
ALWAYS
FOR
THE BETTER
RST

WORKINGTOGETHER MAKES A DIFFERENCE!

from space to underground

Operating in the fields of electronics, space, defense and aviation, RST was founded in 2012. As a solution-oriented company serving in civil and military fields, it has started its activities in Hacettepe Technopolis in order to make the world more effectively in developments in aviation, electronics, space and defense.

It continues to work on innovative and creative projects with its expert personnel who have experience in engineering and project management and closely follow technological developments.

SOLUTIONS

DORUK 2D & 3D RADAR
KUBBE
GAMBI
KA-BAND
METRAD
Sub-Unit Solutions
Radar Modernization

DORUK 2D & 3D
UAV Detection and Surveillance Radar

Doruk radar is used for detection of moving ground and maritime targets and low altitude flying targets. It performs detection and classification simultaneously. While it performs detection and classification, it provides angle, range, Radar Cross-Section, radial velocity, heading, latitude and longitude information, width of Doppler Frequency Spectrum, target tracking over map information of targets. Doruk 2D & 3D radars are fully compliant to Vessel Traffic Service (VTS) system radar requirements as defined in IALA Guidelines. Also, Doruk 3D radar is being adapted to ATC (Air Traffic Control) requirements as a mobile air traffic control system with its integrated ADS-B and/or AIS receiver.

Precise and State of Art

Doruk radars detect low RCS slow-moving targets even in strong clutter environments such as rain, snow, desert sand storms and even urban environments. They are powered by an X-Band solid state transmitter, and combine the capabilities of pulse compression, Doppler processing and CFAR (Constant False Alarm Rate) algorithms. Doruk radars are operated from a customized user-friendly open architecture software user interface.

All targets are shown real time on the geographical map with detailed target informations supplied from the modern and reliable tracker algorithms of system.

Mobile & Flexible

With its unique design, Doruk radars can be installed and used very easily in every environment. Doruk radars can be integrated to any type of vehicle such as car, truck, trailer fast and easy, as their software and hardware interfaces are industry standard.

Robust and Reliable

With high MTBF and low MTTR, each Doruk radar is an autonomous system to operate under all-weather and day/night conditions. Tests and analysis results have proven Doruk radars are compatible with MIL-STD-810F, MIL-STD-461E and IP standards.

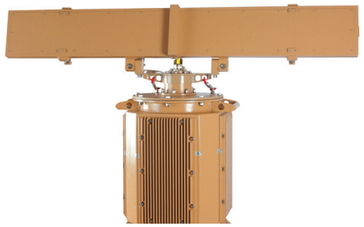
Coastal and Land Border Surveillance Radar Software

Radar Navigation Display is compatible with all map formats, from naval and air traffic control maps to all military and free maps. All inland sea areas and coastal regions will be shown with friend/foe details on map. Also capability to connect to thermal/low light cameras, soft kill jammers and hard kill weapons are included in system.

Radar Software Capabilities

- Detection of moving ground and maritime targets and low altitude flying targets
- Target Classification with Advanced Mathematics and AI (Artificial Intelligence)
- Track While Scan capability
- Provides angle, range, elevation, RCS (Radar Cross Section), radial velocity, latitude and longitude and heading of targets with Doppler Processing
- Target Tracking over map (User selected maps are added easily)

State of the art one box system	:	No waveguide, no cable loss
MIL-STD Design and Production	:	From desert/tropical climates to snow
Electronic Protection (ECCM)	:	Frequency Hoping Radar (anti-jamming)
LRU based design	:	No Specialized Maintenance Training
Light weight 3D Radar	:	Total weight around 70 kg
Light weight 2D Radar	:	Total weight around 60 kg
Operate onboard vehicle	:	Integrated to mast, mobile operation
Single Laptop Operation	:	Operator uses a single rugged laptop
Air Traffic Control Capable	:	Includes ADS-B Receiver
Fully Mobile 3D Radar	:	Automatic Position & North Finding



DORUK 2D RADAR SPECIFICATION

Low Altitude Surveillance Radar for Coastal & Land Borders

Operating Frequency Band	X-Band
Detection (%80 Pd and 10^{-6} Pfa)	Small UAV (RCS=0.01 m^2) @ max. 6 km Human @ max. 15 km Glider @ max. 20 km Big vehicle, Small Ships @ max. 28 km Mid-size aircraft @ max. 40 km
Velocity Detection	2 m/sec to 160 m/sec
Elevation Coverage	-5° to +50°
Azimuth Accuracy	< 0.5°
Range Accuracy	< 5 m
Azimuth Coverage	360°
Scanning Rate	Adjustable, 180°/sec
Weight	< 69 kg
Dimensions	1200 x 500 x 750 mm
Operational Readiness	< 10 minutes
Operating Temperature	-30 °C to +70 °C
Storage Temperature	-40 °C to +85 °C
MTBF	5000 hours
MTTR	< 10 minutes
Simultaneously displaying moving target detection, tracking and classification capability	Max. 300
Antenna Technology	Slotted Waveguide Antenna
Max Power Input Requirement	< 300 watt (Solar panel compliant)

DORUK 3D RADAR SPECIFICATION

UAV Detection/Tracking Radar for Land Borders and Infrastructure

Operating Frequency Band	X-Band
Detection (%80 Pd and 10^{-6} Pfa)	Small UAV (RCS=0.01 m^2) @ max. 6 km Human @ max. 15 km Glider @ max. 20 km Big vehicle, Small Ships @ max. 28 km Mid-size aircraft @ max. 40 km
Velocity Detection	2 m/sec to 160 m/sec
Elevation Coverage	-5° to +50°
Azimuth Accuracy	< 0.5°
Range Accuracy	< 5 m
Elevation Accuracy	< 1°
Azimuth Coverage	360°
Scanning Rate	Adjustable, 180°/sec
Weight	< 70 kg
Dimensions	1100 x 400 x 900 mm
Operational Readiness	≤ 10 minutes
Operating Temperature	-30 °C to +70 °C
Storage Temperature	-40 °C to +85 °C
MTBF	5000 hours
MTTR	< 10 minutes
Simultaneously displaying moving target detection, tracking and classification capability	Max. 300
Antenna Technology	Slotted Waveguide Antenna with 21 Elevation Beams
Max Power Input Requirement	< 300 watt (Solar panel compliant)

KUBBE
STRATEGIC FACILITY SECURITY SYSTEMS

A Dynamic Defense Against Enemy Drones with “KUBBE”

RST develops powerful, ready-to-use, end-to-end solutions to protect critical bases and zones defined as strategic facilities such as government borders, power plants, oil pipelines, military bases, and airports against drone and mini UAV threats.

Kubbe offers soft and hard kill solutions to intercept and neutralize drones.

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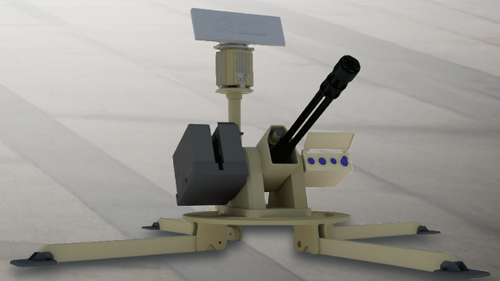
SOFT KILL KUBBE

While the KUBBE Anti-Drone System offers superior drone detection and tracking performance with its radar system and optional thermal / optical cameras, it also allows the drone and mini UAV threats to be neutralized with the optional RF mixer. In the KUBBE Anti-Drone System, in order to create the most effective solution against threats, according to on-site inspections; different configurations and sensor types can be integrated according to the purpose. On the other hand, if necessary, these different sensors and countermeasures can be integrated together in positions such as on the vehicle.

HARD KILL KUBBE

In cases where drones are resistant to jamming or jamming is not feasible, the most appropriate solution is to intercept drones with hard kill. Hard-kill solutions are especially for protecting critical infrastructures and military units, and they typically employ armament systems such as weapons.

KUBBE can be equipped with hard kill feature as well. For hard kill capability; 20 mm, 23 mm and 30 mm barreled high-accuracy machine guns can be integrated into the KUBBE. These barreled systems possess high firing power, precise targeting capability, and allowing them to accurately shoot towards targeted drones. System automatically detects drones and directs machine guns to the target, firing rapidly to neutralize the threat. This proactive approach prevents drones from getting too close and enhances safety by minimizing potential damage.



GAMBI
EXPLOSIVE DEVICE DETECTION & DISPOSAL ROBOT

GAMBI is an unmanned system that is equipped with the latest technology and can be remote-controlled; consists of a highly mobile, durable, light and uniquely designed robot and task-specific handmade explosive (IED) detection or destruction payloads that can be easily integrated. GAMBI has developed to enable security forces to detect and destroy improvised explosive devices from a safe distance.

Detection and Disposal All in One Robot

It can operate with 2 essential modes. One is detection mode, the other is disposal mode.

Detection Mode

The Sensor can detect metallic and plastic explosives embedded underground with a high precision.

Disposal Mode

The Sensor can be replaced with a gripper integrated robotic arm to be used for disposal purposes.

EMI/GPR ROBOT

EMI/GPR Robot is a robust, tracked military outdoor assistant that consists of an EMI (Electromagnetic Induction) and GPR (Ground Penetration Radar) Sensor, a Robotic Arm with gripper, a MAST mechanism, cameras, marker systems and joystick tablet remote control unit. This robot can be used for police and military departments.

Width x Length (Including Sensor Panel)

The Sensor can detect metallic and plastic explosives embedded underground with a high precision.

Height

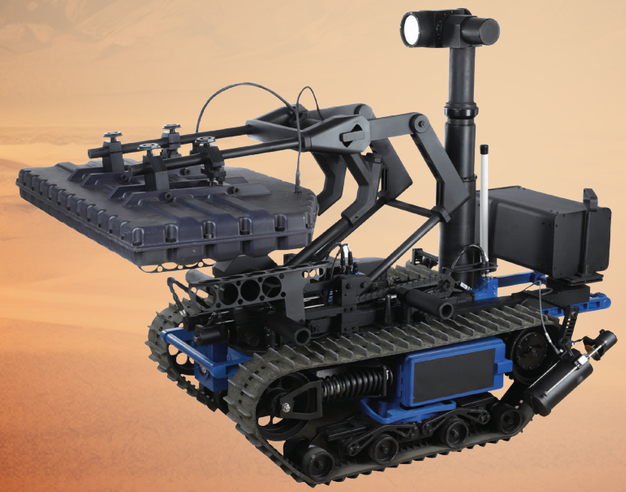
1720 mm (Camera at the highest position)
1080 mm (Camera at the lowest position)

Weight (Including sensor)

76 kg (without batteries), 105 kg (with arm and batteries), 124 kg (with sensor and batteries)

FEATURES

•Portable, can be carried by two people
• Compatible with MIL-STD-810 and MIL-STD-461
• Operates between-30 C° +50 C°
• Wireless range: 300 m / Wired: 100 m
• Lightweight 76 kg (without batteries)
• Size : (w:63 x l:122 x h:110 cm)
• Climb over: Vertical obstacles (18 cm), trench (40 cm), gradient (50%), side slope (20%)
• Microphone & Speaker (for two-way communication)
• Day/night PTZ Surveillance camera (360° two-axis rotatable, up to x30 zoom)
• One front, one rear driving cameras
• One arm camera
• Lightening (front, rear and arm)
• LED and IR Surveillance camera lighting
• Rugged Tablet with Joystick Controller
• Multi-language GUI
• Live video recording/screenshot
• Visual and audible warnings
• 3 hours continuous operation in rough terrain



KA-BAND
TRANSPORTABLE POLARIMETRIC WEATHER RADAR

RST has a ready-to-use Ka-Band radar available as a commercial product developed with the company's own capital. This radar provides high resolution experimental meteorological measurements and can be used to detect very slow moving ground, air and weather targets.

RST's Ka-Band radar that is capable of detecting low RCS targets is a ready-to-use solution for drone incidents frequently encountered near airports and highly strategic facilities.

Ka-Band Properties

• High resolution for experimental measurements in Ka-Band
• Appropriate for meteorological measurements
• Detects low RCS targets
• 35 GHz center frequency
• High range resolution
• High doppler resolution
• Detection of very low moving targets
• Generating range profile and doppler signature of targets
• Row data recording capability

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METRAD
X-BAND TRANSPORTABLE POLARIMETRIC WEATHER RADAR

METRAD is the novel X-Band weather radar with high sensitivity and large dynamic range, which enable the detection of even the weakest hydro-meteorological targets, such as drizzles or light snow.

The compact size and transportability of this complete X-Band system will make it the perfect choice for fixed installation and mobile operations, including rapid deployment for regional campaigns.

Application areas;

• Meteorological measurements
• Scientific weather data collection
• Struggle against natural disasters like flood, landslide etc.
• Harbors and Airports
• Sporting events• Generating range profile and doppler signature of targets
• Row data recording capability

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Transmitter	
Type	Long-Lifetime Magnetron with solid-state modulator (dynamically calibrated for optimum ZDR performance in STAR Mode)
Peak Power	20 KW (Supports up to 50 KW)
Receiver	
Type	Multiple-Channel Superheterodyne Receiver (dynamically calibrated in both amplitude and phase)
Noise Figure	<2.5 dB
Dynamic Range	> 90 dB
Sensitivity	< -111 dBm
Digital Receiver & Signal Processor	
Type	Modular multi-channel receiver
IF Sampling	2 parallel channels, 16-bit per polarization
Processing Mode	Multi-lag autocorrelation with pulse-pair or FFT
Antenna	
Antenna Diameter	1.5 m (Supports up to 1.8 m)
Antenna Gain	4 dBi
Antenna Beamwidth	1.5°
Antenna Coverage	360° continuous in azimuth, -2° – +90° in elevation
Positioning Accuracy	0.1°
Angular Speed	Up to 6 RPM
Dimensions & Weight of System on Trailer	
Width	255 cm
Length	300 cm
Height	380 cm
Weight	Less than 2500 kg
Technical Specifications	
Frequency	9325 MHz
Pulse Repetition Frequency (PRF)	0.2 – 3 KHz (Selectable)
Pulse Width (PW)	0.33 µs-4 µs (Selectable)
Operational Range	>75 km

Data Output

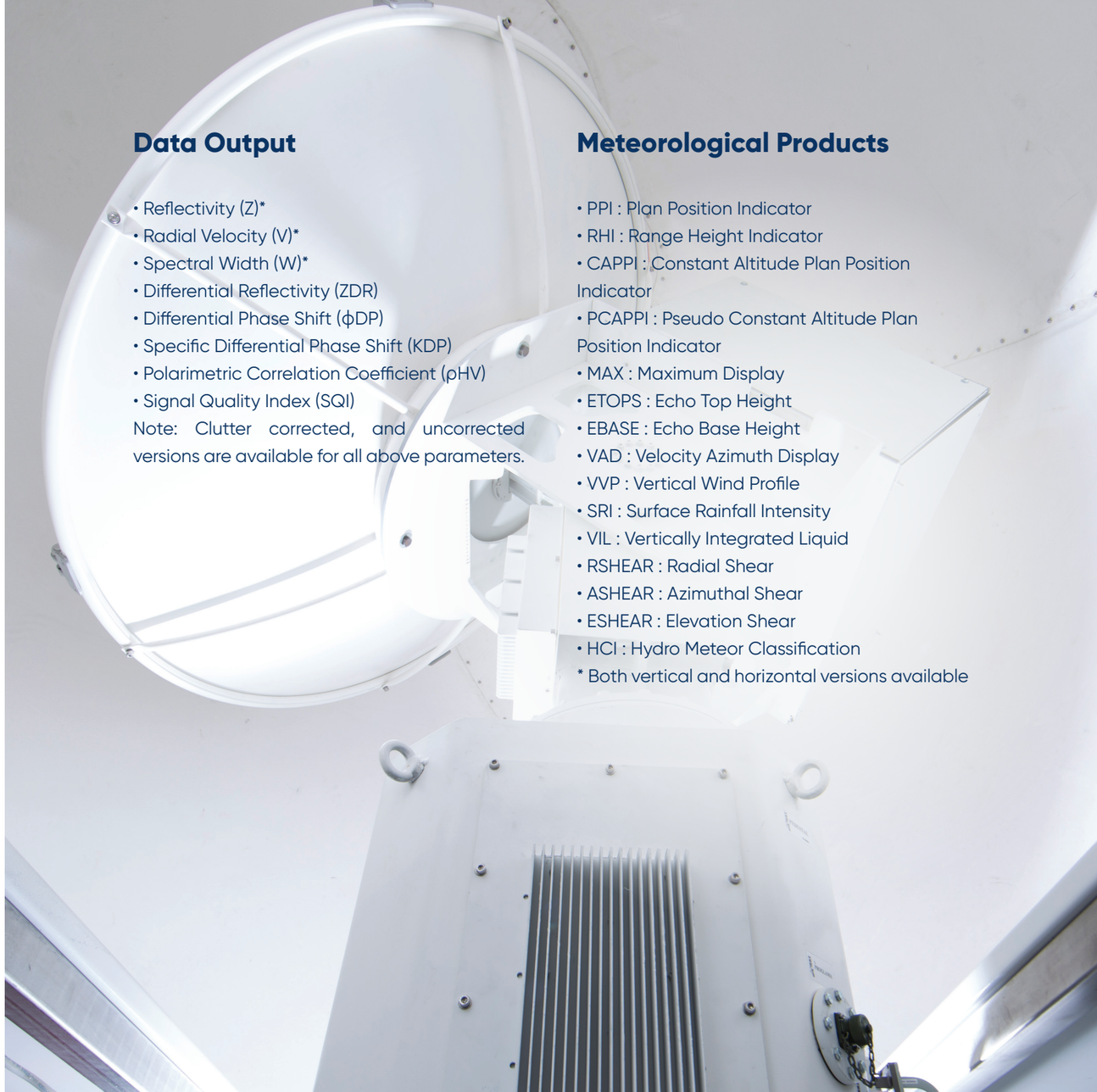
- Reflectivity (Z)*
- Radial Velocity (V)*
- Spectral Width (W)*
- Differential Reflectivity (ZDR)
- Differential Phase Shift (ϕDP)
- Specific Differential Phase Shift (KDP)
- Polarimetric Correlation Coefficient (ρHV)
- Signal Quality Index (SQI)

Note: Clutter corrected, and uncorrected versions are available for all above parameters.

Meteorological Products

- PPI : Plan Position Indicator
- RHI : Range Height Indicator
- CAPPI : Constant Altitude Plan Position Indicator
- PCAPPI : Pseudo Constant Altitude Plan Position Indicator
- MAX : Maximum Display
- ETOPS : Echo Top Height
- EBASE : Echo Base Height
- VAD : Velocity Azimuth Display
- VVP : Vertical Wind Profile
- SRI : Surface Rainfall Intensity
- VIL : Vertically Integrated Liquid
- RSHEAR : Radial Shear
- ASHEAR : Azimuthal Shear
- ESHEAR : Elevation Shear
- HCI : Hydro Meteor Classification

* Both vertical and horizontal versions available

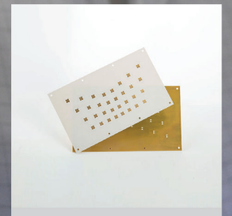


X-Band High Dynamic Range Downconverter Module

X-Band High Dynamic Range Upconverter Module

Ka-Band Wideband High Gain LNA

Patch Array Antenna



Electronic Directed Progressive Receiver Antenna System

FPGA Based PCB Design with 8 Channel ADC / DAC and Application Algorithm

RF PCB Design and Production

SUB-UNIT SOLUTIONS

RST aims to reduce the dependency outside the company and increase its technological knowledge by designing and developing the sub-units that create added value during the system development works.
In addition, since the sub-units are involved in similar projects, the adaptation/customization process for new projects can be made quickly.

RADAR MODERNIZATION

Radar modernization is an approach preferred by the users to extend the service life of the systems, whose maintenance and operation have lost their cost-effectiveness but remain valid in terms of technical performance criteria.

The main purpose of modernization activities are to prevent the high-cost and time-consuming work such as placement and commissioning, especially for large radar systems, and to ensure the continuation of the usual and internalized activities such as use and maintenance.

In this context, RST offers cost effective solutions for the modernization of both RF and digital cards and power amplifiers.

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