ALOS Overview : Time-restricted operation

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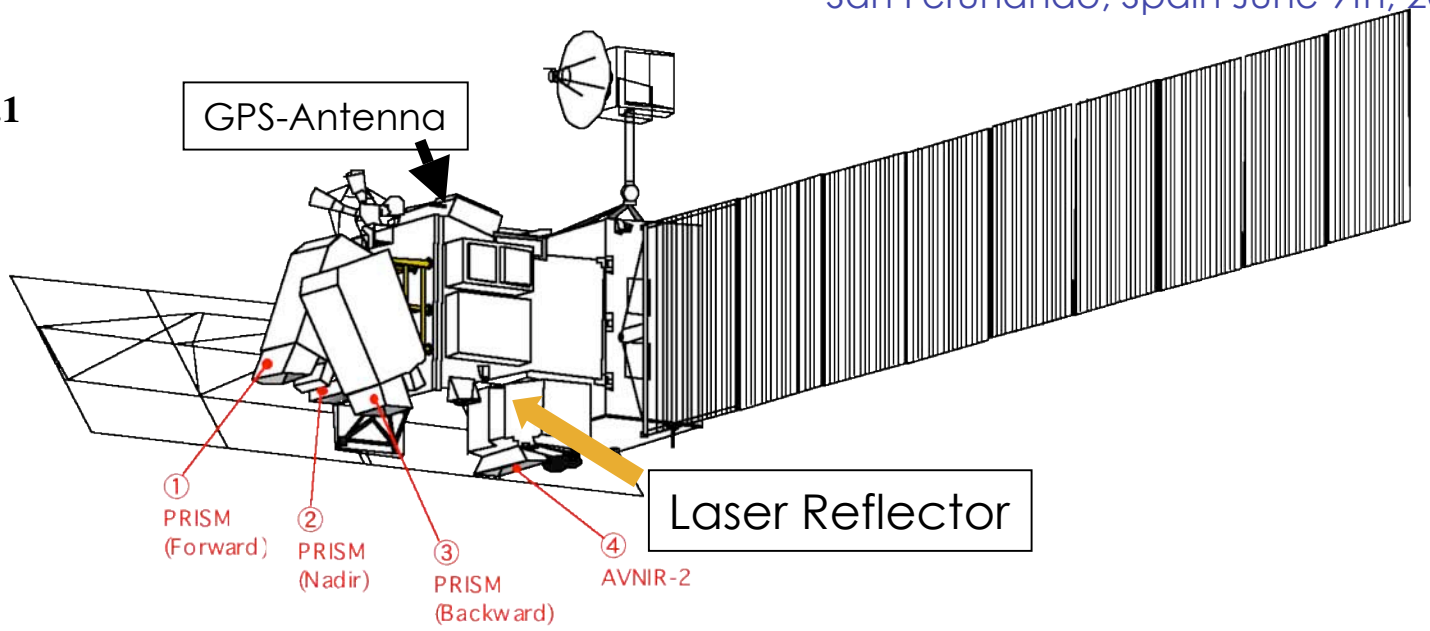
Fig.1



ALOS carries multiple sensors in which there are ones sensible to optical interference/hazard possibility by SLR , namely PRISM and AVNIR-2.

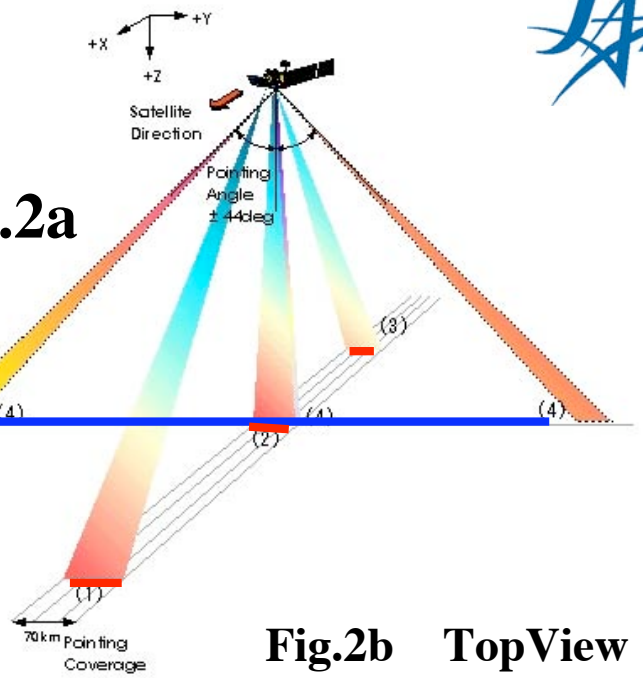
PRISM: Panchromatic Remote-Sensing Instrument for Stereo Mapping

AVNIR-2 : the Advanced Visible and Infrared Radiometer type-2

Restricted Area of ALOS

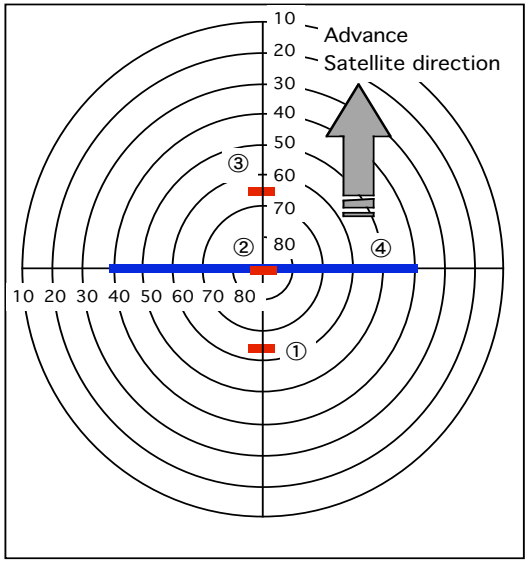
The two sensible sensors looking view from satellite toward the ground consists of 3 small beams and one scanning beam shown in Figure 2a and 2b.

Fig.2a



(1),(2) and (3) shows the transmitting restriction area by PRISM sensor and (4) is a transmitting restriction area by AVNIR-2. PRISM sensor consists of three components and the restriction area has separated into three. On the other hand, AVNIR-2 is side-by-side looking with +/- 44 degrees scan width. Above of a figure is +X axis as an advance satellite direction.

Fig.2b TopView



---> Required complicated conditions to SLR operation

The influence on SLR Operation

Figure 3 shows ground tracks of ALOS ascending node passes during 46 days recurrent cycle (Fig3a: first half, Fig3b: the second half) at Herstmonceux (HERL/7840) as an example.

Number of passes affected by restriction among 151 passes are summarized in Table 1.

- No restriction required : El< 32 or less.
- One restriction (a several seconds max 10 seconds) required : EL > 32 EL< 80
- Multiple restriction required: EL>80

Fig.3a,b Ground Tracks on a station

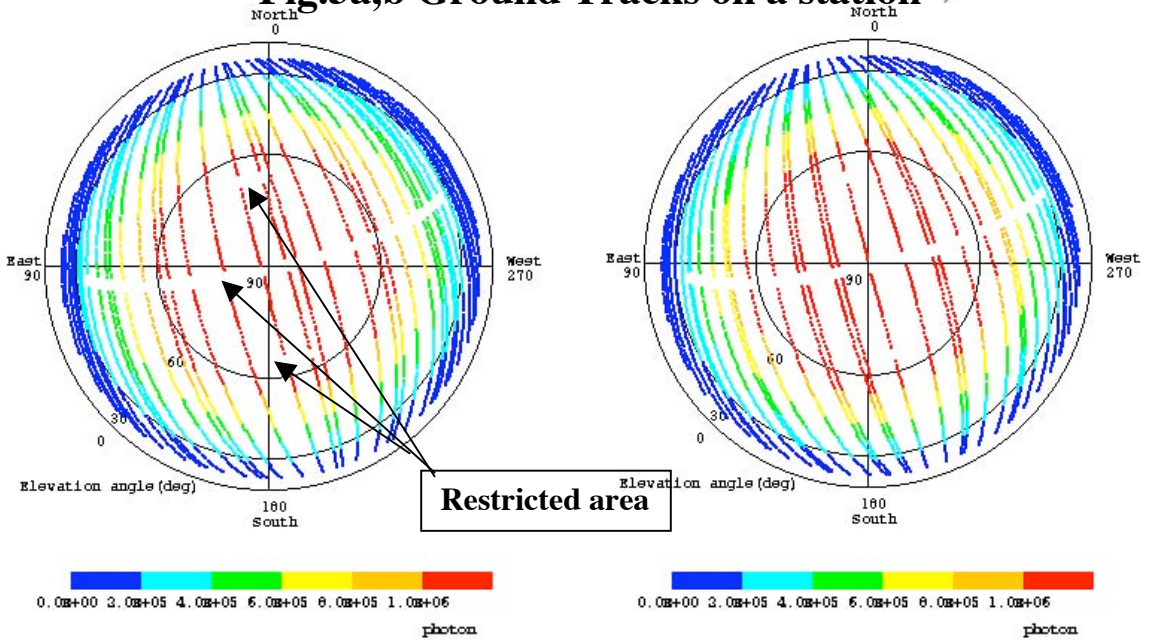


Table 1a Summary of pass

The number of times which crosses SLR restriction area per pass	The number of pass which is exceeding 20 degrees elevation(%)	Max elevation of zone at SLR station (degrees)
NONE	53(35.1)	<32.4
1	90(59.6)	32.4<81.8
2	2(1.3)	81.8<83.4
3	6(4.0)	83.4<
Total	151(100)	-

Table 1b : Duration of restriction

	Minimum	Maximum	Average
Crossing time of SLR restriction area (seconds)	5	10	7.7

Operation procedure

-JAXA to deliver IRV and associated time-restriction information* to the registered station directly.
 * : an example attached.

-Station to send JAXA an acknowledge information before SLR tracking.

-After the tracking ALOS, Station to inform JAXA of tracking result (actual laser start/stop time), as well as QLNP send to JAXA directly and data center.

-JAXA to organize a preparatory campaign for station qualification in which before the ALOS campaign starts. Stations will track a normal satellite (such as AJISAI) with time-restricted operation JAXA proposed.

Attachment: Example of Time-Restriction Information (The same format as ADEOS2 Phase2 campaign)

- Satellite : ADEOS2
- Station : CRLS(7308)
- Data Span : 2003/01/22 00:00:00 - 2003/01/29 00:00:00(UTC)
- Maneuver : 2003/01/23 21:04:52 - 2003/01/23 21:05:34(UTC)

START TIME	STOP TIME	LENGTH	START AZ/EL	MAX EL AZ/EL	END AZ/EL	PASSES AFTER MANEUVER
2003/01/22 00:18:49 -	2003/01/22 00:23:32	(00:04:43)	60.9/15.0	94.2/20.0	126.4/15.4	
2003/01/22 01:57:07 -	2003/01/22 02:01:53	(00:04:46)	354.5/15.1	289.1/42.9	267.0/40.5	
2003/01/22 11:35:46 -	2003/01/22 11:39:42	(00:03:56)	111.3/15.0	67.1/24.8	51.9/23.7	
2003/01/22 13:14:33 -	2003/01/22 13:20:12	(00:05:39)	201.6/15.0	262.0/35.7	300.9/27.9	
2003/01/23 01:31:55 -	2003/01/23 01:36:54	(00:04:59)	8.6/15.0	285.7/75.6	234.3/67.8	
2003/01/23 12:49:03 -	2003/01/23 12:54:19	(00:05:16)	178.9/15.1	258.8/63.7	305.1/53.9	
2003/01/24 01:07:05 -	2003/01/24 01:12:13	(00:05:08)	22.6/15.1	101.4/62.2	141.7/55.2	***
2003/01/24 02:50:34 -	2003/01/24 02:50:43	(00:00:09)	297.7/15.0	296.8/15.0	295.8/15.0	***
2003/01/24 12:24:07 -	2003/01/24 12:29:00	(00:04:53)	157.7/15.1	74.9/74.0	30.4/68.1	***

*The procedure can be applied once the station can implement user-defined laser interlock. What CRL did in the last campaign was that we wrote a short codes(having function of **watch-dog** with timer) in PC, and it disabled one of trigger chain to laser fire through serial interface according to the information listed here.*