

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2034-01-19T05:06:05.540  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3367351460684986752  
 2Mass ID (if available) : 07111471+2208503

Saturn 2034-01-19T05:06:05 K8.03 G11.12 PgtRgt

ICRS Star Coord at Epoch: 07h 11m 14.72212s +22:08:50.23041s

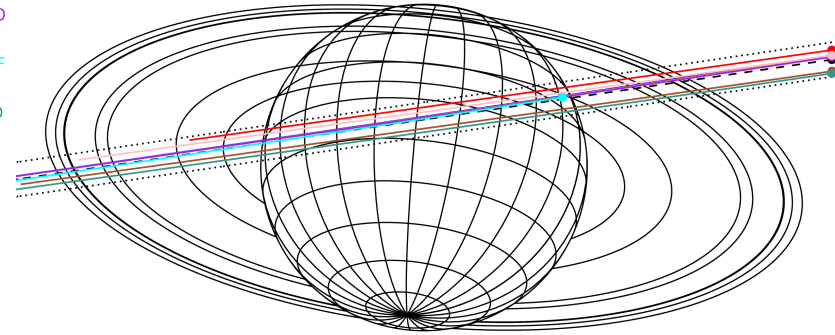
RUWE (>1.4 is poor) : 1.12  
 K magnitude : 8.027  
 G magnitude : 11.124  
 RP magnitude : 10.245  
 BP magnitude : 11.939  
 DUPflag : 0  
 Distance (au) : 8.068  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.47  
 Sun-Target sep (deg) : 167.75  
 Sun-Moon sep (deg) : 174.61  
 B (ring opening deg) : -24.53  
 PA of pole (deg) : -6.59  
 # a(km) ring

Saturn 2034-01-19T05:06:05 K8.03 G11.12  
 PgtRgt



2034-01-19T05:06:05.5400 α: 07 11 14.72212 δ: +22 08 50.230 C/A 2.992° PA 188.36 deg v\_sky -19.47 km/s D 08.07 AU  
 Credit: Styled after SORA/Lucky Star

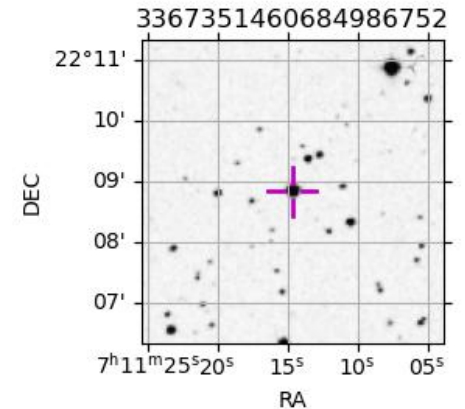
Earth  
 PIC  
 PAL  
 KPNO  
 MCD  
 TEN  
 IRTF  
 RIO  
 ESO



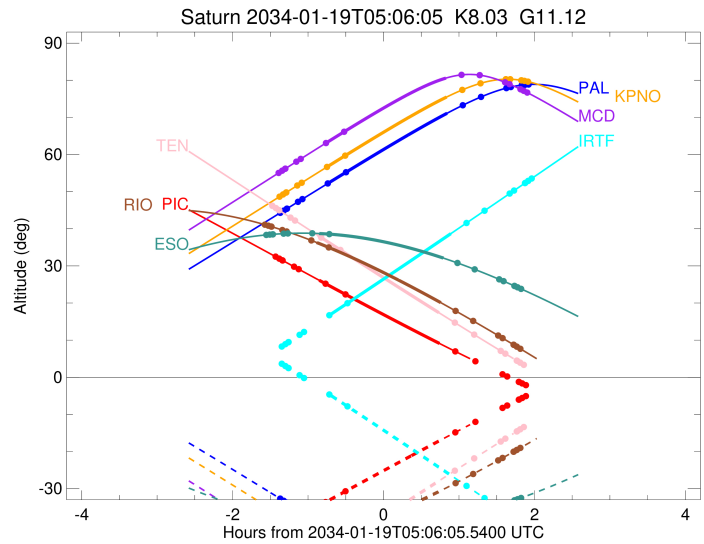
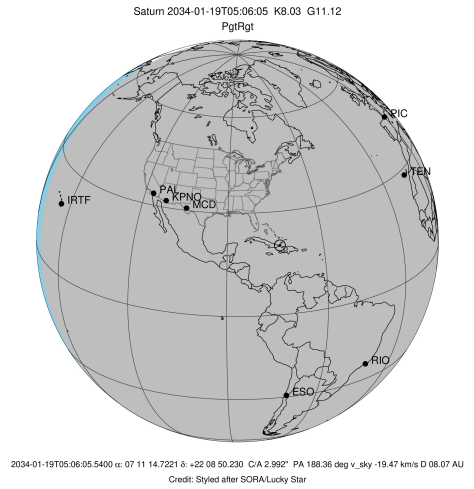
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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	+++++	++	+	JAN 19 03:40 - JAN 19 06:03	PieRie
PAL	Palomar Mt (20	33.4	243.1	+++++	++	+++++	JAN 19 03:44 - JAN 19 07:01	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+++++	++	+++++	JAN 19 03:43 - JAN 19 07:00	PieRie
MCD	McDonald Obs.	30.7	256.0	+++++	++	+++++	JAN 19 03:42 - JAN 19 07:00	PieRie
TEN	Teide Obs./Ten	28.3	343.5	+++++	++	+++	JAN 19 03:37 - JAN 19 06:42	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+++++	JAN 19 05:59 - JAN 19 07:03	PneRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++	++	+++++	JAN 19 03:31 - JAN 19 06:54	PieRie
ESO	European South	-29.3	289.3	+++++	++	+++++	JAN 19 03:32 - JAN 19 06:55	PieRie
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



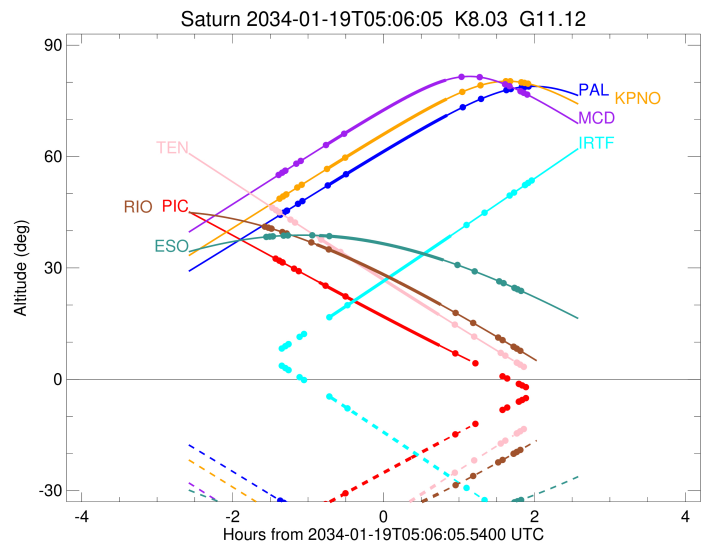
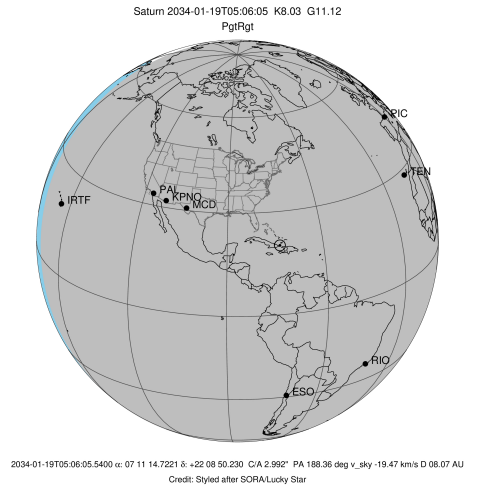
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2034-01-19T05:02:30.560  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 3367351460684986752  
 2Mass ID (if available) : 07111471+2208503  
 ICRS Star Coord at Epoch: 07h 11m 14.72212s +22:08:50.23041s  
 RUWE (>1.4 is poor) : 1.12  
 K magnitude : 8.027  
 G magnitude : 11.124  
 RP magnitude : 10.245  
 BP magnitude : 11.939  
 DUPflag : 0  
 Distance (au) : 8.068  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.47  
 Sun-Target sep (deg) : 167.75  
 Sun-Moon sep (deg) : 175.50  
 B (ring opening deg) : -24.53  
 PA of pole (deg) : -6.59  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 3.770  
 C/A sky separation (km) : 22058.2  
 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



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	2034-01-19T03:40:21.921		32.48	-40.86	140461.00	-21.10		
A (OER)	I	2034-01-19T03:43:16.975		31.94	-40.33	136774.40	-21.02		
Encke (OEG)	I	2034-01-19T03:45:41.324		31.50	-39.89	133744.89	-20.95		
Encke (IEG)	I	2034-01-19T03:45:56.674		31.45	-39.84	133423.31	-20.95		
A (IER)	I	2034-01-19T03:55:03.432		29.78	-38.19	122050.38	-20.64		
B (OER)	I	2034-01-19T03:58:41.166		29.11	-37.53	117571.16	-20.50		
B (IER)	I	2034-01-19T04:20:05.176	b	25.19	-33.61	91984.69	-19.20		
C (IER)	I	2034-01-19T04:35:58.276	b	22.30	-30.69	74490.58	-17.31		
Saturn	I	2034-01-19T04:14:54.254		26.14	-34.56	59923.89		32.44	37.80
Saturn	E	2034-01-19T05:50:36.132		9.11	-17.09	60253.48		6.30	7.72
C (IER)	E	2034-01-19T06:03:10.796		6.97	-14.84	74490.58	17.27		
B (IER)	E	2034-01-19T06:19:08.684		4.31	-12.02	91984.69	19.07		
B (OER)	E	2034-01-19T06:40:44.527		0.80	-8.25	117571.16	20.27		
A (IER)	E	2034-01-19T06:44:24.737		0.22	-7.62	122050.38	20.41		
Encke (IEG)	E	2034-01-19T06:53:38.246		-1.23	-6.04	133423.31	20.68		
Encke (OEG)	E	2034-01-19T06:53:53.797		-1.27	-6.00	133744.89	20.66		
A (OER)	E	2034-01-19T06:56:20.058		-1.65	-5.58	136774.40	20.74		
F ring	E	2034-01-19T06:59:17.498		-2.11	-5.08	140461.00	20.81		

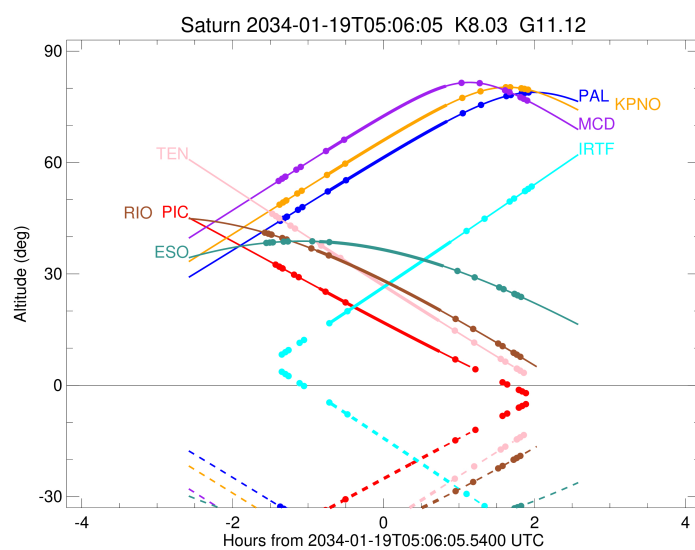
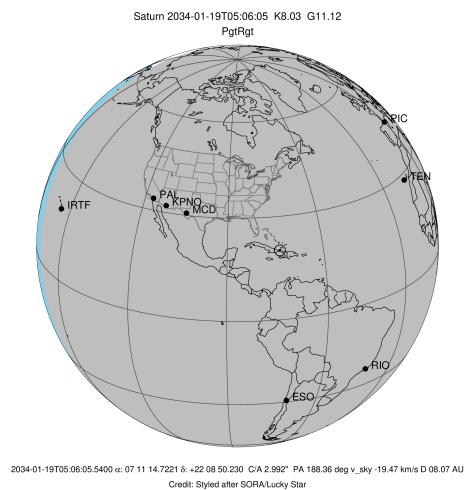
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2034-01-19T05:08:30.790  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3367351460684986752  
 2Mass ID (if available) : 07111471+2208503  
 ICRS Star Coord at Epoch: 07h 11m 14.72212s +22:08:50.23041s  
 RUWE (>1.4 is poor) : 1.12  
 K magnitude : 8.027  
 G magnitude : 11.124  
 RP magnitude : 10.245  
 BP magnitude : 11.939  
 DUPflag : 0  
 Distance (au) : 8.068  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.47  
 Sun-Target sep (deg) : 167.75  
 Sun-Moon sep (deg) : 174.61  
 B (ring opening deg) : -24.53  
 PA of pole (deg) : -6.59  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 3.178  
 C/A sky separation (km) : 18596.4  
 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\_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



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	2034-01-19T03:44:02.881		44.31	-32.71	140461.00	-21.87		
A (OER)	I	2034-01-19T03:46:51.659		44.90	-33.30	136774.40	-21.82		
Encke (OEG)	I	2034-01-19T03:49:10.646		45.39	-33.78	133744.89	-21.78		
Encke (IEG)	I	2034-01-19T03:49:25.416		45.44	-33.83	133423.31	-21.77		
A (IER)	I	2034-01-19T03:58:10.072		47.27	-35.66	122050.38	-21.57		
B (OER)	I	2034-01-19T04:01:38.137		48.00	-36.38	117571.16	-21.48		
B (IER)	I	2034-01-19T04:21:50.636	b	52.22	-40.61	91984.69	-20.62		
C (IER)	I	2034-01-19T04:36:22.764	b	55.25	-43.65	74490.58	-19.37		
Saturn	I	2034-01-19T04:20:31.002		51.95	-40.33	59972.57		29.78	34.96
Saturn	E	2034-01-19T05:56:41.474		71.13	-60.15	60265.18		2.77	3.40
C (IER)	E	2034-01-19T06:09:05.782		73.27	-62.60	74490.58	19.41		
B (IER)	E	2034-01-19T06:23:36.703		75.52	-65.39	91984.69	20.63		
B (OER)	E	2034-01-19T06:43:48.814		77.90	-69.07	117571.16	21.48		
A (IER)	E	2034-01-19T06:47:16.880		78.18	-69.67	122050.38	21.57		
Encke (IEG)	E	2034-01-19T06:56:01.590		78.70	-71.13	133423.31	21.77		
Encke (OEG)	E	2034-01-19T06:56:16.362		78.71	-71.17	133744.89	21.77		
A (OER)	E	2034-01-19T06:58:35.375		78.80	-71.54	136774.40	21.81		
F ring	E	2034-01-19T07:01:24.189		78.87	-71.98	140461.00	21.86		

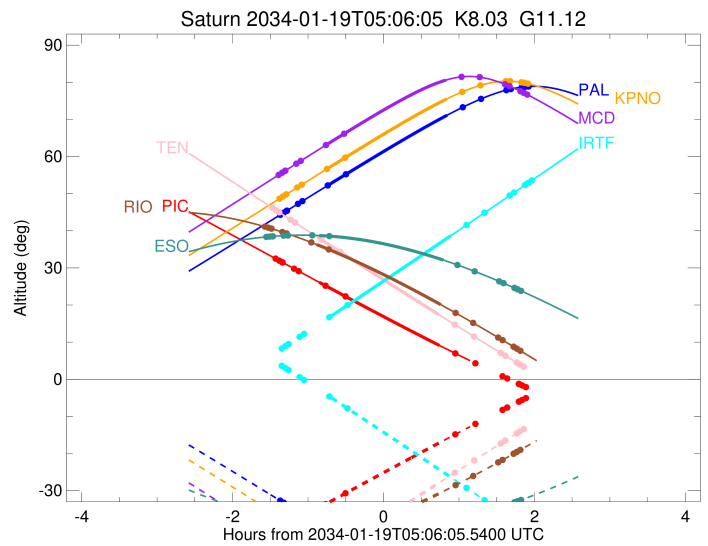
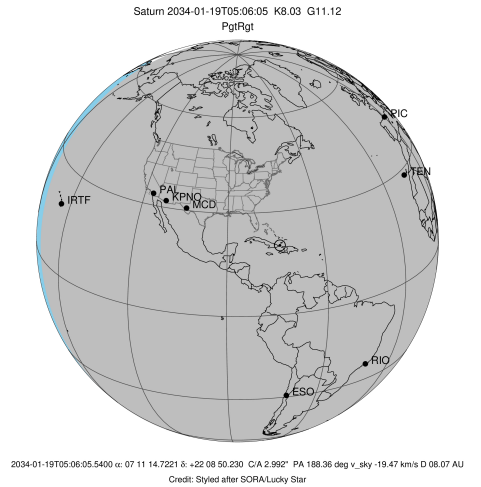
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2034-01-19T05:08:08.280  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : KPNO  
 Location : Kitt Peak Natl Obs  
 Latitude (deg) : 31.96333  
 E. Longitude (deg) : 248.40000  
 Altitude (km) : 2.120  
 Gaia source ID : 3367351460684986752  
 2Mass ID (if available) : 07111471+2208503  
 ICRS Star Coord at Epoch: 07h 11m 14.72212s +22:08:50.23041s  
 RUWE (>1.4 is poor) : 1.12  
 K magnitude : 8.027  
 G magnitude : 11.124  
 RP magnitude : 10.245  
 BP magnitude : 11.939  
 DUPflag : 0  
 Distance (au) : 8.068  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.47  
 Sun-Target sep (deg) : 167.75  
 Sun-Moon sep (deg) : 174.62  
 B (ring opening deg) : -24.53  
 PA of pole (deg) : -6.59  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 3.149  
 C/A sky separation (km) : 18427.3  
 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



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	2034-01-19T03:43:30.284		48.67	-36.95	140461.00	-21.90		
A (OER)	I	2034-01-19T03:46:18.781		49.26	-37.54	136774.40	-21.85		
Encke (OEG)	I	2034-01-19T03:48:37.535		49.76	-38.03	133744.89	-21.81		
Encke (IEG)	I	2034-01-19T03:48:52.279		49.81	-38.09	133423.31	-21.81		
A (IER)	I	2034-01-19T03:57:36.015		51.67	-39.94	122050.38	-21.61		
B (OER)	I	2034-01-19T04:01:03.696		52.40	-40.67	117571.16	-21.52		
B (IER)	I	2034-01-19T04:21:13.580	b	56.67	-44.96	91984.69	-20.67		
C (IER)	I	2034-01-19T04:35:43.012	b	59.72	-48.03	74490.58	-19.44		
Saturn	I	2034-01-19T04:20:08.830		56.45	-44.73	59975.86		29.60	34.76
Saturn	E	2034-01-19T05:56:19.347		75.50	-64.73	60265.41		2.66	3.26
C (IER)	E	2034-01-19T06:08:42.352		77.41	-67.15	74490.58	19.47		
B (IER)	E	2034-01-19T06:23:11.301		79.18	-69.88	91984.69	20.67		
B (OER)	E	2034-01-19T06:43:22.075		80.29	-73.38	117571.16	21.50		
A (IER)	E	2034-01-19T06:46:50.010		80.28	-73.93	122050.38	21.59		
Encke (IEG)	E	2034-01-19T06:55:34.482		79.99	-75.23	133423.31	21.77		
Encke (OEG)	E	2034-01-19T06:55:49.249		79.98	-75.27	133744.89	21.78		
A (OER)	E	2034-01-19T06:58:08.220		79.84	-75.58	136774.40	21.82		
F ring	E	2034-01-19T07:00:56.992		79.64	-75.95	140461.00	21.87		

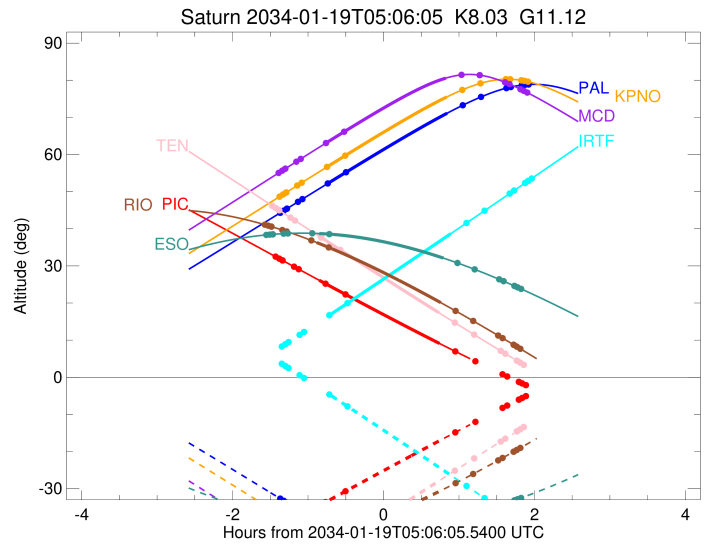
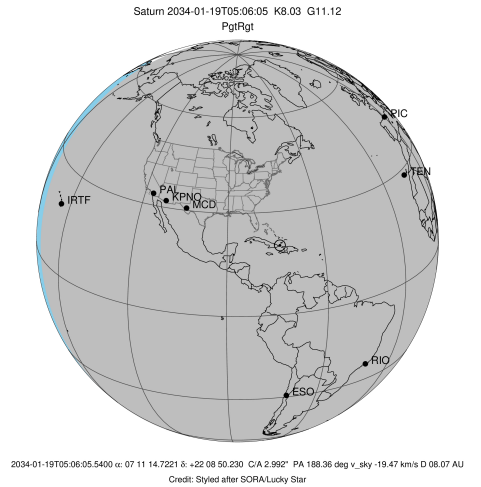
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2034-01-19T05:07:33.190  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : MCD  
 Location : McDonald Obs. 2.7m  
 Latitude (deg) : 30.67158  
 E. Longitude (deg) : 255.97844  
 Altitude (km) : 2.075  
 Gaia source ID : 3367351460684986752  
 2Mass ID (if available) : 07111471+2208503  
 ICRS Star Coord at Epoch: 07h 11m 14.72212s +22:08:50.23041s  
 RUWE (>1.4 is poor) : 1.12  
 K magnitude : 8.027  
 G magnitude : 11.124  
 RP magnitude : 10.245  
 BP magnitude : 11.939  
 DUPflag : 0  
 Distance (au) : 8.068  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.47  
 Sun-Target sep (deg) : 167.75  
 Sun-Moon sep (deg) : 174.66  
 B (ring opening deg) : -24.53  
 PA of pole (deg) : -6.59  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 3.126  
 C/A sky separation (km) : 18291.9  
 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



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	2034-01-19T03:42:46.392		55.06	-43.25	140461.00	-21.94		
A (OER)	I	2034-01-19T03:45:34.635		55.66	-43.85	136774.40	-21.89		
Encke (OEG)	I	2034-01-19T03:47:53.179		56.16	-44.35	133744.89	-21.85		
Encke (IEG)	I	2034-01-19T03:48:07.902		56.21	-44.40	133423.31	-21.84		
A (IER)	I	2034-01-19T03:56:50.838		58.08	-46.28	122050.38	-21.65		
B (OER)	I	2034-01-19T04:00:18.194		58.82	-47.02	117571.17	-21.55		
B (IER)	I	2034-01-19T04:20:25.984	b	63.11	-51.34	91984.69	-20.71		
C (IER)	I	2034-01-19T04:34:53.389	b	66.16	-54.44	74490.58	-19.50		
Saturn	I	2034-01-19T04:19:35.035		62.93	-51.16	59978.93		29.42	34.57
Saturn	E	2034-01-19T05:55:44.235		80.59	-71.05	60265.55		2.59	3.18
C (IER)	E	2034-01-19T06:08:06.305		81.46	-73.33	74490.58	19.51		
B (IER)	E	2034-01-19T06:22:34.267		81.39	-75.76	91984.69	20.68		
B (OER)	E	2034-01-19T06:42:44.808		79.45	-78.46	117571.16	21.49		
A (IER)	E	2034-01-19T06:46:12.788		78.97	-78.80	122050.38	21.58		
Encke (IEG)	E	2034-01-19T06:54:57.457		77.61	-79.46	133423.31	21.76		
Encke (OEG)	E	2034-01-19T06:55:12.231		77.57	-79.47	133744.89	21.77		
A (OER)	E	2034-01-19T06:57:31.272		77.18	-79.59	136774.40	21.81		
F ring	E	2034-01-19T07:00:20.140		76.70	-79.70	140461.00	21.85		

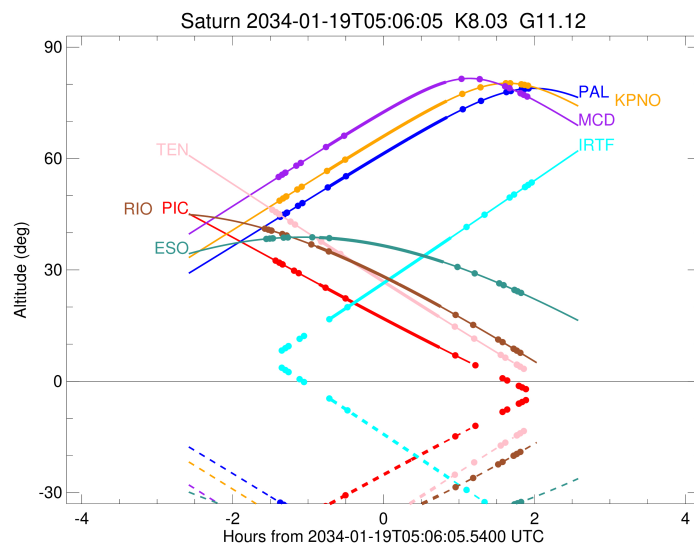
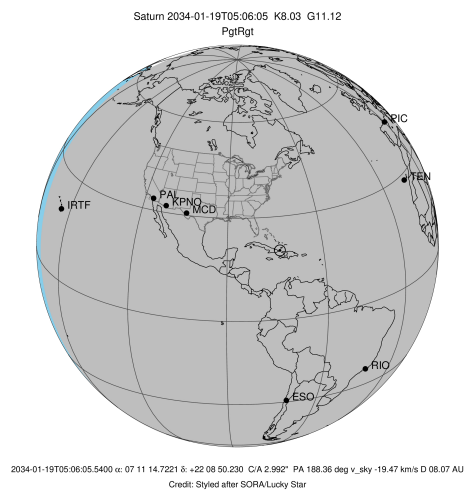
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2034-01-19T05:01:45.190  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : TEN  
 Location : Teide Obs./Tenerife  
 Latitude (deg) : 28.30050  
 E. Longitude (deg) : 343.48909  
 Altitude (km) : 2.395  
 Gaia source ID : 3367351460684986752  
 2Mass ID (if available) : 07111471+2208503  
 ICRS Star Coord at Epoch: 07h 11m 14.72212s +22:08:50.23041s  
 RUWE (>1.4 is poor) : 1.12  
 K magnitude : 8.027  
 G magnitude : 11.124  
 RP magnitude : 10.245  
 BP magnitude : 11.939  
 DUPflag : 0  
 Distance (au) : 8.068  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.47  
 Sun-Target sep (deg) : 167.75  
 Sun-Moon sep (deg) : 175.33  
 B (ring opening deg) : -24.53  
 PA of pole (deg) : -6.59  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 3.472  
 C/A sky separation (km) : 20317.1  
 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



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	2034-01-19T03:37:45.900		46.18	-57.00	140461.00	-21.42		
A (OER)	I	2034-01-19T03:40:38.245		45.54	-56.37	136774.40	-21.36		
Encke (OEG)	I	2034-01-19T03:43:00.287		45.02	-55.85	133744.89	-21.30		
Encke (IEG)	I	2034-01-19T03:43:15.388		44.97	-55.80	133423.31	-21.29		
A (IER)	I	2034-01-19T03:52:12.680		42.99	-53.83	122050.38	-21.03		
B (OER)	I	2034-01-19T03:55:46.277		42.21	-53.04	117571.16	-20.91		
B (IER)	I	2034-01-19T04:16:39.172	b	37.62	-48.44	91984.69	-19.81		
C (IER)	I	2034-01-19T04:31:54.969	b	34.28	-45.08	74490.58	-18.24		
Saturn	I	2034-01-19T04:13:51.853		38.23	-49.06	59954.17		30.80	36.06
Saturn	E	2034-01-19T05:50:07.776		17.40	-27.92	60259.59		4.79	5.88
C (IER)	E	2034-01-19T06:02:47.329		14.72	-25.18	74490.58	18.14		
B (IER)	E	2034-01-19T06:18:10.348		11.49	-21.85	91984.69	19.61		
B (OER)	E	2034-01-19T06:39:18.804		7.10	-17.31	117571.17	20.61		
A (IER)	E	2034-01-19T06:42:55.594		6.36	-16.54	122050.38	20.71		
Encke (IEG)	E	2034-01-19T06:52:01.560		4.50x	-14.60	133423.31	20.94		
Encke (OEG)	E	2034-01-19T06:52:16.918		4.44x	-14.55	133744.89	20.94		
A (OER)	E	2034-01-19T06:54:41.411		3.95x	-14.04	136774.40	20.99		
F ring	E	2034-01-19T06:57:36.811		3.36x	-13.42	140461.00	21.05		

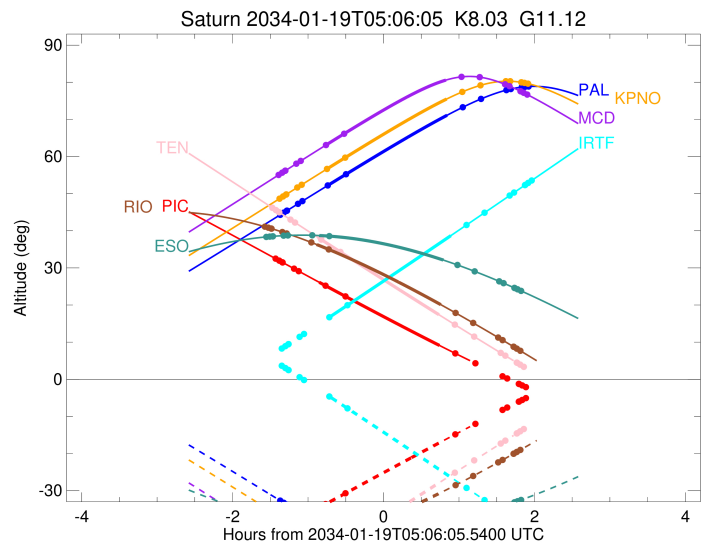
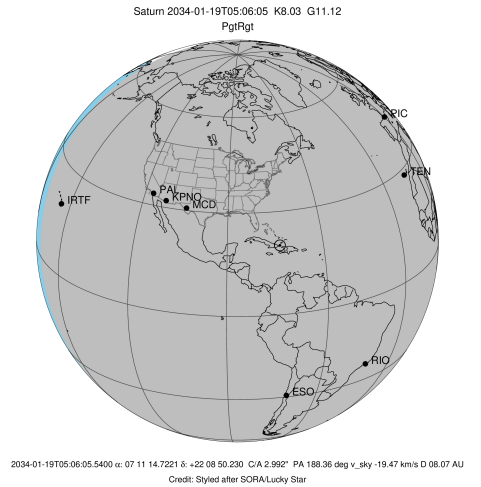
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2034-01-19T05:11:01.540  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : IRTF  
 Location : Mauna Kea/IRTF  
 Latitude (deg) : 19.82622  
 E. Longitude (deg) : 204.52800  
 Altitude (km) : 4.168  
 Gaia source ID : 3367351460684986752  
 2Mass ID (if available) : 07111471+2208503  
 ICRS Star Coord at Epoch: 07h 11m 14.72212s +22:08:50.23041s  
 RUWE (>1.4 is poor) : 1.12  
 K magnitude : 8.027  
 G magnitude : 11.124  
 RP magnitude : 10.245  
 BP magnitude : 11.939  
 DUPflag : 0  
 Distance (au) : 8.068  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.47  
 Sun-Target sep (deg) : 167.75  
 Sun-Moon sep (deg) : 174.24  
 B (ring opening deg) : -24.53  
 PA of pole (deg) : -6.59  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 3.043  
 C/A sky separation (km) : 17804.6  
 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\_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



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	2034-01-19T03:45:17.136		8.30	3.63x	140461.00	-21.78		
A (OER)	I	2034-01-19T03:48:06.554		8.92	3.02x	136774.40	-21.74		
Encke (OEG)	I	2034-01-19T03:50:26.021		9.44	2.51x	133744.89	-21.70		
Encke (IEG)	I	2034-01-19T03:50:40.839		9.49	2.46x	133423.31	-21.70		
A (IER)	I	2034-01-19T03:59:26.854		11.44	0.55x	122050.38	-21.53		
B (OER)	I	2034-01-19T04:02:55.245		12.21	-0.21x	117571.16	-21.45		
B (IER)	I	2034-01-19T04:23:06.345	b	16.72	-4.65x	91984.69	-20.70		
C (IER)	I	2034-01-19T04:37:31.768	b	19.97	-7.85	74490.58	-19.61		
Saturn	I	2034-01-19T04:22:22.042		16.56	-4.49x	59980.41		29.34	34.48
Saturn	E	2034-01-19T05:59:44.504		38.72	-26.43	60266.85		1.77	2.17
C (IER)	E	2034-01-19T06:12:04.943		41.56	-29.26	74490.58	19.75		
B (IER)	E	2034-01-19T06:26:23.973		44.86	-32.55	91984.69	20.86		
B (OER)	E	2034-01-19T06:46:25.013		49.49	-37.16	117571.16	21.65		
A (IER)	E	2034-01-19T06:49:51.472		50.29	-37.96	122050.38	21.74		
Encke (IEG)	E	2034-01-19T06:58:32.320		52.30	-39.97	133423.31	21.92		
Encke (OEG)	E	2034-01-19T06:58:46.987		52.35	-40.02	133744.89	21.93		
A (OER)	E	2034-01-19T07:01:05.010		52.89	-40.55	136774.40	21.97		
F ring	E	2034-01-19T07:03:52.634		53.53	-41.20	140461.00	22.02		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2034-01-19T05:02:07.520  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : RIO  
 Location : Rio de Janeiro  
 Latitude (deg) : -22.89506  
 E. Longitude (deg) : 316.77708  
 Altitude (km) : 0.033  
 Gaia source ID : 3367351460684986752  
 2Mass ID (if available) : 07111471+2208503  
 ICRS Star Coord at Epoch: 07h 11m 14.72212s +22:08:50.23041s  
 RUWE (>1.4 is poor) : 1.12  
 K magnitude : 8.027  
 G magnitude : 11.124  
 RP magnitude : 10.245  
 BP magnitude : 11.939  
 DUPflag : 0  
 Distance (au) : 8.068  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.47  
 Sun-Target sep (deg) : 167.75  
 Sun-Moon sep (deg) : 174.48  
 B (ring opening deg) : -24.53  
 PA of pole (deg) : -6.59  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 2.434  
 C/A sky separation (km) : 14244.6  
 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\_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

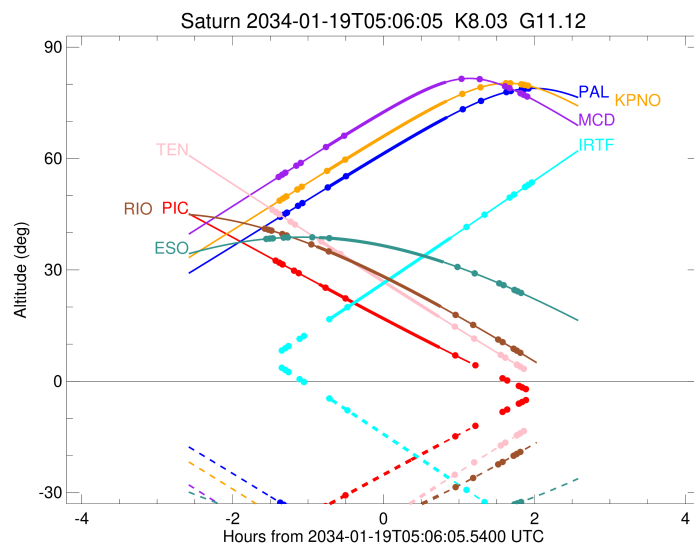
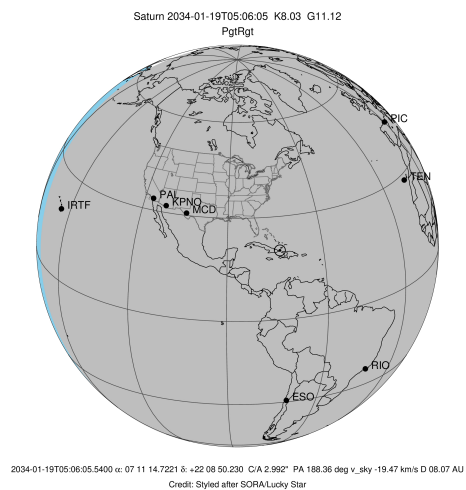


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2034-01-19T03:31:49.849		41.10	-46.36	140461.00	-22.18		
A (OER)	I	2034-01-19T03:34:36.189		40.83	-46.25	136774.40	-22.15		
Encke (OEG)	I	2034-01-19T03:36:53.078		40.60	-46.15	133744.89	-22.12		
Encke (IEG)	I	2034-01-19T03:37:07.619		40.57	-46.14	133423.31	-22.11		
A (IER)	I	2034-01-19T03:45:43.393		39.65	-45.70	122050.38	-21.98		
B (OER)	I	2034-01-19T03:49:07.441		39.27	-45.50	117571.16	-21.92		
B (IER)	I	2034-01-19T04:08:47.375		36.85	-44.07	91984.69	-21.39		
C (IER)	I	2034-01-19T04:22:37.990	b	34.97	-42.79	74490.58	-20.66		
Saturn	I	2034-01-19T04:13:01.046		36.29	-43.70	60045.98		25.48	30.24
Saturn	E	2034-01-19T05:51:36.007		20.11	-30.54	60267.82		-0.70	-0.87
C (IER)	E	2034-01-19T06:03:23.079		17.88	-28.53	74490.58	20.50		
B (IER)	E	2034-01-19T06:17:21.470		15.18	-26.06	91984.69	21.16		
B (OER)	E	2034-01-19T06:37:16.553		11.24	-22.39	117571.17	21.60		
A (IER)	E	2034-01-19T06:40:43.662		10.55	-21.74	122050.38	21.65		
Encke (IEG)	E	2034-01-19T06:49:27.729		8.78	-20.08	133423.31	21.75		
Encke (OEG)	E	2034-01-19T06:49:42.516		8.73	-20.03	133744.89	21.75		
A (OER)	E	2034-01-19T06:52:01.743		8.26	-19.59	136774.40	21.77		
F ring	E	2034-01-19T06:54:50.998		7.68	-19.04	140461.00	21.79		



target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2034-01-19T05:04:08.450  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : ESO  
 Location : European Southern Obs. (3.6m)  
 Latitude (deg) : -29.26097  
 E. Longitude (deg) : 289.26831  
 Altitude (km) : 2.400  
 Gaia source ID : 3367351460684986752  
 2Mass ID (if available) : 07111471+2208503  
 ICRS Star Coord at Epoch: 07h 11m 14.72212s +22:08:50.23041s  
 RUWE (>1.4 is poor) : 1.12  
 K magnitude : 8.027  
 G magnitude : 11.124  
 RP magnitude : 10.245  
 BP magnitude : 11.939  
 DUPflag : 0  
 Distance (au) : 8.068  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.47  
 Sun-Target sep (deg) : 167.75  
 Sun-Moon sep (deg) : 174.18  
 B (ring opening deg) : -24.53  
 PA of pole (deg) : -6.59  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 2.206  
 C/A sky separation (km) : 12906.9  
 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



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	2034-01-19T03:32:58.739		38.35	-36.90	140461.00	-22.37		
A (OER)	I	2034-01-19T03:35:43.662		38.44	-37.14	136774.40	-22.34		
Encke (OEG)	I	2034-01-19T03:37:59.338		38.50	-37.33	133744.89	-22.32		
Encke (IEG)	I	2034-01-19T03:38:13.749		38.51	-37.35	133423.31	-22.31		
A (IER)	I	2034-01-19T03:46:44.529		38.69	-38.02	122050.38	-22.21		
B (OER)	I	2034-01-19T03:50:06.398		38.74	-38.27	117571.16	-22.16		
B (IER)	I	2034-01-19T04:09:30.664		38.78	-39.46	91984.69	-21.74		
C (IER)	I	2034-01-19T04:23:05.201	b	38.56	-40.04	74490.58	-21.16		
Saturn	I	2034-01-19T04:14:55.353		38.72	-39.71	60062.07		24.47	29.12
Saturn	E	2034-01-19T05:53:36.892		32.11	-38.52	60266.50		-2.02	-2.49
C (IER)	E	2034-01-19T06:04:52.627		30.79	-37.69	74490.58	21.05		
B (IER)	E	2034-01-19T06:18:32.330		29.07	-36.52	91984.69	21.58		
B (OER)	E	2034-01-19T06:38:06.812		26.38	-34.54	117571.17	21.94		
A (IER)	E	2034-01-19T06:41:30.754		25.89	-34.16	122050.38	21.98		
Encke (IEG)	E	2034-01-19T06:50:07.158		24.62	-33.17	133423.31	22.06		
Encke (OEG)	E	2034-01-19T06:50:21.734		24.58	-33.14	133744.89	22.06		
A (OER)	E	2034-01-19T06:52:38.998		24.24	-32.86	136774.40	22.08		
F ring	E	2034-01-19T06:55:25.900		23.82	-32.52	140461.00	22.10		