

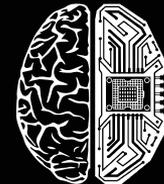
# SpaceTech Industry Landscape Overview

---

**Teaser**

**September 2021**

**[www.spacetechnology.com](http://www.spacetechnology.com)**



**SpaceTech  
Analytics**

# Table of Contents

<b>Introduction</b>
<b>Our Approach</b>
<b>Executive Summary</b>
<b>SpaceTech Industry in Figures</b>
Market Landscape
Investments Overview
100 Leading Companies in SpaceTech Sector
Leading Companies by Investment and Funding Stage
100 Leading Investors in SpaceTech Sector
<b>Top Publicly Traded Companies</b>
<b>Space Government Activity</b>
<b>Space Law</b>
<b>Economics Of Space</b>
<b>Space Transportation Infrastructure</b>
Spaceports
Earth to Orbit
Cislunar & Deep-Space Transportation
Space Traffic Management
<b>Space Health</b>
<b>Off-Planet Construction</b>
<b>Satellite Servicing</b>
<b>In-Situ Resource Utilization</b>
<b>Private Spaceflight</b>
<b>Space Solar Power</b>
<b>Space Settlement</b>
<b>Conclusions and Future Projections</b>
<b>Disclaimer</b>

**SpaceTech Industry Landscape Overview 2021 Q3** summarizes key observations in the SpaceTech ecosystem, a rapidly evolving and exponentially growing industry. In it, we have assembled information about **key industry trends** and created an **unprecedented database** of more than **12 000** SpaceTech related companies, **5 000** leading investors, **200** R&D Hubs and Associations, and **140** governmental organizations.

By providing insights into a number of **public and private companies** engaged in various sub sectors of the space economy, the **Space Industry Database and SpaceTech Landscape** deliver a comprehensive analysis. We also provide a primer on topical issues facing the industry at this important inflection point, as we increasingly transition from an historical period of **high-cost low-activity government space programs** to burgeoning **commercial space activities** driven by plunging costs through private innovation.

The study pays special attention to space-related companies relying on **AI, DeepTech, and Longevity**. By using them, they can further stimulate space exploration. SpaceTech has a **huge economic potential**, and has already resulted in the emergence of goods and services that have become an integral part of our lives.

# Approach of the Report

## Database

Identification of relevant:

- Companies
- Investors
- Hubs
- Universities & Research Centers
- Government Ministries, Departments & Agencies,
- Space Associations, that operate, interact with or are somehow involved in the space industry.

## Applied Research & Analytics Methods

Descriptive  
Analysis

Mixed Data  
Research

Exploratory Data  
Analysis

Comparative  
Analysis

Qualitative Data  
Collection

Data Filtering

## Data Sources\*

Media Overview  
(Articles, Press Releases)

Industry-Specialised  
Databases

Publicly Available  
Sources (Websites)

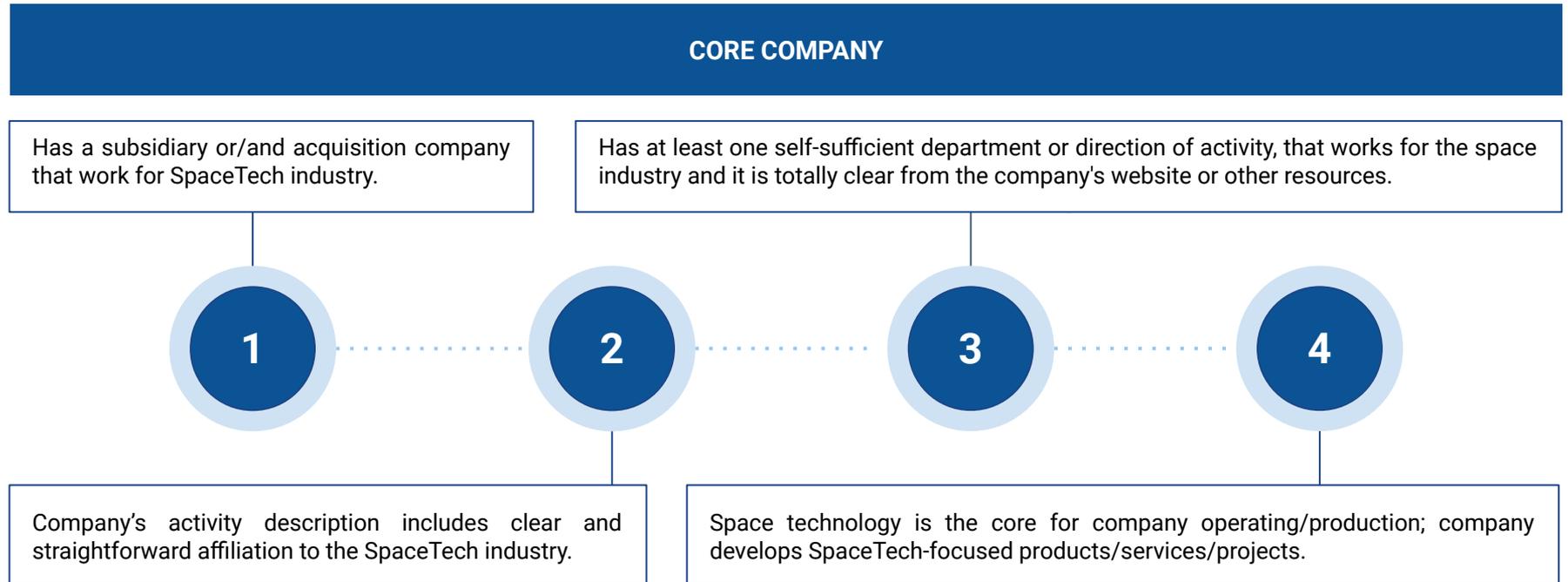
Industry Reports and  
Reviews

Industry Leaders  
Interviews

Relying on various research methods and analytics techniques, this report provides a comprehensive overview of the space industry. This approach has certain limitations, especially when it comes to the leveraging of publicly available data sources and secondary research. SpaceTech Analytics is not responsible for the quality of the secondary data presented herein; however, we do our best to eliminate said risks by using different analytics techniques and cross-checking data. Please note that we did not deliberately exclude certain companies from our analysis. In fact, the main reason for their non-inclusion was incomplete or missing information in the available sources. With respect to the investors in the main database, we include only institutional investors who have invested into SpaceTech companies or SpaceTech related companies. SpaceTech companies included in the database are those that are: Completely involved in the SpaceTech industry; partially belong to it through working with clients from the SpaceTech industry; or have separate departments in the company that work in this sector or cooperate with clients from it.

# SpaceTech Analytics Methodology

The analysis includes more than twelve thousand SpaceTech companies that were chosen according to original methodology. All the entities that were analyzed during the creation of a SpaceTech Industry Landscape Overview were divided into three main categories called Core companies, Verge companies, and Space-Applied Businesses based on the following criteria:



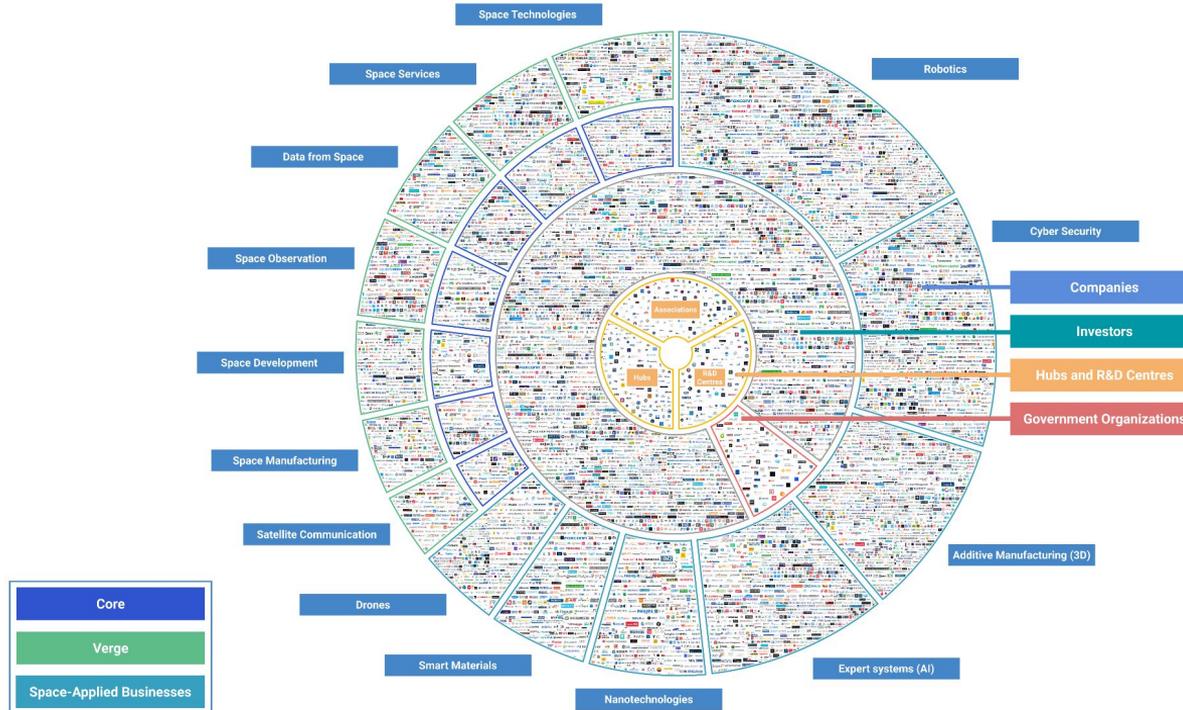
# Global SpaceTech Ecosystem 2021

12 000 Companies

5 000 Investors

200 R&D Hubs and Associations

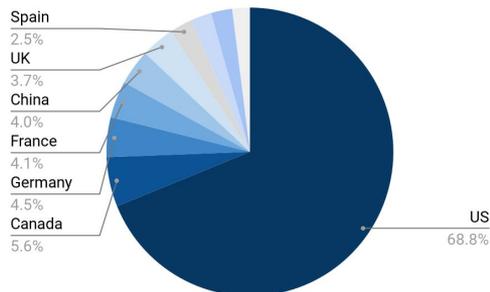
140 Governmental Organizations



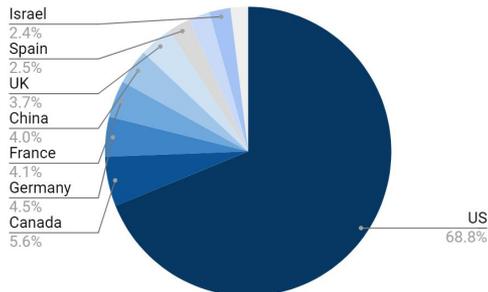
USA	Canada
UK	Germany
China	France
India	Israel
Spain	Japan
Australia	Eastern Europe
Singapore	France
Southern America	Ireland
Gulf Region	EU
Africa	Sweden

# Company Regional Distribution in 2021 (by Categories and Number of Companies)

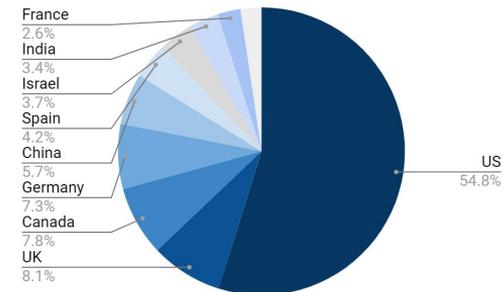
## Space Manufacturing



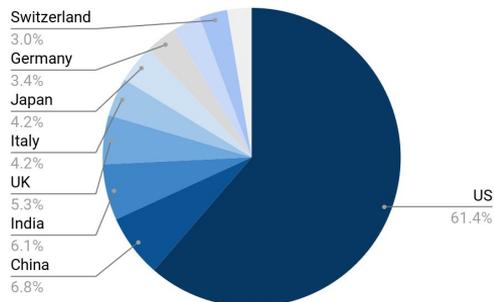
## Satellite Communication



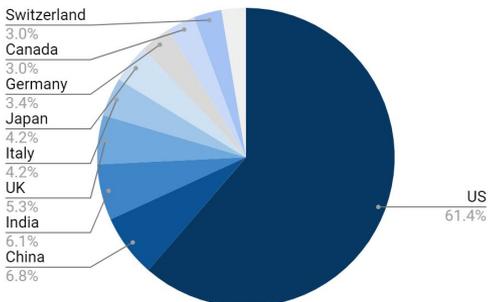
## Space Observation



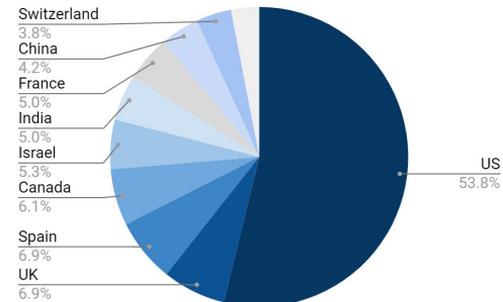
## Space Services



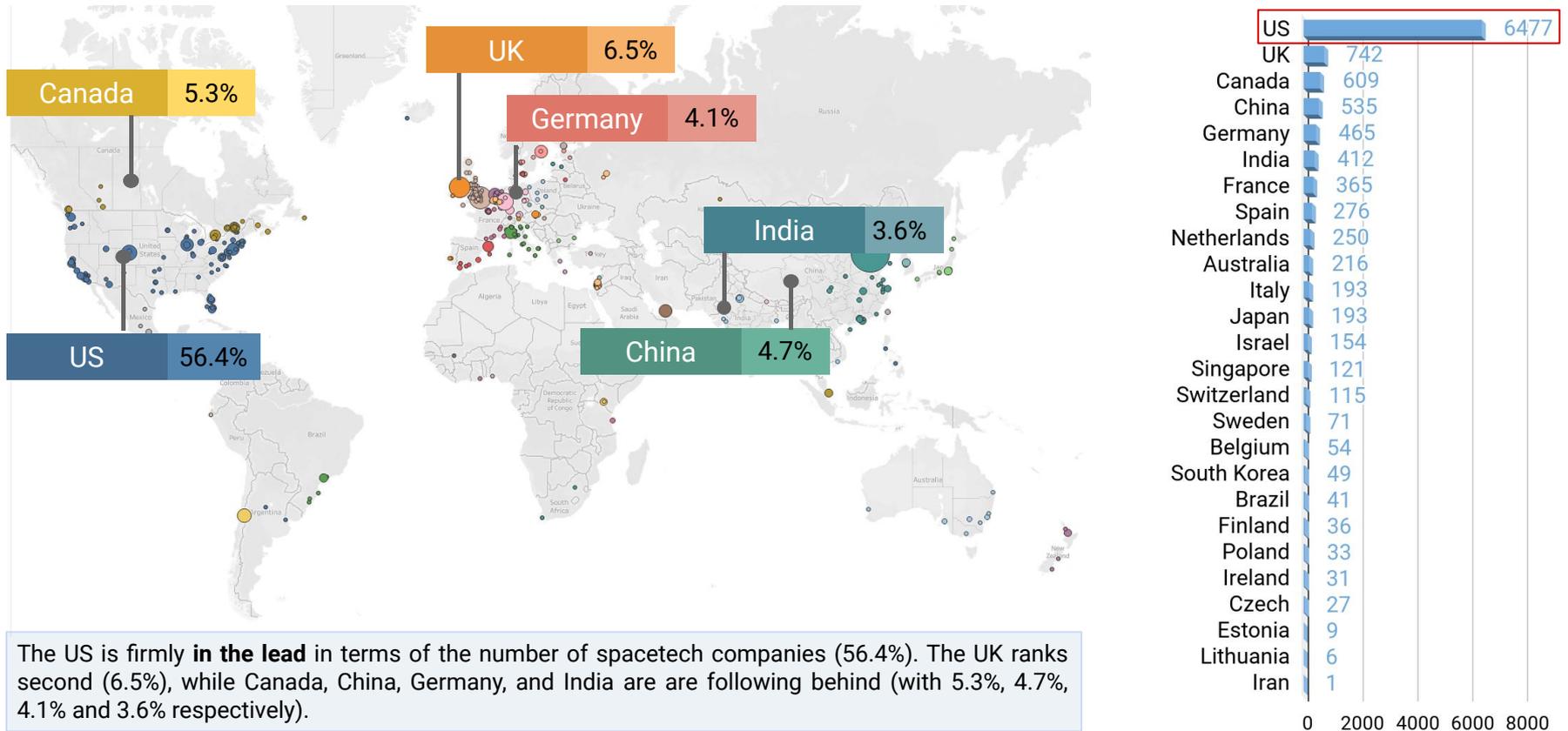
## Data from Space



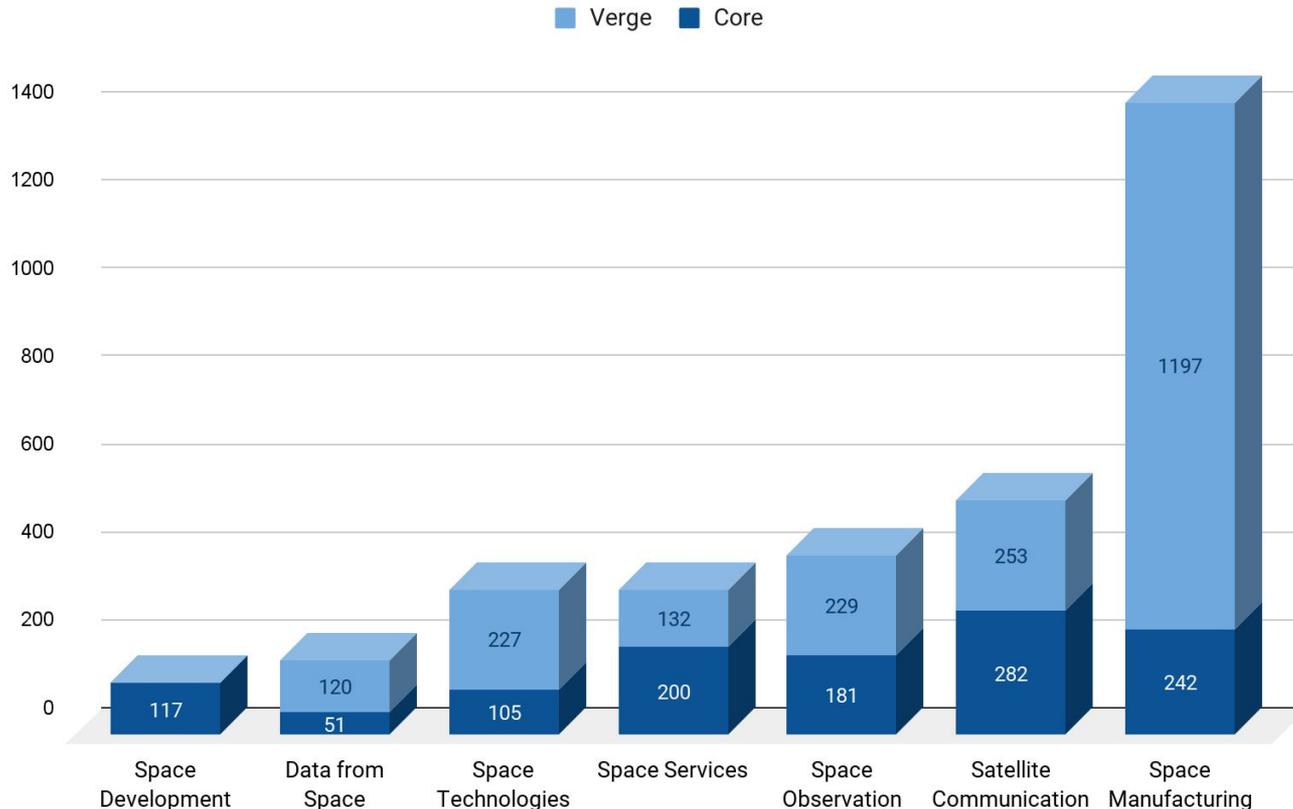
## Space Development



# Company Regional Distribution in 2021 (by Number of Companies)



# SpaceTech Sectors in 2021 (by Number of Companies)



3000+ core and verge SpaceTech companies\* have been classified into fourteen categories. Space manufacturing and Satellite Communication appear to be the two largest sectors in the Space industry. The Space Observation subsector is also significant by number of companies. There is also a large number of different subsectors fueling the space industry.

\*Space-applied companies are not represented

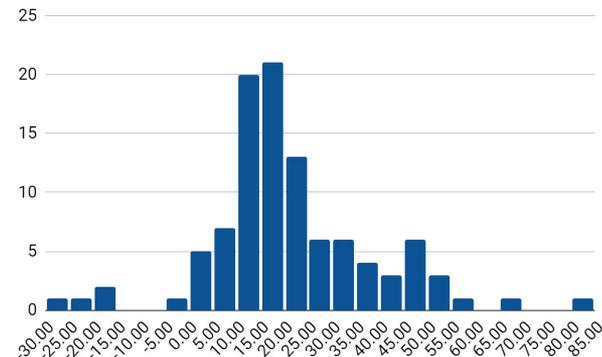
# SpaceTech Stock Market

Our SpaceTech stock index includes more than **170** corporations operating entirely or partially in the space and IT sectors in 2021. Their market capitalisation demonstrates significant growth, exceeding that of the entire market (represented as the **S&P 500 index**), as well as the general **SpaceTech industry** indices (ROKT and ITA). The SpaceTech stock market segment is, therefore, less volatile compared to them (as measured by standard deviation).

The negative skewness of average daily returns means that the median and mode are greater than average, therefore distribution gravitates towards greater positive returns. High kurtosis of the return distribution implies the investor will experience occasional extreme returns (either positive or negative), more extreme than predicted by the normal distribution of returns.

Index	Correlation with longevity market	Average daily return in 2020	Average daily volatility in 2020	Skewness	Kurtosis
SpaceTech Index	-	0.08	1.50	-0.77	11.7
ROKT	0.97	0.07	2.53	0.01	-0.96
S&P500	0.71	0.08	2.08	-0.41	-0.4
ITA	0.74	0.02	2.91	0.68	0.6

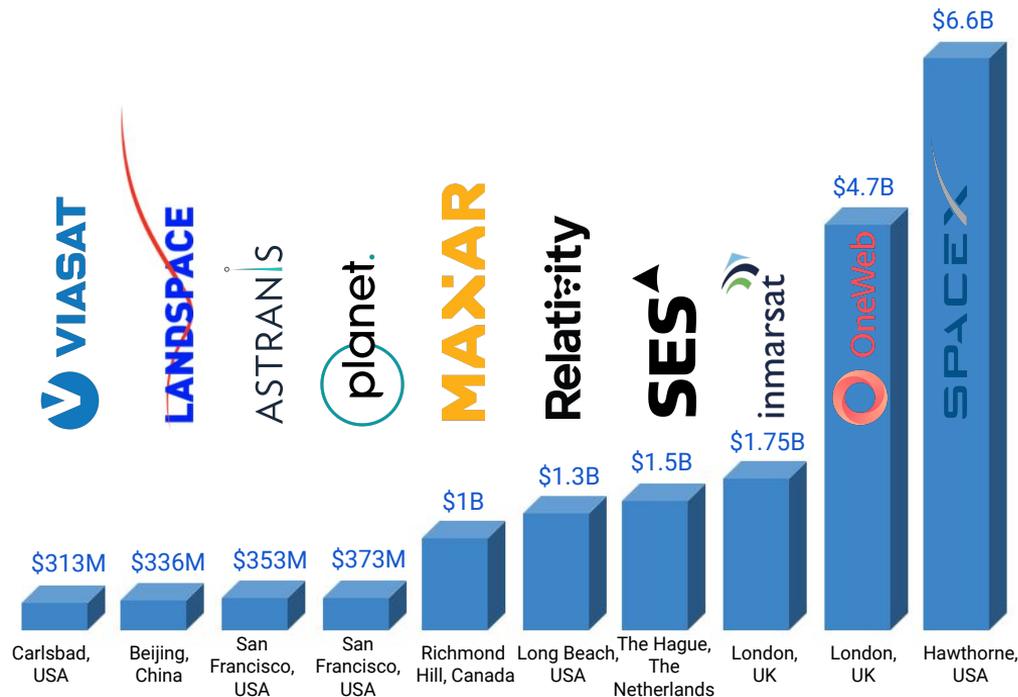
SpaceTech Stock YTD Returns Histogram



# Top 10 Companies in Total Investments

- SpaceX is the most invested core spacetech company with a total of **\$6.6B** investments
- The second largest total, with **\$4.7B**, represents investments in OneWeb.
- With a total of **\$1.75B**, Inmarsat is the third largest invested company.
- With **\$1.5B** and **\$1.3B**, total investments in SES Networks and Relativity are the 4th and 5th largest invested companies in the industry.
- Estimated at **\$1B**, the 6th core company is the Post-IPO Maxar Technologies.
- The 7th largest total, worth **\$373M**, is invested in a Late Stage Planet Labs.
- **With a total of 353M** investments in Astranis, it is considered to be the 8th largest in the industry.
- Valued at **\$336M** and **\$313M** total, investments involving Lanspace and Viasat are the 9th and 10th largest in the industry.

Investments in SpaceTech-Focused Companies Totalled \$132.2B Globally in 2020-2021



# 100 Leading Companies in SpaceTech Sector\*

0.5-1K



1-5K



5-10K



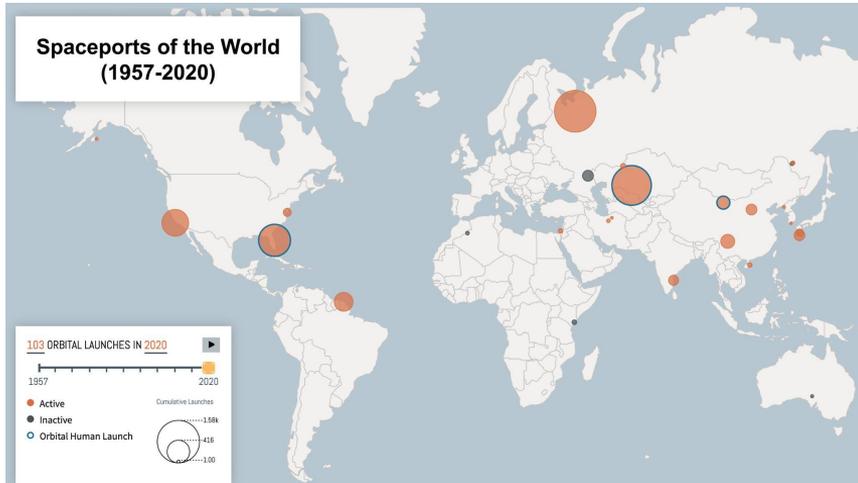
>10K



\* (According to the Number of Employees)

# Spaceport Location is a Function of Technology

Since the early days, the number of spaceports has dramatically increased. Today, there are 18 spaceports that have been actively used in the last ten years.



Most of the spaceports are built as close as possible to the equator, because this maximizes use of the Earth's rotational speed

With the advent of reusability, in which launchers no longer shed parts downrange on nominal missions, and reliability is improved, it will eventually be possible to safely have inland spaceports in America and other places. This already has occurred for suborbital launches, with flights out of Mojave in California, **Spaceport America in New Mexico**, and west Texas on Jeff Bezos's ranch.



# Many Smallsat Launchers in Development

## 45 Companies are Going to Launch Rockets in Near Future

There are 105 companies that have small launchers under development. Most of them do not have exact deadlines regarding the first flight. However, 45 of those companies are planning to have the first launch in 2021-2026 years. The graph below shows the planned dates of the first launches.



# NASA Commercial Lunar Payload Services Awardees

In November 2018, NASA awarded nine companies Indefinite Delivery Indefinite Quantity contracts with a combined maximum value of **\$2.6B** over the next ten years for lunar payload delivery. Payload capacity varies **from 35 to 500 kilograms**. Each company received an unspecified amount of funding to develop its payload users guide.



DRAPER

Masten

ASTROBOTIC



INTUITIVE  
MACHINES



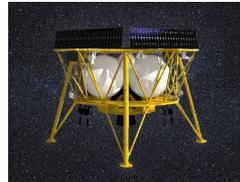
Peregrine: Astrobotic



SLPC Rover: Deep space



Artemis-1: Draper



Genesis: Firefly Aerospace



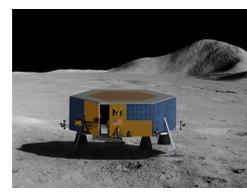
Nova-c: intuitive machines



McCandless: Lockheed Martin



Z-01 Lander: Orbit Beyond



X-1 Lander: Masten Space Systems



MX-1E: Moon Express

# Space Traffic Management

## The Potential for Collisions is Rapidly Increasing

**3000+**  
active  
satellites

Starlink plans to launch up to 42,000 satellites by mid-2027. Other companies have ambitious plans too

**20000+**  
actively  
tracking  
debris

Their size is larger than 10 centimeters. Two objects slamming into each other at terrific speeds, creating numerous bits of new debris. It can result in the **Kessler syndrome**

**500000+**

An estimated number of small particles (1-10 cm)

**100M+**

An estimated number of very small particles (less than 1 cm)

**10 km/s**  
(22,000 mph)

With such an **average speed** a 1 centimeter paint fleck is capable of inflicting the same damage as a 550 pound object traveling 60 miles per hour on earth. A 10 centimeter projectile would be comparable to 7 kilograms of TNT

## “Kessler syndrome” may cause an orbital apocalypse

Kessler syndrome is a cascading series of collisions that could clutter Earth orbit with so much debris that our use of, and travel through, the final frontier is significantly hampered, if not made impossible.

## What about ISS?

International Space Station (ISS) is one of the largest artificial objects in orbit. Thus, it is quite vulnerable.



According to NASA policy ISS has to maneuver away from an object if the chance of collision exceeds 1 in 100,000. The ISS maneuvers by firing thrusters to raise the orbital altitude. It is expected to execute similar maneuvers about once a month to maintain orbital altitude.

# Top Companies Advancing Space Medicine



## United States



### Biogen Inc

Cambridge, Massachusetts, United States



### Amgen

Thousand Oaks, California, United States



### RevBio

Lowell, Massachusetts, United States



### Angiox

Cambridge, Massachusetts, United States



### Kernal Biologics

Cambridge, Massachusetts, United States



### Merck

Kenilworth, New Jersey, United States



### MicroQuin

Cambridge, Massachusetts, United States



### 490 BioTech

Knoxville, Tennessee, United States



### Tympanogen, Inc.

Richmond, Virginia, United States



### Eli Lilly

Indianapolis, Indiana, United States



### SP8CEVC. Venture Capital

New York, New York, United States

60% of companies shown have their headquarters in the **U.S.**, with **Israel, France and Switzerland** sharing second place (30% of all private companies). Other companies are distributed equally among the **UK, Netherlands and Italy**.



## Israel



### SpacePharma

Herzliya Israel, Courgenay Switzerland



### Pluristem Therapeutics Inc.

Haifa, Israel



## United Kingdom



### AstraZeneca

Cambridge, Cambridgeshire, United Kingdom



## Italy



### Kayser Italia

Livorno, Toscana, Italy



## France



### Sanofi

Paris, Ile-de-France, France



### Medes

Toulouse, Midi-Pyrenees, France



## Netherlands



### OrgaNext Research

Arnhem, Gelderland, The Netherlands



## Switzerland



### Nova Space Biotechnology

Zürich, Zurich, Switzerland

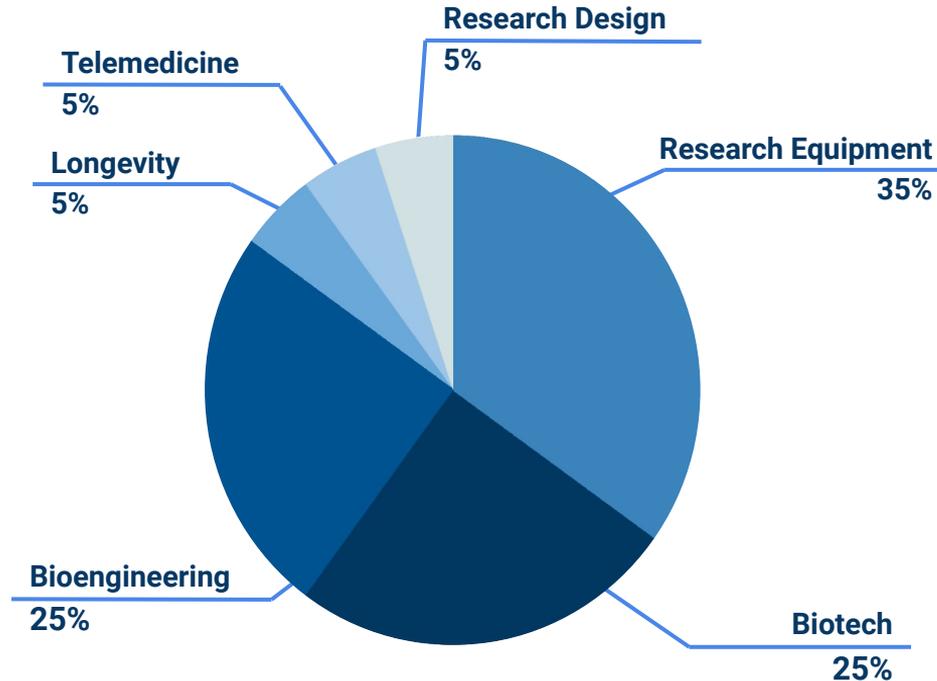


### Novartis

Basel, Basel-Stadt, Switzerland

# Services to Enhance Space Medicine Industry

Number of Companies in Each Sector



**25%** of the marketplace is dedicated to **bioengineering** solutions for astronauts to adverse age-related degenerative conditions: eye and bone implants, or medical hardware to analyse and support astronauts' health. Another **25%** of the space medical market is focused on **the biotechnology** industry dealing with space-related disorders and *in situ* amino-acid production.

More than **35%** of space-related companies **provide research equipment for the ISS**.

**5%** are dedicated directly to human longevity in space. In particular, a new venture-capital fund called **SP8CEVC** has been established to place a laser-tight focus on the intersection between space technology and human longevity.

# What We will Build

## In-Space Construction

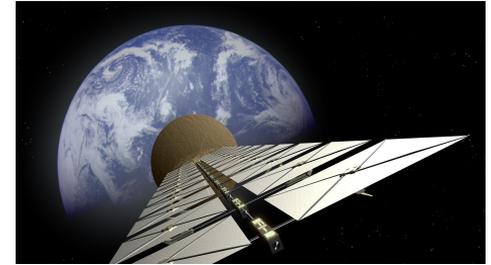
Assembly hangars (space "dry docks")



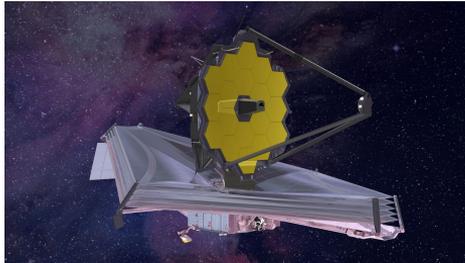
Rotating space habitats for artificial gravity



Solar power satellites



Large space telescopes



Space antennas



Lasers for solar-system propulsion with lightsails



# Throwing Away Satellites Means Throwing Away Money

## Asset Life Extension



20 Satellites are terminated every year when their fuel tanks run dry. Despite many being 15 years old, they are usually fully operational and have paying customers. With additional fuel, most can operate for years to come. Effect of lack of fuel: Lost revenue opportunity up to \$20M per year, each.

## Lost Asset Recovery



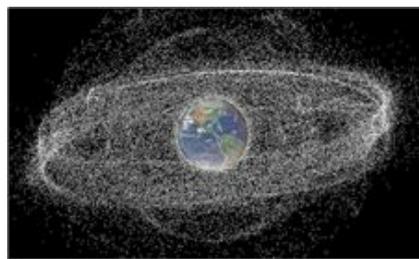
AMC-14, SES Americom's \$300M GEO ComSat was deployed into the wrong orbit due to a launch vehicle failure. Without fuel to move the satellite, SES Americom declared it a complete loss. This is not unique. Effect of lack of fuel: Complete write-off. Unable to realize billions in expected revenue.

## Improved Asset Utilization



The 5th and 6th satellites of ESA's Galileo constellation were placed into useless orbits after a launch vehicle malfunction. 75% of propellant reserves were burned for realignment, shortening operational lifespan. Effect of lack of fuel: Delayed service introduction of \$12B constellation.

## Sustainability



Tens of thousands of new satellites are planned over the next decade, and many will become debris when they run out of fuel or their electronics fail. The cascade collision risk is real and may deny access to space for future generations. Debris removal needs significant quantities of fuel.

# Philosophy is Beginning to Change

A lot of things are going to change. The reasons described in Economics of Space are the driving force of those changes. More specifically, some of those changes (related to satellite servicing) are described on this page.

## Robotics has Advanced a Great Deal

New technology makes it easier to rendezvous, dock, and grapple if a satellite has equipment for it.

## Space Assembly

Space assembly of large structures means that upgrades or repair will make more sense than replacement.

## Reusability

Launch systems are becoming reusable, making it cheaper to service satellites. Thus, satellites and space structures will do so as well, with servicing.

**Eventually, it can be cheaper to extend life than to replace a working satellite**

## Consider GEO “Antenna Farms”

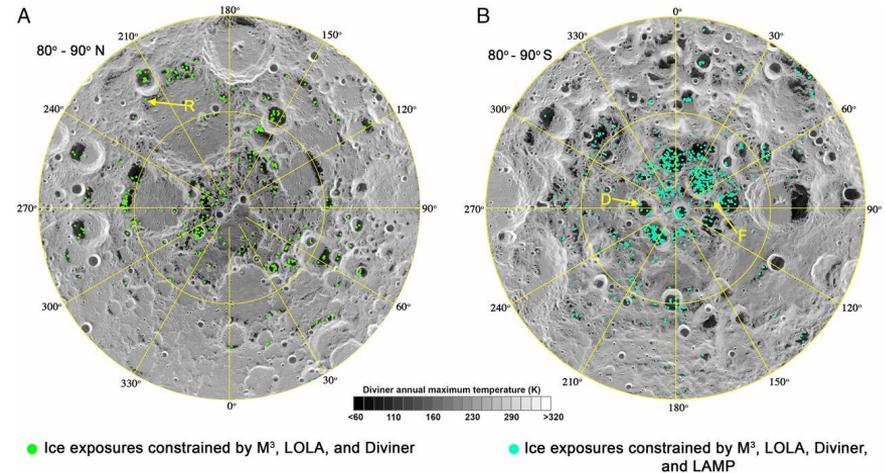
For the antennas, transponders are upgraded, just as buildings aren't razed when out of date; they get a facelift and renovation. The appropriate technologies and capabilities are increasingly developed.



# Earth's Moon Has Volatiles in Addition to Minerals

The Moon bears substantial natural resources which could be exploited in the future. Potential lunar resources may encompass processable materials such as **volatiles and minerals**, along with geologic structures such as lava tubes that together, might enable lunar habitation. The use of resources on the Moon may provide a means of **reducing the cost and risk** of lunar exploration and beyond.

Insights about lunar resources gained from orbit and **sample-return missions** have greatly enhanced the understanding of the potential for in situ resource utilization (ISRU) at the Moon, but that knowledge is not yet sufficient to fully justify the commitment of large financial resources to implement an **ISRU-based campaign**.



## Lunar Agriculture Water Use Case Model



Source: Sky&Telescope

# Many Ways to Utilize the Resources

In-Space  
Manufacturing,  
Robot Arms

**MADE  
IN SPACE**



On-Orbit Propellant  
Depots



Metal Based  
Propulsion



Commercial Space  
Stations, Hosting,  
& Logistics

ARKISYS



An In-Space Industrial Ecosystem is Emerging

Government Customers



Satellite Servicing, Space Robotics, Space  
Logistics, Debris Removal



# Space Tourism is Gaining Momentum

Advances in getting mass back to Earth empower **space tourism** amplified by decreasing launch costs, although prices remain high.



On June, 2021, **Axiom Space** signed one more deal with **SpaceX**. Totally, they are going to have four flights that will send private crews to the ISS for a 10-day voyage.



Furthermore, SpaceX will operate a Crew Dragon space capsule during 3-day **Inspiration4** mission (private orbital spaceflight) financed by Jared Isaacman.



#dearMoon

Besides, **SpaceX's** Starship will participate in the **dearMoon** project. That is a lunar tourism mission and art project conceived and financed by Japanese billionaire Yusaku Maezawa.



The veteran of space tourism, **Space Adventures**, has also agreed with SpaceX to fly private citizens on the Crew Dragon free-flyer mission.

Starliner is **Boeing's** class of reusable crew capsules expected to transport crew and space tourists to the International Space Station. Thus, Boeing intends to become a second company launching Commercial Crew operations to the ISS

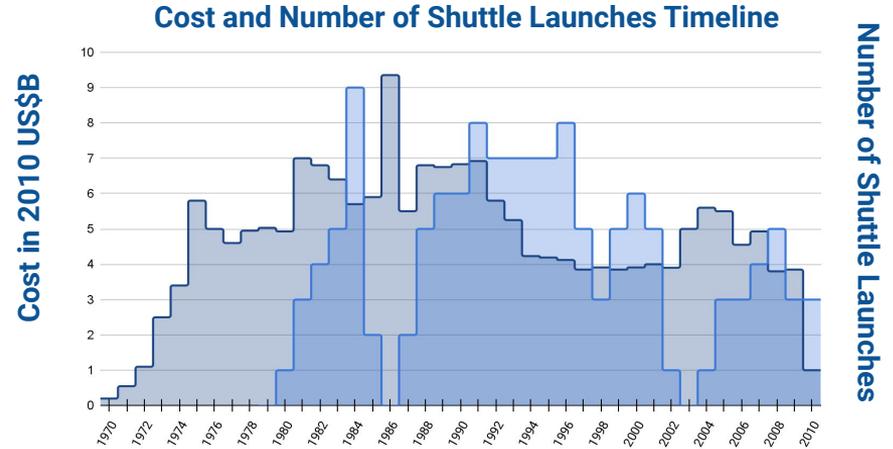


**Blue Origin** and **Virgin Galactic** proposed short-duration space tourism experience, where, cost of returning is not so high. Virgin Galactic and Blue Origin had their inaugural flights in 2021.

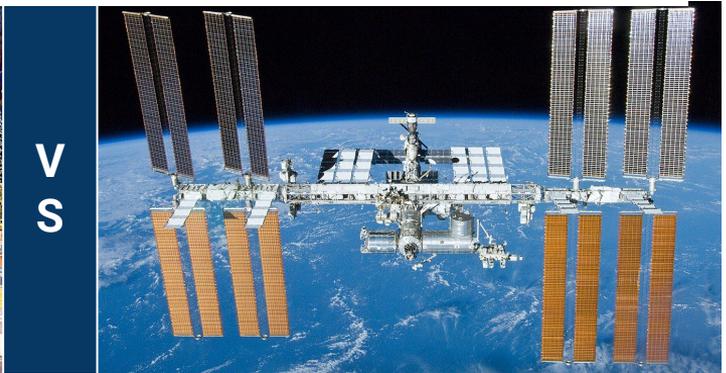


# Cost of Access to Orbit Has Made Settlement Dreams Impractical

**1974 Gerard K. O'Neill** authored a paper called “Colonisation of Space” where he described ways to build space settlements in Lagrange points, if humans can bring lots of payload to space frequently. In some time **L-5 Society** formed, inspired by him, and had hopes that the Space Shuttle would enable “L-5 by '95, a **settlement at Earth-Moon L-5 Lagrange point**. But Shuttle failed in its promise of frequent flights at low cost. The intended **24 missions per year** as NASA predicted were not possible. The prices would go up and down and even at that flight frequency the tragedies occurred.

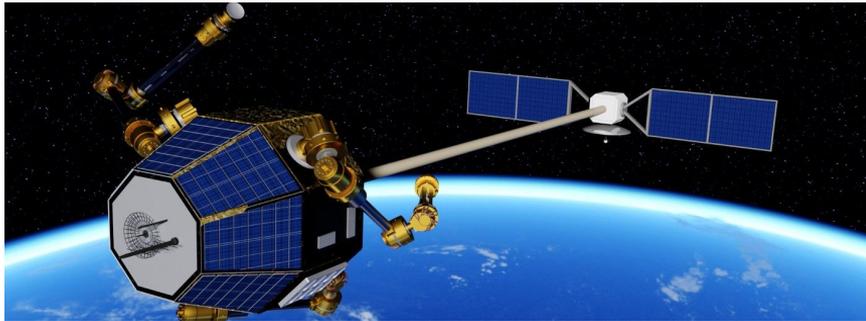


Despite all the dreams humanity had to face the reality. In 2021, all we have is a seven-person space station in low-Earth orbit.



# Technologies Coming Together Enable Large-Scale Human Habitation

While the cost of access to orbit decreases every day, there are more and more technologies that could be sent into space and make some changes. With the use of modern space construction methods together with In-situ resource utilisation and robotics, new horizons can be reached.

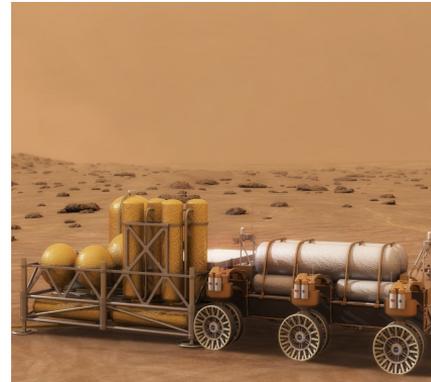
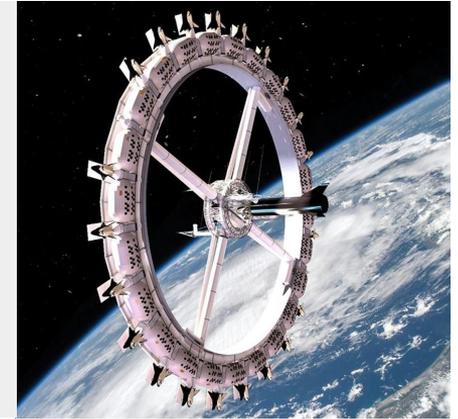


## Robotics

Archinaut is a solution by **Made in Space**, a subsidiary company of **Redwire** that is designed for in-space manufacturing needs using robotics and 3D printing. It is capable of fabricating complex space-optimized structures and repairing previously launched satellites.

## Space construction

**Orbital Assembly** company is busy with building an orbital human habitat with artificial gravity. They have already scheduled the first rotating prototypes with various scientific payloads for 2023



## ISRU

**Skyhaven Systems** were awarded a contract with NASA to develop a hydrogen and methane separation unit for Martian processing. **Sabatier** reactor produces methane and water.

# Key Financial Takeaways



Over the past decades, space has attracted a large number of participants, with New Space and non-space companies entering various industry development chains. Mainly, the number of private space-related companies is prevalent in the United States, while Asian and European regions speed up the activity.



North America is the leading region by the number of SpaceTech companies, with more than 6600 companies in the area. It is followed by Europe & Central Asia with 2681 companies and East Asia & Pacific with 1131 companies. **The US is firmly in the lead in terms of the number of space tech companies (52.1%). The UK ranks second (5.7%), while Canada, China Germany, and India are in third place** (with 4.9%, 4.5%, 3.8%, and 3.6% respectively).



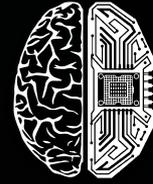
Showing stable growth, the global SpaceTech economy was valued at **\$4T in 2020 and is expected to grow to \$10T by 2030**. According to the most conservative estimates, **it accounts for 0.5% of the global GDP**. This will have a dramatic impact on the annual growth in the global SpaceTech market, and mainly because of the growth of the development of Satellite Technologies, Space Exploration sector, and advances in IT, FinTech, and other digital technologies.



Our Top 20 Core Publicly Traded Companies by Capitalization in 2021 include Korea Aerospace Industries, IHI Corporation, AT&T Inc., Honeywell International Inc., and The Boeing Company sharing the first 5 places which **cumulative capitalization estimated by more than 4 trillion dollars. The most recent space tech companies that have reached IPOs include: Redwire (08.09.2021), Rocket Lab (25.08.2021), Virgin Orbit (23.08.2021)**



The space tech industry experiences rapid growth and gains momentum among entities that were not space-related from the very beginning. We have to mention the top **top 20 verge Space-Tech companies** that have recently started to contribute to the industry or just challenge themselves to take a place in the booming industry. These include **Amazon** with the project "Kuiper", **Jacobs** and its Space Exploration Challenges, **Intel** with the first AI technology enablers to supply its VPU in a "satellite-as-a-service" space mission, and **Garmin's** GPS systems.



**SpaceTech  
Analytics**

# DISCLAIMER

The information and analysis provided in this document have been prepared by SpaceTech Analytics (STA). The sources of information contained herein are deemed reliable by STA, however, STA makes no representations regarding the accuracy or completeness of such information. Though the information herein is believed to be reliable and has been obtained from public sources believed to be reliable, we make no representation as to its accuracy or completeness. Hyperlinks to third-party websites in this report are provided for reader convenience only. Opinions, estimates and analyses in this report reflect the opinions of STA as of the date of this report. STA has no obligation to update, modify or amend this report or to otherwise notify readers in the event that any topic, opinion, estimate, forecast or analysis set forth herein changes or subsequently becomes inaccurate. This report is provided for informational purposes only, it may contain errors and is subject to revision.

**CONTACT US**

---

[www.spacotech.global](http://www.spacotech.global)  
[info@spacotech.global](mailto:info@spacotech.global)

# Introduction the new home for SpaceTech:

[SpaceTech Analytics: Dashboard](#)

**Learn more!**

Navigate 12,000 spacetech companies & more

The dashboard is organized into two main sections: 'SpaceTech Companies' and 'Other Assessments'.

**SpaceTech Companies**

- Top Public Companies
- Funding Rounds
- Leading Companies & Investors

**SpaceTech Mindmap**

**Dashboard Parameters**

COMPANIES	INVESTORS	HUBS AND R&D
10000+	5000	280
INDUSTRY SECTORS	PARAMETERS	DATA POINTS
20+	100+	1499985

**List of Companies**

**Other Assessments**

- Space Medicine Industry
- Space Law & Economics
- Unidentified Aerial Phenomena

**National Space Programms**

**Space Travel Industry**

**SpaceTech Industry 2021 Report**

SpaceTech Industry 2021 / Q2 Landscape Overview

May 2021  
www.spacetechnology.com



SpaceTech  
Analytics

[www.spacetechnology.com](http://www.spacetechnology.com)

**Make a contribution!**

Become a part of the most advanced industry analysis and contribute to our analytical reports

# Open Access Analytics

[View more](#)

## SpaceTech Analytics Contributors



John Spencer



Chris Lewicki



Dallas Bienhoff



Kevin O'Connell



Ian Christensen



John Spencer



John Mankins



Jim Armor



Daniel Faber



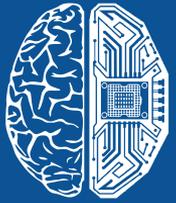
George Sowers



Daniel Sax



Gary Calnan



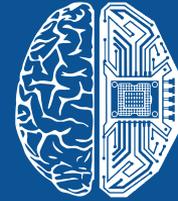
Deep  
Knowledge  
Analytics

---

## CONTACT US

---

[www.dka.global](http://www.dka.global)  
[info@dka.global](mailto:info@dka.global)



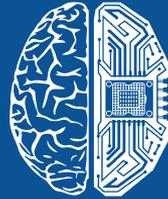
SpaceTech  
Analytics

---

## CONTACT US

---

[www.spacotech.global](http://www.spacotech.global)  
[info@spacotech.global](mailto:info@spacotech.global)



## Deep Knowledge Group

---

[www.dkv.global](http://www.dkv.global)  
[info@dkv.global](mailto:info@dkv.global)