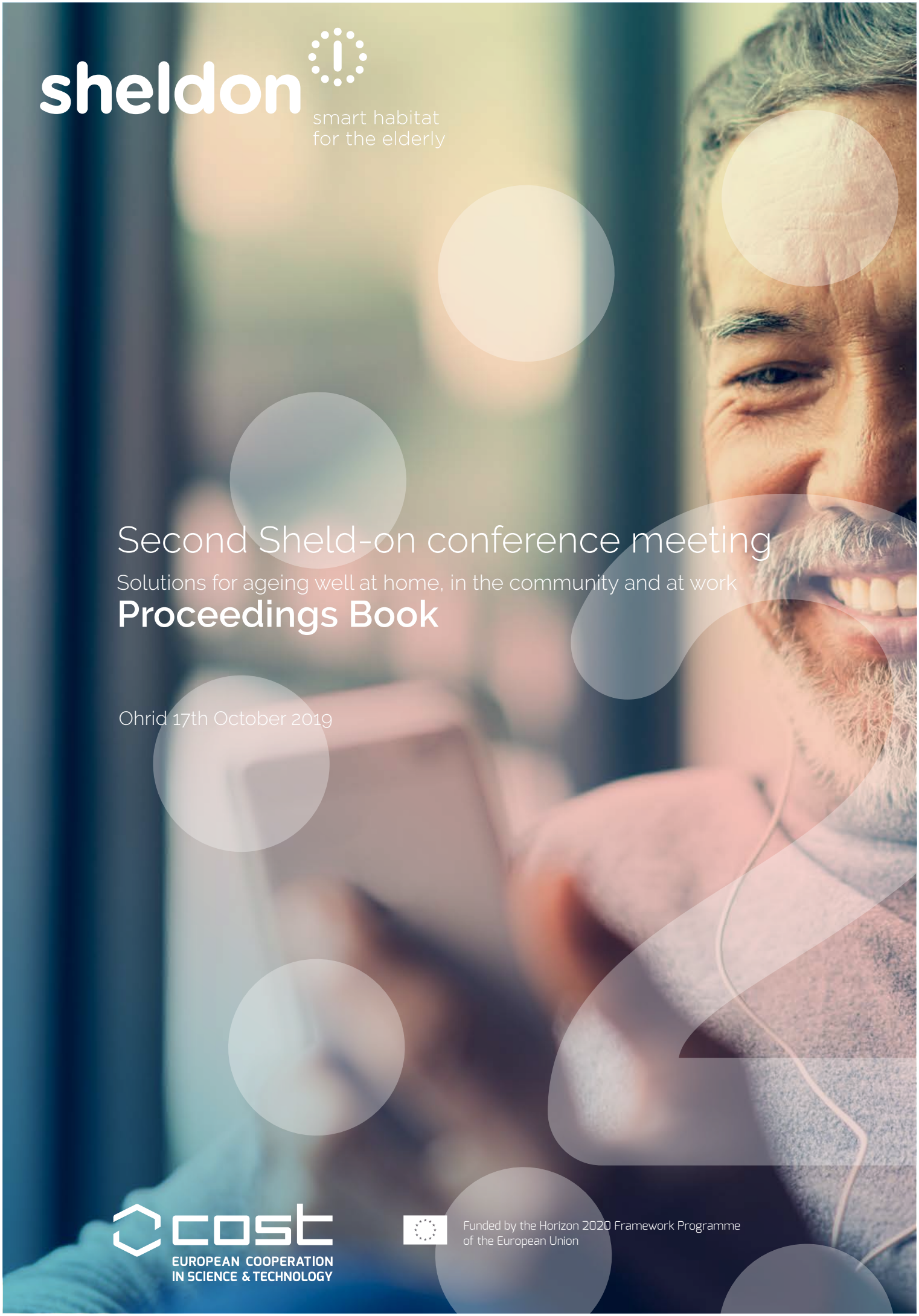
sheldon
smart habitat
for the elderly
Second Sheld-on conference meeting
Solutions for ageing well at home, in the community and at work
Proceedings Book
Ohrid 17th October 2019
cost
EUROPEAN COOPERATION
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COST Action CA16226
Indoor living space improvement: Smart Habitat for the Elderly

Sheld-on
Furniture, Habitat, Active and Healthy Ageing, ICT, Healthcare

Proceedings of the COST Action CA16226 conference meeting,
Ohrid, North Macedonia, 17th October 2019.

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Francisco Melero – Spain

Technical Research Centre of Furniture and Wood of the Región of Murcia
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Preface

It is our pleasure to welcome you to the Second Sheld-on Conference Meeting promoted by the COST Action CA16226: "Indoor living space improvement: Smart habitat for the elderly". This time it will be held in Ohrid, North Macedonia, on the 17th of October, 2019, collocated with the 11th ICT Innovations Conference 2019.
This conference follows almost two years of active collaboration under three different working groups focused in vertical areas of knowledge. This paved the way for a new horizontal working group that aims for deeper interdisciplinary interactions and knowledge interchange considering the broad concept of "Solutions for Ageing Well". Due to its broad spectrum, its structure contains three subworking groups looking into narrower areas of application, specifically at home, work and the community. A fourth one focuses on the important topic of "Technology Adoption". The proceedings and conference parallel tracks reflect this new approach.

This conference brings together researchers not only from Sheld-on members, but also from other institutions that work in related fields, some of which bring results achieved during the Short Term Scientific Mission granted by Sheld-on during the last year. A total of 31 papers cover a wide range of topics within the scope of Sheld-on, including IoT, BIM, connected health, features of the elderly and their relation to technology, applications of robots, and many others such as social aspects, climate change and artificial intelligence. Each work has been peer-reviewed by two carefully selected experts.

This event will be a great opportunity not only to plan for the action work in the near future, but also to advance the Sheld-on collaborative effort to build new solutions that contribute to the well-being of older adults and their caretakers, while addressing the socioeconomics concerns related to a worldwide aging population.

We would like to thank the local organization staff from the Association for Information and Communication Technologies and the Sts. Cyril and Methodius University in Skopje, North Macedonia, the members of the scientific committee for their review work and suggestions for improving the papers, the authors for contributing their research results to the conference, and all Sheld-on members for supporting and publicising the event.

Special thanks to the COST association that has made possible all activities of the Sheld-on Action, including this conference, and has initiated other derived initiatives and fruitful collaborations.

On behalf of the core group,
Rafael Maestre, Working Group 4 Leader
Francisco Melero, Action Chair

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Vice-Leader: Prof. Jake Kaner (UK)

Second Sheld-on conference meeting
Proceedings Book

Telepresence mobile robot platform for elderly care

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Recent demographic trends in most countries show that the percentage of elderly is rapidly increasing. According to the World Health Organization (WHO), by 2050, the number of people in the world who are aged over 60, is projected to grow more than double, from 605 million to 2 billion, representing 16% of the world's population.

These trends are introducing multiple challenges, including social, economic and cultural, not only to the elderly but, also for their families and the entire society. On the other hand, lack of qualified health care personnel, and the high level of expectancy of these services that should meet the demands for the elderly in order to prolong their independency, have already introduced increased burden in the health-care sector in many countries.

Ageing society is demanding technological solutions that will help to overcome these issues. Robotic assistants used in the elderly and the disabled care has emerged as a potential solution. Various personal service robots are already available on the market. Many of them such as: PEARL, CompanionAble, CareBot, Kompai, Care-o-Bot, PR2 (Sharkey and Sharkey, 2011) are designed to perform specific tasks including: manipulating objects, reminder for taking medications, maintaining a shopping list, as well as emergency notification, and navigation. In addition to the high cost, these robots have their own limitations, such as the absence of both social and healthcare capabilities, inability to pick-up objects from high shelves, as well as problems with thresholds, during indoor navigation (Koceska et al. 2019).

Figure 1: Developed assistive telepresence robot for elderly health care.

Having in mind these limitations of the existing solutions, we have designed and developed a low-cost assistive telepresence robot system for facilitating the health care of the elderly, and improving the quality of life of the elderly and handicapped (Figure 1). The developed robot was composed of four main functional hardware units: wheeled robot body capable of steer-steering,

robot body containing linear actuator, robot arm with 6 degrees of freedom (DOF), and robot head represented by a tablet and camera for remote communication.

Along with the smart navigation functionalities, the robot permits various interactions in a remote environment, like navigation, fetch and carry small objects, measuring vital parameters of an elderly person, reminder, calendar, and interpersonal communication. The potential users of the robot system are not only the elderly but, also professional caregivers. The robot can be remotely controlled by a distant person (e.g., a professional caregiver), and can perform some activities as if he/she was physically present at the elderly's residence (Koceska et al. 2019).

Robot's control architecture, various command interfaces (Koceski et al. 2012), (Koceski and Koceska 2010) as well as robot functionalities have been experimentally evaluated. Conducted evaluation studies demonstrated that the core functionalities provided by developed telepresence robot system are accepted by potential users (Koceski and Koceska 2016).

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