

HEO and Moon tracking in Grasse Meo station (7845)

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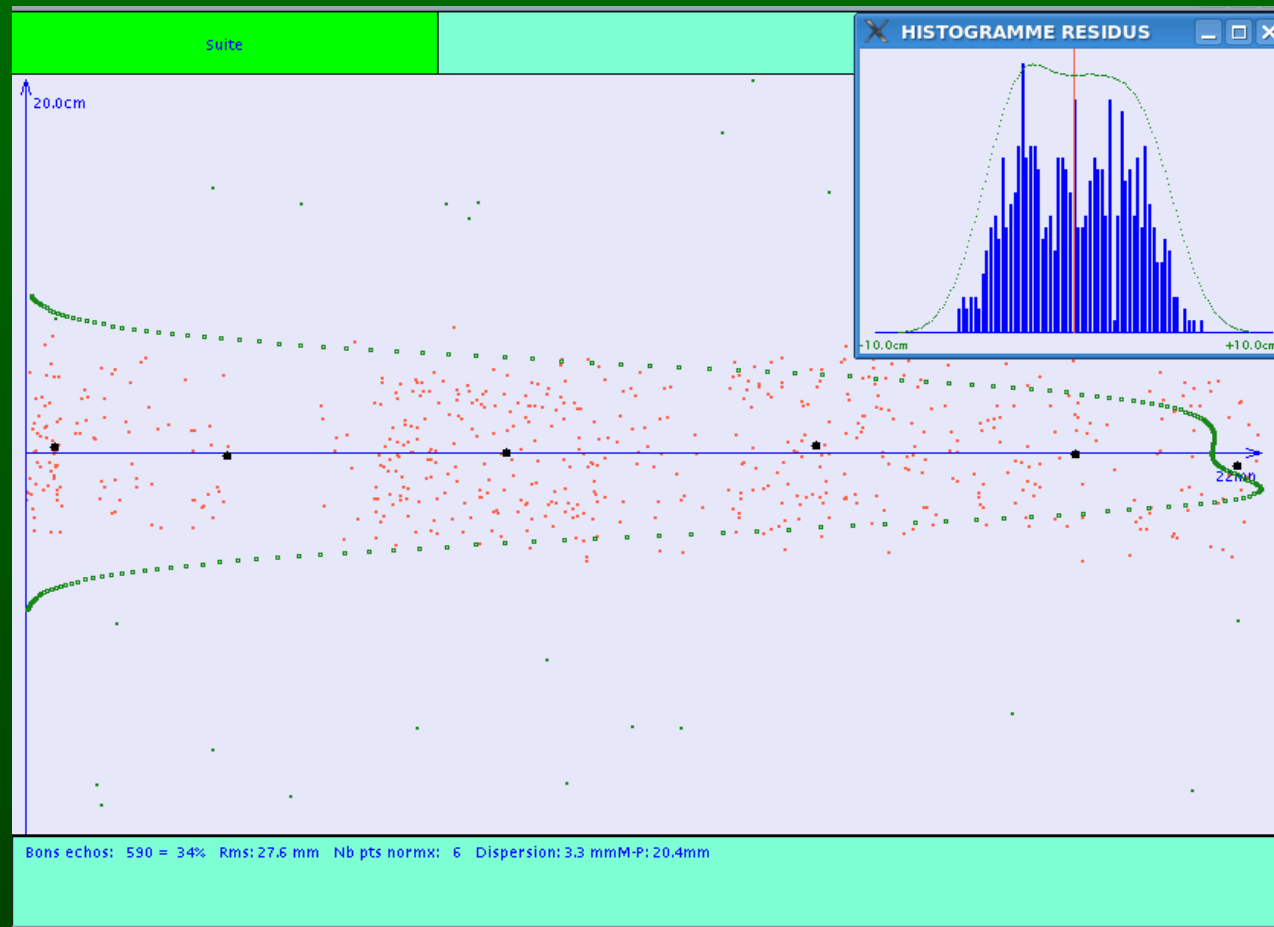
MeO capability

- Maximum speed : $5^{\circ}/\text{sec}$
- Minimum elevation : 4°
- Observers : 14 (3 permanents)
- Laser : 20ps/50mJ/10Hz
- Detection : Single photon level
- Period : Day and night on all targets

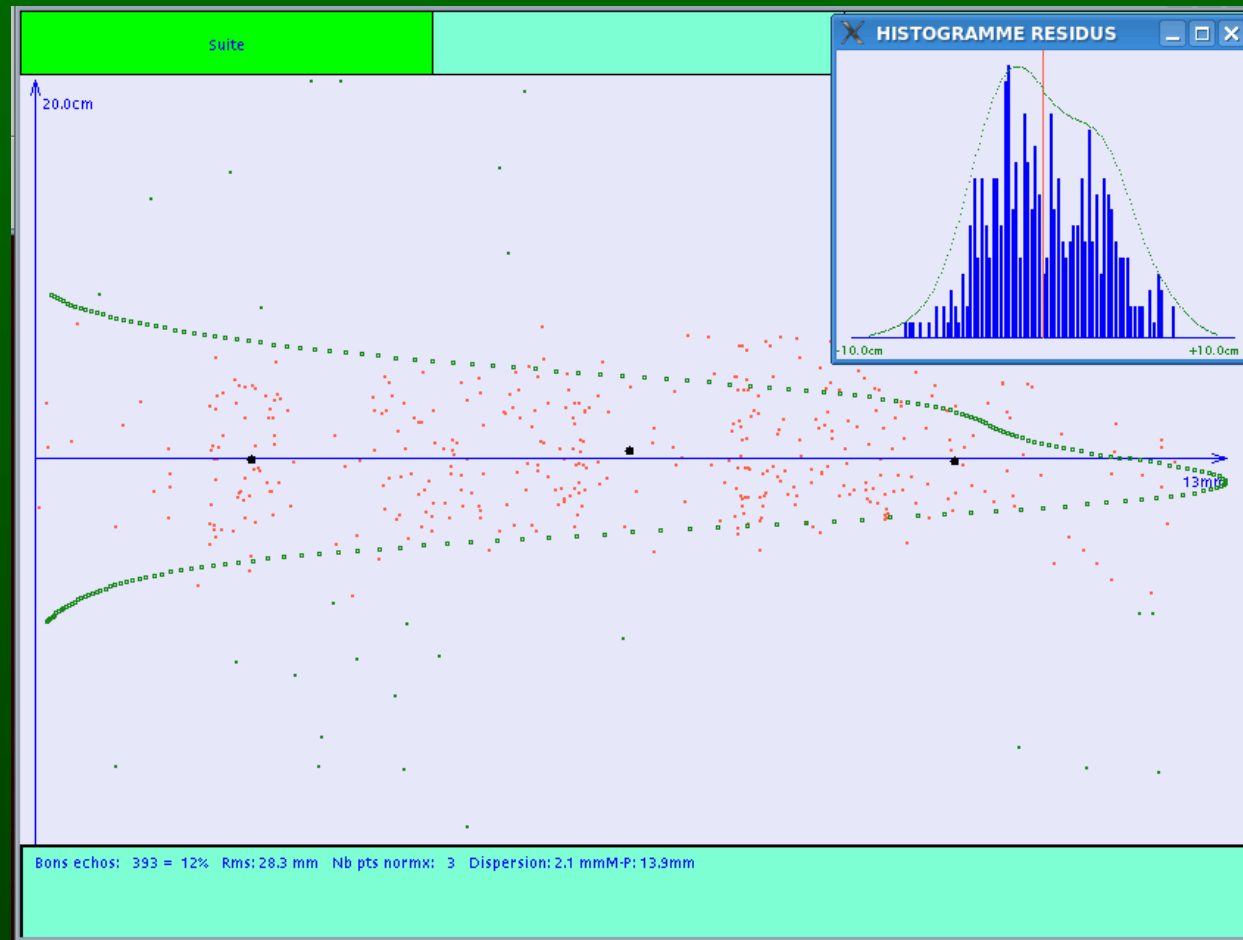
Current priorities

Priority	Mission	ILRS Name	COSPAR ID	SIC	Sponsor	Altitude (km)	Inclination (degrees)
1	GOCE	goce	0901301	0499	ESA	295	96.7
2	ANDE Castor/Pollux	andec andep	0903806 0903805	1073 1074	NRL	350	51.6
3	GRACE-AB	gracea graceb	0201201 0201202	8003 8004	GFZ/JPL	485-500	89
4	CHAMP	champ	0003902	8002	GFZ	429-474	87.27
5	TerraSAR-X	terrasarx	0702601	6201	Infoterra/ DLR/GFZ/CSR	514	97.44
6	Envisat	envisat	0200901	6179	ESA	796	98.6
7	ERS-2	ers2	9502101	6178	ESA	800	98.6
8	Jason-1	jason1	0105501	4378	NASA/CNES	1,350	66.0
9	Jason-2	jason2	0803201	1025	NASA, CNES, Eumetsat , NOAA	1,336	66.0
10	Larets	larets	0304206	5557	IPIE	691	98.204
11	Starlette	starlette	7501001	1134	CNES	815- 1,100	49.8
12	Stella	stella	9306102	0643	CNES	815	98.6
13	Ajisai	ajisai	8606101	1500	JAXA	1,485	50
14	LAGEOS-2	lageos2	9207002	5986	ASI/NASA	5625	52.6
15	LAGEOS-1	lageos1	7603901	1155	NASA	5850	109.8
16	Beacon-C	beaconc	6503201	317	NASA	950-1300	41
17	GIOVE-B	gioveb	0802001	7002	ESA	23,916	56
18	Etalon-1	etalon1	8900103	0525	Russia	19,100	65.3
19	Etalon-2	etalon2	8903903	4146	Russia	19,100	65.2
20	COMPASS-M1	compassm1	0701101	2001	China	21,500	55.5
21	GLONASS-100	glonass100	0505001	9110	Russia	19,100	65
22	GLONASS-115	glonass115	0806702	9115	Russia	19,100	65
23	GLONASS-109	glonass109	0706503	9109	Russia	19,100	65
24	GLONASS-102	glonass102	0606201	9102	Russia	19,100	65
25	GPS-36	gps36	9401601	3636	US DoD	20,100	55.0
26	GIOVE-A	giovea	0505101	7001	ESA	23,916	56

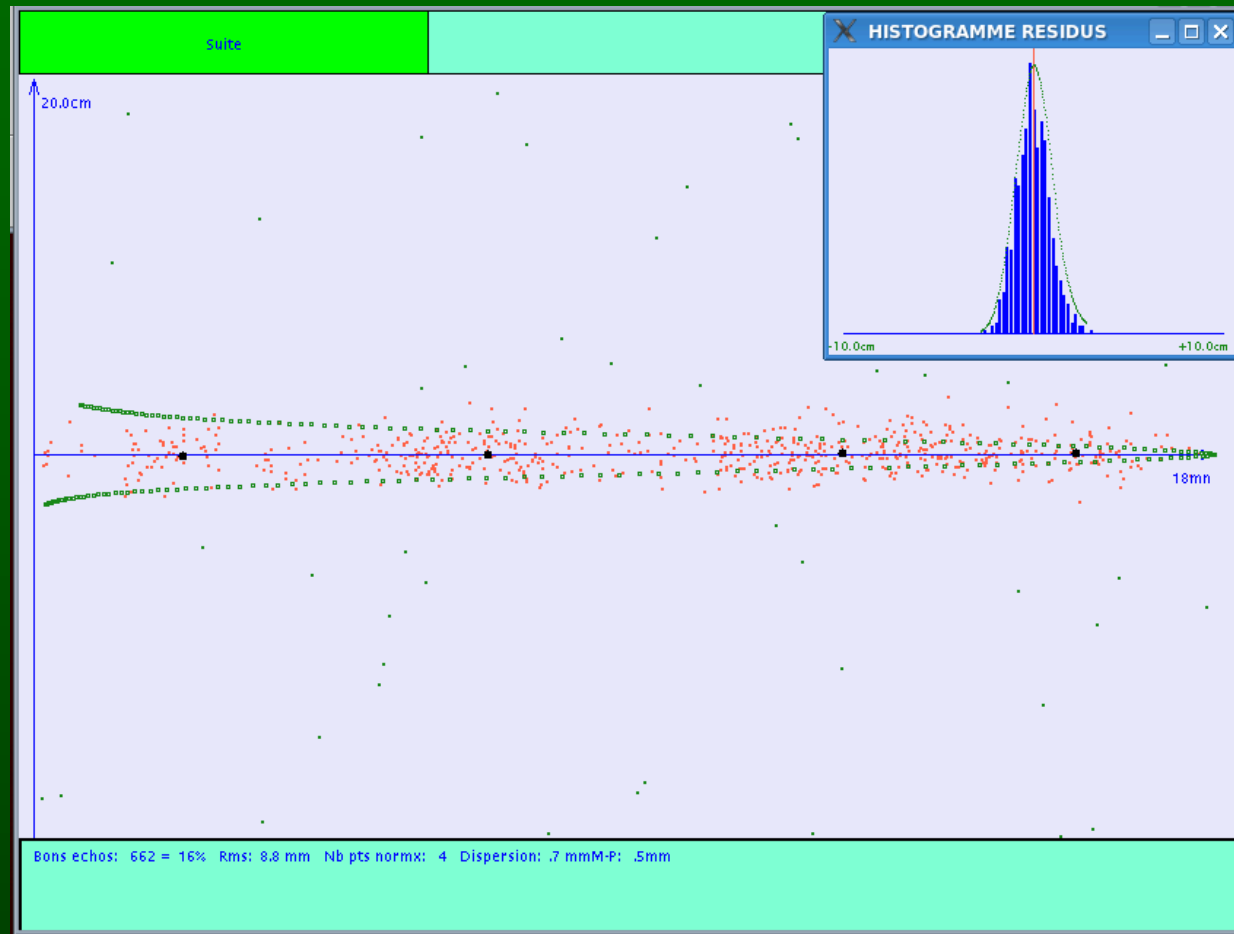
Glonass tracking



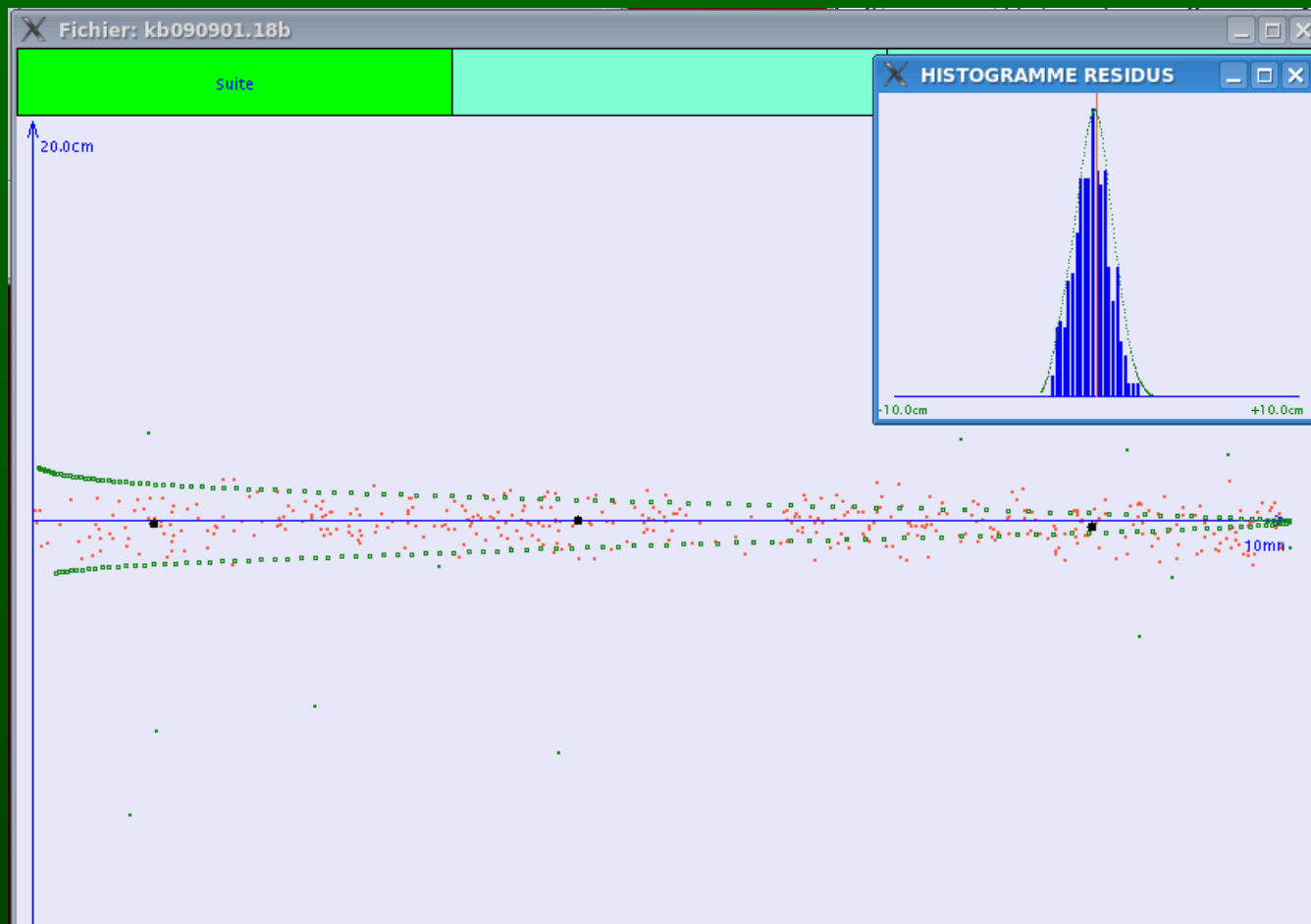
Glonass tracking



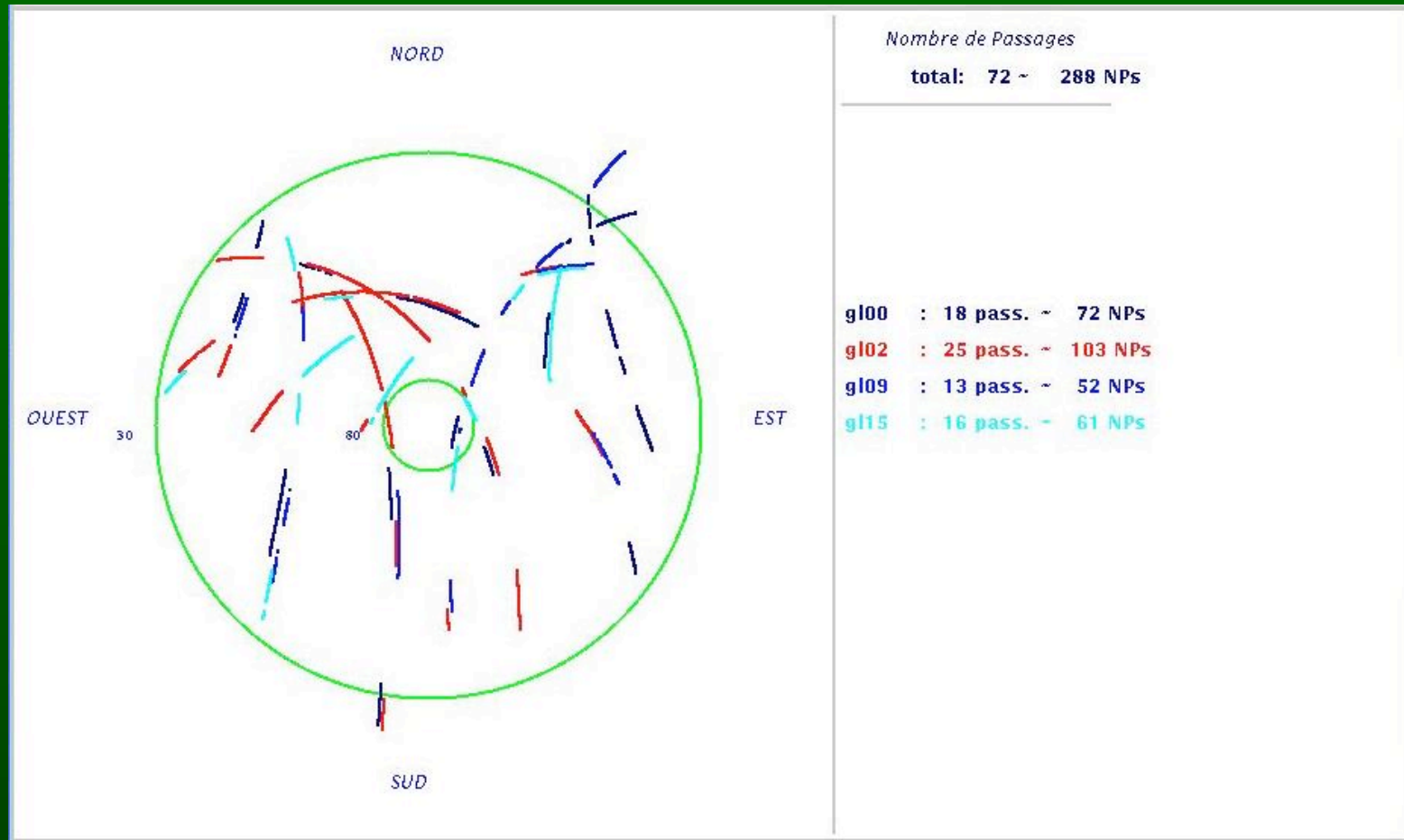
Giove B tracking



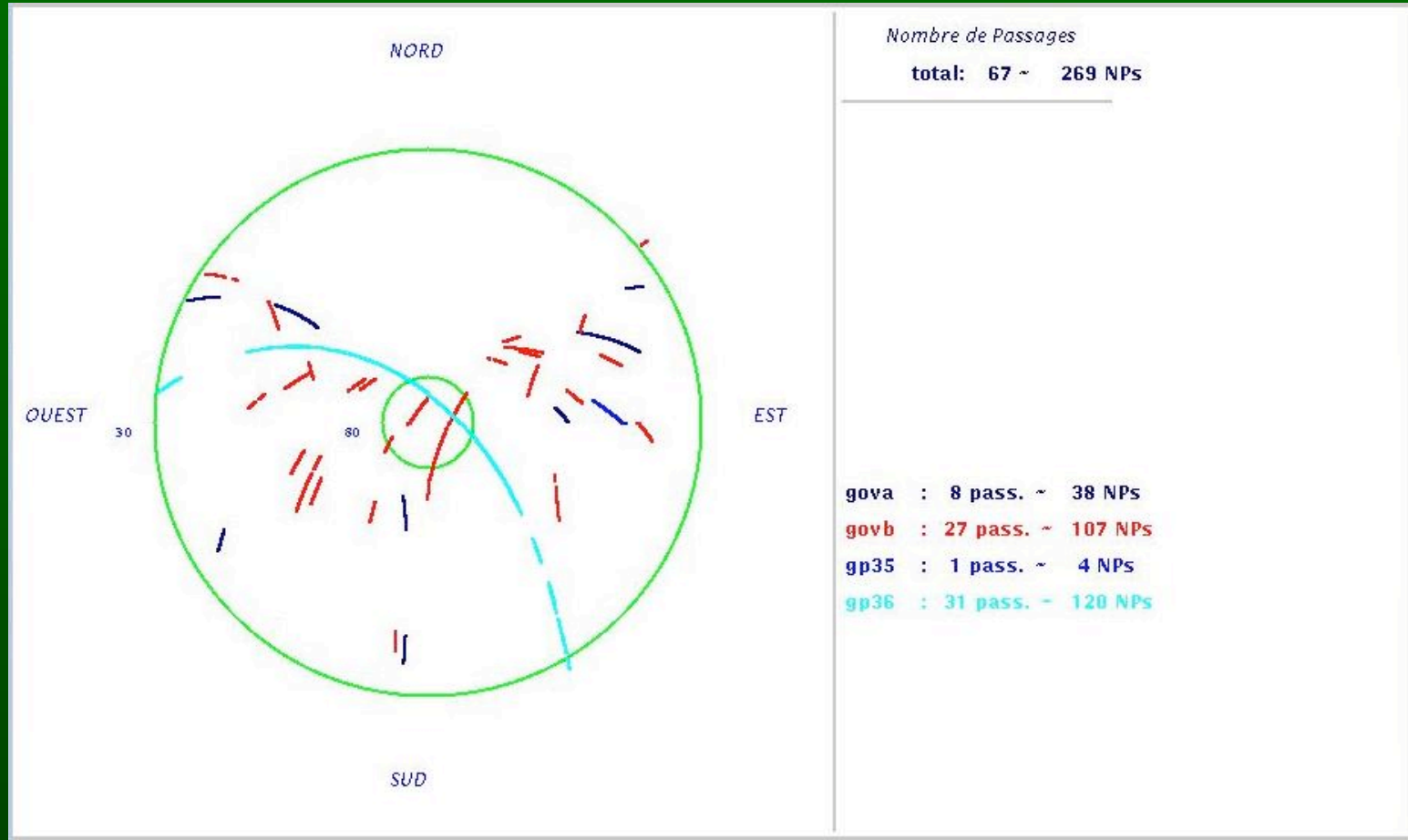
GPS 36 tracking



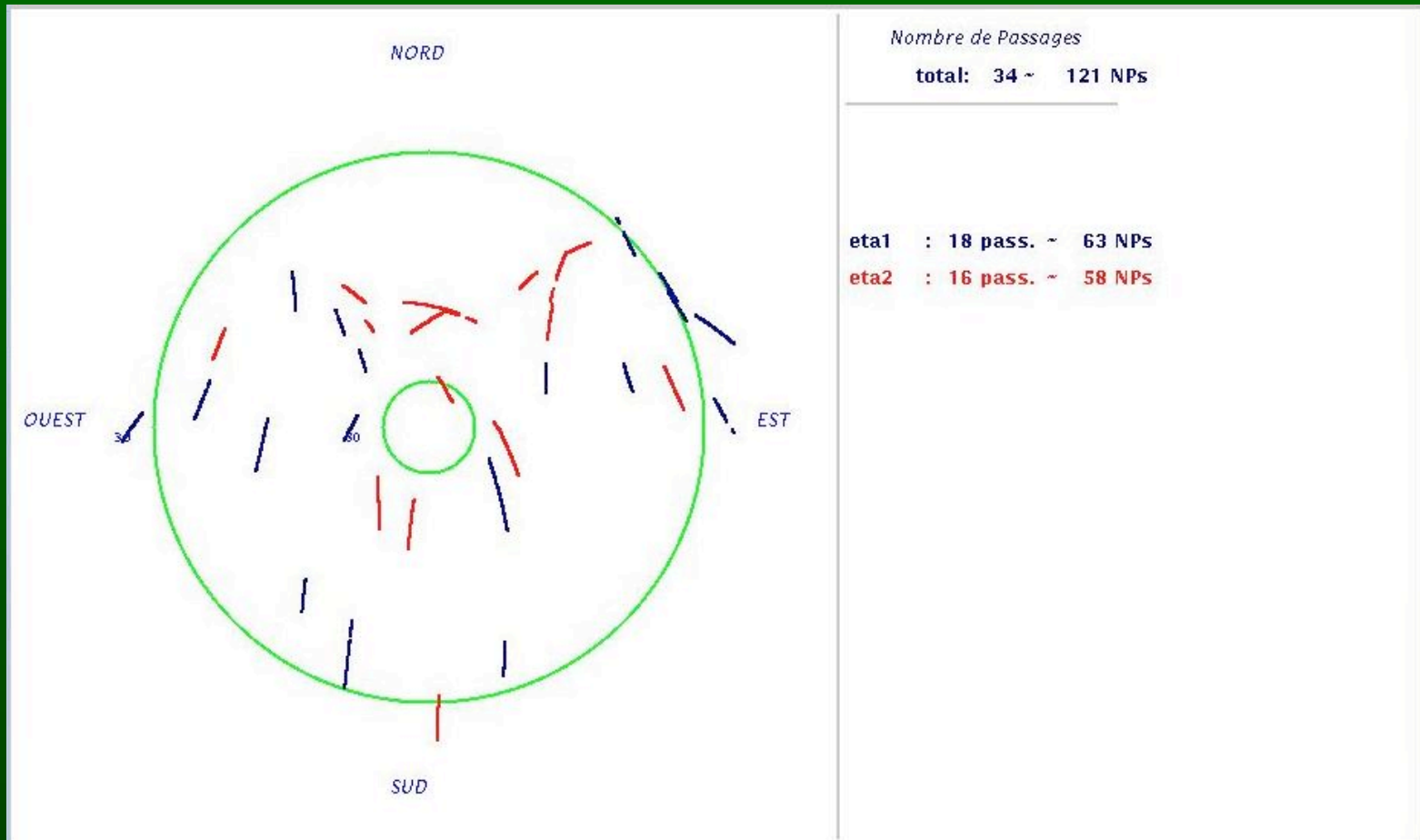
Glonass results



Giove, GPS results



Etalon results



2009 tracking

LEO	passes	NP	HEO	passes	NP
Ajis	8	134	Eta1	26	102
Env1	23	449	Eta2	27	110
Ers2	22	459	G100	18	72
Jas1	80	2134	G102	42	181
Jas2	194	6220	G109	23	100
Lag1	200	2481	G115	17	66
Lag2	135	2017	G199	4	15
Star	42	600	Gova	18	84
Stel	21	223	Govb	39	178
			Gp35	17	75
			Gp36	35	133

HEO tracking conclusion

- Thanks for CPF:
 - Pointing error less than 5 arcsec
 - Distance error less than 1.5 meter
- We need to motivate our managers (station, observatory) and the observers !
 - Priorities adapted to the stations ?
 - Support from the users
- Tracking needed:
 - Day tracking, night tracking
 - Period: 30° / elevation max / 40°
 - Number of normal points per pass
- 2009 results: 991 passes, 15833 NP (GNSS: 213 passes, 904 NP)

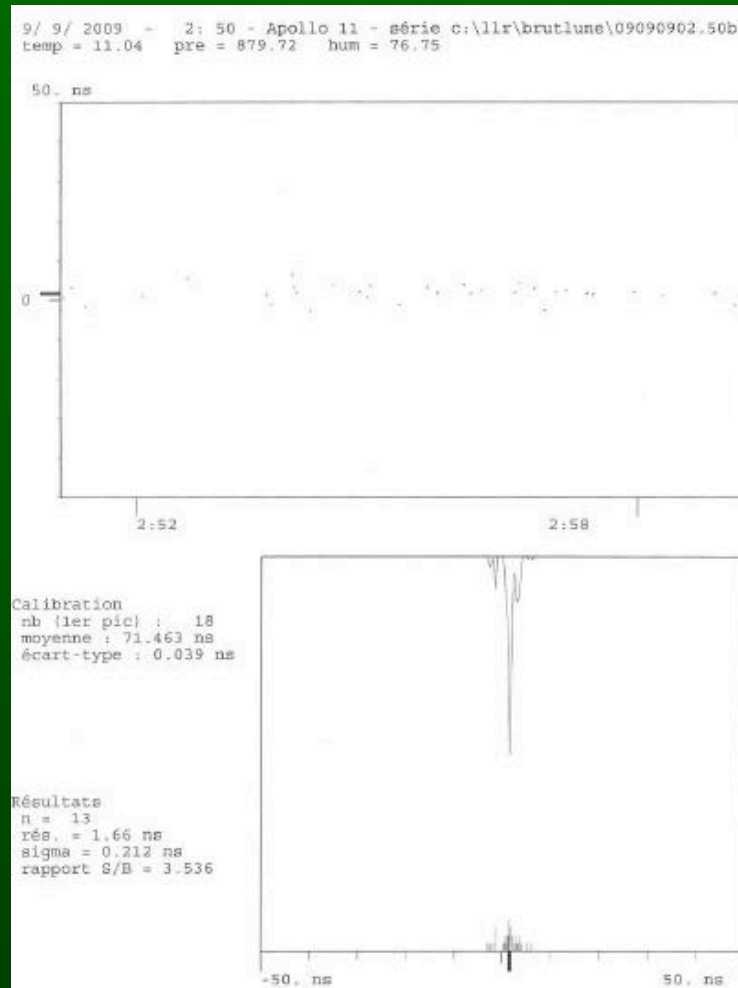
Moon tracking

- We need to re-coat the secondary mirror and the mirror 3.

Only 20% of efficiency today.

- We need to restart the « old » laser:
150 ps, 150 mJ, 10 Hz

First results with the new station



Thanks !!!

International Technical Laser Workshop, Metsovo, Greece

