

DR 100 for S-UAS



KONGSBERG



3D Drone Detection Radar

The Kongsberg DR 100 is a purpose-built Drone (UAV) Detection Radar providing tracking and classification out of the radar panel. It is a small and low-weight, non-rotating, solid-state panel-based radar. The radar is made to recognize commercially available, low-cost and small UAVs (Unmanned Aerial Vehicle) that can easily be rebuilt to carry small payloads, potentially causing large damage. In recent years, smaller commercially available drones have been used in conflict areas as well as around public arrangements and critical infrastructure, both to support good and bad intentions.

The opening angle is 90 - 100 degrees horizontally and approximately the half vertically. This gives the radar a large detection volume with a constant real-time picture based on the FMCW emission. The distributed network approach allows for building a flexible system of radars depending on threats and number of co-operating players, as the radar easily can be mounted on moving vehicles and provisional locations such as tripods etc. For point protection four panels can be mounted in the same location to provide a 360-degree coverage. In a perimeter protection setup the radars can be moved to the flanks to provide early and high accuracy (range and azimuth) target information which is sent over the network to available presentation systems in the network.

Classification

The state-of-the-art tracking and classification algorithms provide for an early classification and low alert/notification rate based on the built-in library. The radar differentiates between moving objects and can classify the objects whether it is a drone, bird, vehicle, person or boat etc. Within the opening angle the object classification probability is above 95 %. The system allows for in-the-field signature library updates assuring a highly flexible and future proof guidance system for effectors and cameras.



Robustness (IP67)

The robust mechanics and the design of the housing are based on Kongsberg's long experience in the maritime environment. No rotation and moving parts allow for low maintenance costs. Effective heat dissipation is achieved through the smart design and provides cooling without using fans.

Networked radars for increased range and performance

One of the benefits of the DR 100 is that it can be linked in an IP based network. In this case, the radars will have to be set up with a high-speed, low-latency communication link. Kongsberg can provide the Mobile Broadband Radio (MBR) for this purpose. However, any IP based communication link with sufficient bandwidth, range and low latency can be utilized. The purpose of using DR 100 in a networked configuration is to expand the range of the area where object are detected.

Mounting options

The radar can be mounted both on fixed installations and on moving platforms. The radar is light-weight and can be mounted on a tripod or similar by one person. A mast based solution with one or up to four panels can be delivered to provide perimeter or point protection of critical infrastructure.



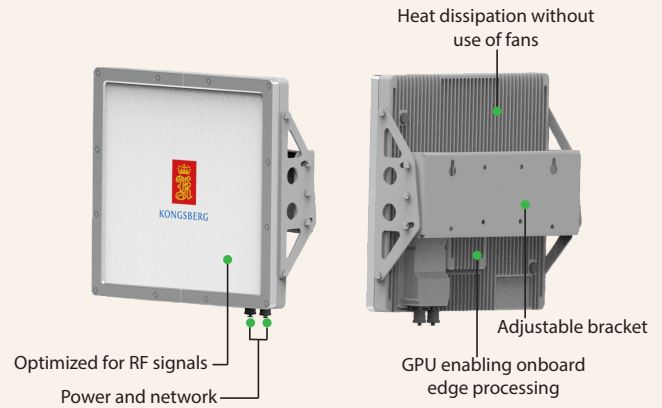
Camera tracking

The DR 100 can be integrated with a PTZ camera, where the camera tracks objects detected by the radar. When integrated with a surveillance system it is a powerful tool for detecting and documenting airborne objects within an area. Kongsberg can provide turn-key solutions for S-UAS.



FEATURES

- Specifically designed for detection, tracking and classification of small UAVs (Unmanned Aerial Vehicle)
- High update rate and low latency
- Individual tracking of drones in a swarm
- Networking of radars
- Small target detection
- All processing onboard the panel
- Target data over LAN on various protocols
- Interface towards Kongsberg Situational Awareness solution (ProximityView)
- Optionally; Broadband communication solutions optimized for real-time systems such as a distributed radar system
- Available in standard colours green or grey



Technical specifications

DR 100 for S-UAS

Technology	FMCW/doppler/micro doppler
Frequency	9.45- 9.55 GHz (X-band)
Accuracy range	< 0.5 m
Accuracy azimuth	< 0.5°
Accuracy elevation	< 1.0
Update rate	5 -10 Hz
Latency	< 200ms
No. of simultaneous targets	> 100
Time to classification	0.5 - 5 sec
Target speed	> 70 m/s, max.
Data protocol	Native (proprietary), Asterix, Sapient (under implementation)
Instrumented range	4.3 km

Interfaces

Ethernet/LAN	1 Gb (Amphenol 38999/mil connector)
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Performance range

90 degrees horizontally, 50 degrees vertically

NATO type	RCS	Tracking range	Classification range
Class 1a Nano	0.001 m ²	0.6 km	0.45 km
Class 1b Micro	0.005 m ²	1 km	0.7 km
Class 1c Mini	0.1 m ²	1.5 km	1 km
Class 1d Small	0.5 m ²	2 km	1.4 km
Class 2 Tactical	1 m ²	2.6 km	1.75 km
Class 3 Strike	20 m ²	4.3 km	3.3 km

IMU sensor during on-the-move

Supported IMU/gyro	MRU 5+, MGC R2, MGC R3 (See dedicated datasheets for technical information) Non-Kongsberg IMU supported upon request
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Weight and dimensions

Dimensions	400 × 400 mm
Weight incl. bracket	9.9 kg

Power specifications

Supply voltage	18 - 34 VDC
Power consumption	60 W standard, 100 W max.
Connector	Amphenol 38999

Environmental specifications

Operating temperature	-25 - +55 °C
Storage temperature	-40 - +70 °C
Operating humidity	100 %
Storage humidity	60 %, max.
Ingress protection	IP67
Safety distance	0.5 m

Standards and regulations

EMC	IEC 60945/EN 60945 MIL-STD-461 (where relevant)
Product safety	IEC 61010-1/EN 61010-1 IEC 62368-1 (pending)
Environmental	IEC 60945/MIL STD 810H (random vibration)
Spectrum	ETSI EN 303 413 V1.2.1 (2021-04) ETSI EN 300 330 V2.1.1 (2017-02)
Maritime Power surge	IEC 60945 MIL STD 1275E



Quad DR 100 with PTZ camera for 360° coverage

Specifications subject to change without any further notice.