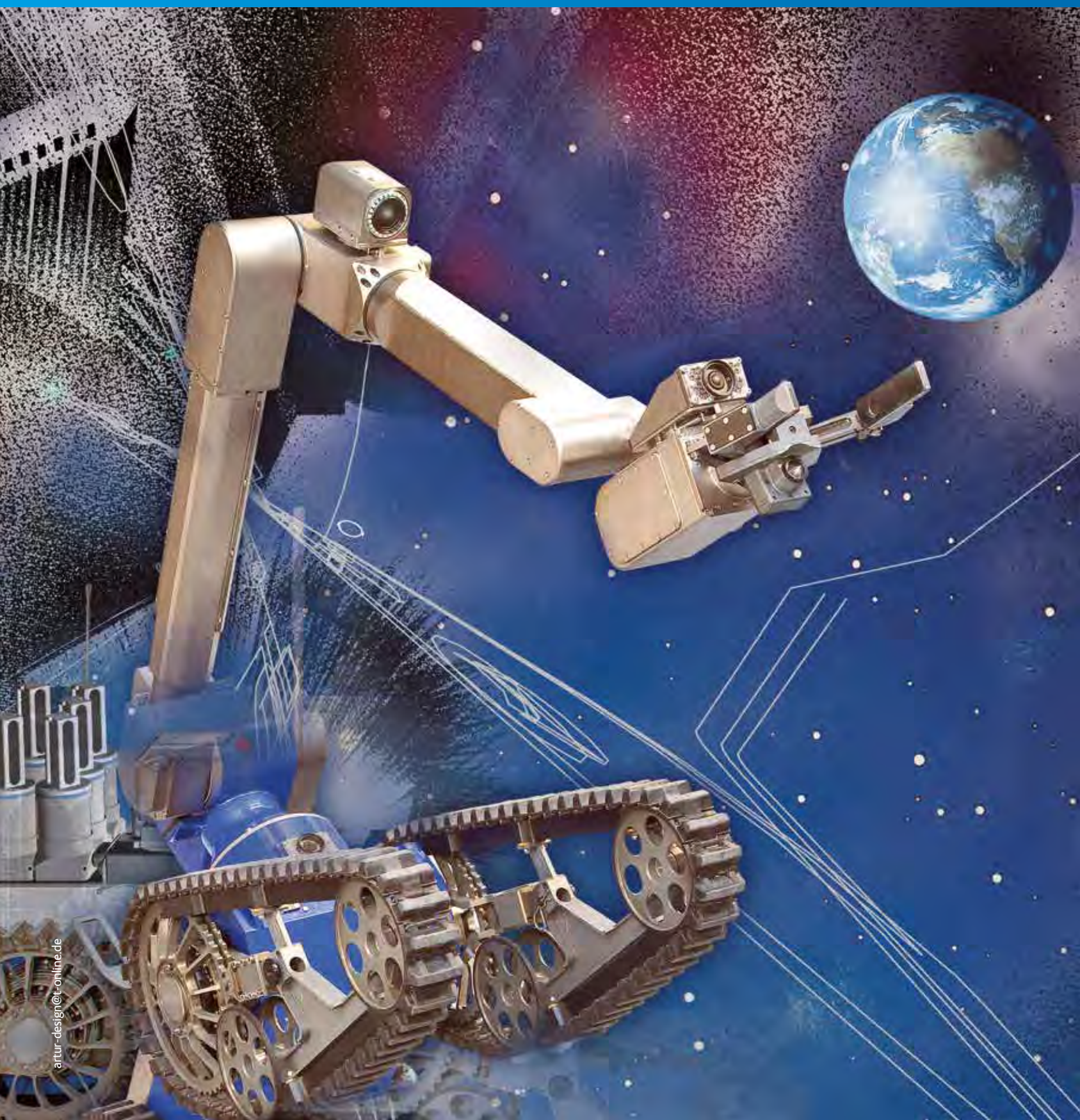
Unmanned Systems
EOD robots

COBHAM

The most important thing we build is trust



To develop machines, equipment and systems that PROTECT OR REPLACE HUMAN BEINGS in situations where their presence would be either impossible or place them at great risk. This is our motto, motivation and mission since 1994*

*Foundation of telerob Gesellschaft für Fernhantierungstechnik mbH. telerob is doing business as Cobham Mission Equipment - Unmanned Systems since 2011

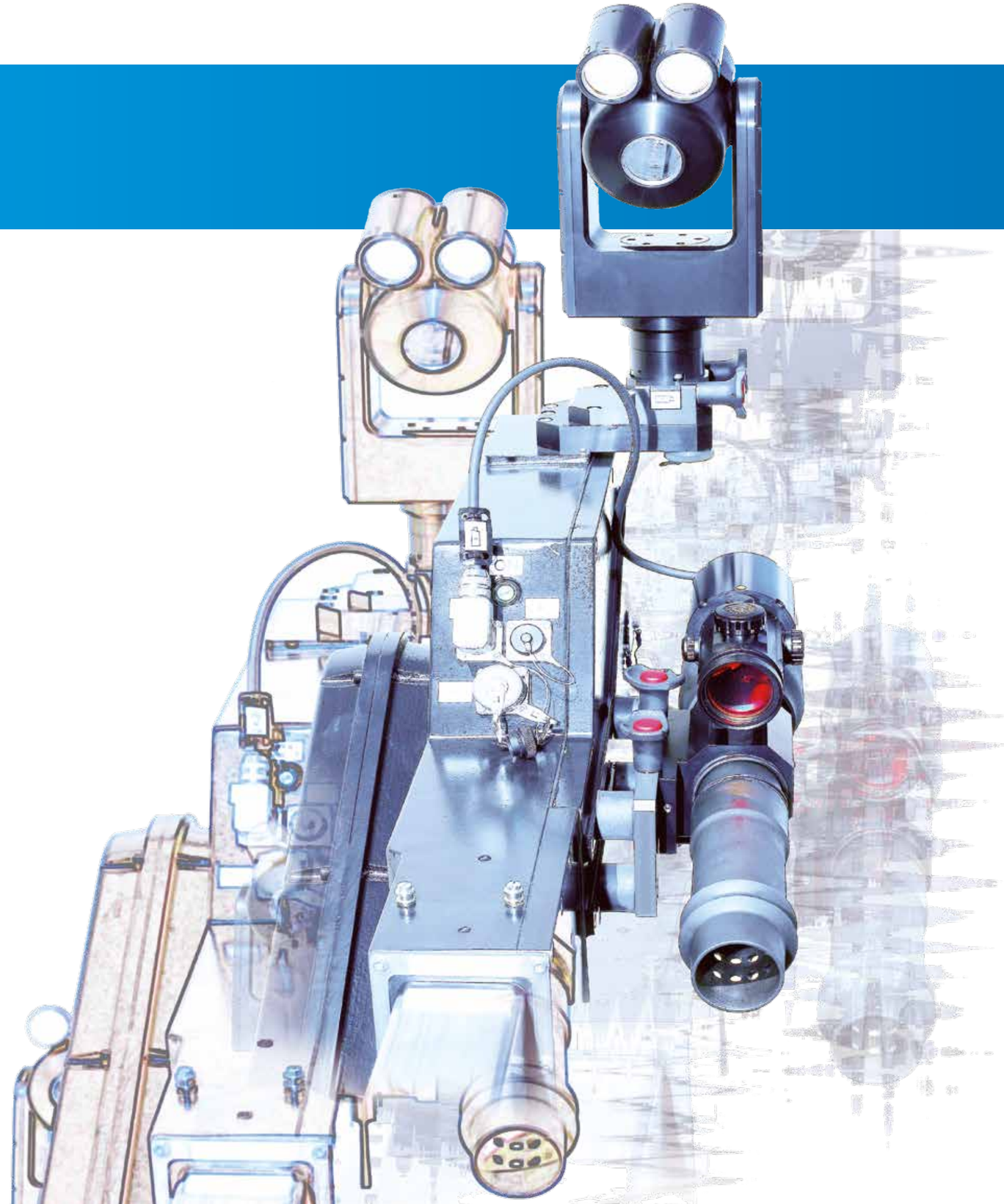
The EOD robot **tEODor**

Distance means safety

This basic rule with regard to disarming explosive devices means that bomb disposal officers increasingly prefer EOD robots as their tool of choice.

The **telerob** **E**xplosive **O**rdnance **D**isposal and ***o***bservation ***r***obot sets the standard worldwide. Robust, reliable and flexible in use, the innovative bomb disposal system provides a maximum degree of safety and protection.

More than **450** units in **41** countries help daily to prevent harm to people and the environment.
A total of **20** NATO countries place their trust in the superior reliability of the most widely sold EOD robot of recent years.



The highlights:

- Programmable 6-axis manipulator with linear axis
- Magazine for three additional EOD devices, with automatic tool change
- Parallel operation of up to five firing systems with a maximum of ten separate shots
- Universal interfaces to connect to all current firing systems
- Built-in diagnostic system with remote maintenance module
- Long list of accessories (more than 40 systems and devices)
- Can be used under all ambient conditions from –20 °C to +60 °C

The EOD robot **tEODor**

Technical Data

Vehicle

Length / Width / Height:	1 300 / 685 / 1 240 mm
Weight:	375 kg
Speed (infinitely):	max. 3 km/h
Climbing ability:*	45°
Turning circle:	1 460 mm
Payload:	350 kg
Towing capacity:	3000 N
Reach vertical / horizontal:	2 860 / 1 860 mm

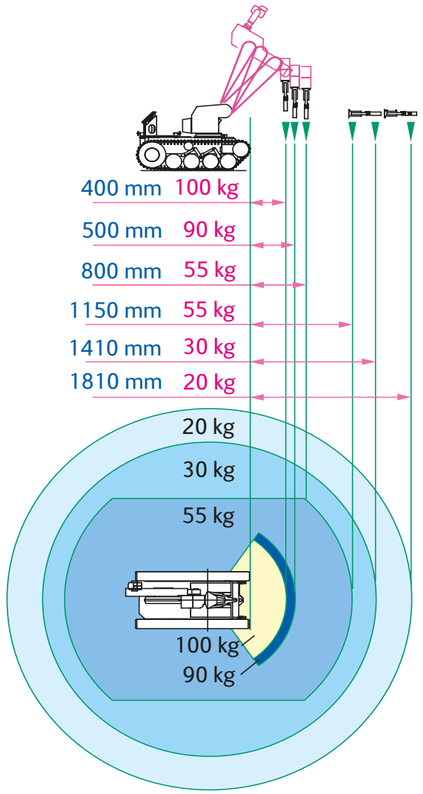
Manipulator

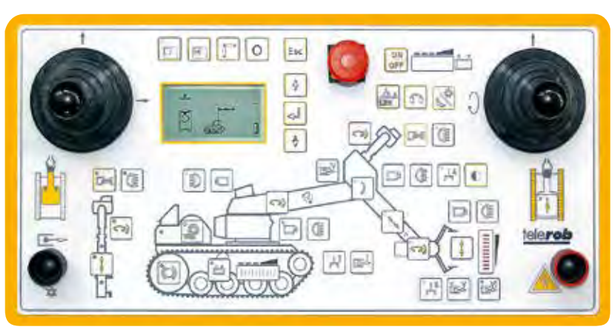
Turret rotation:	± 205°
Upper arm incline:	+ 144°, - 85°
Lower arm incline:	± 110°
Lower arm extension:	0 - 390 mm
Gripper incline:	+ 120°, - 95 °
Gripper rotation:	± endless
Gripper open/close:	300 mm
Gripper force:	600 N

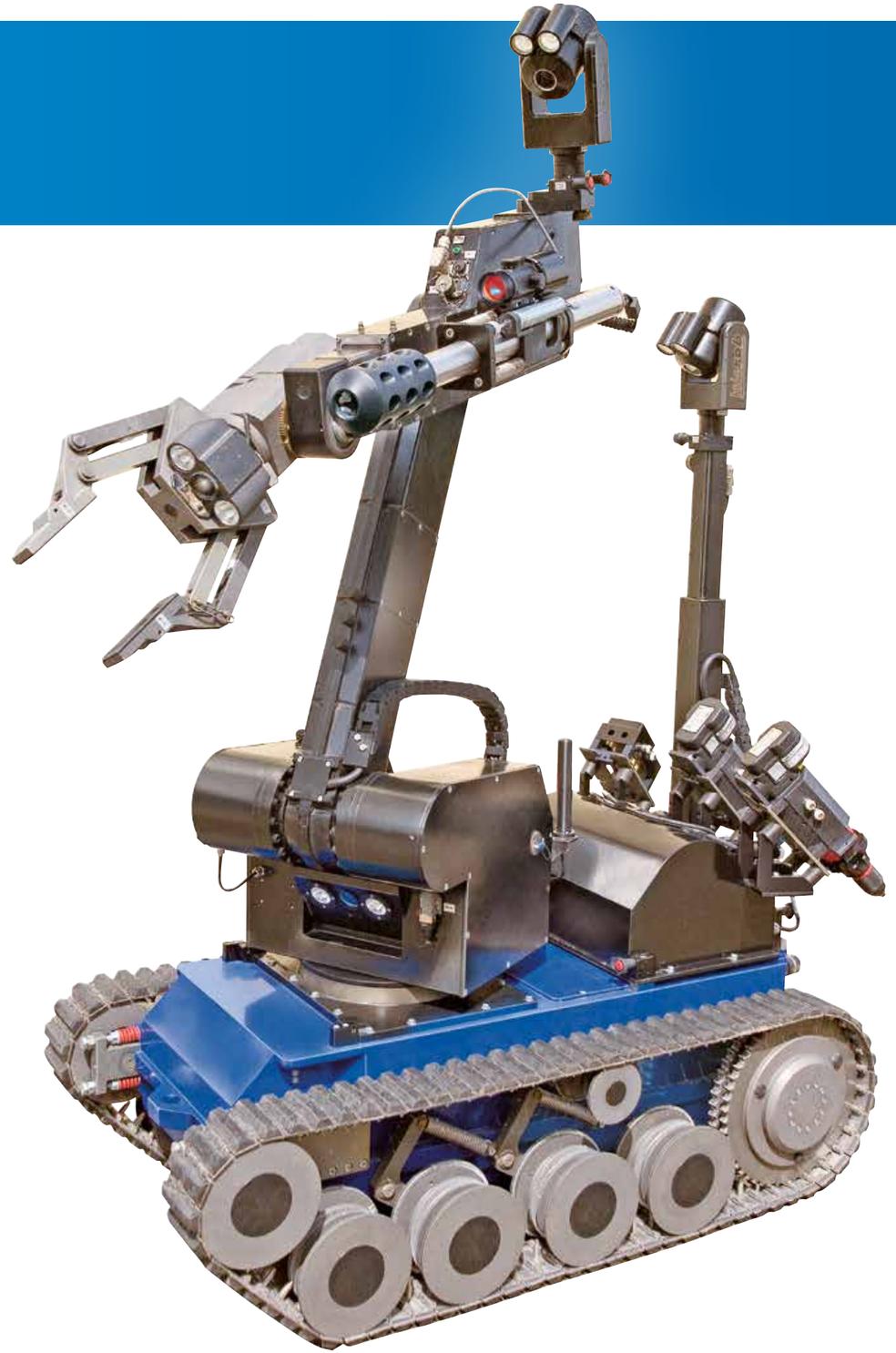
Control panel

Width / Height / Depth:	440 / 350 / 310 mm
Weight:	9 kg

**Depending on ground and friction. Trained operators under ideal conditions may achieve even more by using specific arm configurations.*







The EOD robot **tEODor**

The basic vehicle is designed as a twin-track vehicle. Extremely good maneuverability, good properties on open ground and the ability to climb at angles of up to 45°* characterize the running gear that is equipped with sprung rollers. It is easy to replace individual links of the robust steel track if they become worn or damaged.

The high-torque drive units work with continuous 4-quadrant control both backwards and forwards.
You can operate both the vehicle and the manipulator with extreme delicacy.
When the vehicle stops on slopes or gradients the safety brakes operate automatically to hold the vehicle in place.

The manipulator is a 6-axis high-power manipulator with a range of 2,860 mm.
It can handle even the heaviest objects thanks to a payload of up to 100 kg**. Slipping clutches protect the manipulator axes against damage in the event of overloading.

A unique feature in this class is that the manipulator has a linear axis in the lower arm. This simplifies all linear movements in particular and makes investigation underneath vehicles much easier. Just press a button to automatically initiate routine activities such as tool changes or folding up/unfolding.

* Depending on the surface and its friction characteristics. Greater values are possible if you position the arm accordingly and are working under ideal ambient conditions.
** See the Technical Data on page 6.

The EOD robot **tEODor**

You can control the robot either by radio or by using a 200 m fiber optic cable.

A special data protocol allows secure and error-free operation. Important vehicle data such as the battery voltage or the gripper force is collected regularly and shown on the control panel.

A built-in diagnostic system allows simple troubleshooting. Special software allows access to the diagnostic system via the internet.

In the basic version **the vision system** consists of two drive cameras plus one overview camera and one gripper camera. Stereo, night vision or infrared cameras are available as option.

The control station has been designed as a mobile operations control center. It has its own power supply and can be brought easily to any desired place of use. A large TFT monitor gives a superb overview of the operations area. The compact control panel can also be operated separately from the control station in the event of operations within sight of the vehicle.

COBHAM

Diagnostic System
No. 301969

Remote Diagnostic System
No. 302928

CAT Software
No. 303607

Simulation / Training

– 40°C to + 60°C
extended temperature range
No. 304717

17" monitor
No. 306062

PIP Function
No. 302349

Quadcopter

Holder **PROPARMS 12.5 RC**
No. 305514

Holder **PROPARMS 20 Neutrex**
No. 305087

Holder **PROPARMS 20 RC**
No. 305514

Control station | Robot

2-way audio
(Transmitter)
No. 305743

Digital video
(Receiver)
No. 305582

Holder **PIGSTICK**
No. 305160

Holder **HOTROD**
No. 300736

Holder **NEEDLE** (double)
No. 305389

Holder **ABL 2000**
No. 305595

Holder **ABL 3000**
No. 305596

Holder **RE 12g mini**
No. 303566

Holder **RE 70 M3 Plus**
No. 303565

Holder **TELEJET-short**
No. 304430

Holder **MULTIBLOCK**
No. 305297

Holder **MULTIBLOCK**
No. 305297

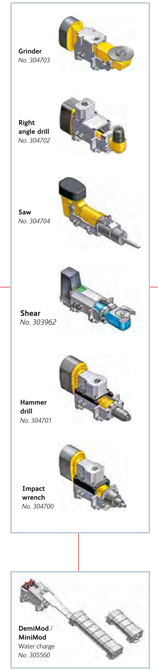
Spring hook
No. 207033

Magnetic clamp
No. 206251

Window breaker
No. 210524

Tearing hook
No. 206700

AQUASET
No. 15



Grinder
No. 304703

Right angle drill
No. 304702

Saw
No. 304704

Shear
No. 303962

Hammer drill
No. 304701

Impact wrench
No. 304700

DemiMod / MiniMod
Water charge
No. 305560

Mini Mace
Jet cutting system
No. 305057

Pan / Tilt camera
No. 301737

Camera mast
No. 302847

Brake release
No. 301732

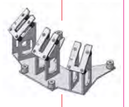
LIN
Freezing system
No. 301499

Sensor platform
No. 306018

Detectors:
+ GPS
No. 305342
+ X-am 7000
No. 305361
+ RadEye-PRD
No. 305360

Other detectors upon request

Tool magazine
No. 206227

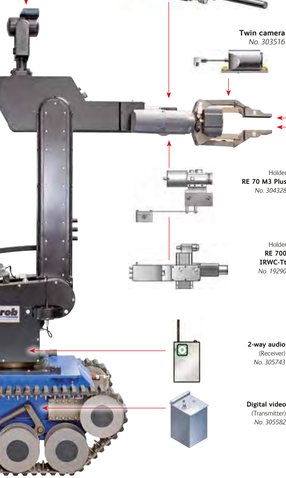


Fiber optic cable light
manual rewind
No. 305028

Fiber optic cable
automatic rewind
with integrated tool magazine
No. 305533

Automatic hitch
No. 304027

P/T night vision camera
No. 305770



Ignition cable drum
No. 207101

TELEJET-long
No. 305307

BENELLI M4 Super 90
No. 305148

Holder **PAN**
No. 305921

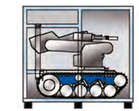
Twin camera
No. 303516

Holder **RE 70 M3 Plus**
No. 304328

Holder **RE 700 IRWC-Tt**
No. 19290

2-way audio
(Receiver)
No. 305743

Digital video
(Transmitter)
No. 305582



Transport container Robot
No. 207031

Transport container Control station
No. 207030

Ramp (foldable)
No. 205364

Car-towing device
No. 210065

Prism gripper
No. 201221

Large gripper
No. 206252

X-ray mounting frame
XR150, XR200 or XRS3
No. 301597

TELEVIS
No. 301513

VISICONSULT

Holder **Image plate**

XR150
No. 301495

XR200
No. 301496

XRS3

Spare parts package **electronic**
No. 302490

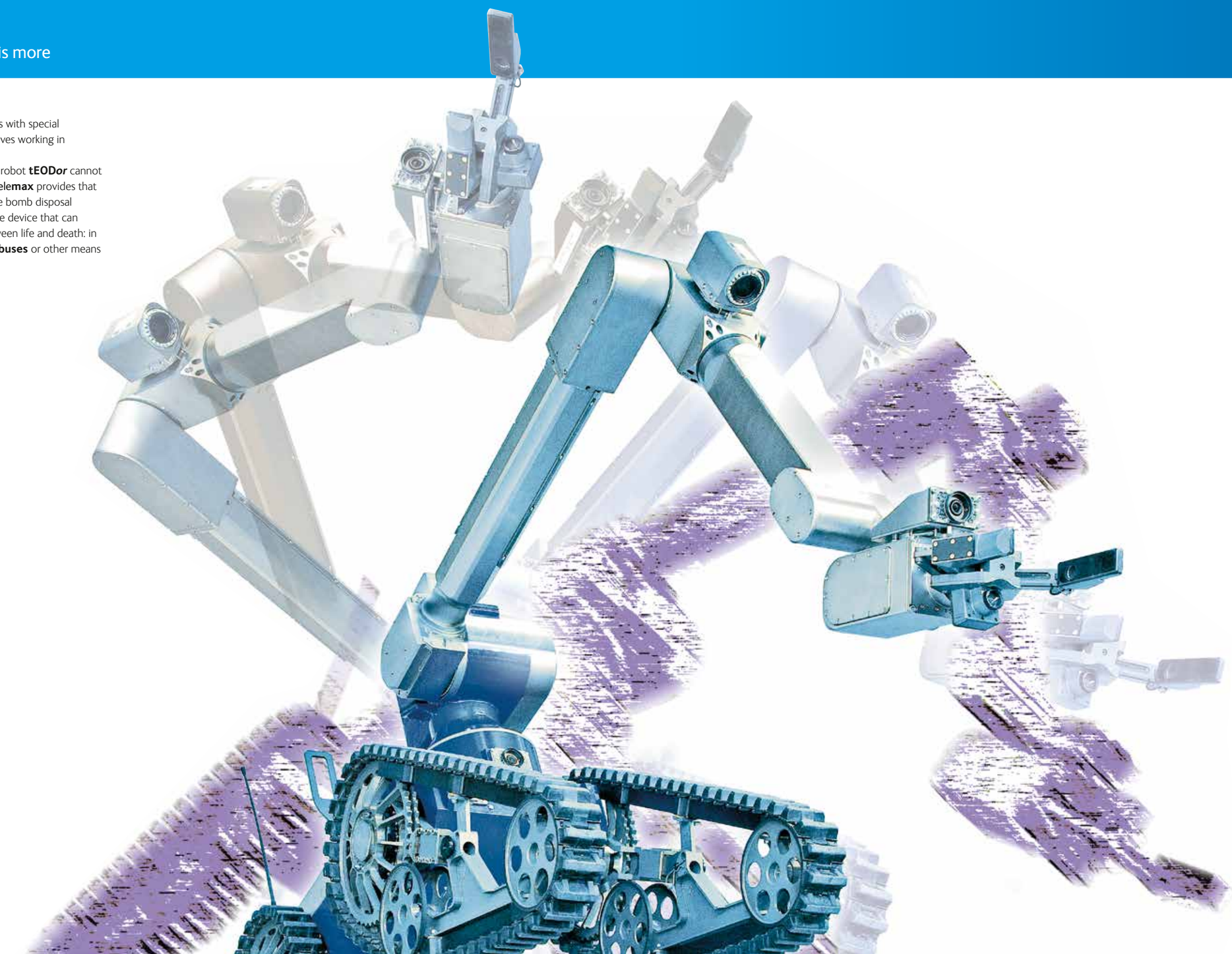
Spare parts package **mechanical**
No. 303718

Spare parts package **batteries**
No. 301924

The EOD robot **telemax**

Sometimes less is more

This basic principle applies with special force if the situation involves working in confined spaces.
In all cases where the big robot **tEOD*or*** cannot be used its little brother **tele*max*** provides that vital distance between the bomb disposal engineer and the explosive device that can mean the difference between life and death: in **aircraft**, in **subways**, in **buses** or other means of public transport.



The highlights:

- Programmable manipulator with Tool Center Point control
- Excellent mobility through 4-track running gear with **^{2}DRIVE** technology
- 7-axis manipulator with rotating turret and linear axis
- Very high reach through the telescope and chassis that can be adjusted for height
- Two tool magazines with automatic tool change
- IATA-conforming Li-ion battery system (in compliance with UN 38.3)
- Interfaces for: **AQUASET**, **ABL 2000**, **PROPARMS 12.5 RC**, **PROPARMS 20 RC**, **RE 70 M3**, **RE 12g Mini**, **BENELLI M4 Super 90**, **NEEDLE and DemiMod**
- Universal charger with intelligent battery management for Li-ion and NiMh technology
- Hybrid drive featuring fuel cells for long endurance missions

The EOD robot telemax

Technical Data

Length: 800 mm*
Width: 400 mm*
Height: 750 mm*
**Stowed position*

Vertical reach (stretched): 1955 mm (2 400 mm)
+ 290 mm telescope

Horizontal reach
front: 1530 mm
+ 290 mm telescope

Gripper payload: 5 kg

Speed:
Standard speed version: 4 km/h (track)
High speed version: 10 km/h (wheel)

Climbing ability: 45°
Obstacle ability: 500 mm
Ambient conditions:
Temperature: -20 to +60°C
Protection: IP 65

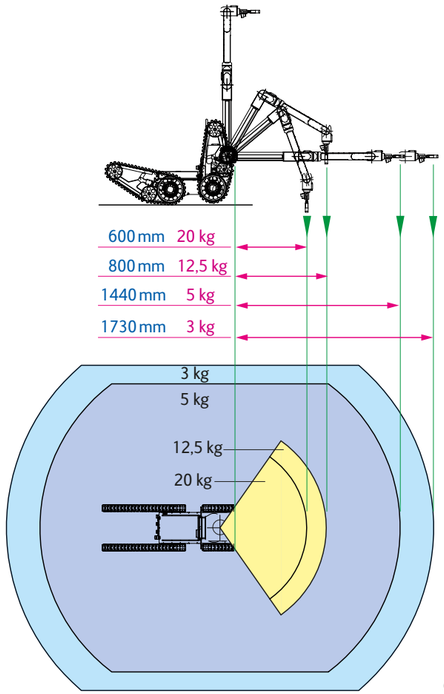
Two men portability acc. to MIL STD 1472E

Chassis: 4-track system, **2DRIVE**-Technology optional 4 wheels

Power: Battery NiMh 17Ah
Battery Li-ion 40Ah
Battery Li-ion 13.2 Ah

Operation time: approx. 2-4 hours

Subject to change without notice!



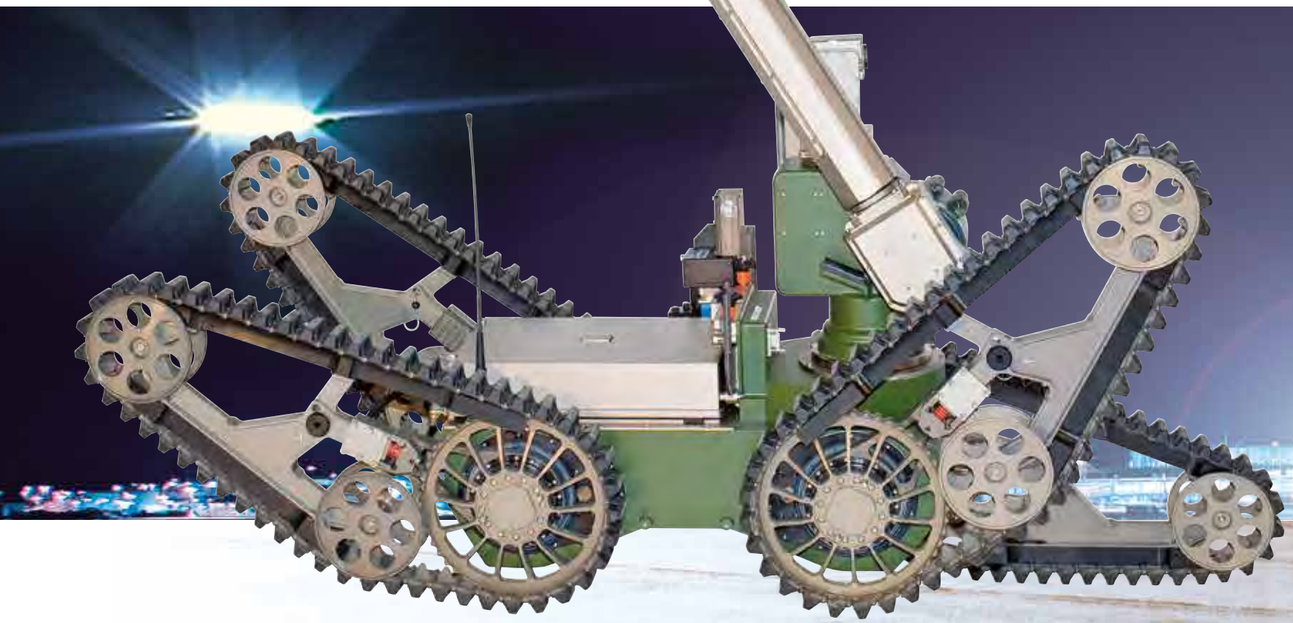
The EOD robot **telemax**

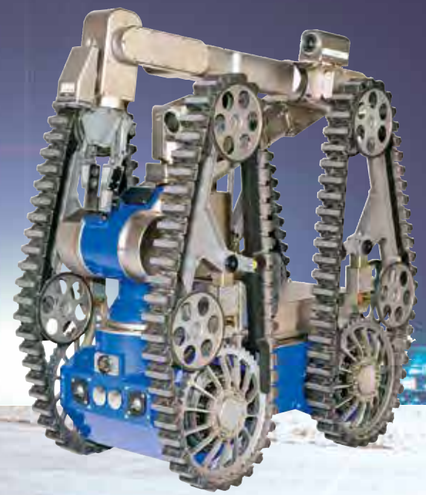
The chassis: A four-track running gear has been used for the first time in a vehicle of this size. It offers superior mobility compared to other forms of running gear. This means that it can handle gradients of 45° or 100% without difficulty. It can overcome obstacles of up to half a meter in height without problems *(see page 25, Fig. 1)*, and also trenches of 600 mm in width. The four individually suspended track units are controlled separately (**²DRIVE** technology) and can be moved individually, in pairs or all together as desired.
An intelligent controller sets running gear configurations to cope with the relevant situation at the press of a button. This makes it easier for the operator to control the vehicle, especially in tricky situations such as narrow stairways, high steps, etc. *(see page 25, Fig. 2)*. Inclination sensors ensure that the **telemax** always maintains its balance. And if you find that a travelling speed of 4 km/h is not enough, then the high speed version offers up to 10 km/h.

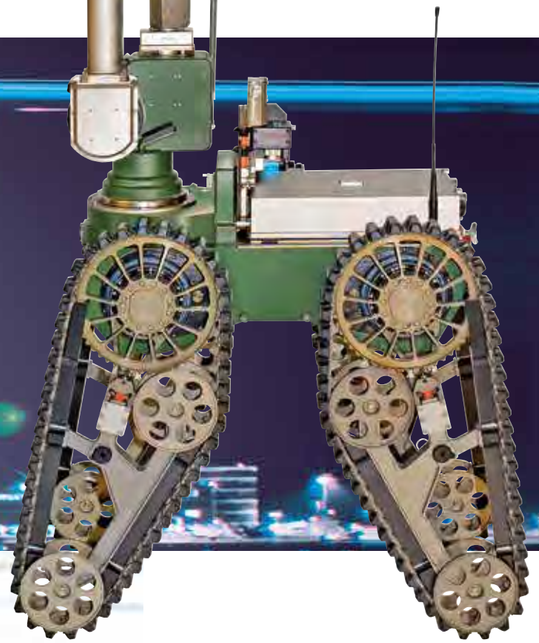
The operating concept: The vehicle is controlled from a control panel in laptop format. A ergonomically designed unit consisting of a thumb and finger joystick is responsible for the movement of the vehicle or the manipulator. The user can communicate directly with the system via a touch screen. The user interface adapts itself to suit the current circumstances and needs.

The signals from up to **six** colour cameras are displayed on a fold-out 10.4" LCD monitor. You can observe the situation simultaneously from two different perspectives thanks to a picture-in-picture function.

The control panel and the transmitting and receiving unit are stored in a robust trolley. This means that you can quickly and easily set up a control stand at any desired location.







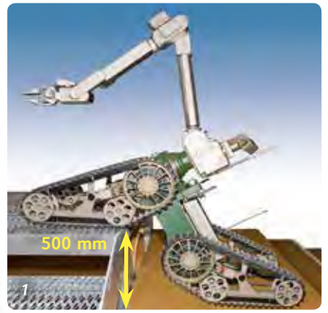
The EOD robot telemax

The manipulator: In order to understand the crucial advantage of the **telemax** system you need to consider the type of control used by conventional EOD robots. If you wish to approach an object with the manipulator, you do this by moving the individual axes.

The operating concept of the **telemax** is almost revolutionary by comparison.
It is the only EOD robot in the world that has a so-called **TCP controller**. **TCP** stands here for **Tool Center Point**, the middle point of the tool, or more simply, the gripper or disrupter. The gripper is positioned freely in space by the simultaneous movements of a thumb and finger joystick. The intelligent controller *(Fig. 3)* calculates which axis is to be moved, and how, in order to reach the desired goal.

What does that mean for the bomb disposal engineer? He gains vital time when approaching the suspicious object. This applies all the more as the approach route becomes increasingly complicated. The integrated robot controller also offers other advantages: It can be programmed. The operator can teach in and save routine movements of the manipulator or running gear positions, and call them up again if they are needed.

As the only vehicle in this class the **telemax** has two tool magazines that are incorporated into the chassis. This means that you can take along two additional tools/firing systems on an operation without needing to go back to the starting point. The manipulator automatically takes out the additional tools at the simple press of a button *(Fig. 4)*.



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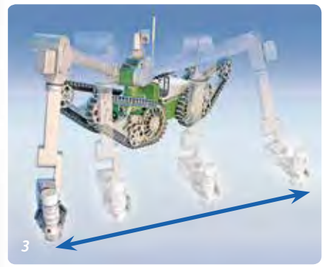
2


3


4

The EOD robot telemax

High reach in aircraft: This system was designed with special emphasis on possible use in aircraft. It fits into any aisle, thanks to a width of only 400 mm. With its running gear that can adjust for height and its telescope it can reach the overhead compartments in aircraft such as the Boeing 747.
The aircraft was parked on the apron? No problem, with its four-track running gear it can cope with even the steepest passenger staircase.

Diagnostic system: Making an important contribution to securing long-term usability, the controller offers the option to display various system states via a laptop. If there is an error, then a skilled operator or the service engineer can locate errors on the basis of the displayed data and provide a quick remedy.

Built-in test: The system first carries out a self-test after the start button is pressed. The main functions for internal communication and the system states are tested automatically.

Li-ion battery: We offer Li-ion batteries to increase the operation time. The 13.2Ah block was dimensioned to comply with the IATA transport guidelines and can be transported in any commercial passenger aircraft.

The firing system satisfies the most stringent requirements for safety. The coding of each individual firing process makes it impossible to fire shots outside of precisely specified conditions and operating steps. If any one of the conditions is not met or if a transmission error occurs, then the firing operation is cancelled. A suitable form of encryption also prevents unauthorized firing by other transmission units. The energy for the firing system is separated from the vehicle battery so that a defined amount of energy operates ignition elements of up to class HU. The robot offers an additional element of functional safety with resistance measurement of the firing circuit up to the firing element.
Of course all the firing devices and weapons that can be used on the **telemax** have also been tested thoroughly on the firing range during development to ensure that they function correctly within the overall system.

Holder
AQUASET
No. 305607

Holder
RE 12g Mini
with laser aiming device
No. 305681+ Nr. 305763

Holder
NEEDLE
No. 305768

Holder
ABL 2000
No. 305766

Holder
RE 70 M3
with laser aiming device
No. 305776 + Nr. 305762

Holder
PROPARMS 12.5 RC
No. 305679

Holder
PROPARMS 20 RC Mk3
No. 305680

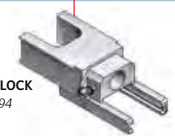
Holder
DemiMod
Water charge
No. 305700

DemiMod kit
No. 305705

Holder
Fido
Explosives sensor
No. 305537

Inspection camera
No. 305697

Holder
MULTIBLOCK
No. 305594



Key holder
No. 208211

Tearing hook
No. 208210

Window breaker
No. 210453

Universal cutter
No. 305711

Wire cutter
No. 306053

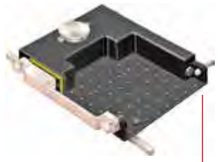
Universal charger
No. 305868

Wheel set
No. 305874

Sensor platform
No. 305876

Detectors:
- **X-am 7000**
- **RadEye-PRD**
- **BioBadge 100**
- **ChemPro 100**

Other detectors upon request



2-way audio system
Nr. 306006

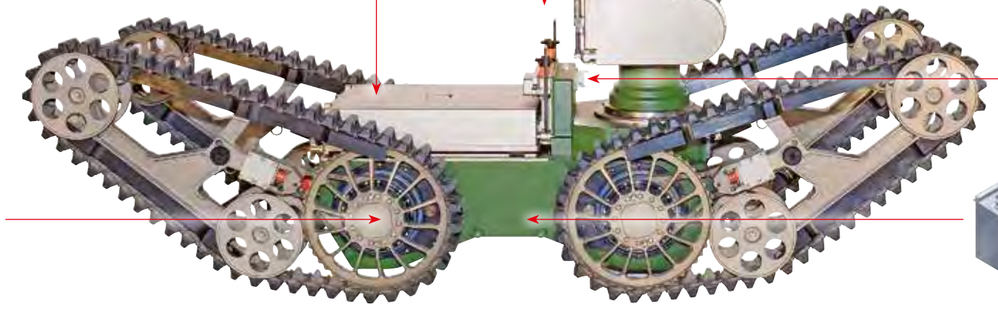
Fiber optic cable
No. 305708

Fuel cell
No. 305857

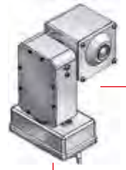
Battery NiMh 24V/17Ah
No. 305804

Battery Li-ion 26V/40Ah
No. 305822

Battery Li-ion 26V/13.2Ah
No. 305817



P/T thermal image camera
No. 305980



P/T zoom camera
No. 305978

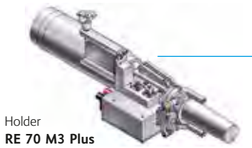
P/T night vision camera
No. 305979

Light module
No. 305227

Zoom camera
No. 305586

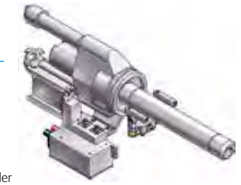
Fix-focus camera
No. 305219

Holder
RE 70 M3 Plus
with laser aiming device
No. 305761

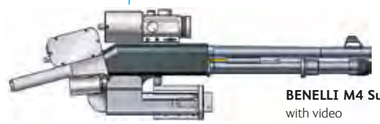


Holder
RE 70 M3 Plus
with video aiming device
No. 305687

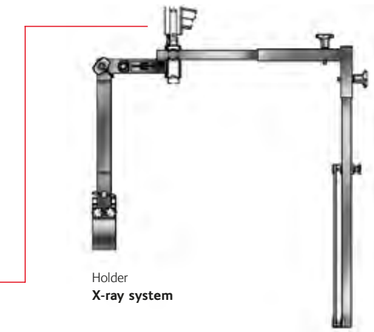
Holder
PROPARMS 20 RC Mk3
with laser aiming device
No. 305823 + No. 305762



BENELLI M4 Super 90
with video
aiming device
No. 305683



Holder
X-ray system



Diagnostic System
No. 305897

Remote Diagnostic System
No. 305898

Spare parts package
electronic

Spare parts package
mechanical

Holder
Sansolo Rapid Coil
No. 305777

Digital video
(Transmitter)

Digital video
(Receiver)

The service robot NBCmax

Sample container with shovel for taking granular substances.

Sample container using a cotton bud for taking liquids.

Sample container with swab to be used in ion-scanners.

Sample container with automatic grasp for picking various objects.

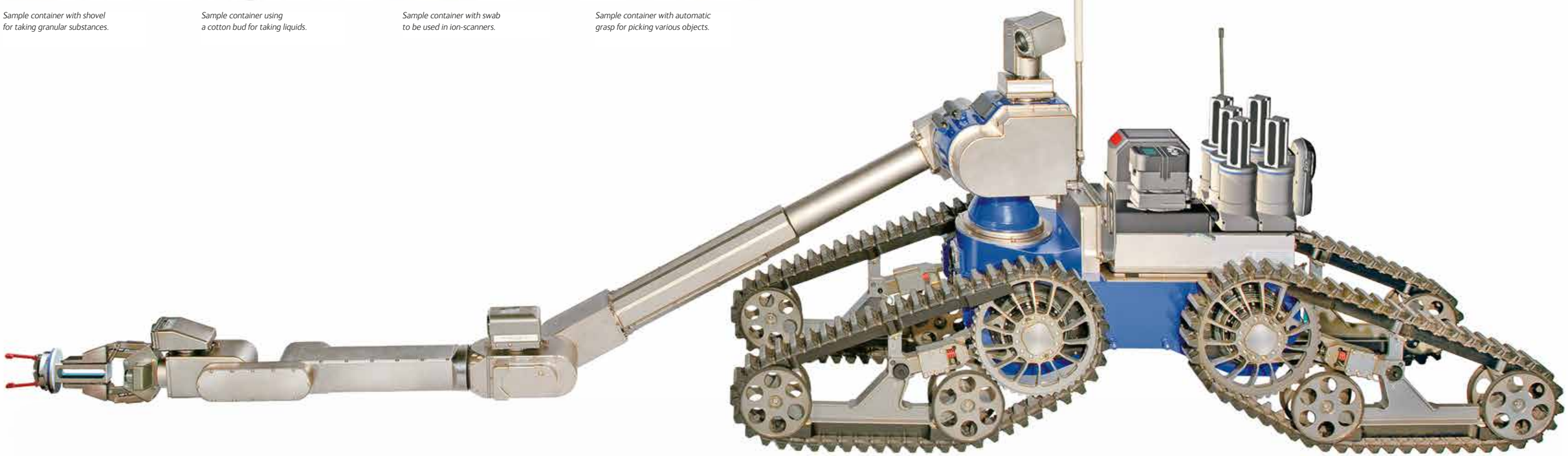
Not only bomb disposal engineers are exposed to a wide and varied range of hazards today. Rescue forces and first responders such as the fire service, technical rescue specialists or international aid forces increasingly get into situations that involve an extremely high level of personal danger.

This applies increasingly to operations that involve hazardous materials, toxic substances or even biologically harmful materials such as viruses or bacteria. Once such substances have been released – whether through accidents or intentionally – the rescue forces are exposed to maximum danger if working manually.

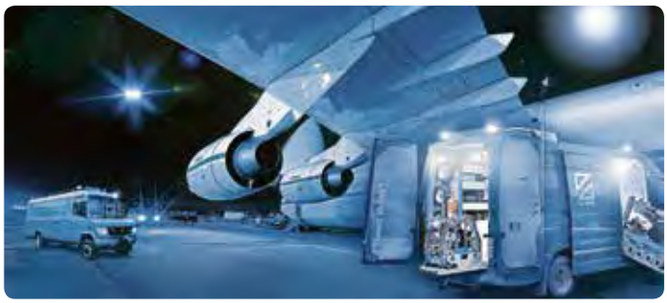
True to its motto, we have developed an unmanned system for these response forces to allow them to inspect, and if applicable, deal with hazards from a safe distance.

The service robot **NBCmax** is a universal mobile sensor platform that can be equipped with a broad palette of sensors to detect and investigate chemical, biological, explosive or toxic substances. The collected data, everything from a simple gas concentration to gamma radiation up to evidence of explosives, is transmitted online to the control panel of the robot and processed for the operator.

The crowning achievement here is a sample-taking system that has been completely developed from scratch.
The system consists of a magazine with up to five containers. The robot automatically opens one container, takes a sample, and conveys it fully automatically into the container.
The robot then closes the container and can go on to take another sample with the next container. This means that if there is a suspicion that especially critical substances are involved, then samples of the material can be collected from a safe distance and subsequently transported to a suitable investigation point.



System solutions, networked mobile systems



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