FURUNO

# ANTI-JAMMING & ANTI-SPOOFING GNSS SOLUTION

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## UNSHAKABLE PRECISION FOR MARITIME NAVIGATION

Unparalleled protection for maritime navigation, ensuring reliable positioning and timing even in the presence of intentional interference.

Designed for the merchant marine, offshore, and coastal sectors, these solutions leverage advanced technology to detect, mitigate, and defend against jamming and spoofing threats, safeguarding your operations and enhancing situational awareness.

Visit furuno.fi/anti-jamming-spoofing-system for more information

# WHAT IS JAMMING AND SPOOFING?

GNSS THREAT LANDSCAPE

### JAMMING

Intentional radio frequency interference that blocks or degrades GNSS signals, causing loss of positioning accuracy.

### SPOOFING

Deceptive transmission of false GNSS signals, leading to incorrect position, navigation, or timing data.

Furuno's solutions detect and mitigate these threats, improving resilience for continuous, accurate navigation.

## KEY BENEFITS

**Reliable Navigation**

Maintains positioning accuracy even under jamming or spoofing attacks.

**Real-Time Monitoring**

Instant alerts for interference, enabling rapid response.

**Multi-band & Multi-Constellation Support**

Compatible with GPS, Galileo, GLONASS, BeiDou, and QZSS for global coverage with L1, L2 and L5 bands.

**Easy Integration**

Seamless installation with existing navigation systems.

**Regulatory Compliance**

IEC60945 marine compliant. Recommended as a backup solution.

**Important:** Furuno FFGR-10 is designed to enhance resilience against jamming and spoofing threats. While it provides significantly improved protection compared to standard wheelmarked GNSS equipment, it is important to note that no system can guarantee absolute immunity. Under conditions of sufficiently strong jamming or sophisticated spoofing signals, FFGR-10 may also experience degradation in positioning accuracy or be affected by spoofing. Users should remain aware of operational limitations and maintain situational awareness when relying on GNSS data. Furuno does not warrant that FFGR-10 will prevent all instances of jamming or spoofing.

# BUILT FOR RESILIENT NAVIGATION

TECHNOLOGY OVERVIEW

## KEY FEATURES

### Authentication Protocols

OSNMA and QZNMA ensure signal authenticity, preventing spoofing.

### Multi-Band GNSS Receiver

FFGR-10 supports multiple constellations and frequencies for robust performance.

### Advanced Anti-Jamming Antennas

Tallysman AJ977XF provides 20 dB suppression of low-elevation jamming signals.

### GNSS Disciplined Oscillator (GNSSDO)

Maintains timing accuracy during signal outages.

### Real-Time Interference Detection

FFSP-100 monitors GNSS spectrum and triggers alarms for jamming or spoofing.

# INTEGRATED COMPONENTS FOR GNSS PROTECTION

PRODUCT LINEUP

## FFGR-10 GNSS RECEIVER

High-precision multi-frequency, multi-constellation **GNSS receiver.** The FFGR-10 is designed for high precision and reliability. This receiver support multiple GNSS constellations, including GPS, Galileo, GLONASS, BeiDou, and QZSS, improving resilience for accurate positioning in challenging environments.

**Key Features:**

- Supports GPS (L1/L2/L5), Galileo, GLONASS, BeiDou, and QZSS.
- 10 Hz output update rate for real-time accuracy.
- Robust performance in noisy RF environments.

**Maritime Segments:** Commercial shipping, offshore platforms, and SOLAS vessels (as backup).

## TALLYSMAN AJ977XF ANTI-JAM ANTENNA

Mitigates ground-based jamming and interference. Equipped with **Tallysman AJ977XF** anti-jamming antennas, the FFGR receivers offer superior resistance to ground-based interference. Their multiband functionality ensures seamless operation across various frequency bands, enhancing system robustness.

**Key Features:**

- 20 dB suppression of low-elevation jamming signals.
- Circular polarization for superior multipath rejection.
- IP67-rated for harsh maritime environments.

## FFSP-100 ANTI-JAMMING AND ANTI-SPOOFING MONITORING DEVICE

Monitors GNSS signals for jamming and spoofing, providing real-time alerts.

**Key Features:**

- Visual and audible alarms for immediate threat response.
- Relay output for integration with vessel alarm systems.
- Compatible with FFGR-10 for seamless protection.

# THE ULTIMATE CHOICE FOR ANTI-JAMMING & ANTI-SPOOFING GNSS

WHY FURUNO

**Since its founding in 1938, Furuno Electric Co., Ltd.** has been at the forefront of developing, manufacturing, and maintaining the world's most advanced marine electronic equipment for navigation and communication. As the leading manufacturer of marine electronics, Furuno delivers GNSS solutions that set the industry standard for innovation, reliability, and performance.

With a global workforce of approximately 3,000 experts and a network of subsidiaries and direct offices in over 30 countries, Furuno combines unparalleled technical expertise with a deep understanding of maritime operations. Our reputation as a leader in marine electronics is matched by our proven excellence as a system integrator, ensuring seamless compatibility, cutting-edge functionality, and future-proof solutions tailored to your vessel's requirements.

## CHOOSE FURUNO FOR GNSS SOLUTIONS THAT ARE AS RELIABLE AS THEY ARE REVOLUTIONARY.

Furuno is not just a supplier, we are your long-term partner, committed to delivering the highest standards of safety, efficiency, and operational confidence.

WHY FURUNO

# GLOBAL SERVICE EXCELLENCE: RELIABLE SUPPORT, ANYWHERE, ANYTIME

## WHY FURUNO

Furuno's GNSS solutions are supported by a global network of highly skilled service professionals, ensuring rapid response and expert intervention wherever and whenever you need it. Our extensive service infrastructure, spanning strategic locations worldwide, guarantees that your operations remain uninterrupted, with dedicated teams ready to deliver prompt technical support, maintenance, and troubleshooting.

Backed by decades of maritime expertise, Furuno's service network is committed to minimizing downtime and maximizing the reliability of your GNSS systems, so you can navigate with confidence, no matter the destination. Whether for routine maintenance, emergency repairs, or system upgrades, Furuno's service excellence is always within reach.