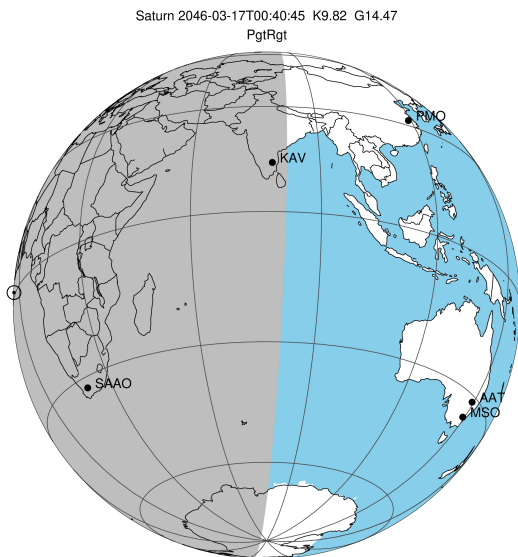


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-17T00:40:45.660
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4120805792372372224
 2Mass ID (if available) : 17271088-2142598

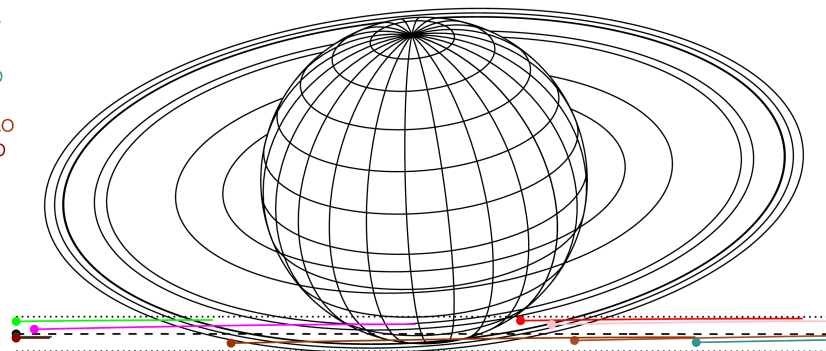
Saturn 2046-03-17T00:40:45 K9.82 G14.47 PgtRgt

ICRS Star Coord at Epoch: 17h 27m 10.88217s -21:42:59.89520s

RUWE (>1.4 is poor) : 1.05
 K magnitude : 9.819
 G magnitude : 14.470
 RP magnitude : 13.277
 BP magnitude : 16.023
 DUPflag : 0
 Distance (au) : 9.917
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.71
 Sun-Target sep (deg) : 93.57
 Sun-Moon sep (deg) : 159.65
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.78



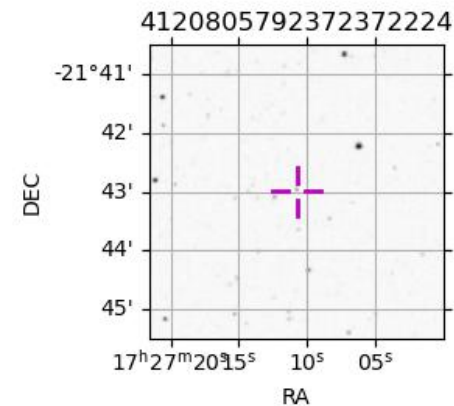
Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



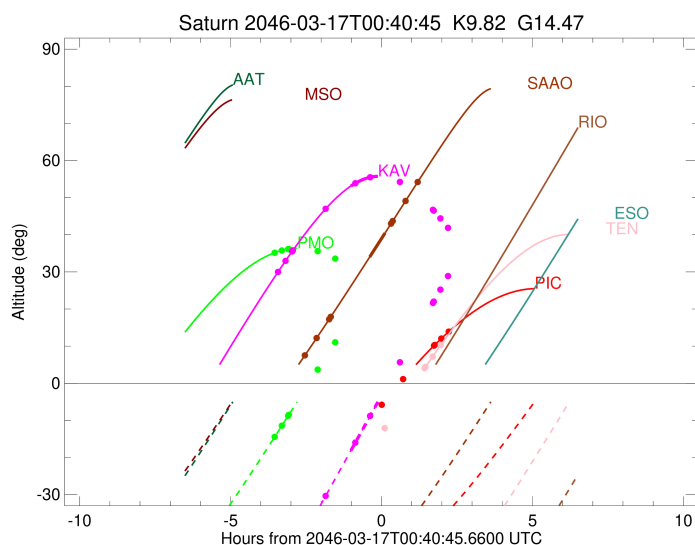
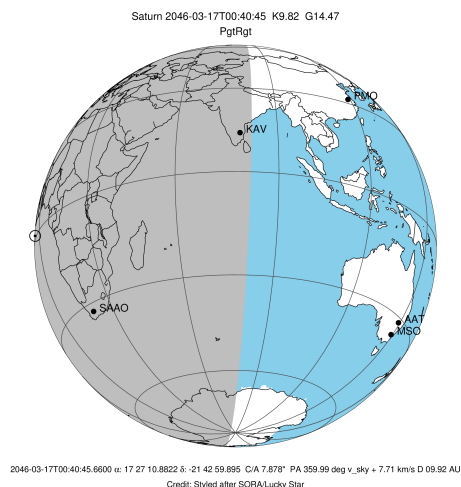
2046-03-17T00:40:45.6600 α: 17 27 10.8822 δ: -21 42 59.895 C/A 7.878° PA 359.99 deg v_sky + 7.71 km/s D 09.92 AU
 Credit: Styled after SORA/Lucky Star

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			+	MAR 17 02:25 - MAR 17 02:54	PnnRne
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8	+			MAR 16 21:08 - MAR 16 21:36	PnnRin
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			+	MAR 17 02:22 - MAR 17 02:38	PnnRne
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8	+	+		MAR 16 21:14 - MAR 16 23:40	PinRin
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	+	+		MAR 16 22:07 - MAR 17 01:52	PieRie
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



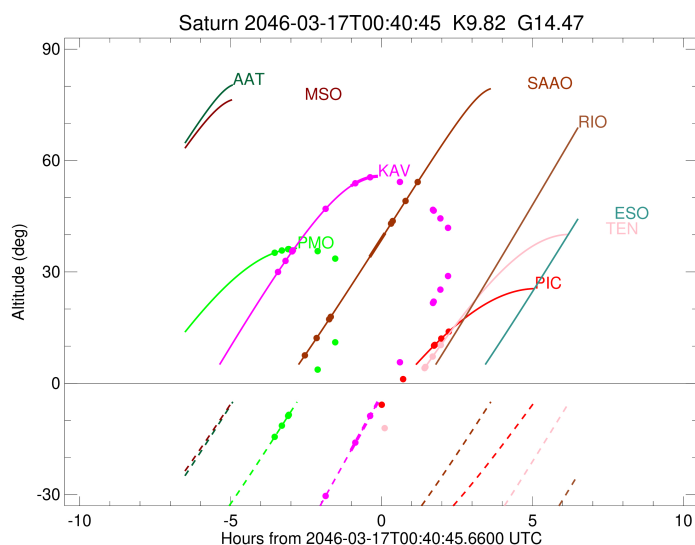
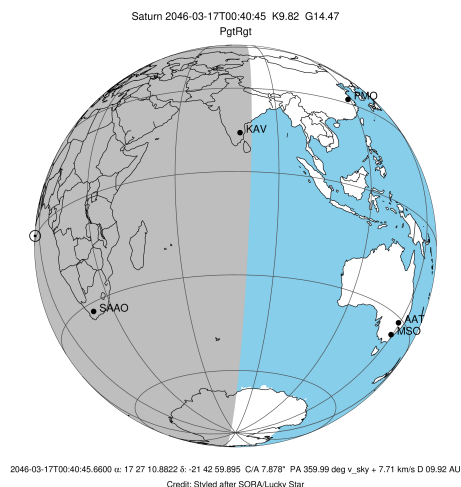
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-17T00:32:42.330
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4120805792372372224
 2Mass ID (if available) : 17271088-2142598
 ICRS Star Coord at Epoch: 17h 27m 10.88217s -21:42:59.89520s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 9.819
 G magnitude : 14.470
 RP magnitude : 13.277
 BP magnitude : 16.023
 DUPflag : 0
 Distance (au) : 9.917
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.71
 Sun-Target sep (deg) : 93.57
 Sun-Moon sep (deg) : 160.41
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.272
 C/A sky separation (km) : 52302.3
 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	2046-03-16T21:15:53.996		-42.70x	-33.64	140461.00	-4.51		
A (OER)	I	2046-03-16T21:29:56.902		-40.14x	-35.70	136774.40	-4.23		
Encke (OEG)	I	2046-03-16T21:42:16.095		-37.88x	-37.43	133744.89	-3.96		
Encke (IEG)	I	2046-03-16T21:43:37.527		-37.63x	-37.61	133423.31	-3.93		
A (IER)	I	2046-03-16T22:42:36.889		-26.79x	-44.47	122050.38	-2.43		
B (OER)	I	2046-03-16T23:23:10.525		-19.42x	-47.45	117571.17	-1.23		
Saturn	I	2046-03-16T23:31:36.711		-17.90x	-47.85	59453.46		-49.21	-54.60
Saturn	E	2046-03-17T01:34:03.365		2.72x	-44.31	59325.58		-54.65	-59.67
B (OER)	E	2046-03-17T00:42:15.267	b	-5.62x	-47.89	117571.16	1.21		
A (IER)	E	2046-03-17T01:23:49.321	b	1.13x	-45.23	122050.38	2.36		
Encke (IEG)	E	2046-03-17T02:25:16.175		10.15	-38.43	133423.31	3.74		
Encke (OEG)	E	2046-03-17T02:26:41.767		10.34	-38.24	133744.89	3.77		
A (OER)	E	2046-03-17T02:39:40.239		12.05	-36.46	136774.40	4.01		
F ring	E	2046-03-17T02:54:31.210		13.92	-34.32	140461.00	4.26		

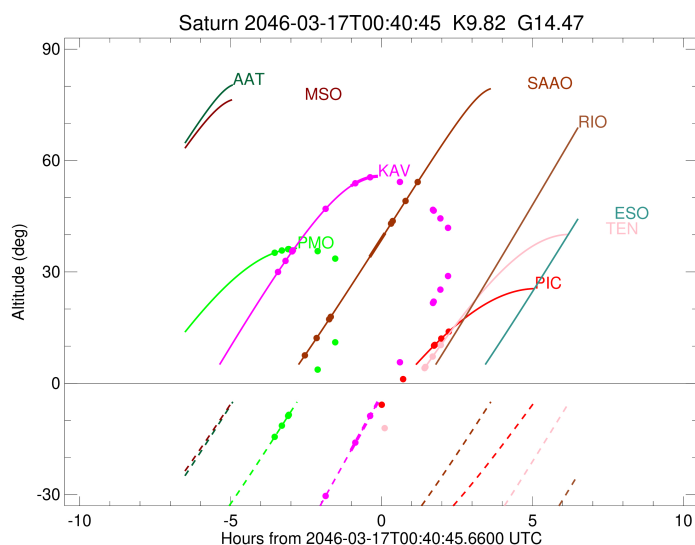
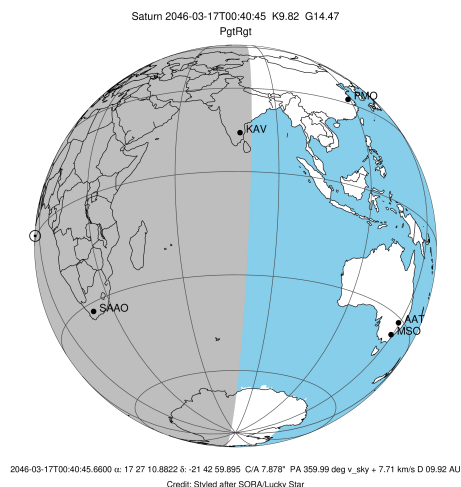
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-17T00:47:14.560
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 4120805792372372224
 2Mass ID (if available) : 17271088-2142598
 ICRS Star Coord at Epoch: 17h 27m 10.88217s -21:42:59.89520s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 9.819
 G magnitude : 14.470
 RP magnitude : 13.277
 BP magnitude : 16.023
 DUPflag : 0
 Distance (au) : 9.917
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.71
 Sun-Target sep (deg) : 93.57
 Sun-Moon sep (deg) : 159.44
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.241
 C/A sky separation (km) : 52082.8
 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

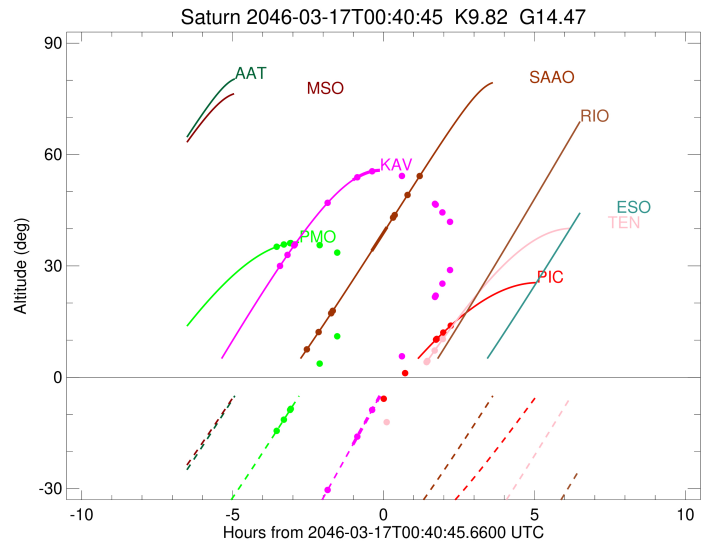
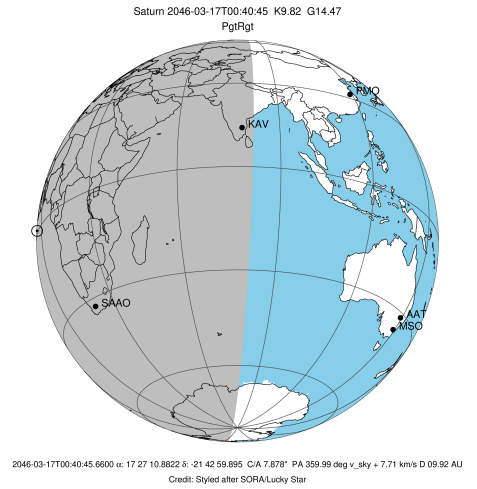
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-03-16T21:08:03.643		35.14	-14.51	140461.00	-4.44		
A (OER)	I	2046-03-16T21:22:17.587		35.75	-11.51	136774.40	-4.19		
Encke (OEG)	I	2046-03-16T21:34:41.279		36.11	-8.88	133744.89	-3.96		
Encke (IEG)	I	2046-03-16T21:36:02.862		36.14	-8.60	133423.31	-3.93		
A (IER)	I	2046-03-16T22:33:18.036		35.61	3.56x	122050.38	-2.64		
B (OER)	I	2046-03-16T23:07:27.482		33.68	10.77x	117571.16	-1.72		
Saturn	I	2046-03-16T23:42:45.101		30.55	18.13x	59491.03		-47.65	-53.12
Saturn	E	2046-03-17T01:50:28.242		12.29	42.65x	59306.19		-55.51	-60.45
B (OER)	E	2046-03-17T01:01:56.800	b	20.23	33.92x	117571.16	1.72		
A (IER)	E	2046-03-17T01:35:54.936	b	14.77	40.14x	122050.38	2.66		
Encke (IEG)	E	2046-03-17T02:32:32.753		4.73x	49.14x	133423.31	3.98		
Encke (OEG)	E	2046-03-17T02:33:53.191		4.48x	49.33x	133744.89	4.01		
A (OER)	E	2046-03-17T02:46:06.004		2.19x	50.93x	136774.40	4.25		
F ring	E	2046-03-17T03:00:06.555		-0.48x	52.57x	140461.00	4.51		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-17T00:30:59.860
 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 : 4120805792372372224
 2Mass ID (if available) : 17271088-2142598
 ICRS Star Coord at Epoch: 17h 27m 10.88217s -21:42:59.89520s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 9.819
 G magnitude : 14.470
 RP magnitude : 13.277
 BP magnitude : 16.023
 DUPflag : 0
 Distance (au) : 9.917
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.71
 Sun-Target sep (deg) : 93.57
 Sun-Moon sep (deg) : 160.45
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.519
 C/A sky separation (km) : 54078.6
 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



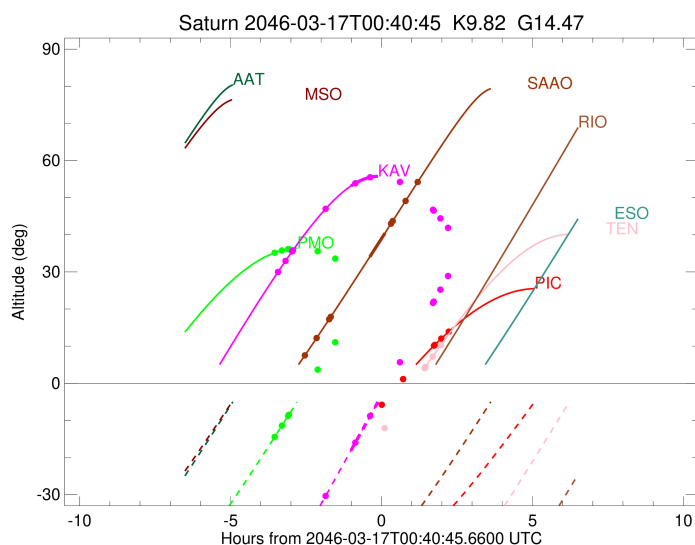
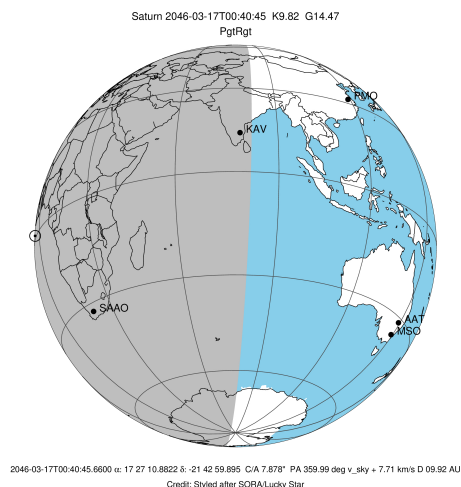
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-03-16T21:28:59.797	-55.16x	-30.02	140461.00	-4.18			
A (OER)	I	2046-03-16T21:44:17.060	-51.78x	-33.24	136774.40	-3.85			
Encke (OEG)	I	2046-03-16T21:57:57.467	-48.76x	-36.07	133744.89	-3.53			
Encke (IEG)	I	2046-03-16T21:59:28.994	-48.43x	-36.39	133423.31	-3.50			
A (IER)	I	2046-03-16T23:15:48.973	-31.65x	-51.05	122050.38	-1.39			
Saturn	I	2046-03-16T23:38:38.634	-26.69x	-54.81	59383.69			-52.14	-57.35
Saturn	E	2046-03-17T01:23:29.802	-4.53x	-63.12	59274.40			-56.94	-61.75
A (IER)	E	2046-03-17T00:47:18.418	b	-12.03x	-62.45	122050.38	1.36		
Encke (IEG)	E	2046-03-17T02:06:31.705		4.10x	-60.43	133423.31	3.32		
Encke (OEG)	E	2046-03-17T02:08:08.079		4.42x	-60.27	133744.89	3.35		
A (OER)	E	2046-03-17T02:22:34.228		7.22	-58.62	136774.40	3.64		
F ring	E	2046-03-17T02:38:47.434		10.31	-56.43	140461.00	3.93		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-17T00:41:01.560
 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 : 4120805792372372224
 2Mass ID (if available) : 17271088-2142598
 ICRS Star Coord at Epoch: 17h 27m 10.88217s -21:42:59.89520s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 9.819
 G magnitude : 14.470
 RP magnitude : 13.277
 BP magnitude : 16.023
 DUPflag : 0
 Distance (au) : 9.917
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.71
 Sun-Target sep (deg) : 93.57
 Sun-Moon sep (deg) : 160.03
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.378
 C/A sky separation (km) : 53066.6
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-03-16T21:14:36.222		29.90	-53.22	140461.00	-4.26		
A (OER)	I	2046-03-16T21:29:31.973		32.87	-49.68	136774.40	-3.97		
Encke (OEG)	I	2046-03-16T21:42:41.444		35.43	-46.54	133744.89	-3.70		
Encke (IEG)	I	2046-03-16T21:44:08.680		35.71	-46.19	133423.31	-3.67		
A (IER)	I	2046-03-16T22:49:01.175		46.89	-30.52	122050.38	-2.11		
B (OER)	I	2046-03-16T23:44:59.206	b	53.57	-16.89	117571.36	-0.53		
Saturn	I	2046-03-16T23:40:03.129		53.14	-18.10	59439.41		-49.79	-55.15
Saturn	E	2046-03-17T01:41:22.820		52.11	11.51x	59286.78		-56.38	-61.24
B (OER)	E	2046-03-17T00:21:10.904	b	55.57	-8.06	117571.24	0.53		
A (IER)	E	2046-03-17T01:17:30.347	b	54.23	5.69x	122050.38	2.09		
Encke (IEG)	E	2046-03-17T02:23:06.773		46.71	21.66x	133423.31	3.62		
Encke (OEG)	E	2046-03-17T02:24:35.158		46.49	22.02x	133744.89	3.65		
A (OER)	E	2046-03-17T02:37:55.350		44.39	25.25x	136774.40	3.92		
F ring	E	2046-03-17T02:53:04.002		41.85	28.91x	140461.00	4.20		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-03-17T00:32:52.450
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 4120805792372372224
 2Mass ID (if available) : 17271088-2142598
 ICRS Star Coord at Epoch: 17h 27m 10.88217s -21:42:59.89520s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 9.819
 G magnitude : 14.470
 RP magnitude : 13.277
 BP magnitude : 16.023
 DUPflag : 0
 Distance (au) : 9.917
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.71
 Sun-Target sep (deg) : 93.57
 Sun-Moon sep (deg) : 160.41
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.78
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.169
 C/A sky separation (km) : 58755.0
 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	2046-03-16T22:07:47.964		7.38	-55.26	140461.00	-2.92		
A (OER)	I	2046-03-16T22:31:02.059		12.02	-56.24	136774.40	-2.36		
Encke (OEG)	I	2046-03-16T22:55:44.120		17.04	-56.32	133744.89	-1.72		
Encke (IEG)	I	2046-03-16T22:58:55.380		17.69	-56.26	133423.31	-1.64		
Saturn	I	2046-03-17T00:17:18.117		34.02	-49.97	59176.54		-61.58	-65.91
Saturn	E	2046-03-17T00:47:50.099		40.48	-45.63	59141.49		-63.37	-67.48
Encke (IEG)	E	2046-03-17T01:00:09.671		43.09	-43.68	133423.31	1.60		
Encke (OEG)	E	2046-03-17T01:03:25.523		43.78	-43.15	133744.89	1.68		
A (OER)	E	2046-03-17T01:28:50.262		49.17	-38.79	136774.40	2.28		
F ring	E	2046-03-17T01:52:55.357		54.26	-34.39	140461.00	2.81		