

Overview of MSAS

MTSAT Satellite-based Augmentation System

ICG EXPERT MEETING ON
GLOBAL NAVIGATION SATELLITE SYSTEMS AND SERVICES

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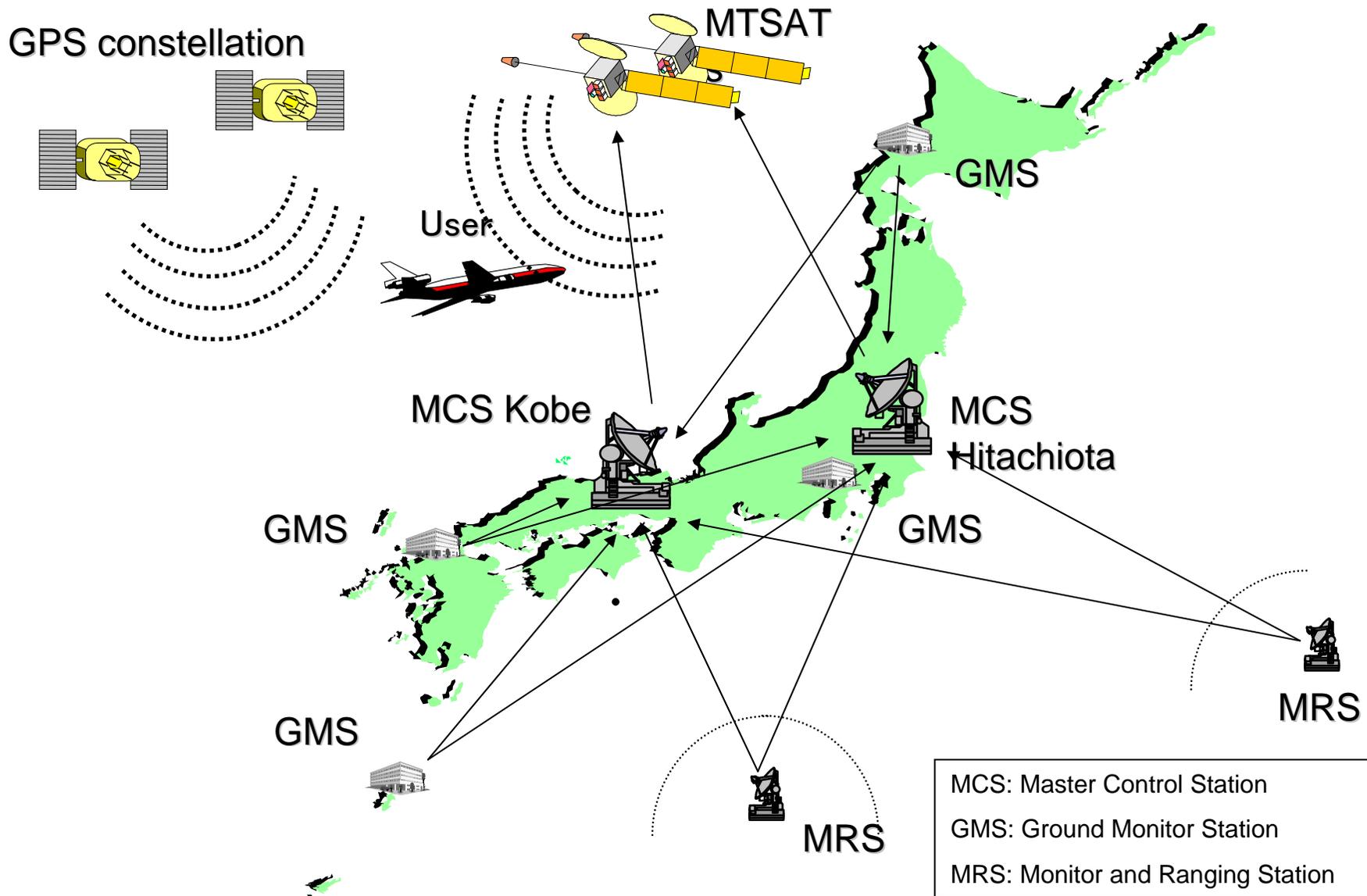
Office of Aeronautical Satellite Systems

ATS engineering division

Japan Civil Aviation Bureau

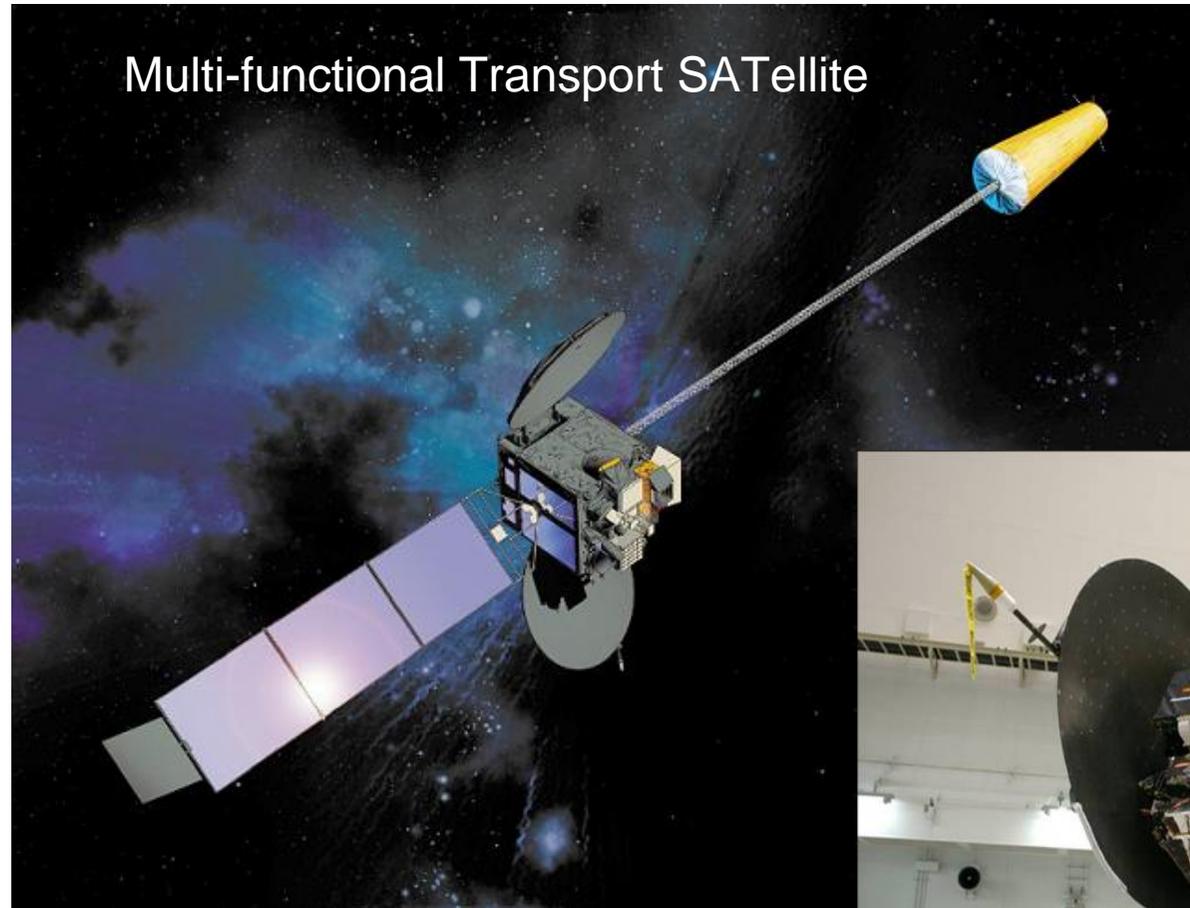


MSAS configuration



MSAS Space Segment(1/2)

MTSAT-1R @140E

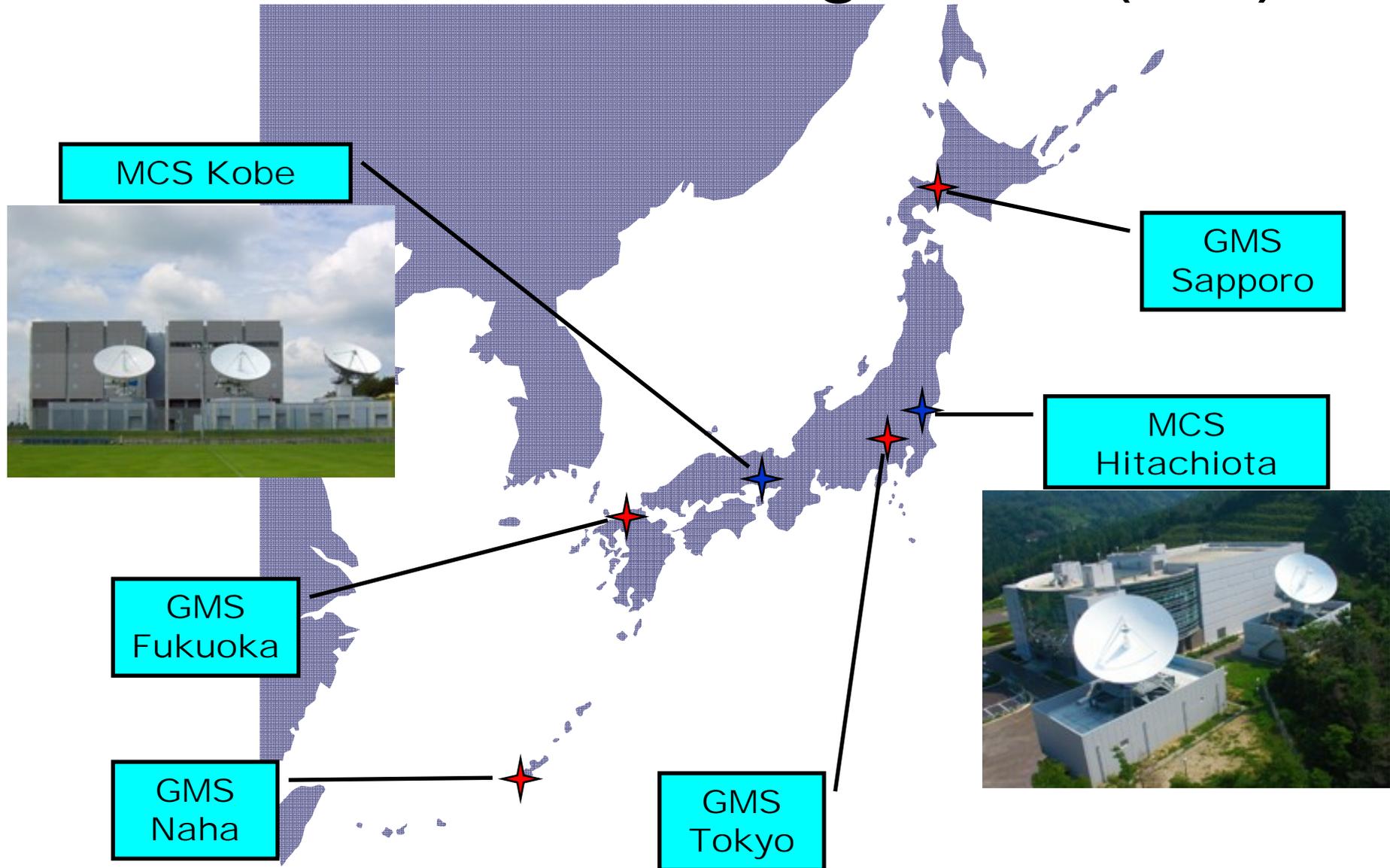


MSAS Space Segment(2/2)

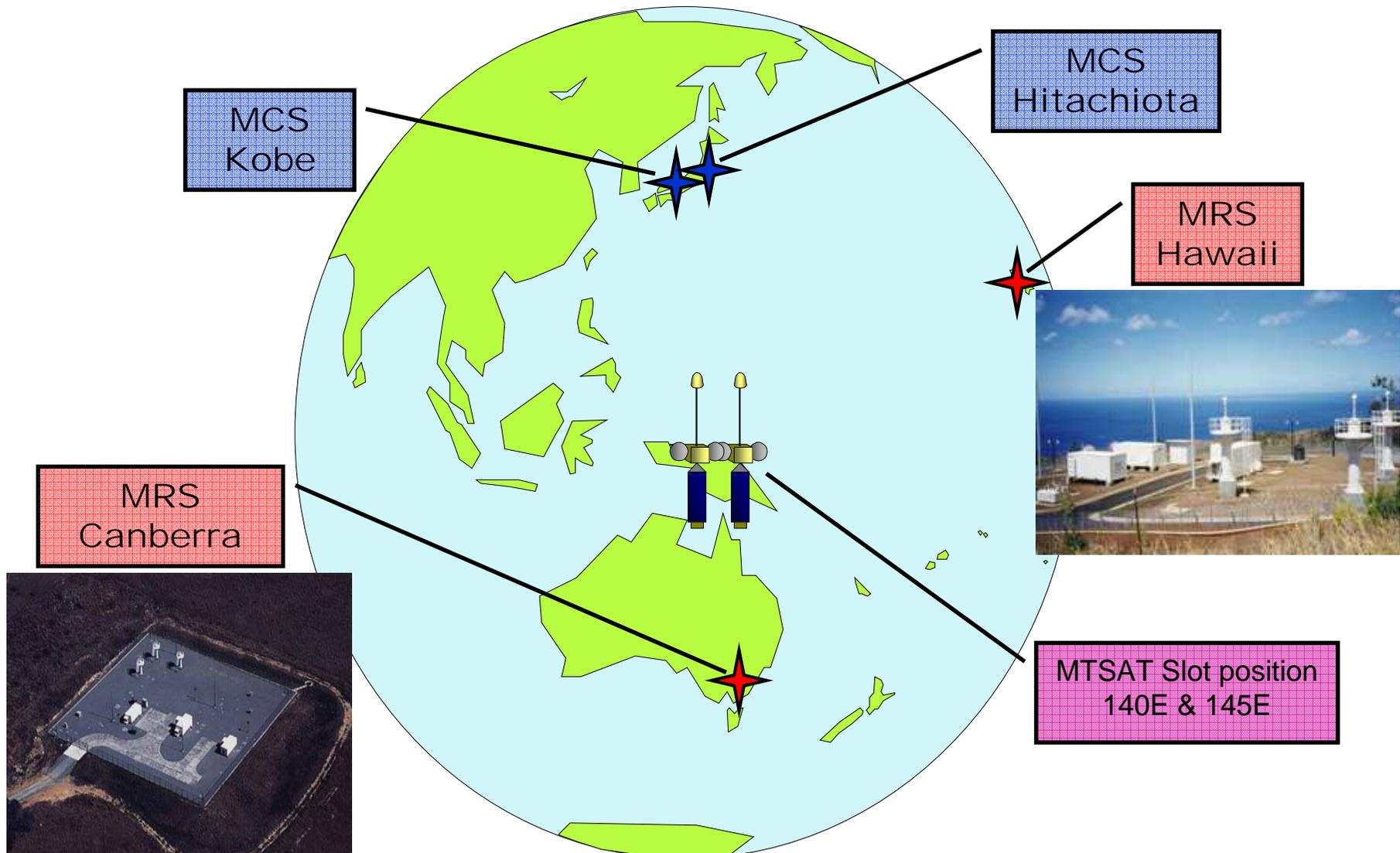
MTSAT-2 @145E



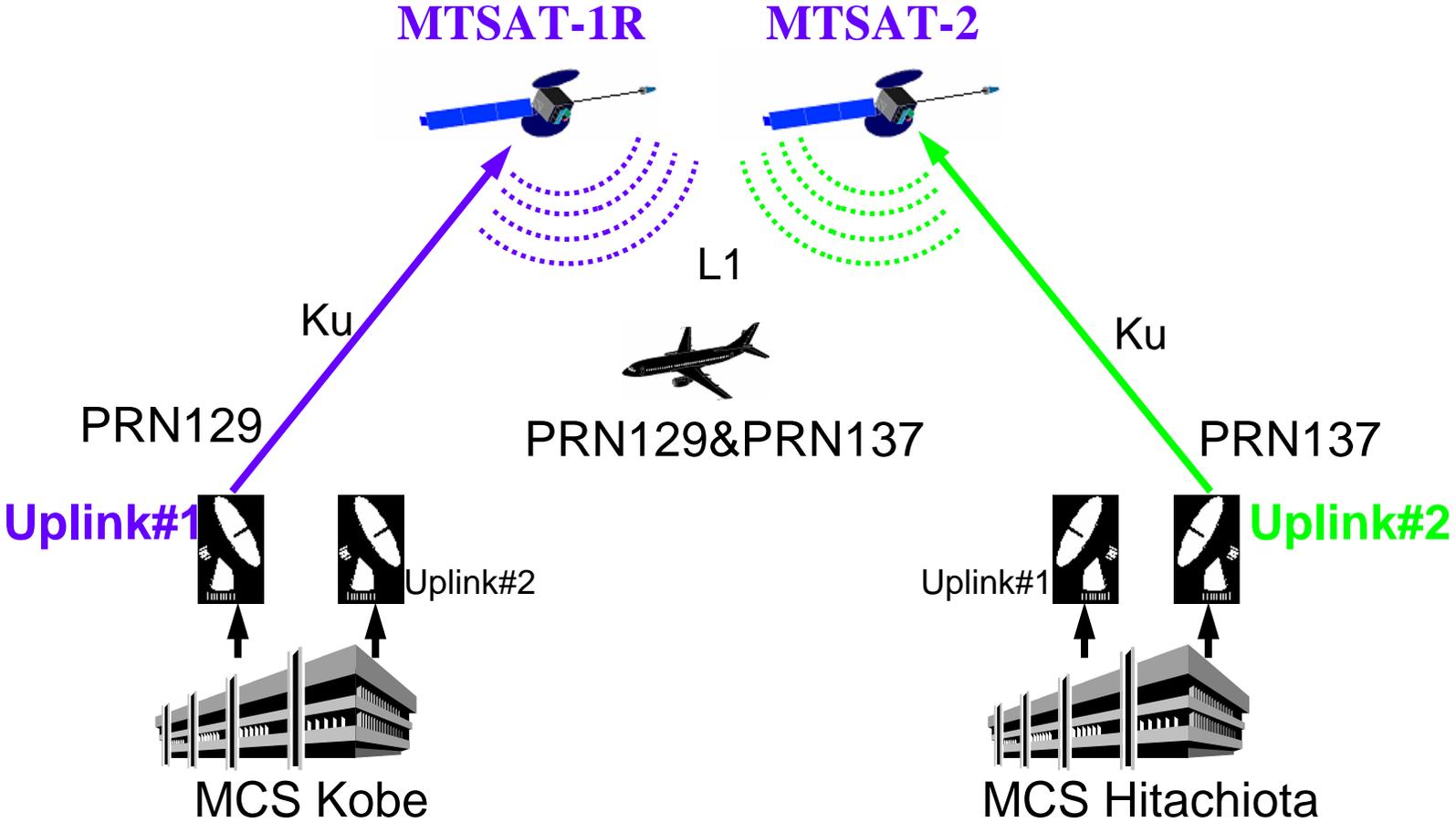
MSAS Ground Segments(1/2)



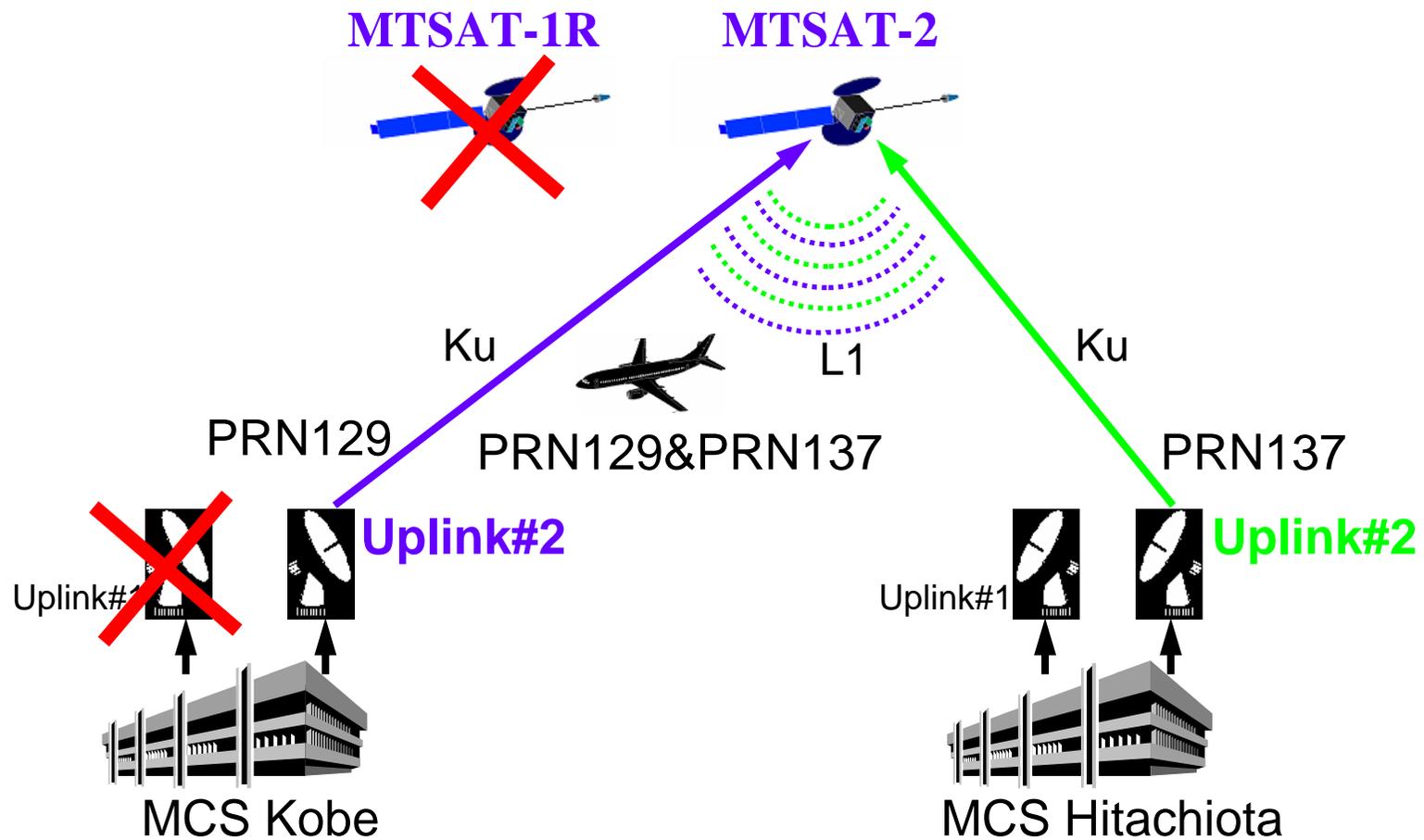
MSAS Ground Segments(2/2)



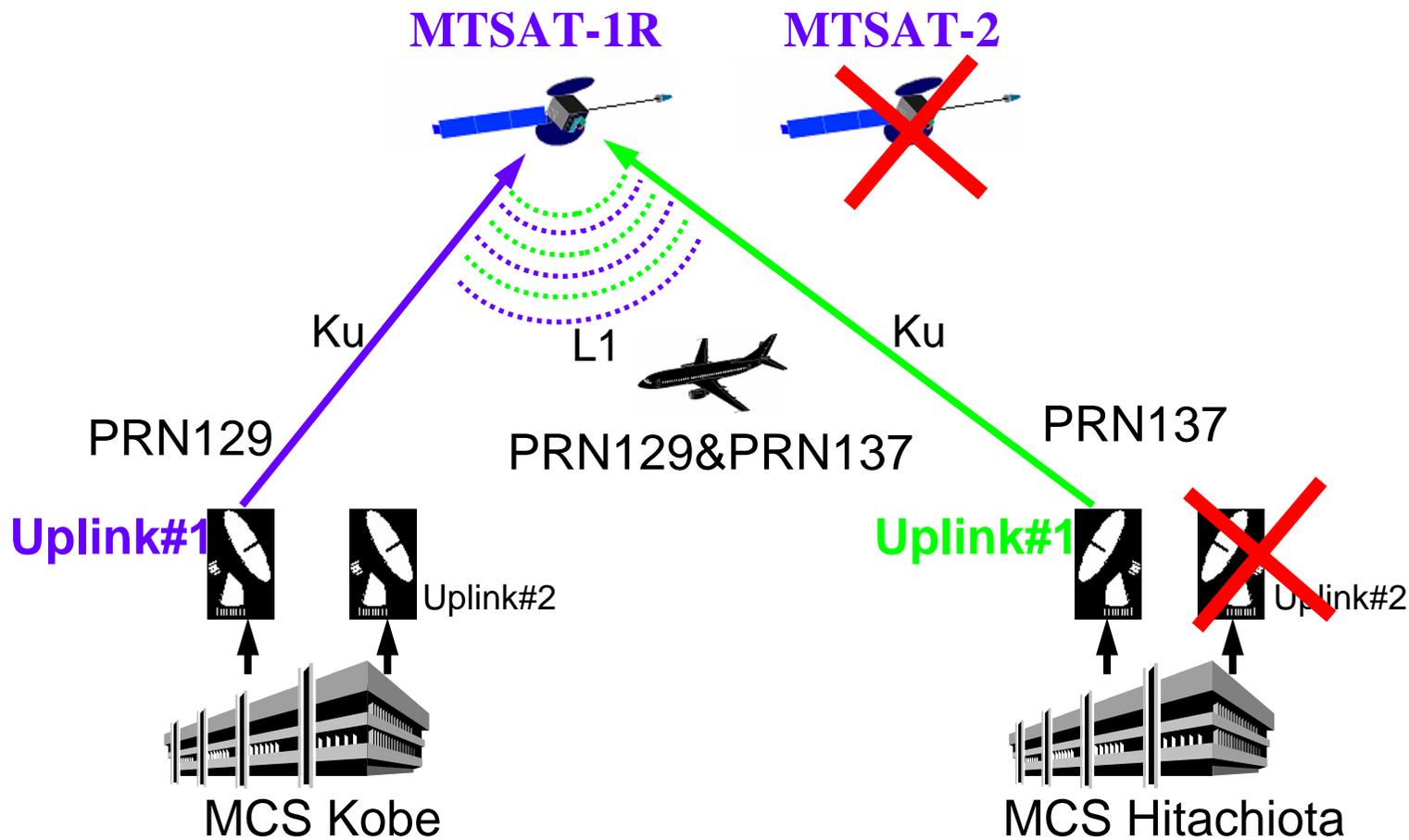
Multiple GEO Configuration(1/3)



Multiple GEO Configuration(2/3)



Multiple GEO Configuration(3/3)

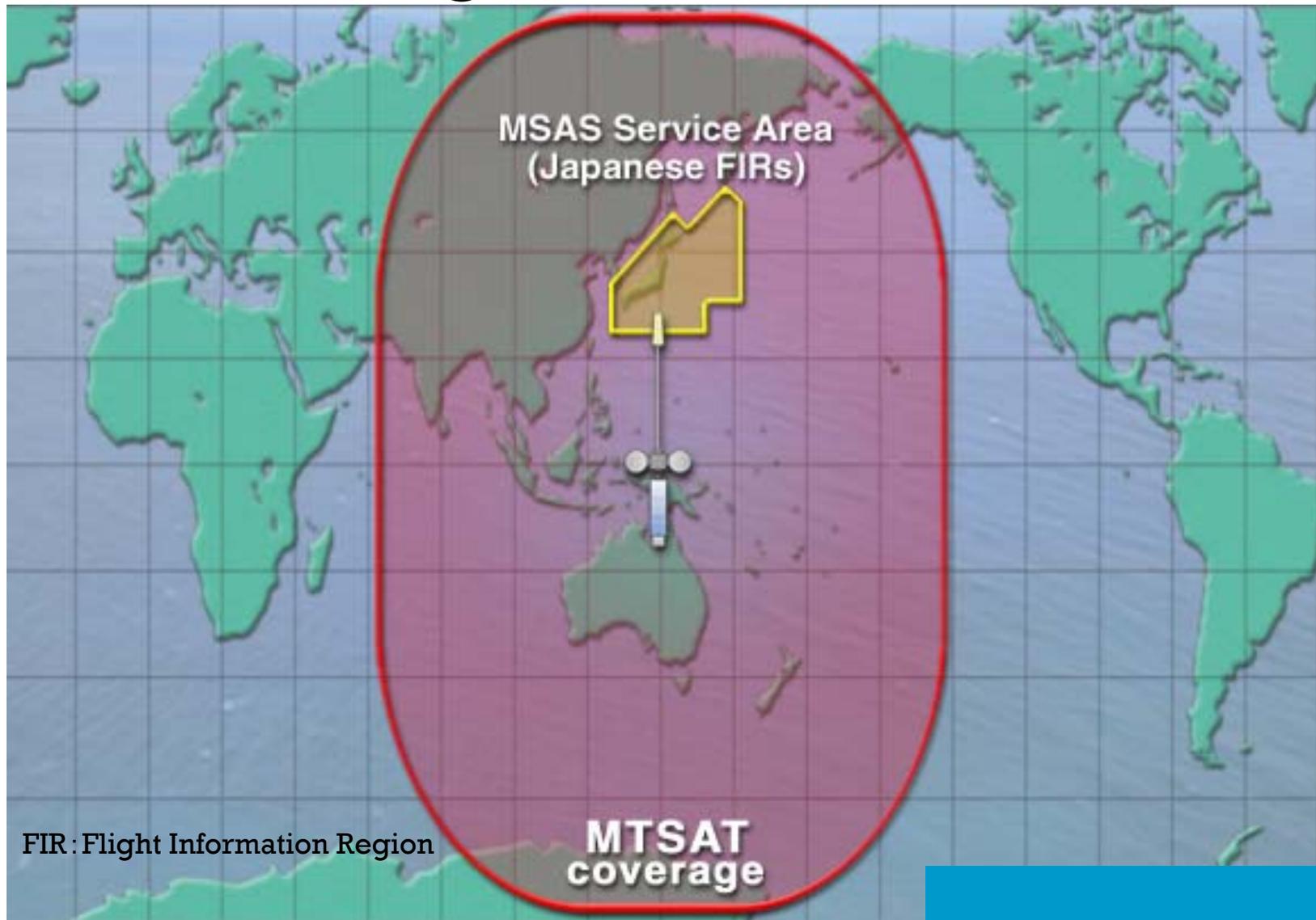


Signal specifications

- RF characteristics are compliant with ICAO SARPs paragraph 3.7.3.4.4.
 - Frequency ; L1 1575.42MHz
 - Band width ; 2.2MHz
 - 500 BPS FEC
 - Signal strength on the earth surface $>-161\text{dBw}$
 -



Coverage & Service Area



Performance -Requirements-

For Non-precision approach

- Horizontal Accuracy (95%)
 - Less than 220m (with SA on)
- Integrity (Probability of HMI)
 - Less than 1×10^{-7} /hour
- Availability
 - Less than 99.9%



Performance

-Actual-

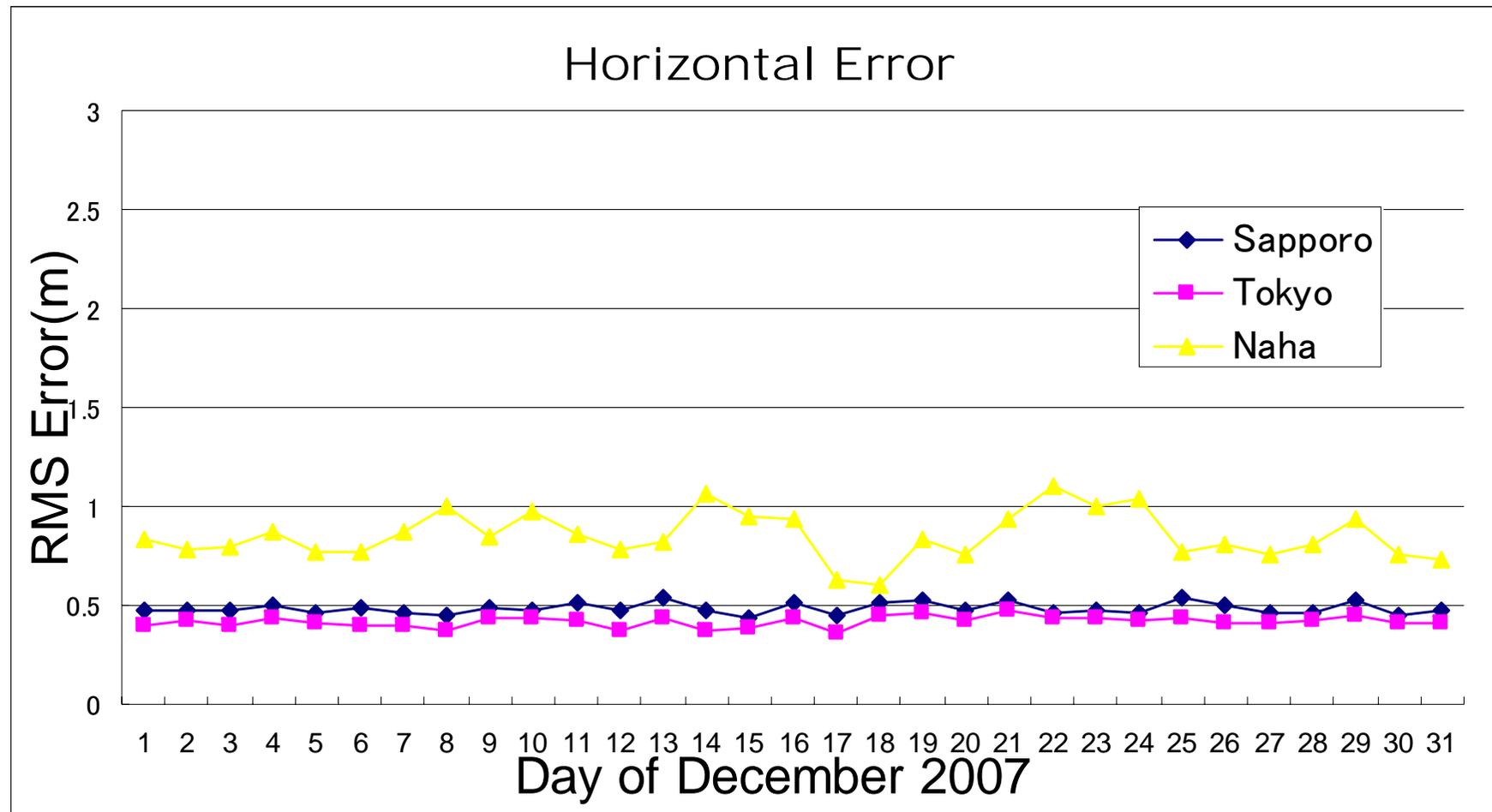
For Non-precision approach

- Observed Horizontal Accuracy
 - Less than 2.2m
- Integrity (Fault Tree Analysis Result)
 - 0.903×10^{-7} /hour
- Observed Availability
 - 99.91%



Performance

Daily plot of observed accuracy



Analyzed by Electronic Navigation Research Institute

Service provision

- Service for air navigation
 - 24hours a day, 7days a week
 - Operational Information is provided as NOTAM
 - Service Interruption, degradation of service
 - En-route through Non Precision Approach phase of flight
 - Performance improvement plan is now under consideration



Thank you !

