



THE FRONTIER

THE PLAYMAKER'S GUIDE
TO BUILDING THE NEW
SPACE ECONOMY

Insights from The Space Ecosystem



TYPE ONE VENTURES

In collaboration with

Deloitte.

BEING A PLAYMAKER

PLAYMAKERS ARE **MASTERS OF VISION, CREATIVITY, AND DECISION-MAKING**, GUIDING ACTIONS TOWARDS DESIRED OUTCOMES.

They are leaders who have a deep understanding of the opportunity at hand and inspire others to follow suit. They are the bold and the brave. They are collaborators with the ability to understand what needs to be done to win, and who's needed to get there. Together these traits help Playmakers influence outcomes and create opportunities for growth.

In the expansive frontier of Space, a new era dawns. It's a realm where commercial opportunity intertwines with the development of a new domain, and the bold emerge as the architects of a burgeoning economy.



Welcome to **The Playmaker's Guide to Building the New Space Economy** – a curated collection of insights from London's 2024 Frontier Roundtable events. These findings are intended to support you and demystify the complexities of the New Space Economy and offers actionable guidance on how you can unlock opportunities and navigate potential risks with confidence.

Whether you're a visionary founder charting new trajectories, a perceptive investor placing bold bets, a corporate harnessing the power of Space technology (SpaceTech), or a pioneer in government helping to foster an environment for growth, you are building markets, creating opportunities, and shaping the future. You are a Playmaker in the New Space Economy.

CONTENTS

ABOUT THE PLAYMAKER'S GUIDE	4
THE GUIDING PRINCIPLES	9
PRINCIPLE ONE	10
PRINCIPLE TWO	17
PRINCIPLE THREE	27
PRINCIPLE FOUR	33
PRINCIPLE FIVE	36
THE 2024 MOMENTS THAT MATTERED	44
APPENDIX	47



ABOUT THE PLAYMAKER'S GUIDE

THE ECONOMICS OF SPACE HAVE NEVER BEEN MORE COMPELLING. OVER THE PAST FEW YEARS, CHALLENGES TO **MANUFACTURING**, **LAUNCHING**, AND **OPERATING SATELLITES** AND OTHER SPACE-BASED ASSETS HAVE DIMINISHED SIGNIFICANTLY.



A record year for Space with **221** launches - a **52%** increase from 2022.¹

96% predicted reduction in launch costs by 2030 from 2020, reaching a price of **\$100/kg**.²

Over **9,000** satellites currently in orbit and an expected **60,000** by 2030.³

The Space economy is expected to grow at a ~9% CAGR through 2035, reaching a \$1.8T sector⁴. The opportunity of Space has captivated the world once again, but now with one key difference – the ecosystem is increasingly fuelled by commercial players. The shift from the Space Industry being dominated by government to private sector (and importantly, private and public sector collaboration) has positively impacted both the speed of innovation and the amount of private capital flowing into the ecosystem.

The opportunities of the New Space Economy are well documented; its potential market size has made it into the headlines of major news outlets, and reports explaining the applications of SpaceTech across industries help guide end-users on the value of Space.

Less documented, however, is the path to achieving these ambitious future market size numbers. We believe that to achieve the ambition set for the New Space Economy, we must move towards action orientated conversations and support the ecosystem to unlock the commercial pathways for growth.

But we recognise that no one person or company, holds all of the answers. And so, we embarked on a journey to bring the right people together, to have meaningful conversations about what action can be taken by the different roles within the ecosystem to support its growth.

This guide represents the collective expertise of Space ecosystem Playmakers and is designed to help founders, investors and corporates to join the Playmaking cohort to lead the transition towards the New Space Economy.

We gathered these experienced Playmakers in the ecosystem through our Frontier 2024 London Roundtables. These included leading investors (experienced in Space investments and new to the ecosystem), insightful SpaceTech founders, representatives from government, and corporates. Over two days of intensive collaboration and exploration, we heard invaluable ideas and perspectives on how the New Space Economy will grow, and advice for navigating the hurdles that we will inevitably face along the way.

We used these comprehensive insights to form the backbone of this guide.

WE GATHERED
THESE EXPERIENCED
PLAYMAKERS IN THE
INDUSTRY THROUGH
OUR **FRONTIER
2024 LONDON
ROUNDTABLES.**



The guide contains **five core guiding principles** that will support you in your role as a Playmaker of the New Space Economy:

1

EMBRACE SPACE AS A STRATEGIC ENABLER AND COMMERCIAL FRONTIER

Recognise 'Space' as more than an industry in silo, SpaceTech is also an enabling technology for other industries, and a new commercially feasible environment to operate in.

2

GROUND OPPORTUNITIES IN REALITY

Always test for feasibility, viability, and desirability, while embracing bold bets that are testing any uncertainties in a structured way.

3

BE COLLABORATIVE

The commercialisation of SpaceTech requires interdisciplinary skillsets and knowledge. In SpaceTech, collaboration isn't just desirable; it's essential.

4

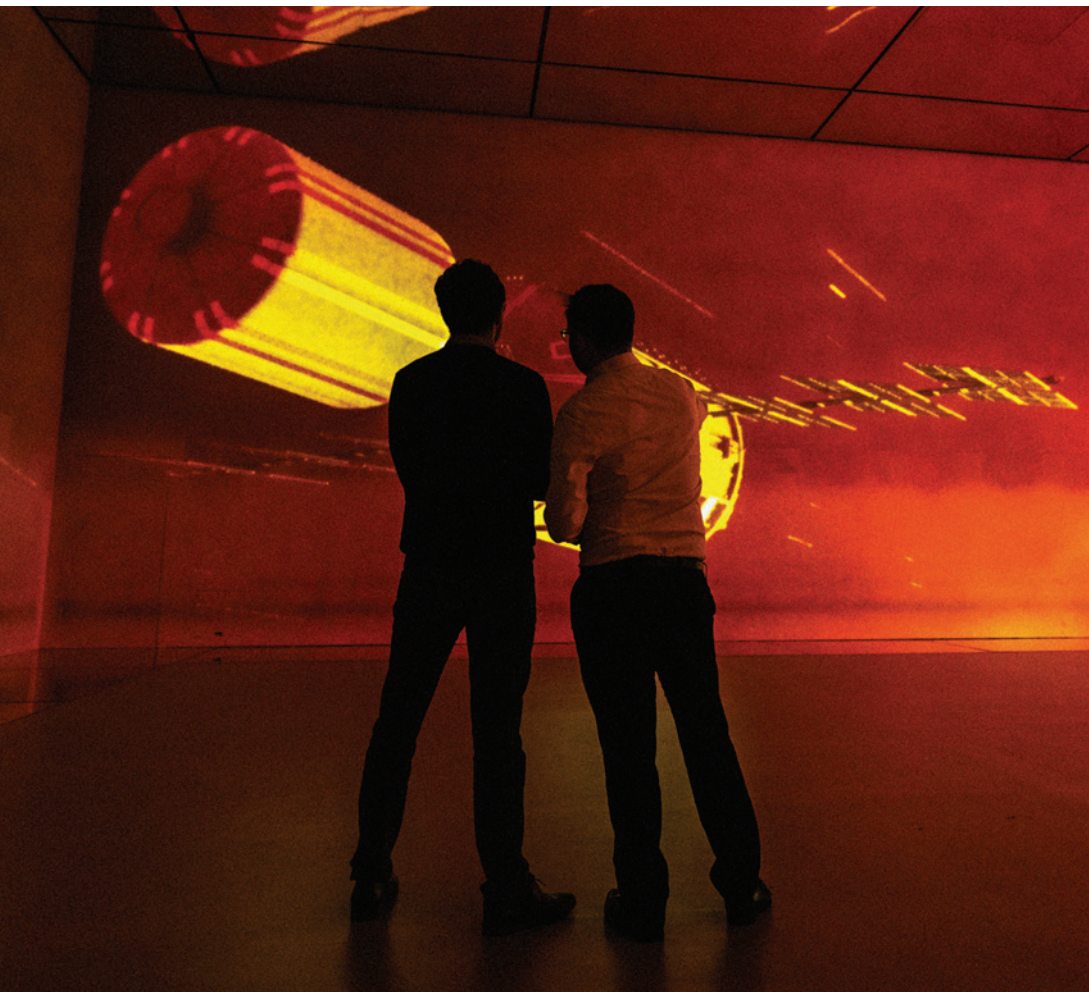
DON'T UNDERESTIMATE THE ROLE OF GOVERNMENT IN THE SPACE INDUSTRY

Lean on and collaborate with governments. Many have major roles to play in providing financial support, policies, and strategies that can push the entire Space sector forward and even be initial customers directly or through subsidies.

5

ADDRESS CHALLENGES HEAD ON

To unlock the full potential of Space, we must develop an enabling regulatory framework, nurture skills, and continue to foster the growth of the startup ecosystem.



This guide is by no means all encompassing or finite in its recommendations. It holds insights based on experience and knowledge of concepts and learnings from those within the New Space Economy. As the industry evolves, so too will this guide, ensuring that it remains a trusted resource for founders, investors, innovators, governments, and enthusiasts alike.

**THANK YOU TO EACH
PLAYMAKER** WHO
JOINED US AT THE
LONDON FRONTIER
ROUNDTABLES
AND SHARED THE
INSIGHTS THAT
ALLOWED US TO FORM
THIS GUIDE.

THE GUIDING PRINCIPLES



01

PRINCIPLE ONE

EMBRACE SPACE AS A STRATEGIC ENABLER AND COMMERCIAL FRONTIER: RECOGNISE 'SPACE' AS MORE THAN AN INDUSTRY IN SILO, IT IS ALSO AN ENABLING TECHNOLOGY FOR OTHER INDUSTRIES, AND A NEW COMMERCIALLY FEASIBLE ENVIRONMENT TO OPERATE IN.

Space should be seen not merely as an industry, but as a transformative enabler of innovation and economic growth. It represents both a cutting-edge technological frontier and a dynamic commercial domain, unlocking new possibilities across industries.

THE SPACE COMMERCIALISATION MARKET COMBINES **INFRASTRUCTURE AND OPERATING SYSTEMS** THAT **ENABLE BUSINESS APPLICATIONS** AND **DRIVE VALUABLE END-USER OUTCOMES ACROSS INDUSTRIES**

Illustrative Space Commercialisation capabilities and outcomes

Infrastructure

Space products and equipment design and manufacturing



Satellites



Ground equipment



Space facilities



Space vehicles

Operating systems

Activities supporting launch and operation of Space equipment



Launch and mission planning



Cyber & privacy



Cloud platforms



Data storage network transmission



In-Space platforms & services



Space asset management & operations

Business applications

Activities that activate business value from Space



Earth observation & remote sensing



Satellite communications & navigation



Consumer space



Business & tech platforms



Beyond low earth orbit activities

End-user outcomes

Outcomes derived from the Space value chain



Operations & business continuity



Enhanced communications



Product & business model innovation

▶ This market has **incredible interconnectivity** between Government & Public Services (GPS) and the Private sector

▶ **GPS increasingly leans on the Private sector** to support a boom in development of Infrastructure and Operating Systems

▶ This **creates more opportunity for business applications and End-user Outcomes**, as utilising the value of Space. **Space becomes more accessible and cost efficient**

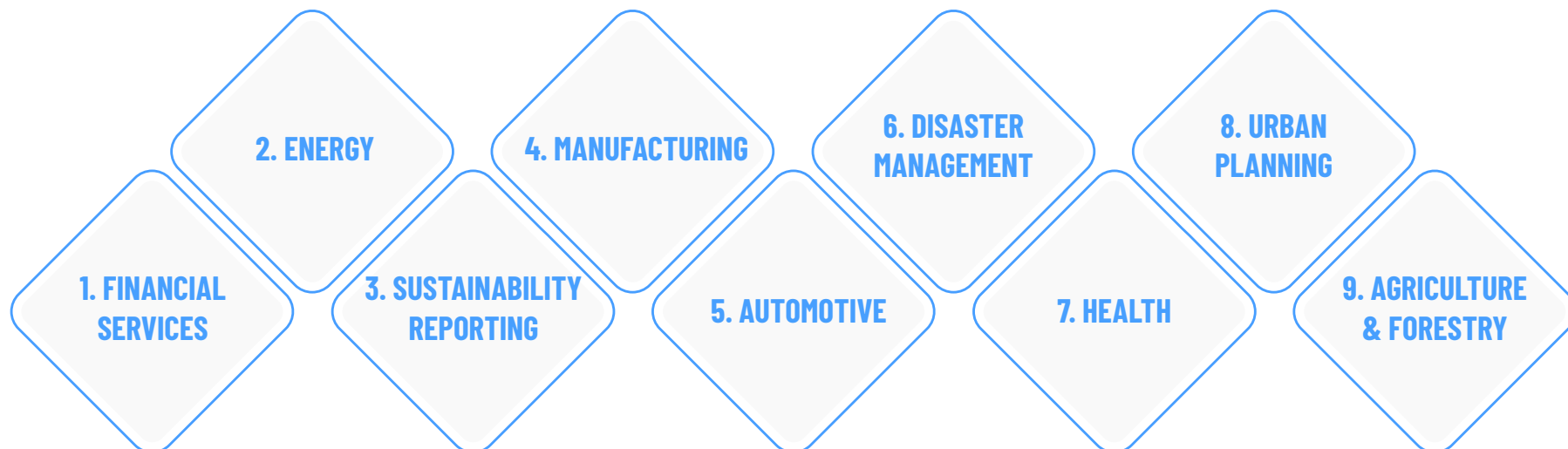
SPACETECH UNLOCKS VALUE ACROSS INDUSTRIES...

Earth Observation data helps in locating potential renewable energy sites, such as optimal areas for solar farms or wind turbines. It also aids in monitoring oil and gas infrastructure for leaks and environmental compliance.

The microgravity environment in Space enables the production of unique materials impossible to create on Earth, such as high-quality fiber optic cables and perfect spherical alloys for advanced electronics.

Satellite imagery and communications play a crucial role in disaster response, providing real-time data on affected areas and maintaining communication links when terrestrial networks fail.

High-resolution Earth Observation data and 3D mapping technologies assist city planners in designing more efficient and sustainable urban Spaces and managing infrastructure and transportation development.



Earth Observation data can be used to help insurance companies verify claims, enable building societies to offer green mortgages or get to know their customers better, and help banks with climate risk assessments and management.

Organisations use Earth Observation data to verify their environmental claims, and monitor carbon emissions, enhancing the accuracy and credibility of their sustainability efforts.

Low Earth Orbit (LEO) satellite constellations provide high-speed, low-latency connectivity for connected and autonomous vehicles, enabling real-time navigation updates and vehicle-to-vehicle communication.

The novel environment in Space offers the chance to research and develop novel medicines for human health on earth, or opens up the ability to use microgravity to improve existing biopharmaceuticals.

Earth Observation data can be used to support farmers with resource management to enhance food security, increase yield and reduce the environmental impact, as well as help with forest monitoring and protection to improve conservation and governance.

... & THESE ARE ONLY A FEW OF THE WAYS IT DOES

To fully harness its potential, we must move beyond the narrow confines of SpaceTech as a buzzword. This term, while useful, can unintentionally limit the perception of Space as a broad and multifaceted opportunity. Space is vast—both literally and as a marketplace—demanding a clear and precise understanding of its many dimensions.

TO FULLY HARNESS ITS POTENTIAL, WE MUST MOVE BEYOND THE NARROW CONFINES OF SPACETECH AS A BUZZWORD.

A more effective approach begins with segmenting SpaceTech into five key areas:

- **Downstream:** Utilizes infrastructure deployed in the Space environment to deliver services and applications to end-users on Earth, including communication, navigation, and Earth observation services.
- **Midstream:** Bridges the upstream (infrastructure) and downstream (end-user applications) by handling data processing, storage, and distribution, and often involves activities like satellite data analysis, signal relay, and intermediary data enhancement services.
- **We segment 'Upstream' into three core sub-segments:**
 - **In-Space:** Pertains to activities and services conducted directly in Space and generally refers to business models/products that can sell into the Space economy. Satellite servicing, Space-based infrastructure manufacturing, and orbit transferring would all be examples of this.
 - **Cis-Lunar:** Companies that contribute to establishing a sustainable human and robotic presence on the moon. It includes ventures that operate in lunar orbit and logistics between the Earth and the Moon.
 - **Deep Space:** Supports business activities beyond the Earth-Moon system, which includes both scientific discovery and commercial ventures like extraterrestrial development as well as asteroid mining.

Given the breadth of what SpaceTech encompasses, a one-size-fits-all view is not an optimal strategy. Investors and stakeholders must take a nuanced approach, evaluating which segments align with their objectives, investment thesis, or strategic goals, and commercialisation or investment time horizons. The key is recognising that SpaceTech is not just confined to the Aerospace Industry; it is an enabler of innovation across sectors as diverse as telecommunications, logistics, defence, and even healthcare. Understanding how Space technologies intersect with existing markets is crucial to unlocking their full value.



HOW TO BE A PLAYMAKER

AS AN INVESTOR

Consider the different applications of SpaceTech and work to understand how the different segments align to your existing investment thesis; considering businesses that leverage Space data, infrastructure, or manufacturing capabilities to deliver innovative products and services across industries.

Evaluate applications and commercial viability of Space-based technologies across industry verticals & potential end customers; not just the Space companies themselves.

AS A FOUNDER

Emphasise the real-world benefits and applications of your Space-enabled technology, rather than just the technical capabilities.

Position your company as solving problems, or creating value in established markets, not just operating in the "Space" domain.

AS A CORPORATE END-USER

Explore how Space-based data, manufacturing, or infrastructure could enhance or enable new products, services, or create new business models within your industry.

Partner with Space companies to integrate their capabilities into your existing offerings, instead of viewing Space as a separate strategic initiative.

Adopt a mindset of using Space as a tool to drive innovation, rather than Space being the sole focus.



A FOUNDER'S PERSPECTIVE

KATIE KING IS THE CO-FOUNDER AND CEO OF BIOORBIT, A UK BASED COMPANY WORKING IN THE IN-ORBIT MANUFACTURING SECTOR.

The organisation is building a pharmaceuticals factory in Space, to harness the benefits of microgravity for large-scale crystallisation of protein drugs. This will help make the switch from intravenous administration of anti-cancer antibodies to subcutaneous delivery of antibodies, so patients can self-inject and not need to go to hospital.

WHEN PITCHING BIOORBIT, HOW DO YOU TYPICALLY POSITION YOUR COMPANY?

When we talk to potential customers, or investors, we don't often start by saying that we are directly a SpaceTech company. There is an important distinction to be made here, which is that BioOrbit is a Biotech company that makes use of the Space environment. Just as we don't call companies on Earth, Earth companies, but name the industry, I believe that Space companies should be described similarly – telecoms, health research, semiconductor production but that use the Space environment. To truly commercialise, we need to stop thinking of Space as Space – it's just an environment.

WHY IS IT IMPORTANT TO MAKE THIS DISTINCTION AND SHOW YOU'RE USING SPACE FOR BENEFITS ON EARTH?

Historically the use of Space has primarily been for Space users, like Space exploration and has focused on astronauts. Lots of Space medicine work to date has been about how the human body reacts to the Space environment with astronauts in mind, which is a small number of end users. For the commercialisation of Space, we need to direct our attention to end users on Earth. It's really important to highlight this and make the point that these drugs are not going to be created for a couple hundred of astronauts. We are talking in the scale of millions and potentially billions of people. When you look at it from that scale, it makes much more sense to be investing and exploring these new technologies.

HOW DO YOU ENGAGE WITH PEOPLE OUTSIDE THE ECOSYSTEM TO SHOW THE BENEFITS OF SPACE?

There's a problem in that non-Space users don't know about the new trends in the Space Industry, and there is a substantial knowledge gap. Whenever we go and speak to potential non-Space users about how it could benefit their industry, there is scepticism, and that makes sense because it's not on their radar. Space has been so inaccessible until now, so why should they think about it? But there is a big gap there that needs to be closed if we are to see non-Space adoption of Space.



A FOUNDER'S PERSPECTIVE

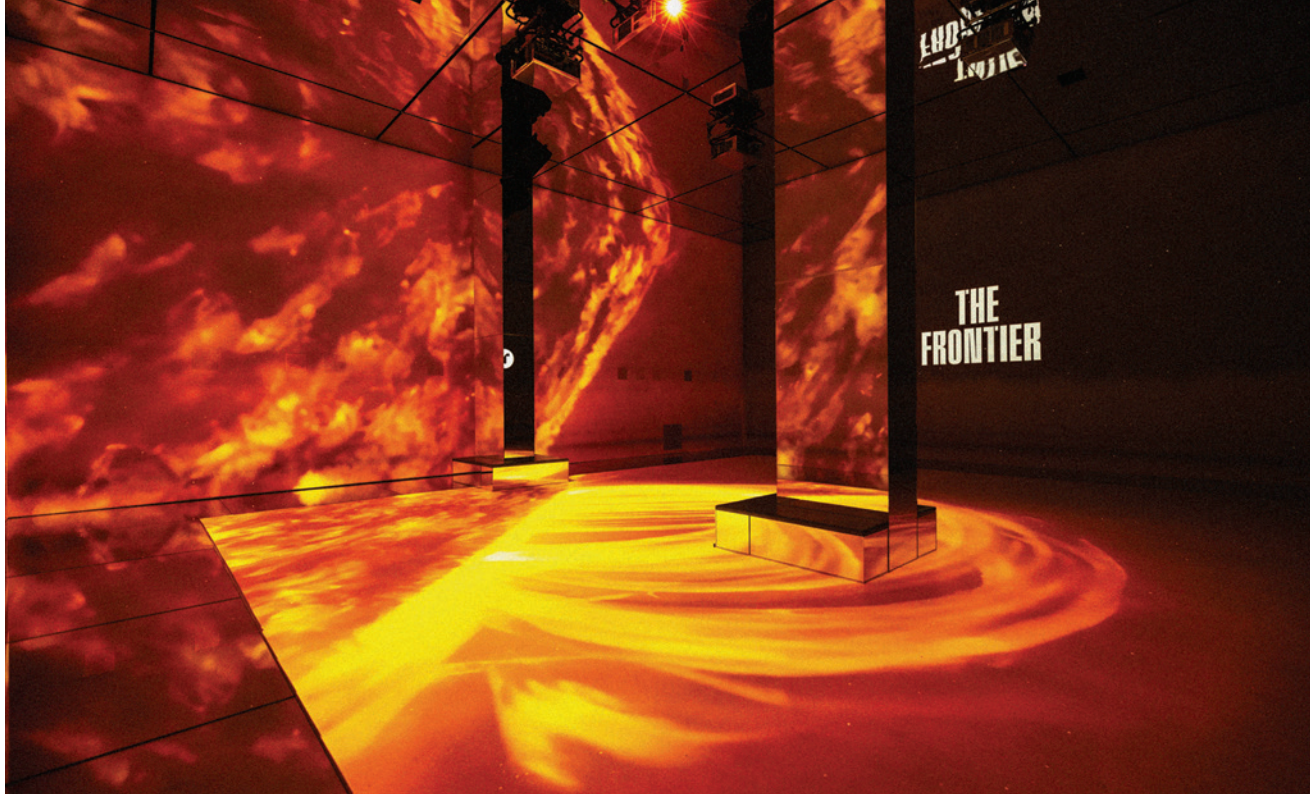
To overcome this, I think there needs to be more conversations about Space in general. We need more discussions on how we can use the microgravity environment to solve some of the biggest challenges we're facing on Earth, and move the conversation away from things like Space tourism.

HOW DO SPACE STARTUPS OVERCOME PERCEPTIONS OF RISK IN THE SPACE INDUSTRY?

I think it all comes back to storytelling and communication due to that knowledge gap. I have found that it's important for founders to properly set the scene and start from scratch to effectively break the sector down before highlighting your own company and tech. The perception is interesting because I don't see what we're doing at BioOrbit as being all that risky from a Space perspective.

The direction that we're seeing the Space Industry moving with all the infrastructural changes, costs of launch reducing and the uptake in commercialisation all adds to the safety of the industry – to me there is no major risk from the Space side. We are basically developing pseudo-couriers to Space and back again; This is in line with how infrastructure changes are going. I just see it as a matter of problem-solving and iterations that we will be able to overcome, rather than being viewed as a dead-in-the-water risk that's often the

JUST AS WE DON'T CALL COMPANIES ON EARTH, "EARTH COMPANIES", BUT NAME THE INDUSTRY, I BELIEVE THAT **SPACE COMPANIES SHOULD BE DESCRIBED SIMILARLY.**



02

PRINCIPLE TWO

GROUND OPPORTUNITIES IN REALITY:

ALWAYS TEST FOR FEASIBILITY, VIABILITY, AND DESIRABILITY, WHILE EMBRACING BOLD BETS THROUGH TESTING ANY UNCERTAINTIES IN A STRUCTURED WAY.

When considering the SpaceTech industry, it is essential to approach opportunities with an understanding of the different time horizons and market segments.

1. CONSIDER THE TIME TO COMMERCIALISATION

Current opportunities

The closer-to-horizon opportunities in SpaceTech include the Earth Observation market, the LEO Satellite Communications market, and the Launch market.

Mid-term and long-term opportunities

The further-from-the-horizon opportunities in SpaceTech include the development and operation of in-space, Space exploration and utilisation, and the emerging Lunar Economy. Evaluating these opportunities requires a different approach, as their indicators of success may be more forward-looking and less defined. However, the technologies being developed within these segments presents a transformational opportunity to end-users and early-engagers. Early-engagers will be able to help shape these technologies, and provide valuable insights about their organisation's requirements for being a customer of these products and solutions.

2. ASSESS OPPORTUNITIES BASED ON A CONSISTENT FRAMEWORK

Regardless of the time horizon or market segment, a consistent framework can be applied to assess the potential of any SpaceTech opportunity. This framework consists of three key elements:



Feasibility: Is the proposed solution or offering technically possible? What are the technical advancements that need to be realised in order to achieve this?



Viability: Will the business value outweigh the costs associated with the opportunity?



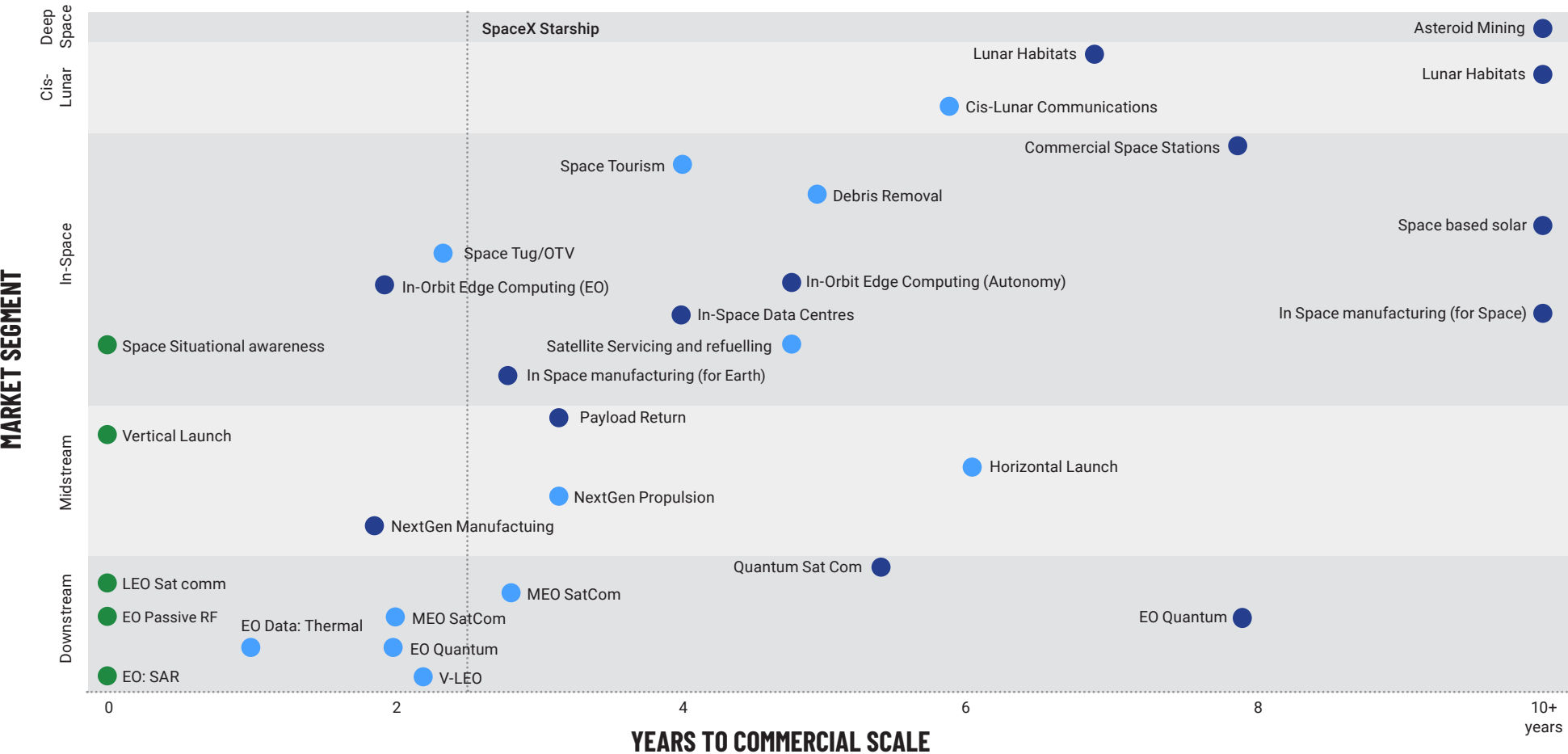
Desirability: Where will the demand for the solution or offering come from? Who are the target customers?



HYPOTHESIS FOR SPACETECH SEGMENTS TIME TO COMMERCIALISATION

This graph represents a view of the time to commercialisation of different Space technologies. It is designed to help end-users and investors alike form their own hypothesis for the evolution of the ecosystem and which technologies are most relevant to them based on the time-horizon they focus on.

The dotted vertical line represents the hypothesised time for SpaceX’s Starship to reach scaled operations. This has been mapped as the ecosystem expects this to be a key turning point for technologies that will require heavy-payload launch capability.



Current Tech Status: ● Commercially scaled ● Some adoption ● In development

Please refer to Appendix 2 for Technology definitions and methodology.

ACROSS ALL
SEGMENTS, IT
IS CRUCIAL FOR
FOUNDERS TO
CLEARLY ARTICULATE
**THE VALUE THEY
ARE CREATING,
FOR WHOM, AND
THE EXPECTED
TIMELINES
TO VALUE.**

For more mature market segments, such as Earth Observation, stakeholders can have greater confidence in answering these questions. However, for nascent opportunities there may be more unknowns. These require a more deliberate approach and a willingness to embrace bold bets through testing any uncertainties in a structured way. Across all segments, it is crucial for founders to clearly articulate: the value they are creating, for whom, and the expected timelines to value. This value proposition is the foundation for demonstrating the desirability of the offering, regardless of the market's maturity.



**“THERE ARE SOME VERY NEAT SOLUTIONS
SEARCHING FOR A PROBLEM. BUT, FROM AN
INVESTMENT PERSPECTIVE, YOU WANT TO
BE SHOWN THAT THERE IS A MARKET FOR IT.”**

MIKE SMEED, MANAGING DIRECTOR OF INMOTION VENTURES

TYPE ONE VENTURES' PERSPECTIVE ON THE EVALUATION OF SPACETECH INVESTMENT OPPORTUNITIES

When evaluating investment opportunities in the New Space Economy, we prioritise key performance indicators (KPIs) and signals that reflect both the ambitious potential and pragmatic execution necessary in this sector. These criteria also highlight how our approach differs from evaluating opportunities in other industries:

1. VISIONARY POTENTIAL FOR PLATFORM CREATION

We look for companies that have the potential to evolve into large platforms with transformative, long-term visions. For example, SpaceX's Starlink and Falcon 1/9 rockets serve as stepping stones toward an audacious goal—enabling a Mars colony. Companies that pursue these kinds of platform-building strategies show the ability to scale their initial offerings into foundational infrastructure for the broader Space economy.

2. PRAGMATIC ITERATION AND PRODUCT DELIVERY

A critical KPI is the ability to iterate rapidly and deliver tangible results. We steer away from hardware companies that exist only on paper or in prototypes. Instead, we look for teams that build, test, and ship hardware in the real world, demonstrating not only technical competence but also a culture of execution. Iterative product cycles and real-world deployment are non-negotiable in an industry where time-to-market and risk management are key differentiators.

3. RISK APPETITE OF COMMITTED TEAMS

We recognise the advantage of teams who are willing to take outsized risks with their time and careers. This energy and boldness are essential in the New Space Economy, where timelines are long, and challenges are immense. We seek out teams with this mindset because they are more likely to push boundaries and persevere through setbacks.

4. COMPLEMENTARY FOUNDERS AND TEAM DYNAMICS

Founders' strengths and weaknesses are as critical as their technical and market acumen. We focus on identifying teams whose capabilities align with areas where our team and network can provide meaningful support. This ensures not only a good cultural fit but also a symbiotic partnership where we can collectively increase the likelihood of success.

5. COMPELLING STORYTELLERS

Finally, we value founders who can articulate a clear, inspiring vision for their company. Storytelling is more than just marketing—it's about galvanising investors, attracting top talent, and securing key partnerships. Founders who communicate their mission with passion and clarity are better equipped to navigate the complex and high-stakes environment of the Space economy.



HOW THIS DIFFERS FROM OTHER SECTORS

The Space economy stands apart from other sectors, offering a unique blend of vision and pragmatism. Unlike software startups that can pivot rapidly, Space companies thrive in a high-capital, high-stakes environment where long-term planning and meticulous execution are key drivers of success.

The sector's reliance on advanced physical infrastructure, compared to industries dominated by digital products, fosters a culture of rigorous iterative development and real-world deployment. The nature of SpaceTech drives breakthroughs with cross-sector applications, adding value to multiple verticals like telecommunications, defense, and climate monitoring.

The Space Industry is rapidly expanding, with increasing demand for satellite services, Space tourism, and in-orbit manufacturing, presenting significant opportunities for early movers. Additionally, increasing collaboration between governments and private companies creates opportunities for investors to participate in large-scale projects with reduced risk and strong growth potential.

Beyond financial returns, investments in Space contribute to scientific advancement, resource exploration, and the long-term future of humanity, aligning with mission-driven investment strategies. This makes aligning values and vision not just important but essential, creating opportunities for purpose-driven innovation that will leave a lasting impact on our world and beyond.

HOW TO BE A PLAYMAKER

AS AN INVESTOR

When evaluating SpaceTech investments, it's essential to adjust traditional metrics used for other tech sectors (such as Annual Recurring Revenue in SaaS) and focus instead on industry-specific indicators. These tailored metrics provide a more accurate reflection of the growth trajectory and potential of these frontier technologies. Due to the nature of different subverticals, companies working in this domain are exploring hybrid or novel business models that are better suited to their customers' needs.

When looking to more novel market opportunities, establish your hypothesis for when the inflection point in the market will be and invest at the right time. For example: if your hypothesis is "there will be a permanent research centre on the moon in 20 years", what technologies could you invest in today that will make this possible? – i.e. lunar transportation or communication.

AS A FOUNDER

Your business can't be an academic endeavour, there also needs to be a clear commercial applicability and scale. Take the time to understand your target customer and where you fit in the market. Make sure you show prospective investors that you understand the market opportunity and where you play. And if they're new to Space, help them to understand the potential too.

Understand if you are a **market taker** or **market maker**. If you are going to be a **market taker**, then you should start with a customer demand signal, or known pain point, and build a solution that's rooted in a problem to solve. In this scenario, you will have more confidence in the desirability of your offering, and will be testing for feasibility and viability. If you are going to be a **market maker**, there may be few demand signals from your target future customers.

In this scenario, there is value in exploring strategic partnerships with your target customers, for the purpose of knowledge exchange and early opportunities to test your offering with the target market. When speaking with prospective customers, remember to be clear on the opportunity you present for them and know what you want and need from them.

Ask yourself: "Will we form part of our customer's supply chain? Or will they be an end-user of our technology?"

If you're not ready to sell them a solution, explore other ways you might collaborate that will help you increase levels of confidence in how you measure against viability and desirability.

AS A CORPORATE END-USER

Begin by mapping out key challenges your organisation is facing where SpaceTech could be a part of the solution. For example, if you are a Financial Institution or Consumer Goods company, try to understand how Earth Observation data could play a role in meeting new climate and nature focused regulations. Starting with the problem will make it easier for you to identify the right partner to work with on the solution.

Hypothesise. Test. Learn. Repeat.

While some of the more emerging technologies will take longer to incubate, start shaping your hypothesis about how this technology could disrupt your industry in the future.

Ask yourself: 'Over the past few years automotive companies have been focussed on the key trends and questions dominating mobility, namely the impacts of Autonomy, Connectivity, Electrification and Shared mobility (ACES). These themes have challenged automakers to go beyond their traditional business models and have been forced to look externally for inspiration.'



A CORPORATE VENTURE CAPITAL (CVC) PERSPECTIVE

MIKE SMEED IS THE MANAGING DIRECTOR OF INMOTION VENTURES, THE CVC UNIT OF JAGUAR LAND ROVER (JLR).

Established in 2016, as a subsidiary of JLR, the InMotion Ventures mandate is to invest in early-stage startups that are going to help accelerate the pace of innovation and delivery of JLR's strategic transformation.

JLR IS AN AUTOMOTIVE BUSINESS, WHAT'S THE LINK TO SPACETECH?

While the primary focus of our parent company is obviously the mobility space, particularly around themes like shared mobility, electrification, and the connected vehicle, we work to understand how these emerging themes will develop and the potential impact to the existing business model within automotive. The big questions include things like: "How will people buy cars in the future?" or "How do we anticipate the car sharing model to continue to develop and JLR's 2039 net zero ambitions?"

To help answer these questions, we consider how corporate venturing can help JLR to look at technologies that will have a real transformation impact on legacy ways of working. As such, our focus is on emerging techs like quantum computing, semiconductors, cyber security, and SpaceTech.

There are real parallels between what is happening within the Space Industry and in automotive. Where traditionally we saw Formula One as being a first mover and leader in automotive R&D, we now also look at the Space Industry as developing leading technology

that will have applications for the automotive industry. For example, take manufacturing advances that you see in Formula One. They end up coming into a production vehicle five years later (e.g. carbon fibre, regenerative braking in Formula One, aerodynamics). Our hypothesis is that it will be the same for the Space Industry. Technological developments made by players in the Space ecosystem will bring value to adjacent industries (such as automotive). We want to understand those technologies, and place bets on what ones will bring value to JLR.





A CORPORATE VENTURE CAPITAL (CVC) PERSPECTIVE

HOW IMPORTANT IS A CLEAR ARTICULATION OF THE PROBLEM THAT THE SPACETECH WILL SOLVE?

It's so important to be clear on the problem that the solution solves for. As an investor, we need to see that there is a market for the product. You don't want to see a solution looking for a problem. Just because you can technically do something, doesn't always mean that you should. A clear business case, in addition to technical viability, is crucial. In the SpaceTech ecosystem, a good example of where you are first and foremost solving a problem, before focusing on the technology, is the sustainability of data centres. A major sustainability challenge for data centres is the energy intensity they require and the water intensity for cooling them. This is a real problem, with a need to solve it.

If you're able to put the data centre in Space, you can overcome both challenges. You could benefit from cooling savings, and if you can get the orbit right, then you've got the sun for continuous solar power. There is a business case here. Next is to focus on the solution. Problem first, then solution. Not the other way around.

FOR STARTUPS, WHERE THE COMMERCIALISATION TIMELINE IS LONGER, WHAT IS YOUR APPROACH TO DE-RISKING THE INVESTMENT DECISION?

In scenarios where we know that the company is focused on a Space application of their technology, it's also great to see that there are Earth applications that are tangible now. They could be a source of income, today, that will help them to reach their longer term goals. There is real alignment

between what a lot of automotive companies are looking at, in terms of electrification, and what the Space Industry is looking at in terms of transportation in Space, for example. They're so similar to the point that we have looked at a couple of deals that both ourselves and NASA's CVC unit was looking at. We looked at the deal because of what the technology could mean for automotive, while NASA are obviously focused on the Space applications of the technology.

We try not to be too fanciful or sci-fi about some of the opportunities. We share the dream of the Space startup, but also want to ensure that there are those more tangible applications that can be delivered in a closer timeframe. The best scenario is where the startup's journey isn't viewed as zero to one hundred, but one with milestones between today and their end-vision,

that will deliver value in the nearer term. A well-defined roadmap with tangible milestones (potentially focused on creating value to adjacencies in the shorter term) is important. We understand that you're not going to go from here to Space. There are going to be steps in the dance that the startup will have to go through. Showing nearer term applications, while still holding on to the ultimate vision and dream, helps in de-risking the investment decision.



03

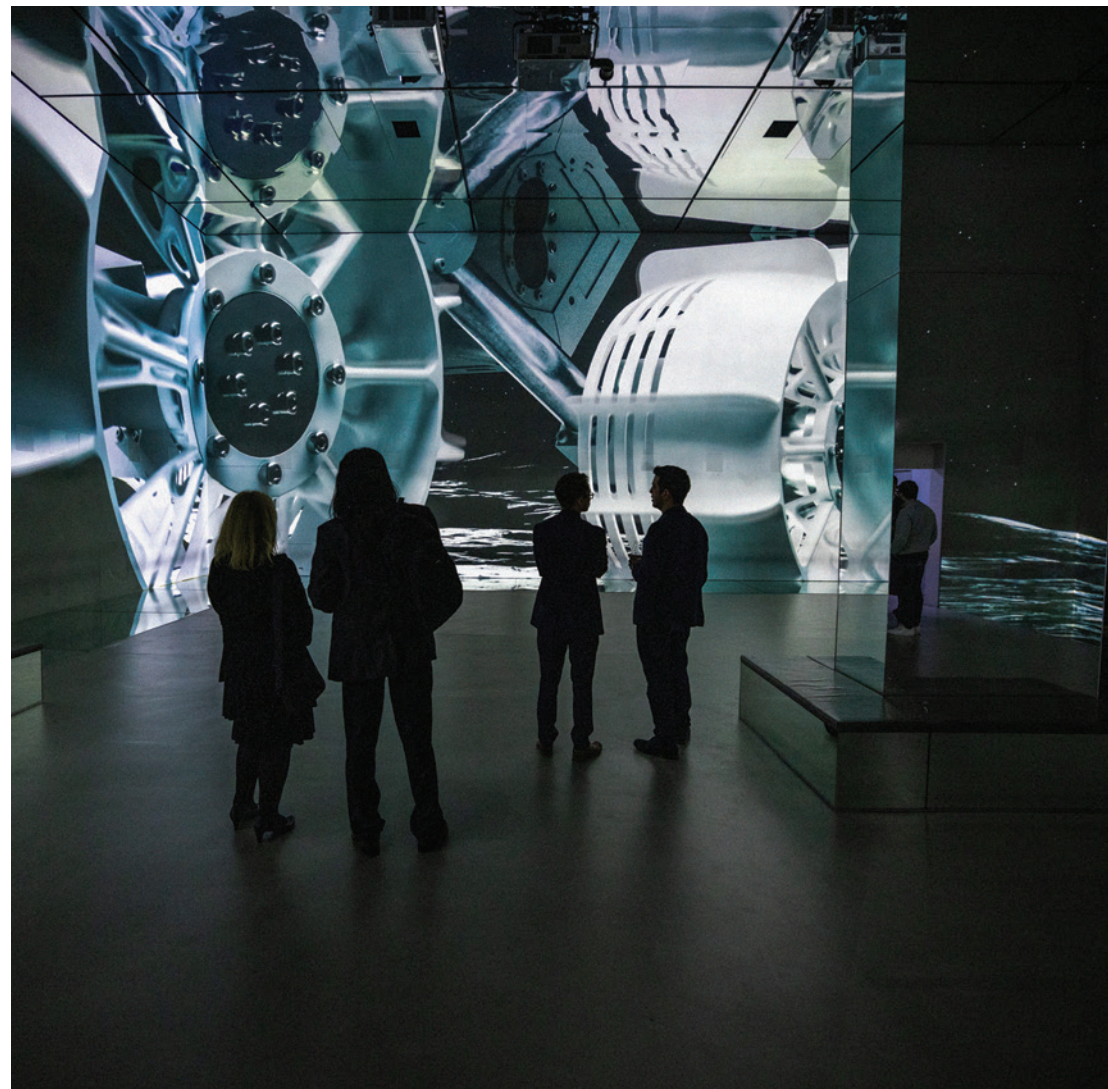
PRINCIPLE THREE

BE COLLABORATIVE: THE COMMERCIALISATION OF SPACETECH REQUIRES INTERDISCIPLINARY SKILLSETS AND KNOWLEDGE. IN SPACETECH COLLABORATION ISN'T JUST DESIRABLE; IT'S ESSENTIAL.

SpaceTech startups require deep expertise and close collaboration between investors, founders, corporates and government to drive the success of their business and the whole sector. This collaboration is crucial to de-risk investments, create trust in the entire ecosystem, and uncover opportunities to achieve common goals through meaningful partnerships and knowledge exchange.

WHY IS COLLABORATION WITHIN THE SPACE ECOSYSTEM CRUCIAL?

1. SpaceTech startups tend to be **more capital-intensive** than other sectors. However, there has historically been a shortage of investors providing follow-on funding beyond the Seed and Series A stages. This creates a funding gap that can hinder the ability of SpaceTech startups to scale and grow. To address this challenge, there is a real need for a diverse set of active investors. Collaboration between early-stage and late-stage investors is crucial. Together they can increase transparency and information sharing, share due-diligence practices, and co-invest in opportunities. By working together, these investors can ensure that Space startups can access the capital they need to scale and succeed.
2. The Space Industry is **highly complex and the regulatory landscape is still mostly undefined**. It requires unique technical expertise in science, engineering, and industry sales cycles. This complexity presents challenges for startups looking to succeed in the short term, as well as corporate innovation teams exploring how they can benefit from Space-enabled technology. To better formulate these new ideas, and address the unique challenges of the Space Industry, startups need to collaborate with a wide range of experts and end users. By sharing networks, knowledge, and corporate pain points, startups can tap into the diverse skills and experiences necessary to navigate the complex landscape of the Space Industry.



COLLABORATION CAN TAKE MANY FORMS. SPACE BUSINESSES CAN PARTNER WITH OTHER SPACE AND AEROSPACE BUSINESSES TO DELIVER COMPLEX PROJECTS. CORPORATES CAN PARTNER WITH EARLY STAGE **BUSINESSES** SO THEY CAN ACCESS NEW MARKETS AND BRING NEW PRODUCTS/SERVICES TO THE MARKET TOGETHER. INVESTORS CAN BE MORE THAN CAPITAL PROVIDERS, AND COLLABORATE WITH OTHER INVESTORS.

Below are examples of how diverse investors can bring value beyond cash to startups:

1 TECHNICAL INVESTORS

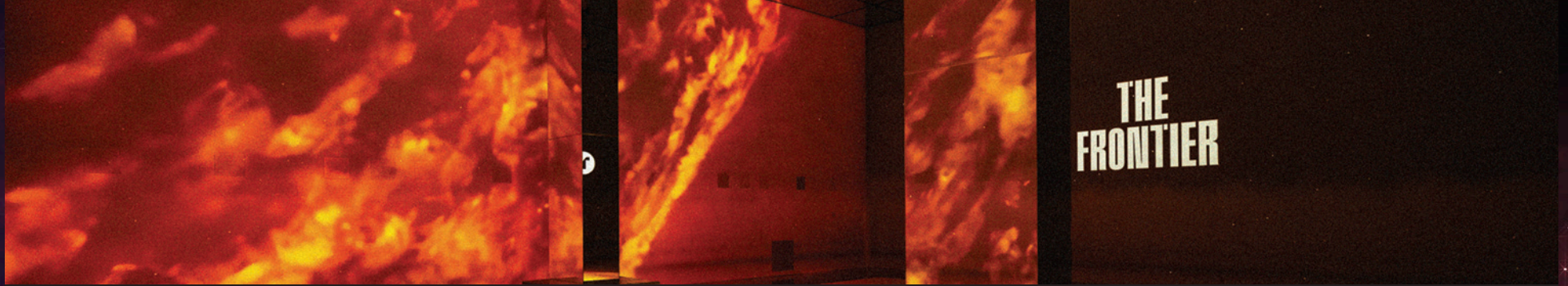
These investors bring **deep technical expertise** and **understanding of the complex science and engineering challenges** in the Space Industry. Their involvement can provide a strong validation of the startup's technology and capabilities for other investors, as it shows that **the due diligence process has already been thoroughly conducted**.

2 CORPORATES AND STRATEGIC INVESTORS

They can **tap into their large networks** to offer SpaceTech startups a range of valuable resources and support. They are also able to provide access to industry expertise, technical resources, and potential customers. Additionally, **their involvement can help signpost potential exit routes**. This can make **the investment look more attractive to other investors**.

3 EXPERIENCED SPACE INVESTORS

These investors play a vital role in effectively evaluating and supporting SpaceTech founders. By leveraging their deep understanding of the ecosystem, industry interdependencies, regulatory environment, and extensive networks, **they can navigate founders through the complexities of the Space sector**. Additionally, they offer valuable insights and reassurance to generalist investors, helping them better assess and capitalize on SpaceTech investment opportunities.



HOW TO BE A PLAYMAKER

AS AN INVESTOR

Two heads are better than one. You'll probably need more co-investors than you're used to. But bringing together a wide range of investors, with complimentary skills and specialist knowledge, will more likely result in success. This may mean you need to learn from experienced Space investors, or even help educate and upskill other investors in your network.

The best way to rapidly upskill is by immersing yourself in the ecosystem, and encouraging others to do the same. That way everyone can grow together and increase their chances of success.

You need to bring more than cash to the table for your portfolio companies. By being an active board member and providing expert advice, breaking down long term strategies into milestones by investment stage.

AS A FOUNDER

Make yourself an attractive investment to all types of VC investors, as they are with you for the long-run, and will play a large part in your success. In a fast growth area such as Space, the more experts you have around you the better. It's hugely beneficial for you to look at other types of investors that are aligned to your offering, such as ClimateTech and FinTech, who can bring a new strategic lens.

AS A CORPORATE END-USER

Be loud about your wins. You play a critical role in the Space ecosystem as a stamp of approval. Investors will look to you for signs of traction, so you need to immerse yourself in the market with investors, governments, and founders to share your success stories.



A FOUNDER'S PERSPECTIVE

JOSH WESTERN IS THE CO-FOUNDER AND CEO OF SPACE FORGE, A UK BASED ADVANCED MATERIALS COMPANY.

Founded in 2018, the company manufactures compound semiconductor substrates on Earth and in Space.

AS THE CEO OF A HIGH GROWTH COMPANY, DO YOU AGREE THAT COLLABORATION IS THE KEY TO SUCCESS?

I think that your statement is pretty much bang on the money. There are lots of ways that collaboration can cause direct, and indirect, impacts to drive the ecosystem forward. These could be startups working alongside their investor's network to solve a corporate pain point. Or a startup working with a corporate can result in investor interest, or any other combination. I think the only thing that's missing is the government. You need them in that mix as well, especially when talking about SpaceTech. You can't do anything in Space without government approval.

CORPORATES ARE OFTEN JUST SEEN AS BUYERS, BUT HOW IMPORTANT IS THEIR ROLE HERE?

One thing that's often missing for Space startups is more in-depth thought about the problem you're solving, identifying who your customer will be, and what your business model is. As with many DeepTech endeavours, technical feasibility is often front of mind for Space startups – as it should be. But I'm sure there are millions of engineers who have invented something incredible, but had no idea how to sell it, so today we don't even know it existed. Partnering with corporates can help frame your thinking, make sure there's a relevant problem, and that you're actually solving it.

Working alongside relevant corporates can also be helpful for long term growth. In our field, the corporates we're working with have the longest time horizon for things they invest in. That's because they can afford it. Lots of them are essentially huge deep tech companies and have survived, so they understand the importance of what startups can do for them in a five-year time frame.

YOU CAN'T DO
ANYTHING IN
SPACE **WITHOUT
GOVERNMENT
APPROVAL.**



A FOUNDER'S PERSPECTIVE

HOW DO YOU COMMUNICATE THE VALUE OF SPACE FORGE TO POTENTIAL COLLABORATORS?

We don't actively engage our customers on the fact that any of our materials are manufactured in Space until they ask. Instead, we talk around the performance improvements and enhancements that we can provide them with. For example, lowering the size, weight, and power of devices by about 60% or more. Space is just the necessary environment for us to conduct our business. Simply put, if you got the same benefits of the Space environment as you did at the bottom of the ocean, then we would be called Sea Forge. Where it was made, other than a geopolitical consideration, is effectively irrelevant. Inevitably, the question comes up, but by that point we've got them hooked on the product and what we could do for them.

HAVE YOU HAD ANY REAL-LIFE EXPERIENCES WHEN COLLABORATION HAS DRIVEN NEW OPPORTUNITIES?

We have some very large corporates as customers and end users, including major UK telecom companies. We were originally working with BT around 5G and 6G improvements. This led to us meeting various telecom industrial network trade associations, where we learned that the UK is concerned it largely doesn't manufacture any of the infrastructure that it relies on for its networks. This in turn unlocked a new segment for us to explore – secure communications – and found us a route to support dual-use telecommunications. There's a root and branch effect when you can access those partnerships.

Not only did these telecom companies unlock new routes to market, their participation and their belief in what Space Forge can achieve is what has led to our recent fundraise. Both companies had conversations with our new investors that came into this round to help them build trust in our products. For brands as big as theirs to be willing to sit down with an investor and chat about a company that isn't even the size of their administration team is a pretty great thing.

THERE'S A **ROOT AND BRANCH EFFECT** WHEN YOU CAN ACCESS THOSE PARTNERSHIPS.



04

PRINCIPLE FOUR

DON'T UNDERESTIMATE THE ROLE OF GOVERNMENT IN THE SPACE INDUSTRY: LEAN ON AND COLLABORATE WITH GOVERNMENTS. MANY HAVE MAJOR ROLES TO PLAY IN PROVIDING FINANCIAL SUPPORT, POLICIES, AND STRATEGIES THAT CAN PUSH THE ENTIRE SPACE SECTOR FORWARD AND EVEN BE INITIAL CUSTOMERS DIRECTLY OR THROUGH SUBSIDIES.

In 2023, the governments globally spent \$117bn on their Space budgets – that's a 15% increase from 2022.⁵ They can continue to support a Space ecosystem that will thrive, by investing in startups and companies through various means. These include grants, open innovation challenges, business support programs, direct procurement and contracts.

At the London Frontier Roundtables, participants shared insights around their experiences and interpretations of the role of government grants and other funding mechanisms.

Participants acknowledged that whilst grants can be helpful to get a startup off the ground, “the grant process takes so long to write and to get to an outcome and startups can die in that time. I’ve found though that grants are more geared to academia and are not very innovation friendly” one founder shared during the roundtable.

This government funding approach worked well in the old Space economy when most end users were government and defence. **In the New Space Economy they can work equally well if aligned with the startups own future vision,**

but were described by a founder at the London Frontier as “too slow, restrictive, and sometimes cause the startup to deviate away from their north star.”

However, it’s not all bad news. In tandem to offering grants to support early-stage innovations, **government procurement of services is another mechanism that is viewed favourably by the ecosystem as it is seen to give a ‘stamp of approval.’** These contracts are often a better signal of traction than grants to future investors, as they demonstrate a real demand for their product. One startup founder described their perception of this as: “every pound in a contract is worth 10x to an investor, whereas every pound in a grant isn’t worth all too much to an investor”.

Another alternative to grants are open innovation challenges, such as the UKRI Challenge Fund, DARPA Grand Challenges or NSF Convergence Accelerator.

Open innovation is often viewed favourably by the different actors in the ecosystem. Open-Innovation programs can align startups with real-world challenges, and ensure that solutions developed are directly relevant to the needs of industry. They often provide startups with direct access to end users. This helps them gain a better understanding of the problems they’re facing, while giving them the opportunity to test and build their product-market fit. However, one founder said that open-innovation challenges “need to be well funded. The funding available needs to be greater than the cost to us of responding to the challenge, which unfortunately it rarely is”.



HOW TO BE A PLAYMAKER

AS AN INVESTOR

Remember that grant funding and revenue are not equal, even if their value is. Seeing a Government body give a contract to a Space startup often carries more weight, as this demonstrates demand for the product or service.

Support your portfolio companies with their governance to ensure that they remain on track with core activities, and only apply for grants if they align with these activities.

AS A FOUNDER

Explore government grants when they align with your development roadmap. They can be a fantastic way to provide you with early, non-dilutive capital that can fund technical development. They also are productive in ensuring you align with government strategy, can provide visibility for your company, and in some instances come with pathways to end-users.

Understand that, to reach your full potential, you need to graduate from government grants. Grant funding can be a lifeline for early stage companies, but it can also hinder progress and be time consuming. You should be progressing from grant funding to commercial, or government contracts, as early as possible. This will help to rapidly establish your product-market fit and be a green flag for investors.

AS A CORPORATE END-USER

Working alongside governments by advising your short and long term business challenges with organisations, such as UKRI, will direct government funding to the right areas.

Leverage consortium grants to get a Proof of Concept funded (or mostly funded). This will help startups develop their product with your requirements in mind.



05

PRINCIPLE FIVE

ADDRESS CHALLENGES HEAD ON: TO UNLOCK SPACE'S FULL POTENTIAL WE MUST DEVELOP AN ENABLING REGULATORY FRAMEWORK, NURTURE SKILLS, AND CONTINUE TO FOSTER THE GROWTH OF THE STARTUP ECOSYSTEM.

During the roundtables, participants shared their insights for the most common challenges seen across the ecosystem and perspectives on how to overcome them:

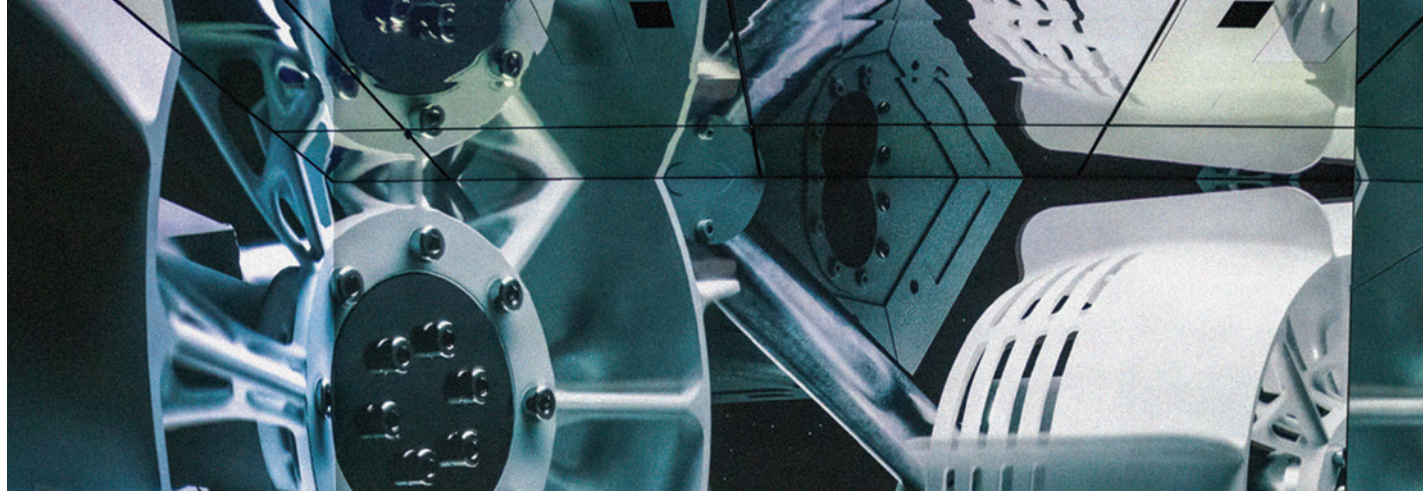
DIFFICULTIES IN SCALING SPACE STARTUPS

“AS A FOUNDER, WE CAN’T JUST FOCUS ON BUILDING THE TECH, WE NEED TO THINK ABOUT HOW WE COMPLY WITH A COMPLEX REGULATORY ENVIRONMENT, CREATE CASH FLOW OPPORTUNITIES IN THE SHORTER TERM, AND FIND THE RIGHT TALENT.”

Space startups still face challenges when it comes to scaling their businesses, despite timelines and costs significantly decreasing in recent years. These challenges include funding difficulties, lack of product-market fit, talent and regulation constraints, and the need for advancements in adjacent technologies like robotics and energy solutions. These complexities, and dependencies on external factors, can make it difficult for investors to identify opportunities and increase the risk of startups running out of cash before reaching commercialisation.

To mitigate these challenges, SpaceTech startups should consider pursuing alternative routes to revenue in the short term to sustain their operations during extended development periods. This could involve forming strategic partnerships with established corporates who can provide access to expertise, resources, and potential customers to help accelerate their go-to-market strategy. These actions can help startups maintain their long-term vision, while bringing in cash and building their reputation and network.

When at the point of scaling, startups need to be aware of alternative financing besides further VC funding. These include debt, government contracts, asset finance, revenue-based financing, and private equity. Identifying and pursuing these alternative financing options may help startups bridge the gap, while developing their technology and securing their first customer.



TALENT AND WORKFORCE DEVELOPMENT

“FOR THE COMMERCIALISATION OF SPACE, IT TAKES THE MESHING OF DIFFERENT INDUSTRIES AND SUBJECT MATTER KNOWLEDGE.”

The Space Industry faces a talent gap. As startups struggle to find individuals with the right combination of technical expertise and commercial acumen, one founder told us that: **“Where the Space Industry is heading, you can’t expect the talent to exist, you have to nurture it yourself.”**

When hiring, prospective candidates tend to have either more commercial expertise or technical expertise. But even when both are present, compensation challenges arise as top talent can earn significantly more at larger players or start their own businesses. While outsourcing technical work can provide a short-term solution, it’s not a sustainable long-term strategy. One solution to help address this challenge is to increase investment in STEM educational programmes that include modules on business management and entrepreneurship. This will help cultivate a larger pool of individuals with the necessary technical skills and interest in the Space Industry.

Making these career paths more attractive through competitive compensation, professional development opportunities, and a supportive ecosystem, can help retain and nurture top talent.

The complexities of the Space Industry mean that founders must have technical capabilities, and strong storytelling and communication skills. When seeking investment or procurement, the ability to effectively convey the startup’s vision and value proposition is just as important as its technical merits. Many founders come from technical backgrounds, and may lack the necessary storytelling skills.

To address this, accelerator programs and investors can provide upskilling opportunities to help founders develop these critical competencies. Founders should also be open to deferring to experienced executives, when the company’s growth and complexity demand a different set of leadership skills.

Recognising that for Space startups where their customers sit in different industries, one strategy could be to hire experienced industry leaders who understand the challenges and processes of the industry the startup is selling to, whilst also building a strong advisory board with deep industry knowledge and networks.

REGULATORY UNCERTAINTY

“WE NEED TO PROMOTE TRANSPARENCY IN THE REGULATORY PROCESS TO PROVIDE CERTAINTY FOR THE ECOSYSTEM.”

The current regulatory framework for Space businesses is not well-defined, which hinders the speed-to-market for domestic companies and limits commercial opportunities. One founder said that getting licences to operate in some geographical jurisdictions is easier than others. This, in turn, impacts the way investors perceive Space as an investment opportunity. Investors require a certain level of regulatory clarity, and safety, to provide assurance for their investments.

However, the complex web of different regulatory bodies that Space startups must navigate diverts valuable time and resources away from core business activities – especially in the early stages. To address these challenges, it's crucial to develop a clear understanding of how future legislation will shape the New Space Economy – particularly in areas like Space debris management, Space resource utilisation, and cybersecurity. However, as one participant of the roundtables noted, “lawyers can’t do it alone.” It will require interdisciplinary skillsets, and knowledge, to build the right regulatory environment that will effectively support the New Space Economy.



“WHEN CONSIDERING SPACE REGULATION AND LEGISLATION, IT’S GOING TO BE IMPERATIVE WE LOOK AT IT FOR HUMANITY AS A WHOLE VERSUS ONE SPECIFIC COUNTRY OR ANOTHER”

EMMA EDHEM, LORD MAYOR'S ALDERMANIC ENVOY FOR SPACETECH AND INNOVATION



HOW TO BE A PLAYMAKER

AS AN INVESTOR

Act as a second voice for your portfolio companies and work with government to help shape their policy.

Bring your experience, and work, alongside startups to identify the skills gap they have and draw up their hiring plans.

AS A FOUNDER

Don't be afraid to look beyond VC funding. Banks have huge pools of capital that are open to DeepTech founders. But in order to access it, you need to speak their language, show how your company stands against, and can beat, standard investment pools.

Consider joining task forces or working groups to help shape the regulatory framework based on your needs and experienced challenges.

AS A CORPORATE END-USER

View Space startups as a partner, not just a vendor. These startups are technical experts offering great solutions. They may not have all the answers, but be open to sharing insight around your industries processes and challenges to help inform their solution design and business model.



INTERVIEW WITH EMMA EDHEM, LORD MAYOR'S ALDERMANIC ENVOY 2023-2024, AND A PROFESSOR IN PRACTICE FOR SPACE ECONOMY, TECHNOLOGY AND INNOVATION AT DURHAM UNIVERSITY'S SPACE RESEARCH CENTRE.

PROFESSOR EMMA EDHEM IS A BARRISTER, MASTER OF THE BENCH AND DISTINGUISHED BARRISTER OF THE HONOURABLE SOCIETY OF GRAY'S INN, PRACTICING FROM N05 CHAMBERS.

Emma is the Lord Mayor's Aldermanic Envoy 2023-2024, and a Professor in Practice for Space Economy, Technology and Innovation at Durham University's Space Research Centre. She is working on finding solutions which could help pave the way for the emergence of a Space Economy within the private sector.

WHAT'S NEEDED TO MOVE THE NEEDLE FORWARD ON CREATING A SUITABLE REGULATORY ENVIRONMENT FOR THE SPACE ECOSYSTEM?

We need everyone around the table to focus on the most important gaps in the current regulatory environment. First, we need to determine what the right laws need to be at the country level. These could vary in terms of cultures and requirements. Then we need to understand what international treaties are required. While global volatility can make it more challenging to align and agree on international treaties, I believe that Space is about the future of our planet and humanity. That is something we all have in common.

WHEN WE CONSIDER HOW THE DEVELOPMENT OF REGULATION FOR THE SPACE INDUSTRY COULD UNFOLD, ARE THERE ANY PARALLELS WE CAN DRAW ON FROM OTHER INDUSTRIES OR TOPIC AREAS?

Our first port of call should be to look at the development of Maritime law and treaties. We were able to come together at a global level and agree on how the maritime environment ought to be governed. Global leaders were able to reach a consensus on economic zones of the maritime environment, for example, on who owns certain sea beds.

This was achieved through remarkable global agreements, and has shown that we can do this. Space is the next undefined environment we must do this for. The International Maritime Organisation (IMO) has been an effective body driving international cooperation of the Maritime environment, perhaps we need an equivalent for Space?



INTERVIEW WITH EMMA EDHEM, THE LORD MAYOR'S ALDERMANIC ENVOY FOR SPACETECH AND INNOVATION

WHAT IS THE ROLE OF GOVERNMENT IN SUPPORTING THE GROWTH OF THE SPACE INDUSTRY?

If you're going to grow an economy, you can't do it without the government playing a role. Governments provide incentives. They are a voice. They encourage participants in that economy. The role of academia is also incredibly important. A UK based university is exploring the creation of a Space Arbitration Centre, which will be increasingly needed as the Space Economy continues to grow. The role of the centre is to work on legal disputes that arise from activities carried out in Space.

SPACE ISN'T EASY, BUT IT'S NOT BEYOND REACH AS WE'VE EXPLORED. WHAT ADVICE WOULD YOU GIVE TO SOMEONE LOOKING TO ENTER THE SPACE INDUSTRY?

Just do it. It's one of the most exciting areas right now and it's still the beginning. If you become an active participant of the Space ecosystem today, you'll be able to shape the future of the industry and drive its progress. Those who lead the way inevitably end up taking marginally more risks, but they are the true Playmakers.

IF YOU'RE GOING TO GROW AN ECONOMY,
**YOU CAN'T DO IT WITHOUT THE
GOVERNMENT PLAYING A ROLE.**

THE 2024 MOMENTS THAT MATTERED

THE 2024 MOMENTS THAT MATTERED – A JOINT PERSPECTIVE FROM TYPE ONE VENTURES & DELOITTE

In the ever-expanding frontier of the New Space Economy, 2024 was a year of remarkable progress and groundbreaking achievements. Certain moments stand out as pivotal events that not only showcase the relentless momentum of the sector but also serve as testament to the visionary spirit of those driving it forward.

From technological breakthroughs to landmark partnerships, each milestone represents a step towards a future where Space is not just a realm of exploration, but a thriving economic ecosystem with commercial opportunity at its core. 2024 was a year of remarkable momentum as we see more people enter the ecosystem.

To acknowledge the continued momentum of the ecosystem, we've included 10 moments that mattered in 2024 (there are of course many more that we were not able to include) – in our view, these moments are signals of positive trajectory of the New Space Economy and set the stage for unprecedented growth and possibility.

They should be celebrated, used as inspiration for those who will follow the same path, and serve as catalysts for further innovation and investment in the Space sector.



1

CORPORATES CONTINUE TO PARTNER WITH SPACETECH TO UNLOCK THE VALUE OF THE IN-SPACE ECONOMY⁶

Axiom Space focused on corporate partnerships throughout 2024, collaborating with some of the world's largest brands, including Prada. These partnerships aim to bring diverse expertise and capability to the Space ecosystem, ranging from Spacesuit design to pharmaceutical research in microgravity.

2

GOVERNMENT SPACE AGENCY RECOGNISES THE VALUE OF EMERGING SPACETECHS TO DELIVER ON MISSIONS⁷

Lunar Outpost secured a prime contract from NASA for the Lunar Terrain Vehicle (LTV) Services program, rather than serving as a subcontractor. The company is leading the "Lunar Dawn" team, which includes Lockheed Martin, MDA Space, General Motors, and Goodyear, to develop a lunar rover for Artemis missions.

3

AUTOMOTIVE PIONEER MAKES AN INVESTMENT INTO THE SPACE INDUSTRY, RECOGNISING SYNERGIES ACROSS INDUSTRIES⁸

InMotion Ventures, Jaguar Land Rover's venture arm, made its first investment in a Space startup by participating in a \$65 million Series B+ funding round for CesiumAstro, a provider of Space communications technology.

4

TECHNICAL INNOVATION WITHIN THE INDUSTRY CONTINUES TO MAKE SPACE MORE ACCESSIBLE⁹

SpaceX successfully caught their Starship heavy rocket booster using massive metal 'chopsticks' at their Starbase facility in Texas. This achievement, part of the Starship development program, marks a significant advancement in reusable rocket technology.

5

PUBLIC-PRIVATE PARTNERSHIPS PROVE VALUE ONCE AGAIN¹⁰

An incident where astronauts were temporarily stranded on the International Space Station (ISS) due to issues with the Russian Soyuz Spacecraft highlighted the importance of collaboration between private and public Space sectors, leading to increased discussions about using SpaceX's Crew Dragon as a potential backup for crew rotations.

6

REGULATORY MILESTONE DEMONSTRATES COMMITMENT TO ENABLING INNOVATION¹¹

AstroForge received the first-ever commercial license from the US Federal Communications Commission for operating and communicating with a Spacecraft in deep Space. This license allows AstroForge to proceed with its asteroid mining mission, marking a significant regulatory milestone for commercial deep Space activities.

7

PRIVATE COMPANY BECOMES THE FIRST TO SUCCESSFULLY LAND ON THE MOON¹²

Intuitive Machines' Odysseus lander became the first privately-built Spacecraft to successfully land on the Moon as part of NASA's Commercial Lunar Payload Services (CLPS) program. The mission, IM-1, delivered several NASA and commercial payloads to the lunar surface.

8

ADVANCES IN ROBOTICS ENABLES IN-SPACE HEALTHCARE DEVELOPMENTS, OPENING UP OPPORTUNITIES FOR FUTURE MISSIONS¹³

Virtual Incision, a Nebraska-based startup, completed the first simulated surgery aboard the International Space Station using a surgical robot. This breakthrough could revolutionize medical care for future long-duration Space missions and remote surgeries on Earth.

9

SPACE SUSTAINABILITY MAKES HEADWAYS¹⁴

Astroscale successfully conducted fly-around observations of Space debris using their ELSA-d (End-of-Life Services by Astroscale-demonstration) satellite. This mission demonstrated progress in developing technologies for active debris removal in low Earth orbit.

10

VENTURE INVESTMENT FOR GROWTH STAGE SPACETECH COMPANIES REACHES EUROPE^{15, 16}

D-Orbit and The Exploration Company secured two of the five largest venture rounds for 2024 globally. D-Orbit, an Italian space logistics startup, secured a \$166m Series C investment, and The Exploration Company, a Franco-German reusable spacecraft developer, secured \$150 million in Series B investment.

AS WE LOOK FORWARD, 2025 PROMISES TO BE ANOTHER YEAR OF GROUNDBREAKING TECHNOLOGICAL ADVANCEMENTS, STRENGTHENED COLLABORATION, AND UNRELENTING AMBITION FROM THE PLAYMAKERS DRIVING THE ECOSYSTEM FORWARD. WILL YOU JOIN THEM?

APPENDIX 1 – METHODOLOGY FOR TECHNOLOGY DEVELOPMENT STATUS

To accurately determine the development status for each technology we have developed a methodology using the following three criteria:



To assign a ranking for each of the above criteria's we took a view of the best in class, best funded and most mature companies within each technology vertical. We based this on those who had the highest Technology Readiness Level and were furthest on the commercialization journey, prioritizing real end-customer partnerships and clients.

This is not a definitive view of all technologies or of the maturity of each technology, and is based of research using the data sources: Pitchbook, CBInsights.

Feasibility	Viability	Desirability
Dreamed Team have a conceptual solution	Envelope model Team identify revenue streams and size	Said Customer expresses a pain point or unmet need
Drawn Team can draw solution & customer journey	Transaction view Team model economics of one transaction	Demonstrated Customer spends money on solving the problem
Prototyped Team has built a functional prototype	Business plan Team build assumption-based financial plan	Used Customer uses a version of the proposed solution
Piloted Team has conducted a pilot/live market test	Unit value proof Real sales prove unit economics	Purchased Customer spends time or money on solution
Launched Team has completed the commercial launch	Profit proof Continued sales prove business profitability	Repeated Customer repeatedly purchases or uses
Scaled Solutions serve more customers and markets	Sustainability Sustained positive cash flow proves value	Advocated Customer advocates and helps sell to others

APPENDIX 2 – TECHNOLOGY DEFINITIONS

Technology	Definition of Technology
Lunar Mining	The concept of extracting lunar resources, such as ice, minerals, and rare earth elements, to provide essential materials for supporting in-Space operations.
Lunar Habitats	The housing and life-support systems for a sustained human presence on the Moon.
Cis-Lunar Communications	The infrastructure and systems designed to enable data transmission between Earth, the Moon, and Space assets in between.
Asteroid Mining	The extraction of valuable resources from asteroids for use in Space or on Earth.
EO data: SAR	An Earth Observation (EO) sensor that utilizes radar-based sensing to provide high-resolution imaging in all weather conditions.
EO Data: Visible Light	An Earth Observation (EO) sensor that uses visible light to capture images of the Earth's surface during daylight hours, for observation and analysis.
EO Passive RF	An Earth Observation (EO) sensor that collects radio frequency signals from Earth for remote sensing and analysis.
LEO Sat comm	A satellite communication system in Low Earth Orbit (LEO) providing global coverage with reduced latency.
EO Data: Thermal	An Earth Observation (EO) sensor that captures Earth's thermal radiation for temperature mapping and monitoring.

Technology	Definition of Technology
EO: Hyperspectral	An Earth Observation (EO) sensor that captures detailed spectral data across multiple wavelength bands for identification and analysis of materials.
V-LEO	Very Low Earth Orbit (V-LEO) satellites operate closer to the Earth than LEO, and offer lower signal latency compared to higher orbits but will likely have shorter lifetimes.
MEO SatCom	A satellite communication system at Medium Earth Orbit (MEO) providing a balance between coverage, latency, and cost.
Optical Sat Com	A laser-based communication system for high-speed data transmission between satellites and ground stations.
Quantum Sat Com	A satellite communication system that uses quantum technology with enhanced encryption to provide secure comms.
EO Quantum	Enhancing Earth Observation capabilities by integrating quantum sensing with EO systems for highly precise measurements.
Space Situational awareness	The monitoring and tracking of objects in Space to ensure operational safety.
In-Orbit Edge Computing (EO)	Processing of data directly in Space before transmission to Earth, minimizing latency and bandwidth requirements, particularly for Earth observation data analytics.

APPENDIX 2 – TECHNOLOGY DEFINITIONS

Technology	Definition of Technology
Space Tug/OTV	The transportation and relocation satellites or payloads in Space using either a single use or reusable vehicle.
In Space manufacturing (for earth)	The production of high-value materials, products or components in the Space environment, typically in Low Earth Orbit, specifically intended for use on Earth.
Debris Removal	The process of collecting and eliminating Space junk and orbital debris that are orbiting Earth, to maintain a safe Space environment.
Space Tourism	Recreational Space travel that allows civilians to experience Space for entertainment.
In-Space Data Centres	Computing infrastructure positioned in Space to process data closer to satellites, forming a mesh network that enhances data accessibility and reduces latency for transmission back to Earth.
In Space manufacturing (for Space)	The production of high-value materials, products or components in the Space environment, typically in Low Earth Orbit, specifically to support further Space operations.
In-Orbit Edge Computing (Autonomy)	Data preprocessing capabilities directly in Space, minimizing bandwidth needs and reducing human intervention for autonomous satellite control.

Technology	Definition of Technology
Commercial Space Stations	Privately-owned and operated platform in orbit to support various activities including research, tourism, or manufacturing.
Space based solar	Collecting solar energy in Space using solar panels and transmitting it for on Earth applications.
Satellite Servicing and refuelling	The process of refurbishing, refuelling, and/or recycling inactive or nearing-inactive satellites.
Vertical Launch	Rocket launches from the ground to transport payloads to Space; although commercially scaled, more players are expected to enter the market in the next 2-3 years.
NextGen Manufacturing	Advanced terrestrial manufacturing methods for creating complex components designed to be used in Space systems.
NextGen Propulsion	Emerging propulsion systems, such as electric propulsion, nuclear thermal propulsion, and solar sails, provide more sustainable, cost-effective, and versatile solutions for Space travel.
Payload Return	Standalone technologies that safely brings back materials or experiments from Space to Earth.
Horizontal Launch	A new method of launching payloads to Space typically from an airport or a runway, providing greater flexibility and a broader range of use cases.

APPENDIX 3 – ENDNOTES

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