Call for the Satellite Broadband Trial in the Pacific Islands

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What is WINDS

- It is a high-speed broadband communication satellite
- Launched in Feb 2008
- Has been used for satellite communications experiments and pilots in Asia and the Pacific
- Can be used for ICT applications and connecting remote and rural areas
- JAXA is soliciting interests on the part of the Pacific for pilots

WINDS: Wideband InternetWorking and Demonstrating Satellite
Features of WINDS

■ High-Speed data communication rate
  • 155 Mbps for home use
    (small terminal with 0.45m diameter class antenna )
  • 1.2Gbps for business use
    (large station with 5m diameter class antenna )

■ Wide coverage
  Ultra-high-data rate communications in a wide area of Asia /Pacific region

■ Establishment of the flexible satellite communications network
  On-board switching provides the flexible network.

Remarks:
  WINDS is the R&D satellite and is open for the experiment users such as institutes, universities and other entity who study and develop the satellite communications technologies. The satellite should not be used for the commercial purpose.
Outline of WINDS

- Ka-band Satellite with High Speed Transmission Capability Gbps order
- Bent pipe and Onboard ATM Switching
- Multi-Beam Antenna (MBA) and Active Phased Array Antenna (APAA) with high speed scanning capability

Launch Schedule: February 23rd, 2008 by H2A Launcher

<table>
<thead>
<tr>
<th>Missions</th>
<th>5 years</th>
</tr>
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<tbody>
<tr>
<td>Location</td>
<td>143 degree E</td>
</tr>
<tr>
<td>Dimension</td>
<td>3 x 2 x 8m Span of Solar Paddles: 21.5m</td>
</tr>
<tr>
<td>MASS</td>
<td>4,850 kg ( lift off )</td>
</tr>
<tr>
<td>Electric Power</td>
<td>5,200W / EOL, Summer Solstice</td>
</tr>
<tr>
<td>Attitude Control</td>
<td>Zero-momentum 3-Axis Control</td>
</tr>
<tr>
<td>Frequency</td>
<td>U/L : 27.5 – 28.6 GHz D/L : 17.7 – 18.8 GHz</td>
</tr>
<tr>
<td>Satellite G/T</td>
<td>&gt; 18 dB/K ( MBA ) &gt; 7 dB/K ( APAA )</td>
</tr>
<tr>
<td>Satellite EIRP</td>
<td>&gt; 68 dBW ( MBA ) &gt; 55 dBW ( APAA )</td>
</tr>
<tr>
<td>Onboard Processing</td>
<td>ATM Baseband SW</td>
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MBA (Multi Beam Antenna)
APAA (Active Phased Array Antenna)

APAA can hop its beams to required points in 2msec interval to provide a wide coverage area.
Trial for overcoming digital divide

Heavily-populated area >>> 100Mbps access based on rapidly-progressing communications environment like optical fiber

Sparsely-populated area >>> Less sophisticated than heavily-populated area

Using satellite two-way broadband to overcome digital divide
Transmission power of APAA is lower than MBA by more than 10dB.

APAA
EIRP: 54.6dBW
G/T: 7.1dB/k

MBA
EIRP: 68dBW
G/T: 17.3dB/k

Large dish is needed. Expensive!

WINDS user terminal in the APAA beam region
WINDS user terminal in the APAA beam region

Issue:

In the WINDS System, a larger antenna with more 2.4m diameter is needed for the APAA region. The cost is very expensive.

Solution:

New WINDS TDMA system should be introduced in order that the small user terminal is available even in the APAA beam area.

Concept:

- Antenna size is about 1.2m, as the same size of the MBA user terminals.
- APAA beam is set to the beam hopping mode.
- WINDS satellite is set to the bent-pipe mode.

Development:

- The new WINDS user terminals is under the development with NICT (National institute of Information and Communications Technology).
- It will take almost one year to complete the development, and those user terminals will be available in 2010.
## Milestones for WINDS Experiments

### WINDS
- **Year**
  - 2010: Basic Experiment (~2010)

### WINDS Trial in Pacific
- **Year**
  - Development
  - Trial

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[Image of satellite and milestone chart showing various experiments and milestones for WINDS and WINDS Trial in Pacific.]
for the WINDS trials in the Pacific Islands

1. The WIDNS satellite are available for pilots in remote island areas, and the high speed data link through the WINDS user terminal (VSAT) as well as some ICT applications, such as distance education, telemedicine, broadband internet, will be implemented.

2. WINDS satellite lifetime is 5 years namely until 2012, however it is expected to be extended.

3. JAXA/NICT are now developing the small user terminals which is available in the Pacific region, where the WINDS APAA beam is illuminated.

4. The users who wish to pilot are kindly requested to inform JAXA of their intention and proposal, and its framework will be finalized by mid 2009.

5. JAXA will lend the WINDS user terminal unless the partner could prepare their own terminal, and the user terminals will be shared among the pilot users, and the pilot users are requested to obtain the permission relating to the WINDS user terminal, such as radio license and I/L, and to bear the necessity arrangements for the experiments.
To whom may concern to join the WINDS trials

1. JAXA will provide the space segment which means free use of the satellite and the ground terminals. Ground terminals will be shared among the WINDS pilot users so the terms of lent is limited to about one month.

2. The users who want to involve the above trial are kindly requested to propose UNESCAP and JAXA of their intention and proposal indicating to the following items by August, 2009.
   - theme
   - period to conduct
   - expected results

3. The pints of the contact are;
   - Information and Communications Technology and Disaster Risk Reduction, UNESCAP
   - Satellite Applications and Promotion Center, JAXA
Ground Terminals vs Data Rate

- **Uplink**
  - LET (>5mφ)
  - SDR-VSAT (2.4mφ)
  - HDR-VSAT (1.2mφ)
  - USAT (45cmφ)
  - MBA Spot Beam Area

- **WINDS**
  - Bent-pipe
    - (622Mbps x 2)
  - 1.2Gbps

- **Downlink**
  - LET (>5mφ)
  - SDR-VSAT (2.4mφ)
  - HDR-VSAT (1.2mφ)
  - USAT (45cmφ)
  - MBA Spot Beam Area

- **Onboard Switch**
  - 1.5~155Mbps
  - 155Mbps

- **Data Rate**
  - ~622Mbps
  - 1.2Gbps
  - 155Mbps
WINDS experiments in the Asian countries
Utilization of WINDS for Sentinel Asia System

Disaster related information disseminate to the disaster management agencies in the Asia–Pacific region by using of the high speed data link of "KIZUNA (WINDS).

Disaster Management Agencies in the Asia-Pacific region
Geo-Informatic and Space Technology Development Agency (GISTDA)
National Institute of Aeronautics and Space (LAPAN)
National Disaster Coordination Center (NDCC)
Indian Space Research Organization (ISRO), etc.
Thank you for your attention
Please visit at JAXA website

http://www.jaxa.jp/projects/sat/winds/index_e.html

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