

WPLTN Network Report

1. National Programs

Australia

China

India

Japan

Korea

Russia

Saudi Arabia

2. Summary



1m SLR

2m SSA

Mt Stromlo

Yarragadee

OVERVIEW: AUSTRALIA

SLR:

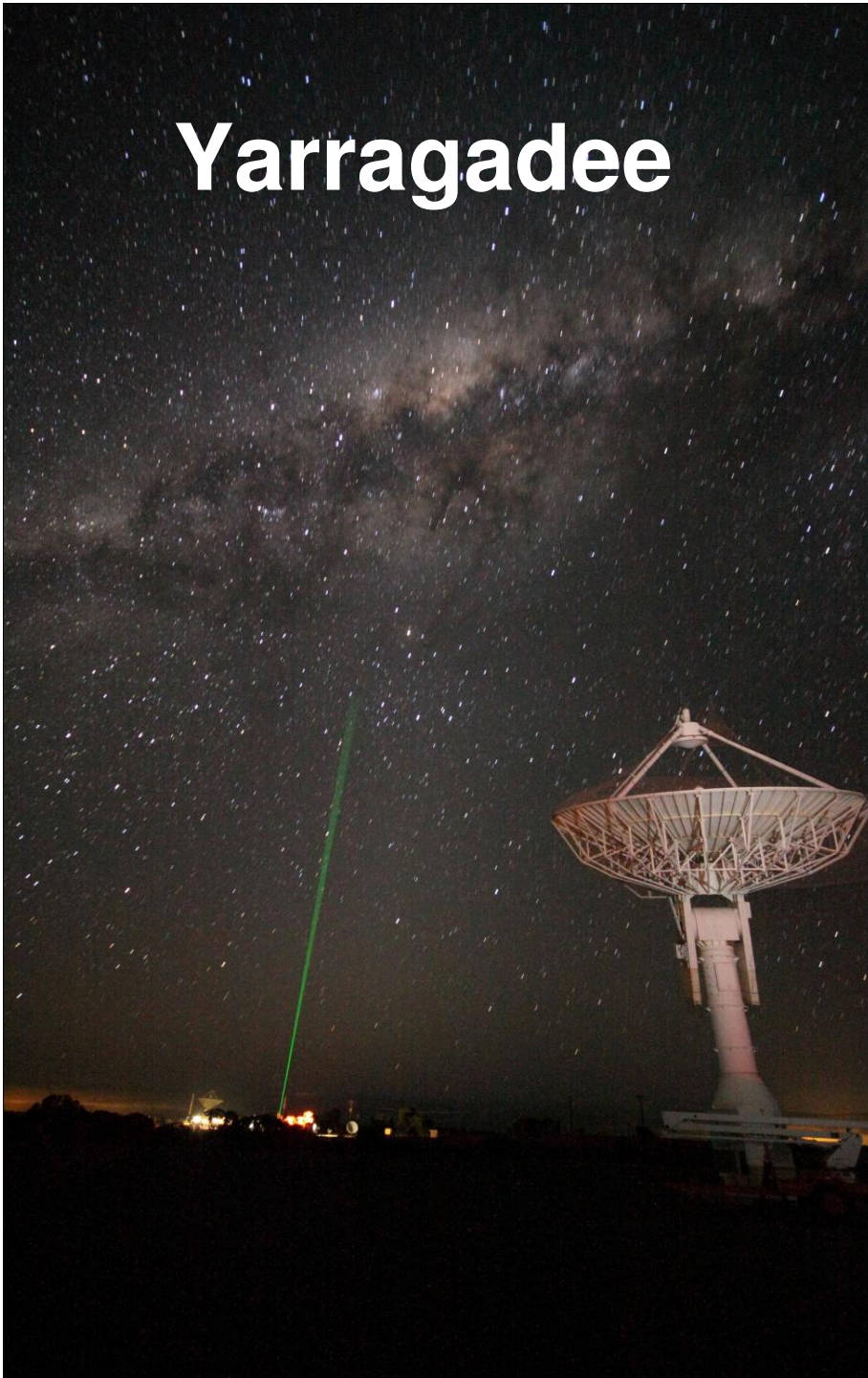
Strong operational performance

Significant expansion of site activities

Space Situation Awareness:

Automated laser tracking of space debris: 5cm @ 1,000 km

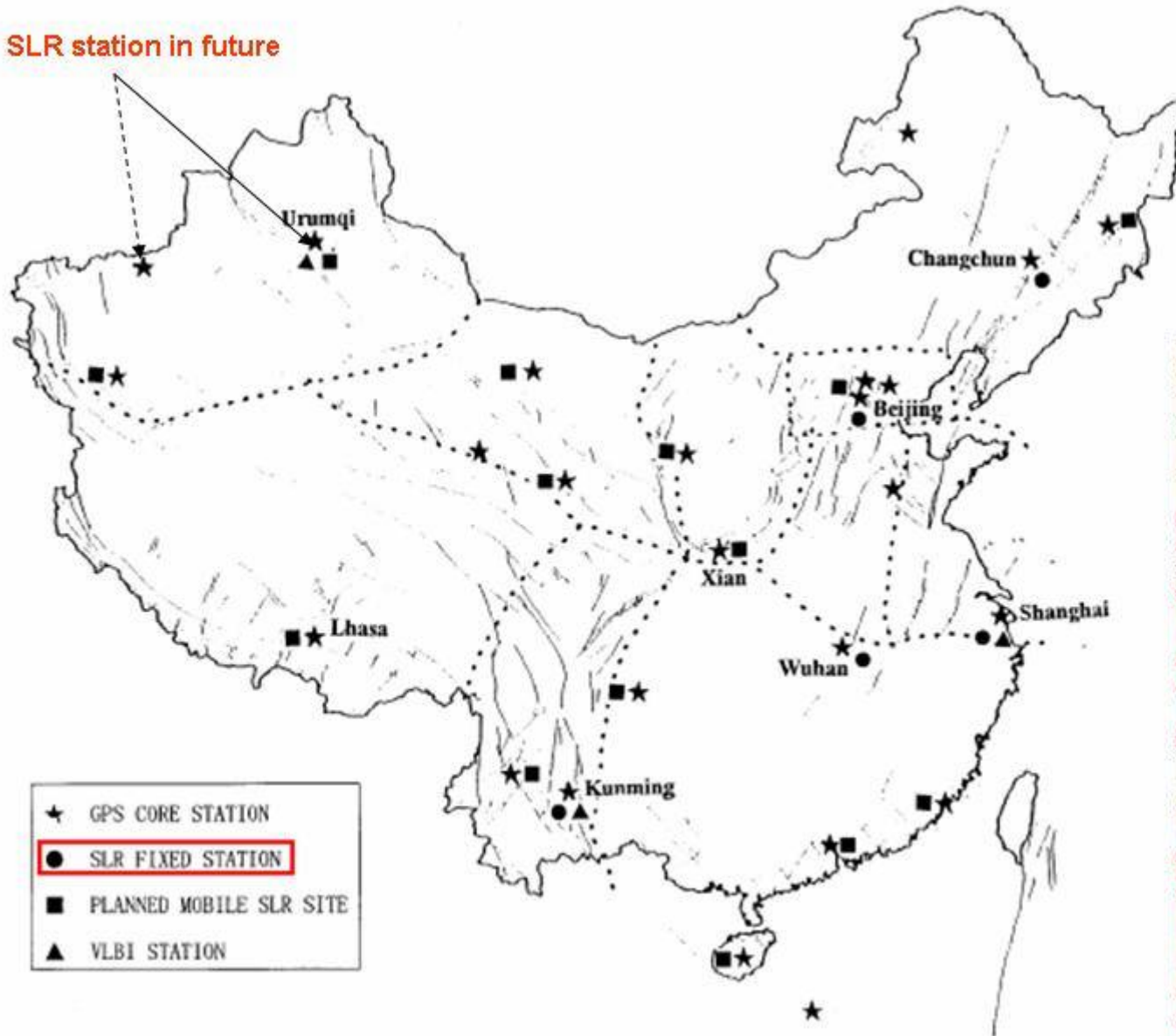
Expansion of international collaboration for SSA



Distribution of the Chinese SLR station

6 sites in China + 1 in Argentina

SLR station in future



San Juan SLR station in Argentina



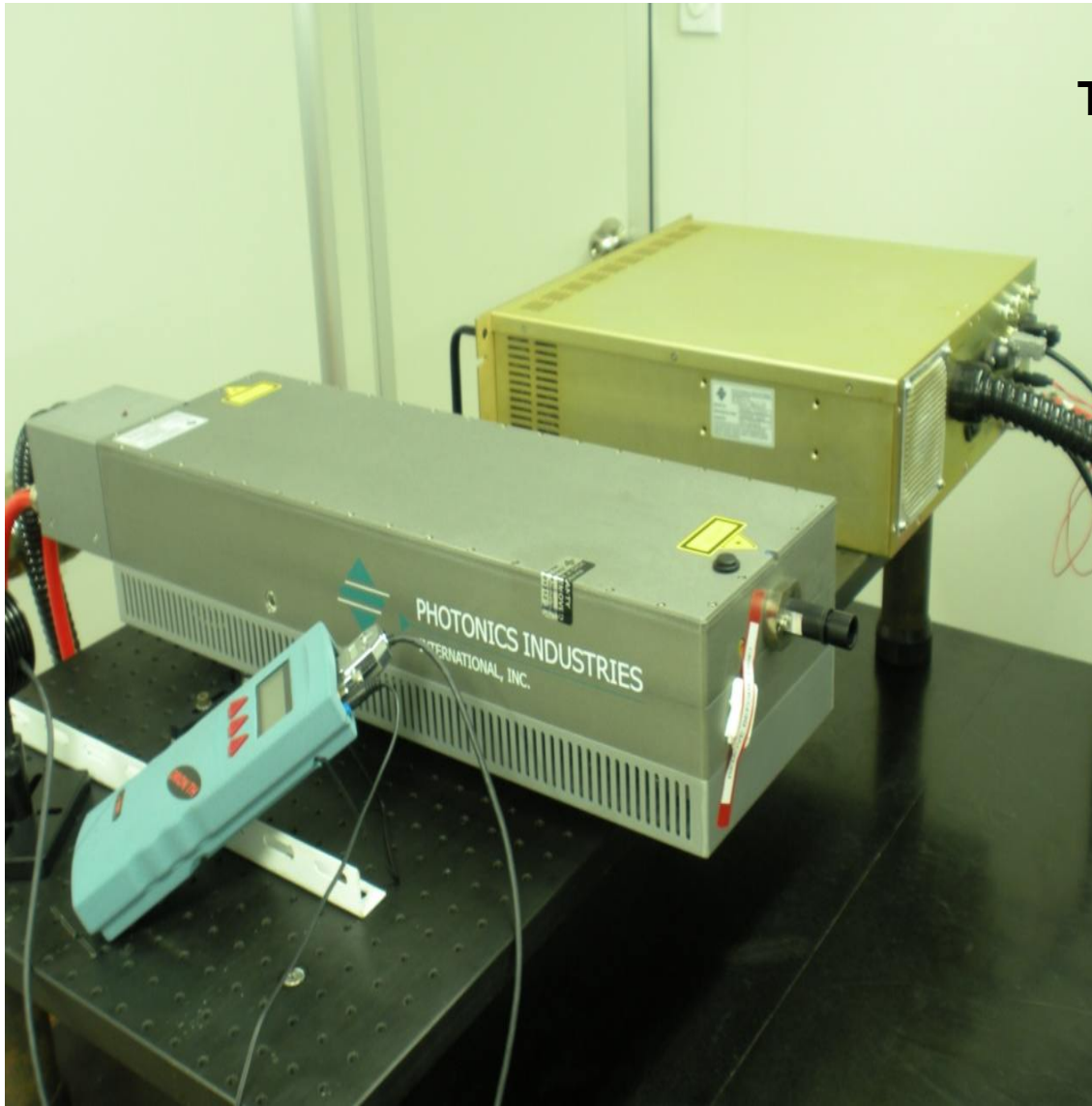


**The telescopes of
the Chinese SLR
stations**



Shanghai	Kun- ming	Changchun
Wuhan		Beijing
TROS-1	San Jaun	TROS-2





Technical upgrades completed:

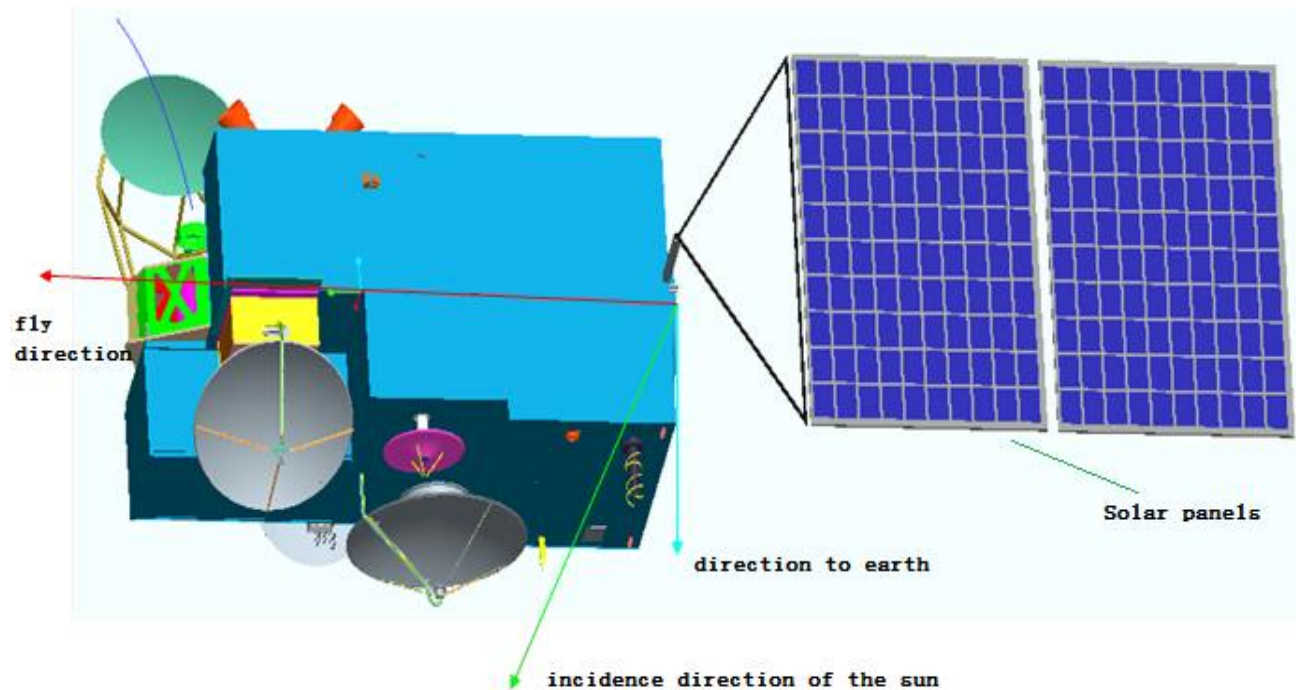
- 1) 7 laser [kHz picoseconds]**
- 2) 10 ps event timers**
- 3) kHz ranging controllers for all stations**
- 4) Daylight tracking packages**

Status of Chinese SLR Network

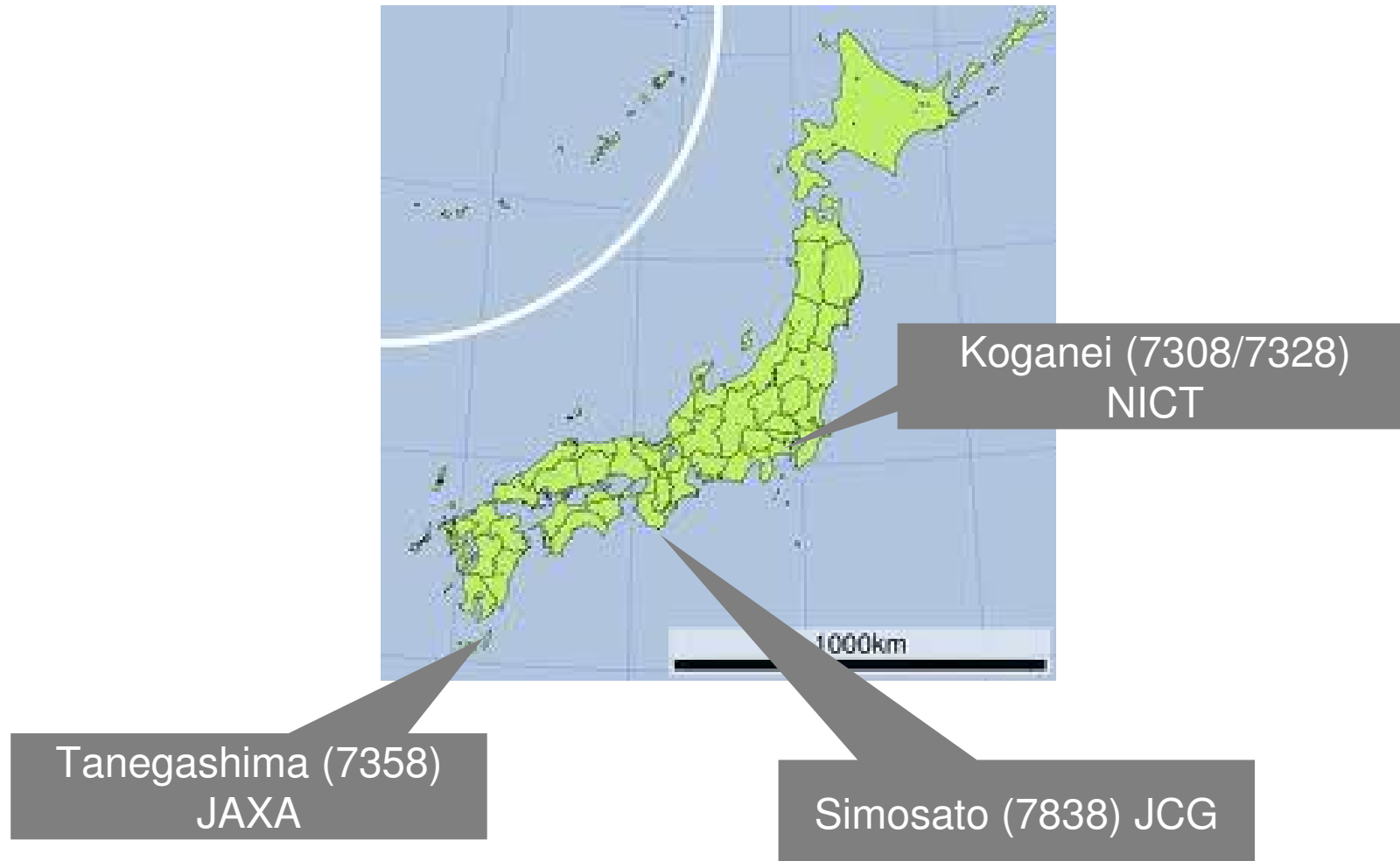
<i>SLR station</i>	<i>kHz ranging</i>	<i>MEO tracking</i>	<i>GEO tracking</i>	<i>Daylight tracking</i>	<i>passes Last year</i>
<i>Shanghai</i>	√	√	√	√	<i>2990</i>
<i>Changchun</i>	√	√	√	√	<i>7580</i>
<i>Beijing</i>	√	√	X	√	<i>1100</i>
<i>Yunnan</i>	√	√	X	√	<i>900</i>
<i>Xi'an</i>	√	√	X	X	<i>100</i>
<i>Wuhan</i>	√	X	X	X	<i>Under developing</i>
<i>TROS-2</i>	X	X	X	X	<i>Under developing</i>
<i>San Juan</i>	X	√	X	X	<i>Under developing</i>

HY-2 satellite

- Altitude: **971km**
- Eccentricity: **0.00117**
- Inclination : **99.35 degree**
- Orbit : **Circular, Sun-Synchronous**
14 days repeat orbit, normal
- Anticipative Launch Date: **July, 2011**
- Expected Mission Duration: **3-5 years**



SLR Stations in JAPAN



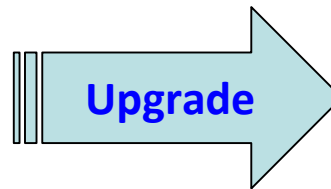
SIMOSATO SLR Station Since 1980'

Recent UPGRADE FY2009-2010



➤ Telescope

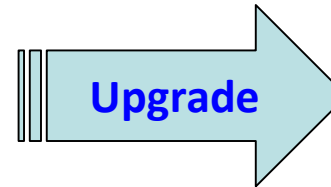
- Bi-static
- T/R = 17/60cm



- Mono-static
- 75cm diameter

➤ Laser

- Wavelength : 532nm
- Pulwidth : 70psec
- Energy:120mJ



-
- 20psec
- 60mJ

➤ Time Frequency source

- Cesium clock

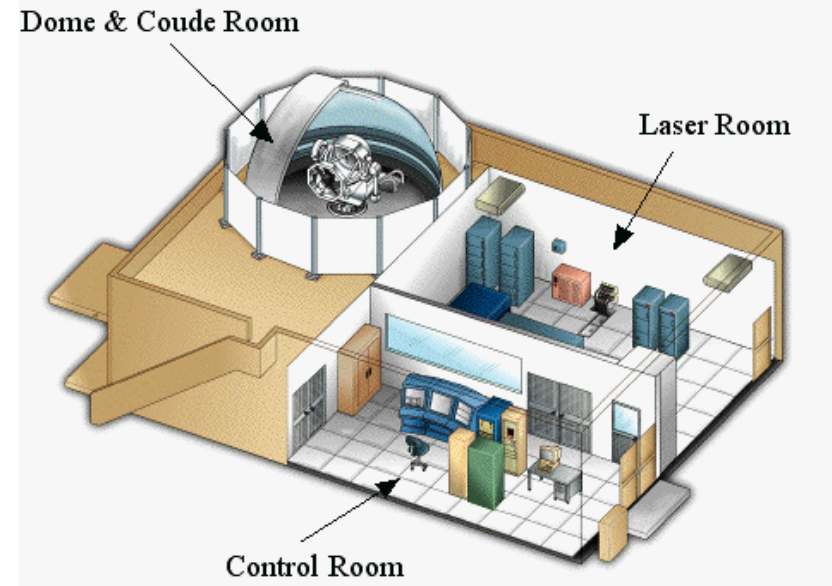
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➤ Repetition rate

- 4Hz

- 5Hz (A032ET TI mode)

Tanegashima GUTS SLR Station JAXA



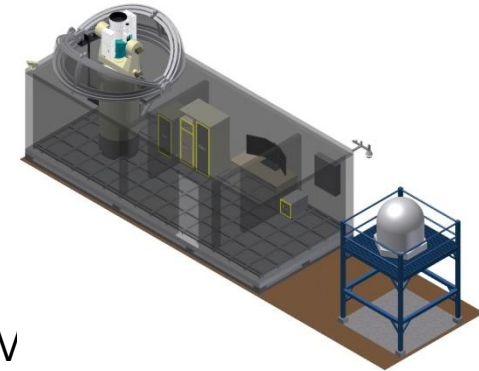
System controlled remotely from TKSC.
Observation weight on High satellites, especially
QZS launched in 2010.
World record of return rate from ETS-VIII, QZS-1

WPLTN Report on Korean SLR Program



■ ARGO Overview

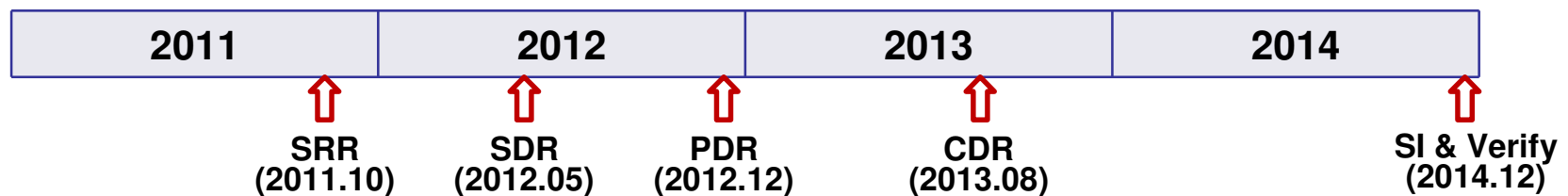
- Name of Korean SLR program
- Development period : 2008 – 2014 (7 years)
- Final Goal
 - ✓ One mobile system(40cm/10cm) : ARGO-M
 - ✓ One fixed system(1m) : ARGO-F



■ ARGO-M

- SRR(Sep. 2008), SDR(May 2009), PDR(Dec. 2009), CDR(M
- The phase of manufacture or fabrication : Now
- System integration and verification : November 2011
- Operational test : June 2012

■ ARGO-F



Legend : SRR(System Requirement Review), SDR(System Design Review)
PDR(Preliminary Design Review), CDR(Critical Design Review)

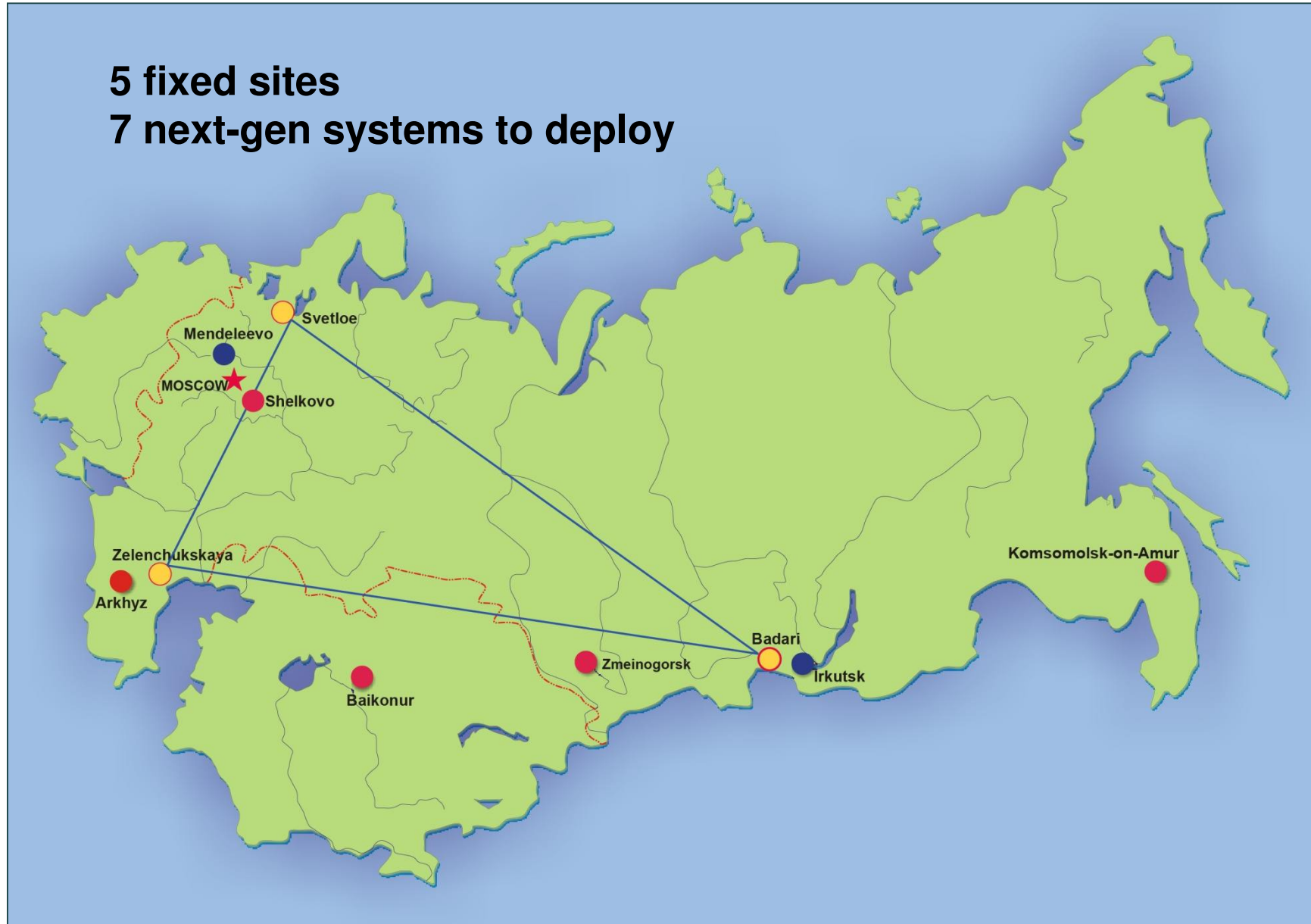
■ Official Operation for ILRS Societies

- ARGO-M : July 2012, ARGO-F : July 2015

Russian Laser Tracking Network

5 fixed sites

7 next-gen systems to deploy



Unified SLR station near Moscow (Shelkovo town)

Fixed-station version



SLR system



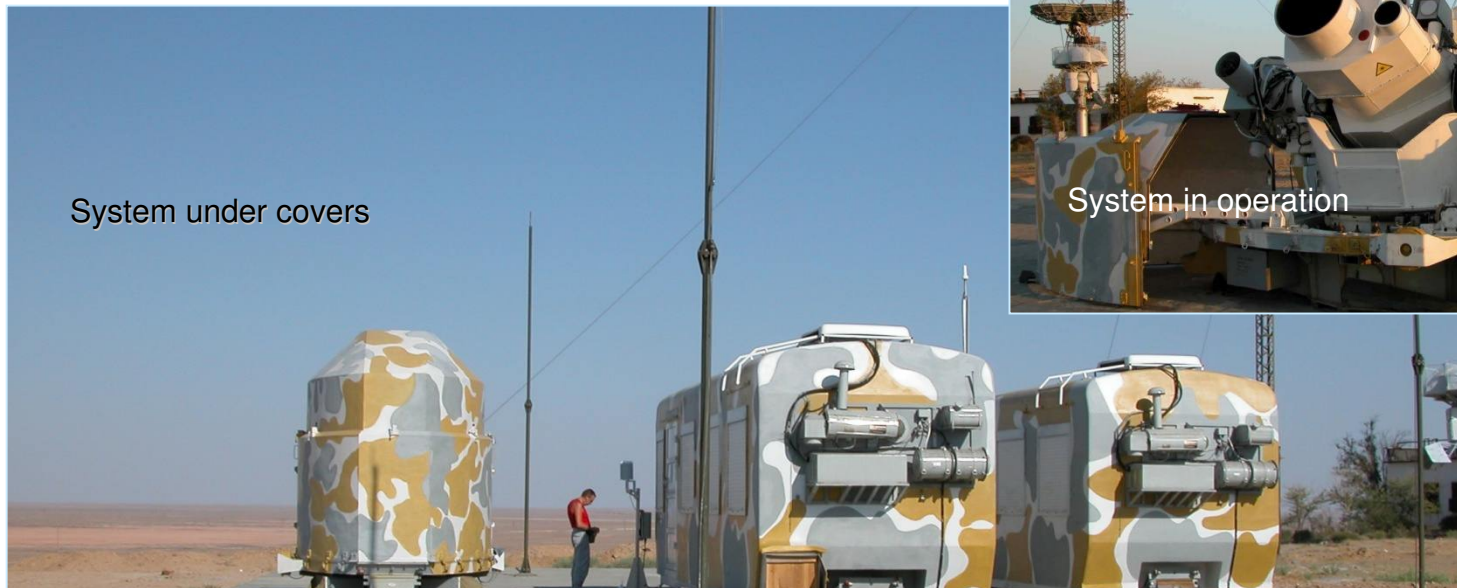
Telescope dome



Operator workplaces

Ranging	Angular measurements	Photometry
SC orbit height: up to 36,000 km	Star magnitude up to: 14 ^m	Star magnitude up to: 13 ^m
NP RMS errors: 0,5 to 1 cm	RMS of measurement 1 – 2 arcsec for SC angular velocity up to 40 arcsec/sec	Brightness measurement RMS error less than 0,2 ^m

Unified SLR station (transportable version) at the Baikonur launching site

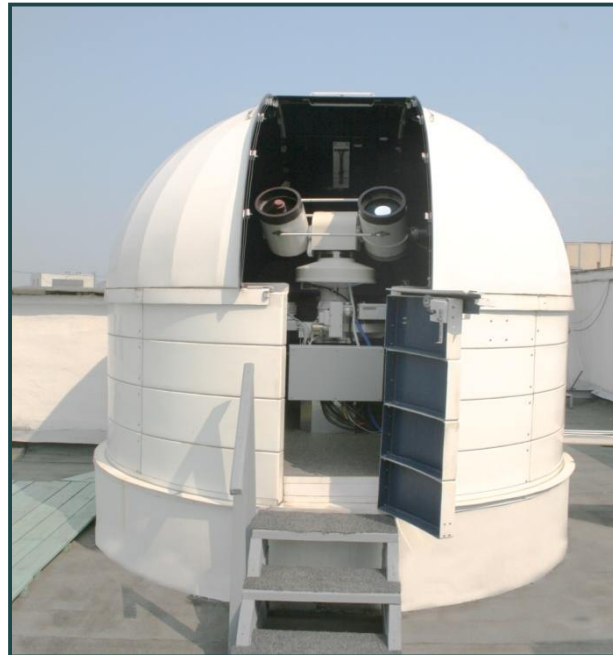


Working platform with the installed equipment, containers, and a telescope

Ranging	Angular measurements	Photometry
SC orbit height: up to 36,000 km NP RMS errors: 0,5 to 1 cm	Star magnitude up to: 14 ^m RMS of measurement 1 – 2 arcsec for SC angular velocity up to 40 arcsec/sec	Star magnitude up to: 13 ^m Brightness measurement RMS error less than 0,2 ^m

The small-size SLR system is currently in serial production. During the 2011 – 2012, it is planned to install 7 such stations within the Russian territory and abroad. Three such stations will be used in combination with the VLBI systems near St Petersburg, near Irkutsk, and in the Northern Caucasus, to form collocation sites.

The site in the Northern Caucasus is in operation since April, 2011



Ranging	Angular measurements	Photometry
SC orbit height: up to 23,000 km NP RMS errors: 0,5 to 1 cm	Star magnitude up to: 12 ^m RMS of measurement 1 – 2 arcsec for SC angular velocity up to 40 arcsec/sec	Star magnitude up to: 11 ^m Brightness measurement RMS error less than 0,2 ^m

Saudi Arabia



SALRO

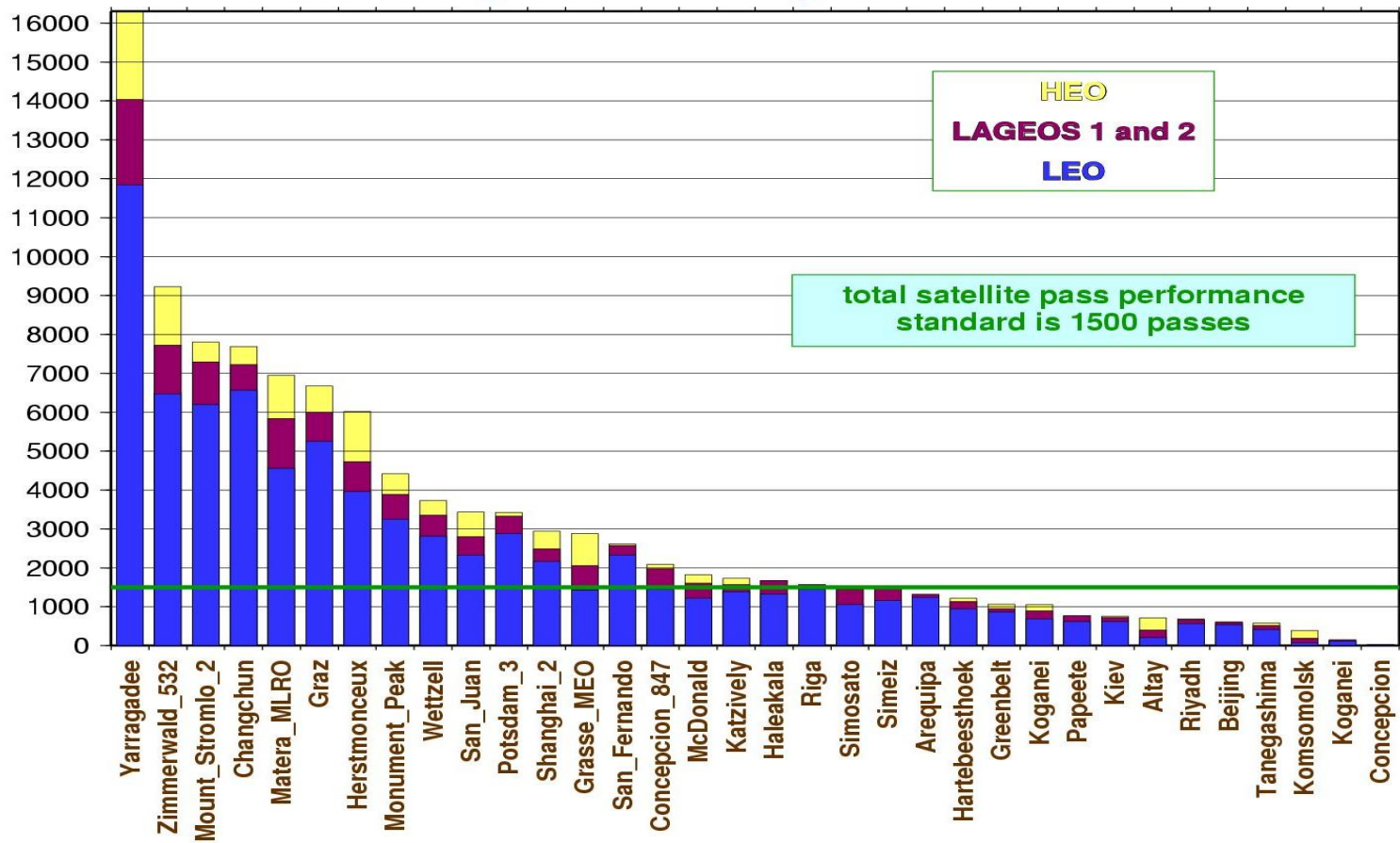
SALRO



Operational for 20 years
Upgrade due in 2013



total passes
from April 1, 2010 through March 31, 2011



20110404

WPLTN Summary

18 sites operational

Significant % of global data

13 new sites in development in 5 members

Several satellite programs

New lunar and space debris capabilities

Very strong program momentum