

SafeLog

Safe human-robot interaction in logistic applications for highly flexible warehouses

Title: Dissemination report I

Deliverable: D7.6

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Contents

1	Summary	4
2	Overview of Dissemination Activites	5
3	Dissemination activites in the first reporting period	5
4	Public Presentations after the first periodic report	8
5	Non-public presentations after the first periodic report	10
6	Consortium	12
6.1	KIT	12
6.2	SLA	12
6.3	CVUT	13
6.4	UNIZG-FER	14
6.5	IML	15
6.6	KEEI	15
7	Glossary	17



1 Summary

This document is meant to give an overview of the dissemination activities in the first 24 months of the project. These include publications, events, workshops and talks, both for members of academia and industry as well as for general public.

To note is that the dissemination activities are constantly being updated, both with the list of publications available on our website (<http://safelog-project.eu/>) as well as through the deliverable *D7.4 Events, Seminars and Conferences [M9]*, this particular deliverable being a living document and updated through time (on a bi-annual basis). *D7.4 Events, Seminars and Conferences [M9]* is also available on the project's website.

The deliverable is organised as follows. Firstly a short overview of the dissemination activities is presented. Next the dissemination activities of all partners in the first reporting period (01.01.2016-31.06.2017) will be presented with a table for each partner. Finally a list of public and non-public dissemination activities from the periodic report up until the end of 2017 will be listed (31.06.2017-31.12.2017)

2 Overview of Dissemination Activities

A total of 9 scientific papers were published in the first 24 months of the project (5 in 2016 and 4 in 2017) showing that SafeLog is already contributing to the state of the art in research. These include conference papers on prestigious robotic conferences such as IROS.

It has been estimated that more than 10.000 people have been reached until the end of the first reporting period (31.06.2017) the number increasing when considering the dissemination and communication activities since then, listed in following subsections. The real number might as well be higher due to difficulties in estimating reach to the general public through Websites, TV and Radio programs etc.

Flyers and promotional material have been designed, as well as the website, the details of which can be found in deliverables *D7.3 Promotional Material [M9]* and *D7.1 Web Site [M3]* respectively.

3 Dissemination activities in the first reporting period

Note

Please check additionally *D7.4 Events, Seminars and Conferences [M9]*

Table 3.1 shows the dissemination activities of CVUT.

Table 3.1: Dissemination activities by Partner CVUT

Type	Amount	What? / Where?
Organisation of a Workshop	2	European Robotics Forum (ERF) 2017 in Edinburgh - 2 Workshops
Press release	2	Hospodarske noviny, Lidove novin
Non-scientific and non-peer-reviewed publication (popularised publication)	1	Acta Politechnica
Website	2	http://ciirc.cvut.cz/projects , http://imr.ciirc.cvut.cz
Communication Campaign (e.g. Radio, TV)	2	Ceska televize, Cesky rozhlas Leonardo
Participation to a Conference	6	Miroslav Kulich, Libor Preucil @IROS 2016, Daejeon Miroslav Kulich, Libor Preucil @ERF 2017, Edinburg Miroslav Kulich, Libor Preucil @ERF 2016, Ljubjana
Participation to an Event other than a Conference or a Workshop	1	Gael Ecorchard @ Pontedera 2016
Participation to a Workshop	2	ERF 2017 (2 workshops)
Other	11	Talks:Ministry for S&T, state of Israel Research council of Sultanate Oman, 2017 Toyota Motors, Mitsubitchi electric, Meijo University, University of Osaka, University of Nagoya, National Institute for Science and Technology (NIST), JP Minister of Industry (METI) and NEDO Agency, JP, 2017 Jetro & Techn. Agency of Czech Republic, JP & CZ, 2017

Table 3.2 shows the roughly estimated number of people reached by CVUT.

Table 3.2: Estimated number of people reached by Partner CVUT

Who ?	How Many ?
Scientific Community (Higher Education, Research)	500

Industry	400
Civil Society	50
General Public	More than 20k (public media, radio, TV...)
Policy Makers	30
Media	50
Investors	50
Customers	30
Other	/

Table 3.3 shows the dissemination activities of IML.

Table 3.3: Dissemination activities by Partner IML

Type	Amount	What? / Where?
Website	1	http://safelog-project.eu/
Participation to a Conference	6	<ol style="list-style-type: none"> 1. European Robotics Forum, 2016 in Ljubljana 2. MobileHCI, 2016 in Florence 3. Augmented Reality World Expo, 2016 in Berlin 4. 15th International Conference on Practical Applications of Agents and Multi-Agent Systems(PAAMS), 2017 in Porto 5. Augmented Reality World Expo, 2017 in California 6. IEEE Industrial Electronics Society's International Conference on Industrial Informatics, INDIN 2017 in Emden
Presentation	1	Heuer Dialog: Real Innovation (Industry Forum), 2017 in Berlin

Table 3.4 shows the roughly estimated number of people reached by IML.

Table 3.4: Estimated number of people reached by Partner IML

Who ?	How Many ?
Scientific Community (Higher Education, Research)	/
Industry	/
Civil Society	/
General Public	Website is open to all
Policy Makers	/
Media	/
Investors	/
Customers	/
Other	More than 6000 people from across the world including Scientific community, Industry, Investors and media

Table 3.5 shows the dissemination activities of [KIT](#).

Table 3.5: Dissemination activities by Partner KIT

Type	Amount	What? / Where?
Website	1	http://www.ipr.kit.edu/english/315_2396.php
Participation to a Conference	4	Björn Hein @ERF 2017, Edinburg Björn Hein, Denis Stogl, David Puljiz @ERF 2016, Ljubjana

Table 3.6 shows the roughly estimated number of people reached by [KIT](#).

Table 3.6: Estimated number of people reached by Partner KIT

Who ?	How Many ?
Scientific Community (Higher Education, Research)	500
Industry	/
Civil Society	/
General Public	Website is open to all on the IPR Webpage
Policy Makers	/
Media	/
Investors	/
Customers	/
Other	/

Table 3.7 shows the dissemination activities of [UNIZG-FER](#).

Table 3.7: Dissemination activities by Partner UNIZG-FER

Type	Amount	What? / Where?
Organisation of a Workshop	1	2nd ACROSS Workshop on Advanced Cooperative Systems, Zagreb, Croatia
Exhibitions	3	<ol style="list-style-type: none"> 1. Science Fair of the Technical Museum Nikola Tesla in Zagreb, Croatia, 2. University Fair, Zagreb, Croatia, 3. Job Fair at the Faculty of Electrical Engineering and Computing, Zagreb, Croatia
Communication Campaign (e.g. Radio, TV)	1	"Prometej" show, the Croatian National Television
Participation to a Conference	2	Presentations of two papers at the 2016 International Conference on Information Fusion, Heidelberg, Germany

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Table 3.7: Dissemination activities by Partner UNIZG-FER (... continued)

Type	Amount	What? / Where?
Participation to an Event other than a Conference or a Workshop	2	<ol style="list-style-type: none"> 1. Presentation at Robotics in Western Balkans workshop at 2016 European Robotics Forum, Ljubljana, Slovenia 2. Poster presentation at 2017 European Robotics Forum, Edinburgh, Scotland
Participation to a Workshop	2	ERF 2017 (2 workshops)

Table 3.8 shows the roughly estimated number of people reached by UNIZG-FER.

Table 3.8: Estimated number of people reached by Partner UNIZG-FER

Who ?	How Many ?
Scientific Community (Higher Education, Research)	3000
Industry	50
Civil Society	/
General Public	1000
Policy Makers	30
Media	500
Investors	/
Customers	/
Other	/

4 Public Presentations after the first periodic report

Table 4.1: Dissemination actions from 2017-06-30 to 2017-12-31 (or not yet in *D7.4 Events, Seminars and Conferences [M9]*)

Event Type	Event Title	Date / Location	Impact	Audience	Partners
Conference	Student Conference on Planning in Artificial Intelligence and Robotics (PAIR 2016)	2016-09-17, Deggendorf, Germany	Jérémy Taquet, Gaël Ecorchard, and Libor Přeučil: "Real-Time Visual Localisation in a Tagged Environment" conference paper was presented	Academia	CVUT

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Table 4.1: Dissemination actions from 2017-06-30 to 2017-12-31 (or not yet in *D7.4 Events, Seminars and Conferences [M9]*)
(... continued)

Event Type	Event Title	Date / Location	Impact	Audience	Partners
Conference	20th International Conference on Climbing and Walking Robots and Support Technologies for Mobile Machines (CLAWAR 2017)	2017-09-11, Porto, Portugal	Gaël Écorchard, Adam Heinrich, and Libor Přeučil: "Ego-Motion Sensor for Unmanned Aerial Vehicles Based on the Raspberry Pi" conference paper was presented	Academia and Industry, ~ 100 attendees	CVUT
Conference	Průmysl 4.0 - Objevte chytré řešení pro Váš podnik (Industry 4.0 - Discover clever solutions for your business)	2017-06-07, Prague, Czech Republic	Libor Přeučil presented the SafeLog project, https://events.economia.cz/17411-prumysl-4- in Czech only	Academia and Industry	CVUT
Workshop	Ro-Man 2017 workshop "RoboCom++ FET-Flagship-Proof-of-Concept Project: Rethinking Robotics for the Robot Companions of the Future"	2017-08-28, Lisbon, Portugal	Ivan Marković presented the SafeLog project within the scope of active laboratory projects	Academia	UNIZG-FER
Workshop	International Workshop on Cooperative Dynamic Simultaneous Localization and Mapping	2017-09-19, Zagreb, Croatia	Ivan Petrović presented the SafeLog project within the scope of active laboratory projects	Academia	UNIZG-FER
Television reportage	Croatian National Television show "EU projects"	2017-09-19, Zagreb, Croatia	Ivan Petrović talked about the SafeLog project in a 4 minute reportage	General	UNIZG-FER
Workshop	Forum Mensch Roboter	2017-10-17, Stuttgart, Germany	SafeLog was presented by Björn Hein before representatives from industry and experts in Human-Robot-Collaboration	Industry	KIT

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Table 4.1: Dissemination actions from 2017-06-30 to 2017-12-31 (or not yet in *D7.4 Events, Seminars and Conferences [M9]*) (... continued)

Event Type	Event Title	Date / Location	Impact	Audience	Partners
Open-door Day	Part of the European Robotics Week	2017-11-21, Karlsruhe, Germany	SafeLog was presented and demos shown by David Puljiz for visitors including high-school students, university students, people from the general public and other interested people	General	KIT

5 Non-public presentations after the first periodic report

Table 5.1: Non-public dissemination actions from 2017-06-30 to 2017-12-31

Event Type	Date / Location	Impact	Audience	Partners
Presentation	2017-05-16, CIIRC, CVUT, Prague, Czech Republic	Libor Přeučil presented the SafeLog project to the First Lady of the Sultanate of Oman, https://www.ciirc.cvut.cz/the-first-lady-of-the	Politicians	CVUT
Presentation	2017-08-21, CIIRC, CVUT, Prague, Czech Republic	Libor Přeučil presented the SafeLog project to Japan's Minister of Economy, Technology and Industry, https://www.ciirc.cvut.cz/ciirc-visited-by-japan	Politicians	CVUT
Presentation	Q4 2017, CIIRC, CVUT, Prague, Czech Republic	Libor Přeučil presented the SafeLog project to potential project partner DHL	Logistic Industry	CVUT
Presentation	Q4 2017, CIIRC, CVUT, Prague, Czech Republic	Libor Přeučil presented the SafeLog project to potential project partner SAS Automotive	Logistic Industry	CVUT
Presentation	Q4 2017, CIIRC, CVUT, Prague, Czech Republic	Libor Přeučil presented the SafeLog project to potential project partner Rockwell Automation	Industry	CVUT
Presentation	Q4 2017, CIIRC, CVUT, Prague, Czech Republic	Libor Přeučil presented the SafeLog project to potential project partner Škoda auto s.r.o.	Industry	CVUT

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Table 5.1: Non-public dissemination actions from 2017-06-30 to 2017-12-31 (... continued)

Event Type	Date / Location	Impact	Audience	Partners
Presentation	Q4 2017, CIIRC, CVUT, Prague, Czech Republic	Libor Přeučil presented the SafeLog project to potential project partner Toyoda cz	Logistic Industry	CVUT
Presentation	2017-11-28, Linköping, Sweden	Ivan Petrović presented the SafeLog project to SAAB Inc.	Defense Industry	UNIZG-FER

6 Consortium

6.1 Karlsruhe Institute of Technology

The Karlsruhe Institute of Technology (**KIT**) is a higher education and research organisation with about 10.000 employees, 25.000 students, and a total annual budget of about 750 million Euros. It bundles the missions of both precursory institutions: a university of the state of Baden-Württemberg with teaching and research tasks and a large-scale research institution of the Helmholtz Association conducting program-oriented provided research on behalf of the Federal Republic of Germany. Within these missions, **KIT** is operating along the three strategic fields of action of research, teaching, and innovation.



In establishing innovative research structures, **KIT** is pursuing joint strategies and visions. **KIT** is devoted to top research and excellent academic education as well as to being a prominent location of academic life, life-long learning, comprehensive advanced training, exchange of know-how, and sustainable innovation culture. **KIT**'s research profile is characterised by a strong focus on information and communication technology, energy technology and mobility. It has significant competencies in the fields of optics and photonics, climate and environment, and the inter-relations of humans and technology. It hosts a significant number of infrastructures of federal or European importance.

KIT builds on the extensive experience its predecessors have gained in EC-funded research from more than 1000 projects up to now.

The **Intelligent Process Control and Robotics Lab (IPR)** is part of the Institute for Anthropomatics and Robotics (IAR) and covers a vast variety of robotic and automation areas. Research in the field of industrial automation comprises conception and realisation of sensor based autonomous robots for typical tasks in production. Another area is safe human robot co-operation integrating multiple sensors and novel interaction techniques. Further activities consist of designing modular control and diagnosis systems for robots, robot cells and plants based on multi-agent architectures.

FORscience is the central Proposal and Project Management Service at **KIT**. Established in 2009, it pools **KIT**'s many years of experience in project management. The Project Management Office thus offers professional expertise in all aspects of project management. Its members have substantial experience in supporting EU and other projects from proposal phase to execution, including for example the FP7-CP DACCWA and the Horizon2020-FoF ProRegio, for both of which **FORscience** serves as the **PMO**.

Role

KIT has two roles:

1. **KIT** will be coordinator of SafeLog. Coordinating person will be Björn Hein. The department FORScience of **KIT** will handle all management issues (s. previous paragraph, section *Management structure and procedures* and *WP8 Project Management* in document Part 1).
2. Regarding research and innovation **KIT** will mainly focus on the human-system interaction and assistive technologies in the envisioned flexible and collaborative warehouse *WP4 Assisting technologies for a collaborative and flexible warehouse system* with the corresponding relations to the other work packages.

6.2 Swisslog Automation GmbH

Swisslog is one of the leading companies for automation and logistics solutions. For many years Swisslog has been a technological leader in many industrial sectors and has been exploiting innovative solutions for its customers. The portfolio of Swisslog comprises



- Intelligent material handling, production, and automation technologies
- Conveyor systems for light goods and pallets
- Shuttle systems and cranes
- Storage and Robot systems for automated case picking
- Automated Guided Vehicles
- Production lines and equipment for building materials
- Modular Warehouse Management and Control Systems

Swisslog is eager in participating in this project as Swisslog sees a big chance in exploiting the fast growing logistics automation market by state-of-the-art goods-to-man systems. Swisslog however wants to support European research to give this research an industrial platform.

Role

Swisslog provides expertise in automation and logistics ranging from industrial robot applications, electrical overhead monorails, transport AGVs and goods-to-man systems. Swisslog will handle the demonstrator based on a fleet of mobile goods-to-man robots. For this system prior work exists comprised of fleet-manager, standard safety infrastructure and also a 2D emulation environment. Swisslog will take the lead of WP1 and WP6.

6.3 Czech Technical University in Prague

The CZECH TECHNICAL UNIVERSITY IN PRAGUE (CVUT), founded in 1707, is one of the oldest technical universities and currently the leading technical university in the Czech Republic with approx. 23000 students enrolled in engineering courses. With over 1700 members of academic staff is also one of the largest research institutions in the Czech Republic. The Czech Institute of Informatics, Robotics, and Cybernetics (CIIRC) that will participate in the project is a new institute of CVUT founded in 2013 with the aim to concentrate an excellent research in the fields robotics, intelligent, distributed and complex systems, automatic control, computer-aided manufacturing, bioinformatics, biomedicine and assistive technologies. The key researchers of CIIRC have come from the Department of Cybernetics, Faculty of Electrical Engineering of CVUT this year, which is recognized as an outstanding research centre at the CVUT. In 2000 the department received the “EU Centre of Excellence” award and in 2006 the prestigious European IST Prize by the European Commission. The Department includes over 80 academic staff and researchers, and over 30 Ph.D. students. The research focus covers the areas of intelligent mobile robotics, computer vision, artificial intelligence, biomedical engineering, and multi-agent systems. The department has been actively involved in scientific collaboration with international partners via various types of research programmes namely FP7/FP6/FP5 programmes. The Department has a strong industrial experience in providing research and development, training services and customized solutions to international industrial partners (e.g. Robert Bosch GmbH, Rockwell Automation, SKODA AUTO/Gedas CR, CADENCE, DENSO Automotive, BAE Systems). Additionally the department extensively collaborates with the defense industry (European Office for Aerospace Research and Development, US Air Force Research Laboratory, US Office for Naval Research and Army Research Laboratory).



Intelligent Mobile Robotics division (IMR) (<http://imr.ciirc.cvut.cz>) will be involved in the project. This unique laboratory founded in 1993 and headed by Dr. Libor Preucil since, steadily builds



excellence in mobile and intelligent systems and robots and stand for major stakeholders in the field in the Czech Republic. Recently, he co-founded **Center for Advanced Field Robotics (CAFR)** (<http://lynx1.felk.cvut.cz/cafr>) bringing together main robotics research labs and industry in the Czech Republic. Dr. Libor Přeučil is going to supervise herein suggested project and will assure the top level quality research within.

Role

CVUT will lead *WP3 Planning and scheduling for a heterogeneous fleet manager*. The target of the workpackage is to realize a planning module that will provide coordinated plans for robots and humans in the warehouse CVUT will also significantly contribute localization activities in *WP2 Integrated safety concept for detecting and localizing of humans* as well as specification and requirement analysis *WP1 Requirements and Specifications* and integration *WP6 Integration and Demonstration*.

6.4 University of Zagreb, Faculty of Electrical Engineering and Computing

The **UNIZG-FER** (<http://www.fer.unizg.hr/en>) is the highest-quality member of the University of Zagreb, with a large and modern infrastructure devoted to research-based education. Currently UNIZG-FER participates in more than 20 projects financed by EU through various grant schemes (HORIZON 2020, FP7, IPA, COST, etc.). With 170 professors, 220 graduate teaching and research assistants, 4.000 students enrolled in various programs, and operating in facilities of more than 40.000 m², UNIZG-FER is the largest and leading educational technical and R&D institution in the fields of electrical and computer engineering and computer science in Croatia. UNIZG-FER is organised in 12 Departments which represent the focal points of education and R&D. Research related to this project will be carried out at the Department of Control and Computer Engineering (DCCE) by the Autonomous Mobile Robotics group (AMOR group, http://act.rasip.fer.hr/groups_amor.php).



The AMOR group has a long tradition in research of advanced control strategies and estimation techniques and their application in autonomous navigation of ground and aerial robots in unknown and dynamic environments. The major research activities of the group include: Simultaneous Localization and Mapping (SLAM), Detection and Tracking of Moving Objects (DATMO) and Motion Planning and Control (MPAC). The Group currently consists of 3 Postdocs and 5 PhD students directed by Prof. Ivan Petrović. Laboratory of the AMOR group is equipped with state of the art ground mobile platforms, aerial vehicle, sets of advanced perception sensors, flying arena, etc. The group coordinated the major national robotic research program “Intelligent robotic systems and autonomous vehicles” (2007-2014), which involved 5 major robotic research groups in Croatia. The group has also a long tradition of collaboration with research centres in the EU and worldwide. Currently, Professor Petrović, the head of the AMOR group, is coordinating the EU project “ACROSS - Centre of Research Excellence for Cooperative Robotic Systems” (<http://across.fer.unizg.hr>), which involves 14 research groups from the University of Zagreb and 16 research institutions from 10 European countries. AMOR group recently successfully organised two robotic conferences: (1) the 4th European Conference on Mobile Robots - ECMR'09 (www.ecmr09.fer.hr) and (2) the 10th IFAC Symposium on Robot Control - SYOROCO 2012 (<http://www.syoroco2012.org>).

Role

UNIZG-FER will lead *WP2 Integrated safety concept for detecting and localizing of humans*. The target of the workpackage is development of a holistic safety concept that will allow safe collaboration of humans and robots in the warehouse. **UNIZG-FER** will also contribute in human aware planning in *WP3 Planning and*

scheduling for a heterogeneous fleet manager, localization and human intention recognition in WP4 Assisting technologies for a collaborative and flexible warehouse system, specification and requirement analysis in WP1 Requirements and Specifications and integration in WP6 Integration and Demonstration.

6.5 Fraunhofer IML

The Fraunhofer Institute for Material Flow and Logistics (IML) has been tackling logistic tasks, mainly the process, hardware and software development for internal and external logistics. The IML turnover consists of more than 50% of industrial contracts for software development in different logistical applications, supply chain consulting and R&D of novel logistical solutions. Knowledge acquired from funded projects is directly transferred in industrial contracts. So made-to-measure arranged teams create cross-industry and customer-specific solutions in the area of materials handling, warehouse management, supply chain management, simulation supported business and system planning and also traffic systems, closed loop economy, resources logistics, building logistics and e-business. IML is said to be first address for all questions with respect to holistic logistics, the employees work on all fields of internal and external logistics. At the Institute, founded in 1981, there are at the moment 200 employees as well as 250 post-graduates, supported by colleagues in workshops, laboratories and service areas.



Role

IML has a comprehensive knowledge about a multitude of interlogistic applications as well as a deep knowledge about development of embedded electronic components and robotic solution.

In this position IML will contribute to the overall integration of the different concepts by leading the WP6 Integration and Demonstration. Furthermore IML will bring in the expert knowledge in embedded systems and communication technologies to contribute majorly to the safety concept and hardware development of the vest as part of WP4 Assisting technologies for a collaborative and flexible warehouse system.

6.6 KONČAR - Electrical Engineering Institute Inc.

KONČAR – Electrical Engineering Institute (www.koncar-institut.com)

is a leading Croatian industrial institute involved in R&D of equipment and technologies for efficient and reliable energy conversion and power transmission. As a result of a 50-year-tradition in applied R&D, KEEI has developed proprietary solutions for monitoring systems (transformers, electrical rotating machines, bay/switchyard, wind turbines), off-grid power supplies as well as platforms for design of demanding embedded HW/SW systems (including safety related SIL4 platforms). KEEI has been involved in several European and national R&D grant schemes (EUREKA, Proof of Concept (PoC), IPA, ERDF etc.) and has a lot of experience in implementation of various R&D projects. Currently there are 164 employees at KEEI, it is organized in 6 departments and its premises occupy 13.000 m². In the frame of 6 departments there are specialised R&D sub-departments and 9 well-equipped laboratories which are used for R&D support, testing and diagnostics. In July 2014 KEEI became a Notified Body of the European Commission for several important EC directives (low voltage equipment, machinery, EMC, radio and telecommunications terminal equipment, appliances burning gaseous fuels, pressure equipment and personal protective equipment). Research related to the proposed project will be carried out by Control, Renewables & Power Electronics Department. This Department employs 30 experts and offers extensive knowledge in design, development and testing of industrial embedded control systems (HW and SW components), renewable energy solutions and power converters used in traction and energy applications.



Control, Renewables & Power Electronics Department: The Department is specialized in design, development and testing of industrial embedded control systems, renewable energy systems and power converters. It develops HW and SW components for industrial embedded control systems and complete systems for highly demanding applications such as rail vehicles and power engineering. Based on initial technical and functional requirements, the Department prepares complete production documentation, performs various tests (type/serial) and eventually provides product life-cycle management. The Department has successfully developed railway crossing safety platform SIL 4 which was positively assessed by TÜV according to EN50126, EN 50128 and EN50129.

Role

KEEI will lead *WP5 Development of a Safety Vest*. The goal of this work package is to develop a Safety Vest which enables humans to safely enter and work in a flexible warehouse system with **AGVs**. Special attention shall be given to safety certification of the safety vest and the Safety Concept developed in *WP2 Integrated safety concept for detecting and localizing of humans*. **KEEI** will contribute to the Project with its experience in embedded systems design and in development and certification of safety critical control systems for railway applications.

7 Glossary

AGV

Automated Guided Vehicle: An Automated Guided Vehicle is a mobile robot that follows markers or wires in the floor, or uses vision, magnets, or lasers for navigation. They are most often used in industrial applications to move materials around a manufacturing facility or warehouse. Application of the automatic guided vehicle has broadened during the late 20th century.. [13](#), [16](#)

EMC

Electromagnetic compatibility: Electromagnetic compatibility is the branch of electrical sciences which studies the unintentional generation, propagation and reception of electromagnetic energy with reference to the unwanted effects (Electromagnetic interference, or EMI) that such energy may induce. The goal of EMC is the correct operation, in the same electromagnetic environment, of different equipment which use electromagnetic phenomena, and the avoidance of any interference effects - Wikipedia.. [15](#)

PMO

The Project Management Office: The project Management Office consists of personnel from KIT FORScience (cf. description of KIT). [12](#)

SIL

Safety Integrity Level: Safety integrity level is a relative level of risk-reduction provided by a safety function, or a targeted level of risk reduction. In other words, SIL is a measurement of performance required for a safety instrumented function.. [15](#), [16](#)