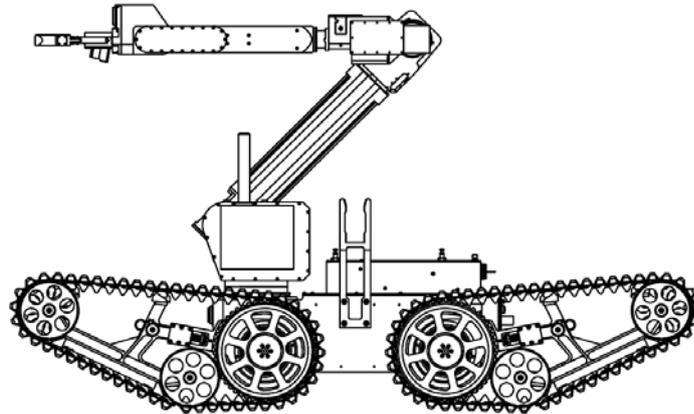




Team Information



Picture of vehicle:

Name of vehicle:

teleMAX



Picture of team leader:

Name of team leader:

Dr. Andreas Ciossek

Team Name:

telerob

Team E-mail:

ciossek@telerob.de

Website:

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Location:

Germany

Institution/Company:

telerob Gesellschaft für Fernhandlungstechnik mbH

Address:

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73760 Ostfildern

Telephone:

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Fax:

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Team Information

Team Description:

The team consists of two partners, which joined to combine their specific knowledge and abilities. The first partner – **telerob** – is a medium-sized company, which develops and manufactures remote-controlled systems. The second partner – Fraunhofer AIS – is a research institute, which tries to expand the highest possible level of autonomy and intelligence for mechatronic systems.

1. **telerob**

*To develop machines, devices, systems and processes for protecting
or replacing human beings in situations where their deployment is
either impossible or associated with extreme risk.*

This is both the motto and motive of **telerob** Gesellschaft für Fernhantierungstechnik mbH. Jointly owned by the Rheinmetall DeTec Group's MaK System Gesellschaft of Kiel (since October 2000 known as Rheinmetall Landsystems) and Bilz Beteiligungsverwaltung GmbH of Ostfildern (near Stuttgart), **telerob** combines the financial strength and stability of a globally active technology group with the competence and flexibility of a medium-sized company specialising in unusual solutions to unusual problems. To guarantee competence in so technically demanding a field, **telerob** has assembled a highly qualified staff drawn from disciplines such as:

- *Telemetry and video technology*
- *Manipulator technology and robotics*
- *Precision engineering*
- *Drive and control technology*

telerob views itself as a protagonist in the path-breaking field of "Mechatronics". In contrast to companies specialising in electronic engineering on one hand, and mechanical engineering on the other, **telerob** combines expertise from both disciplines, developing advanced systems for special applications in the following fields:

- *Bomb disposal technology*
- *Nuclear technology*
- *Metal casting technology*
- *Fire-Fighting technology*

For a world wide clientele, we develop and manufacture a wide array of remote-controlled systems and components ranging from 7-ton manipulator vehicles, casting cleaning systems and EOD-robots down to sensors for optimising container terminals.

We manufacture prototypes and small batches as well as **custom specific designed** machines and projects. However, our more than 30 employees in Ostfildern provide high quality products, but also the necessary service and training for their application. Especially in the



Team Information

field of bomb disposal, *telerob* can offer the service of personnel who are internationally recognised as highly qualified specialists.

telerob delivers most of its products to customers who have installed a pretentious quality assurance system such as the German „Bundeswehr“ and other NATO-Forces, (NATO-supplier Code: C 5152) police and border control as well as operators of nuclear power plants. *telerob* is certified according to EN DIN ISO 9001.

Corporate Goals and Corporate Culture

At *telerob* we rate innovative capacity just as highly as we do profitability. Our corporate culture is closely oriented to the following tenants:

- *Flat hierarchies, resulting in individual empowerment and decision-making authority*
- *An open flow of information that transcends departmental boundaries and hierarchies*
- *A willingness to learn on the part of every employee, and continuous opportunities for doing so*

telerob's most valuable capital is its highly qualified staff, made up of people with

- abundant experience in sales and order processing operations, organised into dynamic, multilingual, customer-oriented teams
- longstanding expertise in developing and fabricating advanced control systems, real-time software and precision mechanical engineering products
- the ability to place complex expert knowledge at the disposal of users
- a deeply ingrained commitment to quality
- interpersonal skills that facilitate a productive, harmonious working climate

2. Fraunhofer AIS

Fraunhofer AIS develops solutions that – by way of their intelligence – help improve human decision-making and – by way of their autonomy – relieve humans of onerous tasks and, in particular, widen the scope of human action. Knowledge computing and autonomous robots are the core activities of the institute founded in 1998.

AIS develops business intelligence solutions that enable improved decision-making through integrated analysis of databases as well as of data from multimedia, text, web and geo sources (visualization, extraction of information, data mining). The systems designed by AIS are being used by commercial and logistics companies – among them one of the leading retail groups in Europe – to interactively support their production site analysis and marketing campaigns. The fact that ideation processes are facilitated by AIS software applies to both in small and large teams – in contexts as diverse as business environments or citizen involvement committees on a municipal level, for instance. The schemes used by AIS to



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model complex systems are derived from multi-agent systems developed in telematics applications.

In the field of autonomous robots, AIS develops sensor-based, robust wheel-driven and walking mobile robots. The institute is a leading player in terms of sensor fusion of 3D laser scanner data for the purpose of unknown environment exploration. The development of robots, however, does not only serve to perform explorative tasks but also fosters improvement in the field of education, considering that robots contain elements featuring mechatronics, computer science, and electronics, all of these disciplines forming part of engineer education and training. For these purposes AIS provides its own specific robotic systems. Last not least, the institute's range of expertise also includes real-time simulation and control of non-linear systems, intelligent control systems as well as hardware and software integration.

For Fraunhofer AIS, the central premise of its work is our conviction that, within the ten years to come, more and more complex requirements will propel those systems into a dominating position that stand out with regard to two key dimensions:

Autonomy

- the ability to autonomously choose the appropriate frame of action and, in addition, to select the appropriate alternatives from a pool of possible actions. For technical systems, this will improve the ability to act independently at any location, cooperatively and adequately. This will result in more robust, more flexible, and more efficient technical systems.

Intelligence

- the ability to make justified predictions about the future (with regard to appropriate frames of action and action alternatives) based on given data and available (experience-driven) knowledge, simulations and learning.

Systems

The system concept is a central element of our approach. The only innovations that are going to be successful are those which integrate into an overall system of human beings, structures and technologies, and which do not only function technically but also yield an actual overall benefit. We see ourselves and the discipline of information technology as an engineering science where new findings are ultimately achieved by system design on a reliable mathematical and formal basis.

In our four business areas and two domains of exploration, we develop two closely interwoven key variants of autonomy and intelligence:

- **software systems** working in cooperation with human beings; these systems are characterized by their ability to generate, use, and communicate knowledge. Here, it is human beings who act as autonomous and intelligent systems. The task of the technical systems is to support the human beings' autonomous actions, based on what they know about human intelligence.
- **robots** (and other mechatronic systems) at the highest possible level of autonomy and intelligence; these are characterized by their ability to use sensor data and to directly



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intervene in their environment. The focus here is on the increasingly autonomous and intelligent technical systems themselves. This is revealed most clearly by mobile robots acting in a changing environment not known in detail.

Linkage to Universities and Technical Colleges

The AIS entered into a strategic cooperation with the Department of Applied Computing Science of the Bonn-Rhein-Sieg Technical College. The two partners jointly offer a Master course entitled “Autonomous Systems”. Successful completion of this international, three-semester course of study will lead to the award of a degree named „Master of Science in Autonomous Systems”.

Prof. Dr. Stefan Wrobel received a call as professor of Practical Computing Science (Data Mining) to the Computing Science III Institute of the Bonn University.

Membership in Fraunhofer Alliances

In addition to membership in the IuK Group, AIS is linked to other Fraunhofer Institutes via five different expert networks: Fraunhofer Vision Alliance, Fraunhofer Traffic and Transportation Alliance, E-Government Centre, Fraunhofer Regional Initiative North-Rhine Westphalia, Fraunhofer Adaptronics Alliance.



Team Information

Sponsors: none

Selection of scenario:

urban	<u> X </u>
non-urban	<u> </u>
EOD/IEDD/UXO	<u> X </u>
exhibition	<u> X </u>

Proof of citizenship: Copy of team leader passport