

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-03-07T20:26:29.750  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 4066727201974396800  
 2Mass ID (if available) : 18122349-2220172

Saturn 2047-03-07T20:26:29 K7.23 G11.78 PgtRgt

ICRS Star Coord at Epoch: 18h 12m 23.50181s -22:20:17.22192s

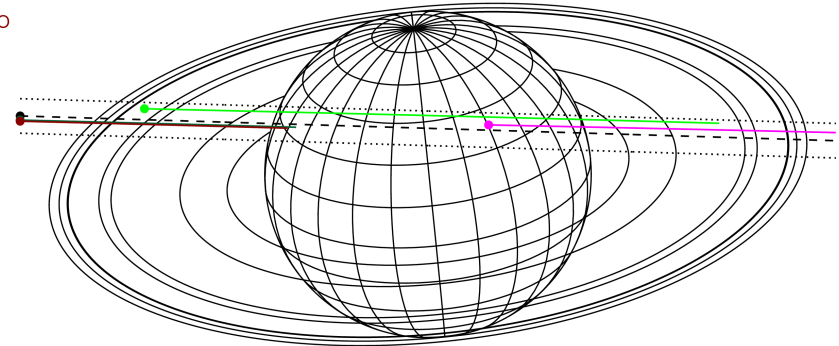
RUWE (>1.4 is poor) : 0.79  
 K magnitude : 7.232  
 G magnitude : 11.776  
 RP magnitude : 10.582  
 BP magnitude : 13.318  
 DUPflag : 0  
 Distance (au) : 10.279  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 17.95  
 Sun-Target sep (deg) : 73.66  
 Sun-Moon sep (deg) : 162.27  
 B (ring opening deg) : 26.19  
 PA of pole (deg) : 5.75

#	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



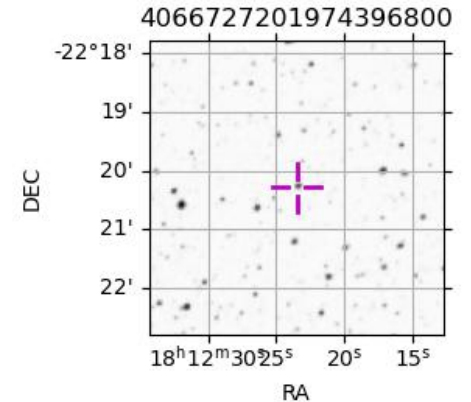
2047-03-07T20:26:29.7500 α: 18 12 23.5018 s: -22 20 17.222 C/A 2.286° PA 178.26 deg v\_sky +17.95 km/s D 10.28 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PMO  
 KAV  
 AAT  
 MSO

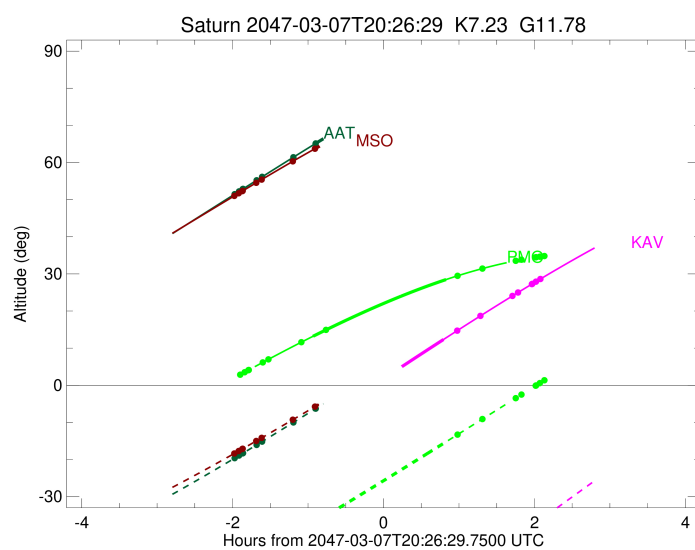
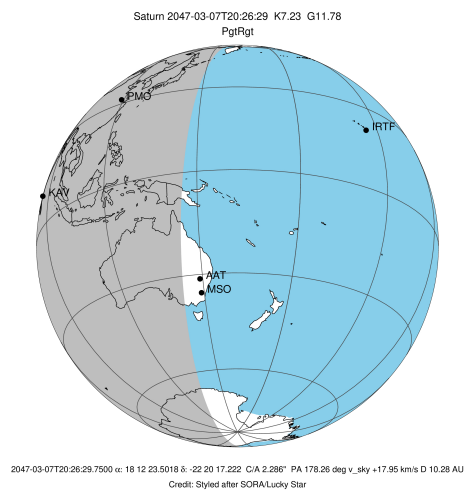


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8	+	+	+	MAR 07 18:50 - MAR 07 21:45	PieRie
KPNO	Kitt Peak Natl	32.0	248.4					PnnRnn
MCD	McDonald Obs.	30.7	256.0					PnnRnn
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8		+	+	MAR 07 21:14 - MAR 07 22:31	PneRne
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+	+	+	MAR 07 18:28 - MAR 07 19:30	PinRin
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	MAR 07 18:27 - MAR 07 19:30	PinRin



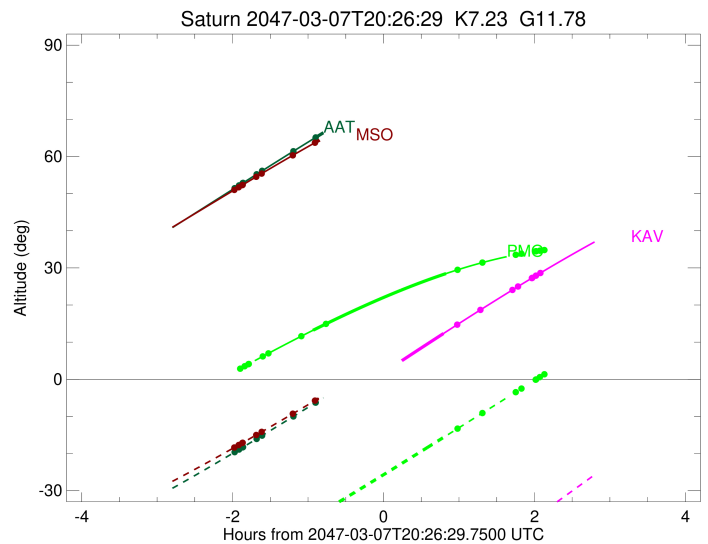
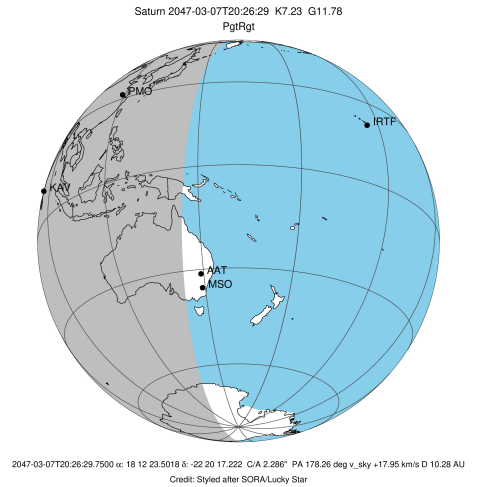
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-03-07T20:23:04.240  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 4066727201974396800  
 2Mass ID (if available) : 18122349-2220172  
 ICRS Star Coord at Epoch: 18h 12m 23.50181s -22:20:17.22192s  
 RUWE (>1.4 is poor) : 0.79  
 K magnitude : 7.232  
 G magnitude : 11.776  
 RP magnitude : 10.582  
 BP magnitude : 13.318  
 DUPflag : 0  
 Distance (au) : 10.279  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 17.95  
 Sun-Target sep (deg) : 73.66  
 Sun-Moon sep (deg) : 162.92  
 B (ring opening deg) : 26.19  
 PA of pole (deg) : 5.75  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 2.921  
 C/A sky separation (km) : 21775.9  
 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	2047-03-07T18:32:36.306		2.86x	-48.22	140461.00	-17.29		
A (OER)	I	2047-03-07T18:36:09.976		3.52x	-47.58	136774.40	-17.22		
Encke (OEG)	I	2047-03-07T18:39:06.225		4.07x	-47.05	133744.89	-17.16		
Encke (IEG)	I	2047-03-07T18:39:24.971		4.12x	-46.99	133423.31	-17.15		
A (IER)	I	2047-03-07T18:50:33.101		6.17	-44.94	122050.38	-16.88		
B (OER)	I	2047-03-07T18:54:59.421		6.97	-44.10	117571.16	-16.75		
B (IER)	I	2047-03-07T19:21:13.902		11.62	-39.03	91984.69	-15.61		
C (IER)	I	2047-03-07T19:40:50.047	b	14.93	-35.11	74490.58	-13.96		
Saturn	I	2047-03-07T19:30:24.996		13.19	-37.20	60013.52		25.26	29.99
Saturn	E	2047-03-07T21:16:09.456		28.47	-15.25	60201.72		12.55	15.28
C (IER)	E	2047-03-07T21:25:23.114		29.48	-13.29	74490.58	13.89		
B (IER)	E	2047-03-07T21:45:08.208		31.43	-9.10	91984.69	15.47		
B (OER)	E	2047-03-07T22:11:41.012		33.53	-3.46x	117571.16	16.53		
A (IER)	E	2047-03-07T22:16:11.043		33.82	-2.51x	122050.38	16.64		
Encke (IEG)	E	2047-03-07T22:27:29.212		34.47	-0.12x	133423.31	16.88		
Encke (OEG)	E	2047-03-07T22:27:48.254		34.49	-0.05x	133744.89	16.89		
A (OER)	E	2047-03-07T22:30:47.330		34.64	0.58x	136774.40	16.94		
F ring	E	2047-03-07T22:34:24.520		34.81	1.34x	140461.00	17.00		

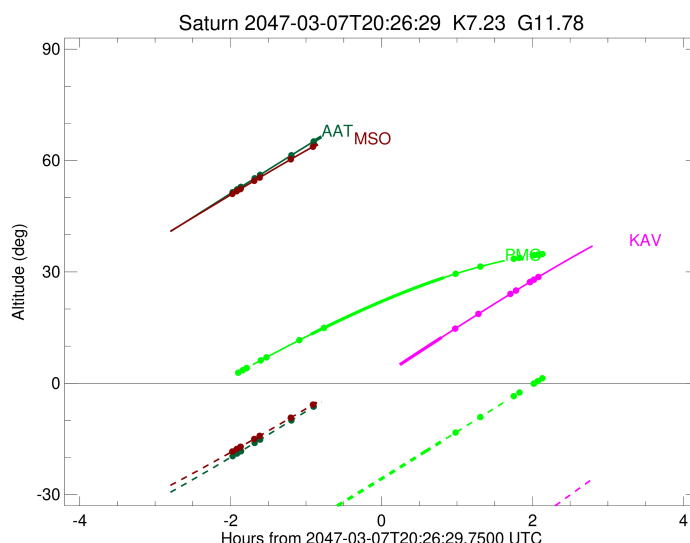
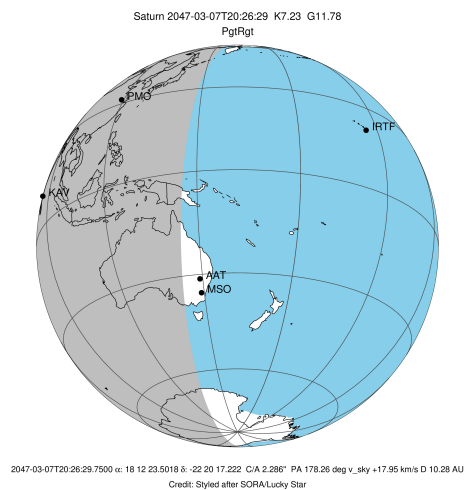
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-03-07T20:20:37.860  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : KAV  
 Location : Kavalur Observatory  
 Latitude (deg) : 12.57556  
 E. Longitude (deg) : 78.83167  
 Altitude (km) : 0.722  
 Gaia source ID : 4066727201974396800  
 2Mass ID (if available) : 18122349-2220172  
 ICRS Star Coord at Epoch: 18h 12m 23.50181s -22:20:17.22192s  
 RUWE (>1.4 is poor) : 0.79  
 K magnitude : 7.232  
 G magnitude : 11.776  
 RP magnitude : 10.582  
 BP magnitude : 13.318  
 DUPflag : 0  
 Distance (au) : 10.279  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 17.95  
 Sun-Target sep (deg) : 73.66  
 Sun-Moon sep (deg) : 163.17  
 B (ring opening deg) : 26.19  
 PA of pole (deg) : 5.75  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 2.519  
 C/A sky separation (km) : 18775.9  
 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	2047-03-07T18:28:15.877		-25.31x	-80.00	140461.00	-17.88		
A (OER)	I	2047-03-07T18:31:42.401		-24.51x	-80.55	136774.40	-17.82		
Encke (OEG)	I	2047-03-07T18:34:32.604		-23.85x	-80.97	133744.89	-17.78		
Encke (IEG)	I	2047-03-07T18:34:50.698		-23.78x	-81.01	133423.31	-17.77		
A (IER)	I	2047-03-07T18:45:34.383		-21.30x	-82.20	122050.38	-17.56		
B (OER)	I	2047-03-07T18:49:50.189		-20.32x	-82.46	117571.16	-17.46		
B (IER)	I	2047-03-07T19:14:48.400		-14.57x	-81.18	91984.69	-16.60		
C (IER)	I	2047-03-07T19:32:57.592	b	-10.41x	-78.14	74490.58	-15.40		
Saturn	I	2047-03-07T19:27:41.786		-11.61x	-79.12	60064.83		22.40	26.78
Saturn	E	2047-03-07T21:14:05.445		12.31	-54.99	60225.00		10.07	12.31
C (IER)	E	2047-03-07T21:25:05.368		14.71	-52.33	74490.58	15.20		
B (IER)	E	2047-03-07T21:43:32.091		18.68	-47.86	91984.69	16.29		
B (OER)	E	2047-03-07T22:09:03.387		24.07	-41.66	117571.16	17.03		
A (IER)	E	2047-03-07T22:13:25.811		24.98	-40.59	122050.38	17.11		
Encke (IEG)	E	2047-03-07T22:24:27.354		27.25	-37.91	133423.31	17.27		
Encke (OEG)	E	2047-03-07T22:24:45.975		27.31	-37.83	133744.89	17.27		
A (OER)	E	2047-03-07T22:27:41.198		27.91	-37.12	136774.40	17.31		
F ring	E	2047-03-07T22:31:13.970		28.63	-36.25	140461.00	17.35		

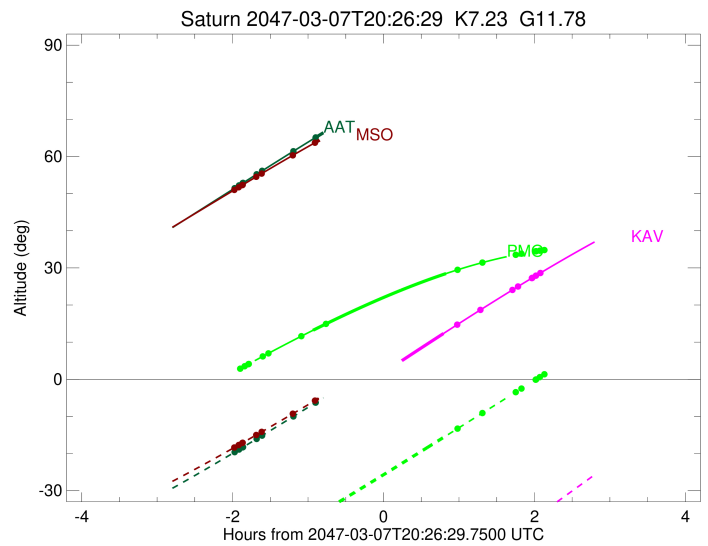
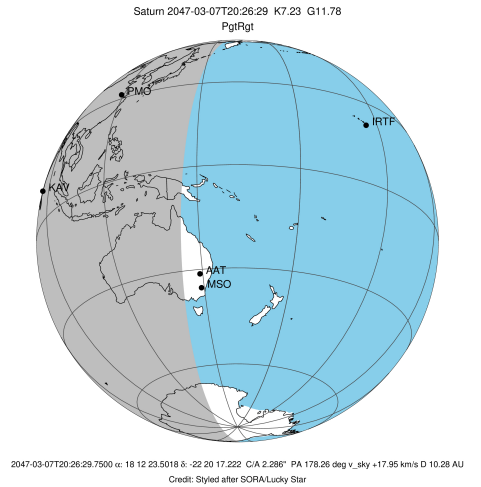
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-03-07T20:25:18.850  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : AAT  
 Location : Siding Spring (AAT)  
 Latitude (deg) : -31.27703  
 E. Longitude (deg) : 149.06608  
 Altitude (km) : 1.164  
 Gaia source ID : 4066727201974396800  
 2Mass ID (if available) : 18122349-2220172  
 ICRS Star Coord at Epoch: 18h 12m 23.50181s -22:20:17.22192s  
 RUWE (>1.4 is poor) : 0.79  
 K magnitude : 7.232  
 G magnitude : 11.776  
 RP magnitude : 10.582  
 BP magnitude : 13.318  
 DUPflag : 0  
 Distance (au) : 10.279  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 17.95  
 Sun-Target sep (deg) : 73.66  
 Sun-Moon sep (deg) : 162.71  
 B (ring opening deg) : 26.19  
 PA of pole (deg) : 5.75  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 2.155  
 C/A sky separation (km) : 16064.5  
 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	2047-03-07T18:28:11.745		51.48	-19.63	140461.00	-17.65		
A (OER)	I	2047-03-07T18:31:40.810		52.23	-18.92	136774.40	-17.62		
Encke (OEG)	I	2047-03-07T18:34:32.951		52.85	-18.34	133744.89	-17.58		
Encke (IEG)	I	2047-03-07T18:34:51.242		52.91	-18.28	133423.31	-17.58		
A (IER)	I	2047-03-07T18:45:40.731		55.23	-16.06	122050.38	-17.44		
B (OER)	I	2047-03-07T18:49:58.104		56.14	-15.18	117571.16	-17.37		
B (IER)	I	2047-03-07T19:14:53.305		61.44	-10.01	91984.69	-16.79		
C (IER)	I	2047-03-07T19:32:38.135	b	65.16	-6.28	74490.58	-15.99		
Saturn	I	2047-03-07T19:30:24.881		64.69	-6.75	60098.08		20.38	24.48
Saturn	E	2047-03-07T21:20:28.922		81.18	16.71x	60245.98		7.19	8.81
C (IER)	E	2047-03-07T21:33:12.295		80.48	19.42x	74490.58	15.97		
B (IER)	E	2047-03-07T21:50:59.291		78.36	23.19x	91984.69	16.74		
B (OER)	E	2047-03-07T22:15:59.262		74.13	28.45x	117571.16	17.30		
A (IER)	E	2047-03-07T22:20:17.624		73.32	29.35x	122050.38	17.37		
Encke (IEG)	E	2047-03-07T22:31:09.811		71.21	31.61x	133423.31	17.50		
Encke (OEG)	E	2047-03-07T22:31:28.182		71.15	31.68x	133744.89	17.51		
A (OER)	E	2047-03-07T22:34:21.088		70.58	32.27x	136774.40	17.54		
F ring	E	2047-03-07T22:37:51.108		69.89	32.99x	140461.00	17.57		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-03-07T20:25:20.880  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : MSO  
 Location : Mt. Stromlo Observatory  
 Latitude (deg) : -35.32000  
 E. Longitude (deg) : 149.00833  
 Altitude (km) : 0.770  
 Gaia source ID : 4066727201974396800  
 2Mass ID (if available) : 18122349-2220172  
 ICRS Star Coord at Epoch: 18h 12m 23.50181s -22:20:17.22192s  
 RUWE (>1.4 is poor) : 0.79  
 K magnitude : 7.232  
 G magnitude : 11.776  
 RP magnitude : 10.582  
 BP magnitude : 13.318  
 DUPflag : 0  
 Distance (au) : 10.279  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 17.95  
 Sun-Target sep (deg) : 73.66  
 Sun-Moon sep (deg) : 162.69  
 B (ring opening deg) : 26.19  
 PA of pole (deg) : 5.75  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 2.096  
 C/A sky separation (km) : 15624.8  
 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



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	2047-03-07T18:27:55.514		51.02	-18.37	140461.00	-17.70		
A (OER)	I	2047-03-07T18:31:23.983		51.73	-17.70	136774.40	-17.67		
Encke (OEG)	I	2047-03-07T18:34:15.615		52.31	-17.15	133744.89	-17.64		
Encke (IEG)	I	2047-03-07T18:34:33.851		52.37	-17.09	133423.31	-17.63		
A (IER)	I	2047-03-07T18:45:21.238		54.55	-15.00	122050.38	-17.50		
B (OER)	I	2047-03-07T18:49:37.690		55.41	-14.17	117571.16	-17.43		
B (IER)	I	2047-03-07T19:14:26.067		60.33	-9.27	91984.69	-16.88		
C (IER)	I	2047-03-07T19:32:03.359	b	63.73	-5.74	74490.58	-16.13		
Saturn	I	2047-03-07T19:30:22.988		63.41	-6.08	60104.07		20.00	24.04
Saturn	E	2047-03-07T21:20:34.475		77.16	16.34x	60248.28		6.80	8.33
C (IER)	E	2047-03-07T21:33:25.489		76.69	18.95x	74490.58	16.11		
B (IER)	E	2047-03-07T21:51:05.005		75.18	22.51x	91984.69	16.84		
B (OER)	E	2047-03-07T22:15:58.204		71.82	27.48x	117571.16	17.37		
A (IER)	E	2047-03-07T22:20:15.652		71.14	28.33x	122050.38	17.43		
Encke (IEG)	E	2047-03-07T22:31:05.758		69.35	30.46x	133423.31	17.55		
Encke (OEG)	E	2047-03-07T22:31:24.075		69.29	30.52x	133744.89	17.56		
A (OER)	E	2047-03-07T22:34:16.478		68.80	31.08x	136774.40	17.59		
F ring	E	2047-03-07T22:37:45.910		68.19	31.76x	140461.00	17.62		