

Patria

When if is not an option.



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Strategic partnership in aerospace maintenance

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features modern mobility and high level protection

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guards Finland's security of supply

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Patria

Patria Group's magazine

Editor in Chief: Birgitta Selonen, birgitta.selonen@patriagroup.com
 Editing and layout: Otavamedia Oy
 Print: Hämeen Kirjapaino
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Patria is a trusted provider of defence, security and aviation life-cycle support services and technology solutions. Besides Finland, the Group has operations in Sweden, Norway, Estonia, Belgium, Poland, Spain, the United Arab Emirates, the United States and South Africa. Patria employs 3,000 professionals. www.patriagroup.com

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Thanks to development efforts, data analysis for engines is now also provided as an expert service.

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Patria's customer promise holds even in exceptional circumstances



Esa Rautalinko
President and CEO
Patria

Patria's customer promise - When it is not an option - means that our operations must be one-hundred-per-cent reliable and dependable under all circumstances. This is required by our customers in critical sectors, such as the defence forces, border guards and police in our countries of operation.

Ensuring security of supply and continuity of society's core functions is always vital, but they take an even greater importance during exceptional circumstances such as the coronavirus pandemic.

Patria's operating methods and collaboration with customers have been seriously put to the test in the past few months. Yet, in spite of these exceptional times, we have been able to provide nearly undisturbed service meeting customer needs.

Patria has demonstrated that it is a partner worthy of its customer promise. Patria's operating model helps ensuring security of supply and delivering commitments. We establish ourselves in our operating countries by building supply chains and fleet maintenance networks with our local partners.

In many cases Patria is also responsible for project management on our customer's behalf. This requires profound expertise and an ability to coordinate and manage complexity so that the customer receives the desired level of performance and required features at the right price.

INVOLVED IN ALL KEY DEVELOPMENT PROJECTS

Patria is involved in key development projects in all branches of the Finnish defence sector increasing both overall defence capabilities and collaboration between different military branches. Cost-effective solutions enhancing performance are a common nominator in all of these projects.

Patria's 6x6 wheeled vehicle platform has been selected for a joint program between Finland, Latvia and Estonia which aims to develop a common armoured wheeled vehicle system combining performance and cost-effectiveness. Patria believes that this will also be of interest to other countries wishing to improve the mobility of their armed forces.

Patria is heavily involved in two major development programs for the Finnish Navy. In the Squadron 2000 project Patria is responsible for updating Hamina-class PPG's (Patrol boat gun/guided missile) as a Prime contractor. Hamina-class PPG's will get new capabilities in anti-submarine warfare and will also get new combat management systems, new surface to surface missile while going through a complete maintenance, repair and overhaul in ship-systems.

In the Squadron 2020 Patria is a provider of a state-of-the-art bistatic active-passive Sonar SONAC DTS to be integrated into new Pohjanmaa-class multirole corvettes as a part of its antisubmarine warfare kit.

Patria is also an active participant in the Finnish Air Force's HX fighter program replacing Finland's Hornet fleet with new multipurpose fighters.

A TRUSTED PARTNER IN LIFE CYCLE SUPPORT SERVICES

Patria is known for its high-performance products in international markets. Thanks to innovative technology and long-term product development, Patria's products are able to perform effectively even in the most difficult operating environments. The confidence shown in the quality of our work is also reflected in the selection of Patria AMV^{XP} 8x8 for a field test program in Japan.

Reliable and cost-effective life cycle support services have a key role in maintaining the required performance of our customers' fleets in all conditions. Three quarters of Patria's net sales is generated by maintenance, repair and refitting services in Finland, Sweden, Norway, Estonia, Latvia and Belgium.

We are cooperating with our customers in order to develop effective operating models for our life cycle support services, no matter what the customer's fleet consists of: aircraft, helicopters, seagoing vessels or armoured vehicles.

All of the abovementioned indicates that Patria is a reliable strategic partner across the defence industry sector both in Finland and internationally. In this publication you can read more about our top-class expertise and our diverse product and service offerings. ■



We are cooperating with our customers in order to develop effective operating models for our life cycle support services, no matter what the customer's fleet consists of: aircraft, helicopters, seagoing vessels or armoured vehicles.

Patria is taking its systems abroad

Patria is heading to international markets with a strong agenda. Whether it is establishing new clients or a new partner, Patria's prime focus is in widening the horizon of the company's international operations.

Patria's Systems business unit is currently taking grand steps in the international markets on the naval, air force and cyber segments. The goal is to establish the international market as the second cornerstone of Systems' business within the next couple of years.

"We do believe that we have the winning selection in this field. Our goal is that 20-25 percent of our business will come from international markets within the next 3-4 years. That will strengthen our domestic operations," states **Jonas Geust**, President of Patria's Systems business unit.

MUST-WIN BATTLE

The international strategy, the "Must-win battle", brings together the many aspects of Patria's proficiency from HR to marketing.

"We hired a high-class pro, **Mikko Viitaniemi**, to run the international sales and marketing team and have continued to reinforce the team this year. We have also continued to clarify our go-to market plans," Geust says.

Mikko Viitaniemi lists the neighboring countries as the most interesting ones for now.

"The Nordics and Baltics plus Northern and Central Europe are our focus. Asia is also an area of interest with its upcoming projects and future needs," Viitaniemi says.

The strategy also includes identifying local, regional and global partners.

"We are not trying to conquer the world on our own, this is a partnership approach," Geust says.

"We will be looking for partners very actively in the upcoming years and are very open to new contacts. We are looking for partners, that share our values and whose operations and systems blend well with ours," Viitaniemi states.



Jonas Geust,
President of Patria's Systems business unit



Mikko Viitaniemi, Vice President, Sales & Marketing took part at the DSEI-event in Tokyo, Japan, in November 2019.

PATRIA HAS THE COUNTERACTIONS

For the past couple of years, Systems has been putting the international strategy into action by investing into product development of some cutting-edge products.

"We are productizing data-based products and technology relating to sensors and data acquisition to all our segments: naval, air force and cyber," Viitaniemi tells.

Viitaniemi finds the naval segment to be especially interesting in the current security environment. With a long history in the area, Patria's solutions are advanced and capable.

"Many western countries neglected e.g. their underwater capabilities during a deeper period of peace. After the security environment has changed during the last few years many of those countries are looking into bringing that performance back," Viitaniemi says.

Viitaniemi also points out, that the technological threats have evolved and changed extremely fast.

"There are more and more autonomous systems also under water not just in the air like seen in the news, and we need to develop countermeasures and high-tech solutions to protect against them," Viitaniemi says.



Patria's Sonac ACS is a state-of-the-art acoustic mine sweeping gear specially designed for sweeping influence mines with advanced acoustic triggering. Sonac ACS will be provided together with an user-friendly control system which allows operator to choose or program a desired acoustic signal for each individual mission. Sonac ACS is an optimal solution for next generation mine sweeping for manned and unmanned platforms.

NEW AIR AND CYBER THREATS CHALLENGE THE DEFENSE SYSTEMS

The same kind of solutions are needed, and made by Patria, for air surveillance.

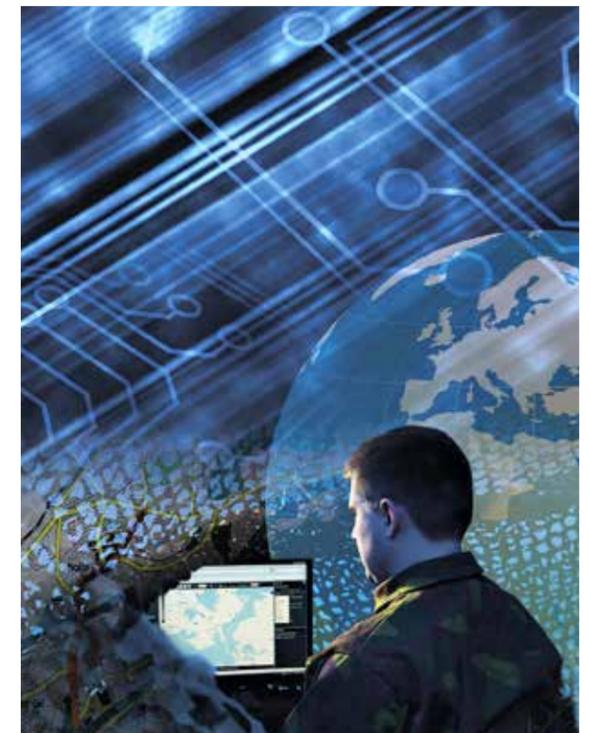
"UAVs, like drones and other autonomous, unmanned aircrafts, can be used for intelligence gathering, as well as harming strategic infrastructure. That calls for a new kind of performance for defense forces and that is an area, where we have the strong knowhow and the top products," Viitaniemi states.

Similar trends can be seen in the cyber dimension. Hybrid threats and operations have become widely common - almost an everyday security issue.

"It is not only a military issue because it is threatening civilian infrastructure and society as a whole. Finding the threats from data networks and the Internet requires new solutions and strategies. We believe that Patria and its data-based AI and analytical knowhow will have a growing role in the cyber segment in the future," Viitaniemi says. ■

SYSTEMS BUSINESS UNIT

- Provides demanding deliveries of systems and devices to security authorities and defence forces of various countries.
- Is an expert in reconnaissance, surveillance and command systems, as well as their integration and life-cycle support.



Patria's top-class pilot training focuses on modern equipment and individual approach

Main customers are both military and civil aviation; the Finnish Air Force and international airlines.



Patria's Pilot Training has trained well over 1,000 professional pilots for civilian aviation since its establishment in 1998. Patria is one of the most important pilot trainers in Northern Europe.

"The best metrics for training quality are good employment prospects and positive feedback from airlines. Practically all the pilots we've trained have found work in the industry," says **Ville Kettula**, Head of Operations from Patria's Aviation business unit.

Patria's Pilot Training operates in Pirkkala, Finland and Córdoba, Spain. Primary pilot training is organised in Spain using single-

engine DA40 aircraft. Pirkkala provides theoretical and simulator training, as well as multi-engine and instrument flight rules training using twin-engine DA42 aircraft.

The training programme for the Multi-Crew Pilot License combines basic training with type-specific aircraft training and the airline client's cockpit requirements. This programme uses an Airbus A320 simulator and two DA42-VI simulators.

NEW TRAINING METHODS

The accelerating pace of global change has been taken into consideration in military pilot training: the knowledge and skills

required, and the learning culture of new generations are all changing. An individual approach to training, in which the pilot's skills and needs can be identified better and sooner, will serve as the basis for future pilot training.

Patria's pilot training places a significant focus on identifying and developing a pilot's psychophysiological characteristics. Competency-based training will also be possible in the future.

"Pilot training is now focusing on overall understanding, and particularly on the significance, use and prioritisation of information. Flying modern planes is easy, but the amount

of information has vastly increased. You have to be able to process, prioritise and use this information at the right time," says **Jussi Virtanen**, Development Director.

"This new era requires students to have a broader range of skills that are coached using new teaching methods and devices. For example, gamification works very well in training new pilots," says **Jari-Matti Taskinen**, Development Manager.

SIMULATOR USE GROWING RAPIDLY

Military pilot training is divided into theoretical training, simulator training, and training using real aircraft. Modern pilot training utilises the latest tools: simulator technology tailored to various different needs and rapidly developing VR/XR training technology. The benefits are considerable cost savings and more versatile training.

Patria is a world-leading provider in Live, Virtual, Constructive training. The LVC environment combines three elements in the same training situation: Live: training in real aircraft, Virtual: simulator training in the same environment, and Constructive: computer-generated models that are programmed to behave in a certain way or have variable factors controlled by artificial intelligence. An LVC training system can be used to create a realistic training environment in a very cost-effective way.

The LVC environment has been used in the Finnish Air Force pilot training for just over two years now and its benefits are apparent. The Hawk LVC training environment developed by Patria has enabled the creation of complex and extensive training scenarios to meet the future requirements of airborne operations. In order to improve performance, Patria's artificial intelligence and Big Data expertise will soon be utilised in the collection and analysis of the data generated by the practice situations imported into the digital environment.

A STRATEGIC PARTNER TO THE FINNISH AIR FORCE

Patria's strength in military pilot training lies in its long-term strategic partnership with the Finnish Defence Forces. Aviation provides Defence Force pilots with elementary

Aviation training in the LVC (Live, Virtual, Constructive) environment is a new concept on the international scene. Patria is a pioneer in the sector.

training as a service that covers both flight instructors and the maintenance and upkeep of training aircraft.

"The instructors are former Defence Force pilots who are extremely familiar with the objectives and special characteristics of military aviation," says Virtanen.

Patria is responsible for a significant proportion of lifecycle support services for the Defence Forces' aircraft - including FA-18 Hornets and Hawks - and its NH-90 helicopters. These services include maintenance, repairs and modernisations. ■

AVIATION BUSINESS UNIT'S AREAS OF EXPERTISE

- Life cycle support services for aircraft and helicopters, including the maintenance, repair and modification of aircraft, helicopters and engines
- Military and state authorities in Northern Europe are the main customers for Patria's life cycle support services.
- Civilian and military pilot training
- A strategic partner of the Finnish Defence Forces



A carefully considered vehicle package guarantees high performance

The strength of Patria's armoured wheeled vehicles lies in an overall package that includes not only a high-performance product but also cost-effective life cycle support services and security of supply in crisis conditions.

When it comes to armoured personnel carriers, customers want tried-and-tested technology based on modern solutions that will also work in the battlefields of the future.

Patria meets these requirements with its Patria AMV^{XP} 8x8 and Patria 6x6 product

families, which are based on long-term product development and experience in vehicle manufacture and life cycle support.

"Customers want solutions that will retain both their cost-effectiveness and high performance throughout the product's life cycle," says **Janne Rökköläinen**, Vice President,

Vehicle Systems from Patria's Land business unit.

Security of supply is also gaining increased importance. Patria's operating model is based on industrial participation with local actors. This ensures that reliable service can be maintained even in crisis situations.



For many customers, vehicle remote control and increasing autonomy are the next big step in intelligence, support and combat missions.



The Patria 6x6 has been selected as the vehicle platform for a joint project between the Finnish, Latvian and Estonian armies.

A COST-EFFECTIVE SOLUTION FOR TROOP TRANSPORT

In 2018, Patria launched its new Patria 6x6 vehicle, whose reliability and terrain mobility have been designed to meet the highest standards. The vehicle's features are continually being developed to meet customers' current and future needs.

The Patria 6x6 has been selected as the vehicle platform for a joint project between the Finnish, Latvian and Estonian armies. The project is seeking to develop a common armoured wheeled vehicle system.

"We hope that this development project will lead to mass production of these vehicles. We're seeking a cost-effective solution that will definitely be of interest to other countries hoping to improve the mobility of their armies," says Rökköläinen.

The development work will also focus on modern maintenance and upkeep solutions for the vehicles.

"These solutions will make effective use of real-time data obtained from the vehicles about their condition and use. This will lead to cost savings in maintenance and more effective user training."

A PIONEER IN UNMANNED VEHICLES

The Patria AMV product family is known for its high-performance vehicles, which are capable of protecting troops in the most demanding of conditions.

"This product family revolves around customers' requirements for performance and usage, and we engage in constant discussion with our customers on these topics," says Rökköläinen.

Patria's AMV^{XP} has been selected for field testing in Japan for about a year on the basis of a tender, which is just one indication of the confidence shown in Patria's products.

One of the priorities in Patria's vehicle R&D has been an embedded drive-by-wire steering system that enables remote control and autonomous functions.

"For many customers, vehicle remote control and increasing autonomy are the next big step in intelligence, support and combat missions," says **Matti Saarikko**, Technology Director from Land business unit.

Remote control requires the driver to have the most realistic and up-to-date picture of the vehicle's operating environment as possible. In the system developed by Patria, optical and acoustic sensors are used to investigate the surrounding environment. Inertia-based movement sensors also provide data on the vehicle's behaviour.

"Development work for the system has taken into consideration the need for low latency and the transfer of large data volumes," says Saarikko.

Patria is a pioneer in the development of unmanned vehicles. The company's prototype has received a great deal of favourable attention in, for example, ELROB test drives of European robotic vehicles. ■

PATRIA AMV PRODUCT FAMILY

- A state-of-the-art, efficient, durable and modular armoured wheeled vehicle with top-class protection and mobility both on roads and over other terrain.
- The troops being transported are protected from mines, IEDs, NBCs and ballistic threats, up to a level of K5+.

PATRIA 6X6

- A modular, high-performance and cost-effective armoured wheeled vehicle with a large quantity of tactical features.
- Ideal as a personnel carrier or for battlefield support missions. Can be combined with, for example, Patria's Nemo mortar system.



Strategic edge

Powered by unique support concept, new-and-improved Kongsberg-Patria Company is poised for big things

A powerful combo of Norwegian and Finnish expertise took off in June 2019, as KAMS (Kongsberg Aviation Maintenance Services - A Kongsberg-Patria Company) was formally launched. Ownership of the company is divided between Kongsberg Defence & Aerospace AS (50.1%) and Patria ISP Oy (49.9%). The new entity is rooted on the principle of strategic partnership - meaning, in essence, 360° support for the operational availability of the military in the two Nordic countries.

In the past, the company's most important platforms have been the F-16 aircraft and the

SeaKing helicopter, says **Atle Wøllo**, President of KAMS.

"We have over 30 years of experience of providing maintenance for these two," he says. In fact, the Norwegian F-16 expertise is held in such a high regard that in October 2019 Lockheed Martin certified KAMS as the first ever Falcon Depot, authorising KAMS to perform certified F-16 Maintenance, Repair and Overhaul (MRO) sustainment work on the fleet.

"This means we're the preferred partner to Lockheed Martin outside the US," states Wøllo.

RELOADED FOR FUTURE

However, the era of the F-16 in Norway is soon coming to an end and the State of Norway is looking to sell its fleet, with F-35 replacing the iconic fighter. The expertise of KAMS is needed in making sure that the F-16s are presentable enough to attract buyers.

"We need to build up the planes so that they can fly the remaining approved flight hours, meaning work for 100-200 people," he notes.

KAMS has come a long way in the past six months, as changes in the organisation, downsizing and the retooling of the cost base have re-energized the company.

"We are in the process of making a full turn-around and are now positioning for the future," says Wøllo. In addition, the corporate culture is currently shifting "from workshop culture to business culture," he confirms.

BRANCHING OUT

Jukka Holkeri heads Patria's International Support Partnerships (ISP) business unit which is handling also Patria's involvement in KAMS. According to Holkeri, ISP has systematically structured itself as an international service provider - and launching KAMS is a major step in this regard.

"Our concept of strategic partnership has proven a winner in Finland, and we're looking to utilize what we've learned also in Norway," says Holkeri. With KAMS, Patria is able to provide more comprehensive services outside Finland, too.

"Strategic partnership means that we've devoted a lot of time and effort in making sure that the relationship between the customer and the support provider is optimal in all respects," Holkeri confirms.

PILOTING THE CONCEPT WITH NH90

Mika Hakanen, Director of Helicopter Programs at KAMS, explains that the maintenance of the Norwegian NH90 helicopters is really the pilot of the strategic partnership concept.

"NH90 helicopters gave us the first crack at this, drawing from the considerable success that Patria has had with NH90 maintenance in Finland," Hakanen says, adding that in times of coronavirus, it's clear that self-reliant MRO has suddenly become a top priority across the world.

Atle Wøllo states that since summer 2019, it has become more and more evident that strategic partnership is the way to pursue consistent maintenance excellence. Wøllo points out that since no two countries are the same, it makes little sense to take a Finnish model and bring it over to Norway without any modifications.

"We can see the big principles of the concept and are working towards creating our own model," he sums up. ■



Patria has systematically structured itself as an international service provider - and launching KAMS is a major step in this regard.



Patria Nemo fires on the move

Patria Nemo mortar system can also be accurately fired from a moving vehicle. No competitors can boast a similar feature.

Although mortars are simple and effective weapons for indirect fire, they are vulnerable on the modern battlefield.

Patria's response to this challenge is Patria Nemo mortar system, which takes mobility, protection and firepower to the next level both on land and at sea.

Thanks to product development, the vehicle-mounted mortar can also be accurately fired on the move. No other manufacturer can boast a similar feature.

"Speed is its greatest advantage. The vehicle does not have to stop in order to fire, as all functions can be performed on the move. This makes it possible to open fire almost immediately after the command is given," says **Kari Reunamäki**, Vice President, Weapon Systems from Patria's Land business unit.

A vehicle in constant motion also makes Patria Nemo a more difficult target.

WORKS BOTH ON LAND AND AT SEA

Patria Nemo is a 120 mm turreted mortar system mounted on a vehicle chassis. Armour protects the crew from ballistic threats, firing residues and combat gases.

The light and compact turret can be installed on a light, tracked chassis or wheeled armoured vehicles in the



Patria Nemo has a modular design, which makes it extremely flexible with regard to future system updates.

6x6 and 8x8 class. The mortar turret is also suitable for naval use on, for example, fast patrol boats and coastal vessels.

"Patria Nemo has a modular design, which makes it extremely flexible and also attractive with regard to future system updates," says Reunamäki.

MOBILE FIRING REQUIRES TOP EXPERTISE

According to Reunamäki, mobile fringe requires the turret to have an effective stabilisation system which compensates the motions of the turret caused by a moving vehicle.

Accurate fire also requires an advanced calculation system to determine continuously changing firing values.

"Nemo calculation system is based on Patria's own software expertise, which is the best in its field."

Patria Nemo's barrel is about one metre longer than traditional mortar tubes. This ensures a higher muzzle velocity of the mortar round, thus a longer range of up to ten kilometres.

Nemo is also able to fire Multiple Rounds Simultaneous Impact (MRSI) missions. Using MRSI, a maximum of six mortars can be fired on different trajectories so that they all hit the target at the same time.

"This maximizes the impact on the target," says Reunamäki.

In addition to indirect fire, Nemo also has a direct-fire capability with the aid of its own day/thermal cameras and laser range finder. This capability can be used for close-range fire support, in urban warfare, and to defend the mortar carrier up to a distance of one kilometre. ■



▲ Patria Nemo is also suitable for naval use on, for example, fast patrol boats and coastal vessels.



PATRIA NEMO

- A 120 mm turreted mortar system whose mobility, protection and accuracy meet all the requirements of modern warfare and crisis management.
- Can be installed on a light, tracked chassis, on wheeled armoured vehicles in the 6x6 and 8x8 class, or on boats/ships.
- Rapid response, as the mortars can also be fired from a moving vehicle.

The Engines unit safeguards Finland's security of supply

Did you know that Patria's Engines unit also bolsters Finland's civilian security of supply? Patria's professional expertise is required in the maintenance of the gas turbines of backup power plants in the Finnish main grid and the emergency diesel generators of nuclear power plants, for instance.

Patria's Engines business focuses on the overhaul, maintenance and repair of aircraft engines for the Finnish Defence Forces. Maintenance of aircraft engine-like industrial gas turbines at backup power plants and diesel engines, especially on board ships and in power generation, is a natural addition to its service portfolio.

RESERVE POWER FOR EXCEPTIONAL SITUATIONS

Fingrid is the Finnish electricity transmission grid operator, responsible for the functionality of the electricity transmission system. In the event of disruptions in electricity generation, Fingrid can draw on reserve power of 1,300 MW - this ensures power supply for our country even if the largest power plant unit or a cross-border connection were to drop from the grid.

Fingrid has a total of 10 of its own backup power plants, with more than 20 power plant units. Patria's maintenance cooperation covers almost all of Fingrid's units in Southern Finland. This cooperation goes back some 20 years and includes annual scheduled maintenance of gas turbines, project-based improvements, urgent repairs and specialist services.

"We maintain the start-up reliability of backup power plants by testing and test-running each unit at six-week intervals. The reserve power is always on standby at the

press of a button, even though only a few incidents each year require switching it on," says **Sampsa Holmberg**, Power Plant Manager at Fingrid.

"If there are problems with Fingrid's test-runs or start-ups during simulated or real-life incidents, for instance, we are on 24-hour standby to go to site. Such situations are infrequent, but we must be on call 24/7 because reserve power is crucial," says **Anita Korsberg**, Business Area Manager, Energy, at Patria.

The maintenance business is heavily competitive. In her view, among the decisive factors why Fingrid has chosen to continue cooperating with Patria are the company's expertise and ability to understand the client's obligations. Safeguarding Finland's energy management to ensure security of supply is prescribed in law.

"Most often we can arrive on site very quickly. If necessary, we can take a faulty gas turbine to our workshop for inspection and

repairs. No incident has been left unresolved over the years," says Korsberg.

HARNESSING DATA TO ANTICIPATE NEEDS

Fingrid and Patria's cooperation is based on precise anticipation of needs. The companies have now renewed their agreement, which also focuses on collecting, analysing and utilising data from turbines.

"When our cooperation began, we carried out demanding basic maintenance and eliminated problems. Now we don't have to do everything from the ground up. We can concentrate on lighter annual maintenance to the extent required, carried out on site. The schedule is based on anticipated needs," says **Taisto Äkräs**, Gas Turbine Specialist at Patria.



Anita Korsberg, Business Area Manager, Energy



Most often we can arrive on site very quickly. If necessary, we can take a faulty gas turbine to our workshop for inspection and repairs. No incident has been left unresolved over the years.

Äkräs emphasises that Patria has developed its own processes continuously. A team of Patria installers and experts have specialised in this particular engine base. Gas turbines have a service life of decades and are built for durability - but ageing is the greatest cause of faults. Thanks to development efforts, data analysis is now also provided as a specialist service.

"Test-runs produce data - we analyse it to anticipate faults and necessary repairs. Maintenance can be carried out smoothly on the basis of this data during operational shutdowns. Continuous monitoring prevents the engines from being run until they fail," says Holmberg from Fingrid.

DIESEL GENERATORS OF NUCLEAR POWER PLANTS ARE SERVICED IN LINNAVUORI

The specialist expertise of Patria's Engines unit also includes the emergency diesel generators of nuclear power plants. These, too, are critical to security of supply - they start up automatically in the event of a power plant failure. In addition, all the safety systems of nuclear power plants are supplied with electricity from the diesel emergency power system.

Finland uses four nuclear plant units to generate electricity, two in Olkiluoto, Eurajoki, and two in Loviisa. A third unit is being completed in Olkiluoto.



Mechanics Harri Toivonen and Pasi Paakkälén assembling the Avon motor of Fingrid at the Linnavuori workshop.

CIVILIAN SECURITY OF SUPPLY

Security of supply ensures a functioning society under all circumstances.

"The diesel generators are transported for overhauling to the engine workshop in Linnavuori. The engine is completely dismantled. All the parts are inspected. Ageing and wearing parts such as bearings and rubber components are replaced. We also test-run the engines here," says Korsberg.

"We service and repair emergency diesel generators also on site at the nuclear power plants if necessary. This ensures that we have reserve power available when it is needed."

The engines are up to the size of a minibus and can weigh as much as 32 tons. The maintenance work is ISO quality certified and demands specialist expertise and under-

standing of the requirements of both nuclear safety and security of supply. Long-term cooperation with the customer also maintains professional expertise, which is supported with regular training. Security of supply is in reliable hands. ■

Heading to new markets - Patria AMV^{XP} to be tested by Japan

Patria is currently facing the second phase of Japan's Self-Defence Forces' acquisition of 8x8s against two other manufacturers. With the leading product on the market, Patria heads to the tests with confidence.

The Japanese Self-Defence Forces have historically opened up to the international markets in acquiring 400 armoured wheeled vehicles. Patria, as the market leader of that segment, has made it to the one-year field testing phase after competitive bidding.

The fact that Patria AMV 8X8, has already been verified and used in combat environment, is something that Japan appreciates.

"They want vehicles that have top notch technology. But they also require maintainability, good usability and reliability, which are the main qualities for low life cycle costs,"

says **Petri Jokinen**, Vice President of Sales and Business Development of the Land business unit.

TESTING STARTS IN 2022

Patria was approved for the field testing in the fall. The two test vehicles must be sent to Japan in November 2020. Customer will install the needed Japanese equipment to the vehicles and Patria will train Japanese test personnel to use and maintain the vehicles in 2021. The actual testing starts in 2022.

"It is a very tight schedule, but that is quite common in these type of programs," states **Ville-Pekka Pirilä**, Project Manager.



They want vehicles that have top notch technology, maintainability, good usability and reliability. We are confident, that Patria's 8x8 will ace the tests.



Petri Jokinen,
Vice President of
Sales and Business
Development



Ville-Pekka Pirilä,
Project Manager



Jokinen and Pirilä are confident, that Patria's 8x8 will ace the tests. Whether Patria gets the deal or not, will be up to other factors.

If Japan chooses the AMV^{XP}, there is still a question if Patria will manufacture the 400 vehicles or will Japan buy a technology transfer project to assemble the vehicles there.

"We have followed the discussion of Japan's Ministry of Economy, and there is a chance that Japan will surprise us and buy also the manufacturing from us against all odds," Jokinen says.

A HISTORICAL CHANCE

Patria has been searching for a way to get to the Japanese market in other fields, but so far armoured vehicles have taken the company the furthest.

"Southeast Asia and East Asia are pretty much an untouched territory for us. We have previously sold all-terrain transport vehicles to China for a non-military use, but the fact that Japan is having international companies in the tendering, is a clear indication that their procurement procedures for land forces equipment are changing," notes Petri Jokinen. ■

PATRIA AMV^{XP}

- High-performance and robust armoured 8x8 wheeled vehicle.
- Available in three different models: basic, high roof and heavy weapon platforms.
- Ideal for integration of medium-calibre weapon systems, direct fire cannon systems up to 120 mm, Patria Nemo 120 mm turreted mortar system and anti-tank or anti-aircraft missile systems.
- Low radar and thermal signature.



New maintenance unit in Belgium is a big leap to Europe and beyond

Patria's strategy to expand internationally is already in action. Patria acquired Belgium Engine Center in June 2019, and the integration process is now well under way.

The new company name is Patria Belgium Engine Center SPRL (PBEC) and it specialises in the maintenance and overhaul of Pratt & Whitney F100 engines. This engine type is used in F-15 and F-16 fighter jets worldwide.

PBEC is now part of Patria's International Support Partnerships business unit.

"We started by incorporating the new company into Patria's financial administration and continued with human resources management, re-branding and business synergies. The next major step is to do it with the IT systems, which will soon become possible once the related formalities will allow it," says **Antti Huuskonen**, who first led the business integration process and since March 2020 has been Marketing & Sales Director of PBEC.

The acquisition was part of a larger whole, where Kongsberg and Patria bought AIM Norway and BEC leading to the current structure where Kongsberg Aviation Maintenance Services (KAMS) is 49.9% owned by Patria and PBEC is 100% owned by Patria.

CAPABILITIES BUILT ON THE DEAL OF THE CENTURY

With the acquisition of PBEC, Patria is now the owner of one of the most specified aero-engine maintenance and overhaul companies. PBEC's capabilities are built on the "Deal of the Century" in 1975, in which the so-called EPAF countries (European Participating Air Forces meaning Norway, Denmark, the Netherlands and Belgium) made a joint acquisition of F-16 fighters, around 348 planes.

Manufacturing and assembly of the planes was shared between the countries, and PBEC (which at that time was part of FN Motors) manufactured and assembled the fan and core modules and assembled and tested all the F100 engines. More than 600 engines were assembled and after the production, PBEC's capabilities were focused on the depot-level maintenance of the F100 engine modules.

Today there are only a handful of companies in the world that provide the same depth of services for F100 engines. PBEC is one of the most experienced companies in this field and works in very close partnership with its customers and the OEM of the engine, Pratt & Whitney.

"In Belgium, we will be soon starting our intermediate-level F100 services on site at the air force base, which is an important new opening for us. We are hoping this service concept will become a reference for some other countries in the future," says **Gery Vanhalsberghe**, Sales Manager of PBEC.

In the future, PBEC hopes to grow in the US market as well. **Alessandro Carrella**, Sales Manager in charge of US market sales explains:

"Our company did sizeable business with US customers several years ago. Based on this experience and supported by Patria's wider interest in growing in the US market, we are aligning ourselves accordingly. Based on PBEC's strong engineering relationship with USAF, we have been able to identify huge potential opportunities with the US air force and there is a lot of activity in progress. It is definitely a future prospect for us," Carrella believes.

"Besides European and US markets, PBEC is strongly active with other global F100 customers in Asia, the Middle East, Africa and South America. We believe PBEC's full depot-level service capability, effectiveness, quality and customer orientation are assets that will continue to leverage us in the current market," says **Ronald Andre** (Aeron Engineering Ltd), a long-time consultant for the company.

"With customers continuing to choose the F100 as the mainstay of their fleets and new F100 customers on the horizon, the F100 MRO potential for the forthcoming years looks very promising," Andre suggests.

"We eagerly look forward to reaching a point where we are more familiar with the other aviation MRO-related units of Patria, as we trust there is potential for additional synergies and cross-learning between the units," Andre continues.

One part of PBEC's marketing and sales is customer support, run by **Eloise Fraiture** and **Solange Marsin**. At PBEC, the customer support team is the main point of contact of existing customers for everyday requests.

"As an intermediary, we internally coordinate the follow-up of the repairs, the shipping and the invoicing. We also work closely with sales managers and we are looking forward to facing new challenges together.



PBEC is looking into the diversity of aeroengine maintenance and also military item repair. We have a lot of competence and we are able to expand our services to other engine types as well.

TARGETING THE FUTURE WITH A VARIETY OF BACKGROUNDS

Despite its long lifespan, extending from the early 1970s to beyond 2030, the use of F100 engines will eventually decline along with the introduction of new fighter types with different engines. Therefore, PBEC is getting ready to broaden its services into other engine types - both military and commercial prospects are being analysed.

"We are looking into the diversity of aeroengine maintenance and also military item repair. We have a lot of competence and we are able to expand our services to other engine types as well," shares Gery Vanhalsberghe.

The marketing and sales team of PBEC is very international. The variety of nationalities, professional and cultural backgrounds as well as language skills is an advantage in different markets and in interactions with customers.

"I am very happy to be a part of this cross-cultural team, and trust that the diversity of our marketing and sales team will be a definitive strength contributing to PBEC's future success," says Antti Huuskonen. ■

PATRIA BELGIUM ENGINE CENTER SPRL (PBEC)

- PBEC is a military jet engine maintenance, repair and overhaul (MRO) center that services the Pratt & Whitney F100 engine which powers F-15 and F-16 aircraft around the globe.
- It also provides material management services for those engines.
- PBEC was previously owned by AIM Norway. Patria has been the owner since June 2019.

Patria 100

The foundation for a secure future.

PATRIA 100

- Patria since 1921
- Patria will celebrate its 100th anniversary in 2021.
- Celebrating 100 years of history does not mark an end.
- It shows that a strong foundation has been created
 - Foundation for growth.
 - Foundation for working together.
 - Foundation for success.

Two new aircraft for Patria

Pilot Training has taken delivery of two new DA40 NG aircraft from Diamond Aircraft Industries in April 2020. Both new aircraft will be taken into active use in Pirkkala, Tampere.

The majority of DA40 aircraft will remain at the main training base of the fleet in Córdoba, Spain. Thanks to several protective measures taken at the base, Patria has been able to proceed with training programs of Air Astana, Nordic Regional Airlines and self-sponsored students even during current exceptional times. Later Patria will use its fleet of eight DA40 NG aircraft both in Finland and in Córdoba.



Patria and Kongsberg - building expertise in export control

In Patria's domain, being able to control the technical data and know-how is indispensable to anticipate customer's needs, maintain the trust of the current customers, and succeed in the industrial and commercial activities.

To promote expertise in export control and build a more robust internal compliance program, Patria and Kongsberg started an initiative named the "Trade Compliance Project". It coordinates the design-work of a holistic approach to export control from planning to implementation.

"We all have a responsibility to protect our technology. Export control will help us to continue growing internationally", says **Rosa Rosanelli**, Patria Group Export Compliance Officer.



Photo: Kongsberg

Milrem LCM is now Milworks

Milworks is the new name for Milrem LCM. Milworks is an Estonia based company focusing on maintenance, repair and overhaul (MRO) of defence materiel and a trusted partner for the Estonian Defence Forces. In Latvia Milworks has a framework contract with Latvian Defence Forces.

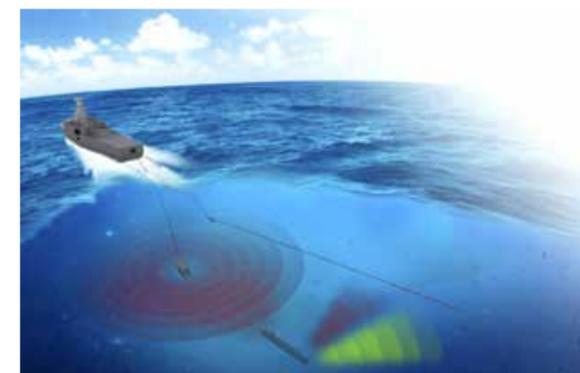
Over the recent years Milworks' focus has primarily been on military vehicles related MRO services. Milworks employs 36 persons in Tallinn, Tapa and Voru. It is owned by Patria Group and Mootor Grupp.



Patria provides new Pohjanmaa class corvettes with SONAC DTS

SONAC DTS is a State-of-Art ASW product strengthening Patria's underwater domain capabilities and product range. It improves company's competitiveness and position in international naval markets.

The new lightweight dual-tow Sonac DTS system consists of both an active VDS (variable depth sonar) and a passive TAS (towed thin line receiving array) that can be used together or independently. The system has been designed to meet the demanding acoustic underwater environmental conditions of the Baltic Sea to ensure the best possible performance. SONAC DTS has been selected onboard Finnish Navy Pohjanmaa-class corvettes.



An esteemed tribute to the Hornet system testing team

This year, Patria's committed and cooperative STIC expert team won the Finnish Air Force's prestigious F-18 Hornet Handler award.

The STIC (Software Test and Integration Center) team is a part of Patria Systems' Fighter a/c product group and has got a long-term experience in F/A-18 Hornet software testing and system expertise.

The team has members with engineering degrees or doctorates in science. It is also supported by a large number of people working in maintenance and other positions.

"Long-term merit in assuring the performance of the Hornet fleet and a steadfast desire to work conscientiously in the best interests of maintaining the fighters", stated the sentiments expressed when the award was presented.



Patria and the U.S. Army entered into agreement

U.S. Army's Combat Capabilities Development Command Armaments Center and Patria have signed a Cooperative Research and Development Agreement (CRADA) to determine feasibility of incorporating a turreted, breech-loaded 120 mm mortar weapon system in U.S. mortar carriers.

The scope of the agreement is to assess the capabilities of Patria Nemo mortar system, its compatibility with U.S. mortar carrier weapon platforms and fire control systems as well as to evaluate the use of current U.S. 120 mm mortar ammunition in a breech-loaded mortar, such as Patria Nemo.

"The agreement between the U.S Army and Patria exemplifies the capability leap that modern turreted mortar systems can introduce to armed forces and illustrates Patria's leading role in this technology area, says **Jussi Järvinen**, President of Patria's Land Business Unit.



Patria

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