalization, new technologies such as the internet and other developments, including in relation to the environment, are creating new and rising demands on public services and substantial changes in public attitudes and expectations.

Budget of the Republic of Macedonia 2009 sets out the strategic challenges facing the economy and confirms the importance of infrastructure investment in driving economic prosperity and growth. The Government also needs to meet new environmental and security challenges. This requires further progress and investment in associated assets and supporting infrastructure. Government action to meet these challenges includes:

- Education – capital investment in building and maintained of schools. Government started from 2008/2009 with two new important programs - for compulsory high school and establishment of new public universities in order to increase level of education in the country.
- Health – hospital building program and improvement of the quality of health care.
- Transport – capital investments in new highways and finishing railroad to Bulgaria. The basic idea is to stimulate economy development (direct and indirect effects).
- Housing – investment program as a long-term commitment to increase the availability of social housing
- Defense – This commitment provides capital investment in the armed forces. This investment will help to ensure that our armed forces have the right balance of capabilities, both equipment and infrastructure, in order to meet a range of challenges.
- Waste Management – the Government is increasing investment in more sustainable waste management options as an addition to, and roughly matches, investment by local authorities themselves.

Good procurement is central to the start of the asset life cycle and it is crucial that procuring authorities use a whole-life costing approach rather than the cheapest or easiest option. Major infrastructure projects require detailed and careful planning and it is important that a robust, value for money assessment be made when choosing the procurement option.

There is no doubt about proper identification of the need to invest in above mentioned crucial sectors, but also Government need to have a more strategic approach to asset management, driving better value for money and encouraging efficient management of the government's existing asset base. This includes:

- with the agreement of the Treasury, departments being able to reinvest proceeds from the sale of surplus fixed assets in capital investment in addition to their existing capital budget;

- departments producing asset management strategies to set out their plans for actively managing their existing assets and to provide the strategic context for future investments;
- retention by departments of proceeds from more efficient use of assets arising from engagement in the Wider Markets Initiative;
- initiative to deliver increased efficiencies in the management of the Government's property assets, especially through PPP; and
- ☐ the National Asset Register to help ensure that Government retains only those assets required for public service delivery.

Budget constraints as well as inappropriate and unsatisfactory use of public owned assets raised the question of PPP as additional opportunity to realize planned capital investments. PPPs are arrangements typified by joint working between the public and private sectors. In their broadest sense they can cover all types of collaboration across the private-public sector interface involving collaborative working together and risk sharing to deliver policies, services and infrastructure. PPP exhibits the following key features:<sup>17</sup>

- a joint working arrangement between the public and private sector, which may be by contract or through a joint venture company, to deliver infrastructure assets and usually, but not always, the ongoing maintenance and operation of the infrastructure assets and the delivery of associated services;
- risks are allocated between the parties based on which party is best placed to manage and bear the risk. Typically design, construction and operational risks are expected to be borne by the private sector; other risks which are shared are allocated in the way that best incentives both parties to manage the risks;
- generally a PPP is a long-term (25-30 years) arrangement between the parties but can be shorter term, for example where ongoing maintenance of the infrastructure assets and associated services are excluded;
- where ongoing operation and maintenance of the infrastructure assets and delivery of associated services are included, the public sector may pay the private sector for all or part of the use of the infrastructure over the life of the arrangement;
- payment to the private sector is structured in such a way as to ensure the private sector is incentivised to deliver the required services or obligations under the arrangement;
- payments are usually made by the authority but can be made by the end user, for example for the use of a toll road;
- the public sector is seeking to access private sector management and expertise to drive value for money; and
- the project is often financed either in part or in whole through private finance.

Government has to proceed with continued assessments of the ownership and management of the governments corporate and financial assets, these initiatives have also ensured good progress against the asset disposals target.

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<sup>17</sup> Infrastructure Procurement: Delivering Long Term Value, HM Treasury, March 12, 2008, page 18



### **3. BETTER ASSET MANAGEMENT, PFI AND ITS PLACE IN PUBLIC EXPENDITURE**

The vast majority of investment in the Macedonia's public services has been, and will continue to be, procured through conventional means. However, other innovative procurement approaches, and PFI in particular, has to be used to deliver some of the government's most complex and significant public sector infrastructure projects and programs. It becomes more and more necessary especially in terms when Government faces with budget constraints and limited resources for capital investment to start with PFI. PFI is an arrangement whereby the public sector contracts to purchase services, usually derived from an investment in assets, from the private sector on a long-term basis, often between 15 to 30 years.

*It is necessary for Government* to stimulate innovative procurement approaches that may in some circumstances provide better value for money for the public sector in addressing the complex infrastructure investment challenges ahead. It does, however, also announce a number of specific measures. To improve the procurement process, applicable to any delivery model, for large, complex infrastructure projects and programs, the Government (Treasury) has to:<sup>18</sup>

- issue guidance on conducting tenders for complex projects under Competitive Dialogue procedures;
- issue guidance on project maturity – the state of development infrastructure investment plans should have before the public sector formally engages with potential private sector contractors;
- move to a risk-based approach to scrutiny, with scrutiny taking place earlier in the procurement cycle and with increasing focus on the delivery model and the procurement process; and
- continue to support a wide-ranging program aimed at enhancing public sector procurement and intelligent client skills.

Government has to make clear guidance on joint ventures, to consider changes in credit terms through banking institutions where Government is part of ownership, has to issue guidance on specific PFI financing issues (related to refinancing, primary equity returns, underpinned debt and public sector capital contributions).

### **4. DEFENSE SPENDING AS “STIMULUS”**

The current world economic crisis torn defense and policy planners worldwide between two seemingly contradictory urges: reducing defense expenditure to help restrain spending, and increasing defense expenditures to help restrain growing global instability and shifting balance of power. Balancing or keeping at one side of this urge is something governments are facing while preparing 2010, or rebalancing 2009 budgets.

It is quite a challenge to cut defense budgets now, after military budgeters over the last decade went on expenditure binge. But the question is why or where to cut, or if there is a

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<sup>18</sup> Infrastructure Procurement: Delivering Long Term Value, HM Treasury, March 12, 2008, page 11

possibility that defense spending could be a stimulus for world economies that face economic downturn. In United States the question of scope of defense expenditures is already raised through public and academic debate.

U.S. Defense Department's budget, excluding funds for nuclear weapons, rose by nearly 70% between 2001 and 2009. The bullish economic climate, globalization, global war on terror and the rapid ascend of India and China provided all the excuses and resources to both politicians and military professionals. But now, with the global economic crisis they are forced to take a hard look at future military expenditures. At the end of 2008, after America got it's new president Barak Obama, and the crisis became deep economic recession, it was clear that changes are needed to be made. Many expected immediate budget cuts in response to the decline in national income, but also many argued for increased government spending as a way to offset the sharp decline in consumer outlays and business investment.

Economies with the most developed defense industries are ones that can use their defense expenditures for moving and stimulating the whole economy. But it is obvious that such measures can only bring benefits to countries that implement them, and the recession is a global issue. Conservative economist and one of U.S. President Obama's advisors on the President's Economic Recovery Advisory Board, Martin Feldstein made waves last year when he declared his support for a fiscal stimulus bill to combat the recession. Last December, Feldstein wrote in the *Wall Street Journal* that "a temporary rise in DoD spending on supplies, equipment and manpower should be a significant part of that increase in overall government outlays." Thus the idea of defense stimulus was born.

This idea has its bases in the Feldstein's arguments that if Washington adds 10 percent to its overall investments in defense, 5 percent to the Pentagon's operations spending, and recruits another 30,000 soldiers (a total increase of \$30 billion), it will help make the economy well again. Even Defense critics such as Lawrence Korb have called for more defense dollars in the stimulus package.

The Obama administration's \$787 billion stimulus package was headline news for weeks, bitterly argued over, hailed and derided in equal measure. At the end of February, another huge "stimulus" package was announced but generated almost no comment, controversy, or argument. The defense industry received its own special stimulus package -- news of the dollars available for the Pentagon budget in 2010; and at nearly \$700 billion (when all the bits and pieces are added in), it's almost as big as the Obama economic package and sure to be a lot less effective.

But why less effective, what are the arguments against using defense expenditures as an economy stimulus? What are the facts that crucified the idea of using defense expenditures as a way out of world economic crisis? The world remembers how World War II and the production stimulus it offered lifted the United States out of the Great Depression.

Today, the opposite seems to be the case. There are many arguments behind this statement. First, there isn't a policy reason to increase the defense budget. The bulk of the spending for Iraq and Afghanistan has already happened. Currently Defense's resources are at historically unprecedented levels, as U.S. defense spending dwarfs any previous level in constant dollar since World War II. U.S. spends more on defense than every other country in the world combined and all of this has led to an almost unprecedented fiscal boon to the manufacturers of military equipment and out-of-control defense budget. Even the defense increase from 3.4 percent of GDP in 2002 to a 4.2 percent in 2008 did little to stimulate economic growth and did nothing to contain the current economic crises – making

Feldstein's proposal to add \$30 billion in defense spending to the stimulus package to boost the economy, sounds like a joke.

Second, it is very important to allocate defense expenditures that can bring benefit to the economy in short terms. Even if Obama stimulus package includes more than \$10 billion for defense expenditures, it is a must-to-know their exact allocation in order to anticipate short and long term impact on the economy. In other words, the stimulus package does contain some spending for defense – new construction, building repairs and maintenance, greening the military infrastructure, etc., but that money is in fast-spending dollars, the construction projects are already designed, the repairs can happen quickly, and the green infrastructure can move just as fast. And when it comes to the equipment that has been degraded by operations in Iraq and Afghanistan, the funds that are needed to repair and replace it have already been heavily front-loaded in the last three “emergency” supplemental budgets, each of which contained \$20 billion to \$30 billion to repair, upgrade, and buy new military equipment. This shows that some kind of stimulus package in the defense industry of U.S. has been under way for a while, yet the economy has sharply tanked. Feldstein argues that defense expenditures have near-time stimulative effect on the economy.

There are also opposite opinions. Economists have also weighed in on why "war for jobs" as a way out of recession or depression has entered the world of mythology. An analysis from the University of Massachusetts's Political Economy Research Institute, for instance, finds that, for every one billion dollars invested in defense, 8,555 jobs are created. By contrast, the same billion invested in health care would create 12,883 jobs, and in education, 17,687 jobs or more than double the defense stimulus payoff.<sup>19</sup> Reallocation and rationalization of defense expenditures is what U.S. is doing now. U.S. President Barak Obama and Defense Secretary Robert Gates decided rather to rationalize than to cut defense expenditures so successively defense budget signals changes in goals and in weapons. Mr. Gates's proposed baseline 2010 Defense Department budget of \$534 billion is up 4% from last year.<sup>20</sup> But it signals a major departure from business as usual at the Pentagon, with a heavy emphasis on overhauling a procurement process that he and congressional leaders have decried as being too heavily influenced by powerful contractors.

However, small economies have also to consider necessity of investment in defense sector as economy stimulus. Considering Republic of Macedonia, country with still fragile security, it is question without alternative. Security is precedent for the people, so defense budget will escape from current budget rebalance.

## CONCLUSION

Responding to global economic crises requires governments to have innovative approaches in solving current issues, sometimes to make tough decisions and to apply them in order to realize what is decided and planned. Global changes arises the need for changes not only for the private, but also for the public sector of the economies. Problems need to be solved with synchronized action between governments and their agencies on one side and private sector on the other side. It is obvious now, months after appearance of crisis, that both

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<sup>19</sup> Berrigan, Frida, “Is the Next Defense Budget a Stimulus Package”, March 12, 2009

<sup>20</sup> The 513 billion dollar budget for 2009 is a final budget, and the proposed 2010 budget of 534 billion dollars hasn't had any supplements yet.

sectors need coordinated actions. So why not to take advantage of that connection and use it in a way that brings benefit to the whole economy?

Recession means less or even no FDI, less budget revenues and more cuts of budget expenditures and this is where Governments face a problem. They must find a way to compensate what is lost and to stimulate economic growth. A way of doing this is through Private-Public Partnership and Private Finance Initiative and these innovative approaches are ensuring better assets management and good procurement. There are also many other ways of stimulating economies that have problems connected with the crisis, as it is defense expenditures or cutting, rationalizing and reallocating different parts of the budget. Still, what will prove to be the best solution is something that first needs to be done.

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# R&D NATIONAL POLICY IN THE REPUBLIC OF MACEDONIA ACCORDING TO THE SECURITY RELATED AND GENERALLY R&D SCENE – CURRENT STATUS AND SHORTFALLS

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## ABSTARACT

*Wiling to use a more general, comprehensive, methodical and thorough approach based on a deductive analyze as well, striving to contribute on a pragmatic way in the area of interest - Security and military R&D policy in Republic of Macedonia, below is offered (by the authors) a **problem-available means-possible solutions model** based on the analyzing the current status, comparative examples, national and international environment, problems and shortfalls and consequently optimal possible solutions, future steps needed to be done.*

## 1. POLICY FRAMEWORK

### 1.1. GOVERNMENTAL BODIES

According to the Constitution, the state has an obligation to encourage and support the technological development of the world. The governmental body in charge of R&D policy in the Republic of Macedonia is the Ministry of Education and Science, which is organized and executed by the Department of Science and Technology and advised by the Council for Science and Research. The Ministry of Education and Science is responsible for organization, financing, developing and promotion of scientific research, technological development, technical culture, information technology and information systems as well as the international cooperation related to these issues. The responsibilities of the Ministry also include issues related to level of education.

Scientific activities in the Republic of Macedonia are performed and organized by a network of scientific institution comprising 6 universities (3 public and 3 private), several research institutes active in various fields units in industry. An important scientific organization is the Macedonian Academy of Science and Arts, the goal of which is to stimulate development of the science and arts.

Within the governmental sector, we should also mention the activities of other ministries: the Ministry of Agriculture, Forestry and Water Supply; the Ministry of Economy, Health and Ecology; and especially the Sector of European Integration of the Government.

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<sup>21</sup> MoD, Military academy “General Mihailo Apostolski” - Skopje

<sup>22</sup> MoD, Macedonian Army, Land Forces

<sup>23</sup> MoD, Department of planning and bilateral cooperation

<sup>24</sup> First Private University - European University, Skopje

According to their strategies, all these bodies act as important subjects related to the research achievement of the scientific community.

## 1.2. LEGAL FRAMEWORKS OF THE R&d SECTOR

Issues related to R&D are regulated by the following laws:

- ✚ Law on the Macedonian Academy of Science and Arts;
- ✚ Law on Science and Research Activities;
  - **Internal documents for:**
    - Supporting of young scientists
    - Financing of scientific projects
    - Supporting of publishing
    - Law on Encouraging and Supporting Technology Development;
    - Law on Higher Education;
    - Law on Industrial and Intellectual Property Protection;
    - Several regulations and instructions.

The Laws related to research arrange the system, principles, public interest, forms of organizations and management of these kinds of activities as well as the ways of stimulating and supporting their development, scientific personnel and other issues related to them. The system of scientific activities involves scientific research, qualification and training of personnel for research work and research infrastructure.

The basic principles of performing scientific activities are inviolability and protection of human personality and dignity, and they are also based on the following: freedom of scientific creativity; autonomy and ethics of researchers during their scientific work and use and application of the results; diversity of scientific ideas and methods; and international cooperation.

These laws also define the public interest in scientific research in the field of national and cultural identity of the Macedonian people and others living in the Republic of Macedonia. It also determines research as a general condition for the economic, social, cultural and environmental development of the country. Research that serves the function of increasing the scientific level and transfer of knowledge as well as that in the field of defense and security is also defined in this law. Improvement in the human resources and research infrastructure are also in the public interest. A five-year program for development of these activities is being prepared.

The law related to technology development stimulates and supports this kind of development in the country as well as the programming of this activity and its financing. This law defines technology development as:

- ✚ Development of own technologies;
- ✚ Progress of the country upon independent economic base;
- ✚ Modernization of existing production capacities;
- ✚ Building of necessary technological infrastructure and transfer of knowledge through a continuous superstructure of skills.

### 1.3. ROLE OF THE INDUSTRIAL SECTOR IN R&D

Considering overall political, social and economic conditions the country has faced during the past years, while additionally burdened by instability, the role and position of industry has significantly decreased in the domain of research and development.

As a result of restructuring and privatization processes, many R&D units within enterprises have vanished. Present inconvenient financial circumstances do not allow larger investments in research and development.

### 1.4. MACEDONIAN RESEARCH INFRASTRUCTURE

Macedonian institutional infrastructure is as follows:

- ✚ Macedonian Academy of Science and Arts, comprising five departments and five research centers;
- ✚ Six universities (three public and three private);
- ✚ Thirty-four faculties;
- ✚ Thirteen public scientific institutes;
- ✚ Twenty R&D units within industry;
- ✚ Six scientific regional associations;
- ✚ Consulting agencies and offices.

In the following table can be seen scientific human resources in Macedonia until 2004.

*Table 1. Scientific Human Resources in Macedonia*

YEAR	1998	1999	2000	2001	2002	2003	2004
Total	3275	3168	3094	2909	2869	2589	2552
FTE	1892	1838	1786	1630	1519	1464	1447
FTE per 1000 LF	2.4	2.3	2.2	1.9	1.8	1.7	1.7

### 1.5. FINANCIAL ASPECTS OF SCIENCE AND TECHNOLOGY IN REPUBLIC OF MACEDONIA

Considering the overall political, social, and economic conditions the country has faced during the past years, the funding of scientific research has been very limited. This has also been followed by a continuous decrease in the number of active researchers in the country. However, the Ministry has promoted and stimulated activities aimed at an integrated approach in research activities and especially for regional and international cooperation.

In 2002, the gross HE (Higher Education) expenditure on R&D - ratio of the GDP was 0.11. Out of 100% gross expenditure for R&D, 40.9% goes to research conducted in the HE sector. Support from the National Budget: national and international research projects, grants for postgraduate and doctoral studies in the country and abroad, R&D meetings,

participation of academics in the international meetings, study visits abroad, programs of the public research institutes, equipment, R&D literature etc

The Higher Education Development and Financing Council (HEDFC) was established by the Government in October 2003. The Council is responsible for development and implementation of measures and criteria for financing of HE (institutions, investments in HE, student grants and loans etc.). It prepares programs for development of HE to be submitted to the Government for adoption.

In accordance with sources for financing, R&D can be financed through:

- ✚ own resources of institutions,
- ✚ companies resources,
- ✚ state budget,
- ✚ international financed projects.

Budget contribution to R&D is limited (scarce resources) and in 2002 it was 0,44% from governmental budget. In accordance with EU suggestion and directives from Barcelona it has to be from GDP, and in case of the Republic of Macedonia it actually means only 0,11 % from GDP. On the other side funds coming from business community are 0,02%, while EU directives are 2%. It means that in the Republic of Macedonia *business sector provides 100 times less than countries from EU*. We can conclude that if continues in that way, we could not expect faster development of R&D in Macedonia. *Having not enough established R&D innovation system in the private sector and low interest in the private sector for R&D it couldn't be possible to provide faster development of science.*

The number of researchers in 2002 was 1519. For their activities in last five years were spent 0.2% of GDP per year. Considering the fact that level of budget expenditures for R&D is still not sufficient, we can identify the need for changes and searching new sources as urgent.

Public-Private partnership should be seriously considered as a additional element of R&D Concept and Policy, that can provide funding and development of necessary capacities and support of R&D Projects in the Republic of Macedonia.

Government still shows low level of trust to private companies' capacities for R&D in security sector as well as their bigger involvement and functions in security area. Full implementation of the Concept of Logistic Support for the Republic of Macedonia and ARM can provide progress in that way. It will help not only to improve the situation in security sector, but also will bring additional influence to economic development of the country.

## **2. THE GOALS OF R&D POLICY IN THE REPUBLIC OF MACEDONIA**

Republic of Macedonia has managed to achieve significant results in certain scientific areas. There are several distinguished high-level institutes and centers recognized throughout the international scientific community. There are also other research units moving rapidly toward achieving international standards and criteria, which can be competitive and desirable partners in research activities.

The goals of R&D policy are to:

- ✚ Increase the use and transfer of knowledge for economic, social, cultural and environmental development of Republic of Macedonia;



- ✚ Encourage and promote international cooperation and transfer of knowledge and technology from abroad;
- ✚ Introduce a monitoring and evaluation system of scientific and technological quality and output of research groups using internationally accepted standards and criteria;
- ✚ Increase investments in S&R activities;
- ✚ Increase the use of internationally funds, technical assistance, etc;
- ✚ Define and establish interdisciplinary programmes for target research;
- ✚ Set internationally recognized measures for evaluation and assessment of the economic value of research results as criteria for future policy definition;
- ✚ Support enterprises in establishing R&D units for effective transfer and use of new technologies;
- ✚ Reduce the technological gap in order to reach the level of development of more highly developed countries;
- ✚ Create conditions to raise the quality of knowledge and innovation;
- ✚ Create a system of technology information as part of a community information system according to the criteria of relevant databases, services and networks;
- ✚ Establish a unique infrastructure model to support and develop science and technology;
- ✚ Heal and improve domestic industry and companies, and especially support SMEs in order to achieve better performance of their products and make them competitive worldwide;
- ✚ Establish a system of priorities that will be supported by economic policy tools.

### **3. MEASURES TAKEN BY THE GOVERNMENT TO DEVELOP THE R&D SECTOR AND ENCOURAGE R&D**

The ministry of Education and Science strives toward the successful transformation of higher education with regard to better transfer of knowledge within the scientific and business sectors.

The Governmental measures for improvement of the R&D sector are defined in several programs, which encompass programs for improvement of R&D and programs for enhanced technological development. The Ministry of Education and Science has seriously considered the problem of the technological development of the country, and in that regard, measures have been taken in order to stimulate and support cooperation between the universities and industry, improve and intensify the use of scientific research results in industry, and promote the technological development of enterprises aimed at stimulating their competitiveness.

( Programs for improvement of R&D

- ✚ for encouraging and supporting national R&D projects,
- ✚ for granting fellowships for post-graduate and doctoral studies both in the country and abroad,
- ✚ for supporting researchers for participation at international meetings,

- ✚ target research program for coordination of the R&D activities within the governmental bodies,
- ✚ for encouraging and supporting technological development for the period 2006-2010,
- ✚ for development of R&D infrastructure

( For enhanced technological development, measures are taken in order to:

- ✚ stimulate and support the cooperation between the universities and the industry;
- ✚ improve and intensify the use of the scientific research results in the industry;
- ✚ promote the technological development of the enterprises aimed at stimulation of their competitiveness.

During 2004 and 2005, for the first time, a complete database with publications in scientific journals with impact factors (journals referred to in SCI and citations of institutions and researchers) was created in the country. A database of all patent activities was compiled as well.

In 2005, the new Council for Scientific research was introduced. Furthermore, a completely new system of project evaluation was established with assigned national coordinators for each scientific discipline who manage the evaluation process of scientific projects in the respective fields.

In 2006, the Ministry of Education and Science signed an agreement for national access to the electronic scientific database Scopus, which is available for all faculties and institutes at the state universities in the country. Also in 2006, the Government accepted a “Program for development of scientific research activities in the Republic of Macedonia for the period of 2006-2010”. The Program was prepared in one year by experts and officials from all fields of science and future activities are set out in the Action Plan of this Program. The new strategy for improvement of R&D defined in this document suggests an integrated approach to research activities characterized by necessity and quality. Increasing funding for R&D projects and for fellowships for young researchers is one of the priorities together with increased regional and international cooperation. Additionally, a definition of the national priorities in the R&D sector as well as an improved intergovernmental coordination between the ministries is emphasized as main concerns for the future development of the country. This strategy for the future science policy also includes a definition of criteria for supporting R&D, establishing a new peer evaluation procedure.

As one of the strategic objectives, five potential centers of excellence have been identified in the country based on their scientific results: Institute of Chemistry at the Faculty of Natural Sciences and Mathematics; Research Centre for Genetic Engineering and Biotechnology at the Macedonian Academy of Sciences and Arts; Nephrology Clinic at the Faculty of Medicine; Research Centre for Energy, Informatics and Material Science at the Macedonian Academy of Sciences and Arts and the Institute for Earthquake Engineering and Engineering Seismology. They are recognized not only in the country, but also internationally due to their publications, citations and international cooperation.

During the 2006, the Ministry has promoted and stimulated international cooperation in all fields of scientific research and technological development. This strategy has produced a substantial increase in international scientific cooperation with many countries, especially with the European Union Member States. The scientific cooperation has been realized

through the Framework Programs for RTD, COST, NATO, UNESCO, IAEA and JICA. The increased participation of the Macedonian scientists in the 6th Framework Program should be especially highlighted. According to our data, more than 50 projects with our scientists have been approved, which is 4 times more than in the 5th Framework Program. The Macedonian Government officially stated the willingness and readiness for improvement of science and research in the country and a full participation in the 7th Framework Program. The Department of Science at the Ministry of Education and Science is an active participant in two large and important multilateral projects in the 6th Framework Program (SEE-ERA.NET and ERA-WEST-BALKAN+), which enables a wider incorporation of Macedonia in European S&T activities. The participation of our scientists in the COST Program also significantly increased from 5 Actions in 2003 to 25 Actions in 2006.












The Department of Science creates European oriented science policy and, in every way, promotes, stimulates and assists in establishing international cooperation. Three years ago, there was bilateral project cooperation with Slovenia and Germany only. Then, this kind of cooperation was for the first time established with Bulgaria, Serbia, Croatia, France, Albania, the Russian Federation, Japan and China with more than a hundred bilateral projects. In the near future, cooperation with the USA, Israel, Austria and Spain will begin as well. Furthermore, there is an open call for joint project proposals with institutions from countries with which Macedonia has not signed agreements for scientific cooperation yet.

All these activities are intended to facilitate the incorporation of Macedonia in the European activities in the scientific research area, which has been recognized in the opinion of the European Commission for the status of this sector in the country, stating that in the fields of Science and Research the country should not have major difficulties in applying the *acquis* in the medium term.

Finally, the necessity of full understanding, coordination and support between the science policy makers and other decision makers should be emphasized because it is the only way for efficient and productive improvement of the scientific research and technological development of the country.

### **3.1. NATIONAL RESEARCH POLICY**

The Ministry of Education and Science has defined and set the following R&D priorities:

-  Sustainable development;
-  Water resources and management;
-  Energy;
-  New materials;
-  Environment;
-  Information and communication technologies;
-  Health;
-  Biotechnology;
-  Nanotechnology
-  High-quality food production;
-  Earth science and engineering.

Special attention will be paid to overcoming problems concerning modernization of the existing R&D infrastructure as well as building a new one.

### 3.2. DEVELOPMENT OF THE STRATEGY FOR INDUSTRIAL POLICY IN THE REPUBLIC OF MACEDONIA

Key drivers of Macedonian industry development are the following:

- ✚ Future of Macedonian industry will depend on enhanced collaboration between business and academia/research for knowledge creation and innovation.
- ✚ Macedonian industry will need better technology and will have to adopt high-quality standards in order to create high-value added products and services. Strategic industries will have to be defined.
- ✚ SME development and entrepreneurship will depend upon concrete governmental measures for elimination of administrative barriers.
- ✚ Relevance of education and importance of knowledge for industry development should be intensively promoted.
- ✚ Macedonia should strive for regulation compatible with EU (especially in the area of technology imports, quality, prices and other terms of trade).
- ✚ Exploitation and financing of new technologies should be stimulated (also by establishment of coordinative body for new technologies support).
- ✚ Public-Private Partnership (PPP) should be enhanced (learning PPP from experiences in other countries).
- ✚ Renewable energy production will have to be stimulated by supportive regulation and proactive policy measures.
- ✚ Better financing for SMEs (loans, venture capital etc.) is a pre-requisite for SME development.
- ✚ Innovation support institutions will have to be developed and they will have an important role for innovation development.

Investment enhancement will have to be based on equal treatment between domestic and foreign investors. The Inter-ministerial working group, business sector representatives and academia members have created a **shared vision** of industry development. It has been jointly agreed that the **vision of Macedonian industry will be based on high value added products and the development of new capacities in research and production of sustainable, organic and specialized high-tech products and services** (i.e. organic wine and foods, eco-steel, specialized electronic parts, renewable energy production, construction, medical equipment, authentic tourism etc.).

The pro-active industrial policy as a set of governmental measures will support Macedonian industry in such way that it will be able to **grow traditional (niche oriented) as well as new high tech sustainable industries around the renewable energy field, and combining information technology and other advanced services – building on knowledge networks established through the world.**

Macedonian industrial policy will strive to enhance new, applicable research and innovation methods in education and industry. Business and research will be stimulated for interaction and collaboration (clustering). Knowledge for development will be possible due to the **increased public and private investment in research and development and engagement of talented people** (approaching towards Lisbon Strategy goals).

The Macedonian new industry potential will be possible due to the ability of key development stakeholders (political, business and research/academia leaders) to reach consensus and decide for value-added, internationally oriented industry based on dynamic

mix of sustainable and authentic industries, “clean-tech” manufacturing, and innovative service industries that create jobs and a rising standard of living for all population in Macedonia.

#### **4. MACEDONIAN SECURITY RELATED R&D SCENE**

Macedonia’s accession to the North Atlantic Treaty Organization (NATO) requires restructuring as well as modernization of the Macedonian Armed Forces in compliance with the NATO standards. Along with the outlined plan for the modernization of the Armed Forces within a timeframe that spans from 2004-2013 there is also a separate Strategic Defense Review (SDR). Its main task is to perform a thorough reassessment of the state of the armed forces and to outline the guidelines for their long-term development in conformity with the new security environment and the available defense resources.

The *upgrading of the communication/information systems will be one of the main focuses* of the campaign, as well as *strengthening the operative capabilities of the deployable forces*. The modernization of the armament/equipment of the Army, and Aviation WING, Development of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance Systems (C4ISR) is another priority.

For the sake of development of the structure and capabilities, defense assumptions should be adopted most urgently, which relate to operational capability, readiness, scale of effort and concurrency for operations. The development of the structure of forces and capabilities should be in accordance with the requirements and structure of forces and capabilities established in this political framework, especially the priorities, missions of defense and tasks of Macedonian army.

The *Strategy is adopted* for the management of defense at all levels of decision making, as well as in the areas that relate to personnel (including also education of civilian experts), its professionalization, qualifications, career with equal opportunities for all, as well as adequate ethnic representation in the Macedonian army, training and education, including the civilian personnel in the ministry of defense, interoperability, modernization and procurement, logistics, standardization, as well as development of strategies for improvement and interoperability of the intelligence capabilities and crisis management.

The current Strategic Defense Review works on the basis not of a nonexistent conventional threat, but of a *considerable internal terrorist and insurgent threat*. Cross-border criminal activity should figure prominently in these calculations, as should plans to stop trafficking and *organized crime* networks from further eroding the authority of the Macedonian state. The lingering *ethnic tension* signals to NATO that Republic of Macedonia still requires significant external assistance, from both Europe and the United States, in order to embrace its original reform policies and goals and that continued international engagement and the bi-ethnic composition of the ruling coalition in Republic of Macedonia will help to reduce the threat of a return to the open conflict experienced in 2001. However, the acknowledgment of the achieved results accomplishing all NATO membership criteria (including political stability and contribution to regional and worldwide stability ) given to Republic of Macedonia during NATO Summit in Bucharest 2008 presents Republic of Macedonia in an another light - as more contributing country than an user of foreign assistance.

Achieving NATO interoperability and contributing to the organization’s future operations are priority goals for Republic of Macedonia, even though currently the ARM’s capability is limited in both of these areas. Still, Republic of Macedonia now contribute a motorized

infantry company, a medical squad, an aviation detachment with two utility helicopters, and an engineering platoon for Multinational Peace Force South-East Europe (MPFSEE)/ Southeast European Brigade (SEEBRIG).

The Republic of Macedonia is not “giant” manufacturer of armament and military equipment and therefore the Republic of Macedonia is not a big exporter of defense technologies. There are only two factories producing some military equipment and armament (“Suvenir” – producing munitions and repair of small weapons and “Eurocomposit”- producing equipment for personal protection as helmets and bulletproof personal equipment) and one factory for repairing and maintenance of the military equipment and armament factory - “MZT Specijalni vozila” (factory that repairs the artillery armament and light combat vehicles). At the beginning of 2005 the factory “Suvenir” was bought by “Olympicos Industry”. The restarting of the production is expected followed by extending of the small ammunition production program- appropriate to NATO standards. In the next period the factory “Eurocomposit” should be sold and its privatization is to be expected in the near future. According to the factual situation there is no strict and designed concept for defense industry transformation.

According to the Production and Turnover of Armament and Military Equipment Law (published on 15 July, 2002), articles 9 and 10, D & R of new armament and military equipment technologies is committed under the base of a D & R program which is adopted by the Government of the R Macedonia on the proposal by the Ministry of Economy in cooperation with the Ministries of Defense and Interior. The D & R of the new armament and military equipment can be committed by public science institutions, enterprises producing armament and military equipment and other science institutions that are dealing with science – research activities, in accordance to the existing laws. The program is financed from the budget of the Republic of Macedonia. The Ministry of Defense doesn't possess science – research and producing capacities. Therefore the Ministry of Defense for its own needs is contracting products and services with the factories that are part of the Economy system, eligible and verified for this purpose. Within the Ministry of Economy exists a Sector for Special Production that is the pillar body for coordination of R & D activities. In the budget of MoD/Sector for Logistic – Section for R & D of the weapons and military equipment is planned an amount of 50 000 Euros per year for R & D. The R & D issue is only generally considered within the 5<sup>th</sup> part of the SDR – Equipment and Modernization Plan.

## **5. ACTORS AND COORDINATION OF SECURITY RELATED R&D**

Ministry of Defense R&D capacities- The function of the Section for R&D (3 persons manned only) of the production of weapons and military equipment in the frame of the Sector for Logistic in the MoD is: informative support to the leading authorities in the MoD in the creating of the policy for equipping of the MoD by weapon and military equipment from the domestic industrial resources, cooperation with the Sector for Special Production in the Ministry of Economy by overseeing the situation of the domestic industrial capacities and preparation of the relevant legal documents, preparing the regular analyses for technical – technological capacities and regular analyses for the personal management capacities of the production subjects that are dealing with R&D of the production of weapons and military equipment.

*The Commission for Special Production oversees the situation and the development of the production of weapons and military equipment in peace; development and preparation of*

*the basic and additional capacities intended for production of weapons and military equipment, as well as production of medical materials and other products, equipment and services for the needs of the defense.*

Within the Ministry of Economy - Sector for Special Production is the focal point dealing with special production and plays the coordination role for other institutions and agencies (Ministries).

The main own innovation potential of military science development and R&D policy of the MoD and General Staff are the Military academy, the Military Hospital and other institutions in the Army. Material and financial support is from the MoD budget funds. Responsible institution in MoD (Department for training and education and R&D policy) should make plans and programs and should hold A Law for R&D policy within the Army.

***The Military Academy of the Republic of Macedonia*** was established by Law which is in accordance with the Law on Higher Education and the Law on Research Work in the Republic of Macedonia.

The Military Academy was verified by the Ministry of Education and Science as tertiary level educational and research institution, which gives it the same status as other faculties and makes it part of the educational system of the Republic of Macedonia. The degrees issued by the Military Academy are valid in the country and they give officers an equal education status as other graduates from civilian universities. The Military Academy is the only tertiary-level military educational institution in the Republic of Macedonia. Its main task is to educate, train and provide further development for officer personnel for ARM, and to engage them in research in the field of defense in accordance with the law.

***Section for R&D of the production of weapons and military equipment***, in the frame of the Sector for Logistic in the MoD, provides: informative support to the leading authorities in the MoD in the creating of the policy for equipping of the MoD by weapon and military equipment from the domestic industrial resources, cooperation with the Sector for Special Production in the Ministry of Economy by overseeing the situation of the domestic industrial capacities and preparation of the relevant legal documents, preparing the regular analyses for technical – technological capacities and regular analyses for the personal management capacities of the production subjects that are dealing with R&D of the production of weapons and military equipment.

On the 1<sup>st</sup> of July 2003 the Law on ***the Police Academy*** came into effect. This law provides the Police Academy with a leading role concerning research and education in the field of policing and other areas of security.

***Police academy*** (now is transformed as faculty of security from St. Kliment Ohridski University - Bitola) want to enhance its educational role by delivering basic and further education of national and international acknowledged quality and by the evaluation, dissemination, production and application of scientific knowledge in the field of policing and other areas of security. Police academy want to become a ***centre of excellence*** in our part of the world as well as belonging to the top five Police Academies in Europe. It considers itself responsible for remaining up-to-date in the field of research and education. Its police education is recognized on national and international level. This means that it will meet national and international quality standards. Its diplomas will be recognized all over Europe and they will facilitate participation in studies abroad. Being a centre of excellence will provide the Macedonian police and the other agencies in the field of security with state-of-the-art expertise. In this way we can serve the police and the other agencies in our field of security of our country in the best way.

## 6. FUTURE STEPS – BY PRIORITIES

### 6.1 INVESTMENTS AGAINST POSSIBLE SECURITY THREATS

Having in mind the national and international defense missions, tasks, strategic goals and functions, the asymmetric character of most possible security threats (facing with terrorist groups attacks) especially viewed through the light of casualties analyzed from the conflict 2001 in Macedonia, where more than 80% were spawned by anti transport vehicles mine attacks, it is obvious that first priority of the security and military R&D should be obtaining ***highest level of combat/transport vehicles mine attacks protection***. Other priorities in this area should be T72 tanks modernization and supplying of transport aircrafts.

6.1.1 In pursuit of mission 1.1.1 subtask B.4- -defense and protection of the territorial integrity and independence of the Republic of Macedonia versus Control of the Macedonia Airspace, creating the ***optimal development anti-aircraft protection programs*** would be second priority. In this regard a suitable regional ASOC system development program will be much appreciated.

6.1.2. Concerning the counterterrorism the development ***upgrading programs for the communication/information systems should be one of the main focuses***, especially in correlation to the Development of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance Systems (C4ISR) is another priority. Taking into consideration that the current Strategic Defense Review works on the basis of a ***considerable internal terrorist and insurgent threat*** and that cross-border criminal activity should figure prominently in these calculations, development of appropriate ***engineer equipment and special vehicles upgrading programs*** are welcomed as well as programs for soldier personal higher protection (for example within a cooperation with EUROINVEST company)

6.1.3. Having in mind that in the long term we are not expecting any conventional one, in addition to the above said, the visions, plans, force structures and manner of their functioning should incorporate elements and contents of what is today called crises management and early warning on potential threats. To that end, we particularly have to improve the intelligence capabilities and possibilities of compatible and efficient information sharing and coordination of the activities with the all other subsystems of the R. Macedonia, as well as with our neighbours, countries in the region, NATO and the international community.

The Republic of Macedonia continues the development of the national capabilities for the fight against terrorism and capacities for support of and participation in the joint activities of NATO and its Partners, as well as with the other international organizations. The security agencies in the country (the Directorate for Security and Counterintelligence at the Ministry of the Interior, the Military Service for Security and Intelligence at the Ministry of the Defense and the Intelligence Agency) maintain mutual coordination and cooperation at an exceptionally high level. Prime minister and the president of Republic of Macedonia are regularly informed on the security situation in the country and in the region through joint intelligence information from the security services.

Security agencies of the Republic of Macedonia maintain continuous and good cooperation with NOS (NATO Office for Security), ILU (Intelligence Liaison Units) and TTIU (Terrorist Threat Intelligence Unit). On several occasions in course of 2007 direct communications have been established and Joint meetings have been held.



Aiming at creating a single and integrated national security system, upon the initiative of the Ministry of the Interior, and an inter-department Working Group, composed of representatives of the competent ministries, agencies and services for intelligence and counterintelligence, for reform of the security system was established.

In capability category of intelligence collection and reconnaissance, procurement of the Long range Surveillance Vehicles, High performance Radar Equipments, Unmanned Aerial Vehicles and specific Warfare Equipment will be made and they are to be organically combined in the mixed ISR Units of the Army intelligence branch.

## **6.2. COOPERATION WITH EU AND NATO R&D INSTITUTIONS**

Having in mind the Macedonian aspiration to be a full-fledged member of NATO and EU and to promote a collective approach to the security and stability as comparatively considered superior and more appropriate versus a clear national approach, especially seen in the light of coping with asymmetric threats - such as international terrorism, for the Republic of Macedonia would be very beneficial to continue with following and incorporating its own R&D capacities within NATO and EU R&D structure, programs and organization (NATO Program for Security Through Science, NATO Research and Technology Organization, EDA and EU R&D area with EU Framework Programs)

## **6.3. EDUCATION SYSTEM IMPROVEMENT**

Concerning the threats coming from structural violence especially potential internal *ethnic tension* and low level of R&D oriented education it is more than needed to strengthen the governmental coordination with relevant IO's (OSCE, EU, NATO, US resident missions) through development of common (governmental and IO supported) confidence building focused programs<sup>25</sup>.

6.3.1. Development of programs for better and more qualitative R&D oriented *education* comprising as much as possible of the school population.

6.3.1.1. Increasing the awareness and relevance of education and importance of knowledge for industry development should be intensively promoted.

6.3.1.2. Improving the education and science system in order to tackle shortage in the supply of qualified labor, to improve the firms' access to high qualified personnel, including vocational and on-the-job training and to provide a public research base as a partner in innovation projects.

6.3.2. The lack of enough traditional produced energy is more and more obvious and in the future this lack can spawn instability and security threats. In order timely to take relevant and appropriate measures it is necessary a development of renewable and alternative energy production programs - to be stimulated by supportive regulation and proactive policy measures.

## **6.4. GOVERNMENT (STATE) INSTITUTION VERSUS PRIVATE COMPANIES**

✚ Improving framework conditions for innovation, notably through simplifying the tax system and reducing the tax burden for firms, and by diminishing bureaucratic procedures that may inhibit innovation and the start-up of new enterprises.

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<sup>25</sup> For example OSCE Spill-over mission (in Skopje) budget for 2007 was around 10 Mil EURO. One of five sections within structure of this mission is focused on confidence building.

✚ Promoting innovation activities in firms through financial aid. Subsidies can be delivered via four channels: R&D grants for research in high-tech areas, R&D grants for co-operative research, financial support for innovation projects in technology-oriented R&D provided either through loans or venture capital and technology consulting services and the provision of a techno-scientific and informational infrastructure for innovative enterprises.

- Establishment of Inter-ministerial and private companies working groups,
- Establishment of new technology transfer centers in a view of more efficient integration of research and business entities,
- Providing favorable working conditions for the research entities with unacceptable conditions.
- Stimulation of the promoting new research and development units within the economy,
- Recommendations for increasing knowledge transfer between universities and industries,
- In pursuit of aspects of security and industrial policy - the preservation of core capabilities, the problems relating to military equipment and dual us equipment, the preservation of technology and jobs must hereby all be taken into account

6.4.1. The **research work conducted by government-funded institutes** is of particular importance. In addition to the available civilian research and its results that are to be used for defense technology these institutes have to accomplish the following central tasks:

- to provide the scientific and technological know-how for intelligent and economical equipment decisions;
- to offer new technological solutions and to realize the relevance of new technologies for the armed forces' capabilities;
- to develop new generic (sub-)system concepts;
- to work out contributions for a national- relevant international NATO/EU research and technology basis and for the ability for cooperation;
- to participate in maintaining a defense-related competence;
- to research in the area of the *Catalysts and electrode structure for ecological clean electromechanical energy sources with hard polymer electrolyte*, bilateral project funded by the Ministry of Science of the RM and The institute for electrochemistry at the Bulgarian Academy of Science, continuing with work during 2008;
- to research in the area of the *Instability and nature law at the rising up of the morphology forms at the electrochemical systems which are far from stability*, bilateral project funded by the Ministry of Science of the RM and The institute for physical chemistry at the Bulgarian Academy of Science, continuing with work during 2008;
- to study *the morphology of the metal deposits with electro refinement in modified conditions*, project funded by the Ministry of Science of the RM, 2003-2006
- to provide the system for researching and following the chemical stability of pressured explosive materia – fusses, project funded by the Ministry of Defense of the RM, from 2006 and during 2008.

## 6.5. FUNDS

As it is elaborated above, concerned by the growing capabilities gap between Europe and the United States, the 2002 Barcelona European Council set the goal of raising overall research investment in the *EU* from 1.9% of GDP to **around 3%** by 2010. Nearly all Member States have set targets, which – if met – would bring research investment in the EU to 2.6% by 2010. The same trend exists in *NATO* frame where many European leaders have already taken steps to increase their defense budgets. France, Norway, Portugal, and the United Kingdom have submitted budgets with **a boost in defense spending**, ranging from 1.2 percent in the United Kingdom to 8.2 percent in France (here especially increasing the level of funds dedicated to R&D - near **to 2%**)

From the another side a short overview given above within item 1.5 depicts the low level of financial support ( **0.44%** from the GDP) as well as even low level of consideration of using developed R&D capacities advantages within the industrial process (military/civilian) in Macedonia. A proper way ahead could be increasing of national (governmental) funds dedicated on R&D capacities, especially in the industrial process, based on the priorities mentioned in this item or a consolidated version of these main priorities appropriate to national industry (state or private sector), but not limited only on the relying on these funds. It will be grate advantage to use also the IO, NGO, multilateral cooperation projects and bilateral cooperation programs funds for this purpose i.e. supporting the industrial R&D projects as it is case with some agricultural projects, electrical power and water supply projects, clean environment (ecological) and communities confidence building projects. etc. It is to convince the projects allocation funds decision makers on the benefit of some industrial R&D and technological development projects.

## 7. PERSPECTIVES AND IDEAS FOR CHANGE OF THE R&D NATIONAL POLICIES FOR THE REPUBLIC OF MACEDONIA

In the field of R&D in the Republic of Macedonia, the *main priorities* are as follows:

- ✚ Further development of the academic research network,
- ✚ Renovation of the research equipment,
- ✚ Stimulation of the promoting new research and development units within the economy,
- ✚ Systematic and continuous supply of foreign reference literature and providing access to electronic scientific data bases,
- ✚ Upgrading the library information system,
- ✚ Strengthening the present technology development capacities,
- ✚ Establishment of new technology transfer centers in a view of more efficient integration of research and business entities,
- ✚ Providing favorable working conditions for the research entities with unacceptable conditions.
  - Improving framework conditions for innovation, notably through simplifying the tax system and reducing the tax burden for firms, and by diminishing bureaucratic procedures that may inhibit innovation and the start-up of new enterprises.

- Improving the education and science system in order to tackle shortage in the supply of qualified labor, to improve the firms' access to high qualified personnel, including vocational and on-the-job training and to provide a public research base as a partner in innovation projects.
- Promoting innovation activities in firms through financial aid. Subsidies are delivered via four channels: i. R&D grants for research in high-tech areas (esp. through the thematic programs of the Science institutions in the Republic of Macedonia); ii. R&D grants for co-operative research by SMEs; iii. Financial support for innovation projects in technology-oriented SMEs provided either through loans or venture capital; iv. Technology consulting services and the provision of a techno-scientific and informational infrastructure for innovative enterprises.
- Aspects of security and industrial policy, the preservation of core Macedonian capabilities, the problems relating to SMEs and dual use, the preservation of technology and jobs in Macedonia must hereby all be taken into account

Macedonia aims at the participation of the institutes, where it is possible and useful, for they can act as competent and integrative links between the civilian and military levels of security research, even more so as this subject will become increasingly important in the Commission's future framework programs for research.

A short overview given above within item 4.3 depicts the low level of financial support as well as even low level of consideration of using developed R&D capacities advantages within the industrial process (military/civilian). A proper way ahead could be increasing of national (governmental) funds dedicated on R&D capacities, especially in the industrial process, based on the priorities mentioned in item 8 or a consolidated version of these main priorities appropriate to national industry (state or private sector), but not limited only on the relying on these funds. It will be grate advantage to use also the IO, NGO, multilateral cooperation projects and bilateral cooperation programs funds for this purpose i.e. supporting the industrial R&D projects as it is case with some agricultural projects, electrical power and water supply projects, clean environment (ecological) and communities confidence building projects. etc. It is to convince the projects allocation funds decision makers on the benefit of some industrial R&D and technological development projects.

## **7.1. PERSPECTIVES**

The DG will continue to manage the Framework Programmes, which will remain a central policy tool. But while these programmes have to date mainly sought to bring about synergies in European science by sponsoring trans-national collaboration and mobility, we will need to add new activities. We envisage competition-based European funding for fundamental research, European decision-making about the development of major facilities, and large-scale technological research projects undertaken through public-private partnership.

The overall results of the consultation reveal a strong stakeholder support for the ERA vision, and the six specific ERA dimensions. Knowledge sharing is coming out on top and it is the area in which actions is most required at regional level. It appeared that forthcoming action at EU level will have to aim at the realisation of a single labour market for researchers. Correspondingly, five key communications have been planned (in the following chronological order):

1. Joint Programming of Research for more strategic and *better-structured joint programmes* and common calls for projects as of **2010**.
2. A communication on measures *to increase researcher mobility*, e.g. by a ‘European Researchers’ passport’;
3. A legal framework for pan-European research (based on *art. 171 EU Treaty*) to facilitate the construction and operation of new consortia;
4. A European strategy for enhanced and coherent international science and technology cooperation;
5. *Recommendations for increasing knowledge transfer between universities and industries*.

# **PART III: PROJECT REPORTS BY MACEDONIAN TEAM**

## **COMPARATIVE OBSERVATION OF DEVELOPED COUNTRIES REGULATIONS AND PRACTICES - GERMANY**

### **GENERAL VIEW ON GERMAN POLITICAL SYSTEM**

#### **THE GOVERNMENT OF GERMANY**

The constitution or “Grundgesetz” (Basic Law) was adopted in May 1949 as the provisional” law pending Germany reunification. The Basic Law combined the lessons from German experience with the Weimar Republic, the National Socialist State and the intentions of the Western powers. It was the foundation for creating a democratic and social Federal Republic. The name “Federal Republic of Germany” itself denotes the country’s federal structure. The Federal Republic consists of sixteen Länder (states) including the City-States of Hamburg, Bremen and Berlin, each with its own powers and each having significant authority reserved to themselves.

The Federal Republic’s constitution spells out responsibilities for the three separate branches— legislative, executive and judicial. The legislature consists of a bicameral parliament—the Bundestag and the Bundesrat. The executive function is split between the President and the Chancellor.

The Federal Constitutional Court is the highest court in the country with the right to declare unconstitutional an act of the federal or state legislatures. The Court is the guardian of the Basic Law and consists of two panels with eight judges each. The Bundestag and the Bundesrat elect an equal number of judges. Each judge can only serve one twelve-year term.

#### **THE FEDERAL PRESIDENT (BUNDESPRÄSIDENT)**

The Federal President is Head of State and performs primarily a ceremonial role. He represents Germany in its international relations, concluding treaties, accrediting and receiving envoys. The Federal President is neither a member of the government, nor the Federal and Länder legislatures. He is elected by the Federal Convention (Bundesversammlung)<sup>2</sup> for a five-year term and may run for only one additional term. His primary political role is the appointment and dismissal of the Chancellor, ministers, federal judges, civil servants, officers and non-commissioned officers. He also signs laws, but orders and decrees of the Federal President require, for their validity, the countersignature of the Federal Chancellor or the appropriate Federal Minister.

#### **THE CHANCELLOR (BUNDESKANZELER)**

The Federal Chancellor is head of the German Federal Governments. He is elected by a majority vote of the Bundestag and is the head of the majority party (or coalition) in the Bundestag. The Chancellor selects the ministers to form his cabinet and proposes them to the President, in turn appoints them. In a coalition government, such as has existed during most of the last 50 years, ministries are agreed upon in forming the coalition. Today, there

is a “big coalition” between the most powerful political parties, CDU (Christliche Demokratische Union) led by madam Merckel and SPD (Sozial Demokratische Partei). The cabinet members are then tasked with managing the ministries, setting policy and ensuring that it is carried out. The Chancellor plays a dominant role because of his constitutional ability to set the general policy of the government. Not only can he appoint ministers, but has the authority to dismiss them. The Chancellor has two primary roles regarding defense. He sets the general policy for the government on military issues. He also has the constitutional “power of command over the Armed Force.” Article 115(b) of the Basic Law stipulates that upon the declaration of a state of “defense,” national command of the Bundeswehr is transferred from the Federal Minister of Defense to the Federal Chancellor.

## **THE LEGISLATURE OF THE FEDERATION**

The Federal Parliament is bicameral, consisting of an Upper House — the Bundesrat and a Lower House—the Bundestag. The Bundesrat is composed of 68 representatives from the sixteen federal states. Each state is proportionally represented in accordance with their population. In contrast to the senatorial system of the United States the Bundesrat’s members are representatives of the Länder. The Länder governments appoint and can recall Bundesrat members. All constitutionally relevant laws require the assent of the Bundesrat. This applies especially to bills that concern vital interests of the states, for instance their financial affairs or their administrative powers. No proposed amendments to the constitution can be adopted without the Bundesrat’s consent (two-thirds majority). Members of the Bundesrat do not vote as individuals, but rather all votes are cast as a Länder block. On a percentage basis more than half of all bills require the formal approval of the Bundesrat. The Chancellor cannot always rely on Länder governments even when the same party is in power to follow its lead. Each Länder has its own special interests and sometimes takes sides with other Länder irrespective of the party affiliation. This produces fluctuating majorities and compromises have to be made where the parties forming the Federal Government do not have a majority in the Bundesrat. The Bundestag is composed of 660 seats and is elected every four years unless elections are called earlier. The Bundestag is the parliamentary assembly representing the people of the Federal Republic of Germany. It may only be dissolved prematurely, under exceptional circumstances, with the final decision lying with the Federal President. The primary role of the parliament as *it relates to defense* is to pass the yearly defense budget. It also has the requirement under Article 115a of the Basic Law to determine whether or not a state of “defense” exists, i.e., the federal territory is being attacked. This requires a two-thirds majority of the vote’s cast and the consent of the Bundesrat.

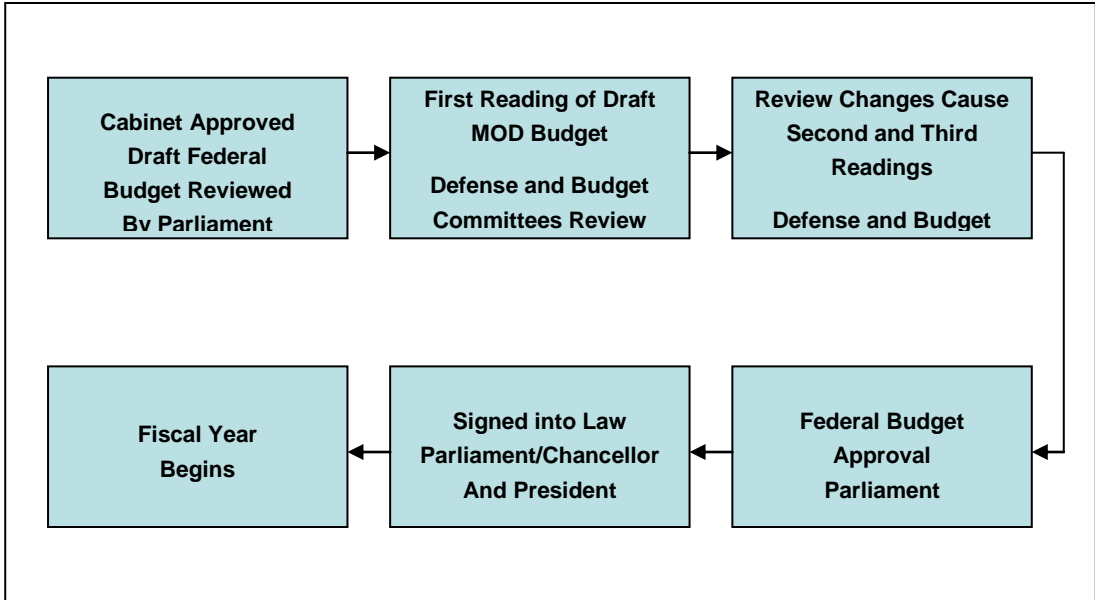
## **ROLE OF THE COMMITTEES**

The primary committees that impact the defense budget are *the Committees on Defense and Budget*. The committees are structured based upon the relative strengths of the parliamentary groups. It is in these parliamentary committees, particularly in Defense and Budget, which the parliament scrutinizes and controls the activity of the Ministry of Defense. The Parliament’s Defense and Budget Committees evaluate the federal armed forces equipment requirements and the suitability of planned measures, the numerical strength, and general organizational structure. However, *the parliament’s approval* of the budget as submitted by the government is the norm. Generally, these meetings are not open to the public. Extensive preparatory work for legislation is done here. It is in these committees that the work of harmonizing political philosophy with the detailed knowledge provided by the experts takes place. The budget committee is of particular importance

because it represents parliament’s control of the budget. These committees also have the power of investigation although to this point in time they have not investigated any defense issues. All large contracts over (>\$30M U.S., 25M Euro) must be approved by Parliament before contract award. Usually the Director General of armaments represents the Ministry and presents the case for a contract to the appropriate committees—Budget and Defense. Depending on the committee’s degree of scrutiny, such presentations/hearings, may be called repeatedly, until the committee is satisfied with the information it has received to form a decision basis. If the committee approves the contract, then the FMOD will direct the BWB to sign the contract. If there is no committee approval then the matter is elevated for reevaluation at the ministerial level, involving various ministers such as Finance or Economics. In rare cases the decision will be elevated to the Federal Chancellor, as happened in the controversial “Euro Fighter” decision.

**THE BUDGETARY PROCESS**

While Bundestag and Bundesrat members may introduce legislation, the Federal government initiates most bills including the yearly defense budget. Each bill receives three readings in the Bundestag and is usually referred to the appropriate committee—defense or budget. The final vote is taken after the third reading. Upon their adoption, the President of the Bundestag transmits them to the Bundesrat. For many laws the Bundesrat has a veto right, which might be overridden in the Bundestag with a two-thirds majority. While they have the authority to override the defense budget for practical and political reasons this has not happened. Given the German role in European security, its NATO commitments and the Länder interest in work being performed in their state the Bundesrat has not vetoed the defense budget. Figure 1 depicts the budget process. In a case where the Bundesrat does not agree with a bill it may, within three weeks of the receipt of the adopted bill, demand that a Committee for Joint Consideration (mediation committee, *vermittlungsausschuss*) be convened.



*Figure 1. Federal Government of Germany – Typical Flow of Budget*



This committee will be composed of an equal number of members of the Bundestag and the Bundesrat. While normally the Bundesrat members are required to vote based upon their Länder guidance, once a mediation committee has been formed they are not bound by Länder guidance. If the committee adopts a revised bill, the Bundestag must again vote on the bill. If it is adopted, then the committee's proceedings are finished. If the Bundestag does not concur, then the Joint Committee will continue its work until a bill acceptable to both houses can be drafted. The yearly defense budget must be passed every year by the end of December. The new fiscal year begins on 1 January and parliament normally passes it on time. As part of the yearly defense budget, the Bundestag will provide the ministry of defense with full funding budget authority at the beginning of a program. Unless the budget authority is breached, the FMOD is not required to seek further approval from the Bundestag.

## **THE CABINET**

*Articles 62-69 of the Federal Constitution* delineates the role of the Federal Ministers. The Federal Ministers are appointed and dismissed by the Federal President upon the proposal of the Federal Chancellor. The chancellor, as chairman of the cabinet, sets the general policy for the government. He also determines the number of ministers and their responsibilities. Within the limits of this general policy, each Federal Minister conducts the business of his department. However, within this general framework the minister has significant power to act. Article 65 of the constitution states that "each Minister conducts the affairs of his department independently under his own responsibility." In a coalition government the Chancellor must also take account of agreements reached with the other party in the coalition. Unlike some other countries, the cabinet members are not members of the legislative branch of government. This explains why the German system of government is often referred to as a "Chancellor democracy." The Chancellor is the only member of the government elected by parliament and he alone is accountable to it.

**The Finance Minister** plays a key role in deciding budgetary issues—a "first" among equals. He has the power to veto all decisions of financial importance including all legislative proposals with implication for public spending, provided the Chancellor sides with him. The Federal Government decides on differences of opinion between the Federal Ministers.

## **THE FEDERAL MINISTRY OF DEFENSE (BUNDESMINISTERIUM DER VERTEIDIGUNG—BMVG)**

The Minister of Defense who has responsibility for commanding the armed forces in peacetime leads the Federal Ministry of Defense. Two politically appointed parliamentary State Secretaries support him. The Parliamentary State Secretary is a member of the Bundestag and is concerned with relations and communications between the defense ministry and the parliament.

The Minister of Defense is also supported by two civil servants—State Secretaries—whose primary roles are to provide authority, expertise, leadership and continuity in running the ministry. Each has specific responsibilities. One of the state secretaries is primarily responsible for armament matters. The State Secretary for Administration has responsibility for personnel, budgets, administrative and legal affairs, infrastructure, social services, including oversight of the Federal Academy of Defense Administration and Technology. The Federal Academy provides armament acquisition and management education to the workforce, especially to the civilian part of the FMOD (Wehrverwaltung des Bundes = Federal Arms Forces Administration according to *basic law Articles 87a and*

*b*). The State Secretary for Armament and Logistics has responsibility for security and alliance policy, arms control, intelligence and other areas. He is also responsible for armament matters. The Director General of Armaments reports to him. The Federal Ministry of Defense (FMOD) consists of two elements—the civilian Federal Administrative portion, which includes the armaments organizations and the military, or armed forces (Bundeswehr). This civilian Federal Administrative division was created in 1956 when the basic law was amended to direct that the “The administration of the Federal Defense Forces shall be conducted as a Federal administration with its own administrative substructure. Its function shall be to administer matters pertaining to personnel and to the immediate supply of the material requirements of the Armed Forces.” Thus Article 87b of the Federal Constitution mandated the creation of an administrative substructure to the ministry which would have responsibility for the armaments requirement of the military. Figure 2 depicts the organizational structure of the FMOD. In 1991 the Defense Ministry adopted a plan— “Reorganization of the Territorial Defense Administration and the Armaments Organization” which reorganized the Armaments Directorate and its subordinate organizations. Its main purpose was to streamline and reduce the size of the organization by the year 2000.

## **THE BUNDESWEHR**

The Bundeswehr, the military portion of the Federal Ministry of Defense, was established in 1955 and integrated into the Western alliance. The constitution of 1949 required the establishment of “the Armed Forces for Defense purposes.” The Bundeswehr senior military leader is the Chief of Staff of the Armed Forces, who is supported by a Deputy Chief of Staff. He is the senior military advisor to the Minister of Defense and the chancellor. He is also a nonvoting member of the Cabinet’s Federal Security Council. He chairs the Federal Armed Forces Defense Council, which consists of the Deputy Chief and the Chiefs of the three services. He exercises “executive authority” over the council.

For the foreseeable future, the most likely tasks will be the prevention of international conflicts and crisis management, to include the fight against international terrorism. They will determine the structure of and exert significant influence on the capabilities, command and control systems, availability, and equipment of the Bundeswehr.

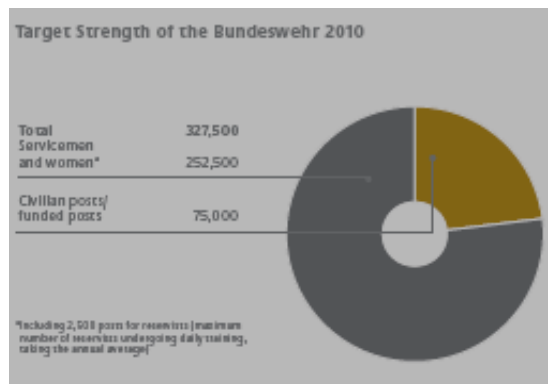
The structure of the Bundeswehr is consistently oriented towards its operational needs. Consequently, the German Armed Forces are organized into the categories of response, stabilization, and support forces. They are trained, equipped, and deployed according to their respective functions. The Bundeswehr will continue to be a conscript force in the future; universal conscription has proven to be an unqualified success in varying security environments.

The tenets of “Innere Führung” – leadership development and civic education – will remain the Bundeswehr’s guiding principles. However, the effectiveness of the Bundeswehr depends not only on its personnel but also on the availability of financial resources. The ever-present dichotomy between the requirements of defense policy and the financial needs of other national tasks will continue into the future.

The Army, Navy and Air Force and the Surgeon General make up the rest of the Bundeswehr. (See Figure 2.) The current strength of the Bundeswehr is about 340,000 military—Army personnel number 233,400, Air Force personnel 77,400, and Navy personnel 27,200. In a state of “defense,” total manpower can rise to 700,000 soldiers. The armed forces, while primarily defensive, recently were restructured to include a quick reaction force to respond to humanitarian and military situations, such as occurred in Kosovo.

## Operational Requirements

<b>NATO Response Force</b>	up to 15,000 troops, of which 5,000 are on standby and 10,000 involved in preparation and follow-up activities
<b>European Headline Goal</b>	up to 18,000 troops
<b>UN Standby Arrangement System</b>	up to 1,000 troops
<b>Rescue and evacuation operations</b>	up to 1,000 troops



Today's Bundeswehr has been shaped by international missions. Already, more than 200,000 military personnel have served on operations abroad. The cost to the Bundeswehr for humanitarian relief operations has also been steadily increasing over the past years, tying up its resources.

The German Ministry of Defense has seen significant changes during last 15 years. The role of the North Atlantic Treaty Organization (NATO) is in transition, German defense industry has been downsizing, and NATO peacekeeping missions continue, all requiring changes in Germany's response. Like most governments around the world, with the collapse of the communist empire, the Ministry of Defense has seen a decrease in the number of armed forces personnel—490,000 in 1990 to approximately 340,000 in 2006 and today consequently Transformation is the shaping of a continuous, forward-looking process of adapting to changing framework conditions in order to enhance and durably sustain the Bundeswehr's effectiveness on operations. The Transformation of the Bundeswehr determines thinking, concepts, training, organization and equipment, thus creating something entirely new.

With the Response Forces the Bundeswehr will take on the tasks deriving from their commitments to the NATO Response Force, the European Headline Goal and the United Nations Standby Arrangement System. Additionally, they will provide the assets for Evacuation Operations under national command as part of the national level of ambition.

Stabilization Forces will form up to 5 single contingents with a maximum total of 14.000 troops. These will take on tasks in the broad spectrum of peace-keeping and stabilization operations and take their share of the national level of ambition.

Last, but certainly not least, the third category of Support Forces will ensure comprehensive support of all ongoing operations in the complete spectrum. Furthermore

they will take care of the basic services for the daily routine in the Bundeswehr. The 147.500 Support Forces include 2.500 reserve duty slots.

#### Force Categories



The realignment of the Bundeswehr necessitates an adapted capability profile. To achieve the level of ambition, a capability profile is required comprising six interlinked capability categories:

Mobility, Intelligence and Reconnaissance, Support and Sustainability Command and Control Capability Survivability and Protection Effective Engagement. The principles of Transformation accompany the restructuring of the Armed Forces permanently and can be seen as brackets that hold all capability categories together.

The impact is even greater when it is recognized that the unification and integration of the former GDR's armed forces happened at the same time.

The German acquisition system has also seen changes and with it cuts in manpower, defense budgets and organizational changes. The defense budgets have decreased from about 27 billion € at the height of the Cold War to 23.88 billion € in Fiscal Year 2006.

#### **THE REQUIREMENT PROCESS**

The three military services are similarly organized. Each has a central staff, a C2 command for operational planning and mission control, a support command and an office for central issues which has the function of a Training, Development and Doctrine Command (TRADOC). For the Army, this office is the Heeresamt (HA); for the Air Force, the Luftwaffenamt; and for the Navy, the Marineamt. The military service staffs determine military equipment requirements, provide logistics support, perform operational tests on new equipment, and maintain the weapons systems. They are involved throughout the acquisition process.

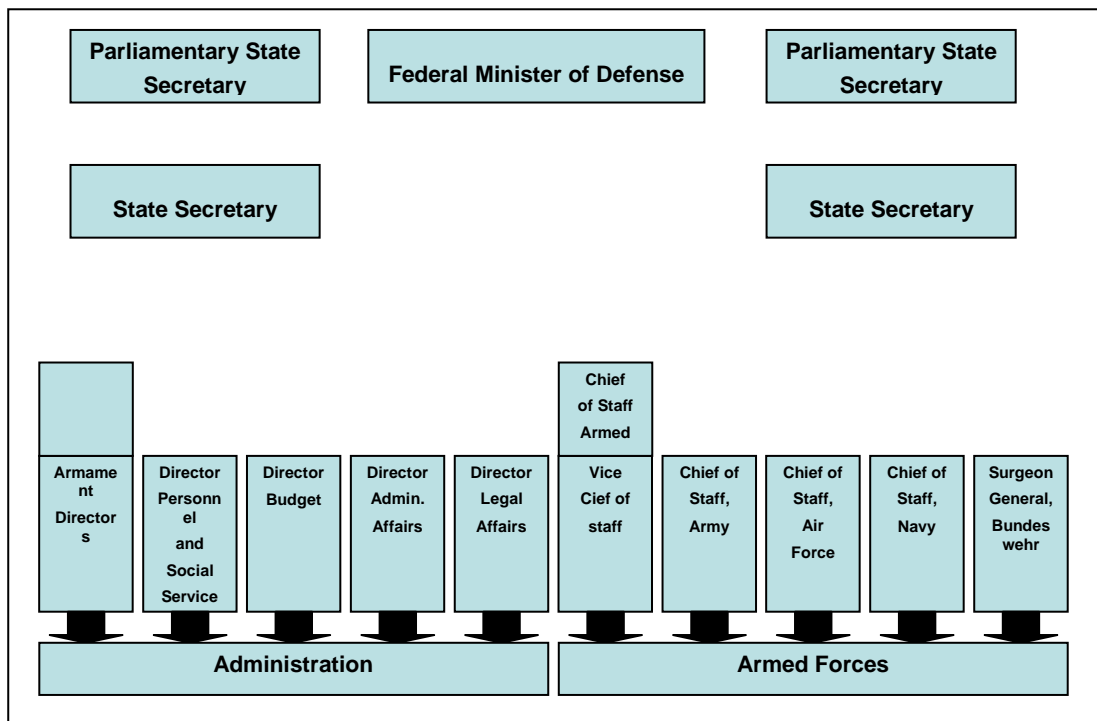


Figure 2. Organization of the Federal Ministry of Defense

The requirements process operates and is roughly organized the same in each Service. In the Army, the troop schools develop the requirements and present them to TRADOC. In the other Services, the user, the “exposed commanders,” develop the requirements and present them to the Support Commands. TRADOC and each of the Service Support Commands have “study groups” that take over at this point. Their role is to check the identified military requirement against the concepts and planning directives of the various staffs and commands and to validate the military need. They will then develop the document—the Staff Requirement—that describes the equipment shortage and the military requirements. These study groups also play a key role during the predefinition phase of working with industry to obtain information to determine availability of technology and at what price. Recently, the Bundeswehr revised the study groups and now the “Standing Joint Study Group” brings together the military services around tactical areas, such as air defense and command, control and reconnaissance. New guidelines also place increased emphasis on evaluating commercial-off-the-shelf equipment. As indicated above, the Service Staffs are responsible for developing the military requirements. They work with the Directorate General of Armaments in the selection of possible solutions and, as users, participate in the research and technology concept efforts. The Armed Force Staff performs an oversight role in reviewing requirements and for coordinating matters concerning communications and electronics equipment.

### ARMY (HEER)

The Training Development and Doctrine Command, also referred to as the Heeresamt, located in Cologne, is the Army’s central point for development of military materiel requirements. Department III in TRADOC, Army Development, is responsible through the 16-school commanders for equipment. Materiel requirements are thoroughly valuated in the army study groups for the development of defense materiel. Department II

Armaments/Deployment) of the Army Staff has the responsibility for representing the Army with the Acquisition Organization (the BWB to be discussed later) and industry. It directs the tactical and technical field evaluations, which are carried out by the troop schools. Upon demonstration of satisfactory performance, Department II signs for the acceptance of the equipment as part of the service capability. During the introduction of new materiel into the field, this command will also initiate spare parts procurements with the BWB. They are also responsible for contracting, through the BWB, for industrial maintenance services, mostly for overhaul and technical alterations that are geared toward service life extension of materiel use.

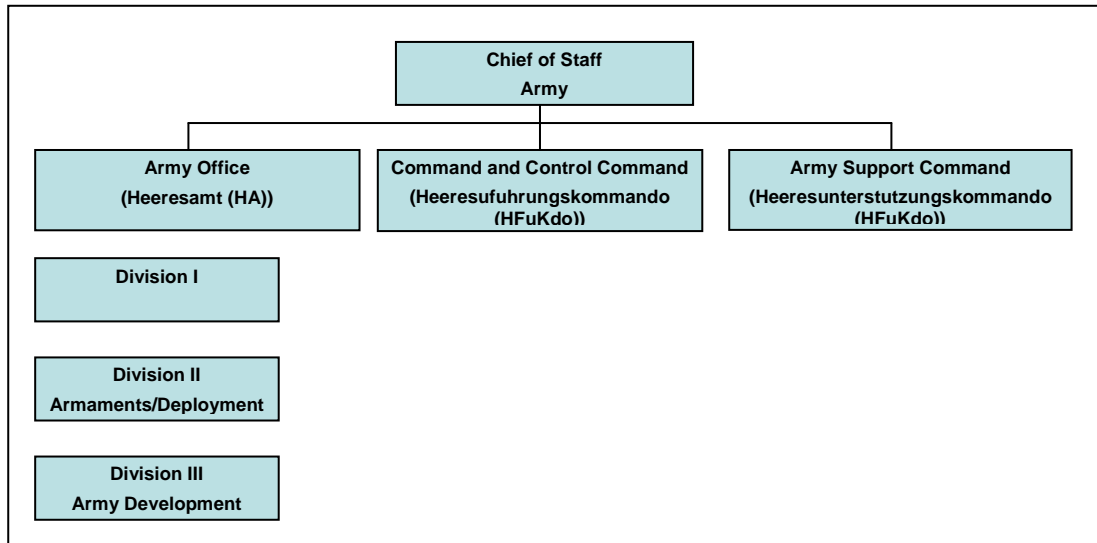


Figure 3. Army (Heer)

### NAVY (Marine)

The Naval Support Command (Marineunterstützungskommando) has responsibility similar to TRADOC for the development of military materiel requirements for new military equipment. In this role, they are not only responsible for validating the requirements and developing the Staff Document, but also for working with the BWB and industry as new systems are developed. They accept the delivered equipment and perform the tactical and technical field evaluations through a subordinate element, the Naval Service Test Command. The Naval Support Command also is responsible for initiating spare parts procurements and maintenance and contracts for the overhaul of equipment.

As equipment is in need of modernization or updates, they will work through the BWB to contract with industry.

### AIR FORCE (Luftwaffe)

The Air Force Support Command (Luftwaffenunterstützungskommando) has a leading role in planning and armaments. Its subordinate structure includes the Air Force Materiel Command and six logistics regiments. The Air Force study groups develop military requirements. The Armaments Department of the Air Force Support Command works with the BWB and industry during development of the equipment.

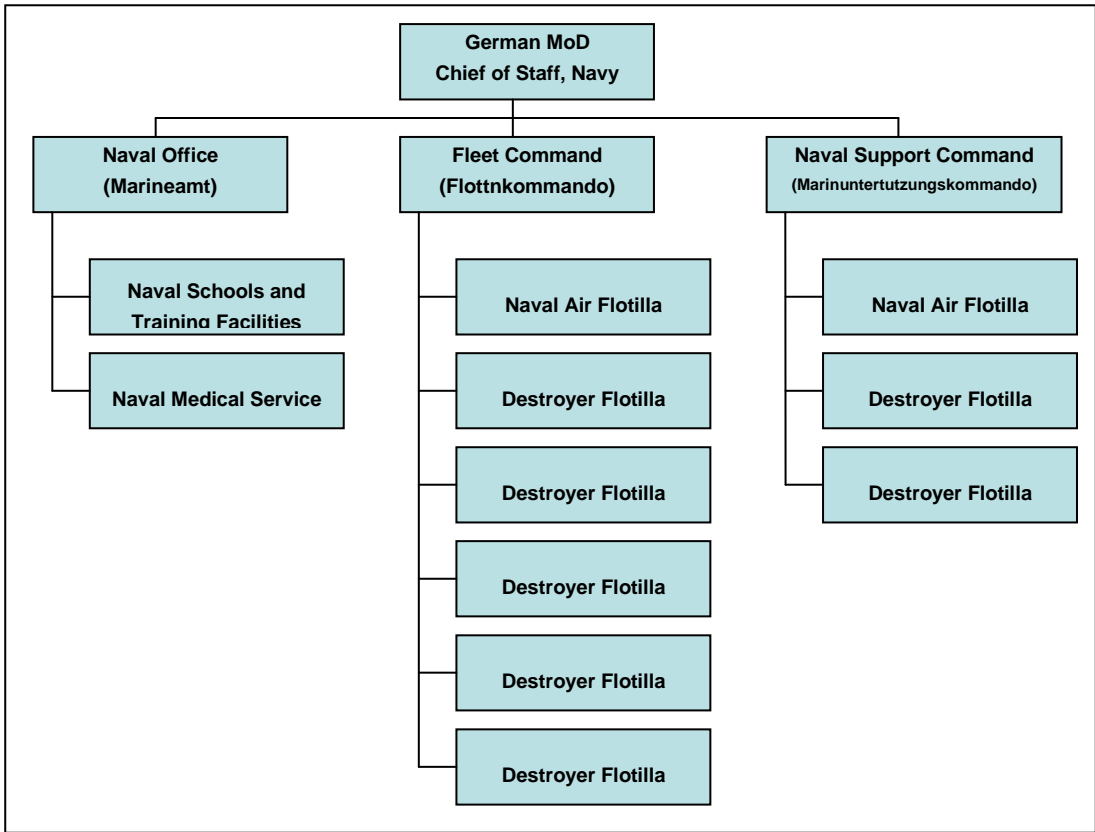


Figure 4. German Navy

They perform the operational tests for new equipment and, upon successful completion of tests, they accept the equipment for service use. They are also responsible for initiation of spare parts procurements and the maintenance and overhaul of equipment with the BWB. Modernization and updates will be accomplished by the Air Force Support Command through the BWB.

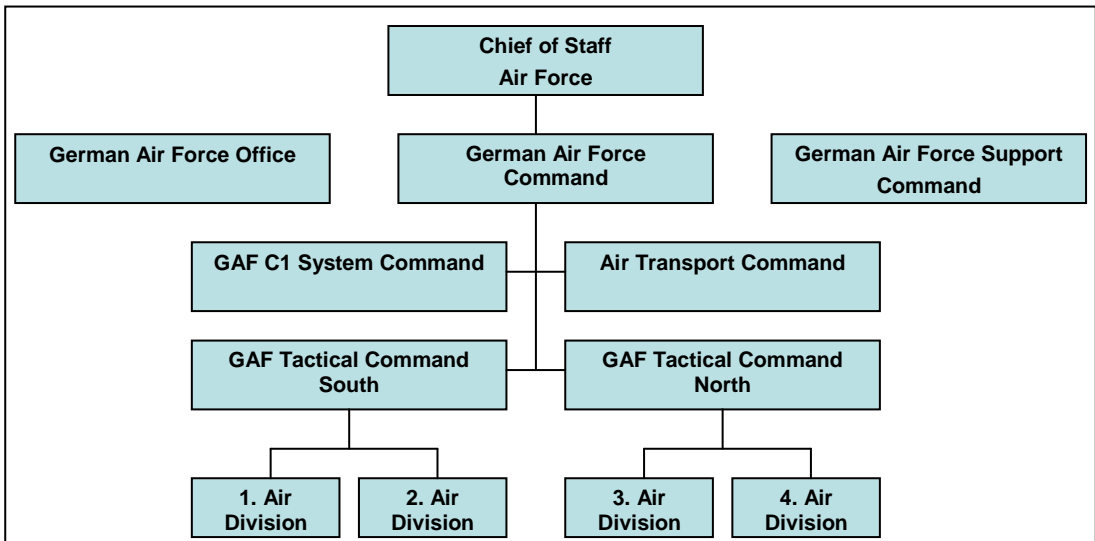


Figure 5. German Air Force

The Bundeswehr is tasked by the Basic Law (Grundgesetz) with the duty of providing national defense. In order to be able to accomplish this mission and the associated tasks, the armed forces must be provided with the necessary capabilities by making available the equipment required.

Art. 87b of the Basic Law assigns the task of satisfying the armed forces' requirements for materiel and services to the Federal Defense Administration. The contracts required for providing the necessary equipment to the armed forces are awarded to industry, trade and commerce by the designated civilian authorities of the Federal Defense Administration in compliance with the awarding regulations and directives of the Federal Government.

## CONTRYS INNOVATION SYSTEM

### RESEARCH POLICY IN GERMANY

The *Committee on Education, Research and Technology Assessment* prepares the German Parliament decisions in the area of Education and Research policy. In the same time the commission is an instrument for parliamentary control over the governmental activities in this political area. The corresponding ministry from the government is the federal Ministry for Education and Research. The commission is composed by 38 regular members and the same number of their deputies. The composition and proportion of the members comply with the political fractions composition in the parliament. The commission milestone activities are regulation and the improvement of the professional education, the high education, permanent after school education and the state educational support. The commission is responsible to improve the prerequisites for better Research and Technologies in different areas, for example: environmental protection research, space travel research, information and telecommunication technology.

The subjects considered by the Committee include national and European projects and also proposals relating to education and research policy. The German Bundestag charges the Committee to put forward its views on Council documents containing proposed directives and regulations, proposed programs and notifications of the Commission of the European Union and legislative decisions of the European Parliament, where they are relevant to education and research policy. The Socrates and Leonardo programs and the 5th RTD Framework Program are examples.

The Committee's recommended decisions and reports to the Bundestag on matters referred to it are - where they go beyond mere information - published as printed papers of the Bundestag and constitute submissions for deliberation and decision by the Bundestag.

In addition to that basic function as a standing specialized committee on its own policy areas, the Bundestag's Committee on Education, Research and Technology Assessment is also the controlling body and authority responsible for the *Office for Technology Assessment under the auspices of the German Bundestag (TAB)*. The TAB works exclusively for the German Bundestag. The Committee informs the Bundestag of the results of the TAB's investigations that the Bundestag then refers to the specialized committees for more comprehensive consideration and the drafting of recommended decisions. During the individual investigations by the TAB, developments in Germany are compared with those in other European countries or else subjects are dealt with in the European context, eg. with regard to the investigation into "Opportunities and problems in pursuing and securing national and EC-wide environmental objectives as part of European standardization



## NATIONAL R&D/INNOVATION POLICY AND STRATEGY

Innovation policy is a main policy priority in Germany. The *main objectives* of innovation policy currently are the following:

- Increasing R&D activities in enterprises and public institutions. In 2010, 3% of GDP should be spent on R&D.
- Increasing the participation of SMEs in R&D and innovation.
- Developing new technologies and facilitating the dissemination of these technologies in economy and society. Special focus is currently laid on ICT, biotechnology, nanotechnology, fuel cell technology, medical and health technologies, optical technologies, micro-system technology, space and aircraft technologies, environmental technologies, energy technologies (e.g. wind power, solar power).
- Stimulating the creation of new technology-based enterprises and the growth of young technology companies.
- Increasing the use and commercialization of research results achieved at public research institutions, including a more intense co-operation between enterprises and academic institutions.
- Improving education in order to meet changes and increases in the demand for highly qualified people.
- Promoting innovation in the eastern Länder in order to contribute to the economic restructuring of eastern Germany.
- Fostering the development of regional clusters in innovation in order to make full use of complementary skills and competencies of the various actors in innovation systems.

In order to achieve these goals, German innovation policy uses *a broad set of instruments*, basically resting on three approaches:

- Improving framework conditions for innovation, notably through simplifying the tax system and reducing the tax burden for firms, and by diminishing bureaucratic procedures that may inhibit innovation and the start-up of new enterprises.
- Improving the education and science system in order to tackle shortage in the supply of qualified labor, to improve the firms' access to high qualified personnel, including vocational and on-the-job training and to provide a public research base as a partner in innovation projects.
- Promoting innovation activities in firms through financial aid. Subsidies are delivered via four channels: i. R&D grants for research in high-tech areas (esp. through the thematic programs of the BMBF); ii. R&D grants for co-operative research by SMEs (esp. through BMWA programs such as ProInno); iii. financial support for innovation projects in technology-oriented SMEs provided either through loans or venture capital; iv. technology consulting services and the provision of a techno-scientific and informational infrastructure for innovative enterprises.

In 2005, the following *main developments* took place:

- New High-tech Start-ups: introduced in July 2005, this fund offers public venture capital to founders of technology-based start-ups for financing seed and start-up stages. A main target group is spin-offs from public research institutions and universities as well as corporate spin-offs.
- “Excellence initiative” and “Pact for Research and Innovation”: These activities are intended to promote excellence and top-level academic research at universities, and increase institutional funding for non-university public research institutions. They are

both intended to strengthen the research base in Germany, which is perceived as a prerequisite for more innovation in the business sector.

- Reform of Federal Technology Venture Capital Programs: In October 2004, a new set of VC measures: has been introduced, including a new umbrella fund (EIF-Fund).

These innovation policy developments respond to *major challenges* within the German innovation system, which are well revealed by the European Innovation Scoreboard: The output of the education system is weak, esp. with regard to S&E graduates, and participation in lifelong learning is low. Despite a high share of SMEs that innovate in-house, the share of innovative SMEs was decreasing for a number of years. In high-tech sectors such as pharmaceuticals, computers, electronics or aircrafts, Germany is losing momentum. The still strong technological performance is increasingly dependent upon the automobile sector

## **THE GERMAN RESEARCH SCENE**

At the beginning of the 21st century, two basic trends are setting science and research considerable challenges: globalization and the transition to a society based on knowledge. A highly efficient and competitive system of science is necessary if Germany is to maintain its leading position in the international competition for research locations.

Within the German research scene - which is essentially characterized by the sectors of economics, universities/colleges and non-university establishments - economic activity in the field of R&D plays the largest role. In 1999, R&D expenditure by German business exceeded the DM 60 billion mark. The universities/colleges received R&D funding worth DM 15.5 billion and non-university establishments funding worth around DM 13,3 billion. Thus, in 1999 gross domestic expenditure on R&D by the Federal Republic of Germany totaled DM 88,8 billion, or 2.4% of the gross domestic product.

*Together with the federal states, the Federal Government supports the two major research organizations, the [Max-Planck-Gesellschaft](#) (MPG) and the [Fraunhofer-Gesellschaft](#) (FhG). The Federal Government provides 50% of the basic funding for the MPG and 90% for that of the FhG. The MPG conducts free basic research in new fields of importance for the future. It sets priority areas for top-level research and performs a complementary function, in particular with regard to university research. The FhG concentrates on applied research and its principal objective is to translate the results of research into new and innovative products, processes and services.*

The support organization the [Deutsche Forschungsgemeinschaft](#) (DFG) is also funded by the Federal Government and the federal states. In its capacity as a self-governing scientific organization it primarily supports universities/colleges across all their disciplines by means of projects and programs. The Federal Government's contribution stands at 50% or more. Together with the MPG and the FhG, the DFG makes a considerable contribution towards the strengthening and integration of research in Germany and also to international co-operation. Support for the next generation of scientists is also of prime importance.

The Federal Government and the federal states also deal with the expansion of existing and the building of new universities/colleges, including university hospitals. In that respect the basic aim is to adapt the universities/colleges to meet national and international requirements as an integral part of the overall system of education and research. That also involves promoting priority areas of research at the universities/colleges in that field, having regard to the non-university research establishments. Furthermore, the Federal Government supports the universities/colleges in areas that require swift and disproportionate support on account of their particular importance or workload by means of fixed-term special programs that are agreed with the federal states. Such special

programs are used for both teaching and research purposes. Following reunification particular emphasis in that respect was placed on the restructuring of universities/colleges and research in the new federal states.

The 15 major research establishments, which have joined together to form the [Hermann von Helmholtz-Gemeinschaft Deutscher Forschungszentren](#) (HGF), form an integral part of research capacity in the Federal Republic of Germany. They work on complex technical questions and cross-disciplinary tasks, operate large scientific and technical apparatus and develop systematic solutions. The major research establishments receive 90% of their funding from the Federal Government and 10% from the federal state or states in which they are situated.

Primarily, the Federal Government and the Länder (States) jointly fund the centers of the [Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz](#). Together with the Hermann von Helmholtz-Gemeinschaft Deutscher Forschungszentren, the Max-Planck-Gesellschaft and the Fraunhofer-Gesellschaft, the Leibniz Institutes (formerly known as Blue List Institutes) represent the fourth pillar of research jointly funded by the Federal Government and the Länder. The Leibniz Institutes differ greatly according to their tasks, size, location and legal form. Most of the institutes focus on application-oriented basic research. Recognition beyond State borders and interest in their work from the viewpoint of scientific policy throughout the Länder are common to all the centers. The Leibniz Institutes are subject to a scientific quality evaluation carried out externally on a regular basis, the effects of which are unique in Germany.

The *federal and regional research establishments* funded by the Federal Government and the federal states provide a considerable capacity for research. Those establishments are primarily responsible - in addition to their territorial activities - for achieving scientific results to meet their departmental responsibilities, but also contribute to the general acquisition of knowledge.

As a joint institution of German universities, the [Deutscher Akademischer Austauschdienst](#) (DAAD) [*German Academic Exchange Service*] has the task of promoting foreign relations in higher education in particular by means of exchanges of students and scientists. Its programs are usually open to all disciplines and all countries; Germans and foreigners may equally benefit from them. The DAAD is mainly financed by the public purse, primarily the Federal Government (approx. 90%) and the EU (approx. 6%).

With its more than 200 individual programs, the DAAD pursues the objectives of academic cooperation with other countries, the promotion of the German language and of German literature abroad as well as (follow-up) counseling for scholarship holders, information and publication, higher education marketing and advice for policy makers.

The [Alexander von Humboldt-Stiftung](#) (AvH) [*Alexander von Humboldt Foundation*] awards up to 600 research grants to foreign post-docs under the age of 40. There are no quotas with regard to country or discipline. Research periods abroad of German scholars and scientists are supported in particular by the annually up to 159 Feodor Lyenen research grants awarded by the AvH. German scholars and scientists wishing to spend research periods in Japan can apply for one of the annually 35 research grants of the Japan Society for the Promotion of Science (JSPS) and the Science and Technology Agency (STA).

The [Arbeitsgemeinschaft industrieller Forschungsvereinigungen e.V.](#) (AiF) [*Association of Industrial Research Organizations (registered association)*] forms an important part of the research scene. The AiF is a commercial umbrella organization comprising around 107 industrial research organizations. The main responsibility of the AiF is to support joint industrial research. Public funding is used to support projects relating to applied research

that takes account of the practical needs of small and medium-sized undertakings. Together with the research departments of the undertakings, those research establishments account for 68.4% of gross domestic expenditure on R&D in 1997 and constitute the largest (economic) sector of the research scene in terms of quantity.

The R&D expenditure of the 52 federal institutions that perform research functions amounts to some DM 1.3 billion (fully funded by the Federal Government). These institutions perform their R&D functions in the framework of their governmental duties. The various activities are assigned to the federal ministries into whose portfolios they fall. The objective of their research activities is therefore first and foremost to obtain scientific findings that will help to perform departmental duties (“departmental or mission-oriented research”); however, they also help to acquire general knowledge. In addition, there are 84 Länder and municipal research institutions (that are not part of the Blue List), which are fully financed from Länder funds.

Germany’s seven academies of sciences – which are located in Berlin, Düsseldorf, Göttingen, Heidelberg, Leipzig, Mainz and Munich and which have over 1,400 ordinary and corresponding members from a wide variety of disciplines – are members of the Union of Germany Academies of Sciences. These academies, whose basic budgets are financed exclusively by the Länder governments, are scientific forums designed to foster science, in particular interdisciplinary reflection and the cross-disciplinary generation of knowledge; they also act as mediators in scientific and societal conflicts related to the assessment of science, and serve as points of contact for international scientific co-operation. An important function of the academies is the implementation of the Academies Program with a total volume of DM 74 million in the year 2000, half of which is funded by the Federal Government, while the other half is financed by the Länder governments.

The Deutsche Akademie der Naturforscher Leopoldina (*German Academy of Natural Science*) in Halle, which is a supranational society of scholars in the fields of science and medicine, is funded by the Federal Government (BMBF) and the Land Government of Sachsen-Anhalt in a ratio of 80:20.

The breadth of the research scene and the fact that a variety of responsibilities are met by the science organizations and research establishments are among the strengths of the German system of science. Its dynamic further development is one of the central aims of Germany research policy. Open-mindedness, an ability to co-operate and excellence are the models for a research scene that is ready to meet the demands of the 21st century

## **DEFENSE ACQUISITION CYCLE. SPECIFICITY OF EVERY PHASE**

### **THE ACQUISITION MANAGEMENT PROCESS**

The basic requirement for new military systems and equipment comes from the military services as described above. The annual program, which is prepared each year as part of the budget process by the Directorate General of Armaments for the Services, provides the program targets for cost, schedule and performance. The governing document for the development of a program is contained in the “Directive for the Planning, Development, Procurement and, Acceptance of Defense Materiel and Data Processing Projects” (Bestimmungen für die Planung, Entwicklung und Beschaffung von Wehrmaterial und Datenverarbeitungsvorhaben (EBMat). Figure 10 depicts the EBMat weapons systems development process. It consists of five phases beginning with the Pre-Definition phase

and continuing through the In-service phase. At the end of each phase, and to reduce risks, a decision and approval is required as to whether and how, the program is to be continued.

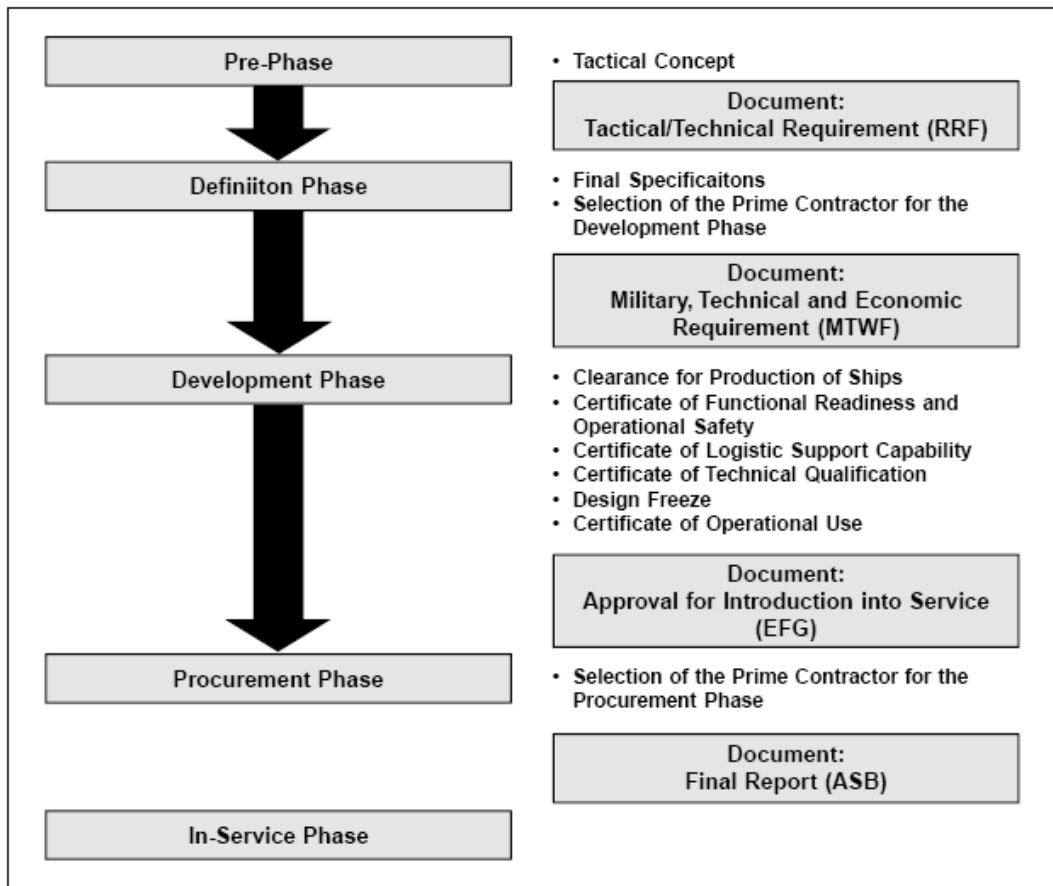


Figure 6. EBMAT Weapons Systems Development Process

### **Pre-Phase**

During the Pre-definition phase the military need is verified by the Services. The Tactical Concept comprehensively describes the equipment shortage and the military requirement. An early market evaluation is performed and national and foreign alternatives are considered as part of this phase. This evaluation is conducted by the FMOD/BWB with both the military and industry participating. In 1998 the EBMAT process was revised with new principles for acquiring equipment. The new principles place increased emphasis on the affordability of systems and equipment and for streamlining the process. A priority list of materiel alternatives is given. They are:

- Recommend no action, thus accepting an equipment gap,
- modification and extended use of materiel already in service,
- purchase or integration of available materiel (civilian, commercial and from other armed forces), and
- new development (national or international).

Once the alternatives have been defined and the economic impact estimated, then the Staff Requirement (Tactical/Technical Requirement, Taktisch/technische Forderung-TTF) is

prepared and that phase is concluded with a proposal or the selection of a tactical-technical solution. The Bundeswehr Chief of Staff is the approval authority for Tactical Concepts that have importance for more than one service/international cooperation, and exceed the cost ceiling of 24M € for development and 50M € for procurement. For projects that have political or economic importance and exceed 20M € for development and 50M € for procurement the FMOD executive group receives an informational notice. For Information Technology (IT) projects the Pre-definitional phase document for completion is called the Organizational Staff Requirement.

The Ministry staffs, along with the Armament Division, then review the TTF. Once this is approved the program is introduced in the Bundeswehr Plan.

**Definition Phase**

The next phase, the Definition Phase, is the point that project management responsibility is delegated to the BWB. During this phase the final specifications will be completed by the BWB. Industry is usually involved at this point, but care is taken to ensure that activities performed during this phase do not prejudice a subsequent competitive contract award. It is also during this phase that the project manager and team working groups are established to include all those responsible for technical-engineering issues at the BWB. These working groups are vital partners for cooperation with industry. The military services will assign a project officer from the support command to represent the service branch priorities within the project managers’ working groups. Joint project conferences are held for joint decision making and coordination talks between the BWB and the service branch. (See Figure 11.)

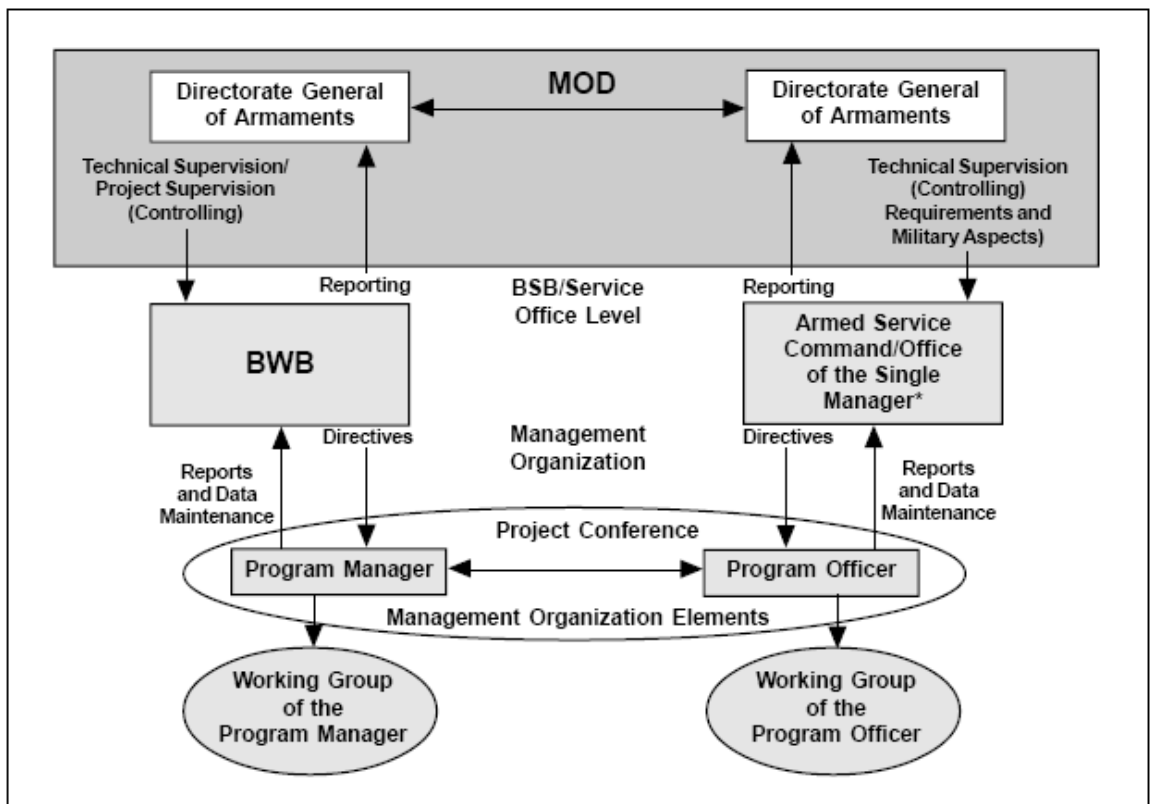


Figure 7. The Definition Phase

The Definition Phase is finished with the completion and approval of the “Development Baseline” (Militarisch-Technisch-Wirtschaftliche Forderung, literally translated as Military-Technical-Economic Requirement”). For complex programs, or projects of political importance (e.g., cooperative programs), or where the development cost estimate will exceed 20 million €, or procurement cost will exceed 50 million €, the executive level FMOD approval is required.

### ***Development Phase***

The next phase is the Development Phase. The selection of the prime contractor occurs during this phase. The development contract will define the contractor’s responsibilities, including the generation of materiel baselines, service and logistics capability. Its initial operational capability and logistic supportability trials will be performed in this phase. While the BWB will conduct the development efforts, the Armed Services are responsible for certifying to the systems logistics supportability and for the successful completion of operational testing and “Approval for Service Use.” The development phase is concluded with approval of the document “Approval for Production” (Einführungsgenehmigung-EFG).

### ***Procurement Phase***

The next phase is the Procurement Phase, which includes all activities necessary to execute series production, to include selection of the contractor for the procurement phase. It is concluded with the delivery of the production equipment to the military and preparation of a Final Report by the BWB.

### ***In-Service Phase***

With the first delivery of equipment, the In-Service Phase begins. The user now takes responsibility for the equipment, assigning an in-service manager responsible for ensuring the operational capability of the system or equipment. The Services prepare for initial operational capability by setting up at their service schools systems/equipment specific training, maintenance and field operations, and core units of school personnel for the training of field user units’ personnel. The service schools are usually the first to receive production equipment. The support and logistics commands go through the sometimes lengthy process of system/equipment documentation (maintenance manuals, spare parts list, etc.) to integrate the new system/equipment into the services’ inventory. While primary responsibility rests with the Services, the BWB continues to provide engineering and logistical support. BWB will buy the spare parts, conclude repair contracts and develop and incorporate changes for equipment deficiencies and operational improvements. Of course, in some cases the changes can be significant enough to begin the EBMat process all over again. The individual phases described above provide a structured approach for producing equipment. Simplification of the process can often occur with overlaps between development and production allowed, when appropriate, if risks remain within acceptable limits. Programs will progress through the various phases at different speeds depending upon the technology and speed of development.

### ***Designation of Programs***

There are three categories of systems/equipment: Category 1 includes those systems with a value greater than 20M € in development and greater than 50M € in production. These systems require approval by the Bundestag. Category 2 (2-20M € for development, 5-50M € for production) receives approval with the Armed Service Command within the military services. Category 3 programs are lower dollar programs for items with a development cost of less than 2M € and 5M € for production.

Category 1 is considered a major program. The FMOD will designate a complex program or a program, which involves a cooperative effort with other countries as a major program.

## **FUTURE OF DEFENSE ARMAMENTS**

The German military has seen significant changes in the last ten years with its restructuring and downsizing in personnel and budgets. What will be the status of the acquisition system in the year 2005? Change is a certainty. Seeing a need for change the FMOD chartered a commission on "Common Security and the Future of the Bundeswehr" to develop a long range plan for the future of the Bundeswehr. It is expected they will report out in the fall of 1999. What is the overall political/military environment the commission is looking at? First, the mission has changed. Faced with the Soviet and Warsaw Pact threat the defense of the nation was the primary focus of Bundeswehr for the last 30 year. Now the Bundeswehr must prepare for humanitarian missions and to regional threats, such as Kosovo. The Bundeswehr created the Rapid Reaction Forces to respond to the new mission requirements. But futures equipment needs will need to reflect this change. As an example the need for a rapid transportation of personnel would indicate that a Future Large Aircraft would become a priority for acquisition. Secondly, the Bundeswehr will respond under the auspices of the United Nations, NATO or the Organization for Security and Cooperation in Europe (OSCE). Internally, the general political environment will continue to put pressures on the defense budget. Adequate money will probably not be available to meet the overall modernization needs of the Bundeswehr. Within this framework the Bundeswehr acquisition system will remain relatively stable. The BWB will continue to downsize, but slowly, with continual emphasis on the need to work collaboratively with European nations, NATO and the United States. The excess of defense firms in Europe will impact European Union and German efforts at lowering the cost of weapon systems. With defense budgets that will continue to decline, and more than 750 defense contractor in Europe, which is three time the current number in the United States, mergers will continue. Daimler-Chrysler Aerospace is an example of the possible transatlantic mergers. In conjunction with industry efforts six European nations including Germany pledged to support industrial consolidation. German industry will continue its downsizing, with less than 100,000 personnel supporting the defense needs of the Bundeswehr Internationally, NATO will continue to be a keystone of the German defense framework, along with the Western European and European Unions efforts in structuring a more European security policy and collaboration in the development of defense equipment. A significant step was taken in this direction when the European Nations, as part of the European Union, appointed Javier Solana as the Secretary General of the European Union council of Ministers and High Representative for the Common Foreign and Security Policy of the Union. This increases the probability of future cooperative projects being undertaken within the structure of OCCAR and significant European harmonization of security policy.

## **DEFENSE ACQUISITION REGULATIONS**

The direct purchase of army stocks is regulated by Article 87b of the basic Defense Law. The civil defense administration is authorized to conclude army equipment contracts with industry and trade companies, under the supervision of the federal government and certain regulations and rules mentioned below:

- the Bidding Limitations Law



- the Public Contracts Rulebook
- the Profit Rulebook ( part A)
- the Freelance Profit Rulebook

Based on these documents the *Office for Defense Technology and Procurement* is responsible to run the central purchases. The central purchase presumes that first the army acquisition requests are to be collected together and then as an integral need are to be supplied. The study, research and development contracts are provided through the central purchase process as well as the first and second needs for defense and logistic goods (personnel carrier vehicles, aircraft and navy equipment, signal and computer equipment, weapon and ammunition, gas and food, etc) .

In Article 87b is stipulated that the federal defense administration is authorized to provide own administrative support. This administration office deals with personnel issue and direct purchases of army stocks. The procurement and construction tasks can be transferred to the federal defense administration only within the federal law frame, which needs approval of the Federal Council.

## **DEFENSE ACQUISITION PROJECT REGULATIONS. PROJECT EVALUATION METODOLOGY. INTEGRATED PROJECT TEAMS' CREATION AND MENAGEMENT. GOOD PRACTICES**

One of the basic documents dealing with acquisition issues in the MoD is so called CPM (*Customer Product Management*) Document, originally adopted on 24 May 2004 and updated in October 2006. The aim of the needs exploring and needs sufficiency CPM provisions is, through timely and economical providing of products and services, to provide the mission readiness. During this process it is to pay attention especially on the unity of the capacities, time and costs. The principle of efficiency means that the whole system efficiency has advantage v.v the system elements (holistic approach). The needs exploring and needs sufficiency process is shared in three phases: analyzing phase, projecting phase and execution phase. The needs exploring is part of the analyzing phase and needs sufficiency is part of the execution phase. The realizing risks determine the needs exploring and needs sufficiency expenditure.

The system capability requests (SFF) gradual steps are determined and commented during the *analyzing phase*. The conceptual planes as well as the mission experience is the conclusions making base in this phase. The decision making way is determined in one or more so called documents- final functional request (AF). It is to make difference between:

- improvement of the already introduced products and services
- introducing of available products and services (if the functional needs can be realized from the bulk of the available products, the functional size marks have to be determined in AF )
- realization of new products (if the functional needs can be realised only with new products, this new products must be functionally defined by using the available components and having in mind the mission accomplishment demands).

In order to accomplish the realization of the new products, at the end of the analyzing phase it is to incorporate a new phase – so called *projecting phase*. At the same time it is necessary all measures to be taken in order all existing risks (related to achievement, time and costs) to be maximum reduced. The achievement capabilities and agreeing process must be examined by involving the future capabilities users (for example in a form of demonstrators). If it is possible and has sense, the examination should be carried out

through presence of real mission circumstances. This phase is ending by a phases based document – approval of the realization (ReG).

**Execution phase** embraces all measures that are necessary in order to:

- improve the already introduced products/services
- provide the available products/services on economical
- economically to produce new products (as more quality, as sooner possible) and this product to give on customer (user) disposal in a ready for mission condition.

If the basic prerequisites for full or partly products using are fulfilled, a approval for using document (GeNu) will be in-processed. Execution phase is ending after completion of all realizing measures by a phase based document- Final report (ASB).

**Organization.** The highest MoD needs exploring authority is CHOD (GenInsp). He is responsible for BW capabilities analyzing, carrying out the gravity centre, further BW development, central needs exploring as well for units mission readiness. In order to accomplish all this tasks he uses the integral capabilities analyzing *working group (IAFGA)*. The WG deal with all BW relevant capabilities categories adequate to BW concept. IAFGA is responsible to lead permanent analytic adjustment between the existing BW capacities and requested capacities, in a short-middle-long period, in order to cover the capabilities gaps. The WG is in charge as well to present the demands related to R&T concepts, to give proposals for research /basic technology and future modern technology. Related to needs exploring the WG is responsible for

- proving the demands fulfillment ( achievements, time and costs).
- realizing the review during the achieving of the most important milestones or for the case if there occur remarkable differences in comparison with already approved achievements, time and costs

**Research and technology.** All necessary measures helping to reach the technical prerequisites for timely and adequate qualitative army equipping are taken in the frame of VM R&T concept. At some moment it is to pay attention on the: political, conceptual, technological and industrial-political planes as well as on the IAGFA capabilities analyze demands. The research and basic technology activities are long period planning activities. The future modern technology activities are middle period planning activities. The short planning activities are system driven F&T supporting analyzing phase activities which realization is based on the foreseen technology and project planed exploring costs. The F&T tasks are :

- to provide the requested scientific and technological knowledge in all relevant technical areas for a adequate, intelligent and economical armament decision making.
- to provide timely recognition of the new technologies meaning in connection of military unites capabilities and to offer new technology based solutions e.t.c.

In order to provide a suitable answer to the urgent mission requirements, on 28.09.2006 the VM state secretary endorsed the document – *(ESB) urgent mission requirements fulfillment*. The task of this document is to accelerate the covering of mission requirements (demands) in the area of the recognized mission capabilities gapes. For this task there is developed a three stage supplying of requested materials procedure. This modus operandi is limited on the purchases that should be realized in a period from 6 months to 1 year.

One of the other changes in the updated CPM version from October 2006 is the incorporation of a new phase – so called *using phase*. Practicing this phase it is possible to use a not-bureaucratic between-stage-solution instrument in the products and services

utilization phase. Using this way the administrative expenditure can be remarkably reduced in the following cases:

- if the using purposes augmentation of a product (or service) will be recognized as a possible way for capabilities gaps covering or
- in the case of needs ( multiple needs) increase ( for example in case of users cycle augmentation, increase of multiple capabilities or change of organization –STAN)

The second change is relevant *connection to commercial economy*. The commercial economy technological stage making function mustn't be used only at the end of the execution phase (during the contracts conclusion) but also this its function should contribute in the process of effective solution choosing process, already in the analysing phase.

## **PROGRAMME MANAGEMENT OF DEFENSE ACQUISITION RESOURCES. GOOD PRACTICES**

### **THE PLANNING, PROGRAMING, BUDGETING SYSTEMS**

Military planning is done in a series of strategic and tactical documents that lay out the armed forces planning for a period of 5 years—midterm, and 15 years—long-term. The overarching document is the *Defense Policy Guidelines*, (Verteidigungspolitische Richtlinien—VPR). This document describes the current and foreseeable (15 years) political, economic, and military conditions, to include risks and threats. It then describes the defense policy and structure necessary to address these issues. Its goal is to provide defense planners with stable financial and structural strategic assumptions. The Defense Policy Guidelines are prepared by the Planungsstab (Planning Staff) of the BMVg and endorsed by the Federal Minister of Defense. From this document are derived the *Military Strategic Objectives* (Militärpolitische Zielsetzung) which provide a framework for the development of concepts, mission definitions and a set of goals necessary to accomplish them. The next document is the *Bundeswehr Concept* (Bundeswehr-Konzeption) which prioritizes tasks needed to accomplish the military strategic concepts and the design of the forces necessary to meet mission needs. The *Planning Guideline* then translates the threat-oriented statements of need into definable requirement. The final plan is the *Bundeswehr Plan* (Bundeswehrplanung), which provides the military needs to include military equipment and weapons systems. A project must be scheduled in the Bundeswehr Plan to become a part of the annual program. This becomes the basis for the annual budget estimate. The Bundeswehr Plan is prepared in December by the Federal Ministry of Defense. The Ministry of Finance provides the budget guidelines in late December to the cabinet. From December until March, the Armaments Directorate and Services develop the budget needs and prepare a consolidated budget for military systems and equipment. The FMOD Budget Directorate then submits the draft budget to the cabinet. The Ministry of Finance reviews the Draft Defense budget and the Federal Cabinet's coordination is obtained. Finally in July, the cabinet approves the budget and submits it to the Parliament for its review process. The FMOD portion of the budget process takes approximately eight months. (See Figure 9) This is a relatively stable process with few changes occurring in the budget of the weapon system programs once the government has committed to a program.

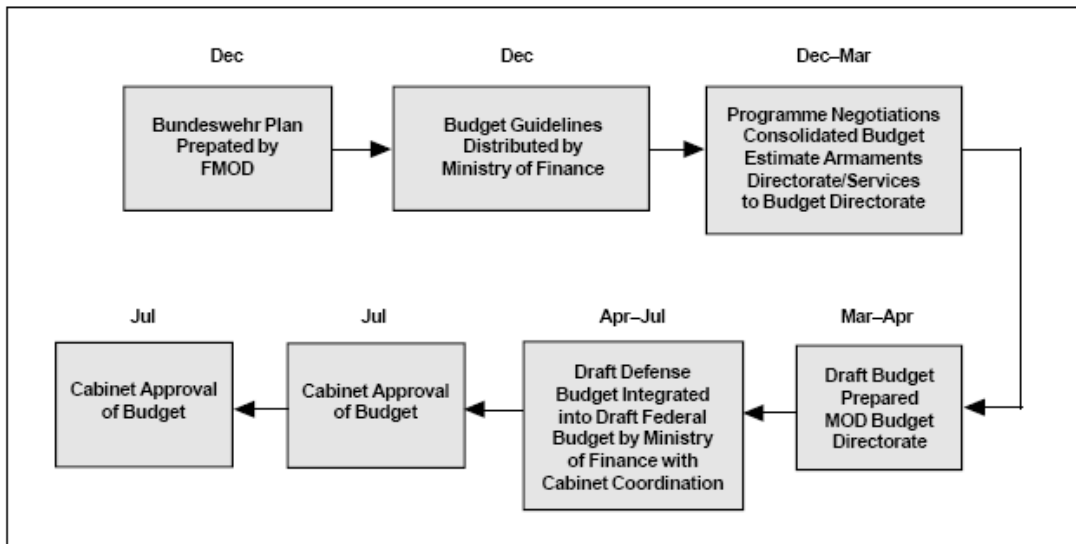


Figure 8. Federal Ministry of Defense – Typical Flow of Budget

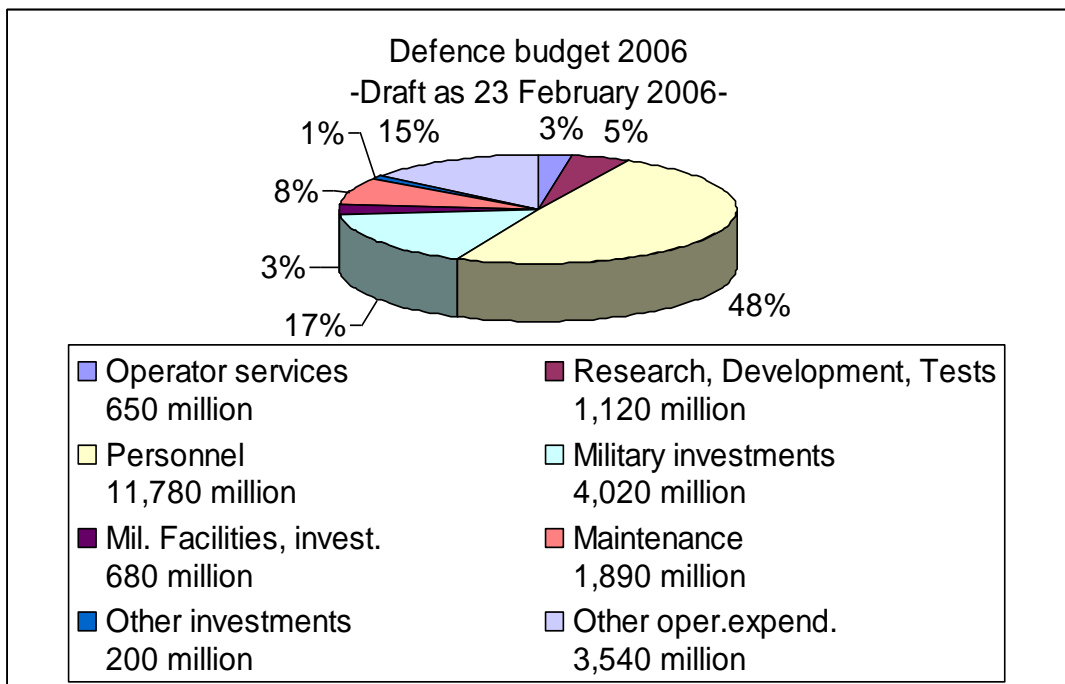


Figure 9. Defense budget 2006

The defense budget sets the annual financial scope for awarding Bundeswehr contracts. It provides the Bundeswehr with the financial basis required for accomplishing its mission.

In 2006 the planned defense budget amounts to approx. 23.88 billion Euros. With a share of approx. 72 percent, operating expenditure forms the major part of the budget. Investments represent about 25 percent of the defense budget. With an amount of 4 billion Euros, military procurement is the main focus of investments. "Operator

services" contracts for the further development of the Bundeswehr are shown as a separate item, representing an amount of 650 million euros.

This change was made because the Bundeswehr, in order to curb its operational cost, is now confined to providing supplies and services which are indispensable core tasks or which it can provide at less cost than commercial suppliers.

All construction projects are managed by the regional financial construction agencies (Finanzbauverwaltung) of the Bundeslander; hence the Bundeswehr is not a direct customer in this area. By establishing and operating barracks, depots and other agencies, the Bundeswehr has an influence on regional economy and infrastructure. Through the income of military and civilian personnel it is also a market factor for the local economy.

## **MoD's RESEARCH POTENTIAL**

### **THE DEFENSE ACQUISITION SYSTEM**

The armaments organization as an element of the Federal Defense Administration is responsible for providing, in an economical manner and in line with the demand, the armed services with the defense materiel required for the achievement of their mission. To this end, the armaments organization concludes the requisite contracts with industry.

Functionally, it is composed of:

- the Federal Office of Defense Technology and Procurement (BWB) in Koblenz,
- the Federal Office of the Bundeswehr for Information Management and Information Technology (Bundeswehr IT Office) in Koblenz, and their subordinate agencies.
- The BWB reports to the Directorate General of Armaments of the Federal Ministry of Defense, the Bundeswehr IT Office reports to the IT Director at the FMoD.

#### ***The Directorate General of Armaments of the FMoD***

The Directorate General of Armaments

- is responsible for advising the MoD executive group and the supreme military commanders on scientific/technical questions and on economic affairs,
- is instrumental in the planning of new defense materiel as well as in the overall Bundeswehr planning,
- is responsible for the planning, supervision and control of
  - basic research activities, studies on future technologies, concepts,
  - experimental and component developments, market analyses,
  - the development and procurement of new defense materiel,
  - post-design services and maintenance of in-service defense materiel,
- represents the FMoD in technological and economic matters,
- represents the FMoD within the scope of international armaments cooperation.

The Directorate General of Armaments is headed by the Director General of Armaments (HAL Ru) and his deputy, the Director of Armaments (AL Ru). Both of them are assisted by an executive secretary (GB Ru).

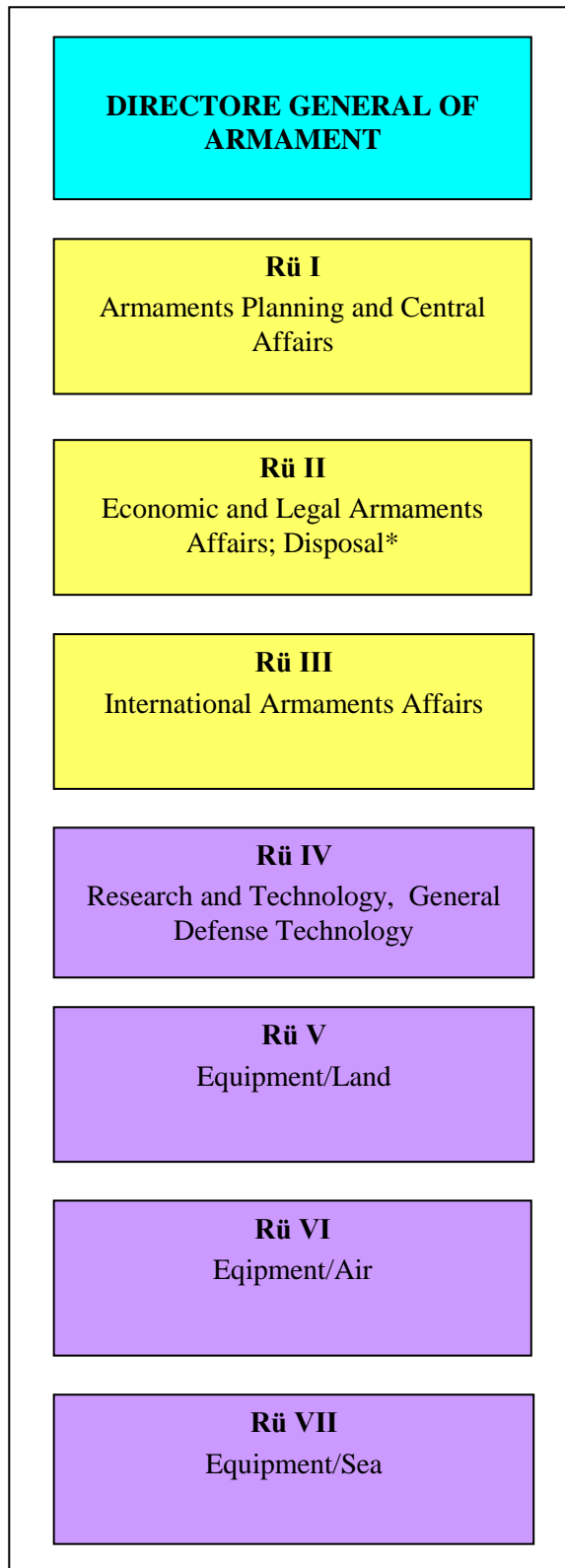


Figure 10. The structure of Directorate General of Armaments

The Directorate General of Armaments is divided into:

- Three divisions engaged in policy tasks:

- Division Ru I "Armaments Planning and Central Affairs", responsible i.a. for organization and supervision affairs of the armaments sector (without IT sector), central affairs, including PR, armaments planning, armaments situation, budgetary and financial planning;
- Division Ru II "Economic and Legal Armaments Affairs, Disposal\*", responsible i.a. for armaments management, defense industry, armament export and war weapons control affairs as well as for cost-effectiveness policy matters, legal armaments affairs and for the utilization/disposal of defense materiel from the former NVA (East German Army);
- Division Ru III "International Armaments Affairs", responsible i.a. for the international armaments cooperation within the framework of NATO and Western European Union (WEU), for armaments cooperation and relations with other nations, equipment aid, MoLJs and European Defense Agency (EDA) matters, and

- Four divisions oriented along technical and technological lines:

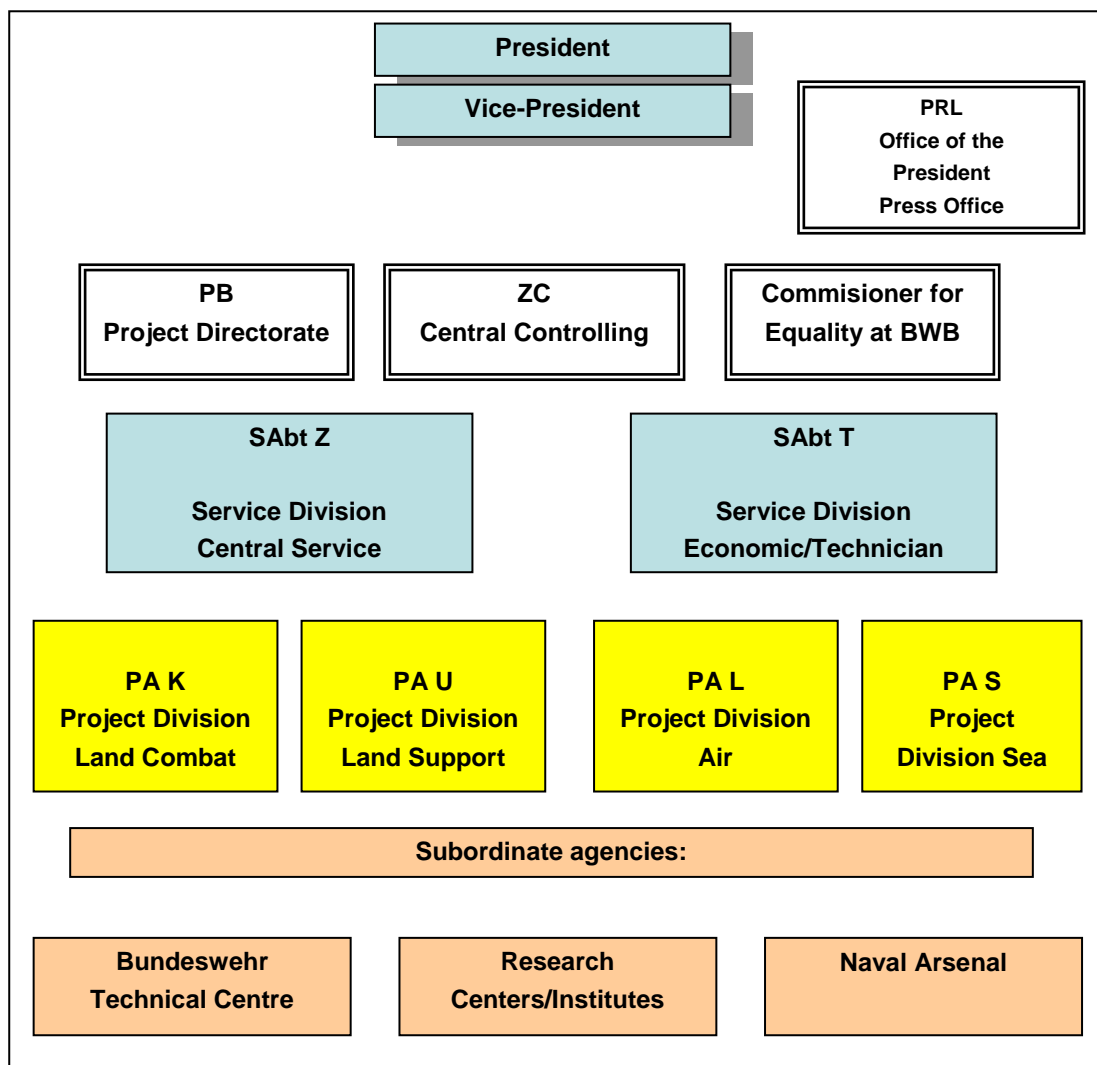
- Division Ru IV "Research and Technology, General Defense Technology",
- Division Ru V "Equipment/Land",
- Division Ru VI "Equipment/Air",
- Division Ru VII "Equipment/Sea", for armaments projects and project supervision.

\*Special Commissioner for Defense Materiel Disposal

Project supervision develops objectives for project management and project execution, controls the project sector at ministerial level with a view to political, economic and budgetary conditions and constraints, monitors the achievement of objectives of individual projects as well as the fulfillment of higher ministerial objectives, develops alternative solutions and produces decisions which exceed the competence of the project management at subordinate level.

### ***The Federal Office of Defense Technology and Procurement (BWB)***

The Federal Office of Defense Technology and Procurement, "Bundesamt für Wehrtechnik und Beschaffung" (BWB), located in Koblenz, was created over 48 years ago as a "central" interface between the Bundeswehr and industry. The BWB is under the control of the FMOD, but is a civil, not a military organization and operates independently. For most of its history BWB managed the technical-engineering portion of the program, and the contractual relationship with industry. As a result of the 1991 reorganization plan, the BWB has gone from that role to the broader role of project management of the weapons systems programs. The BWB is now responsible for the definition, development, engineering, test and evaluation, production and procurement of military weapon systems. The BWB, headquartered in Koblenz, has locations throughout Germany, and in the United States, France and Sweden. In 1998 they spent approximately 2.5 Billion DM for the development and procurement of new systems and equipment.



*Figure 11. The BWB Structure*

Within the scope of the Bundeswehr reform process the BWB adopted a new structure on 15 April 2003 to adjust to the changed security environment.

The BWB is headed by a president and one vice-president, who are supported by the executive staff, Central Controlling as well as by the Project Directorate.

The two service divisions Z and T deal with central administrative tasks as well as general technical and economic matters.

The four project divisions, Land Combat, Land Support, Air and Sea are responsible for

- the management of complex projects,
- systems engineering and integration,
- research and technology,
- technical/economic aspects of in-service support management,
- contract and price negotiations.

The BWB is the supervisory body for seven technical centers and three research centers which are mainly responsible for



- technical consultation and support of the project management for components and equipment,
- performance of studies, research and technology tasks, and
- performance of experiments and analyses.

The Naval Arsenal carries out repairs for the Navy.

The Liaison Office for Defense Materiel USA/Canada near Washington D.C. establishes and maintains contacts with the transatlantic partners.

The most important feature of the new structure is its concentration on the core responsibility of the BWB: Project management. Specialist technical tasks were delegated to the technical centers. Tasks related to information technology are assumed by the newly established Bundeswehr IT Office.

### ***IT Director and IT Staff of the FMoD***

The IT Director reports to the executive group of the Federal Ministry of Defense on the effective planning, introduction and operation of a modern, comprehensive and secure information technology in the Bundeswehr.

The IT Director's planning, control and supervisory tasks comprise

- determination of the future strategic, economic and technological IT policies for the Bundeswehr, including IT security,
- analysis of available and necessary Bundeswehr IT capabilities,
- responsibility at FMoD level for modeling and simulation (M&S),
- development of the architecture for the new "Bundeswehr IT System",
- definition of priorities for the IT projects to be included in the budget,
- responsibility for all IT projects in progress, and
- implementation of IT pilot projects agreed between Bundeswehr and industry.

In this area the IT Director is also responsible for the budget funds required.

The IT Staff subordinate to the IT Director, being one of the executive staffs of the Federal Ministry of Defense, is the focal point for strategic information management and responsibility for the provision and use of information technology, including IT security.

Composed of the SASPF Implementation Coordinator and six branches, the IT Staff combines supplier, single manager and user tasks at ministerial level, including IT project supervision.

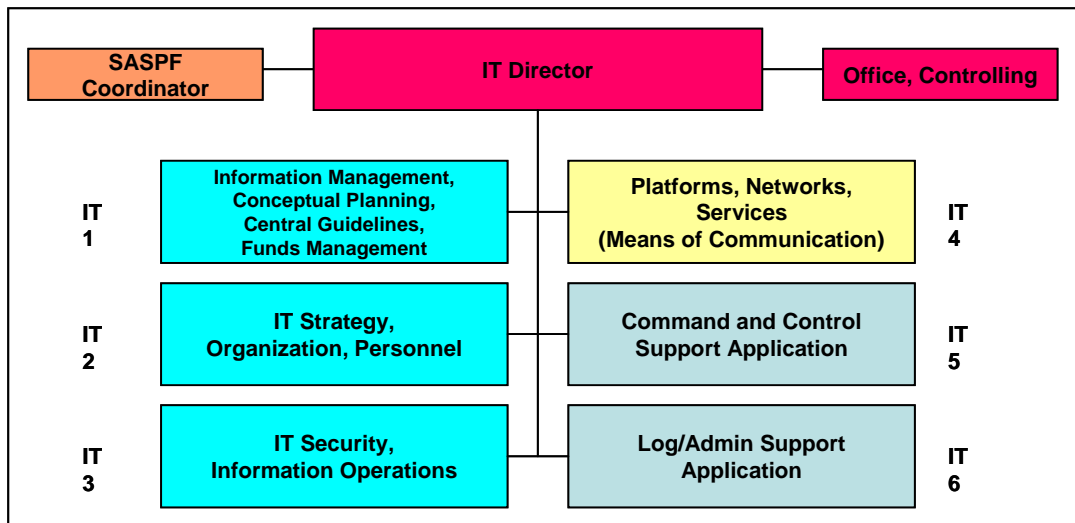


Figure 12. The IT Director Responsibilities

The "SASPF Implementation Coordinator" directly reports to the IT Director on the orientation and control of processes required within the IT project SASPF (Standard Application Software Product Family). The Coordinator harmonizes the technical introduction of SASPF and the activities related to its use with the Commissioner for Process Orientation SASPF. In addition, he coordinates the cross-organizational planning of IT projects managed by the IT Staff with SASPF and HERKULES.

Branch IT 1 deals with conceptual tasks related to central information management, planning tasks for the Bundeswehr Plan, funds management and maintenance of the IT budget, as well as international cooperation activities. IT 1 provides the authorized representative of the IT Director for the "Capability Analysis Integrated Working Groups" (German abbreviation: IAGFA).

IT 2 performs organizational, personnel and training related tasks for the IT Staff including its subordinate level. IT 2 coordinates the R&T activities of the IT sector and the strategic requirements. In terms of organization, the position of the IT Staff Controller is assigned to IT 2.

The responsibilities assigned to IT 3 cover policy matters, control, supervision and project tasks related to IT security and information operations. This branch also performs the tasks of the IT security officer for the IT Staff.

- The branches IT 4, 5 and 6 exercise ministerial supervision over IT projects from the following areas:
  - Platforms, networks, services (means of communication)
  - Command and control support applications
  - Logistics and administration support applications.

## MoD's KNOWLEDGE MANAGEMENT SYSTEM

### DEFENSE ARMAMENTS WORKFORCE

The program managers come from the BWB. The involved service Support Commands appoint a staff officer as the program officer to work as part of an Integrated Project Team with the BWB. On the side of the Field of Armament (Rue = Armament Division, BWB, Support Commands) basic acquisition education is done at the Federal Academy for

Defense Administration and Military Technology located in Mannheim. The basic education for the engineers/technicians is a seven-month program, which is part of an overall two-year post-graduate course of study. Further education—aimed at the various program managers—civilian as well as military—is currently a four-week course entitled “Program Management for the Armament Sector.” Examples of major subjects taught by the Academy are: Program and Project Management; Acquisition Process; Equipment Design and Engineering; Contracting; Procurement; Government-Business Administration; and International Program Management. Most of the training is performed on-the-job with various short courses or seminars available on special acquisition topics, such as value engineering and earned value. There is a typical acquisition oriented career path for both the military and civilian workforce. Practically every civilian entering this career path already has, as a minimum, the equivalent of a Bachelors degree. For acquisition personnel equivalent to a GS-13 or field grade officer rank on up it is mandatory to have the equivalent of a Master’s degree. The military receive acquisition-related training on-the-job, and at their schools, including the two Bundeswehr Universities in Munich and Hamburg. At least one German civilian university, the Friedrich-Alexander University at Erlangen-Nürnberg, offers course and seminars in defense economics and acquisition topics.

## **MoD’s CONTRACTS MANAGEMENT SYSTEM**

### **WHO AWARDS CONTRACTS?**

Various procurement agencies share the task of satisfying the extensive demand for goods and services of the armed forces and the civil administration. The Bundeswehr has fielded more than 1.8 million supply items.

### **CENTRAL PROCUREMENT**

Central procurement means that the entire demand of the armed services is jointly determined and procured. This creates a wide competitive environment. Large order quantities for combined demand result in a reduction of unit prices.

Study, research and development contracts, initial as well as follow-up requirements for defense materiel and supplies (vehicles, Air Force and Navy equipment, communications equipment, information technology, weapons, ammunition, missiles, POL, food, etc.) including repair work for the armed services are awarded centrally.

Contracts under the central procurement procedure are awarded by

### **Bundesamt für Wehrtechnik und Beschaffung (BWB)**

**Ferdinand-Sauerbruch-Str. 1, 56073 Koblenz**

**Phone: +49 261 400-0**

**Fax: +49 261 400-7630**

<http://www.bwb.org/>

E-mail: [BWBPoesteinqang@bwb.org](mailto:BWBPoesteinqang@bwb.org)

with the following project divisions:

### **PA K: Project Division Land Combat**

- o Combat vehicles
- o Artillery systems
- o Antiaircraft weapon systems

- o Infantry weapons and antitank systems
- o Air defense weapon systems
- o Engineer munitions, detection and clearance systems
- o Land-based missiles
- o Bridges and crossing equipment

**PA L: Project Division Air**

- o Management of airborne weapon and reconnaissance systems, including space-based systems
- o System engineering and integration of subsystems including armament
- o System-related research and technology
- o Technological and economic support during service use of manned and unmanned Bundeswehr aircraft
- o Mission support systems

**PA S: Project Division Sea**

- o Surface ships
- o Submarines
- o Mine warfare systems
- o Mission support and auxiliary ships, including all pertinent ship subsystems, weapons and sensors

**PA U: Project Division Land Support**

- o Field accommodation and equipment
- o The "Soldier System"
- o Reconnaissance and electronic warfare systems
- o Training / simulation systems

and

**The Federal Office of the Bundeswehr for Information Management and Information Technology (Bundeswehr IT Office)**

**Ferdinand-Sauerbruch-Str. 1, 56073 Koblenz**

**Tel.: +49261 400-0**

**Fax: +49 261 400-4505**

**e-mail: [itamtbw@bundeswehr.org](mailto:itamtbw@bundeswehr.org)**

Contract awarding procedures as well as the conclusion and administration of procurement contracts are the responsibility of service branches B1, B2 and B3 ("Contracts") within Division B.

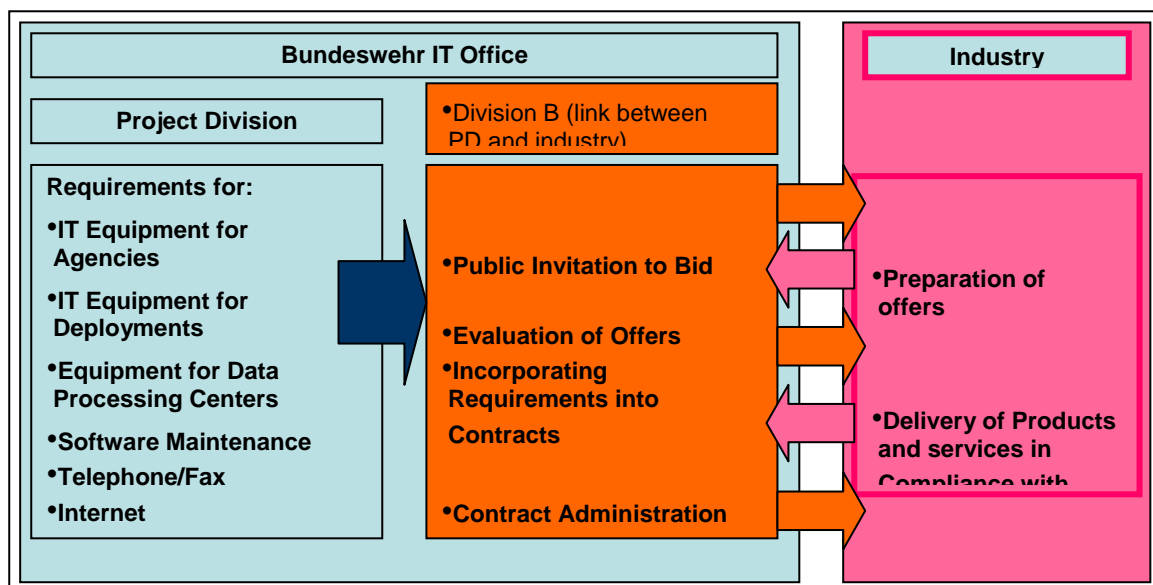


Figure 13. Contract awarding procedures

Ship maintenance/repair contracts are awarded by the Naval Arsenal:

**Marinearsenal**

Ebertstraße - Tor 8 -  
 26382 Wilhelmshaven  
 Tel.: +494421 49-0  
 Fax: +494421 49-2037  
 E-mail: [Marinearsenal@bundeswehr.org](mailto:Marinearsenal@bundeswehr.org)

The following Technical and Research Centers within the area of responsibility of the BWB award research and study contracts in accordance with their technical responsibility. In addition, they award procurement and repair contracts to satisfy their own demand for basic equipment, consumables and test vehicles/resources.

**Wehrtechnische Dienststelle für  
 Kraftfahrzeuge und Panzer  
 (WTD41)  
 (Automotive and Armored Vehicles)**  
 Kolonnenweg  
 54296 Trier  
 Tel.: +49 651 9129-0  
 Fax +49 651 9129-26 00  
 e-mail: [WTD41@bwb.org](mailto:WTD41@bwb.org)

**Wehrtechnische Dienststelle  
 für Pionier- und Truppengerät  
 (WTD51)  
 (Engineer and General Field Equipment)**  
 Universitätsstraße 5  
 56070 Koblenz  
 Tel.: +49 261 400-1701  
 Fax: +49 261 400-1857  
 e-mail: [WTD51\\_posteingang@bwb.org](mailto:WTD51_posteingang@bwb.org)

**Wehrtechnische Dienststelle für  
Schutz- und Sondertechnik  
(WTD 52)  
(Protective and Special  
Technologies)**

83458 Schneizreuth  
Tel.: +49 8651 79-0  
Fax: + 49 8651 1600  
e-mail: [WTD52posteingang@jbwb.org](mailto:WTD52posteingang@jbwb.org)

**Wehrtechnische Dienststelle für  
Schiffe und Marinewaffen  
(WTD 71)**

**(Ships and Naval Weapons)**  
Berliner Straße 115  
24340 Eckernförde  
Tel.: +49 4351 66-0  
Fax: +49 4351 66-1400  
e-mail: [WTD71@WTD71.de](mailto:WTD71@WTD71.de)

**Wehrtechnische Dienststelle für  
Waffen und Munition  
(WTD 91)**

**(Weapons and Ammunition)**  
Schießplatz  
49716 Meppen  
Tel.: +49 5931 43-0  
Fax: +49 5931 43-2091  
e-mail: [WTD91@bwb.org](mailto:WTD91@bwb.org)

**Wehrwissenschaftliches Institut für  
Werk-, Explosiv- und Betriebsstoffe  
(WIWEB)**

**(Research Institute for Materials,  
Explosives and POL)**  
Institutsweg 1  
85435 Erding  
Tel.: +49 8122 9590-0

**Wehrtechnische Dienststelle für  
Luftfahrzeuge - Musterprüfwesen  
für Luftfahrtgerät (WTD 61)  
(Technical and Airworthiness  
Center)**

Flugplatz  
85077 Manching  
Tel.: +49 8459 80-1  
Fax: +49 8459 80 20 22  
e-mail: [WTD61@bwb.org](mailto:WTD61@bwb.org)

**Wehrtechnische Dienststelle für  
Informationstechnologie und  
Elektronik (WTD 81)**

**(Information Technology and Electronics)**  
Kalvarienberg  
91171 Greding  
Tel.: +49 8463 652-0  
Fax: +49 8463 652-607 and 707  
e-mail: [WTD81\\_posteingang@bwb.org](mailto:WTD81_posteingang@bwb.org)

**Wehrwissenschaftliches Institut für  
Schutztechnologien - ABC-Schutz  
(WIS)**

**(Research Institute for Protective  
Technologies and NBC Protection)**  
Humboldtstraße  
29633 Münster  
Tel.: +49 5192 136-...  
Fax: +49 5192 136-355  
e-mail: [WISPosteingang@bwb.org](mailto:WISPosteingang@bwb.org)

**Forschungsanstalt der Bundeswehr  
für Wasserschall- und Geophysik  
(FWG)**

**(Institute for Underwater Sound and  
Geophysical Research)**  
Klausdorfer Weg 2-24  
24148 Kiel  
Tel.: +49 431 607-0

Fax: +49 8122 9590-3902  
e-mail: [WIWEB@bwb.org](mailto:WIWEB@bwb.org)

Fax: +49 431 607-4150  
e-mail: [fwq@bwb.org](mailto:fwq@bwb.org)

The relevant homepage and organizational structure of each agency can be found under <http://www.bwb.org>. "Agencies" (for more detailed information please refer to the German version of the website under "Dienststellen").

In individual cases, contracts under the central procurement procedure are awarded by the Federal Ministry of Defense:

### **Bundesministerium der Verteidigung**

Postfach 1328

Hardthohe

53003 Bonn

Tel.: +49 18882400

Fax: +49 1888245357

e-mail: [poststelle@bmvq.bund40Q.de](mailto:poststelle@bmvq.bund40Q.de)

### **DECENTRALIZED PROCUREMENT**

Decentralized procurement means that several procurement agencies cover the demand of a regional sector of the Bundeswehr for materiel or other types of supplies/services.

All products and services for which central procurement is inappropriate because of their nature or for economic reasons are subject to decentralized procurement. These are mainly commercial items of supply for the daily demand of the units, garrisons and the local administration.

This includes for example:

- food (e.g. fresh meat, eggs, fruit, vegetables)
- consumables for the maintenance of billets and garrisons (hardware items, paints, special oils, fertilizers)
- spare parts for commercial items (e.g. tires, starter batteries)
- repair contracts (e.g. repair of standard vehicles)
- guard and cleaning services.

### **Decentralized procurement is carried out by**

-the four military district administrative offices with their three branch offices

#### **Wehrbereichsverwaltung Nord**

*(Northern Military District)*

Hans-Böckler-Allee 16

30173 Hannover

Tel: +49 511 284-0

Fax: +49 511 284-4380

E-mail: [wbnord@bundeswehr.org](mailto:wbnord@bundeswehr.org)

#### **Wehrbereichsverwaltung Nord**

*(Northern Military District)*

Auftenstelle Kiel (Kiel branch office)

Feldstr. 234

24106 Kiel

Tel.: +49 431 384-0

Fax: +49 431 384-5454

E-mail: [wbnordastkiel@bundeswehr.org](mailto:wbnordastkiel@bundeswehr.org)

**Wehrbereichsverwaltung West**  
*(Western Military District)*

Wilhelm-Raabe-Str. 46  
40470 Dusseldorf

Tel: +49211 959-0

Fax: +49211 959-2187

E-mail: [WBVWestPresse-  
stelle@bundeswehr.org](mailto:WBVWestPressestelle@bundeswehr.org)

**Wehrbereichsverwaltung Süd**  
*(Southern Military District)*

Heilbronnerstr. 186  
70191 Stuttgart

Tel.: +49 711 2540-0

Fax: +49 711 2540-2188

E-mail: [WBVSuedPresse-  
steile@bundeswehr.org](mailto:WBVSuedPressesteile@bundeswehr.org)

**Wehrbereichsverwaltung Ost**  
*(Eastern Military District)*

Prötzeler Chaussee 25  
15344 Strausberg

Tel: +493341 58-0

Fax: +493341 58-3166

E-mail: [info@wbv-ost.de](mailto:info@wbv-ost.de)

- the garrison administrative offices subordinate to the military district administrative offices, and
- the armed services (commands, units and other military agencies) for contracts mostly below a certain value.

**Wehrbereichsverwaltung West**  
*(Western Military District)*

Außenstelle Wiesbaden (Wiesbaden  
branch office)

Moltkering 9

65189 Wiesbaden

Tel.: +49611 799-0

Fax: +49611 799-1699

E-mail: see Wehrbereichsverwaltung  
West

**Wehrbereichsverwaltung Süd**  
*(Southern Military District)*

Außenstelle Munchen (Münich branch  
office)

Dachauerstr. 128

80637 Munchen

Tel.: +49 89 1249-0

Fax: +49 89 1249-2209

E-mail:

[WBVSUEDAStMuenchenDezernat11  
Pressestelle@bundeswehr.org](mailto:WBVSUEDAStMuenchenDezernat11.Pressestelle@bundeswehr.org)



## HOW ARE CONTRACTS AWARDED?

### Awarding Law Structure

- **European Contract Awarding Regulations**
  - Legal Basis
    - EC Treaty
    - EC Directives
    - GWB Part 4
    - Regulation on the Award of Public Contracts
  - Awarding Procedures
    - VOL/A Section 2
    - VOF
  - Types of award
    - Open procedure
    - Restricted procedure
    - Competitive dialogue
    - Negotiated procedure
- **National Contract Awarding Regulations**
  - Legal Basis
    - Budget Law (§30 HGrG, Budget Principles Act)
    - Federal Budget Code (§55 BHO)
  - Awarding Procedures
    - VOL/A Section 2
  - Types of award
    - Public competitive bidding
    - Restricted bidding
    - Competitive dialogue
    - Negotiated contracting

### Legal Protection for Applicants and Bidders

- § 97 et seqq. of GWB/VgV
  - Claim to application of awarding regulations
  - Claims for damages
- German Civil Code (BGB)
  - Claims for damages

## **THE AWARDING PROCEDURES**

When awarding contracts, the Bundeswehr as a public customer has to comply with the contract awarding regulations. National or international awarding procedures are applied depending on the type and extent of required performance.

In the international awarding procedure competitors and bidders have an enforceable claim to the application of the awarding regulations, to equal treatment and transparency of the awarding process.

### **NATIONAL AWARDING PROCEDURE**

The national awarding procedure is based on the Federal Budget Code (§ 55 BHO) and on section 1 of the "Verdingungsordnung für Leistungen" (VOL/A) (Conditions concerning Contracts for Supplies and Services), Part A. As an administrative guideline for the implementation of the Federal Budget Code (BHO), VOL/A applies the principle of economy. Thus, it stipulates that as a rule contracts must be placed on a competitive basis.

### **INTERNATIONAL PROCEDURE ON THE BASIS OF THE COORDINATION DIRECTIVES ON PUBLIC SUPPLIES AND SERVICES CONTRACTS OF THE EUROPEAN UNION AND THE ‘GOUVERNMENT PROCUREMENT AGREEMENT’ OF THE WORLD TRADE ORGANIZATION (WTO)**

The international awarding procedure is based on the EC Treaty and the EC directives on the coordination of awarding procedures within the EU member countries:

- Council Directive 92/50/EEC of 18 June 1992 on the coordination of procedures for the award of public service contracts
- Council Directive 93/36/EEC of 14 June 1993 coordinating procedures for the award of public supply contracts and Council Directive 93/37/EEC of 14 June 1993 concerning the coordination of procedures for the award of public works contracts
- Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts.

The Government Procurement Agreement (GPA) of the World Trade Organization (WTO) has been implemented in the EU directives. The EU awarding regulations are implemented in German Law by the Act against Restraints of Competition (Gesetz gegen Wettbewerbsbeschränkungen (GWB-Part 4 - Awarding Provisions)), the Regulation on the Award of Public Contracts (Vergabeverordnung - VgV), Section 2 of VOL/A (Conditions concerning Contracts for Supplies and Services), and in the Conditions concerning Contracts for Supplies and Services of Freelancers (VOF).

Excluded from the international awarding procedure are contracts as defined in Article 100 section 2 of GWB, especially contracts concerning the production of or trade in weapons, munitions and war material, and contracts where an exemption from the international procedure is justified by national security interests.

In accordance with Articles 102 et seqq. of GWB, the award of contracts for supplies and services reaching or exceeding a value of 130,000 / 200,000 € is subject to the verification procedure of the Federal Cartel Office Division for contract awards. The tribunal in charge must be indicated in the cover letter to the Request for Proposal.

**TYPES OF AWARD WITHIN THE DIFFERENT AWARDING PROCEDURES – A SUMMARY**

Within each awarding procedure the scope of competition is based on the type of contract award.

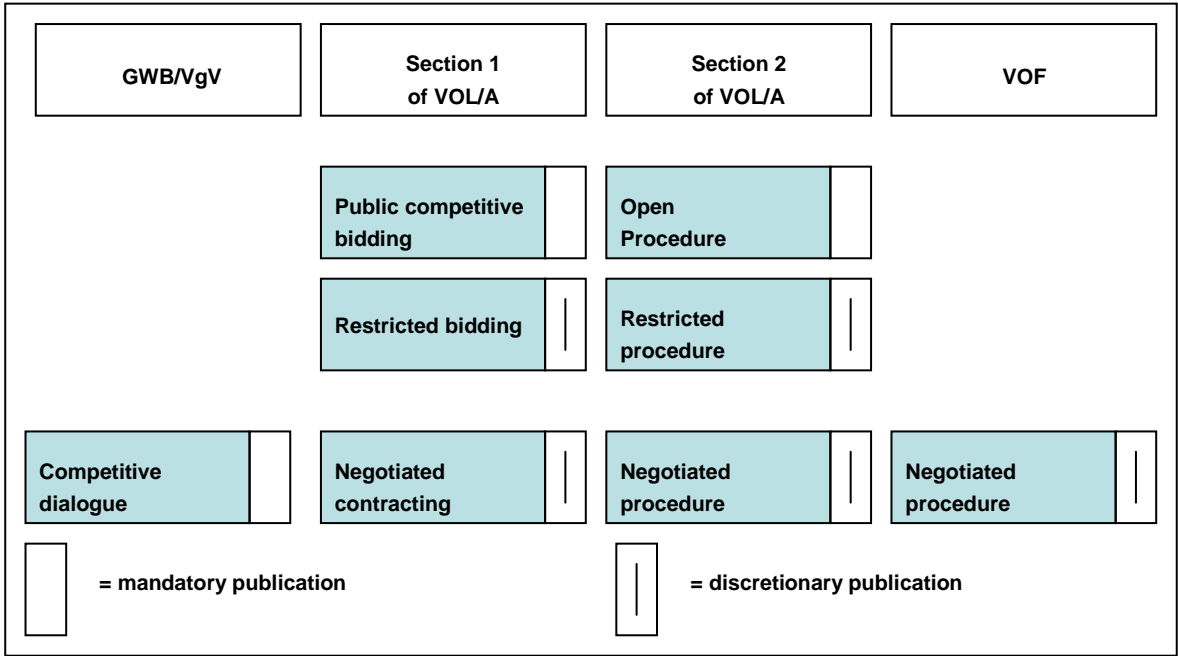


Figure 14. Types of awards within the different awarding procedures

**PUBLIC COMPETITIVE BIDDING/OPEN PROCEDURE**

Under the public competitive bidding/open procedure, contracts are awarded after a public Invitation to Bid to an unrestricted number of companies.

Companies must observe notices in the relevant publications, request submittal of the tender specifications and then apply directly to the tendering authority.

**RESTRICTED BIDDING/RESTRICTED PROCEDURE**

If certain types of supplies/services can only be properly provided by a limited number of companies, or if other reasons specified in VOL/A exclude public competitive bidding/open procedure, restricted bidding/ restricted procedure is applied.

In this procedure qualified competitors will be determined by the tendering agencies following a public invitation to apply for participation in the tender (Request for Interest), and will be invited to submit their offers.

**COMPETITIVE DIALOG**

The competitive dialogue can be conducted by government customers if they are objectively unable to specify the technical means required to meet their needs and goals or if they are objectively unable to specify the legal and financial conditions of the project.

A dialogue will be opened with the companies selected following the publication. During this dialogue, the government customers shall identify and determine how to best meet their needs, and discuss all contract details with the selected companies.

## **NEGOTIATED CONTRACTING/NEGOTIATED PROCEDURE**

If a formal bidding procedure is excluded for particular reasons (e.g. special experience, reliability, special types of implementation) the contracts will be awarded by negotiated contracting or negotiated procedure; preferably, on a competitive basis.

In this case the contracting authority can select qualified companies after or without having published a Request for Interest, and negotiate with them the performance for the contract to be awarded.

## **INTERNATIONAL NATO INFRASTRUCTURE PROCEDURE**

Building/construction and infrastructure projects for NATO are governed by NATO document AC/4-D/2261 (RINATO); for these projects the Federal Office of Defense Administration (BAWV), ErmekeilstraGe 27, 53113 Bonn, Tel.: +49 228 947-0 issues Invitations to Bid in the Federal Tender Gazette (Postfach 20 01 80, 40099 Dusseldorf) as well as in the Bundesanzeiger Verlag (Amsterdamer StraGe 192, 50735 Koln). Such Invitations to Bid are always preceded by a Request for Interest. This procedure offers the companies the opportunity to express their interest in obtaining a contract. They are then entered in a bidders list and may receive a formal request for proposal.

Prior to a request for proposal, the procuring agencies may request the bidders to provide proof of their qualification.

## **COOPERATION BETWEEN MoD AND DEFENSE INDUSTRY – REGULATIONS AND GOOD PRACTICES**

### **MULTINATIONAL ARMAMENTS AND ARMAMENT SALES**

“Armaments Cooperation also is an integral element of political cooperation and joint military planning. Moreover, armaments cooperation offers the best possible use of economic and technological resources.”<sup>8</sup> Notwithstanding changes in the political and military situation in Europe over the last ten years—the fall of the Berlin Wall, the Warsaw Pact disintegration and the developments in central Europe—cooperative armaments programs continue to be a key part of the Bundeswehr armament planning.

Recent budget cuts, smaller quantities of equipment being bought, technological advances and costs all contribute to the need to continue armaments cooperation. By some estimates 70 percent of the major Bundeswehr programs have been cooperative programs. The export market is also important for the defense industry. For example in the land weapons industry sector the military spends about 5B DM per annum while the international market sales are about ten times the home market. The Office of International Armaments Affairs in the FMOD Directorate General Of Armaments has overall responsibility for armaments cooperation. In the BWB responsibility for international armaments cooperation is assigned to the BWB project manager. The service staffs will assign their own international armaments affairs office to the project. The major players are the military users, armaments and procurement authorities and industry. With the magnitude of funds involved in armaments cooperation, both the Ministry of Economics and Technology and the Ministry of Foreign Affairs play a role in the consideration of a cooperative program. The Armament Organization and the Bundeswehr participate in a variety of bilateral and multinational defense development and procurement activities. Over the years there have been a variety of forums where cooperative programs have been addressed. One of the earliest ones was the FINABEL, founded in 1958 between army chiefs of France, Italy, the

Netherlands, Belgium and Luxembourg. Later Germany, Great Britain, Spain and Portugal and Greece joined. The current major NATO armament forums provide Germany with additional opportunities to participate in cooperative programs. The NATO committees are:

- NATO Armaments Committees,
- NATO Naval Armaments Group (NNAG),
- NATO Air Force Armaments Group (NAFAG), and
- NATO Army Armaments Group (NAAG).

Germany is also a key participant in European Armament Committees. These include the Western European Armament Group (WEAG), the Western European Armament Organization (WEAO), and the OCCAR (Organisme Conjoint de Cooperation en Matière d'Armement) Joint Armament Structure. Germany is also a participant in a number of bilateral programs.

The basic German policy on arms sales is that such sales must be in the vital national interests, to include political security considerations. The Government will not approve the sale of equipment where it will contribute to civil war, human rights violations, or contribute to armed conflicts in a region. The political principles covering the arms sales are outlined in the "Political Principles of the Federal Government for the Export of War Weapons and other Military Equipment" issued 28 April 1982. Currently, arms exports to NATO countries are not restricted.

This includes countries such as Sweden, Switzerland, Austria, Finland, Japan, and Australia, and New Zealand which are treated as NATOlike. Export to a third category of countries is permitted only in exceptional cases. The Grundgesetz, Article 26, provides the constitutional foundation for German arms export policy. Article 26 states, "Weapons designed for warfare may be manufactured, transported or marketed only with the permission of the Federal Government. A Federal Law will regulate details." The War Weapons Control Act and the Foreign Trade and Payments Act provide the procedures and policies for arms exports. This Act was passed in 1961 and prohibits nuclear, biological and chemical sales. Conventional weapons sales (production, purchase, and transport) require approval to be obtained from various ministries to include, the Ministry of Defense, the Ministry of Foreign Affairs and the Federal Export Office prior to action. The War Weapons List, an annex to the regulation, includes 62 items, such as, rockets, missiles and tanks. Equipment is included only when it has gone past the research stage and becomes a prototype. The Foreign Trade and Payments Act—passed in 1961— covers other equipment, such as, sport and hunting weapons, chemical, certain machine tools and plants for the production of defense equipment and other military equipment. The Federal Export Office (BAFA – Bundesausfuhramt), in coordination with NATO COCOM, maintains an Export Control list for these types of items. This office, part of the Ministry of Economics and Technology, is the licensing authority. BAFA has responsibility for:

- Foreign Trade and Payments Act, Foreign Trade and Payments Regulation, EC-Dual-Use Regulation,
- Control of the export of armaments and dualuse goods (include technology),
- Granting of export licenses (to include nuclear),
- Decision on applications for International Import Certificates, and
- Participation in EU bodies and international export control regimes.

However, if the equipment has a military use, then the Armaments Division will be the approving authority. For political assessment of these export applications the Ministry of Foreign Affairs and the Ministry of Defense will always be involved.

### **THE DEFENSE INDUSTRIAL BASE**

The German defense industry is privately owned and has been from the beginning. For a variety of reasons—political and economic—the German defense industry is not separable from the commercial industry. The economics of the size of the defense budget and the political concern of a highly visible defense industry have contributed to the defense industry remaining part of the overall German industry. The strength of most of these businesses is in their commercial operations and defense production accounts for a limited percentage of their sales revenue. In 1998 over 100,000 (see below) people were employed in these industries<sup>10</sup>. This reflects a decrease of 57 percent from the end of the cold war. The defense industry can be broken down into several different sectors—Land, Naval, Aerospace, Electronics and Software. Each sector has at least two-to-six prime producers. In the land sector, for example, five companies are the leaders in providing systems and equipment. They are:

- Henschel Wehrtechnik GmbH,
- Krauss-Maffei Wehrtechnik GmbH,
- KUKA Wehrtechnik AG,
- Mak System GmbH, and
- Wegmann and Co. GmbH.

The German naval shipyards have depended upon the sale of exports to keep them in business. The German ship industry can be fit into two categories. Large shipyards owned by two companies—the Thyssen Group with shipyards in Hamburg and Emdenand, and the Preusaag Group with a shipyard in Kiel. Smaller shipyards are located in Lemwerder, Bremen, and Wolgast. In the Aerospace sector there are five companies that are considered the major suppliers of equipment to the Bundeswehr. They are:

- Alcatel Air Navigation Systems GmbH,
- Allied Signal Aerospace GmbH,
- Bodenseewerk Gerätetechnik GmbH,
- Daimler Chrysler Aerospace, and
- Deutsches Zentrum für Luft und Raumfahrte.V. (DLR).

The German electronics industry employs over 860,000 people and is one of the largest in the country and the third largest in the world, trailing only the US and Japan. The leading companies in this sector are:

- Siemens AG Defense Electronics Group,
- STN Atlas Electronicsik GmbH,
- ESG Elektroniksystem und Logistic GmbH,
- Diehl GmbH Luftfahrt Elektronik, and
- AEG Elektronische Röhren GmbH.

The German industry has been hit hard by the significant decrease in procurement deutschmarks spent. In 1991, Germany spent 3.05 billion Euros. By 1998 this had dropped to 1.15 billion €. This has led to considerable discussion of mergers and consolidations.

Restructuring has primarily occurred in the aerospace sector. In 1995, Deutsche Aerospace became

Daimler-Benz Aerospace, which includes about 80 percent of German industrial capabilities in aerospace. At the same time, European governments have taken several initiatives to integrate the defense market, including the formation of two new organizations—Western European Armaments Organization (WEAO) and the Joint Organization for Cooperation in Matters of Armament (OCCAR)<sup>11</sup>—to improve armament cooperation. Cooperative programs have long been viewed as the impetus for cross-border defense cooperation at the industry level. Several defense firms, however, have initiated cross-border mergers that are not tied to government cooperative programs. While much discussion has taken place, national sovereignty issues and complex ownership structures have inhibited defense industry consolidation across national borders.

### **HOW TO GET INTO BUSINESS**

The correct way for firms wishing to obtain a Bundeswehr contract is to participate in tenders, apply for participation in a public market research and/or to contact the "Auftragsberatungsstelle" (Contract Advisory Agency) of the Bundesland in which they have their place of business (German companies only).

### **PUBLIC MARKET RESEARCH**

Invitations to Bid and Requests for Interest are published in the Supplement to the Official Journal of the European Union and/or on the portal of the federal government ([www.bund.de](http://www.bund.de)). Furthermore, the Invitations to Bid are published on the sites of the respective contracting authorities/procurement agencies. As an example, the invitations to bid of the BWB are published under "<http://www.bwb.org/Contract Award/invitations of Tender>".

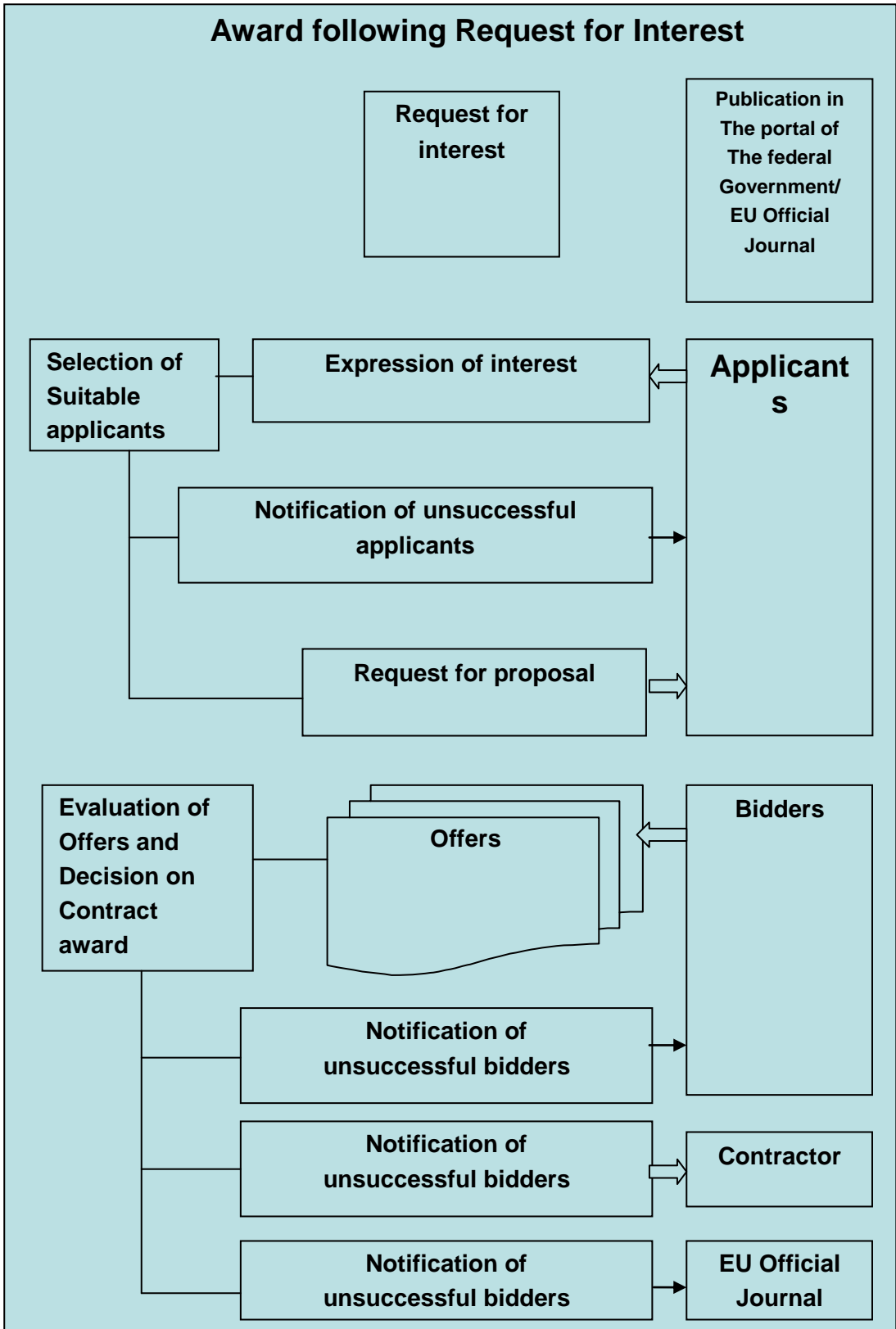


Figure 15. Award following request for interest



Supplement to the Official Journal of the EU,  
Office for Official Publications of the EC  
2, rue Mercier,  
L-2985 Luxembourg  
<http://simap.eu.int>  
<http://ted.publications.eu.int/official/>

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E-Mail:  
[vertrieb@bundesanzeiger.de](mailto:vertrieb@bundesanzeiger.de)  
URL:  
<http://www.bundesanzeiger.de>

#### **NON-PUBLIC MARKET RESEARCH**

Restricted bidding and negotiated contracting as well as the negotiate procedure may be preceded by a public invitation to apply for participation in the tender (Request for Interest).

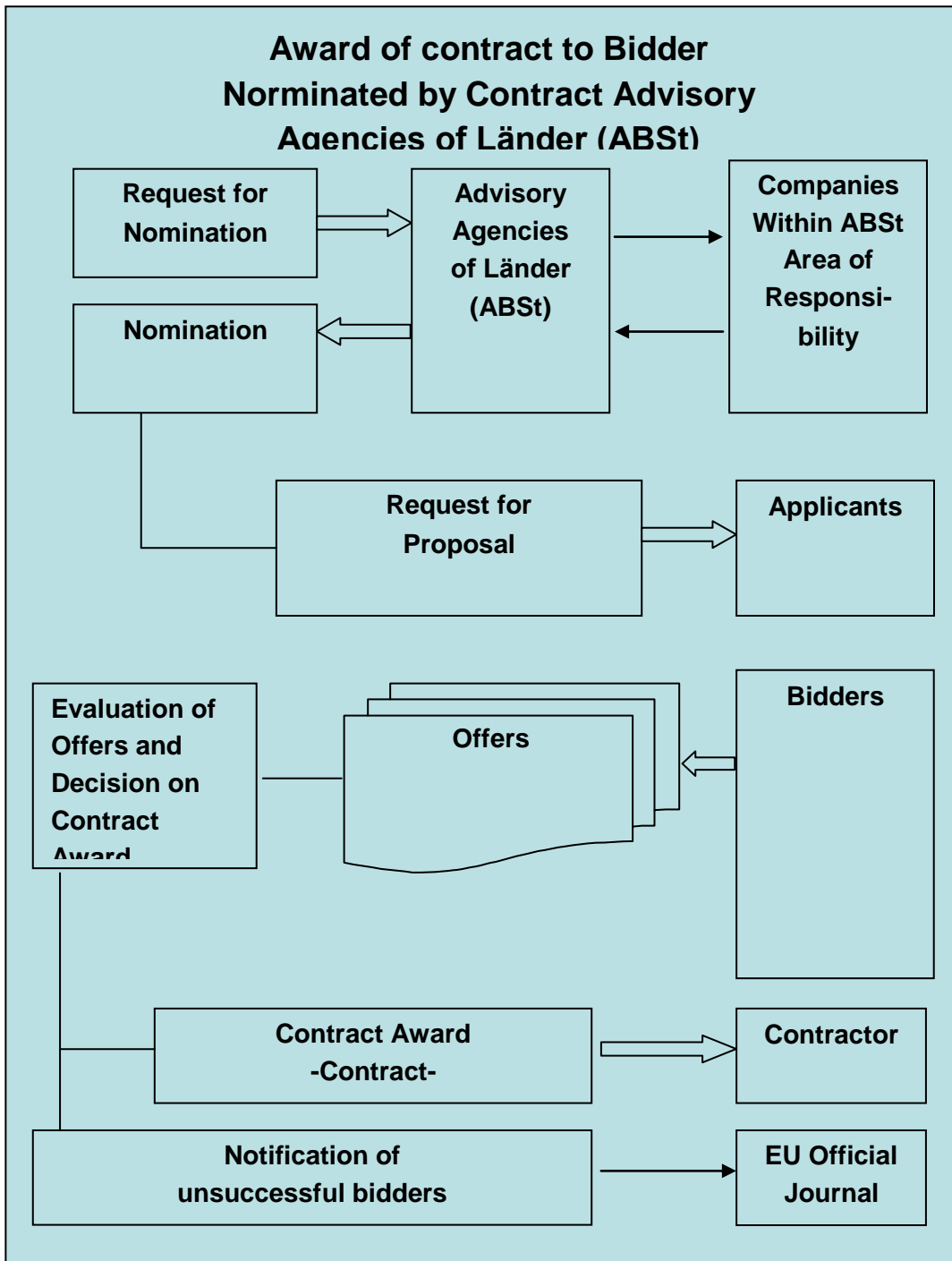


Figure 16. Award of contract to bidder normalized by contract advisory agencies of Länder (ABSt)

If there is no Request for Interest in the case of central procurements above a certain value, the Advisory Agencies of the Bundesländer are involved on the basis of an agreement between the Federal Minister of Defense, the Federal Minister of Economics and Technology and the Bundesländer. They will nominate qualified companies. The

Advisory Agencies have the requisite knowledge of the market situation and are, above all, tasked with advising interested companies on public contracting issues.

The Contract Advisory Agencies provide information about their tasks at <http://www.abst.de> and <http://www.abst.de/ansrift.html>.

## **ELECTRONIC PUBLIC CONTRACTING (E-TENDERING)**

The e-Tendering platform of the German government is an IT procedure which is intended to be used by all ministries pursuant to the Cabinet decision dated 10 December 2003 (the so-called 7-Punkte-Programm). Currently, this electronic public contracting system as used by the BWB includes the notice of intended contracting, the Invitation to Bid/Request for Proposal, the submittal of the tender documents, the submittal and evaluation of the offer.

With the project "Offentiicher Einkauf Online" (Online public purchasing), the procurement office of the Federal Ministry of the Interior (<http://www.bescha.bund.de>) takes part in the eGovernment initiative "BundOnline 2005" launched by the Federal Government. The sub-project "e-Tendering" represents the internet platform for electronic contract award to enable digital communication between customer and industry.

The Bundeswehr is planning to use this platform (<http://www.evergabe-online.de>) as well.

## **CONTRACT TERMS**

The drafting of contracts is based on the principle of freedom of contracts. There are no special legal provisions governing the contents of contracts with public customers. In accordance with the principle of self-commitment of the administration, however, the procuring agencies are obliged to follow uniform administrative guidelines when contracting. This ensures equal treatment of similar circumstances and prevents arbitrary decisions in contracting. There are, therefore, a number of preprinted, standardized contract terms which are included in contracts on a case-by-case basis and which, as a rule, are already part of the tendering documentation. In order to become legally effective, general contract terms must be clearly and unambiguously identified as contractual provisions. The contractor's general terms and conditions are not accepted.

The general contract terms of the Bundeswehr are composed of

- *General Contract Provisions*  
VOL/B "Verdingungsordnung für Leistungen Teil B" (Conditions Concerning Contracts for Supplies and Services Part B)
- *Additional terms of contract in the defense sector*  
ZVB/BMVg "Zusätzliche Vertragsbedingungen des Bundesministeriums der Verteidigung" zur VOL/B (Additional Terms of Contract of the German Ministry of Defense Implementing VOL/B)
- *Supplementary terms of contract for non-IT supplies/services:*  
ABBV "Allgemeine Bedingungen für Beschaffungsverträge des Bundesministeriums der Verteidigung" (General Terms and Conditions for Procurement Contracts Placed by the Federal Ministry of Defense)  
ABEI "Allgemeine Bedingungen für Entwicklungsverträge mit

Industriefirmen" (General Terms and Conditions for Development Contracts with Industrial Firms)  
ABFI "Allgemeine Bedingungen für Forschungsverträge mit Industriefirmen" (General Terms and Conditions for Research Contracts with Industrial Firms)

The terms of contract are available for viewing or download at <http://www.bwb.org/>, "Contract Award" (for more detailed information please refer to the German version of the website under "Vergabe"), "Forms and Bases for Contracting" ("Formulare und Grundlagen für die Vertragsgestaltung"), key word "Contract Terms" ("Vertragsbedingungen").

• *Supplementary terms of contract for IT supplies/services:*

EVB-IT "Ergänzende Vertragsbedingungen für die Beschaffung von IT-Leistungen" (Supplementary Terms of Contract for the Procurement of IT Supplies/Services) (EVB-IT for transfer, services, purchase, repair, software maintenance)

Where the IT services are not yet covered by existing types of EVB-IT contracts, the contract will be concluded on the basis of the following terms:

-BVB "Besondere Vertragsbedingungen" (Special terms of contract)

(Planning, generation, rental, maintenance)

-BBV-EDV "Besondere Vertragsbedingungen - EDV" (Special terms of contract - EDP)

(Program maintenance, purchase of equipment).

A German version of the supplementary terms of contract for IT supplies/services is available for viewing or download at [www.kbst.bund.de](http://www.kbst.bund.de).

In case of simple contracts, the procurement agencies use special form sheets and apply the shorter "Allgemeine Auftragsbedingungen" (General Terms and Conditions) or, for IT supplies/services, the applicable EVB contract forms with special annexes on a case-by-case basis. These will be attached to the tender documentation/Invitations to Bid, unless they are published on the BWB website.

## **STRATEGIC TECHNOLOGY PARTNERSHIP BETWEEN MoD AND DEFENSE INDUSTRY (PUBLIC-PRIVATE) AND BETWEEN ENTERPRISES**

Germany's Armed Forces are currently undergoing the largest restructuring in their forty-year history.

Significant structural changes will be necessary to meet new challenges and take into account significant political and technological changes as

- Germany is no longer in danger of a conventional military invasion
- The army must deal with military situations abroad
- The war on terrorism will be fought against individuals not an army
- Existing technology has to be upgraded to fight terrorism effectively

Multinational preventative security measures are the basic factors determining German defense policy. The German constitution stipulates that with the exception of evacuation and rescue missions, Germany's armed forces may conduct armed operations only in cooperation with allies and partners in a UN, NATO and EU context, stipulating efficient cooperation and communication with other nations' armies.

Necessary modifications, however, must not result in increased spending. On the contrary, Germany's budget calls for a decrease in military spending. Currently, defense expenditure is expected to be reduced to EUR 23.8 billion (USD 28.56 billion) during 2004.

## **A. THE AIR FORCE**

Germany's air force is also affected by decreasing budgets, but the government claims that it will honor all contracts that have already been signed and at the same make sure that new purchases meet overall financial targets.

Since the vast majority of future military investments is going to be in new technologies, companies who are at the forefront of technological developments are likely to profit most. Germany itself, in both the military and commercial aerospace sectors, invests heavily in research: Companies organized in the BDLI (Association of German Aerospace and Space Industry) spend roughly 17.2% of their sales on R&D. Industry analyses are largely indicating a strong recovery after two years of slow growth, and 2005 is expected to be a good year for the industry (2003 saw a sales increase of 2.3% compared with Within the air force, older aircraft are currently being replaced with the new Eurofighter (Typhoon). The aircraft is multi-purpose and will be replacing the F-4F Pantom 2, the MIG 29 and part of the Luftwaffe's fleet of Tornados. By 2015, the Luftwaffe is expecting to operate 180 aircraft with a value of over EUR 15 billion (USD 18.5 billion).

## **Major Players in the Industry**

### ***EADS***

EADS is the largest aerospace company in Europe and the second largest worldwide. It is active in the fields of civil and military aircraft, space, defense systems and services. In 2003, EADS achieved revenues of EUR 30.133 billion (more than USD 36 billion).

The EADS Group includes the commercial aircraft manufacturer Airbus, the helicopter supplier Eurocopter and the space company Astrium. EADS holds a 37.5 percent interest in MBDA, the second largest guided missiles manufacturer worldwide. In addition, EADS is the major partner in the Eurofighter consortium and also develops the A400M military transport aircraft.

The following is a list of companies active in the German military aerospace industry:

- AvCraft Aerospace GmbH- Aircraft Manufacturer
- Becker Flugfunkwerk GmbH- Communications Equipment
- CAE Elektronik GmbH- Telecommunications
- Diehl Munitionssysteme GmbH & Co. KG- Ammunition
- Dittel GmbH Luftfahrtgerätebau- Radio, Measuring and Power Technology
- Dräger Aerospace GmbH- Components
- E.I.S. ELECTRONICS GmbH- Cabling and Components
- ELAN Elektronische- und Anzeiger-Gesellschaft mbH- Instrument Components

- ESW-EXTEL SYSTEMS WEDEL Gesellschaft für Ausrüstung GmbH- Stabilizing and Motor technology and Power management
- Garner CAD Technic GmbH- CAD
- Goodrich Control Systems (GCS) GmbH- Aircraft Manufacture and Testing
- Goodrich Rosemount Aerospace GmbH- Sales and marketing
- Gore - W. L. Gore & Associates GmbH- Cabling, Radar and Microwave Systems
- HOLMBERG GmbH & Co. KG- Head-sets and –phones, Telecommunication
- Hydro-Gerätebau GmbH & Co. KG- Ground Operations Machinery
- Liebherr-Aerospace Lindenberg GmbH- Completed Systems and Components
- LITEF GmbH- Sensors and Navigation Systems
- Lockheed Martin GmbH, Büro Berlin
- MTU Aero Engines GmbH
- Nord-Micro AG & Co. OHG- Ventilators, cabin and Flight Control Systems
- ROHDE & SCHWARZ GmbH & Co.KG- Radio technology
- RUAG Aerospace Deutschland GmbH- Defense Technology
- SACS GmbH- Components
- TELDIX GmbH- Computer/Display Systems
- TURBOMECA GmbH- Helicopter Gas Turbines

Sales in the European Aerospace Industry in EUR billion

	'98	'99	'00	'01	'02
<b>Civil Aviation including space</b>	42.0	47.0	52.0	57.5	51.0
<b>Military Aviation/ Defense Technology</b>	26.0	22.0	21.0	24.5	23.5

(Exchange Rate: EUR 1 equals USD 1.2)

## **B. THE ARMY**

The German Defense Ministry's restructuring plans for the army stipulates the following:

- Response forces (about 35,000) for multinational high-intensity operations.
- Stabilization forces (about 70,000) for peace stability measures in low- and medium-intensity operations
- Support forces (137,500 personnel, to include 40,000 undergoing training at any given time) to support all operations and ensure routine duty operations at home.

Compulsory nine-month military service for all male German citizens upon completion of their school education will continue. Abolishing or suspending conscription would necessitate the employment of 40,000 additional temporary-

career soldiers. Maintaining national service will allow Germany to best meet future military requirements.

Presently, personnel are stationed at 621 bases. The government's 2001 stationing concept originally reduced the number of bases to 505, new plans see the closure of an additional 100 bases.

### **Major Players in the Industry**

#### ***Rheinmetall DeTec AG***

Rheinmetall DeTec AG is the parent company of the defense technology arm of the Rheinmetall group, with its divisions Land Systems, Air Defense Systems, Weapons & Ammunition, and Defense Electronics. With some 7,400 employees worldwide, the subsidiaries and affiliates of Rheinmetall DeTec generate EUR 1.6 billion in annual sales. This makes Rheinmetall DeTec one of the largest and most important defense technology enterprises in Europe.

#### ***KMW Krauss-Maffei Wegman***

KMW is a Germany-based defense contractor with worldwide sales. The company produces tanks, artillery, air defenses, infantry vehicles, wheeled vehicles, armor protection and other military engineering equipment such as mobile bridge builders. The company is also producing the BOXER APC, which is part of the OCCAR project (see below).

### **C. THE NAVY**

The German marine industry is presently undergoing drastic changes. Most recent and possibly most important is the decision to merge the largest of the German Naval companies (Blohm and Voss owned by the ThyssenKrupp group) and HDW (owned by the U.S group OEP) aiming at being able to compete globally. Production will be centralized i.e. naval ships in Hamburg, trade vessels, frigates and corvettes in Emden and submarines in Kiel. This will allow the individual docks to specialize, thereby reducing costs and increasing efficiency.

Steps are being taken to create a trans-European naval company as a result (even if originally not intended) of the merger of four companies. Effects on competition may be similar to the situation in the aerospace industry, where EADS has a dominant position and makes it very hard for international defense companies to enter the market.

Presently the German shipbuilding market is experiencing tough competition from abroad, particularly from countries such as China, Japan and South Korea.

The marine industry is presently characterized by considerable investments into new technologies. One example is the new 212A class submarine, which operates on new fuel cell technology. It is the first submarine to operate on this kind of technology, which enables it to stay under water for longer periods of time and achieve higher maximum speeds, dive deeper and have less environmental impact than other models. It is currently being tested in Norway.

### **Major Players in the Industry**

There are several players in the German shipbuilding industry, however, there are four which are particularly influential.

#### ***Blohm and Voss***

Blohm and Voss was founded in 1877 and employs 1,110 people with annual sales of EUR 402 million. The owner company, Thyssen Krupp, has a huge international presence, has

annual sales of over EUR 36 billion (USD 43 billion) and employs around 120,000 people worldwide ([www.blohmvooss.com](http://www.blohmvooss.com), [www.hdw.de](http://www.hdw.de))

### ***Abeking & Rasmussen***

The shipyard was founded in 1907. The product line includes research ships and specialized ships, such as SAR (search and rescue) craft, ocean supply ships, fast passenger ferries, patrol boats, minesweepers, and mine hunters. A&R developed SWATH (Small Waterplane Area Twin Hull) technology.

### ***Friedrich Lürssen-Werft***

Friedrich Lürssen Werft is family-owned and was founded in 1875. It employs around 1,200. Production comprises of naval vessels, such as fast patrol boats, corvettes, frigates, mine counter measure vessels and support vessels; patrol boats, fast ferries, SAR and coast guard; and yachts.

### ***Kröger Werft***

Kröger Werft is owned by Friedrich Lürssen-Werft and employs 300. The product line includes containerships, commercial ships, research vessels, and naval vessels. The shipyard also does repair and refit works, as well as consulting.

## **D. MARKET OPPORTUNITIES AND ACCESS**

As with almost all government purchases, preference is typically given to domestic components. In 2003, 98% of all German government procurement contracts were awarded to German companies; 1.2% to companies from the EU, only 0.8% of procurement to firms from outside the European Union (equaling EUR 17.23 million (US\$ 20.67 million)).

*While offers may be published in English, all tenders must be submitted in German. Schedules for the tenders are also particularly tight meaning that applications must be translated and submitted quickly. Taking all this into consideration a German partner company appears to be essential in order to be successful in Germany.*

However, there is already a significant U.S presence in the German defense market with companies such as Lockheed Martin, Goodrich Control Systems and MTU Aero Engines cooperating with various German partners, especially in areas such as avionics, laser optics and security.

### **Trade Shows**

In Germany, trade fairs play a major role in product marketing. Exhibiting at fairs can bring direct sales, but more significantly, it can be one of the least expensive ways to test the market's receptivity for the products. Further the strength and scope of the competition can be assessed and contacts with others "in the trade" can be established.

### **Key Contacts**

Additional information sources on German government procurement and market entry can be obtained from these organizations and their websites:

- ( **Federal Republic of Germany Office for Defense Material USA/Canada**  
Federal Republic of Germany Liaison Office (GLO)  
For Defense Material USA/Canada  
11152 Sunrise Valley Drive  
Reston, VA 20191

**GLO in general:** (703) 715-8260, [DtVStRue@BWB.org](mailto:DtVStRue@BWB.org)



**Defense Technology:** (703) 715-8168, [DtVStRue-Technik@BWB.org](mailto:DtVStRue-Technik@BWB.org)

**Defense Economics:** (703) 715-8177, [DtVStRue-Beschaffung@BWB.org](mailto:DtVStRue-Beschaffung@BWB.org)

↳ • **Bundesamt für Wehrtechnik und Beschaffung (State Military Procurement)**

P.O. Box 30 01 65

56057 Koblenz

GERMANY - **Tel:** +49 (0261) 400-0

**Fax:** +49 (0261) 400-7630

**Email:** [BWB@bwb.org](mailto:BWB@bwb.org)

**Web:** [www.bwb.org](http://www.bwb.org)

• **Beschaffungsamt des Bundesministeriums des Innern (Federal Procurement Office of the Interior)**

Sankt Augustiner Str. 86

53225 Bonn

Tel: +49 (0) 228 - 610 - 0

Fax: +49 (0) 228 - 610 - 1610

Email: [info@bescha.bund.de](mailto:info@bescha.bund.de)

Web: [www.bescha.bund.de](http://www.bescha.bund.de)

## **THE FEDERAL OFFICE OF DEFENSE TECHNOLOGY AND PROCUREMENT AS PART OF ARMAMENTS ORGANIZATIONS**

### **Centralized Procurement for the Bundeswehr**

In Germany, the Federal Defense Administration performs personnel and procurement management functions for the armed forces.

The armaments organization is part of the Federal Defense Administration. Its task is to ensure that the Bundeswehr demand is met by supplying state-of-the-art technology and modern equipment at economic conditions.

The gamut of defense material ranges from highly sophisticated weapon systems to personal equipment of the soldiers. As a central "purchasing agent" for the Bundeswehr, the armaments organization constitutes an important public customer for suppliers of technology and services. Depending on the type of project, contracts are placed for research, development, procurement or maintenance activities.

The **Federal Office of Defense Technology and Procurement (BWB)**, which is part of the civilian Federal Defense Administration, is responsible for the implementation of all armament projects with the exception of those in the area of information management and information technology. For the latter, the Federal Office of the Bundeswehr for Information Management and Information Technology (Bundeswehr IT Office) was set up in April 2002. An additional area of responsibility consists in the disposal of condemned materiel.

BWB is the largest technical authority in Germany. In addition to its main location in Koblenz, BWB has affiliated agencies all over Germany, as well as in the United States, the United Kingdom, and in France.

It is supervised by the Federal Ministry of Defense's (FMOD) Directorate General of Armaments, which is in charge of armaments planning.

In 2003, the BWB issued 10,936 tenders with a value of EUR 2.153 billion (US\$ 2.584 billion).

## **THE EUROPEAN ANGLE**

### **WEAG Procedure (Western European Armament Group)**

The Western European Armaments Group (WEAG) was originally established by the 13 European NATO nations (except Iceland) Belgium, Denmark, Germany, France, Greece, United Kingdom, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain and Turkey. In November 2000, Finland, Austria, Poland, Sweden, the Czech Republic and Hungary, acceded to full WEAG membership.

One objective of the WEAG is to create a European market for defense equipment, not subject to EU regulations. For this reason, all WEAG nations publish their future requirements for defense equipment in periodical national bulletins. These publications are intended to make contract awards more transparent and to invite interested bidders to participate in the competition. The WEAG procedure is an information procedure, which precedes the national contract awarding procedures, and is designed to create international market transparency.

### **European Defense Agency**

Particular attention must also be paid to developments with the European Defense Agency. The planning for this organization is currently underway and has considerable industry support. The main goal of this organization is to streamline European defense capabilities by developing Europe's military strength, eliminating R&D overlaps, furthering armaments co-operation, creating a competitive defense equipment market and strengthening the defense industrial technology base.

The organization still lacks funding, but if it continues to develop as expected it will become extremely important for European defense purchases. With the support of companies such as Thales, EADS and BAE Systems, there is a realistic chance that EDA will succeed.

Currently, EDA attempts to improve R&D cooperation between EU countries and to promote further collaboration and further streamline European military spending.

Further Information:

[http://ue.eu.int/cms3\\_fo/showPage.asp?id=277&lang=en&mode=g](http://ue.eu.int/cms3_fo/showPage.asp?id=277&lang=en&mode=g)

### **OCCAR (Organisation Conjointe de Coopération en matière d'Armement)**

OCCAR (Organisation Conjoint de Cooperation en matiere d'ARmement) was established by Administrative Arrangement in 1996 by the Defense Ministers of France, Germany, Italy and the UK. Its aim is to provide more effective and efficient arrangements for the management of certain existing and future collaborative armament programs. The OCCAR Convention gives OCCAR its legal status, allowing it to place and manage contracts, and to employ its own staff. In support of the Convention, OCCAR has developed a comprehensive set of management procedures (OMP) and an organizational structure that will enable it to handle the business of collaborative program management.

Current programs managed by OCCAR include TIGER (Anti Tank Helicopter), BOXER (APC), FSAF (Surface to air missile system), COBRA (Counter Battery Radar System) and ROLAND (Radar Guided Surface to Air Missile. The possible integration of a range of other programs and involvement in early phase activity e.g., Technology Demonstration Programs (TDPs) is planned.

Additional programs currently under active consideration for integration into OCCAR are the A400M military transport aircraft, the PAAMS ship borne air-to-air missile system and the TRIFOM missile program.

## **ADDITIONAL GERMAN GOVERNMENT PROCUREMENT INFORMATION**

Non-Military government procurement is handled by the Bundesbeschaffungsamt (State Procurement Office). Organizations such as the German Border Police (a part of the Ministry of the Interior) have similar procurement requirements to those of the military. The border police is involved in fighting terrorism, where the same technology will be used as in military areas. Examples of this would be weapons technology, scanning and detections equipment, night vision technology and many more. All procurement opportunities are offered through the website:

<http://www.evergabe-online.de/>.

Further information on other government procurement can be found on: <http://www.bescha.bund.de/>

however, all information on these websites is in German.

### **For More Information**

For further information on the German Defense sector and how the Commercial Service can assist U.S. Companies, please contact

### **CS Germany Contact:**

Juergen Mueller  
Commercial Specialist  
U.S. Commercial Service  
American Consulate General  
Alsterufer 27 – 28  
20354 Hamburg  
Germany  
Tel.: +49-40 41171-313  
Fax: +49-40-4106598  
E-mail: [Juergen.Mueller@mail.doc.gov](mailto:Juergen.Mueller@mail.doc.gov)

## **PROMOTION AND ENCOURAGEMENT**

-of small and medium-sized business

-of occupational therapy installations and workshops for the blind

It has always been a particular concern of the Federal Defense Administration to involve small and medium-sized business when placing public contracts. Wide involvement of these firms promotes competition and helps to put innovative products on the market.

Considerable sums are paid annually to small and medium-sized business in the form of direct procurement and service contracts. A large number of these firms is directly involved in the supply of consumer goods, maintenance and other services. In addition, the (internal) "Leitsätze zur Vergabe von Bundeswehraufträgen" (Guiding Principles for Placing Bundeswehr Contracts) issued by the Federal Ministry of Defense require the procurement agencies to take care that subcontracts under large-scale and/or complex contracts are awarded to small and medium-sized business firms.

Within the scope of the promotion of small and medium-sized business, possible competitive disadvantages of small and medium-sized enterprises compared to big enterprises have to be compensated with certain measures (e.g. breakdown of services into lots, or small and medium-sized companies are also requested to submit their bids) when contracts are awarded. Such measures are applied to encourage small and medium-sized enterprises to quote for Bundeswehr contracts in order to facilitate their integration into economic life.

### **ENCOURAGEMENT OF SMALL AND MEDIUM-SIZED BUSINESS**

Award of contracts is subject to the Federal Government Directives for adequate participation of small and medium-sized business from trade, commerce and industry (Supplement No. 16/76 to the Federal Gazette No. 111 dated 16 June 1976 - to be obtained from Bundesanzeiger Verlagsgesellschaft mbH, Postfach 10 05 34, 50445 Köln). Thus these firms are given a chance to compete with larger-sized companies. This is done by inviting such companies to submit bids in a restricted tender/restricted procedure or negotiated contracting/negotiated procedure; they are also given a chance - under certain conditions - to challenge the most economic bid in the national contract awarding procedure.

### **OCCUPATIONAL THERAPY INSTALLATIONS AND WORKSHOPS FOR THE BLINDS**

Articles 56 and 58 of the Severely Disabled Persons Act stipulate that occupational therapy installations and workshops for the blind be given priority with respect to public contracts which they are able to execute. To this end, the Federal Government enacted the directives for the consideration of occupational therapy installations and workshops for the blind in connection with the award of public contracts, dated 10 May 2001 (BMWiT I B 3 - 26 23 55 of 10 May 2001, Federal Gazette No. 109 of 16 June 2001 page 11 773). According to these directives, occupational therapy installations and workshops for the blind must be awarded the contract in question if their bid price does not exceed the price of the most economic bidder by more than 15 percent.

### **THE CAPABILITIES OF THE BUNDESWEHR – FUTURE PERSPECTIVE**

The capabilities of the Bundeswehr as a whole require equipment that is efficient and commensurate with the new, most probable tasks.

The modernisation of materiel and equipment will be strictly geared towards the capability profile and a joint overall approach. The scope of procurement is oriented along the three newly introduced force categories.

Some examples of equipment which is currently procured or will be procured in the near future is depicted here:

- Modern maritime weapon systems (Submarine 212 class, Frigate 124 class),
- Eurofighter,

- Armored Personal Carriers and Transport Vehicles (Dingo, GTF),
- Strategic Air Transport (A 400M),
- Unmanned Aerial Reconnaissance Systems of different kind,
- A joint 3D terrain database,
- Communication- and Information-systems.

Nevertheless the system is flexible enough to adapt to sudden necessities. Due to the rapid increase of suicidal attacks in AFG, BW prepared a financial corridor for next year's procurement in order to buy more armored vehicles for the sake of other pre-planned products.

The last milestone of Transformation is the partnership with business industries. Efficiency is an important prerequisite for Transformation. Therefore the Bundeswehr will be relieved of all tasks that can be performed more economically using modern forms of co-operation and financing. However, it must be clear that economic considerations are strictly limited by operational requirements. BW identified areas that are suitable for outsourcing services to third parties. The vehicle pool and the clothing management are examples.

Secondly the Bundeswehr's management procedures are replicated in a process-oriented integrated software system utilising the management procedures of business enterprises (SASPF).

HERKULES is the biggest outsourcing project. For 6.5 billion € an IT-company will on the responsibility to connect, integrate, streamline and manage every single peacetime network of the Bundeswehr, including hardware components.

Finally, it is to establish the army equipment repair and maintenance organization, a private-public-partnership between the Bundeswehr and industrial partners.

## **TRANSPARENCY AND ACCOUNTABILITY PROCEDURES. CIVIL CONTROL**

“...with regard to price and performance, your products have to meet Bundeswehr requirements better than those of your competitors.” Friedrich Steinseifer, retired TRADOC Deputy Director, captures the philosophy of the FMOD's procurement policies. The goal is to achieve the market price for military equipment based on a fair, transparent and open competition. The Armaments-Related Economic and Legal Affairs Division sets the procurement policy for the FMOD. The Bürgerliches Gesetzbuch or civil code is the governing law for all BWB contracts. Based upon Roman Law and the Napoleonic Code, German civil law is codified, unlike the more common practice in the U.S. and the United Kingdom, of judicially-created law. Thus the regulations governing acquisition are relatively few in numbers and not subject to a great deal of interpretation. It is interesting to note that of the approximately 150 contracting officers in the FMOD almost all are lawyers by education. The “regulations” governing procurement for the BWB is contained in a series of documents, which describes the terms and conditions for the various types of contracts. They are listed in Figure 12. Procurement of military equipment and technical services is centralized within the BWB for efficiency. Annually, it responds to 40,000 to 60,000 procurement requests to place contracts for research and development, studies, initial and follow-on production of defense material, equipment, fuels and other items. Additionally, the individual services buy the following items most logically procured locally—food, consumables, operations and maintenance of military bases. There are several types of contracts (or pricing mechanisms) used by the BWB, but the most

frequently used are fixed price and cost reimbursement, although the preference is to use fixed price. Fixed price falls into two categories.

<p><b>VoI/A- General Terms for Placing Contracts (VOL/A)*</b></p> <p><b>VoI/B- Terms and Conditions for Placing Public Contracts, Part B</b></p> <p><b>/BMVg- Supplementary Conditions of the Ministry of Defense to VoI/B</b></p> <p><b>ABBV-General Terms and Conditions for Procurement Contracts of the Ministry of Defense</b></p> <p><b>ABEI- General Terms and Conditions for Ministry of Defense Development Contracts with Industrial Firms</b></p> <p><b>ABR- General Terms and Conditions for Ministry of Defense Research Contracts with Industrial Firms</b></p>
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*Figure 16. Types of Procurement Contracts*

In the first category where risk is low and a comprehensive calculation of the price is supported by the contractor, the price is set at the beginning. Where risk is higher, such as early in the first production of a new item, the “fixed price” is set as a ceiling. Should the cost be less, then payments will be restricted to the amount spent. For very high risk programs a Cost Plus contract will be used which will cover the development and production costs, but will limit the contractor to a fixed profit.

The BWB, for highly complex decisions, uses a formal, and transparent, evaluation procedure to make the decision on the selection of the winning company. The preferred method of acquisition is through a formal process of Public Competitive Bidding. Since this does not always lend itself to buying weapon systems, other methods are used. For those items where a high level of quality is demanded or for other technical reasons,

Restricted Bidding is used. When Restricted Bidding is used, a select number of companies, chosen under formal procedure, will be requested to submit bids. The winning company will be selected based upon its technical competence, efficiency and reliability and economic factors. Finally, in some cases, the BWB will non-competitively select a contractor because of its special expertise or technical capability. In every case where a sole source approval is required, the Federal Office for Economics (Bundesamt für Wirtschaft) located in Eschborn, will be involved in sole source approval. This office may nominate qualified firms (in coordination with the Contact Advisory Agencies of the Länder). These Advisory Agencies will have conducted market research on behalf of the public customer to determine the availability of sources. The Advisory agencies provide:

- absolute neutrality in selection (thus fair and equal treatment);
- regional economic conditions considered; and
- even distribution of orders

To ensure fair treatment of companies in the selection process, protests of awards will use the European Union procedures, i.e., an independent group will evaluate the merits of the protest. In some cases, the Western European Armaments Group will be used as the forum for the protest. This is an indication of the increasingly important role that European award and information procedures are playing in Germany. After the contract has been awarded by the BWB to a contractor, the BWB also will manage the contract. For matters of audit

the BWB has the authority for aeronautical and naval equipment, as stipulated by contract clause, to audit contractors' records. For other types of equipment the individual Länder will perform the audit. The Federal government also has designed several socio-economic programs for award of contracts to small businesses, companies in the eastern Länder and for other firms that hire the disabled to include handicapped and the blind. These programs allow acceptance of other than the lowest prices. The guiding principles for placing Bundeswehr contracts further oblige the procurement authorities that for large contracts the selection criteria for the prime contractor will include the involvement of small business firms. This obligation also aims at creating new jobs, economically important in view of the current unemployment rate of over 11 percent.

## **TRIALS AND OPERATIONAL SUITABILITY**

The organizational structure for conducting testing within the German system is different among the services. The Army and the Air Force Support Commands conduct tests by creating "test teams" for each new piece of equipment that has passed testing by the BWB. Once the tests are complete the team will be disbanded. The Army Support Command, Office of Armament/In-Service Management Divisions Policy Doctrine and General Activities has responsibility for troop testing. The testing scenarios are agreed to between ASC and BWB during program conferences. The Navy has a standalone organization within the Naval Support Command, the Commandotruppenversuch, located at Eckerforde in northern Germany, which has responsibility for planning and conducting trials prior to fleet use. This organization will develop a test plan (truppenversuch plan) during the development process. Every weapons system or piece of military equipment acquired by the BWB goes through a series of trials—engineering trials, technical testing, troop trials and logistics trials—to ensure its capable for service use. These trials start with the contractor's trials as it develops the system. Technical-engineering trials are performed next at the BWB Test Centers under the auspices of the BWB project manager to ensure contractual requirements are being met. The military service schools and users will conduct the operational capability and logistics supportability trials to ensure the equipment meets the service requirements. The military will establish a test team made up of war-fighters and engineers for each system or piece of equipment being procured. They will verify system performance. If all tests are accomplished satisfactorily a "Certification of Operational Use" is provided. A final trial report is also prepared, identifying any deficiencies. This plan will be forwarded to the State Secretary for Armaments. What happens when deficiencies occur? While problems may occur, and have, once the system has met contractual requirements it will be acquired and entered into the inventory. Deficiencies that have been identified will become the service responsibility to budget and plan for future modifications to correct the deficiency during service life extensions. In the past few years, the trend has been to combine these trials in so-called "integrated trials." This kind of direct cooperation between contractor, BWB and the military services often results in quicker delivery of equipment at less cost and increased quality.

## **CONCLUSION**

By applying modern concepts, procedures and methods BW already developed some cornerstones of Transformation.

The fundamental achievement of Transformation is the three force categories: Response Forces, Stabilization Forces and Support Forces, which will be properly trained and equipped for their respective missions according to the capability profile and which will be

gradually able to conduct interoperable, Network Enabled Operations. The full development of their overall capability is increasing and depends not least on mission experience.

The continuous, forward-looking process of adapting to changing framework conditions in order to enhance and durably sustain the Bundeswehr's effectiveness on operations forces to change and shape the Bundeswehr in a holistic approach, so that the respective measures will find expression in new concepts, personnel management, structures, procedures, adapted materiel and equipment and changed military planning and training.

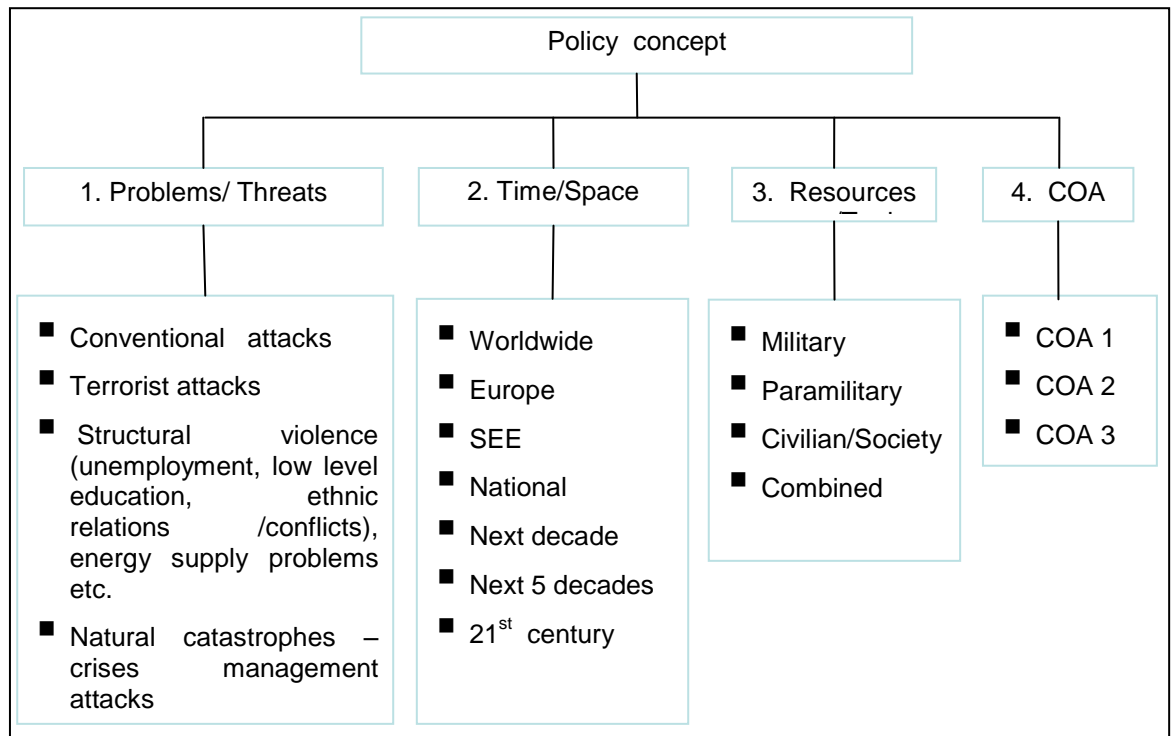


# SECURITY AND MILITARY R&D NATIONAL POLICY IN REPUBLIC OF MACEDONIA (PROPOSAL)

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## INTRODUCTION

Wiling to use a more general, comprehensive, methodical and thorough approach based on a deductive analyze as well, striving to contribute on a pragmatic way in the area of interest - Security and military R&D policy in Republic of Macedonia, below is offered (by the authors) a *problem-available means-possible solutions model* (depicted in the schema No 1) based on the analyzing the current status, comparative examples, national and international environment, problems and shortfalls and consequently optimal possible solutions, future steps needed to be done.



Schema No 1

<sup>26</sup> Ministry of Defense, Department of planning and bilateral cooperation

<sup>27</sup> Macedonian Army, Land Forces

<sup>28</sup> Military academy “General Mihailo Apostolski” - Skopje

<sup>29</sup> Macedonian Army, Land Forces

<sup>30</sup> European University Skopje

# 1. NATIONAL SECURITY & MILITARY THREATS - OVERVIEW

In accordance to the Macedonian SDR from 2005 and in order to have more clear picture on the first box from the schema No1 (given above), below are presented the defense missions v.v. their appropriate tasks and strategic goals & MoD functions:

## 1.1 DEFENSE MISSIONS

### *1.1.1 Mission – Defense of the country*

A. Task - Defense and protection of the territorial integrity and independence of the Republic of Macedonia in compliance with the Constitution, Defense Law and Security and Defense National Concept of the Republic of Macedonia;

#### B. Subtasks

- Defense and protection of the territorial integrity from conventional assaults.
- Control of the Macedonia Airspace [1].
- Protection of the armed forces.
- Co-operative defense with the future defense alliances members.

C. Task-Support to the MoI (Ministry of Interior) forces in dealing with threats, risks and dangers to Macedonian security that go beyond its capabilities and capacities.

#### D. Subtasks

- Cooperation with Ministry of Interior in combating terrorism
- Cooperation with Ministry of Interior in securing of strategic objects
- Cooperation with Ministry of Interior in dealing with asymmetric threats
- Cooperation with Ministry of Interior in border securing

E. Task - Support to the governmental organs, local self-government units and other governmental and non-governmental organizations and institutions as well as inhabitants in dealing with natural disasters and epidemics, technical-technological and other emergencies.

#### F. Subtasks

- Support of civilian authorities in cases of probability of natural disasters and reducing of their consequences
- Support of civilian authorities in cases of illnesses and epidemics
- Support of civilian authorities in cases of technical-technological disasters
- Support of civilian authorities in cases of endangerment of degradation of the environment and reparation of caused damage

G. Task-Realization of operations and combat support as a host country to international forces on Macedonian territory as an implementation of tasks and obligations taken by RM, including the joint defense of Macedonian territorial integrity.

#### H. Subtasks

- Support of international forces in the role of host countries for the purpose of mission realization in the neighborhood and the region
- Cooperation with and support of the international Cooperative Forces for RM Defense (Article 5)

### ***1.1.2 Mission – Peace-support and humanitarian assistance***

A. Task - Participation in NATO, UN, OSCE, EU-led peace-keeping operation (all kinds) and conflict prevention with declared forces

B. Subtasks

- Peace-keeping
- Peace –enforcement
- Conflict prevention
- Peace re-establishment
- Peace building

C. Task - Humanitarian operations / Participation or assistance to NATO, UN, OSCE, EU and other internationally agreed alliances' humanitarian operations.

D. Subtasks

- Humanitarian assistance to countries struck by natural and technical-technological disasters
- Humanitarian assistance to civil population during armed conflicts
- Assistance and protection of personnel engaged in humanitarian activities

### ***1.1.3 Mission – Contribution to dealing with regional conflicts and crisis***

A. Task-Participation with declared forces in NATO, UN, OSCE, EU and other internationally agreed alliances' operations for dealing with regional conflicts and crisis.

B. Subtasks

- Combat engagement in regional conflict and crisis management operations.
- Enforcement of cessation of military activity among the conflicted sides

### ***1.1.4 – Protection of broader interests of the Republic of Macedonia***

A. Task- Military-diplomatic support and cooperation in the field of promotion of Macedonian interests.

B. Subtasks

- Broadening and intensifying of multilateral cooperation as a contribution to regional security and stability.
- Implementation of SEEDM Initiatives
- Strengthening of the defense department within the Macedonian Mission at NATO.
- Establishment of military department within Macedonian missions at UN and OSCE.
- Strengthening of partnership staff elements in regional NATO HQs
- Establishment of military-diplomatic missions in neighboring countries

## **1.2 STRATEGIC GOALS**

- Accomplishment of the system of defense of the independence and the territorial integrity of the Republic of Macedonia;
- Planning, organization, equipping developing and preparing of the Armed Forces of the Republic of Macedonia and execution of the established plans;
- Civilian control of the Armed Forces;
- Planning, organization and participation in the collective c\security and defense systems;

- Organization and preparation for defense by the subjects of the defense system;
- Insuring equitable ethnic representation within the MOD and ARM;
- Planning, organization and conduct of the defense training.

***1.2.1 Strategic MOD goals, adjusted to the provisions of the National Security and Defense Concept are:***

- Realization of the defense system of the independence and territorial integrity of the RM;
- Planning, organization equipping, development and preparing of the ARM and realization of the plans;
- Realization of civil control over the Armed Forces;
- Planning, organizing and participation in the collective security and defense systems;
- Organizing and preparing for defense of the defense system subjects;
- Provision of appropriate representation of the ethnic community members in the MOD and ARM;
- Planning, organizing and realization of defense training.

***1.2.2 Medium-Term Goals***

1. Reorganization of the MOD and downsizing of personnel.
2. Transformation of ARM structures and downsizing of personnel.
3. Professionalization of the active ARM component
4. Equipping and modernization of the defense system
5. Implementation of methodology for preparing and organizing of the defense system subjects
6. Development of an assessment of future long-term security and defense challenges
7. Activities for participation in collective security and defense systems
8. Redefinition of army service
9. Activities related to regional engagements
10. Appropriate representation of ethnic community members
11. Intensifying of professional training and development of MOD and ARM personnel and reorganization of military education
12. Implementation of PPBS
13. Development of strategic documents in the defense area
14. Adjustment of the existing regulations to the standards of NATO member-countries
15. Intensifying of defense training
16. Dealing with possible asymmetric threats and crisis
17. Strengthening of civilian control
18. International cooperation in the defense area

19. Participation in peace-support operations and fight against asymmetric threats
20. Peace support and humanitarian assistance operations

***1.2.3 In terms of realization of the strategic goals, the MOD executes the following functions:***

1. Organizes and prepares the defense system and suggests measures for its development and perfection;
2. Development of Defense Strategy of the RM;
3. Analysis of the security environment and participation in creation and prevention of risks and dangers;
4. Prepares a defense plan for the RM and adjusts and coordinates the defense system with the other parts of the national security system;
5. Prepares, organizes and realizes readiness measure;
6. Prepares the state institutions for war-time functioning;
7. Prepares the local self-government, other legal and economic entities, NGO and other citizens associations, depending on their role and position in the society for realization of the national security policy;
8. Plans and organizes the territorial arrangement for defense needs;
9. Prepares and organizes management links for defense need in war-time conditions;
10. Plans and organizes realization of citizens' working duties in war-time conditions;
11. Plans and organizes defense reserves for war-time conditions;
12. Plans and realizes international cooperation in the defense area;
13. Participates in regional cooperation incentives;
14. Assumes measures and activities for integration into NATO;
15. Participates in missions for strengthening of peace and stability;
16. Assumes activities for PfP and EAPC cooperation;
17. Plans, organizes and participates in exercises and training, humanitarian and peace-support operations in accordance with ratified international agreements;
18. Develops medium-term and long-term plans and programs for defense needs;
19. Organizes and conducts conscript service;
20. Trains the conscript component;
21. Organizes and conducts manning and mobilization of the reserve component;
22. Plans, organizes and conducts defense training;
23. Drafts the ARM organization and formation;
24. Executes ARM manning;
25. Organizes and conducts ARM mobilization;
26. Participates in dealing with regional conflicts and crisis;
27. Plans and supports the crisis elimination forces;
28. Professional development and education of the MOD and ARM personnel;
29. Organization and conducting of security and intelligence for defense needs;
30. Development of legal regulations;
31. Trains and sends civilian and military MOD and ARM representatives abroad;
32. Adjusts the MOD organization to NATO member-countries' standards;
33. Plans the ARM utilization;
34. Conducts civilian control over the Armed Forces;
35. Controls the realization of the Defense Law, ARM Service Law and other regulations in the area of defense;

36. MOD activities for bilateral cooperation and development of plans and programs for cooperation with NATO structures and other NATO and PfP member countries (IPP, MAP, PARP);
37. Participates in humanitarian assistance missions;
38. Provides transparency in the execution of defense.

### 1.3 MoD ROLE WITHIN MISSION 1.1.1 AND MISSION 1.1.3

Having in mind that in 2005 the border control is over-handed to Ministry of Interior, it is interesting to present how the military support to Crises Management Center and MoI is foreseen in accordance to follow two crucial documents:

1. Strategic Defense Review ( adopted 2005) and
2. Crises Management Law ( adopted May 2005)

In the article 2 of the Crises Management Law is written: “The crises management system is running within the bodies of state administration and state government bodies (Parliament, the President of the State), *armed forces – such as the Army of Republic of Macedonia, protection and rescue forces... etc.*”

The definition of “Threats and Risks “ is given in the article 3 – “Forms and activities related to international terrorism, organized crime, illicit drugs, weapon and people trade, weapon of mass destruction consequences etc...”

The using of the armed forces is presumed under circumstances regulated by this law. There is a Crises Management Center, as an independent government body, presumed by article 20. Inside the Center a General Staff is established as an operative and professional body that steers the crises situations activities for coping with and prevention of these activities - (Article 24). The General Staff is comprised of representatives from Steering Comity (Ministers of Interior, Health, *Defense*, Transport and Communication, Foreign Affairs...).

*A Threats and Risks Assessment Group*, as a government body, is presumed by article 17. This group encompasses: Director of Bureau for Public Security, Department for security and counterintelligence (from MoI), Intelligence Agency, Crises Management Center Directors and Deputy Directors, *DCHOD and the Head of Military Security and Intelligence Department*).

The crucial article is article 35. With this article is presumed the follow: ***A contingent of the Army takes part in the MoI assistance process, since the state security is threaten by the crises situation and the State Agencies don't possess appropriate resources, assets and tools.***

This Army participation and assistance is running under government proposal and approval by the president. The scope and the way how the army contingent will assist the MoI is regulated by the President Directive.

In accordance to Macedonian Strategic Defense Review (2005) the military assistance to MoI unites is presumed as one of the basic mission-army tasks (assisting of combat unites in the border security, support by the special unites and military police unites in counter terrorisms and assistance by the air unites in counter terrorism activities, prevention of asymmetric threats and border security, assistance by the engineer and NBC unites in the same field).

In the last two years, as a result of this law regulation, different combined activities such as exercises, seminar etc, were organized. The exercise “Vodno 2007” on 30 May 2007 took place at training area Choljila (near to Skopje). This exercise was organized in the frame of

the project for exchanging of small units and practical training of ARM and MoI components. During the exercise were examined few phases: reporting, accepting, exchange of information on armed group presence, sending of joint units in the field (terrain), action for destroying of infiltrated terrorist groups and wounded person evacuation procedures.

## **2. INTERNATIONAL SECURITY AND MILITARY R&D ENVIRONMENT AND CONTEXT**

Having in mind the Macedonian aspiration to be full-fledged member of NATO and EU and to promote collective approach to the security and stability as comparatively considered superior and more appropriate versus clear national approach, especially seen in the light of coping with asymmetric threats - such as international terrorism, for Republic of Macedonia would be very beneficial to follow and to incorporate its own R&D capacities within NATO and EU R&D structure, programs and organization.

### **2.1 NATO SCINCE PROGRAM – SECURITY THROUGH SCIENCE**

The NATO Program for *Security Through Science* offers support for international collaboration between scientists of the Euro-Atlantic Partnership Council (Macedonia is a partner). Awards are made following consideration of applications received by individual scientists in these countries.

Research topics supported are in areas of *Defense Against Terrorism, or Countering Other Threats to Security; and Partner-country priorities*, which are also taken into account for Science for Peace Projects. (Annex I).

Collaborative Activities in Priority Research Topics:

- Collaborative Linkage Grants
- Expert Visits
- Advanced Study Institutes
- Advanced Research Workshops
- “Science for Peace” R&D projects
- Fellowships
- Networking Infrastructure Grants

Details for all kind of activities can be obtained on: <http://www.nato.int/science>

#### **2.1.1 Collaborative Linkage Grants (CLG):**

- CLG provide opportunities for collaboration on research projects to members of research teams in universities or research institutions between scientists *in NATO countries and those in Partner countries*
- Grants are given for projects that rely for basic costs on national funding but where the costs for the international collaboration cannot be met from other sources. They support *travel and living expenses of investigators for short visits to partner institutions abroad*.
- Awards are given for *reciprocal visits of members* of the collaborating teams from two or three scientists to visit one another laboratories over a period of one year, to maximum of five research teams involving a maximum of five people to collaborate over a two-year period.
- Visits should be of short duration and in any case no longer than two months.

- Amounts awarded are normally between 5,000 Euro for one year of collaboration for two or three scientists, or a maximum of 23,000 Euro for two years collaboration for five researcher teams. Daily expenses should go up to 100 Euro.
- A contribution may be requested towards acquisition of scientific equipment of modest cost essential for and specific to the project.

### **2.1.2 Expert Visits (EV)**

Allow high-level specialists to benefit from one another's expertise, through providing assistance with on-going projects. Only EV in security-related topics will be supported. Support is given to cover the travel and living expenses, to a maximum of 100 Euro a day, in duration from a few days to a maximum of one month. The visit should take place within six months of the date of award of the grant.

### **2.1.3 Advanced Study Institutes (ASI)**

ASIs are short courses contributing to dissemination of knowledge and the formation of international scientific contacts. Scientist should be at the *postdoctoral level*, or about to obtain a Ph.D., with an appropriate scientific background.

ASIs should have a minimum duration of 10 days in order to give adequate time for the development of a topic and allow for sufficient interaction between scientists.

ASIs have two Co-Directors, one from NATO country and *one from Partner country*. They are responsible for the preparation of the scientific program, the selection of participants, the administration of meeting and the publication.

- An ASI should preferably be held in a *Partner country*.
- The number of lecturers should range from 12 – 15, and the number of students 60-80.
- The NATO award is intended to cover direct organizational expenses, the travel and living of a maximum of 15 lecturers, and to subsidize those ASI students from NATO and Partner countries who are unable to obtain support from other sources.
- The level of funding is determined on a case by case basis and it is awarded in Euro.

### **2.1.4 Advanced Research Workshops (ARWs)**

ARWs are meetings which should enable a small group of experts 20 – 50, of two to five days' duration, to make assessment of existing knowledge on new important topics, and identify directions for future research.

ARWs have two Co-Directors, one from a NATO country and one from a Partner country. The Co-Directors are responsible for organizing the ARW, preparing the scientific program, the selection of participants, and the administration of the meeting and the publication of its conclusions and recommendations.

The NATO grant is intended to cover direct organizational expenses of the ARW, the travel and living expenses of key speakers, and to subsidize any other participants from NATO or from Partner countries who are unable to obtain support from other sources.

### **2.1.5 Science for Peace Projects – Support for Applied R&D (SfP)**

SfP grants offer support for applied research and development projects to cover costs such as scientific equipment, computers, software, and training of project personnel. Only projects in the Priority research Topics (Annex I) will be supported.

SfP projects are of a co-operative nature, jointly carried out among NATO and Partner countries with a maximum of three years' duration and those involving more than one partner will be encouraged.



The essential characteristics of SfP are:

- High quality applied R&D
- Substantial scientific co-operation among scientists from Partner and NATO countries
- Ability to contribute to the solution of problems
- Ability to promote collaboration among scientists and users
- Good prospects for promoting the integration of the country's scientists into the international R&D
- Participation of young scientists

#### **2.1.6 Financial Support**

The average amount awarded ranges between 250,000 – 300, 000 EUR.

#### **2.1.7 Fellowships**

This program is undergoing some revision and change, but a number of fellowships are available and for additional enquiry's it is possible to address the relevant national administrator of the NATO country.

#### **2.1.8 Networking Infrastructure Grants**

- This grant should provide assistance to research institutions for purchasing equipment that will improve the level and the quality of *telecommunication* facilities.
- These grants are aimed at improving the general connectivity of a whole community in a specific geographic region.
- These grants are intended primarily:
  1. to provide connectivity to communities which are not yet connected to the internet;
  2. to increase the number of users already connected;
  3. to provide equipment for communication, not for research purposes.

Awarded funds can be used for purchasing of computer networking equipment, as well as for covering some of the costs for services such as leased lines.

#### **2.1.9 Annex I/Priority Research Topics/Scientific Collaboration for Defense Against Terrorism**

- Rapid Detection of Chemical, Biological, Radiological Nuclear (CBRN) Agents and Weapons, and Rapid Diagnosis of their effects on people
- Novel and rapid methods of detection (e.g., chemical biosensors, multisensors processing, gene chips)
- Physical protection against CBRN agents
- Decontamination of CBRN agents
- Destruction of CBRN agents and weapons (e.g., chemical and vaccine technologies)
- Medical Countermeasures
- Explosive Detection
- Eco-terrorism Countermeasures
- Computer Terrorism Countermeasures

### **2.1.10 Scientific Collaboration to Counter Other Threats to Security**

- Environmental Security (e.g., désertification, land érosion, pollution, etc.)
- Water Resources Management
- Management of Non-Renewable Resources
- Modeling Sustainable Consumption (e.g., food, energy, materials, fiscal measures, and environmental costing)
- Disaster Forecast and Prevention
- Food Security
- Information Security
- Human and Societal Dynamics (e.g., new challenges for global security, economic impact of terrorist actions, topics in science policy)

## **2.2 NATO RESEARCH AND TECHNOLOGY STRATEGY**

### ***Overview***

The accord establishing the North Atlantic Treaty Organization (NATO) in 1949 provided the framework for the greatest international mechanism ever in defense science and technology. From its earliest days, NATO involvement in science and technology has sought to build cooperation and promote security and stability. Today, the central element of the NATO defense science and technology program is the ***Research and Technology Organization (RTO)***, which provides the best basis for collaboration among the most technologically advanced countries in the world. Through this body, alliance nations plan and execute activities that ***cover the full spectrum of technologies vital to current and future security***.

RTO and its two predecessors, the Advisory Group for Aerospace Research and Development and the Defense Research Group, have a history of fostering long-term relationships among senior executives, scientists, and engineers; sharing information and research; and enhancing military capabilities. There is no international activity that rivals RTO in scope, magnitude, or potential. RTO can continue to build on these successes by emphasizing longevity of its highly qualified members, prioritizing areas of opportunity, integrating the seven newest NATO invitees, and building a closer relationship with Russia. This paper examines the origins of NATO defense science and technology, provides an overview of the Research and Technology Organization, and analyzes the elements that make RTO successful. The paper concludes with recommendations for enhancing RTO effectiveness in the 21st century.

### ***Origins of NATO Science and Technology***

Involvement of the North Atlantic Treaty Organization (NATO) in defense science and technology dates to the earliest days of the alliance. It was founded on the principles of international cooperation and security. Although neither science and technology nor research and technology are explicitly mentioned in any of the 14 North Atlantic Treaty articles, they are clearly implicit in Articles 2 and 3, which address "promoting conditions of stability and well-being" and achieving "the objectives of this Treaty . . . by means of continuous and effective self-help and mutual aid, (to) maintain and develop . . . capacity to resist armed attack."<sup>31</sup>. In drawing the connection between promoting stability and

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<sup>31</sup> Article 2 of the NATO Charter states, "The Parties will contribute toward the further development of peaceful and friendly international relations by strengthening their free institutions, by bringing about a better understanding of the principles upon which these institutions are founded, and by promoting conditions of stability and well-being." Article 3 adds, "In order more effectively

providing for mutual aid for defense, the NATO charter laid the foundation for future cooperation among the alliance nations in defense science and technology. This unique cooperation has been a key element in establishing and maintaining the connection between the military and technology.

The first scientific and technical organization of the alliance was the Advisory Group for Aerospace Research and Development (AGARD), founded by Theodore von Karman in 1953. Von Karman was a powerful, if quiet, voice in establishing the post-World War II model of a military that was closely coupled with the scientific and technical community. He contended that "scientific results cannot be used efficiently by soldiers who have no understanding of them, and scientists cannot produce results useful for warfare without an understanding of operations."<sup>32</sup>

The mission statement of the AGARD Charter actively sanctioned the free exchange of militarily relevant scientific information to strengthen the NATO common defense posture and increase the scientific potential of member nations, thereby providing the essence of international technical cooperation for NATO that continues today<sup>33</sup>. Although commonly accepted now, this charter at the time represented significant new thinking for an international activity. Oversight and management of AGARD evolved somewhat over the years but generally consisted of a Board of Delegates, which reported to the NATO Military Committee, and various technical panels, which had oversight in their own areas. The Board of Delegates provided guidance to the technical panels and approved their program of work.

A second scientific and technical organization within NATO, the Defense Research Group (DRG), was formed in 1967, also based on input from von Karman. DRG was created simultaneously with the Conference of National Armaments Directors (CNAD). Unlike

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to achieve the objectives of this Treaty, the Parties, separately and jointly, by means of continuous and effective self-help and mutual aid, will maintain and develop their individual and collective capacity to resist armed attack

<sup>32</sup> Theodore von Karman with Lee Edson, *The Wind and Beyond: Theodore von Karman, Pioneer in Aviation and Pathfinder in Space* (Boston: Little, Brown and Company, 1967)

<sup>33</sup> Jan Van der Bliet, ed., *AGARD, The History 1952-1997* (Essex, UK: SPS Communications, 1999). The elements of the AGARD Charter were to:

- recommend effective ways for member nations to use research and development capabilities for the common benefit of the NATO community
- provide scientific and technical advice and assistance to the Military Committee in the field of aerospace research and development (with particular regard to its military application)
- continuously stimulate advances in the aerospace sciences relevant to strengthening the common defense posture
- improve the cooperation among member nations in aerospace research and development
- exchange scientific and technical information
- provide assistance to member nations for the purpose of increasing scientific and technical potential render scientific and technical assistance, as requested, to other NATO bodies and to member nations in connection with research and development problems in the aerospace field.

AGARD with its research focus, the primary purpose of DRG was to foster technical cooperation among alliance nations that could lead to the development of future defense equipment. Also, unlike AGARD, which reported to the Military Committee, DRG reported to the newly created CNAD. At the highest level, DRG was made up of individuals from the alliance nations who had responsibility for national defense research and development. DRG featured eight panels and two special groups of experts.

During the 1990s, senior leaders from the member nations and NATO headquarters increasingly perceived that unnecessary duplication existed between DRG and AGARD. There was also some concern about the number of individuals involved, which had grown to more than 1,000 scientists, engineers, and administrators. The consensus among several nations was that both the total number of people and unnecessary duplication needed to be reduced. In an effort to solve these problems, NATO Secretary General Javier Solana formally disbanded DRG and AGARD in April 1997 as part of a major restructuring of defense research and technology. The Research and Technology Organization (RTO) was then created, and it absorbed the duties of its predecessors.

### ***The Research and Technology Organization***

The ***NATO Research and Technology Organization (RTO)*** promotes and conducts cooperative scientific research and exchange of technical information amongst 26 NATO nations and 38 NATO partners. The largest such collaborative body in the world, the RTO encompasses over 3000 scientists and engineers addressing the complete scope of defense technologies and operational domains. This effort is supported by an executive agency, the Research and Technology Agency (RTA), which facilitates the collaboration by organizing a wide range of studies, workshops, symposia, and other forums in which researchers can meet and exchange knowledge.

Formed in 1998 by the merger of AGARD and DRG, the Research and Technology Organization is the primary NATO organization for defense science and technology. RTO reports to both CNAD and the Military Committee; it has both a board and technical panels; and it blends the research and technical missions of its predecessors. RTO promotes and conducts cooperative research and information exchange, develops and maintains a long-term NATO research and technology strategy, and provides advice to all elements of NATO on research and technology issues. In pursuit of this mission, RTO operates at three levels: the Research and Technology Board, technical panels, and technical teams. A Research and Technology Agency provides staff support to RTO.

The ***Research and Technology Board (RTB)*** constitutes the highest authority in RTO. It is the policy body tasked by the North Atlantic Council through the Conference of National Armaments Directors and the Military Committee to serve as the single integrating body within NATO for the direction and/or coordination of defense research and technology. RTB consists of up to three members per NATO nation. The members are chosen by the nations and may be from government, academia, or industry, although the majority of members are from government. Board members are typically senior science and technology executives at the deputy under secretary, deputy assistant secretary, or deputy administrator level. RTB elects a chairman for a 3-year term from nominations submitted by the nations.

***Technical panels*** are composed of senior-level technical experts appointed by member nations. Panels have considerable autonomy and are charged with initiating, planning, and managing technical activities, subject to RTB approval, within their areas of responsibility. Each technical panel consists of up to three national members from each NATO nation. These members are chosen by the nations, with the majority coming from government. In

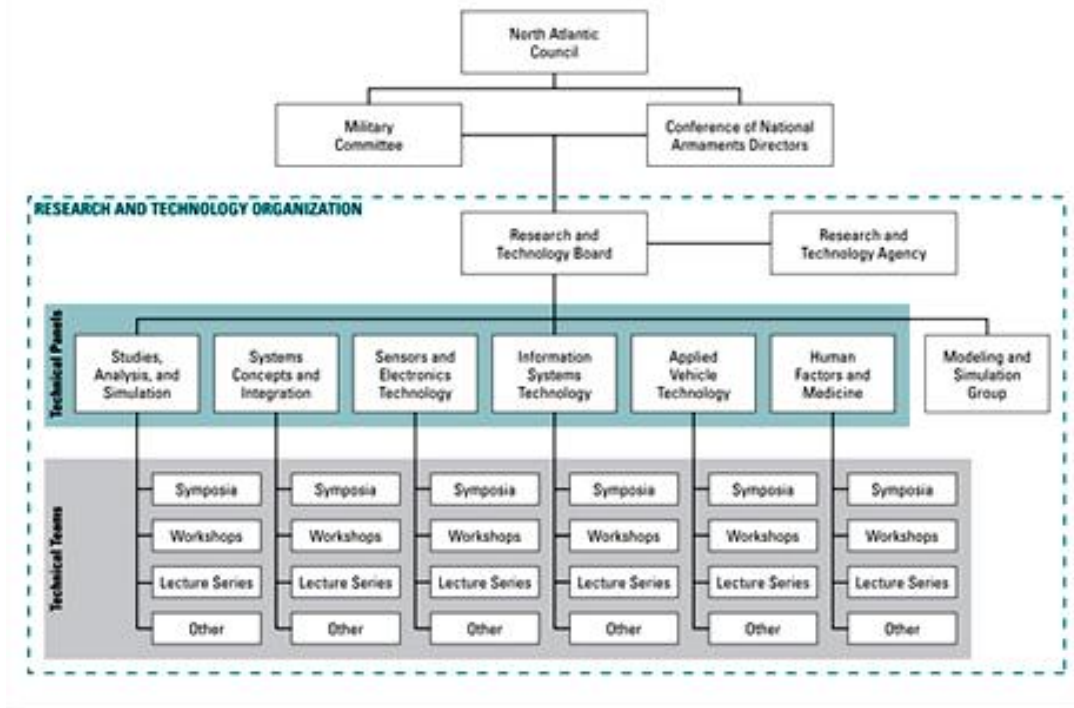
addition, members-at-large, who may be required for a specific technical expertise, may also be appointed based on a panel request or recommendation. The total membership of a panel is limited to 60, however. National panel members typically have been government senior executive personnel with extensive science and technology responsibility and authority. Panel members-at-large most often have been internationally recognized experts of high technical stature from government, academia, or industry. The total spectrum of R&T activities is addressed by *six Technical Panels* covering a wide spectrum of scientific research activities, and a Group specializing in modeling and simulation: and a Committee dedicated to supporting the information management needs of the organization:

- Applied Vehicle Technology Panel (AVT)
- Human Factors and Medicine Panel (HFM)
- Information Systems Technology Panel (IST)
- System Analysis and Studies Panel (SAS)
- Systems Concepts and Integration Panel (SCI)
- Sensors and Electronics Technology Panel (SET)
- NATO Modeling and Simulation Group (NMSG)
- Information Management Committee (IMC)

These bodies are made up of national representatives as well as generally recognized world-class scientists and information specialists.

*Technical teams* are formed by the technical panels to perform specific tasks, which include organizing and hosting symposia, specialist meetings, workshops, lecture series, technical courses, and other activities. Technical team activities have clearly defined products and are limited in scope as well as duration, with 3 years being the maximum time a team may be in existence unless specifically extended by the board. Panel or board members appoint technical team members. Any significant change in activities or team membership requires board approval. At any given time, dozens of technical teams exist. Each team typically has multiple representatives from the nations coming from a variety of backgrounds and experience levels.

The *Research and Technology Agency (RTA)* provides RTO staff support. The multinational RTA staff numbers approximately 50 people. It consists of formal NATO positions and a larger number of positions that member nations voluntarily provide in an ad hoc manner. The assigned personnel may be civilian or military and either technical or administrative. RTA is led by a director whom RTB selects subject to approval by CNAD and the Military Committee in consultation with the Secretary General. The director is a full-time NATO employee.



Schema No 2.

### ***Benefits to RTO Nations***

The RTO structure provides the framework for the greatest international scientific and technical cooperative mechanism for ***sharing of defense-related information*** of its kind. These research results lead, in turn, to significantly enhance military capabilities of benefit to the entire alliance. As the NATO Standing Group communiqué to the AGARD Second General Assembly in 1952 declared:

The research and development potential of the North Atlantic Treaty Nations is one of the greatest resources of the West. Any feasible pooling of these resources should achieve a greater rate of technical progress than would each nation working alone. It is self-evident that ***any contribution*** to this rate of progress is a contribution of fundamental importance to NATO defense objectives<sup>34</sup>

### ***Long-Term Relationships***

Progress in science and technology frequently is made with a long-term investment; often a ***decade or two passes before results appear outside*** the immediate technical community in the form of products or processes. Perseverance and steady advancement are key elements in the success of science and technology and lend themselves to long-term international relationships that provide both new approaches to difficult problems and the scientific feedback necessary for progress.

RTO provides an exceptional opportunity for member nation senior executives, scientists, and engineers to establish long-term professional relationships. Regularly scheduled

<sup>34</sup> Van der Bliek. Emphasis added

meetings in various nations over the years give participants the opportunity for repeated dialogue and exchange of ideas. Professional relationships and strong ties evolve based initially on common technical interests, but with continued contact, the relationships evolve further based on in-depth, personal knowledge of individuals and institutions. These solid relationships significantly enhance the prospects for resolving technical, or even political, issues.

### ***Leveraged Resources***

Leveraging resources has always been at the heart of NATO. In 1945, von Karman concluded, "progress in technology was so swift that ***only a pool of nations could properly utilize scientific advances for mutual protection.***" This statement has as much validity today as it did over 50 years ago, and it continues to underscore NATO scientific and technical cooperation. By combining the financial and human resources as well as technical capacities of its members, NATO can make greater advances in defense science and technology than any one nation working alone. As the NATO Standing Committee communiqué indicated to the Second AGARD General Assembly in 1952, "the research and development potential of the North Atlantic Treaty nations is one of the greatest resources of the West."

### ***Issues and Recommendations***

Built on a foundation of international scientific and technical cooperation, the NATO Research and Technology Organization has achieved many successes in defense science and technology that have contributed significantly to NATO military capabilities. Since the November 2002 NATO Summit in Prague, even more opportunities exist to build on these past successes. Not only were seven new nations invited to join in accession talks for future membership in the alliance, but the North Atlantic Council also announced new NATO efforts at transformation--from streamlining its command structure to creating a NATO Response Force. RTO can and must play an integral role in working with the new strategic command for transformation and the NATO Response Force, the integration of the new members, and building relations with Russia.

### ***Increased Defense Spending***

Proportionate leveraging of financial resources in defense science and technology is one of the most fundamental and important tasks for RTO. The gross domestic products of the United States and Europe are almost equal, at approximately \$10 trillion. However, the United States outspends Europe almost ***4 to 1*** in defense research and technology. With a defense science and technology budget that approaches \$10 billion per year, a multibillion-dollar laboratory infrastructure, and over 20,000 people employed in the laboratories, the U.S. investment is a formidable one. An already exceptional leveraging opportunity can clearly be enhanced by an increase in European defense budgets.

It is gratifying to see that, concerned by the growing capabilities gap between Europe and the United States, many European leaders have already taken steps to increase their defense budgets. France, Norway, Portugal, and the United Kingdom have submitted budgets with ***a boost in defense spending***, ranging from 1.2 percent in the United Kingdom to 8.2 percent in France. The Czech Republic, Poland, and Hungary have also announced plans to increase their budgets. France's \$13.3 billion proposed 2003 defense budget is especially significant since it includes an increase in research and development to \$3.7 billion.

### ***Prioritization of Technical Areas***

RTO must achieve a balance of its activities across the spectrum of land, air, sea, space, and command, control, communications, computers, and information technologies. Because of its AGARD heritage, RTO activities perhaps continue to be too aeronautics-centric, and RTB must be more proactive in providing policy guidance to its panels to improve this situation. Perhaps the two major technical areas of opportunity are ***information technology and communications***, which are also the two most dominant emerging areas demanding increased interoperability. ***These should be a top priority.*** Information technology is particularly appealing since it does not require large infrastructure investments. As Ann Miller, chair of the Information Systems Technology Panel, recently pointed out, "The playing field is more level between Europe and the U.S. industry when it comes to information technology."

In setting research priorities, RTB must continue to listen carefully to its primary customers: the two strategic commands, the Military Committee, and the Conference of National Armaments Directors. These customers will become increasingly important as NATO transforms its forces and stands up the NATO Response Force. The new strategic command for transformation, announced at the Prague Summit, will be responsible for the continuing transformation of military capabilities and for the promotion of interoperability of alliance forces.<sup>35</sup>The formation of this command provides a unique opportunity to rapidly transition the right technologies with the highest impacts.

### ***Interoperability***

One of the most critical issues that NATO has faced over the last 50 years has been improving military interoperability. RTO has excellent potential to increase interoperability from the research beginnings of a given technology. With appropriate RTB policy guidance, the technical panels can perhaps derive solutions to interoperability problems early in a technology's research and development cycle. ***Information technology and communications are two areas where interoperability is not only critical but also where technical opportunities may be highest.*** More opportunities for enhanced interoperability may also evolve as the defense industry becomes more multinational over time; RTO must stay in touch with this evolution through the NATO Industrial Advisory Group and foster cooperation within the framework of growing interoperability.

### ***Integration of New Members***

At the NATO Summit in Prague, seven nations were invited to begin accession talks to join NATO by May 2004. With their membership so close, RTO must formulate and implement plans ***to integrate these new members into a broad spectrum of technical activities.*** Their technical capabilities and desires must be considered equally, and proactive plans that are mutually beneficial to NATO and the new members must be put in place. The new members must understand from the beginning that their active participation in RTO is welcome and that their scientific and technical contributions are expected.

### ***Conclusion***

Allied cooperation in defense science and technology through the NATO Research and Technology Organization remains critical to the promotion of peace, stability, and security throughout the world. By ***encouraging international scientific and technical cooperation***

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<sup>35</sup> Prague Summit Declaration, issued by the heads of state and government participating in the meeting of the North Atlantic Council, Prague, November 21, 2002



and by conducting research to maintain a technological lead in defense capabilities, NATO assures its active engagement and continued viability in the new strategic environment.

No international defense research and technology activity rivals RTO in scope, magnitude, or potential. As NATO enlarges and takes on new missions, the *common language of scientists* and engineers will offer a mechanism for exchange and growth in a world that will continue to be dominated by technology. It is imperative that the technical arm of NATO grasps this opportunity and remains a key ingredient in our collective security<sup>36</sup>.

## 2.2 EU RESEARCH AND TECHNOLOGY STRATEGY

### *Overview*

Although the challenges facing the European nations change over time, and with them the scientific and technical research priorities, certain immutable reasons militate *in favour of a common approach to research problems*. The common research policy *must define* the economic, social, political and even military objectives of research, draw up an inventory of the resources available in terms of *human resources, laboratories and funds*, set the *priorities* and apportion the work among the laboratories of the Member States. In this way it can be ensured that no important sector is neglected, that duplication is avoided and that the Union's human, material and financial resources are put to best use. Labour distribution can also ensure that Europe's smallest countries, which would otherwise be excluded owing to a lack of resources, can participate in research and development.

Europe is experiencing a massive transformation of its economy and society. Traditional industrial structures are undergoing rapid change. The problems that are observed in the structures of the traditional European industries, like textiles, shipbuilding and steel are notably the results of the movement of production to countries with low wage levels induced by the globalisation of markets and economies. The transfer of European traditional industrial production to other countries can be offset only by new industries with a high level of technology.

Since 1984, the EU has funded research and technological development through successive Framework Programmes. The *Sixth Framework Programme (2002-2006)*, known as FP6, updates this effort to address new and emerging scientific and technical priorities. But FP6 is also intended to strengthen Europe's long-term capacity to conduct research of real economic and social value. In other words, it is designed to establish a fully functioning European Research Area by promoting coordination, integration, synergy and efficiency.

FP6 comprises four main programmes. Nearly two-thirds of the overall budget is devoted to seven 'thematic priority' areas. Research is mainly carried out either by Integrated Projects (IP) or Networks of Excellence (NoE). These are innovative funding instruments introduced in FP6 to promote coherent, long-term research activities and partnerships with 'critical mass' at European level.

EU is moving towards a *knowledge* based economy and research is the key and now with specific emphasis on what is a new piece of EU jargon - "*the fifth freedom*" – the mobility of knowledge.

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<sup>36</sup> Donald C. Daniel and Leigh C. Caraher: US Center for Technology and National Security Policy at the National Defense University, Paper on NATO Defense Science and Technology, page 7, 2007

Research and development policy is one of the European Union's priorities, at the heart of the Lisbon Strategy to boost employment and growth in Europe. Research, with education and innovation, forms the "knowledge triangle", which it is hoped will allow Europe to maintain its economic dynamism and social model. The Seventh Framework Programme for Research (2007–2013) seeks to consolidate the **European Research Area** (ERA) and stimulate the national investment needed **to reach the target of 3% of GDP**.

European research and development policy is based on provisions in the three founding treaties (ECSC, Euratom and Title XVIII of the EC Treaty). The Single European Act introduced the concept of technology into Community law and the Treaty on European Union (EU Treaty) then developed the Community's objectives in this field.

### **2.2.1 Policy Goals**

Making growth and jobs the immediate target goes hand in hand with promoting social or environmental objectives. The Lisbon Strategy is an essential component of the overarching objective of sustainable development set out in the Treaty: improving welfare and living conditions in a sustainable way for present and future generations. Both Lisbon and the Sustainable Development Strategy contribute to ensuring this goal. Being mutually reinforcing, they target complementary actions, use different instruments and produce their results in different time frames.

World-wide competition to attract research and innovation investment is growing. The EU invests about a third less in research than the US, and the **EU/US innovation gap** has not narrowed in recent years. Meanwhile, emerging countries like China and India are fast becoming world-class centers of research and innovation. Research investment in **China is growing by 20% a year**. The scale of competition is such that no Member State can succeed in isolation.

Research and innovation have been confirmed as key challenges in the new Lisbon Partnership for Growth and Jobs. The 2002 Barcelona European Council set the goal of raising overall **research investment in the EU from 1.9% of GDP to around 3% by 2010**. Nearly all Member States have set targets, which – if met – would bring research investment in the EU to 2.6% by 2010. **But instead of rising, the overall level of EU research is currently more or less stagnant**.

To address this challenge, the Commission has tabled an integrated innovation/research action plan, which calls for a major upgrade of the conditions for research and innovation in Europe.

The action plan updates the actions that have been launched in the past few years with the 3% Action Plan for research and the innovation policy. It goes also further than these actions, in order to give substance to the high priority which has been given to research and innovation in the Lisbon Partnership for Growth and Jobs.

The action plan aims to achieve four objectives, for which 19 actions are proposed:

1. Upgrade research and innovation in policy agendas
  - Better regulation in support of new technologies
  - Redeployment of state aid towards research and innovation
  - Improved efficiency and use of intellectual property protection
  - An attractive single market for researchers
  - The use of public procurement to foster research and innovation
  - Better and wider use of tax incentives
2. Mobilize EU funds and instruments to support research and innovation

- Mobilization of public and private resources for key technologies
  - European Structural Funds to drive research and innovation
  - Improved access of SMEs to finance
  - Mobilization of national programs to fund EU research and innovation
3. Improve the environment for business to do research and innovate
- Intensified university–industry partnerships
  - Innovation poles and research-driven and industrial clusters
  - Proactive business support services to stimulate research and innovation
  - Innovation management and social change
  - The potential of innovative services
  - European industrial research and innovation monitoring system
4. Enhance national policies through trans-national cooperation
- Research and innovation as a priority of the National Reform Programmes for growth and jobs
  - Improved policy analysis instruments
  - Support to policy learning and co-operation

Research lies at the heart of the European Union’s strategy for becoming the world’s most competitive and dynamic knowledge-based economy by 2010. To meet this target, Europe must invest more in research, as well as exploiting its technological outputs more effectively than in the past. The EU has committed itself to building a European Research Area (ERA) that will overcome outdated geographical, institutional, disciplinary and sectoral boundaries. The ERA will extend the single European market to the world of research and technological development, ensuring open and transparent trade in scientific and technical skills, ideas and know-how. The role of the European Commission is neither to carry out nor to control European research. The overall objective of the EU’s Research Framework Programmes is to establish the ERA as a framework for political and practical co-operation within which scientific excellence can flourish and research results can be efficiently applied to address major European priorities.

The ERA concept combines: a European «internal market» for research, where researchers, technology and knowledge freely circulate; effective European-level coordination of national and regional research activities, programmes and policies; and initiatives implemented and funded at European level. Some progress has been made since the concept was endorsed at the Lisbon European Council in 2000. The European Research Area has become a key reference for research policy in Europe.

However, there is still much further to go to build ERA, particularly to overcome the fragmentation of research activities, programmes and policies across Europe. The European Research Area that the scientific community, business and citizens need should have the following features:

- An adequate flow of competent researchers, with high levels of mobility between institutions, disciplines, sectors and countries;
- World-class research infrastructures, integrated, networked and accessible to research teams from across Europe and the world, notably thanks to new generations of electronic communication infrastructures;
- Excellent research institutions, engaged in effective public-private cooperation and partnerships, forming the core of research and innovation ‘clusters’ including ‘virtual

- research communities’, mostly specialised in interdisciplinary areas and attracting a critical mass of human and financial resources;
- Effective knowledge-sharing, notably between public research and industry, as well as with the public at large;
- Well-coordinated research programmes and priorities, including a significant volume of jointly programmed public research investment at European level involving common priorities, coordinated implementation and joint evaluation; and
- A wide opening of the European Research Area to the world, with special emphasis on neighbouring countries and a strong commitment to addressing global challenges with Europe’s partners.

The Seventh Framework Program (FP7) bundles all research-related EU initiatives together under a common roof playing a crucial role in reaching the goals of growth, competitiveness and employment; along with a new Competitiveness and Innovation Framework Program (CIP), Education and Training programs, and Structural and Cohesion Funds for regional convergence and competitiveness. It is also a key pillar for the European Research Area (ERA).

The broad objectives of FP7 have been grouped into four categories: Cooperation, Ideas, People and Capacities. For each type of objective, there is a specific program corresponding to the main areas of EU research policy. All specific programs work together to promote and encourage the creation of European poles of (scientific) excellence.

The non-nuclear research activities of the Joint Research Centre (JRC) are grouped under a specific program with individual budget allocation.

### **2.2.2 Policy Guidelines**

Research DG devotes considerable effort to ensuring openness and fairness in the allocation of Framework Programme funds. Projects are selected solely on the basis of their quality and expected impact, following independent evaluation of proposals submitted in response to open calls published in the Official Journal of the European Union. Comprehensive information about

the calls, their objectives, their criteria for eligibility and evaluation and their application procedures is also made available on the web, and through a network of National Contact Points in each Member State.

Application and evaluation procedures are as simple as possible. Evaluations are carried out by panels of experts on the basis of anonymous ‘peer review’. Selected research consortia are invited

to negotiate specific contracts covering their rights and obligations, project management and monitoring procedures, and payment. Large-scale Integrated Projects and Networks of Excellence are given considerable flexibility and autonomy in carrying out their work. Until 2000, the DG focused almost exclusively on the funding of research and development projects through the EU Framework Programmes. But by then it had become clear that a more strategic approach was required. To improve the coordination and impact of European research efforts, Research DG is actively developing policies addressing three key problems:

The United States and Japan currently spend far more on research than Europe – the EU now plans to increase its own spending to 3% of its GDP by 2010.

The fragmentation of European research policies and activities diminishes their effectiveness – the ERA is creating a single market for scientific and technological ideas, skills and know-how.

European research is often exploited elsewhere – renewed emphasis has been placed on the conversion of Europe’s scientific expertise into marketable products and services.

The need to increase European research spending, especially by business, will be a central preoccupation of research policy for some years. The Commission plans to tackle this with measures to improve the incentives for private sector investment in research, and to refocus direct public support. Space sector research, security-related research, and the coordination of the Framework Programme with the research elements of the EU’s Structural Fund programmes, will also be policy priorities.

To increase and improve investment in R & D, in particular by private business, the overall objective for 2010 of 3 % of GDP is confirmed with an adequate split between private and public investment; Member States will define specific intermediate levels. Member States should further develop a mix of measures appropriate to foster R & D, in particular business R & D, through:

- improved framework conditions and ensuring that companies operate in a sufficiently competitive and attractive environment;
- more effective and efficient public expenditure on R & D and developing public-private partnerships (PPPs);
- developing and strengthening centers of excellence of educational and research institutions in Member States, as well as creating new ones where appropriate, and improving the cooperation and transfer of technologies between public research institutes and private enterprises;
- developing and making better use of incentives to leverage private R & D;
- modernizing the management of research institutions and universities;
- ensuring a sufficient supply of qualified researchers by attracting more students into scientific, technical and engineering disciplines and enhancing the career development and the European, international as well as inter-sector mobility of researchers and development personnel.

### **2.2.3 Actors and Coordination**

Research DG does not develop or implement R&D policies alone. It works closely with other Commission services, notably:

The Commission’s Joint Research Centre – the European Union’s scientific and technical research laboratory • Information Society DG, which manages the parts of the Framework Programme that deal with information and communication technologies • Enterprise DG, which plays a key role in establishing an environment in which European businesses can use research results as the basis for innovation and improved competitiveness The DG consults widely with the European institutions, with Member States and acceding and candidate countries, and with industry, the research community, the financial sector and other key stakeholders.

And it supports the Scientific and Technical Research Committee (CREST) in facilitating the “open method of coordination” by which Member States help one another to pursue common policy objectives through the exchange of experience and the identification of good practice. In the future, new sector-specific European technology platforms may bring together representatives of industry, research, the financial community, NGOs, consumers

and public authorities to define strategic research priorities and to address regulatory and standardisation issues.

Research DG is an organisation of about 1 700 staff structured in 14 Directorates, each of which has between four and seven units. Each Directorate and unit pursues well-defined activities which encompass policy-making as well as the implementation of the Research Framework Programmes.

In its role as the catalyst and coordinator of the European Research Area, the DG has established close formal and informal links with a very large number of external partners, both organisations and individuals. First and foremost, this involves continuous collaboration with other Directorates-General of the European Commission, and especially those which also have a responsibility for research, or whose work impacts on the world of research. Formally speaking, the DG serves and reports to the European Council and Parliament. But it also maintains an ongoing dialogue with the worlds of research policymaking, academic and industrial research, industrial and consumer end-use, and science education, as well as with the wider public.

7th Research Framework Programme (with longer duration 7 years, major innovations – European Research Council: eligible research costs contract model; further coordination between national and European research programmes through new mechanisms such as ERA-NET and Regions of Knowledge)

Moreover, the creation of a European Institute of Technology by 2009 should enable European excellence to fully take shape.

Coordination of research and development initiatives within the Community is based on various instruments:

- The framework programs for research and technological development. These multi-annual programs, introduced in 1984, encompass more specific programs covering fields as varied as information and communication technologies, the environment, biotechnology, energy (including nuclear power), transport and mobility of researchers. The Seventh Framework Program (2007–13) has the largest budget since the creation of a European research identity. It responds to the needs of industry and of European policies, placing knowledge at the service of economic, social and environmental progress.
- The Joint Research Centre (JRC) — the research body which supports the action of the Union — is made up of eight research establishments distributed in the European Community which meet the specific needs of the various policies of the European Commission. It is at the forefront of research in nuclear energy (especially safety) and has diversified into sectors such as materials, the environment, industrial risks and satellites. It is funded through the EU framework programs for research and by its own earnings from commercial contracts.

European Researchers' Charter and Code of Conduct/Research Careers and Mobility / Researcher's Passport

Communication on Improving Knowledge Transfer between Research Institutions and Industry 'Green Paper' on Future of the European Research Area: Consultation and Follow-Up

The EU Research Framework Programme is explicitly designed to support the creation of ERA and its funding has been substantially increased, although less than initially proposed by the European Commission. New initiatives launched in conjunction with the 7th Framework Programme (2007- 2013), such as the European Research Council, will have

an important impact on the European research landscape. The future European Institute of Technology also has the potential to play a substantial role in creating world-class ‘knowledge and innovation communities’.

Initiatives have been launched to improve the coordination of research activities and programmes. They include the European Technology Platforms, through which industry and other stakeholders develop shared long-term visions and strategic research agendas in areas of business interest, and the bottom-up ‘ERA-Net’ scheme which supports the coordination of national and regional programmes.

Policy coordination is addressed through the ‘open method of coordination’ and the use of voluntary guidelines and recommendations. This is stimulating a process of debate and reforms at national level, which has resulted in all Member States setting national R&D investment targets in the context of the overall EU 3% of GDP R&D investment objective and taking measures to improve their research and innovation systems.

EU cohesion policy and its financial instruments – the Structural Funds - give strong priority to the development of research and innovation capacities, particularly in less developed regions. Together with the priority given in most Member States’ internal policies, this can help the whole of Europe to participate in and derive full benefit from the European Research Area.

Researchers still see career opportunities curtailed by legal and practical barriers hampering their mobility across institutions, sectors and countries.

Businesses often find it difficult to cooperate and enter into partnerships with research institutions in Europe, particularly across countries.

National and regional research funding (programmes, infrastructures, core funding of research institutions) remains largely uncoordinated. This leads to dispersion of resources, excessive duplication, unrealised benefits from potential spillovers, and failure to play the global role that Europe’s R&D capability would otherwise allow, notably in addressing major global challenges. Reforms undertaken at national level often lack a true European perspective and translational coherence.

#### **2.2.4 Results and Beneficiaries**

Principal beneficiaries of EU R&D policy are *citizens, researchers, SME and Industry*. The crucial role of the universities is recognised.

Key statistics for the European Union:

- The EU strategy on growth and jobs is paying off. Although this is not the time for complacency, a statistical analysis of the economic situation during 2006 and the forecasts for 2007 show positive trends in many areas including employment and inflation.
- The EU is expected to create seven million jobs over the 2006-2008 period and five million in the Euro area;
- The employment rate in the EU has increased from 62.5% in 2001 to 64.5% in 2006 and is expected to rise to 65.5% in 2008;
- Employment growth accelerated to 1.5% in 2006, representing three million jobs in the EU;
- Unemployment decreased by one percent from 2004 to 2006 and is set to go down by another 0.5% by 2008;

- Economic growth increased considerably from 1.7% in 2005 to 2.9% in 2006 and is expected to remain at around 2.7% in 2007;
- Labor productivity growth almost doubled from 2005 to 2006 and is continuing to grow to a predicted 1.5% in 2008;
- Inflation, stable at 2.2% in 2005 and 2006, is forecast to gradually decline to 2% in the EU and below 2% in the Euro area by 2008.

### 2.2.5 Resources

Despite the stagnation of R&D spending in the EU at 1.84% the EU has retained the 3% objective (2/3rds private and 1/3 public) but this objective is unlikely to be reached by 2010. However, research intensive research regions and countries are doing better than the 3% and this is due to a much higher input by private companies. The ambition is to increase the amount of private funding into R&D and more incentives may be needed.

Since their launch in 1984, the Framework Programmes have played a lead role in multidisciplinary research and cooperative activities in Europe and beyond. FP7 continues that task, and is both larger and more comprehensive than earlier Framework Programmes. Running from **2007 to 2013**, the programme has a budget of 53.2 billion euros over its seven-year lifespan, the largest funding allocation yet for such programmes.

The Seventh Framework Programme for research and technological development (FP7) is the European Union's main instrument for funding research in Europe. FP7, which applies to the **years 2007-2013**, is the natural successor to the Sixth Framework Programme (FP6), and is the result of years of consultation with the scientific community, research and policy making institutions, and other interested parties.

The total budget for FP7, including the non-nuclear research of the Joint Research Centre, **is 51 Billion euros over 7 years.**

### 2.2.6 Perspectives

The DG will continue to manage the Framework Programmes, which will remain a central policy tool. But while these programmes have to date mainly sought to bring about synergies in European science by sponsoring trans-national collaboration and mobility, after 2006 we will need to add new activities. We envisage competition-based European funding for fundamental research, European decision-making about the development of major facilities, and large-scale technological research projects undertaken through public-private partnership.

The overall results of the consultation reveal a strong stakeholder support for the ERA vision, and the six specific ERA dimensions. Knowledge sharing is coming out on top and it is the area in which actions is most required at regional level. It appeared that forthcoming action at EU level will have to aim at the realisation of a single labour market for researchers. Correspondingly, five key communications have been planned (in the following chronological order):

1. Joint Programming of Research for more strategic and ***better-structured joint programmes*** and common calls for projects as of **2010**.
2. A communication on measures ***to increase researcher mobility***, e.g. by a 'European Researchers' passport';
3. A legal framework for pan-European research (based on ***art. 171 EU Treaty***) to facilitate the construction and operation of new consortia;



4. A European strategy for enhanced and coherent international science and technology cooperation;
5. *Recommendations for increasing knowledge transfer between universities and industries*, by for example codes of conduct for intellectual property rights<sup>37</sup>.

### 3. COMPARATIVE CASE STUDY (example) – FEDERAL REPUBLIC OF GERMANY

*The Federal Office of Defense Technology and Procurement (Bundesamt für Wehrtechnik und Beschaffung – BWB)*, as part of the civilian Bundeswehr administration, is the **largest technical authority in Germany**. It is the heart of the armaments organization and a higher federal authority of the Federal Ministry of Defense. Its primary task is to supply the Bundeswehr with state-of-the-art equipment under economical conditions.

The BWB has the central responsibility for managing all armaments projects and is also the responsible point of contact for industry (see [www.bwb.org](http://www.bwb.org)). This task is derived from Article 87b of the Basic Law where the ‘meeting of the direct material demand of the armed forces’ is assigned to the Bundeswehr administration.

*The general core tasks of the BWB also comprise – for the entire armaments organization – the central responsibility for:*

- Policy issues of defense technology-relevant standardization.
- Cooperation with the Deutsches Institut für Normung eV (DIN) (German Standardization Institution).
- The implementation of international standardization results into national development and procurement documents (standards and technical specifications).

Based on a contractual agreement, the DIN cooperates with the armaments organization in national, European and international standardization activities, if the MOD (represented by the BWB) claims an interest in such standardization. Thus, armaments organization representatives have the opportunity, through their cooperation in DIN standardization committees, to ensure that defense technology-relevant aspects are considered in DIN Standards. This way the armaments organization represents its specific interests in standardization work similar to other ‘interested circles’. When realizing military capabilities, the armaments organization basically aims at using commercially available products. Thus, the application of civilian Standards is always of prime importance. If, however, the inclusion of defense technology requirements in civilian Standards is not possible or not possible in time, defense equipment Standards (VG Standards) can be developed for Bundeswehr purposes. The consideration of existing NATO STANAGs has priority in the elaboration of VG standards. VG Standards have the same status as DIN Standards, are also reviewed for topicality every five years and are available from Beuth-Verlag (a subsidiary of DIN) like other national and international Standards. At present, a total of approximately 1700 defense equipment Standards are updated regularly (a list of presently applicable VG Standards is available at <http://www.bwb.org/AG-Bund/VG/VG-norm.htm>).

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<sup>37</sup> Dimitar Dimitrov, EU R&D policy, University of national and world economy – Sofia, 2007, page 11

The Federal Minister of Defense sponsors the defense technology standardization work performed by the DIN through annual contributions to the budget of the Standards offices. Owing to the decreasing importance of purely defense technology standardization and the increased application of civilian Standards, this financial contribution has been reduced from approximately e1.8 million in 1998 to approximately e0.6 million in 2001.

In addition to defense equipment Standards, other forms of ‘technical procurement documents’ are used for the development, and especially for the procurement, of the follow-on demand of defense technology products. Of particular importance are the Technical Specifications (TL) of the BWB. The majority of these documents describe fully developed products such as clothing, hardware and commercial goods, where the standardized description allows a repeated procurement on a competitive basis while ensuring continuous product and quality characteristics over a long service life. TL are developed by the competent technical experts of the BWB, if required by consulting the relevant companies. Their layout is in accordance with the requirements of the DIN 820 series and they must also be reviewed for topicality every five years. In the section ‘Normative References’ TL also refer to civilian Standards (DIN, EN, ISO, etc) as well as military Standards (VG, MilStd, etc). A complete list of all applicable TL of the BWB is available at <http://www.bwb.org/AG-Bund/TL/TL-Verz.htm>. Most of the TL are even available for free download as a pdf file. A free email newsletter service is offered, after corresponding registration, on changes to the database. In addition, new and revised editions of BWB TL and of VG Standards are published in the DIN bulletin.

The *codification of the Bundeswehr* is in line of the NATO Codification System (see enclosure at

[http://www.nato.int/structur/AC/135/ncs\\_brochure/ncs\\_brochure\\_e/index.html](http://www.nato.int/structur/AC/135/ncs_brochure/ncs_brochure_e/index.html))

### **3.1 PERSPECTIVES AND IDEAS FOR CHANGE OF THE R&D POLICIES**

Modern and efficient Armed Forces are an element of national security provision. *Their tasks derive from their constitutional mission and from the values, goals and interests of German security and defense policy.*

The transformation of the Armed Forces is aimed at improving their operational readiness across the entire task spectrum and requires unconditional joint thinking and action throughout the Bundeswehr, as well as a stronger inter-ministerial approach.

The further development of existing capabilities must, at the same time, take account of the Bundeswehr's multinational involvement. The capability of the Bundeswehr to conduct network-enabled operations will be an absolute prerequisite for it to play a successful part in *multinational conflict prevention and crisis management*.

The establishment of the European Defense Agency has triggered a process which Europe's governments and defense companies – including Germany's defense industry and government – must face up to. It is very difficult to estimate the speed of this process. It is politically desired by the Commission, the European Parliament as well as the international defense companies. The UK and France are trying to safeguard their respective national industrial policies by means of national strategies, which will slow down the process in the area of industry and the market.

The EU wishes to create new framework conditions for competition and defense policy. The *EDA* initiative *in the field of R&T* aims to create regional centers of excellence in the medium and long term. German industry and government must face up to these changes and help shape the transitional phase in a new situation characterized by greater influence from Brussels. This is supported by the following reasons:

- Germany has the third largest defense budget in the EU.
- Germany must demonstrate a security policy stature which reflects its economic strength.
- Germany has a high level of *national competence* in defense equipment; it is in Germany's national interest to remove the unequal terms of competition on the European defense market.

Successful participation depends on:

- A *national industry policy agenda that includes the preservation of core defense capabilities*.
- The advocating of this agenda within the EU and the EDA.
- An appropriate and strategically oriented personnel policy concerning the appointment of key positions.

In the past ten years, even by comparison with the country's European partners, the German defense equipment industry has had to dismantle unparalleled levels of expertise and, in particular, jobs. Its influence in Europe is therefore already no longer proportionate. If a country wishes to be taken seriously in future European structures, it *must be able to contribute*. Own "assets" are the only means of gaining influence. Despite its present technological leadership, Germany is in danger of losing its position in important areas. The Federal Government must therefore use its industrial policy to retain a European balance of defense technology and high-tech areas in Germany too. Active industrial policy therefore means the strategically oriented financing of technology and contracts in order to safeguard both systems leadership and supplies to the defense equipment industry in European cooperation.

On the path to Europeanization, the *defense equipment industry needs clear orientation*, a dependable political basis, i.e. including a clear declaration from the German government of its security policy role in future European structures.

Government and industry must jointly define the strategic positioning of German defense technology in the Europe of the future. Aspects of security and industrial policy, the preservation of core German capabilities, the problems relating to SMEs and dual use, the preservation of technology and jobs in Germany must hereby all be taken into account. The assertions of national positions to be agreed with industry at the EDA are further important aspects.

Germany is the EDA's largest financial contributor, but is third behind the UK and France in terms of defense expenditure with a relatively smaller investment ratio.

**Britain's** defense industry enjoys large-scale state support through the Defense Export Services Organization. Some of France's industry is under state control, which means that it needs to pay less attention to the capital markets. There as well, the state promotes exports through a dedicated organisation.

In December 2005, the **UK Defense Ministry** published a new white paper on the strategic orientation of its defense industry<sup>13</sup>. In **France** a new edition of the strategy paper "The Defense Procurement Policy" originally published in July 2004 is undergoing preparation. Both countries are using these papers to establish their goals for Europeanization. A corresponding German paper is needed to persuasively represent Germany's national interests in Brussels.

The weight of the Federal Republic of Germany in terms of security policy is greatly influenced by the capabilities of its security and defense industry. Merely reacting to

changes in Europe is not sufficient. Germany has to be in the position to help shape the process of change.

### 3.2 NEED FOR ACTION

An important aim in the course of restructuring the European defense industry is to prevent the predominance of individual countries, as this would prejudice the interests of the others and handicap the process of *Europeanization*. Persuasive European corporate structures require a balancing of European interests through deliberate mutual interdependence, as is explicitly stated in the LoI/Framework Agreement. National strivings for autonomy and competition for markets within the Community must be prevented. A pooling of strengths which preserves a fair and balanced coordination of interests must safeguard a fair and balanced regional European – and thus also German – added value and jobs.

The need for action can be divided into three main fields:

- A uniform *representation* of interests by government and industry in European bodies.
- The *strategic orientation* of an industry in the throes of rapid change with *new challenges* for defense and security against global challenges.
- The *preservation of competitiveness* and of the still existing core capabilities of the German defense equipment industry.

Successful representation of national interests in Brussels depends on the existence of a national strategy in which positions need to be drawn up with respect to the following problem areas:

- Preservation of core German defense equipment capabilities.
- Harmonizing export practices for all EU countries.
- Cooperation between the Federal Government, the Federal Ministry of Defense, the Federal Ministry of Economics and Technology, and industry in protecting German interests at international level.
- Introduction of a demonstrator project under German leadership at the EDA to emphasize German support for Europeanization and the establishment of national technological aspirations.
- Co-shaping the future R&T landscape in Europe wanted by the EDA.

All measures must be organized into a schedule. It is risky to await developments in Brussels for so long that one is forced to act, reducing possible action to reactions.

### 3.3 FURTHER STEPS

To make sure the Bundeswehr regains its financial leeway in the medium term, the BDI (Federation of German Industries e.V.) proposes a model that has already been successfully applied in Sweden. To sum it up: tough, short-term measures to create financial leeway.

According to this method, a financial turnaround could already be achieved in the medium-term by making the necessary cuts in personnel and operating costs. The alternative of gritting our teeth and ploughing through is unacceptable.

Over the past years, Germany's defense industry has consolidated its competitiveness and innovation capacity in a targeted way with extensive restructuring measures.

However, in the long-term, German defense technology will be defeated by the lack of political attention and the unfair terms of competition it is subjected to by its own country.

*"The familiar phrase: think globally - act locally is absolutely true, and it is always about the relationship between national policies and international cooperation."*<sup>38</sup>

### **3.4 THE DEFENSE TECHNOLOGY INDUSTRY IN A TIME OF FORCE TRANSFORMATION AND INTERNATIONALIZATION**

Principles for fundamentally re-orientating the country's armed forces were set forth in Germany's Defense Policy Guidelines in May 2003. Primarily, they deal with integrating the Bundeswehr into multinational force structures when deployed abroad, the new mission spectrum, and strategies for coping with a limited defense budget. The guidelines gave rise to five important official documents on the Bundeswehr's future: "Directive on the Development of the Bundeswehr" (October 1, 2003), "Directive on the Development of the Armed Forces" (March 1, 2004), "Concept for the Bundeswehr" (August 9, 2004), "Directive on the Development of the Army" (July 5, 2004), and "The Army in Transformation" (December 1, 2004).

In the Berlin Edict of January 21, 2005, the Federal Minister of Defense ordered the reorganization of the Bundeswehr's command structure. The new structure places the Inspector-General of the Bundeswehr in charge of combat readiness of the armed forces, the analysis of their joint capabilities, and the centralized identification of requirements. In general, this considerably expands the Inspector-General's responsibilities. Current changes in the Bundeswehr and its adaptation to new circumstances are summed up by the term "Force Transformation".

Transforming the Bundeswehr also means transforming the defense industry. At the same time, Europeanization of security and defense technology policy is growing as a common European security and defense policy emerges, and the EU Commission presses for greater competition in defense procurement.

At the initiative of the Council of Ministers, the European Defense Agency (EDA) was created in July 2004. The *EDA's brief includes* developing military capabilities, research and technology, military equipment, and fostering a European defense market. Defense ministers of the member nations make up the EDA's steering committee, enabling procurement policy to be coordinated at high levels as well as at lower echelons.

### **3.5 NATIONAL R&D/INNOVATION POLICY AND STRATEGY**

Innovation policy is a main policy priority in Germany. The *main objectives* of innovation policy currently are the following:

1. Increasing R&D activities in enterprises and public institutions. In 2010, **3% of GDP** should be spent on R&D.
2. Increasing the participation of SMEs in R&D and innovation.
3. Developing new technologies and facilitating the dissemination of these technologies in economy and society. Special focus is currently laid on ICT, biotechnology, nanotechnology, fuel cell technology, medical and health technologies, optical technologies, micro-system technology, space and aircraft technologies, environmental technologies, energy technologies (e.g. wind power, solar power).
4. Stimulating the creation of new technology-based enterprises and the growth of young technology companies.

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<sup>38</sup> Gerhard Schröder, Federal Chancellor, Speech at the World Economic Forum 2002, New York

5. Increasing the use and commercialization of research results achieved at public research institutions, including a more intense co-operation between enterprises and academic institutions.
6. Improving education in order to meet changes and increases in the demand for highly qualified people.
7. Promoting innovation in the eastern Länder in order to contribute to the economic restructuring of eastern Germany.
8. Fostering the development of regional clusters in innovation in order to make full use of complementary skills and competencies of the various actors in innovation systems.

In order to achieve these goals, German innovation policy uses *a broad set of instruments*, basically resting on three approaches:

1. Improving framework conditions for innovation, notably through simplifying the tax system and reducing the tax burden for firms, and by diminishing bureaucratic procedures that may inhibit innovation and the start-up of new enterprises.
2. Improving the education and science system in order to tackle shortage in the supply of qualified labor, to improve the firms' access to high qualified personnel, including vocational and on-the-job training and to provide a public research base as a partner in innovation projects.
3. Promoting innovation activities in firms through financial aid. Subsidies are delivered via four channels: i. R&D grants for research in high-tech areas (esp. through the thematic programs of the BMBF); ii. R&D grants for co-operative research by SMEs (esp. through BMWA programs such as ProInno); iii. financial support for innovation projects in technology-oriented SMEs provided either through loans or venture capital; iv. technology consulting services and the provision of a techno-scientific and informational infrastructure for innovative enterprises.

### **3.6 MILITARY R&D CONCEPTS**

The priorities and objectives in military R&D are determined by the Research and Technology (R&T) Concept of the BMVg, which was introduced in 1985.

Defense-related R&D is divided into three areas:<sup>33</sup>

1. Research oriented towards defense technology,
2. Future key technologies oriented towards military tasks,
3. Systems technology/guiding concepts.

Military tasks in research and future technologies include:

- reconnaissance, command and control (e.g., radar improvements, sensors, GaAs technology, optronics, pattern recognition, friend-foeidentification); (Hrsg.):Conversion of Military R&D, London/New York 1998, p.163-182.
- mobility (e.g., light-weight construction, fluid-mechanical improvements, remotely piloted vehicles, energy support for electromagnetic guns);
- weapons use and lethality (e.g., electromagnetic guns, weapon lasers, torpedoes and torpedo defense, land mines, kinetic weapons against improved armor);
- protection (e.g., improved armor, ABC protection, protection against microwaves and electronic warfare);

- planning support (e.g., military-technological trends, threat perception, simulation technologies, computer-aided planning, international harmonization of armament programs).

The Fraunhofer-Institut für Naturwissenschaftlich-Technische Trendanalysen (INT, Institute for Scientific-Technical Trend Analyses) at Euskirchen near Bonn provides an evaluation of relevant literature on a regular basis for the BMVg, which is used as an input to the 'defense technology forecast.' In this forecast, long-term projections of trends in military technology are presented and evaluated by the BMVg.

### **3.7 THE GERMAN RESEARCH SCENE**

At the beginning of the 21st century, two basic trends are setting science and research considerable challenges: globalization and the transition to a society based on knowledge. A highly efficient and competitive system of science is necessary if Germany is to maintain its leading position in the international competition for research locations.

Within the German research scene - which is essentially characterized by the sectors of economics, universities/colleges and non-university establishments - economic activity in the field of R&D plays the largest role. In 1999, R&D expenditure by German business exceeded the DM 60 billion mark. The universities/colleges received R&D funding worth DM 15.5 billion and non-university establishments funding worth around DM 13,3 billion. Thus, in 1999 gross domestic expenditure on R&D by the Federal Republic of Germany totaled DM 88,8 billion, or 2.4% of the gross domestic product.

Together with the federal states, the Federal Government supports the two major research organizations, the [Max-Planck-Gesellschaft](#) (MPG) and the [Fraunhofer-Gesellschaft](#) (FhG). The Federal Government provides 50% of the basic funding for the MPG and 90% for that of the FhG. The MPG conducts free basic research in new fields of importance for the future. It sets priority areas for top-level research and performs a complementary function, in particular with regard to university research. The FhG concentrates on applied research and its principal objective is to translate the results of research into new and innovative products, processes and services.

The support organization the [Deutsche Forschungsgemeinschaft](#) (DFG) is also funded by the Federal Government and the federal states. In its capacity as a self-governing scientific organization it primarily supports universities/colleges across all their disciplines by means of projects and programs. The Federal Government's contribution stands at 50% or more. Together with the MPG and the FhG, the DFG makes a considerable contribution towards the strengthening and integration of research in Germany and also to international co-operation. Support for the next generation of scientists is also of prime importance.

The Federal Government and the federal states also deal with the expansion of existing and the building of new universities/colleges, including university hospitals. In that respect the basic aim is to adapt the universities/colleges to meet national and international requirements as an integral part of the overall system of education and research. That also involves promoting priority areas of research at the universities/colleges in that field, having regard to the non-university research establishments. Furthermore, the Federal Government supports the universities/colleges in areas that require swift and disproportionate support on account of their particular importance or workload by means of fixed-term special programs that are agreed with the federal states. Such special programs are used for both teaching and research purposes. Following reunification particular emphasis in that respect was placed on the restructuring of universities/colleges and research in the new federal states.

### **3.8 SHORT OVERVIEW OF MAIN RESEARCH ORGANIZATIONS – INSTITUTES, CENTERS, UNIVERSITIES, CORPORATIONS**

In few centers in Bundeswehr 250 man and woman work on creation of the future military forces: Strausberg, Ottobrun, Gelsdorf, Potsdam and Berlin. The most of them work in the basic institution - “the mother house“ in Strausberg. Together with academy of information and communication (AKA) and the institute of social science, the center is regular research and scientific campus. Within the center’s “thought factories” running studies and experiments dedicated on security policy and military strategy. They provide the FMoD in Bonn and Berlin with decision making relevant information and analyses related to always more rapidly political, social, economical and technological changes. The goals of the center, beside others, are:

- Permanent development of the capabilities profile of FMoD
- Planning and running of exercises and experiments
- Model building and simulations

This center of transformation comes from the previous center for studies and analyses in 2004. In May 2006 the centers moved the HQ from Waldröb to Strausberg.

The agency mainly responsible for research and technology was the 'Bundesministerium für Forschung und Technologie,' BMFT (Federal Ministry for Research and Technology); which in 1995 was fused with the Ministry of Education and Science. Its 1993 budget was 9.4 billion DM, more than half of the 17.9 billion DM that the German Federal government spent for R&D that year.

Other principal German government founders of R&D are the Defense Ministry (BMVg), the Economics Ministry (BMW), and the Ministry of Education and Science (BMBW).

The BMFT is the main Hinder for Germany's four major publicly funded research institutions, and its priorities and costs are reflected in the research areas they cover. The institutions are:

- The sixteen Grossforschungseinrichtungen (GFEs), or large research organizations, working in a variety of fields from energy to advanced materials, information technology, environment, aeronautics and space.
- The Max Planck Society (Max-Planck-Gesellschaft, or MPG), which performs basic scientific research, mostly in the natural sciences.
- The Fraunhofer Society (Fraunhofer-Gesellschaft, or FhG), the smallest of the four major research institutions, whose task is to pursue applied R&D dedicated to direct transfer into practical use.
- The Blue List, which is not an organization, but a collection of independent research organizations, including a number of new East German institutes, working in various fields.

### **3.9 RESEARCH FOR DEFENSE AND SECURITY – FRAUNHOFER - GESELLSCHAFT (FhG)**

The reorganization of the Federal Armed Forces and the revised form of the regulations for the procurement of Armed Forces equipment “Customer, Product, Management (CPM)” focus on the necessary new capabilities of the Federal Armed Forces and no longer concentrate on the upgrading or the development of follow on generations of existing systems. The main emphasis is now on worldwide market analysis, the increased use of civilian research and its products, partnership with business world, as well as on industrial cooperation including, in particular, the European nations.



**Research and technology projects** are carried out in the government agencies as the Bundeswehr Technical Centers as well as in external organizations in order to meet the armed forces' requirements.

The **research work conducted by government-funded institutes** is of particular importance. In addition to the available civilian research and its results that are to be used for defense technology these institutes have to accomplish the following central tasks:

- to provide the scientific and technological know-how for intelligent and economical equipment decisions
- to offer new technological solutions and to realize the relevance of new technologies for the armed forces' capabilities
- to develop new generic (sub-)system concepts
- to work out contributions for a European research and technology basis and for the ability for cooperation
- to participate in maintaining a defense-related competence in Germany

A substantial part of the budget funds spent by the Ministry of Defense for research and basic technology is made available to government funded institutes of various research organizations in order to guarantee the required R&T planning and R&T processes in the long run.

This **includes** the Fraunhofer-Gesellschaft (FhG), the Society for Applied Sciences (FGAN), the German Aerospace Centre (DLR) and the French- German Research Institute Saint-Louis (ISL).

Within the German scientific scene the **Fraunhofer- Gesellschaft** with its applied research acts as a transfer organization between fundamental research, as conducted at universities and at the Max Planck Society , on the one hand and industrial companies on the other hand. The FhG performs research work and develops products and techniques to the point that they are ready for application. Five institutes out of at present 58 Fraunhofer institutes are concerned with defense-related questions:

- Fraunhofer Institute for Applied Solid State Physics (IAF)
- Fraunhofer Institute for Chemical Technology (ICT)
- Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut (EMI)
- Fraunhofer Institute for Technological Trend Analysis (INT)
- Fraunhofer Institute for Information and Data Processing (IITB)

With the approval of the Executive Board of the Fraunhofer-Gesellschaft the institutes IAF, ICT, EMI and INT founded the Alliance for Defense and Security Research in September 2002. In the meantime they have been joined by the IITB. This alliance coordinates almost all defense-related research activities within the FhG. Defense research and topics defined by the Ministry of Defense and its armament department link these institutes. Within their research work the institutes continue to work in their own various technological and technical fields.

In order to assure that the member institutes of the Fraunhofer Alliance for Defense and Security Research are integrated in the general scientific environment of their respective fields of research, they are, as are all the other Fraunhofer institutes, also part of the Fraunhofer scientific alliances. (Institutes working in related subject areas cooperate in scientific alliances and foster a joint presence on the R&D market). On account of this double integration into both scientific alliances and contract research, the institutes guarantee that defense-related research is state-of-the-art. The risk that they isolate

themselves form the rest of the scientific world and the resulting disadvantages can thus be reliably avoided.

In accordance with this an increasingly European orientation of many projects becomes apparent. They are supported by the Ministry of Defense in the various international, bilateral and multilateral partnerships and forums for defense research and technology. This does not only result from recognizable political tendencies, but also from an economical pressure recognized by all parties involved, particularly concerning European efforts to find suitable ways for an integration process.

At present, the institutes attentively follow a discussion on the type, the promotion and the orientation of a common security research. This discussion has been started by the European Commission having the establishment of a comprehensive European security policy in mind.

Germany aims at the participation of the institutes, where it is possible and useful, for they can act as competent and integrative links between the civilian and military levels of security research, even more so as this subject will become increasingly important in the Commission's future framework programs for research.

The Fraunhofer Alliance for Defense and Security Research (VVS = Verteidigungs- und Sicherheitsforschung) is comprised of five institutes from the Fraunhofer-Gesellschaft. Although their activities lie in different fields of research, they are associated at a superior level through the German Ministry of Defense, and thus through defense-related research. The research topics presented in this brochure show the wide spectrum of the institutes' work on the one hand and the professional benefit which results from this mutual combination of competencies on the other hand.

In the past, defense-related research was the impulse generator in many subject areas, setting off and promoting new topics (the most widely known being the development from Darpanet to Internet). Meanwhile, civil research has become the driving force for most of the fields of activity.

This assigns an important task to the member institutes carrying out defense-related as well as civil research, i.e., to conduct knowledge transfer and to ensure that the great progress made in civilian research is also applied to defense technology. A typical example is in the field of material research, which does not have an equivalent in defense-related research despite the numerous programs of the German Ministry of Education and Research (BMBF). Therefore, the Fraunhofer Institutes presented here consider knowledge transfer in their research areas as one of their most important tasks.

An additional key topic is research in fields that are relevant to defense only and for which virtually no civil research (such as that at universities) exists. In this case, the institutes on topics such as the development and application of energetic materials (explosives and propellants), weapon-specific aspects (the general topic of armor and anti-armor), and sensor and information techniques related to weapons systems hold an exceptional position.

The German Ministry of Defense and its subordinated authorities are the main customers. The events of September 2001 have increased public awareness of the changed state of security in view of globally operating terrorism. As a consequence, measures concerning the security and protection of the population are required. In establishing the Department of Homeland Security, the United States has also drawn important conclusions in this field of research. In the meantime, the European Commission has also realized that security

research is an important topic and therefore it started corresponding research programs in 2004.

One of the most essential tasks in applied research will be to determine and analyze the hazards and risks for the many sensitive components of our vital infrastructure, and eventually to develop proposals on how to reduce or avoid the risks. By cooperating in the Defense and Security Research Alliance under the umbrella of the Fraunhofer-Gesellschaft, the member institutes will be able to assert themselves within the European competition that is to be expected in defense and security research.

As mentioned above, an extensive range of tasks of prime importance has opened up to the institutes concerning defense-related research. In the present brochure, the five Fraunhofer Institutes IAF, ICT, EMI, IITB and INT introduce themselves with a brief presentation of their research fields.

### **3.10 SOURCE OF FUNDING – CASE STUDY ON THE PRIVATIZATION ON BUNDESWHER IT**

The most often in the field of PPP (Public-Private-Partnership) the partner from the industry overtakes the enterprise steering with majority of 50.01 % of the IT society, while Bw keeps a participation of 49,9 %. The success spectrum includes the production and steering of the overland communications and data networks, construction and operating of IT lay post networks in the more than 700 Bw lay posts with approximately 140.000 working places, the modernization of logistic and Bw administrative centers, the software maintenance, inter and intranet etc. Considered in general, ten years operating time based on a finance volume of **6.5 Billions** is determined by the previous elaborated framework agreement signed in 1999.

## **4. R&D NATIONAL POLICY IN THE REPUBLIC OF MACEDONIA ACCORDING TO THE SECURITY RELATED AND GENERALLY R&D SCENE – CURRENT STATUS AND SHORTFALLS -**

### **4.1. POLICY FRAMEWORK**

#### **4.1.1. Governmental Bodies**

According to the Constitution, the state has an obligation to encourage and support the technological development of the world. The governmental body in charge of R&D policy in the Republic of Macedonia is the Ministry of Education and Science, which is organized and executed by the Department of Science and Technology and advised by the Council for Science and Research. The Ministry of Education and Science is responsible for organization, financing, developing and promotion of scientific research, technological development, technical culture, information technology and information systems as well as the international cooperation related to these issues. The responsibilities of the Ministry also include issues related to level of education.

Scientific activities in the Republic of Macedonia are performed and organized by a network of scientific institution comprising 6 universities (3 public and 3 private), several research institutes active in various fields units in industry. An important scientific organization is the Macedonian Academy of Science and Arts, the goal of which is to stimulate development of the science and arts.

Within the governmental sector, we should also mention the activities of other ministries: the Ministry of Agriculture, Forestry and Water Supply; the Ministry of Economy, Health

and Ecology; and especially the Sector of European Integration of the Government. According to their strategies, all these bodies act as important subjects related to the research achievement of the scientific community.

#### **4.1.2. Legal Framework of the R&D Sector**

Issues related to R&D are regulated by the following laws:

- Law on the Macedonian Academy of Science and Arts;
- Law on Science and Research Activities;
  - **Internal documents for:**
    - **Supporting of young scientists**
    - **Financing of scientific projects**
    - **Supporting of publishing**
- Law on Encouraging and Supporting Technology Development;
- Law on Higher Education;
- Law on Industrial and Intellectual Property Protection;
- Several regulations and instructions.

The Laws related to research arrange the system, principles, public interest, forms of organizations and management of these kinds of activities as well as the ways of stimulating and supporting their development, scientific personnel and other issues related to them. The system of scientific activities involves scientific research, qualification and training of personnel for research work and research infrastructure.

The basic principles of performing scientific activities are inviolability and protection of human personality and dignity, and they are also based on the following: freedom of scientific creativity; autonomy and ethics of researchers during their scientific work and use and application of the results; diversity of scientific ideas and methods; and international cooperation.

These laws also define the public interest in scientific research in the field of national and cultural identity of the Macedonian people and others living in the Republic of Macedonia. It also determines research as a general condition for the economic, social, cultural and environmental development of the country. Research that serves the function of increasing the scientific level and transfer of knowledge as well as that in the field of defense and security is also defined in this law. Improvement in the human resources and research infrastructure are also in the public interest. A five-year programme for development of these activities is being prepared.

The law related to technology development stimulates and supports this kind of development in the country as well as the programming of this activity and its financing. This law defines technology development as:

- Development of own technologies;
- Progress of the country upon independent economic base;
- Modernization of existing production capacities;
- Building of necessary technological infrastructure and transfer of knowledge through a continuous superstructure of skills.

#### **4.1.3. Role of the industrial sector in R&D**

Considering overall political, social and economic conditions the country has faced during the past years, while additionally burdened by instability, the role and position of industry has significantly decreased in the domain of research and development.

As a result of restructuring and privatization processes, many R&D units within enterprises have vanished. Present inconvenient financial circumstances do not allow larger investments in research and development.

#### **4.1.4. Macedonian Research Infrastructure**

Macedonian institutional infrastructure is as follows:

- Macedonian Academy of Science and Arts, comprising five departments and five research centers;
- Six universities (three public and three private);
- Thirty-four faculties;
- Thirteen public scientific institutes;
- Twenty R&D units within industry;
- Six scientific regional associations;
- Consulting agencies and offices.

In the following table can be seen scientific human resources in Macedonia until 2004.

**Table 1. Scientific Human Resources in Macedonia**

<b>YEAR</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
<b>Total</b>	<b>3275</b>	<b>3168</b>	<b>3094</b>	<b>2909</b>	<b>2869</b>	<b>2589</b>	<b>2552</b>
<b>FTE</b>	<b>1892</b>	<b>1838</b>	<b>1786</b>	<b>1630</b>	<b>1519</b>	<b>1464</b>	<b>1447</b>
<b>FTE per 1000 LF</b>	<b>2.4</b>	<b>2.3</b>	<b>2.2</b>	<b>1.9</b>	<b>1.8</b>	<b>1.7</b>	<b>1.7</b>

#### **4.1.5. Financial aspects of science and technology in R. Macedonia**

Considering the overall political, social, and economic conditions the country has faced during the past years, the funding of scientific research has been very limited. This has also been followed by a continuous decrease in the number of active researchers in the country. However, the Ministry has promoted and stimulated activities aimed at an integrated approach in research activities and especially for regional and international cooperation.

In 2002, the gross HE (Higher Education) expenditure on R&D - ratio of the GDP was 0.11. Out of 100% gross expenditure for R&D, 40.9% goes to research conducted in the HE sector. Support from the National Budget: national and international research projects, grants for postgraduate and doctoral studies in the country and abroad, R&D meetings, participation of academics in the international meetings, study visits abroad, programs of the public research institutes, equipment, R&D literature etc

The Higher Education Development and Financing Council (HEDFC) was established by the Government in October 2003. The Council is responsible for development and implementation of measures and criteria for financing of HE (institutions, investments in HE, student grants and loans etc.). It prepares programs for development of HE to be submitted to the Government for adoption.

In accordance with sources for financing, R&D can be financed through:

- own resources of institutions,
- companies resources,
- state budget,
- international financed projects.

Budget contribution to R&D is limited (scarce resources) and in 2002 it was 0,44% from governmental budget. In accordance with EU suggestion and directives from Barcelona it has to be from GDP, and in case of the Republic of Macedonia it actually means only 0,11 % from GDP. On the other side funds coming from business community are 0,02%, while EU directives are 2%. It means that in the Republic of Macedonia *business sector provides 100 times less than countries from EU*. We can conclude that if continues in that way, we could not expect faster development of R&D in Macedonia. *Having not enough established R&D innovation system in the private sector and low interest in the private sector for R&D it couldn't be possible to provide faster development of science.*

In the Table 2 can be seen the budget contribution in R&D in the Republic of Macedonia until 2004.

YEAR	BUDGET	PART FOR SCIENCE	%
1998	830 million EUR	5 million EUR	0.62
1999	690 million EUR	6.1 million EUR	0.94
2000	1.05 billion EUR	4.3 million EUR	0.39
2001	910 million EUR	5.2 million EUR	0.58
2002	1.18 billion EUR	5.2 million EUR	0.44
2003	915 million EUR	5.0 million EUR	0.54
2004	923 million EUR	5.1 million EUR	0.55

*Table No... Financial aspect of science and technology in Macedonia Budget contribution in R&D*

TYPE OF EXPENDITURE	1998	1999	2000	2001	2002	2003	2004
GERD (Gross domestic expenditure on R&D)/GDP	0.43	0.35	0.44	0.32	0.27	0.22	0.25
BERD (Expenditure on R&D in the Business sector)/GDP	0.05	0.04	0.03	0.02	0.01	0.003	0.015
GOVERD (Government intramural expenditure on	0.15	0.16	0.15	0.16	0.15	0.14	0.12
HERD (Expenditure on R&D in the Higher Education)/GDP	0.23	0.14	0.27	0.13	0.11	0.08	0.11

*Table No... R&D intensity (%) of GDP by sector of performance*

The number of researchers in 2002 was 1519. For their activities in last five years were spent 0.2% of GDP per year. Considering the fact that level of budget expenditures for R&D is still not sufficient, we can identify the need for changes and searching new sources as urgent.

Public-Private partnership should be seriously considered as a additional element of R&D Concept and Policy, that can provide funding and development of necessary capacities and support of R&D Projects in the Republic of Macedonia.

Government still shows low level of trust to private companies' capacities for R&D in security sector as well as their bigger involvement and functions in security area. Full implementation of the Concept of Logistic Support for the Republic of Macedonia and ARM can provide progress in that way. It will help not only to improve the situation in security sector, but also will bring additional influence to economic development of the country.

#### **4.2. THE GOALS OF R&D POLICY IN THE REPUBLIC OF MACEDONIA**

Republic of Macedonia has managed to achieve significant results in certain scientific areas. There are several distinguished high-level institutes and centers recognized throughout the international scientific community. There are also other research units moving rapidly toward achieving international standards and criteria, which can be competitive and desirable partners in research activities.

The goals of R&D policy are to:

- Increase the use and transfer of knowledge for economic, social, cultural and environmental development of Republic of Macedonia;
- Encourage and promote international cooperation and transfer of knowledge and technology from abroad;
- Introduce a monitoring and evaluation system of scientific and technological quality and output of research groups using internationally accepted standards and criteria;
- Increase investments in S&R activities;
- Increase the use of international funds, technical assistance, etc;
- Define and establish interdisciplinary programs for target research;
- Set internationally recognized measures for evaluation and assessment of the economic value of research results as criteria for future policy definition;
- Support enterprises in establishing R&D units for effective transfer and use of new technologies;
- Reduce the technological gap in order to reach the level of development of more highly developed countries;
- Create conditions to raise the quality of knowledge and innovation;
- Create a system of technology information as part of a community information system according to the criteria of relevant databases, services and networks;
- Establish a unique infrastructure model to support and develop science and technology;
- Heal and improve domestic industry and companies, and especially support SMEs in order to achieve better performance of their products and make them competitive worldwide;
- Establish a system of priorities that will be supported by economic policy tools.

### **4.3. MEASURES TAKEN BY THE GOVERNMENT TO DEVELOP THE R&D SECTOR AND ENCOURAGE R&D**

The ministry of Education and Science strives toward the successful transformation of higher education with regard to better transfer of knowledge within the scientific and business sectors.

The Governmental measures for improvement of the R&D sector are defined in several programs, which encompass programs for improvement of R&D and programs for enhanced technological development. The Ministry of Education and Science has seriously considered the problem of the technological development of the country, and in that regard, measures have been taken in order to stimulate and support cooperation between the universities and industry, improve and intensify the use of scientific research results in industry, and promote the technological development of enterprises aimed at stimulating their competitiveness.

#### ↳ Programs for improvement of R&D

- for encouraging and supporting national R&D projects,
- for granting fellowships for post-graduate and doctoral studies both in the country and abroad,
- for supporting researchers for participation at international meetings,
- target research program for coordination of the R&D activities within the governmental bodies,
- for encouraging and supporting technological development for the period 2006-2010,
- for development of R&D infrastructure

#### ↳ For enhanced technological development, measures are taken in order to:

- stimulate and support the cooperation between the universities and the industry;
- improve and intensify the use of the scientific research results in the industry;
- promote the technological development of the enterprises aimed at stimulation of their competitiveness.

During 2004 and 2005, for the first time, a complete database with publications in scientific journals with impact factors (journals referred to in SCI and citations of institutions and researchers) was created in the country. A database of all patent activities was compiled as well.

In 2005, the new Council for Scientific research was introduced. Furthermore, a completely new system of project evaluation was established with assigned national coordinators for each scientific discipline who manage the evaluation process of scientific projects in the respective fields.

In 2006, the Ministry of Education and Science signed an agreement for national access to the electronic scientific database Scopus, which is available for all faculties and institutes at the state universities in the country. Also in 2006, the Government accepted a “Program for development of scientific research activities in the Republic of Macedonia for the



period of 2006-2010". The Program was prepared in one year by experts and officials from all fields of science and future activities are set out in the Action Plan of this Program. The new strategy for improvement of R&D defined in this document suggests an integrated approach to research activities characterized by necessity and quality. Increasing funding for R&D projects and for fellowships for young researchers is one of the priorities together with increased regional and international cooperation. Additionally, a definition of the national priorities in the R&D sector as well as an improved intergovernmental coordination between the ministries is emphasized as main concerns for the future development of the country. This strategy for the future science policy also includes a definition of criteria for supporting R&D, establishing a new peer evaluation procedure.

As one of the strategic objectives, five potential centers of excellence have been identified in the country based on their scientific results: Institute of Chemistry at the Faculty of Natural Sciences and Mathematics; Research Centre for Genetic Engineering and Biotechnology at the Macedonian Academy of Sciences and Arts; Nephrology Clinic at the Faculty of Medicine; Research Centre for Energy, Informatics and Material Science at the Macedonian Academy of Sciences and Arts and the Institute for Earthquake Engineering and Engineering Seismology. They are recognized not only in the country, but also internationally due to their publications, citations and international cooperation.

During the 2006, the Ministry has promoted and stimulated international cooperation in all fields of scientific research and technological development. This strategy has produced a substantial increase in international scientific cooperation with many countries, especially with the European Union Member States. The scientific cooperation has been realized through the Framework Programs for RTD, COST, NATO, UNESCO, IAEA and JICA. The increased participation of the Macedonian scientists in the 6th Framework Program should be especially highlighted. According to our data, more than 50 projects with our scientists have been approved, which is 4 times more than in the 5th Framework Program. The Macedonian Government officially stated the willingness and readiness for improvement of science and research in the country and a full participation in the 7th Framework Program. The Department of Science at the Ministry of Education and Science is an active participant in two large and important multilateral projects in the 6th Framework Program (SEE-ERA.NET and ERA-WEST-BALKAN+), which enables a wider incorporation of Macedonia in European S&T activities. The participation of our scientists in the COST Program also significantly increased from 5 Actions in 2003 to 25 Actions in 2006.

The Department of Science creates European oriented science policy and, in every way, promotes, stimulates and assists in establishing international cooperation. Three years ago, there was bilateral project cooperation with Slovenia and Germany only. Then, this kind of cooperation was for the first time established with Bulgaria, Serbia, Croatia, France, Albania, the Russian Federation, Japan and China with more than a hundred bilateral projects. In the near future, cooperation with the USA, Israel, Austria and Spain will begin as well. Furthermore, there is an open call for joint project proposals with institutions from countries with which Macedonia has not signed agreements for scientific cooperation yet.

All these activities are intended to facilitate the incorporation of Macedonia in the European activities in the scientific research area, which has been recognized in the opinion of the European Commission for the status of this sector in the country, stating that in the fields of Science and Research the country should not have major difficulties in applying the acquis in the medium term.

Finally, the necessity of full understanding, coordination and support between the science policy makers and other decision makers should be emphasized because it is the only way for efficient and productive improvement of the scientific research and technological development of the country.

#### ***4.3.1. National Research Priorities***

The Ministry of Education and Science has defined and set the following R&D priorities:

- Sustainable development;
- Water resources and management;
- Energy;
- New materials;
- Environment;
- Information and communication technologies;
- Health;
- Biotechnology;
- High-quality food production;
- Earth science and engineering.

Special attention will be paid to overcoming problems concerning modernization of the existing R&D infrastructure as well as building a new one.

#### ***4.3.2. Development of the strategy for industrial policy in the Republic of Macedonia***

Key drivers of Macedonian industry development are the following:

1. Future of Macedonian industry will depend on enhanced collaboration between business and academia/research for knowledge creation and innovation.
2. Macedonian industry will need better technology and will have to adopt high-quality standards in order to create high-value added products and services. Strategic industries will have to be defined.
3. SME development and entrepreneurship will depend upon concrete governmental measures for elimination of administrative barriers.
4. Relevance of education and importance of knowledge for industry development should be intensively promoted.
5. Macedonia should strive for regulation compatible with EU (especially in the area of technology imports, quality, prices and other terms of trade).
6. Exploitation and financing of new technologies should be stimulated (also by establishment of coordinative body for new technologies support).
7. Public-Private Partnership (PPP) should be enhanced (learning PPP from experiences in other countries).
8. Renewable energy production will have to be stimulated by supportive regulation and proactive policy measures.
9. Better financing for SMEs (loans, venture capital etc.) is a pre-requisite for SME development.
10. Innovation support institutions will have to be developed and they will have an important role for innovation development.

Investment enhancement will have to be based on equal treatment between domestic and foreign investors. The Inter-ministerial working group, business sector representatives and academia members have created a **shared vision** of industry development. It has been

jointly agreed that the **vision of Macedonian industry will be based on high value added products and the development of new capacities in research and production of sustainable, organic and specialized high-tech products and services** (i.e. organic wine and foods, eco-steel, specialized electronic parts, renewable energy production, construction, medical equipment, authentic tourism etc.).

The pro-active industrial policy as a set of governmental measures will support Macedonian industry in such way that it will be able to **grow traditional (niche oriented) as well as new high tech sustainable industries around the renewable energy field, and combining information technology and other advanced services – building on knowledge networks established through the world.**

Macedonian industrial policy will strive to enhance new, applicable research and innovation methods in education and industry. Business and research will be stimulated for interaction and collaboration (clustering). Knowledge for development will be possible due to the **increased public and private investment in research and development and engagement of talented people** (approaching towards Lisbon Strategy goals).

The Macedonian new industry potential will be possible due to the ability of key development stakeholders (political, business and research/academia leaders) to reach consensus and decide for value-added, internationally oriented industry based on dynamic mix of sustainable and authentic industries, “clean-tech” manufacturing, and innovative service industries that create jobs and a rising standard of living for all its people.

#### **4.4 MACEDONIAN SECURITY RELATED R&D SCENE**

Macedonia’s accession to the North Atlantic Treaty Organization (NATO) requires restructuring as well as modernization of the Macedonian Armed Forces in compliance with the NATO standards. Along with the outlined plan for the modernization of the Armed Forces within a timeframe that spans from 2004-2013 there is also a separate Strategic Defense Review (SDR). Its main task is to perform a thorough reassessment of the state of the armed forces and to outline the guidelines for their long-term development in conformity with the new security environment and the available defense resources.

The *upgrading of the communication/information systems will be one of the main focuses* of the campaign, as well as *strengthening the operative capabilities of the deployable forces*. The modernization of the armament/equipment of the Army, and Aviation WING, Development of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance Systems (C4ISR) is another priority.

For the sake of development of the structure and capabilities, defense assumptions should be adopted most urgently, which relate to operational capability, readiness, scale of effort and concurrency for operations. The development of the structure of forces and capabilities should be in accordance with the requirements and structure of forces and capabilities established in this political framework, especially the priorities, missions of defense and tasks of Macedonian army.

The *Strategy is adopted* for the management of defense at all levels of decision making, as well as in the areas that relate to personnel (including also education of civilian experts), its professionalization, qualifications, career with equal opportunities for all, as well as adequate ethnic representation in the Macedonian army, training and education, including the civilian personnel in the ministry of defense, interoperability, modernization and procurement, logistics, standardization, as well as development of strategies for improvement and interoperability of the intelligence capabilities and crisis management.

The current Strategic Defense Review works on the basis not of a nonexistent conventional threat, but of a *considerable internal terrorist and insurgent threat*. Cross-border criminal activity should figure prominently in these calculations, as should plans to stop trafficking and *organized crime* networks from further eroding the authority of the Macedonian state. The lingering *ethnic tension* signals to NATO that Republic of Macedonia still requires significant external assistance, from both Europe and the United States, in order to embrace its original reform policies and goals and that continued international engagement and the bi-ethnic composition of the ruling coalition in Republic of Macedonia will help to reduce the threat of a return to the open conflict experienced in 2001. However, the acknowledgment of the achieved results accomplishing all NATO membership criteria (including political stability and contribution to regional and worldwide stability ) given to Republic of Macedonia during NATO Summit in Bucharest 2008 presents Republic of Macedonia in an another light - as more contributing country than an user of foreign assistance.

Achieving NATO interoperability and contributing to the organization's future operations are priority goals for Republic of Macedonia, even though currently the ARM's capability is limited in both of these areas. Still, Republic of Macedonia now contribute a motorized infantry company, a medical squad, an aviation detachment with two utility helicopters, and an engineering platoon for Multinational Peace Force South-East Europe (MPFSEE)/ Southeast European Brigade (SEEBRIG).

In order the deployment tasks to be accomplished more successfully some of the key priorities for defense modernization and procurement include:

- T72 tanks modernization ,
- Transport aircraft,
- More advanced helicopter gunships,
- Radio-telecommunication and surveillance equipment.

The Republic of Macedonia is not "giant" manufacturer of armament and military equipment and therefore the Republic of Macedonia is not a big exporter of defense technologies. There are only two factories producing some military equipment and armament ("Suvenir" – producing munitions and repair of small weapons and "Eurocomposit"- producing equipment for personal protection as helmets and bulletproof personal equipment) and one factory for repairing and maintenance of the military equipment and armament factory - "MZT Specijalni vozila" (factory that repairs the artillery armament and light combat vehicles). At the beginning of 2005 the factory "Suvenir" was bought by "Olympicos Industry". The restarting of the production is expected followed by extending of the small ammunition production program- appropriate to NATO standards. In the next period the factory "Eurocomposit" should be sold and its privatization is to be expected in the near future. According the factual situation there is no strict and designed concept for defense industry transformation.

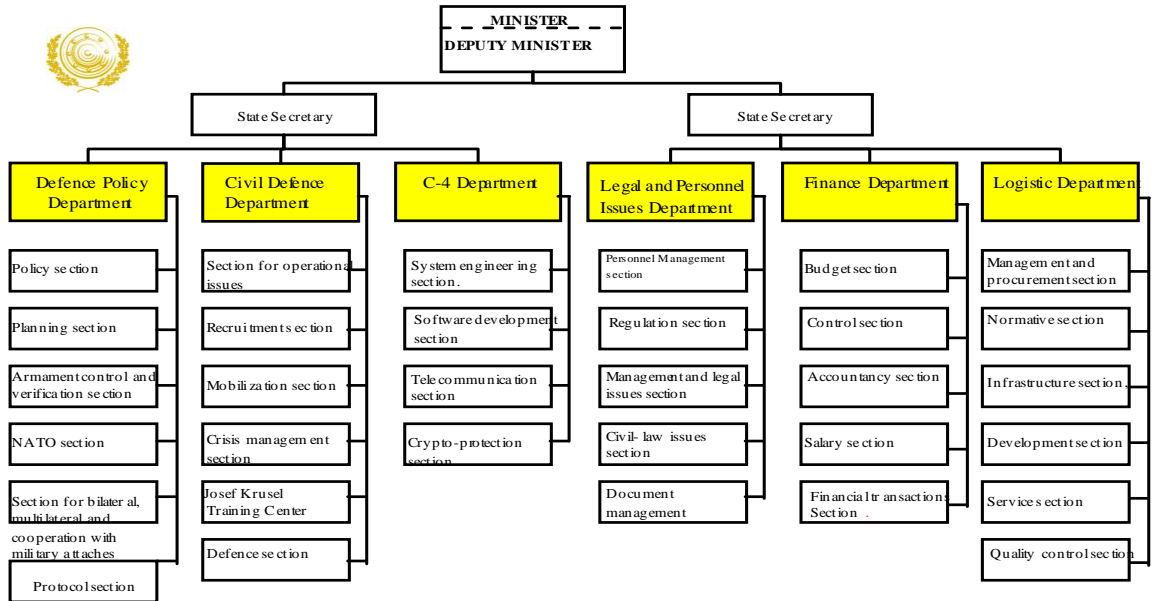
According to the Production and Turnover of Armament and Military Equipment Law (published on 15 July, 2002), articles 9 and 10, D & R of new armament and military equipment technologies is committed under the base of a D & R program which is adopted by the Government of the R Macedonia on the proposal by the Ministry of Economy in cooperation with the Ministries of Defense and Interior. The D & R of the new armament and military equipment can be committed by public science institutions, enterprises producing armament and military equipment and other science institutions that are dealing with science – research activities, in accordance to the existing laws. The program is

financed from the budget of the Republic of Macedonia. The Ministry of Defense doesn't possess science – research and producing capacities. Therefore the Ministry of Defense for its own needs is contracting products and services with the factories that are part of the Economy system, eligible and verified for this purpose. Within the Ministry of Economy exists a Sector for Special Production that is the pillar body for coordination of R & D activities. In the budget of MoD/Sector for Logistic – Section for R & D of the weapons and military equipment is planned an amount of 50 000 Euros per year for R & D. The R & D issue is only generally considered within the 5<sup>th</sup> part of the SDR – Equipment and Modernization Plan.

#### **4.5. ACTORS AND COORDINATION OF SECURITY RELATED R&D**

Ministry of Defense R&D capacities- The function of the Section for R&D ( 3 persons manned only) of the production of weapons and military equipment in the frame of the Sector for Logistic in the MoD is: informative support to the leading authorities in the MoD in the creating of the policy for equipping of the MoD by weapon and military equipment from the domestic industrial resources, cooperation with the Sector for Special Production in the Ministry of Economy by overseeing the situation of the domestic industrial capacities and preparation of the relevant legal documents, preparing the regular analyses for technical – technological capacities and regular analyses for the personal management capacities of the production subjects that are dealing with R&D of the production of weapons and military equipment.

*The Commission for Special Production oversees the situation and the development of the production of weapons and military equipment in peace; development and preparation of the basic and additional capacities intended for production of weapons and military equipment, as well as production of medical materials and other products, equipment and services for the needs of the defense.*



Schema No 2. Republic of Macedonia MoD Structure

Within the Ministry of Economy - Sector for Special Production is the focal point dealing with special production and plays the coordination role for other institutions and agencies (Ministries).

#### 4.5.1 Info- Security related R&D issues

In the present time of modern informational and communication societies, the administrative tasks are more and more supported by the informatics technology. Numerous working processes are electronically controlled, and huge quantities of information are stored in a digital form, electronically processed and transferred through the computer networks. The Ministry of Defense, together with the ARM General Staff follow these trends and with the great development in this field in the last years, they inevitably start facing the fact that the success of the achieved results will depend on ability to protect the integrity, confidentiality and accessibility of data and systems which they rely on. The security of informatics implies realization of the abovementioned tasks, by undertaking preventive measures for protection of classified information that are kept, processed or transferred by informatics means, but also realization of the actions undertaken in situations when their security is violated. These problems are not regulated and at the moment, MOD and ARM General Staff come across this difficulty, which results in their *uncoordinated and incidental coping with the same*. There are huge gaps in providing appropriate protection of the communicational-informatics systems, even from the stage of their planning and implementation until the stage of their usage. There are no determined measures for protection which have to be applied, minimum security structure that should take care of their implementation, low education of the personnel, etc.

The Instructions will more closely regulate the criteria, measures and procedures for performing security checks of legal and physical entities and MOD and ARM members who are to be given a security certificate and license for access to the classified

information, types of security checks for obtaining a certificate, measures and activities for establishing the working positions and appointing persons as users of classified information.

The Directorate will make the Instructions in compliance with the completion of the procedure from the preparation of sub-legal acts, according to article 30 of the Law on Classified Information upon the production of the Bylaw on Industrial Security by the Government of Republic of Macedonia.

Based upon article 9 of the Law on Classified Information and the Regulations for physical security, security of the persons and industrial security of the Government of Republic of Macedonia, and in compliance with the national concept of security and defense of RM the preparation of the assessment for threat to foreign classified information that are in use with MOD is in progress.

#### **4.6. RECOURSES**

The main own innovation potential of military science development and R&D policy of the MoD and General Staff are the Military academy, the Military Hospital and other institutions in the Army. Material and financial support is from the MoD budget funds. Responsible institution in MoD (Department for training and education and R&D policy) should make plans and programs and should held A Law for R&D policy within the Army.

*The Military Academy of the Republic of Macedonia* was established by Law which is in accordance with the Law on Higher Education and the Law on Research Work in the Republic of Macedonia.

The Military Academy was verified by the Ministry of Education and Science as tertiary level educational and research institution, which gives it the same status as other faculties and makes it part of the educational system of the Republic of Macedonia. The degrees issued by the Military Academy are valid in the country and they give officers an equal education status as other graduates from civilian universities. The Military Academy is the only tertiary-level military educational institution in the Republic of Macedonia. Its main task is to educate, train and provide further development for officer personnel for ARM, and to engage them in research in the field of defense in accordance with the law.

*Section for R&D of the production of weapons and military equipment*, in the frame of the Sector for Logistic in the MoD, provides: informative support to the leading authorities in the MoD in the creating of the policy for equipping of the MoD by weapon and military equipment from the domestic industrial resources, cooperation with the Sector for Special Production in the Ministry of Economy by overseeing the situation of the domestic industrial capacities and preparation of the relevant legal documents, preparing the regular analyses for technical – technological capacities and regular analyses for the personal management capacities of the production subjects that are dealing with R&D of the production of weapons and military equipment.

On the 1<sup>st</sup> of July 2003 the Law on *the Police Academy* came into effect. This law provides the Police Academy with a leading role concerning research and education in the field of policing and other areas of security.

*Police academy* want to enhance its educational role by delivering basic and further education of national and international acknowledged quality and by the evaluation, dissemination, production and application of scientific knowledge in the field of policing and other areas of security. Police academy want to become a *centre of excellence* in our part of the world as well as belonging to the top five Police Academies in Europe. It considers itself responsible for remaining up-to-date in the field of research and education.

Its police education is recognized on national and international level. This means that it will meet national and international quality standards. Its diplomas will be recognized all over Europe and they will facilitate participation in studies abroad. Being a centre of excellence will provide the Macedonian police and the other agencies in the field of security with state-of-the-art expertise. In this way we can serve the police and the other agencies in our field of security of our country in the best way.

## 5. FUTURE STEPS – BY PRIORITIES

### 5.1 INVESTMENTS AGAINST POSSIBLE SECURITY THREATS

Having in mind the national and international defense missions, tasks, strategic goals and functions, the asymmetric character of most possible security threats (facing with terrorist groups attacks) especially viewed through the light of casualties analyze from the conflict 2001 in Macedonia, where more than 80% were spawned by anti transport vehicles mine attacks, it is obvious that first priority of the security and military R&D should be obtaining ***highest level of combat/transport vehicles mine attacks protection***. Other priorities in this area should be T72 tanks modernization and supplying of transport aircrafts.

5.1.1 In pursuit of mission 1.1.1 subtask B.4- -defense and protection of the territorial integrity and independence of the Republic of Macedonia versus Control of the Macedonia Airspace, creating the ***optimal development anti-aircraft protection programs*** would be second priority. In this regard a suitable regional ASOC system development program will be much appreciated.

5.1.2. Concerning the counterterrorism the development ***upgrading programs for the communication/information systems should be one of the main focuses***, especially in correlation to the Development of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance Systems (C4ISR) is another priority. Taking into consideration that the current Strategic Defense Review works on the basis of a ***considerable internal terrorist and insurgent threat*** and that cross-border criminal activity should figure prominently in these calculations, development of appropriate ***engineer equipment and special vehicles upgrading programs*** are welcomed as well as programs for soldier personal higher protection (for example within a cooperation with EUROINVEST company)

5.1.3. Having in mind that in the long term we are not expecting any conventional one, in addition to the above said, the visions, plans, force structures and manner of their functioning should incorporate elements and contents of what is today called crises management and early warning on potential threats. To that end, we particularly have to improve the intelligence capabilities and possibilities of compatible and efficient information sharing and coordination of the activities with the all other subsystems of the R. Macedonia, as well as with our neighbours, countries in the region, NATO and the international community.

The Republic of Macedonia continues the development of the national capabilities for the fight against terrorism and capacities for support of and participation in the joint activities of NATO and its Partners, as well as with the other international organizations. The security agencies in the country (the Directorate for Security and Counterintelligence at the Ministry of the Interior, the Military Service for Security and Intelligence at the Ministry of the Defense and the Intelligence Agency) maintain mutual coordination and cooperation at an exceptionally high level. Prime minister and the president of Republic of Macedonia



are regularly informed on the security situation in the country and in the region through joint intelligence information from the security services.

Security agencies of the Republic of Macedonia maintain continuous and good cooperation with NOS (NATO Office for Security), ILU (Intelligence Liaison Units) and TTIU (Terrorist Threat Intelligence Unit). On several occasions in course of 2007 direct communications has been established and Joint meetings have been held.

Aiming at creating a single and integrated national security system, upon the initiative of the Ministry of the Interior, and an inter-department Working Group, composed of representatives of the competent ministries, agencies and services for intelligence and counterintelligence, for reform of the security system was established.

In capability category of intelligence collection and reconnaissance, procurement of the Long range Surveillance Vehicles, High performance Radar Equipments, Unmanned Aerial Vehicles and specific Warfare Equipment will be made and they are to be organically combined in the mix ISR Units of the Army intelligence branch.

## **5.2. COOPERATION WITH EU AND NATO R&D INSTITUTIONS**

Having in mind the Macedonian aspiration to be full-fledged member of NATO and EU and to promote collective approach to the security and stability as comparatively considered superior and more appropriate versus clear national approach, especially seen in the light of coping with asymmetric threats - such as international terrorism, for Republic of Macedonia would be very beneficial to continue with following and incorporating its own R&D capacities within NATO and EU R&D structure, programs and organization (NATO Program for Security Through Science, NATO Research and Technology Organization, EDA and EU R&D area with EU Framework Programs)

## **5.3. EDUCATION SYSTEM IMPROVEMENT**

Concerning the threats coming from structural violence especially potential internal *ethnic tension* and low level of R&D oriented education it is more than needed to strengthen the governmental coordination with relevant IO's (OSCE, EU, NATO, US resident missions) through development of common (governmental and IO supported ) confidence building focused programs<sup>39</sup>.

5.3.1. Development of programs for better and more qualitative R&D oriented *education* comprising as much as possible of the school population.

5.3.1.1. Increasing the awareness and relevance of education and importance of knowledge for industry development should be intensively promoted.

5.3.1.2. Improving the education and science system in order to tackle shortage in the supply of qualified labor, to improve the firms' access to high qualified personnel, including vocational and on-the-job training and to provide a public research base as a partner in innovation projects.

5.3.2. The lack of enough traditional produced energy is more and more obvious and in the future this lack can spawn instability and security threats. In order timely to take relevant and appropriate measures it is necessary a development of renewable and alternative energy production programs - to be stimulated by supportive regulation and proactive policy measures.

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39 For example OSCE Spill-over mission (in Skopje) budget for 2007 was around 10 Mil EURO. One of five sections within structure of this mission is focused on confidence building.

## 5.4. GOVERNMENT (STATE) INSTITUTIONS VERSUS PRIVATE COMPANIES

- Improving framework conditions for innovation, notably through simplifying the tax system and reducing the tax burden for firms, and by diminishing bureaucratic procedures that may inhibit innovation and the start-up of new enterprises.
- Promoting innovation activities in firms through financial aid. Subsidies can be delivered via four channels: R&D grants for research in high-tech areas, R&D grants for co-operative research, financial support for innovation projects in technology-oriented R&D provided either through loans or venture capital and technology consulting services and the provision of a techno-scientific and informational infrastructure for innovative enterprises.
  - Establishment of Inter-ministerial and private companies working groups,
  - Establishment of new technology transfer centers in a view of more efficient integration of research and business entities,
  - Providing favorable working conditions for the research entities with unacceptable conditions.
  - Stimulation of the promoting new research and development units within the economy,
  - Recommendations for increasing knowledge transfer between universities and industries,
  - In pursuit of aspects of security and industrial policy - the preservation of core capabilities, the problems relating to military equipment and dual us equipment, the preservation of technology and jobs must hereby all be taken into account

5.4.1. The *research work conducted by government-funded institutes* is of particular importance. In addition to the available civilian research and its results that are to be used for defense technology these institutes have to accomplish the following central tasks:

- to provide the scientific and technological know-how for intelligent and economical equipment decisions;
- to offer new technological solutions and to realize the relevance of new technologies for the armed forces' capabilities;
- to develop new generic (sub-)system concepts;
- to work out contributions for a national- relevant international NATO/EU research and technology basis and for the ability for cooperation;
- to participate in maintaining a defense-related competence;
- to research in the area of the *Catalysts and electrode structure for ecological clean electromechanical energy sources with hard polymer electrolyte*, bilateral project funded by the Ministry of Science of the RM and The institute for electrochemistry at the Bulgarian Academy of Science, continuing with work during 2008;
- to research in the area of the *Instability and nature law at the rising up of the morphology forms at the electrochemical systems which are far from stability*, bilateral project funded by the Ministry of Science of the RM and The institute for physical chemistry at the Bulgarian Academy of Science, continuing with work during 2008;

- to study *the morphology of the metal deposits with electro-refinement in modified conditions*, project funded by the Ministry of Science of the RM, 2003-2006
- to provide the system for researching and following the chemical stability of pressured explosive materia – fuses, project funded by the Ministry of Defense of the RM, from 2006 and during 2008.

## 5.5. FUNDS

As it is elaborated above, concerned by the growing capabilities gap between Europe and the United States, the 2002 Barcelona European Council set the goal of raising overall research investment in the *EU* from 1.9% of GDP to **around 3%** by 2010. Nearly all Member States have set targets, which – if met – would bring research investment in the EU to 2.6% by 2010. The same trend exists in *NATO* frame where many European leaders have already taken steps to increase their defense budgets. France, Norway, Portugal, and the United Kingdom have submitted budgets with **a boost in defense spending**, ranging from 1.2 percent in the United Kingdom to 8.2 percent in France (here especially increasing the level of funds dedicated to R&D - near **to 2%**)

From the another side a short overview given above within item 4.3 depicts the low level of financial support ( **0.44%** from the GDP) as well as even low level of consideration of using developed R&D capacities advantages within the industrial process (military/civilian) in Macedonia. A proper way ahead could be increasing of national (governmental) funds dedicated on R&D capacities, especially in the industrial process, based on the priorities mentioned in this item or a consolidated version of these main priorities appropriate to national industry (state or private sector), but not limited only on the relying on these funds. It will be grate advantage to use also the IO, NGO, multilateral cooperation projects and bilateral cooperation programs funds for this purpose i.e. supporting the industrial R&D projects as it is case with some agricultural projects, electrical power and water supply projects, clean environment (ecological) and communities confidence building projects. etc. It is to convince the projects allocation funds decision makers on the benefit of some industrial R&D and technological development projects.

## 6. PERSPECTIVES AND IDEAS FOR CHANGE OF THE R&D NATIONAL POLICIES FOR THE REPUBLIC MACEDONIA

In the field of R&D in the Republic of Macedonia, the *main priorities* are as follows:

- Further development of the academic research network,
- Renovation of the research equipment,
- Stimulation of the promoting new research and development units within the economy,
- Systematic and continuous supply of foreign reference literature and providing access to electronic scientific data bases,
- Upgrading the library information system,
- Strengthening the present technology development capacities,
- Establishment of new technology transfer centers in a view of more efficient integration of research and business entities,

- Providing favorable working conditions for the research entities with unacceptable conditions.
  - Improving framework conditions for innovation, notably through simplifying the tax system and reducing the tax burden for firms, and by diminishing bureaucratic procedures that may inhibit innovation and the start-up of new enterprises.
  - Improving the education and science system in order to tackle shortage in the supply of qualified labor, to improve the firms' access to high qualified personnel, including vocational and on-the-job training and to provide a public research base as a partner in innovation projects.
  - Promoting innovation activities in firms through financial aid. Subsidies are delivered via four channels: i. R&D grants for research in high-tech areas (esp. through the thematic programs of the Science institutions in the Republic of Macedonia); ii. R&D grants for co-operative research by SMEs; iii. financial support for innovation projects in technology-oriented SMEs provided either through loans or venture capital; iv. technology consulting services and the provision of a techno-scientific and informational infrastructure for innovative enterprises.
  - Aspects of security and industrial policy, the preservation of core Macedonian capabilities, the problems relating to SMEs and dual use, the preservation of technology and jobs in Macedonia must hereby all be taken into account

The EU wishes to create new framework conditions for competition and defense policy. The **EDA** initiative *in the field of R&T* aims to create regional centers of excellence in the medium and long term. Macedonian industry and government must face up to these changes and help shape the transitional phase in a new situation characterized by greater influence from Brussels.

Macedonia aims at the participation of the institutes, where it is possible and useful, for they can act as competent and integrative links between the civilian and military levels of security research, even more so as this subject will become increasingly important in the Commission's future framework programs for research.

A short overview given above within item 4.3 depicts the low level of financial support as well as even low level of consideration of using developed R&D capacities advantages within the industrial process (military/civilian). A proper way ahead could be increasing of national (governmental) funds dedicated on R&D capacities, especially in the industrial process, based on the priorities mentioned in item 8 or a consolidated version of these main priorities appropriate to national industry (state or private sector), but not limited only on the relying on these funds. It will be grate advantage to use also the IO, NGO, multilateral cooperation projects and bilateral cooperation programs funds for this purpose i.e. supporting the industrial R&D projects as it is case with some agricultural projects, electrical power and water supply projects, clean environment (ecological) and communities confidence building projects. etc. It is to convince the projects allocation funds decision makers on the benefit of some industrial R&D and technological development projects.

## 6.1. PERSPECTIVES

The DG will continue to manage the Framework Programmes, which will remain a central policy tool. But while these programmes have to date mainly sought to bring about synergies in European science by sponsoring trans-national collaboration and mobility, after 2006 we will need to add new activities. We envisage competition-based European funding for fundamental research, European decision-making about the development of major facilities, and large-scale technological research projects undertaken through public-private partnership.

The overall results of the consultation reveal a strong stakeholder support for the ERA vision, and the six specific ERA dimensions. Knowledge sharing is coming out on top and it is the area in which actions is most required at regional level. It appeared that forthcoming action at EU level will have to aim at the realisation of a single labour market for researchers. Correspondingly, five key communications have been planned (in the following chronological order):

1. Joint Programming of Research for more strategic and *better-structured joint programmes* and common calls for projects as of **2010**.
2. A communication on measures *to increase researcher mobility*, e.g. by a 'European Researchers' passport';
3. A legal framework for pan-European research (based on *art. 171 EU Treaty*) to facilitate the construction and operation of new consortia;
4. A European strategy for enhanced and coherent international science and technology cooperation;
5. *Recommendations for increasing knowledge transfer between universities and industries*.