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# Study of Strategic Drivers and Patterns that Change Planet's Business Model CANVAS

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**REPORT**

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# *ABSTRACT*

Universitat Politècnica de Catalunya

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## **Study of Strategic Drivers and Patterns that Change Planet's Business Model CANVAS**

*By Margalida Puigserver Rosselló*

The last 10 years have been a decade of deep changes and evolution in the Earth Observation industry. This changes have been led by the innovation in space and data management technologies, and by the irruption of *New Space* companies. Within the development of this study, the drivers that guide the evolution of the sector and the patterns that it follows have been analyzed through the changes in *Planet's* CANVAS Business Model and conclusions about the changes in the Earth Observation Industry have been achieved.

**Key Words:** *Planet Labs, CANVAS Business Model, Drivers, Patterns, Earth Observation, New Space, Democratization of Space.*

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*To my family, for being a constant support in my life, for believing in me and loving me. For being by my side everyday, even from the distance.*

*To my friends, for helping me to keep sane in those moments in which everything seemed lost. For enliven this years and always make me feel like at home.*

*Finally, to my grandparents, who, even if they can not understand this lines of dedication will feel proud of me. For being the keystone of all the family.*

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# CHAPTER

## 1

# INTRODUCTION

## 1.1 Aim

The main purpose of the project that is to be developed is to identify the drivers that motivated the company *Planet* to modify its business model and compare the results with suitable patterns. This is going to be achieved through a comparison between both old and new CANVAS Business Models. Ultimately, an image of the evolution and the reasons that lead to it are to be achieved, as well as an idea of the current Earth Observation Industry.

## 1.2 Scope

During the development of the project, the following concepts will be dealt with:

- ▶ Description of the Evolution of the Earth Observation Industry.
- ▶ Description of the main Earth observation companies, their missions and the position of *Planet* amongst them.
- ▶ Presentation and study of *Planet* old business model.
- ▶ Presentation and study of the old business plan of *Planet* by means of a CANVAS design.
- ▶ Study of mission design of *Planet* in actuality.
- ▶ Exhaustive analysis of *Planet's* business model by means of a CANVAS design.

- ▶ Comparison between the old and the new business model of *Planet* and identification of key points for both models.
- ▶ Analysis of results and identification of drivers for *Planet*.
- ▶ Matching of the conclusions with an suitable pattern.
- ▶ Development of hypothesis about the Earth Observation Industry current situation.

However, in the project the following points are not going to be coped with:

- ▷ Exhaustive study about technologies, satellites or missions used for Earth Observation, with the exception of those which are related to *Planet*.
- ▷ Extrapolation of the results to a general market.
- ▷ Development of an environmental study for the missions of *Planet* both for old and new mission models.

### 1.3 Requirements

The project that is going to be developed is going to be delimited by the following restrictions, which may be either technical or practical. This means that the project is going to be shaped under the requirements that are to be shown:

- All missions that are to be analyzed have to be based in the LEO-VLEO sections, therefore, the missions that are going to be studied will be performed between 140 and 970 km.
- All missions that are to be analyzed need to have activities related to Earth Observation.
- A comparison between *Planet* old and new mission concepts has to be made using the CANVAS methodology.
- The suitability of existing patterns needs to be checked.

### 1.4 Background

One can consider that the aerospace industry started when the Sputnik 1, launched from Baikonur, successfully performed its first orbit around the Earth. It can be seen as the beginning of an industrial race that far from stopping, improves every year.

For many years, this sector of the industry was strictly restricted to the national organizations, both because of its hidden military interest and also because of the

stratospheric costs which had to be assumed, as well as the high probability of failure. Therefore, the first big steps of the aerospace industry were developed by agencies such as NASA, Roscosmos and eventually ESA.

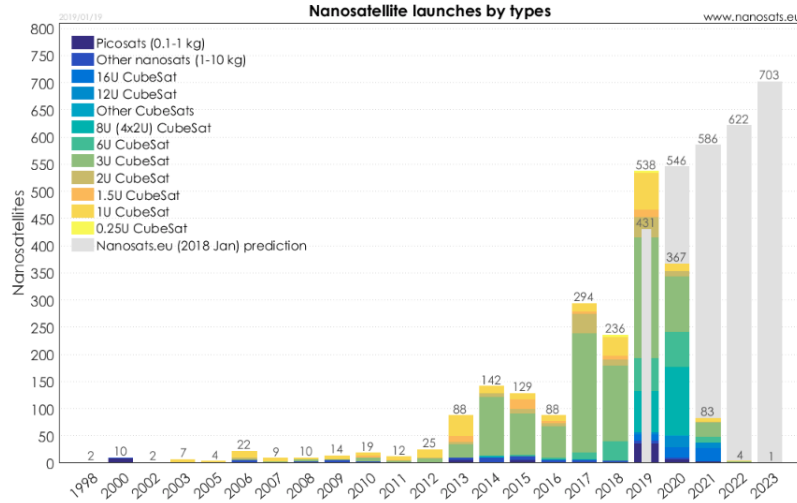
During the last decade, the rules of the game have dramatically changed. Some companies, such as Space X, Blue Origin or Virgin Aerospace have acted as beacons for the rest of smaller companies. Following this path, the private market has entered the space competition [1], developing all kind of space devices, starting by small satellites (CubeSats) and reaching some of the most innovative launchers. All in all, this entrance of the private investment in the aerospace market, has brought fresh air to the industry, providing an eager to the discovering of new technologies, an interest for improving efficiency of space devices and proving to the crowds that space is worth investing; that the future of the technologies and the knowledge is up-there, beyond the atmosphere.

Now, attention is going to be focused on a single field of all the spacial range, the Earth Observation. The Low and Very Low Earth Orbits, *LEO-VLEO*, appear as the most important regions when it comes to Earth Observation. First of all, it allows the best views of very large regions, since it is not too far, as to damage image resolution, and it is not too close to the surface as to see its vision range restricted. This possibility has been detected by many start-ups, that have starting developing the *CubeSat* technology [2], initially an university experiment, in order to reach this kind of orbits. The use of this type of small satellites, allows an important reduction in construction costs and at the same time ensures the accomplishment of the mission, which is to monitor by image a certain activity on Earth; this kind of *cheap* satellites give a chance for newly created companies to survive in a typically highly competitive industry.

On Fig.1.1 [3], it can be seen how the presence of this small satellites has been increasing during the last years (with a forecast of continue growing during the following years), which can be directly translated to an increase in the presence and gains of the industries whose main task is to design, build and guide the satellites in order to obtain the images. Some of the most important missions that have been developed by CubeSats in VLEO, and with the objective of observing the Earth, are all the *Doves* that have been launched by *Planet*, a constellation of CubeSats which is able to take a picture of any place on Earth everyday.

This previously described new aerospace model is the so called *New Space*, which states for the new tendency of opening the space industry to the start-ups, which is mainly achieved by the investigation in new technologies, and by a cheapening in mission and general costs. One of the greatest supports of the *New Space* have been the *CubeSats*.

Now focusing attention in the company that is going to be exhaustively analyzed, an evolution in its business model has been detected. What started as a purely *New Space* company is transitioning towards a company which uses conventional satellites, which means that the missions are changing, as well as the targets. Addi-



**Figure 1.1:** Tendency of growth of the CubeSats along the years

tionally, the company also announced that efforts had begun to be put in Machine Learning Artificial Intelligence, and in the designing of MegaSatellites, to monitor the entire Solar System. This evolution leads to a question, which is, is there an alternative to the *New Space* tendency? Perhaps, once a start-up has settled its position in the market, the best way to keep on growing is to leave the small satellites behind and to transition towards a mission model based in regular sized satellites and innovation. This tendency, incarnated by the transition of *Planet* [4] is worth studying. Therefore, the key drivers that lead the model to its change have to be analyzed and compared.

Some of the tools that can be used in order to determine the answer to the tendency question are, first of all, a CANVAS model, which carefully analyzes all the factors that have an effect on the company and the relationships between them; this way, by a comparison between the old and the new models, answers can be obtained. In addition, the changes in the model and the identification of the drivers can be matched with patterns, such as A. Osterwalder and J.E. Ricart and R.Casadesus methodologies [5].

The ultimate goal of this project is, through analysis, determine all the factors that lead towards the evolution of this company, and therefore, extract a first idea of how the EO market is changing.

## CHAPTER

# 2

## STATE OF THE ART

### 2.1 Description of the Earth Observation Market

#### 2.1.1 Introduction to the Earth Observation

To begin with the description of what the Earth Observation Market is, one has to firstly think about what the Earth Observation is. Earth Observation encompasses all those missions whose aim is to monitor some parameter or activity that takes place in the Earth Surface, and logically, the most effective way to do so is from above.<sup>1</sup>

Most of the Earth Observation satellites are located in Low Earth Orbits, which span heights between 180 and 2000 km above the surface of the Earth [6]. This kind of orbits, present a small revisit time, due to the high speed at which satellites orbit, therefore, spacecrafts develop a significant amount of orbits each day. As an example, the ISS<sup>2</sup>, located 400 km above the Earth surface, develops 16 orbits a day. For the highest case in Low Earth Orbit, an orbital velocity of 6.89 km/s is obtained, which leads to an orbital period of 125 minutes and to almost 12 revolutions a day.

Keeping on with the description of the orbits which the Earth Observation satellites develop, one has to think about the kind of space environment that may be found in Low Earth Orbit [7].

---

<sup>1</sup>A justification of the points that are treated in the State of the Art can be found in Appendix C.1.1

<sup>2</sup>International Space Station

- *Hard Vacuum*: might cause outgassing, that might lead to the release of volatile materials.
- *Presence of Atomic Oxygen*: A hazardous oxidator for metals in satellites, and general degrader.
- *Ultraviolet Radiation*: Which might damage polymers in the satellite.
- *Ionizing Radiation*: The known *South Atlantic Anomaly* might cause single-event upsets, bit errors and latchups in the satellite's electronic system.
- *Plasma*: Composed by positively charged oxygen ions and free electrons, this parameter varies with solar activity and altitude, this parameter might slowly charge the satellite leading to a final ion sputternig.
- *High Temperature Gradients*: Provoked by the difference of temperature that the satellite suffers when passes through light or shadow sections of orbit.
- *Space Debris*: Because of human activities, LEOs are populated by a high number of small to big objects, which have to be monitored in order to avoid catastrophic collisions with the orbiting satellite.

Inside the family of Low Earth Orbits, for optical Earth Observation, there is a particularly special orbit, which is the *Sun Synchronous* one. This orbit is able to obtain images with the same light incidence, which is translated into obtaining images with the same light every time the satellite overpasses the same point on Earth. This feature is specially attractive since a better comparison between pictures, may be achieved.

To finish with this introduction to Earth Observation, there is a key parameter, which is how Earth Observations are developed, resolution. A disruptive is observed when it comes to this parameter. As resolution increases (leaving costs aside), the swept available area decreases, since devices focus their activity in smaller sections. This leads to a longer time in order to analyze all the Earth area [8]. This is where constellations enter the game. By using constellations of satellites, which work together (either monitored from Ground Control or by automatically communicating between them, as Clusters [9]), revisit time might be lowered, allowing the obtainment of relatively high resolution pictures, from anyplace on Earth in small periods of time.

### 2.1.2 Earth Observation Applications

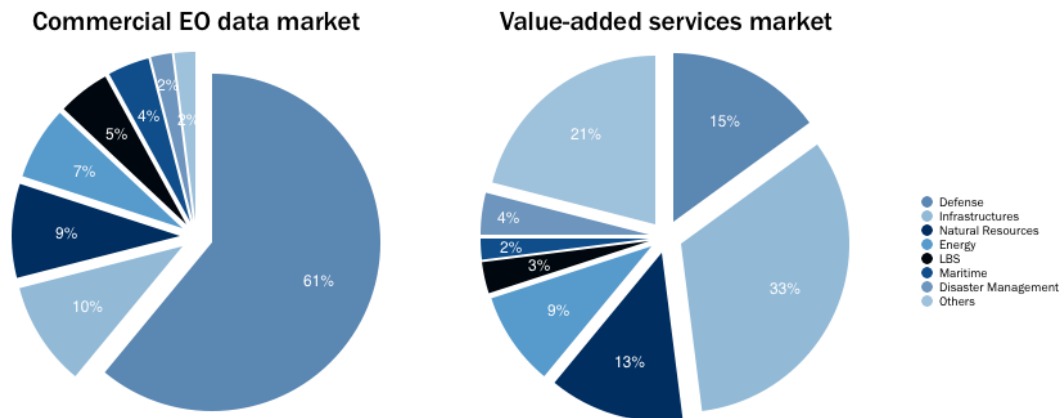
The fact that the Earth Observation Industry is one of the aerospace industries that presents higher perspectives of growth during the following years (based on the past year tendencies [10]) is at a great degree, a direct result of its versatility. This versatility can be seen in all the fields that Earth Observation satellites are able to monitor and to extract data from. The fields are presented in Table 2.1, following

an order from most to least economically relevant [11]<sup>3</sup>:

FIELD	EXAMPLE OF USE
<i>Defense &amp; Intelligence</i>	Hostile Regions Control or Borders Vigilance for quick response.
<i>Infrastructures</i>	Mapping tasks or oil pipping uses.
<i>Natural Resources</i>	Crops or forest mass control.
<i>Energy</i>	Control of the integrity of extensive areas for energy generation (with solar arrays, generators...)
<i>Maritime</i>	Maritime Routes Monitoring
<i>Disaster Management</i>	Control of areas prone to floods or response coordination after disasters.
<i>Others</i>	Education or Climate Change Monitoring

**Table 2.1:** Description of EO data commercial uses

In the following chart, extracted from [11], reader can visually see the impact of each sector in Earth Observation obtained data in 2015:



**Figure 2.1:** Percentage of the economic values of each activities and services added values.

<sup>3</sup>Reader is invited to consult Appendix C.1.2 to find a table with the most representative missions from each application in the EO market.



### 2.1.3 Description and Evolution of the Earth Observation Market

#### Beginnings

The activities related to Earth Observation, could be said to have quite a long trajectory (in terms of modern aerospace industry). The first ever taken picture of Earth from a satellite, was captured in the August of 1959, by the satellite Explorer VI, launched by the NASA from Cape Canaveral [12]. The mentioned picture, extracted from [13], can be seen in Fig. 2.2



**Figure 2.2:** *First image taken of the Earth from a satellite.*

However, the first missions with a serious purpose of recording data from Earth, were the Nimbus missions, a series of satellites, launched by NASA between 1964 and 1978, with activities related to weather recording and prediction. From that moment on, many satellites were launched, from different space agencies:

- *Russia:* Started its Earth Observation activities with the Kosmos 4, in 1962, a satellite with military objectives.
- *Europe:* Irrupted the Earth Observation market in 1977 with the MeteoSat 1, a meteorological geostationary satellite.
- *Japan:* Also in 1977 launched its first meteorological geostationary satellite, the GMS-1.

During this first phase of Earth Observation, missions were mainly dedicated to Weather and Military purposes, and commercial uses were left as secondaries. Following this idea, Earth Observation Companies, were mainly space agencies, such as NASA, Roscosmos or ESA, with little presence of private companies. A tendency only importantly disrupted with the entrance of DigitalGlobe on 1992.

## Present

The present situation is going to be accounted from 2005 until nowadays, since the tendency that is now lived in Earth Observation can be considered to have started in 2005 with the "*Democratization of the Space*", after Google Earth created its virtual globe through real Earth images, with public access to whoever who wanted to access it.

Regarding how the market performs its duties, it can be seen that three main segments exist [14], an upstream, a midstream and a downstream; better understood in Fig.2.3



**Figure 2.3:** *Distribution of the Earth Observation data market.*

This last 15 years of Earth Observation can be characterized by exponential growth, in a great manner, because of the development of the **New Space**. New Space is the tendency that newly created space companies follow, and resides in the combination of new space technologies as well as new space information technologies, in order to cope with the huge amounts of information that are daily recorded by all the operative satellites.

The so called New Space companies propose the use of smaller satellites (mainly CubeSats) in order to create constellations, as well as using cheaper systems in order to lower costs. By doing this, smaller revisit time can be achieved. With this strategy, New Space companies aim to compete with the ultra high resolution that the big actors in the EO market offer (which may be up to 20 cm).

As it can be intuited, companies have to make a decision when it comes to develop the mission features, choosing between lower revisit time or higher resolution. This is because of two factors:

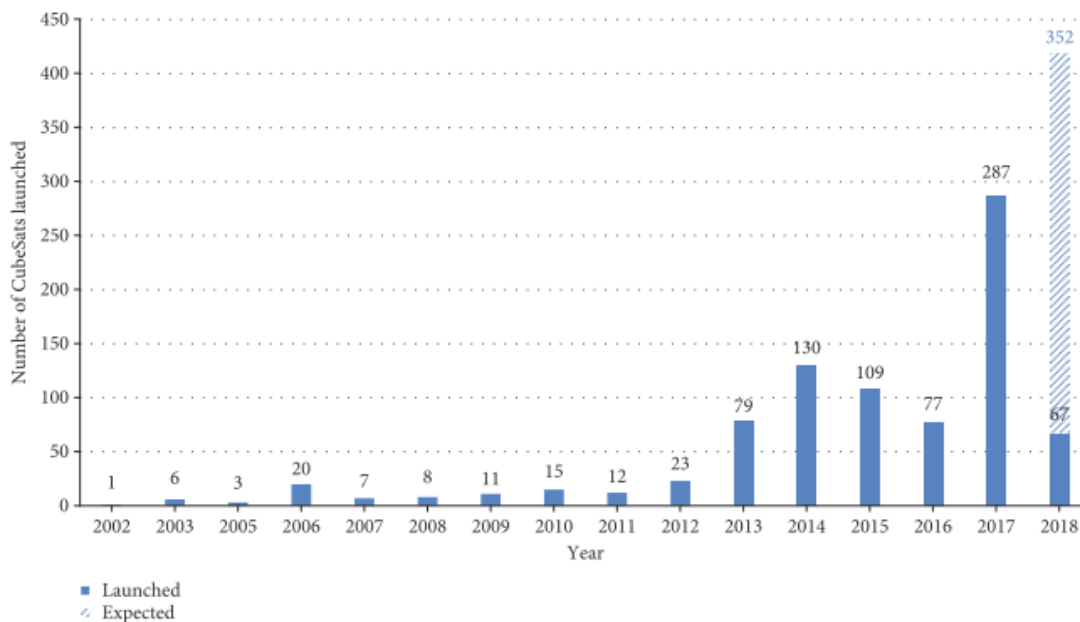
1. In order to increase resolution, costs increase , as well as the size of the satellites, since the resolution of any imaging system is limited by diffraction. [11]<sup>4</sup>
2. When resolution increases the swept area per orbit decreases, since the sensors are focused in a much smaller section.

<sup>4</sup>For a given wavelength, the angular resolution is inversely proportional to the aperture of the instrument (i.e. the diameter of the main mirror).

Because of this disruptive, during the last years, a tendency of hybridization has been developed; combining constellations of lower resolution with a certain amount of high resolution satellites.

Despite the previously explained Democratization of Space, traditional providers are still the leaders; this would mean that DigitalGlobe, in the U.S. and Airbus Space and Defence in Europe have control over the majority of the customers, investments and revenues. And the non-private space agencies still have a key roll in the general markets. Yet smaller companies are increasing their importance year after year.

Putting attention once again in Earth Observation companies, concretely, in the New Space companies, the growth that they have been experiencing during the last years can easily be seen through the growth in the launching of CubeSats. This two parameters are closely related since this is the kind of satellite chosen by this sort of companies. [15]



**Figure 2.4:** Number of CubeSats launched per year from 2002 to May 31, 2018.

According to available data [16], Earth Observation satellites are increasing their presence in space, and their presence in the markets as it can be seen in Fig. 2.5

Another significant data that proves the good moment for the Earth Observation industry, is the evolution of annual revenues (see Fig. 2.6), which has been increasing year after year, and with perspectives of a continuous growth, and expectations of reaching up to 6.9 B\$ in 2027, according to NSR. However, this point will be dealt within the following lines.

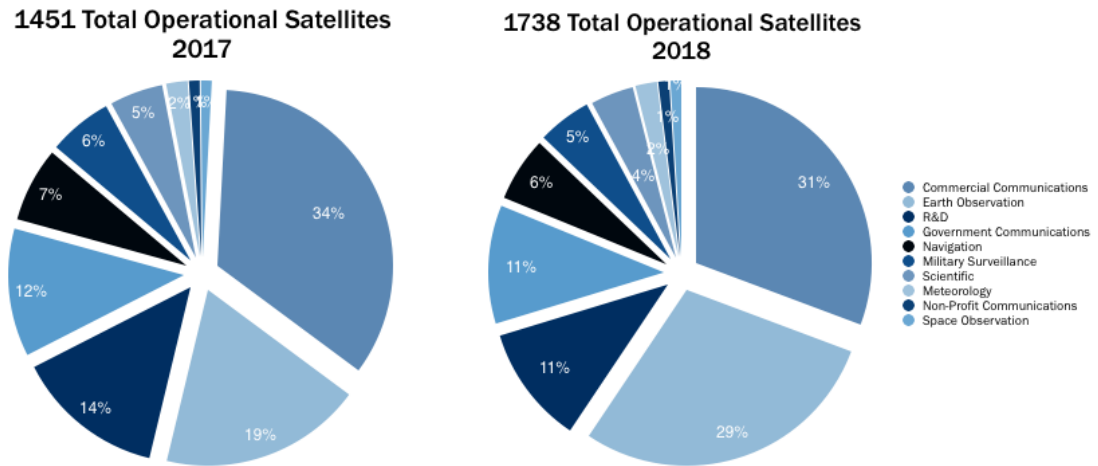


Figure 2.5: Percentage of the Earth Observation Satellites in 2017 (left) and 2018 (right).

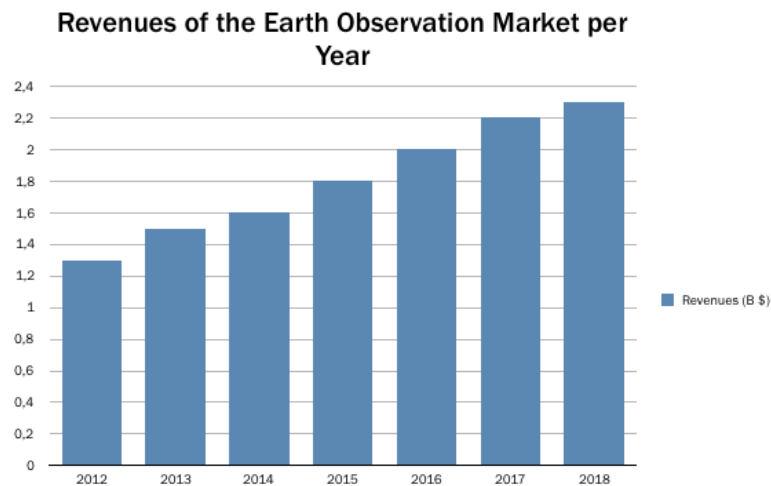


Figure 2.6: Revenues of the Earth Observation industry in billions of dollars per year.

### Future

Based on analysis performed by companies such as Eurocontrol or NSR, data points towards an increase in the number of satellites that will be launched per year with Earth Observation purposes, both small and regular satellites. Therefore, the revenues for the acquired data are expected to keep on growing, as well as the revenues for the added value products.

When it comes to the operators and their origin, it seems that the number of operators will also increase [11] and that more markets will be opened. Even though the United States will still be on the lead of Earth Observation companies and services, with Europe on second place, markets in Asia and Latin America will enter the competition.

The effects on the following factors will be important: first of all, the evolution of the prices, secondly, the evolution of the demand, and lastly, the evolution of the number of suppliers. These will be determinant factors to analyze in order to recalculate the estimations of the evolution of the market. However, according to the demands predicted nowadays, the market is expected to generate 3 billion of dollars in direct services and 5.3 billion of dollars in value-added services by 2025 [11].

Regarding the future situations, two antagonist possibilities can be intuited. First of all, a continuation in the growth. Supposing that governments keep on demanding high resolution data from Earth Observation and that on the commercial side, the applications that are being exploited nowadays continue having the presented growth. This situation could lead to a "banalization" of the Earth Observation supplies, approaching them to the general public. Which would mean a continuous income to the Earth Observation industry.

On the other hand, a recession situation could also be lived. Supposing that the growth that nowadays the industry is living is just part of a bubble, and that sooner or later, the bubble will explode, provoking a recession in the demand. This situation would probably bring the industry back to the point right before the previously explained "*Democratization of Space*", where the main customers of the Earth Observation supplies were the national agencies.

## 2.2 Description of the Main Players in EO

In order to clearly present who are the main actors in the Earth Observation Industry, Table 2.2 is presented [16][17]. The listed companies are ordered following a descending order, first of all, showing those companies which use large satellites for Earth Observation activities (which would be the main conventional companies) and after that, the companies with small satellites. However, national agencies (NASA, ESA...) are left outside of this chart, since they can not be considered private companies.

In the table, all parameters related to the companies in the Earth Observation field can be observed; this means that parameters such as resolution or even the main missions of each company are presented.

MAIN COMPANIES IN EARTH OBSERVATION						
Company	Sensor Description	Size	System Size	High Resolution	High Revisit	Main Missions
<i>DigitalGlobe</i>	Optical	Large	5	X	X	- WorldView Satellites - Geo Eye
<i>Airbus S&amp;D</i>	Optical Radar	Large	4	X		- Sentinel Satellites - Astro-Bus Satellites
<i>UrtheCast</i>	Optical Radar	Large	24	X	X	- DeimosSatellites - OptiSAR Satellites
<i>GeoEye</i>	Radio Occultation	Small	24		X	- GeoEye Satellites - OrbView Satellites
<i>Astrium</i>	Optical	Small	30	X	X	- Pleiades -MeteoSat
<i>Planet</i>	Optical	Small	150		X	- Constellation of Doves - Constellation of Flocks
<i>TerraBella</i>	Optical	Small	24	X		- SkySat Constellation
<i>BlackBridge</i>	Optical	Small	5	X	X	- RapidEye Satellites
<i>Satellopic</i>	Optical	Small	25	X	X	- Nu Satellites
<i>BlackSky</i>	Optical	Small	60		X	- Global Satellites
<i>Hera Systems</i>	Optical	Small	48		X	- IHOPSat
<i>AxelSpace</i>	Optical	Small	50		X	- Hodyoshi Sat - WNISATs

**Table 2.2:** List of the main companies in Earth Observation

## 2.3 Position of Planet in the EO Market

The following lines aim to briefly present *Planet*. How it started and what is its situation nowadays. Exhaustive analysis will be performed in the coming chapters.

### 2.3.1 Introduction to Planet

*Planet*, formerly Planet Labs Inc., is a company founded in 2010 by three ex-NASA employees: Will Marshall, Chris Boshuizen and Robbie Schingle. The company was created pursuing a single a goal: *the possibility of taking a picture from any place on Earth, every day at low costs.*

From its headquarters in San Francisco, CA, the company started its journey towards what nowadays is, one of the most representative companies from the New Space generation, with 6 offices around the world and about 500 employees.

As it is going to be explained in the following lines, the company develops its work, in Earth Observation data recording, through the use of three constellations of satellites; the most extensive one, the one which is composed by *Doves*, CubeSat technology, followed by the SkySat and the RapidEye ones. Through this constellations, the company is able to record images (from various resolutions) from any place on Earth everyday. Allowing them to offer great coverage and variety in data products.

### 2.3.2 Planet's Evolution

The idea that brought Planet Inc. to a reality was simple; the three founders realized that bringing a satellite up to space was expensive and required vast resources and time. Therefore, they aimed to simplify the process, and as a consequence, lower the related costs. Their final aim was to bring space closer to a more extensive group of people, and consequently, open the aerospace data. This way, objectives such as climate and natural resources control could be better monitored.

Following this idea, Will Marshall, Chris Boshuizen and Robbie Schingle founded Cosmologia Inc. in 2010, starting to build their first satellites inside a San Francisco garage. By 2013 their first two satellites (CubeSats), the *Dove-1* and *Dove-2* were launched as a demonstration of the possibilities of the company. By the end of 2013 the company launched its first constellation, composed by 28 Flocks.

The enterprise continued growing year after year, by acquiring BlackBridge, and the RapidEye constellation in 2015. More recently, in 2017, the company bought the TerraBella satellites (SkySats) and just a few months ago, in the december of 2018, the company acquired Boundless Spatial, a company which develops activities

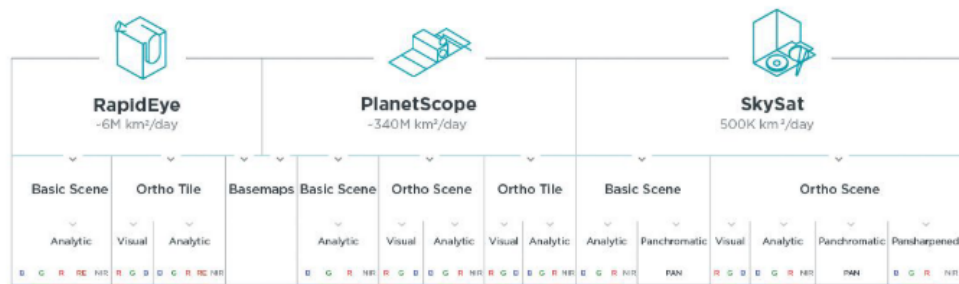
related to data processing.<sup>5</sup>

By March, 2019, Planet has the following orbiting Satellites: 140 Doves, 5 RapidEye Satellites and 15 SkySats.

Future perspectives of the company are of a continued growth, partly because of the contract with the U.S government that Planet achieved in 2018.

### 2.3.3 Planet's Products

The products that Planet offers are summarized in Fig.2.7, and will be briefly explained in the following lines.



**Figure 2.7:** *Products offered by Planet Inc.*

The company offers two different orbits: either Sun-Synchronous or ISS orbit. As well as, three different kind of satellites, in order to capture the data are offered: the Doves, a high revisit, lower resolution option, the RapidEye, a lower revisit high resolution option and the SkySats, the highest resolution possibility. Besides that, three different possibilities of acquiring any type of captured data are also offered:[18]

- *Basic scene:* designed for users with advanced image processing and geometric correction capabilities. This product has scene based framing and is not projected to a cartographic projection.
- *Ortho scene:* Orthorectified, scaled Top of Atmosphere Radiance (at sensor) or Surface Reflectance image product suitable for analytic and visual applications. This product has scene based framing and projected to a cartographic projection
- *Ortho tile:* Radiometric and sensor corrections applied to the data. Imagery is orthorectified and projected to a UTM projection

Deeper studies on the products will be performed in the following chapter, since the aim in this point is just to execute a superficial introduction.

<sup>5</sup>Of high importance, due to the great amounts of data that the company records daily (around 10 TB).



## CHAPTER

### 3

# PLANET'S OLD BUSINESS MODEL

## 3.1 Introduction

Within this first lines of introduction, it is aimed to present the situation and the ideas that *Planet* was following by the beginning of 2017.

From the very beginning, when Planet was founded, the aerospace industry was coming from, probably, its darkest years. Since the Clinton government, back in 1993, had restricted the financing towards the aerospace industries, combined with the boom of Silicon Valley, which induced that many of the engineers that were in this industry fled and finally adding that most of the founding generation of engineers started retiring, left the aerospace sector rather weak. In this environment, only big contractors, with significant funding funds continued with the necessary aerospace activity. [11]

Breaking with this tendency, in the early 10s, a renovation of the aerospace industry started to occur, and *Planet* was part of this renovation. This company started its activity back in 2011 in San Francisco, and it was born with the mission of daily imaging the entire surface of the Earth and providing universal access to the data they would record, this was a *Democratization of access to data*.

By developing this task, the founders hoped to make global change visible, accessible and actionable. [19] Therefore, the initial objective of the company was to use space intelligence to help people and the planet; monitoring events such as deforestation, ice-melting and catastrophic events (amongst others). This kind of events, if action has to be taken, need to be monitored on a daily, or near daily, basis. And back

in the time the company was founded, this service did not exist. As a way to see it, back in 2011, typical Earth images that could be accessed through Internet open sources, were usually 3 to 5 years old. [20]

The idea that *Planet* followed was to build a constellation (*Flock*) of small and compact satellites, specifically, CubeSats or *Doves*, which once the project was completely executed would count up to 150 small satellites in different orbits, in order to achieve this searched daily ground coverage.

By the beginning of 2017, Planet was offering 3 to 5m resolution images [21], obtained with their Doves or the RapidEye constellation. Low revisit time and acceptable resolution were achieved.

Despite the growth, the company was facing some substantial troubles. Mainly, the following ones:

1. *The delays in the launches:* at a first moment, quite a significant problem, but once the enterprise was started, due to the high number of satellites that were launched yearly, the delays lost importance. Besides, the problem was also solved by placing distinct number of Doves in different launch vehicles, ensuring that sooner or later, some of the Doves would eventually be deployed, and at the same time, reducing risk of lost in case of a launch failure.
2. *High loads during stage separation:* The Doves are prepared to resist impacts of up to 200 G, with the aim of protecting the components that they carry.
3. *Significant temperature gradients:* which in a matter of 40 minutes may vary from +55°C to -35 °C.

Finally, the biggest challenge that the company was facing is quite obvious: how could the satellite size be reduced and still be competitive? Firstly, they were part of the tendency of New Space companies which broke with the perspective that size equaled functionality. Advances in miniturization and integration technologies allowed *Planet* to develop the Doves, which basically proved that costs related to development and construction times could be lowered in the aerospace industry. This was able to be performed, in part, thanks to the advances in supply chain management and commercial manufacturing practices that started to occur in the previous years to the foundation of Planet.

Regarding miniturization of the satellite technology that was performed by *Planet*, first of all, it could be partly done because the company decided not to use regular aerospace components in their satellites. This decision was taken, not only thinking about the reduction in the size of the satellite, but also thinking about the reduction in costs and the improvement in performance that non-aerospace components could bring.

The Doves that were manufactured and launched up to 2017 were build using COTS<sup>1</sup>

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<sup>1</sup>Commercial Off The Shell

suppliers. Some other innovations that were introduced in order to reduce the size of the satellites were the use of some of the hi-tech improvements in the cell phone industry; in the energy field, the development of deployable solar arrays without glass; a reduction of space in the optical field, in order to reduce launch costs (by allowing that a higher number of satellites could be deployed per launch, and therefore, allowing the formation of an extensive constellation), the introduction of the concept of hyperintegration in hardware and software and the use of micromechanical systems amongst many others. [21]

However, and with the aim of keeping expanding the Earth Observation section of the market that they controlled, in 2015 (concretely the 15/07/2015), Planet acquired the BlackBridge constellation, composed by 5 RapidEye satellites, built by Canada's MDA Corp. and with a weight of 150 kg each [22]. This satellites are located in a sun-synchronous orbit, at 630 km of altitude, and posses a resolution of 5m and a revisit time of one day, off-nadir, and 5.5 days, nadir<sup>2</sup> [23].

Moving to the ground section of the company, it needed to have an extensive series of ground stations distributed all over the planet, with the purpose of receiving the information that the Doves are constantly sending. By the end of 2016, *Planet* had a total of 33 antennas (Yagi antennas) distributed on 11 ground stations all over the Planet [24]. Which allowed the company to receive approximately 550 GB of daily data, with a maximum capacity of 777 GB.



**Figure 3.1:** Location of the 11 Planet Ground Stations by the end of 2016.

Finishing this introductory section to what Planet was by 2017, the company followed a working system, which is contained in the *Agile Manifesto*<sup>3</sup> [25].

Additionally, the company followed a distributed risk approach philosophy, which is not a part of the *Agile Manifesto* approach, however, it is worth mentioning: *Planet* opted by a redundancy into the overall constellation rather than inside the satellite (meaning that if one of the satellites fails, the rest of the constellation will compensate).

<sup>2</sup>Nadir states for the direction pointing directly below a particular location

<sup>3</sup>The main points that characterize this philosophy can be consulted in Appendix D.1.

During the development of the introduced section, a more exhaustive analysis of all parts of the structure of the company, until 2017, will be performed.

## 3.2 CANVAS breakdown

Reader is invited to consult Appendix A to find further information about what a CANVAS business model is and how it is developed. Since it has not been considered as part of the research, this information has been left to the Appendices and is at readers will whether to consult it or not.

### 3.2.1 Customer Segments

The approach to the first step of the CANVAS breakdown will be to plainly introduce the main customers that *Planet* had back at the end of 2016 and explain the activities that each of them were developing. Therefore, in the end, it will be possible to catalogue each of this customers into different segments and analyze the profile of the customer segments that Planet was serving. Anyway, it is worth mentioning that only the most representative customers will be presented. [26] The list of the customers and the cataloging performed after the analysis can be consulted in Table 3.1.<sup>4</sup>

The final action that needs to be taken during the analysis of the customer segments is to see, according to *Osterwalder and Pigneur's* model generation, which kind of customer segment was Planet serving, back in 2017. This segments can be: *Mass Market, Niche Market, Segmented, Diversified or Multi-sided platforms.*[27] According to the analysis that has been developed, and whose results can be seen in Table 3.1, it can be seen that the customers have slightly different needs, but in the end, all of them require from Earth Observation data to undertake slightly different observation and analysis data and predictions (difference is only based in which parameter is observed). Therefore, it can be stated that Planet, back in 2017 had a **Segmented Customer Segment**.

### 3.2.2 Value Proposition

During the development of this subsection, firstly, the products that *Planet* was offering by the beginning of 2017 will be presented. In addition, a brief analysis of each of them will be performed. Finally, a general analysis of the value proposition of *Planet* will be presented, by means of the *Osterwalder and Pigneur* CANVAS methodology. [27]

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<sup>4</sup>Reader is invited to consult Appendix D.2. for better knowledge about the process of construction of the table 3.1 and for further information about each of the companies.

CUSTOMER SEGMENTS IN PLANET	
<i>Customer Segments</i>	<i>Organizations</i>
Private sector	<b>Engineering and Infrastructure Data Analysts</b> - Geoplex - Descartes Labs - Woolpert - GPC Group - C-Core - Envision - SAINS - Orbital Insight - Pro-gea
	<b>Environmental and Agriculture Data Analysts</b> - FarmersEdge - Wilbur Ellis - Farm Drive
<b>NGOs</b>	
<b>National and International Agencies</b>	
<b>Minor Customers</b>	
	- Amazon (ACA) - ISCMD - Rockefeller Found. - ESA - UN-REDD - SNET - Small Organizations - Individuals - Aid Situations

**Table 3.1:** *Division of main customers by segments*

The products that *Planet* was offering back in the beginning of 2017 can be seen in Figure 3.2, and mainly were<sup>5</sup>:

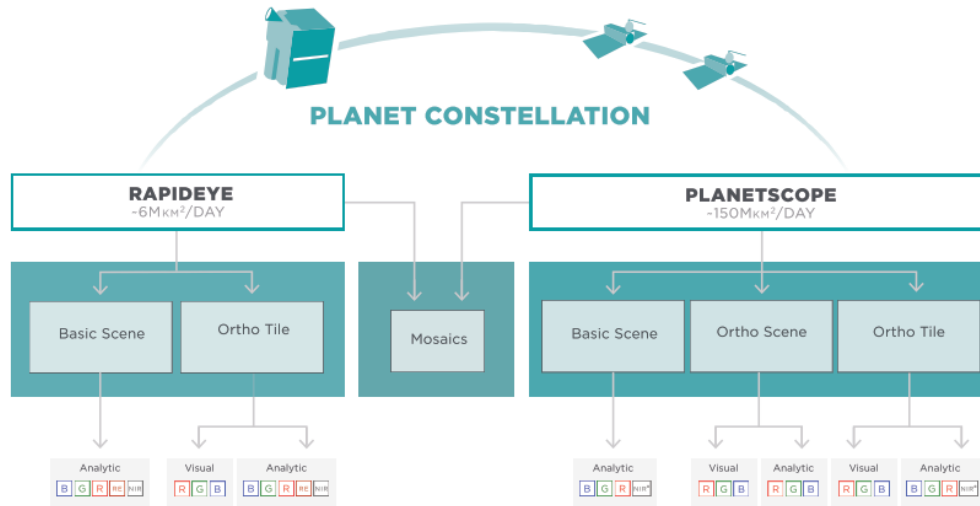
- *PlanetScope Basic Scene*
- *PlanetScope Ortho Scenes*
- *PlanetScope Ortho Tile Product*
- *RapidEye Basic Scene Product*
- *RapidEye Ortho Tile*

### Generated value from the Products

In order to develop the analysis of the value proposition, the Osterwalder and Pigneur CANVAS model proposals of generating added-value are going to be introduced and matched (or not) to what *Planet* offered [27].

1. *Newness*: In the strict meaning of the word, *Planet* did not create a new product, since Earth satellite imagery had been existing since the 70s. However, its proposal did have something new, which expanded the market. *Planet* democratized the market, allowing a wider number of customers (such as private

<sup>5</sup>For further information about the processing process of imagery and the development of the analysis of the value proposition, reader may consult the attached appendix D.3.



**Figure 3.2:** Products offered by Planet by the beginning of 2017.

sector corporations or NGOs, amongst others) to access data that was previously either restricted or too expensive. Therefore, **newness became one of the generated values.**

2. *Performance:* Planet's value proposal did have an improvement in development, which was the capability of imaging the entire surface of the Earth daily with moderate accuracy. Some other improvements were in the fields of geometric and positional accuracy, cloud cover recognition or radiometry and radiometric accuracy. Consequently, **performance was a generated value.**
3. *Customization:* Different customers had access to different products, depending on their needs. There was a wide offer in the Planet's products, which could be acquired in a more processed degree, as well as raw data. For this reason, **there was a certain grade of customization.**
4. *"Getting the job done":* Since Planet did not analyze the obtained images, meaning that the company did not look for any parameter in concrete, leaving this task to customers, **it could not be said that "Getting the job done" was one of the values of the company's products.**
5. *Design:* Planet's products were data and imagery products, therefore, non-physical. As there was no actual physical product, **design was not one of the product's added values.**
6. *Brand:* Because of the kind of product that Planet was selling, the act of using their imagery did not provide customers with higher status. **Brand is not one of the generated values by the company.**
7. *Price:* Planet helped democratizing access to space products. This was possible due to the reduction in acquisition costs of the imagery they provided. This reduction in price was likely to be achieved thanks to the reduction in

building and operating costs of the constellations. Therefore, **the reduction in costs was one of the value propositions.**

8. *Cost Reduction:* By means of the customers cost reduction, when it comes to analysing the changes, during long periods of time, of vast areas, the use of terrestrial or aircraft observation methods might be quite more expensive than doing it from space, in addition, it can also be harder, longer and more irregular. By doing it from space imagery, the companies ensure regular prices and regular delivery times, **allowing a reduction in costs.**
9. *Risk Reduction:* Since imagery provided by *Planet* had already been pre-processed and corrected, customers were ensured risk-free imagery, by means that the data that they were acquiring did not have mistakes in codification. So, **risk reduction was also one of the value points of the company's products.**
10. *Accessibility:* This point has already been indirectly treated. As *Planet* had been part of the Space Democratization tendency, it is intrinsic that **accessibility to their products was one of the most important values that they offer.**
11. *Usability:* By means of easiness in the use of their products, **usability depends on the product that is being acquired.** If customer is acquiring pre-processed and corrected data, usability is going to be achieved. However, if customer is acquiring raw data, usability becomes harder.

**Summary:** The value proposal of *Planet* had some key points, which roughly were, a high revisit time, good image and data quality (as well as reliable) at low costs, some technical improvements in the delivered products, a certain degree of customization in the product that was commercialized and easy and wide accessibility to the products.

### 3.2.3 Channels

For the analysis of the distribution and delivery channels that *Planet* had back in the beginning of 2017, after a first presentation of the delivery options that *Planet* used to have, the channels are going to be identified and presented. The last step of this subsection, will be breaking down the phases of the delivery channels.

First things, first; *Planet* used to have two main different ways of accessing their products. The **direct** way, through their sales team and their web page. Or the **indirect** way, through a web of Partners and alliances, which were either *resellers*<sup>6</sup> or *solution partners*.<sup>7</sup> [28].

<sup>6</sup>A series of companies which directly sold *Planet's* products (E.G. Cartodata or GeoServe)

<sup>7</sup>Companies which sold derived products from the ones directly offered by *Planet* (E.G. GeoSpark or FeatureX)

When any *Planet* product was acquired, all imagery products were made available via *Application Processing Interface* (API), which was an interface that offered REST API access, which allowed listing, filtering and downloading data to anyone who used a valid API key, and *Graphical User Interface* (GUI).<sup>8</sup>

### Channels Breakdown

1. *Awareness*: The way *Planet* had in order to expose the products and services that it provided, were mainly *conferences* (most of them given by W. Marshall, one of its founders) [20] and the interviews with potential customers (E.G. national agencies [29]), or to media [30]. Through this "advertising events", *Planet* could clearly explain what they were doing and selling, and how they were doing it. Their project could reach possible interested customers and the delivery of the products and services could be initiated.
2. *Evaluation*: *Planet* had to make sure the customer understood what was the real value and possibilities that the offered product possessed. Also through conferences, the company could make the customers know the value of this products; letting them know which uses could the products have. Which, could roughly go from agricultural control to maritime route tracking, all of this on a safe and daily basis.
3. *Purchase*: There were two main ways to acquire *Planet's* services. The first one, a direct one, by establishing direct contact with the company, through its sales teams or through their web page, which would be a **direct and owned channel**. The second one, through second actors, which would be the previously introduced resellers or solution partners; an **indirect, partner channel**.
4. *Delivery*: The delivery was always done through *Planet's* web page; the client would receive a .zip format folder, which contained a series of documents, and would gain a key to access the API and GUI through which data and a catalogue of images were able to be accessed. Depending on the product that the customer had bought, the access to the available products would vary.
5. *After-sales*: *Planet* did not offer a proper after-sales service, however, the company could be easily contacted by the costumers in case of any malfunction of the bought product or in case of doubt, through the contact sales option.

**Summary:** the company presented and explained their products and services through conferences or interviews. Two purchase channels were available, a direct and an indirect (partners) one. After that, the product was delivered through the *Planet's* platform, accessible from their web page, and through which, the customer got a customized product. Once the customer had the product on its possession, if any problem was detected, *Planet* could be contacted through the contact sales team, reachable through their web page.

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<sup>8</sup>This options of obtaining the products have been analyzed, and reader may find further information of this analysis in Appendix D.4.



### 3.2.4 Customer Relationships

In this specific part of the functioning of the company, *Osterwalder and Pigneur* propose six different types of relationships between the company and the customer, which are [27]:

- *Personal Assistance*: Meaning that the customer interacts with a person.
- *Personalized Assistance*: When the customer receives an specialized attention which responds and tailors the needs that have been requested to be satisfied.
- *Self-Service*: The company has disposed the necessary means so that the client might be able to satisfy its needs by its own.
- *Automatic Service*: One step further than the Self-Service. It mixes a sophisticated self-order system with automated process, allowing the customers to have online profiles, customized to their needs, remembered by the algorithm.
- *Communities*: Not directly provided by the company, but for the very same customers. Through some platforms, customers share information and experiences in order to help each other.
- *Co-creation*: Through the exposition of their needs, the customers help the company creating the exact product or service that they need, as well as giving the company some feedback when it comes to improve that product.

Reflecting this points into the company, it can be stated that three of them were present.

Since most of the customers that used *Planet* imagery were already quite specialized, not much personalized attention was needed, therefore, this attention could be provided by some more efficient means. The most important assistance that was given to customers was through **Automatic Services**. As it has been explained, in the Channels section, customers had access to data through a platform that was provided by *Planet*, and which was customized depending on the client's request.

On a smaller degree, a combination of two relationships was found. Through **Personalized attention**, the company could achieve a **Co-creation** relationship. As the *Agile Manifesto* [25] states, customer collaboration prevails over contract negotiation. This two relationships were less relevant because, it was less likely that smaller customers would require from this kind of attention, whereas the automated one was granted to each and every one of the customers. An example of company which received this personalized attention and co-creates with *Planet* was Farmers Edge, a company that helped *Planet* developing a product that perfectly tailored its needs, by giving feedback. [31]

Finally, it is worth mentioning that *Planet* had basic personal assistance through their contact field, in their web page.

### 3.2.5 Revenue Streams

The first questions that have to be answered are, how does the customer pay to the provider, and by which means does he do it? Secondly, does every customer pay the same, is there a fixed price or does it vary depending on demand or the global economic situation?

To answer the first question, it can be stated that the payment made to *Planet*, would be rather **recurrent**, more than transactional. Customers could choose to make an only payment for an only set of imagery, however, the most common way to do it was recurrently. By contracting a **Data License**, which varied depending on the customer's needs, the client gained access to the required data.<sup>9</sup> [32].

*Planet* also offered free access to a part of its imagery library in special cases. E.G. in order to access imagery of areas damaged by any types of catastrophes (so that the help towards this zones could be higher) or a free 14 days trial, as well as an open data community, in certain areas. [33]

Moving on to the second question, *Planet* had **fixed list** pricing mechanisms; basically, prices depend on the product that was being acquired, and depends on the customer and the license that was being acquired as well: a government with an expanded license did not pay the same as a company with a multi-user license. However, this list of prices maintains constant.

### 3.2.6 Key Resources

Defined as all those services, components and activities that are completely necessary in order to develop the key activities. Catalogued into *Physical, Intellectual, Human and Financial*.

#### Physical Resources

It implies all facilities, materials and in definitive, all material resources needed for the good functioning of the company; listed as:

1. *Manufacturing Facilities and Headquarters*: Back in the beginning of 2017, *Planet* had a manufacturing facility in San Francisco and 5 headquarters, distributed in San Francisco, Bellevue, Amsterdam, Berlin and Lethbridge.
2. *Launching Vehicles*: Not quite a possessed resource, but a needed one. *Planet* contracted the services of launching companies to insert their satellites on orbit<sup>10</sup>

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<sup>9</sup>Some of the characteristics of this acquired license can be seen in Appendix D.5

<sup>10</sup>See Table D.1, available on Appendix D.6. and extracted from [34] for further information.

3. *World Web*: *Planet* needed to have an extensive web of ground stations all over the World in order to keep constant contact with the satellites. There were 11 of this ground stations and 30 antennas in both hemispheres in the beginning of 2017. For further information, see Fig. 3.1.
4. *Platforms*: Owned online tools that the company had back in 2017 though which the customers could access the data.

### Intellectual Resources

Mainly composed by the Copyright licenses that it possessed all over its owned imagery. Apart from this, the partnerships that it had established were also key in the development of their activities.

*Planet* also had in its possession some very powerful databases, where around 777 GB of information were stored daily. Therefore, it could be said that the intellectual resources in *Planet* used to have quite an important paper.

### Human Resources

Composed by around 300 workers. This human resources formed the engineering and analyst teams, the ground and operations control, marketing and sales teams, software engineers and product developers.

### Financial Resources

Mainly composed by the investments made from different partners <sup>11</sup> Through this inversions, *Planet* was able to financiate the cost of the development of its activities (from the designing to the launching and maintenance of the satellites). The inversions were payed back with the company's revenues, on percentages pre-accorded by both actors.

### 3.2.7 Key Activities

*Osterwalder and Pigneur* distinguish between three categories of key activities: *Production, problem solving and platform*. For *Planet's* old business model, the most important ones were those related to production and problem solving.

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<sup>11</sup>For further information, see Table D.2, extracted from [35], available in Appendix D.6.

## Production

It encompasses all the designing, manufacturing and physical delivery of the products. In order to better illustrate the production activities developed by *Planet*, the following list, presented in chronological order, is attached<sup>12</sup>:

1. Designing of the PlanetScope satellites.
2. Development of the PlanetScope updates in design.
3. Planning of the missions' logistics, both for the PlanetScope and the RapidEye constellations.
4. Assembling and manufacturing the PlanetScope satellites.
5. Monitor the constellations with the ground control stations
6. Data storage process.
7. Data analysis engineering.
8. Data processing engineering.

## Problem Solving

Activities related to giving individual solutions to each customer. For *Planet*, there was a certain degree of creation with every customer that wanted to be involved. Nevertheless, it also offered a wide series of options in the acquisition of its products that may also have given this certain degree of individual solutions to customers.

## Platform

By means of all the activities that need to be performed in order to ensure the functioning of the platform, which is the main delivery channel, basically are the following ones:

1. Software development engineering.
2. Network maintenance.
3. Network update.
4. Attention to customer in order to solve problems related to the platform at real time.

### 3.2.8 Key Partnerships

Four different types of partnerships will be differentiated: *Strategic alliances with non-competitors, strategic alliances between competitors, joint ventures and buyer-supplier*. In addition, three motivations will also be differentiated: *Optimization and economy of scale, reduction of risk and uncertainty and acquisition of particular resources and activities*<sup>13</sup>.

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<sup>12</sup>NOTE: The launching activity has not been included in the enumeration since *Planet* sub-contracted the launching vehicles.

<sup>13</sup>Reader is invited to consult Appendix D.7 in order to see the description of key Partnerships in the early years of activity of *Planet*.

*Planet* needed to have partnerships with providers of raw materials, and electronic components (COTS) in order to be able to assemble all the PlanetScope satellites. This kind of partners would establish a **buyer-supplier** partnership, were, *Planet* would be the buyer, and the COTS companies, the suppliers. The motivation of this partnerships, would be the simple need for the acquisition of the resources that are necessary for the satellites' assembly.

On a second step of the formation of the constellation<sup>14</sup>, there were the partners which transported the satellites to the space, as payload in their launches, this would be (see Table D.1., available in Appendix D.1.5.): Norhrop Grumman, Yuzhnoye, SpaceX, JAXA, United Launch Alliance and the Indian Space Research Organization. The type of partnership that *Planet* maintained with each of this organizations was a **buyer-supplier one**, with the motivation of accessing a resource that the company did not posses.

On the deployment phase of the delivery of the satellites, there was the ISS partnership, one of the PlanetScope's deployers. This partnership would also be a **buyer-supplier one**, with the motivation of providing *Planet* with a service that it can not develop.

*Planet* did also establish some partnerships with investors, such as Data Collective, investor in all series of transactions (A, B and C), Capricorn Investment Group or IFC Venture Capital Group, amongst others. All this partnerships were **strategic alliances** with non-competitors, with the aim of optimizing the economy of any of these companies.

Moving to the partnerships that it established in order to deliver its products to a higher sector of the World market, such as Orbital Insight or Windward, the company established an **alliance** between non-competitors, allowing to optimizing the range of operation of the company. [36]

*Planet* also established relationships of partnerships with humanitarian foundations, such as USAID or Humanity United [37], as well as the United Nations [38]. This kind of partnerships are a mix between an alliance and a buyer-supplier one, since *Planet* did not earn money from this companies in many cases (as when offering help when natural disasters occurred). The motivation of this partnerships, looking from the humanitarian organizations, is to acquire services that they can not develop.

### 3.2.9 Cost Structure

Before starting this subsection, it is worth mentioning that *Planet* does not publish any data regarding its economical and financial issues; therefore, the analysis of the cost structure is going to be rather qualitative instead of quantitative, which, for the purpose of this study, is totally acceptable.

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<sup>14</sup>Only talking about the PlaneScope one, since the RapidEye one was already orbiting when *Planet* bought it

To begin with, the cost of the structure (which includes the economical resources for developing the product, maintain it, distribute it and collect the profits) can be splitted into two parts: the fixed (non-dependant of the number of units sold) and the variable costs (dependant of the number of units sold).

COSTS	
<i>FIXED</i>	<i>VARIABLE</i>
<ul style="list-style-type: none"> <li>- <i>COTS for the satellites.</i></li> <li>- <i>Assemble of the satellites.</i></li> <li>- <i>Tools and machinery cost.</i></li> <li>- <i>Launching Costs.</i></li> <li>- <i>Maintenance costs.</i></li> <li>- <i>Installations costs: factories and offices.</i></li> <li>- <i>Ground Control: Stations and Antennas.</i></li> <li>- <i>Salaries of the personnel.</i></li> <li>- <i>Software Licenses.</i></li> </ul>	<ul style="list-style-type: none"> <li>- <i>Maintain the Platform's Software.</i></li> <li>- <i>Cost of the Data Storage</i></li> <li>- <i>Cost of the Data Analysis</i></li> </ul>

**Table 3.2:** *Costs of the Planet structure in 2017*

As a clarification, this distribution of costs is based on the amount of imagery sold. If the number of satellites were the starting point, the launching costs would be variable costs (depending on the number of launched satellites, they vary), as well as the COTS costs.<sup>15</sup>

Regarding the type of cost model that the company used to, it could be seen as an equilibrium between a **cost and value driven** model. The company provided a very specialized service, even though the access to this service was wider than before. However, because of the reduction in costs that the company achieved, the cost-driven structure was also present.

To finish with this cost analysis, it can be said that there is a slight scope economy characterization, since, some of the services that it offers can be used through the same distribution channels.

### 3.3 CANVAS Design

As it can be seen in Fig. 3.3, all the information that has been presented in the previous pages of this third chapter, has been summed up and plotted in a single CANVAS model. In order to better explain how this model works, some lines of explanation have been added. This way, not only the construction process of the CANVAS has been presented, but also the relationships between each of the introduced building blocks<sup>16</sup>.

<sup>15</sup>Reader is invited to consult Appendix D.8 to find an indicative idea of the numerical costs.

<sup>16</sup>More concrete and further analysis and studies on the development of the CANVAS and its results can be found in Appendix D.9.

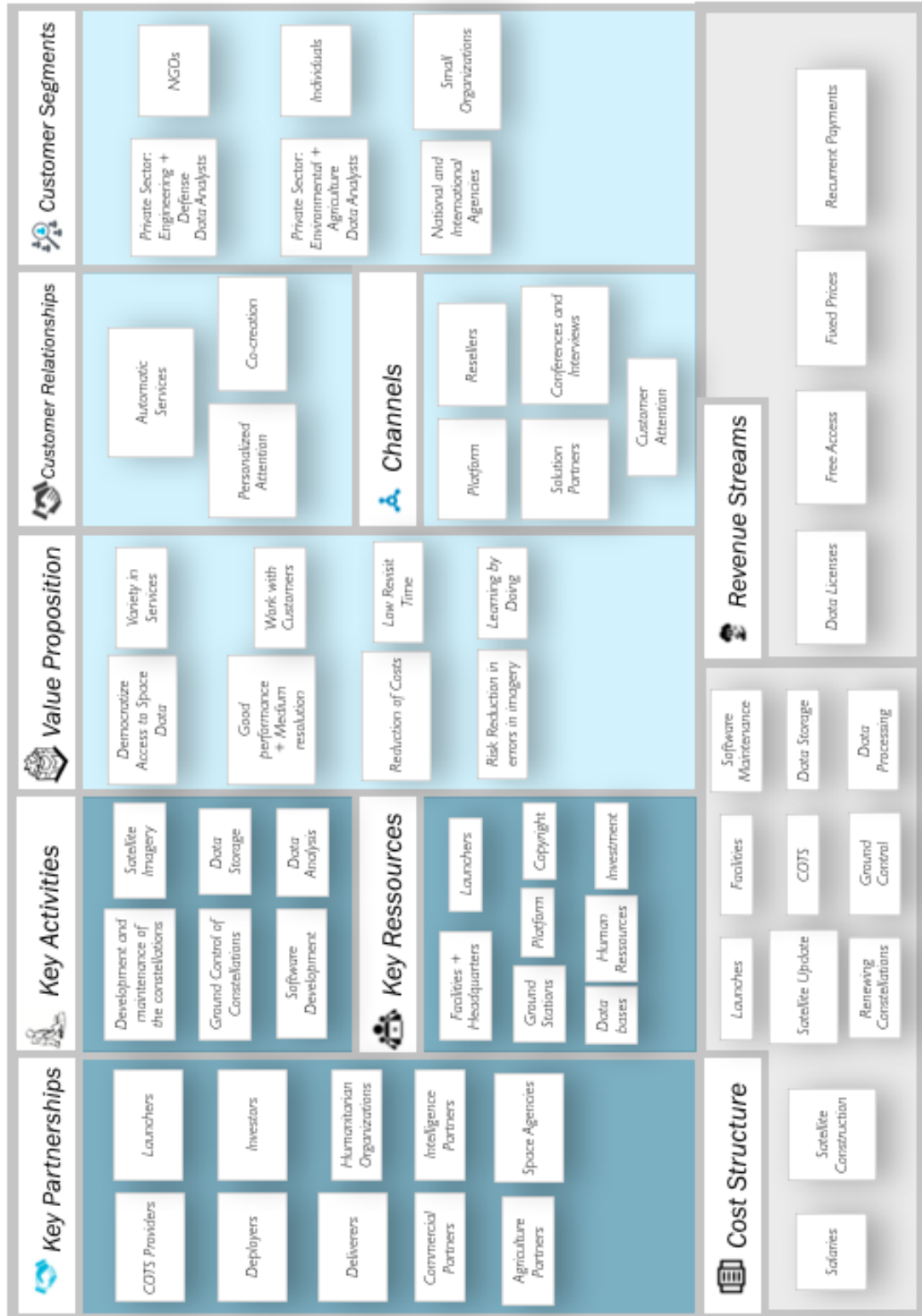


Figure 3.3: Design of the CANVAS model for Planet in 2017.

Firstly, the *Efficiency Side*, composed by the key partnerships, activities, resources and cost structure, which is the heart of the company by itself, will be plotted down.

In order to perform all its key activities, which basically guided the company towards achieving the development of the value proposition, *Planet* designed a series of satellites, in its facilities, which were later assembled in its very facilities. This satellites, built with the tools and materials provided by partner-sellers, aimed to renew and maintain the PlanetScope constellation. When this satellites were finally assembled, they were launched to a low Earth orbit by some launcher-partners, and later deployed either by the same launchers or by the ISS.

Regarding both, the PlanetScope, and the RapidEye constellations, there was a Ground control, which monitored all the movements and received all the information that the satellites took. This information was then stored in data bases and firstly analyzed by the company, which later distributed it. When it comes to the analysis of the data, the company worked together with some of its partners and customers in each field (agriculture, engineering...) so that better products were developed.

The information was finally delivered to the customers through the *Planet's* Platform, and the client obtained some rights on the imagery that was being bought. The company had a Copyright license over all its images, and the customers established contracts in order to obtain licenses over this data.

All the structure was sustained, in the economical field, not only by the incomes of *Planet*, but also by investors which financed part of the programs, in expectancy of some retribution.



## CHAPTER

# 4

## PLANET'S NEW BUSINESS MODEL

### 4.1 Introduction

The second development of the CANVAS model, this time for the company at the present time, is to be seen as a continuation of Chapter 3.

During its first years of activity *Planet*, did accomplish its objectives. It successfully launched and deployed its self designed constellation of CubeSats; it bought and took profit of a second constellation; it established a net of customers, in very diverse areas and environments. All in all, it built solid pillars for the company's sustained growth.

It could be said that the company has started its real evolution this years, increasing its contracts and the size of its contractors; expanding the offered services, and most importantly, entering *Mission 2*.

*Mission 1*, consisted on possessing a solid constellation that could image the Earth on a daily basis, with medium to high resolution. By the end of 2017, *Planet* announced that mission one had successfully been accomplished and that *Mission 2* was to be started. *Mission 2* consists on combining the space imagery and engineering with the Artificial Intelligence methods. This project, called the *Queryable Earth*, aims to monitor and itemize everything on Earth; from cars, to planes, and even trees, by using Artificial Intelligence. [39]

The second part of *Mission 2* is to develop *MegaSats*, in collaboration with SpaceX, so that the entire Solar System can be monitored.

In order to accomplish this second stage, *Planet*, nowadays, counts with three different constellations: The evolved *PlanetScope* constellation, with an increased size, updated with every launch. Apart from this, the *RapidEye* constellation, and the third and newest constellation the *TerraBella* one, a constellation of 13 SkySat satellites, bought on February of 2017 to Google. [40]

Another field to which *Planet* has expanded to, is the Data Analysis and the Solar System Observation. With all constellations fully operative, the company received around 6 TB of data per day, so strong tools in order to convert this huge data base into actionable and lucrative products needed to be developed. *Planet*, aims to develop reliable machine learning methods for automated analysis of data imagery, and ultimately, allow the customer to ask precise questions, and receive equally precise answers.[41] Pursuing this goal, *Planet* reached an agreement to buy *Boundless* by the end of 2018. [42]

Regarding the Solar System observation and monitoring, back in March of 2018, *Planet* announced, as part of the *Mission 2* project, a collaboration with SpaceX, in the development of MegaSats that would be able to observe and monitor the entire Solar System. [43]

Nowadays *Planet* has around 500 employees, distributed along 6 offices, in the U.S and Europe, and possesses a Ground Station Network of 31 installations, located in both hemispheres, from Greenland to the Antarctica. Even though the company is growing, the initial philosophy and ethics remains untouched. *Planet* aims to help the Earth by democratizing the access to space information and still pursues values such as the aim of provoking a global impact through knowledge. [44]

## 4.2 CANVAS breakdown

All the points that are going to be presented, regarding the new *Planet's* business model, are to be seen as a continuation of the same points from Chapter 3, therefore, the fields that have remained the same, are not going to be re-explained; they are simply going to be referenced.

### 4.2.1 Customer Segments

The most representative customers which consume *Planet's* services are going to be plotted and classified, with the final aim of obtaining an image of the different groups of customers that *Planet* is serving nowadays.<sup>1</sup> The result of the classification can be seen in Table 4.1.

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<sup>1</sup>Reader is invited to consult Appendices D.2 and E.1 in order to know how the information for Customer classification has been extracted.

When analysing the customer segments, this can be: *Mass Market, Niche Market, Segmented, Diversified or Multi-sided platforms*. According to the study that has been made to develop table 4.1, the customers that *Planet* are serving have slightly different needs, even though they all require from the imagery and data sets that the company is providing, the needs of an Agriculture based company are not the same ones as a national agency such as ESA, therefore, the services are not going to be exactly the same, and *Planet* will be forced to offer different customized packages of imagery.

By this means, it can be stated that the kind of customer segments that *Planet* is targeting in the present, is a **Segmented Kind**, The most direct consequence that this has, is that *Planet* needs to also slightly diversify the products that is offering, in order to perfectly match each of the customer segments that are being attended.

<b>CUSTOMER SEGMENTS IN PLANET</b>	
<i>Customer Segments</i>	<i>Organizations</i>
Private sector	<b>Engineering and Infrastructure Data Analysts</b> <ul style="list-style-type: none"> <li>- Google</li> <li>- Descartes Labs</li> <li>- Woolpert</li> <li>- GPC Group</li> <li>- C-Core</li> <li>- Envision</li> <li>- SAINS</li> <li>- Orbital Insight</li> <li>- Cesium Community</li> <li>- Pro-gea</li> </ul>
	<b>Environmental and Agriculture Data Analysts</b> <ul style="list-style-type: none"> <li>- FarmersEdge</li> <li>- Wilbur Ellis</li> <li>- Farm Drive</li> <li>- DowDuPont</li> </ul>
<b>NGOs</b>	
<b>National and International Agencies</b>	
<ul style="list-style-type: none"> <li>- Amazon (ACA)</li> <li>- Rockefeller Found.</li> <li>- Paul G. Allen Phil.</li> <li>- ESA</li> <li>- UN-REDD</li> <li>- SNET</li> <li>- ISCMD</li> <li>- European Comission</li> <li>- NASA</li> </ul>	
<b>Minor Customers</b>	
<ul style="list-style-type: none"> <li>- Small Companies</li> <li>- Individuals</li> <li>- Aid Situations</li> <li>- Researchers</li> <li>- Universities</li> </ul>	

**Table 4.1:** *Division of main customers by segments in the present*

## 4.2.2 Value Proposition

Within this points, the changes and evolution in the value propositions of *Planet* will be presented. Therefore, in the end, a clear image of the present value proposition will be achieved, and an analysis, by means of the *Pigneur and Osterwalder* proposal is going to be made.

The means that nowadays *Planet* has in order to obtain all data and imagery are:

- *PlanetScope Constellation*: Composed by around 120 PlanetScope CubeSats, with an approximate resolution of 3 m, in ISS or 475 km sun-synchronous orbits and an image capture capacity of 340 million  $km^2/day$ .
- *BlackBridge Constellation*: Composed by 5 RapidEye satellites, with a resolution of 5m, in a 680 km sun-synchronous orbit and an image capture capacity of 6 million  $km^2/day$ .
- *TerraBella Constellation*: Composed by 13 SkySat satellites, with a resolution of 0.8 m, in an orbit of approximately 500 km of altitude and an image capture capacity of 32 million  $km^2/day$ .

All this satellites, offer the following products, finally summarized in Table 4.2, extracted from [18] where sub-variations of the products are also visible.<sup>2</sup>

Satellite	<i>PlanetScope</i>	<i>Rapid Eye</i>	<i>SkySat</i>	<i>Partners</i>
Products	Basic Scene	Basic Scene	Basic Scene	LandSat-8
	Ortho Scene		Ortho Scene	
	Ortho Tile	Ortho Tile	Ortho Collect	Sentinel-2
			Base Maps	

**Table 4.2:** Products offered by Planet in the present.

Now the value proposition is going to be analyzed point by point by means of the *Pigneur and Osterwalder* proposal<sup>3</sup>. [27]

1. *Newness*: Products that *Planet* is offering nowadays, though not as new as in 2017, are still quite recent and revolutionary. It has been during this last years that the general public has began to be aware of the existence of this products. Then, since, this typically hard to reach field has been opened to an bigger market, it can be said that **newness is one of the traits of the value proposal**. Nevertheless, and regarding bigger companies and national and international agencies, the possibility (not offered before) of accessing great amounts of imagery data which are renewed and updated every day, is also a proposal that had never been presented before.

<sup>2</sup>Please note, that not only does *Planet* offer its own products and services, through its own satellites (*PlanetScope*, *RapidEye* and *SkySat*), but also offers access to services provided by its partners NASA and ESA.

<sup>3</sup>Reader is invited to consult Appendices D.3 and E.2 to find further information about the Value Proposition analysis

2. *Performance*: By expanding the number of different satellites that the company is using, which has been achieved by increasing the PlanetScope constellation, the acquisition of the SkySats and the partnership with NASA and ESA, *Planet* is able to offer great resolution images from any place on Earth, everyday. This combination of quality imagery and very low revisit time, provide *Planet* with great performance parameters.
3. *Customization*: *Planet* possesses a great fleet of satellites with very different qualities and performance parameters. Even though all services are related to Earth observation, each custom segments has slightly different needs. *Planet* does offer services to each of them, by reaching individual contracts. Then, it can also be said that **Customization is another of the company's traits**.
4. *Getting the job done*: This job in concrete would be acquiring the images. Customers that contract the services of *Planet* need this imagery data. Then, since *Planet* does acquire it, **getting the job done is a trait which is satisfied**. It is worth saying that, after the announce made in July, 2018, about the Mission 2 of the company, during the following years, the company will also be able to provide services in intricate data analysis.
5. *Design*: **Not one of the values of the sold product**.
6. *Brand*: **Not a key of the value proposition**.
7. *Price*: *Planet* has been one of the companies that have expanded the idea of the democratization of space, and the way to democratize the access to space is by reducing the price of the products with the aim of reaching a higher public. For this reasons, not only it can be said that price is one of the values of the product, but it has to be said that **price is one of the key values of the product**.
8. *Cost Reduction*: The fact of using this *Planet's* imagery may imply a collateral reduction of costs. With an example: If an farmer, which has crops in wide areas wants to monitor the health of its crops, in order to create strategies to increase the harvest, doing it by means of land or air investigation would suppose a higher cost rather than doing it though the means that *Planet* offers. Therefore, **Cost Reduction is one of the offered values**.
9. *Risk Reduction*: This can be seen through another example. When it comes to sea vigilance, the typical means are air patrols; however, the area that needs to be observed is way too wide for these aircrafts. By having daily images of the totality of the sea area, governments may create strategies to predict were the threats are going to be in the present, reducing the risk of leaving unattended areas. So, **Risk Reduction is one of the keys of the value proposition**.
10. *Accessibility*: Allowing to provide access to the higher public, was one of the challenges that the company was chasing. This easy accessibility is achieved through competitive prices and an easy access to the company's platform. Therefore, **Accessibility is also part of the value proposition**.

11. *Usability*: *Planet* offers means to its customers to have an easier process when trying to analyze the provided imagery products, assessing them and providing them with the necessary tools. It can also be said that **usability is part of the value proposal**.

**Summary:** the main characteristics of the value proposition of *Planet* nowadays is a combination of customized services related to EO activities. The EO data, is updated on a daily basis, and at different resolutions. The access to the imagery and/or pre-processed data is rather easy, as well as cheaper than the traditional competence, allowing that nearly all customers may acquire and extract profit from them. This, combined with the uniqueness of the service, create a great value proposition, for which, many and diverse customers are willing to pay.<sup>4</sup>

### 4.2.3 Channels

At the present time, *Planet* has two main ways of obtaining the purchased products. First, **directly**, through the sales team, and the platform of the company. It has the certainty of obtaining a grade of customization through negotiation with the company, which makes it the most indicated for big companies chasing partner and collaboration opportunities with *Planet*.

The second way, is the **indirect** way, through distributors and resellers. Currently, *Planet* counts with a total of 66 resellers [45], located in all regions of the World. Nevertheless, *Planet* makes a distinction between its re-distributors, splitting them into two groups: *Distributors*<sup>5</sup>, and *Resellers*<sup>6</sup>. Both of this deliverers are quite more focused on regional companies, acting as intermediates, connecting the company with the customers in each region of the World.

*Planet* also counts with a global network of *solution partners*, which are industry experts that develop and provide solutions leveraging *Planet's* products.

When customers finally take the decision of acquiring *Planet's* services, they gain access to the distributing online platform of the company. This platform makes products available via Application Processing Interface (API) and Graphical User Interface (GUI).

The API, offers access that allows listing, filtering and downloading of data to anyone using an API key, obtained when the license is acquired by the customer. Additionally, *Planet's* GUI allows users to: *View timelapse mosaics.*, *Search*, *Save search*, *Filter*, *Zoom and preview imagery*, *View imagery details*, *Download*, *use Draw tools*, *use Imagery compare tools*. Another part of the GUI, is an administration and account management tool, used to manage user accounts overview, organization and

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<sup>4</sup>To be mentioned: the expansion in the value proposition that the company is going to be offering in some years from now; the MegaSats and the Queryable products, now under development phases, will help increasing the value proposition of *Planet* .

<sup>5</sup>Which sell *Planet* products through their network and directly to customers

<sup>6</sup>Which sell *Planet* products directly to customers.

sub-organization overview, account privileges and orders and usage review. [18]. Apart from this, the company also offers an open media channel and creative commons CC-BY SA 4.0, where anyone may obtain and see the images uploaded to this platform by the company, as long as the usage is well referenced and used.

To better explain these channels, the analysis by *Pigneur and Osterwalder's* means is going to be performed.

1. *Awareness*: The ways that *Planet* has to reach its potential customers are: first, the conferences given by its representatives and the open papers that they provide. Also, the given interviews and the advertising events, which allow the company to present the products that they are developing<sup>7</sup>.
2. *Evaluation*: The evaluation process ensures that the customer understands the value of the provided services. It is achieved through the conferences and through the work of the sales teams as well.
3. *Purchase*: In the process of purchasing, the client has two main options of purchase: directly, through the very same company of *Planet*, or through intermediaries, which might be resellers, distributors or solution partners. This way, the company ensures that any potential buyer in any place of the World can be reached.
4. *Delivery*: All products are delivered through the platform of the company. When the purchase has finished, the customer receives a key entrance to the platform, already customized depending on the product that has been contracted, as well as access to the imagery and the possibility of downloading and transforming it at its will, under *Planet's* conditions.
5. *After-sales*: At the present time, *Planet* does not offer a typical after-sales service, however, it keeps contact with the customers with the aim of adjusting the product that has already been acquired to the exact needs of the client.

**Summary:** through the conferences or the sales teams, the potential clients are informed of the products that are being sold. Once this has been achieved, *Planet* makes sure that the client understands the value of the imagery that is being offered. If the client is convinced about that, the purchase process starts; this process, depending on the location and the size of the company, will be done directly (through *Planet*), or indirectly (through intermediaries). After that, the customer gains access to the platform, where the pack of imagery that has been purchased is awaiting to be analyzed. Finally, if required, the customer may keep contact with the company in order to obtain help or to provide feedback in the personal development and evolution of the acquired product.

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<sup>7</sup>During these last years, awareness has also been achieved through the work of its sales team, and the presence of partners and resellers throughout the World.

### 4.2.4 Customer Relationships

The breakdown of the customer relationships, aims to describe the types of relationships *Planet* establishes with each of the customer segments. In order to clearly identify how the relationships are, the different types of relationships that can be established are going to be analyzed.

1. *Personal Assistance*: Based on human interaction, between the customer and *Planet*. In the specific case of *Planet*, the personal assistance does exist, and the degree of assistance that is given to each customer varies depending on the customer that is being addressed<sup>8</sup>.
2. *Dedicated Personal Assistance*: When a great dedication to an specific customer is required. This kind of assistance is only totally given to those customers which have established large contracts with *Planet*. Part of this personal assistance, derives in collaborations between the company and the customer, in order to provide the best and most tailored product to these customer's needs. It requires from constant bilateral communication.

Smaller customers are not granted the totality of this dedicated personal assistance, however, they do have the possibility of contacting the teams of *Planet* to obtain help if problems regarding the usage of the imagery would occur.

3. *Self-Service*: It would be contradictory to affirm that the kind of relationship that *Planet* establishes with customers is of self-service, yet it does exist to one of the customer segments. Since the imagery is open-sourced, it can be freely accessed and used without the need of establishing a formal relationship with *Planet*.
4. *Automated Services*: Through its delivery platform, and depending on which kind of service each customer has contracted, the platform will have one or another appearance and customization. This means that the company, automatically, matches the delivery platform to the needs of each customer, through an automatic process.
5. *Communities*: Established though a common communication platform, created by *Planet*, however, the idea is that the very same users exchange knowledge to solve each other's problems (as well as allowing the company to better understand which are the customers needs and feedback). Since the end of January, 2019, *Planet* does possess a community platform, where anyone who has access to the imagery can add a new topic to the discussion, or can answer the doubts of other users. [46]
6. *Co-creation*: This kind of relationship goes beyond the personalized attention. The co-creation requires from constant communication and feedback between

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<sup>8</sup>E.G. Contracts signed with great companies or national and international agencies require a higher effort from the contacting means of the company. The assistance that is given to this customers requires the intervention of negotiating teams.



*Planet* and any other company. The co-creation is only established with big-sized customers; and for *Planet* it consists on developing sub-products that are perfectly adapted to what this companies needs<sup>9</sup>.

**Summary:** it can be said that *Planet* does establish all kind of relationships with its customers. They simply vary depending on the customers that are being served. Providing different assistance to bigger or to smaller companies.

#### 4.2.5 Revenue Streams

Each revenue stream connects each customer segment with the company, so they might be different for each customer segment. In the case of *Planet*, the revenue streams are mainly the same, and work the same way for almost all of its customer segments.

The payment mechanisms used by the company, are mainly recurring; regular payments are made by each client, to keep on having access to the imagery and data provided by *Planet*. However, specially smaller customers, might choose to perform a single transaction payment when only punctual services are needed. The big contracts<sup>10</sup> can also be seen as transactional movements, since, from the very beginning the totality of the payment has been agreed. On a less significant way, the researchers have free access to the imagery, when reaching an agreement with *Planet*. Nowadays, and since the Mission 2 project is still on a developing stage, all the revenues that the company earns, come from the transactions made from the constellation's imagery.

In the following lines, a breakdown of *Planet's* means to generate revenue streams will be plotted:

1. *Usage and Subscription Fees:* The contract establishes a limit of workers allowed to access the imagery, this would be the usage limitation and control. The subscription fee, would be the one which establishes the duration of the contract and how often the payments are going to be made.
2. *Licensing:* As long as the payments are made, the customer is granted licensing privileges on the *Planet's* imagery, under the agreements that have been reached. The customer will be able to download, study, analyze and change at is will the imagery and data to which he has been granted access.

Regarding the pricing mechanisms, *Planet* possesses fixed price mechanisms based on the following static variables:

1. *List price:* Each product has a different price depending on the resolution and the quality.

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<sup>9</sup>The profit that *Planet* extracts from it, is the ability to developing a product, which can later be sold to similar customers. Nowadays, *Planet* has co-creation relationships for example with Farmers Edge; together, they are developing data-analysis products, focused on crops monitoring.

<sup>10</sup>Such as those signed with the NGA or NASA.

2. *Product feature dependent*: Each product might have variations, which come from the resolution and frequency that has been agreed to be provided. Being more expensive to obtain more frequent and better resolution images and data.
3. *Customer segment dependent*: Each customer segment will be interested in obtaining different sets of imagery.
4. *Volume Dependent*: Related to the extension of the signed contract, the price per month will be decreased, as the number of contracted months increases.

### 4.2.6 Key Resources

The analyzed resources will be those used or acquired from 2017 up to nowadays, inviting the reader to consult section 3.2.6 for older information.

#### Physical Resources

1. *Manufacturing Facilities*: *Planet* opened a manufacturing and testing factory, located in San Francisco, at the end of 2018. [47]
2. *Machines*: Machines, tools and test benches that are essentially needed for the correct assembly of the self-designed satellites.
3. *Headquarters*: The central headquarters of the company are based in San Francisco. Apart from this, *Planet* counts with 5 more headquarters located in Mountain View, Berlin, Lethbridge, Washington D.C and Amsterdam.
4. *Ground Station Network*: *Planet* requires from an extensive network of ground stations. There are 31 ground stations, and a support network of antennas that receive all the information from the satellites.
5. *Launching Vehicles*: Not a physical resource owned by the company, however it is contracted when new satellites need to be put on orbit<sup>11</sup>.
6. *Data Storage Facilities*: Regarding the storage of around 6 to 10 TB of daily information, *Planet* reached an agreement with Google Cloud Platform back in March, 2017, and currently, it possesses a 7 PB core storage facility rented to Google Cloud. [49]
7. *Platform*: *Planet* has developed and updated an owned platform, composed by a GUI and an API, through which the customers might access the information.
8. *Satellites*: The fleet of satellites that take *Planet's* imagery, up to mid 2019 is composed by 130 PlanetScope satellites, 5 RapidEye satellites and 13 SkySat satellites.

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<sup>11</sup>The last launches can be seen in Table E.1, which is a continuation of Table D.1, extracted from the last available annual report of *Planet*. [48], available in Appendix E.3.1.

### Intellectual Resources

Mainly composed by the licenses, all the imagery captured by the satellites and the stored data intellectual property. In the following years, due to the Mission 2 development, the intellectual resources will be increased.

Apart from this, the company's intellectual resources also include the processing methods of the imagery, developed by *Planet* and some partner companies. Nowadays, the intellectual resources of the company, and surely in the future, are the key services with which *Planet* works and trades.

### Human Resources

Composed by 430 full-time employees, distributed in engineering teams, sales and marketing, amongst others. These resources are the ones that make sure that the service is correctly performed and provided, and that take care for the growth of the company.

### Financial Resources

Composed by the investments raised in the different financing rounds that the company has made. The earnings, which have been raised from big contracts, are left aside, since they are earnings and not investments.<sup>12</sup>

## 4.2.7 Key Activities

They define the company by itself. The key activities, as proposed by Osterwalder and Pigneur can be divided into: *Production, problem solving and performance of the platform*. [27]

### Production

The designing, manufacturing and distribution activities developed by *Planet* nowadays are going to be plotted, following a chronological order.

1. Designing process of the constellations<sup>13</sup>.
2. Development of the constellations.
3. Planning of constellations' orbital position and control.
4. Assembly of the satellites.
5. Monitor constellations from ground control stations.
6. Obtaining of the imagery.
7. Data storage process.

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<sup>12</sup>For further information, reader is invited to consult Appendix E.3.3.

<sup>13</sup>Regarding only the PlanetScope and RapidEye.

- |                                 |                                                                              |
|---------------------------------|------------------------------------------------------------------------------|
| 8. Data analysis engineering.   | 10. Development of specific data sets and results for each customer segment. |
| 9. Data processing engineering. |                                                                              |

Regarding the Mission 2 phase, its key activities should also be accounted in this section, since they are already being developed. It is worth saying that mission 2 involves two very different activities: the development of Mega Satellites, together with SpaceX, and the Queryable Earth project.

- |                               |                                                 |
|-------------------------------|-------------------------------------------------|
| 1. Designing of MegaSats.     | 6. Development of Machine Learning Algorithms.  |
| 2. Assembly of MegaSats.      |                                                 |
| 3. Solar System Monitoring.   | 7. Development of <i>Planet</i> Analytics.      |
| 4. Space Weather Forecasting. | 8. Implementation of Queryable at Global Scale. |
| 5. Space Junk Monitoring.     |                                                 |

### Problem Solving

In the present, as in the past, the activities developed by *Planet* in problem solving only include the partnerships and collaborations of development in customized products for some of the customers, as well as a certain kind of personal attention for the rest of smaller customers. Nowadays, problem solving is covered by the co-creation philosophy of the company and its customers.

### Platform

The platform is the key stone in product delivery for *Planet* at the present time. And regarding the future missions that are being developed, an extension of the Platform will have to be made, so that Earth indexes can be accessed. The Platform's key activities would be:

- |                                      |                                                                               |
|--------------------------------------|-------------------------------------------------------------------------------|
| 1. Software development Engineering. | 4. Attention to Customer.                                                     |
| 2. Newtwork Maintenance.             | 5. Development of an extension of the Platform for Planet Analytics missions. |
| 3. Network Update.                   |                                                                               |

#### 4.2.8 Key Partnerships

4 types of Key partnerships might be distinguished, as well as 4 different types of motivations<sup>14</sup>.

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<sup>14</sup>Reader might consult Appendix A for further information

1. *Strategic Alliances*: The most extensive partnership that *Planet* maintains. It is established with the Solution Partners, and the main motivation is the risk reduction in the investigation of some highly specific fields.<sup>15</sup> Reader might find further information about the development of this section in Appendix E.4.
2. *Coopetition*: The most recent kind of partnership. Established with cutting edge companies of the sector (as Airbus S&D) with the aim of risk reduction.
3. *Buyer-Supplier*: Established with COTS suppliers and Launching companies.
4. *Joint Ventures*: Reached with SpaceX and Google to help with the development of *Mission 2*.

### 4.2.9 Cost Structure

As in the past, the policy of *Planet* about its financial reports, and the papers regarding its economic situation are quite opaque, therefore, the Cost Structure Analysis is going to be rather qualitative instead of quantitative. For the sake of simplicity, the breakdown of the costs is presented in Table 4.3.<sup>16</sup>

COSTS	
<i>FIXED</i>	<i>VARIABLE</i>
<ul style="list-style-type: none"> <li>- <i>Salaries of the workers.</i></li> <li>- <i>Software licenses.</i></li> <li>- <i>Acquisition and renting of the facilities.</i></li> <li>- <i>Maintenance of the facilities.</i></li> <li>- <i>Acquisition of the test benches.</i></li> <li>- <i>Acquisition of the machinery and tools.</i></li> <li>- <i>Salary of launching brokers.</i></li> <li>- <i>Price of the P-PODS.</i></li> <li>- <i>Acquisition of antennas</i></li> <li>- <i>Maintenance of antennas.</i></li> </ul>	<ul style="list-style-type: none"> <li>- <i>Acquisition of raw materials.</i></li> <li>- <i>Acquisition of electronic components.</i></li> <li>- <i>Acquisition of COTS.</i></li> <li>- <i>Launching costs.</i></li> <li>- <i>Satellite transport costs.</i></li> <li>- <i>Deployment costs.</i></li> <li>- <i>Data storage facilities and data bases.</i></li> </ul>

**Table 4.3:** *Costs of the Planet structure in 2019*

To end with the analysis of the economy of *Planet*, Osterwalder and Pigneur distinguish between two types of driven economies: Cost driven and value driven. Since *Planet* focuses on the quality of the product, and keeping in mind that the its sector is highly technological, it is **predominantly value driven**. However, part of the revolution that *Planet* has performed in the Earth Observation sector is thanks to the great efforts that have been made to keep the price of the imagery as low as possible. Therefore, *Planet* presents a mix of the value and the cost driven economies with a predominance of the value over the cost.

<sup>15</sup>E.G. The relationship that *Planet* maintains with Farmers Edge for the development of Crop's Health analysis by means of EO imagery.

<sup>16</sup>For further explanations about this costs, reader might consult Appendix E.5.

### 4.3 CANVAS Design

A summary design of the CANVAS model of the new business model of *Planet* is going to be presented in figure 4.1. The information needed to develop this CANVAS is a result of all the analysis that has been made in this chapter.

To better understand the CANVAS relationships, the following lines will explain how each customer segment relates with the company. Starting with the clients that *Planet* is serving nowadays, 6 important segments can be distinguished, where the weight of the national and international agencies has been increased as well as the services devoted to defense and agriculture private sector analysts. The NGOs and the individuals are those segments which have less economical importance, and can be rather seen as sectors that the company chooses to serve without expecting great economical retribution.

All the customers are reached through the same channels: the awareness conferences. And, if the contracts are important enough, through the negotiating teams. When providing services to smaller companies, *Planet* counts with an easily reachable World network of distributors and solution partners. No matter which kind of contract has been established, all the customers will access the services through the same online platform.

Once the services have been contracted, bigger companies will establish a co-creation relationship with *Planet*. On the other hand, smaller companies will only gain access to a customer attention service, which might be reached when problems might occur.

The reasons for which the customers choose to use *Planet* services are mainly the same for all segments: a low revisit time, with high-resolution imagery at a low cost. Therefore, a precious proposal, at low cost. In addition, the services have a degree of customization and are friendly usable.

The same happens with the revenue streams, this revenue streams are quite similar for all segments, the only difference important enough is that, depending on the size of the contract, the payment will be recurrent or transactional.

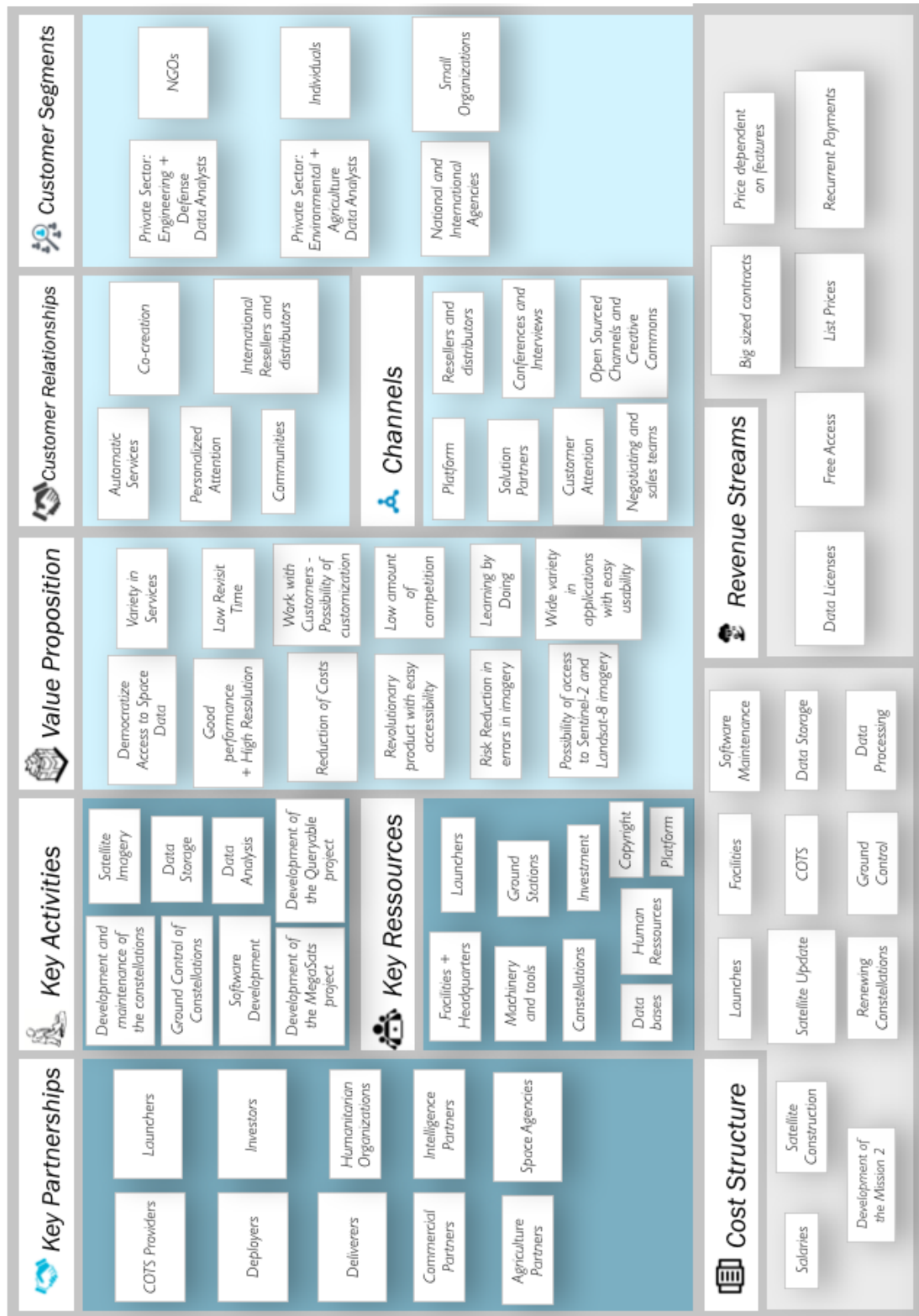


Figure 4.1: Design of the CANVAS model for Planet in 2019.

## CHAPTER

### 5

# COMPARISON OF CANVAS MODELS

For the sake of simplicity, the comparison will be performed block by block, which will eventually end up in the identification of the drivers that caused this changes.

## 5.1 Customer Segments

The root of the formation of the customer segments has remained the same, however, some changes in the volumes of the customer segments do have changed. The market that *Planet* is serving, nowadays, as until 2017, is a *Niche Market*.

In both models, the customers that the company is serving, though requiring from the same data imagery sets, have slightly different needs; the data processing is what makes each served pack of data different and tailored to each customer<sup>1</sup>. So that the greater changes in the Customer Segments can be understood, Figure 5.1 is provided.

This small changes in the customer segments distribution have been one of the keys of the change of the model. During this two last years, *Planet* not only has settled a solid network of customers, but has also managed to make this network grow exponentially in all ways. Part of this achievement has been reached thanks to the acknowledgement of the value of what *Planet* is offering. As a consequence, the number and size of the contracts that *Planet* has achieved this two last years with

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<sup>1</sup>Either an Space Agency, which aims to recognize how certain areas of the World change during a certain period of time, or a company of Data Analysts which wants to determine the best way to position an oil pipeline facility.





**Figure 5.1:** *Greater Changes in the Customer Segments.*

important National and Space Agencies, has increased. Since the customers that *Planet* required from it, the co-creation contracts also increased, specially in the agriculture sector.

The last important change in the Customer Segments area has been the increase in the number of customers, devoted to data analysis, that were interested in *Planet*'s data sets, as well as the number of clients that were interested in the already pre-processed data.

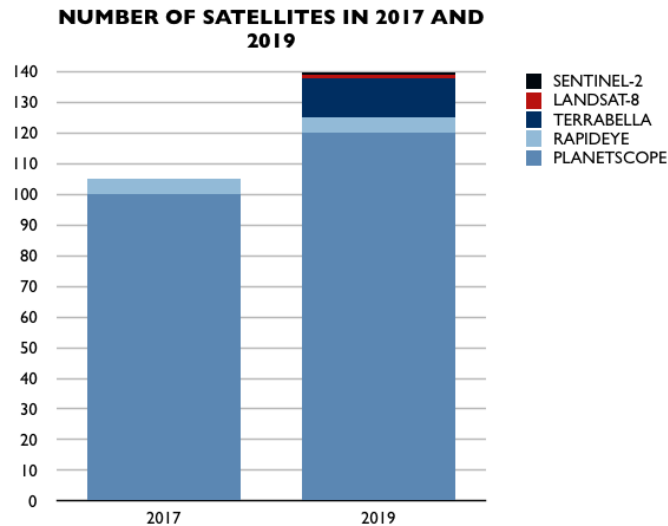
## 5.2 Value Proposition

Between 2017 and 2019, *Planet* did not change its value proposition, yet, it was evolved and increased.

The company increased its number of satellites and constellations, by acquiring the TerraBella constellation and the SkySat satellites, and by constantly upgrading its PlanetScope doves; even though the general numbers of the PlanetScope satellites did not have a major increase<sup>2</sup>, during this last two years, more than 50 of this satellites have been deployed, substituting the older versions which were ending up their useful lives. In addition, *Planet* reached agreements with NASA and ESA so that the imagery of their Landsat-8 and Sentinel-2 satellites was accessible to the company. The evolution in the general number of the constellations can be seen in Figure 5.2.

This increasing in the number of accessible constellations translates into two direct consequences: and increase in the available resolution of imagery (because of the

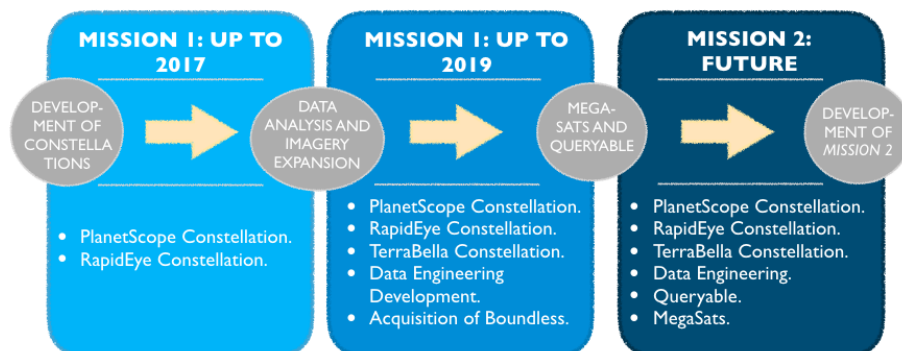
<sup>2</sup>The number of PlanetScope orbiting satellites increased from 110 to 120.



**Figure 5.2:** *Number of Planet’s Satellites in 2017 and 2019.*

TerraBella, NASA and ESA imagery products), and a reduction in the revisit time for the company. All in all, allowing an increase in the quality of the services that are offered. Since the quality of the product has increased, a major customization of the products depending on the customer might be requested as well, this major customization has been achieved through collaborations with Solution Partners. In addition, the wide offer of data products also makes the product easily accessible to many different types of customers (one of the keys to this is keeping a reasonable price for the services).

In October 2018 the value proposition expanded. The company entered the *Mission 2* phase, which aims to present a value proposition which encompasses different fields. Firstly, in the self-management of geospatial data, by the acquisition of Boundless; secondly, by the development of Machine Learning and Artificial Intelligence methods in the Queryable project field; and lastly by developing of MegaSats that aim to monitor the entire Solar System. A visualization of the evolution in the concrete Value proposition can be seen in Figure 5.3.

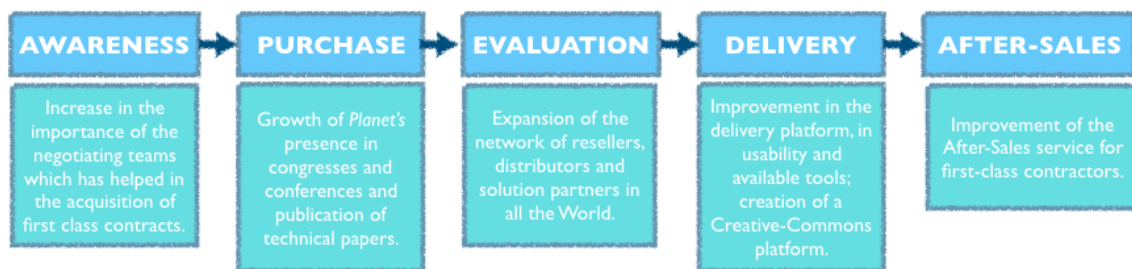


**Figure 5.3:** *Evolution of the Value Proposition of Planet.*

### 5.3 Channels

Delivery Channels have simply evolved to satisfying the new needs of the Customers. Nowadays, as in the past, *Planet's* products can be acquired through a direct or an indirect purchase channel. This channels, still the same, have grown, by increasing the number of resellers in the World, the presence of the company in more conference and improving the Sales team's work..

The other two major changes are the creation of a creative-commons channel, of free access, and the improvement in the services provided by the delivery online platform. Figure 5.4 resumes all the changes in the delivery channels; anyway, it is worth mentioning that all the changes in the channels have been a consequence of the changes in other fields of the model, such as in the Customer Segments.



**Figure 5.4:** Changes in all areas of the Delivery process.

### 5.4 Customer Relationships

The changes in the customer relationships are also product of the natural evolution and growth of the company. Between 2017 and 2019, *Planet* has strengthened its co-creation relationships with specialized companies.

A secondary consequence of the increase of the signing of important contracts, is the increase in the need of dedicated personal attention for this companies. On the other hand the kind of relationships established with smaller customers has remained the same. Since *Planet* has increased the number of free-access imagery data sets, the self-service relationships have also increased. This kind of customers access the free provided imagery at their will, without establishing much of a relationship with *Planet*.

On the side of new created services, during this 2 years, *Planet* launched an owned community service, where customers could upload their doubts, which would be solved by other customers; additionally, *Planet* improved its automated relationships by improving its automated services.

## 5.5 Revenue Streams

*Planet* has not suffered from any important changes; the only worth mentioning change is the increasing in the number of contracts, with expectancy of high revenues that have been signed.

## 5.6 Key Resources

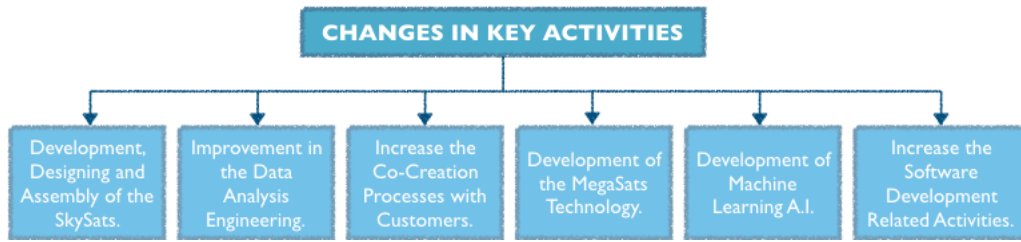
The greatest change comes from the acquisition of the TerraBella constellation, and the constant evolution of the PlanetScope constellation. As a consequence of this aggrandizement of the number of operative satellites, *Planet* had to assume a higher volume of satellite assembly, easier thanks to the construction of a new assembly facility. Another consequence of receiving more data per day, was the need of increasing the ground control facilities, and the needs for biggest data storage facilities increased. Major changes are summarized on Figure 5.5.

CHANGES IN KEY RESOURCES			
Physical	Intellectual	Human	Financial
<ul style="list-style-type: none"> <li>• Acquisition of TerraBella.</li> <li>• Evolution of PlanetScope.</li> <li>• Extension of the Ground Stations Network.</li> <li>• Opening of new offices in Europe.</li> <li>• Agreement with Google Cloud for data storage.</li> <li>• Update the delivery Platform.</li> </ul>	<ul style="list-style-type: none"> <li>• Extension of the Intellectual Resources with the development of the <i>Mission 2</i>.</li> </ul>	<ul style="list-style-type: none"> <li>• Contract of 130 new employees.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in the number of investors and investments.</li> </ul>

**Figure 5.5:** *Changes in Key Resources*

## 5.7 Key Activities

The changes in the Key Activities, come, in a great measure from the evolution of the company, and the decision of developing new projects that are expected to be on market in several years vista. The main changes are plotted in Figure 5.6.



**Figure 5.6:** *Changes in Key Activities*

## 5.8 Key Partnerships

The main changes in Key Partnerships are going to be listed down below.

1. Signing of new alliances with intelligence companies to help developing the value product.
2. Increase of the number of collaborations with agriculture analysis companies, a consequence of the implementation of EO methods into modern agriculture.
3. Great expansion in the Data Analysis Alliances, especially because of the contract with Boundless.
4. Beginning of the coopetition relationship with Airbus.
5. Increase in the collaboration with first order Space Agencies, such as NASA and ESA.
6. Collaboration with SpaceX in the development of the MegaSats project.
7. Collaboration with Google in the field of data storage and analysis.

## 5.9 Cost Structure

All changes in the Cost Structure field come from the investments field. As *Planet* has expanded its investigation projects, the related costs have also expanded. After expanding the constellations, the costs of maintenance of this larger number of satellite increased as well. The main changes can be seen in Figure 5.7.

INVESTMENTS IN INNOVATION	INVESTMENTS IN EXPANSION
<ul style="list-style-type: none"> <li>• Research in Data Science.</li> <li>• Research in Data Engineering.</li> <li>• Research in Machine Learning A.I.</li> <li>• Development of Software Engineering.</li> <li>• Acquisition of bigger satellites.</li> <li>• Development of MegaSats Technology.</li> </ul>	<ul style="list-style-type: none"> <li>• Research in Updates for PlanetScope.</li> <li>• Research in Updates for TerraBella.</li> <li>• Assembly of new Satellites.</li> <li>• Acquisition of new Facilities.</li> <li>• Expand the number of workers.</li> <li>• Develop the Imagery Analysis Science</li> </ul>

**Figure 5.7:** *Changes in Cost Structure*

# CHAPTER

# 6

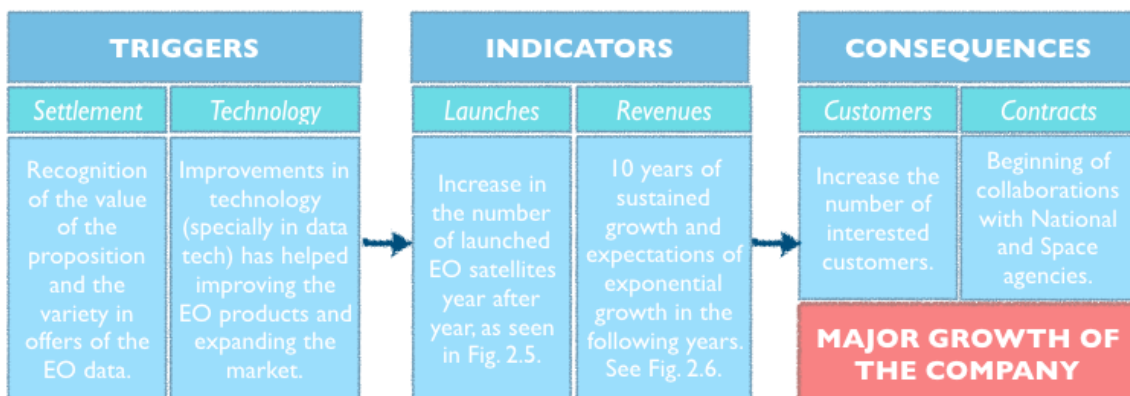
## DRIVERS AND PATTERNS

### 6.1 Identification and Analysis of Drivers

#### 6.1.1 Market Consolidation

The market consolidation, an **external** driver, has been one of the main keys of the growth and change of the company. This driver is considered external since, even though *Planet* has partly contributed in it, it is more a result of the change in the economic streams.

Figure 6.1 summarizes all triggers, indicators and consequences of this driver<sup>1</sup>:

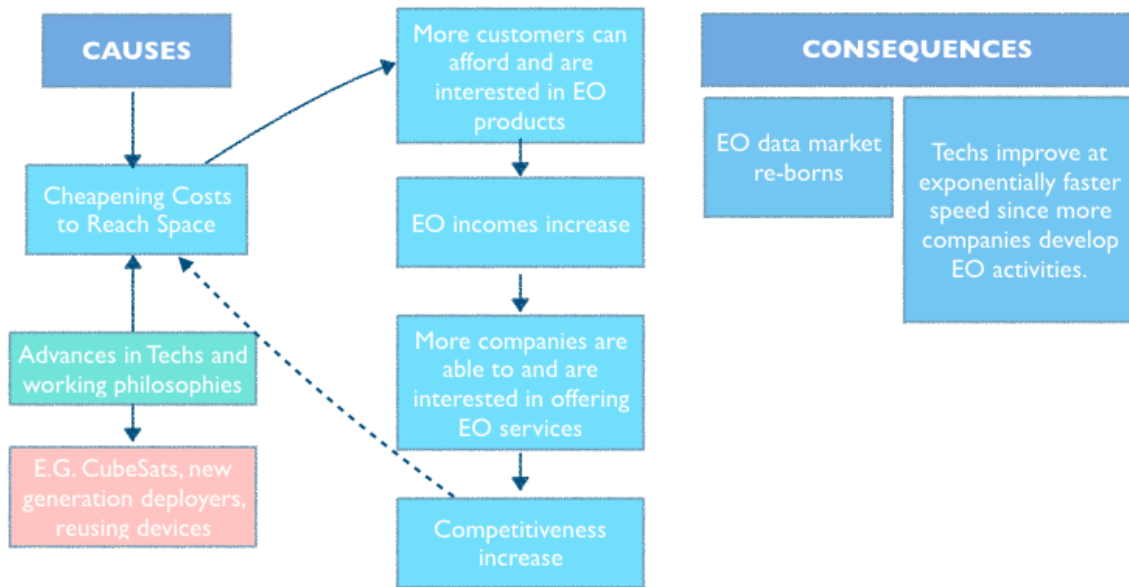


**Figure 6.1:** *Breakdown of the Market Consolidation for Planet.*

<sup>1</sup>Triggers and Indicators had already been noticed when developing Chapter 2.

### 6.1.2 Market Opening

**External driver** motivated by the global market streams of the last years, and a representation of the *Democratization of Space*. *Market Opening* has occurred in two areas: the number of possible customers and to the number of available EO companies. The change is summarized in Fig. 6.2.



**Figure 6.2:** Breakdown of the Market Opening.

*Planet* has partly been able to be created and succeed thanks to this market opening. A small company has been able to settle a space value proposition, by putting in orbit large constellations of cheap CubeSats. At the same time, it has created a whole new network of customers (traditionally out of the Earth Observation reach), which are farmers, NGOs or private data analysis and intelligence corporations, which as it has been seen, have been increasing year after year. *Planet* has helped (since it is on its philosophy of creation) expanding the reach of the value proposition of the Earth Observation data services to fields that were typically left aside.

### 6.1.3 Entrance of SM Enterprises

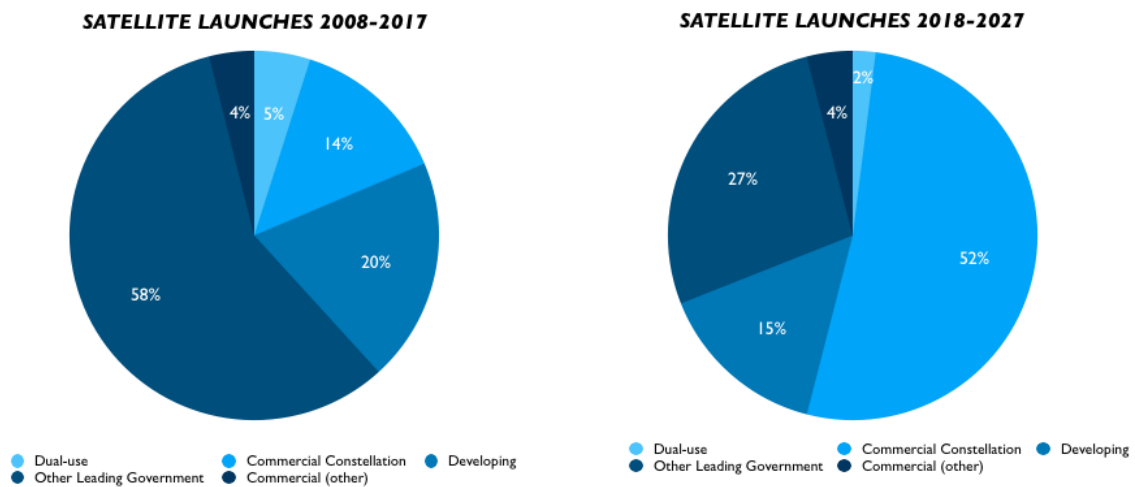
The Entrance of SM Enterprises<sup>2</sup> in the Earth Observation industry is an **external driver** of change, as well, is a direct consequence of the cheapening of the space reaching costs. This expansion of the EO companies can be seen in the increase in the number of commercial satellites launched and expected to be launched in the following years (see Figure 6.3, extracted from [50]).

Until the mid 2000's, for smaller companies, the goal of creating and launching a satellite, with which deliver a value proposition and extract benefits was completely

<sup>2</sup>Small and Medium Enterprises

impossible. That is why up to that date, Small and Medium enterprises dedicated to Earth Observation were extremely rare. This tendency, which is still evolving, was changed with the irruption of new space technologies, such as CubeSats.

Once the space reaching costs had been cheapened, new companies entered the Earth Observation Scene, proposing new and different products. One of this companies was *Planet*, which, with the use of large constellations of small and cheap satellites, offered low to medium resolution imagery, at a highly frequent revisit time and at very competitive prices. Just as *Planet* developed this new value proposition, all the newly created Earth Observations, such as Satellogic or Urthe Cast, started developing its own and new value propositions. All in all, helping expanding the reach of the whole Earth Observation industry.



**Figure 6.3:** *Expansion of the commercial Earth Observation presence.*

### 6.1.4 Brand Consolidation

**Internal driver**, since it has been achieved by the company, through its work and evolution process. The brand consolidation has been achieved after creating a global and proper awareness of the services that *Planet* has to offer, as well as a recognition of the value of what the company is offering. This implies that, a larger number of customers know about the value proposition of *Planet* and believe in the value of the services<sup>3</sup>.

The consolidation of the brand can be **identified** through the increase in the number of customers, in all fields, and in all regions of the World; the increase in the number of Partnerships and Solution Partners, and the subsequent increase in the investments and revenues. As well as the achievement of contracts with National, Space and Intelligence Agencies, and the collaborations with leading companies. All this facts contribute on consolidating the brand even more, and allow the sustained expansion of *Planet*.

<sup>3</sup>Frequently renewed Earth imagery at good resolution and low costs.



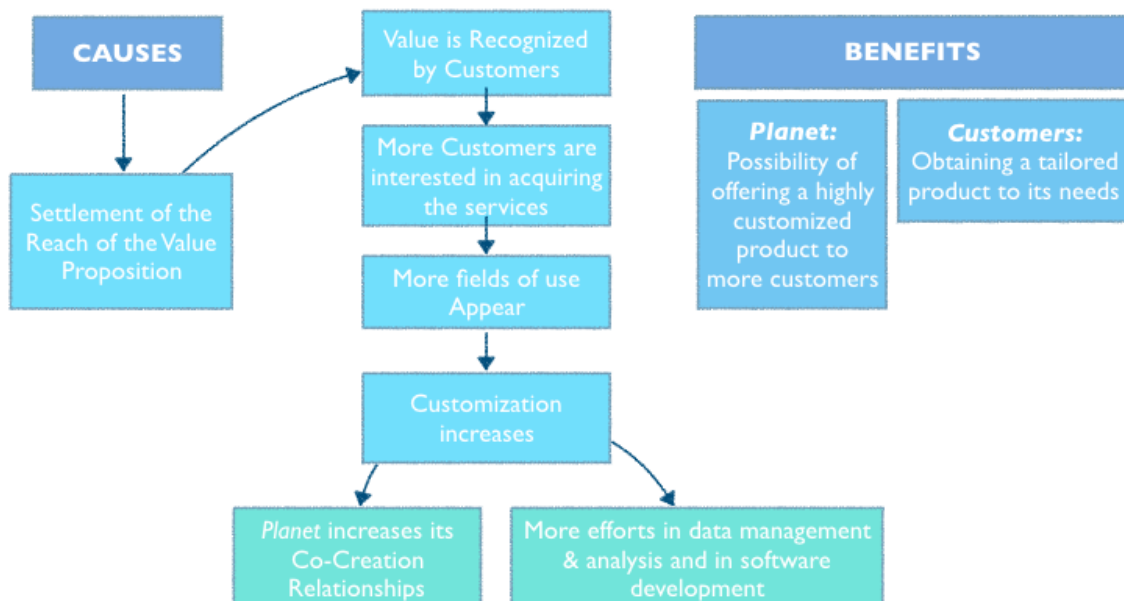
### 6.1.5 Vision of the Service as a Commodity

This driver, can be seen as **internal and external** at the same time. Since *Planet* offers plenty of easiness for reaching its products and services, with the security of obtaining reliable results, on a very customized way and at a reasonable price, every time more and more customers opt for acquiring this kind of services and not any others. This same tendency has been experienced by the rest of the Earth Observation companies, which all in all, has contributed on creating a feeling of commodity when opting for use Earth Observation services.

This driver is specially visible in the behaviour of certain types of customers, which are the agriculture related ones, the researchers and punctual people, the private intelligence companies and the NGOs. Any of this customers could achieve very similar results by using other types of Earth Observation means. Yet, they opt for Space EO, due to the easiness and reliability of its specific offers. When it comes to the researchers and individual people, this feeling of commodity of the service becomes even more visible, since this kind of customers use the service for non-profit researches on any changing parameters that effect Earth. Thanks to the opening of this kind of services, this kind of researches have somehow boomed, becoming a sort of a trend.

### 6.1.6 Demand of a More Specific Service

This driver can be considered as external, yet, the company has presented a clear internal response to this specific driver. *Planet's* reaction to the effect of this driver is summarized in Fig. 6.4.



**Figure 6.4:** Process of increase in product customization.

### 6.1.7 Consolidation and Growth of the Technologies

During the last years, and especially after the consolidation of the opening of the Earth Observation market, an spectacular growth in the number and variety of used technologies related to Earth Observation activities occurred. This phenomena had direct impact on the behaviour of *Planet*. It allowed *Planet* and many other small-to-medium newly created EO companies to begin their activity and to succeed in their tasks. Yet, this technological development line has continued its expansion in two different fields, both of them have had great influence in the evolution of *Planet*. and are summarized in Fig. 6.5.

<b>DEVELOPMENT OF SATELLITE PHYSICAL TECHNOLOGIES</b>	It began as a process of cheapening the construction costs with the CubeSats. The evolution in material and electric and electronic components has contributed in an extensive improvement of resolution and services.
<b>ADVANCES IN DATA PROCESSING AND ANALYSIS</b>	They have had deep impact in the company. Special interest has been put in the development of this technologies by Planet. The company seems to be pursuing a development of more processed and valuable products.

**Figure 6.5:** *Fields of technological development for Planet.*

### 6.1.8 Desire for Expansion

Entirely **internal**. *Planet*, has already created fully operative constellations of satellites at LEO, which allow the company to obtaining the necessary imagery for the correct development of the offered products and services. At the same time, *Planet* has settled its position on the EO market, as well as ensured strong relationships with an important network of customers. Since this field is completed and operative, the company seems to have decided to diversify its offers, so that expansion is ensured.

*Planet* is looking for different types of contracts, which imply bigger retributions, with intelligence companies or National Agencies, such as the ones that have already been signed with the NGA [51]. To do so, the company needs to offer higher resolution imagery data sets, which imply bigger satellites. To satisfy this demands, the small satellites that had been used in the first years were not enough, for this reason, *Planet* acquired the TerraBella constellation and signed agreements with NASA and ESA to have access to the Sentinel-2 and the Landsat-8 imagery.

The most direct consequence of this driver is the expansion in the variety of offered services, enabling the company to sign contracts with bigger and more specialized companies and agencies. On a collateral side, this desire for expansion, has brought the company to start its *Mission 2* projects, however, this will be treated as a separated driver.

### 6.1.9 Bet for innovation

Since July, 2018, *Planet*, always on the Space Observation sector, has started a process of diversification in services, through the initiation of the investigations in two new projects. This diver is purely internal, since the company has chosen this innovation path.

1. *Solar System Observation: Planet* expects that, through the development of MegaSats, the monitoring and observation of the entire Solar System can be achieved..
2. *Earth Observation Index and Monitoring:* The company has started developing this concept through the Machine Learning Artificial Intelligence, and the expectations on this project are to create a global index of anything on the surface of the Earth regularly updated. And that, on a similar way as to what Google achieved, anyone can consult any parameter and the change of this parameter on an Online platform.

The company is putting resources and efforts on the development of this projects with the aim of being pioneers in delivering services that do not exist yet.

### 6.1.10 Government Interest in the Earth Observation Market

This **external** driver involves the recent contributions of different Governments in the Earth Observation industry.

Typically, National Governments did partly fund Earth Observation projects, expecting military and intelligence data. During this last years, the governments have started signing contracts with newly created Earth Observation companies, specially in the fields of environment control, frontiers surveillance and intelligence as well.

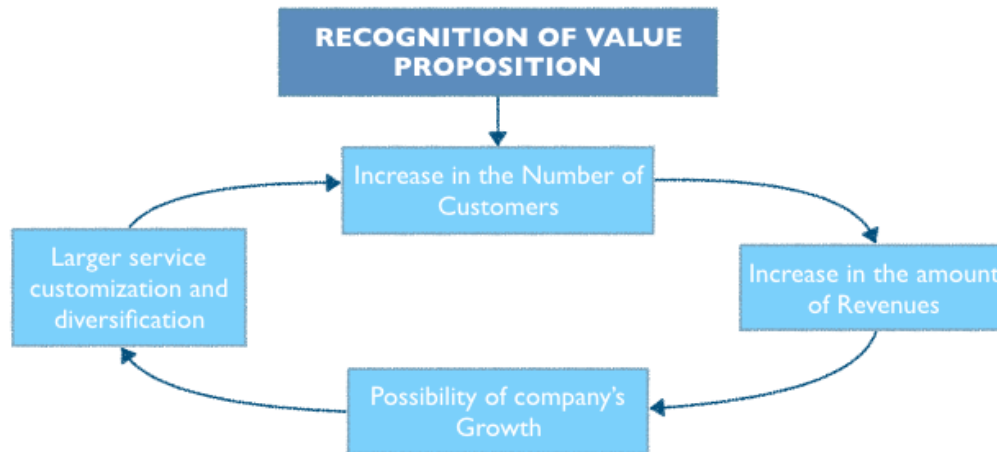
This tendency has influenced in the *Planet's* activities, which have gained powerful customers (the Governments). Some of the contracts that the company has signed are with the U.S government, for intelligence purposes [29]. This key collaborations have helped *Planet* and many other Earth Observation companies to expand and consolidate their reach and value propositions.

### 6.1.11 Consequences

During the last years, a recognition of the value of the Earth Observation services has been achieved on a global scale; partly because of the collaboration of the newly funded companies with governments, partly because of the market opening or the consolidation of the very same companies. This has brought the whole industry to an increase in the sales volume and an increase in the number of customers.

This increase in the sales and customers volume, together with the improvement of the technologies, has impused *Planet* to an expansion in all areas. The company has started innovating in very diverse fields, the number of employees has been increased, the company has been able to acquire more satellites and facilities; all in all the company has been growing in all areas.

The process of evolution of *Planet* can be seen as a reflection of the process of evolution of the New Space companies in the Earth Observation industry; once their value propositions have been solidly established and have settled in the minds of the potential customers, the growth has been exponential, and retroactive; as the companies were selling more, they could grow bigger, and expand to more areas of the segment, reaching even more customers, which meant more incomes. This recognition of the value was completely achieved when the traditional customers (Space and National Agencies) started using the companies' services; impulsing even further the expansion of these.



**Figure 6.6:** Representation of the impact of the drivers.

## 6.2 Identification and Analysis of Patters

### 6.2.1 Introduction to Proposed Patterns

A *Pattern* can be defined as a group of certain business models which share similar characteristics and behaviours. This identified patterns have the objective of giving approximate ideas of future behaviours of analyzed companies, basing on the behaviour trajectories of other companies which share the same pattern. [27]. In the development of the sections to come, the following patterns are going to be treated:

1. Unbundling Business Model.
2. Long Tail Model.
3. Multi-sided Platforms.
4. FREE as a Business Model.
5. Open Business Model.
6. Democratizing Business Model.

The first five models, are all proposed by *Osterwalder and Pigneur*; the last model, was proposed by *Catalina Maria Pascual*, a DISCOVERER student.<sup>4</sup>

Table 6.1 is presented as an illustrative idea of which patterns might or might not apply to the Case Study, and why.

PATTERN	APPLICABILITY	REASON
<i>Unbundling BM</i>	NO	<i>Planet</i> does not devote its resources to an specific block; rather than that, it needs to master in diverse blocks all at once.
<i>Long Tail BM</i>	YES	Part <i>Planet's</i> key to success is in selling highly customized products. Even though all products come from EO, the company extracts profit from selling a low number of a great variety of variations of the service.
<i>Multi-Sided Platforms</i>	NO	The company does use intermediaries to reach some of its customers; however, the company does not act as an intermediary itself.
<i>FREE as a BM</i>	NO	<i>Planet</i> does offer free imagery, but as a secondary activity. Since the majority of its customers could not profitably use any of the Free imagery.
<i>Open BM</i>	YES	Specially in the <i>Inside-Out</i> Innovation field. Part of the success of the company has been the ability to establishing a large network of Partnerships.
<i>Democratizing BM</i>	YES	The growth strategy followed by <i>Planet</i> has been reaching a large number of customer segments; lowering the price of the services, using automated delivery channels and establishing a great number of partnerships.

**Table 6.1:** *Applicability of the Patterns*

## 6.2.2 Long Tail BM

*Planet* has devoted its first years of activity into creating a large variety of highly customized products. By developing data analysis software, the obtained EO imagery can be turned into a highly specific value service for any of its customers, no matter the field of activities of it.

<sup>4</sup>Reader is invited to consult Appendix B to find brief descriptions of each model.

As a result, the company is selling a large variety of different subservices, however, each of this subproducts are only bought by a very reduced number of customers.

Since the company has been expanding, the number of available products has been able to expand as well, allowing that more potential clients might access the products, and once again, contribute to *Planet's* growth.

The diversification in services that *Planet* has started, will contribute on expanding the Long Tail of the availability of products. Nevertheless, both the Queryable and the MegaSats projects, aim to reach a greater number of customers. This, diversified block, would not be applicable to the Long Tail Business Model. Anyway, until the projects are completely developed and operative, this statements can only remain as forecasts.

### 6.2.3 Open Business Model

*Planet*, since its early days, has put special effort into establishing Key Partnerships in all areas where Earth Observation may be of value. This can be seen as *Outside-In Innovation*, since the company has brought intelligence, ideas and ways-of-doing from the outside to the inside of itself, through the partners.

The Key Partnerships have already been explained in Chapter 4, however, an example of this outside-in innovation is going to be re-explained. From its very beginning, *Planet* has decided to collaborate with agriculture data Analysis corporations, as Farmers Edge. Through this collaborations, this companies could obtain a tailored product to its needs, and what the company could obtain, was first hand information about the parameters that the farmers need to monitor in order to have correct forecasts about the health of its crops and the expectations that they could have about the size of the annual harvests. This is a clear example of the interest that the company had in attracting outside innovation into its internal development structures.

On a smaller degree, and also more recent, *Planet* has also been contributing to an *Inside-Out innovation*. Since 2018, *Planet* has been granting free access to relevant EO data to some researchers. By allowing this, the company expects to receive important advances in data analysis in some fields that had not been yet covered.

### 6.2.4 Democratising BM

Probably, the pattern that best suits the behaviour of *Planet*, since it was developed to explain the behaviour of companies that are in the same trend as *Planet* (which would be Satellogic and Blacksky). This confirms that there does exist such a thing as the Democratising Space philosophy.

*Planet*, as it can be seen after analysing all the factors of its business model and the evolution that they follow, presents some key aspects in its development.

1. *Increase the number of customers:* When comparing both CANVAS models, one of the most significant differences was in the growth in the number of customers and the size of this customers in 2019. This expansion in the customer field is key to the development of the company, since more customers imply more incomes, which allow the company to invest in more areas, and therefore, once again, attract more potential clients.
2. *Lower the price of the service:* Another of the milestones of the company has been lowering the price (and facilitate the access) to some services that had historically been restricted to giant corporations or national agencies. By doing that, and at the same time maintaining a more than acceptable quality of the service, the company has achieved once again expanding the customer network, as well as contributing to a general development of the same service. Since it is more profitable, more companies appear in the competence spectrum, and the entire sector benefits from a development both in the economical and the technological fields.
3. *Automated Channels and Customer Relationships:* In the development of both CANVAS models, it has been seen that the vast majority of the relationships that *Planet* establishes, are through automated means (only special contracts have had direct contact with the company). In all cases, the delivery channels are automated.
4. *Key Partnerships:* This point has already been explained in the previous subsection, anyway, it is worth saying that part of the success of the company has been establishing a large number of collaborations and partnerships with some specialized corporations in diverse fields.
5. *Reduce the Cost Structure:* One of the ways that *Planet* has been able to reduce the structure costs has been through the use of low cost satellites, which might obtain accurate enough results. By doing this, the company has been able to reduce the costs of the products, and, as it has been explained in the previous lines, expand the number of potential clients.

To all this characteristics of the Democratising Business Model, in the case of *Planet*, an extra feature can be added: **Innovation to ensure the growth.** *Planet* has had to constantly devote a large number of resources into improving the developed products (either through the improvement of the constellations or the data analysis systems). A last step into this tendency to innovate has been the development of the *Mission 2* projects. By doing this, the company seems to look to leading sectors of the market that are yet to be exploited; which are application of Artificial Intelligence and advances in Machine Learning into the Earth Observation industry, and the aim of monitoring the entire Solar System rather than only the Earth. This investments in innovation are expected to ensure the growth of the company, and even suppose a leader position in some aspects.

## CHAPTER

# 7

## CLOSURE

### 7.1 Environmental Study

Since this project and study are composed by analytic analysis about business models and Earth Observation companies, no environmental impact is involved in its development. Therefore, no environmental study can be performed.

### 7.2 Budget

In order to break down and analyze all costs related to the development of the project, a budget document has been constructed.

Since the totality of this project is on the analysis side, the majority of the stated costs are related to the expense of the human resources, this means, the salaries of the researchers.

A total of 360 hours of work have been needed to perform this project, which, after adding the additional physical and software costs, lead to a total price of **7,870 €**.

Reader is invited to consult the separated *Budget* document to see the details in the breakdown of the construction of the project costs.



## 7.3 Conclusions and Further Studies

The last ten years have been years of deep change in the Earth Observation Industry. Many areas have evolved since the end of the 20<sup>th</sup> century; the traditional billionaire corporations, such as DigitalGlobe or Airbus Space & Defense, and the National and International Space Agencies have started co-existing with Small and Medium companies, newly created and which have brought airs of renovation into this industry.

This newly created Earth Observation companies (where *Planet* is included), are part of the New Space and Democratization of the Space trends and philosophies, whose aim is mainly to create products and services, related to Space, which might be accessed by an increasing number of customers. The keystones so that this goals might be achieved, are the reduction in structure costs, which is achieved through the use of new technologies such as CubeSats or new generation launchers, and the expansion in fields in which the Earth Observation products might be of use. By allowing it, an increasing number of customers have the possibility of accessing hi-tech services. To summarize it, the New Space companies, aim to make a change in the World by opening the access to this services.

Regarding *Planet*, the central point of this study, it is a company which devotes its activities to Earth Observation. It counts with 3 operative constellations, adding up to a total of around 150 satellites, which provide daily imagery from any place on Earth within a range of resolutions between medium to high. Since the company was created back in 2010, it has been experiencing exponential growth in all areas: The number of satellites has been increasing until reaching the actual number, where it stabilized; the number of customers, and their size, has been growing, as well as the degree in the customization of the products, which has been a tool to attract more specialized customers.

The company has aggrandized the number of available products, and in the present, is submerged in a new innovation mission. Thanks to the advances in launchers and in data analysis engineering, *Planet* has decided to start putting efforts into the development of two new projects, one related to the Automated Data Analysis through Artificial Intelligence, and the other into developing MegaSats so that the entire Solar System can be monitored on a regular basis. As well as at the same time, continue updating the Earth Observation imagery and data services that it is already providing.

When studying the traits which have driven *Planet* to evolve and change, two main kinds have been found. First of all, the Internal Drivers: those which derive from the same decisions and activities in which the company has been actively involved. This regards the consolidation of *Planet's* brand, which after hard work is seen as one of the representatives of the renovation of the access to Earth Observation Imagery services. And secondly and most important, the desire for expansion and innovation that the company seems to be experiencing. After analyzing the changes within the

company, it can be stated that great efforts have been put and are still put into refining the Earth Observation data sets that the company is already providing (by updating the satellites in every launch, and by developing new sub-products related to the analysis of this imagery), and into creating new services and technologies which are yet to be exploited; most concretely, services related to using Artificial Intelligence into data processing, and developing a new kind of Mega Satellites.

The second kind of change drivers that have been found are the External ones; this type of drivers are related to the global market and customer behaviours streams, and are one of the main engines of change of the company. This external drivers involve subjects such as the Market Consolidation and Opening, the paper that the entrance of Small and Medium companies has had in the behaviour of the new Earth Observation Industry, the beginning of identifying the Earth Observation related services as commodities, the growth and consolidation of new technologies, and the growing interest of Governments regarding this kind of services.

The found External drivers might be used to enlighten the answer to a key disruptive: Is this growth in the interest for the Earth Observation industry a mirage that will eventually fade, or is it an indicator of the beginning of the exponential growth of a market which is nowadays on its early stage and that will eventually settle its position after finishing expansion? In accordance to the results of this study, it all seems to point towards the second, and favorable, answer.

Within the development of this project, another important result has been reached. The concordance of results with those discovered by DISCOVERER student *C.M Pascual Canyelles* in her *Study of Earth Observation Business Models by Means of Business Models Methodologies*. The similarities between the pattern which *C.M Pascual Canyelles* proposed and the key aspects which define *Planet's* business model which regard the importance of cost reduction, opening the service an increasing number of customers and customer segments or the importance of establishing key partnerships, give strength to the idea that a Democratize Space pattern does exist. With the exception that, according to the results in this study, and additional key aspect of this companies should be added: the pursuit of innovation.

To give precise answers about both raised hypothesis, further studies would need to be developed. Only after analyzing a higher number of New Space Earth Observation companies, analyzing the trajectory of the Earth Observation Market and trends, and after summarizing all results into a final study, the current and future situation of the Earth Observation industry and how the Democratization of Space has shaped it can be understood (and the raised hypothesis might be confirmed or denied). This final results, in which the results of this very same project contributes, will be of great interest to the entire DISCOVERER project.<sup>1</sup>

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<sup>1</sup>Information about the proposal of further studies and hypothesis might be found in Appendix F.

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