



iGMAS : Status and Progress

Test and Assessment Research Center, CSNO

2012.11 Beijing-China

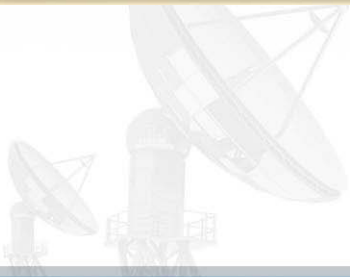


Contents

- **Reviews on international GNSS monitoring and assessment**

- **Progress of iGMAS**

- **Summary**





Reviews on international GNSS monitoring and assessment

Background

- ✓ Multi-GNSS era has been coming , and more navigation systems will provide services for users.
- ✓ To ensure the service quality, consistent with common OS performance parameters, and realize the goal of interoperable GNSS OS signals, it is desirable to carry out GNSS monitoring and assessment.
- ✓ To monitor and assess GNSS open services worldwide, the subgroup on International GNSS Monitoring and Assessment was formed at ICG-6



Reviews on international GNSS monitoring and assessment

Several GNSS monitoring activities are underway. e.g.

- preliminary experience of iGMAS,
- the long-term successful operation of IGS,
- the achievements in GNSS signal monitoring made by Stanford University, DLR, Information Analysis Center of Roscosmos, MGA and others.

Objective & tasks:

- ✓ To promote the sharing of the global monitoring resource and provide better GNSS service for users.
- ✓ to support related activities and develop proposals to optimize existing and planned capabilities, and identify additional necessary activities
- ✓ To discuss the related standards, the sharing mode of resource
- ✓ To develop the monitoring and assessment products
- ✓ To provide assessment service effectively



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- **Progress of iGMAS**

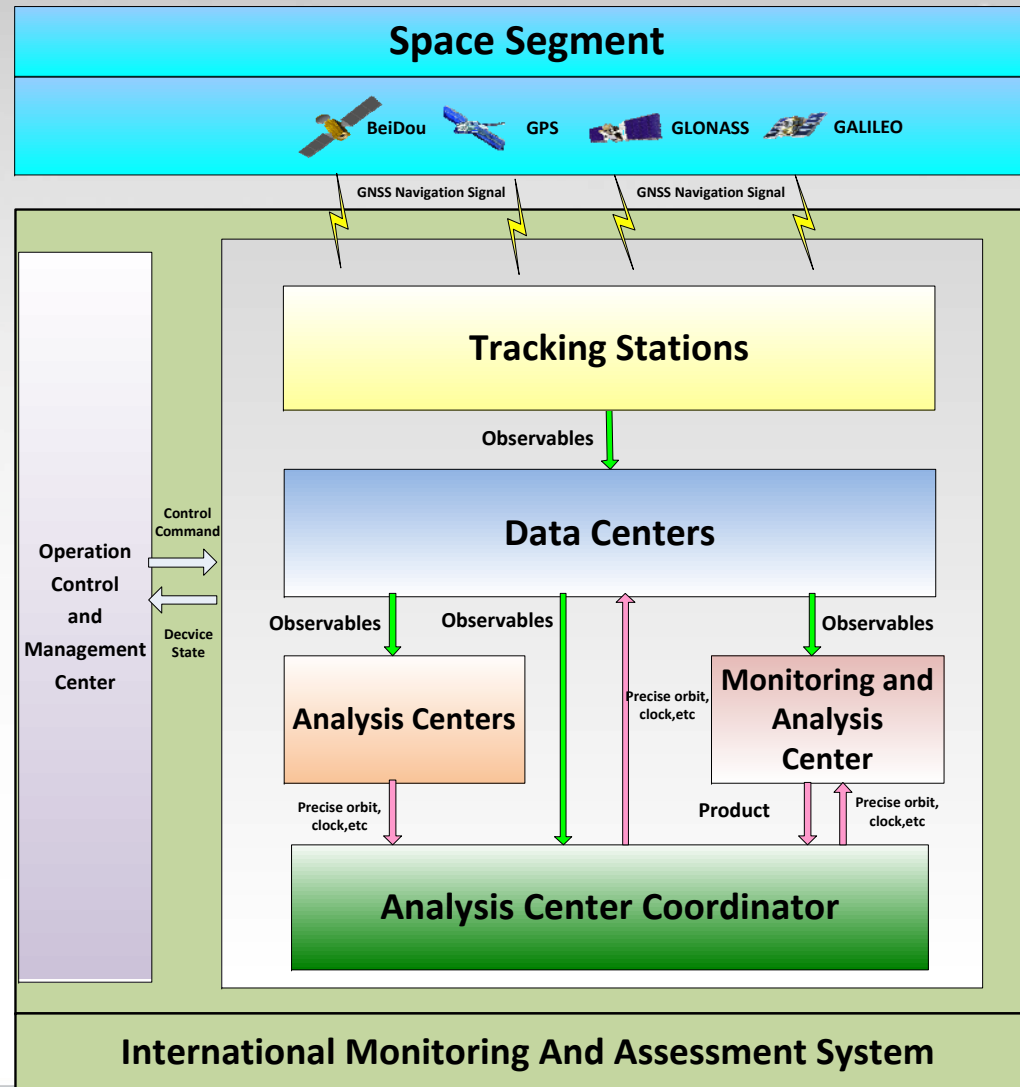
- **Summary**



Progress of iGMAS

China is developing the iGMAS to support the activities for International GNSS Monitoring and Assessment

System Structure

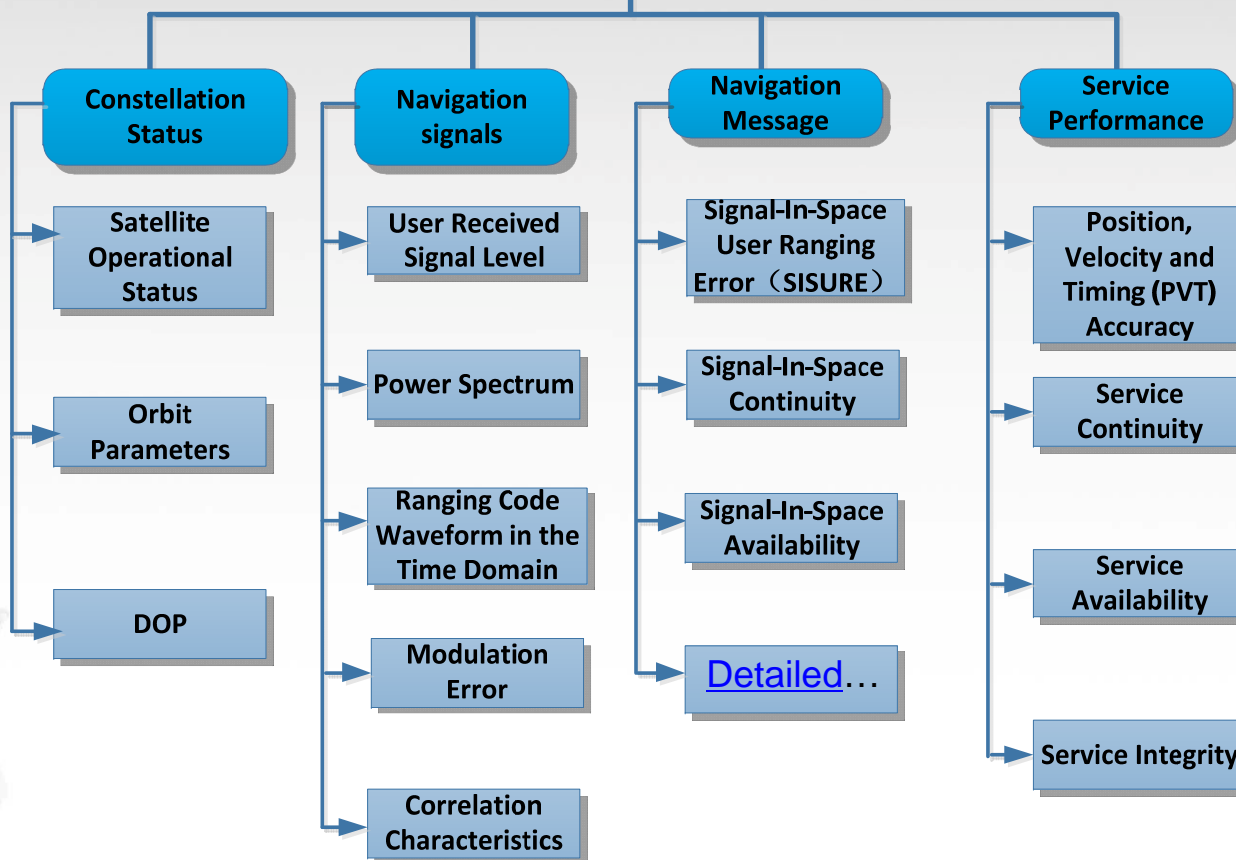




Progress of iGMAS

Monitoring and Assessment Item

GNSS Monitoring and Assessment Item





Progress of iGMAS

Tracking facilities

- ✓ receivers with BeiDou/GPS/GLONASS/Galileo capability have been developed
- ✓ A 7.3-meter aperture antenna is operational.
- ✓ The new 40-meter aperture antenna is being developed, will be installed in Xi'an, early,2014.





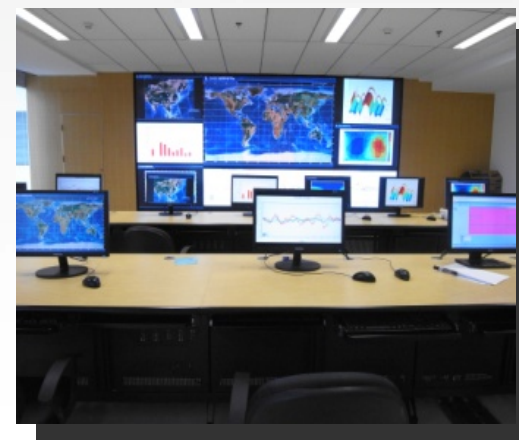
Progress of iGMAS

Data Center

- ✓ Two data centers are under construction at Wuhan University and National Time Service Center.



Operation Control Center





Progress of iGMAS

Specifications

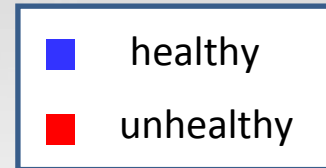
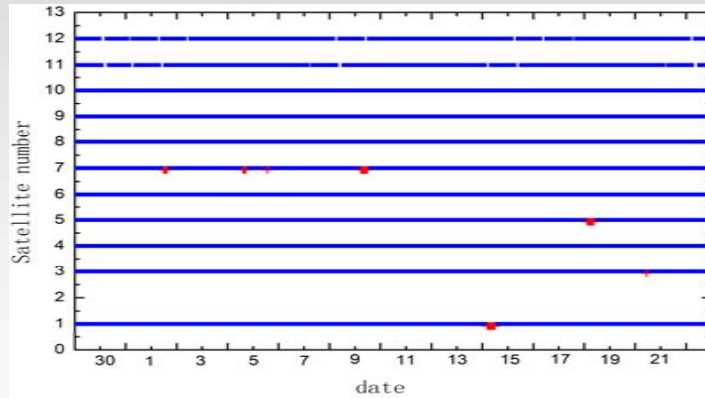
- ✓ Specifications for construction, operation and maintenance of the iGMAS tracking stations, Data Center and Analysis Center.
- ✓ Data and product format.
- ✓ Monitoring and Assessment Items Standards will be formulated after reaching a consensus with related countries and organizations.



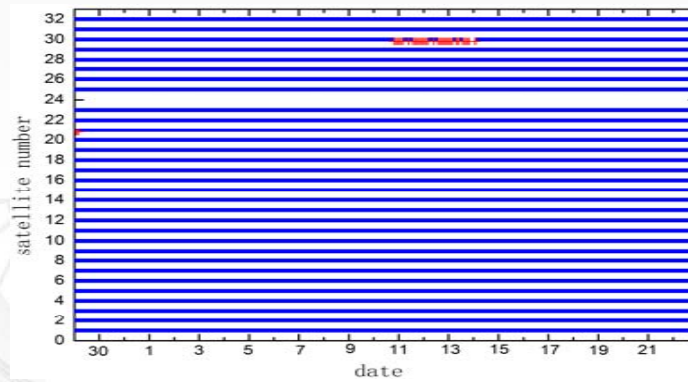


Progress of iGMAS

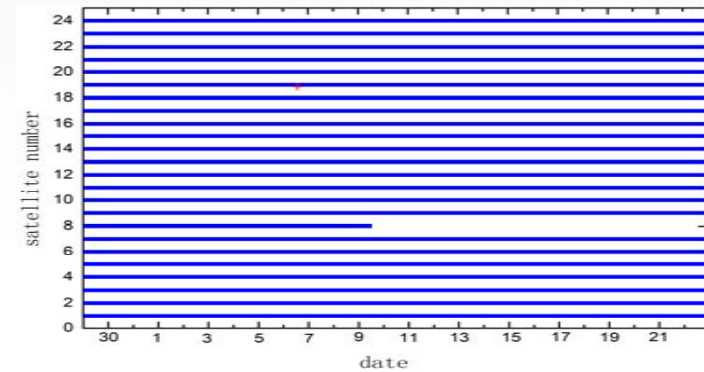
Monitoring result- Constellation Status



BeiDou Satellites Healthy Status
from August 29 to September 22,2012



GPS Satellites Healthy Status
from August 29 to September 22,2012

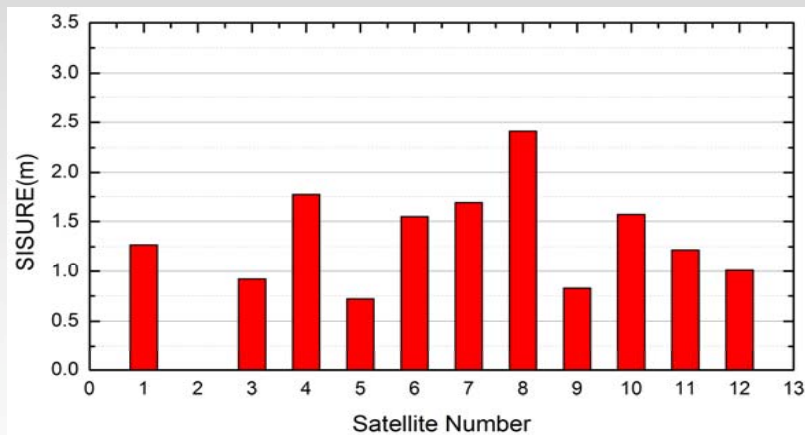


GLONASS Satellites Healthy Status
from August 29 to September 22,2012

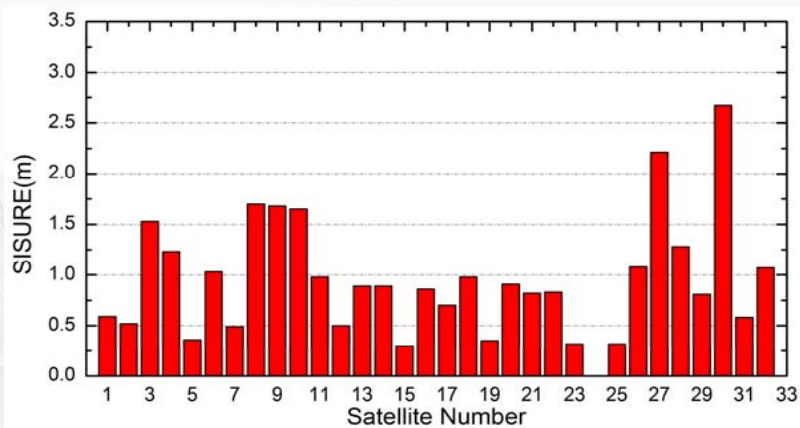


Progress of iGMAS

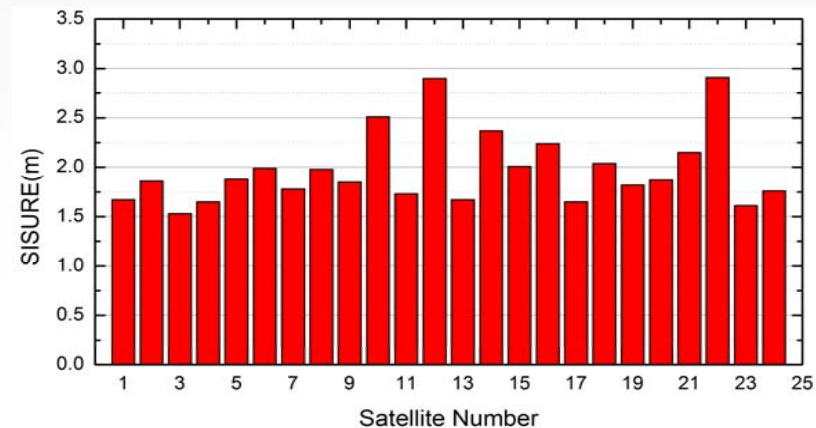
Monitoring result- SISURE



BeiDou SISURE from August 29 to September 22,2012



GPS SISURE from August 29 to September 22,2012

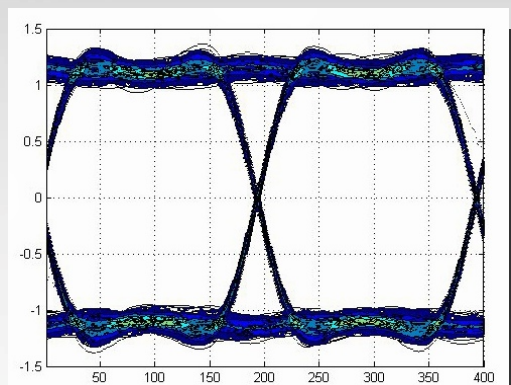


GLONASS SISURE from August 29 to September 22,2012

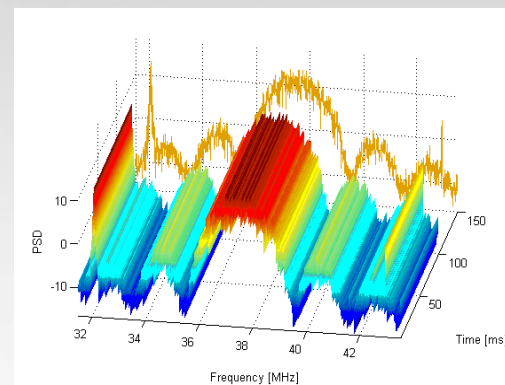


Progress of iGMAS

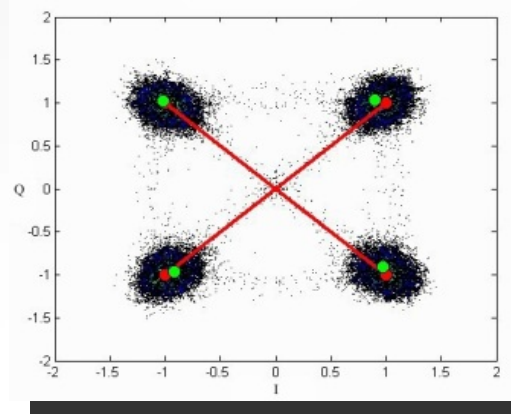
Monitoring result- Signal Quality



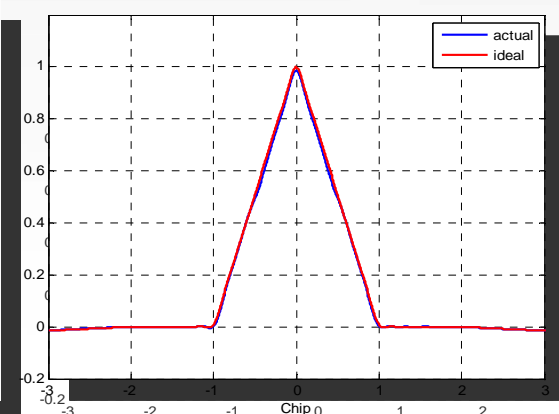
Eye pattern



Spectrum



Constellation diagram



Correlation peak curve

GEO-4, September 18, 2012



Progress of iGMAS

Monitoring result- Signal Quality

Satellite Number	Observation Time	Orthogonality (degree)			Correlation loss (dB)		
		B1	B2	B3	B1	B2	B3
C4	16:58, September 18	-0.3963	0.9929	1.0054	-0.1686	-0.1820	-0.4016
C7	12:14, September 18	0.9918	0.9905	1.0045	-0.1904	-0.1897	0.4022
C8	19:54, September 18	1.0015	1.0193	1.2317	-0.2688	-0.1801	-0.4229

Monitoring result of BeiDou Satellite orthogonality
and correlation loss





Progress of iGMAS

Monitoring result- Positioning Accuracy

Number	Station	Address	Horizontal (95%, meters)	Vertical (95%, meters)	3D (95%, meters)
01	CCHU	Changchun	6.61	9.50	11.10
02	CKUN	Kunming	8.40	14.88	16.44
03	CLIN	Lintong	5.70	7.06	8.46
04	CSHA	Wulumuqi	5.71	6.38	7.77
05	CWUQ	Kashi	5.78	6.70	7.84

from August 29 to September
22,2012
BeiDou B1I
Raw data source: iGMAS

Number	Station	Address	Horizontal (95%, meters)	Vertical (95%, meters)	3D (95%, meters)
01	BDOS	Bridgetown	4.98	8.00	8.90
02	FFMJ	Frankfurt	3.29	4.72	5.31
03	GMSD	Nakatane	6.99	6.24	8.74
04	GODZ	Greenbelt	2.85	5.08	5.57

from August 29 to
September 22,2012
GPS L1 C/A
Raw data source: IGS

Number	Station	Address	Horizontal (95%, meters)	Vertical (95%, meters)	3D (95%, meters)
01	BDOS	Bridgetown	8.96	15.16	16.86
02	FFMJ	Frankfurt	7.78	12.92	14.19
03	GMSD	Nakatane	10.32	17.78	19.43
04	GODZ	Greenbelt	7.58	13.06	14.33

from August 29 to September
22,2012
GLONASS L1
Raw data source: IGS



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Summary

- ✓ International GNSS Monitoring and Assessment is beneficial for improving system service performance.
- ✓ Subgroup on International GNSS Monitoring and Assessment aims to promote GNSS Monitoring and Assessment.
- ✓ iGMAS going forward smoothly, needs more countries and organizations to take part in, e.g. building stations jointly, sharing data and products with each other etc. [Call for Participation! www.beidou.gov.cn](http://www.beidou.gov.cn)
- ✓ Monitoring and Assessment Item has been submitted to this meeting as a proposal, for discussion.
- ✓ iGMAS going to support various campaign e.g. IGS M-GEX, by sharing stations . raw data and geodetic receivers with four system capability.





Thank you!