Space: The Final Frontier

How Falling Costs, Surging Demand, and New Regulations are Creating a Trillion-Dollar Space Economy

ICM HPQC FUND

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(with edits by Claude Opus 4.6)

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A New Space Age Is Dawning

$600 BILLION

The space economy today

↓

$1+ TRILLION

Projected in the next decade

80+
Countries with space programs

1M+
Satellites applied for

100x
Launch cost reduction

The space economy by the numbers: a $600 billion industry heading toward $1 trillion.

Source: Derived from our own analysis - see References on p.10.

> “Man must rise above the Earth—to the top of the atmosphere and beyond—for only thus will he fully understand the world in which he lives.”
>
> — Attributed to Socrates

Dr William “Bill” Jeffrey has worked with emerging technologies for 30+ years, driving the development of groundbreaking products and bringing innovations from the lab to the marketplace, including as Director of NIST and as CEO of HRL and SRI International. Bill is a director of unlisted and listed technology companies internationally.

For most of history, space belonged to governments. Only nation-states had the technology, the budgets, and the appetite for risk to operate beyond Earth’s atmosphere. That era is over. A commercial space economy has emerged that now exceeds $600 billion a year, and credible projections put it on track to pass $1 trillion within the decade. [1, 2]

Three forces are driving this shift: dramatic drops in the cost of getting to space, a wave of new commercial markets that can actually make money from space-based services, and governments around the world that are rewriting regulations to encourage private enterprise rather than monopolise it.

This pattern should sound familiar. When technology, markets, and regulation aligned for the internet in the 1990s, or smartphones in the 2010s, the result was explosive value creation. Space is approaching that same tipping point.

That does not mean it will be a smooth ride. Private investment in space startups peaked at $18 billion in 2021, then fell sharply to $5.9 billion in 2024 as high-profile failures reminded everyone that space is hard.[3] But government space budgets hit $135 billion in 2024, and early-stage commercial funding is rebounding. The speculative phase is giving way to a more mature market.

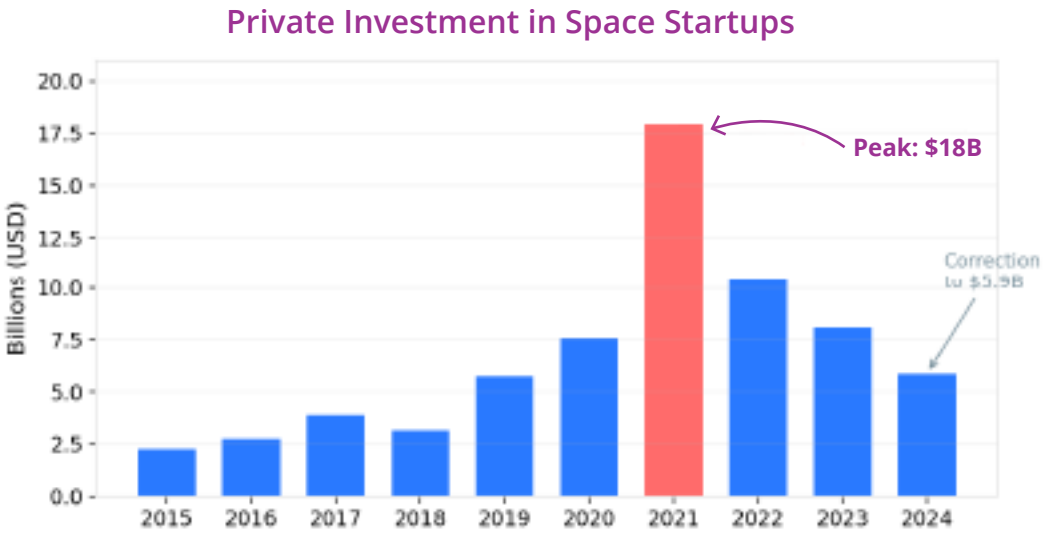


Figure 1. Private investment in space startups: a boom-and-correction cycle typical of maturing industries. Sources: Novaspace, PitchBook.[3]

Getting to Space Just Got Cheap

If there is one chart that explains the entire space transformation, it is the plummeting cost of launching things into orbit. In the 1980s, putting a kilogram into low Earth orbit cost about $54,000, roughly the price of a kilogram of platinum. At that price, only governments could play.[4, 5]

SpaceX changed everything. By mass-producing rockets instead of hand-building each one, by landing and reusing the most expensive stage, and by stripping out military over-engineering, they cut launch costs by more than 10 times.[6] The company's next vehicle, Starship, designed to be fully reusable, could cut costs by another 10 times, potentially bringing the price below $500 per kilogram. At that price, space is open for business in ways that were never economically feasible before.

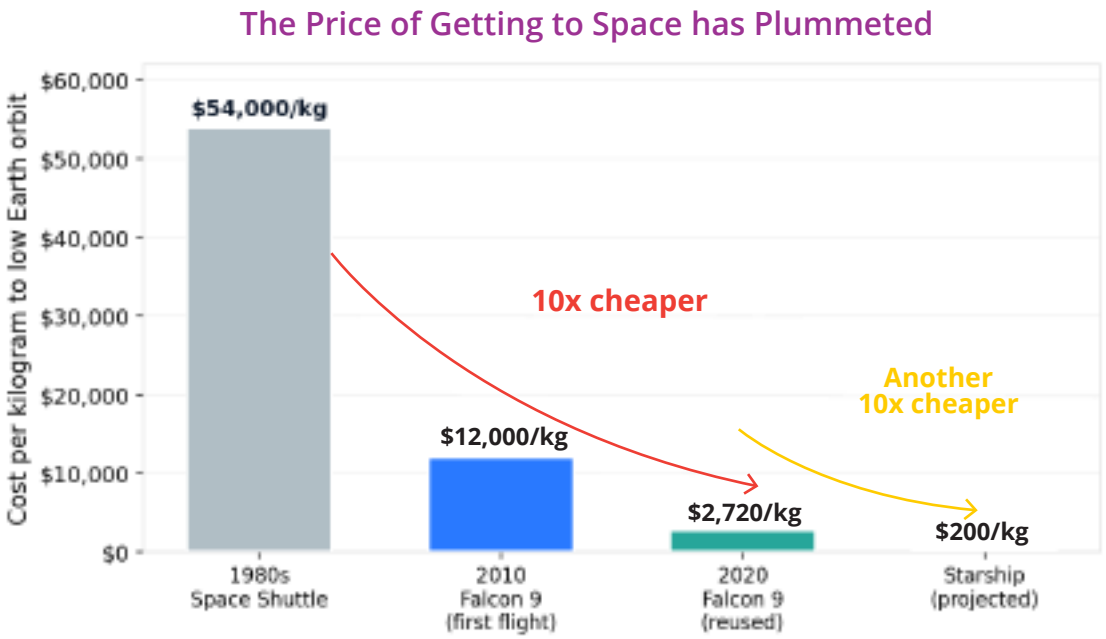


Figure 2. Launch costs have plummeted from $54,000/kg to under $3,000/kg, with Starship targeting under $500. Sources: CSIS, NASA, Our World in Data.[4, 5, 6]

Cheap launches changed everything about satellite design too. When a launch cost $100 million, you built a satellite to last 15 years with triple-redundant systems. When launches cost a fraction of that, you can mass-produce cheaper satellites, deploy them in huge fleets, and simply replace the ones that fail. The marginal cost of a satellite has dropped by 100 to 1,000 times since 1970.[7, 8]

A Million Satellites?

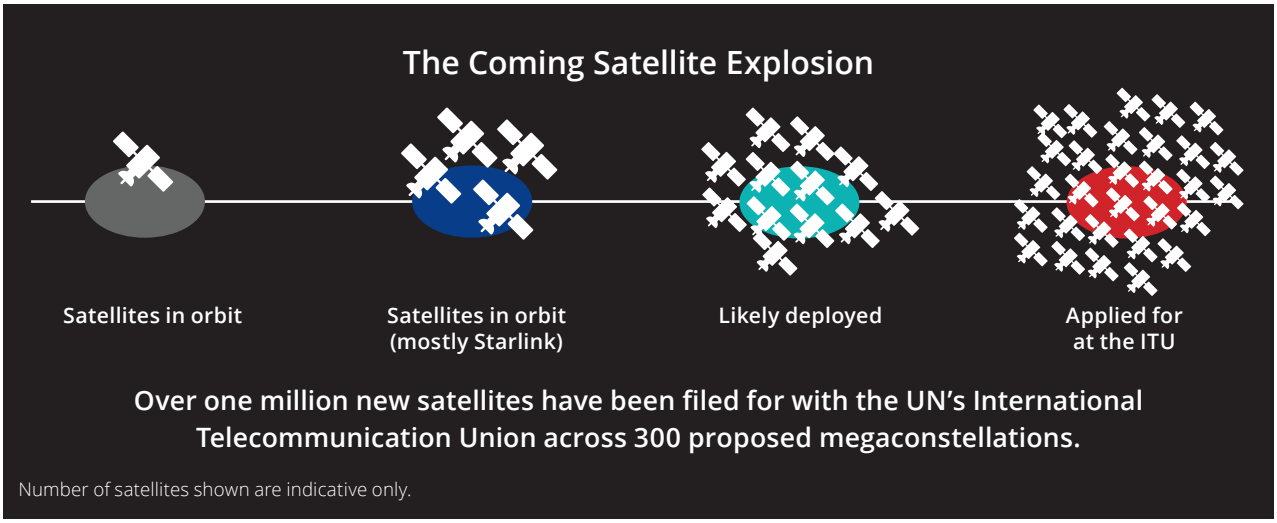


Figure 3. The number of satellites in orbit is set to increase by orders of magnitude over the coming decade.

The numbers being proposed are staggering. The International Telecommunication Union, the UN agency that assigns orbital slots, currently has applications for over one million new satellites across 300 proposed megaconstellations.[9, 10]

Not all of these will be built. Many filings are speculative spectrum reservations, the orbital equivalent of buying domain names in the early internet. But the momentum is real. In just the past few months, China applied for nearly 200,000 new satellites[11]; Jeff Bezos's Blue Origin announced a 5,400-satellite constellation called TeraWave[12]; and SpaceX filed to launch up to one million satellites as orbiting data centers.[13, 14]

Even if only 10–20 percent of what has been filed actually gets built, the number of satellites in orbit will increase by more than 10 times. The ripple effects on ground infrastructure, communications networks, and consumer services will be enormous.

Smarter Satellites, Powered by AI

Satellites have traditionally run on processors that were years behind what you carry in your pocket. Government satellites, built to survive harsh radiation for decades, used chips the size of a fingernail from an era when flip phones were cutting-edge.

Commercial companies are changing the rules. When you have thousands of satellites and replacements are cheap, you can use powerful modern chips and accept that some will fail. In late 2025, the Nvidia-backed startup Starcloud flew an H100 GPU, one of the most powerful AI processors on Earth, in orbit, delivering roughly 100 times more computing power than any previous spacecraft.[15, 16] They used it to train a small AI language model in space and run Google's Gemma AI model from orbit.[17]

This matters because more on-board processing means satellites can make decisions in real time rather than waiting to relay data to the ground, a game-changer for everything from autonomous navigation to military surveillance to disaster response.

Where the Money Is

Cheap launches and smart satellites are enabling tools. The real question is: who will pay for all this? It turns out the market opportunities are broader than most people realise.

Where the Money Is: Key Space Markets

Figure 4. Three of the biggest commercial opportunities emerging from the new space economy.

Phones That Talk to Satellites

The most immediately exciting development for ordinary consumers is direct-to-device (D2D) satellite connectivity—the ability for your regular smartphone to connect to satellites overhead without any special hardware. T-Mobile launched a Starlink-based satellite messaging service in mid-2025.[18, 19] AST SpaceMobile is targeting broadband-speed satellite service through AT&T and Verizon in 2026.[20] This market alone could reach $6 billion in annual revenue by 2032.[21]

Spy Satellites for Farmers and Hedge Funds

Space-based imaging used to be the exclusive domain of intelligence agencies. Now it is being used for surprisingly practical commercial purposes. Micro-insurance products are being built for small farmers in developing countries, using satellite imagery to verify crop damage.[22] Insurance companies use high-resolution imagery to catch fraud, verifying property conditions before and after natural disasters.[23] And hedge funds are monitoring factory output, traffic patterns, and shipping volumes from orbit to gain an edge on financial markets.[24]

The GPS Problem

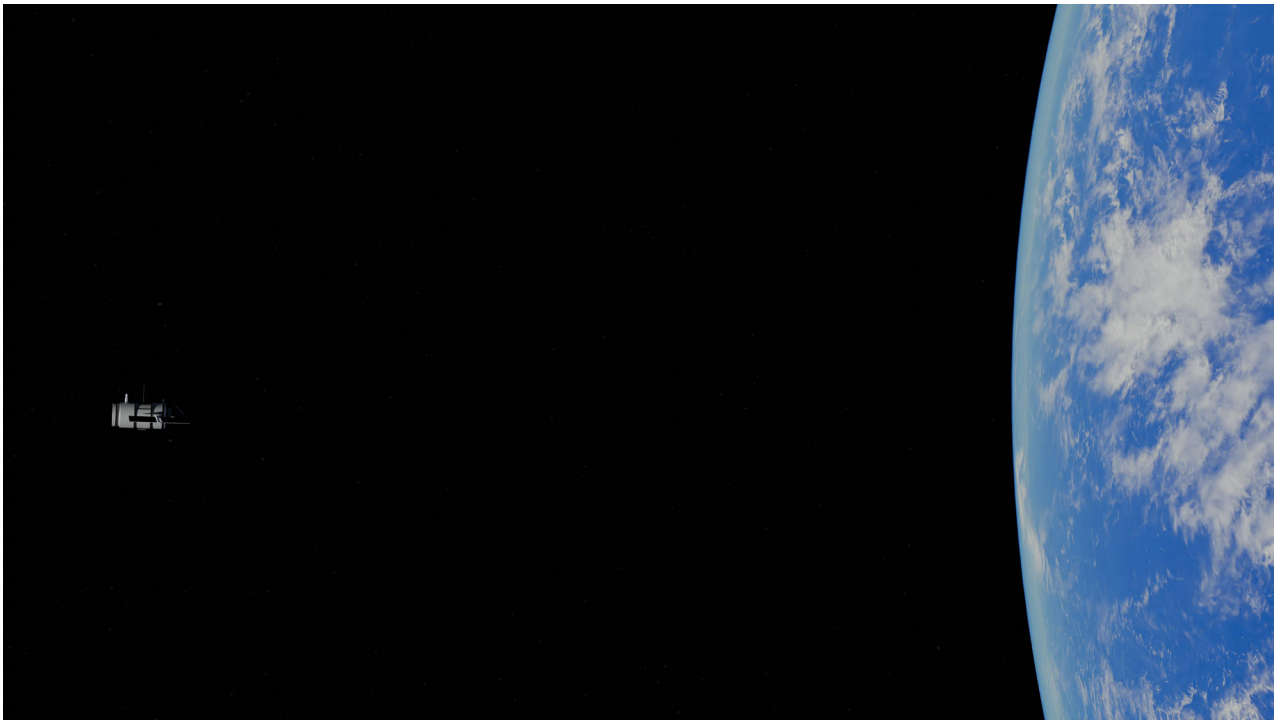
GPS is one of those technologies so deeply embedded in daily life that most people never think about it.

But it is vulnerable. The GPS timing signal synchronises the internet and most financial transactions with accuracy better than 30 nanoseconds.[25] If that signal were jammed or spoofed, a real possibility in a military conflict, the economic disruption would be severe. Startups like Xona[26] and TrustPoint[27] are building satellite constellations to augment or replace GPS for customers who need guaranteed, high-precision positioning.

Data Centres in Orbit?

Here is where things get truly ambitious and controversial. AI data centres on Earth are consuming staggering amounts of electricity and water. Some engineers argue that space offers a solution: unlimited solar energy and the vacuum of space for radiative cooling. Starcloud has proposed a five-gigawatt orbital data centre.[28] Google's Project Suncatcher reached similar conclusions about feasibility.[29] And SpaceX's million-satellite FCC filing is explicitly for an orbital data centre, which the company called "a first step towards becoming a Kardashev Type II civilisation."[30]

A reality check is in order. These analyses likely underestimate the toll of radiation on electronics, the stress of thermal cycling as satellites pass in and out of Earth's shadow, and the difficulty of running complex systems for years without maintenance. The economics probably do not work before the mid-2030s, and even that assumes launch cost reductions that have not yet been proven at scale.



The Long Game: Mining the Moon and Beyond

The most futuristic, but potentially most transformative, opportunity is in situ resource utilisation (ISRU): mining and processing materials in space rather than hauling everything up from Earth. The physics makes a compelling case. Earth's gravity is so strong that only about one percent of a rocket's total mass at launch actually reaches orbit. The rest is fuel and discarded stages. The Moon's gravity is so weak that payloads can be launched with dramatically less energy.[31]

The Moon contains oxygen, water ice, iron, aluminium, titanium, silicon, and rare earths.[32] Companies around the globe in Canada, the United States, Australia, Singapore, and Germany are developing lunar mining plans. One asteroid (16 Psyche), mostly iron and nickel, has a theoretical value at today's ore prices of about $10,000 quadrillion.[33] That number is absurd, but it captures the scale of resources waiting to be tapped.

As with every gold rush in history, most of the money will not be made by the miners. It will be made by the companies selling the picks and axes.

Governments are Getting Out of the Way

Over 80 countries now have national space programs, up from a handful during the Cold War, and more than 100 have at least one satellite in orbit.[34, 35] The Artemis Accords, signed by 61 countries as of early 2026, establish non-binding principles for the peaceful exploration and commercial use of space resources.[36]

More importantly, regulations are shifting from gatekeeping to enablement. The United States has streamlined launch licensing through the FAA and limits its regulation of commercial human spaceflight, allowing faster innovation. The European Union's proposed Space Act would create a single EU market for space activities. The United Kingdom's Space Industry Act 2025 caps liability for space operators, protecting startups from catastrophic financial exposure. And countries like Luxembourg and the UAE are creating legal frameworks that explicitly allow private companies to own resources they extract in space.[37]

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