

OCULUS F-AESA

FULL ACTIVE
ELECTRONICALLY
SCANNED ARRAY

COMMERCIAL DOCUMENTATION



ABAC
INDUSTRY

ADVANCED SENSING TECHNOLOGIES

ADVANCED RADAR SYSTEM

LONG RANGE SURVEILLANCE | 360° COVERAGE | ALL WEATHER

OCULUS F-AESA

Full Active Electronically Scanned Array Radar

Technical Documentation

ABAC INDUSTRY

Advanced Sensing Technologies

Product Overview

The OCULUS F-AESA is a next-generation Active Electronically Scanned Array (AESA) radar platform developed by ABAC Industry for advanced surveillance, target tracking, Counter-UAV operations, maritime monitoring, critical infrastructure protection, and situational awareness missions.

Designed around a scalable and mission-configurable architecture, the system combines advanced phased-array technology, electronic beam steering, high-performance signal processing, and modern electronic protection features to provide reliable detection and tracking capabilities across a broad range of operational environments.

The platform is available in multiple configurations and can be adapted to various frequency bands, antenna architectures, deployment platforms, and mission requirements.

Key Features

- Full AESA Architecture
- Electronic Beam Steering
- Multi-Target Tracking
- Track While Scan (TWS)
- Advanced Pulse Compression
- Doppler Processing
- Moving Target Indication (MTI)
- Constant False Alarm Rate (CFAR)
- Anti-Jamming Features
- Electronic Protection Features
- GPS/GNSS Protection
- Mission Configurable Architecture
- Modular Design
- Multi-Panel Configurations
- Customizable Detection Range



Radar Architecture

The OCULUS F-AESA architecture combines multiple radar subsystems into a unified sensing platform.

The radar consists of:

- AESA Antenna Array
- RF Front-End
- Frequency Generation System
- High-Performance Signal Processing Engine
- System Controller
- Power Management System
- Navigation and Positioning Sensors
- Radar Control Software
- Communication Interfaces

The architecture supports single-panel, multi-panel, and full 360° surveillance configurations.

AESA Technology

Unlike conventional mechanically scanned radars, the OCULUS F-AESA employs electronically controlled antenna elements to steer and shape the radar beam.



Benefits include:

- Rapid Scan Rates
- Simultaneous Search and Tracking
- Enhanced Reliability
- Reduced Mechanical Complexity
- Adaptive Beam Control
- Improved Situational Awareness

The architecture supports dynamic beam allocation and mission-specific scanning strategies.

Beam Steering Technology

The OCULUS F-AESA utilizes fully electronic beam steering.

Capabilities include:

- Azimuth Steering
- Elevation Steering
- Dynamic Sector Scanning
- Adaptive Search Patterns
- Target Prioritization
- Rapid Target Reacquisition



Electronic steering enables extremely fast beam repositioning without continuous mechanical movement.

Signal Processing Capabilities

The radar incorporates advanced real-time signal processing functions.

Capabilities include:

- Digital Down Conversion^{300°}
- I/Q Processing
- Pulse Compression
- Doppler Processing^{270°}
- MTI
- CFAR Detection
- Target Extraction
- Target Tracking^{240°}
- Multi-Target Management
- Track While Scan

The processing architecture is optimized for demanding surveillance and tracking missions.



Detection Capabilities

The OCULUS F-AESA can be configured for detection and tracking of:

- Small UAVs
- Medium UAVs
- Fixed-Wing Aircraft
- Rotary-Wing Aircraft
- Ground Vehicles
- Maritime Targets
- Personnel
- Infrastructure Intrusions

Detection performance depends on:

- Frequency Band
- Antenna Configuration
- Target Radar Cross Section
- Environmental Conditions
- Mission Configuration



Multi-Target Tracking

The OCULUS F-AESA supports simultaneous tracking of multiple targets.

Capabilities include:

- Automatic Track Initiation
- Track Correlation
- Track Maintenance
- Target Prioritization
- Track Prediction
- Continuous Target Updates
- Simultaneous Search and Tracking

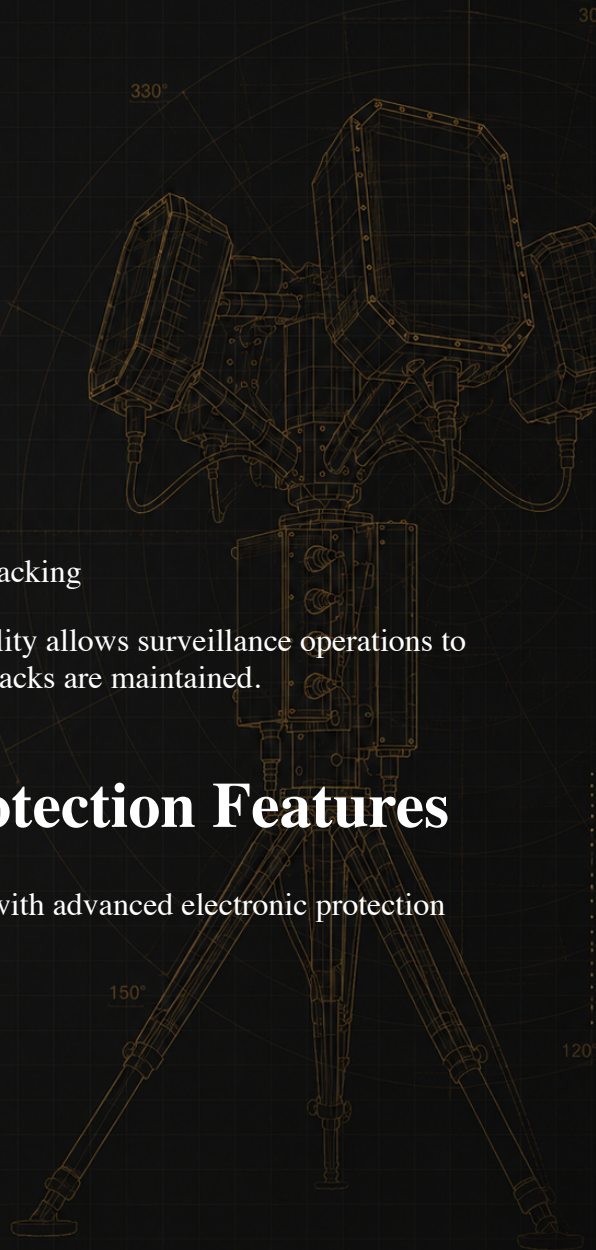
The Track While Scan capability allows surveillance operations to continue while active target tracks are maintained.

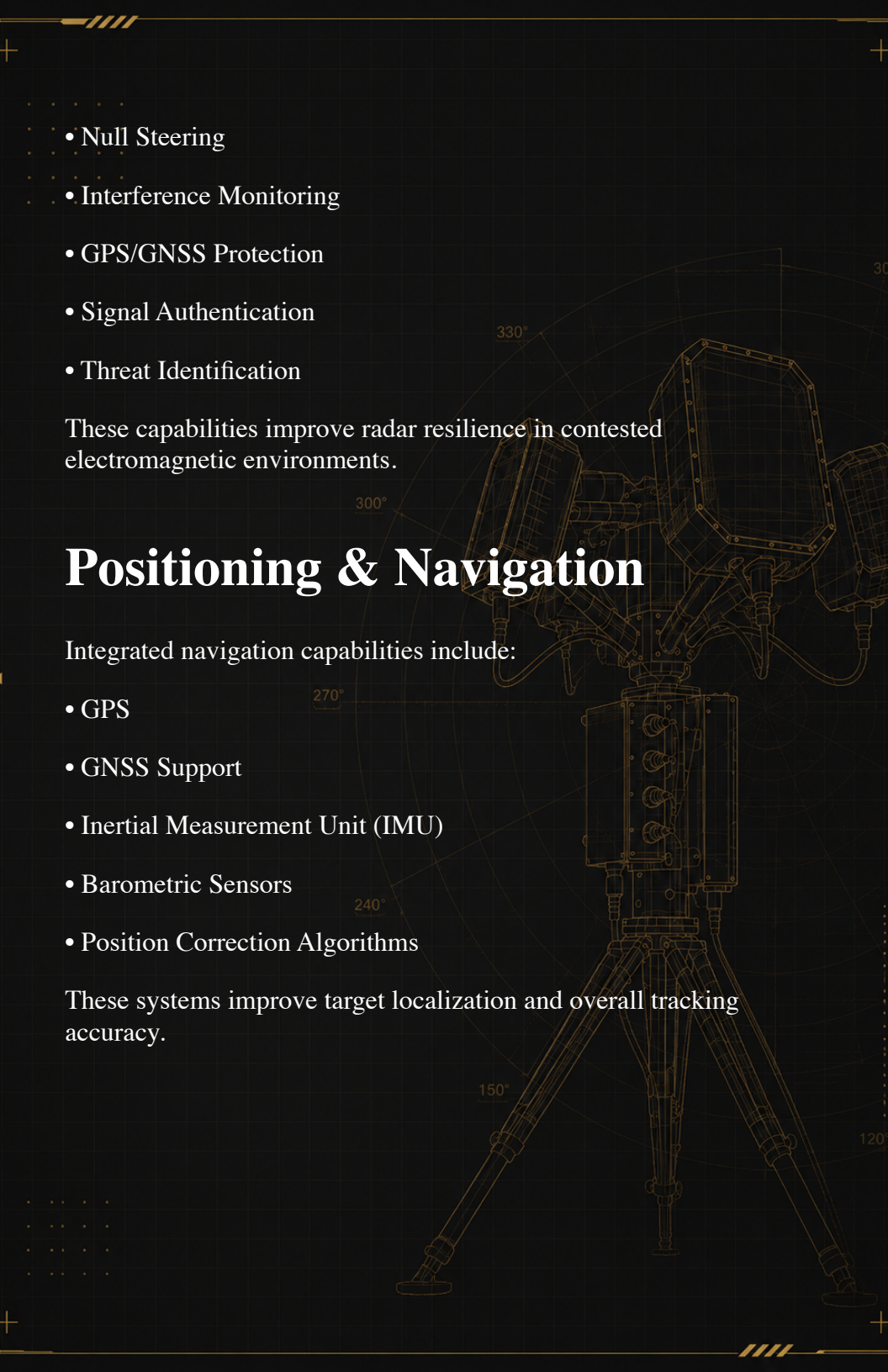
Electronic Protection Features

The system can be equipped with advanced electronic protection capabilities.

Available features include:

- RF Jamming Detection
- Adaptive Beamforming



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- Null Steering
 - Interference Monitoring
 - GPS/GNSS Protection
 - Signal Authentication
 - Threat Identification

These capabilities improve radar resilience in contested electromagnetic environments.

Positioning & Navigation

Integrated navigation capabilities include:

- GPS
- GNSS Support
- Inertial Measurement Unit (IMU)
- Barometric Sensors
- Position Correction Algorithms

These systems improve target localization and overall tracking accuracy.

Environmental Specifications

The platform can be configured for operation in demanding environments.

Available options include:

- Extended Temperature Operation
- Outdoor Deployment
- Dust Protection
- Water Protection
- Shock Resistance
- Vibration Resistance
- Corrosion Protection

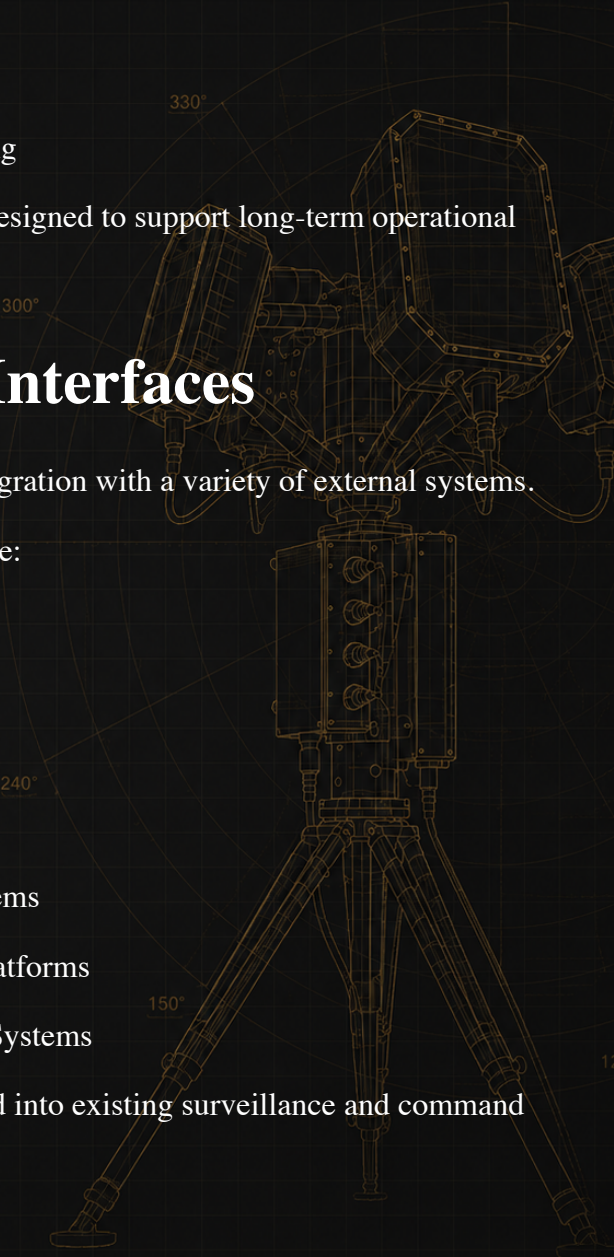
Environmental specifications may vary according to mission requirements.

Software Platform

The radar is supplied with a modern software environment supporting:

- Radar Control
- Target Visualization
- Mission Configuration



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- Data Logging
 - Recording & Playback
 - Remote Monitoring
 - Diagnostics
 - System Health Monitoring

The software platform is designed to support long-term operational deployment.

Integration Interfaces

The platform supports integration with a variety of external systems.

Available interfaces include:

- Ethernet
- USB
- Serial Interfaces
- Network Protocols
- External Command Systems
- Situational Awareness Platforms
- Third-Party Monitoring Systems

The radar can be integrated into existing surveillance and command infrastructures.

Deployment Configurations

The OCULUS F-AESA platform supports multiple deployment options.

Fixed Site Surveillance

Permanent monitoring installations.

Mobile Surveillance Systems

Rapid deployment operations.

Vehicle Mounted Systems

Ground vehicle integration.

Maritime Surveillance Platforms

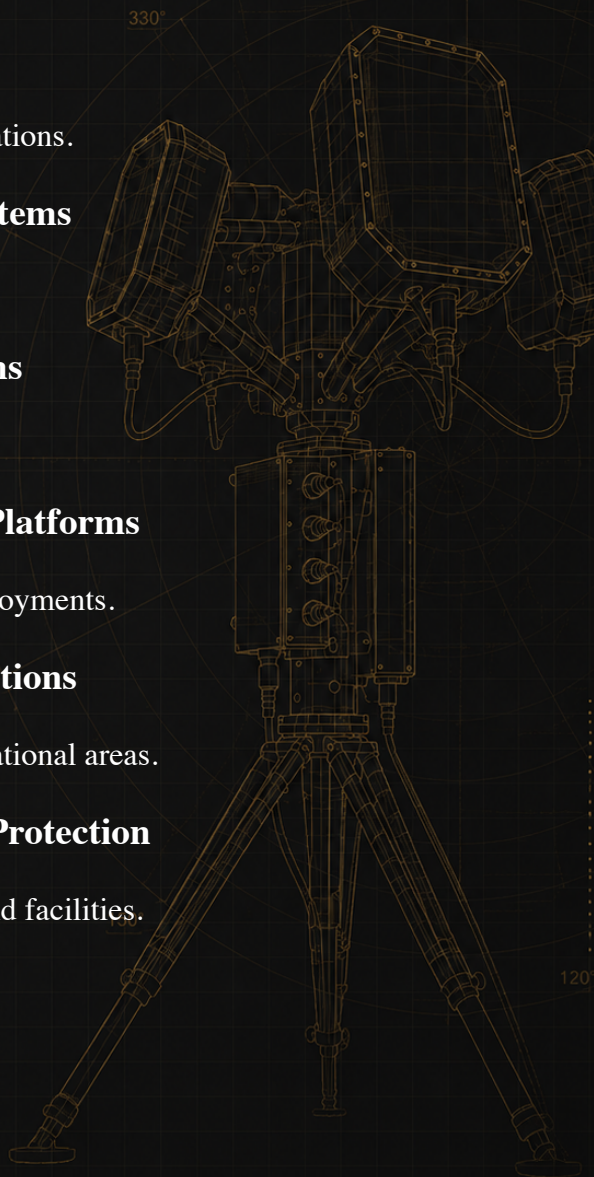
Coastal and vessel-based deployments.

Border Security Installations

Persistent monitoring of operational areas.

Critical Infrastructure Protection

Protection of strategic sites and facilities.



Customization Options

The OCULUS F-AESA architecture is designed to be scalable and configurable.

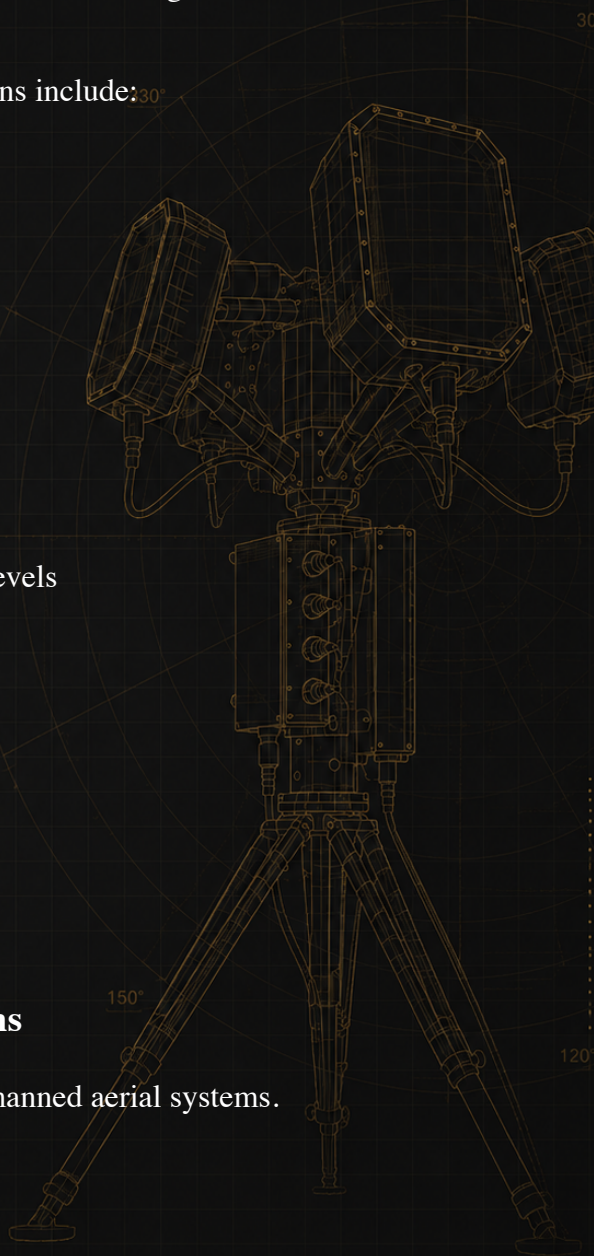
Available customization options include:

- Frequency Band Selection
- Detection Range
- Antenna Dimensions
- Number of AESA Elements
- Multi-Panel Architectures
- Signal Processing Features
- Environmental Protection Levels
- Communication Interfaces
- Software Features
- Deployment Platforms

Applications

Counter-UAV Operations

Detection and tracking of unmanned aerial systems.





Air Surveillance

Monitoring of aerial activity and airspace awareness.

Border Security

Persistent surveillance of sensitive areas.

Maritime Surveillance

Monitoring of maritime traffic and coastal environments.

Critical Infrastructure Protection

Protection of strategic facilities and assets.

Defense & Security

Situational awareness and force protection.

Industrial Security

Monitoring and protection of industrial facilities.

Why OCULUS F-AESA

The OCULUS F-AESA combines advanced Active Electronically Scanned Array technology, electronic beam steering, real-time signal processing, and mission-configurable architecture into a versatile radar platform.

Designed for defense, security, infrastructure protection, and surveillance missions, the platform can be configured to meet a wide

range of operational requirements while maintaining the performance advantages of modern AESA radar technology.

The OCULUS F-AESA represents ABAC Industry's commitment to developing advanced sensing technologies capable of delivering reliable situational awareness in complex operational environments.

ABAC INDUSTRY

Advanced Sensing Technologies

Building next-generation radar, sensing intelligence, target tracking, and situational awareness systems.

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