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Liftero's space dreams are coming true. The revolutionary achievement of the Kraków-based start-up is already in outer space

The first Polish satellite propulsion system is already in space. The RED5 satellite developed by a Kraków-based company called Liftero was put in Earth's orbit on March 15th by SpaceX as part of the Transporter-13 mission. The purpose of the mission is to demonstrate an innovative propulsion system for satellites. If Booster, which was developed by Tomasz Palacz and Przemysław Drózdź, works well, their company, Liftero, will get some space wind in their sails.

tekst Marek Długopolski

In 2022, Tomasz Palacz and Przemysław Drózdź, the founders of Liftero, found themselves on Forbes' 30 Under 30 List. A year later, they were included in the group of people expected to change the future called Jutronauci and their start-up was named one of the 20 start-ups from Central and Eastern Europe worth paying attention to.

– Where did you get the idea to make money in outer space?

– We had always been looking into the sky, into space—like almost everyone. However, the impulse to focus on it in a serious way came when I was

studying at the AGH University of Science and Technology. It was there that I met Tomasz, my current business partner. I studied mechatronics in Polish, he studied it in English. We were also deeply involved in the activities of AGH Space Systems, a student team dealing with the development of space technologies—naturally, at the level available to students.

– The passion was born there?

– At AGH Space Systems, we built suborbital rockets and Mars rovers, sent balloons into the stratosphere... A lot of things were happening there. We took those devices to competitions, mainly international ones. Our ingenuity, passion, enthusiasm, and knowledge—already fairly extensive—translated to notable successes, including during the Spaceport America Cup or the Rover Challenge.

– Did this open your eyes to another world?

– During those competitions, we noticed that in Western Europe and in the United States, a new branch of the industry was starting to develop. Today, we call it New Space. In Poland, that trend was not noticeable back then. It was only in 2012, when Poland joined the European Space Agency (ESA), that the first companies operating in the space sector started to pop up. Seeing this potential and having some experience in the sector as well as a few fresh ideas, we decided to take a risk and founded Progresja Space in 2019.

– What did you deal with back then?

– Those were mainly services. We started to participate in the tenders organized by the ESA. This allowed us to gain experience in a completely new sector. In 2022, we decided to move a few notches up, transforming from a service company to a product company. These dreams materialized in 2023, when Liftero was born.

– Wasn't it a bit of a crazy venture?

– Looking back, young age combined with lots of enthusiasm and ambition were our assets. Another strength was having no idea of what we were up against and what obstacles we would have to overcome on the way. Luckily, we had the support of Progresja SA, which allowed us to apply for grants from the European Space Agency.

– Your first win?

– The first tender that we won was related to space propulsion systems. This allowed us to present ourselves on this market. At that time, we also got two grants, both related to the same area: development of space propulsion systems. On the basis of the technology we developed thanks to those grants, we started to think about our own satellite propulsion system.

– That sounds like another case of biting off more than you could chew.

– At that point in time, we weren't fully aware of it. Maybe it was because the New Space trend was getting born. Private companies started to get involved in space exploration, which previously had been a domain of national space agencies. This was a result of a higher availability of many technologies, the miniaturization of equipment, the development of IT systems, and lower costs of launching devices to the orbit.

– But it would seem that building propulsion systems for satellites is within the reach of only the most powerful organizations, such as NASA or ESA?

– It turns out that a fresh glance helps... Let me just say that as students at the AGH, we built one of the first Polish liquid fuel propulsion systems. So we did have some background.

– So, what exactly is your Booster?

– It's a green chemical propulsion system for satellites. It not only increases precision, but also the speed of maneuvering in outer space. Booster is many times faster than traditional electrical systems. Innovative use of low-cost fuels also makes it very cost-efficient from the point of view of potential clients.

– Is this how the green revolution has reached outer space?

– Yes, but not in the sense in which with we understand it here on Earth. In space, it is more about not using highly toxic fuels, about replacing hydrazine with non-toxic fuels.

– Why?

– Because it means a gigantic decrease in the costs of space missions. If you use toxic fuels, such as hydrazine, the process of fueling up a satellite costs a minimum of one million dollars. When green, i.e., non-toxic fuels are available, you can fuel up the satellite for less than a hundred thousand dollars, perhaps even below twenty thousand. So the savings are enormous.

– Is this a result of Elon Musk's SpaceX entering the game?

– You could say that. SpaceX has introduced a rule where in SmallSat Rideshare missions, which bring small satellites to the orbit, the engines must be powered by non-toxic fuels. This opened a gate for companies such as Liftero.

– How many companies took advantage of the opportunity?

– Not many, and only five have at their disposal ready and reliable solutions. This means that we are one of very few companies in the world that develop this kind of propulsion systems, and we can count our competitors on the fingers of one hand.

– In what aspects are you ahead of them?

– Technology, ingenuity, and the manufacturing time of propulsion systems for clients.

– But most satellites are electrically powered?

– That's true. These propulsion systems offer high performance, but very small thrust. This means that they orbit very slowly. An electrical propul-

sion system also draws a lot of energy, so when it is engaged, no other instruments of the satellite can work—for instance, you cannot use the telescope or data processing units... As a result, an electrical propulsion system makes a satellite inoperable.

– Why then is it used?

– Because of costs. An electrical propulsion system means that you don't have to carry so much fuel on board, which in turn lowers the costs of launching the satellite. But for a few years now, ever since the fees for bringing satellites to the orbit went down, this is less important. It's one of the effects of the revolution initiated by SpaceX. It seems that the fees will continue to decrease since more companies have entered the space race.

– Coming back to chemical propulsion systems...

– Considering the expected lowering of costs of bringing satellites to the orbit, clients will be more inclined to choose chemical propulsion systems.

– Why are you so sure about it?

– Satellites powered in this way can move more quickly and reliably through the orbits defined for them. Every maneuver—locking on an orbit and sticking to the course, changing the orbit, and leaving the orbit—will be possible to execute much faster than in the case of an electrical propulsion system.

– How important is that?

– Hugely. Currently, even a fairly simple maneuver requires several months to complete. So, for half a year, the satellite—assuming it's a commercial one—is not making money because it's not supplying data. Assuming that the life of a satellite is about four years, and it is not functioning for half a year, then we have a problem and gigantic losses affecting the rate of return.

– I understand that the drawbacks of an electrical propulsion system can be removed by using engines powered with chemical fuel?

– A satellite running on green chemical fuel can execute every maneuver more quickly and reliably. It takes several days, not months. Our Booster is equipped with a 1 N propulsion system, which means that its thrust is several dozen or even several hundred times more powerful than in the case of an electrical propulsion system. This is one of the advantages we have over our competitors. The strengths of our propulsion system incre-

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– **What is the secret of your success?**
– It's the design process. Our propulsion systems are modular. This means they can be put together like Lego bricks. Configuring the given propulsion system in line with the client's order is not a problem.

– **When will Booster be tested in space?**
– The RED5 mission started in March. SpaceX Transporter 13, carrying out satellite on board, was brought to the orbit by a Falcon 9 rocket.

– **How did you hook up with SpaceX?**
– As a client. We spent our own funds on a demo mission.

– **To sell something into space, it first has to be tested in space?**
– That's how it works in this industry. Our partner in the United Kingdom has built a satellite platform the size of a microwave. Booster was attached to it. The entire thing, assembled in a facility in the UK, was transported to the USA. In Florida, our team filled the satellite with green non-toxic fuel and then it was moved to the Vandenberg base in California. There, together with other small satellites, it waited to be launched to the orbit as part of the SpaceX Transporter 13 mission.

– **Are you superstitious?**
– No.

– **So you like number 13?**
– I do, and I hope that SpaceX Transporter 13 mission will be lucky.

– **When will your satellite detach from Transporter 13?**
– For about a month, we will be slowly starting it up with our partner from the UK. We want to carefully check and test all of the satellite's devices and systems. When we are 100% sure that everything works as it should, we will start testing Booster.

– **Will this mean a change of its location on the orbit?**
– Yes, we will be launching different work protocols. We have fuel for about 2,000 seconds of work.

– **This does not seem like a lot.**

– For us, it is quite a lot, considering 1 N of thrust. The satellite is relatively small, so we have extensive testing capabilities.

– **What scenarios do you have?**
– There are several of them.

– **Which is the worst one?**
– That we are unable to establish communication with the satellite. In such a case, there will unfortunately be no way to start the propulsion system.

– **And if Booster does start?**
– Various things could happen. We hope that we have a scenario prepared for every situation. This is the only way to know if our propulsion system works and how it functions in outer space. We will understand the scale of our success or potential failure. However, for us, it is already a huge success that we have gone through the entire process and placed Booster in a rocket and in space.

– **What will happen with your satellite once the tests are over?**
– It will be removed from the orbit, burning in Earth's atmosphere. During this event, we will be using our propulsion system in order to slow down the satellite. This way, it will deorbit and end its life in Earth's atmosphere.

– **And if the mission is a success?**
– Then it will be the time to do business. We have been negotiating with clients for some time now. One of them has decided to risk and started cooperation with us even before the orbit test of Booster. But most of them are waiting for the results of the mission, when it's confirmed that the propulsion system does work in space.

– **How many propulsion systems are you planning to manufacture?**
– The plan is to achieve an output of 20 systems per year within about 15 months of the demonstration. However, this will mean the need to expand our facilities and hire more people.

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the ESA. Today, Poland has quite a few companies manufacturing space stuff.

– **Are we capable of building our own satellite?**
– I think that we do have the potential. This is a result of public and private investment in Polish satellite systems. Hence the increasing interest in Poland from the biggest players on the space market.

– **Will the Małopolska Region be able to participate in this space race?**
– We are already a part of it. Liftero builds propulsion systems for satellites, several other companies provide services. There are also new initiatives going on; we should hear about them soon. The authorities, but also the academic personnel and the students of the AGH University of Science and Technology, where the Professor Tadeusz Uhl Space Technologies Center is located, are looking into outer space more and more boldly. For reference, when I was a student at the AGH, there was one students research club focusing on outer space; today, there are six. The European Rover Challenge has been moved to Kraków.

– **And the Małopolska Region Council for the Space Sector has been established.**
– Which is good news and an excellent stimulus for the development of the space sector in the region. The fact that the Office of the Marshal of the Małopolskie Province is involved means that local governments are also starting to think about this sector of the economy. Naturally, we are hoping that this will result in some funds being pumped into the development of the sector. It would be a pity if this enormous potential went to waste.

Liftero offer several versions of the propulsion system, with a nominal thrust of between 1 N and 20 N

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