SRS

Multi-Role Shadow Robotic System for Independent Living

Small or medium scale focused research project (STREP)

DELIVERABLE D 7.2.2

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Coordinator: Cardiff University

1. INTRODUCTORY SECTION: PURPOSE OF DOCUMENT AND CONTENTS

This report is enclosed under the Dissemination and Exploitation Workpackage of SRS project. The objectives of this WP are

- To disseminate widely information on the problems to be addressed, the existence of the project and its results and achievements, through effective multimedia dissemination material
- To raise awareness about the possibilities offered by SRS by direct contact with potential user groups, care organisations, and others
- To promote and exploit the project results.

This report on raising public participation summarizes the SRS project main activities making the project and its outcomes public.

One of the activities carried out within WP7 is the participation in international robotics and assistant technology conferences to promote SRS results. At this deliverable the most important events where SRS project has been presented are explained.

2. SRS MAIN PUBLIC EVENTS

2.1. IJCAI 2011

The twenty second International Joint Conference on Artificial Intelligence, the main international gathering of researchers in AI. was held in Barcelona in July 2011 (1).

Robotnik which attended as an exhibitor had the chance to spread more than 1500 leaflets of SRS to the participants of the event. The banner of SRS project was also visible during the whole length of the exhibition, as shown in the next figure:

Figure 1. SRS presentation at IJCAI 2011

2.2. BULGARIAN NATIONAL PARLIAMENT

SRS was presented at the Bulgarian National Parliament in the frame of Exhibition of the Bulgarian Academy of Sciences (2).

The Exhibition took place in the big foyer and in the presence of majority of deputies. It was opened by the Head of the Parliament Mrs. Cecka Cacheva and the President of BAS Academician Nikola Sabotinov. Mrs. Cacheva mentioned the important role of BAS for the development of the national economy, science and culture, using European and National funds.

Figure 2: Presentation of SRS project at Bulgarian National Parliament

2.3. IROS 2011

The IEEE/RSJ International Conference on Intelligent Robots and Systems was held on September 2011 in San Francisco, California (3).

The SRS project took part in the "standard robot demonstration" and demonstrated first outcomes from the project. The idea of the standard robot demonstration was to have multiple groups showing their research on a single "standard" platform, which was in this case Care-O-bot (4). Care-O-bot was provided by Fraunhofer IPA at the conference exhibition area and was used by four groups demonstrating their current research.

The SRS demo was entitled: Semi-autonomous Tele-Operation Interface for Robotic Fetch and Carry Tasks.

The demonstration focused on remote user interface such as Apple IPAD to tele-operate robot semi-autonomously. It enabled non-expert users taking charge of the robot around the home.

The SRS consortium showed the usage of the UI_PRI on Care-O-bot where to robot could be sent to a new location using a graphical user interface on the iPad. Besides this live demonstration on the hardware a poster with the ideas and goals of the SRS project was presented to the visitors. There was quite a big interest by the audience, which were mainly scientific participants of the conference from the robotics community from all over the world.

Figure 3: SRS Demo at IROS 2011 using the COB3

2.4. EUROPEAN ROBOTICS WEEK

Partner ISER-BAS organized a special session devoted to the SRS project, as well as demonstration on the exhibition site of the UI_PRI and MRS controlling the Care-o-Bot 3 simulation at the National Conference of "Service Robotics 2011" organized in the frame of the European Robotics Week (5).

In the SRS session next was presented:

- Presentation "Multirole Shadow Robotic System for Independent living" by Dr. Nayden Chivarov, reporting what the project is, which are the participants, movie of the SRS demonstrator – Care-o-Bot 3 etc.
- Presentation "UI_PRI for the SRS project" by Phd. Student Daniel Radev, reporting the main features of the SRS UI in development by ISER-BAS
- Presentation "Mixed Reality Server for the SRS project", by Phd. Student Vladimir Vladimirov, reporting the development of this component for the SRS project.

It is noteworthy that SRS project caused a lot of interest among the Bulgarian Robotics Specialist, University students and Hobbyists.

Figure 4: SRS at Bulgarian European Robotics week

2.5. IZA CENTER

As a way to start promoting SRS outcomes at care-giving institutions, the 2nd year project review meeting was held at Ricardo Bermingham Hospital in San Sebastian, Spain. Next to it there is the IZA Center which is a caregiver center for severe unpaired people.

SRS project was introduced to the persons in charge of the hospital and the IZA center, and the SRS consortium members were showed the main facilities in where the outcomes from the project might be applied in the future

Figure 5: SRS at Ricardo Birmingham Hospital and IZA centre

Previous to the SRS project review meeting, the IZA centre was the location of the first SRS outcomes trials with real users. Two scenarios were tested:

- SRS Manipulation test scenario: A robotic arm simulating the COB3 arm grasps and object in the nearby of and elderly:

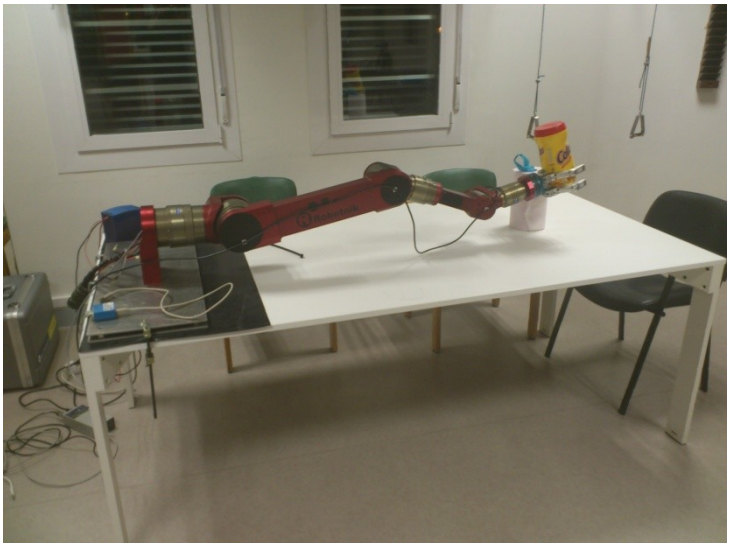


Figure 6: SRS manipulation trial workbench

- SRS visualization test scenario: professional operators used the UI_PRO for robot visualization and performed a grasping task:

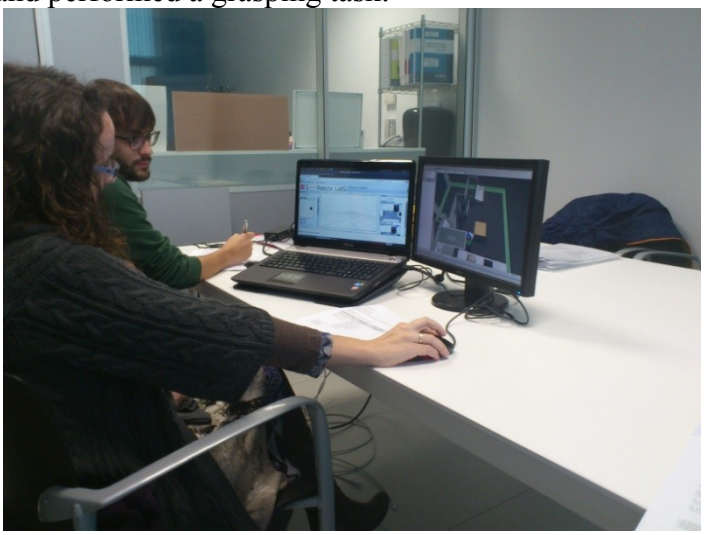


Figure 7: SRS visualization trial

2.6. SRS ETHNOGRAPHIC RESEARCH

In this research, 5 interviews conducted by FDGCO and 10 interviews conducted by Ingema were reported, including home visit descriptions to frail elderly people's houses, tasks about daily living activities and picture taking procedures. Results showed that frail elderly people living alone have age-related sensorial and osteoarticular problems limiting mobility, and also chronic health conditions. Houses are usually furnished with ornaments and carpets making difficult for the robot to circulate; some of the houses have also narrow corridors or rooms. The performance in the Activities of Daily Living is limited by those problems. They require assistance and different activities; in this sense, gender is a relevant variable, with woman better coping with housekeeping tasks. Management of risk situations is one of the better accepted functionalities proposed, especially regarding feelings of fear about falling

Figure 8: some pictures from the Ethnographic research

2.7. SRS INTERFACE TEST

Some tests were done over the SRS interfaces UI_LOC and UI_PRI in order to determine the initial "feelings" of both the elderly people and the family member when using the corresponding SRS interface. Next pictures show some of these tests:

Figure 9: Robot got milk for the elderly based on the request sent from the smart phone (UI_LOC)

Figure 10: Family member learning how to use SRS remote user interface on an IPad (UI_PRI)

2.8. SRS ROBOT TEST IN A REAL FLAT

The main objectives of this test were to identify technical problems when operating the robot in a real home environment and to get feedback from potential elderly users on their perception of the robot in their home.
The test was carried out in two apartments of the same house located near Stuttgart, Germany. Two elderly people (1 female, age 80; 1 male, age 81) live on the ground floor where the robot was deployed. For UI_PRI operation, a remote operator (grandchild, female, age 30) controlled the robot from another apartment upstairs in the same house.
The test duration was 1 ½ days including setup and removal of robot and equipment. There were two test trials with elderly people, one involving a remote operator. Two interviewers were attending to the participants, corresponding to two usage scenarios:

- Scenario 1: An elderly person was sitting on the couch and used a handheld interaction device to make the robot fetch a book from a locker in the dining room. However, the robot failed at executing the task (this failure was planned / simulated) because a stool hindered appropriate path planning for delivering the object to the user. Therefore, a remote operator (located in another apartment) was called and remotely navigated the robot to deliver the book.
- Scenario 2: An elderly person was in bed and the robot fetched a medicine box from the window sill in the kitchen.

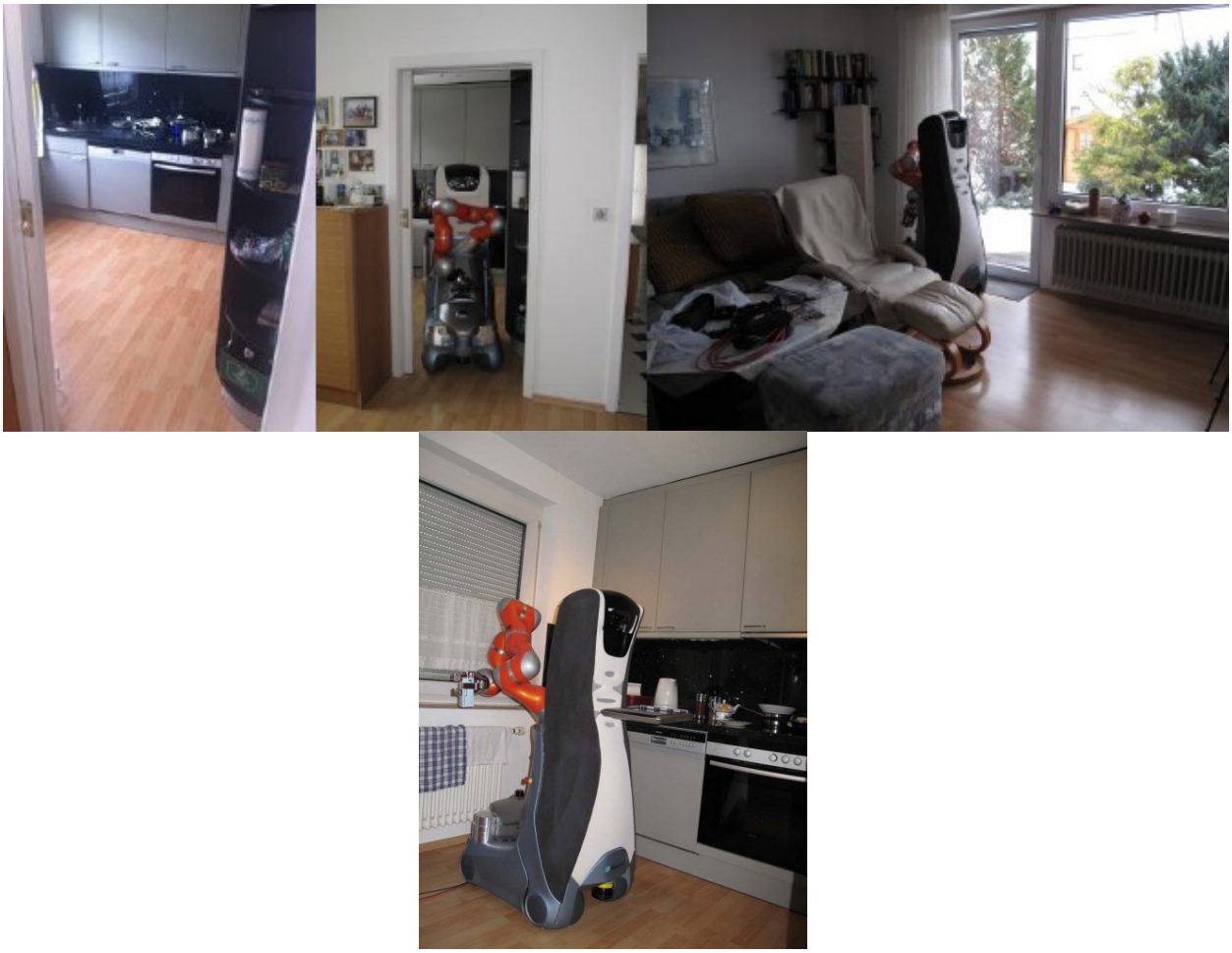


Figure 11: Robot working on a real flat

2.9. SRS AT AGING SOCIETIES IN EUROPE AND JAPAN

The SRS project participated at the Aging Societies in Europe and Japan conference in Tokyo on 9-10th October, 2012. Organised by the European Commission, the Delegation of the European Union to Japan, and the EU-Japan Centre for Industrial Cooperation, it looked at ways to help and provide for the ageing societies in Europe and Japan.

This event brought together experts and policy makers from the EU and Japan to share ideas and develop new strategies on how to improve care for the world's increasing number of elderly people. The first day centred on the numerous social and economic challenges; the second day considered different responses provided by research and innovation, with leading EU and Japanese engineers and scientists presenting the latest in state-of-the-art senior citizen care solutions.

Figure 12: SRS at Aging Societies in Europe and Japan

2.10. SRS PRESENTS AT INNOROBO ON 19-21 MARCH 2013

The SRS project is presenting one of the scenarios developed in the project at Innorobo 2013 in Lyon (6). Innorobo is a great opportunity for robotics companies and affiliated industry to get together and make new contacts. The scenario shows a tele-operated Care-O-bot that can accomplish navigation and manipulation tasks with the help of a human operator. Related key technologies developed in SRS are 3-D environment perception and visualization, user interface design and implementation as well as intuitive interaction patterns.

Figure 13. Innorobo 2013 booth (left) and press conference (right)

2.11. SRS PRESS CONFERENCE, MILAN, 4 MAY 2012

In the first week of May, several representatives of the SRS ”Multi–role Shadow Robotic System for Independent Living” Consortium met in Milano to implement and test a first prototype of the SRS robot within the Smart Home laboratory of the Don Carlo Gnocchi Foundation. As part of this event, a Press Conference was held which gave an insight into the main results achieved by the project so far and of the expected developments. Attendees included newspapers such as La Repubblica (Milano), TV stations including TG1 and TG3, magazines such as Panorama and Italian radio stations that included Radio Rai 1.

Figure 14. SRS Press Conference, Milan 2012

2.12. IROS 2012

The SRS project had an Invited Session at the 2012 IEEE/RSJ International Conference on Intelligent Robots and Systems in Portugal (7).

The following papers were presented as part of the session:

- Evaluation of 3D Feature Descriptors for Classification of Surface Geometries in Point Clouds

- Towards a Robust Personal Assistant Robot: Experiences Gained in SRS Project

- Fuzzy Optimisation Based Symbolic Grounding for Service Robots

- Fast and Accurate Plane Segmentation in Depth Maps for Indoor Scenes

Figure 15. IROS 2012

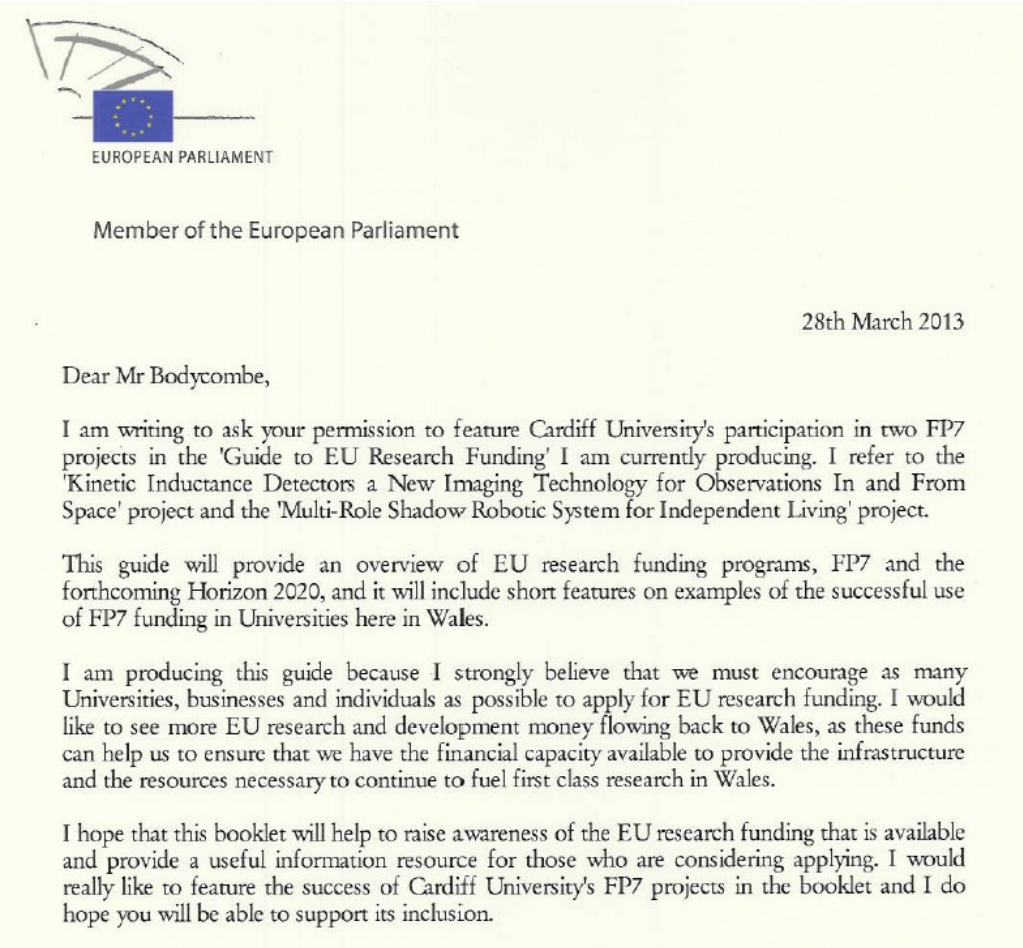
2.13. SRS AT FUTURE HEALTHCARE EVENT, HOUSE OF LORDS, PLACE OF WESTMINSTER

This event was designed to bring together key stakeholders (including policy makers, care providers, health agencies, representative bodies/charities, industry and researchers) to ensure effective development of technology to assist in independent living at home. Key statistics and trends were presented and an introduction to some of the existing research projects being undertaken. In particular there was detail of the European Union FP7 funded SRS project in which 12 partners from industry and academia have developed a new system. The event presented considerations for the implementation of such systems and provided an opportunity for stakeholders to express their views and requirements.

Figure 16. SRS at Future Healthcare Event

2.14. SRS IS SELECTED BY 'GUIDE TO EU RESEARCH FUNDING'

SRS was selected in the 'Guide to EU research Funding' edited Dr. Kay Swinburn. Dr. Swinburn is the MEP for Wales. The guide will provide an overview of EU research fund programmes, FP7 and the forthcoming Horizon 2020, and it will include short features on examples of the successful use of the FP7 funding in universities at Wales.



EUROPEAN PARLIAMENT

Member of the European Parliament

28th March 2013

Dear Mr Bodycombe,

I am writing to ask your permission to feature Cardiff University's participation in two FP7 projects in the 'Guide to EU Research Funding' I am currently producing. I refer to the 'Kinetic Inductance Detectors a New Imaging Technology for Observations In and From Space' project and the 'Multi-Role Shadow Robotic System for Independent Living' project.

This guide will provide an overview of EU research funding programs, FP7 and the forthcoming Horizon 2020, and it will include short features on examples of the successful use of FP7 funding in Universities here in Wales.

I am producing this guide because I strongly believe that we must encourage as many Universities, businesses and individuals as possible to apply for EU research funding. I would like to see more EU research and development money flowing back to Wales, as these funds can help us to ensure that we have the financial capacity available to provide the infrastructure and the resources necessary to continue to fuel first class research in Wales.

I hope that this booklet will help to raise awareness of the EU research funding that is available and provide a useful information resource for those who are considering applying. I would really like to feature the success of Cardiff University's FP7 projects in the booklet and I do hope you will be able to support its inclusion.

Figure 17 Confirmation of the SRS selection by the guide

3. OTHER EVENTS

3.1. MEETINGS AND CONFERENCES

The SRS project has been presented in many different meetings and conferences as:

- Antony Soroka (CU), Semi-autonomous Robot for Elderly Care FP7 consultation meeting on Service and Social Robotics for the Ageing Population
- Prof. Carsten Maple (BED), Assistive Technologies for the Elderly and Infirm first International Conference on Integrated Intelligent Computing (ICIIC2010), August 05-07, 2010, Bangalore, India (http://www.dline.info/iciic2010/keynote.php)
- Juan Bosca (ROB), IEEE International Workshop on Safety, Security and Rescue Robotics in Bremen, at Jacobs University
- Roberto Guzman (ROB), Presentation of Robotnik projects at National Conference of Robotics, University of Malaga
- Roberto Guzman (ROB), Presentation of Robotnik projects at XI Workshop of Physical Agents 2010, Politecnic Univ. Valencia
- Juan Bosca (ROB), Presentation of Robotnik products and projects 2010 Robotics: Science and Systems Conference, University of Zaragoza
- Miguel Moreno (ROB), Presentation of Robotnik products and projects, Dec-2010 IRI (Robotic and Informatic Institute)
- Renxi Qiu (CU) presented SRS project in European Robotics Forum at the workshop of "Assistance robots for the elderly" in Västerås, Sweden
- Marcus Mast (HDM), Speech on Stuttgart Media University's Annual Day of Research, June 2011
- Marcus Mast (HDM), Speech on SRS interaction concept and user interface approach as part of the main track of the European Robotics Forum in Odense, Denmark, March 2011
- Marcus Mast (HDM), Speech on SRS user interface concept at HdM's Day of Research, June 2012
- Renxi Qiu(CU), Anthony Soroka(CU) and Dayou Li(BED), SRS Special Session at IEEE INDIN 2012, Beijing
- Michal Spanel (BUT), Advanced Concepts for Intelligent Vision Systems, ACIVS 2012, Brno Sep. 2012

- Alexandre Noyvirt (CU) and Georg Abeiter (IPA) IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Vilamoura, Portugal, Oct 7-12, 1651-1657. doi:10.1109/IROS.2012.6385727
- Renxi Qiu (CU), Aging Societies in Europe and Japan conference in Tokyo on 9-10th October. Organised by the European Commission, the Delegation of the European Union to Japan, and the EU-Japan Centre for Industrial Cooperation. Tokyo 2012
- Marcus Mast (HDM), Speech on SRS user interface concept at World Usability Day in Stuttgart, Nov 2012
- Renxi Qiu (CU), Michael Burmester (HDM) and Carsten Maple (BED), Speech on SRS for health care at House of Lords workshop, Westminster, London, UK. Nov 2012
- Renzo Aldrich (FDCGO), ICCHP 2012 - 13th International Conference on Computers Helping People with Special Needs, July 2012, Linz, Austria
- Roberto Guzman (ROB), Robocity12: Robots for citizens, June 2012, Madrid, Spain
- Roberto Guzman (ROB), GMV Robotics Day, Dec 2012, Madrid, Spain

3.2. MEDIA AND OTHER PUBLICATIONS

SRS at Media and other publication:

- 1st March 2010, HdM Michael Burmester SRS Press Release on HdM website including an interview of Prof. Michael Burmester
- 2nd March 2010, PROF Andreas Pichler OÖ Nachrichten - Rollstuhl mit integriertem Autopilot soll Benutzer sicher ans Ziel bringen - SRS project is also mentioned in this article
- 1st March 2010, Stuttgart Media University Michael Burmester Michael Burmester, course on scenario-based design with SRS as the design subject
- January 2010, Linköping University Marcus Mast SRS Project concept and innovations guest lecture (2x) at Linköping University
- 12th April 2010, Stuttgart Media University Marcus Mast & Michael Burmester Research colloquium speech by Marcus Mast and Michael Burmester on SRS Robotic concept and focus group
- 2011 Winter Semester, Marcus Mast: course on usability testing with SRS user interfaces as the test artifacts

- Video Film (HDM), Filming of an official SRS demonstration video with a professional film company with elderly people in a real home environment and publication on YouTube, SRS website, and partner websites, Dec 2012
- HDM, BUT and IPA, Press Conference showcase SRS professional 3D user interface and present first results of SRS user evaluation with 55 users, March 2013
- HDM Press release on SRS user evaluation of professional 3D user interface, March 2013
- HDM Tv Clip, RegioTV broadcast on SRS user evaluation, March 2013
- HDM Tv Clip, Spiegel.de national news magazine and website, video on SRS user evaluation, March 2013
- IPA Tv Clip, Blick Switzerland broadcast on SRS robot, March 2013
- HDM, Reuters coverage of SRS user evaluation as a multiplier for a number of media outlets, March 2013
- FDCGO, SRS Project press conference, May 2012
- IPA, Trade Fair Automatica 2012, May 2012
- IPA, Trade Fair Rehacare 2012, Oct 2012
- CU, SRS Presentation at Science Night in conjunction with the Film Robot and Frank, March 2013, Cardiff
- IPA, SRS Movie, Nov 2012
- ROB, TV Interview “Hablemos de robots”, March 2013
- Annual United Kingdom Department of Health report on Research and Development in assistive technology, May 2013

4. REFERENCES

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(3) http://www.iros2011.org/

(4) http://www.care-o-bot.de/english/

(5) http://www.eurobotics-project.eu/eurobotics-week/index.html

(6) http://www.innorobo.com/index.php?lang=en

(7) http://www.iros2012.org