

# Large-scale system integrations on land, at sea and in the air

The lifespan of the military platforms is typically exceptionally long. During the lifetime most of the platforms will face Mid-Life Upgrades (MLU) to extend the lifecycle and Mid-Life Improvements (MLI) to add new capabilities, some platforms will find even new purposes of use. Patria has solid experience in various large-scale system integration projects on land, at sea and in the air to respond all these needs.

A Typical platform-oriented system integration project often combines an existing military platform with one or more new subsystems to be integrated into it to extend life cycle and improve fleet performance to meet the future requirements. In some cases, the company acting as a main integrator is not the OEM of the platform itself nor any of the new subsystems. In these cases, company's ability to respond to the diverse challenges of a system integration project plays a crucial role.

From Patria's perspective basic building blocks for successful large and complex integration project are professional project management and systematic engineering, both of which must be managed transparently and precisely. Building a professional project team and establishing an atmosphere of trust between the parties form the basis for a successful project.

As a prime contractor, Patria is responsible for the total turnkey delivery of the system integration project to the customer. The prime contractor leads the integration of different systems through design reviews, factory acceptance tests, commissioning and verification test campaigns into a complete system delivery to the customer. This work is supported by succeeding in special areas of expertise including project -, change -, configuration -, requirement - and risk management, system design and integration, as well as supply chain management and professional procurement.

## On land

Engineer vehicles based on Leopard 2 tank platform serve as an example of Patria's system integration expertise in the land domain. An international industrial project organization led by Patria produced the world's first Leopard 2 -based Bridge Laying Vehicles and Armoured Breaching Vehicles for the Finnish Defence Forces' Engineer Corps during the first decade of the 2000s. This exceptional achievement was enabled by Patria's background in modernising and modifying of tracked armoured fighting vehicles in the pre-Leopard era, as well as the decades of history in development and production of Patria's own line of armoured wheeled vehicles.



## At sea

The spearhead of integration services in Patria's naval business area have been the mid-life upgrade programs of existing Finnish Navy vessels, such as the Squadron 2000 (Hamina-class) mid-life upgrade (MLU) project, which is fast approaching its closure.

Starting from Patria's previous MLU program for the Finnish Navy's Rauma-class, during 2010-2014, Patria already achieved customer admiration, both in terms of schedule and budget. From the early steps of this program, Patria started to develop extensive naval integration service expertise, which can utilise all of Patria's know-how.

In 2018, the Finnish Defence Forces signed an agreement with Patria on the renovation of four Hamina-class missile boats belonging to the Finnish Navy's Squadron 2000, where Patria has acted as the prime contractor and main integrator with overall responsibility for the project. The complete program delivery has included several sensor, weapon and communication systems, system upgrades as well as ship technical modifications and renovations installed and integrated to extend the service life of the Hamina class vessels until the 2030s.



## In the air

Patria has renewed the Finnish Air Force's Hawk Mk.51 and Mk.66 fighter training fleet together with the Finnish Air Force and the Finnish Defence Forces Logistics Command. This was an extensive system integration project that ensured that the Hawk fleet would have enough flight hours until the 2030s. At the same time, the suitability of the Hawk fleet systems for the pilot training needs of the coming years was ensured.

The modernisation of the Hawks consisted of modernising the cockpit environment, integrating a datalink, weapon control system, structure monitoring and engine condition monitoring system, and updating the pilot training system. The former, mainly analog, instrument cluster was replaced with modern, computer-controlled avionics equipment that meets all modern requirements in terms of user interface. The avionics devices and displays in the cockpit are controlled by software developed by Patria, which Patria integrates as part of the aircraft's other systems in accordance with the Air Force's wishes.

The developed and implemented Hawk training system enables flight simulations, analysis of completed tasks and various training situations. Patria is able to develop and maintain the Hawk software, which enables the planning and implementation of system upgrades for the Hawk fleet in Finland as part of the strategic partnership between the Finnish Defence Forces and Patria. Other systems integrated with and supporting the Hawks can be further developed to meet the needs of the customer as the F-35 will replace the F/A-18 Hornet as the main aircraft of the Finnish Air Force in the future.

