



L'utilizzo delle tecnologie wireless in ambito Oil & Gas per la realizzazione di infrastrutture mission critical

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CAMBIUM NETWORKS



Industry leader in Point-to-Multipoint and Point-to-Point IP Wireless Broadband Solutions

Products and platforms spanning 900MHz – 38GHz

Uniquely positioned to deliver breakthrough scalability, reliability, and secure outdoor broadband solutions

More than 4.5 million nodes shipped to thousands of networks in over 150 countries

Global Company with local presence in 25 + countries

CAMBIUM'S TECHNOLOGY

Benefits of Fixed Wireless

Fixed wireless is the most cost effective solution for deploying broadband connectivity:

Scalable

Reliable

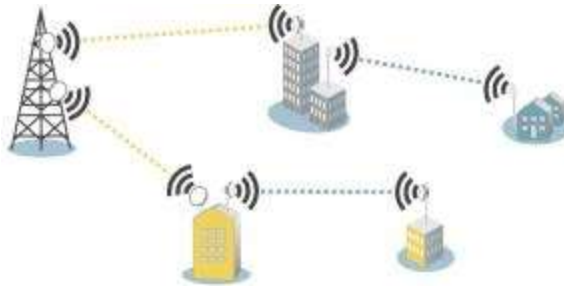
Outdoor

Performance



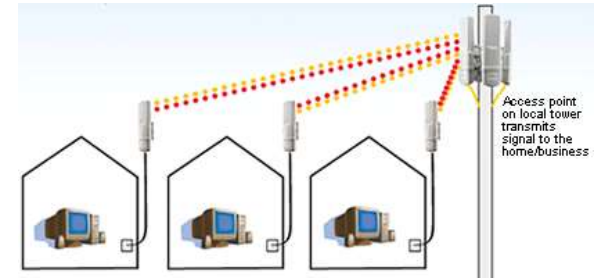
Point to Point (PTP)

- High-speed wireless data link between two sites
- GigaBit bandwidth links



Point to Multipoint (PMP)

- Last mile access and distribution
- Up to Mbps bandwidth x AP, 1.5 Gbps per site



CAMBIUM PETROCHEMICAL BENEFITS

Faster communications

More informed decisions

Streamlined operations

Increased safety and security

More reliable connectivity

Reduced costs

**HIGH PERFORMANCE
WHERE YOU NEED IT MOST...
...AND EXPECT IT LEAST.**

A large offshore oil rig is positioned in the center-left of the frame, supported by several white cylindrical legs. To its right, a red and white support vessel is visible. The background is a clear blue sky and a dark blue sea. The text "OVER WATER." is overlaid in the center in a bold, white, sans-serif font with a slight shadow.

OVER WATER.

PLATFORM-TO-VESSEL COMMUNICATIONS

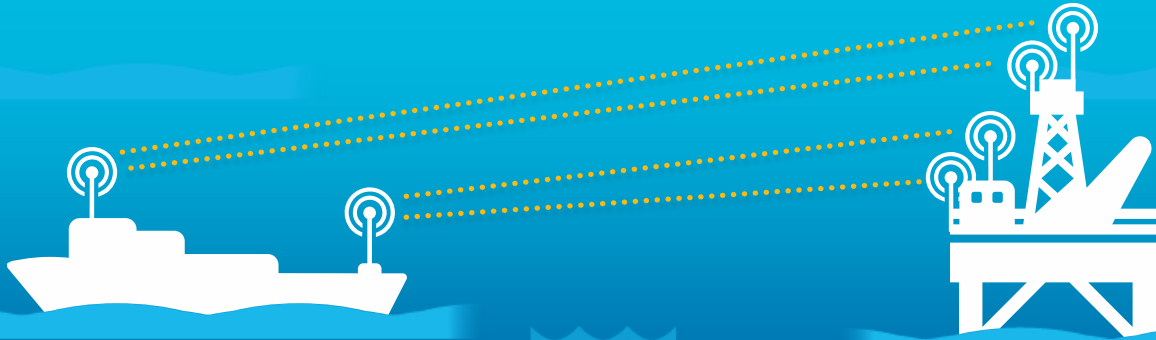


An oil company needs reliable communications between an offshore platform and rotating collection vessels

Replace costly, low-performing satellite connections

Both voice and data connectivity is required for over-water path distances of 9 and 12 miles

PLATFORM-TO-VESSEL COMMUNICATIONS



CHALLENGES

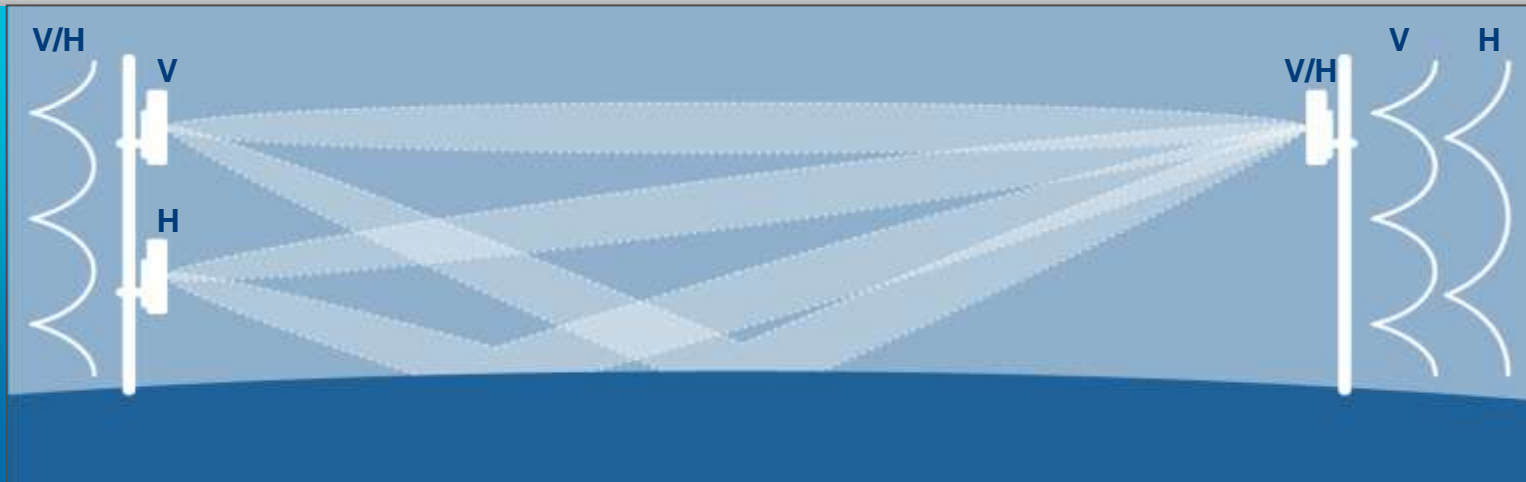
- Long distance connectivity over water
- Non-Line-of-Sight frequency paths
- Harsh saltwater environments

CAMBIUM PTP SOLUTIONS

- Spatial diversity
- MIMO
- Low latency
- OFDM
- Ruggedized equipment

PLATFORM-TO-VESSEL COMMUNICATIONS

SPATIAL DIVERSITY



IDEAL OVER WATER AND FLAT TERRAIN

Wireless signals across water or hard surfaces (desert) pose performance and reliability challenges:

- Highly reflective surfaces create multi-path interference
- Varying water heights create over-sea challenges

Spatially diverse antennas can mitigate the ducting and fading that is typical over water and desert.



IN HIGH INTERFERENCE ENVIRONMENTS.

OIL FIELD COMMUNICATIONS

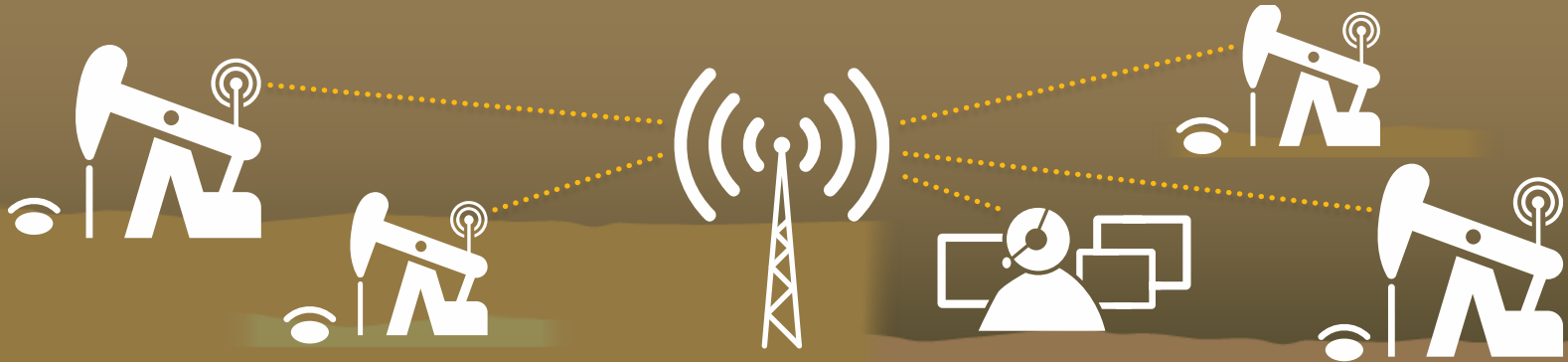


There is always significant interference on oil fields where multiple drilling operations co-exist

Multiple users are constantly transmitting SCADA and other data using the same frequency

Need wireless communications networks that mitigate against interference to ensure high performance and reliability

OIL FIELD SCADA COMMUNICATIONS



CHALLENGES

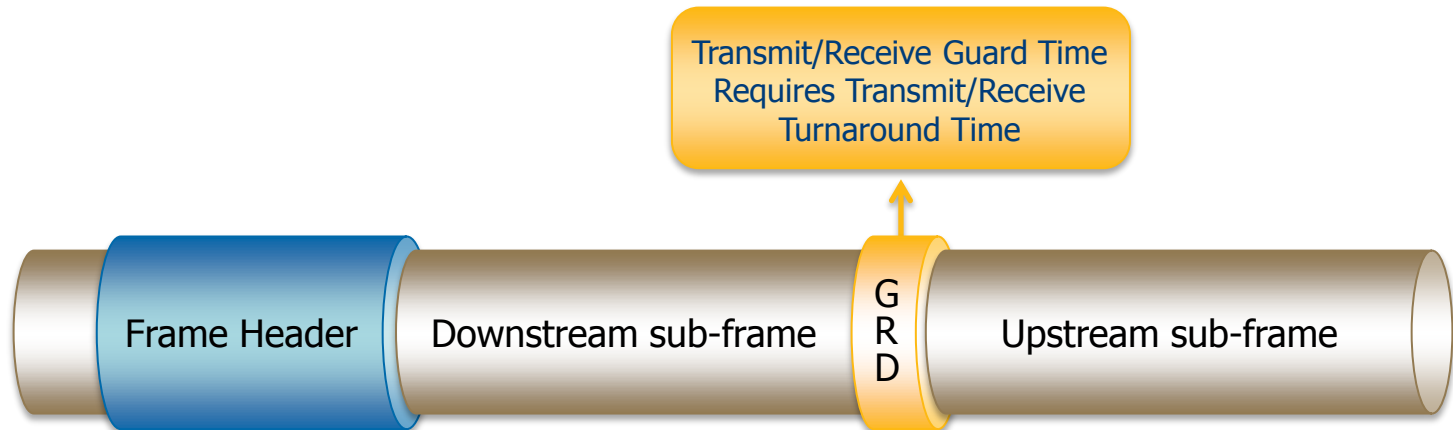
- Interference riddled environment
- Multiple users on same frequency
- High noise floor
- Dropped and faded signals

CAMBIUM PMP SOLUTIONS

- Unique receiver sensitivity
- GPS synchronization
- FSK Air Interface Protocol
- Low C/I Ratio

OIL FIELD COMMUNICATIONS

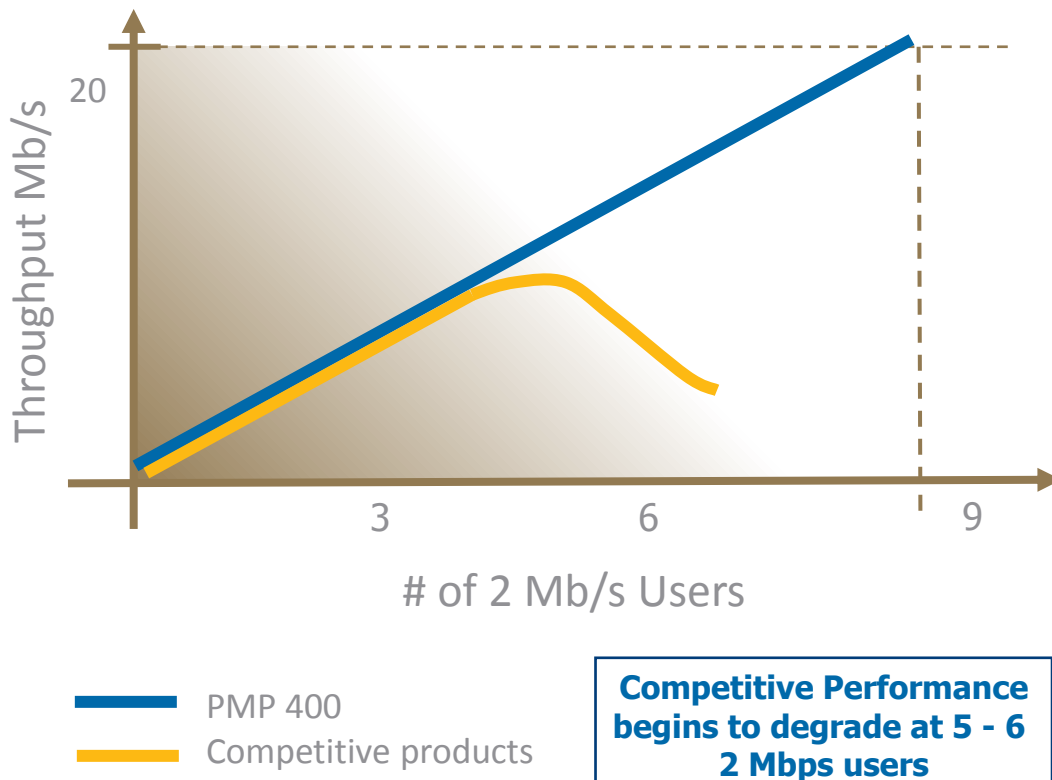
CONSISTENT DATA TRANSFER



Cambium PMP Scheduled TDD Orderly Access

**Cambium PMP reduces idle time and
provides consistent data transfer**


OIL FIELD COMMUNICATIONS COMPETITIVE TECHNOLOGY



- Access as needed / Collisions and Backoff

A worker wearing a white hard hat and a blue jacket is positioned on a construction site. The worker is looking down, and the scene is filled with rebar and concrete forms, suggesting a complex structure is being built. The background shows a dirt area and some greenery under a clear blue sky. The text "WHERE THERE'S NO LINE OF SIGHT." is overlaid in large, white, bold letters across the center of the image.

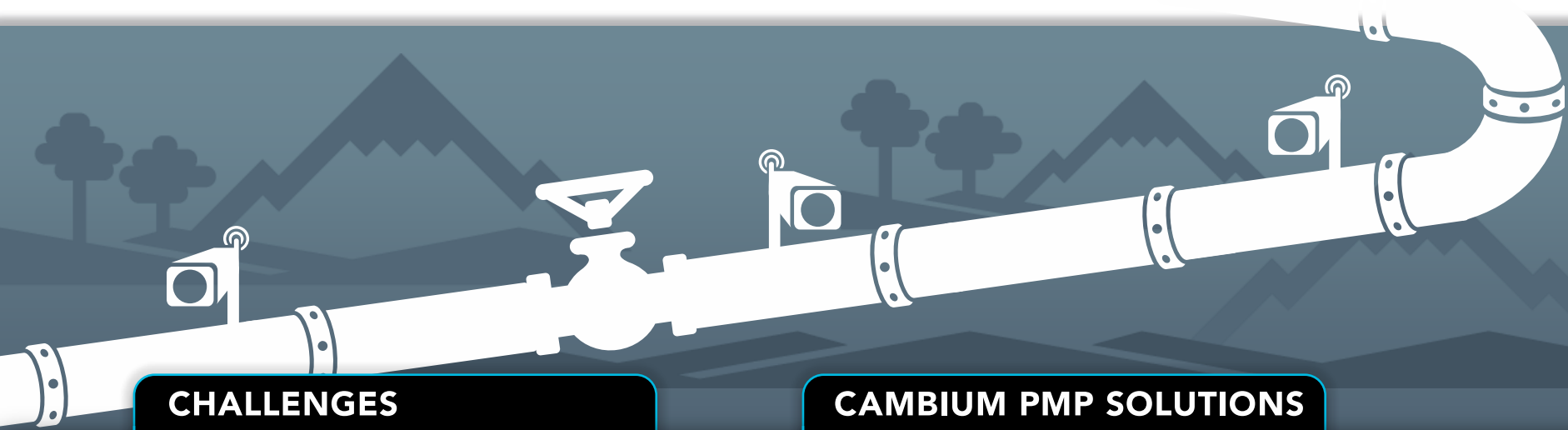
**WHERE THERE'S
NO LINE OF SIGHT.**



WHERE **HIGH QUALITY VIDEO**
IS CRUCIAL.

**CAMBIUM WORKS
WHERE OTHERS DON'T.**

PIPELINE VIDEO SURVEILLANCE



CHALLENGES

- Remote location
- Regular visual inspection
- Need for clear, real-time video images

CAMBIUM PMP SOLUTIONS

- Low latency
- Built-in QoS
- FSK air interface
- Prioritization Polling
- Long distance backhaul

PIPELINE VIDEO SURVEILLANCE



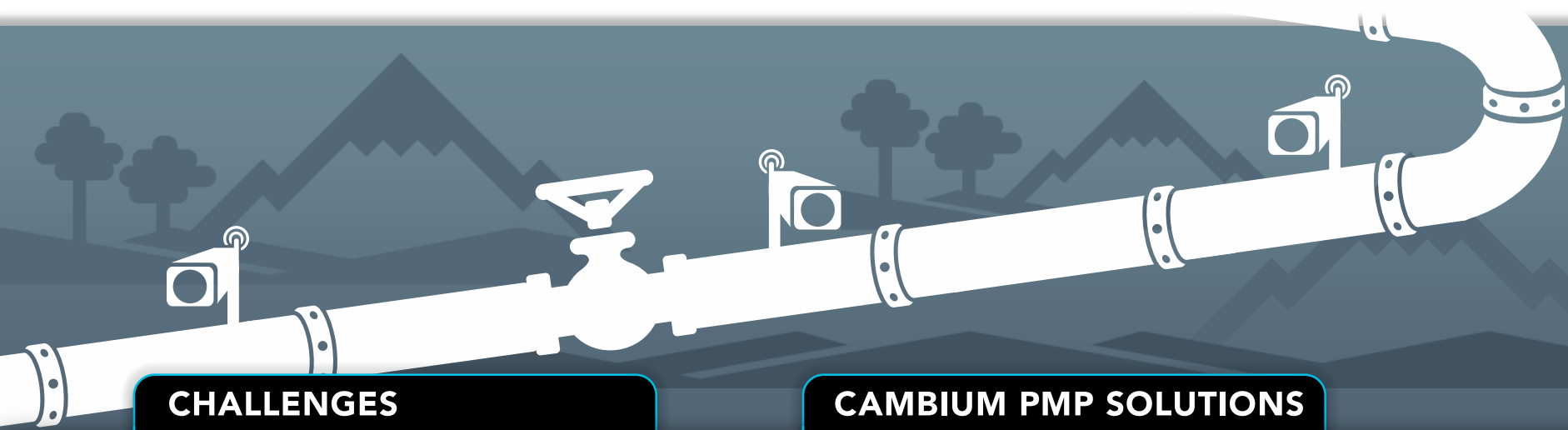
A natural gas company has thousands of miles of pipeline, plus multiple remote pumping stations and substations

Constant visual monitoring is essential for ensuring security

Video is more effective than ground or aerial monitoring

Video images must be high quality, without delays, and without being blurry or choppy

PIPELINE VIDEO SURVEILLANCE



CHALLENGES

- Remote location
- Regular visual inspection
- Need for clear, real-time video images

CAMBIUM PMP SOLUTIONS

- Low latency
- Built-in QoS
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- Prioritization Polling
- Long distance backhaul

CAMBIUM NETWORKS' PTP PORTFOLIO

MEAN TIME BETWEEN FAILURE

40 Yrs < PTP 100/200
141 Yrs < PTP 300/500
441 Yrs < PTP 600
80 Yrs < PTP 800 ODU
58 Yrs < PTP 800 CMU

WIND SPEED SURVIVAL

118 mph < PTP 100/200
202 mph < PTP 300/500
202 mph < PTP 600
150 mph < PTP 800

TEMPERATURE RANGES

PTP 100/200 > -40° to +131° F
PTP 300/500 > -40° to +140° F
PTP 600 > -40° to +140° F
PTP 800 > -27° to +131° F

More than
2.2 BILLION
FIELD HOURS
confirm the durability
of our PTP products

CERTIFICATIONS

FIPS 140-2
IP66 Rating
MEF9
ATEX and HAZLOC

PTP 600 ATEX/HAZLOC

- Target Markets:
 - PetroChem
 - Utility (Generation and Transmission)
 - Defence
- Solution:
 - PTP 600 Series
 - 5.4GHz and 5.8GHz
 - ATEX and HAZLOC Compliant
 - Dedicated SKUs
- Value Proposition
 - Universal radio for all applications
 - Non LOS
 - Over Water
 - Over long distance
 - High RF interference
 - Avoid expensive NEMA
 - Established field reliability
 - Easy to plan and install link



ATEX & HAZLOC APPLICATION BRIEF



IN YOUR SPACE SAFETY IS NON-NEGOTIABLE

The oil and gas industry liberally hosts our global economy, and growing demand necessitates the highest level of engineering, productivity and safety. Every aspect of exploration, extraction and refinement must be carefully orchestrated to operate continuously and maximize profits. Achieving this high level of operational excellence is not possible without advanced data, voice and video communications.

Wireless Ethernet is fast becoming the preferred communication delivery system due to its excellent reliability, adaptability and affordability. However, your communication systems should be ATEX and HAZLOC certified to ensure safe operations in your potentially hazardous environments.

ATEX AND HAZLOC CERTIFIED WIRELESS
Our Series 6000 1.6 and 1.8 GHz Certified Point-to-Point (PTP) Series Wireless Ethernet Solutions are excellent connectivity and localized systems to support your operational requirements. The systems are engineered to provide you with our rugged, high-speed, secure connectivity in virtually any environment. You can establish communications across line-of-sight (LOS), long distance line-of-sight (LOS) and high-interference environments, as well as over water and down terrain. The ruggedized builds can withstand temperatures between -40°F and








140°F (40°C and 60°C) and what speeds up to 100 mbps (100 Mbps) performance.

The unmatched performance is possible due to our unique combination of technologies. These technologies work together to minimize interference, mitigate interference and enable long distance communications with high spectral efficiency and up to five times of reliability. The systems reliably operate in some of the most hostile environments on earth, including oil refineries, hot and dusty deserts, turbulent seas and congested cities.

PTP 600 ATEX/HAZLOC 07/1007



PTP PORTFOLIO OVERVIEW

FEATURE	PTP 100	PTP 200/230	PTP 250	PTP 500	PTP 600	PTP 650	PTP 800/810
							
RF Bands (GHz)	2.4, 5.2, 5.4, 5.8	200 - 4.9 230 - 5.4, 5.8	5.4- 5.8 Dual Band	5.4, 5.8	2,5, 4.5, 4.8, 4.9, 5.4, 5.8, 5.9	4.9 – 6.05GHz Wideband	6 – 38 GHz Licensed
Max. Throughput	14 Mbps *	200 –21 Mbps * 230 –50 Mbps *	256 Mbps *	105 Mbps *	300 Mbps *	450 Mbps *	800 -368 Mbps 810 -696 Mbps
Tx Power	Up to 22dBm	200 –18dBm 230 –19dBm	Up to 22dBm	Up to 27dBm	Up to 25dBm	Up to 27dBm	Up to 30dBm i - Up to 34dBm
Channel Bandwidths	20	200 – 10 230 – 10/20	20/40	5/10/15	5/10/15/20/30	5/10/15/20/ 30/40/45	7-56
Max. LOS Range	35 / 56	200 –15 /24 230 –80 /129	34 mi (54 km)	155 mi (250 km)	124 mi (200 km)	124 mi (200km)	124 mi (200km)
Max. NLOS Range	NA	NA	NA	6 mi (10 km)	5 mi (8 km)	5 mi (8km)	NA
Security	56-bit DES 128-bit AES	56-bit DES 128-bit AES	128-bit AES	128/256-bit AES	128/256-bit AES, FIPS 140-2	128/256-bit AES FIPS 140-2 (future)	Proprietary/ Optional 128/256-bit AES & FIPS 140-2

* Aggregate throughput

CAMBIUM NETWORKS' PMP PORTFOLIO

MEAN TIME BETWEEN FAILURE

40 Years

< PMP 100/320/400/430/450

TEMPERATURE RANGES

PMP 100/320/400/430/450

> -40° to +131° F

**MILLIONS OF
DEPLOYED PMP
PRODUCTS**
demonstrate our
reliability day after day

WIND SPEED SURVIVAL

118 mph

LATENCY

3.5, 7.5 and 25 milliseconds

SECURITY

DES, FIPS 197 AES






CERTIFICATIONS

FCC

Industry Canada

CE

PMP PORTFOLIO OVERVIEW

FEATURE	PMP 100	PMP 400	PMP 430	PMP 450	ePMP
					
RF Bands (GHz)	900 MHz, 2.4, 5.1, 5.2, 5.4, 5.8, 5.9, 6.05	4.9	5.4, 5.8	2.4, 5.4, 5.8	5.1, 5.2, 5.4, 5.8
Max. Throughput	14 Mbps Per sector	20 Mbps Per sector	50 Mbps Per sector	125 Mbps Per sector	200 Mbps Per sector
Tx Power	23 dBm	19 dBm	19 dBm	22 dBm	Up to 23dBm
SM per sector/AP	Up to 200	Up to 200	Up to 200	Up to 238	Up to 40
Max. LOS Range	40 (64 km)	30 (48 km)	30 (48 km)	40 (48 km)	13 mi (20km)
NLOS	900 only	nLOS	nLOS	nLOS	nLOS
Security	56-bit DES 128-bit AES	56-bit DES 128-bit AES	56-bit DES 128-bit AES	56-bit DES 128-bit AES	128-bit AES

IN THE
PETROCHEMICAL INDUSTRY,
CAMBIUM SOLUTIONS
WORK WHERE OTHERS DON'T.

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