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THE ENTREPRENEURSHIP SIDE OF COMMERCIAL SPACE ACTIVITIES IN JAPAN – A NEW WAVE OF JAPANESE SPACE INDUSTRY

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ABSTRACT

Space venture companies and their activities - it is not so surprising a thing in the U.S. However, space ventures are not common in the rest of the world. Are space ventures just reckless and mad even if the circumstances of space development now lead toward space commercialization? Because outside of the U.S. there are almost no cases of billionaires starting or financing space businesses, space development so far seems not to be so attractive in Japan. In addition, investment circumstances for space businesses are very difficult. It is necessary for venture companies to find a more attractive essence, and projects which encourage the flow of investor's money in any way. This initial group of Japanese venture companies even invite investment in new space transportation development, which is regarded as the last thing to invest in because of the risks. Several charming Japanese venture companies will be introduced in this paper and their business and financial strategy will be reviewed. Also, there will be some consideration of new ways for space venture companies to advance and how to begin to encourage investor's money for the first time to flow into the space field in Japan.

PROLOGUE

Space entrepreneurship and the activities of space venture companies are very active in the U.S. in addition to government and big companies' space developments. American space venture

companies don’t fully depend on government funding but depend on self financing including investors funds. This phenomenon cannot happen in other countries. For example, it is obvious to compare with European countries. American space ventures are focusing on private sector space projects mainly. On the other hand, European space ventures cannot exist if they just do only space projects though they have earth observation companies and an orbital recovery company as exceptions to the general rule. It is difficult for European space ventures to provide funding from the private capital market to sustain themselves so that they share their startup budget expense with government under a government and private partnership scheme, while American space ventures have sought funding to stand up on their own legs.

In any way, American ventures can be independent because of the large number of the government space budget compared to other countries. Will space venture in Europe, Japan and other countries become just like America on the stream of space commercialization? Or will only government and its contractors lead space commercialization, instead? What is happening with space venture in Japan now?

SPACE VENTURE IN THE U.S.

Even though it is still in discussion whether there is enough market for space venture companies in the U.S, it can be said that there are circumstances in the U.S. for space venture companies to get funding from the market to do space development in the US, at least, more than any other countries including Japan. This is not simply because of increasing investors who are interested in space but achievement by efforts both private and government sides in the U.S. Partnering with a government entity provides additional credibility to the private sector venture.

As for private efforts, the X Prize is a typical case to appeal space venture activities for investors. Also, some prominent events such as Space Investors Summit and others have been held. As for efforts of the government side, there have been formed incentives such as the system of tax credits for space projects including the proposed Zero G Zero Tax system. Therefore, the current situation in the U.S. is the achievement of both public and private sides to be leaders of space ventures in the world even though there are still serious problems such as ITAR issues. Also, space tourism potential and its projects, the existing FAA/AST regulatory status, and government technology transfer systems contribute

to the success of space ventures in the U.S.

There are several categories of these venture companies; NASA contract companies, DOD/DARPA contract companies, billionaire owner companies, and investment capital fund-raising companies, and so on. The NASA budget is 10 times bigger than the Japanese space budget and the DOD/DARPA budget is inestimable. There are chances for venture companies to have contracts from them in many ways. Also, billionaires have gotten into the space business recently. Space development seems to be the least attractive challenging and charming field for them in the U.S.

CURRENT STATUS OF SPACE VENTURES IN JAPAN

Meanwhile as for space ventures in Japan, there is no following wind type of circumstance existing so far. There are almost no successful examples to get funding or provide self funding and fully achieve space systems up to now . However, local space development organizations have been active more and more in recent years such as those in Hokkaido, Kinki and Kyushu districts which activities are focus on local industries promotion and cheap access to space by unique private ways. There were a few cases of billionaires' investment in the space tourism industry a few years ago. However, it is not successful so far. One of the particular cultural phenomenon in Japan is "Prominent stake should be struck".

Thus there are almost no cases where billionaires have gotten into the space business in Japan. There is not as big as space development budget in Japan, nor are there any chances to share in the self defense budget for venture companies. Self-defense in Japan is strictly controlled by the government and its budget is only for big companies, what is called self defense companies such as heavy industries and electric companies. However, even with these constraints the activities of space venture type of companies are popping up and getting active gradually for the last few years in Japan, mainly due to the early success of space ventures in the US.

GOVERNMENT SUPPORT FOR SPACE INDUSTRIES

It is difficult for the Japanese government to provide support to create space venture companies. It is impossible to spend tax money for particular private companies. Also, this is not government work to appeal space as charming investment opportunities for investors. The government role is to make it possible for the private sector to perform space projects smoothly. As the

same way of the U.S., government should provide regulatory matters, R&D support funding, and eventually buying what private sectors develop. Thus, the opportunities for space projects will be increasing so that space industries market will be expanded and commercial space activities will be promoted by space venture companies.

JAXA has had about $120M budget out of total $1700M at FY2008 for collaboration with private industries and so on. It is increased double compared to FY2007. One of the R&D support projects is Space Open Lab which was established in 2005 to provide opportunities and supporting budget for universities, laboratories and companies and to develop new ideas and support creative projects and promote space utilization. It has been a successful program with about 20 projects every year.

Also, JAXA provides space branding what is called COSMODE, which is a certification and logo of space products developed under collaboration with JAXA to encourage their sales promotion as high technology products born in space development. Furthermore, JAXA has an intellectual property program that is for making the best use of space intellectual properties which JAXA has successes up to now for not only in space industry but also for other variety of industries broadly. JAXA also provides facilities to private sector companies and universities and laboratories.

TYPES OF SPACE VENTURES IN JAPAN

There are Japanese space venture companies such as space transportation, satellite, engineering, space business development and services, and expansion of new areas of space business such as related matters of living in space for the International Space Station. For example, Space Futon, a space sleeping bag is one of them.

It can be said that there are several types of space ventures in Japan. The first one is intrepreneurs activity, which are entrepreneurs in big companies. This is a characteristic thing that even big companies which have gotten into space business have entrepreneurship and venture companies' spirit. The second type is regional space development by space venture companies and venture companies coming from spin-out of university laboratories are noticeably unique activities. Also, space venture companies which one-focused space engineering is another type. One prominent technology makes it possible to be a sustainable development. Niche

is also one of categories of space venture companies which include space cultural utilization and so on. Space wedding and space funeral are in this category. The space services area has big potential because it has the power to tap in to major multi-billion dollar existing markets with the new charm of a space theme as the value proposition.

A FEW EXAMPLES OF NEW MOVEMENT OF SPACE VENTURES IN JAPAN

As discussed before, there are several types of space venture companies in Japan, which are 1) intrepreneur in big companies 2) regional both companies and universities 3) single-focused space engineering 4) Niche including space cultural utilization 5) Space service. We will introduce one of each categories.

JTB Corporation

JTB is the biggest travel agency not only in Japan but also in the world. JTB has established its commercial space travel development office in the Business Development Headquarters of the Market Development Division in 2005. JTB sells four type of space tourism; the Moon trip, ISS orbital trip, suborbital, and zero G flights under contract with Space Adventure. Since then, they have generated about one hundred customer inquiries per month and sold 10 flight agreements for suborbital and over 10 for zero G flights. Though there is no customer for an ISS space tourism flight so far, there are a few serious potential customers. One Japanese billionaire did sign up for an ISS flight in 2005 but was unable to fly for health reasons. Anousheh Ansari was his backup and ended up flying in his place.

JTB is such a giant company, the space division has the support for the entrepreneurship to make space tourism more popular for the general public. The impact of their starting space tourism business has been big in the general public. Thinking about their many sales shops all over the world, their name is so familiar to give us big influence and contribute to the popularization of space tourism even though their sales numbers are not so high. The value of the JTB brand as an endorsement of the concept of space tourism as a valuable market is itself very meaningful.

©JTB

Figure 1. JTB space tourism web site

HASTIC (Hokkaido Aerospace Science and Technology Incubation Center)

HASTIC was established in June, 2002 and became an NPO organization in January, 2003. HASTIC, which profess that space is of the people, by the people and for the people, makes networking for every space related facilities, universities and companies in Hokkaido to create new industry, encourage and support entrepreneurs, educate researchers and engineers for the next generation. Also, HASTIC will contribute to the Japanese space industry and space science development by their regional power. HASTIC activities are 1) small satellite development and application 2) CAMUI, a hybrid rocket development, 3) space medicine, 4) space environment utilization, 5) small unmanned hypersonic vehicle development.

As for small satellite, Hokkaido Satellite Corporation was established which has developed a 50kg class small satellite by focus on missions for each satellite so that it is affordable to take one or two years to develop at about $1M, even though traditional satellite development has needed about ten years and hundreds of million dollars up to now. Most of the components and parts are provided in Hokkaido. They have the unique technology called Hyper Spectral camera which has sensors to enable applications for agriculture, aquaculture and physical distribution.

©Hokkaido Satellite

Figure 2. HitSat of Hokkaido Satellite

As for the CAMUI hybrid rocket development, it is a low cost, safe fully reusable small rocket at one tenth of the cost compared to current small launching systems. It is developed under the keyword of “small”, “private”, and “high cycle” by Hokkaido University and CAMUI Space Works which has been a spin off from Uematsu Electric Company. Uematsu Electric Company is the most entrepreneurial R & D space company that has CAMUI development facilities, a drop tower which provides three second microgravity experiment drops at $300 each, satellite manufacturing, satellite tracking and control center, and an observatory / planetarium in his factory.

Uematsu Electric Company is originally a one product focus company of magnetic coils for industrial equipment.

As recent topics, 8 CAMUI rocket were launched on 25 August 2008 and CanSat experiments successfully performed their missions.

©Taiki

Figure 3. CAMUI launching

HASTIC has concluded an agreement with Rocketplane Global since 2006 on the matter of spaceport development in Hokkaido, the second stage rocket launching from the XP spaceplane, microgravity experiments, space medicine and biotech and so on.

Manned Rocket Project (MRP)

As the opposite case of regional space development like HASTIC, MRP is an all-Japan type organization which supports the development of manned space vehicles. MRP was established 2005 and became a NPO in February of 2006. MRP aims to form a community by networking of engineering, facilities, and resources to R&D establishment engineering and to integrate them so that MRP will complete a manned space vehicle. Also, MRP will contribute to space business development such as space tourism and space environment utilization by operation of the manned space vehicle.

Furthermore, MRP will educate and encourage manned space activities and contribute to space popularization and commercialization which influences society being more active and increases science & technology and industrial development. MRP has almost 100 member companies and individuals from all over Japan.

©Manned Space Project

Figure 4. Images of MRP manned rockets

PD Aerospace

PD Aerospace is single-focused engineering company which has developed a pulse engine and compete space vehicle both unmanned and manned. Their vehicle has Pulse Detonation Engine (PDE) and its style is horizontal single stage type of rocketplane. Their strategy is to use simple structure which enables the reduction of R&D cost, operation costs and weight to realize lower cost space tourism ticket prices.

PDA seeks for investors funding. They have already gotten some financing, however PDA has developed a small scale test vehicle with its own funding and its first flight test was performed in August of 2008.

©PDAerospace

Figure 5. PDA first small scale prototype

First Advantage Corporation (FA)

FA's space activities are typical niche and service to add super value for original space program. FA is an IT consultant and wedding business company which have expertise in high end wedding ceremony and honeymoon planning and space related business opportunities. FA has entered the space business concluding a contract with Rocketplane Global to evolve space wedding innovation in February of 2008. Especially in Japan, the wedding market is more than $40B per year so that space weddings are expected to be a popular extremely high end style wedding. In addition to Japan, customers are expected from all over the world.

Rocketplane's suborbital space travel by XP spaceplane costs $200,000. Total passengers for XP spaceplane are 6 including a pilot. However, FA began to sell XP space wedding charter flights at $2.2M including premium services as high end space wedding. It grasped media and the general public interests. Space wedding charter flight stories ran all over the world at the beginning of sales.

Thus, even though it increases cost, it could be created a market if the service is able to catch people's mind and needs. This is the normal kind of terrestrial commercial activity. This is the example that a space product can be more charming and attractive by creating additional value.

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Figure 6. Image of Space Wedding

ISSUES AND PERSPECTIVE OF JAPANESE SPACE VENTURES

Because there are almost no cases of billionaires starting or joining space businesses, space development so far seems not to be so attractive in Japan. There was only one case in Japan where a billionaire invested in a space tourism vehicle development project. However, after he started this, he was arrested and later convicted because of breaking securities and exchange laws of the stock market (unrelated to the space project). However, after that any investment in space business ventures is regarded to be not a good image. In addition, investment circumstances for space businesses are very difficult. It is necessary for venture companies to find a more attractive essence, and projects which encourage the flow of investor's money in any way. Japanese venture capital firms are beginning to have an interest in space business. However, they generally believe that space venture companies have no potential to show a return on investmet in a short term of at least 5 years. They would like to have returns in a shorter term, and this becomes an additional barrier to VC investment. This problem is not just in Japan but all over the world. The small group of Japanese venture companies such as PDA even invite investment in new space transportation development, which is regarded as the last thing to invest in because of risk.

If one space venture will get early success in their space entrepreneurship

business, it could be a blast to a bright future to expand rapidly space market and encourage investor's money following that. It is the most optimistic perspective that everyone can imagine. However, it is true that if even one space venture company will a big success just like Scaled Composites which success to reach the edge of space by SpaceShipOne and got the Ansari X prize and the crucial partner, Virgin Galactic. Early success will bring a growing tendency to establish market and funding.

Regional initiatives are also one of particular phenomenon for space venture companies. The way to support incubators, funding from local bank and foundation are important. Also, it is important to find local economic leaders and educate for space development to promote local industries as well.

Creating and expanding the market is another issue. So far, space pace development is not user friendly because of government activities. It should be changed. Space activities should be more a customer driven mood to expand its market. For example IT and mobile phones had no market at the beginning. Also, added value encourages and promotes new markets. Space business is not special but the same commercial activities just like others basically. In addition to that, every government project is big but projects are not so many in number to encourage investors funding for space venture companies. Government should create continuously smaller scale project such as small satellite and small locker payloads so that this kind of steady and sustainable demand will drive private space activities for space venture companies.

For any industry and business, it is one of the most important things to appeal to investors to get funding. However, space business is the last thing for investors to fund so that space ventures need to endure this most difficult matter. However, it is not impossible because space is also the last frontier for investors, too.

To perform public and private partnerships is essential to perform space activities for venture companies, too. Also, it is important to develop tax credits including Zero G Zero Tax system in order to attract investment capital. It will be helpful and necessary because space business is tough and risky.

EPILOGUE

Are space ventures just reckless and mad even though the circumstances of space development are pushing toward

space commercialization? Space ventures are still normal commercial activities and have big potential to change old space development practices which has high cost, high risk, and low return up to now. To realize it, space ventures must conquer the absolute feeling of “Failure will never be forgiven” which is a typical phenomenon in Japan.

Several charming Japanese venture companies and organizations including “super private space development organization” which is supported by local companies and organizations which had not space related up to them, are introduced in this paper. Also, there is some consideration of issues and perspective of Japanese venture companies

I believe the space entrepreneur mind has the same hot temperature and enthusiasm in all countries as well as the U.S. and the space entrepreneur’s perspective is not easy but not madly bad. Space venture’s voyage has never ended.