ILRS SLR Mission Support Request Form

SECTION I :MISSION INFORMATION

General Information

Satellite Name:	SOHLA-1	Satellite Host Name:	Astro-Technology SOHLA
Web Address:	http://www.sohla.com/		
Primary Technical Contact:	Harushige Noguchi	Alternate Technical Contact	Takahiro Inoue
Address	Consolidated Space Tracking and Data Acquisition Department 2-1-1 Sengen,Tsukuba, Ibaraki,Japan	Address	Consolidated Space Tracking and Data Acquisition Department 2-1-1 Sengen,Tsukuba, Ibaraki,Japan
Phone No.	+81 29 868 2610	Phone No.	+81 29 868 2627
FAX No.	+81 29 868 2990	FAX No.	+81 29 868 2990
Web Address	http://god.tksc.jaxa.jp/	Web Address	http://god.tksc.jaxa.jp/
Email Address	noguchi.harushige@jaxa.jp	Email Address	inoue.takahiro@jaxa.jp
Primary Science Contact	Hidekazu Hashimoto	Alternate Science Contact	Koji Nakaya
Address	Space Technology Demonstration Research Center 2-1-1 Sengen,Tsukuba, Ibaraki,Japan	Address	Space Technology Demonstration Research Center 2-1-1 Sengen,Tsukuba, Ibaraki,Japan
Phone No.	+81 29 868 2170	Phone No.	+81 29 868 2184
FAX No.	+81 29 868 2966	FAX No.	+81 29 868 2966
Web Address	—	Web Address	-
E-mail Address	hashimoto.hidekazu@jaxa.jp	Email Address	nakaya.koji@jaxa.jp

MISSION SPECIFICS

Scientific or Engineering Objectives of Mission:	SOHLA-1 is a technical demonstration satellite developed by local SMEs (small and medium-sized enterprises) with technical support of Japan Aerospace Exploration Agency (JAXA) and Osaka Prefecture University. The main objective of SOHLA-1 is to acquire and to accumulate various technologies for small satellite development. Anothre mission of SOHLA-1 is on-orbit demonstration of several new technologies such as the VHF lightning impulse measurement .
Satellite Laser Ranging (SLR) Role of Mission:	SLR will be used for the calibration of GPS-based satellite positioning. The micro GPS receiver used in this mission has been developed by JAXA based on COTS automobile navigation technology.
Anticipated Launch Date:	2009.01.23
Expected Mission Duration:	2009.03.09 - 2009. 03.22 *We plan to carry out the second ILRS tracking campaign on SOHLA-1 in the later operation phase (TBD) of the satellite.
Orbital Accuracy	meter order

ANTICIPATED ORBITAL PARAMETERS

Altitude:	666 km	Frequency of Orbital Maneuvers	None
Inclination:	98.06 deg	Mission Timeline:	1 year
Eccentricity:	0.001		
Orbital Period	1.6 hours		

TRACKING REQUIREMENTS

Tracking Schedule:	Start of tracking immediately after C/O phase. We request the ILRS tracking campaign on SOHLA for March 9 through March 22. Tracking prediction file (CPF) will be distributed by CDDIS server. During the tracking campaign, JAXA provides the stations with CPF(N-1 ~ N+5) everyday at 08:00(UT).

Spatial Coverage:	All over the world. SOHLA-1 is spinning satellite. Axis of spinning is fixed to inertial reference frame. Therefore, there is spatial restriction, in which SLR can get laser pulse return. JAXA analyzed that where the SLR station can make link to SOHLA-1. From the analysis, we find that the return becomes intermittent. However, there is no need to distribute additional information other than CPF to the stations.
Temporal Coverage:	All times

OPERATIONS REQUIREMENTS

Predicition center:	JAXA	Priority of SLR for POD:	Second. but it is needed SLR while evaluation of GPS.
Prediction Technical Contact Inf:	Shinichi Nakamura		
Address:	Consolidated Space Tracking and Data Acquisition Department 2-1-1 Sengen,Tsukuba, Ibaraki,Japan	Other Sources of POD (GPS, PRARE, Doppler, etc.)	GPS
Phone No.:	+81 29 868 2625	Normal Point Time Span (sec)	5 seconds
Fax No.:	+81 29 868 2966	Tracking Network Required	Full
E-mail Address:	nakamura.shinichi@jaxa.jp		

Other Comments:	More detailed information are shown in the "SOHLA-1 SLR Tracking Standards" and the "SLR Return Analysis for SOHLA-1", which is presented at 15th ILRS meeting.

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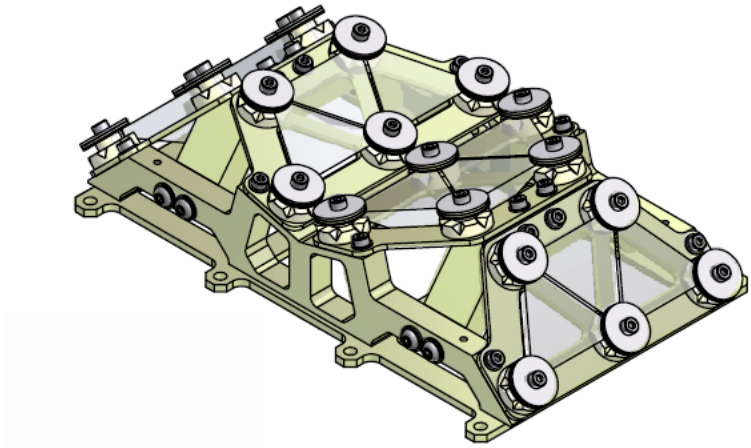
SECTION III: Retroreflector Information

Satellite Name	SOHLA-1
Contact for Retroreflector Information	(1st) Koji Nakaya (2nd) Shinichi Nakamura
Phone Number	+81-29-868-2184 (Nakaya) +81-29-868-2625 (Nakamura)
E-mail Address	nakaya.koji@jaxa.jp Nakamura.shinichi@jaxa.jp

1.Array Type (spherical, hexagonal, planar, etc) to include a diagram or photograph

Modified hexagonal array. Laser reflector consists of 12 prisms.



2. Array manufacturer

Space Technology Demonstration Research Center, JAXA

3. Link (URL or reference) to any ground-tests that were carried out on the array

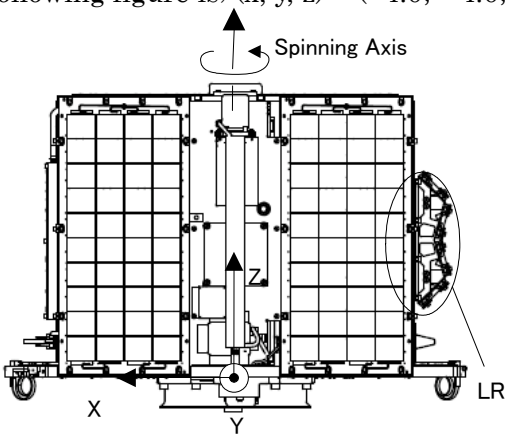
Since this LRA is same as AJISAI, the LRA's performance, such as optical test, ground test, and environment testing, have already evaluated. Therefore, we did not perform performance test.

4. The LRA design and/or type of cubes was previously used on the following missions:

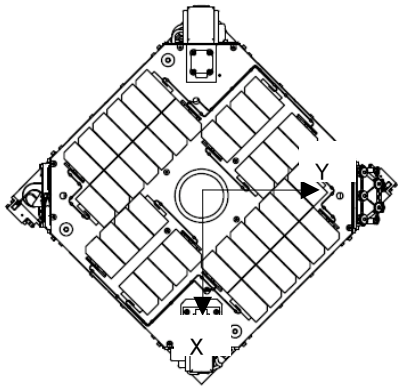
Prisms are same as Ajisai and LRE.

5. The 3-D location (possibly time dependent) of the satellite's mass center relative to a satellite-based origin:

The position of the satellite's mass center relative to the satellite system coordinate shown in the following figure is; (x, y, z) = (+4.0, -4.0, +255) [unit: mm].



SIDE VIEW



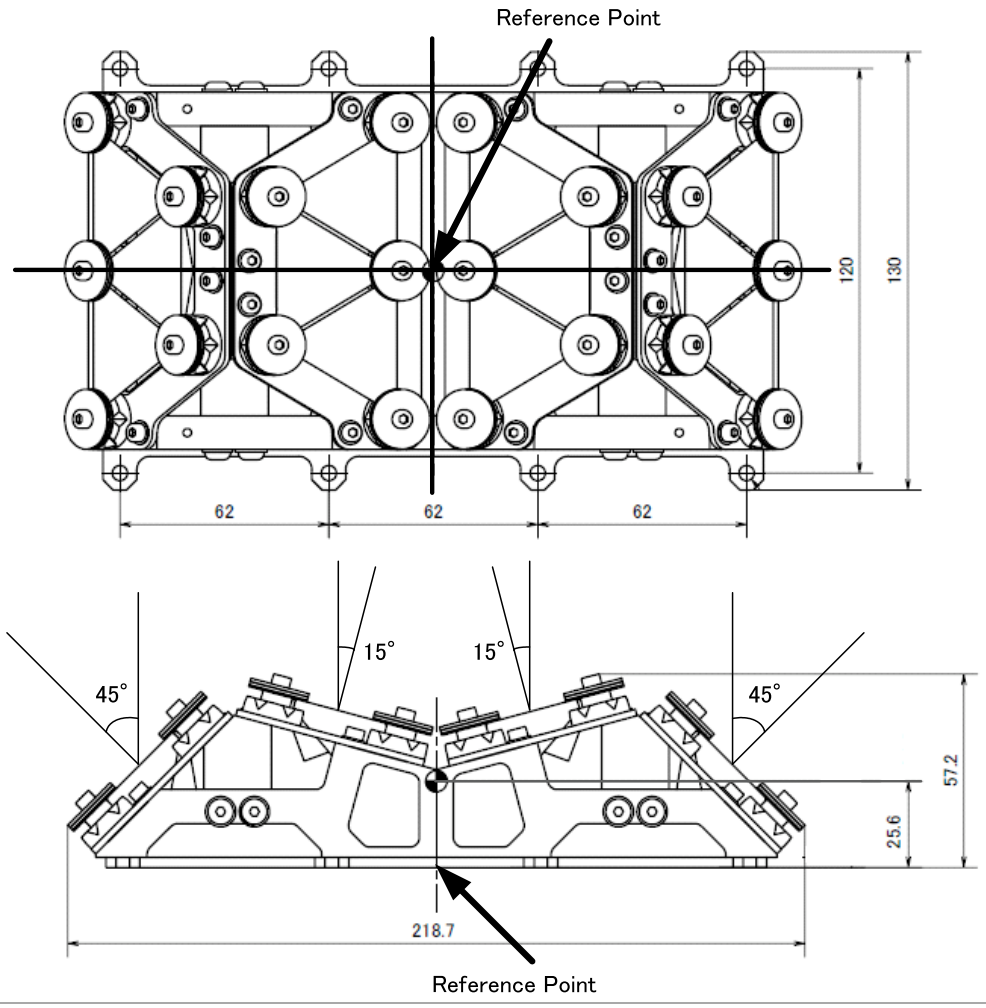
BOTTOM VIEW

6. The 3-D location of the phase center of the LRA relative to a satellite-based origin:

Not Defined.

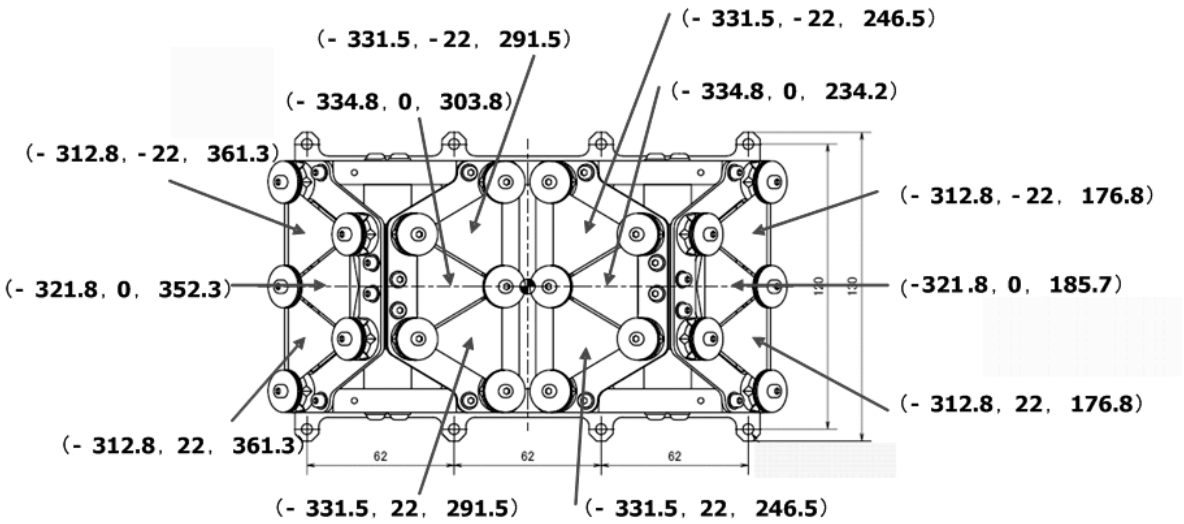
7. The position and orientation of the LRA reference point (LRA mass-center or marker on LRA assembly) relative to a satellite-based origin:

The position of the LRA reference point shown in the following figure is; (x, y, z) = (-286.8, +55, +269) [unit: mm].

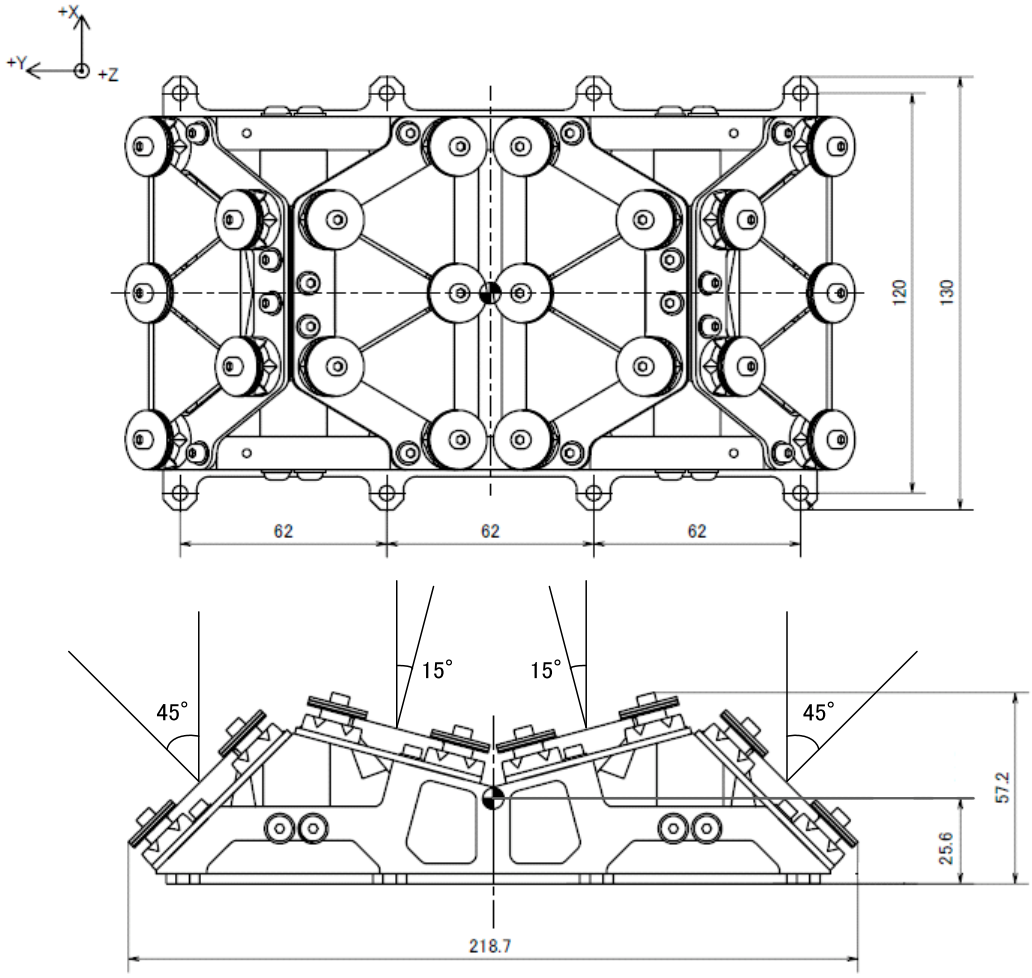


8. The position (x, y, z) of either the vertex or the center of the front face of each corner cube within the LRA assembly, with respect to the LRA reference point and including information of amount of recession of front faces of cubes:

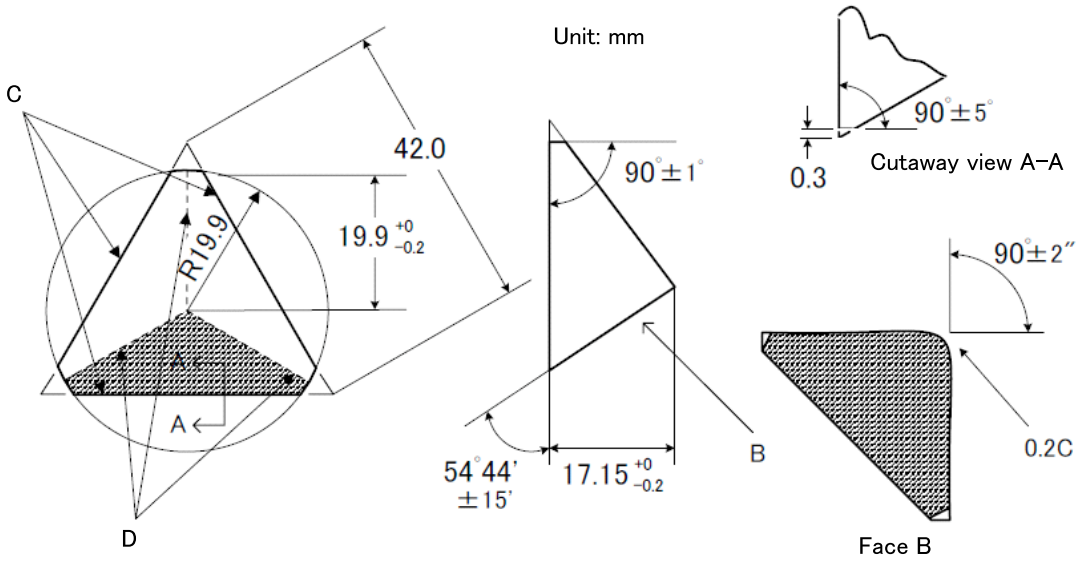
The position of the center of the front face of each corner cube is shown in the following figure.



9. The orientation of each cube within the LRA assembly (three angles for each cube):



10. The shape and size of each corner cube, especially the height:



11. The material from which the cube are manufactured (e.g. quartz)
Material: BK7
12. The refractive index of the cube material, as a function of wavelength λ (micron)
n=1.51872 for 546.1 nm
13. Dihedral angle offset(s) and manufacturing tolerance:
We did not consider dihedral angle.
14. Radius of curvature of front surface of cubes, if applicable:
Not applicable.
15. Flatness of cubes' surfaces (as a fraction of wavelength)
λ/10
16. Whether or not the cubes are coated and with what material:
Non coated cubes

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SECTION II: Tracking Restrictions

Can detector(s) or other equipment on the spacecraft be damaged or confused by excessive irradiation, particularly in any one of these wavelengths (532nm, 1063nm, 846nm, or 423nm)?	No problem.
Are there times when the LRAs will not be accessible from the ground?	SOHLA-1 is spinning satellite. Axis of spinning is fixed to inertial reference frame. Therefore, there is spatial restriction, in which SLR can get laser pulse return.From the analysis, we find that the return becomes intermittent. However, there is no need to distribute additional information other than CPF to the stations.

(If so, go/nogo or segmentation files might be used to avoid ranging an LRA that is not accessible.)

Is there a need for an altitude tracking restriction?	No.	Is there a need for a pass segmentation restriction?	No.
Is there a need for a go/no-go tracking restriction?	No.	Is there a need for a laser power restriction?	No.
Is manual control of transmit power acceptable?	Yes.		

Please initial here to express agreement: Hidekazu Hashimoto

Other comments on tracking restrictions: More detailed information are shown in the "SOHLA-1 SLR Tracking Standards" and the "SLR Return Analysis for SOHLA-1", which is presented at 15th ILRS meeting.

SECTION IV: MISSION CONCURRENCE

As an authorized representative of the SOHLA-1 mission, I hereby request and authorize the ILRS to track the satellite described in this document.

Name (print): Hidekazu Hashimoto Date 2009. 2.16

Signature: Hidekazu Hashimoto

Position: Director

Send form to:

ILRS Central Bureau
c/o Carey Noll
NASA GSFC
Code 690
Greenbelt, MD 20771
USA
301-614-6542 (Voice)
301-614-6015 (Fax)
Carey.Noll@nasa.gov