

GABRIEL PANKOW

Lasers in Lithuania – why being small is an advantage

Gediminas Ra□iukaitis is President of the Lithuanian Laser Association. He explains how his small country has developed such a strong laser industry.

Herr Ra□iukaitis , are people surprised when you tell them about the laser industry in Lithuania?

Ra□iukaitis: Yes, all the time.

Why is that?

Ra□iukaitis: We're a small country with fewer than three million inhabitants. a former Soviet republic that has only been in the European Union for some 20 years. We're used to people underestimating us. But we have had laser technology since 1966 – longer than most other countries in the world.

How did the early involvement come about?

Ra□iukaitis: The Lithuanian laser industry can essentially be traced back to three students. They left for Moscow in 1962 to study quantum electronics, which involved the emerging field of laser technology. In 1966, they helped fired Lithuania's first laser and subsequently established the Laser Research Centre at Vilnius University and the Centre for Physical Sciences and Technology, where I am currently the head of the Department of Laser Technologies. Anyone in Lithuania who is involved in lasers has some sort of connection to at least one of these bodies, and usually to both of them. They are just 20 kilometers apart. Commercial lasers for science have been built in Lithuania since 1983.

What's the situation in Lithuania's laser industry today?

Ra□iukaitis: We have more than 50 companies that manufacture lasers or optical components for lasers. They employ around 1,400 people and generate revenues in the region of 176 million euros.

That's not a lot.

Ra□iukaitis: No, it isn't. But if you own a cell phone, it's pretty likely to contain a part that was made by an ultrashort pulse laser in Lithuania. For certain high-tech systems, our small country can hold its own with the USA, China or Germany.

What do the companies make?

Ra□iukaitis: We are traditionally strong at making scientific lasers. We are working on some of the most intense lasers in the

world as part of Extreme Light Infrastructure (ELI), a European research initiative. Around 15 years ago, the first Lithuanian companies began producing lasers and optical components designed specifically for industrial use. Our gateway into the industry back then was the commercialization of the ultrashort pulse laser – an area where we've played a strong role from the very beginning. We now have a broad spectrum of manufacturers producing lasers and laser-processing machines, or optical components such as coated lenses, or optical parametric oscillators (OPOs). They are used to convert and amplify laser light, and 90% of all OPOs sold worldwide are made in Lithuania. There are also a number of contract manufacturers operating here – companies with laser machinery who provide high-end laser-processing services such as glass cutting. Several companies are currently branching out into medical technology.



"If you own a cell phone, it's pretty likely to contain a few parts that were made by a USP laser in Lithuania." Gediminas Ra iukaitis, President of the Lithuanian Laser Association, heads the Department of Laser Technologies at the Center for Physical Sciences and Technology in Vilnius. His research interests include the laser-induced generation of high-energy electron beams and selective metallization by laser for electronics applications. He is also president of the Lithuanian Laser Association and has been involved in the development and growth of the country's export-led laser industry from the very beginning.

What is Lithuania's flagship product in the laser industry?

Ra iukaitis: If I had to choose one, then I'd say OPCPA. It is an amplifier for ultrashort laser pulses. Lithuanian companies have enjoyed great success in this field for a long time. In general, we're competing on a level footing with the rest of the world when it comes to ultrashort pulse lasers and parts. I'm delighted about this because they are all cutting-edge technologies that will enable us to build lasers of ever-greater intensity.

Who buys your products?

Ra iukaitis: We sell to foreign markets. There aren't many Lithuanian companies that use laser technology in their manufacturing. Sadly, this is a real disadvantage compared to a country like Germany, for example, where it is much easier to chat to users and find out what they need. You can meet up with them and even take a look around their factories. We are looking at ways of getting more feedback from end users. They don't come to us, so we need to reach out to them. The Lithuanian Laser Association is currently organizing a visit to companies in Korea and Taiwan.

What's the secret behind Lithuania's success in the laser industry?

Ra iukaitis: That sometimes it pays to be small. It means we all know each other personally. Most companies are spin-offs from the major institutes, and most of the company founders and workforce are the same age as the people from the other companies and institutes as they all studied together. It's very common to move back and forth between academia and industry. As a result, research and development at the institutes are strongly aligned with companies' real-world requirements. In the laser industry, we all trust each other – even between companies. We may be market rivals, but companies tend to work together rather than against one another. I'd say that's pretty unique in the photonics world.

How does Lithuania itself benefit from this unprecedented success in the photonics industry?

Ra iukaitis: First of all, it benefits us in ways you might expect – it gives us a strong economy and global prestige. But it also provides something even more important – a home for my fellow Lithuanians.

In what way?

Ra iukaitis: In Lithuania, people often look abroad when it comes to choosing a career. Ideally, you study at Oxford – no matter the subject, no matter how successful – and then go on to work in Sweden or in Germany. That really suits some people. But it means leaving your homeland, which makes many people very unhappy. Now that Lithuania has a flourishing laser industry, young people can imagine having a bright future back home, complete with an exciting and well-paid job. That's the best way of stopping the brain drain. It's something I see year after year – the desire to stay at home in Lithuania.

Where do you see it?

Ra iukaitis: Each year, 40 out of 50 of the new cohort of physics students at Vilnius University opt for laser physics or laser technology. It is quieter in the corridors of the other physics departments because they don't have any ties with industry. Of course, even setting that aside, laser technology is still a great field with excellent prospects. And young people recognize that.

What does the future hold for Lithuanian laser technology?

Ra□iukaitis: Between 2009 and 2021, our photonics industry grew by 16% year on year. That's rapid growth, and I see it continuing in the same vein. This will involve tapping into more markets, so that there is an outlet for this growth. That is our mission at the Laser Association. In terms of new applications, I see good opportunities in the fields of optical and quantum optical communication. I'm actually already seeing the first evidence of commercial activities in this direction. And there is more to come. Very soon.

Do you have any advice for other countries?

Ra□iukaitis: If you don't use lasers in science and industry, then everything grinds to a halt. Everything goes dark.



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