

Communication Technology in Space Application

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Academic Background:

- 1962 Bachelor of Engineering, University of Tokyo
- 1978 M.B.A., Massachusetts Institute of Technology
- 1981 Doctor of Engineering, University of Tokyo

Business Career:

- 1962 Nippon Telegraph & Telephone Public Corporation (NTT)
- 1997 Senior Executive Vice President, NTT DoCoMo, Inc.
- 1998 President and CEO, NTT DoCoMo, Inc.
- 2001 Commissioner, Space Activities Commission
- 2004 President, JAXA

On October 1, 2003, the Institute of Space and Astronautical Science (ISAS), the National Aerospace Laboratory of Japan (NAL) and the National Space Development Agency of Japan (NASDA) were merged into one independent administrative institution: the Japan Aerospace Exploration Agency (JAXA). Unfortunately however, we had to cope with the accidents of the failure of H-IIA Launch Vehicle No. 6 (H-IIA F6) and sudden operational anomaly of Midori-II (Advanced Earth Observing Satellite II, ADEOS-II) soon thereafter. We had to concentrate all our energy on the accident investigation into the causes of these failures for the first one and half years since the establishment. In the end, JAXA finally got back on track again with successful launch of Himawari-6 (MTSAT-1R) by H-IIA F7 on February 26, 2005 followed by equally successful launch of an X-ray astronomy satellite "Suzaku" (ASTRO-EII) by M-V F6 on July 10, 2005. It is still fresh in our memories that the Space Shuttle Discovery was successfully launched for the Return to Flight mission on July 26, 2005, with impressive accomplishments by our Mission Specialist Soichi Noguchi during the flight. Several satellites are planned to be launched this fiscal year. In April 2005, JAXA released a long term vision entitled "JAXA 2025", in which we propose our own initiatives and provide ideal situation of aerospace areas in the next 20 years and the direction for its realization. In October 2005, JAXA made structure changes for strengthening systems engineering as well as safety and mission assurance to ensure mission success.

Looking at recent NASA's vision to again explore the Moon, Chinese successful manned mission and the Galileo Mission by Europe, we witness intensified space development and exploration activities. Under such circumstances, it is important how Japan will promote our space activities. It is necessary to secure the financial resources, further develop human resources and work out concrete implementation plans to realize

our Vision.

As for JAXA's research and development of communication technology in space application, "KIRARI" or OICETS (Optical Inter-orbit Communications Engineering Test Satellite) was launched by Dnepr launch vehicle of Ukraine/Russia on August 24, 2005. On December 9, 2005, JAXA and ESA succeeded in the first bi-directional optical inter-orbit communication experiment using a laser beam between KIRARI and ARTEMIS satellite of ESA.

http://www.jaxa.jp/missions/projects/sat/tsushin/oicets/index_e.html



OICETS and ARTEMIS Optical Inter-Orbit Communication

We have thus taken a step forward into the demonstration of the most advanced optical communication technology in space. Engineering Test Satellite VIII (ETS-VIII) and Wideband InterNetworking Engineering Test and Demonstration Satellite (WINDS) are also scheduled to be launched in 2006 and in 2007 respectively. I have long believed that JAXA should leave conventional satellite communication entirely to the private sectors and should actively challenge highly advanced technology development (see Interview in JAXA's volume 001 March 2005). Communication technology is indispensable in any space mission, and thus we need higher data transmission rate, higher efficiency and higher functional performance. For example, one of the major pillars of JAXA Vision, the information gathering and warning system for disaster and crisis management. Or the global environmental monitoring system integrating observations and predictions. Such systems require information communication technology with large volume, high data transmission rate. They also require advanced mobile communication system for information dissemination to individuals. Advanced communication is essential for space exploration and manned space activity as well. We should extend into space, the optical communication technology, already widely used on the ground, for larger volume data transmission. Our future research should also cover quantum communication corresponding to the quantum computer. The research and development for these communication technologies are, in my view, a challenge Japan should continue to pursue.