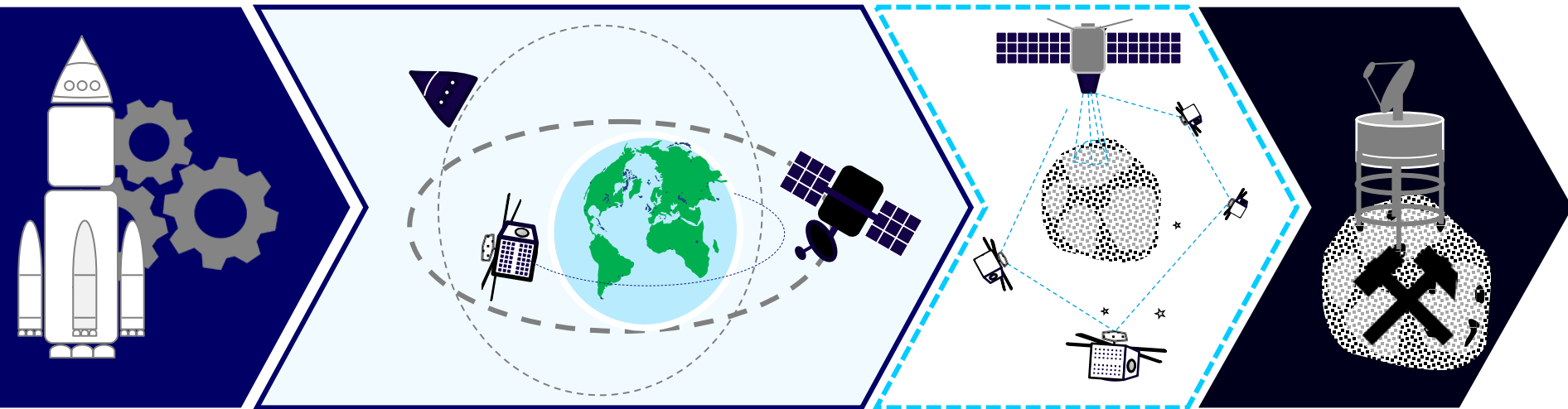


SPACE COMMERCE PRESENTATION 2016

SPACE VENTURES INVESTORS

An Investing in Space Overview and Strategy



Scope of this Presentation

The following presentation is an overview of Space Commerce in 2016.

This analysis was performed with diligence by Space Ventures Investors Ltd.

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The information contained in the presentation was finalised on October 30th 2016.

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SPACE COMMERCE OVERVIEW

Space and its Business Environment:

- The Space Commerce Growth Story
- HNW Investors in Space Commerce
- Sources of Investment in Space Start-ups
- 2015 Space Investors
- Space Commerce Road Map: Private Space Companies

The Space Commerce Growth Story

- ✓ Space continues to gain momentum
- ✓ Volatile geopolitical events (conflict = more surveillance assets) and extreme weather (disaster = more surveillance, rescue, monitoring assets) are positive for Space Commerce...
- ✓ When volatility becomes political it gets better budgets.
- ✓ Competition among Aerospace, Private Space Players and Superpowers to meet existing demand is a driver of innovation
- ✓ Space Investors want to be part of this industry, innovative solutions will bring them onboard

HNW Investors in Space Commerce

Highly Successful Entrepreneurs are Committed to Space...



Richard Branson

Elon Musk

Jeff Bezos

Paul Allen

Larry Page

James Cameron



Space Tourism

Space Transport

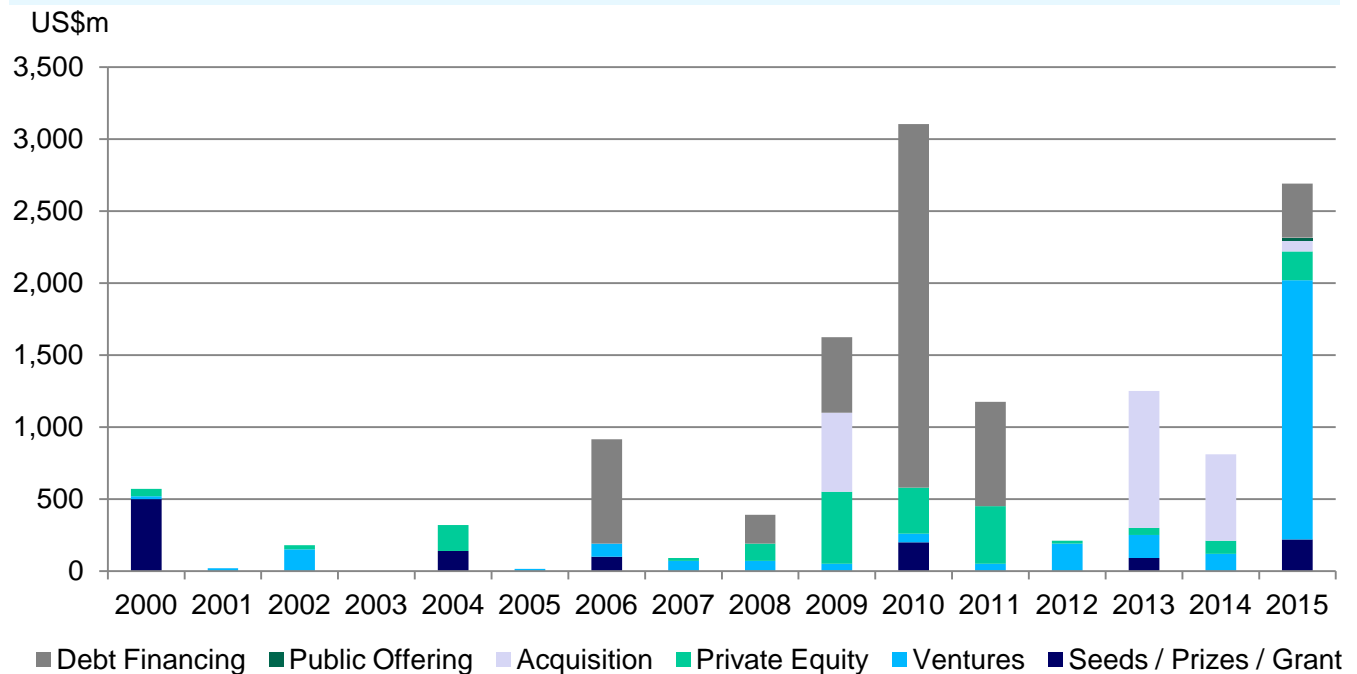
Asteroid Mining and Private Space Telescopes

The Source of Capital for Investments in Space Start-Ups is Growing...

Key Points

- Capital is moving in to space as more opportunities are now available.
- \$13.3bn invested in Space-Start-ups since 2000.
- Space start-ups are an emerging and growing field - Their business models and technology must be transparent to attract a wider variety of investors.
- 2015 flow of Venture Capital into space is a major shift - VC is leaving one area and investing in space.

Magnitude of Investment in Start-Up Space Ventures 2000 to 2015.



“The next 7 years will have the same amount of change as the last 50.”
 –Silicon Valley investor

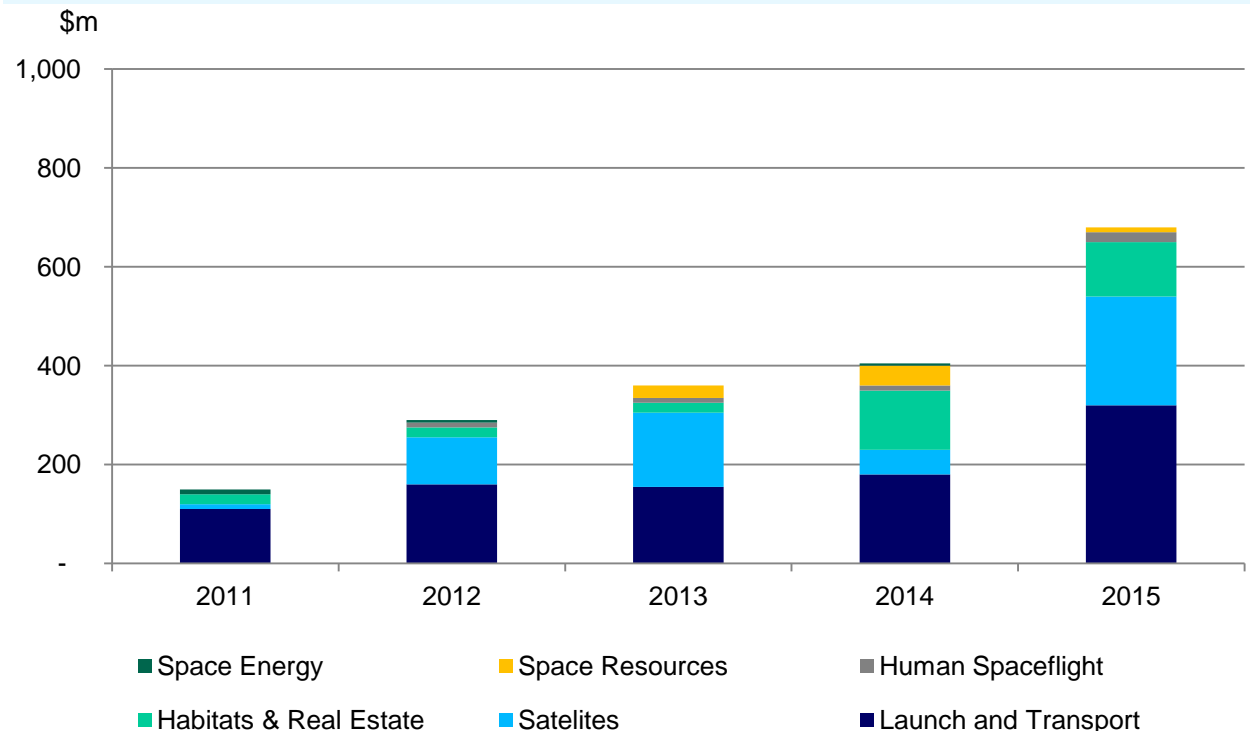
Source: Start Up Space – Tauri Group

Overview of 2015: Increased Investment in Space

Key Points

- In 2015 approximately 70 venture capital firms invested in one or more private space ventures.
- This is approximately four times the number of firms that invested in 2014.
- 2011 to 2015 growth of early-stage investors is continuing.
- Once the fully funded categories of Launch & Transport and Satellites are operational, then funds will chase the next opportunities: Space Resources, Small Satellites and Space Energy – all three compliment each other.

Early Stage: ~\$700 million VC and Angel Investments in 2015



Source: Space Angels Network

Space Commerce Road Map: Private Space Companies

Key: Established Businesses Funded, but not yet Operational

	Risk-Off			Risk-On			DIY DD ¹	
Rating	✓⇒	✓↗	✓↗	✓✓↗	✓⊕↑	✓⊕↑	✓⊕↗	✓⊕⇒
Mars								MARS ONE
Asteroids							DSI PLANETARY RESOURCES	
Lunar / Moon Operations	AIRBUS DEFENCE & SPACE	ASTROBOTIC MOON EXPRESS	me				ASTROBOTIC me	
Geosynchronous	eutelsat COMMUNICATIONS NORTHROP GRUMMAN INTELSAT Emission. Connect. Transform	United Launch Alliance SPACEX	THALES	inmarsat INTELSAT Emission. Connect. Transform 3b Networks				
Orbital					BIGELOW AEROSPACE			
Low Earth Orbit					Virgin GALACTIC			
Sub-Orbital	Orbital FINMECCANICA SPACE SYSTEMS LORAL inmarsat	STRATOLAUNCH SYSTEMS XCOR SPACE EXPLORATIONS PLDSPACE	United Technologies ASTROTECH		XCOR AEROSPACE			
Earth								
	Communication	Transportation	Space Infrastructure	Global Internet	Space Tourism	Bases and Habitats	Resources	Colonies
Examples:	Satellites: Mass Communication and Media	Launch Facilities, Rockets, Spacecraft	Parts and technology	Satellites: Broadband	HNW Space Tourism		Mining, Energy, Solar etc	Speculative Colonies

1. Do It Yourself Due Diligence

INVESTING IN SPACE STRATEGIES

Focussing on the Size and Strategies:

- Common Investing in Space Dangers...
- Historical Precedents for Large Investments
- Public vs. Privately Funded Trade-Offs
- The Rocket Showdown Continues
- Old vs. New Space Verticals
- **Build a Balanced Space Portfolio**

Common Investing in Space Dangers...

The Billionaire *is* Just A Brand



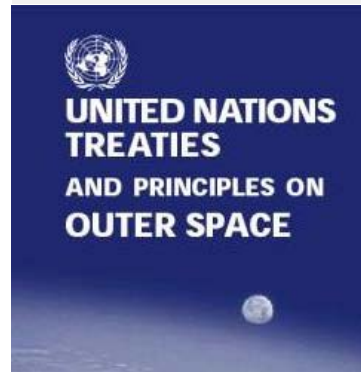
Know What Can Will Go Wrong



Mainstream Media *is* 50% Sci-Fi



The Legalities *might* be harder than the hard Science



Historical Precedents for Large Investments

Key Points

- Raising funding for large exploration ventures was more 'normal' in previous eras of Western Civilisation
- Many space ventures require massive investments to be operational
- As time goes on, more people want to invest in space related companies
- History shows, there will always be Entrepreneurs undertaking capital-intensive and high-risk ventures, **leveraging technology to their advantage.**

	History: 15 th – 19 th Century	Now: 21 st Century
First Level Exploration	<ul style="list-style-type: none"> ▪ Typically from Monarchs (Kings, Queens) increasing their Empire 	<ul style="list-style-type: none"> ▪ Typically from Governments, e.g. Cold War
Transport	<ul style="list-style-type: none"> ▪ Ships had been under development for over 2,000 years 	<ul style="list-style-type: none"> ▪ Launch and remote vehicles have been around 50+ years.
Technology	<ul style="list-style-type: none"> ▪ 'Guns, Germs and Steel' gave small Western Armies massive leverage over indigenous populations 	<ul style="list-style-type: none"> ▪ Scaled-down computer hardware, increased computing power, robotics, 3D-Printing and communications make it easier to plan remote operations
The Entrepreneur	<ul style="list-style-type: none"> ▪ Trade in spices, materials and labour was massive ▪ Merchants often were at the forefront of exploration, seeking new trade routes. ▪ Dutch East India company the first to issue shares. 	<ul style="list-style-type: none"> ▪ There is increasing awareness in space commerce, meaning more investors will 'come to the party' ▪ This broadens the investor base and supports existing ventures in need of bridging capital

"We shouldn't only be mining the Earth, we should be thinking of the Moon as our eighth continent."

Naveen Jain, Co-founder and Chairman of Moon Express

Source: <http://www.wired.co.uk/news/archive/2016-01/05/space-mining-a-reality-in-2016>

Public vs. Privately Funded Trade-Offs

- There is a clear division between **Public** and **Private** space related companies

	Risk	Reward
Public Companies	Retail and Institutional Investors back Public Aerospace Companies; they follow the same analysis, can be part of the “herd”	<ul style="list-style-type: none">Liquidity: Easy to enter, easy to exitDividendsTrade on Stock Price Volatility
Private Companies	Private Investors (mainly Venture Capital and Sovereign Wealth Funds) are funding Private Space Companies , which are ‘high-risk’ for various reasons	<ul style="list-style-type: none">Multiples of 100 are the prime goals of VCsFirst mover advantage

The Rocket Showdown

- Lack of Heavy lift rocket capabilities has led to the space industry coming to the cross roads; Government (and the Public Aerospace companies that benefit as contractors) vs. Private Space Companies
- First new heavy lift rockets in over twenty years are enter testing phases
- Will government or privately designed rockets be more efficient?
- 2016 will be the first year to truly showcase how the privatized space industry can spend less and do more



Space Launch System



- Cost: \$32bn
- Bloc 1 Lift: 70 Metric Tons
- Max Lift: 130 Metric Tons
- Cost Per launch: \$500m



Falcon 9 Heavy



- Cost: Estimated \$3bn
- Lift: 53+ Metric Tons
- Cost Per Launch: \$90m

Old vs. New Space Verticals

Industry	Years in operation	Government Funded?	Commercial Applications
Satellites	50+	Yes Communication, Navigational, Military etc	Yes Military, Media, GPS etc.
Rockets & Delivery Systems	50+	Yes Space programs	Yes Numerous and growing
Space Debris	In planning	Possible Legislation may require debris removal	Yes Grows in line with space activity
Space Tourism	Estimated 2018	No Strictly Commercial	Yes Wealthy Customers
Space Resources	Estimated 2020- 2025	No , but agency state sponsored missions can not be ruled out, e.g. ESA wants a Moon Base	Yes Precious Metals, Water, Energy

Funding Space Commerce: The Solution is to Build a Balanced Portfolio

- ✓ A balanced (risk minimized) space commerce portfolio is achievable but requires scale
- ✓ Competition among space companies will lead to mergers, spin-offs etc.

Satellites



SPACE SYSTEMS
LORAL

inmarsat

eutelsat

THALES

Space Tech

SPACEX



ASTROTECH
CORPORATION



OHB EADS

PLSPACE

EOS

Space Tourism



XCOR
AEROSPACE

BIGELOW
AEROSPACE SM

Space Resources: Asteroid & Lunar Mining



DSI
DEEP SPACE INDUSTRIES

ASTROBOTIC



LOOKING FORWARD

- Upcoming Space Commerce Themes
- Negative for Space Commerce
- Fast Forward 5+ Years
- Fast Forward 10+ Years
- Fast Forward 20+ Years

Upcoming Space Commerce Themes

- Private Space Companies will provide cheaper access to space, via reusable rockets and sub-orbital flights
- Following the current progress of technology enables a clearer view of what is actually possible and what is not; ***Search the Signal from the Noise***
- Space Commerce will see jumps and set-backs in-line with global macro events; Global conflict & recessions, and political and social movements
- Mainstream Media (MSM) acceptance that Space is a viable reality and not Science Fiction / Just Another Government Funded Project
- But MSM loves SpaceX failures (launch pad mystery explosion) and fanfare (plans for Mars)

Negative for Space Commerce

(Revised from our Space Commerce 2015 Presentation)

- ✗ **Global Economics:** Mis-management of Western (e.g. G7) Economic Policy to offset demographic slow-downs may increase the political motivation to 'boost healthcare / welfare for baby-boomers' rather than 'explore the stars'.
- ✗ **Benign 'Space Critics':** Social Movements that become Political and Ultra Eco-Friendly Activism can easily become anti-space, e.g. An argument to Feed the Poor / Save the Ecosystem vs. Colonize Mars.
- ✗ **Catastrophic Space Related Accidents:** The loss of lives, including in space tourism, will scale-back achievements and milestones.
- ✗ **Monopolies Defending Market Share:** Space based technologies will impact on earth-based industries, therefore current monopolies will defend their market share by keeping space technologies 'out of reach'; including negative PR campaigns and disinformation.

Fast Forward ▶▶

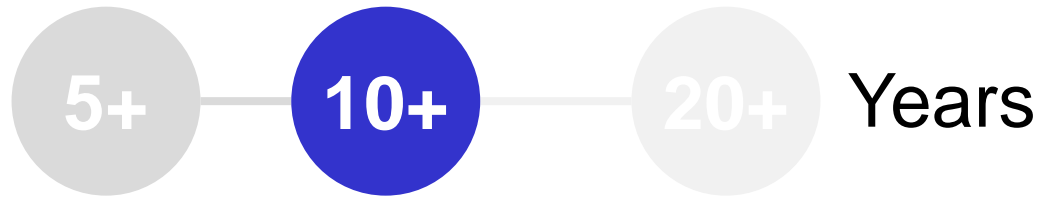


Space Commerce Vertical

Commercial Risk

- ▶ **Global Internet Coverage:** Competition and consolidation begins. Low
- ▶ **Space Debris:** Commercial Players & Start-ups seek investment. Medium
- ▶ **Space Tourism:** Virgin Galactic Space, XCOR, or Zero2Infinity have clearance to begin taking tourists to space: Sub-Orbital only. High
- ▶ **Transport:** Space-X and ULA will officially be carrying human cargo to the ISS under current contract schedules. Medium
- ▶ **Launch Costs:** Reusable rockets that Space-X has been testing will be successful under current schedules, driving down the cost of launches. Medium
- ▶ **Habitation:** Bigelow Aerospace B330 manned space habitat operational. Competitors seek R&D funding. Medium
- ▶ **Space Resources / Asteroid mining** prospectors roll-out and test hardware to prove their business models. High
- ▶ **NASA's Orion space craft** will also finish testing one of the first manned missions to Mars by a country. Medium
- ▶ **Other official Mars mission** plans will be unveiled by private ventures, with timelines for launch within the next ten years. High
- ▶ **Back to the Moon** is back in vogue, possible ESA plans for a base. Low

Fast Forward ▶▶

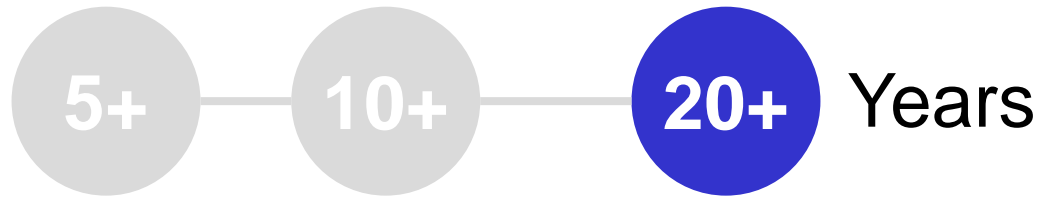


Space Commerce Vertical

Commercial Risk

- ▶ **Global Internet** online after the launch of swarms of new satellites and mergers of operators. Low
- ▶ **Space Debris:** Possibly enforced by law, activity becomes constant. Medium
- ▶ **Space Tourism,** sub-orbital a real business, and orbital to manned stations in a business model to invest in. Medium
- ▶ **Space Resources / Asteroid mining:** Scouting missions complete and the first samples/ minerals returned to earth. Medium
- ▶ **Alternative Propulsion:** Testing of plasma rockets and fusion energy should also be completed, leading to the designing of space craft that can go greater distances than previously imagined. Medium
- ▶ **Mars:** SpaceX and NASA co possibly on their way to Mars, opening the door for more downstream technology transfers. High
- ▶ **Space Elevators:** Plans drawn for carbon nanotube space elevator; enabling access to space without rockets, lowering costs and enabling the building of ships in space; practical for interplanetary travel. Very High

Fast Forward ▶▶



Space Commerce Vertical

Commercial Risk

- | | |
|--|---------|
| ▶ Global Internet: The cost of global internet coverage is now minimal. | No Risk |
| ▶ Space Debris: An established and regulated industry open to tenders. | Low |
| ▶ Space Tourism: First space hotel likely to be established. A consortium of tourism and aerospace companies become market leaders. | Low |
| ▶ Space Resources / Asteroid mining: Operations are online, freeing water and energy from locations like the Moon. | Medium |
| ▶ Mars: A Mars Colony established but small, commercial activity between Earth begins, and plans drawn for eventual terra-forming. | High |
| ▶ Mars Space Elevator Plans: In planning. | High |
| ▶ Earth Space Elevator Plans: Depending on technology, may be in planning stages. | Medium |
| ▶ Space Based Agriculture becomes a concept that may help feed the billions of humans on Earth, and Martian Colonies. | Low |
| ▶ Lunar Tourism: A viable industry, possibly in conjunction with a commercial Moon Base. | Medium |

Space Ventures Investors Team

Management

Simon Drake (MD)



Co-Founder & Partner
Business Development
UK and Rest of World
London and Frankfurt

Kevin Mac Gowan



Co-Founder & Partner
Business Development
DACH and France
Frankfurt, Germany

Brad Lewis



Space Commerce Analyst
Business Development
North America
Washington DC, USA

SVI Anonymous Team



Freelancers

Legal (UK)

Aerospace
Financing
(UK)

Various
Interns,
Researchers

Space Ventures Investors Limited

Company Number: 09340453
Registered in England,
United Kingdom

Registered Address:

207 Regent Street
London'
W1B 3HH
United Kingdom

Postal Address:

Postfach 600754
60337 Frankfurt am Main
Germany