Patria MUSCL

Passive radar system

PROTECTED MOBILITY

SUSTAINMENT SOLUTIONS

DEFENCE AND WEAPON SYSTEMS

EXTREME SURVIVABILITY

Finland is known for high technology and extreme resilience. Our harsh nature and limited resources have pushed us to learn and innovate efficiently. Thorough preparation for the future is the backbone of our culture.

Patria is a modern and international defence and technology company with over 100 years of experience. We use resources wisely, create innovative solutions and build intelligent systems that provide extreme survivability in any conditions. We work with our customers throughout the entire lifecycle to ensure maximum value. Honest and straightforward co-operation is at the core of our work.

We build exceptional partnerships that last through critical operations. That's what it takes when you stand for your sovereignty. Trust us, we've been there.

QUALITY AND SIMPLICITY

In a world brimming with fleeting trends and overengineered solutions, we stand apart by offering tools built with a singular focus: unwavering reliability and uncompromising quality.

We believe in the power of simplicity. Our products are well-designed, robustly constructed, and thoroughly tested to perform their intended task flawlessly, every single time.

Our philosophy is simple: true innovation should help, not complicate. Driven by dedicated research, we develop advanced technologies for real results. Our straightforward approach makes the difference. Engineered for a single purpose – Yours.

Patria – Extreme conditions embedded.

Staying one step ahead in modern battlefield requires early and reliable target detection with forward deployable surveillance capability. Due to vulnerability of active sensors, those must be complemented with covert and agile passive sensors to ensure mission success.

Patria MUSCL (Multi Static Coherent Locator) is a novel passive radar system for air surveillance enabling detecting air targets while remaining undetected from the adversaries. The system can detect also small and low-flying objects that are usually hard to detect.

Patria MUSCL system enables setting up cost-effective wide area or local surveillance for different use cases like military air surveillance and protection of critical assets. By filling the operational or geographical gaps of an existing active radar network, it can complement the legacy air surveillance system's coverage providing capability to detect new threats as well as improve survivability and availability.

Passive Coherent Location (PCL) technology is used to detect, locate and track targets. Therefore, the system does not produce a signal footprint, making it invisible for adversaries' signal intelligence and anti-radiation missiles, as well as enabling deployment in locations where using active radars could be challenging.

Patria MUSCL system exploits FM radio and DVB-T/T2 television broadcast signals as illuminators, providing 360° surveillance coverage. The system can be used both in a standalone mode containing only a single station operated locally, and in a networked mode where constellation of several Patria MUSCL stations operated and managed completely remotely. In both cases, after setting up the system, it provides air situation picture without any operator attendance.

Multistatic operation, ability to use simultaneously several MUSCL stations as an integrated constellation and utilisation of low frequencies enables detection of not only low flying targets but also small and slow speed targets and even those trying to avoid being detected by using stealth technologies. Surveillance capability is not limited to air domain; it is also possible to utilize system in coastal surveillance.

USE CASES

In **wide area passive air surveillance**, sufficient amount of unmanned and remotely managed MUSCL stations are deployed to provide complete coverage e.g. to border area.

When **complementing legacy air surveillance radar network**, recognized gaps are complemented with precisely deployed MUSCL passive radars, enhancing e.g. low altitude coverage, survivability and capability to detect small, slow flying and stealthy targets.

In **GBAD use**, using one to multiple transportable MUSCL stations augments the GBAD entity's tactical opportunities and survivability by providing covert local air surveillance and target acquisition capability against current and future aerial threats.

For **coastal surveillance**, coastal-deployed MUSCL stations utilizing special processing can provide passive maritime situation picture. In addition to surface surveillance, air targets can be detected simultaneously.

In each use case, the stations can be either fixed or transportable, and the compiled passive situation data can be integrated into Customer's environment via standard interfaces. Operation and management of all MUSCL assets can be done remotely or locally. After launching surveillance mission, the system operates without any operator attendance.
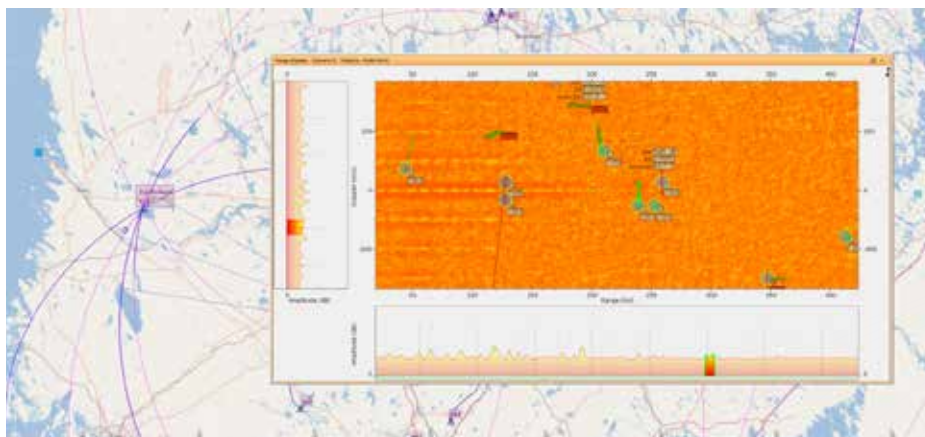
MUSCL graphical user interface provides comprehensive tools to control the system and to visualize the air surveillance picture.

Technical specification

Signal compatibility	FM and DVB-T/T2 simultaneously
Azimuth coverage	360° or sector
Tracking capability	> 100 simultaneous targets
Air situation picture update rate	< 1 second
Detection range	Up to 250-300 km depending on target type. Typical examples:

- < 150 km for fighter aircraft
- < 80 km for helicopter (limited typically by terrain shadowing)
- > 10 km for UAVs (NATO Class 1, "Mini" and "Small")

Target classification support	Rotor modulation and RCS estimate

Main functionalities

- Asset management
- Mission preparation
- Air situation picture (cartesian and bistatic views)
- Recording and playback
- Mission analysis
- System status

System highlights

- Configurable and customizable passive radar system with no signal footprint
- 365/24/7 unattended remote operation and management
- Integration to Customer's environment with standard interfaces: Eurocontrol ASTERIX, MILSTD 3011 JREAP-C or customer spesific interface
- Boundary protection solution available when system elements are deployed in different security zones.
- Rapid deployment with transportable stations
- Environmental tolerance and high availability for harsh conditions

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Patria

When if is not an option.

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