

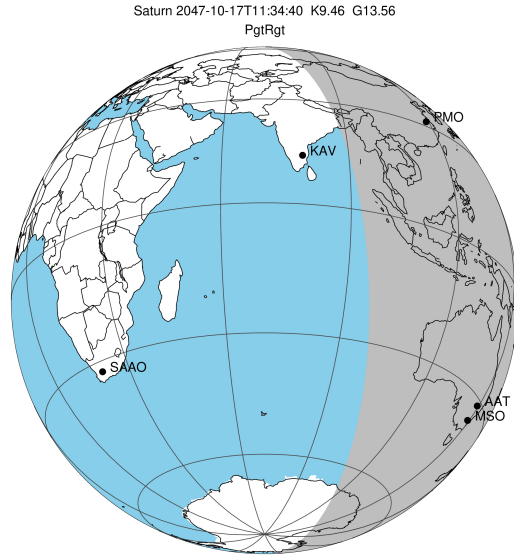
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-10-17T11:34:40.940
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4070184929897406208
 2Mass ID (if available) : 17553178-2238226

Saturn 2047-10-17T11:34:40 K9.46 G13.56 PgtRgt

ICRS Star Coord at Epoch: 17h 55m 31.79324s -22:38:22.63765s

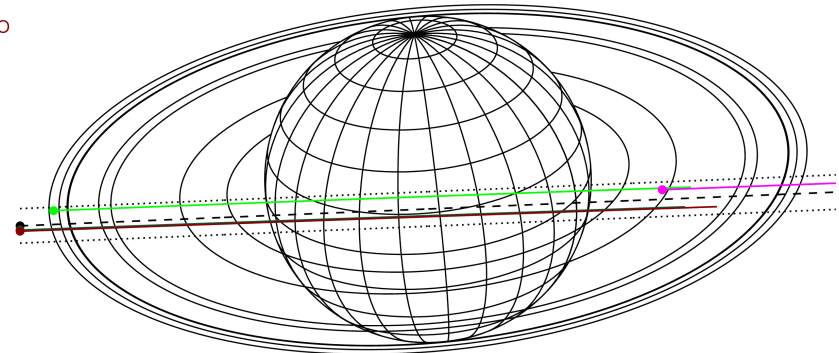
RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.455
 G magnitude : 13.561
 RP magnitude : 12.445
 BP magnitude : 14.868
 DUPflag : 0
 Distance (au) : 10.416
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.89
 Sun-Target sep (deg) : 65.61
 Sun-Moon sep (deg) : 89.03
 B (ring opening deg) : 26.87
 PA of pole (deg) : 5.44

#	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



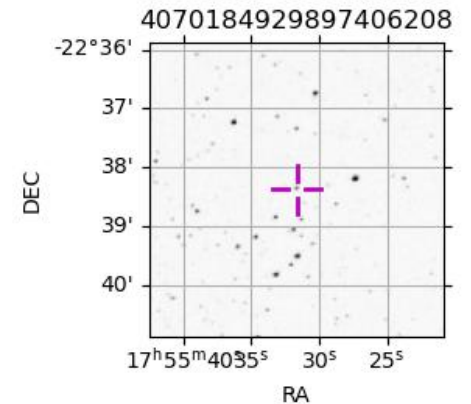
2047-10-17T11:34:40.9400 α: 17 55 31.7932 δ: -22 38 22.638 C/A 1.440° PA 2.37 deg v_sky +21.89 km/s D 10.42 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PMO
 KAV
 AAT
 MSO

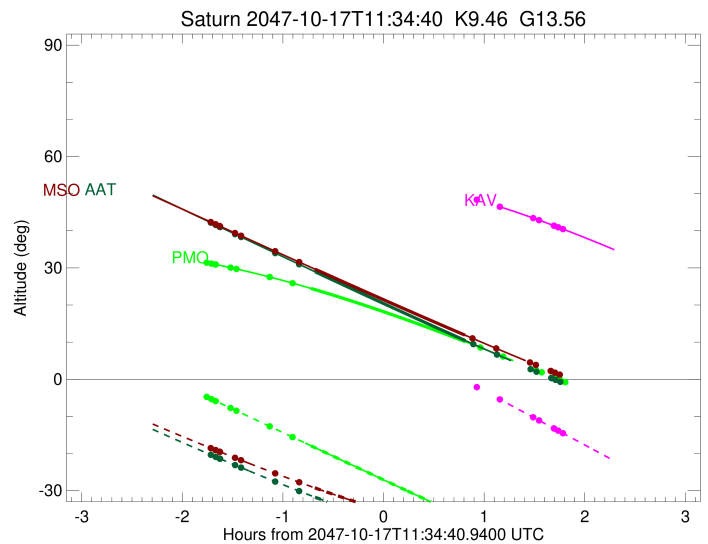
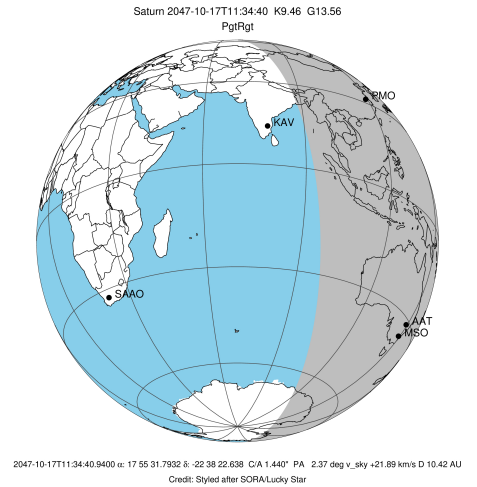


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
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	+	+	+	OCT 17 09:52 - OCT 17 12:45	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			+	OCT 17 12:44 - OCT 17 13:21	PnnRne
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+	+	+	OCT 17 09:51 - OCT 17 12:42	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	OCT 17 09:51 - OCT 17 12:41	PieRie



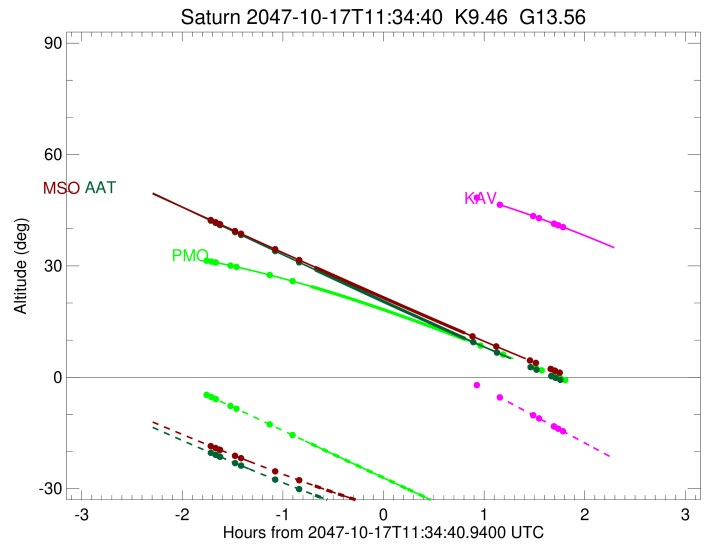
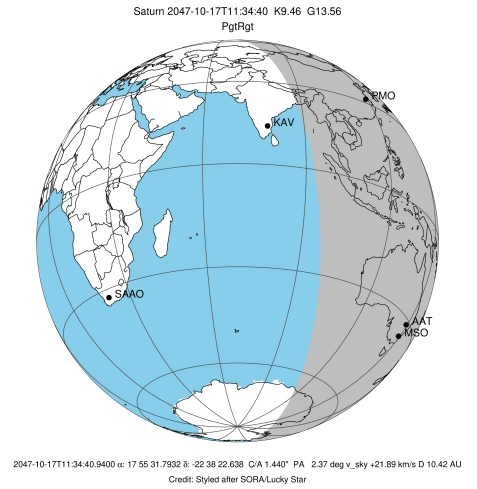
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-10-17T11:37:40.150
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4070184929897406208
 2Mass ID (if available) : 17553178-2238226
 ICRS Star Coord at Epoch: 17h 55m 31.79324s -22:38:22.63765s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.455
 G magnitude : 13.561
 RP magnitude : 12.445
 BP magnitude : 14.868
 DUPflag : 0
 Distance (au) : 10.416
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.89
 Sun-Target sep (deg) : 65.61
 Sun-Moon sep (deg) : 89.35
 B (ring opening deg) : 26.87
 PA of pole (deg) : 5.44
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.831
 C/A sky separation (km) : 6274.7
 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

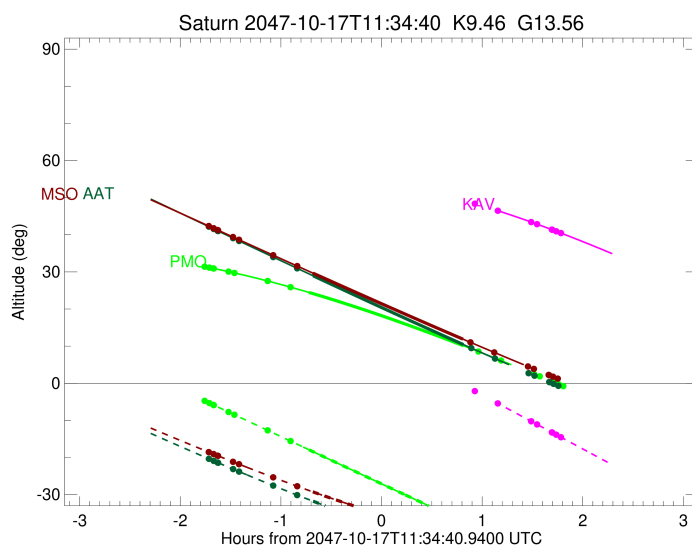
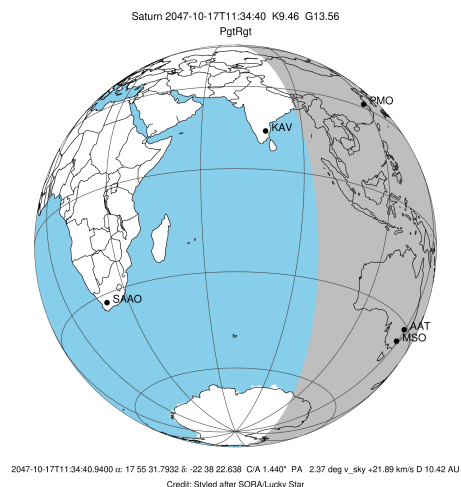
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-10-17T09:49:13.277		31.41	-4.74x	140461.00	-21.52		
A (OER)	I	2047-10-17T09:52:04.615		31.15	-5.34	136774.40	-21.52		
Encke (OEG)	I	2047-10-17T09:54:25.432		30.94	-5.83	133744.89	-21.51		
Encke (IEG)	I	2047-10-17T09:54:40.381		30.92	-5.89	133423.31	-21.51		
A (IER)	I	2047-10-17T10:03:29.203		30.07	-7.75	122050.38	-21.50		
B (OER)	I	2047-10-17T10:06:57.580		29.72	-8.48	117571.16	-21.49		
B (IER)	I	2047-10-17T10:26:49.779		27.55	-12.69	91984.69	-21.42		
C (IER)	I	2047-10-17T10:40:28.455		25.89	-15.58	74490.58	-21.30		
Saturn	I	2047-10-17T10:51:24.922		24.47	-17.91	60265.38		-2.40	-2.95
Saturn	E	2047-10-17T12:23:44.469		10.08	-37.35	60236.76		-8.31	-10.18
C (IER)	E	2047-10-17T12:32:26.462		8.55	-39.14	74490.58	21.49		
B (IER)	E	2047-10-17T12:45:57.171		6.13	-41.89	91984.69	21.65		
B (OER)	E	2047-10-17T13:05:34.751		2.52x	-45.82	117571.16	21.79		
A (IER)	E	2047-10-17T13:09:00.214		1.88x	-46.50	122050.38	21.81		
Encke (IEG)	E	2047-10-17T13:17:41.175		0.24x	-48.19	133423.31	21.85		
Encke (OEG)	E	2047-10-17T13:17:55.892		0.19x	-48.24	133744.89	21.85		
A (OER)	E	2047-10-17T13:20:14.498		-0.24x	-48.69	136774.40	21.86		
F ring	E	2047-10-17T13:23:03.084		-0.78x	-49.23	140461.00	21.87		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-10-17T11:35:19.150
 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 : 4070184929897406208
 2Mass ID (if available) : 17553178-2238226
 ICRS Star Coord at Epoch: 17h 55m 31.79324s -22:38:22.63765s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.455
 G magnitude : 13.561
 RP magnitude : 12.445
 BP magnitude : 14.868
 DUPflag : 0
 Distance (au) : 10.416
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.89
 Sun-Target sep (deg) : 65.61
 Sun-Moon sep (deg) : 89.84
 B (ring opening deg) : 26.87
 PA of pole (deg) : 5.44
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.954
 C/A sky separation (km) : 7205.2
 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_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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-10-17T09:46:13.444		50.53	36.60x	140461.00	-21.40		
A (OER)	I	2047-10-17T09:49:05.740		50.85	35.95x	136774.40	-21.39		
Encke (OEG)	I	2047-10-17T09:51:27.378		51.10	35.41x	133744.89	-21.39		
Encke (IEG)	I	2047-10-17T09:51:42.416		51.12	35.35x	133423.31	-21.38		
A (IER)	I	2047-10-17T10:00:34.615		52.00	33.33x	122050.38	-21.35		
B (OER)	I	2047-10-17T10:04:04.452		52.32	32.52x	117571.16	-21.34		
B (IER)	I	2047-10-17T10:24:06.674		53.81	27.89x	91984.69	-21.21		
C (IER)	I	2047-10-17T10:37:54.431		54.47	24.67x	74490.58	-21.04		
Saturn	I	2047-10-17T10:48:47.617		54.77	22.11x	60262.64		-3.43	-4.21
Saturn	E	2047-10-17T12:21:45.573		49.46	-0.05x	60232.23		-8.90	-10.89
C (IER)	E	2047-10-17T12:30:17.095		48.38	-2.10x	74490.58	21.12		
B (IER)	E	2047-10-17T12:44:01.244		46.48	-5.42	91984.69	21.31		
B (OER)	E	2047-10-17T13:03:56.800		43.43	-10.24	117571.16	21.47		
A (IER)	E	2047-10-17T13:07:25.306		42.86	-11.08	122050.38	21.49		
Encke (IEG)	E	2047-10-17T13:16:13.910		41.39	-13.21	133423.31	21.54		
Encke (OEG)	E	2047-10-17T13:16:28.841		41.35	-13.27	133744.89	21.54		
A (OER)	E	2047-10-17T13:18:49.467		40.95	-13.84	136774.40	21.55		
F ring	E	2047-10-17T13:21:40.503		40.46	-14.53	140461.00	21.56		

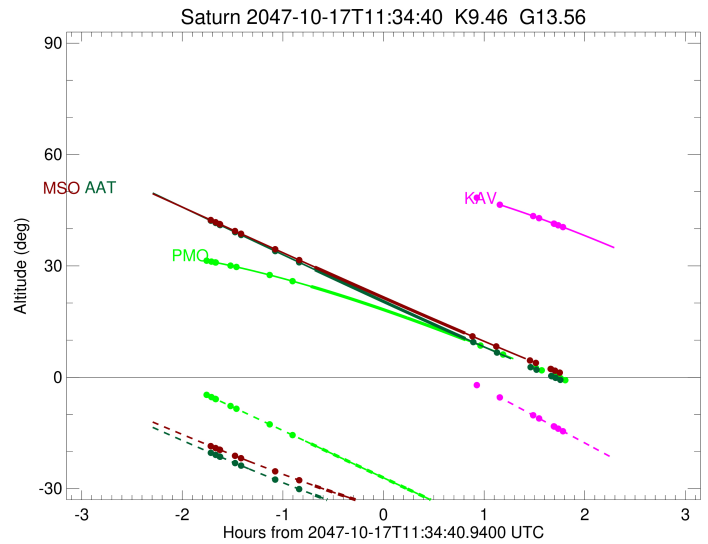
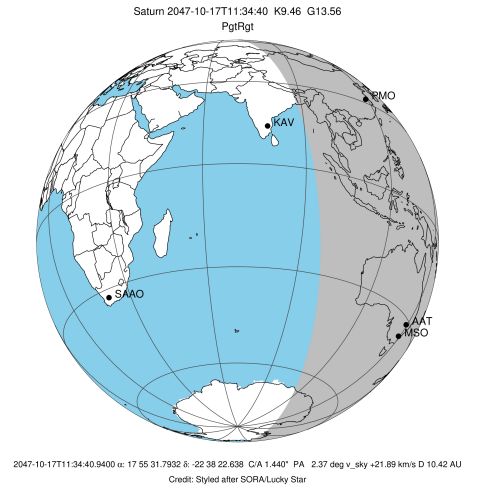
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-10-17T11:38:46.620
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4070184929897406208
 2Mass ID (if available) : 17553178-2238226
 ICRS Star Coord at Epoch: 17h 55m 31.79324s -22:38:22.63765s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.455
 G magnitude : 13.561
 RP magnitude : 12.445
 BP magnitude : 14.868
 DUPflag : 0
 Distance (au) : 10.416
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.89
 Sun-Target sep (deg) : 65.61
 Sun-Moon sep (deg) : 89.39
 B (ring opening deg) : 26.87
 PA of pole (deg) : 5.44
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.769
 C/A sky separation (km) : 13360.4
 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	2047-10-17T09:51:44.529		42.19	-20.35	140461.00	-21.29		
A (OER)	I	2047-10-17T09:54:37.817		41.57	-20.91	136774.40	-21.26		
Encke (OEG)	I	2047-10-17T09:57:00.357		41.06	-21.37	133744.89	-21.24		
Encke (IEG)	I	2047-10-17T09:57:15.496		41.00	-21.42	133423.31	-21.24		
A (IER)	I	2047-10-17T10:06:11.987		39.09	-23.12	122050.38	-21.15		
B (OER)	I	2047-10-17T10:09:43.978		38.34	-23.79	117571.16	-21.11		
B (IER)	I	2047-10-17T10:30:06.690		33.99	-27.57	91984.69	-20.69		
C (IER)	I	2047-10-17T10:44:23.392		30.96	-30.12	74490.58	-20.08		
Saturn	I	2047-10-17T10:53:49.158		28.97	-31.76	60236.28		-8.38	-10.25
Saturn	E	2047-10-17T12:23:30.011		10.43	-44.67	60174.84		-14.47	-17.57
C (IER)	E	2047-10-17T12:28:10.897		9.48	-45.17	74490.58	20.27		
B (IER)	E	2047-10-17T12:42:18.478		6.67	-46.52	91984.69	20.94		
B (OER)	E	2047-10-17T13:02:24.326		2.72x	-48.04	117571.16	21.44		
A (IER)	E	2047-10-17T13:05:52.950		2.04x	-48.25	122050.38	21.50		
Encke (IEG)	E	2047-10-17T13:14:40.349		0.35x	-48.72	133423.31	21.62		
Encke (OEG)	E	2047-10-17T13:14:55.219		0.30x	-48.73	133744.89	21.63		
A (OER)	E	2047-10-17T13:17:15.201		-0.15x	-48.84	136774.40	21.66		
F ring	E	2047-10-17T13:20:05.304		-0.69x	-48.96	140461.00	21.69		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-10-17T11:38:36.140
 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 : 4070184929897406208
 2Mass ID (if available) : 17553178-2238226
 ICRS Star Coord at Epoch: 17h 55m 31.79324s -22:38:22.63765s
 RUWE (>1.4 is poor) : 0.90
 K magnitude : 9.455
 G magnitude : 13.561
 RP magnitude : 12.445
 BP magnitude : 14.868
 DUPflag : 0
 Distance (au) : 10.416
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.89
 Sun-Target sep (deg) : 65.61
 Sun-Moon sep (deg) : 89.40
 B (ring opening deg) : 26.87
 PA of pole (deg) : 5.44
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.817
 C/A sky separation (km) : 13727.5
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-10-17T09:51:40.422		42.36	-18.54	140461.00	-21.27		
A (OER)	I	2047-10-17T09:54:33.865		41.77	-19.07	136774.40	-21.24		
Encke (OEG)	I	2047-10-17T09:56:56.544		41.28	-19.50	133744.89	-21.22		
Encke (IEG)	I	2047-10-17T09:57:11.698		41.23	-19.55	133423.31	-21.22		
A (IER)	I	2047-10-17T10:06:08.818		39.39	-21.16	122050.38	-21.12		
B (OER)	I	2047-10-17T10:09:41.110		38.67	-21.79	117571.17	-21.08		
B (IER)	I	2047-10-17T10:30:06.391		34.49	-25.35	91984.69	-20.63		
C (IER)	I	2047-10-17T10:44:26.337		31.57	-27.75	74490.58	-19.99		
Saturn	I	2047-10-17T10:53:43.227		29.69	-29.25	60233.71		-8.71	-10.66
Saturn	E	2047-10-17T12:23:15.378		11.89	-41.11	60171.01		-14.77	-17.93
C (IER)	E	2047-10-17T12:27:41.403		11.03	-41.54	74490.58	20.16		
B (IER)	E	2047-10-17T12:41:52.593		8.32	-42.76	91984.69	20.87		
B (OER)	E	2047-10-17T13:02:01.670		4.52x	-44.14	117571.16	21.39		
A (IER)	E	2047-10-17T13:05:30.725		3.88x	-44.34	122050.38	21.46		
Encke (IEG)	E	2047-10-17T13:14:19.105		2.25x	-44.76	133423.31	21.59		
Encke (OEG)	E	2047-10-17T13:14:34.000		2.20x	-44.77	133744.89	21.59		
A (OER)	E	2047-10-17T13:16:54.220		1.78x	-44.87	136774.40	21.62		
F ring	E	2047-10-17T13:19:44.601		1.26x	-44.97	140461.00	21.65		