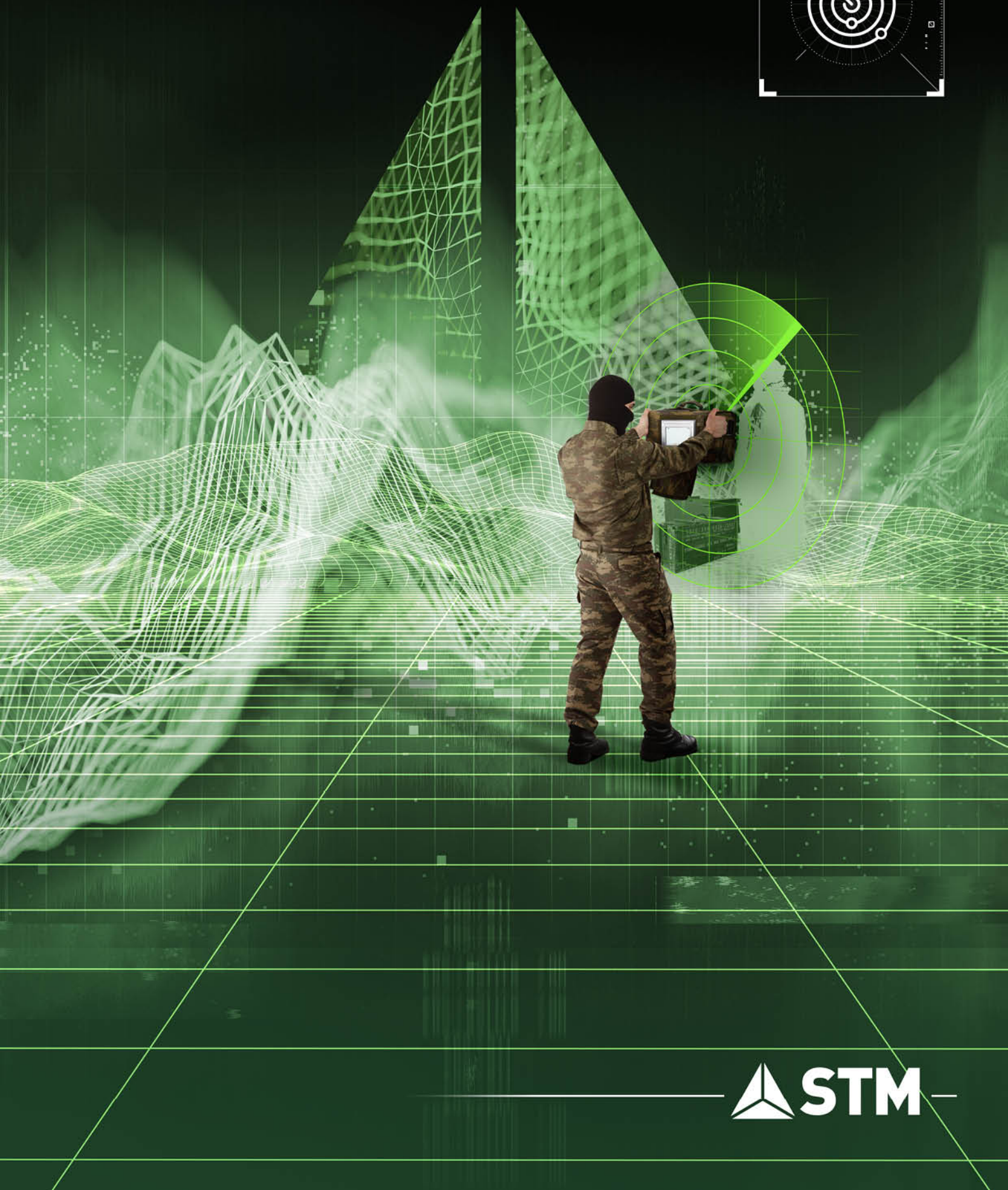
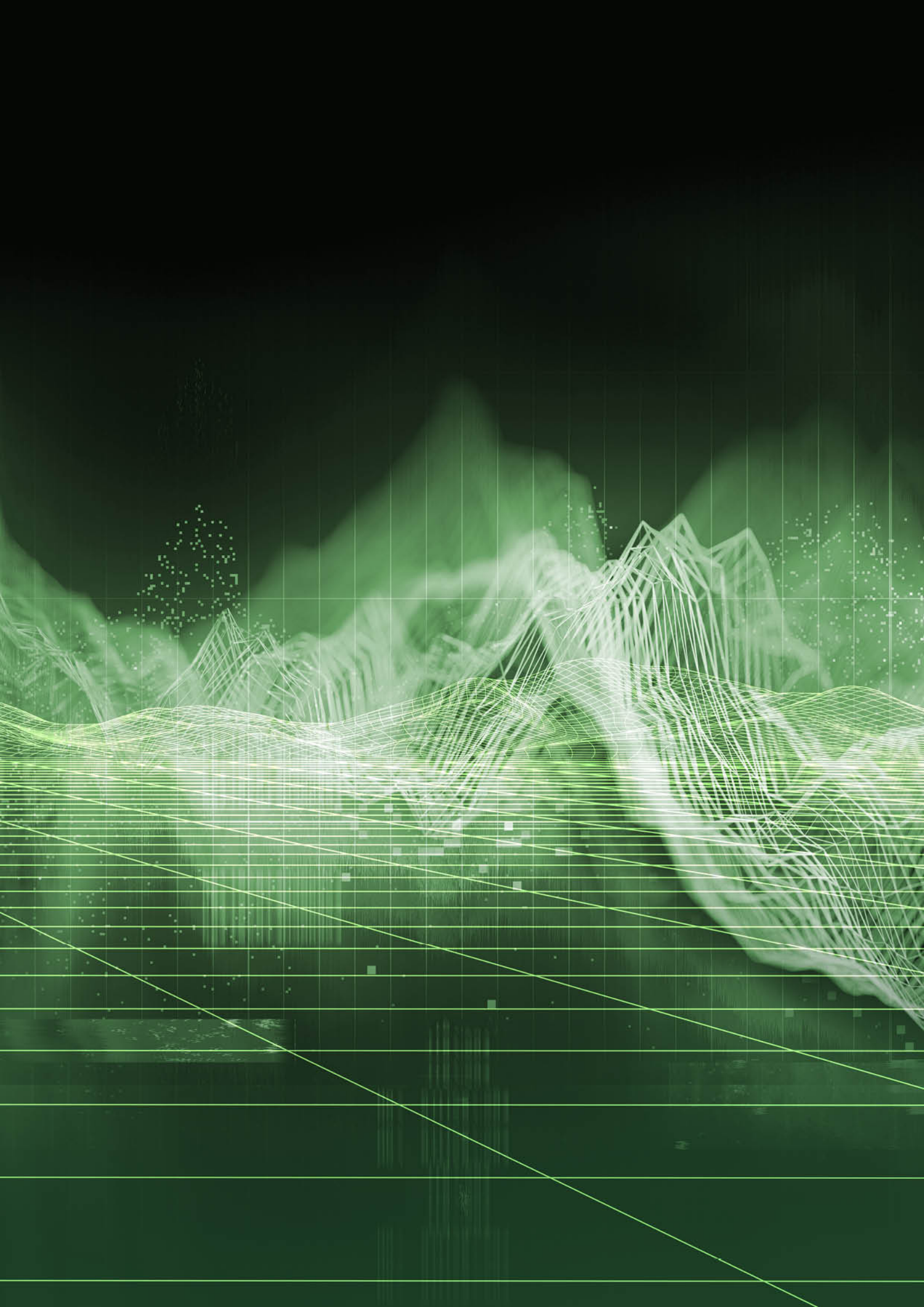


# ELECTRONIC WARFARE AND RADAR SYSTEMS









## **STM Savunma Teknolojileri, Mühendislik ve Ticaret A.Ş.**

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STM was established in 1991 for the provision of project management, system engineering and consultancy services to the Defense Industry Agency (SSB) and the Turkish Armed Forces (TAF).

The SSB continues to be the majority shareholder in the company, which has a workforce of 850 people, 63 percent of whom are engineers.

STM is among the leading companies operating in the defense sector, and is engaged in projects, particularly in the fields of naval platforms, tactical mini UAV systems, cybersecurity and IT services, command and control projects, satellite technologies, military aviation, radar and electronic warfare, and procurement and consultancy services.

Aside from its involvement in many national projects being conducted by the Turkish defence sector, STM is also engaged in export and business development activities for NATO with operations in more than 30 countries.

In addition to acting as the main subcontractor in the MiLGEM Project for the development of Türkiye's first national corvette, STM is also carrying out the detailed design as the main contractor in the project for the construction of TCG İSTANBUL (F-515), Türkiye's first national frigate.

STM has undertaken important tasks in submarine modernization and construction projects for the Turkish Navy, and is also responsible for Türkiye's first submarine modernization export, taking the lead role in the Pakistan AGOSTA 90B project.

STM developed KARGU, Türkiye's first indigenous attack UAV System, and launched Türkiye's first Cyber Fusion Center in 2016.

Through the INTEL-FS2 Project, STM ensures the flow of intelligence between all NATO headquarters around the world, and is successfully engaged in one of Türkiye's largest software exports to the Organization.

STM diversifies its technology-based activities to meet the needs of the public and private sectors – in particular those related to the Turkish defense sector.

STM is headquartered in Ankara, the capital of Türkiye, and continues its operations out of nine facilities, located in İstanbul, Gölçük and Ankara, as well as Pakistan.

STM was for three consecutive years listed on the Defense News Top 100 list of the world's top 100 defense companies.





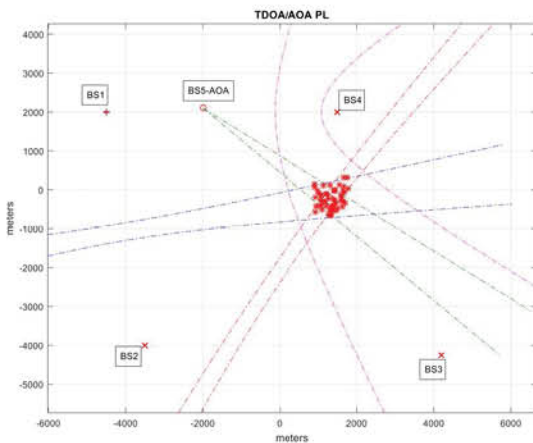
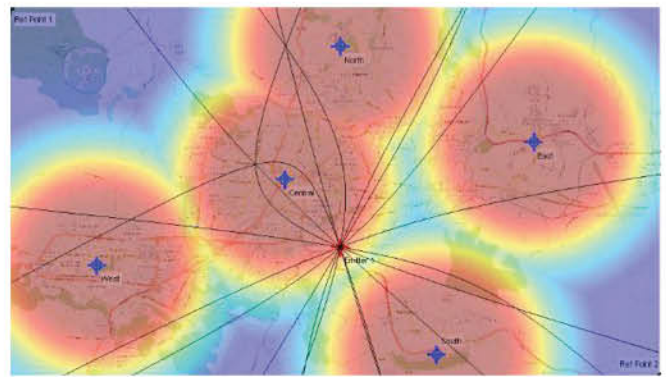
# ELECTRONIC WARFARE SYSTEMS

Monitoring the Electromagnetic Spectrum with proper RF Receiver, processor architectures, and antennas enables the gathering of Tactical and Strategic Communication Intelligence. Also, it allows for determining the location of broadcasts.

Combining the existing know-how on RF Receivers with the Algorithm and Software Development capabilities in the field of Electronic Warfare, STM produces off-the-shelf and turnkey solutions in Spectrum Monitoring, Communication Intelligence (COMINT) and Location Estimation Systems.

Mobile/fixed platform solutions are developed for frequency violation detection, detection of malicious broadcasts, modulation/protocol recognition analysis, and parameter extraction, and recording and listening of these broadcasts in the field of Spectrum Monitoring.

The Location of a Broadcast is mainly detected with Time Difference of Arrival (TDOA) techniques, if needed, with Direction Finding (DF) techniques or with the hybrid use of both methods in conjunction.



## COMINT and Location Estimation Systems

Within the scope of civil and military applications, indigenous algorithms and integrated COMINT and Location Estimation Systems have been developed for the detection and tracking of illegal and suspicious broadcasts.

- > Indigenous Signal Processing Algorithms
- > Integration of Advanced Hardware Solutions
- > Precise Location Estimation Performance
- > Cost-Effective Coverage of Large Areas

## Capabilities | Competencies

- > Target Signal Detection
- > Modulation Detection
- > Broadband Signal Recording
- > Precise Location Estimation

# RF RECEIVER SYSTEM

RF Receiver System is an electronic system that performs radio spectrum monitoring and time stamped data generation of targets communicating in the 20 MHz - 6000 MHz communication band. The RF Receiver works as a V/UHF broadband receiver with high sensitivity and high linearity for spectrum monitoring applications. It can be used as a critical hardware component of electronic warfare systems that perform tasks such as detecting targets, signal monitoring to detected targets and target localization.



## TECHNICAL SPECIFICATIONS

### General

Receiver Type	SHR (Superheterodyne Receiver)
Frequency Range	20MHz - 6GHz
Instantaneous Bandwidth	2,5,10,40,100 MHz
Number of Receiver Channels	1
Dynamic Range (Single-Tone Spur Free)	80 dB typ., 60 dB min.
Phase Noise	-116 dBc/Hz @100 kHz typ.
Maximum Input Power	10 dBm
Automatic Gain Control	60 dB min.
Time Synchronization	<100nsec
Time Stamp	Ok
NTP Support	Ok
SSH Support	Ok

### Interfaces

Data Interface (Fiber)	10Gbps (VITA-49)
Command Interface (Fiber/Eth)	1Gbps (SCPI)
Sync Interface	1PPS/10MHz
Serial Ports	USB-UART
Debugging	USB Debugging

### Size, Weight and Power

Nominal Power Consumption	35 W
Mass	12 kg
Length	64.77 cm
Width	43.43 cm
Height	12.95 cm



# DAR®

## Through The Wall Radar

The Through The Wall Radar (DAR) is a radar system used to obtain 2D position information of the target stationary and moving elements, which are located in enclosed areas where there is no visual access, through ultra-wideband (UWB) signals.

Also, DAR can be used for various civilian purposes, such as firefighting, post-disaster rescue operations, and fighting against human trafficking and migrant smuggling in transportation and customs

In addition to military scenarios such as hostage rescue, counter-terrorism and internal security operations, DAR can also be used for various civilian purposes such as search and rescue activities after various disasters such as earthquakes, avalanches, fires, and combating Human Trafficking and Migrant Smuggling in Transport and Customs.





## Main Features

- > Lightweight and ergonomic design
- > Remote control capability
- > High range resolution
- > Effective penetration ability
- > Macro and micro motion detection capability
- > Low power consumption and use with internal battery
- > Location and distance estimation of stable or moving or static targets
- > Dust protection
- > Save and replay the task
- > Wall detection
- > Remote viewing and control with tablet
- > Foreign language support



## Technical Specifications

Size	48cm x 26cm x 16cm
Weight	6.5 kg
Detection Distance	22 m (in free field)
Motion Detection	Macro and micro movements
Wall Types	Brick, plasterboard, wood, plastic, concrete, etc.
Cross-range Field of View	112°
Display Modes	1D, 2D
Screen Size	7"
Power Type	Built-in rechargeable battery and mains
Battery Operating Life (h)	4 hours
Ingress Protection	IP66

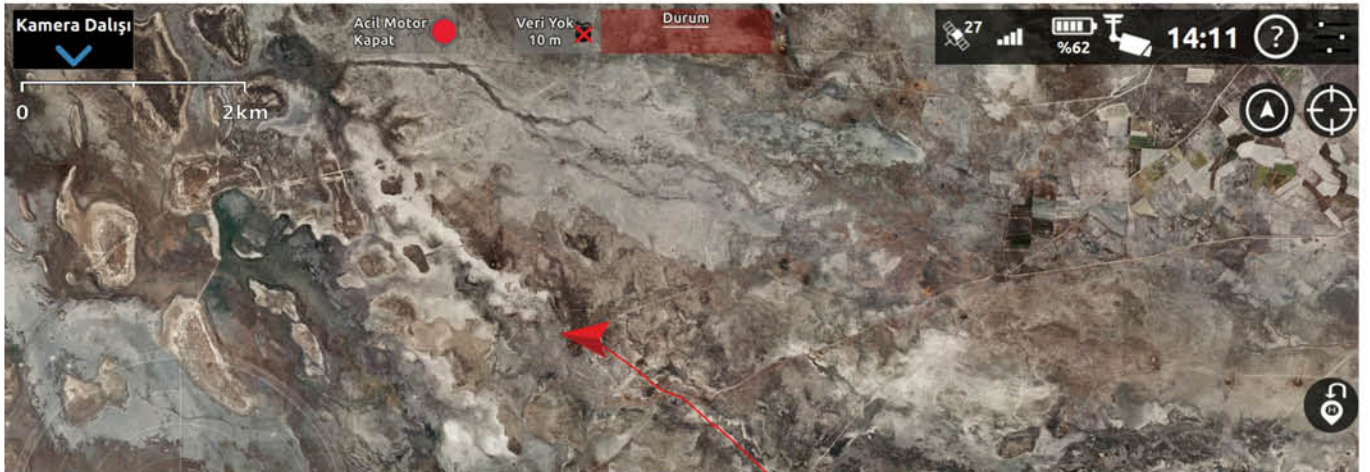
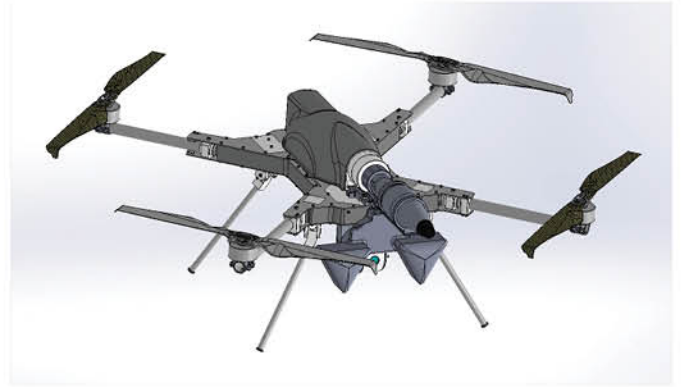




# STM RF SEEKER PAYLOAD

## RF Seeker Payload for Mini/Micro or Small Class UAV

**STM RF Seeker Payload**, is a passive wideband sensor that allows mini/micro or small class UAV platforms to detect and track RF transmissions belonging to friend and foe systems. **STM RF Seeker Payload** works integrated with the STM KARGU platform, which has successfully proven itself in the field in domestic and international missions.



### Specifications

- > Wide Frequency Coverage
- > Automatic Gain Control
- > Guidance on Fixed or Moving Target
- > Hom-on-Jam
- > Automatic Target Selection Capability
- > Lightweight Design
- > Non-Moving Parts
- > Low Power Consumption
- > Platform Independent Integration



## ELECTRONIC WARFARE RESISTANT UAV DATA LINK



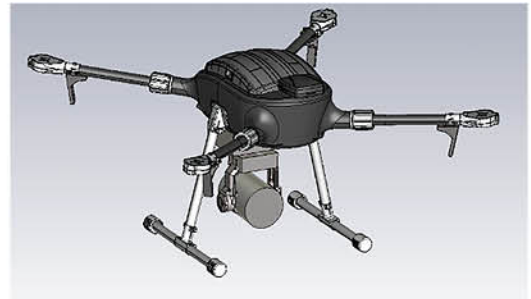
One of the critical sub-systems of a UAV is the communication system between the ground control station and the vehicle. Continuous radio communication is mandatory to command and control a UAV in critical operations.

Electronic Warfare Resistant Data Link is a game-changer solution for tactical communication needs. STM has developed reliable, secure and high-speed communication solutions for unmanned aerial vehicles such as STM KARGU®, TOGAN® and BOYGA®.

The mission performance of UAVs has been maximized by precise antenna design, transmitter/receiver system, and algorithms to detect Electronic Warfare threats.

### Technical Specifications

Frequency	S, C-Band
Channel	4 Tx, 4 Rx
Sensitivity	< -100 dBm
Automatic Gain Control (AGC)	> 60 dB
Pout	>2 W
Platform Antenna	Directional/Omni
Ground Control Station Antenna	Directional/Omni
Modulation	OFDM
Mod 1	Interference Avoidance
Mod 2	Frequency Hopping



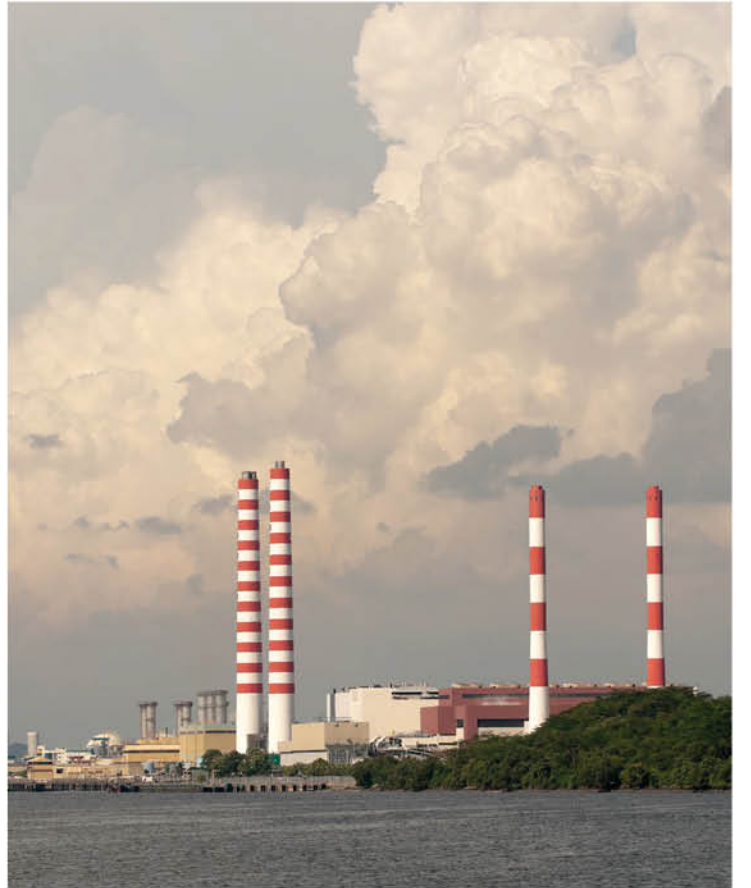


## INTEGRATION PROJECTS

STM realise the knowledge gained in radar technologies and complex software development areas with integration projects in different fields. In this context, STM has completed the establishment of complex distributed systems in critical facilities ranging from CCTV installations in approximately 5,000 Post Office (PTT) branches throughout Turkey to self-sustaining Coastal Surveillance Stations (CSSs), including their infrastructures, superstructures, and renewable energy systems, on the Aegean and the Blacksea coasts.

### Capabilities | Competencies

- > System Integration
- > Radar, EO, Lidar etc. Imaging System Integration and Remote Management
- > Electronic Chart Display and Information System
- > Radio Link Data Transfer
- > Energy infrastructures
- > Infrastructure / superstructure installation
- > Decision Support Analysis and Simulation



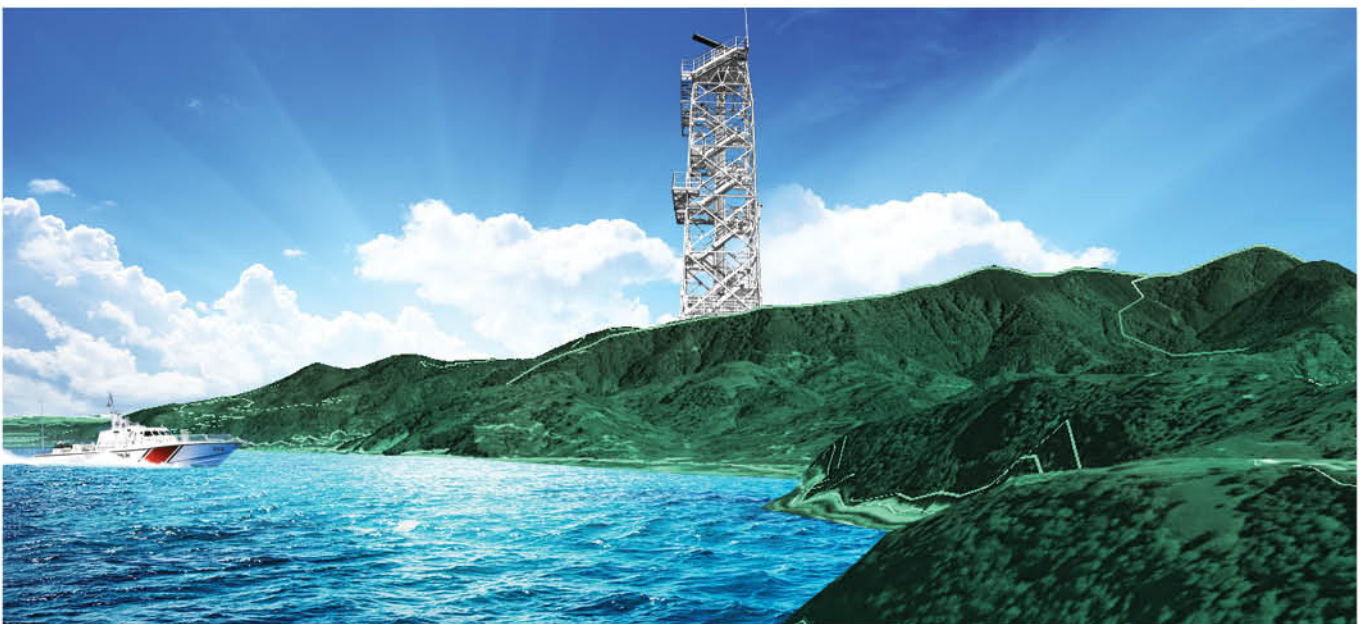


# HOPA

## Coastal Surveillance Station

The Hopa Coastal Surveillance Station comprises a Radar Tower, an Energy and Control Building, a Sensor Tower, and the Hopa Monitoring and Control Center.

Within the scope of the project, sensor integration and fusion and command control software were developed.



### SYSTEM SPECIFICATIONS

- > Radar System Low Probability of Intercept (LPI), conforms to the IALA V128 Standard, 12, 24 and 48nm selectable range mode, sector blackout feature, automatic/manual tracking of around 300 targets
- > Electro-Optical Day Cam Vision System 60X Optical Zoom, detection of a target (2.3x2.3) from at least 7nm and identification at 3nm
- > Electro-Optical Thermal Cam Vision System 3-5MWIR, 640x480 resolution cooled detector, 16X Optical Zoom
- > Geographical Information System Locating vessels on map, DTED, S-57 and S-63 support
- > Target Acquisition/Identification by Radar and AIS Data Fusion Association of Radar and AIS detections with each other
- > Video Surveillance System Motion detection and automatically generated alarm
- > Automatic Identification System (AIS) Transfer of identity and navigation information of vessels to the Control Center
- > Remote Control System Remote control of the entire system via radio link
- > VHF Communication System
- > Autonomous Functioning
- > Wired/Wireless Communication

### Missions

- > Border and Coastal Surveillance
- > Acquisition of Trafficking and Irregular Migration
- > Law Enforcement and Search & Rescue Tasks



# ÇAVUŞ ISLAND

## Coastal Surveillance Station

The Çavuş Island Coastal Surveillance Station comprises a radar tower, an energy and control building, a solar energy system, a sensor tower, and the Turgutreis Monitoring and Control Center.

Within the scope of the project, sensor integration and fusion-based command and control software were developed.



## System Specifications

- > Radar System Low Probability of Intercept (LPI), conforms to the IALA V128 standard, 12, 24 and 36nm selectable range mode, sector blackout feature, automatic/manual tracking of around 300 targets
- > Electro-Optical Day Cam Vision System 1920x1080 Resolution, 60X Optical Zoom
- > Electro-Optical Thermal Cam Vision System 3-5MWIR, 640x480 resolution cooled detector, 16X optical zoom
- > Geographical Information System Locating vessels on map, DTED, S-57 and S-63 Support
- > Alarm Management Module Identifying zone of security, entry/exit, speed and acceleration alarm for a given vessel type
- > Target Acquisition/Identification by Radar and AIS Data Fusion Association of Radar and AIS detections with each other
- > Solar Energy System (Off Grid) Self energy producing off-grid 24/7 autonomous system
- > Video Surveillance System Motion and detection and automatically generated alarm
- > Automatic Identification System (AIS) Transfer of identity and navigation information of vessels to the Control Center
- > Remote Control System Remote control of the entire system via radio link
- > VHF Communication System
- > Autonomous Functioning
- > Radio Link Communication System

## Missions

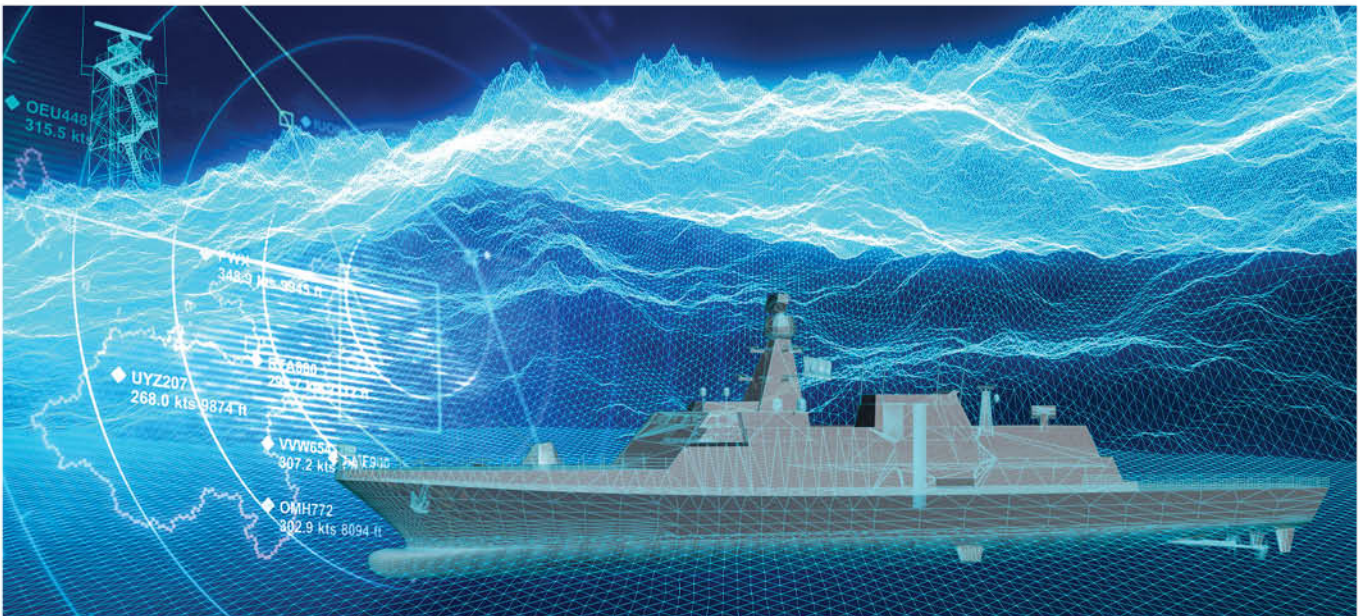
- > Border and Coastal Surveillance
- > Acquisition of Trafficking and Irregular Migration
- > Law Enforcement and Search & Rescue Tasks



# ENEZ

## Coastal Surveillance Station

As a result of the studies we carried out regarding Radar and Electronic Warfare, we will integrate the knowledge acquired in the fields of national software, Radar signal processing algorithms and data fusion with Radar hardware technologies, providing the Coast Guard Command with such capabilities as border/coastal surveillance, trafficking/irregular migration acquisition, and law enforcement/search-rescue mission effectiveness in the region.





# CRITICAL FACILITY SECURITY

Critical Facilities and Infrastructures such as Power Generation Facilities, Energy Transmission and Storage Facilities, Public Facilities and Military Facilities are complex and large systems.

If any security failure occurs in Critical Facilities\Infrastructures, the following cases may be encountered:

- > Loss of life and property,
- > Huge and irreparable economic damage,
- > National security weakness
- > Disruption of public order

Therefore the protection of Critical Facilities against internal and external threats has great importance. STM has all the necessary capabilities to provide critical facility security at the highest level with innovative and state-of-the-art design and integration solutions in line with customer needs.

In this context, STM can provide an integrated turn-key solution including at least the following:

- > Radar
- > Electro-Optical Systems (Day/Night Vision/Thermal Camera Systems, Lidar, etc.)
- > Fiber Optic Intrusion Detection
- > Seismic Detectors
- > Fence Mounted Sensors
- > Microwave Intrusion Detection
- > Unmanned Aerial Vehicles for Patrol
- > Personnel/Vehicle Tracking
- > Central Control Software





## STM SAVUNMA TEKNOLOJİLERİ MÜHENDİSLİK VE TİCARET A.Ş.

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