TEST YOUR DEFENSES

How Teledyne LeCroy helps test the performance of Ethernet-based systems used on modern battlefields.

TELEDYNE LECROY
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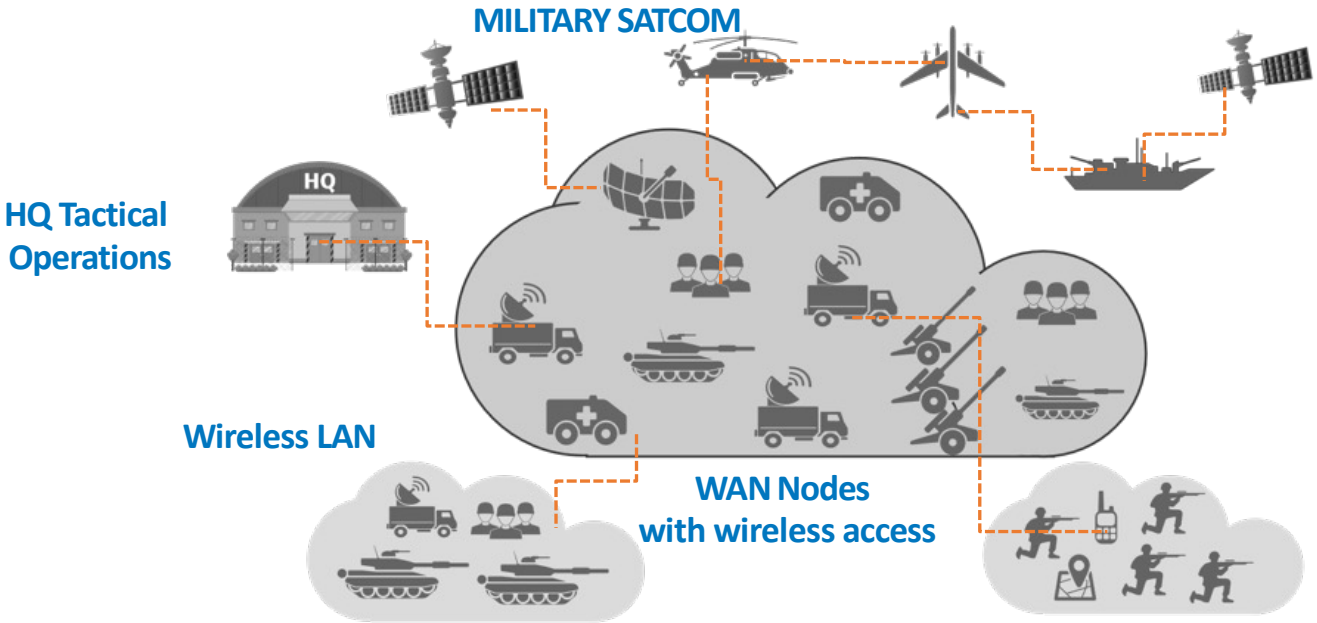
Interconnected Battlefield

- Ensuring information flows quickly and smoothly between different groups on the battlefield - and those coordinating their operations - is essential.

- Ethernet is the technology most frequently used for these ad-hoc networks.

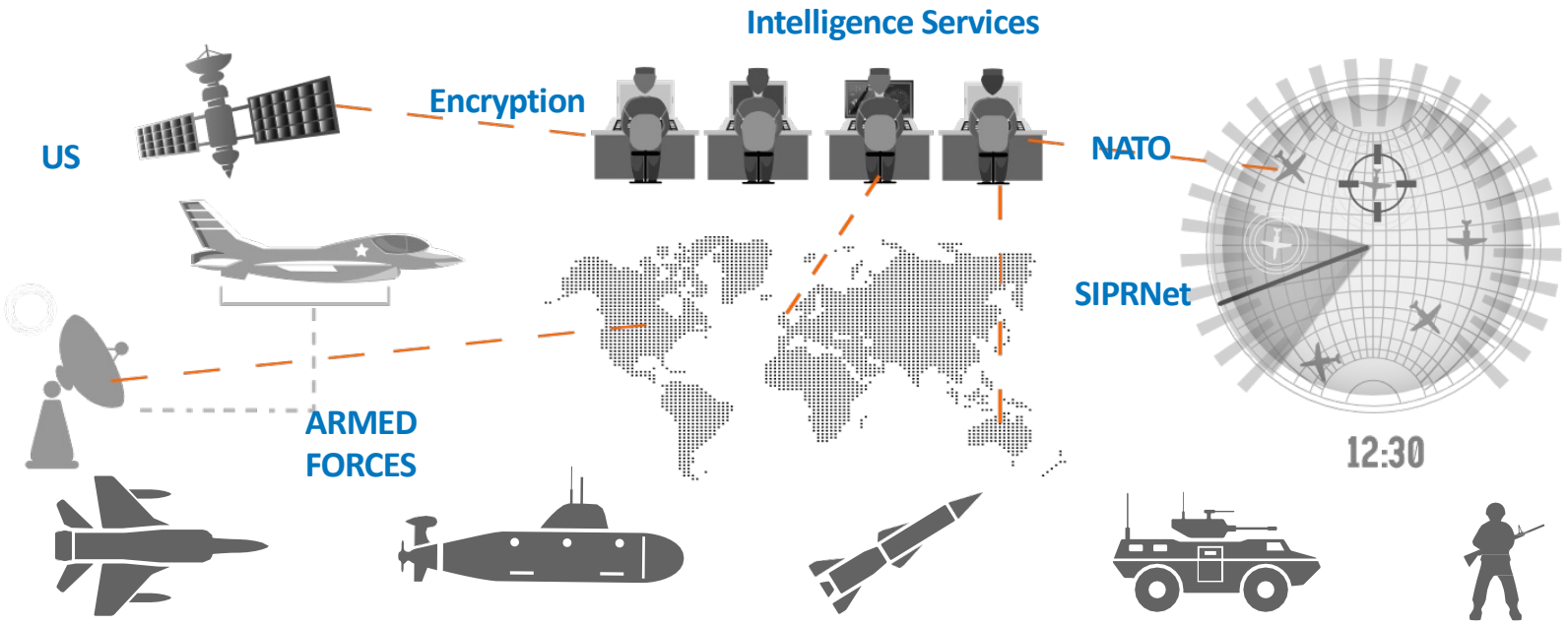
- This document looks at how Teledyne LeCroy's Ethernet test solutions are used to validate the resilience and performance of devices and services on the interconnected battlefield.

WIN-T



WIN-T Warfighter Information Network-Tactical

Platforms like WIN-T (Warfighter Information Network-Tactical) allow forces to securely transmit real-time video, view maps, request artillery support, access mission command applications and connect with commanders. This requires resilient high-speed, low latency networks.



JTIDS
Joint Tactical Information Distribution System

Other systems - like JTIDS - allow a strategic sharing of information between partner countries and agencies.
This demands interoperability and a secure network.

Ethernet Everywhere

The networking technology most frequently used for connecting units on battlefield and in command centres is Ethernet.

Ethernet can handle very large amounts of data – the top speed is now 800Gbps.

Using Ethernet also ensures interoperability. It is a tried and tested technology based on well-defined international standards that all suppliers support. As a result, ethernet is used ubiquitously by the military. The trend is to go with existing COTS switches and other core networking devices and ruggedize them for use on the battlefield.

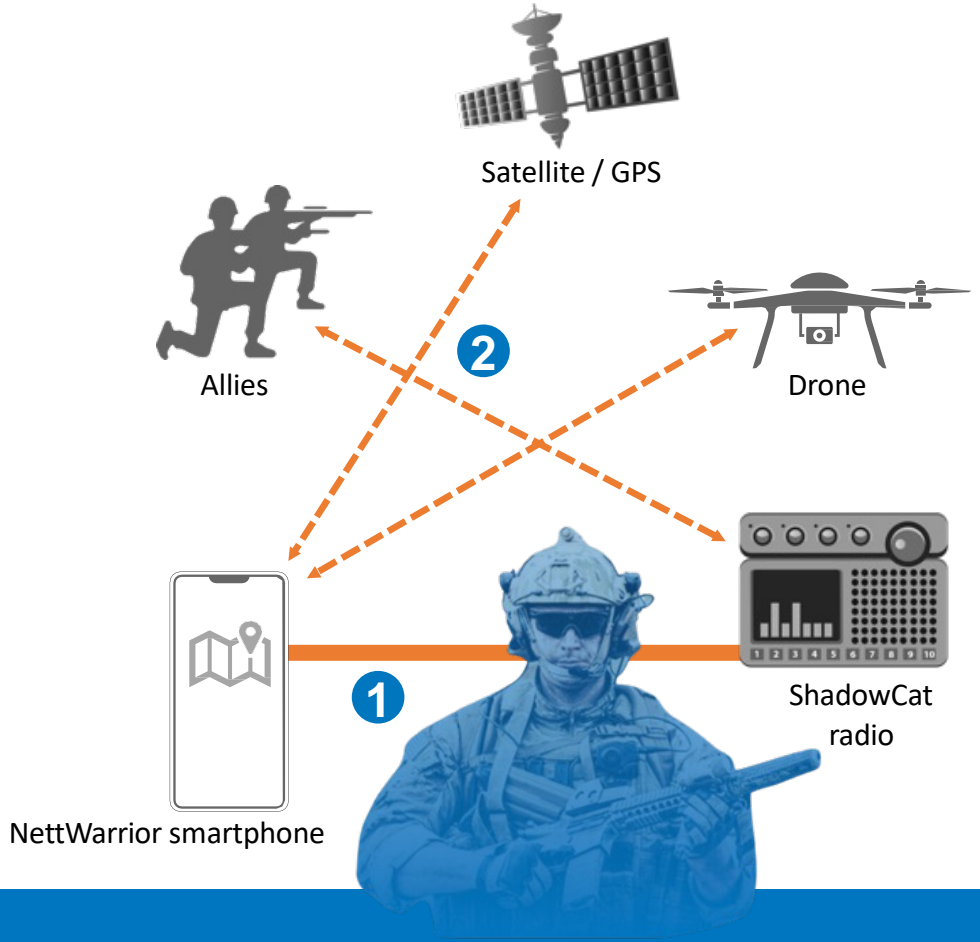
We have over 10 years' experience in testing the performance and features of such devices.

Simple Scenario using Ethernet

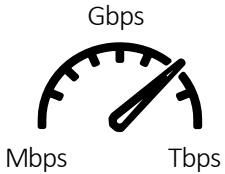
1. Soldiers may have a Rifleman or ShadowCat Radio plus a NettWarrior smartphone connected via a standard RJ45 Ethernet cable or a military M12 style connector.
2. This lets them access data feeds from overhead drones, JTIDS command station or air support. They can communicate securely with other units and receive precise GPS data.

The Ethernet switches used in these devices are ruggedized COTS switches. They allow the broadest range of interconnecting devices where there are very few - if any - protocol requirements.

The Ethernet interface allows connectivity to other devices without the need to know about security technologies such as encryption or frequency hopping.



What needs testing?



Performance

Performance is critical. Can people get the data they need when they need it? Does the data flow smoothly – also across a heterogenous network topology deployed in remote, hostile environments? What is the impact of heavy encryption? What about mobility?

Interoperability

Expecting software and networking components – switches, radios, phones, transceivers - from different manufacturers to all work seamlessly together out of the box is naïve, also in civilian life. Interoperability testing is crucial.

Reliability (QA)

Military equipment is ruggedized for a reason. But who tests if all still works when its time to shake, rattle & roll? Simulating the data flows to see if equipment continues to function under real-life conditions is a must.

Testing in the lab

M12 Connector

Encryption module

Radio modem

Frequency hopper

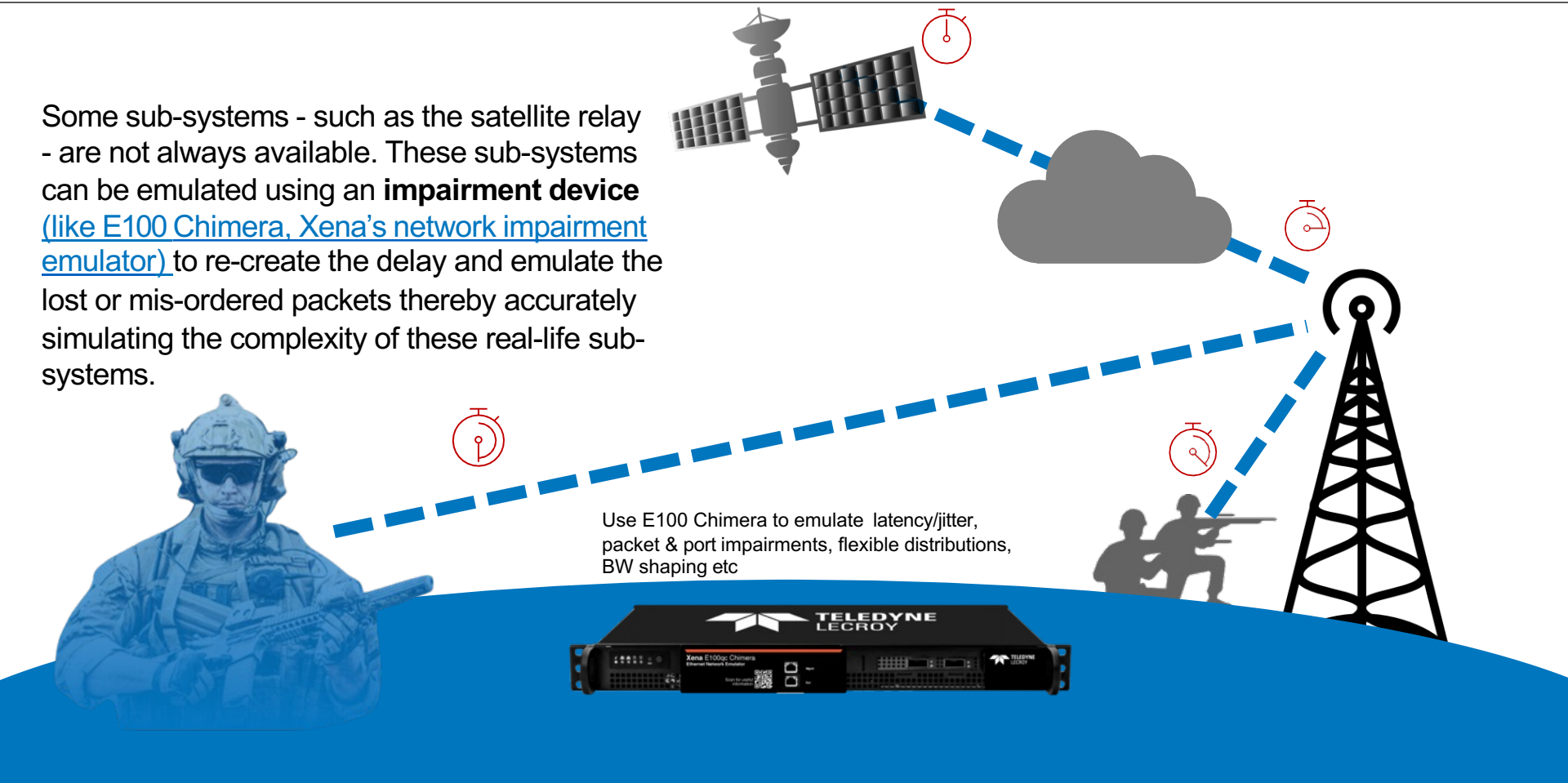
Shadowcat radio

Xena Ethernet traffic generator

An engineer in the R&D lab can use a high-speed Ethernet traffic generator (e.g. Xena test platform) to check the performance of each sub- system of the Ethernet traffic path. From the M12 connector through to the Ethernet switch and all the subsequent relays. Just like in the commercial world, RFC2544 is the benchmark everyone uses as a reference

Simulating real world conditions

Some sub-systems - such as the satellite relay - are not always available. These sub-systems can be emulated using an **impairment device** (like E100 Chimera, Xena's network impairment emulator) to re-create the delay and emulate the lost or mis-ordered packets thereby accurately simulating the complexity of these real-life sub-systems.

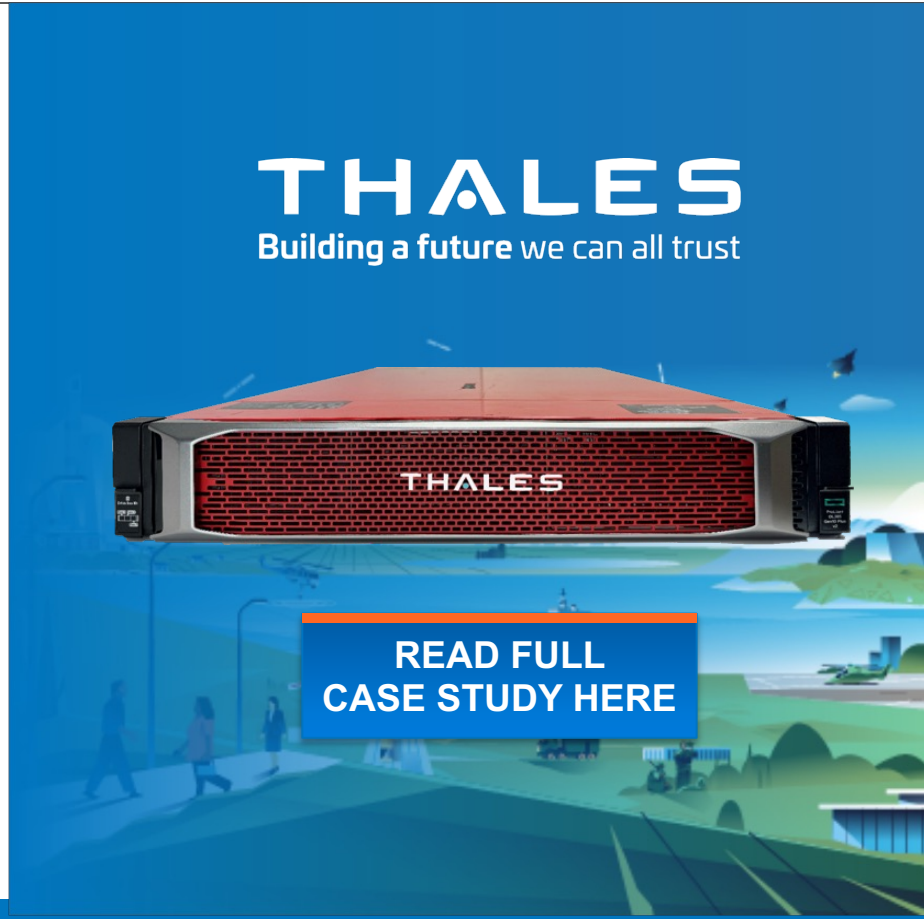


Thales Case study

Real-Time Gateways (RTGs) are used to prevent cyberattacks in military communication systems by filtering data flowing between the domains. Since RTGs are mission-critical, it is crucial to validate their performance using data traffic that mimics real-world scenarios.

Thales, a leading defense and cybersecurity supplier, chose the Xena Z10 Odin and Z100 Loki traffic generators together with the free, open-source XOA Python API to performance tests their new CYBELS RTG.

Learn why this Xena solution saved Thales significant time in the development of the CYBELS RTG, by enabling almost all issues in the code to be found and fixed before final validation testing.

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