

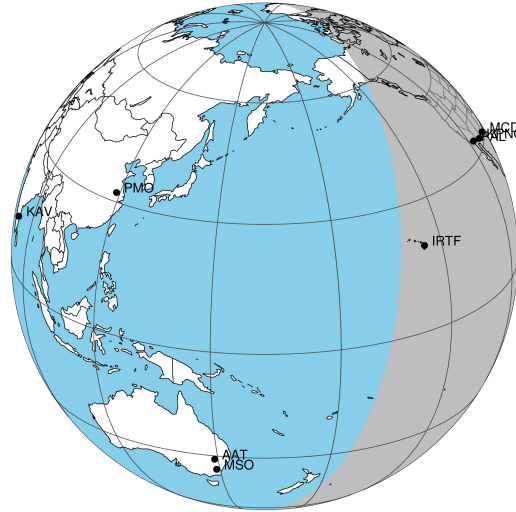
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2033-04-25T05:08:23.690
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3425086511320434304
 2Mass ID (if available) : 06101253+2246219

Saturn 2033-04-25T05:08:23 K9.84 G12.78 PgtRgt

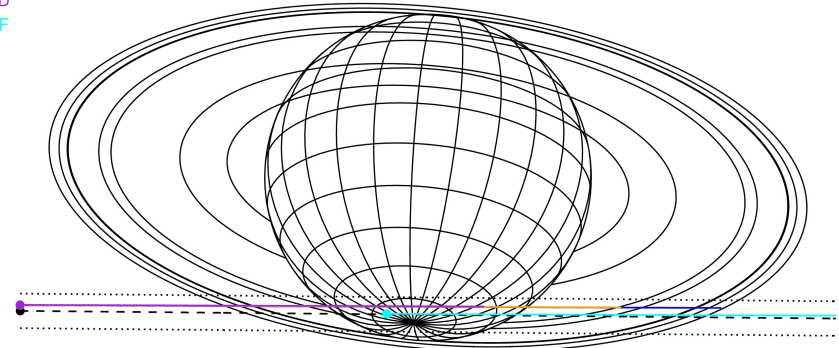
ICRS Star Coord at Epoch: 06h 10m 12.53534s +22:46:21.91051s

RUWE (>1.4 is poor) : 1.14
 K magnitude : 9.835
 G magnitude : 12.783
 RP magnitude : 11.919
 BP magnitude : 13.550
 DUPflag : 0
 Distance (au) : 9.518
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.66
 Sun-Target sep (deg) : 57.50
 Sun-Moon sep (deg) : 111.55
 B (ring opening deg) : -26.67
 PA of pole (deg) : -5.73

Saturn 2033-04-25T05:08:23 K9.84 G12.78
 PgtRgt



Earth
 PAL
 KPNO
 MCD
 IRTF

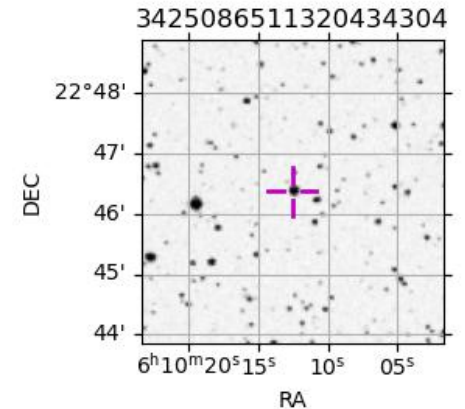


2033-04-25T05:08:23.6900 ex: 06 10 12.5353 s: +22 46 21.911 C/A 7.342° PA 359.46 deg v_sky +25.66 km/s D 09.52 AU
 Credit: Styled after SORA/Lucky Star

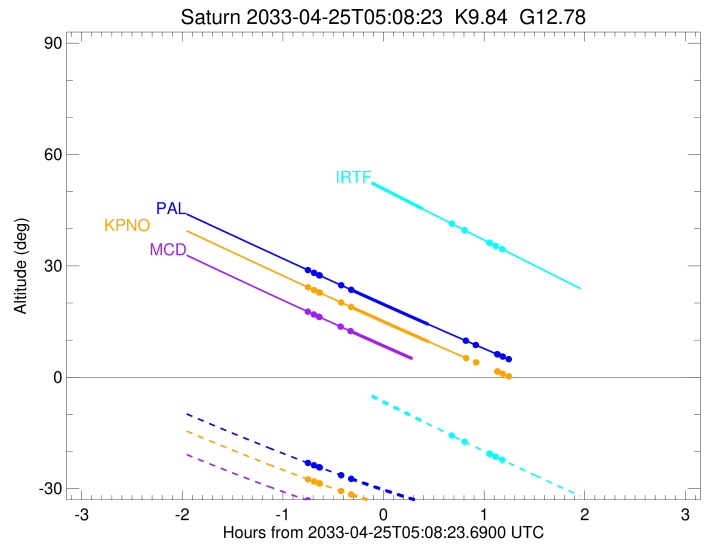
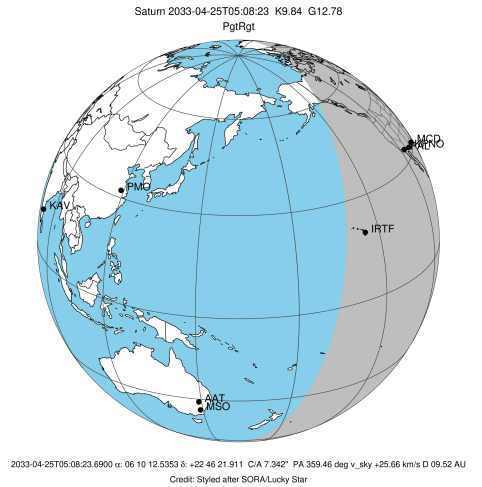
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+ + + + +	+ +	+ + + + +	APR 25 04:23 - APR 25 06:19	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + +	+ +	+	APR 25 04:23 - APR 25 05:57	PieRie
MCD	McDonald Obs.	30.7	256.0	+ + + + +	+		APR 25 04:23 - APR 25 04:49	PinRin
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+ + + + +	APR 25 05:32 - APR 25 06:19	PneRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn

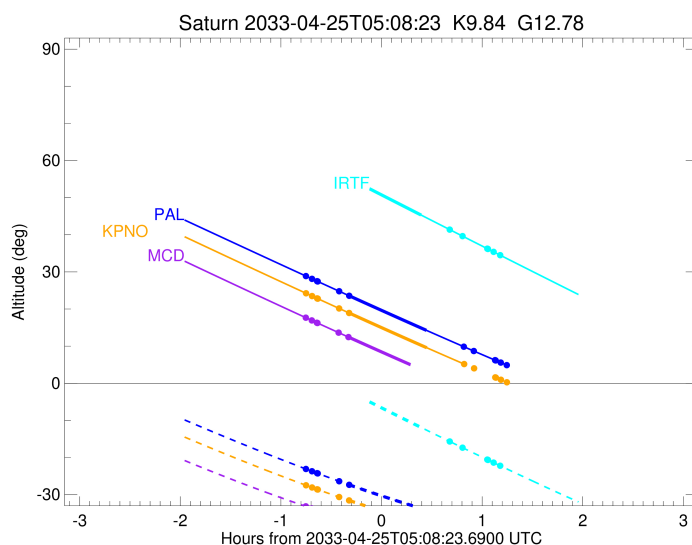
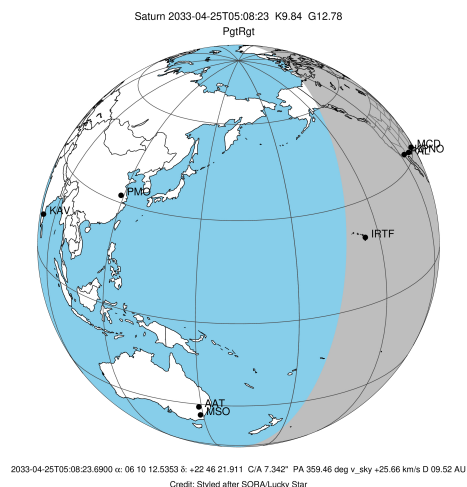


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2033-04-25T05:12:00.850
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3425086511320434304
 2Mass ID (if available) : 06101253+2246219
 ICRS Star Coord at Epoch: 06h 10m 12.53534s +22:46:21.91051s
 RUWE (>1.4 is poor) : 1.14
 K magnitude : 9.835
 G magnitude : 12.783
 RP magnitude : 11.919
 BP magnitude : 13.550
 DUPflag : 0
 Distance (au) : 9.518
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.66
 Sun-Target sep (deg) : 57.50
 Sun-Moon sep (deg) : 111.57
 B (ring opening deg) : -26.67
 PA of pole (deg) : -5.73
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.923
 C/A sky separation (km) : 47789.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



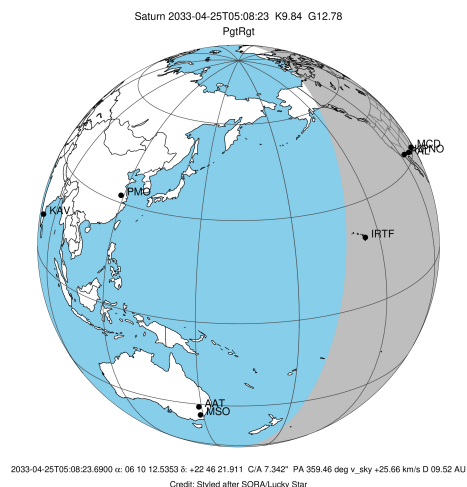
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2033-04-25T04:23:20.926		28.87	-23.09	140461.00	-17.31		
A (OER)	I	2033-04-25T04:26:57.566		28.13	-23.71	136774.40	-16.71		
Encke (OEG)	I	2033-04-25T04:30:01.793		27.49	-24.22	133744.89	-16.17		
Encke (IEG)	I	2033-04-25T04:30:21.721		27.43	-24.28	133423.31	-16.11		
A (IER)	I	2033-04-25T04:43:10.237		24.79	-26.39	122050.38	-13.37		
B (OER)	I	2033-04-25T04:49:05.241	b	23.58	-27.35	117571.16	-11.84		
Saturn	I	2033-04-25T04:49:00.006		23.60	-27.33	59423.20		-50.02	-55.36
Saturn	E	2033-04-25T05:35:13.024		14.25	-34.11	59634.50		-41.44	-47.05
B (OER)	E	2033-04-25T05:57:40.288		9.81	-36.89	117571.16	11.94		
A (IER)	E	2033-04-25T06:03:32.264		8.66	-37.55	122050.38	13.48		
Encke (IEG)	E	2033-04-25T06:16:13.706		6.20	-38.88	133423.31	16.27		
Encke (OEG)	E	2033-04-25T06:16:33.437		6.14	-38.91	133744.89	16.33		
A (OER)	E	2033-04-25T06:19:35.818		5.55	-39.20	136774.40	16.89		
F ring	E	2033-04-25T06:23:10.200		4.87x	-39.54	140461.00	17.50		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2033-04-25T05:12:06.300
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 3425086511320434304
 2Mass ID (if available) : 06101253+2246219
 ICRS Star Coord at Epoch: 06h 10m 12.53534s +22:46:21.91051s
 RUWE (>1.4 is poor) : 1.14
 K magnitude : 9.835
 G magnitude : 12.783
 RP magnitude : 11.919
 BP magnitude : 13.550
 DUPflag : 0
 Distance (au) : 9.518
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.66
 Sun-Target sep (deg) : 57.50
 Sun-Moon sep (deg) : 111.49
 B (ring opening deg) : -26.67
 PA of pole (deg) : -5.73
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.913
 C/A sky separation (km) : 47722.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk

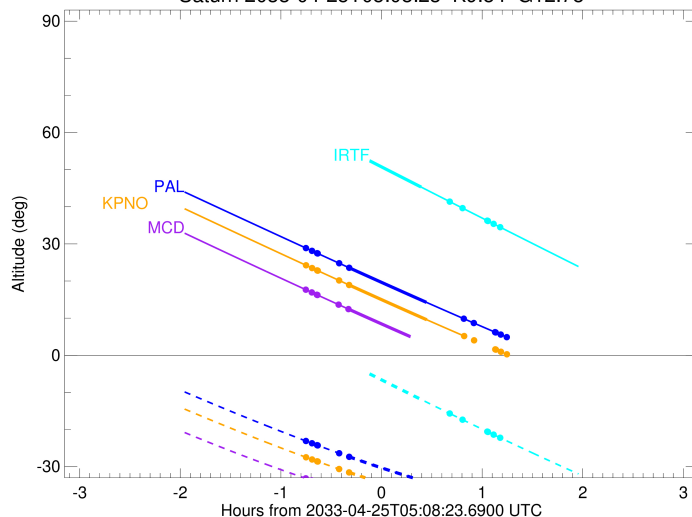


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2033-04-25T04:23:24.376		24.24	-27.48	140461.00	-17.37		
A (OER)	I	2033-04-25T04:27:00.268		23.49	-28.07	136774.40	-16.77		
Encke (OEG)	I	2033-04-25T04:30:03.814		22.86	-28.57	133744.89	-16.23		
Encke (IEG)	I	2033-04-25T04:30:23.666		22.79	-28.63	133423.31	-16.17		
A (IER)	I	2033-04-25T04:43:08.652		20.15	-30.65	122050.38	-13.44		
B (OER)	I	2033-04-25T04:49:01.437		18.95	-31.55	117571.16	-11.92		
Saturn	I	2033-04-25T04:49:03.725		18.94	-31.56	59424.95		-49.95	-55.29
Saturn	E	2033-04-25T05:35:20.120		9.58	-37.89	59636.82		-41.34	-46.96
B (OER)	E	2033-04-25T05:57:52.496		5.14	-40.37	117571.16	12.02		
A (IER)	E	2033-04-25T06:03:42.261		4.00x	-40.94	122050.38	13.56		
Encke (IEG)	E	2033-04-25T06:16:20.174		1.57x	-42.05	133423.31	16.33		
Encke (OEG)	E	2033-04-25T06:16:39.829		1.50x	-42.07	133744.89	16.39		
A (OER)	E	2033-04-25T06:19:41.527		0.93x	-42.31	136774.40	16.95		
F ring	E	2033-04-25T06:23:15.159		0.25x	-42.58	140461.00	17.56		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2033-04-25T05:12:08.970
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3425086511320434304
 2Mass ID (if available) : 06101253+2246219
 ICRS Star Coord at Epoch: 06h 10m 12.53534s +22:46:21.91051s
 RUWE (>1.4 is poor) : 1.14
 K magnitude : 9.835
 G magnitude : 12.783
 RP magnitude : 11.919
 BP magnitude : 13.550
 DUPflag : 0
 Distance (au) : 9.518
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.66
 Sun-Target sep (deg) : 57.50
 Sun-Moon sep (deg) : 111.39
 B (ring opening deg) : -26.67
 PA of pole (deg) : -5.73
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.889
 C/A sky separation (km) : 47556.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itr93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk

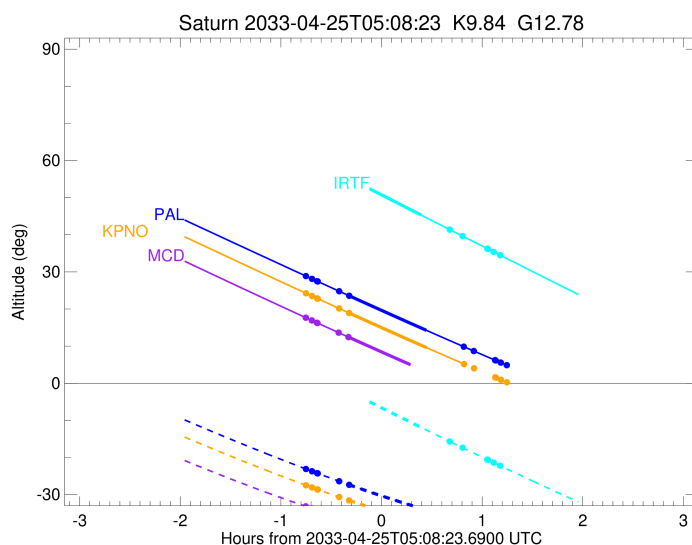
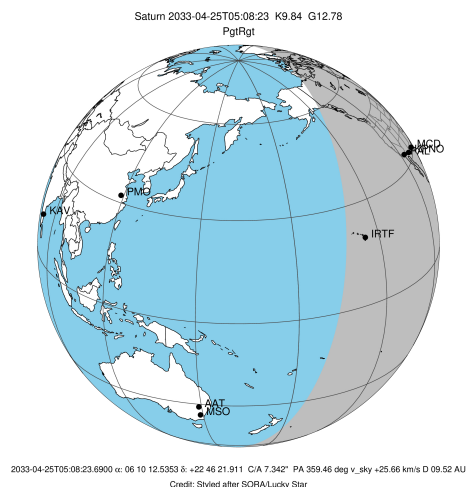


Saturn 2033-04-25T05:08:23 K9.84 G12.78



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2033-04-25T04:23:16.221		17.67	-33.16	140461.00	-17.48		
A (OER)	I	2033-04-25T04:26:50.630		16.93	-33.70	136774.40	-16.90		
Encke (OEG)	I	2033-04-25T04:29:52.812		16.30	-34.15	133744.89	-16.36		
Encke (IEG)	I	2033-04-25T04:30:12.509		16.23	-34.20	133423.31	-16.30		
A (IER)	I	2033-04-25T04:42:50.218		13.64	-36.03	122050.38	-13.60		
B (OER)	I	2033-04-25T04:48:38.295		12.45	-36.83	117571.16	-12.11		
Saturn	I	2033-04-25T04:49:00.296		12.38	-36.88	59429.61		-49.75	-55.11
Saturn	E	2033-04-25T05:35:28.795		3.07x	-42.30	59642.25		-41.12	-46.74
B (OER)	E	2033-04-25T05:58:13.574		-1.34x	-44.18	117571.16	12.21		
A (IER)	E	2033-04-25T06:03:58.696		-2.43x	-44.57	122050.38	13.72		
Encke (IEG)	E	2033-04-25T06:16:29.469		-4.79x	-45.27	133423.31	16.46		
Encke (OEG)	E	2033-04-25T06:16:48.973		-4.85x	-45.28	133744.89	16.52		
A (OER)	E	2033-04-25T06:19:49.341		-5.41x	-45.42	136774.40	17.07		
F ring	E	2033-04-25T06:23:21.531		-6.07x	-45.57	140461.00	17.67		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2033-04-25T05:11:11.630
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 3425086511320434304
 2Mass ID (if available) : 06101253+2246219
 ICRS Star Coord at Epoch: 06h 10m 12.53534s +22:46:21.91051s
 RUWE (>1.4 is poor) : 1.14
 K magnitude : 9.835
 G magnitude : 12.783
 RP magnitude : 11.919
 BP magnitude : 13.550
 DUPflag : 0
 Distance (au) : 9.518
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.66
 Sun-Target sep (deg) : 57.50
 Sun-Moon sep (deg) : 112.03
 B (ring opening deg) : -26.67
 PA of pole (deg) : -5.73
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.304
 C/A sky separation (km) : 50419.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itr93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2033-04-25T04:26:55.414		60.33	2.82x	140461.00	-15.85		
A (OER)	I	2033-04-25T04:30:53.274		59.41	1.91x	136774.40	-15.14		
Encke (OEG)	I	2033-04-25T04:34:17.853		58.63	1.13x	133744.89	-14.47		
Encke (IEG)	I	2033-04-25T04:34:40.129		58.54	1.04x	133423.31	-14.40		
A (IER)	I	2033-04-25T04:49:32.936		55.10	-2.35x	122050.38	-10.92		
B (OER)	I	2033-04-25T04:57:06.233	b	53.36	-4.06x	117571.16	-8.80		
Saturn	I	2033-04-25T04:50:34.725		54.87	-2.58x	59348.24		-53.16	-58.29
Saturn	E	2033-04-25T05:32:01.453		45.31	-11.91	59543.67		-45.11	-50.67
B (OER)	E	2033-04-25T05:49:21.068		41.33	-15.74	117571.16	8.87		
A (IER)	E	2033-04-25T05:56:50.871		39.61	-17.38	122050.38	11.01		
Encke (IEG)	E	2033-04-25T06:11:36.226		36.23	-20.59	133423.31	14.53		
Encke (OEG)	E	2033-04-25T06:11:58.305		36.15	-20.67	133744.89	14.60		
A (OER)	E	2033-04-25T06:15:21.032		35.38	-21.40	136774.40	15.28		
F ring	E	2033-04-25T06:19:16.656		34.48	-22.24	140461.00	16.01		