Promotion of Service Oriented Businesses for Space Utilization

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Abstract

From manufacturing business view point, the market for the space has almost matured. For further development in this sector, it is essential to shift the main business focus from equipment manufacturing to service oriented businesses that include systems management and data usage. This paper introduces NEC's activities in promoting "service oriented businesses for space utilization."

Keywords

observation satellite system, data utilization system, packaged products export
comprehensive data utilization business, space system utilization business

1. Introduction

The main enterprises in the Japanese space business domain so far have been related to technological developments. As regards to the space utilization, the main interest hitherto was meteorological observation, communication, broadcasting and GPS. However, most of the satellites for these purposes were made by overseas manufacturers. Moreover, Japanese space related manufacturers and institutes have been developing satellites mainly for scientific observation, planetary exploration and technological experiments. Recently the demand for observation satellites has been increasing worldwide, especially among the developing countries. Major space countries including France, some other European countries and the U.S. are proposing to introduce observation satellites to the emerging space countries. China, India, Israel and Korea are showing interest in this market and are becoming Japan's competitors. In such market conditions, "space business" is focused as one of the state-of-the-art technologies of the projected Japanese new growth strategies aimed at entering global markets including those of the Asian countries.

In order to survive in the current climate of global competition by setting space business as a Japan's growth industry, it is essential to shift our involvement from being a hardware provision business such as equipment manufacturing including satellites and ground-base systems, to service oriented businesses such as systems management, operation and data utilization services that can be provided for the market as long term business ventures. NEC already possesses various technology elements that are suitable for establishing such businesses.

This paper introduces an outline of the projected "service oriented businesses" for the space businesses of the future.

2. Space Development Businesses in the Past

As described in the above section, the space business in many fields has already stepped into the phase of practical utilization. In particular, this trend is accelerating in the fields of communications, broadcasting, meteorology and GPS and these are all now essential functions of our every day lives. Practical utilization of observation satellites is recently advancing and businesses using data from observation satellites have been increasing. In the following, an overview of the observation satellite systems and the businesses and services that use observation satellites are described.

Fig. 1 shows an image of the comprehensive system that connects the functional elements of data utilization after the system acquires data from observation satellites. In such a system, a satellite is positioned as an observation satellite to acquire satellite data and also to function as an internet or communications satellite and to distribute satellite data for further data applications. Other than these, other functions such as satellite management planning, satellite control, receiving and processing of satellite data, the acquisition of various data other than from satellites, data value-added processing (informatization) are necessary to complete a system. An archive to storing data and information, a data control system including distributing data to users and a network control system to

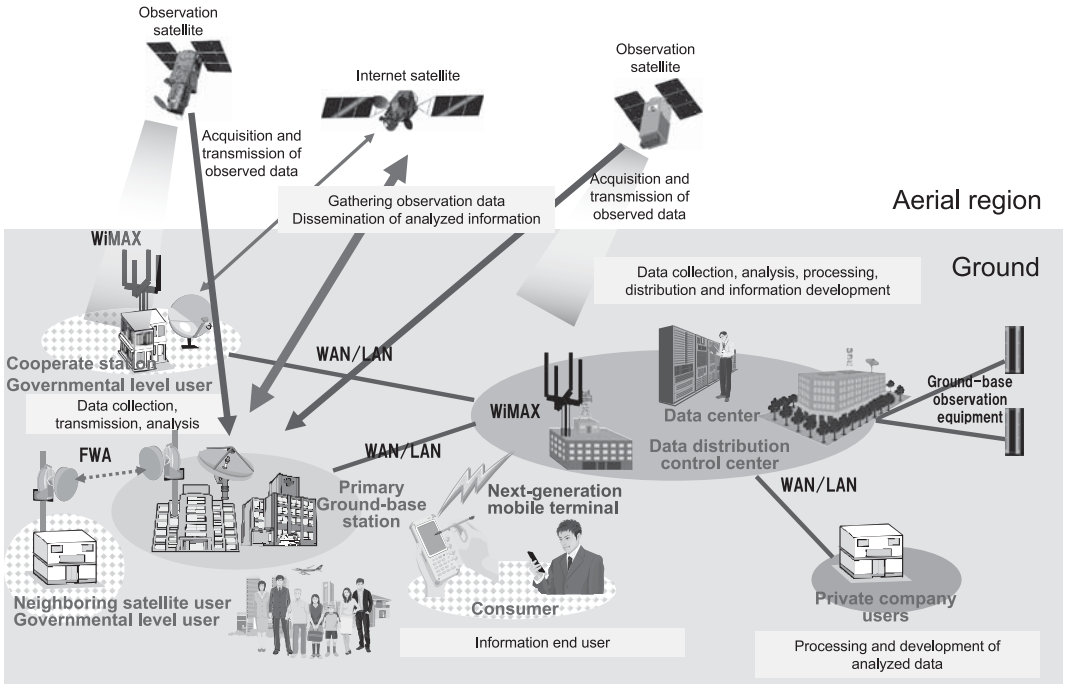

Fig. 1 Comprehensive system of observation data deployment.

provide information to users are also required to the comprehensive system.

Not only Japan but also other overseas countries have already established observation satellite data usage systems. However, the entire system including required functions, etc. are not currently developed or manufactured by a single institute or a company. The functions are in fact manufactured separately by specialized institutes or companies.

In such an operational environment, NEC used to deal with the provision of satellites and related ground-based systems, as well as the support services including maintenance of ground-base systems and the management of satellite operations. Other parts of the space system business were separately developed among JAXA (Japan aerospace Exploration Agency), related juridical foundations, data provision companies, VARs (value-added resellers) and network providers.

3. Promotion of New Space Businesses

However, changes have occurred recently in the organization of the space businesses: a decreasing number of governmental satellite launch programs, saturation of the satellite products market in the developed countries, tightening of related regulations, an increase in the service life of satellites, expansion of demands in the developing countries, downward price trends of satellites, etc. In such a market situation with so many limitations, a drastic change in the business model is required.

Moreover, governmental policies are tending to be changed by; strengthening of state-of-the-art technologies, expansion of space usage businesses based on the Basic Space Law, amendment of the ODA policies, tighter coordination of governmental agencies and the private sector for promoting related packaged products, etc. In order to break through the economic recession in Japan, various industries are promoting the export of their products to developing countries and the space system business is one of those industries. While economic growth is accelerating in the developing countries, it is essential for these countries to control the various areas of administrative information such as that of trade, securing resources and foodstuffs, etc. Moreover, public concern regarding disaster observation and environmental conservation are increasing with regard to securing safer lives for the people of developing countries. In such a business environment, the space business will have a more important role in terms of global

industries. Global social activities are promoted and relationships between countries are more and more expanded. With such global trends, attention to the space business has been increasing and it is now used for a wider variety of purposes, such as for enhancing national prestige, appealing technological advancements and other practical use capabilities. With such a background, "packaged products" are attracting attention in the space business market. This trend does not in itself lead to the export of a satellite but it can help export a satellite together with its associated ground facilities that are needed to operate it successfully, satellite launching services, satellite data utilization services and support services to administrate satellites and train human resources. With "packaged products", business development in the space utilization markets will be accelerated. Fig. 1 shows the entire system of the "packaged products" services, and overall solutions including satellite data utilization that is aiming to be delivered to the developing countries.

This is the innovative and promising business model for future space business. A single company provides comprehensive services that used to be provided via different institutes and companies. **Fig. 2** outlines the services flow starting from data acquisition and ending at the information provision in the technology domain that is necessary for constructing a comprehensive space utilization system, as is shown in Fig. 1. A very wide range of technologies are involved, and NEC will provide them by optimally using our entire arsenal of technological expertise. For example, NEC has abundant experience in satellite-borne sensor developments. We also possess various elemental technologies such as IT, cloud services, network systems, telecommunication technologies, data processing and analysis, and also video terminal technologies including 3D display. By combining all of these technologies, NEC will construct a comprehensive space utilization system.

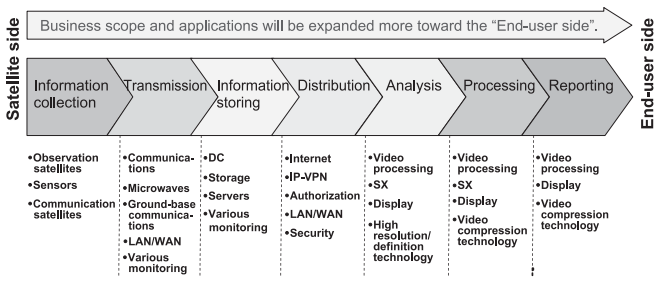

Fig. 2 Technology domains related to observation satellite data utilization business.

While combining all of these element technologies, it is important to deal with total data utilization business in the space industry to expand NEC's space related businesses.

We consider that understanding the various customer needs of the developing countries should be one of our concerns and that we must provide solutions to meet such needs. By combining businesses that provide "products" including hardware and software within a comprehensive space utilization system, NEC aims to develop innovative businesses that provide solutions and contribute more effectively to people globally.

As described above, NEC has already developed; satellite-borne sensor technologies, regional and global data distribution and telecommunications technologies, data processing technologies including data encryption, data display terminals, and also data center facilities using cloud systems. It is possible to apply these technologies and products to the satellite data and information provision business. When the concept of providing services is combined with these technologies, it will be possible to add value to our business ventures.

4. Space Utilization Services Business

In this section, we outline the space utilization services business and how our services can be integrated into the space utilization business (Fig. 1) via the use of observation satellites.

Japanese space system business has been providing hardware, software and data acquired from satellites separately. In the weather reports markets, meteorological satellites are generally employed. Telecommunications satellites and broadcasting satellites are now essential for people's everyday lives. Among these satellites, the space systems are employed for providing information services and this tendency has been increasing. However, weather report services using data other than from satellites are becoming popular recently. Data acquired from observation satellites is recognized as being essential in today's markets; however, it is actually used mainly by some specialists and is not employed in the market widely.

By shifting business that sets satellites as core sales items to business that sets them as only a part of the space system and by focusing on the data and information acquired from satellites, various services concepts can be developed. Such services aiming at the "utilization" or "materialization of users' needs" are considered to be important and they are increasingly adopted worldwide. NEC has already deployed such service oriented businesses in the IT market.

Every business element shown in Fig. 1 may be usefully

employed in such services.

These elements include; an observation system using satellites, data reception and processing systems, value-added data processing systems that convert simple data into value-added data, archive systems to store such data, information distribution systems for users to use information anywhere and at any time, information search systems for users that can access required data and also a system that indicates how to use such data or information. Service oriented businesses can be applied to all of these elements.

By combining the concept of services oriented to these business elements, the satellite utilization business can be significantly altered. It is possible to provide "convenience" to users who use systems and information. We provide comprehensive space utilization systems such as packaged business for developing countries. This means that users can use information sent from satellites without specific knowledge about satellites and even without knowledge of the ground-based systems that are required to operate the satellites. This results in an increase in the utility value of the space systems. However, there is a limit to the amount of provided data and information acquired from satellites so that combining the data acquired from satellites and other data or information acquired from other sources than satellites is necessary in order to satisfy all the needs of users.

Reasonable prices and efficient and easy operation are demanded for these systems. Moreover, high quality "convenience" to meet users' demands is the key to the system.

With the comprehensive space utilization systems and services, the main targets of the space business will be expanded greatly into a major market that supports the construction of various infrastructures and their management systems in the developing countries, including the governmental-lead space related technology developments, science observation national projects, etc. Moreover, frequent and high quality information provision enables private companies to use space related information more actively. Some private sector businesses such as data provision services for weather reports, resource developments and resource explorations will be promoted even more widely. Moreover, data provision services for agricultural resources and environmental conservation, and the utilization of linkages between nations and UN activities can be expected. It is possible to create even more variety for markets such as contents provision services for consumers and the manufacturing of their related terminal products.

As explained so far, if a business mechanism that enables the use of satellite data easily is constructed with comprehensive space utilization systems and related services for element technologies, data usage demands including satellite data will increase. This will result in the expansion of the related systems markets. Subsequently the expansion of comprehensive systems and data usage will create new demands and accelerate economic growth. This growth spiral will then result in the expansion of the markets.

5. Conclusion

The space business market is going to ripeness rapidly in the equipment manufacturing fields including that of satellite production. However, by finding new challenges in wider markets such as in services provision and in increasing their business share, it is possible to develop space business even more. In other words, changing the concept of the space business from manufacturing satellites to using satellites is becoming important. This is the way that NEC can truly become more active as a "space solutions company."

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