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THE *BARCELONA MOON TEAM* AT THE GLXP
INVOLVING SOCIETY: PAVING THE SPANISH LEGAL PATH

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ABSTRACT

The Barcelona Moon Team is the 21st official team at the international competition Google Lunar X-Prize. In 2007, *Google* and the *X PRIZE Foundation* together established a prize to reach the Moon with private funding and encourage entrepreneurs, technicians and scientists from around the globe to develop technologies that will use the Moon as a platform for solar system exploration and a source of energy solutions for Earth.
This paper explains additional objectives and challenges for the Barcelona Moon Team: to create a tractor project for the small but growing Catalan and Spanish aerospace industry, and to create alliances and boost business relations between companies and universities, to be able to take on greater challenges in the future. The mission will also carry scientific payloads developed by local universities and it wants to contribute in the development of the Spanish legal framework, to create the basis of a private access to space both for exploration and business development. The recent news in the space policy environment indicates a radical shift in the strategy for space exploration, with a strong boost for the private sector, in line with the GLXP goals.

The project wants to engage the whole society through an outreach strategy including media and educational programs to promote interest in space science and technology studies within the youngsters. Further involvement of society in space will drive to the appearance of new private actors besides the public administration. To achieve that, the team wants to promote, together with other initiatives in the aerospace sector in our country, a development of specific space legislation on the definition of a specific authority in charge of the organization of space activities both public and private, including all aspects of basic activity, such as licensing, operation security, certification, infrastructure, accountability, adequacy rules on insurance, tax advantageous promotion, etc..

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INTRODUCTION

In the year 2007 the *X PRIZE Foundation* together with the company *Google* unveiled a new prize which states its mission as follows: "The *Google Lunar X PRIZE* (GLXP) is a $30 million competition for the first privately funded team to send a robot to the moon, travel 500 meters and transmit video, images and data back to the Earth."

Galactic Suite Moonrace, a filial company of Galactic Suite Design, promoter of the Galactic Suite Spaceresort, leads the Barcelona Moon Team (BMT). Our team comprises other private companies, e.g. *New Output*, the *Aerospace Research & Technology Centre (CTAE)*, the Technical University of Catalonia *(UPC)*, and the space law advisory firm, Stardust Consulting. Headquartered in Barcelona, we are the first team based in Spain to enter the GLXP competition.

The *Barcelona Moon Team* pursues a number of goals, which are classified into the following categories and general descriptions:

Mission goals: The mission has been designed to accomplish different sorts of objectives. Some of the objectives are compulsory for all competitors in the *Google Lunar X PRIZE* competition, other are optional and awarded with bonus prizes. Besides both set of objectives, our team has also selected other additional goals (*e.g.* scientific goals).

Industrial goals: To encourage and facilitate an increase of current space activities and capabilities in Catalonia and Spain; as well as to foster closer collaboration among companies, universities and research organizations.

Fundraising goals: To attract private and public investment to our space initiative, especially from non-space related companies.

Outreach goals: To boost outreach and educational activities about space, involving the general public and encouraging the youngsters to undertake scientific and technical careers.

Legal goals: To promote a development of specific space legislation on the definition of a specific authority in charge of the organization of space activities both public and private.

These sets of goals are intimately related and may contribute ultimately to the involvement of the public in the space activities and the development of new private activities within the Spanish space sector.

THE NEW PRIVATE ACTORS IN THE SPACE INDUSTRY

Apparently, we are living a historical change, the beginning of a new era within the space sector. Since it started, in 1957 (and earlier), the States were the only players in the space arena. They were actually two in the beginning, the USSR and the USA, and it was only many years later that other states came into play.

The way these states operated then and still now, is based in the establishment of contracts with private national companies that would design and manufacture the required elements and systems: rockets, spacecrafts, scientific payloads, ground facilities, etc.

Even the real actors up there, the astronauts and cosmonauts, were *ab initium* a place reserved for a special kind of state men: test flight pilots, almost all of them arrived from the Army.

But recently, even if the states remain as the main actors in the space scene, it's clear that changes have occurred: the space programs changed during the last decades from a National challenge, the space race, to an industry, a business like another, but with very special requirements for both, manned and unmanned projects.

Within these programs, science and exploration remain as the main achievements, but a lot of different operations are and should be possible.

As a matter of fact, two different set of players can be set currently:

- States or associations of States remain as the main actors of the space arena. The USA and Russia joined forces together with Europe (ESA), Canada and Japan in building and operating the ISS, while new states such as China, India and others have become active players and developed launching capabilities.

- Not only states, but also the private sector has become involved. Private companies, with acquired or self developed capabilities and resources, want to develop a most active role in these activities. Some of them are historical contractors of space launch systems; other are "new comers" in the field, with fresh ideas and concepts.

Within these new actors a distinction should be made between the veteran space companies (mainly large US companies, but also from Europe, Canada and other countries), which have a lot of history and had an important role in the success of the actual space business; and a set of new real pioneers: different sized corporations which, as it happened in the early times in aviation, see the space as an adventure and a challenge, as well as a promising business.

These new private actors have started their way as independent, without large contracts with public administrations or traditional suppliers. They have started individual projects on their own risk (financial risk, personal risk, prestige risk). They are mainly dreamers, sometimes wealthy dreamers, but in many cases, only dreamers, with ideas, with personal sacrifice and with a lot of work to do.
Within these new pioneers we find different kinds of people with different projects, sometimes with no apparent entrepreneurial intentions: Mr. Dennis Tito was the first of a short list of privileged wealthy people that paid a considerable amount of money to the Russian Space Agency to visit the International Space Station and live in space for some days (and remember it all life!). We shouldn't forget that aviation pioneering, was considered an activity only for eccentric people (adventure seekers, artists, billionaires and other); obviously a business without future.

On the other hand, there are a lot of entrepreneurial initiatives, focused in many activities based on recreational, science, services, etc. We mention hereunder some of them, in a non-exhaustive list:

- Private suborbital flights. Different companies are competing to achieve reusable spacecrafts able to fly up to 100 km and reenter in controllable gliding flights, staying for some minutes in microgravity. With a wide range of development, some have very advanced projects with real hardware flying.

- Private spaceports. Some companies try to develop such infrastructures in strategically set locations around the world, as first stones of complex real state and commercial operations.

- Private manned orbital stations. Different companies compete to establish the first private orbital station, as a counterpart of the ISS, with many different operational requirements, such as space hotel, scientific private platforms, etc. Some companies already have test hardware in orbit, while others are in different project stages.

- Private communications, global positioning systems, remote sensing satellites, etc. Although private companies are buying and operating such systems for many decades, they were always attached to the large space companies providing those heavy pieces of

hardware and their launch. Reduced sized satellites will enable new companies to build and to launch them.

- Projects of collaboration like Commercial Spaceflight Federation, an initiative between different space actors to place on the same level a wide range of resources and initiatives, and present itself in front of the Administrations as a joint industry with common goals, expectations and projects.

- Other private initiatives such as space mining, including mining in asteroids, searching for rare minerals, exploitation of planetary surfaces (e.g. Helium 3 in the lunar regolith), or private space platforms for research in microgravity and other industries.

Considering all these initiatives, private activities in space is not just about space tourism. We believe that *private access to space* is a more accurate term.

A common goal for all these companies, besides the necessary profit any private venture must have, comes from the fact that all of them are started by people that are truly interested in space, and that really understand it as a next frontier for human kind, the new environment where people will go to work and live. That given, we all want the same thing: to involve the whole society in our projects, to promote participation, to make people follow our adventures and difficulties, as a real global adventure: the next step of mankind seeking his future out the Earth as its original home.

THE CURRENT STATUS OF SPANISH SPACE LEGAL FRAMEWORK AND THE NEED FOR AN SPANISH SPACE LAW

In Spain there are also some of these new private initiatives, including local and foreign companies operating in Spain. Some of these initiatives include:

- Space tourism and spaceports: Spain is both the origin and the destination of several space tourism projects, including orbital facilities, suborbital and stratospheric flights and their ground infrastructures, including facilities, runways, industry and also, attractive "terrestrial" tourism complementary to the flights. As an example Galactic Suite Design promotes several space tourism projects in different altitudes including the GS Spaceresort, an orbital hotel.

- The official candidacy of the BMT to the GLXP. The Barcelona Moon Team represents an innovative venture that, for the first time, brings to Spain all the parties related to the project including investment, management, design and construction.

As any other human activity involving different parties, a high level of investment, risk and liabilities, space activities need rules.

Even if this paper is not the right place to present an exhaustive comparative study between current space laws around the world, it can be set that one of the most important differences at time to develop space activities by our team is the lack of a real space legal framework in Spain.

Spain is part of the principal U.N treaties about space, although not all of them -like many other countries. It also participates in UNCOPUOS and has some regulations, especially in objects launch registration. Spain also works actively with ESA, where it is involved in its entire project, including the ISS, and has agreements with NASA, including an alternative runway for the American Space Shuttle's emergency landing.

Although Spain doesn't have a Space Law (as many other countries around the world - including most in Europe), with the current legal framework, the country can act with

no problem in the international scenario of space activities in the *old way*, both as a member of supranational organizations like ESA or in collaboration with other countries by bilateral agreements. By *old way* we mean when the Country is the main actor in such space activity, in comparison of the *new view*, which would refer to the new private and corporate actors.

However, when discussing new challenges as the initiatives mentioned above, the present situation requires tailoring specific handmade clothes, which would be useful only for punctual situations. To achieve a real business development, specific regulation will be required.

If a more specific legal framework is not achieved, potential investors would probably go to other countries with developed regulations that will secure their investments.

Spain must play an important role in this new business, and this requires establishing a regulation like many other countries already did.

In essence, it is needed a system of authorization and regulation of all the activities, including the possibility of launching and, obviously, the private access to Space. All these activities should be under the control of an existent or new Space Authority.

As a general background, in 2006 FAA proposed to establish the regulation for Overseeing Commercial Spaceflight under the next points:

- Licensing commercial space launches.
- Creating spaceport.
- Granting Astronauts wings.
- Protecting the public.
- Promoting the Industry.

These recommendations should be translated in a concrete program, essentially regulating over the following points:

- General discussion about the needs of a Spanish legal space framework. Due the local initiatives and the interest of international companies in using Spain as a base for space activities, it is essential to promote a discussion between legislators, politicians and space actors to design guideline or route map about the current situation, expectations and possibilities to develop a legal space framework, a necessary tool to promote and develop local space industry and to attract international entrepreneurs.

- Definitions. To develop such legal framework it is necessary to have the essential definitions about all the space items, to give full guaranties on the allowed activities and involved options and actions.

- Licensing, certifications and register, and authorities in charge. As an important point, the regime of authorizations must be easy and clear. It must include all the parameters and requirements, but also give a clear way to the space actors to have real possibilities to develop their activities.

- Rules about spacecrafts, facilities, equipment and crew. Spacecraft certifications are determinant for this activity. One option would be to follow the FAA rules; also assuming that, in the early years, hardware will be principally American.

- Operators. It will be also necessary the regulation of the operators, companies involved in these activities. Such companies must have economic and technical solvency.

- Spaceflight regulation. There should be a nexus between space and aeronautical regulations, due to the fact that, as an example, it should be possible to have suborbital flights coexisting with

commercial airplanes in the same or different airport.

- Liability and insurances. As one of the key points in the new regulation for private space activities, a complete regulation on liability and insurances will be necessary to license and develop projects. Currently the States, acting as principal actors, are giving more guaranties in case of accident or liability. However, the introduction of private companies must also introduce a harder level of control about liability for damages.

- Control over the activities. All activities must be under control to avoid a bad use of space, illegal activities or damages. This control will involve not only spaceflight but also terrestrial, aerial and other space activities

- Taxes regulations. As a new activity, costly and with high value, an active tax regulation that benefits these activities must be necessary. Companies largely investing in this new business, could be attracted with a reduced tax policy under determinate conditions (e.g. they might be required to reinvest part of the benefits in the country).

- Environmental regulation. All these activities must be according to environmental protection rules, not only in relation to Earth, but also to Space or other celestial bodies. In this new frontier we have the opportunity to develop a "clean" way to do the activities. Furthermore, a correct regulation and an according actuation will be the best way to avoid opposition from some people.

TEAM ACTIONS TO SUPPORT THE DEVELOPMENT OF THE SPANISH SPACE LEGAL FRAMEWORK

The Barcelona Moon Team is a real opportunity to work within the Spanish society to establish space as a common place for many activities. The team has set its goals within society to achieve:

- Public support, as we aim at creating a project that involves the general public and encourages the youngsters to undertake scientific and technical careers.

- Financial support, especially from private non space related companies that might understand the project as a commercial opportunity for its social recognition.

- Legal support, to be able to carry on the team's mission and to promote, together with other initiatives in the aerospace sector in our country, a development of specific space legislation on the definition of a specific authority in charge of the organization of space activities both public and private.

Therefore the challenge is triple:

- We need to involve industry, with young and senior engineers, and universities with their researchers.

- We need to involve the authorities, the politicians and the administration to promote the project, to help developing it (for the rules of the competition allow for a 10% of the investment to come from public money), and to establish the regulation needed for this and other activities.

- And we need to achieve a strong support from the general public to help pushing the administration towards this end, and above all, to help rising money from private non

space related companies that may use their support as commercial actions showing their technological commitment in front of society.

Therefore, this is an opportunity to close the gap between law and reality, and develop the rules that investors, entrepreneurs and public interested in space, need to make their projects a reality.

The Barcelona Moon Team will carry on different actions to work in this direction:

- The team will go on assisting to conferences and making papers to spread the word, and getting support from other ventures in pushing the Spanish administration.

- The team will promote activities about space through different programs in schools and universities, but also television and internet to gain public support.

- The team will identify and contact the right interlocutors able to take decisions within the administration. This includes the Centre for Technological and Industrial Development (CDTI) that is Spain's representative in institutions like ESA, but also the politicians in the Spanish Parliament who can constitute a commission to study and present a proposal for a Spanish Space Law.

CONCLUSIONS

Although until recent years, the states were virtually the only actors able to carry out activities in Space, recently different initiatives have demonstrated the capabilities and strong commitment of private organizations to develop a private access to space.

This paper described who these new actors are, what their needs are, and the necessity of a regulatory body that involves society effectively and safely.

The Barcelona Moon Team is one of the current projects in Spain to develop private access to space, in this case not an easy one: go to the Moon. This paper has examined this and other initiatives, the current status of the Spanish space legal framework, and the necessary regulations needed to develop that framework in which investors, entrepreneurs and public might develop their activities in space with security for operations and their investments.

Finally this paper has presented the commitment of the Barcelona Moon Team with involving society, creating interest that can help the team not only to make this project a reality, but also to promote and develop the necessary legal space framework that other Spanish and foreigner initiatives in Spain also need.

We are determined to work in this direction and we wait for the support from society and other private initiatives like ours to advance towards an effective private access to space for all those who believe that space is a real next New World.