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Asia Broadband Plan and its implication for bridging Digital Divide

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Introduction

In order to bridge the digital divide issues in the Asia Pacific region, Japan initiated the Asia Broadband Program with collaboration among Asia Pacific Counties. This paper describes first joint experiments that were undertaken in Japan, Singapore and China. Then this paper also describes Japanese efforts to build space infrastructure for development of ICT Society in the Asia Pacific region for further international cooperation to bridge the digital divide.

Global information traffic over the Internet shows bipolarization towards the US and Europe. The volume of information distributed in Asian society, including Japan, on the other hand, is relatively small to the scale of population and economy..

In order to increase information traffic in Asia, framework to promote digital content distribution and measures to meet to the multi-language environment in this area will be vital. Recognizing that promotion of international digital-content e-commerce and a solution to language barriers would be effective, the following two tests were conducted.

Japan-Singapore advanced IT testing

Demonstration testing of an international digital-content e-commerce platform was conducted between Japan and Singapore. Due to the problems of performance fees according to the use of content, the use of broadband networks in the international digital contents business is limited.

In order to solve the issues of international sales of digital contents, a method that is applicable when sales are undertaken through the other country's operator(B2B2C) was developed and tested.

Trough the testing, practical performance was confirmed with a constant

flow of transactions from content registration to distribution. Further, unified management of various rights was confirmed and an arrangement that enables content-holders to undertake international distribution was also demonstrated. These results were proposed before TV anytime, a standardization forum, as a new distribution model.

Japan-China advanced IT testing

Demonstration testing of a multilingual system that uses machine translation technology was conducted between Japan and China. As current machine translation is based on text format, the quality is never satisfactory. It can hardly be used in actual communications since the speaker's intention is often not conveyed to the listener. In order to make communications without being aware of language barriers, the following two methods were demonstrated.

In order to complement the poor quality of machine translation, additional methods to support communication by machine translation, i.e., visual tools that assist intuitive understanding (including video and characters) and enriched dictionaries and example sentences in specific areas will be necessary. Therefore, the quality of machine translation in specific area was demonstrated by introducing these methods.

In the future, by combining additional tools for machine translation and upgraded translation tools, more efficient communications will be undertaken in the multilingual environment.

Future initiatives

- *International digital-content e-commerce platform*

In order to realize international digital-content e-commerce, the above-mentioned testing should be developed into a setup for constant e-commerce. In addition, to make the system useful in industries with high potential for digital contents, applications of platform technology will be developed.

- *Multi-language system*

By using more practical collaborative targets and other Asian languages, expanding the translation function, as well as improving joint use of the translation platform, the results of this testing can be further developed.

In order to bridge the digital divide, especially information flow with broadband networks among the Asia Pacific countries, above-mentioned issues would be very important for more international collaboration and cooperation.

Japan aims to build space infrastructure for bridging digital divide and development of ICT society

The Japan Aerospace Exploration Agency (JAXA), which undertakes Japan's space and aviation research and development was formed by combining three agencies that handle basic research and development and utilization technologies. JAXA operates as the central agency that consistently executes everything from the pursuit of space science to the development of space utilization and rockets and transport systems.

The following part of this paper covers the building of space infrastructure aimed at a new information base for the further advancement of information and communication technology (ICT) society within the context of JAXA's activities promoting the most advanced space research and development for implementing the Asia broadband plan.

Toward a safe and secure ICT society

Japan is advancing the building of 'space infrastructure' using communication satellites with the objective of a more livable ICT society. When the utilization of satellites moves forward in the creation of space infrastructure, information will be available even in areas that cannot be reached by terrestrial networks, and it will be possible to maintain stable communications unaffected by disasters and changes in the weather. In addition, people throughout Japan as well as Asia Pacific region will be able to benefit from ICTs.

The aim of JAXA is the 'space infrastructure conception' that will rise above a leading-edge ICT society. Building space infrastructure will require the development of satellites that are highly reliable and have greater transmission speed and capacity. Accordingly the launch of satellites outlined below is planned.

Optical Inter-Orbit Communication Engineering Test Satellite (OICETS)

Test of high-efficiency, large-capacity satellite

Scheduled launch: in 2005

OPICETS is a technology trial satellite that will test optical communications between satellites separated by tens of thousands of kilometers (optical communications between satellites) using laser. Since laser, unlike radio waves, does not cause interference, stable communications is possible. Since the on-board equipment can be compact and lightweight and the transmission speed is improved, this offers the advantage of allowing the smooth transmission/reception of large volumes of data. This test will advance the development of basic technologies that support space development and space utilization, such as allowing the acquisition of global data from earth observation satellites and securing communications with manned space stations.

In addition, through international cooperation with the European Space Agency (ESA), OICETS is scheduled to conduct orbital tests between satellites with ESA's ARTEMIS advanced data relay satellite centered on acquisition, tracking and direction technologies.

Engineering Test Satellite-VIII (ETS-VIII)

Japan's first 3-ton –class geostationary satellite

Schedules launch: fiscal 2006

This is an engineering test satellite intended to realize mobile communications using hand-held terminals, 40 meter in total length and 40 meter in total width when the solar array antenna reflectors (as large as a tennis court) are deployed.

The purpose of ETS-VIII is the development and acquisition of mobile communications technologies using hand-held terminals and future positioning satellite technologies. ETS-VIII is equipped with two 19 x 17 m antennas (among the largest in the world), high power transponders, on-board processors, and an atomic clock.

In addition, it uses a satellite bus that can be shared with large geostationary satellites in the future. This geostationary satellite will cover all of the Japanese archipelago, enabling direct communication from

terminals that are same size as today's mobile handsets and providing a system that allows communications 'anytime and anywhere' with hand-held terminals.

This system is expected to function as an important communications method, such in allowing a location to be confirmed when an accident occurs by directly receiving GPS data, or in enabling information transmission without depending on terrestrial networks when a disaster takes place and ground-based wireless communications are disabled.

Although a PDA-type terminal is currently under development, moving pictures can be transmitted at a date rate of 1.5 Mbps with a portable terminal that has already been developed.

A practical drill in rescuing and protecting the victims of a distant disaster using this terminal was held at the hospital this January.

The Ministry of Internal Affairs and Communications(MIC) invited applications for participants in tests for the purpose of verigying this satellite communications technology and developing new satellite applications, resulting in 22 test projects. (21 projects in Japan and one in China)

Wideband InterNetworking engineering test and Demonstration Satellite (WINDS)

Toward bridging digital divide

Scheduled launch: fiscal 2007

WINDSis an ultra-high speed communications satellite being developed in cooperation with the National Institute of Information and Communications Technology (NICT) based on the priority policy plan for Japan's (ICT society.). The objective is the formation of a world-level advanced information network. It is hoped that by taking advantage of satellites—simultaneous communications capability over a wide range –this will help in bridging the digital divide as infrastructure of a broadband environment not only in Japan but also in Asia Pacific region. The WINDS system will enable high-speed (maximum 155 Mbps from the satellite to the home, maximum 1.5-6 Mbps from the home to the satellite) Internet access even from homes using a small (about 45 cm in a diameter) dish antenna. Further, for enterprise utilization, ultra high-speed interactive communications is possible by installing a ground station with an antenna dish about 5 m in

diameter.

WINDS will use the Ka-band and be equipped with the following three new technologies.

a) Multiport amplifier

Power combiner/divider consisting of 8 high-output amplifiers with 8 input and 8 output ports capable of smoothly distributing power for 8 input signals.. Stable communications can be maintained by increasing the output for signals that have been attenuated by rain etc.

b) Active phased array antenna (APAA)

This enables free, high-speed (500times/sec) switching of the emission direction of transmit/receive radio waves. This will enable communications in a wide area of Asia Pacific region.

c) Onboard high-speed base band switching router

Router will enable high-speed (155 Mbps x 3 channels) information switching on the satellite.

Domestic and overseas broadband communications test using WINDS

Plans call for utilization tests using WINDS to be conducted for a period of five years after launch and tests of various applications, such as an international disaster network and a distance learning network. By means of an antenna for the Southeast Asia region, the satellite will be usable from the major cities in the region. MIC is planning to solicit themes for tests using WINDS from both Japan and foreign countries.

High-Accuracy Positioning Experiment System Using Quasi-Zenith Satellite System

Scheduled launch: fiscal 2008

The orbit of a quasi-zenith satellite differs from that of a geostationary satellite; by inclining the orbit toward the equator, the satellite passes near the zenith of Japan. The quasi-zenith satellite system consist of a combination of satellites and since one or more satellites can be seen directly above Japan at all times, easy high-speed communication from moving vehicles and by individuals and high-accuracy positioning without any effects from building or mountains is possible from any point near Japan.

The high-accuracy positioning test system consists of the equipment on board the satellite, such as devices to generate and send the positioning signal, and ground equipment, such a monitor station that estimates the orbit and timing of the quasi-zenith satellites and a master control station.

Japan's development of space is putting energy into joint business –academic-government cooperation activities and the creation of new business markets. One example of this, for the transfer of WINDS technologies to the private sector, is the emergence of private enterprises such as in growing new satellite businesses. Space is infrastructure that can be used by the world.

In order to bridging digital divide, we should have more collaboration and cooperation for building of space infrastructure.