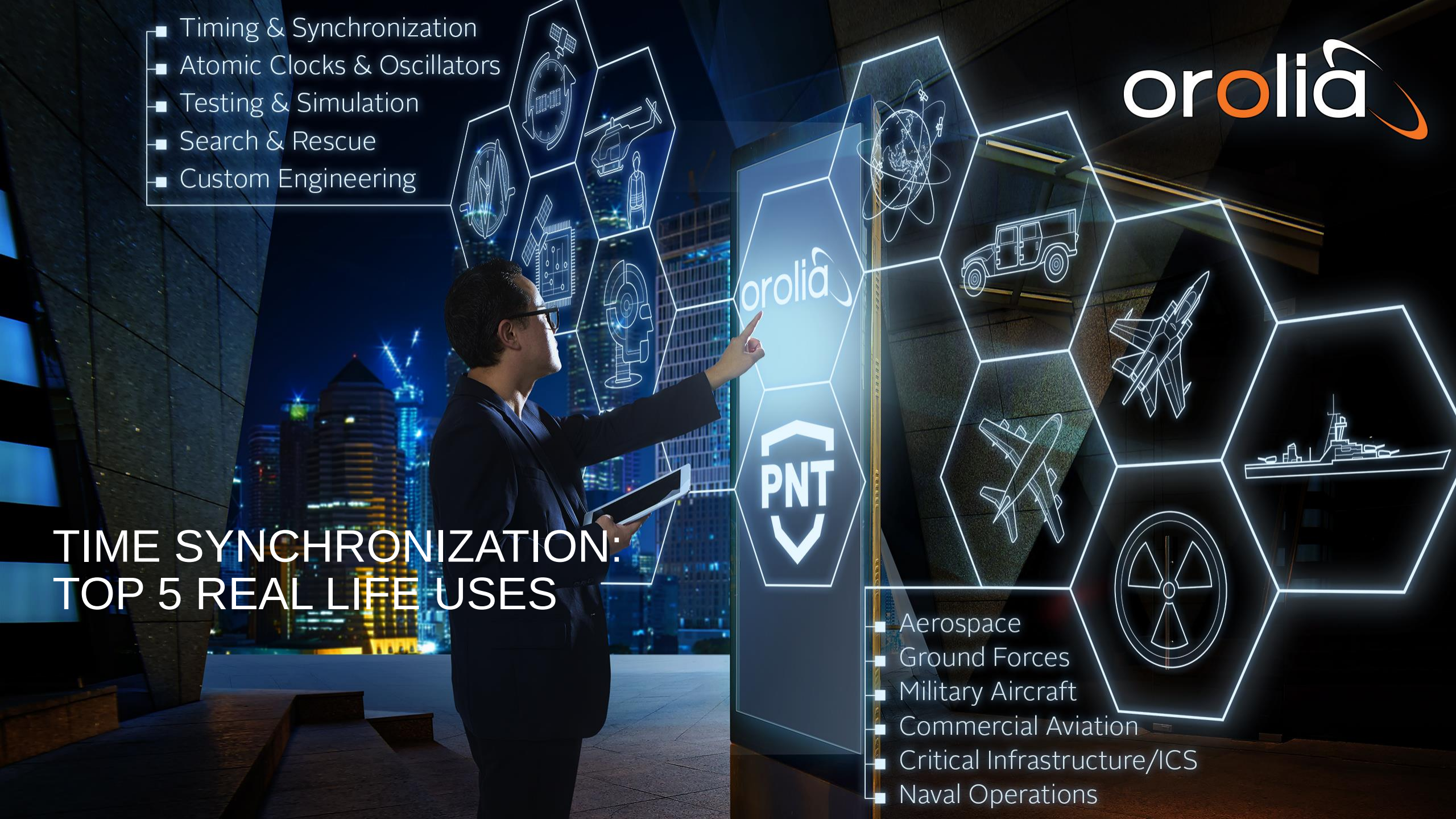


TIME SYNCHRONIZATION: TOP 5 REAL LIFE USES

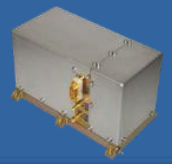
WHO IS OROLIA?

A Reference GNSS Critical Applications Specialist With Worldwide Leadership Positions

- European Private Company Founded in 2006, with a Strong US Footprint
- Develops, Manufactures and Sells Electronic Equipment and Software to Assure Precise and Reliable Positioning, Navigation and Timing (PNT) Data for Critical Operations
- Supplier of Large System Integrators, Governments and Blue-Chip Companies
- 2nd Largest High-Precision Timing Specialist
  N°2 World Leader for GPS/GNSS* Signal Simulation
- Only Independent Provider of Resilient PNT Solutions
- 4 Main Hubs; Industrial Presence in 4 Countries

** GNSS: Global Navigation Satellite Systems such as GPS, Galileo, Glonass or Beidou*

OROLIA PRODUCT PORTFOLIO

Industry	Aerospace	Defense	Critical infrastructure	Enterprise / Finance
				
Resilient Timing & Positioning	Versa Line  	SecureSync & White Rabbit  		
Atomic Clocks & Oscillators	RAFS  LPFRS/AV1  SRO 5680 	SRO 100  mRO-50 		
Testing & GNSS simulation	GSG-8 			GSG-5/6 
Distress Beacons	Ultima Line 	SARBE CSAR beacon 		

TIMING & SYNCHRONIZATION

PNT PORTFOLIO OVERVIEW

Application/customer profile

Application

	Embedded / OEM	Integrator	Operator
Mobile mission systems	 Tsync VPX	 VersaSync  VersaPNT	
Critical infrastructures	 Tsync PCIe  WR-LEN		 SecureSync  WR Z16, WR ZEN TP-FL

SECURESYNC® TIME & FREQUENCY REFERENCE SOLUTIONS

Industry-Leading, Modular Resilient Time & Frequency Synchronization Platforms

- Synchronize to GPS, SAASM GPS, Galileo, multi-GNSS and many other timing references
- Generate virtually any time and frequency output signals
- Multiple internal oscillator options
- Built-in high-performance NTP server; PTP options
- Modular (configure-to-order) ruggedized shock and vibration-tested chassis (1RU)
- Exceptional operating temperature range of -20°C to +65°C
- Secure network management and control
- Platform approach allows easy integration of specific capabilities

DATASHEET

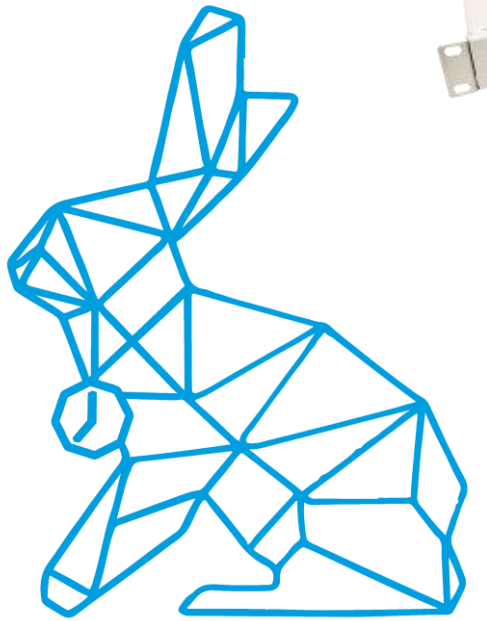
BROCHURE

FOCUS ON SUB-NANOSECOND TIMING

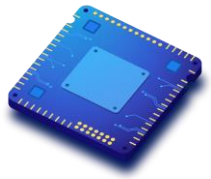
Sub-Nanosecond Timing

White Rabbit Technology uses the Precision Time Protocol (PTP) to achieve sub-nanosecond accuracy for time transfer and frequency distribution applications.

White Rabbit Z16



High Accuracy Timing IP Core (HATI)



White Rabbit is the reference protocol for High Accuracy time distribution in financial networks. Its accuracy, failover capabilities and interoperability with 1PPS, PTP and NTP make White Rabbit a comprehensive solution time sensitive applications.

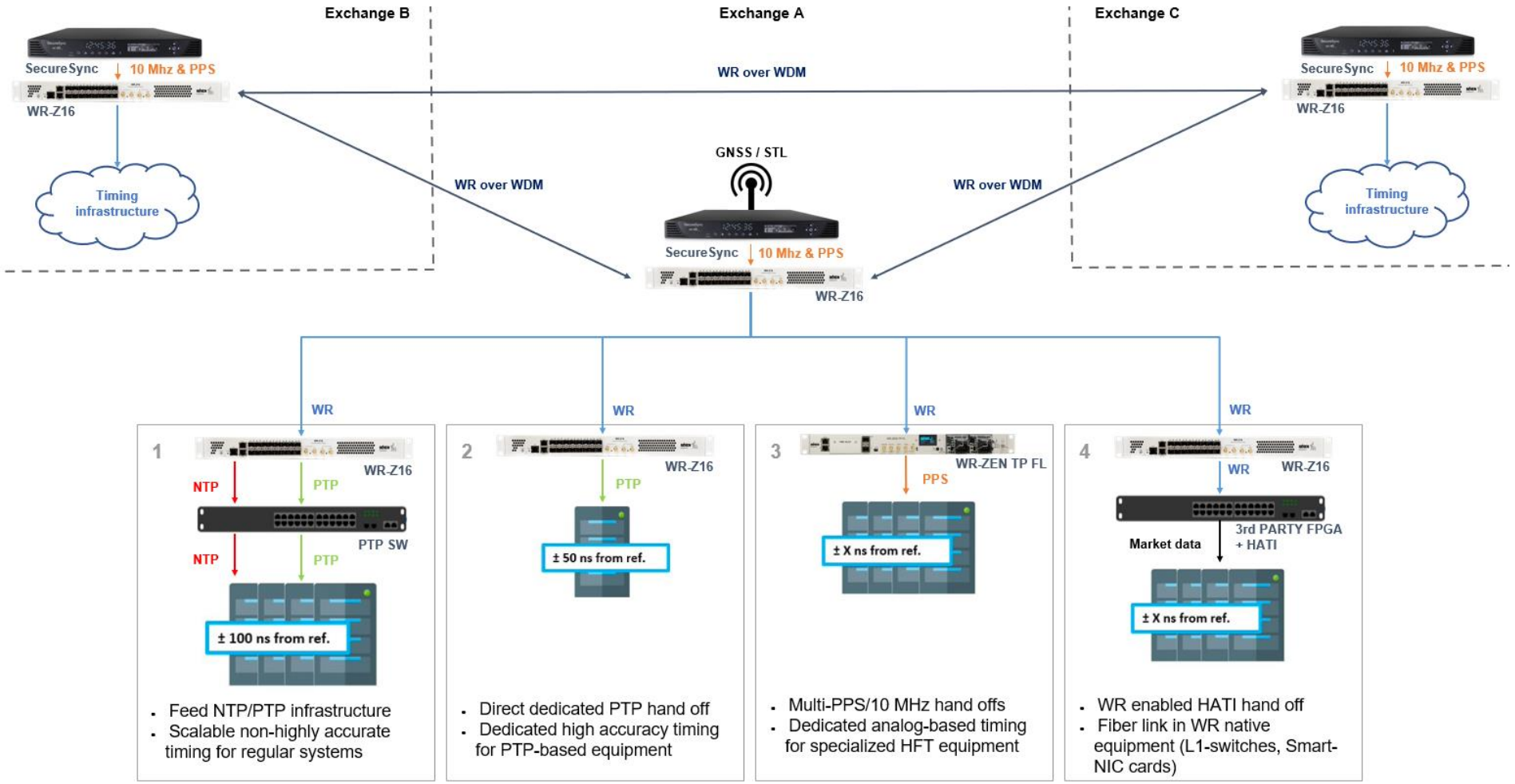
Its objective is to develop a fully deterministic Ethernet-based network for sub-nanosecond accuracy time transfer.

The White Rabbit Project focuses on:

- Sub-nanosecond accuracy
- Flexibility
- Predictability and Reliability
- Robustness
- Open Source Hardware and Software

BROCHURE

TIMING INFRASTRUCTURE IN FINANCIAL NETWORKS

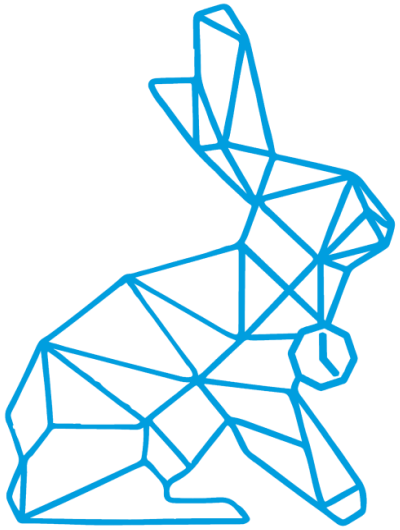


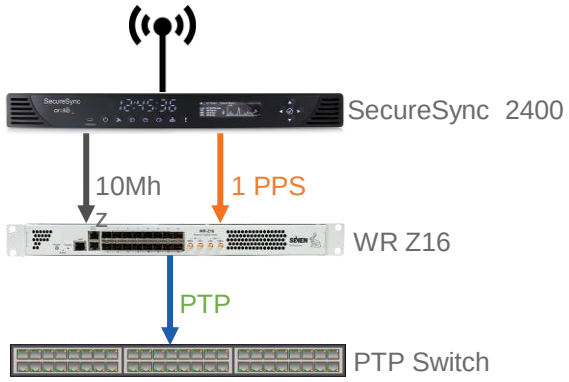
orolia

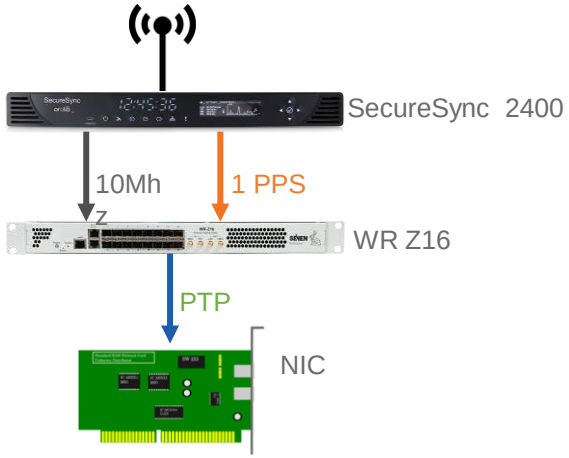
USE CASES

Use Cases

WR backbone in a PTP network



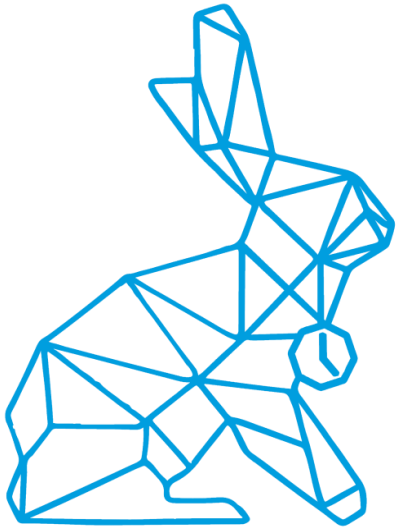


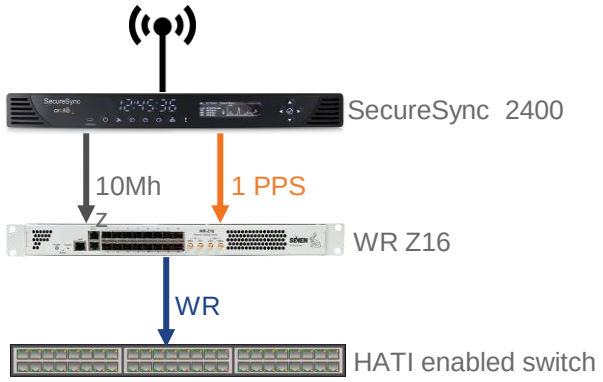


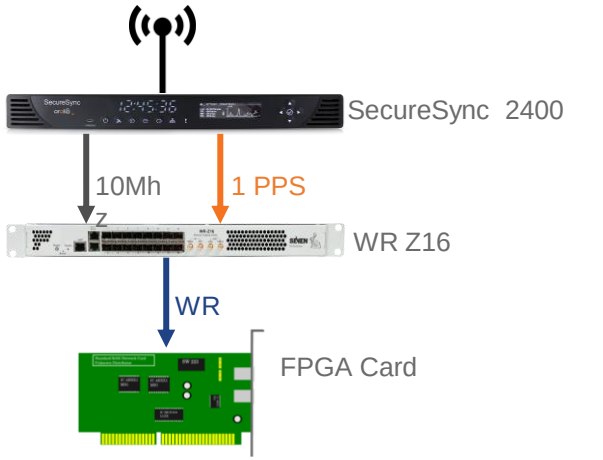
- Simple addition to existing PTP design.
- Introduces White Rabbit to the network without requiring any changes.
- Can co-exist with other PTP services using the best master clock algorithm.
- Improvement over existing PTP design with ±50ns from reference to PTP device.
- No downstream change to end client applications but allows an adoption of White Rabbit as a starting point for other timing projects or use-cases.
- Standard fiber deployment, no special cabling, optics or calibration required.

Use Cases

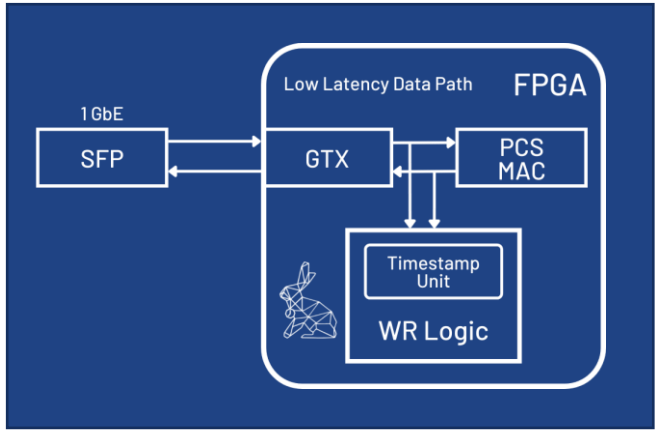
WR to the very last hop







- Sub-nanosecond level timing to HATI enabled switch.
- Works with Arista 7130LB series running MetaWatch.
- Distribution over standard fiber from the WR-Z16 with no calibration required. Pre-calibrated optics.



HATI – NATIVE WHITE RABBIT SUPPORT

HATI is being integrated with Arista, Cisco and LDA Technologies L1-switches.

High Accuracy timing integration in Xilinx FPGAs (including US+).

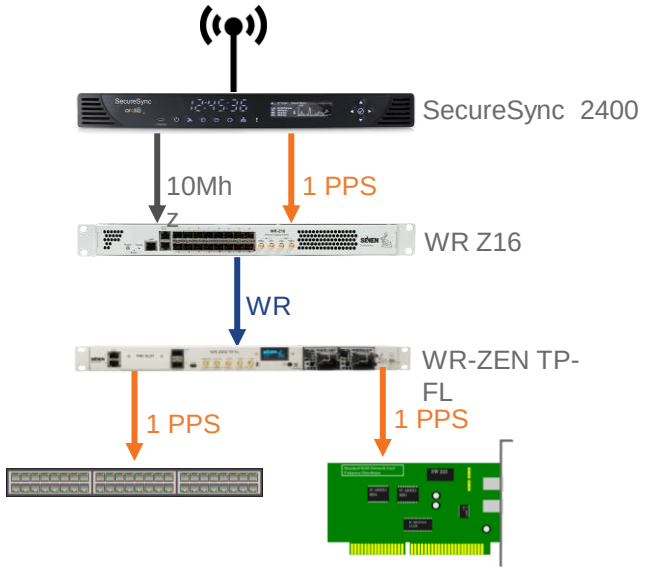
Sub-nanosecond time accuracy on NICs can be achieved leveraging this technology.

No need for expensive oscillators/clocks or dedicated hardware.

Distribution over fiber without calibration. Remove the need for coaxial cables.

Use Cases

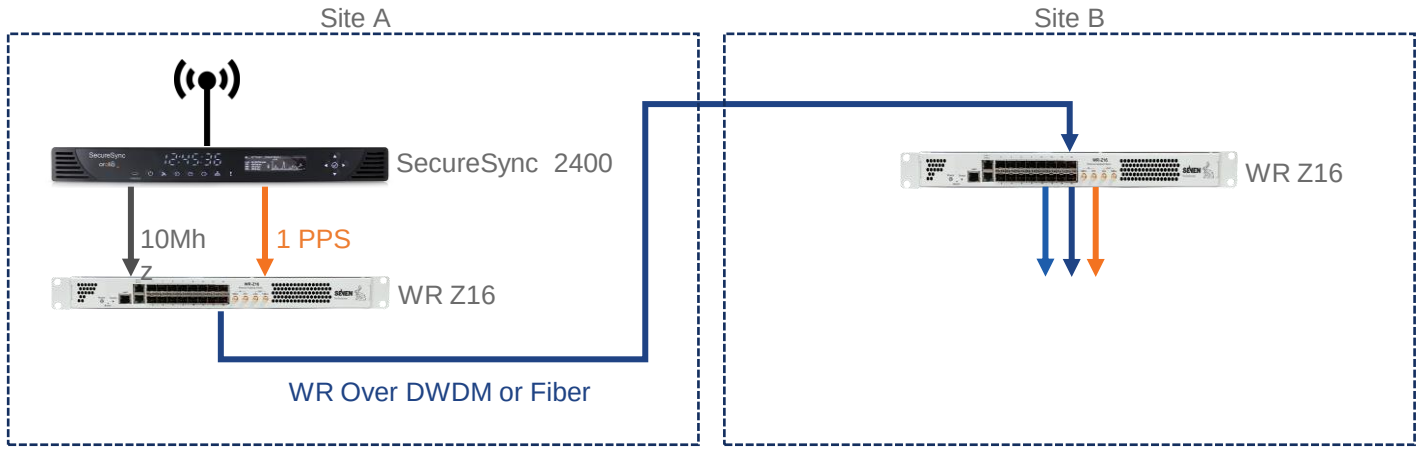
WR to minimize PPS calibration

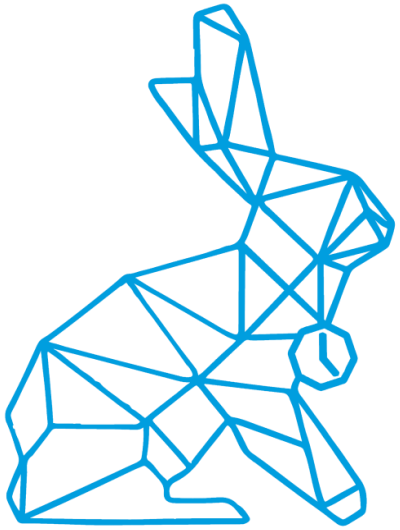


- Suitable for network cards and switches that require 1 PPS handoff.
- White Rabbit (WR ZEN TP-FL) converts to 1 PPS at the local rack, and can hand off 1 PPS.
- White Rabbit links as sub-nanosecond accuracy.
- Handoff from 1 PPS on WR-ZEN TP-FL are sub-nanosecond accuracy.
- Distribution between White Rabbit nodes over standard fiber from the WR-Z16 with no calibration required. Pre-calibrated optics.
- Any inaccuracy introduced will be based on either coaxial cable variance or receiving hardware.

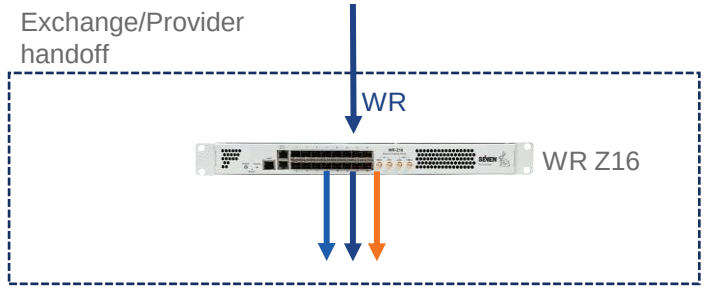
Use Cases

WR where GPS is not available



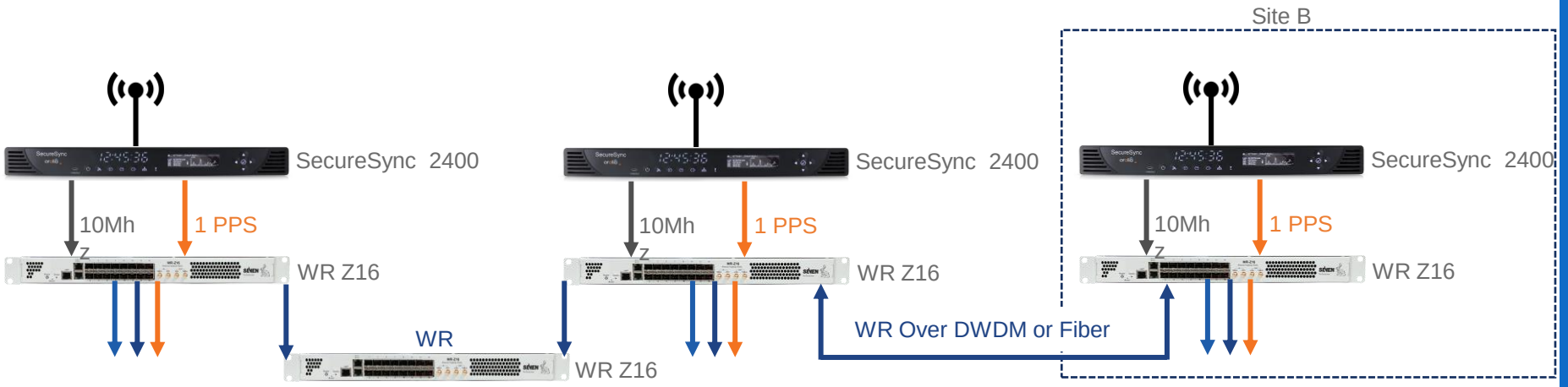


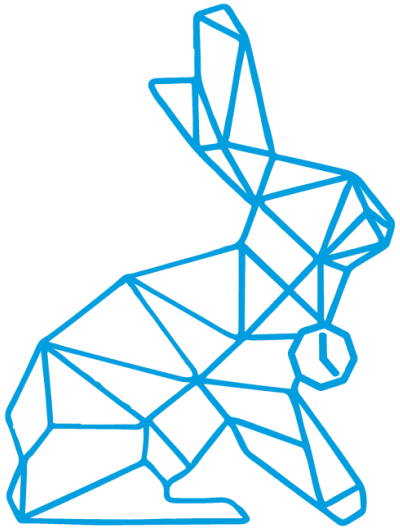
- Suitable for sites without local GNSS/GPS access.
- White Rabbit signal delivered from Site A -> Site B over DWDM or fiber or by a local provider.
- Sub-nanosecond accuracy.
- Output from WR Z16 may be WR, PTP or 1 PPS.
- No retiming should happen on the optical path.



Use Cases

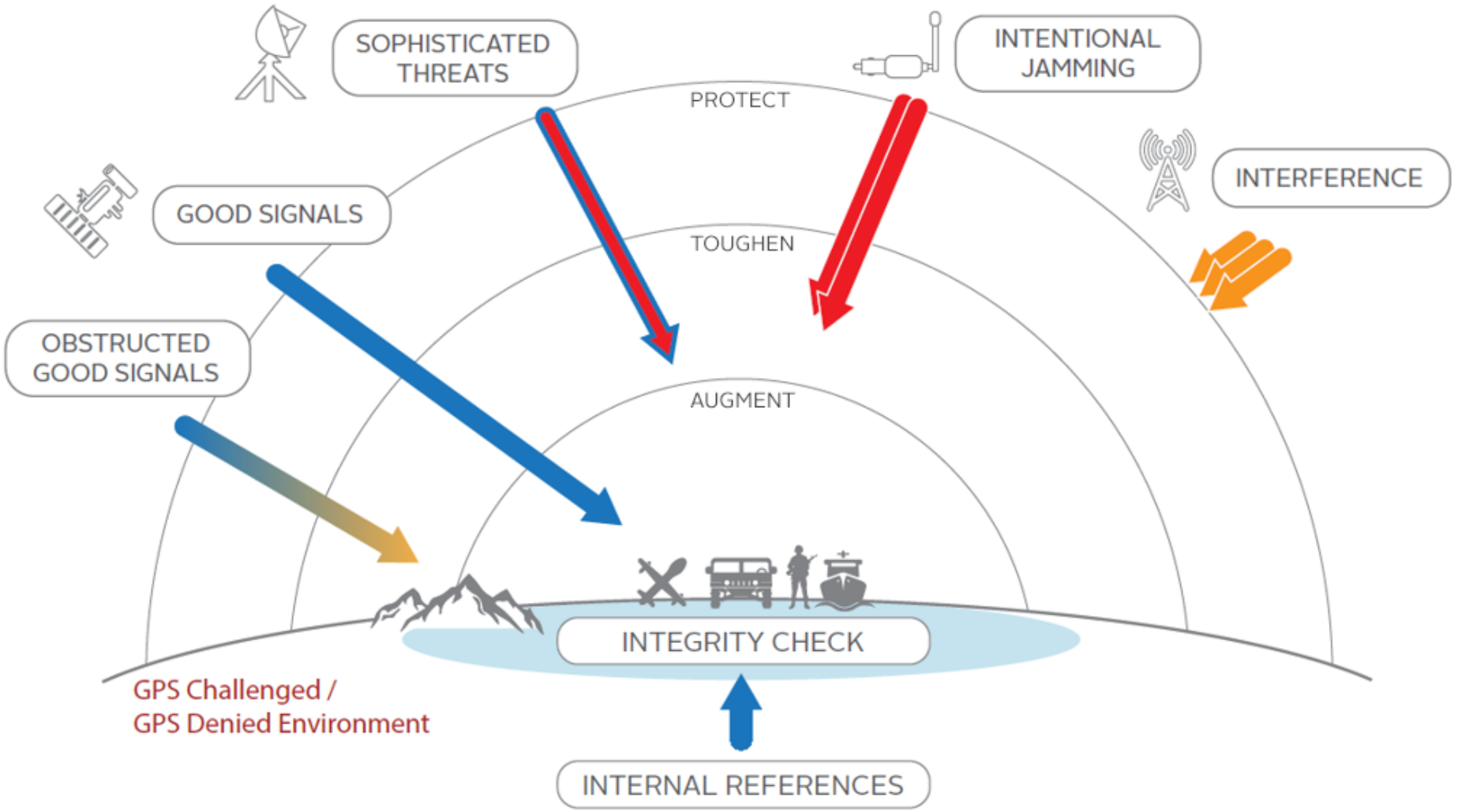
WR for resilient timing





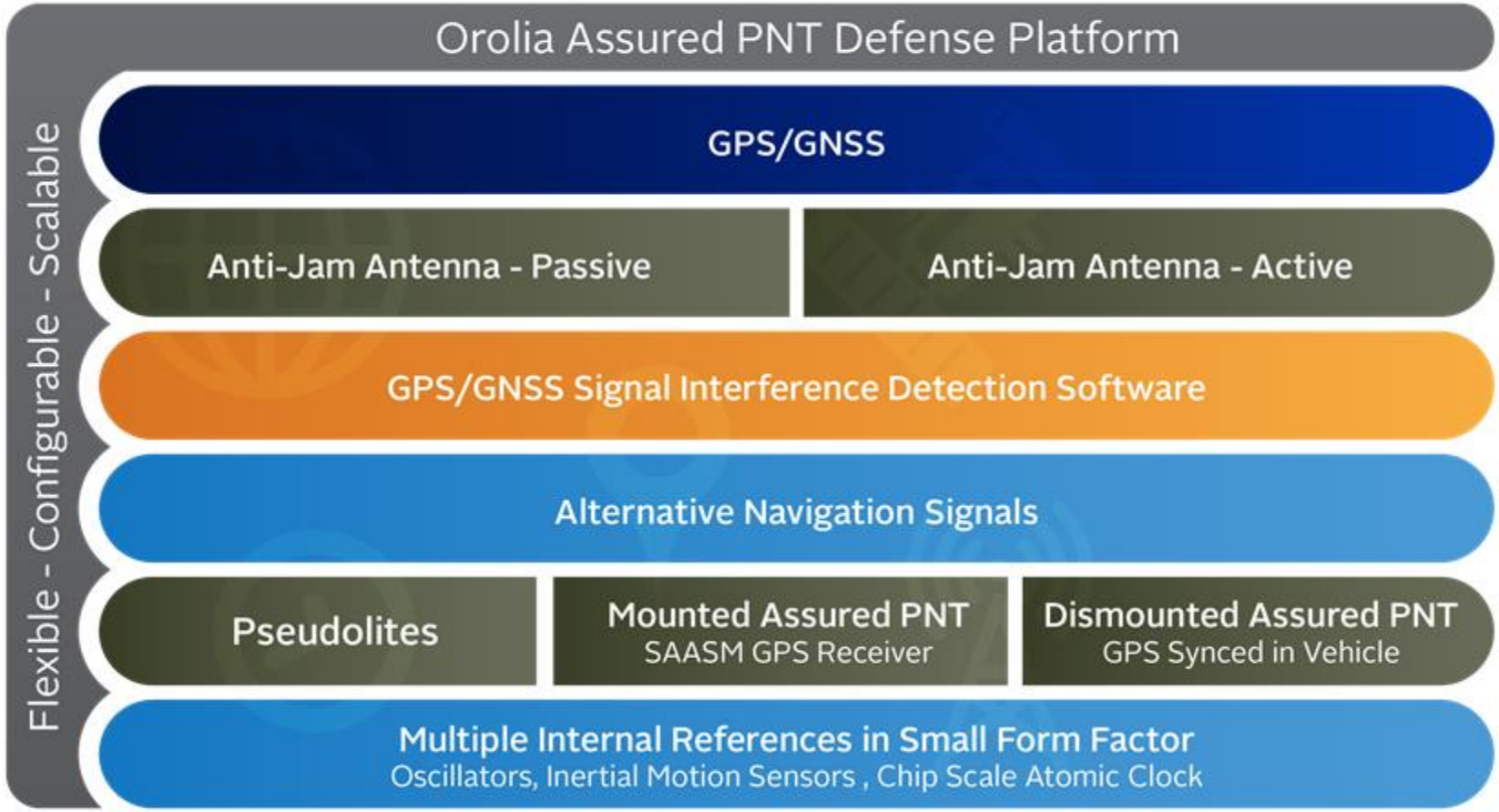
- WR Z16's can be configured to have multiple prioritized input sources of time.
- Multiple time references may be used to create WR Z16 devices redundancy.
- Each WR Z16 can provide time at sub-nanosecond accuracy to another.
- Distribution between White Rabbit nodes over standard fiber from the WR-Z16 with no calibration required. Pre-calibrated optics.
- Each WR Z16 can receive White Rabbit signal from another site to provide a 2nd source of time in the case of component failure.

GNSS DENIAL COMES FROM ACCIDENTAL OR INTENTIONAL (JAMMING AND SPOOFING) INTERFERENCE



A LAYERED DEFENSE APPROACH

The most comprehensive suite of PNT IDM solutions available today



PREVENTING INTERFERENCES AT ANTENNA LEVEL

Passive Anti-jam antenna 8230AJ
Horizon blocking antenna

GPS Dome
Null steering in direction of interference

⇒ Both anti-jam antenna 8230 and GPS dome can be combined for higher interference rejection

⇒ Orolia works also on CRPA antenna (longer-term projects)

STL – SATELLITE TIME AND LOCATION SIGNAL

New signal available today

- Broadcast on the Iridium sats

>30 dB stronger than GPS

- Higher jamming and interference resistance
- Operates indoors

Encrypted signal

- Inherently anti-spoof
- Subscription based service
- Available for civilian use
- Requires a dedicated Receiver (as a SecureSync option board) and antenna

www.orolia.com