# Integration of 1.5m Telescope and Ranging System in CRL

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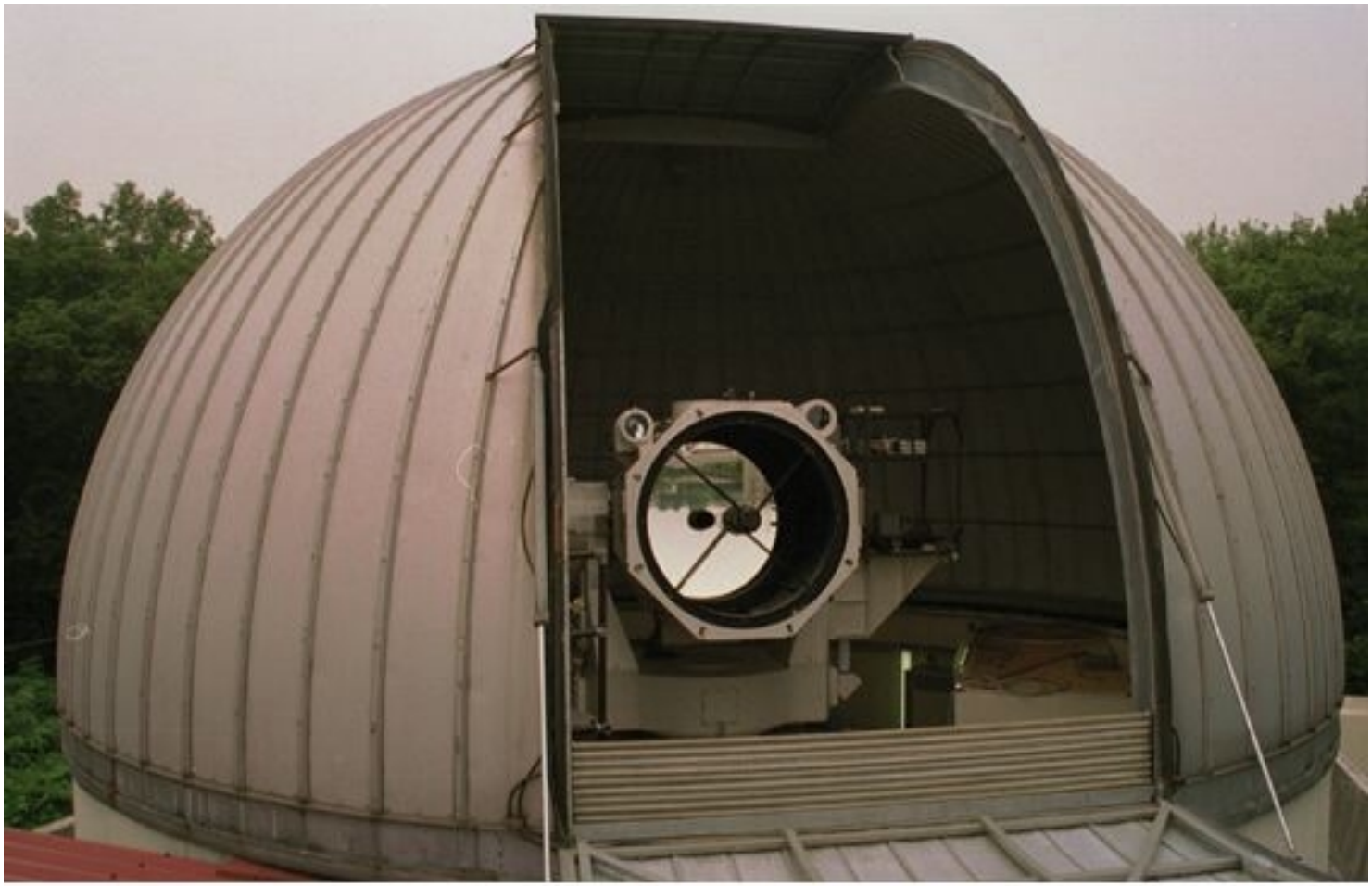
# Integration of 1.5m Telescope and Ranging System in CRL

Abstract

- The Keystone stations (Miura and Tateyama) were dismantled in 2001 and the 75cm telescopes were transferred to other institute in Japan. Laser and electronics were moved and integrated to Koganei(CRLLAS) 1.5m telescope as basis of conventional SLR system but without routine operation.
- Major Specifications are the same as those of Keystone except telescope diameter double. We switch lasers between 50mJ/50ps 20Hz (high precision) and 200mJ/3ns/ 10Hz (high power) laser for requirement of various targets acquisition (from LEO to Geosynchronous ) such as LRE or ADEOS-II. Another advantage is to use existing multiple tracking cameras in different FOV (0.5arcdeg/2arcmin/50arcsec) with increased sensitivity (Mag.9-13). Draft Site Log file attached.
- We also plan to use 1.5m telescope as test bed of a next generation of laser ranging development collaborated with optical communication device by integrating CW laser with pseudo-noise modulation and wideband correlator.



1.5m Telescope and Dome:  Optical communication ground station CRLLAS

# Dismantle of KSP stations

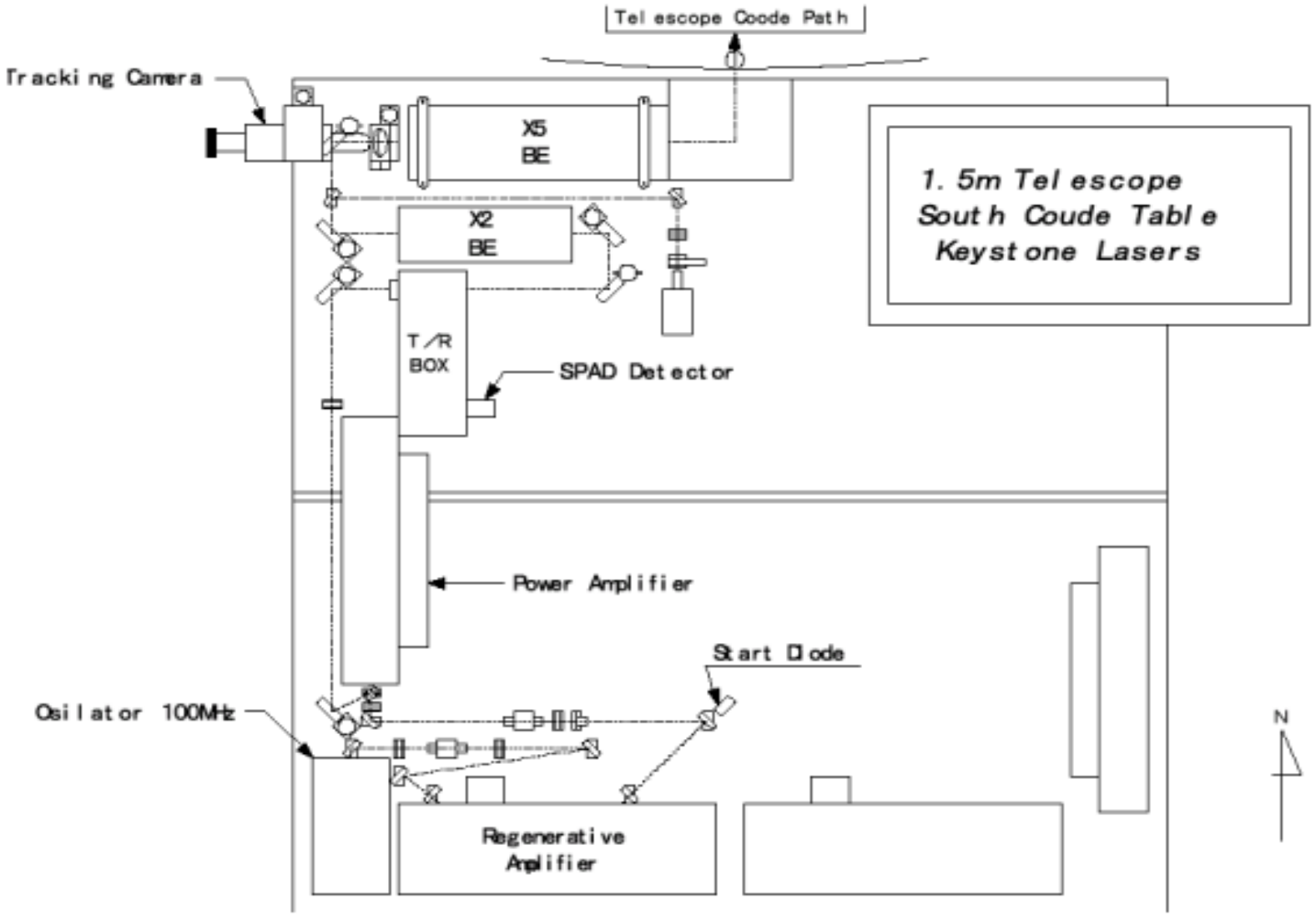
Tateyama: 2001 Nov

Miura: 2001 January

Laser Ranging
2002

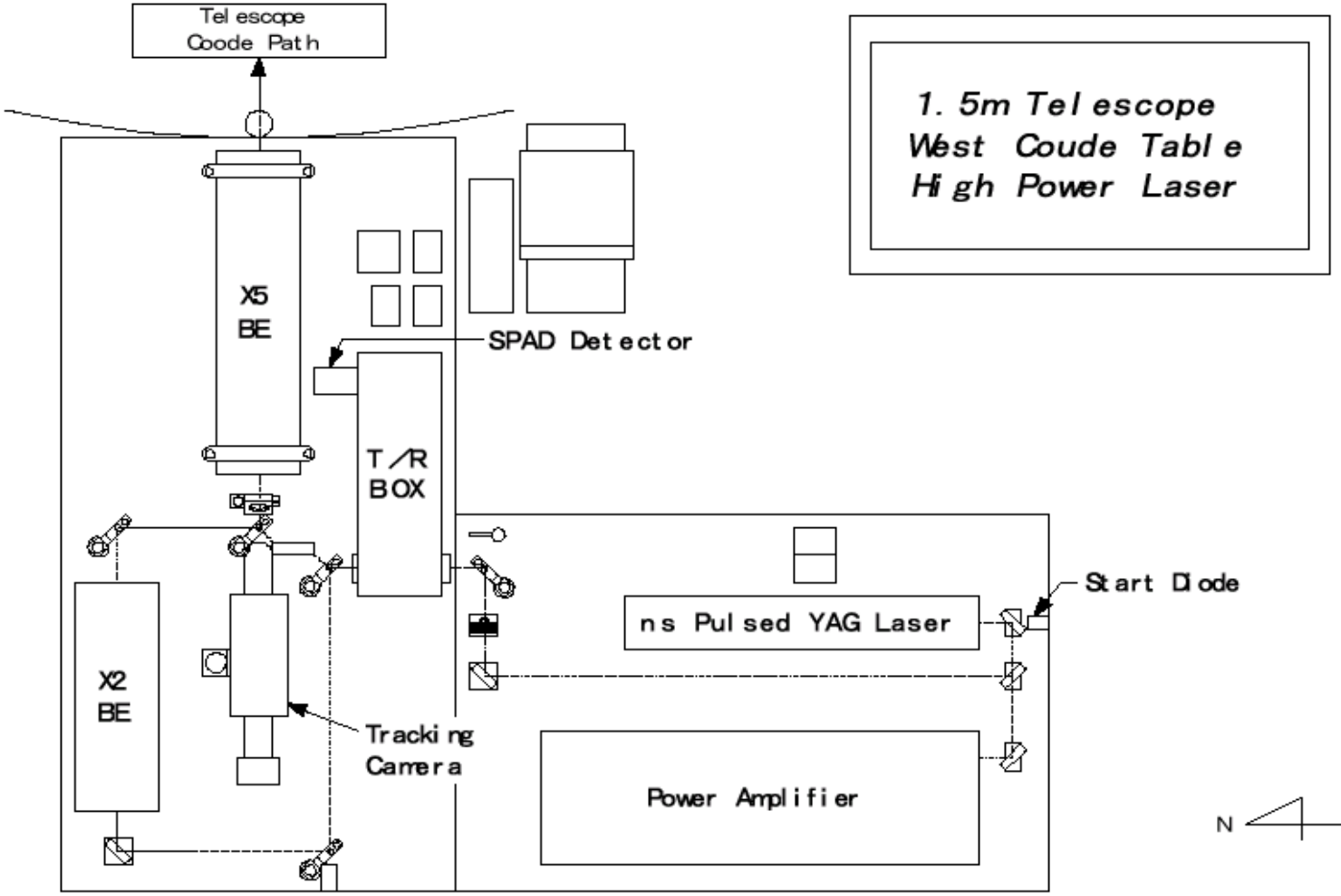
# Integration of Keystone Lasers and 1.5m telescope

# (50mJ/20Hz/50ps high precision setup)

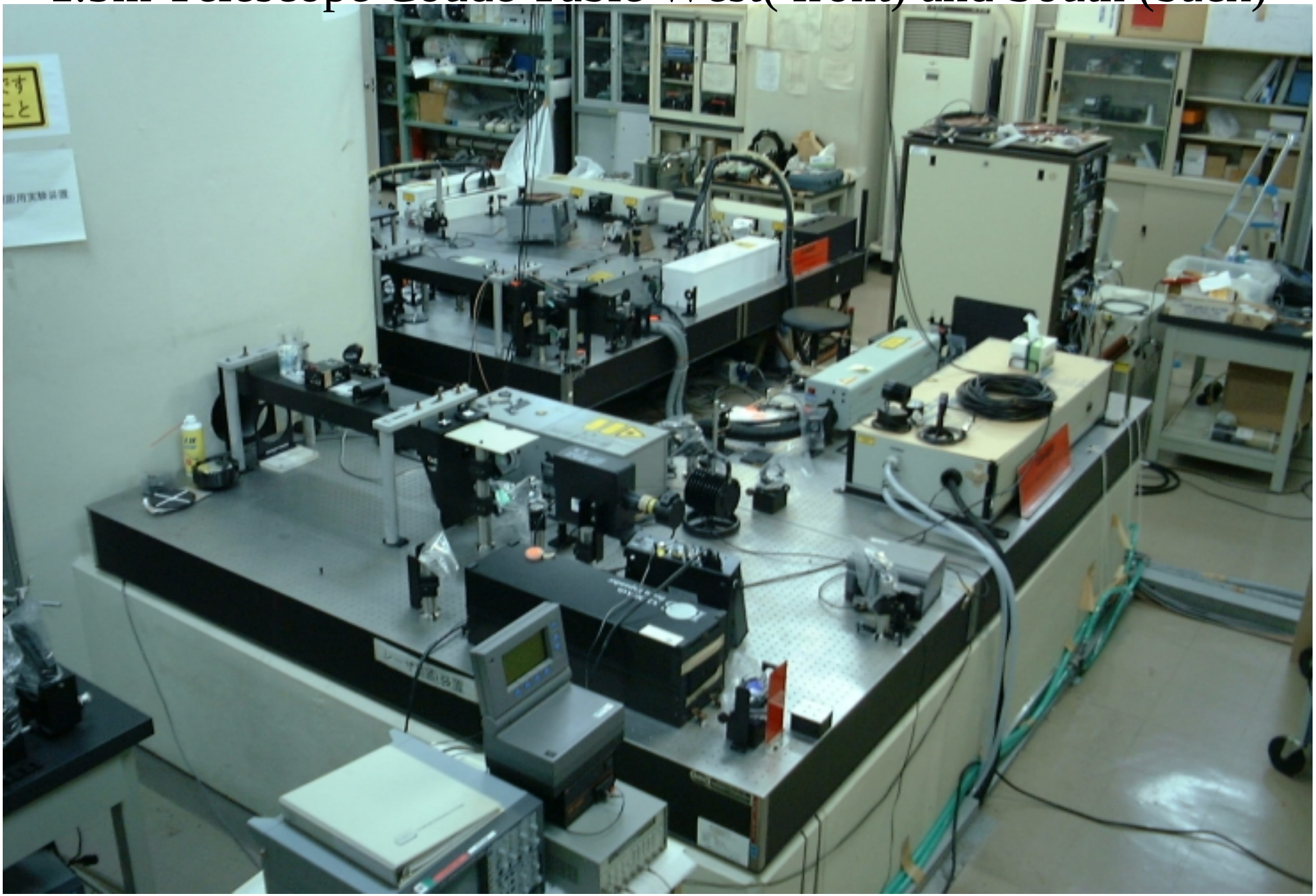


# Integration of Keystone Lasers and 1.5m telescope

# (200mJ/10Hz/3ns high power setup)



# 1.5m Telescope Coude Table West( front) and South (back)



# 1.5m telescope controler(left) and KSP SLR electronics(right)

# Satellite Targets in CRLLAS

- Lageos and other geodetic satellites to fix self station coordinates in ITRF.
- LRE(2001-) and ADEOS-II (2002Dec.-) under NASDA agreement.
- ETS-VIII (fiscal 2004-) geosynchronous satellite orbit determination
- Other future satellites such as OICETS (Launch TBD: optical communication),Quasi-Zenith Satellites(Launch TBD: Communication) and Selene-2 (Launch TBD: Lunar science)

# Draft Site LOG

## SITE.LOG :

**ILRS Site and System Information Form**
**International Laser Ranging Service**

0. Form

Prepared by (Full Name) : Hiroo Kunimori

Preparer E-mail : kuni@crl.go.jp

Date Prepared : 2002-10-07

Report Type : NEW

Format Version : 1.0

1. Identification of the Ranging System Reference Point (SRP)

Site Name : CRLLAS

IERS DOMES Number : 21704S002

CDP Pad ID : 7308

Subnetwork : WPLTN

Description : Intersection of Axes of Telescope

2. Site Location Information

City or Town : Koganei

State or Province : Tokyo

Country : Japan

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3. General System Information

3.01 System Name :

4-Character Code : CRLS

CDP System Number : 50

CDP Occupation Number : 14

Eccentricity to SRP (if Not Identical With SRP)
North [m]: 0.0

East [m]: 0.0

Up [m]: 0.0

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4. Telescope Information….

5. Laser System Information….

6. Receiver System….

7. Tracking Capabilities

8. Calibration

9. Time and Frequency Standards

10. Preprocessing Information

11. Aircraft Detection

12. Meteorological Instrumentation

13. Local Ties, Eccentricities, and Collocation Information

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# Collaboration with Optical Communication Devices

- We also use 1.5m telescope as test bed for ranging system collaborated with optical communication devices.
- Next generation of laser ranging system for Japanese test satellite with a distance of geosynchronous satellite or further.
- The approach includes
  -Miniatulization of laser: pulsed laser/photon receiving SLR
  -CW modulation based ranging :Baseline of current device components using 2Gbps rate pseudo noise in communication channel on 1.5um wavelength Er doped fiber amplification device and wide-band real-time correlator.