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So, welcome to Arc's four-year innovation podcast. Today, we've got great guests from Axiom Space and I'm very honored to be in both of your presence. We have Michael Lopez-Elegria, a five-time astronaut, and we have Amir Blockman, who's the chief investment officer for Axiom Space. And both of you are shaping the future of space, but before we dive in, I want to be sure to shout out your backgrounds here because they're both so impressive. So, Michael, you've been a five-time astronaut here. You've been on pretty much all of the spacecraft that are interesting, so we're going to have to get your review on which one is most comfortable. You've also set some records here for most extra vehicular activities. So, space walks, you know, you've spent 67 hours out in space itself, 275 days in space, and you're in the astronaut hall of fame, so that's pretty impressive. Michael, did I miss anything there that our listeners should know about? You definitely got the high point, Sam. Nice. And Amir, you're an Israeli Air Force instructor. You served as one. And your Axiom Space's first employee helped raise over $500 million for Axiom Space. You've co-authored reports and proposals that are helping NASA shape its strategy on the future of space stations. What else should we know about you?
I appreciate that. I think those are some of the more important points. I have had some relevant experience in running what, at the time, was the world's largest space investment syndicate, so I hope that that's some value that I've been able to bring to the table at Axiom.
Amazing. Very honored to have both of you here. So much insights that we can learn from you. And before we go down the rabbit hole, maybe just the basics here, Michael, what is the International Space Station? Why is it so important to us? And why is it important to have next-generation space station? Well, I don't know how much time we have, but I'll try to cover it. The International Space Station is really the first of its kind cooperation between five agencies, the most important in the world, I would say. So, obviously, NASA, the Europeans, the Canadians, the Japanese, and the Russians. It is a multi-module vehicle that is in low Earth orbit as we speak. The first module was launched in 1998, and it largely was finished construction in 2011, although there have been some modules added to it recently. It has currently seven people aboard. It has been permanently inhabited since 2000. Astronauts from 19 countries have visited it. They've done over 3,000 experiments. It's a giant structure, big as a football field, weighs about 450 tons, has 1,000 cubic meters of interior volume, and it's really a platform for doing cutting-edge science. So, first and foremost, it's a laboratory, but it's also a platform from which the astronauts can make outreach events with audiences around the world. It is obviously a symbol of diplomacy when you think about the current geopolitical situation. We work hand-in-hand with our Russian colleagues every day, both on board and more

in greater numbers on the ground. So, it's an amazing piece. It's the U.S. conduit to get experiments to the ISS. It's called the ISS National Lab. It's a non-profit run by NASA or funded by NASA, and it is the first entity to start bringing commercial work to the ISS, but suffice it to say that the discoveries that are going on there continue to improve life on Earth and off it. However, it is a machine, and as such, it will someday wear out, and we are very keen to not have it wear out before we have a replacement on board, because the agencies that I mentioned want to continue doing the important work that's going on there, and we want to have a platform that can transition that work from the ISS to itself seamlessly. And so Axiom's role in this and really goal as a company is to build the world's first commercial space station. We plan to do it by launching modules that will attach to it. We can get into that a little bit more later, but suffice it to say that it is important that we not have a gap in the permanent presence that is going on in low Earth orbit today, and we are very keen to enable, facilitate that transition. That's amazing. And if I'm correct, you were on the space shuttle mission in 1995, and you've been up as recently as the past year. What's changed? What's evolved? You know, for most of us, we've never been up there. Have things changed in the past two and a half decades? Well, in 1995, there was no space station, so that mission was a microgravity research mission, kind of a precursor to the work that's being done in ISS, but it was done completely self-contained within the shuttle, and it's payload being in a European-built module. But the second mission I flew, which was in 2000, was the third mission, the third of the assembly missions to the ISS. Nobody was living on board yet, but we've brought some important elements to it. And when we left in late November of 2000, we closed the hatch on the uninhabited space station for the last time. So a few days later, literally, the first crew showed up, and it has been permanently inhabited ever since. I spent the most time in 2006-2007, where I commanded Expedition 14. It turned out to be seven months. It was a three-person crew back then. And I will tell you that the duration then and last April, when I went as commander of AX-1, the first fully private commercial mission to the ISS, it was very, very different. I mean, physically, it had more than doubled in size. The crew had gone from three to seven. It's just loaded with stuff, cables, and computers, and fluid lines, and experiments. I mean, it's really a busy place. So back then, you know, 15, 16 years ago, we were still very much in the assembly phase, but now it's full-on utilization. But I like to say it's kind of like, you know, when you go back to the home that you grew up in, that your parents may have remodeled a few times, but it had a very familiar feel and dare I say, smell to it. It felt very comfortable, very familiar to me, even though the appearance had changed so drastically. And like going home to the childhood home, did you see the markings where you're measuring your height? Did you, you know, graffiti anything before people were on there? So every time you go back, you say, yep, I was here. I was here before people were living up here. Well, every crew that visits leaves their patch, they're insignia stickered to the wall somewhere, so I definitely checked out those other ones. That's amazing. One of the other things that I think goes under appreciated talking about space is it's amazing. It's a huge structure in space, but it's out of sight, out of mind. Same thing. People just appreciate that they can use GPS and all of these other functionalities that are space enabled, but they don't necessarily connect the dots because it's in outer space. So with all of the experiments going on in the International Space Station, what are some of the things that have come from that that have benefited humanity that are, you know, these tangible things where people don't even

appreciate that that's where it started? There are quite a few, I would point to a couple in particular, most of them have to do with human health. And, you know, we study that on board for two reasons. One kind of selfishly is we want to understand how the human body reacts to microgravity
and what we can do to make humans more healthy in space. But it turns out there's a lot of application to things that happen on Earth. So for instance, one of the big problems that we have when we live in microgravity, which is delightful, by the way, I mean, it's so pleasant to float and move around effortlessly. But your body is pretty smart and it says, wow, this is pretty easy. I could be like a jellyfish. I really don't need this skeletal structure that I have. And you start losing bone density. And that's fine while you're in space. But when you come back to Earth, that's a real problem. And so in the work that we have done, both in improving the exercise equipment, which is one of the most important countermeasures, but also some of the medications that we can take,
you know, we've actually advanced research into osteoporosis, a huge amount on Earth.
So that's one, there are other things that it turns out certain viruses grow more virulently in microgravity, not really understood why, but the fact that they do has helped us create more effective medications for people who are ailing on Earth. So I think, again, we could spend the entire podcast talking about the spin off benefits, but now suffice it to say that they are plentiful.
Maybe we'll transition now. The ISS has been incredible. And it continues to do amazing things. But it's set for retirement. So Michael or Amir here, what's the plan for retiring it?
And how does that tie into what Axiom Space does? And what's the plan here for the company and for
the lab itself? Amir, do you want to jump in? Sure, I'd be happy to. So Sam, first of all,
I just want to say that we really do appreciate being on the air with ARC and with you. And thank you for providing us a platform to share this very exciting work that we're doing in space. So thanks for that. And regarding your question, so there are three phases to what Axiom is doing, the transition from the International Space Station to the Commercial Space Station. So today, we send these commercial missions, these crews to the International Space Station,
under an agreement that we have with NASA. And that's an opportunity for us to demonstrate to NASA and its international partners that Axiom is able to run these missions and to work cooperatively
with the ISS program in terms of operations and safety and communications and other elements like that. We are simultaneously building the commercial space station modules that will connect to the International Space Station. And eventually when ISS retires, those modules that we've sent to the ISS will operate as a separate and independent new commercial space station. So the first phase is today we are sending our customers, our crews, to the International Space Station. We'll then have
a period of about four to five years where we'll be connected to the International Space Station as we assemble our new space station. And then towards the end of the decade, the International Space Station will separate from our station. It will retire and Axiom Station will be the new cornerstone of human spaceflight activity in Earth's orbit. That's pretty incredible. So you're building off of it. It's like building a new wing to a home and then you keep expanding that wing and then eventually the new wing is the main thing and the old house crumbles away.

That's pretty much it. Yes. And so where did the initial idea come from for Axiom space? Why is now the right time? And obviously other people know the plans for the International Space Station. How has Axiom space really become this go-to partner?
So I'll share with you a little bit about the company's genesis and the reason behind it, the why of our company. So the launch companies like ULA and SpaceX and others are building the railroad to space. Axiom Space is building the space stations that are the destinations in space. And just like SpaceX is leading the commercialization of the launch side of things, Axiom is leading the commercialization of the destination side of the business of the space stations. So as I mentioned that the International Space Station will be retired at the end of the decade while more and more countries and companies are coming to depend on it. We're building this
new space station at about a 30th the cost of ISS. So ISS costs approximately 100 billion dollars to build. We're building the new space station for about three billion dollars and in the process we're improving the capabilities that are available on orbit by leveraging some more modern technologies.
So we are reimagining the way humans live and work in low-earth orbit and like we're doing today we're educating the global community on how to leverage microgravity. So the private astronaut missions that Axiom Space sends to the ISS like the first one we did last April which LA commanded are not only providing perspective, expanding access to space for research development, outreach and inspiration, but also these are precursor missions that help us flesh out and test the procedures and processes and communications so that when our space station is ready to become
independent the teams are in place, the platform they support will be fully operational and it'll be ready to execute on behalf of all of our customers around the world.
So the space station that we're building, Axiom Station ends up being the ultimate proving ground to build the experience that's required to explore the solar system and enable humans to permanently live and thrive off the planet as we say for the planet. So what we're doing is we're building prosperity through these opportunities. You see it's only by creating an economically sustainable business, economically sustainable reasons to go to space that we codify the rationale for a human permanence in space, right? Why should we leave earth and expand our footprint out into
the solar system? So we're beginning the transformation of low earth orbit first into a global space marketplace through these building blocks of research of in-space manufacturing and tech demonstrations and then through that we're facilitating the extension and the invention of commerce and space through which we offer access to countries and institutions and industries and individuals that have these new ideas that fuel the human economy beyond earth and the result of that is like LA said we're helping build a better life on earth through advances in medicine and material science and even just the perspective of how we view the planet and as really the only home we have in the place that we need to take care of and then of course we're preparing for the beyond. So humanity's desire to learn and grow as a species fuels this drive to push farther into the universe. So our critical work which now extends also to next generation spacesuits advances the world's collective knowledge about low earth orbit, about the moon and beyond and the work that we're doing today on the ISS is the bridge to building our next

generation space station and that's where we're going to refine technologies and procedures and operations while enhancing the level and the quantity and quality of human productivity in space. And then maybe Amir just on the very high level business model it costs a lot to build space station but how does that compare to the original space station and then the plan is countries and companies then pay you essentially to have room and board and access to the space station. Is that the right thinking there? That's exactly the right thinking yeah so you asked about what was it on ISS and what's it going to be on our station. So the ISS is owned and operated by five space agencies that represent about 15 countries and they are the owners and users of this platform. So we're building a new platform where those customers will be tenants and so now we have really three customer segments so we've got the space agencies who want to send astronauts
and payloads to orbit and who have the need for hardware and services that Axiom is uniquely suited to provide. So for space agencies this is an opportunity to continue to signal status, they get diplomatic opportunities through working it as part of the family of space faring nations, they have an opportunity to build a technically capable workforce within each of their countries and of course there's a whole upstream industry that comes from having an astronaut program. So that's the space agency segment, the second segment are the companies who have started in very very small volume to do work on the ISS and there are so many who want to utilize our infrastructure and Earth's orbit and do the things that you can only do on a space station and in microgravity. So I'll just give you three small examples. One is on our first mission, AWS sent up its first server to go to space so eventually we'll have server farms in space. The second is 3D bioprinting so here I'll just read you a very brief quote that's about the second mission that's coming up now. So on our second mission Axiom Space will be working with the University of Connecticut,
ESCRO Biotech, Cedar Sinai and the Wake Forest Institute to learn about how microgravity affects stem cells and thick tissue construct. This research is going to provide valuable insights into detecting diseases and developing therapies for people on Earth. Among the experiments flying on X2 are bioengineered liver and kidney constructs which will assess the impact of microgravity on the vascularization of thick tissues which could help create a solution for patients in need of organ transplants. And I chose to read that to you one because it's a lot of information but also because it's so exciting. I mean we're getting to a point where we're going to help companies actually print human tissues in space to be brought back to Earth for patients who need transplants who otherwise wouldn't get it by just waiting in the transplant line. Third example is retinal implants so you can produce higher resolution retinal implants in orbit than you can on Earth. So these are the types of things that our second customer segment companies are doing and then lastly of course there's the individuals who want to experience astronaut training and life in space. It's an opportunity for them to test their metal and also to contribute significantly to this science because when they're in space they're actually activating all of these payloads so that gives you a sense of who the user base is and why they fly with us to ISS and later to our station. That's incredible and I also love what you said too just comparing it to launches the railroad and then Axiom Space is these destinations and we've seen just how well the public-private partnership has worked for building those railroads and how the commercialization of space really leads to increased velocity of innovation.

So I think that's very exciting. And then you mentioned AX2 and that's when is that taking place? I think that's pretty imminent is it not? Kelly do you want to talk about that? Yeah it's coming up. It's very complicated. We are second in line on SpaceX's pad 39A at the Kennedy Space Center and so we have to wait for the rocket that's on the pad right now to launch and then they start the process to convert it to our launch. So right now we're holding May 17th but it depends on the launch that is scheduled to happen tonight so we'll see.
Amazing and then Michael maybe we can just get into AX1 first fully private astronaut trip to the space station. What was it like up there? What were the learnings? Was it like a space camp you're going around waking people at 6 a.m making sure they're sticking to the schedule?
What is the dynamic for these types of operations? We know the story starts way before then when we
actually began training together and I have to say you know these are three people one American, one Canadian, one Israeli who had had very successful business careers that wanted to have the experience that Amir I think well described and they really hit the ground running. I mean I was super impressed with their dedication and their commitment to the training process which at the end of the day it took over a year. It doesn't necessarily have to take that long if we do it you know back to back but the way things turned out it was a it was a pretty long process. It started with us spending about a week together in the Talkeetna range of Alaska doing something very
very far from glamping. It was pretty rough. The idea was to put us in a difficult physiological situation to help teach us things like leadership and followership and self-care and self-management and more than anything it just ended up being an amazing bonding experience,
bonding through adversity we like to say and then we got into training for the two vehicles that would be spending time on of course the ISS and the SpaceX Crew Dragon and when I say training to
live and work on there it's obviously it's about rather mundane things like how do you prepare a meal or how do you go to the bathroom or you know simple daily life things but also what to
do in an emergency because that can happen obviously at any time and the things you worry about in space typically are depressurization and a fire and so we did a lot of what we call reps a lot of repetitions of those kinds of drills in both vehicles and again these guys were very attentive present participative it was really a pleasure to see and let me tell you when we got on board I mean first of all the smiles on their faces were worth the price of admission it was so gratifying to see how the experience was just soaked into them right from the beginning and it's difficult to describe in words to be honest I mean you've got this incredible sensation of the launch sequence which is like no roller coaster ride you could possibly imagine followed immediately by microgravity basically weightlessness and the peace and tranquility of what that transmits to you as you look out the window at this earth that's now 250 miles below you going by at five miles a second I mean it's really an overwhelming sensation but we spent about a day not quite 17 hours on the Crew Dragon on the way to the ISS between launch and docking and then when we got on board ISS it was work work work I mean each of these guys brought a very complete package of research and outreach the Larry the American teamed with the Mayo Clinic and the Cleveland Clinic

marked the Canadian with the Royal Canadian Geographical Society and the Montreal Children's Hospital and Eitan who has an interesting story he was a squadron mate of a man named Elon Ramon
and Elon was the first Israeli astronaut who was tragically killed in the Columbia accident in 2003 and when that happened in Israel they stood up the Elon Ramon Foundation which Eitan leveraged to
help get the word out to the entire country that this mission was happening and used it as a platform to call both for scientific investigations as well as opportunities for outreach so with all of that stuff going on the guys were super busy and you know it takes a while to get used to working in the microgravity environment this weightlessness is super fun but it's also very different and it's not what you expect you can't just put your pencil down and expect it to be there when you go reach for it you know two minutes later so that took us some time and luckily in a way we were delayed in our landing we were supposed to spend 10 days docked to the ISS we ended up spending 15 I'm sorry we're supposed to spend eight we ended up spending 15 so almost double the time so we really got the full experience of being able to appreciate what a magnificent
life it is up there to be able to look out the window and see that blue planet you know going by beneath your eyes it's really special and then Splashdown another pretty amazing roller coaster ride the recovery crew had us on the ship and the hatch opened 37 minutes after Splashdown which is
incredibly fast that's practically faster than getting off a plane these days exactly especially if you're seated in the back right yeah and that doesn't involve you know lifting the airplane up with a crane and putting it on the deck of a ship and sliding it forward and checking for hazardous gases and all that so yeah it's an amazing process and SpaceX did a great job I think if you were to talk to any of those three they would first of all tell you they'd go back tomorrow and convince you that it was really an experience of a lifetime that's incredible and then what are the
takeaways from that mission did their experiments yield anything interesting is it too early to tell well let's see they're starting with Larry and the two hospitals that he teamed up with they also were looking at stem cells and so what we were looking at there is seeing how they react in the microgravity conditions we weren't trying to grow them we were just trying to observe them and how they multiplied and it turns out they multiplied well Mark did the first two-way holoportation from space so I watched him he was you know floating in the laboratory module talking to people who thought that he was in the room with them and he thought that they were in the module with him so that was pretty neat to watch eight time did a lot of things one of the ones that I remember was he would take a syringe full of a polymer and inject it into a circular ring and once you eject enough liquid it basically adheres to the ring all the way around and closes and then the more or less liquid he would inject he could make that form become concave or convex and then it would be solidified under ultraviolet light in just a few minutes and we actually got lenses out of those and I didn't mention it but one of the things that we are dealing with with long duration space light right now is people have a hyperoptic shift so they get farsighted they need stronger reading glasses to put it a different way and imagine being able to make new lenses to accommodate a new prescription because your vision changes in space so I think

the results and we've had a couple of conferences now to discuss results of many of the experiments and they've all been relatively positive and I would say really worthwhile for the investigators and then Amir what about from the economic side of things what was the significance of the AX1 mission so like Galei said this was the first all private mission so the whole customer base pretty much was a commercial customer base and it helped us grow in as a company in a few ways one
is all of the contracting and regulatory hurdles involved were solved so that was very important and took a number of years to get done cooperation was demonstrated between NASA the launch providers
us as the commercial space station builder and in this case the mission operator governments and the commercial customers over 25 payloads were sent up in markets like I mentioned including on-orbit server farms stem cells radiation protection material science and I mentioned
a few of them like AWS's first server but also MIT sent up a payload to prototype
self-shaping structures so what would it look like if we could send up pieces of a space station in the future and have itself assembled and UC San Diego sent up a payload to investigate cancer biomarkers so some massive opportunities for the pharma industry so from an economic growth standpoint it really started to you know set the bit on what kinds of businesses would we see evolving today the company and the whole space station business is kind of where the internet was in 1995 where we can see how eventually it's going to permeate every aspect of human life we don't know which killer apps are going to be the ones that launch first but we know they're happening and we're seeing the sparks of them right now on the international space station missions we even had things like sponsorships and brand partnerships so Loro Piana provided apparel David Uriman designed the mission pin and Jose Andres who is a very well-known executive chef and philanthropist provided both food for the astronauts while they were in quarantine and also on orbit so this mission provided all of that provided support for scientific research and institutions that LA mentioned and on this first mission we were very excited we didn't know what the level of demand would initially be thanks in great part to the work that
Etan Stebe and the Ramon Foundation did which Mike LA mentioned a moment ago we had over 65 applicants for the 25 payload spots and we were really only limited in terms of the business we could produce here by the bandwidth of the ISS program the cargo capacity of the vehicles and maximum zone operational capabilities so now what this has done this first mission has done is provided us very clear evidence that we're going to be oversubscribed for the foreseeable future that's a good spot to be and so what should we look forward to the experiments going up on AX2 hopefully in the next month here and are you already seeing that you only have one module up there but you're already starting to really commercialize things that NASA would have otherwise done let me take a stab at that first of all I think where we really are going to make a difference in addition to sort of expanding or continuing maybe the kinds of research that NASA is doing as a government agency they pretty much stop short when it comes to fabricating things so they try to do the research can we make higher quality crystals in microgravity and maybe the answer is yes but they don't have a mandate to actually do the development to make those crystals on a big scale which is exactly what a company whether it's a pharma company for protein crystal or a semiconductor company for a way for a kind of crystal would do right so I think that is a pretty untapped market that we are looking forward to exploiting and then on specifically on AX2

they're doing actually interestingly some stem cell research where they're actually trying to produce stem cells for regenerative medicine targeting the heart the brain and blood we've got some experiments coming out of the kingdom of Saudi Arabia where two of the emission specialists
are from doing weather control technology to generate artificial rain believe it or not
we're developing dna mic nanotherapeutics for cartilage repair there's a lot of interest in
the pilot john schoffner has a sort of a contest of that stem related that he's doing I think
teamed with MIT as well axiom has its own a couple of technology demonstrators one of the things that
we really struggle with an ISS is what we call storage so putting stuff away and being able to find it when you need it we have an inventory management system that is basically an enormous excel spreadsheet but there's probably a better way and right now we use a barcode reader to scan something scan the location put a local location and hopefully when you come back it's still there but you know things move around in space and it's time consuming to do all that so we're doing a technology demonstrator where we're using the cameras that are already on board
and a little bit not sure I'd call it AI but let's just say advanced computational techniques
to identify objects by their shape so I mean you can go through passport control now by having your face be recognized so that same idea can recognize an object and watch you put it in a place so it eliminates that whole scanning process which obviously is a big time saver so those are just a few of the things that are planned for x2 super exciting can't wait to see it launch and see the results obviously right now things are pretty expensive but costs are declining rocket launch costs are declining in theory as more space becomes available in outer space maybe those costs decline as well Michael when could an everyday person be involved and be an astronaut
what's the timeline there is that a reality hey I think it's a reality for sure but be I don't know
I mean that is a great question and one that we struggle with it is as you suggest completely tied to launch costs and those costs first of all have come down a lot but I think it's still
going to take some more both innovation and competition for the prices to come down even more and I like to use the analogy of commercial airline service in the 1920s and 30s century ago when again only very wealthy people could fly and now you see people getting on airplanes for almost any reason I don't know when what the time scale is of that but I'm very convinced that it's going to happen and I think you know as we saw the Starship although many would call that a failure
the SpaceX Starship launched the other day was in many ways a great success and that I think will be a game changer in terms of cost of getting both goods and humans to low earth orbit and beyond so you know they sort of led the first revolution in reducing launch costs and maybe this is the cost for the second absolutely and that's what our our modeling suggests as well it was surprising to see so many people call it a failure despite the impressive achievements obviously it wasn't a full success in landing in Hawaii in the ocean but definitely impressive and lots of learnings there maybe before we wrap up Amir what is Axiom Space doing that's allowing it to execute so well relative
to you know other space companies I think one of the things we see as an investor is space is big and exciting but oftentimes you can see solutions in search of problems what is Axiom Space doing differently here yes Sam it's a great question and it started with our founders because like you

said there have been other folks over the years who have played with the idea and some put a lot of money into trying to build a successor space station to the ISS but our founders came with deep roots in the human spaceflight history and program so Mike Saffordini our CEO and co-founder ran the International Space Station program for about a decade and for a decade before that ran the program's business office so he personally had a hand in overseeing the final assembly of the International Space Station and the expansion of the International Space Station's customer base from government to the commercial sector our other co-founder Cam Gaffarian
Cam started a company that ended up growing to be NASA's second largest engineering service provider and a critical operational partner to the ISS program so they did things like orbit determination and in fact about two-thirds of the staff in Houston mission control were Cam's employees outsourced to NASA so when astronauts were calling down to earth they were speaking with
his company's employees and so Mike and Cam early on were testifying to congress about what the destiny of ISS would be and how long the station could effectively remain in orbit and how long it would be a cost-effective solution and so they probably earlier than anybody else understood that by the end of this decade ISS would have to be retired because right now the ISS for example costs two billion dollars per year to maintain and we're building the entire new space station for three billion dollars so as that two billion dollar per year cost goes and increases there's a stronger and stronger economic argument for the countries to become tenants on a new commercial space station with all of its various efficiencies relative to you know maintaining ISS or what could newly be built under the government paradigm so the first thing like I said is started with our founders second is it extends to the team that we built which is now really the world's leading team in space station engineering and business so our team has specialized expertise in human spaceflight and deep experience in the design construction assembly and operation of the ISS so we specifically assembled this team to build on the legacy and on the success of ISS to bring in new people with innovative ideas to keep ISS's utilization maximized so long as it's around and then to succeed with a next generation destination and microgravity platform in orbit so basically what that means is we have two decades of experience that comes from working on ISS and from that understanding where we need to now improve in materials and tech and design and processes and so that's what's enabling us to build this new space station with a far lower cost and next generation technologies so I mentioned to you that there's that three phase model of how we transition from the ISS to our new space station and we proposed that to NASA as part of the competitive bid in 2019 and at the beginning of 2020 NASA's sole selected axiom to be the company that would connect its modules to the International Space Station and that connection when you ask really what helped us to succeed is probably one of the most important ingredients because that unique connection to the ISS provides us with a few critical competitive advantages so one it means that we are at least a decade ahead of any competitor who would propose
to build a free flying space station because we've already started operating missions in terms of planning in 2019 in terms of revenue and customer proceeds in 2019 we actually launched the first mission in 2022 it's not likely that competitors will be launching hardware to orbit this decade at least not hardware that is commercially operational so we're about a decade ahead of the competition

in terms of operations we're probably about 15 years ahead of competition in terms of market capture because when we operate these missions to the ISS and when we connect our modules to the
ISS there are astronauts both within the current ISS partnership and countries that are not yet sending astronauts to the ISS who will fly with us so what that means is the current ISS user base is already starting to transition over to axiom and as our new modules come up we'll see more and more of the country's transition over to us and then eventually by the time ISS separates we expect that that whole user base will become axiom space's customer base and then on top of that we're adding
more countries that will join and more commercial customers that will join so that's what puts us about a decade a decade and a half in front of any competitors in terms of market capture
so today like I mentioned we're the only company selected by NASA for private astronaut missions to the ISS and that connection helps us lastly delay massive capex associated with bringing hardware to orbit so we are pulling electrical power from ISS's solar panels once our modules get up there we'll be pulling co2 scrubbing from the air and other types of utilities so that means that instead of having to launch that up in 2025 we can launch some of that hardware as late as 2027
2028 and what that translates to is that we can fund the construction of the station out of the profits of our missions to ISS instead of funding it dilutively and that's great for the investors that have joined us already and it really minimizes the amount of equity that we need to sell in the company so I would say that those are the ingredients that have helped us to succeed and where that puts us now is in a position where we've had a number of really significant milestones that cement our position as the category maker so we had the ax1 mission fly with 25 payloads over 20 public affairs events we signed agreements with six countries and the european space agency that represents multiple countries to fly with us and lastly I do want to mention that there are some super interesting derivative technologies and revenue lines coming out of building a space station so for example we set out to build a space station and as part of that we had to build a new generation of spacesuits that would integrate with our space station and once we built that capability to build next generation spacesuits in-house we competed on a NASA program to build what's called the next generation extravignicular activity suits or the XEVA suits and we won from NASA a $1.3 billion contract to build that next generation of spacesuits so we are actually now building the spacesuits that will be worn by NASA astronauts when they land on the moon in 2025 and and so that's probably our first major derivative revenue line but all of that together gives you a complete picture of why ax1 has become the first company to succeed in this area that's incredible and super exciting last question here michael what is your prediction for first human on mars what timeline well that's a tough one
i actually don't see it happening anytime soon and i think the reasons are not new to anybody but the idea of traveling that far with today's chemical propulsion technology will be a mission of depending on whom you ask anywhere from two to three years and when you think about the logistics
required to support humans for that duration it's really daunting so i don't know i could be wrong and you know never bet against elon as they say but i think that we are well to focus on lunar exploration and establishing an iss-like presence on the lunar surface to be able to

develop in situ resource utilization to live off the land to the extent possible there's
not a lot of it there but you can use a regular to make structures you know you might be able to
extract water from the ice and the poles and use that for both drinking and making rocket propellant
and oxygen and all those things so all that i think are good things for us to do while we wait
and maybe nuclear propulsion is not that far away i feel like there's some movement in that
direction but i think it's going to be a pretty heavy lift to try to go there with chemical
propulsion and so therefore i'm saying decades got it michael and amir thank you so much for
joining us and sharing axiom spaces a story and goal thank you for joining thank you sam it's a
pleasure sam all the best arc believes that the information presented is accurate and was obtained
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