



Interview with Aldas Juronis

CEO of EKSPLA, a Lithuanian company developing and commercializing femtosecond, picosecond and nanosecond lasers.

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Can you tell us about your background?

My background is in electronics. I graduated in that field many years ago and spent most of my career in business development and sales management across very different industries, none of them related to photonics. Ekspla is actually my first experience in this sector.

How did you come to lead Ekspla?

I joined the company about seven years ago as OEM Program Manager. After a few years, I became Head of Production, and later I was appointed as CEO. This evolution came naturally from my background in business development. When I joined, I quickly realized that Ekspla was a very unique company with truly distinctive products and technologies. The main challenge was to better monetize those innovations, to translate the impressive technical achievements of our engineers into sustainable business growth. Ekspla had already reached a solid level of maturity, but to move forward we needed to prepare for the next strategic step.

How did Ekspla begin?

The company was founded in 1992 by eleven engineers, just a couple of years after Lithuania regained its independence. Before 1990, there were no private companies in the country, since everything was state-owned. Those engineers realized that they had something very special: deep expertise in picosecond laser technology.

At that time, picosecond lasers were still cutting-edge, and very few groups worldwide could design reliable systems. These engineers were already building such lasers for research institutions. When Lithuania's economy opened, they decided to stay together and create

a company, even though they had no business training at all. It was a difficult time. They knew how to build lasers, trusted in themselves, technology and most importantly – each other. I am sure that was the main reason that helped Ekspla to overcome tough economical environment conditions – focusing on cutting edge technologies and strong innovation culture.

What are the reasons why Lithuania managed to develop such strong laser expertise so early on?

Laser technology turned out to be one of the rare advanced fields where Lithuania could excel. The roots of this expertise go even deeper. The first laser in Lithuania was built in 1966, just six years after the invention of the laser itself, by scientists at Vilnius University. They were working on semiconductors and realized that a laser would be the perfect tool for characterizing materials. As importing lasers was impossible under Soviet rule, they built one themselves. Later, young researchers went to Moscow to study photonics and brought their knowledge back home, laying the foundations for a strong scientific community.

How would you describe Lithuania's photonics landscape today?

Today, Lithuania is widely recognized as a photonics country. Whenever I travel abroad, whether to the United States, Japan, Korea or elsewhere, people in our field immediately associate Lithuania with photonics. For a nation of fewer than three million people, we have more than sixty companies active in this area.

It is not just laser manufacturers. There are optics producers, coating specialists, machine builders and system integrators.

We even like to joke that Lithuania has the world's highest density of coating machines per capita. There is now a complete ecosystem, an entire infrastructure for photonics, from design to production and applications.

What we lack, on the other hand, are local end-users. Only a few universities or industries in Lithuania use ultrashort-pulse lasers or advanced photonic systems. But this limitation has also made us more open and flexible. It pushed us to collaborate internationally and to build partnerships with research institutes and industrial customers all around the world. This global mindset is one of our strongest competitive advantages today.

Can you describe the early days of Ekspla?

The beginning was really tough. At that time, the founders had no money to purchase advanced equipment, not even basic metrology tools. They had to improvise everything. For example, they built their first optical tables using empty coffee cans as supports. We still have some unique photographs showing those early setups. Buying a proper optical table was simply unaffordable in Lithuania at that time.

Interestingly, the very first market for Ekspla was not local but Japan. Even before the company was formally established, during the Laser World of Photonics exhibition in Munich, the founders met a Japanese businessman who believed their technology was truly unique and could be of interest to Japanese researchers. As a result, the first laser produced by Ekspla was shipped to Japan.

The first sale took place in 1993, when they sold a single picosecond laser. The income from that single sale was enough

to sustain all eleven founders for six months and to reinvest in the company's production. It gives you an idea of how modest the living conditions were in Lithuania at that time. One laser sale was enough to pay salaries and finance further innovation.

From there, the company gradually expanded into other markets—first in Germany and across Europe, then later in the United States and other regions. Today, Ekspla operates worldwide wherever ultrashort-pulse lasers are needed. Technologically, we remain focused on pulsed and ultrashort-pulse lasers, from nanosecond down to femtosecond systems. Over the years, the product portfolio has grown steadily.

The company that started with eleven founders now counts more than 150 employees. Interestingly, five of those original founders are still working with us today, in various roles, not necessarily in management. They are excellent specialists who remain passionate about what they do.

It must have taken a lot of determination to keep the team together.

Yes, those were hard times, and it is really exceptional that the founders managed to stay united. Even when there are only two founders, it is common to see them split after a few years because of different visions on how to use profits or develop the company. But these eleven engineers stayed together and grew the company. What united them then, and still unites all of us today, is the passion for innovation. Innovation is what drives Ekspla forward and keeps the company evolving.

How do you maintain that pioneering spirit?

From the very beginning, the company has been built around the idea of constant innovation. When Ekspla started, picosecond and mode-locked laser technologies were already remarkable, but our founders never stopped looking for new ways to improve and differentiate. We have always sought to adapt existing technologies and to bring new ones to market with a distinctive edge.

The best proof of this commitment to innovation lies in the international recognition our products have received. Two of them have won the “Photonics Oscar” - PRISM Award, which is quite rare. The first was in 2010 for a DPSS-pumped OPO system integrated into a single housing. At that time, this was a real breakthrough. Traditionally, researchers had a separate pumping laser and an OPO system in another box. DPSS technology itself was still quite new, as most OPOs were pumped by flashlamp systems. Our engineers decided to take the next step: to use a diode-pumped laser source and integrate it directly with the OPO, in one compact and robust enclosure. This made the system far more user-friendly and earned Ekspla the PRISM Award in the Scientific Laser category.

We received our second PRISM Award in 2024 for our industrial femtosecond laser *FemtoLux*. Of course, we were not the first company to develop an industrial femtosecond laser but we knew that launching just another system would not be enough. The key innovation was dry cooling. For moderate and high-power lasers, efficient cooling is always a challenge. Traditional water chillers require frequent maintenance and are often the weakest point of a laser system. We decided to rethink this entirely by adapting a cooling technology from the defense sector. Instead of circulating water, we use a refrigerant that

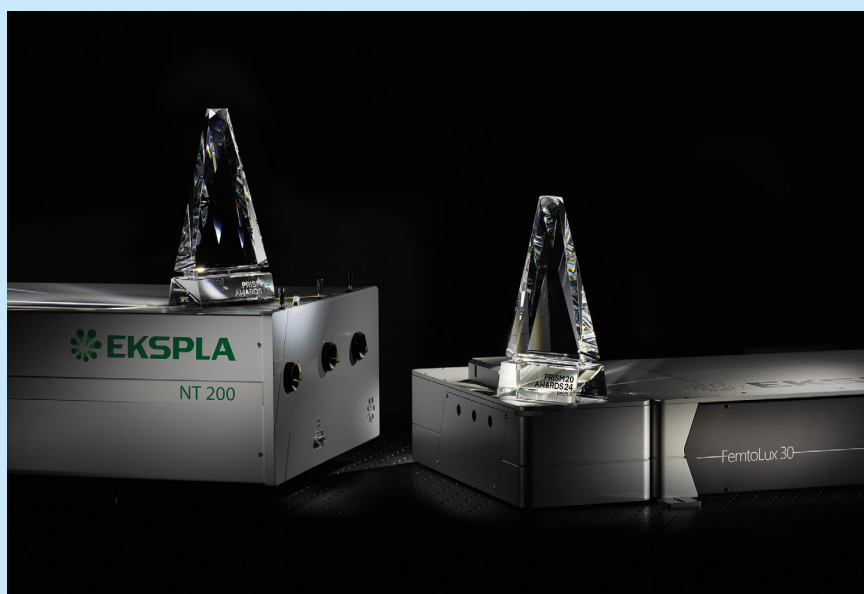
flows directly through cooling plates. This makes the laser maintenance-free, eliminates leakage risks and ensures robust, reliable operation. In addition, it enables a smaller footprint, ~50% greater energy efficiency compared with water-cooled systems. In comparative tests, direct refrigerant systems consumed half the power of liquid chillers under identical conditions. Compressor lifetime typically exceeds that of a pump by a factor of three to five. And, with a mean time between failures of >90,000 h, the system can operate continuously for more than a decade without downtime.

What are your most recent innovations?

I would say the gigahertz burst operation, offering the most flexible regime available: from two up to nearly a thousand pulses per burst, with adjustable pulse duration from the same laser source. Our patented active fiber loop design enables the same laser to operate in femtosecond, picosecond or nanosecond regimes while keeping the same optical path and pointing stability.

How does Ekspla stand out in such a competitive market?

Competition is global and intense. Our strength lies in deep scientific expertise, flexibility and reliability. We are small enough to listen closely to our ●●●



customers and to customize. Our innovations, such as the integrated tunable wavelength lasers, active fiber loop or the new direct refrigerant cooling system, are not just about better specifications but about stable and predictable performance in real-world conditions.

What markets do your products address?

We serve two main markets. The first, and historically most important, is the scientific community. Thirty years ago, ultrashort-pulse lasers were mainly research tools, often built by scientists themselves. Our mission was to provide reliable picosecond and later nanosecond lasers for research institutions. Today, eighty out of the world's top one hundred universities use Ekspla lasers. As ultrashort-pulse technology matured, we moved into industrial markets, first with picosecond systems, and now mainly with femtosecond ones, such as the FemtoLux. Our portfolio expanded naturally thanks to close interaction with academic users, who constantly need new capabilities. In industry, the goal is different: to optimize parameters and scale up for production. Our main target markets are consumer electronics, display manufacturing, semiconductors and medical technologies, including stent cutting and precision marking. This combination of scientific roots and industrial ambition makes Ekspla unique. We understand the physics deeply and know how to turn it into reliable, manufacturable systems.

How is your R&D structured to support innovation?

Innovation is deeply rooted in our organization. Out of more than 150 employees, about 25 percent work in R&D. Beyond photonics, we maintain strong in-house expertise in mechanics, electronics and software. We design and build much of our hardware ourselves, including mechanical components like lens and mirror mounts. Our teams continuously improve fixation methods, model environmental stability and refine control electronics, which enhances robustness and reliability.

Being located in Vilnius is a real advantage: most of Lithuania's photonics companies are nearby, allowing very fast iteration with local partners for optical components or coatings. We also collaborate with universities and research institutes, both in Lithuania and abroad. Each R&D team follows its own roadmap to improve existing products and explore new concepts across femtosecond, picosecond and nanosecond technologies. Maintaining excellence across all these domains requires sustained investment, but it is the foundation of our success.

Do you also develop high-intensity laser systems?

Yes, we have a dedicated team working on high-intensity laser technologies, primarily for large research centers using terawatt and petawatt-class systems. We have delivered several systems for the ELI facilities in Hungary and the Czech Republic, in collaboration with our partners, and we supply similar systems to customers worldwide.

So you collaborate regularly with other companies?

Absolutely. Collaboration is essential. We work closely with Lithuanian and international partners, depending on the project. In science, such cooperation is natural; you can only innovate effectively by combining complementary expertise. Sometimes we even collaborate with competitors if together we can create something new and meaningful.

Could you tell us more about Ekspla's structure and global reach?

Our headquarters are in Vilnius, where we have R&D, production and administration. As the company grows, we are looking for additional space to expand. Beyond Lithuania, we have subsidiaries in the United States, the United Kingdom and South Korea, which handle sales and customer support. We also rely on a network of more than twenty-five distributors who sell our lasers and provide local service and maintenance. A dedicated service team travels globally to support our customers.

From your perspective, what are Europe's strengths and weaknesses in developing photonics?

Europe is an excellent place for photonics, with strong traditions in Germany, France, the United Kingdom and, of course, Lithuania. The weakness lies in inconsistent governmental support. The European Union recognizes the importance of photonics but often acts too slowly, and funding levels remain far below those in the United States or China. Photonics is now a strategic technology, essential for quantum science and artificial intelligence. Chips, data transmission and even data processing increasingly rely on photonic components. Europe has the expertise, infrastructure and academic excellence to lead, but without stronger public support and faster decision-making, it risks becoming a user rather than a developer of next-generation technologies.

Where would you like to take Ekspla in the coming years?

I see tremendous potential in expanding the industrial use of ultrashort-pulse lasers. They are already indispensable for manufacturing next-generation semiconductor devices, and their importance will only grow. Each new chip generation requires more advanced photonic tools, and we intend to play a role in that evolution.

Beyond semiconductors, the consumer electronics and automotive industries will also continue to grow, driven by new technologies and global demographic changes. In parallel, we see promising developments in medical and life-science applications, particularly in photoacoustic imaging, which is now moving from the lab to clinical tools. I believe it is only a matter of time before such technologies become widely accessible in hospitals.

Finally, we will keep working closely with academic partners. Collaboration with universities and research institutes keeps us at the forefront of laser science, helps us understand technological limits, and guides us in developing new products that will serve both research and industry in the years ahead. ●