

Platform to Vessel High-Speed Connectivity

The image of a ship at sea connotes being disconnected and isolated. This is no longer the case with wireless communications. High-speed connectivity and communication improves operation efficiency, personnel safety, and business growth. Industries seeking to



achieve these benefits for offshore platform to vessel communications need to select the best communication solutions for their particular applications.

APPLICATION

Thanks to the proliferation of sensors, cameras, and performance analytics, ships function as connected assets that interact with equally connected platforms. Logistics information and other details can be shared to improve safety and efficiency. The relevant communications requirements include:

- Deliver at least 15 Mbps from Oil Platform to Rotating Collection Vessels with at least 99.99% Reliability.
- Voice and Data connectivity required.
- Video surveillance and streaming video connectivity desired.
- Establish a solid connection with near field obstructions at times.
- Provide automatic communications load balancing between redundant paths.
- Path distances are completely over water at ranges between 12 and 9 miles (20 and 15 km).



These requirements need to be met while meeting business objectives of providing a higher-speed solution with high reliability at a lower total cost than satellite-based alternatives.

CHALLENGES

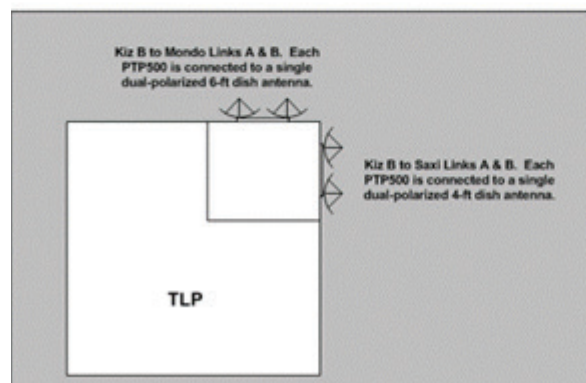
Unlike terrestrial applications, these at-sea systems operate in a dynamic environment where vessels are constantly in motion, and environmental factors are harsh. Challenges come in the form of environmental, situation, and personnel issues. The communication solution must be able to consistently perform in the presence of the following issues:

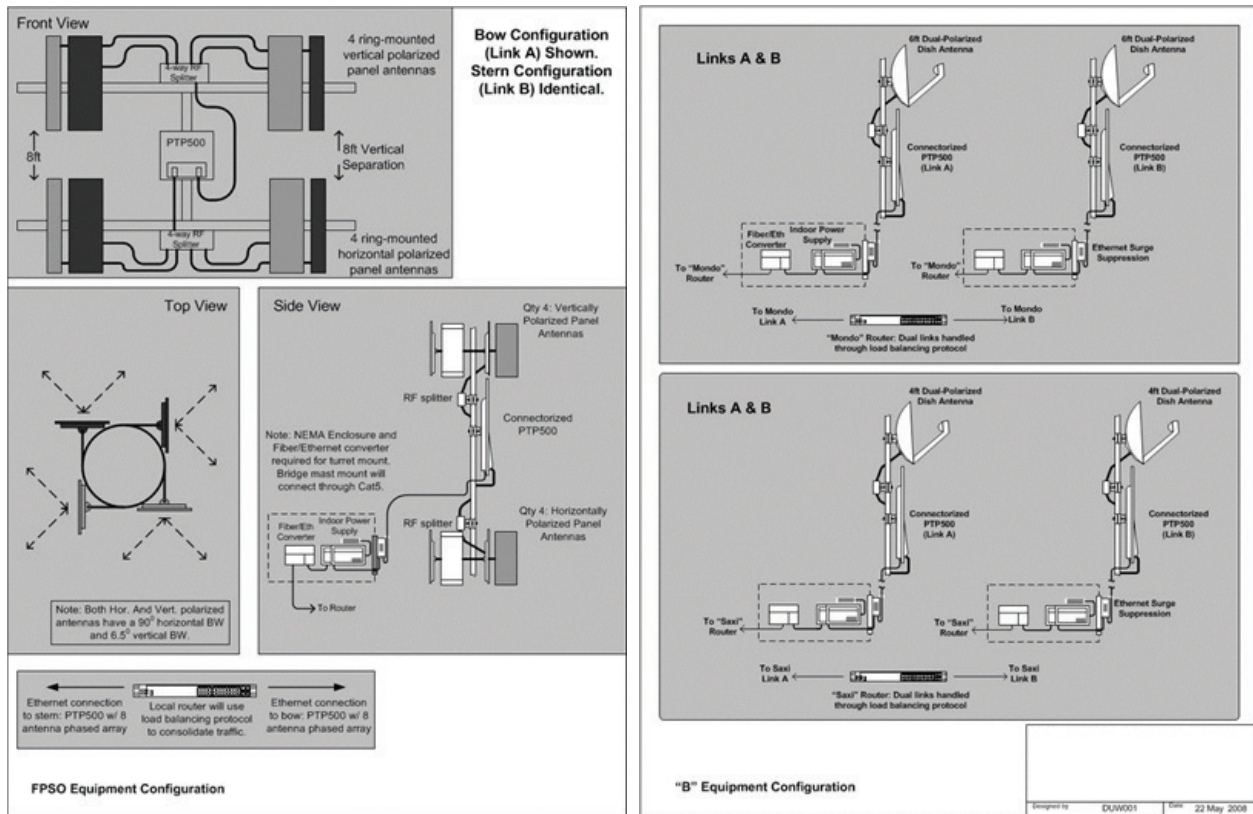
- Environmental
- Withstand the demanding elements of being deployed outdoors for years in a saltwater environment.
- Consistently perform when Near and Non-Line of Site conditions occur.
- Consistently perform in an environment where reflections and dynamic atmospheric conditions cause occasional heavy fades in the path.
- Situational
- Account for vessel motion (pitch and yaw) and rotation and maintain connectivity.
- Account for changing vessel levels depending on weight, fuel, tides.
- Personnel
- On-site staff has limited technical resources, so links must be reliable.
- Limited access to the sites, making installation and maintenance time and system reliability particularly critical

SOLUTION

Vessels can be equipped with Point-to-Point PTP 650 high-speed wireless broadband radios that operate in the unlicensed 5 GHz spectrum to link with similar radios installed on the platforms. These links provide up to 450 Mbps of throughput for streaming video, voice, and data applications. Proven effective in platform to vessel applications, performance can be optimized by using the following configuration:

- PTP 650 (2 Links Per vessel) - one installed on the bow and one on the stern of the vessel
- PTP 650 equipped with High Gain Dual Polarity antennas installed on the platform
- Ship requires spatial diversity antennas to be installed





- Four 90-degree sector antennas with 4-way splitters on each radio to provide 360-degree coverage per radio
- Class I Div II certified enclosure for media converter, radio, and power supply
- EIGRP enabled switch to load balance and provide redundancy as one link loses connectivity due to motion or obstructions

RESULTS

With PTP 6XX wireless broadband links installed in this configuration, the performance exceeds expectations, and the results meet the business objectives:

- All links exhibit >99.99% of availability resulting in >99.999% system availability.
- Average throughput of XX Mbps per links result in close to YY Mbps when both links are active (>99.99% of the time).
- Low latency of less than 2ms in each direction.
- Maintain a very low byte-error rate 2.404 E-8 with fades exceeding 15 dB.
- Data link availability is achieved with a modest 25 dB Fade Margin.

CHOOSE THE RIGHT EQUIPMENT

While wireless broadband connectivity is demonstrated to be rapidly installed at a fraction of the cost of other solutions, not all wireless broadband equipment can consistently deliver the reliable high performance of the PTP 6XX family of products. Network owners should consider the following capabilities that contribute to the ease of installation and the rock solid reliability of the PTP 650:

- PTP Optimized OFDM (1024 Sub-Carrier).
- Multiple-in/ Multiple Out (MIMO) technology optimized for PTP application.
- Ability to model and deploy spatial diversity (Tx/Rx) and have a dual polarity antenna at one end.
- Hitless Adaptive Modulation provides error free connectivity when switching.
- Dynamic Spectrum Optimization enables the system to automatically adjust to optimize signal strength and throughput.
- Ease of Installation enables installations to be done correctly the first time and last over time in harsh environments.



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