

# ELROB 2014

23-27 June 2014

Warsaw, Poland

## Team Information

Picture of vehicle:



Name of vehicle:

Garm

Picture of team leader:



Name of team leader:

Schulz, Dirk

Team Name:

Team FKIE

Team E-mail:

bernd.brueggemann@fkie.fraunhofer.de

Logo:



Website:

[www.fkie.fraunhofer.de](http://www.fkie.fraunhofer.de)

Location:

Wachtberg, Germany

Institution/Company:

Fraunhofer Institute for Communication, Information Processing and Ergonomics FKIE

Address:

Fraunhoferstr. 20  
53343 Wachtberg

Telephone:

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Team Description:

**Company Description:**

The FKIE employs currently 300 staff members, who perform studies in computer science and ergonomics with application to

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diverse research area of command & control, communications, intelligence, surveillance, and reconnaissance (C3ISR).

A distinctive aspect of the FKIE methodology is the fact that we are as accomplished in technology as we are in the so called “human factor”. As experts in ergonomics we know how to equip technologies with user interfaces that are easy to operate and control. Also unique to us is the fact that we handle the entire data processing chain from acquisition to display allowing us to work in highly specialized units or interdisciplinary teams according to the project’s requirements.

- Analysis, modelling and evaluation of military data formats and processes
- Distributed data processing in heterogeneous systems (interoperability)
- Information and knowledge management
- Communication in heterogeneous networks
- Analysis and evaluation of sensor data sets
- Protection of data networks against interference or cyber attacks
- Ergonomic user interfaces for intelligent support of users.

The research group Unmanned Systems of the Fraunhofer-Institut for Communication, Information Processing and Ergonomics (FKIE) is actively researching in the area of unmanned systems for more than 20 years. Our main expertise is the development and evaluation of complex human-robot systems. The main focus is on the RSTA and CBRNE-reconnaissance missions using heterogeneous multi-robot systems. Working with such multi-robot systems is a competitive task for the operator. Even a single robot utilizes several different sensors and provides a high degree of mobility, which all need to be controlled by the operator. The research group Unmanned Systems approaches this challenge through intelligent assistance functions. The operator is supported by these assistance functionalities on all levels, ranging from navigating a single robot to complex planning problems of multi-robot systems. Assisting the operator is achieved by two key components. First, we enhance the autonomous capabilities of each single robot, and second, we reduce the burden on the operator through the assistance

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functions. Navigation algorithms like obstacle avoidance in dynamic environments as well as methods to improve the presentation of available information are both examples of such functions. Our key skill is the development of innovative tools for human-robot interaction and cooperation. For this purpose new developments are constantly integrated in experimental systems and evaluated in co-operation with security authorities and organizations as well as the German army.

The Unmanned Systems department:

The Research Group Unmanned Systems as part of the FKIE develops innovative techniques for the efficient guidance of human-multi robot systems within military applications.

Remote-controlled unmanned mobile systems have high demands on the operator's concentration and cognitive abilities, especially if the control is to be maintained over long time periods. In order to increase the efficiency and the available deployment options, the research group develops assistance functions which enable the operator to guide the mobile systems on a high level of abstraction, while the robots execute the required low-level commands autonomously. Additionally, the research group serves as consultant and evaluator for the German army.

The booth presents an overview of the current activities of the FKIE regarding Unmanned Systems, in particular

- The experimental CBRNE Reconnaissance Platform
- NEC techniques for multi robot systems
- Mobile 3D world model generation
- Autonomous outdoor navigation
- European Land-Robot Trials (ELROB)

Sponsors: --

Selection of scenario:

- Reconnaissance and surveillance in non-urban environments
- Transport – repeated shuttling between two camps
- Search and retrieval of human casualties in outdoor environments

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## Team Information

- \_\_\_ Reconnoitring of building structures
- \_\_\_ EOR/EOD/IEDD/CIED (for professionals only!)

Proof of citizenship::            A copy of team leader passport will do (will not be published)!

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