Innok Robotics

HEROS

Modular robot system for custom robots

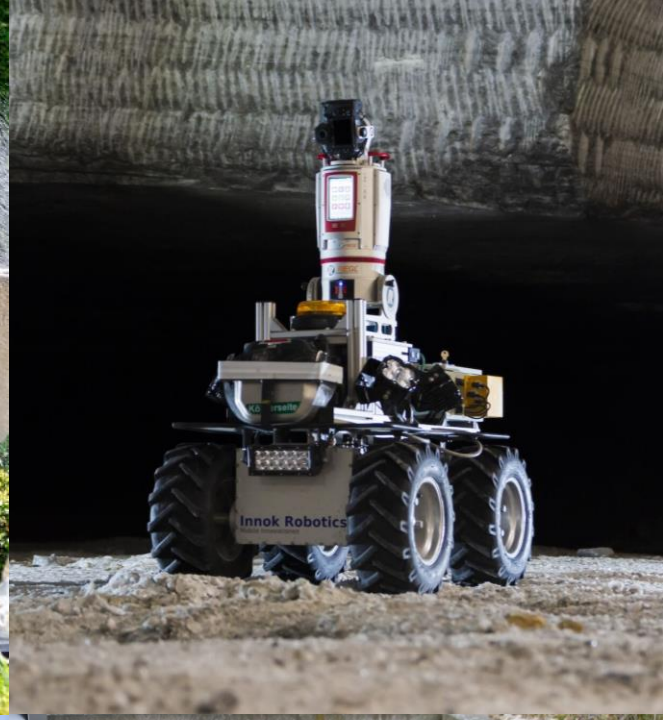
Product presentation – HEROS
2025

Innok Robotics

Innok Robotics

Technology leader in autonomous, outdoor-capable robots

- Founded 2012 in Regenstauf, Bavaria
- Represented in various markets
- > 150 robots in operation
- > 500.000 operating hours
- HEROS since 2012 in operation



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Our autonomous product groups

INDUROS

Autonomous mobile transport robot for intralogistics

- Area of application in intralogistics (indoor and outdoor) with public traffic
- Complete autonomy thanks to automatic coupling and decoupling
- Towing capacity of up to 1,300 kg
  Load capacity of up to 60 kg

RAINOS

Fully automatic and autonomous irrigation robot for the agricultural industry

- Area of application in green spaces and cemeteries
- Automatic watering and refilling enable autonomous operation
- Management of up to 1,400 watering points

HEROS

Modular autonomous robot platform for a wide range of applications

- Wide range of applications in very difficult terrain
- Highest precision in localization even over long distances
- Almost endless possibilities for integrating sensors and actuators

A selection of satisfied customers

INDUROS

RAINOS

HEROS

HEROS

Modular robot system for custom robots

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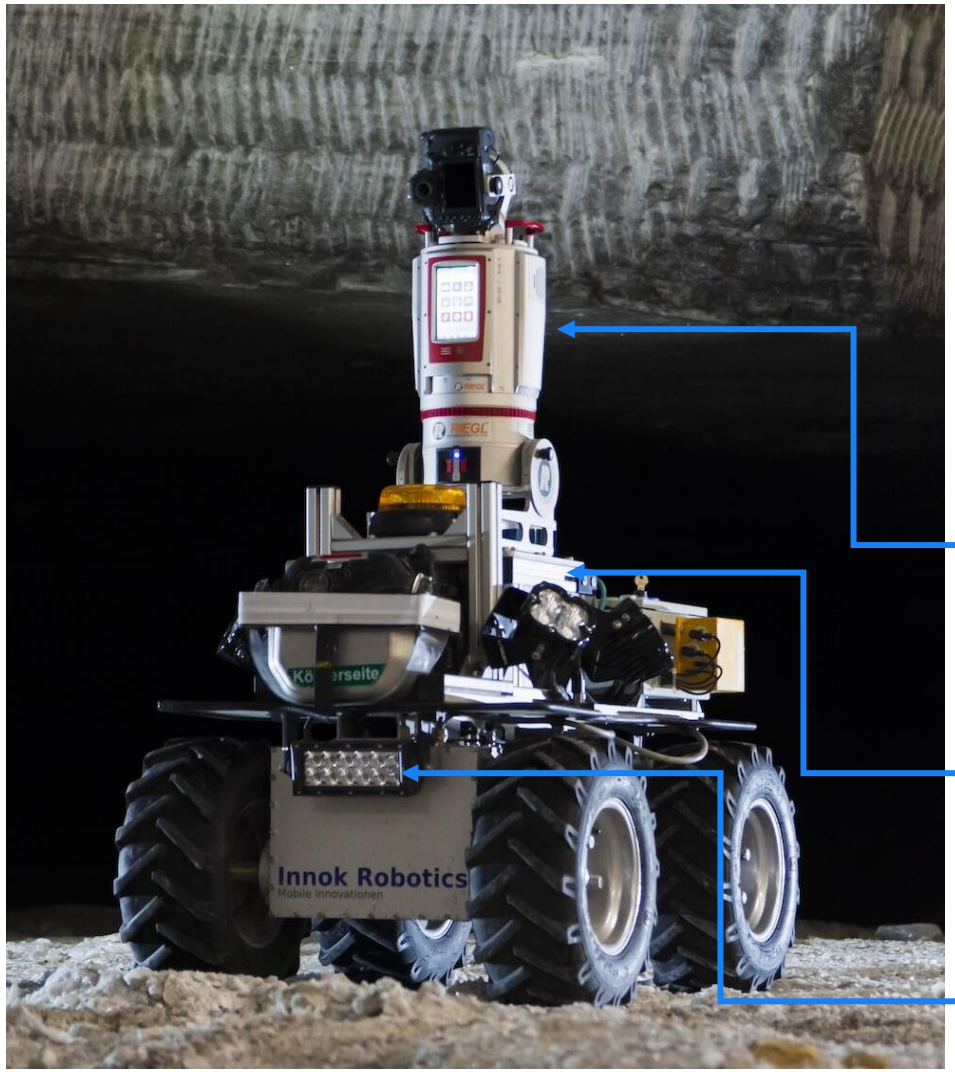
HEROS – Versatile configuration



Example configuration

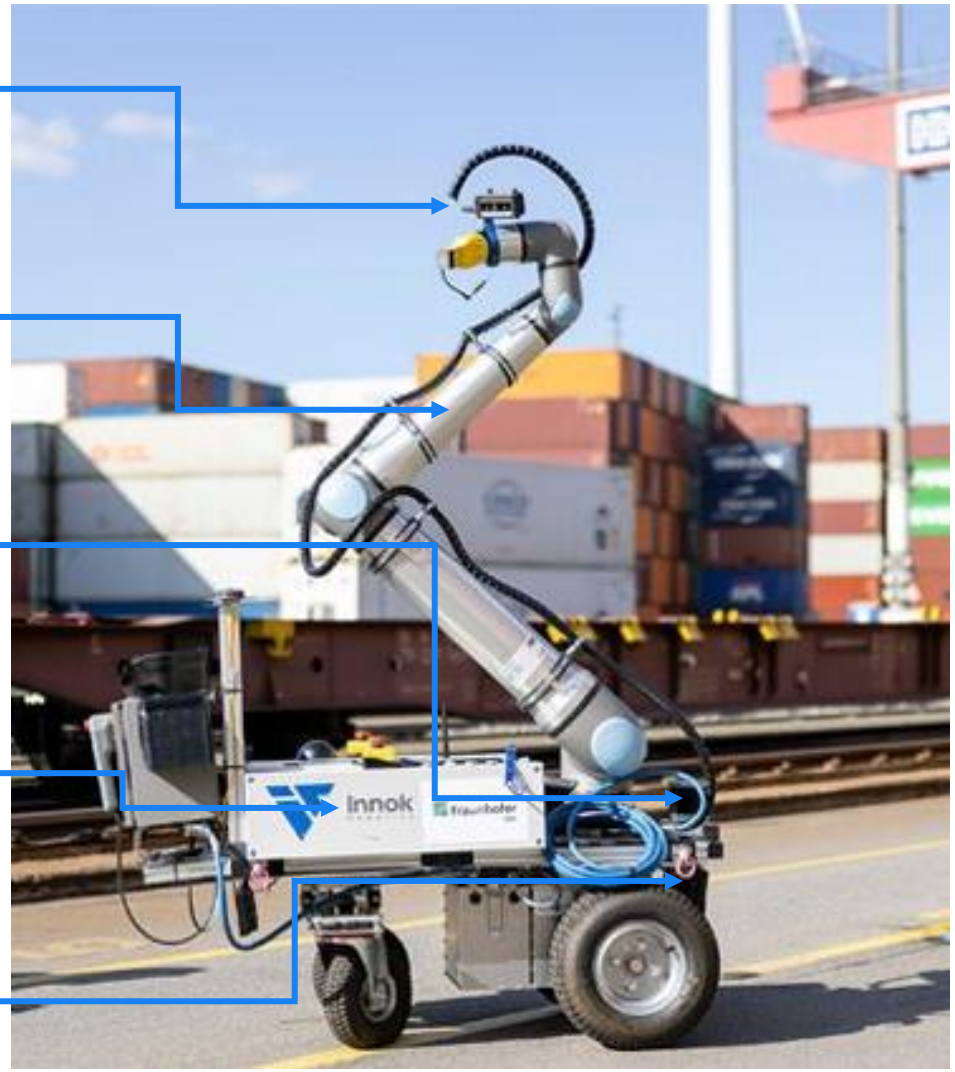
Camera

Manipulator (UR20)

3D LIDAR

Computer

Lighting



Example configuration with manipulator

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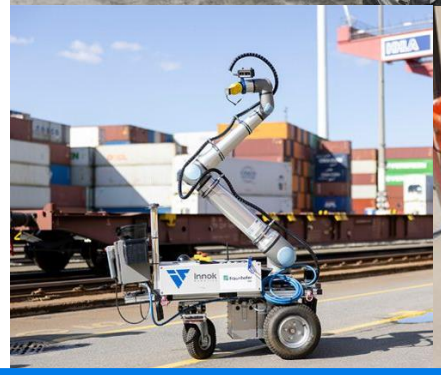
Customisable for many applications

- Surveillance / Inspection
- Industry
- Intralogistics & Logistics
- Mining
- Professional Cleaning
- Agriculture
- Research & Development

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Technical Data

Dimension: 920 x 720 x 440 mm

Weight: 70 to 140 kg

Max. Load: 70 to 700 kg

Ground Clearance: 95 to 195 mm

Max. Speed: 3,1 km/h or 0,9 m/s

Charging time: 2 hours (20 to 80 %)

Battery runtime: up to 16 hours

Battery: 2900 Wh, 48 V, up to zu 4,0 kW

Drive wheels: ⌀320 – 520 mm, steel rims

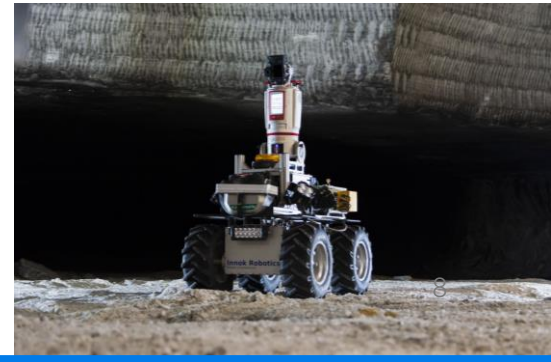
Tyre profile: Tractor profiles, floor protection profiles

Ambient temperature : -20 °C to 40 °C

Motor: 2WD: 800 W, 4WD: 1600 W

Steering system: 2WD: Differential steering, 4WD: Armoured steering

Protection class: Robot: IP65, Additional configuration: up to IP66/67



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Full package HEROS

Hardware Toolbox

- Customised composition according to your needs
- Easy expansion possible
- 3- and 4-wheel configuration possible

Software Toolbox

- Modular AMR-Software: Innok Cockpit ™
- Flexible configuration of the modules
- Wide range of robotic functions

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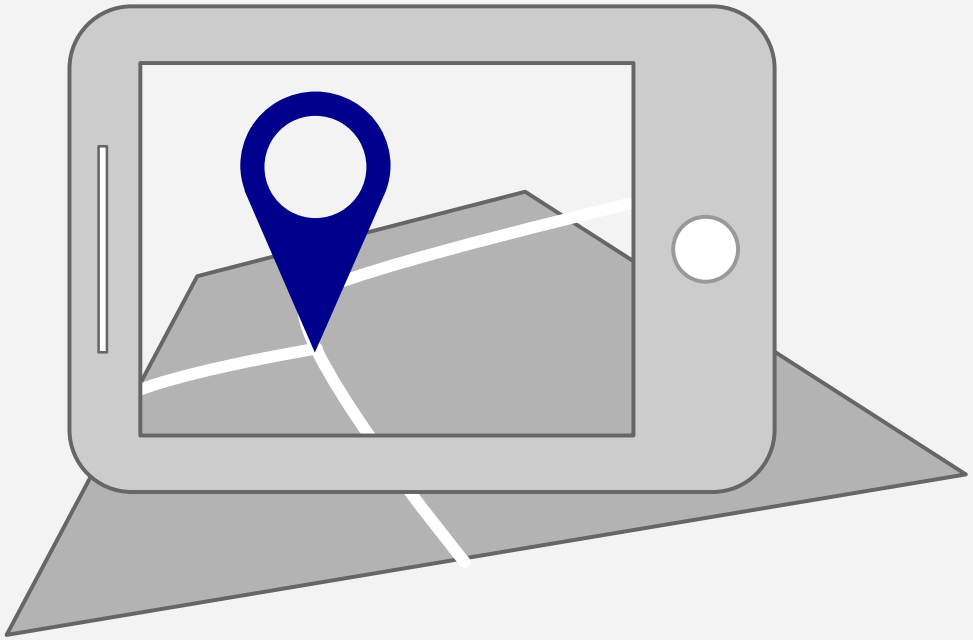
Innok COCKPIT ™ Autonomy Software



Unique features for safe and high-precision navigation

- Autonomous navigation based on 3D LiDAR data, GPS is also possible
- Robust and very precise obstacle detection: people, cars, lorries, equipment, etc.
- Intuitive user interface for controlling the robot, maintaining the path network, retrieving diagnostic data, etc.
- Based on the open-source robot control software ROS
- Possibility to integrate your own software (for custom actions and tasks)
- Best precision, reliability and usability Made-in-Germany
- Continuous development of our own autonomy software Innok COCKPIT ™

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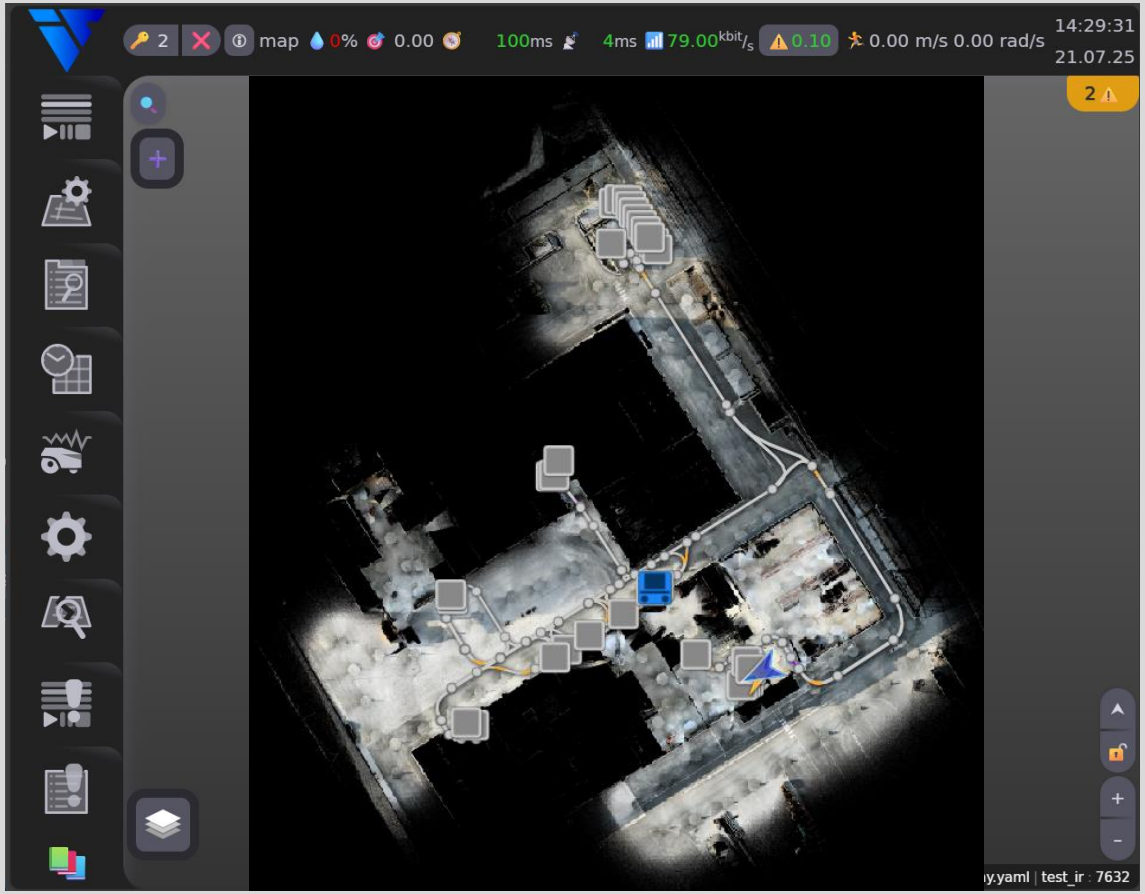
User-friendliness
User interface

- Intuitive graphical user interface
- Simple setup of the robot even without programming knowledge
- Highly developed mission control
- Efficient diagnostic and reporting tools for fast remote support



EXAMPLE

Real-time monitoring
(tablet or cell phone) of an INDUROS

The robot‘s navigation paths show its movement indoors and on the adjacent outdoor areas.

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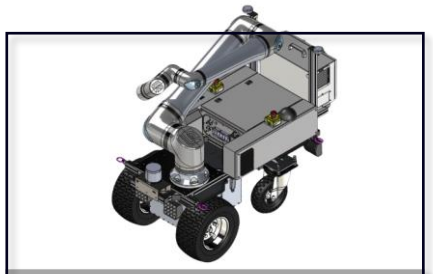
Innok has realised various development projects


Spraying Robot


Mapping Robot


Salting Robot

Waste Robot


Pin Robot


Trash Can Robot

Dump Truck


Monitoring Robot


Mining Robot


Wheelbarrow R.

Fulling Robot


Watering Robot

Logistics Robot

> 15
additional robots

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HHLA (Hamburger Hafen und Logistik)

The Customer

Hamburger Hafen und Logistik AG (HHLA) is a German logistics company that specialises primarily in port handling, container and transport logistics. As a European network logistics provider, HHLA creates the conditions that ensure that our everyday lives and our economy run reliably.

HHLA

Fraunhofer

The Use Case

- Research project in collaboration with Fraunhofer CML
- Automation of pin handling on container wagons using mobile robotics
- The usual manual insertion of pins on container wagons in seaport rail terminals was dangerous, cost-intensive and led to delays in the handling of container trains.

The Challenges

- Design of the mobile robot for pin handling by the Fraunhofer CML in accordance with the requirements to be determined
- Development of the corresponding software for its sub-functions by the Fraunhofer CML

Location: Hamburg

Number of robots: 1

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Technical University Bergakademie Freiberg (1/2)

The Customer

The Technical University Bergakademie Freiberg is a state university in Freiberg, Saxony. It sees itself as a resource university and is dedicated to teaching and research in the fields of geosciences, engineering, natural sciences and economics. It specialises in energy and resource science.

TECHNISCHE UNIVERSITÄT BERGAKADEMIE FREIBERG
Die Ressourcenuniversität. Seit 1765.

The Use Case

- The Mining-ROX project is led by TU Freiberg and is currently one of Europe's most representative research projects in the field of automation in mining.
- The project focuses on the use of autonomous robot systems in high-risk, unstructured mining environments with the aim of improving safety and efficiency in mining and gradually realising the future vision of an ‘unmanned mine’.

Location
Freiberg

Number of robots
1

The Challenges

- Navigation in unstructured environments: Mines are uneven, narrow, dark, dusty and often full of unexpected obstacles.
- Robust sensor technology: Dust, moisture, temperature fluctuations and vibrations can impair cameras, LiDAR or radar sensors.
- Power supply: Charging infrastructure is a logistical hurdle in remote, underground areas.

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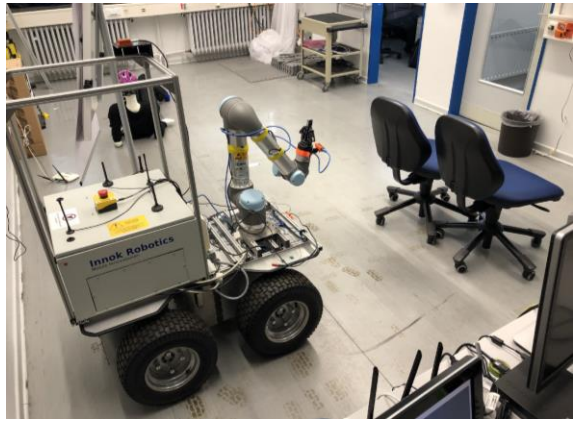
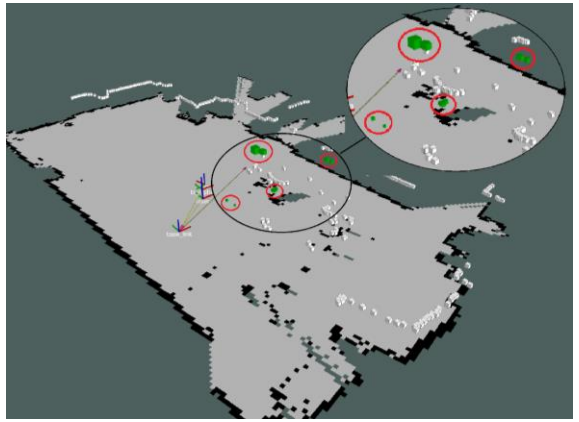
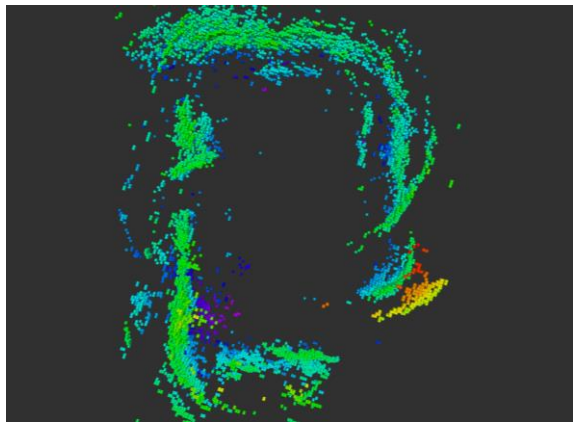
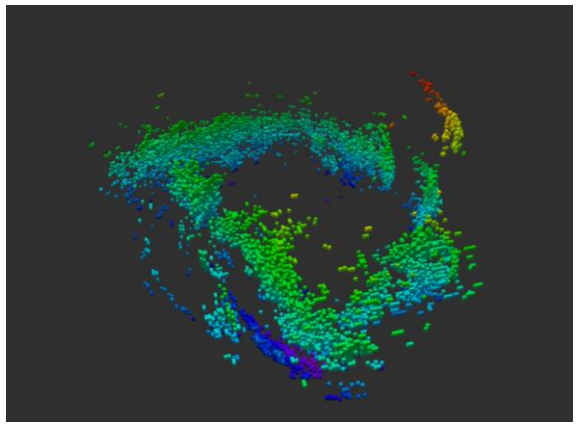
Technical University Bergakademie Freiberg (2/2)

Design of autonomous robots for use in underground mines with regard to map creation, navigation and operation

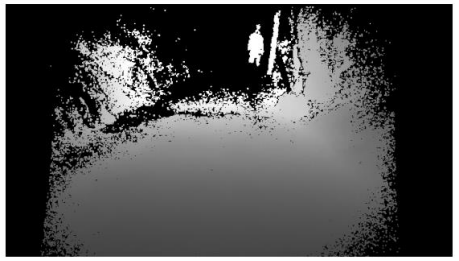






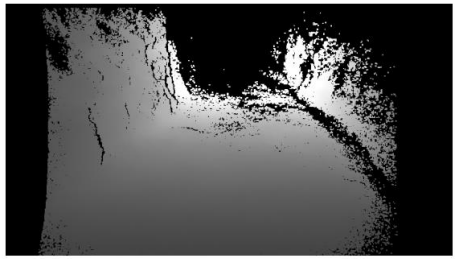


(a) Kinect RGB image.



(b) Kinect depth image of 3(a).

(c) Depth image of mine equipment.



(d) Depth image with absorbed IR.

(a) With the help of the lighting system, the RGB camera can capture images in the visible light range.
(b) With the help of the depth camera, the sensor can detect a person in the dark area in the middle.
(c) The infrared image also shows the ladder, the person and the supports of the tunnel.
(d) The moat on the right side of the image absorbs all infrared rays and therefore cannot be detected by the depth camera.

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K+S Minerals and Agriculture AG (1/2)

The Customer

K+S AG is a German mining company specialising in potash and salt production. K+S is one of the leading international suppliers of potash and magnesium products for agricultural and industrial applications.

The Use Case

- Automation of workflows in mines through the use of artificial intelligence
- Multiple scanning and comparison of data to detect geological changes and potential safety risks
- Enables dynamic monitoring and supports early warning and safety management

The Challenges

- Extreme stress on hardware due to the aggressive atmosphere in the salt mine
- Accurate data collection in a difficult environment (dust, humidity, poor visibility)
- Ensuring that measurements are comparable during repeated scanning, despite changing conditions.

Location: Kassel

Number of robots: 1

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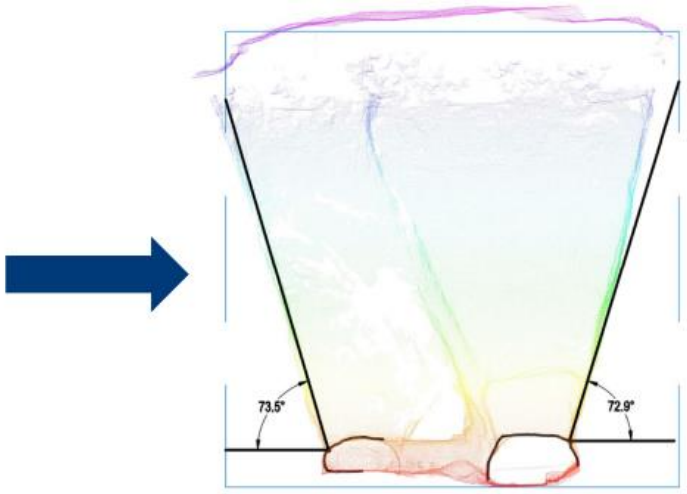
K+S Minerals and Agriculture AG (2/2)

Use in remote mode for measuring inaccessible underground excavations

- Routing via waypoint navigation or prior travel and recording of the route
- Orientation is achieved using retro-reflective targets, IMU, wheel odometry and cloud-to-cloud registration of individual scan positions
- Tilt sensors as protection against tipping during autonomous driving
- LiDAR sensor for collision avoidance



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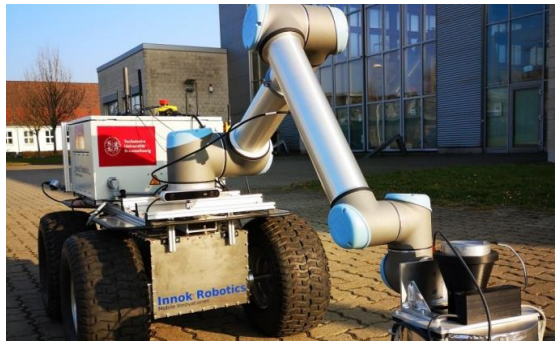
Technical University Braunschweig (1/2)

The Customer

The TU Braunschweig is a medium-sized university in Germany. It dates back to the Collegium Carolinum, founded in 1745, and thus has the longest tradition of any technical university in Germany.

Technische Universität Braunschweig



The Use Case

- The project is being led by the Institute of Space Systems at the Technical University of Braunschweig.
- As part of the '3D4Space' innovation network, research is being conducted into how the resources available on the moon (regolith) can be used for 3D printing.
- Project goal: Future implementation by mobile rovers that print living modules or infrastructure on the moon's surface.

The Challenges

- Unclear mechanical and thermal properties for 3D printing under lunar conditions
- Navigation and positioning on uneven, unknown terrain without GPS
- Combining materials science, robotics, 3D printing technology and space systems to create a functioning overall system

Location
Braunschweig

Number of robots
1

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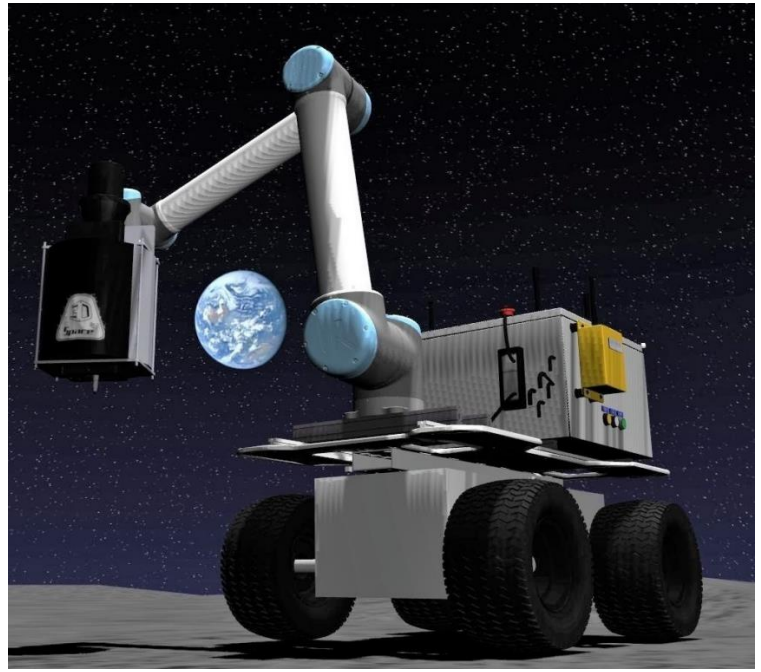
Technical University Braunschweig (2/2)



A lunar rover equipped with a 3D printer, which will be used to collect building materials on the moon and for on-site printing tests.

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Further HEROS projects

Automation in agriculture

Application scenarios:

- Agricultural field work
- Greenhouse and high-culture plants
- Horticulture and tree nursery management

Technical features:

- Modular design: Adaptable to different planting densities and row spacing
- Autonomous driving and path reconstruction: High-precision positioning system ensures work efficiency
- Environmentally friendly and energy-saving: Battery-powered, suitable for use in closed or semi-closed environments
- Intelligent control: Spray volume and path can be flexibly adjusted via the software

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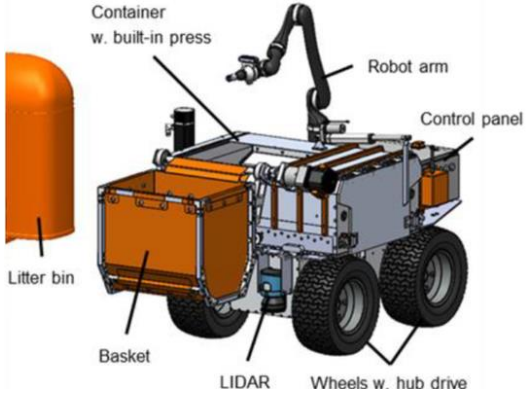
Further HEROS projects



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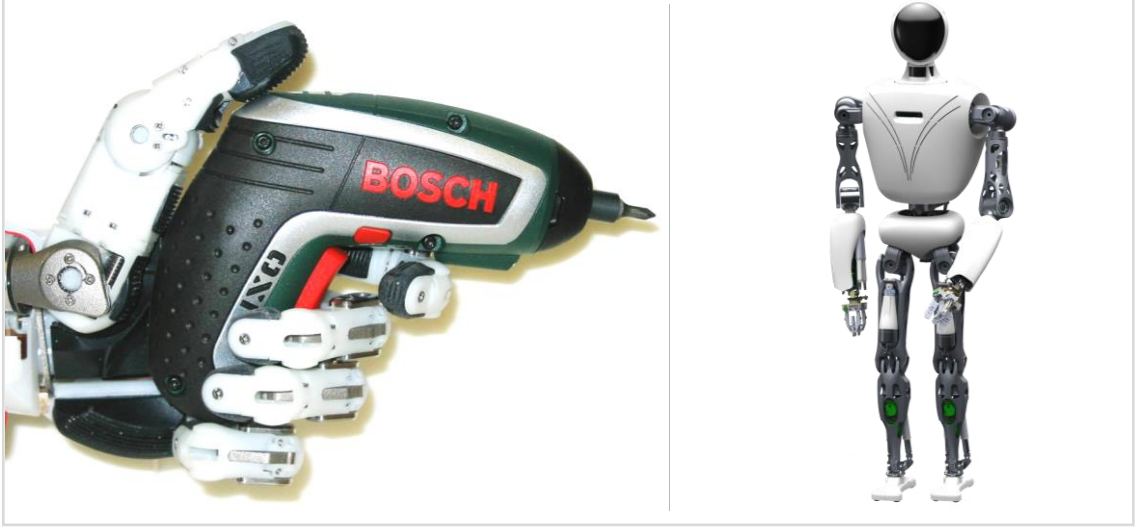
Autonomous mobile robots vs. humanoid robots



Optimised ‘robot adapter tool’ system

- High degree of maturity
  - Cobot and autonomous mobile systems ready for use
  - Established industrial tools for robot interfaces
  - Robust adapters and fixtures for various tools
  - Functional modules for special applications
- Future potential
  - Development of new tools, adapters and modules for additional applications
  - High investment potential with low risk

Complexity of humanoid robot systems

- Technical challenges
  - Highly complex hand and gripping systems (“human hand”)
  - Complex bipedal mechanisms
  - Demanding motion control based on humanoid technology
- Limitations & risks
  - Human anatomy not ideal for technical work
  - Humanoid robots as an inefficient solution for replacing human labour
  - High risks & long-term investment requirements

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What‘s next?

First presentation of the HEROS

Project planning according to individual customer requirements

Sending of a quotation

Delivery and instruction

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Any questions?

Feel free to contact us about your individual application!

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