

Advanced Automatic RF Tracking and Observation Solution

Aaronia AARTOS DDS

Captures any kind of UAV / Real-time remote controllable / All-in-one solution



Extremely high coverage of several km

Locates the drone and the drone operator

360° coverage with high tracking accuracy

Highlights

- ✓ Real-time measurement of the RF emissions from drones / UAVs, radar etc.
- ✓ Tracks the operator controlling the drone too
- ✓ Extremely high coverage, several kilometers depending on the drone type
- ✓ Works with unlimited number of drones at the same time
- ✓ Identification of the drone type (e.g. DJI Phantom 4)
- ✓ Works at night, fog and bad weather
- ✓ Also works against drones “disguised” between buildings, plants, trees
- ✓ Allows for 24/7 recording and monitoring without any gaps
- ✓ High tracking accuracy of up to 1°
- ✓ Ready for use within a minute (portable version)
- ✓ 360° coverage
- ✓ DF measurement accuracy up to ITU class A
- ✓ Covers a frequency range of up to 20MHz to 20GHz
- ✓ Unlimited in size & numbers of receivers, arbitrary scalable and expandable
- ✓ High sensitivity even in urban environment, due to switchable sectro-amps
- ✓ Made in Germany



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MADE IN GERMANY

Aaronia AARTOS DDS

Anti-UAV System to monitor, detect and defeat unwanted Drones

After 4 years of development, Aaronia introduces its new drone detection system - the AARTOS DDS. It is used to detect the incursion of unwanted drones, based on the directional real-time measurement of the electromagnetic emissions of the drone and its remote control. It warns the operator when drones are in the area and send alerts.

Drones can be more than just an annoyance

The rapid proliferation of micro/mini UAVs is a growing potential threat to national and commercial security. Easy to produce, cheap to buy, simple to fly, and hard to detect, commercially and non-commercially available drones are one of the most quickly evolving technological threats to military and civilian interests. A commercial drone reportedly alarmed the Secret Service in March 2015 when the aircraft flew too close to President Barack Obama during a round of golf in Florida.



Detection Range

The system has no limitation in detection range, usually the detection range is the same as the usable distance from the operator to the drone (or better), so it always depends on the transmitter power of the drone/operator. Depending on the drone type, it could be several km / miles without problems.

Early detection

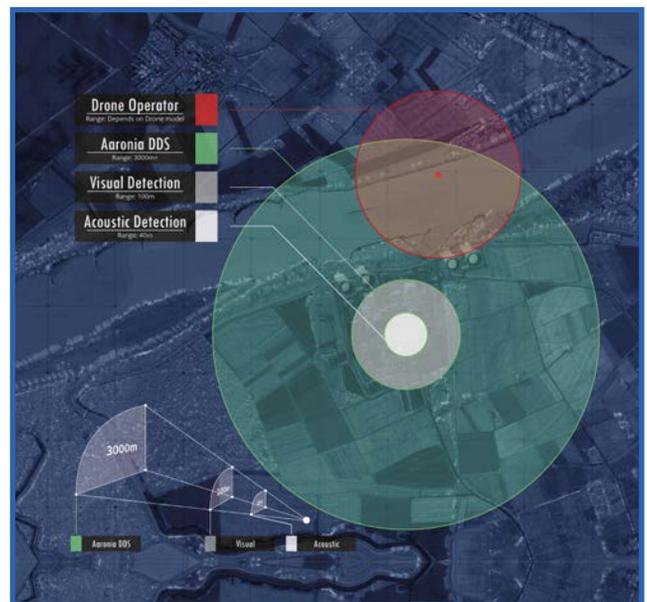
The AARTOS Drone Detector already gives an alarm as soon as a remote control is on air, so even before the drone is in the air. Countermeasures can therefore be initiated at an early stage.

Aaronia Drone Detector can be used anywhere

The drone detection system can be used virtually anywhere. Typical use scenarios are the protection of residential areas, governmental buildings and commercial / industrial areas like nuclear plants. Available as single-side or multiple-side solution, the system is adjustable to the characteristics of the terrain to be monitored.

Hardware

The drone detector is based on the Aaronia Iso-LOG 3D antenna, a real-time Spectrum Analyzer (XFR V5 PRO, RR or RF Command Center) and a special software plugin for the RTSA Suite software. All parts combined allow a 24/7 monitoring and recording with a gapless data-streaming. The system saves considerable measurement time and is compact and flexible. It can be set up at any place you need to control.



Typical Detection Range of the AARTOS DDS



Counter-Measures

The system can be extended by a jammer that can effectively prevent RF contact to a drone to force it into the fail-safe mode, e.g. to land or to hover. The interference is extremely selective, that other RF channels are not impaired.

Besides the selectivity the jammer is highly directional and only jams in the direction of the incoming UAV.

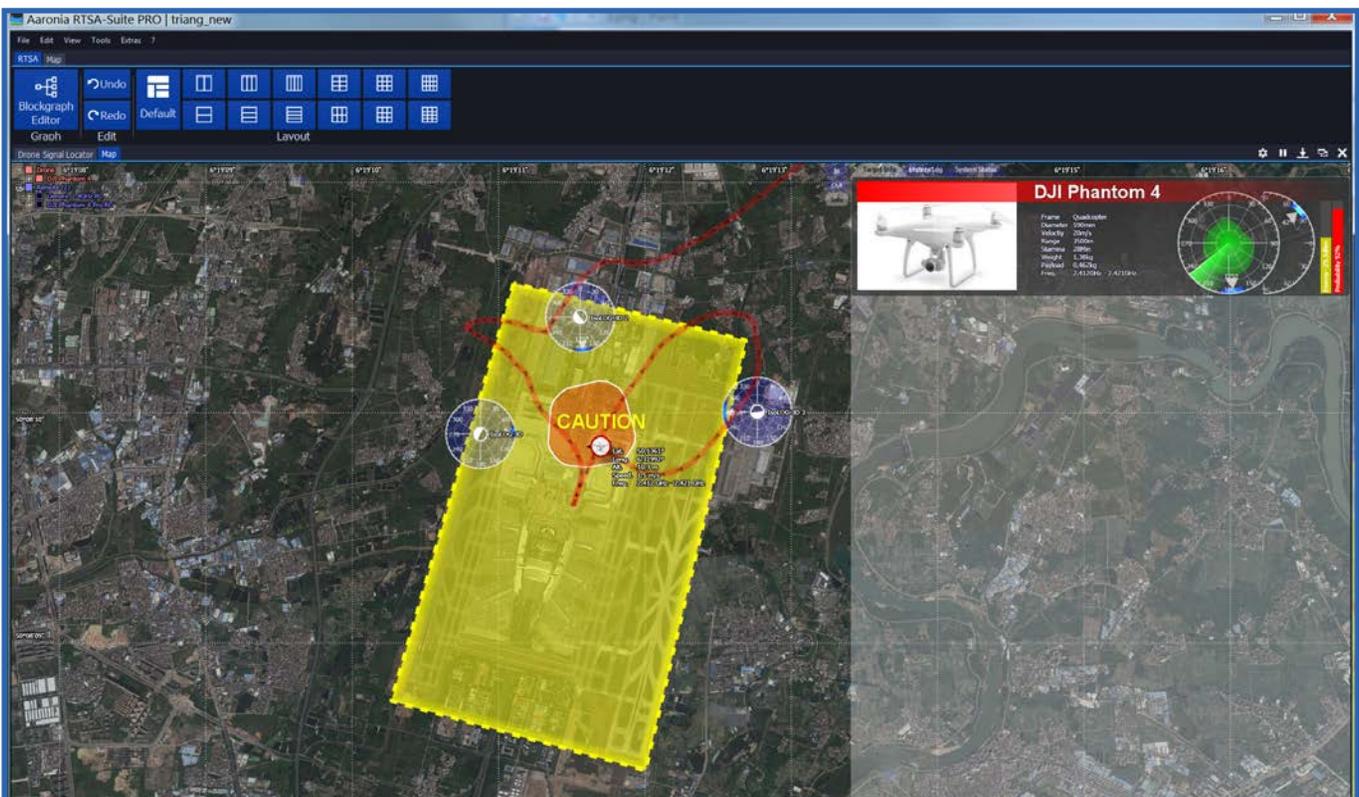
Advantages of a radio communication solution

The RF detection of the drone signals has minor advantages compared to other methods such as radar, optical and acoustic detection:

- **Safe detection without false alarms**
The system can not be irritated by other flying objects such as birds, balloons or dragons.
- **Early detection**
The AARTOS DDS already gives an alarm as soon as a remote control is turned on, so even before the drone is in the air. Countermeasures can therefore be initiated at an early stage.
- **Tracking the drone owner**
Since the Aaronia AARTOS DDS detects both the drone via its downlink signals as well as the remote control, the direction of both can be tracked immediately. When 3 or more systems are used, the exact position can be determined via triangulation.

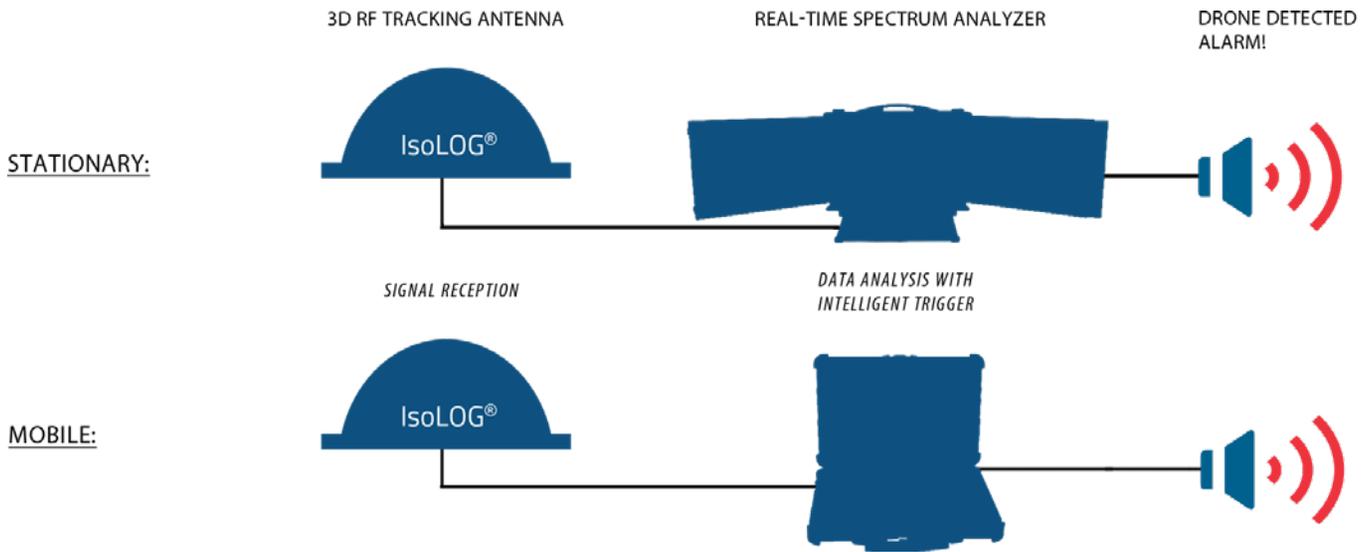
Made in Germany

The Aaronia AARTOS DDS is developed, individually manufactured and calibrated in Germany. This guarantees highest standards.



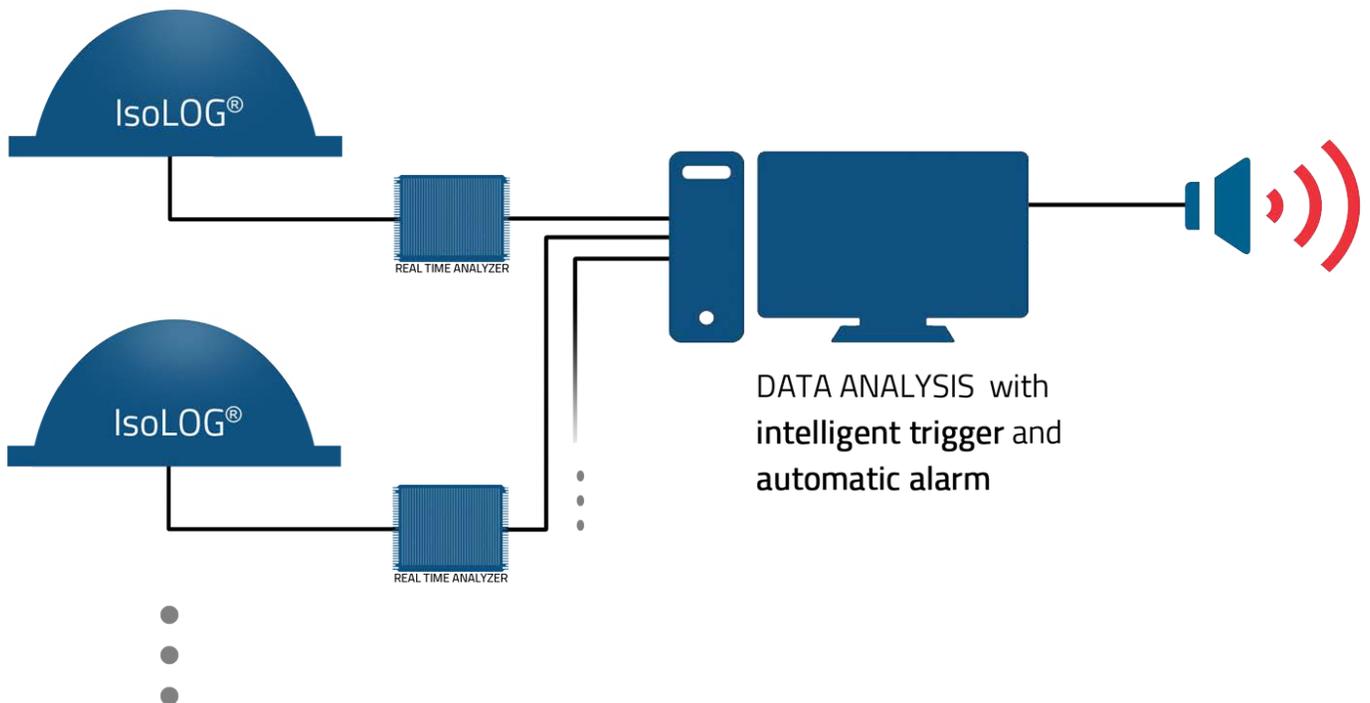
This picture shows the map view of the AARTOS DDS, with triangulated position of the drone (red) inside a warning area (yellow). The DDS shows even the type of detected drone and can handle an unlimited number of drones simultaneously.

Single Site / Portable Solution



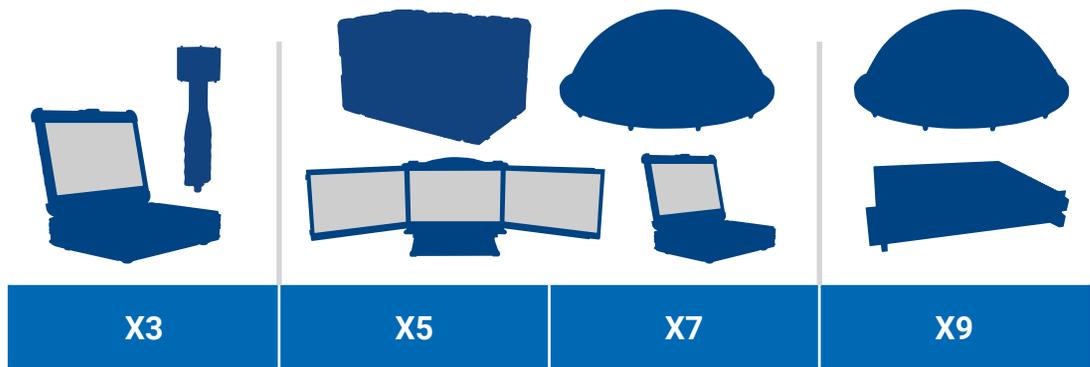
The single site solution is ready to use within a few minutes only. Based on a stationary or mobile Spectrum Analyzer (RF Command Center or XFR V5 PRO, see page 6) and the 3D direction finding antenna IsoLOG 3D, this solution is the first choice for surveillance of smaller areas, e.g. a house or a prison.

Multi-Site Solution



The multi solution consists of several antennas (IsoLOG 3D) and analyzers (Spectran V5 Rugged Rack), coupled together to one centralized monitoring PC which manages all systems simultaneously. The advantage of the multi solution is the possibility to triangulate the signals. This leads to a very high tracking accuracy. Furthermore, the multi solution can combine an unlimited number of receivers, thus it's suitable to protect very large areas e.g. industry plants, stadiums, government buildings etc.

System Versions

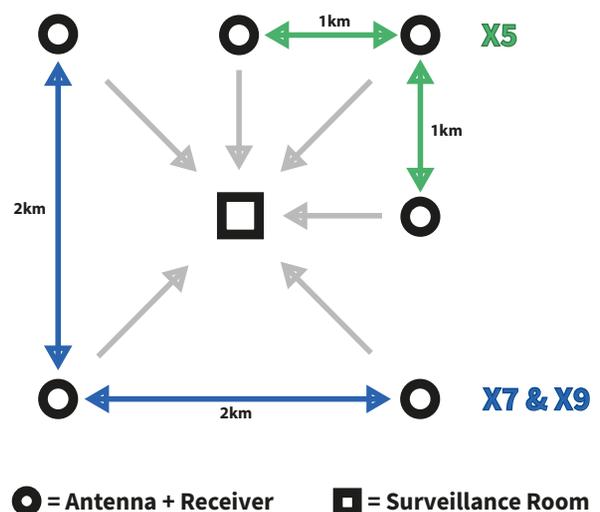


	X3	X5	X7	X9
Range	500m - 1km	1km - 2km	2km - 5km	3km - 7km
Sectors	Omnidirectional	8	16	16
Tracking Accuracy (Line of Sight)	Omnidirectional	4 - 6°	1 - 3°	1 - 3°
ITU Class for Tracking Accuracy	-	B	A	A
Amps	1	2	2	2
Simultaneous Band Coverage	Hopping	Hopping	Hopping	Real-Time
Receivers	1	1	1 (2 - Optional)	4-8 (unlimited additional receivers)
Scalable	No	Yes	Yes	Yes
Recommended Grid Distance	-	1km	2km	2km
Included Equipment	V5 XFR Pro, IsoLOG 3D Mobile	Command Center / XFR Pro /RR, IsoLOG 3D	Command Center / XFR Pro /RR, IsoLOG 3D	UWB, IsoLOG 3D

Using a GRID (X5 - X7 - X9)

When using the AARTOS DDS as a scalable grid solution for drone and RF detection, we recommend placing the antenna + receiver combos at certain distances from one another in order to assure the best coverage and detection without gaps. For the X5 we recommend a maximum distance of 1km, for the X7 and X9 a maximum distance of 2km.

The GRID system can be conveniently remotely controlled from a centralized location.



System Versions

X3 (Mobile)

Designed to be used as an easily portable drone and jammer detection device. This setup is light-weight and comfortable for the carrier. It offers a long battery life.

X7 (Advanced)

The highest precision in drone detection, combined with a very high detection range. Perfect for both single-system and multi-grid-system setups. It consists of a 16 sector IsoLOG 3D antenna-array and a spectrum analyzer (Command Center, XFR Pro or Rugged Rack).

X5 (Base)

The system consists of an analyzer (Command Center, XFR Pro or Rugged Rack) and an IsoLOG 3D antenna-array with 8 sectors. It can be used as a very cost-effective method to cover large areas with drone detection systems.

X9 (Ultra Wideband)

The X9 combines the highest precision and range and adds ultra wideband monitoring for instant, real-time detection on multiple bands (instead of one instant or multiple via hopping). Consists of an IsoLOG 3D antenna-array with 16 sectors and the UWB unit.

Jammer Versions

Manpack-Jammer



Omni- or Directional Antenna,
Covers **5 bands,**
120W (range up to **2,5km**) output

Corner-Jammer (180°)



2 sectors with 2 antennas,
Covers **7-8 bands,**
180W (range up to **3km**) or
650W (up to **6km**) output

Omni-Jammer (360°)



4 sectors with 4 antennas,
Covers **14-16 bands,**
360W (range up to **3km**) or
1300W (up to **8km**) output

Jammer Disclaimer

The AARTOS CMS (Counter-Measure Solutions) can only be sold to entities, who have proper government permits for the deployment of jammers. Contact us for more information at mail@aaronia.de

Analyzer Versions



Portable Analyzer

The SPECTRAN V5 XFR Pro is the right choice if a portable system is required. A rugged, military grade Laptop, with a powerful i7 processor and an integrated spectrum analyzer.

Perfect for rapid deployment in the field - set up the IsoLOG 3D antenna, connect it to the XFR Pro and you are ready to detect drones.

Stationary Analyzer

The SPECTRAN V5 Command Center is built with the newest and most powerful hardware available (or with different specs per request). Three Full-HD monitors offer enough space to display all the information the RTSA Suite Software can show at the same time.

The hardware and large displays make the Command Center an excellent choice for stationary systems.



Grid / Indoor / Outdoor 19" Rack

The SPECTRAN V5 Rugged Rack is highly versatile and can be used as either an indoor or outdoor analyzer in multiple configurations for remote detection or as a part of an antenna-analyzer grid, allowing the coverage of large areas and the triangulation of drones/operators.

It can be water- and dustproof, remote controllable and requires almost no maintenance.

Ultra Wideband Analyzer

The UWB Recorder is our analyzer-array. It makes the monitoring of multiple bands in real-time (without hopping) possible.

Available as a PC-System, 19" Version or Server-Rack, with a real-time bandwidth of up to 20GHz. It can be used for stationary or grid systems and is the choice for no-compromise system setups.



Antenna Versions

IsoLOG 3D 80



8 sectors with 16 antennas

Frequency range: 680MHz (20MHz) to **6 GHz**
 Tracking accuracy (line of sight): **4 to 6°**

Frequency range	
Standard	680MHz to 6GHz
VLF Extender to 20MHz (option)	Yes
SHF Extender to 20GHz (option)	Yes

Additional Options	
Internal GPS receiver	Yes
Internal low-noise pre-amplifier	Yes (included)
Customized color (RAL table)	Yes (standard - white)

Mechanical & Environmental	
Operating temperature	-30 to +60°C (-22 to 140° F)
Storage temperature	-40 to 70°C (-40 to 158°F)
Dimensions	950 x 950 x 300mm
Weight	approx. 20kg
RF Output	N (50 Ohm)
Warranty	2 years

IsoLOG 3D 160



16 sectors with 32 antennas

Frequency range: 680MHz (20MHz) to **6 GHz**
 Tracking accuracy (line of sight): **1 to 3°**

Frequency range	
Standard	680MHz to 6GHz
VLF Extender to 20MHz (option)	Yes
SHF Extender to 20GHz (option)	Yes

Additional Options	
Internal GPS receiver	Yes
Internal low-noise pre-amplifier	Yes (included)
Customized color (RAL table)	Yes (standard - white)

Mechanical & Environmental	
Operating temperature	-30 to +60°C (-22 to 140° F)
Storage temperature	-40 to 70°C (-40 to 158°F)
Dimensions	950 x 950 x 300mm
Weight	approx. 20kg
RF Output	N (50 Ohm)
Warranty	2 years

References



Cross-Section of Aaronia Clients

Government, Military, Aeronautic, Astronautic

- NATO, Belgium
- Department of Defense, USA
- Department of Defense, Australia
- Airbus, Germany
- Boeing, USA
- Bundeswehr, Germany
- NASA, USA
- Lockheed Martin, USA
- Lufthansa, Germany
- DLR, Germany
- Eurocontrol, Belgium
- EADS, Germany
- DEA, USA
- FBI, USA
- BKA, Germany
- Federal Police, Germany
- Ministry of Defense, Netherlands

Research/Development, Science and Universities

- MIT - Physics Department, USA
- California State University, USA
- Indonesien Institute of Science, Indonesia
- Los Alamos National Laboratory, USA
- University of Bahrain, Bahrain
- University of Florida, USA
- University of Victoria, Canada
- University of Newcastle, United Kingdom
- University of Durham, United Kingdom
- University Strasbourg, France
- University of Sydney, Australia
- University of Athen, Greece
- University of Munich, Germany
- Technical University of Hamburg, Germany
- Max-Planck Inst. for Radio Astronomy, Germany
- Max-Planck-Inst. for Nuclear Physics, Germany
- Research Centre Karlsruhe, Germany

Industry

- APPLE, USA
- IBM, Switzerland
- Intel, Germany
- Shell Oil Company, USA
- ATI, USA
- Microsoft, USA
- Motorola, Brazil
- Audi, Germany
- BMW, Germany
- Daimler, Germany
- Volkswagen, Germany
- BASF, Germany
- Siemens AG, Germany
- Rohde & Schwarz, Germany
- Infineon, Austria
- Philips, Germany
- ThyssenKrupp, Germany
- EnBW, Germany
- CNN, USA
- Duracell, USA
- German Telekom, Germany
- Bank of Canada, Canada
- NBC News, USA
- Sony, Germany
- Anritsu, Germany
- Hewlett Packard, Germany
- Robert Bosch, Germany
- Mercedes Benz, Austria
- Osram, Germany
- DEKRA, Germany
- AMD, Germany
- Keysight, China
- Infineon Technologies, Germany
- Philips Semiconductors, Germany
- Hyundai Europe, Germany
- VIAVI, Korea
- Wilkinson Sword, Germany
- IBM Deutschland, Germany
- Nokia-Siemens Networks, Germany


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