Pharos Airborne RF Geolocation System

Technical Specifications

General Information

System Name:
Pharos Airborne RF Geolocation System

System Type:
Podded Airborne RF Geolocation Sensor

Primary Function:
Near real-time kinematic geolocation of ground-based RF emitters

Designed For:
Group 3+ Unmanned Aircraft Systems (UAS)

Development Status:
TRL 3 (Concept/Simulation); Targeting TRL 6/7 via prototype demonstration within 18-24 months.

Key Features

- Single-platform kinematic geolocation capability
- Multi-baseline phase interferometric array sensor
- Onboard Edge AI processing for enhanced performance and real-time results
- Optimized for C/X-Band emitter detection and localization
- Designed with COTS/MOTS components for affordability
- Self-contained podded system for simplified integration
- Low-latency reporting for tactical relevance

Performance Specifications

Geolocation Accuracy (Stationary Emitter):

Threshold: < 500 meters CEP90
Objective: < 150 meters CEP90

(Note: Achieving objective performance depends on operational factors including favorable geometry, signal characteristics, slant range ≤ 5km, and assumes successful mitigation of technical risks like multipath and sensor instability)

System Latency (Detection to Report):

< 10 seconds

Sensor Update Rate:

< 1 second

Minimum Signal Level:

≥ 10 dB SNR (Nominal)

Angle of Arrival (AOA) Accuracy:

< 0.5 degrees RMS (Instrument)

RF System Specifications

Operating Frequency Range:

4 GHz – 12 GHz (C/X-Band)

Sensor Type:

Multi-Baseline Phase Interferometer Array

Antenna Elements:

5-7 (Nominal)

Antenna Baseline:

~0.5 – 1.0 meters (Nominal)

Field of View:

Wide area surveillance configuration (Example: +/- 60° Azimuth, Nadir-focused Elevation +/- 70°)

Polarization:

Single or Dual Linear (Configurable)

Processing & Navigation Specifications

Onboard Processor:

High-performance edge compute processor suitable for demanding AI workloads

Geolocation Algorithm:

Proprietary sensor fusion algorithms leveraging platform kinematics and advanced signal processing (AOA-dominant focus)

Navigation Source:

Integrated Tactical-Grade GNSS/INS

Timing Reference:

High-Stability Timing Reference (Utilizing MEMS OCXO technology or equivalent)

Physical Specifications

Form Factor:
Podded Enclosure

Dimensions (Nominal):
~15 inches (Diameter) x ~80 inches (Length)

Weight (Nominal):
21 kg – 37 kg (Design Goal < 22 kg)

Mounting Provisions:
Standard 14" Lugs

Center of Gravity (CG):
Specification provided in Interface Control Document (ICD)

Power Specifications

Input Voltage:
28 VDC Nominal

Power Consumption (Nominal):
Average: 110 – 265 W (Design Goal < 300W)
Peak: ~350 W+

Power Connector:
MIL-DTL-38999 Series

Environmental Specifications

Operating Temperature:
-20°C to +60°C

Storage Temperature:
-40°C to +70°C

Environmental Qualification:
MIL-STD-810H (Relevant airborne profiles: Vibration, Shock, Temperature, Altitude)

EMC Qualification:
MIL-STD-461G (Key tests: RE102, CE102, RS103)

Cooling Method:
Conduction/Passive with potential internal fans; Requires platform thermal interface analysis

Interfaces

Command & Control (C2):

Physical: Ethernet
Protocol: IP-Based (UDP/TCP)
Standard: STANAG 4586 VSM (Level of Interoperability 3)

Data Output:

Physical: Ethernet (Gigabit recommended)
Protocol: IP-Based (UDP/TCP)
Content: Geolocation reports (position, error ellipse), System status, Metadata (Timestamp, Quality), Optional AOA/IQ snippets
Data Rate: Application Dependent (Requires platform downlink assessment)

Power Interface:

Defined per MIL-DTL-38999 standard connector

Mechanical Interface:

Standard 14" Lugs

Connectors:

MIL-DTL-38999 Series

Operational Concept Summary

- Single-platform operation from Group 3+ UAS.
- Leverages platform motion (kinematic diversity) for geolocation.
- Employs sensor fusion algorithms with an AOA-dominant approach.
- Provides near real-time geolocation reports to GCS via STANAG 4586.
- Suitable for standoff surveillance, interference hunting, and target cueing.

Disclaimer

Specifications describe the Pharos Airborne RF Geolocation System baseline configuration. Performance subject to validation during prototype testing and demonstration. Contact Valence Intel Systems for finalized production system specifications and capabilities. Specifications subject to change without notice.

Contact Us

Learn more about how Pharos can meet your RF geolocation needs.

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