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AUTONOMIK

AUTONOMICS - Autonomous, simulation-based systems for small and medium-sized enterprises

www.autonomik.de

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INSTITUT FÜR
INNOVATION UND
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AUTONOMICS

Autonomous, simulation-based systems for small and medium-sized enterprises - the funding priority of the Federal Ministry of Economics and Technology (BMWi)

The major aim of the technology programme is to advance the development and prooftesting of autonomous systems as components of a future Internet of Things in practical application fields.

Available, basic methods, such as visualisation, modelling, simulation, decision-making or modularisation, will be applied and upgraded for specific applications or scenarios.

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Autonomics
Data

- **14 Projects** with approx. **100 companies** and **scientific institutions** in association
- **Funding volume:** **approx. 55 Mio. EUR**
- **R&D Investment:** **approx. 110 Mio. EUR**

Scientific Assistance

- Scientific assistance for the technology programme, Autonomics, aims to ensure a high quality of project outcomes to make an important contribution to their market success and the effective introduction of technology-based process and product innovations.

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Targeted project results

- Open and generally accessible tools and services as a basis for the design, construction and operation of autonomous systems (e.g. for environment recognition, simulation, visualisation, process modelling)
- Standards for skills profiles in autonomous systems and service delivery to provide 'knowledge' on coping with application situations and scenarios
- Generic interfaces for programming, operation and interaction (standardised human-machine interfaces)
- Solutions for the integration of autonomous systems into existing applications, infrastructures and supply chains (e.g. in assembly, construction site logistics) with corresponding standards for plug & play or self-configuration
- Methods for improving user-friendliness and acceptance.

Projects

The themes range from safe and autonomous logistics and transport solutions for outside areas to energy-self-sufficient, smart container networks for the airfreight industry, simulation solutions for autonomous production processes, service robots to support materials processing and assembly processes as well as the execution of hazardous work to networking smart systems in the operating theatres of the future.

Example & Challenge 1

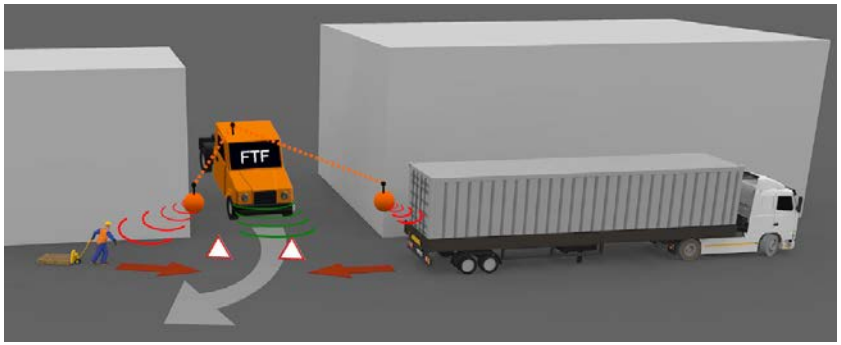
RoRaRob

- Welding task assistant for tubular and frame structures with a robot system
- Prototype hardware and software assistance system
- Human-machine-interaction to held work pieces in exact positions
- Questions if liability

Example & Challenge 2

SaLsA

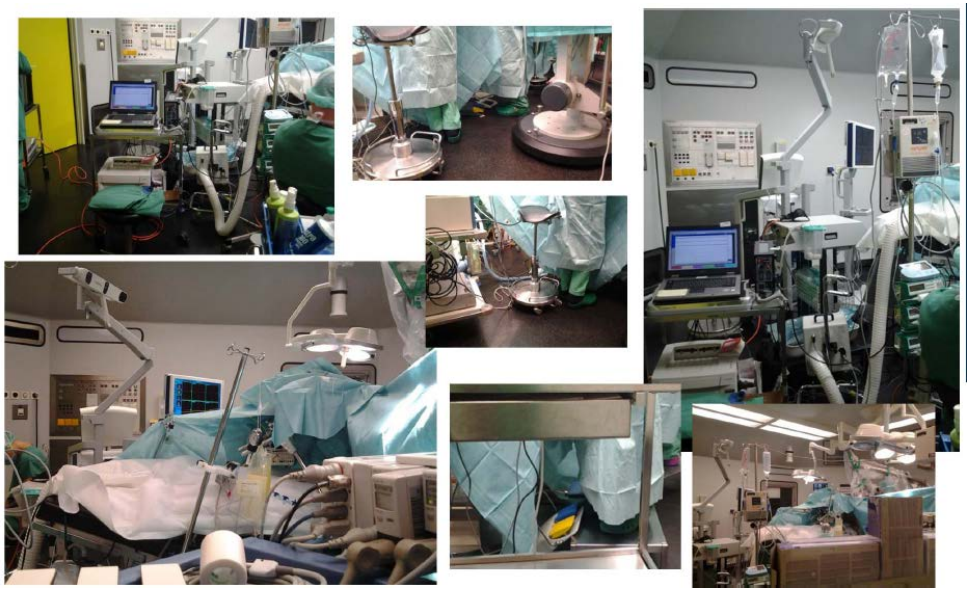
- Safe autonomous logistics and transportation vehicles in outdoor areas
- Automated guidance
- Data from vehicle sensors and stationary sensors in an overall model
- Liability risk, privacy issues



Example & Challenge 3

smartOR

- Innovative communications and network architectures, for modularised, integrated operating theatres of the future
- Support by technical components – integration in modular operating systems
- Communication interfaces
- Question of standardisation, liability and data flow



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Autonomics – Legal Framework and challenges in Germany and Europe

Prof. Dr. Dr. Eric Hilgendorf

University of Würzburg

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Law and new technologies

- The development of new technologies depends on the normative (i.e. moral and legal) framework
- Law as an obstacle for technological development
- Law as a „technology booster“

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Research Centre for Robot Law

- University of Wurzburg, Faculty of Law
- Founded in 2010
- Numerous activities
  - Internet Law/Internet of the Future
  - Robotics and the Law (2010, DFG)
  - European Greenbook on Law and Robotics
  - Legal Questions of the Use of Service Robots for the Elderly
  - Autonomous Cars and the Law
  - Autonomics and the law

Starting points

- Modern technology is developing rapidly in many areas
- The law must react to, control and possibly limit these changes
- In many areas such as biotechnology and computer law, this is already done quite successfully
- So far, autonomous systems have been neglected

Challenges – technological perspective

- Autonomous cars
- Service robots in hospitals/homes for the elderly
- Robots for medical purposes (e.g. operations)
- Autonomous systems for industrial purposes
- Military robots (drones)
- ...

Challenges – legal perspective

- Admission
- Data protection/privacy
- Insurance
- Civil liability
- Criminal liability
- ...

National vs. European approach

- One technology – many divergent legal systems
- From a practical point of view, national law is more important
- European Harmonizisation would be helpful, but it seems far away
- Greenbook on Law and Robotics
- Importance of legal comparison !

Methodology

- Cooperation between law and technology poses many interdisciplinary challenges

- General approach vs. bottom up-approach

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General approach to the topic „autonomous systems an the law“

- Can autonomous systems/robots be „persons“ ?
- Can autonomous systems/robots be punished ?
- Can/Should autonomous systems/robots have (human) rights?

Bottom up-approach

- Analysis of the autonomous system (industrial robot, car, service robot ...)
- Identification of legal problems
- Systematic exposure of legal problems
- Formulation of tentative solutions
- Criticism of these solutions in the light of practical applicability
- Formulation of improved solutions
- ...

Kinds of Solutions

- Many problems can be solved inside the law as it is existing now
- Necessity of extensive interpretation of given law
- Necessity of new law ?
  - Admission of autonomous cars?
  - Liability for damages caused be autonomous systems – do we need new forms of insurance?
  - Reform of privacy law?
- Comparison between different legal systems and even legal cultures
- International harmonization as the ultimate goal?

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- Thank you for listening!

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