GP-Probe NANO L1
Product information and specifications
Document version: v.0.5

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GP-Probe NANO L1
Wearable GNSS Jamming Detector/Logger

Portable GNSS jamming detector designed to identify and log interference in the GNSS L1 band. Can function independently or in combination with an Android phone via a USB Type-C connection

GP-Probe Nano L1 is a highly compact and portable GNSS jamming detector engineered for identification and logging of interference within the GPS L1 band. Utilizing advanced power measurement techniques with huge dynamic range, the device continuously monitors interference power, and alerts users to potential jamming threats. Designed for versatility, it can operate autonomously using its built-in battery and alert system (speaker, vibration, and LED scale) or be connected to an Android smartphone via USB Type-C for enhanced real-time data visualization, analysis and streaming to GP-Cloud. The small form factor, roughly the size of a flash drives, makes it ideal for field use, security applications, and interference investigations.

Key Features

- **Dual Operation Modes**:
  - **Detector Mode**: Monitors signal power 10 times per second and instantly alerts users to potential jamming events.
  - **Logger Mode**: Runs fully autonomously for up to **3 months**, recording power levels every second. All measurements are stored and can be later transferred to an Android app for detailed analysis.
- **Android App Integration**:
  - Enables real-time monitoring of power levels and GNSS signal quality (e.g., SNR).
  - Allows users to retrieve and analyze logged data.
  - Supports multiple smartphone-assisted modes:
    - Monitoring Mode – live signal and interference visualization.
    - Patrol Mode – mobile jammer detection with classification and geotagging.
    - Sentinel Mode – stationary roadside monitoring with optional photo capture.
  - Optional GP-Cloud integration for collaborative localization and event sharing.
- **GP-Cloud Integration:**
  - Real-time synchronization of interference events across multiple users.

Sales and Info: www.hensec.com   gps@hensec.com

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- o Supports collaborative modes:
  - Collaborative Localization Mode – triangulate jammer position using directional data from several detectors.
  - Collaborative Patrol Mode – share mobile detection events and jammer classifications.
  - Collaborative Sentinel Mode – upload stationary monitoring data and optional images for remote analysis.
  - o Enables centralized analysis, team coordination, and remote access to all logged data.

- **High Sensitivity**: Detects GNSS jamming up to 200 meters in line-of-sight conditions from a 5 dBm USB-powered jammer. Detection range is 50-70 meters when the jammer is installed inside a vehicle, depending on shielding and propagation conditions.

- **Wide Dynamic Range**: Covers **5 dBm to -100 dBm**, ensuring detection of both low-power and high-power jammers. Enables reliable identification of interference sources across short and long distances, adapting to varying signal environments.

- **Notification System**: Utilizes a **built-in speaker, vibration, and a 36-LED scale** to alert users about detected interference in real-time and it's power.

- **Compact & Lightweight Design**: Its form factor is comparable to a flash drive, making it easily portable for field operations.

- **Extended Battery Life**:
  - o Up to **1 month** in Detector mode (10 measurements per second).
  - o Up to **3 months** in Logger mode (1 measurement per second).

- **One-Button Simplicity**: A single button on the device controls **power, notification muting, and battery status check**, ensuring intuitive operation in any environment.

- **Angle-of-Arrival Estimation**: By leveraging natural body attenuation effects, users can determine the approximate direction of interference sources without requiring a directional antenna.

Technical Specifications

Monitored GNSS Signals:	• GPS L1
	• Galileo E1B/C
	• GLONASS G1
	• Beidou B1

Operational Modes:

Standalone Operation (without connection to a smartphone)

- **Detector Mode**
  The device operates independently on internal battery. Continuously monitors interference in the GNSS L1 band and alerts the user via vibration, sound, and a 36-LED visual scale when jamming is detected. Ideal for walk-around inspections and personal protection in sensitive environments.

- **Logger Mode**
  Silent monitoring mode for long-term data logging. Records interference power levels every second without notifications. Operates autonomously for up to 3 months. Logged data can be downloaded to the mobile app for later analysis. Ideal for covert or unattended monitoring.

Smartphone-Assisted Operation (via GPSPATRON Connect app)

- **Monitoring Mode**
  Provides real-time visualization of RF power levels and GNSS signal quality (e.g., SNR) on charts. Helps identify GNSS signal anomalies and interferences.

- **Localization Mode** *- Coming soon*
  Allows the user to determine the approximate location of a GNSS jammer on the map using direction vectors collected from multiple observation points.

- **Patrol Mode** *- Coming soon*
  Vehicle-based monitoring mode. Detects and classifies jamming signals while in motion, logs geotagged events, and estimates jammer behavior (stationary, approaching, or moving). Ideal for mobile interference mapping.

- **Sentinel Mode** *- Coming soon*
  Stationary roadside monitoring to detect interference from passing vehicles. Can capture photos for later review.

GP-Cloud Enhanced Operation

- **Collaborative Localization Mode** *- Coming soon*
  Multiple users simultaneously estimate jammer directions using their detectors. Direction vectors are synced in GP-Cloud and visualized in real time. The source location is calculated based on vector intersections, dramatically improving accuracy and speed of localization.

- **Collaborative Patrol Mode** *- Coming soon*
  Extends Patrol Mode functionality by synchronizing detected events and jammer classifications with other users in real time via GP-Cloud. Enables team-based jamming detection, situational awareness, and coverage across large areas.

- **Collaborative Sentinel Mode** *- Coming soon*
  Sentinel Mode with cloud synchronization. All interference events, including optional images, are uploaded to GP-Cloud for centralized analysis and archival. Enables remote team access and operator oversight.

RF Power Measurement Dynamic Range:	+5 dBm to -100 dBm
Jammer Detection Range:	For usb-style low-power (5 dBm) jammer • Up to 200m in line-of-sight conditions • 50m when jammer is inside a vehicle
GNSS Measurement:	**GPSPATRON Connect app:** • Power • SNR **GP-Cloud:** • Signal quality • Anomaly detection caused by spoofing or jamming • Interference detection • SNR • Numbers of visible satellites • DOP • Position accuracy • + much more
Angle-of-Arrival Estivation:	Passive localization
Notification:	Configurable in app: • Speaker • Vibration • 36 LEDs

Power

Battery:	3.7V LiPo, 450mAh
Charging:	USB Type-C 90 minutes for a full charge
Operating time:	• Up to 1 month in Detector mode (2 measurements per second). • Up to 3 months in Logger mode (1 measurement per second).

Mechanical

Enclosure:	Ruggedized, IP65-rated for dust and water resistance
Size:	113 × 31 × 15 mm
Weight:	~50 g

Environmental

Operational Temperature:	-20°C to +60°C
Storage Temperature:	-20°C ~ +70°C
Humidity:	0% – 90% RH non-condensing @ 40°C

Regulatory Compliance

Complies with the requirements:	CE | FCC | ROHS | RED
EMC:	EN 55032:2015+A1:2020 EN 55035:2017+A11:2020 ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-19 V2.2.1 (2022-09) AS/NZS Cispr 32 FCC Part15B
Safety:	ETSI EN 303 413 V1.2.1 (2021-04)

Warranty & Support

Warranty:	1 year Extended warranty is available
Support:	1 year of complimentary technical support

Package Content

GP-Probe Nano L1:	1 pc.
Cables:	USB Type C – Type C. 1 meter cable
Mounting Accessories:	¼" quick release adapter Mounting kit for motorcycle, bicycle Mounting kit for car Nato rail adapter Belt clip
Manuals:	Online quick start guide

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Standalone Detector Mode

The detector mode is designed for real-time GNSS jamming detection by continuously measuring the power level in the GPS L1 band. The device operates autonomously, scanning for signal anomalies and notifying the user when interference is detected.

- **High-Speed Monitoring**: Measures power **10 times per second**, ensuring rapid detection of sudden interference events.

- **Threshold-Based Detection**: Compares real-time power measurements to a pre-defined threshold to distinguish interference from normal fluctuations.

- **Multi-Level Alerts**: When interference is detected, the device provides feedback via:
  - **LED Scale**: A visual representation of signal strength and interference severity.
  - **Audio Alert**: A beeping sound that increases in intensity as interference strengthens.
  - **Haptic Feedback**: A vibration motor activates when interference exceeds a critical level.

- **One-Button Control**: The single button allows the user to mute alerts temporarily, check battery status, and turn the device on/off.

- **Angle-of-Arrival Estimation**: By rotating the device and using the natural signal attenuation effect of the user's body, it is possible to estimate the interference source direction.

- **Standalone Operation**: Fully functional without an external connection, making it ideal for field use.

Use Case Scenarios

- **Vehicle Jammer Detection:** Identifies unauthorized GPS jammers used by drivers to evade tracking, ensuring compliance with fleet management and law enforcement regulations.

- **Law Enforcement & Military Operations:** Supports police and military teams in detecting GNSS jamming threats, aiding investigations and operational security.

- **Critical Infrastructure Protection:** Monitors interference near airports, seaports, power plants, and other key locations to prevent navigation disruptions.

- **Regulatory Compliance & Spectrum Monitoring:** Enables authorities to detect illegal GNSS interference, ensuring adherence to spectrum regulations.

- **Field Investigations & Anti-Surveillance:** Helps security professionals and researchers locate jamming sources using passive Angle-of-Arrival estimation.

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Standalone Logger Mode

The logger mode enables long-term GNSS interference monitoring by continuously recording power measurements every second. A high-stability internal clock ensures precise timestamping, allowing accurate correlation of interference events. This enables detailed post-event analysis and trend identification over extended periods without user intervention.

- **Autonomous Data Collection**: Runs independently for up to **3 months** on a single charge, recording power levels once per second.

- **Signal Power Logging**: Captures signal variations over time, allowing retrospective analysis of interference patterns.

- **Data Retrieval & Analysis**: Stored data can be downloaded to an Android phone for detailed post-event evaluation and reporting.

- **Stealth Operation**: No active notifications, making it ideal for passive monitoring in sensitive environments.

Use Case Scenarios

- **Fleet Monitoring**: Detect when drivers use jammers in vehicles to bypass GPS tracking.

- **Urban Interference Studies**: Identify recurring interference hotspots at intersections or high-traffic areas.

- **Security Applications**: Monitor unauthorized GNSS jamming near critical infrastructure.

- **Compliance Audits**: Verify adherence to legal restrictions on GNSS jammer usage.

- **Academic & Research Use**: Gather long-term interference data for scientific analysis.

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Monitoring Mode
with a smartphone and GPSPATRON Connect app

(Real-time visualization of interference and GNSS signal quality)

Description:

Monitoring Mode is designed for stationary or walking operation, providing a real-time view of the RF environment and GNSS signal quality. In this mode, the GP-Probe Nano L1 is connected to an Android smartphone via USB Type-C and controlled through the GPSPATRON Connect app. The device continuously measures signal power in the GNSS L1 band and displays live charts of both RF interference and GNSS SNR (signal-to-noise ratio).

This mode helps users visually assess signal health, detect anomalies, and understand how interference affects GNSS performance. It's particularly useful for field diagnostics, walk-around inspections, and signal quality verification.

Key Features:

- **Live RF Power Visualization:** Continuously displays power level in the GNSS L1 band to reveal potential jamming.

- **GNSS Signal Quality Monitoring:** Shows real-time SNR values for satellite signals, helping to assess reception quality.

- **Immediate Anomaly Detection:** Enables users to spot sudden changes that may indicate jamming or spoofing.

- **User-Friendly Interface:** No configuration required—just connect and observe. Suitable for technical and non-technical users alike.

- **Ideal Use Case:** Walk-around inspections, indoor/outdoor testing, infrastructure checks, and security diagnostics.

Integration with GP-Cloud (optional):

When internet connectivity is available, live data can be streamed to GP-Cloud for centralized visualization, historical logging, and collaborative assessment. This allows remote teams to monitor the environment in real time and correlate results with other detectors in the field.

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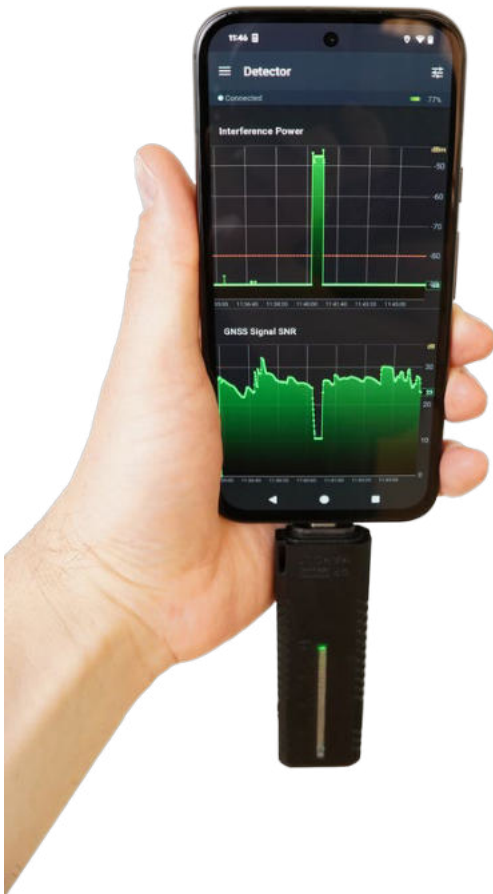
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Localization Mode - *Coming soon*
with a smartphone and GPSPATRON Connect app

(Manual jammer localization using body shadowing and app-guided direction vectors)

Description:

Localization Mode allows users to determine the location of a GNSS jammer using only the GP-Probe Nano L1, a smartphone, and their own body—no directional antennas required. The system leverages a natural physical effect: the human body attenuates GNSS signals by approximately 10–15 dB, when the signal source is behind the user.

The GPSPATRON Connect app displays a real-time power chart and a live map. As the user slowly rotates with the device at waist level, the app monitors signal strength and detects the direction of minimum interference—indicating the jammer is likely behind the user. A direction vector is then automatically plotted on the map. By repeating this process from multiple positions, the intersection of vectors reveals the jammer's exact location.

Key Features:

- **Body-Based Direction Estimation:** Uses the body's natural signal attenuation to determine the most likely direction of the jammer.

- **Automatic Vector Plotting:** The app identifies the minimum signal direction and draws a vector on the map.

- **Smart App Guidance:** Provides real-time instructions on how to hold the device, rotate, and complete the scan.

- **Multi-Point Localization:** Users can perform measurements from multiple points to accurately pinpoint the source.

- **No Specialized Hardware:** Requires no directional antenna or expert knowledge—fully accessible for field teams and first-time users.

Integration with GP-Cloud (optional):

When connected to the GP-Cloud, all direction vectors are instantly synced with your team members. This enables real-time collaboration between multiple users performing localization from different locations. Vectors are automatically combined and visualized on a shared map, significantly improving accuracy and speed.

GP-Cloud transforms Localization Mode into a team-capable tool. Multiple operators can work in parallel, detect jammers faster, and build a complete interference map across large areas—from neighborhoods to cities and beyond.
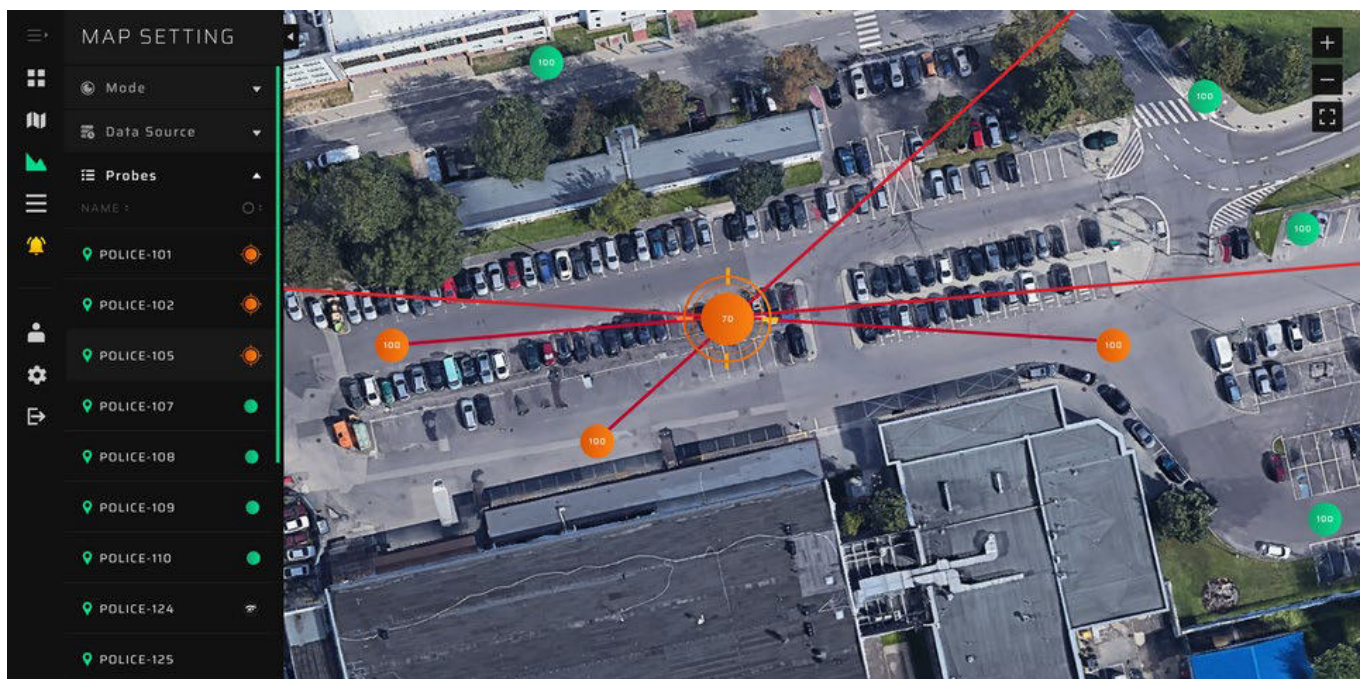
Patrol Mode - *Coming soon*
with a smartphone and GPSPATRON Connect app

(Vehicle-based mobile monitoring and jamming classification)

Description:

Patrol Mode is designed for dynamic, in-motion GNSS interference detection. In this mode, the GP-Probe Nano L1 is connected to a smartphone running the **GPSPATRON Connect** app and mounted inside a moving vehicle. The system continuously monitors the RF environment in the GPS L1 band and detects the presence of jamming signals.

When interference is detected, the application automatically classifies the type of jamming signal and estimates the jammer's behavior based on real-time movement and signal dynamics. The detected event is geotagged and logged on the map, allowing users to build a detailed interference map along the route.

Key Features:

- **Jammer Classification:** Identifies the type of detected jamming signal using onboard algorithms.

- **Event Geotagging:** Each interference event is saved with precise location and time for later analysis.

- **Source Estimation:** The system evaluates whether the jammer is stationary, approaching, or moving in the same direction as the vehicle.

- **Hands-Free Logging:** Automatic operation while driving; no manual input is required during detection.

- **Ideal Use Case:** Law enforcement, fleet operators, and field engineers tracking mobile jammers on public roads or secured perimeters.

Integration with GP-Cloud (optional):

When connected to the internet, detected events are instantly uploaded to **GP-Cloud**, enabling real-time collaboration with other users. This allows multiple teams to build a shared interference map and identify recurring sources of GNSS disruption more efficiently.

Sentinel Mode *- Coming soon*
with a smartphone and GPSPATRON Connect app

(Stationary roadside GNSS jamming detection with event logging and optional photo capture)

Description:

Sentinel Mode is intended for stationary deployment—typically on the roadside or at fixed observation points—to detect GNSS jamming from passing vehicles or nearby sources. The GP-Probe Nano L1 is connected to an Android smartphone via USB Type-C and operated through the GPSPATRON Connect app.

In this mode, the system continuously monitors RF power in the GNSS L1 band and automatically logs interference events with timestamps and signal data. Optionally, the connected smartphone can take a photo at the moment of detection to assist in identifying potential sources (e.g., vehicles). Sentinel Mode is ideal for law enforcement, critical infrastructure security, and perimeter monitoring applications.

Key Features:

• **Stationary Monitoring:** Continuously listens for interference at a fixed location without requiring user interaction.

• **Event Logging:** Each detected jamming event is automatically saved with precise time and signal characteristics.

• **Optional Photo Capture:** When an interference event is detected, the app can trigger the phone's camera to take a photo of the surrounding area.

• **Hands-Free Operation:** Fully autonomous detection and logging — no manual input required.

• **Ideal Use Case:** Monitoring roadsides, facility perimeters, or entry points for jamming sources—especially from moving vehicles.

Integration with GP-Cloud (optional):

When internet access is available, all events (including optional photos) are uploaded to GP-Cloud. This enables centralized analysis, remote access, and team-wide situational awareness. Events from multiple Sentinel deployments can be correlated for broader threat monitoring and source tracking.

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Integration with GP-Cloud - *Coming soon*
with a smartphone and GPSPATRON Connect app

(Collaborative detection, localization, and centralized event management)

GP-Cloud is an optional cloud-based platform that enhances the capabilities of the GP-Probe Nano L1 by enabling real-time data synchronization, team collaboration, and centralized event analysis. When connected to the internet via the GPSPATRON Connect app, the device streams detected events, signal measurements, and optional visual evidence to the cloud in real time.

This integration supports multiple collaborative modes and allows multiple users or devices to work together, improving localization accuracy, area coverage, and operational awareness.

Key Features:
• **Collaborative Localization Mode:** Combines direction estimates from multiple detectors to calculate jammer positions based on intersecting vectors.
• **Collaborative Patrol Mode:** Synchronizes interference detections and jammer classifications between mobile units in real time, enabling team-based road coverage.
• **Collaborative Sentinel Mode:** Uploads stationary monitoring events (with optional photos) for centralized review, archiving, and coordination.
• **Real-Time Data Sharing:** Instantly transmits power measurements, signal anomalies, and event metadata to the cloud.
• **Centralized Access and Archiving:** All data is stored in GP-Cloud, allowing remote teams to review, analyze, and correlate interference events across devices and time periods.
• **Visual Context Support:** Automatically captures and uploads images (if configured) during jamming incidents to assist in source identification.

Ideal Use Case:
Coordinated missions, critical infrastructure protection, wide-area monitoring, and centralized GNSS threat tracking by multiple teams or agencies.