A-Shield

Resillient Positioning for Critical Applications

Advanced Navigation Solutions

Application

A-Shield is the advanced solution for resilient real-time positioning, offering unmatched protection against GNSS interference such as jamming, spoofing, and meaconing. Built upon the ANavS tightly coupled sensor fusion engine and extended with AI-driven threat detection, A-Shield ensures trusted navigation, even under critical conditions.

A-Shield was designed for industries where positioning integrity is critical:

- UxS Navigation in Urban and GNSS-challenged/denied Environments
- Critical Mobile Assets (Defense, Emergency Services)
- Maritime and Port Operations
- Railway and Infrastructure Monitoring
- Autonomous Driving (ADAS, V2X)

Key Features

- Multi-layer GNSS protection against spoofing, jamming, and meaconing
- Tightly coupled GNSS/IMU/Odometry sensor fusion
- SLAM/visual Navigation for redundant localization
- Resilient map-based navigation using landmark and environmental feature correlation
- Galileo OSNMA authentication for verified satellite signals
- AI-enhanced threat detection with Recurrent Neural Networks (RNN)
- Navigation with protection levels and confidence indicators
- Robust hardware, optimized for high-reliability environments

A-SHIELD

System Architecture

- **Sensor Fusion Engine:** GNSS/INS/Odometry
- **AI-Modules:** Neural networks for threat classification
- **OSNMA Handler:** Galileo authentication verification
- **Web Interface:** Configuration, visualization, remote access
- **Cloud Backend (A-Hub):** Postprocessing, integrity logging, fleet monitoring

Technical Specifications

Technology Stack:

A-Shield combines multiple layers of resilience (excerpt). These are integrated in the ANavS Sensor Fusion Framework, which guarantees real-time, high-precision positioning with integrity values, even in critical applications.

Layer 1 – Classical Interference Detection:

- AGC analysis, C/N0 monitoring, Hatch filter
- OSNMA authentication (Galileo)
- Carrier-phase and cross-band analysis

Related Products:

- EMBox Positioning/ Heading
- Embedded Modules

Layer 2 – AI-Based Interference Classification:

- RNN trained with real-world data (e.g., from Jammertest 2024/2026)
- Multi-label classification of signal threats per GNSS band
- Deep neural networks fuse GNSS, IMU, and RF signal metrics

Related Products:

- A-ROX, AI-ROX

Layer 3 – Redundant Sensor Fusion

- Visual odometry, LiDAR SLAM or Camera SLAM
- Radio navigation or landmark-based fallback localization

Related Products:

- AI-ROX

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