

Master Class Report

26 May 2020



THE FUTURE OF WORK: CASE STUDIES IN ASTROPRENEURSHIP



*An image of Earth, taken from the International Space Station (ISS). An AstroHub student experiment is heading home on the SpaceX Dragon capsule (seen as streak of light in the lower left). Photo courtesy of NASA. * This is one of 7 AstroHub labs that have been sent to ISS since 2017. This lab spent 30 days studying bacteria growth in space. . Experiment kit courtesy of Quest Institute for Quality Learning.*

AstroHub, a Singapore & US-based space company, is committed to building global access to outer space through training and education. Learn how can you be part of the rapidly growing commercial space sector. Email us at info@astrohub.co or visit astrohub.co

Contents

Overview	3
Course Format, 26 May 2020	3
Spire Case Study	4
SpaceX Case Study	7



AstroHub builds the global space workforce through training and knowledge dissemination.

Left - An AstroHub training course in Australia using handheld satellites known as “CubeSats.” Space companies fly variants of the CubeSat to provide consumers with data and services.

Right - AstroHub CEO Dr. Bidushi Bhattacharya interviews NASA Commander Jeff Williams at Google Talks in Singapore.

Overview

Our online Case Studies offer interactive, learning opportunities for anyone who wants to understand the space job market today and in the future.

Each master class summarizes the relevance of recent space activity to life on Planet Earth. Through Q&A with industry experts and hands-on business case studies, these sessions help participants to identify potential opportunity channels for joining the commercial space ecosystem.

Course Format, 26 May 2020

Overview of the latest space activity

Lead Lecturer: Bidushi Bhattacharya
Former-NASA scientist & CEO of Astrohub

Q&A with Industry Expert

Guest Speaker: John W. Tucker, Creator and CEO of NewSpaceHub

Breakout Sessions for Case Studies of Selected Companies

Breakout Case Study 1: Spire Global

AstroHub Lead: Mateusz Kostrzewa, BS Engr/Bus (2022), ISS Research Engr

Participants: Brett Grossman (LinkedIn)
Jerrick Wee

Breakout Case Study 2: SpaceX

AstroHub Lead: Ankur Gupta, MBA, CubeSatellite software developer

Participant Avinash Mamaraju
Ivan Ng

Spire Case Study

Lead: Mateusz Kostrzewa

Participants: Brett Grossman, Jerrick Wee

Company: Spire Global

Founded: 2012



Leadership: Heroen Cappaert, Peter Platzer (CEO), Joel Spark

Product & Services: Subscription-based access to data & analytics.

Funding: over \$198M in funding & grants, Series A to D

Revenue: \$23M to date

STRENGTHS

- Founders vision & good leadership/ execution team
- Access to capital
- Positive perception of the product line in the market (all Line of Business)
- US Space Ecosystem
- Marketing and Branding. Attracts right kind of investor's interest.
- Constant demonstration of POCS

WEAKNESSES

- Lack of innovative practices which are low cost, high value, which impacts larger community.
- High growth phase capital investment will be high. Not fair to point specifically at space industry alone. As long as vision doesn't change and objectives are met, results are predictable, company would recover its investments in shortest possible time.

OPPORTUNITIES

- Space satellites driven internet
- Air Transportation and Logistics. Can SpaceX provide
- Step change saturated segment
- Investment in End-end supply chain optimization (a la Walmart and its vendors)
- Prototype for future air travel options?
- Clean energy alternatives in consumer market

THREATS

- Blue Origin
- Virgin Galactic
- NASA (not sure)
- Politics at home
- Space policies of other countries (if company wants to go global)
- Protectionist policies of countries in advent of space cold war. SpaceX would be constrained with limited market for doing business

Spire Discussion Summary - Kostrzewa, Grossman & Wee

What is the company's business model?

Satellite-as-a-data-service platform, 80 satellites in constellation, provide relevant analytics for specific target industries.

Would it be feasible or appropriate for the company to provide free or discounted launch services to educational and non-profit institutions?

Almost a necessity for the growth of Spire to expand. Giving students and non-profit organisations access to their data and API's yields good publicity for the company and gives people a chance to learn and possibly improve the software. It also eases the barriers of entry to the space sector.

How can this company manage public perception of their product/operations?

- Get people to become fans,
- Sponsorship opportunities (help certain customer section)
- Helping pro bono with disaster relief, so that people become more aware of Spire's data and APIs.

Is the current economic and political climate conducive to the company's business?

As for many others in the sector, current climate is challenging and with possible legal changes on the horizon, operating business in space industry might prove even tougher. Spire, however, proves their data invaluable in uncertain times by helping monitor changes across the aviation and maritime industries related to the current crisis. The company's operations do not seem threatened, however it remains hard to say whether the climate is conducive to the their business.

How does their business model fit into the current and future consumer space markets?

- Early mover advantage and building datasets
- Establishing industry relationships and creating long-term subscription models and contracts

How can the company further differentiate itself from its competitors to gain competitive advantage? Do they need to?

Thus far the company shows significant differentiation via specific industry targeting and their flexibility in retask satellites with software. This statement can be supported by the amount of funding they received to date given the size of their team, evidence that investors believe in the company adding new value to the global economy.

How can the company further expand its reach and convince new customers to their value?

As mentioned previously, it would be a good marketing move to reach out to educational institutions, where passionate individuals would be able to learn how to use their products and services and possibly apply them to their own businesses. That way Spire would help not only the space sector itself, but the entire ecosystem surrounding it grow.

SpaceX Case Study

Lead: Ankur Gupta

Participants: Avinash Mamaraju, Ivan Ng

Company: Space Exploration Technologies (SpaceX)



Founded: 2002

Leadership: Elon Musk (CEO), Gwynne Shotwell (President)

Funding: \$3.2B, 27 rounds

Revenue: not available

Product & Services: Launching earth observing satellites; transporting humans (upcoming) cargo transport to International Space Station

Interim Goal: Reduce Space Transportation Costs

Long-term Goal: Human Settlements on Mars

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SpaceX Discussion Summary - Gupta, Mamaraju & Ng

What is the company's business model?

- Primary - To act as a contractor for Space Agencies to launch space rockets for cargo/humans
- Future: To be an aggregator and become leader in interplanetary travel and become first space company to colonize Mars

Would it be feasible or appropriate for the company to provide free or discounted launch services to educational and non-profit institutions?

As long as its workforce requirements are possible by aligning with these educational institutions and SpaceX gets tax breaks, it would be feasible.

How can this company manage public perception of their product/operations?

SpaceX is always 5 steps ahead in the perception management of its brand and what can it do. It can inspire people with its success and failures as long as Elon is around, it will not shy away to make mistakes and learn from them

Is the current economic and political climate conducive to the company's business?

Not sure if it had any serious impact now, but definitely SpaceX would factor these unforeseen events like pandemics into their long term planning like any other industry and ensure business continuity

How does their business model fit into the current and future consumer space markets?

By positioning as an innovation driven culture company, SpaceX has opened up new possibilities in Commercial Internet/ (Starlink project), opened up new focus areas (non-space) with its objective for interplanetary travel. This is a gateway for future in areas like medicine, law, cybersecurity, entertainment, education, robotics etc.

Important point to be noted here is that SpaceX by virtue of its brand, can bring Space in the mainstream conversations and it would open imagination of possibilities in many people/organizations.

How can the company further differentiate itself from its competitors to gain competitive advantage? Do they need to?

By creating a culture within the company to continue the vision set by its founders & innovative leaders, SpaceX is in the trajectory of being most valued company in history in next 10 years or less

Space always excited everyone on the planet. But SpaceX has changed that idea by converting that intent and executed the idea. It /will continue to define standards /benchmarks in future

How can the company further expand its reach and convince new customers to their value?

Future of the mankind would include interplanetary travel, study of outer space and colonize other planets. To achieve that its not possible for a single company to do-it-all. Its therefore important to:

- Become a global company. Take leadership role to create a scalable space ecosystem
- Invest in future (space education and research)
- Become institution by itself

Customers would follow...

About AstroHub

AstroHub, a Singapore and US-based company, is committed to building global access to outer space through training and education. We are committed to removing the barrier to entry to “rocket science” for professionals and students from all disciplines. Our products include interactive business case master classes, such as the course described herein; hands-on small satellite workshops; and the development and launch of experiments to the International Space Station.

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Left - Dr. Bhattacharya discusses the importance of human presence in outer space.

Right - The AstroHub Team teaches a master class on space operations at International Space University.



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