KYMETA™

# Peregrine™ u8 User Terminal on the Oneweb Network

FOR MARITIME USE CASE

# EXECUTIVE SUMMARY

Maritime operations are becoming increasingly data-driven, mission-critical, and latency-sensitive. From crew welfare and navigation systems to real-time operational data, safety systems, and command-and-control applications, vessels now depend on reliable, high-capacity connectivity at sea. Traditional stabilized GEO VSAT systems struggle to meet these demands due to high latency, mechanical complexity, maintenance burden, and limited adaptability to modern maritime operations.

The Peregrine™ u8 user terminal, developed by Kymeta and optimized for the OneWeb Low Earth Orbit (LEO) satellite network, is purpose-built to address these challenges. Designed specifically for maritime environments, Peregrine u8 delivers low-latency broadband connectivity while under motion—without the complexity, maintenance overhead, or failure modes associated with mechanically steered antennas.

Peregrine u8 leverages a solid-state, electronically steered flat-panel antenna with no moving parts. By eliminating motors, gimbals, and slip rings, the terminal significantly improves reliability and reduces lifecycle operating costs in harsh maritime conditions. Electronic beam steering enables rapid satellite acquisition, seamless tracking of fast-moving LEO satellites, and consistent performance even in high sea states.

# MARITIME CHALLENGES

**THE NEED FOR LARGE DATA PIPE OPERATIONS**

Due to the increasing reliance on data-intensive applications, the need for high-speed and reliable data connectivity has become essential.

## Defining the need for large data pipe operations

Maritime operations require a large data pipe to transmit and receive critical data, such as weather updates, navigation information, and other essential communications. Therefore, the challenge lies in meeting requirements for maritime operations and ensuring that a terminal can meet these needs.

## Motion and LEO

Maritime vessels are constantly in motion, making it challenging to maintain a stable connection with LEO satellites that provide low-latency broadband connectivity services. This can result in intermittent data transmission and connectivity issues, impacting the safety and efficiency of maritime operations. Maritime vessels need a user terminal that can handle the motion of the vessel while keeping a connection with LEO satellites moving overhead.

## Mounting locations

Maritime vessels have limited space and require efficient use of available resources. Mast and deck spaces constrain mounting options and can make terminals difficult to reach and service. Additionally, power runs can be difficult to install and often have the need to pass through bulk heads. Any installation must be well thought out and planned.

### The need for low maintenance

Maritime vessels frequently operate in cold, wet, and salty environments, making maintenance frequent and challenging. User terminals need to be designed for minimal maintenance, ensuring that they can withstand the harsh conditions and remain operational for an extended period without frequent maintenance.

### Service coverage

Maritime vessels often operate in remote areas with limited-service coverage, so they need a terminal that can provide reliable connectivity and data transmission in the absence of terrestrial coverage.

## THE ONEWEB LEO NETWORK AND PEREGRINE u8 SOLVE MARITIME CHALLENGES

**PEREGRINE u8 SOLVES THE CHALLENGE**

The Peregrine u8 can compensate for the motion of the vessel, ensuring a steady connection with LEO satellites in rough sea conditions.

The Peregrine™ u8, developed by Kymeta, is an industry-leading user terminal designed specifically for maritime use, providing seamless satellite or hybrid satellite/cellular connectivity. It is optimized to address the unique challenges faced by maritime operations, such as the need for large data pipe operations, motion compensation, optimal mounting locations, low maintenance, and global service coverage. The Peregrine™ u8 is designed to work in conjunction with the OneWeb network, a low Earth orbit (LEO) satellite network that offers low-latency data transmission. Additionally, the Peregrine™ u8 features hybrid Cellular  capability, allowing it to switch between satellite and cellular connectivity, further enhancing its versatility for maritime applications.

### General motion defines use cases

Maritime operations require connectivity solutions that can handle the motion of the vessel while maintaining a connection with LEO satellites.

The Peregrine u8 can stay connected in the following situations:

- On vessels up to 7 m in sea state 6 (4 m waves)
- On vessels 10 m and larger in sea state 7 (5.7 m waves)
- On vessels 30 m and larger in all known sea states

This capability makes it suitable for a wide range of maritime use cases, from commercial fishing vessels to research ships and military vessels.

In the table below, turquoise blocks indicate optimal performance, while red blocks indicate potential service disruptions.

| SEA STATE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Wave (m) | .15 | .30 | .91 | 1.5 | 2.4 | 3.6 | 5.7 | 7.6 |
| Vessels ≤ 7 m | | | | | | | | |
| Vessels ≥ 10 m | | | | | | | | |
| Vessels ≥ 30 m | | | | | | | | |

## Low latency

The Peregrine u8 together with the OneWeb's LEO satellite network provides low-latency data transmission, making it the perfect combination for maritime operations that require fast and reliable data transmission, such as vessel tracking, weather updates, and emergency response.

| SHIP MOTION | |
|---|---|
| Roll | ±30° / 4.8 s (12.5°/s) max. |
| Pitch | ±30° / 4.8 s (12.5°/s) max. |
| Yaw | ±10° / 5 s max. |
| Headway speed | 20.5 m/s (40 knots) |
| Wind | 53.5 m/s (104 knots) |

## Fast tracking equals consistent bandwidth

The Peregrine u8 can track LEO satellites at 12.5° per second, ensuring consistent bandwidth and reliable data transmission. This is particularly important in maritime environments where vessels are constantly in motion and a steady connection with LEO satellites can be difficult to maintain.


## Full duplex operation

The Peregrine u8 is capable of full-duplex data transmission, allowing for simultaneous transmission and reception of data from a single terminal. This capability is crucial for maritime operations where real-time communication is essential, such as search and rescue missions, disaster response, and critical navigation updates.

## Reliability and low maintenance

Peregrine u8 is engineered for the realities of maritime operations: continuous motion, salt exposure, limited access for maintenance, and the need for predictable performance. With IP-rated environmental protection, software-defined beamforming, and over-the-air updates, the terminal is designed to operate reliably with minimal intervention over extended service life..

**FLEXIBLE**

The Peregrine u8 is versatile and can be used in a wide range of maritime applications.

## Mounting and installation

The Peregrine u8 mounting system makes it easy to install in various locations for the best view of the sky with a minimal footprint on the vessel. The integrated modem and antenna design further reduces below-deck space requirements, and when combined with industry-standard connectivity, the Peregrine u8 can be fully integrated into virtually any network infrastructure either through wired or wireless means.

# USE CASES

The Peregrine u8 is versatile and can be used in a wide range of maritime applications such as yachts, oil platforms and servicing vessels, merchant shipping, fishing and commercial trawlers, LNG, and oil tankers. Below are examples of how the Peregrine u8 can be used.

## Research vessels (20 m to 100 m)

Research vessels require reliable connectivity for communication and data transmission. With OneWeb LEO connectivity, the Peregrine u8 can provide low-latency data transmission, even in remote locations. This is crucial for research vessels that need to transmit large amounts of data, such as oceanographic surveys, seismic studies, and marine biology research.

## Shipping and industry (vessels over 100 m)

Large shipping vessels and industrial vessels require reliable connectivity for real-time communication and remote monitoring. The Peregrine u8 coupled with the OneWeb LEO network can maintain connection in aggressive maritime conditions. This is essential for shipping and industry vessels that need to maintain communication with onshore teams, track cargo, and monitor vessel operations.

## Personal pleasure craft yachts (30 m or larger)

Luxury yachts require reliable and high-speed connectivity for entertainment, communication, and remote monitoring. The Peregrine u8 and OneWeb LEO connectivity can provide a fast connection even in remote locations, allowing passengers to stay connected and entertained while enjoying their journey.

## Personal pleasure craft and smaller boats (20 m and under)

Smaller boats and personal pleasure craft require terminals that are compact, reliable, and easy to use. The Peregrine u8 configured with hybrid satellite/cellular connectivity works perfectly for smaller boats and personal pleasure craft that move in out of ports with cellular connections. The Peregrine u8 can switch between OneWeb LEO connectivity and cellular based connectivity on user- defined rules. The Peregrine u8 hybrid satellite/cellular option provides a dependable, low-cost connection at ports, harbors, and sea, allowing users to stay always connected.

# THE CASE FOR MULTIPLE TERMINALS WITH FULL DUPLEX ANTENNAS

**BETTER CONNECTIVITY VIA REDUNDANCY**

Multiple terminals can be installed to increase data capacity for vessels with more demanding connectivity requirements.

In some cases, a single Peregrine u8 may not provide enough connectivity for a vessel's needs, so it may be necessary to install multiple Peregrine u8 terminals. There are two reasons why dual-terminal or multi-terminal configurations may be needed.

## Shipboard blockages

In large vessels with many compartments, a single terminal's view of the satellite may be interrupted by shipboard blockages such as steel walls, equipment, and other signal-interfering obstructions. In these cases, multiple terminals can be installed in strategic locations to jointly provide an uninterrupted satellite connection.

## When more data is needed

While a single Peregrine u8 terminal may be sufficient for many vessels, multiple terminals can be installed to increase data capacity for vessels with more demanding connectivity requirements. This could be due to an increase in data usage or because the vessel is undertaking new applications that require higher bandwidth. By strategically installing multiple terminals in conjunction with almost any commercially available SD-WAN solution, vessels can ensure they have sufficient data capacity for their needs.

# CONCLUSION

**PEREGRINE u8 PUSHES CONNECTIVITY TO A NEW LEVEL**

The Peregrine u8 represents a significant step forward in maritime connectivity, offering reliable and high-speed connectivity in even the most challenging conditions.

The maritime industry is constantly evolving, and the need for reliable, high-speed connectivity is more important than ever. The Peregrine u8 addresses the challenges faced by maritime vessels, providing reliable connectivity even in remote locations and adverse conditions. The Peregrine u8 configured for the OneWeb LEO network offers numerous benefits, including low latency, fast tracking, reliable operation, and low maintenance. Moreover, its full duplex capabilities and ability to handle large data pipes make it ideal for modern vessels with demanding connectivity requirements.

The Peregrine u8 represents a significant step forward in maritime connectivity. Its innovative design and advanced features make it the right solution for vessels of all sizes — from research vessels to luxury yachts and shipping freighters to personal pleasure craft — ensuring that they can stay connected and operate safely and efficiently while at sea.


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793-00031-000 rev 03