Development of Satellite Communication Technologies in Japan

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Education
1968 Graduated from Tokyo University
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1973 Joined National Space Development Agency of Japan (NASDA)
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Currently, 20 communications or broadcasting satellites are commercially operated in Japan, all of which were procured from foreign manufacturers. In mid-1980, Japan decided that all satellites for government use must be openly procured through the world markets. As a result, Japanese satellite manufacturers were slow in acquiring the technological capability of manufacturing satellites. In contrast, space communication technologies were well established worldwide, and communication and broadcasting satellites were commonly operated by commercial communication satellite operators. As a result, Japanese satellite manufacturers were unable to acquire any business contracts to produce satellites because they had less experience and poor cost competitiveness.

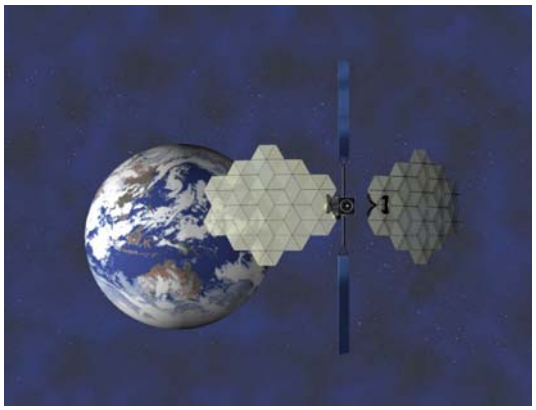
The Japan Aerospace Exploration Agency (JAXA), formerly the National Space Development Agency of Japan (NASDA), developed experimental communication and broadcasting satellites as well as engineering test satellites for standardizing geostationary satellite bus technology. However, Japan cannot achieve the competitive level of other advanced countries because the Japanese space industry began with procurement from foreign companies as a technology transfer approach, and satellites employing domestic technologies were developed rather intermittently. In addition, consecutive launch-vehicle failures and on-orbit satellite malfunctions made the situation worse. During this phase, communication satellite technologies were well established, and there was criticism that the responsibility for developing commercial satellites resided with industry, and so satellite development did not benefit from national tax investment. Industry had serious problems amassing the large initial investment and conducting an extremely high-risk business without any government support.

Under these circumstances, JAXA continued to develop advanced satellite technologies to respond to new demands or needs for satellite communication. Seeking to ensure that industry could acquire world-level competitiveness, JAXA planned specifically to develop technologies for optical inter-satellite communications, mobile communication

satellites with large antennas, and wideband internet communication satellites. The ground communication infrastructure using optical fiber was well advanced at that time, but those new technologies for space communication still needed to be developed.

Optical Intersatellite Communications satellite

JAXA, together with the National Institute of Information and Communications Technology (NICT), launched an optical inter-satellite communications satellite in August 2005 and successfully conducted optical communication experiments with a European geostationary communications satellite. In December 2006, JAXA launched Engineering Test Satellite-VIII, deployed a large antenna on orbit, and conducted mobile communications experiments. In addition, in February 2008, JAXA will launch a wideband internetworking engineering test and demonstration satellite and will conduct 1.2Gbps data transmission experiments and various application experiments. Based on these advanced communication technologies, JAXA seeks to conduct various studies on advanced applications of communication by utilizing the special characteristics of geostationary orbit. For example, studies on seamless mobile communication technologies between space and ground, using much larger antennas and high-quality, high-rate inter-satellite optical data transmission will be conducted. Geostationary satellites will also be able to observe the Earth environment and monitor natural disasters.



Engineering Test Satellite-VIII

Wideband InterNetworking engineering test and Demonstration Satellite

Through these applications, JAXA would like to contribute to the benefit of the general public and to secure the safety of societies throughout Japan and worldwide, which is expected to be provided by the government. In order to do so, JAXA would like to challenge industry to expand its ability to gain world competitiveness. JAXA will enthusiastically promote advanced technology and improvement of reliability as much as possible. Therefore, JAXA strongly expects industry to make major efforts to advance domestic and autonomous technologies and to establish and promote appropriate strategies to participate in the world satellite business. Responding to great demands of applications, realizing advanced missions, and developing highly reliable and long-life satellites that have already obtained a certain level through past experience, JAXA believes Japanese industries will be able to achieve world-class performance, quality, cost, and schedule in space development by acknowledging individual roles.