



Customer Magazine 2023

# DA-GROUP

Advanced Solutions from Seabed to Space

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## DA-Group

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# Self-sufficiency and safety are the new normal

If we have learned anything from the past few years, it is the importance of self-sufficiency. The pandemic, component and raw material shortages, energy crisis and war in Europe have improved our understanding of how important it is to keep the supply chain in-house as much as possible. And also of how naive it was to assume that global markets would function as agreed during times of crisis.

Self-sufficiency has been a strategic cornerstone for DA-Group for many years now. We have purposefully expanded our expertise and thus ensured the functionality of the entire supply chain, from R&D to production. Nevertheless, we were not spared from the impacts of the component shortage. We have stocks of nearly finished products that, in many cases, are waiting for that one missing component.

The crisis years have left their mark, but as a company we have shown, just like the entire nation has shown, that we can also function in challenging circumstances. Not necessarily as we would have expected or wanted, but functioning nonetheless. At DA-Group, our projects have continuously moved forward, despite all the difficulties.

The EU area must have its own component and circuit board manufacturing, and global disputes must be treated as a real threat, also to our economy. New opportunities are currently opening up almost every day particularly in the defense industry. We have developed, among other things, advanced and safe underwater technology for nearly two decades, and the time has come for us to turn our world-class expertise into a commercial success and reap the rewards of our well-executed, long-term work. Many countries are interested in a highly capable and cost-effective maritime defense system.

When one door closes, ten new ones open. This is the approach we have taken for DA-Group going forward, and it will continue to make us an even more reliable and safe partner.

DA-Group has developed its organization to match the requirements of a changing environment. Tauno Maksniemi, who was our interim CEO for much of 2023, is starting his well-earned retirement, and the company's organizational structure was updated to better serve our customers. For the time being, I will continue as DA-Group's CEO. As we have now completed our organizational revamp, there will be more time for development projects.

Kind regards,  
**Sami Kotiniemi**



Photo: *Taija Piikkilä*

# Nordic collaboration for effective naval defense

SH Defence, DA-Group and Forcit Defence have signed a multiparty Memorandum of Understanding to develop the use of The CUBE™ System for sea mines. The companies are exploring the potential to develop the launching, laying and storing of sea mines designed and manufactured by DA-Group and Forcit, such as BLOCKER and TURSO sea mines, in the containerized multi-mission module system called The CUBE™.

The future naval minelaying operations will be based on SH Defence's modular mission concept, The CUBE, including associated handling equipment. The operations will include design and conception, and will be supported by DA-Group's patented

modular SUMICO naval minelaying concept.

Mission modules are rapidly becoming the standard within maritime mission capabilities for naval, coast guard, and SAR vessels around the world, especially within NATO and around the Baltic Sea.

Modern naval vessels must be capable of carrying out different missions and roles in both peacetime and wartime. Therefore, the easy and rapid exchange of capabilities is an increasing requirement for newbuildings and the retrofit of naval vessels.

DA-Group is very pleased to have entered into this cooperation with SH Defence. DA-Group has been working on the modularity of naval mines and

missions for years and has seen the need for such a system. This is also the reason for the SUMICO patent, which can now be used in The CUBE™ system.

CUBE and SUMICO together enhance naval capabilities and flexibility. Forcit Defence has been developing and manufacturing modern naval mines since 1988. Recent developments in the security environment have highlighted the importance of maritime combat and naval minelaying capabilities. The partnership with SH Defence, DA-Group and Forcit provides world-class sea defence capabilities for maritime defence.



## DSEI 2023 EXHIBITION

DA-Group was present at the DSEI 2023 exhibition in London. Defence and Security Equipment International represents the premier global event in the defence and security sector for conducting business, sharing knowledge and shaping the future capabilities of armed forces worldwide.

It was a great opportunity to delve into state-of-the-art solutions and connect with industry leaders. The event included visits from equipment suppliers, designers and defence forces. DA-Group had many engagements, friendly catch-ups, strategic discussions and planning ahead of our upcoming events. DA-Group also visited the Finnish Ambassador's residence in London, Kensington Palace Gardens, to meet Ambassador Jukka Siukosaari. Thank you to all visitors and partners!



## New vapor phase soldering machine reinforces space tech components

DA-Group uses a new vapor phase soldering machine for soldering circuit boards, resulting in void-free solders. This means that the vacuum functionality of the soldering machine removes all gas bubbles from the solder.

The process uses a liquid to achieve a higher and more even rate of heat transfer into the component, thus resulting in a more reliable bond. The va-

por phase machine can be used for soldering parts or components requiring large amounts of heat, because it offers better heat transfer performance than a conventional reflow oven. In a vapor phase system, the component temperature never exceeds the vapor temperature, which is a major benefit when processing complex PCB products, for instance. The technology al-

lows lower temperature processing than infrared or hot air processing.

The quality provided by the vapor phase process is further increased by the absence of oxygen. The process increases durability and high quality—particular requirements for products designed to be used in space. Customer saves time and money.



The Gatorade Center in Turku, illuminated with products manufactured by DA-Group and Easy LED Oy. (Photo by courtesy of Easy LED Oy)



Learn more about the LED products here.

# Clearly superior LED technology

DA-Group acquired Tepcomp Oy's LED product business in July 2022. The acquired operations consist of the components for LED luminaires, intellectual property rights, and product development, including a R&D team of five people.

LED technology has long been used in the signal lights of electronic products and various types of LED displays, but has also more recently gained popularity in lighting applications. LED luminaires are now the most important source of lighting, not least because of the gradual phasing out of tungsten halogen lamps and fluorescent lamps.

The energy crisis has increased the popularity of LED lighting due to its high quality, environmental friendliness, durability and low-maintenance, and because LED lights consume much less electricity than other lighting technologies.

The acquisition will also boost DA-Group's technology, product and market know-how in LED products and drivers.

Three product groups were taken over by DA-Group in the acquisition: PowerPAQ LED power supplies, ActivePAQ LED modules and PassivePAQ LED modules.

"The main product is the 540-watt

PowerPAQ LED driver designed for illuminating large spaces, such as stadiums and other sports venues, ports, green houses, ski slopes and parking lots. This is your solution if you need high-powered LED lighting," says **Timo Lautanala**, Product Manager for the LED business.

He is also one of the five-strong product development team which now reinforces DA-Group's competence, thanks to the acquisition.

## Solutions for special needs

Finnish luminaire manufacturers are the most important customers in standard LED drivers and LED modules. The LED modules and high-powered drivers are installed inside the luminaires. Optical lenses are used to create the light patterns required for various applications and needs.

"The LED luminaires most commonly used for household applications and similar low-priced LED luminaires are mostly produced in Asia. Competition is extremely tough in the LED industry, so we focus on special solutions by building superior technological capabilities."

Lautanala says the solutions developed by DA-Group's LED business are typically sought for applications where the technical performance of the lighting system is crucial.

"Thanks to DA-Group, we can now expand our customer base even further. One big opportunity is the defense industry and the related needs. In terms of self-sufficiency, it is preferable to have domestic expertise and luminaire manufacturers in Finland."

After a transition period, the manufacturing of LED products will be transferred to DA-Group's Forssa plant, which already produces a broad range of electronics and other devices, precision mechanics and injection molds.



# Forum Marinum breaks its all-time visitor record

The history of Finnish maritime museums stretches back to the 1930s, when the Åbo Akademi university established its maritime collection in Turku. Today's Forum Marinum museum attracts an impressive 80,000 annual visitors to Turku and is among Finland's 10 most popular museums. With 85,000 tickets sold, mostly to Finnish patrons, 2022 was a record year for Forum Marinum. Germans and Swedes are the biggest visitor groups from abroad. The museum collection consists of artefacts collected by the city of Turku and Åbo Akademi, some of which have been gifted by shipping companies, sailors and ship builders as well as maritime companies.

## Naval weapons in Forssa

A part of Forum Marinum's historically significant sea mine and torpedo collection is now exhibited under the title *Vedenalainen sodankäynti* ('Underwater warfare') and was opened in

DA-Group's premises in Forssa in 2021. The purpose of the relocation was to make the unique exhibits more widely accessible and to store them in adequate, museum-appropriate conditions.

## The last of its kind

Forum Marinum's oldest artefacts date from the eighteenth century, including a painting of a ship and navigational tools. The oldest vessel in the museum collection, *Sigyn*, was built in 1887 in Gothenburg, Sweden. This trader is significant not only because she is a typical representative of her time, but also because she is the last one of her kind globally, says **Mikko Meronen**, researcher with Forum Marinum.

## Sad memories from the Titanic

Forum Marinum of Turku currently features a Titanic exhibition, rebuilt in

response to popular demand. Mikko Meronen says it was far from easy to find all the material for the exhibits: "It was known for a long time that there were many Finns onboard, 64 in total. Our idea was to showcase those Finnish travelers on the Titanic and the emigration of the time in general. We wanted to represent it more dramatically. You have these huge, very expensive exhibitions going around abroad, and if we had had a couple of million euros to spend, we could have made an exhibition highlighting the artefacts from the Titanic, but it would have taken years. Instead, we show what happened on the ship with actors from the Turku city theatre, using audio drama and dramatic means in general. The exhibition focuses on the fates of the people who travelled on the Titanic."

## Expectations, dreams and fears

The exhibition includes the photographs of nearly all of the 64 Finns

## EXHIBITONS 2023

18–20 January 2023 Espoo Dipoli,  
Finland  
Finnish Satellite Workshop 2023

8 & 9 February 2023 Helsinki,  
Finland  
SecD-Day 2023

25–27 April 2023 Stockholm,  
Sverige  
Train & Rail 2023

23 & 24 August 2023 Ballerup,  
Denmark  
DALO Industry Days 2023

12–15 September 2023 London, UK  
DSEI Defence and Security  
Equipment International

18 September 2023 Kouvola,  
Finland  
Kouvola Security Conference

19–22 September 2023 Gdansk,  
Poland  
Trako exhibition

26–28 September 2023 Tampere,  
Finland  
Subcontracting Fair



*The 3-year-old Urho, along with his brothers and mother Maria, was meant to arrive in New York and continue to Coal Center, Pennsylvania, where Juho, his father, was waiting for his family in a newly built home. Maria and all her children perished en route in the Atlantic.*



aboard the Titanic. Twenty-six of them reached their destination, America. Some of the passengers had already been to America, some were on their third trip, and some were visiting family. The mother of the Panula family, together with her five sons, had visited Finland and was now returning to America. The entire family drowned.

"A large wave of emigration emerged from Finland, starting especially from the late nineteenth century; between 1820 and 1939, 380,000 Finns emigrated," Meronen says. The Finns on the Titanic travelled in third class, while the Swedes were in second class. Meronen says that Swedish emigration had started earlier, in the first half of the nineteenth century, and people had had more time to accumulate wealth. First class on the Titanic was equipped with a telephone exchange and 50 telephone lines. The ship carried 3,300 mailbags, and 42 parcels sent from Finland vanished with her.

### Empress of Ireland sank in 14 minutes

The Empress of Ireland suffered the same fate as the Titanic. An ocean steamer built in the U.K., she sank near the mouth of the Saint Lawrence river in Canada after a collision with the Norwegian trader Storstad in thick fog early in the morning of 29 May 1914. While the Empress of Ireland had watertight compartments, she took only 14 minutes to go under, so having enough life boats for everyone onboard, installed following the Titanic disaster two years earlier, did not help. Of the 1,477 on board, 1,012 lost their lives, making it the worst peace-time maritime disaster in Canada's history. The ship mostly carried immigrants travelling in third class. This disaster is rarely remembered, Mikko Meronen says.



# Defense demand at its peak

The war in Ukraine has prompted European countries to raise their military readiness. However, many years of stagnation leave a lot of catching up to do. This creates demand and opportunities for the Finnish defense technology and local defense industry.

The war in Ukraine has been in daily headlines for more than a year. In addition to situation reports, the media covers the defense materiel aid donated to Ukraine.

"The daily ammunition consumption in Ukraine currently matches a year's worth of peace-time exercises of a small country. The European stockpiles are nearly empty, while the defense industry is still in peace-time mode. The production rates cannot be raised overnight. This also coincides with the persisting availability problems concerning raw materials and components," says Vice Admiral (retired) **Kari Takanen**.

He has helped DA-Group as a defense market consultant.

"The war in Ukraine has revealed the weaknesses of Europe's defense arrangements. The USA has for a long time demanded Europe to take more responsibility for its own security, including with NATO."

"When the war in Ukraine began, no one believed how tenaciously the Ukrainians would defend their country. People believed it would be over soon. The drawn-out war has made clear how badly prepared the European countries are for such a scenario."

## NATO membership opening doors

Finland became a full member of the NATO on 4 April 2023. Takanen says that while this will not bring any sudden miracles or lottery wins for the Finnish defense industry, NATO membership will open up new doors for our defense contractors.

"NATO itself does not acquire any capabilities; it is the member countries that do this. Now that we are a member of the NATO family, we can be sure to receive more requests for proposals from other members."

During the application process, generals and NATO officers from several countries have visited Finland to learn more about our defense forces and defense technology.

"Thanks to these visits, our expertise is now on a totally new level of awareness. Other NATO countries now know better what we do here and where we are good at."

***"The power of the Finnish defense industry lies in high-tech solutions."***

## Sea mines and niche expertise

Takanen says that the power of the Finnish defense industry lies in high-tech solutions, such as the modern sea mines manufactured by DA-Group and other underwater warfare capabilities.

"It makes no sense for us to make bulk products here. Instead we should continue to focus on where we are ahead of others. We are talking about niche defense products."

Many forms of warfare were forgotten about during the last 30 years, when military crisis management efforts focused on areas such as Afghanistan and anti-terrorism missions.

"Fortunately, here in Finland we continued to develop sea mine technology and now have a major edge over other players on the field. The effectiveness of sea mines has once again been proven in the naval action taking place on the Black Sea."

"Furthermore, sea mines have become safer to use and store during the last decades. They are not used in massive numbers anymore; rather they are precision weapons. On top of that, they are far cheaper than missiles."



# The future of technology depends on people

Every now and then, technology takes major leaps forward, causing many to throw up their hands in surrender. Technology has already changed our day-to-day lives, however, and it will continue to do so. As technology evolves, professions and work tasks also change.

Futurist **Perttu Pölönen**, who studied future technologies at NASA's Ames Research Center in Silicon Valley, has a theory about why so many people shun technological development. According to him, in the past few decades, the development of digital technology in particular has almost exclusively been in the hands of young male engineers.

"This is a good example of why we need diversity. When teams include people of different ages, backgrounds and genders, we gain the perspective of as many users as possible. This is how we could get technology to serve us all a bit better. Not even climate change can be solved by Finland alone."

Pölönen's comments are not meant as an indictment of young men and engineers. Many of them simply have a natural interest in technology, which has attracted them to the field.

"Technology always creates inequality at first, innovations are not available to everyone right away. I believe it is even more important, however, that we include everyone in the development. Technological development must not be a rare treat that only a few enjoy," he says.

Pölönen adds that technology will increasingly affect people's lives. The development will also bring a heap of ethical and legal issues to be decided.

## You can't discount humans

The most common fear about technological development is a scenario in which machines take over the world. Pölönen sees this as Hollywood's way of dealing with fears.

"It is important to have a discussion about killer robots and drones. In the big picture, machines are still just machines whose actions are specifically guided by people," he stresses.

"A robot or machine may write a very good poem, but only a human is able to say why, how and where the poem was written. Humans can create meaning and contexts for things, while machines cannot."

According to Pölönen, machines can also not replace all workers, because if people are removed from service jobs, such as libraries and shops, human interaction and sentiment that are crucial to human nature will be lost. They are difficult to replace.

"People also need to keep in mind that every force has a counterforce. Technology is evolving, but that does not have to mean that it is constantly present. Technology should be used wisely and not be allowed to enslave us," says Pölönen.

One megatrend that Pölönen is keen to bring up is the ageing of the population. For Finns, this is a harsh truth, but

at the same time, elsewhere in the world every second person is under 30.

"In Finland, the older population forms a large demography, but since we operate globally, disregarding the voice and perspective of young people is dangerous. Dialogue between generations is important, as otherwise we will grow apart," Pölönen concludes.

Perttu Pölönen, Futurist





*Noak was completed in 1911*

# Seafaring expertise— Wooden boats in the Finnish craftsmanship tradition

**Ismo Postareff**, a house construction teacher in Jyväskylä, has a passion for renovating old boats. He wants to preserve a piece of Finland's boat-building history.

Ismo's parents owned old iron-hull boats, tugboats, which sparked his interest and eventually led him to purchase his first wooden boat in 2011. The exclusive boat was built by the boat-building company August Eklöf Borgå in Porvoo, and it was originally intended for corporate visitors.

AEB was a big company at the time, with over 30,000 hectares of land and more than 2,000 employees. Ismo recalls the first time he laid eyes on the boat:

"What a beauty! But it was a wreck, really. It still struck a chord with me. I spent 5 years and 5,000 hours restoring the boat. And the hobby took on a life of its own—boats started piling up so much that I had to build a bigger workshop," recounts Postareff.

## Boathouse designed by Alvar Aalto will see the light of day

The oldest boat in Ismo's workshop is Noak, completed in 1911 by Andrée & Rosenqvist, a boat-building company founded in 1906. It is in original condition and has even been on the water.

Noak was on display at the Helsinki Boat Show in February 2023 and features in a book about Finland's boat history. There is one particularly interesting detail about Noak. Architect Alvar Aalto designed a boathouse for Noak, but it was never built. Ismo has the original drawings, and he intends to build the boathouse at his cottage on Lake Päijänne.

"Many people who jump into boat renovating are surprised at how time-consuming it is. It takes a proper workshop, good tools, machines, skills, effort and a burning desire. One time, a mahogany log that I needed for a boat arrived from Germany. That was quite pricey," he recalls.

## The Kultaranta presi- dential boat

One of Ismo's boats—Kultaranta, built in 1921—has been used by the Finnish presidents Ståhlberg, Relander, Kallio and Paasikivi. As an exciting backstory, Ismo learned that the boat's original propeller existed somewhere. After several phone calls and persistent detective work, he got his hands on the propeller and it is now on the boat.

"The level of craftsmanship has been incredible. The conditions under which these boats were made and the tools that were used—what a feat! There were hundreds of builders in Finland who did amazing work. And there still are some professional boat builders who do solid work."

"I now own eight boats. I have no intention of selling them. I sit in my rocking chair, listen to music and enjoy the time I spend on my boats," Ismo sums up.

# Future traffic rolls on rails

Urbanization, population growth and the crisis of ecological sustainability. These are some of the megatrends that will affect the future of transport. Trams will have a clear edge in urban public transit—rails will give one answer to the challenges posed by the megatrends.

Urban rail systems are booming. This is what Škoda Group, a provider of public transit solutions, believes.

Several new light rail line projects are underway in Finland, particularly in the Helsinki region. The most well known probably is the Jokeri Light Rail line, on which technical test runs began in November 2022. A new extension project is underway also in Tampere, and Turku is starting up its own project as well.

The Jokeri Light Rail cars were manufactured by Škoda Group. DA-Group will provide the cars with a display system, the actual displays, the user interface of the driver information system and the screens for the onboard cameras.

“The Smart Artic Jokeri cars that we have designed for the Jokeri Light Rail line are a strong proof of our innovativeness. The Jokeri car is the only articulated fully low-floor tram with free-turning bogies in the world. Furthermore, the tram can be retrofitted with a kneeling system in the multi-purpose compartment, another global first,” says **Ollipekka Heikkilä**, Head of Sales with Škoda Group.

## Heading to Europe and beyond

The demanding conditions of the Helsinki tram network, both in terms of the climate and rail line geometry, have prompted Škoda Group’s business to meet the Arctic challenges. Škoda Group’s plant in Finland holds a major share of the international low-floor tram market.

The company mainly serves the home markets in Finland and the Czech Republic (and Slovakia) and other European markets. Heikkilä says Škoda Group is also focusing on Italy, Sweden, and Germany.

## MLUs and upgrades

Light rail traffic has a long lifespan: a car manufactured by Škoda will last at least 40 years. A mid-life upgrade is usually carried out at halfway of the lifecycle, including modernized electronics and interior fittings. The systems provided by DA-Group are also designed for long lifespans.

“Our co-operation with DA-Group started with a joint customer project. DA-Group’s solutions are valuable for many customers precisely because of their adaptability and compatibility characteristics,” Heikkilä says.

Other benefits of light rail traffic include the added financial value along the completed tram line which many cities have experienced.

“A tram line is a statement of permanence and trust in future. This is why building lots and real estate along tram lines increase in value and why marketing pitches always mention tram service nearby.”



*DA-Group supplies the Jokeri Light Rail line vehicle and passenger information systems*

A woman with blonde hair, wearing a bright red, long-sleeved, form-fitting dress and black high-heeled boots, stands on a modern staircase with a glass railing. She is smiling and looking towards the camera. The background is a bright, clean interior space.

# DA-Group's capability enables growth in light rail transport market

Tanja Popko handles sales and marketing at DA-Group as part of a team that provides public transport solutions. The goal is to raise awareness of DA-Group's expertise and products in the Nordics and all of Europe.

Tanja Popko has reason to smile, having completed her studies and a two-year apprenticeship, she can now focus her full attention on her job of selling and marketing public transport solutions to potential new clients in Europe for DA-Group.

Popko joined DA-Group two years ago, after completing studies in international trade in her native Ukraine, but working in Finland required her to update her skills and competence. The solution came in the form of a local educational institution that helped find Popko a suitable continuing education package.

"We have very actively attended public transport events and fairs, for instance in Poland and Germany. This year we are participating in at least the public transport fairs in April in Stockholm and in autumn in Gdansk."

Last summer, several European train and tram manufacturers visited DA-Group in Forssa to learn about the company's products and expertise.

"Everyone was very impressed by our campus and facilities, including our production plant," says Popko.

"Conquering new markets and raising awareness of our competence is a long process, but we are already on the short list in a few tenders. I can hardly wait to celebrate some winning bids. After all, the best part of the job is closing the deal!" exclaims Popko.

## Permission to grow

Popko describes the atmosphere at her workplace as positive and respectful towards employees. She especially appreciates the work of the three-person team that she is a part of.

"We work very closely as a team, and we help and understand one another. Every team member has their own role and duties: I maintain contact with clients and make offers, and the engineer designs the right solutions for the client, but all ideas and thoughts are listened to with an open mind," she stresses.

Popko believes that she also has opportunities and room to grow in DA-Group.

"DA-Group's public transport information systems are based on open technology. Likewise, I see DA-Group as being an open platform for us employees, one that gives us an opportunity to develop."

"The company's expansion into Europe is also a great opportunity for me to grow. The more we make ourselves and our competence known, the more opportunities we can tap into," says Popko.

**DA-Group manufactures onboard systems for public transport, increasing passengers' travel comfort and enjoyment. A computer system designed for public transport equipment is used to manage data in different devices, for instance in driver cab interfaces and passenger displays, CCTV and PA systems. Open IP technology enables the connection of third-party equipment to the system.**

# Best RF filters are designed through a dialogue with the user

When the customer needs truly high-performance radio frequency (RF) filters for a testing application, there are not many suppliers to choose from globally. DA-Group's subsidiary Creowave Filters is a unique company in the sense that customers find that it fulfills their special needs within telecommunications and cell site manufacturing sectors. Other application areas include the defense sector and space business.

*The Oulu region is Finland's biggest hub of RF know-how. Oulu is also the base of DA-Group's subsidiary Creowave Filters and their 10-person team with unique top expertise. Creowave Filters' portfolio consists of 2,300 different products, a clear sign of continuous product development and quick responses to new needs from customers.*

>>



Creowave Filters' senior RF designer **Ari Isola** knows the magic that can happen when two engineers get a chance to exchange ideas. This is why he often wants to talk to the customer's designer before sending a quote.

"I have two recent examples of how you can actually get a better product than the customer initially requested, simply through interaction, by asking questions. The request for quote often comes from the customer's procurement department and they mainly look at competitive products and pricing."

## Getting the big picture

One of Isola's examples was a request for a quote which included several RF filters specified for very limited space. The customer had stated the size requirements for each individual filter.

While looking into the specifications, the Creowave Filters team quickly realized that some of the filters were unnecessarily large in terms of the actual design requirements, and some were too small.

"We suggested that we could redesign the entire set-up. The customer gave us green light, instantly making our job so much easier."

The end result was a new set-up with a much higher overall capacity. The customer got more efficient and cost-effective products and the consistent quality benefits of serial production.

Creowave Filters's core competence includes test filters. This type of RF filters typically requires fast lead times, and the orders often involve set-ups of a standalone filter or several filters.

"We understand that timely product testing is a key aspect of product development and new launches. Missing

your product launch deadline usually means huge financial losses," Isola says.

## Testing requires top notch filters

"We have what it takes to rapidly deliver the required products. Customers trust us and appreciate that we always meet our deadlines. They also trust our expertise and often skip any detailed specifications—the request is simply to make a filter with the best performance we can achieve."

Some customers also particularly value a supply chain in Europe. It is a question of security, from many different angles. In a rapidly changing climate of global politics, it is essential to make sure that the key competence is safe from embargoes or otherwise sketchy actors.

# Secure space makes Earth safer

Space is no more an exclusive domain of states and governmental institutions. Thanks to advancing technology, satellites have become lighter and launching them into space is more affordable. The new possibilities also create new threats—but they can be countered with proper space situational awareness. This is also an area of potential value from DA-Group's RF expertise.

Like any technology, satellites have gone through the typical stages of development. What once was an exclusive luxury is now a commodity. Governmental actors have been joined by commercial operators and new applications are constantly being invented.

According to an estimate by the US Department of Defense from 2021, the Earth is orbited by more than 30,000 objects of 10 centimeters in diameter or larger. The figure includes both functional satellites and fragments of collided satellites and their launch vehicles.

Some 1,500 satellites circulate in the lower range of the low Earth orbits (LEO) and some 14,000 in the higher range of the LEOs.

"Donald J. Kessler forecasted as early as the 1970s that the density of space debris in low Earth orbit would increase until collisions inevitably became even more common and made near space unusable", says **Timo Lähtilä**, Chief Business Officer of DA-Group's Space business area.

"To avoid the Kessler syndrome, inventing new ways to control satellites is necessary. One course of action is legislation, another is removing debris and a third one is creating so-called graveyard orbits. The most important goal is to have an adequate situational awareness of what is happening in orbital paths and what threats are present."

## How can a satellite be controlled safely?

Many actors maintain situational awareness in space and monitor satellite orbits. Situational awareness en-

ables a warning system to avoid collision risks. In addition to satellites, the objects to be monitored include near-earth asteroids.

DA-Group has collaborated with major institutional space technology players for roughly twenty years, participating in several satellite launches. As commercial operations in space become more and more common, Lähtilä feels that the up-coming operators will include many potential customers.

"We have strong expertise in radio signal technology and radiometry, which can be helpful to safely impact the operations of satellites nearing the end of their lifecycles, for example by boosting them into a graveyard orbit or enacting a safe atmospheric reentry."

"We can build a device that constantly follows the satellite in its orbit. This is much safer and more effective than relying only on ground stations. A ground station can communicate with the satellite only for a few minutes during each orbit," Lähtilä describes.

## Satellites offer many services

Situational awareness in space and the safe control of satellites are of great significance. Satellites can do their job only if the near space remains usable. Large pieces of debris that could return to Earth are a safety risk of their own.

"Many things depend on satellites remaining functional. Without satellites, we can't have telecommunication, we can't predict the weather or natural catastrophes, and there is no geolocation either. A large number of services we take for granted is dependent on satellites," says Lähtilä.

"Summing up, you could say that satellites are a tool for many good

things and monitoring them as well as maintaining situational awareness in space, and of course international cooperation, are ways to make sure that satellites keep working. We have a lot of expertise that can make our world safer," Lähtilä says.



**Timo Lähtilä (MSc tech) started at DA-Group last July as Chief Business Officer, Space. He has worked for 25 years on safety-critical systems and devices and has experience in projects related to nuclear safety, medical devices, aerospace systems and space technology.**

**In terms of space industry, Lähtilä's expertise includes the Platform Application Software (PASW) project for the GOCE satellite, the PASW for the Herschel-Planck space craft as well as various consultation projects for NASA.**



## Finland doing great, including in space

Business Finland has investigated and compiled Finnish solutions for New Space and situational awareness applications. The New Space Economy program headed by **Markus Ranne** ended in December 2022. The program aimed to use growth opportunities of the space industry and to showcase Finnish space know-how internationally.

"The global volume of space business amounts to EUR 460 billion. Commercial space business has also boosted the related expertise in Finland and

raised awareness about Finnish companies. The appreciation of our expertise can be seen in the growth of international venture capital investments. The participating companies collected in five years a total of EUR 390 million in venture capital. Finns are seen as potential partners."

"While elsewhere space-related activities involve space tourism and commercial space flights, here in Finland we are focusing on scaling space technology for services on Earth. Various

forestry services are one example of this," Ranne says.

"Finnish companies are actively producing technologies and solutions for managing natural resources and mitigating climate change. Since last year's events, the defense sector is also increasingly interested in the space technology designed for commercial applications," he concludes.



**Advanced Solutions from Seabed to Space**

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