

# THE CURRENT STATUS OF ASIA OCEANIA MULTI-GNSS DEMONSTRATION CAMPAIGN

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**Multi-GNSS Asia Secretariat**

**July 25, 2012**

**UN ICG WG-A intersession Mtg. Session4**

**@UWM Olstzyn, Poland**

## Three Major Activities

### Establishment of Multi-GNSS Monitoring Network

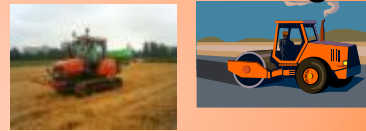


### Applications Demonstration

#### Disaster Mitigation



#### Precise Positioning



#### ITS



#### LBS



Others, ex. ionospheric observation etc

### Regional Workshop

3<sup>rd</sup> Workshop, Nov. 2011  
@ Jeju, Korea:



2<sup>nd</sup> Workshop, Nov. 2010  
@ Melbourne, Australia



1<sup>st</sup> Workshop, JAN. 2010,  
@ Bangkok, Thailand



# THE CURRENT STATUS OF MGM-NET (1/3)


## Call for hosting site



City	Country
1 Bulit Kayu Arang	Brunei
2 Jakarta	Indonesia
3 Daejeon	Korea
4 Putrajaya	Malaysia
5 Waigani	Papua New Guinea
6 Taguig city	Philippines
7 Hanoi	Vietnam
8 Ondrejov	Czech Republic
9 Delft	Netherland
10 Tainan	Republic of China
11 Singapore	Singapore
12 Alaska	U.S.A.
13 Yanbu	Saudi Arabia
14 General Santos	Philippines
15 Nagarkot	Nepal

Call for application has been opened continuously until enough number of sites are selected.

 Selected Sites  
(showed in above table)

 Applied and under  
selection process  
arrangement



# THE CURRENT STATUS OF MGM-NET (2/3)

- Selected 15 sites and JAXA Masuda station (GMSD) are operating or being prepared to start operation.

City	Country	Status	
1 Bulit Kayu Arang	Brunei	Preparation for monument construction	
2 Jakarta	Indonesia	Coordination with local organization	
3 Daejeon	Korea	Operation	RT connecting JAXA NTRIP caster
4 Putrajaya	Malaysia	Preparation for monument construction	
5 Waigani	Papua New Guinea	Coordination with local organization	
6 Taguig city	Philippines	Preparation for monument construction	
7 Hanoi	Vietnam	Under Installation	
8 Ondrejov	Czech Republic	Operation	RT connecting JAXA NTRIP caster
9 Delft	Netherland	Operation	RT connecting JAXA NTRIP caster
10 Tainan	Republic of China	Operation	RT connecting JAXA NTRIP caster
11 Singapore	Singapore	Operation	RT connecting JAXA NTRIP caster
12 Alaska	U.S.A.	Operation	RT connecting JAXA NTRIP caster
13 Yanbu	Saudi Arabia	Coordination with local organization	
14 General Santos	Philippine	Preparation for monument construction	
15 Nagarkot	Nepal	Coordination with local organization	
16 Masuda	JAPAN	Operation	RT connecting JAXA NTRIP caster

 Sites were registered to IGS M-GEX.



# THE CURRENT STATUS OF MGM-NET (3/3)

- Collaboration with other network operators
  - Geospatial Information Authority in Japan (GSI) will provide 4 site RT data stream to MGM-net.
  - RT data sharing with Geoscience Australia, Curtin University, GPSnet Victoria in Australia and LINZ network in NZ are under coordination.
  - The discussion with other space agencies such as DLR(CONGO), ESOC/ESA, CNES/IGN(REGINA), and JPL/NASA are on going with considering;
    - Data exchange/sharing
    - Collocation of Antenna/Rx (Hosting ANT/Rx mutually)
    - Cross validation for POD performance on the orbit and clock offset estimation for new GNSS constellations



# CONTRIBUTION TO IGS MGEX PROJECT

- 10 sites in MGM-net were registered to IGS M-GEX
  - Installation process are going on. (See Slide #5)
  - The site which installation was completed has started operation and is preparing data provision to M-GEX
  - Data exchange conversion issue should be resolved for inclusion QZSS into M-GEX experiments
    - Current draft version RTCM MSM has NOT covered QZSS yet.
    - RINEX 3.02 including QZSS are almost finalized, but still NO official format has included QZSS at this moment.
  - Earlier official adoption of RINEX and RTCM MSM including QZSS are requested.
  - The data observed at MGM-net station will be provided by RINEX 2.11/3.01 and RAW data stream tentatively until those data formats will be updated.

# ACTIVITIES 2: APPLICATION DEMONSTRATION: WORKING GROUPS



Working Groups	Examples of GNSS applications
Disaster Mitigation and Management	Tsunami monitoring, GNSS Meteorology, Landslide Monitoring, Emergency Message
Precise Positioning	Precise Agriculture, Construction machine guidance/control
Intelligent Transportation Systems (ITS)	Probe-car, Mobile Mapping System, Road Pricing, Car-navigation,
Location Based Services (LBS)	Mobile phone, Pedestrian Navigation, Short message, Sightseeing application



# PROPOSED MULTI-GNSS JOINT EXPERIMENTS



- 8 Experiments were endorsed to be implemented <- 1<sup>st</sup> CALL

1	Evaluation of Multi-GNSS for Precision Agriculture in Korea, Chungnam National University	Korea
2	Sustainable Resource Utilization by Precision Farming of Oil Palm Plantation; RTK-Auto Guided Oil Palm Planter; On-the-Go Soil ECa Mapping, University Putra Malaysia	Malaysia
3	Automated rice transplanter guided by using Multi-GNSS including QZSS , Agricultural Research Center , National Agriculture Research Organization	JAPAN
4	"Joint QZSS/GPS positioning using L1/L5 band signals“, National Cheng Kung University,	Republic of China
5	"Multi-GNSS Experiment at RMIT University in Melbourne“, RMIT University	Australia
6	Evaluation of QZSS-LEX and L1-SAIF signals based positioning compared to DGPS and IGS PPP, positioning for Thailand	Thailand
7	Exploiting the use of QZSS and GNSS for navigational and high precision applications and their performance assessment (EQUATOR)	China
8	Development of Driver Behavior Measurement Method for Level of Safety Estimation from High Precision and High Resolution Global Positioning System with Quasi-Zenith Satellite System (QZSS)	Thailand



# SEEKING THE POSSIBILITIES OF NEXT PROPOSALS FOR “2<sup>ND</sup> CALL FOR JOINT EXPERIMENT”

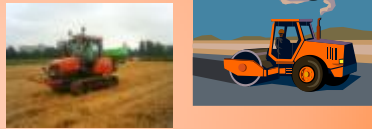


## Application Demonstration

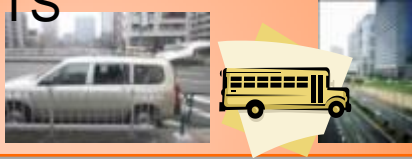
### Disaster Mitigation



### Precise Positioning



### ITS



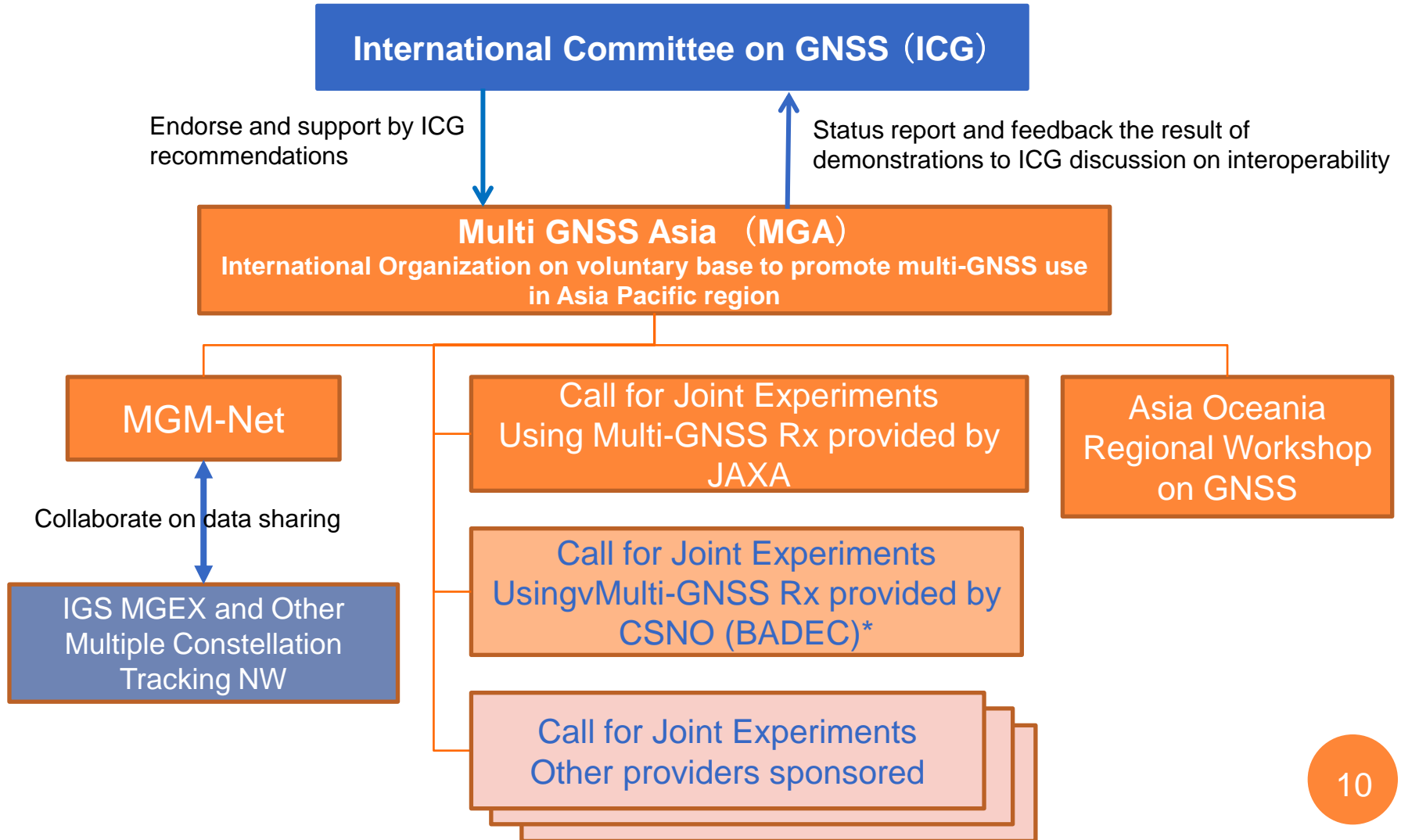
### LBS



## Planned Procedure for 2<sup>nd</sup> Call

- User requirements to GNSS utilization
- Proposal to demonstrate the Multi-GNSS benefits
- The proposals should be discussed in 4<sup>th</sup> Asia Oceania Regional Workshop on Multi-GNSS
- The experiments endorsed by MGA Steering Committee in the workshop will be implemented in 2013.

# WORK STRUCTURE FOR MULTI-GNSS DEMONSTRATION IN ASIA OCEANIA REGION



\* A demonstration campaign proposed by China. MGA is inviting China to promote jointly under MGA as well as UN ICG framework.

# THE 4<sup>TH</sup> ASIA OCEANIA REGIONAL WORKSHOP ON GNSS

- Purpose

Discussion about new application experiments of GNSS and Information sharing of the results of the current status of the activities of Multi-GNSS Asia.

- Date

9-10th Dec. 2012

- Venue

Kuala Lumpur, Malaysia (Berjaya Times Square Hotel)

- Co-Host Organization: JAXA, ANGKASA, SPAC

- Support Organization: ICG, IGS

- Contents

- What's new about GNSS
- GNSS Applications presentations
- Reports of Activities of Multi-GNSS Asia (MGA)





## PARTICIPATION TO MGA

- The organizations which have interests in GNSS utilization in Asia Oceania region are expected to participate:
  - Government agencies,
  - Universities, and research institutes
  - International organizations
  - Industries such as Receiver manufacturer, service providers
  - GNSS providers

Please visit to

[http://www.multignss.asia/howto\\_join\\_mga.html](http://www.multignss.asia/howto_join_mga.html)

# MGA PARTICIPATING ORGANIZATIONS

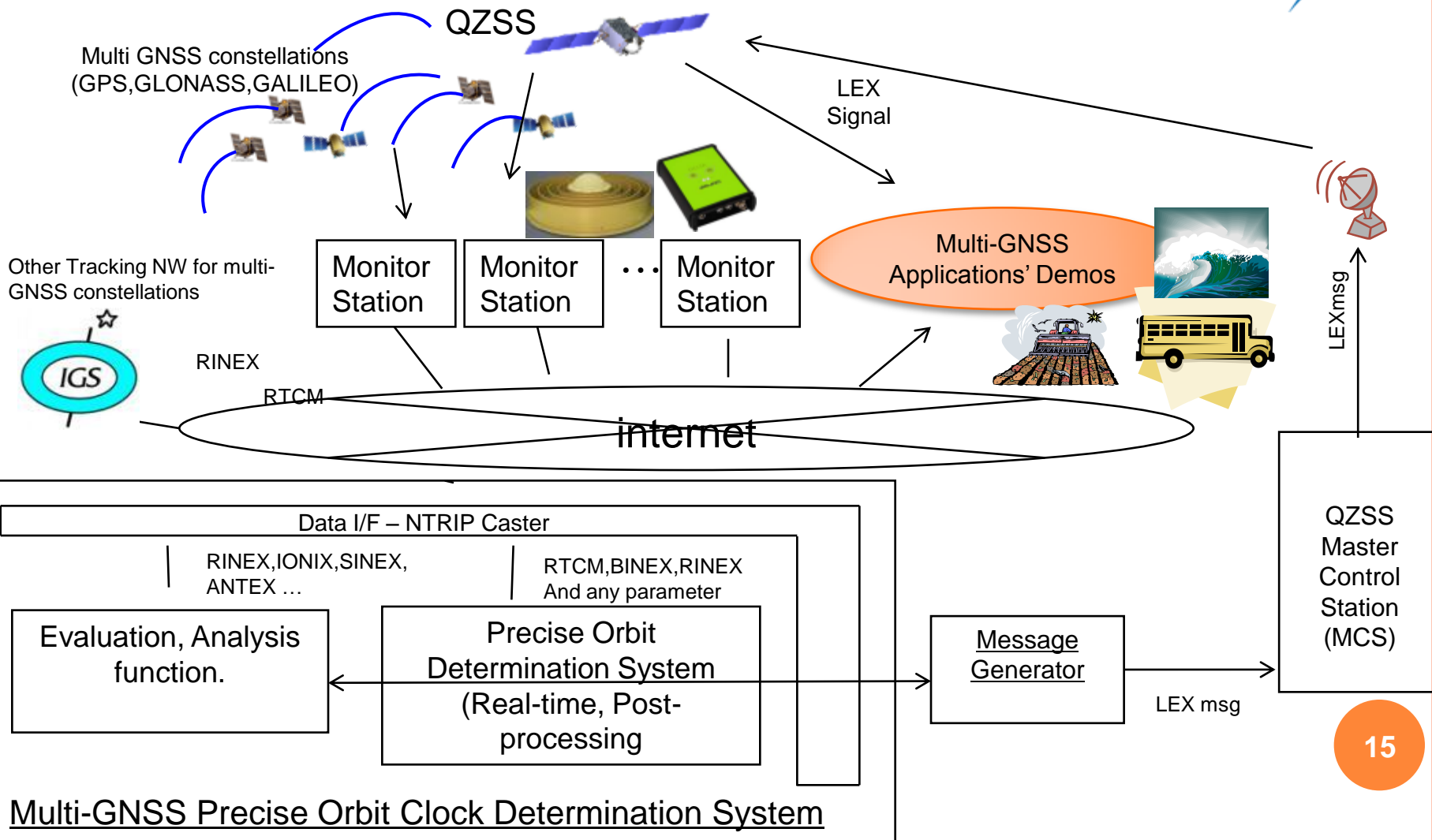


No	Organizations	Countries
1	Beach Building & Civil Group (BBCG)	Australia
2	RMIT University (RMIT)	Australia
3	Japan Aerospace Exploration Agency (JAXA)	Japan
4	University Putra Malaysia (UPM)	Malaysia
5	National Cheng Kung University (NCKU)	Republic of China
6	Asian Institute of Technology (AIT)	Thailand
7	Chungnam National University (CNU)	Korea
8	SINGAPORE LAND AUTHORITY (SLA)	Singapore
9	The University of Nottingham Ningbo China (UNNC)	China
10	Tokyo University of Marine Science and Technology (TUMST)	Japan
11	National Electronics and Computer Technology Center (NECTEC)	Thailand
12	Ministry of Science and Technology (MOST)	Vietnam
13	National Agriculture and Food Research Organization (NARO)	Japan
14	Earthquake Research Institute, the University of Tokyo (ERI)	Japan
15	Research Faculty of Agriculture, Hokkaido University (AGHU)	Japan

# SUMMARY

- 15 stations were selected for hosting sites of MGM net and selection process for some stations are still under going.
  - Call for application is being opened continuously until enough number of sites are selected.
- 10 sites in MGM-net were registered to IGS M-GEX and now are preparing data provision.
  - Data format update is an issue to be resolved for QZSS data sharing with IGS M-GEX.
- 8 Joint Experiments were to be implemented as MGA experiments and 2<sup>nd</sup> joint experiments call will be opened.
- The 4<sup>th</sup> Workshop will be held on Dec. 9-10, 2012 at Kuala Lumpur, Malaysia.
- Multi-GNSS Asia (MGA) was established to promote the Campaign activities. 15 organizations joined as of the end of June, 2012.

# Ref: Utilizing MGM-net RT-PPP experiments in AP region





## ORGANIZATION: STRUCTURE

### MGA Member

