

Closer to Space with Mobility

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Deeshraf Elias:

Unlike other industries that are largely driven by the public sector, the space tech industry is increasingly fronted by private entities. On top of the regional collaborations, the funding by these private entities have accelerated space tech advancements in cities like Singapore.

One example is the development of nanosatellites where information such as geospatial data and imageries can be retrieved efficiently at low costs, allowing for ecosystem players to better facilitate mobility through space. Today, we discuss space technology and its role in elevating mobility on Earth.

Hi everyone, happy new year and welcome to the second season of our Future of Mobility series, bringing you the top voices from the sector – decision makers, innovators and shapers pushing the envelope on future ideas for transportation and beyond. I'm your host, Deeshraf and today, we're joined by Nikolai Khlystov, Lead, Shaping the Future of Mobility

and Space at the World Economic Forum, and Lynette Tan, Chief Executive at Singapore Space and Technology Limited. Nikolai, Lynette, welcome to the show!

Nikolai Khlystov:

Great to be here.

Lynette Tan:

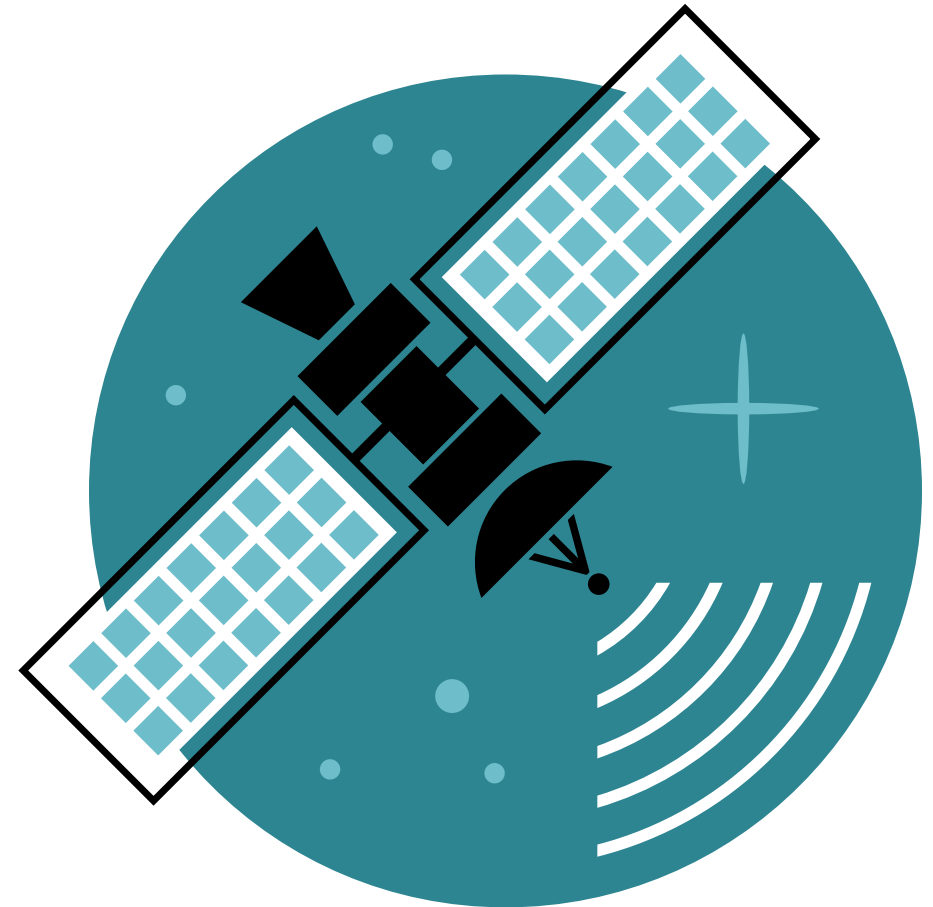
Hi.

Deeshraf Elias:

Nikolai, I'd like to start off with you. As the Lead Shaping the Future of Mobility and Space at the World Economic Forum, what is your organisation's vision for the global space tech as well as your role in it?

Nikolai Khlystov:

Yes, of course, thanks Deeshraf and I'm delighted to be here. Well, the World Economic Forum is a neutral platform. We look at some of the biggest global challenges that really require collaboration of different stakeholders. To address some of these biggest global



challenges, you need all these stakeholders working together. Now, technology is supposed to improve our lives, right? I think most would agree with that. We at the forum, are not working on developing perhaps the actual technologies, but rather more broadly thinking through the rules, frameworks, of how this technology could be integrated in the best possible way for us all, for humanity and also how to apply it in the best way. So, for space technology specifically, I would say it could be a question of promoting the benefits that come from connectivity. For example, satellite connectivity, or global positioning or observation. Also, maybe it could be a question of creating tools to promote sustainability in orbit and beyond, because we need to protect those orbits. Maybe (even) helping the sector move forward on (the) difficult question that it's facing, through forward thinking action and progressive steps. So when talking about sustainability, when you're talking about the rules of the road, working through scenarios, toolkits, guidelines, that would be what we really (need to) focus on and try to address.

Deeshraf Elias:

And moving to you, (Lynette), the Singapore Space and Technology Limited, also known as SSTL, serves as an advocate and thought leader in the industry, with a focus on developing space tech capabilities within the Southeast Asia region. So, as the Chief Executive at SSTL, what are some initiatives that have been introduced for regional stakeholders in the space industry, to convene and drive the development of space tech?

Lynette Tan:

Well, we don't run the World Economic Forum or events of that scale. There are good established platforms for that. But we do

organise Asia's largest English-speaking space tech conference out of Singapore, a country within Southeast Asia and interestingly does not yet have a space agency. But again, with similar principles, as what Nikolai has expressed, it's a neutral platform, for thought leaders, technology leaders to come to talk about the ideas, the regulations, the adoption. We try to also stimulate a frontier knowledge sharing at the global space and technology convention. Talking about events in 2020 and 2021, you know, this goes down in history. These are COVID years, right? It's very interesting, but we're going to push on like the World Economic Forum. We will be having our conference this year, and we want to keep that momentum for the dialogue and conversations to continue. In Asia Pacific, there is also the Asia-Pacific Regional Space Agency Forum hosted by Japan Aerospace Exploration Agency (JAXA) (which is) an annual regional meeting with the government stakeholders. They talk about disaster management and environmental protection. So in this part of the world geographically, well now with zoom, we (are able to) open up all time zones, these are

some key platforms for people to convene now virtually and drive the development, adoption and good practices of these technologies.

Deeshraf Elias:

That's great Lynette. And now before we jump and deep dive into the discussion around space technology, for our listeners who are not familiar, how are space technology built different from typical technologies that we see today, and can you walk us through what makes up space tech? Nikolai, maybe we'll start off with you on that.

Nikolai Khlystov:

Well, I'll do my best. I'm not an engineer, so really not an expert on the actual hands-on (side) of technologies. But what I can say probably is that space tech has an interesting relationship between space technology and terrestrial technology. I mean, (they're) build on Earth, right? It's all designed by people on earth. But space tech has benefited tremendously from other sectors on earth over the past decades, especially when you think about all the investment that went

into the space programs. (Maybe not) the 50s, but certainly the 60s, 70s and 80s. You need design materials, sensors, solar panels, different types of chemicals and compounds, and now the elements that have to survive in extremely cold environments, for useful purposes, in a vacuum. So the pressure issues, they have to be exposed to high Geographic Information System (GIS). Alright, so particularly during launch, that's really when the highest GIS are there. So you have to really think of that. And also the fact that you need to design things as light as possible, because the launch costs have traditionally been very high, they're coming down now, but also strong and compact for reasons again, of launch. But also specific problems the other way around, needed to be sold for human spaceflight, for example. So these solutions then became extremely valuable on Earth, for example, different medical applications, different materials, water purification, etc. Now, more recently, space tech has in turn benefited from the soundest technologies that were developed and improved, perhaps there, but were really pushed forward in the terrestrial sector, particularly in the consumer and technology sectors, in the end of 90s, and early 2000s. So really miniaturisation of tech has played a huge role in the recent boom of private enterprise, making satellites smaller, which then makes them cheaper to launch.

Deeshraf Elias:

And Lynette, what about you?

Lynette Tan:

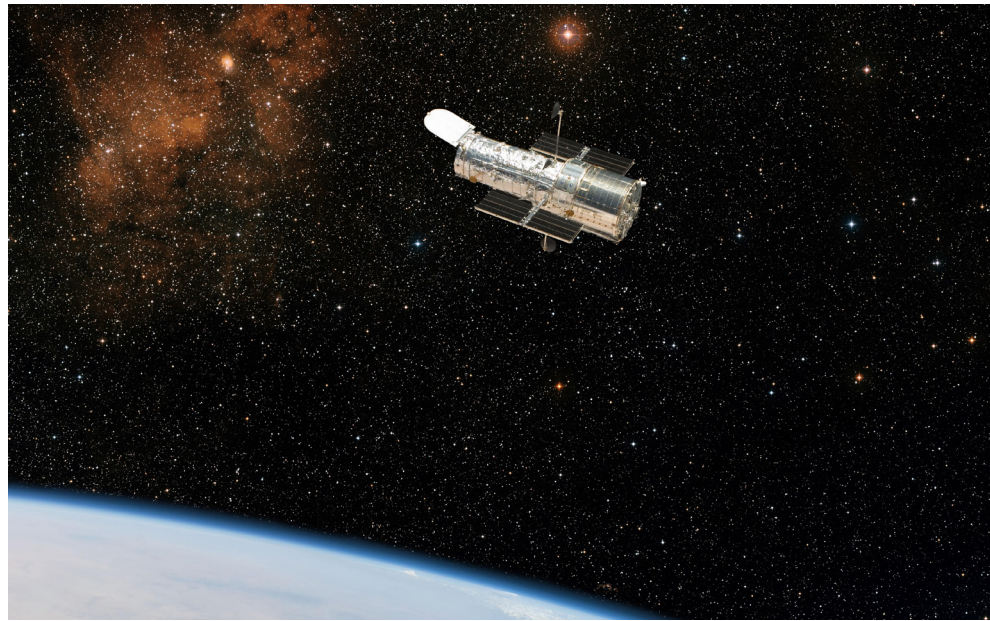
I was trained as a chemical engineer, not spacecraft or space engineering, I think this is a really good question, because many times people talk about space tech, and they think of rockets. So rocket is one part of the space technology similar to vehicles, you



have the car, but then you have the engine, and then you have the services that the car provides. You also have the tires, and you have the things inside the car, such as cargo. In a way there are underlying fundamental technologies, (and) what (else) makes up space tech is astronautics. Let's go very far out, what we sent out deep into space to understand the universe. And then let's go a bit closer, what we send into space, into the International Space Station, provide services back onto Earth, so they can be satellites, providing us with communications. There are software and other developments within the satellites and spacecraft that we also understand on Earth, such as in situ processing, or artificial intelligence, then certainly, there's a whole field of material science for the reasons that Nikolai has stated in that you're operating in some of these out of the world mission in a very dangerous environment. You have solar flares; you're not protected from the radiation. You have extreme temperature cycles. So material science becomes very important. Earth is super benign, (it is) very comfortable, but when you shoot the rocket and the spacecraft out into this protective environment, it needs to be able to withstand that. And then there's a whole complexity with zero gravity. That's when space tech starts to be super cool and awesome, and also very challenging. Even then you will see new technologies coming in, how there's quantum or there's cybersecurity, there's big data analytics. These are all technologies that are also used in the space industry, but in a different way.

Deeshraf Elias:

And expanding on the developments in space tech, Singapore, for instance, has launched 13 small satellites since 2011, and aims to become a leading space tech hub in Southeast Asia. So Lynette, I wanted to ask you, what are



some motivations behind the establishment of a task force to develop space technology in Singapore?

Lynette Tan:

There are various organisations and entities looking into various aspects, and where SSTL gets very involved in, is in innovation and talent development, and that's exactly what you have mentioned. So we want people to consider Singapore as a place where they could test out and incubate their ideas, because space also touches certain sensitivity, in terms of access to the air and to space. So having an entity that tends to be good neighbours is also important. SSTL also organises this space accelerator program where we welcome any start-ups to come and join us. It's really interesting now, because of COVID, we have people from all over the world, to really look into how to develop Singapore as a hub to spark off global solutions to solve problems using space technologies. Now,

we're very realistic, because it can't just be about space technology, you need to augment it with very good earth technologies to make it sustainable and commercially viable. So we're scoping out certain of these objectives, but various task force has various agenda. One of them is likely on regulations, when you launch something into space, it's like a wild, wild west, no one really owns it, you don't have police patrolling, and no one's going to catch you in a way. It's not easy to do that. So that kind of regulation, (the) task force is going to have a very important job. So then there will be innovation, how do you progress and promote innovation out of a small country like Singapore, and I think where we also get very active with the various stakeholders is in talent development, really enabling and emboldening people to reach for the stars, and to ensure that there are sustainable jobs for them, you know, whether in Singapore or in various parts of the world.

Deeshraf Elias:

And Nikolai, coming back to some of your points you mentioned earlier, we understand that there are currently 16 public and private space agencies across the world. So with that said, in your opinion, what type of regulations can be introduced to ensure more successful implementations of space tech?

Nikolai Khlystov:

Well Deeshraf, that's probably one of the trickiest questions. Personally, I think it's not really a question of technology for the space sector. Really, the big question is, how do we actually get all the different countries aligned about some of the rules of the road. How do we do this? How do we successfully go permanently beyond the Earth orbits or, frankly, beyond the lower Earth orbit, which is where the International Space Station is. It's very close to us, flying at 400 kilometres, and people have been there for the last 20 years, how do we permanently go beyond that? Whether it's moon, or beyond, you need rules. We need rules. Now, the number of space agencies is growing. It's still relatively low and hopefully, Singapore will join that number soon. There are many more countries that are part of the UN Committee on Peaceful Uses of Outer Space and that number is also expanding. So a lot of countries actually are looking to be part of this conversation, even if they cannot necessarily launch themselves, but maybe they build a satellite, then they want to have ability to harness some of the data or even use other folks' hardware. They want to be part of this conversation. Absolutely correctly so. But again, the question on rules, we do need to think about rules. For example, for managing space debris, that's probably one of the biggest pressing issues right now we have in orbits. So the debris that's been left there, from the very

beginning – old rocket bodies, old satellites, things that debris as in really debris, after collisions that have happened, this is really a big threat for the whole sector. And there's a lot of thinking going on, about how to try to remove that. There are several companies that are now thinking actively of designing machines to demonstrate removal and build a commercial proposition out of that. There are some rules that exist, but we need to probably tighten them, really for the benefit of all. The other element linked to that is probably space traffic management, as I'm sure many of your listeners would know, there are many constellations now in planning to provide global connectivity, and now becomes a national element as well, certain countries want to have their own constellation. They don't want to rely on an American connectivity only. Now, thousands of satellites in orbit, it's not going to work over the foreseeable future. It's just each system maybe can manage itself autonomously and avoid collisions. But if you start having multiple large systems, in orbits, which are maybe close to each other, on top of all the things that are already there, that becomes very tricky. And you really need to think you need a global traffic management system, which currently doesn't exist.

Deeshraf Elias:

Lynette, do you have anything else to add?

Lynette Tan:

You know, I think those are really, really good points. And coming from the innovation and engineering side is really a necessary balance. On one hand, you want innovation, creativity, people to try out. The reason why these rules didn't exist, it was because these problems or challenges and opportunities that comes with its challenges are brought about because of innovation. Innovation created a new

paradigm for the industry that then require new rules, but with new development and opportunities because they were playing in a wild wild west field, that created another step that was beneficial and that, like how Nikolai pointed out, they can be potentially very dangerous. So (having) that balance is difficult. And then when you start to have the necessary rules as is sometimes required, you inevitably stifle certain types of innovation. So I want to be just upfront with the whole, having a circumspective approach towards this. But I feel what is tremendously important is in a soft governance, that every individual, every space actor needs to learn to be responsible, there is an acceptable realm that we operate in, this is not rocket science. I think every individual, regardless of whether there's a hard and fast rule, there's a tick at the end of it, we need to practice that kind of soft governance mechanisms that should be in every actor's DNA. Until there are established rules, and because of the nature of space, that can be very difficult, until there are established clear rules and regulations, when there are rogue activities, the reaction of the community is very important in sending the signal of how that's going to perpetuate or not.

Deeshraf Elias:

Thanks a lot Nikolai and Lynette. Now, I wanted to shift the conversation towards the real-life applications. We've talked about the use of space technology here on Earth. So for example, you mentioned solar panels earlier. But aside from that, we wanted to hear as well, what are the real-life applications of space tech that you have witnessed, and if possible, share with us some real-life applications of space technology that you have seen, benefit the Future of Mobility?

Lynette Tan:

Yeah, I think the very evident one is in global positioning, so using the navigation satellites to pinpoint location, which will affect Future of Mobility, if we move into an autonomous vehicle, you know, not getting the guy to read the map on the phone, or in my days, you flip the street directory. So now the machine is going to talk to something that's going to tell it where it is. That's that ubiquitous asset that tells the position, so that's important. And sensor technologies to recognise, they're not necessarily space technologies but in space missions, you do need very precise docking, that kind of precision levels, that's base level precision, that could have potential spin off, but for sure, autonomous control, because space is all about remote, right? Yeah, it's not about human being there. It's all about remote, (from) remote control (to) remote computing. And that in the Future of Mobility is, a lot of times, people are out of driver's seat in most vehicles. So that kind of remote understanding systems, applications will be seen very prevalent in the Future of Mobility. I'm going to leave some for Nikolai.

Nikolai Khlystov:

Yeah, I mean, coming back to an earlier point that was mentioned, (it) was a wonderful answer to describe the space technology. This is a bit of a cliché, maybe statistic, but for every dollar you invest in the space sector, you know, you get approximately \$4 back. Maybe that changes now a little bit. But the point is that it's actually difficult to calculate all the value that we get, right? Because there's so many spin offs, there's so many applications, new applications and new types of cases that we get back from investment in space tech, rather, whether it's a Mars, lander (or) rover to the new types of satellites. Of course for sounds (and) applications, then maybe not purposefully made to benefit Earth, again is line-able dimensioning. But there's a lot of stuff that we by accident, discover and say, oh, wow, this is actually pretty powerful. You know, this can solve some really interesting challenges back on Earth. Of course, as we continue developing, and growing the space sector, the possibilities are almost endless, right? You start thinking about all the technologies that you can mix and match. From robotics,



to 3D printing, to more and more powerful AI systems, to new kinds of materials. You start thinking, maybe the ideas of actually building something, building a big spaceship on orbit, almost autonomously – it doesn't sound that far-fetched and that impossible. Maybe it's not going to happen next year, but when you start thinking a little bit (into) one decade, two decades of the future (and) certainly to the middle of the century. (With) all these technologies, you really start accelerating and exponentially growing the things that you're doing in orbit, (or) in any space, and then thinking of all the applications back.

Deeshraf Elias:

Yeah, that's great. Thanks a lot, Nikolai and Lynette. Now, building on what both of you have shared, it seems that cross-sector collaborations is something that we're going to be seeing more off as we move forward with the future of space technology and the Future of Mobility itself, be it regional, or even global partnerships. I wanted to ask the both of you, how do you envision collaborations within the space ecosystem, helping to accelerate the benefits of space technology? And can you share some examples? So maybe Nikolai, from a global perspective, having worked in the World Economic Forum, what have you seen and how do you see this helping to enable the space technology ecosystem?

Nikolai Khlystov:

Yeah, excellent question. I think these are the really exciting questions. You know, we can all do our own things separately. But you know, what opportunities open up when you start really collaborating, right? And it's not just saying, well, this technology and this technology are working together, but it's actually adding the third and fourth technologies and coming up with creative



solutions. We've spoken already about some of these. So you know, elaborations are critical. But they're difficult. They're not so obvious. You have different cultures, you have different expectations, you have maybe slightly different incentives. So that's why it doesn't happen instantaneously. But that would be maybe my quick reaction to that question.

Deeshraf Elias:

And Lynette?

Lynette Tan:

Ironically, it was nice when Nikolai handed this question to me, I did think that the EU is practically one of the only (or) best case studies we have in the International Space Agency (ISA), (given) that Germany has its own space agency, France has its own space agency, the Italians have their own. And they come together to form the European Space Agency, which is that regional partnership established. So they have the most experience in these space tech partnerships. In Asia Pacific, there are big brothers who step up to do that, one of them being the Japanese, because they also have a module onboard the International Space Station. Again, that is a very global partnership. And so, what we do is to ride onto the partnerships and framework that they have established, look

into it to make sure that it makes sense. We don't find them very unfair; they are providing a lot of access to space for Southeast Asian companies, organisations and research institutions. They have been providing a lot of information and knowledge. I do feel that there are many different types of collaboration. There is the G-to-G kind, which is in a way that ISA model that we have, then there is the industry consortium business kind that we get more involved in. In that case, things are a little bit more straightforward, because the common objective is to create as much return on investment for every entity. So the metric to measure is more straightforward. There are research institutions that want certain research outcomes and guidelines. I find that they are extremely collaborative. We've seen so many Singapore payloads on the mission of another program from another country, and then going up together, because the research objectives are very clearly defined. So these are some of the examples of partnerships that we have seen in Asia Pacific and Southeast Asia.

Deeshraf Elias:

Now, I'd like to move the conversation forward. Besides collaboration, sustainable growth in space technology, it is important to ensure long term benefits to the Future of Mobility. As such, Nikolai, one of the many projects introduced by your organisation, is this space sustainability rating concept. Could you elaborate more on this, as well as share how advancements in space tech can encourage sustainability in space?

Nikolai Khlystov:

Thanks, Deeshraf. Well, the concept initially came out from quite a lot of work of the Global Future Council on Space. (It) took the group two years to sort of think through, not just

come up with a concept, but think through the different elements of it, engage different stakeholders, so the members of the council really worked hard. That's when the concept was born, the forum sort of said, we can help perhaps build it. But again, it's a complex idea. We actually went out to different stakeholders (and asked) who'd like to work with us on this. We don't necessarily have all the technical expertise of aerodynamics, and some of the distinctive technologies, which are critical here. We have a terrific collaboration for the last year and a half, almost two years now, with MIT's space enabled research group and the Media Labs with European Space Agency's debris office. Also with the University of Texas, as well as Bryce Space and Technology. Talking about collaboration, we have different types of stakeholder groups, but really working together because we all believe in this concept. And so, we're coming close to the launch of it, we're right now in the process of selecting an organisation, or perhaps, several organisations that work together to actually manage it, we are in the final stages of beta testing the rating. I'll say a few words on that (later). We hope it will be launched in the first half of this year. Now, the idea is relatively simple, right? We didn't create anything dramatically new. The concept has been, you know, we have it on Earth. The LEED certification for buildings for green technologies, the different efficiency ratings for your appliances, (and) other rating systems. So we basically are designing a concept that says if you're an operator or a launch provider, how can we incentivise you with a carrot approach to really mitigate and manage any potential deterioration your mission may have.

Deeshraf Elias:

Now, I don't want to put both of you on the spot. But given that both of you are experts in

your field, what will be your pitch to encourage more start-ups and innovators to join the space industry? And how exactly do they get started? Maybe we'll start off with you, Nikolai.

Nikolai Khlystov:

Well, I was hoping you wouldn't go to me first. That's a tough question. I'm sure Lynette will have a much better answer to this. I'm not a financial advisor and I certainly don't want to be responsible for anybody's investment decisions here. That's not our role at all. But that aside, I mean the space sector is an exciting place right now. The boom has been going on for the last 10 years, really, in private funding, maybe a few years more than that, whether it continues for the next 10 years? We certainly hope so. I think the sector is really bullish on that idea. But it's always risky. You cannot judge what's going to happen in the future, just because the last 10 years have been wonderful. It's one of the basic principles of investment. Perhaps I'm not presenting the most sort of joyous optimistic viewpoint on (the issue), maybe a little bit more balanced (view) here. But many start-ups, as in any other sector, don't survive. It's the minority that make it forward. I think there was an interesting sort of statistic. Probably a year and a half ago, there were something like over a hundred small launch start-ups, working on developing small launch vehicles around the world. I'm not sure how many of them now are still in operation (or) are still looking to do something, certainly less than that number. We think that there are a lot of opportunities within the space sector, certainly poised to grow and really benefit the rest of humanity. So, sky's the limit, as it says.

Deeshraf Elias:

And Lynette, what about you?

Lynette Tan:

Yeah, I think I'm in the same lane with Nikolai. Maybe that's because we know a little bit about the industry. So we're very realistic with what kind of advice (to give). To be fair, you had a few parts to your question, what would you do to encourage more start-up and innovators to join the space industry? I think that's the easy part, people are generally, naturally very excited about space technology, and how do they get started? So thankfully, I do have a solution, and that you should join our accelerator program, because we do have one. It has been very successful. In 12 months, we've helped the companies raise 5 million in terms of funds or contracts. That's because the international network we have with the people in the industry, and with people outside of the industry. So in our mentor program, I'm not selling, but you did ask me, how do they get started. We do tell them we have various profiles, but not from the space industry, in our mentor program. These are the people who know how to apply your technology into various businesses. That's very important and useful. That's why we've been fairly successful. I also do very nice prep talks with start-ups who join us in that. You know, start-up is hard, space tech is very hard. 99.9% fail, just to let you know. So our pitch is not really to encourage, because naturally space tech attracts the best, the brightest, and the most exciting people. Challenge is to put the feet on the ground, and say, "Sorry, you need to do this Excel sheet, because you need to submit it to the investor". "Sorry, the system doesn't work. We did the in-orbit testing, it didn't work." Or, in many cases, as many start-ups would have told you, your launch got delayed by six months, you're not going to get any money in the next six months, because you can't prove your concept. In cases that I have also witnessed, "I'm sorry, the rocket

blew up, satellites gone." It does happen. Two years of research, vaporised. We do want them to have a heart of steel, we do want them to have grit. But I think they go on to do very exciting things. I think if you're going to be in an awesome start-up, it's got to be space tech. But yeah, it can blow up.

Deeshraf Elias:

Now, I'd like to wrap up the discussion and ask the both of you something a bit more personal. Nikolai, maybe we'll start off with you first. Can you share with us a fun fact about space? And where do you see space tech five years from now?

Nikolai Khlystov:

That's a hard one because there's so many fun facts. Maybe there are two quick points here. One element that I was always amazed by when I started working in (the) space sector and then doing a little bit of research in history. You know, the grandfather of space exploration could be considered Tsiolkovsky, who was a Russian philosopher, scientist, mathematician. You name it, right? Who designed some of the early equations, I think he came up with the orbital velocity, so the speed you need to stay in orbit. But he came up with those over 100 years ago, literally at the turn of the 20th century. Just think about that. He was sitting somewhere where there was no electricity. He just had some kind of a pencil or charcoal; I don't know what he was writing his equations with. Then it took another 20, 30 years for (the) first engine to be started and first rocket to be conceived, right? For me, that was always quite astonishing. So thinking from those beginnings, 120, 130 years ago, to what we are now and where we are going to go. I think it's just interesting to put that in perspective. I think that the real fun fact isn't people's imaginations now, in a



lot we hear about, it is the idea of search for life. I mean, just in the solar system, there are multiple places where we could fight microbial life. We're not going to find aliens, Jupiter or Saturn's moons. But there are places or moons around Jupiter and Saturn that could hold and could have support life of basic microbes. Just think about that, that's in our own solar system, there is a chance. When you expand that and project that to trillions of stars that all have planets around them, it's really a fascinating thing to think about. One that sort of gives me a lot of positive energy. I mean, it sometimes could be a little bit scary, one might argue, to think of other intelligent civilisations living across the universe. But I think that's really an exciting fact, that drives a lot of this space technology. When you just think about satellites, well, it's just a satellite, right? But actually you need the satellites, units, rockets, to get us to know some of these answers and to push us beyond the Earth orbit.

Deeshraf Elias:

And Lynette, same question goes to you. Can you share with us a fun fact about space? And where do you see space tech five years from now?

Lynette Tan:

Yeah, give you a fun fact. Go to a bar, if you can, just make sure practise safe distancing.

Nikolai had a very good one. I'm just going to keep something light. But one of the first things I learned in this industry was, you know, in Singapore, we talk about the joke about how NASA spent a lot of money trying to develop a pencil to be used in space, and the Russians just used a pencil. So that's not true. I learned that the hard way, I'll tell you why. The carbon and the lead flakes, that's very hazardous in space. So using a pencil in space is dangerous, it's flammable. I knew that because we were trying to send a scientific experiment onboard the International Space Station and we just took an ink from our table, we wrote it and sent it. The receiving authority, said, no, no, you didn't use space grade ink. It is going to be flammable; space station will blow up. I was like, whoa. So there's a list of things you

can bring onto the space station and it's very strict. I like to talk about it again, space always sounds very exciting, very romantic. But when you come down to it, it actually is a very rigorous, and very down to earth type of industry. They don't take things for granted there. So anyway, if you're going to a bar at some point, you can tell that joke about the pencil. Everyone seems quite excited to hear that. But if they are from the space industry, they probably would know. And then where do you see space tech five years from now? I think people are looking forward to the Artemis mission. There's a lot of anticipation. I think the language of the moon, going to (the) Moon is going to be common again. I think there was a period of time, we didn't go back to the moon. Now we are, and I think young kids, the society

(and) community are just going to be so much more receptive, like oh yeah, I know someone who's going on a mission to the moon. I think that will be part of everyday life. It's actually very, very exciting to know that. I also wanted to talk about the mainstream of suborbital flight. I think and I hope, something we might be able to achieve, at least for cargo, maybe not for humans, because manned missions are always more stringent in requirements and rightfully so. But maybe in cargo and telemedicine and let's say you need an organ transplant, and they're always time critical. Every hour matters. Can we do something like that using suborbital flight? Save a human life? I think that's worth exploring, and I would be optimistic that it can happen.

Deeshraf Elias:

All right. Well, that's all the time we have today. I'd like to thank both our guests, Nikolai and Lynette for sharing valuable insights into space technology and how it impacts mobility on Earth. In the meantime, if you want to comment on this podcast or the topics covered, you can send us an email at seapodcast@deloitte.com. That's spelled S-E-A podcast @ deloitte.com. Also, don't forget to subscribe to our podcasts to get the latest episodes – we are available on Apple Podcast, Google Podcast, Spotify, SoundCloud and Stitcher. I am Deeshraf and until next time.



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