

Overview of Utilization of WINDS

2nd Joint Project Team Meeting for Sentinel Asia STEP3 Yangon, Myanmar



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1. Introduction

- ✓ Concept of Sentinel Asia
- ✓ Overview of the WINDS satellite
- 2. Current Status of WINDS Data Transmission
 - ✓ Current Status
 - Emergency operation
- 3. WINDS communication system
 - Main feauture of satellite
 - ✓ Ground Station
- 4. Experiment in Japan
 - ✓ Emergency communication experiment
 - Communication experiment for real use
- 5. Summary





Concept of Sentinel Asia



JAXA

A States

Overview of the WINDS satellite

MBA for Japanese islands MBA for Southeast Asia
Outline of WINDS System
Ka-band Satellite with High Speed Transmission Capability Gbps order
Bent pipe repeater and Onboard Baseband Switching
Multi-Beam Antenna (MBA) and Active Phased Array Antenna (APAA) with

high speed beam hopping capability

Launch Schedule	February 23 rd , 2008 by H2A Launcher		
Mission Life	5 years		
Location	143 degree E		
Dimension	3 x 2 x 8m Span of Solar Paddles: 21.5m		
MASS	4,850 kg(lift off)		
Electric Power	5,200W / EOL, Summer Solstice		
Attitude Control	Zero-momentum 3-Axis Control		
Frequency	U/L : 27.5 – 28.6 GHz D/L : 17.7 – 18.8 GHz		
Satellite G/T	> 18 dB/K(MBA) > 7 dB/K(APAA)		
Satellite EIRP	> 68 dBW(MBA) > 55 dBW(APAA)		
Onboard Processing	ATM Baseband SW		



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Current Status of WINDS Data Transmission (1/4)



Current Status of WINDS Data Transmission (2/4)

Country	Cooperation Agencies	Terminals
Philippine	Advanced Science and Technology Institute (ASTI)	51M-VSAT
Thailand	Geo-Informatics and Space Technology Development Agency (GISTDA)	REF-VSAT
Mongolia	National Emergency Management Agency (NEMA)	SA-VSAT
📩 Vietnam	National Remote Sensing Centre (NRSC)	SA-VSAT
k Nepal	International Centre for Integrated Mountain Development (ICIMOD)	SA-VSAT
📕 Sri Lanka	Disaster Management Center(DMC)	SA-VSAT
Indonesia	Lembaga Penerbangan dan Antariksa Nasional (LAPAN)	SA-VSAT
Service Kyrgyz	Central Asian Institute for Applied Geosciences (CAIAG)	SA-VSAT
Kazakhstan	National Nectral Space Research Technology (NCSRT)	SA-VSAT
Bangladesh	Space Research and Remote Sensing Organization (SPARRSO)	SA-VSAT
Malaysia	Agensi Angkasa Negara (ANGKASA)	51M-VSAT

The 10 disaster management agencies join the Sentinel Asia Project with WINDS Data Transmission.

Current Status of WINDS Data Transmission (3/4)

>We supported to communication for some emergency cases

Emergency operation in the actual disasters

•The data was useful to make database for disaster in LAPAN and to monitor typhoon and earthquake in Philippine.

•The disaster management agencies in Mongolia and Fiji had the training because these countries had no chance to request the the emergency data transmitted .

Country	Cooperation Agencies	Activity	
Mongolia	National Emergency Management Agency (NEMA)	Emergency communication training in Jan, 2011	
Nepal	International Centre for Integrated Mountain Development (ICIMOD)	Flood in 7 July, 2011 Flood in 22 July, 2011	
Fiji 👫 🐺	National Disaster Management Office (NDMO)	Eemergency communication training in Jan, 2012 and Flood in 8 Feb, 2012	
Kyrgyz	Central Asian Institute for Applied Geosciences (CAIAG)	Earthquake in 22 July 2011 Flood in 11 April 2012	
Philippine	Advanced Science and Technology Institute (ASTI)	Flood in 27 Dec 2011	
Kazakhstan	National Nectral Space Research Technology (NCSRT)	Forest fire in 27 Aug 2012	
ndonesia	Lembaga Penerbangan dan Antariksa Nasional (LAPAN)	Flood in 5 Sep 2012 Flood in 11 Sep 2012	





•The emergency data was transmitted 11times including 2 times training to each country and helped to share the information when the disaster occurred.

•The date of MTSAT, GFAS, GSMap, Wild Fire were transmitted about once per week through the WINDS satellite so far.

•The result of data transmission and the opinion of the cooperation agencies are need to summurize and provide feedback for future Sentinel Asia activities and future communication satellites. Please let me know what you think.







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Main feauture of WINDS

APAA (Active Phased Array Antenna)







Main feauture of WINDS

MBA (Multi Beam Antenna)





Main feauture of WINDS

Country/Locations WINDS Ground Station Installed





WINDS Ground Station

Fixed type for MBA/APAA area

	HDR-VSAT	51M-VSAT	SA-VSAT
Antenna System	Diameter: 1.2 m	Diameter: 1.2 m	Diameter: 1.8 m
Fequency Band		Uplink 27.5 - 28.1 Downlink 17.7 - 18.3	GHz GHz
Maximum Data Rate*	Uplink 1.5-155 Mbps	Uplink 1.5-51 Mbps	Uplink 1.5 Mbps
	Downlink 155 Mbps	Downlink 155 Mbps	Downlink 155 Mbps
HPA (High Power Amplifier)	100 W (250W TWTA)	40 W (SSPA)	2.5 W (SSPA)
Weight	Approx. 4420kg	Approx. 300kg	Approx. 300kg





WINDS Ground Station

Portable type for MBA area

	Portable VSAT	Portable USAT	
Antenna System	Diameter: 1.0 m	Diameter: 45 cm	
Frequency Band	Uplink 27.5 - 28.1 GHz		
	Downlink 17.7 - 18.3 GHz		
Maximum Data Rate*	Uplink 1.5 - 24 Mbps	Uplink 1.5 - 6 Mbps	
	Downlink 155 Mbps	Downlink 155 Mbps	
HPA (High Power Amplifier)	40 W (SSPA)	10 W (SSPA)	
Weight	Approx. 250kg	Approx. 53kg	
Power consumption	1,400W	850W	

* This data rate is for the satellite link, and includes overhead bits.





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Experiment in Japan (1/4)

JAXA have finished the basic experiment phase of WINDS in 2011 and started the Utilization demonstration experiments.

Utilization Demonstration Experiment

Utilization Demonstration Experiments have been performed in order to promote further utilization by WINDS and to provide feedback for future communication satellites, by incorporating fresh ideas and initiatives from private companies.

1. Emergency communication experiment :

Emergency communications experiments by JAXA are introduced, including actual achievements of support activities to the Great East Japan Earthquake and ongoing experiments performed jointly with local governments and disaster prevention organizations.

2. Communication experiment for real use:

Experiments performed by mainly private companies using WINDS are introduced, including technical validation and verification of satellite communications applications.







Experiment in Japan (2/4)

1. Emergency communication experiment :

(1) Great East Japan Earthquake Support Activity in Iwate prefecture







Experiment in Japan (3/4)

1. Emergency communication experiment :

(2) The satellite application demonstration experiment simulating the Great Earthquake with Japan Medical Association











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- WINDS has a capability of providing high data rate communication links in the Asia-Pacific region with its MBA and APAA
- WINDS ground terminals have installed and now are under operating every week for each 10 asian countries.
- Now the 10 disaster management agencies in asia-pacific region join the Sentinel Asia project with WINDS data transmission.
- The application such as Sentinel Asia system has been succesfully conducted in Asian countries. We supported to communication for some emergency cases.
- We continue WINDS communication experiment and summarize the result of the Sentinel Asia.
- Let us know what you think for WINDS data transmission to provide feedback for future Sentinel Asia activities and future communication satellites.





THANK YOU

