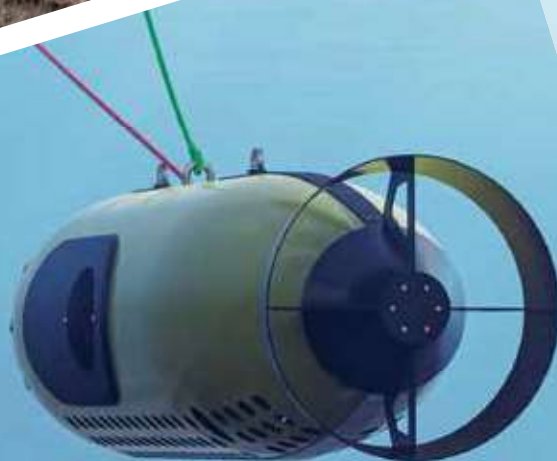


**Patria**

# Patria Offering

Extreme conditions embedded.



# Patria MUSCL - Enhanced target situational picture to air defence

Patria MUSCL is a novel passive radar system for air surveillance that enables detecting objects without allowing adversaries to detect it. The system can detect even small low-flying objects that are usually hard to detect.

Detections made with air surveillance radars are the basis of air defence situational awareness. However, the expected service life of active radars under crisis and exceptional circumstances is not long as they are easy to detect and therefore vulnerable to attacks from adversaries. Active radars also cannot detect all flying objects, and detecting low-flying objects is particularly difficult. Patria MUSCL passive radar system is a cost-effective solution that fills the gaps in air surveillance.

Patria MUSCL system comprises an antenna array, a receiver, and servers that process the received signals with advanced signal processing and target tracking algorithms to produce a target situation picture. The system has no transmitters of its own; instead, it takes advantage of FM radio broadcasting signals and digital television broadcasting (DVB-T/T2) signals and similar to form target situation picture. The system determines the location, speed and direction of flying objects by using signals that propagate directly from a transmitter to the antennas of the passive radar and very weak echoes reflected from the objects.

## **The new, cost-effective system that is hard to locate and provides high performance**

Patria MUSCL enables setting up cost-effective area or spot surveillance for different needs such as military air surveillance, border control, and protection of critical infrastructure. The passive system has no transmitters which means that it has no signal footprint. This makes Patria MUSCL system practically invisible to signal intelligence actions and anti-

radiation missiles. It also means that the system is safe to use in urban areas as well.

The system can be used both as a standalone and as a network of several MUSCL stations remotely. Depending on the object type with its characteristics Patria MUSCL provides sector surveillance up to 360-degrees to the distance of up to hundreds of kilometres. The system can simultaneously track more than one hundred objects, and the target situational picture it provides, is updated every second. Patria MUSCL detects small and large flying objects from drones and artillery projectiles to bombers. The system is set apart by its ability to extract type-specific data on flying objects for object classification and identification.

## **Also detects stealth aircraft**

The radio and television signals that the MUSCL system exploits are available actually everywhere and these transmitters produce a continuous stream of signals with high availability. The transmitter network has extensive geographic coverage.

Patria MUSCL detects stealth aircraft better than conventional radars. The coating solutions of stealth aircraft are designed to make the aircraft invisible to active radars that operate at higher frequencies. Stealth design is at its best in the bow of stealth aircraft because active monostatic radars view them from that direction. In other directions of the stealth aircraft, there are larger spots that produce radar reflexions. The broadcasting signal network that passive radar exploits provide the possibility to simultaneously illuminate the stealth aircraft from several geographical locations, making it possible

that one or some illumination directions will produce a so-called normal radar reflection from the stealth object.

### **Modular system easy to update**

Patria MUSCL is the result of more than a decade of tenacious research and development. The modular system uses commercial technologies to the extent possible. This enables updating the system flexibly according to technological advancements. The digital signal processing algorithms and the RF signal path from the antennas to signal digitisation are at the core of MUSCL's performance.

The system hardware is robust and designed for demanding military use. Its benefits include easy mobility and quick deployment. In addition to the mobile solution, Patria provides a fixed version of the system.

