

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-18T08:28:10.090
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4115632310948587136
 2Mass ID (if available) : 17112795-2125133

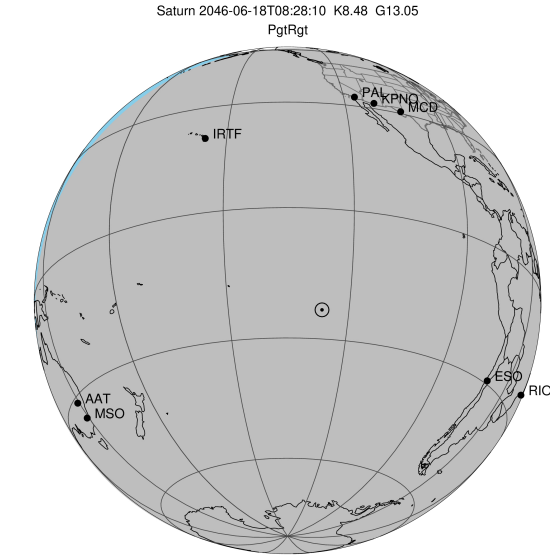
Saturn 2046-06-18T08:28:10 K8.48 G13.05 PgtRgt

ICRS Star Coord at Epoch: 17h 11m 27.94407s -21:25:13.35598s

RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.483
 G magnitude : 13.045
 RP magnitude : 11.818
 BP magnitude : 14.687
 DUPflag : 0
 Distance (au) : 9.028
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.89
 Sun-Target sep (deg) : 171.91
 Sun-Moon sep (deg) : 7.35
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.40

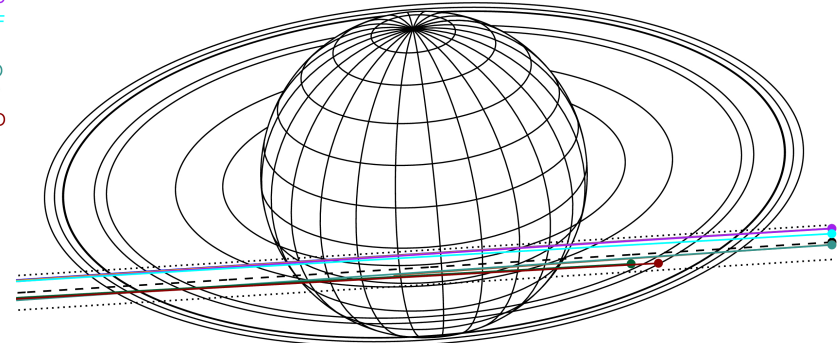
a(km) ring

- 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



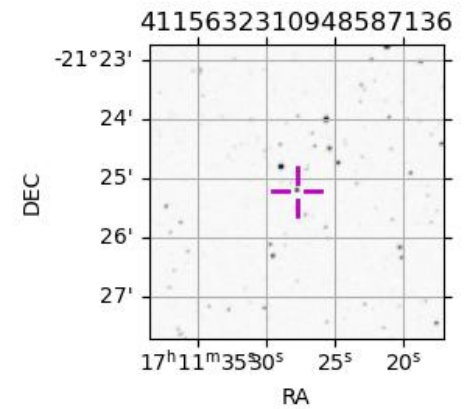
2046-06-18T08:28:10.0900 a: 17 11 27.9441 δ: -21 25 13.356 C/A 5.239° PA 3.56 deg v_sky -19.89 km/s D 09.03 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 IRTF
 RIO
 ESO
 AAT
 MSO

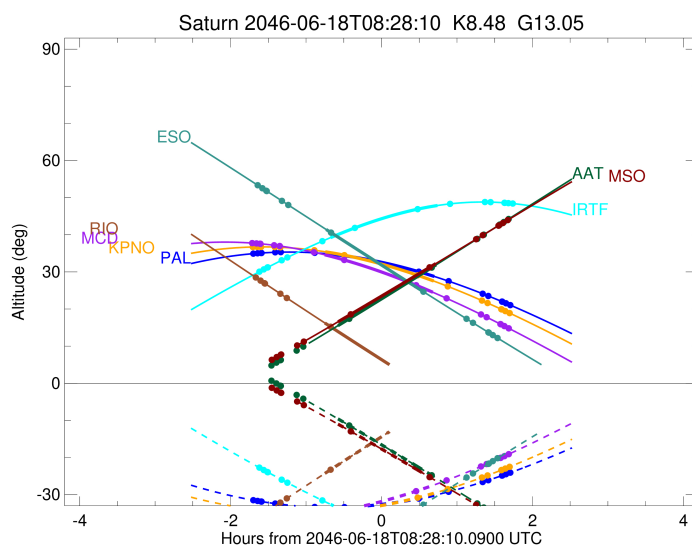
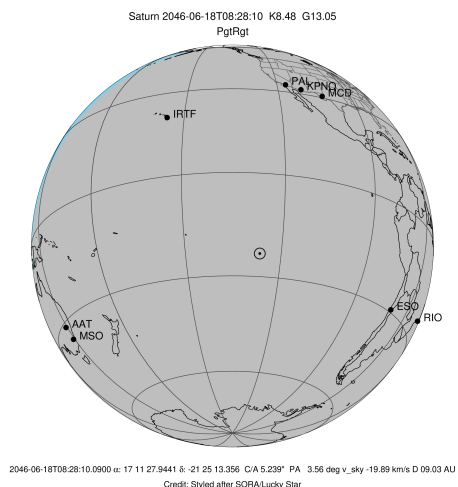


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+ + + + +	+ +	+ + + + +	JUN 18 06:46 - JUN 18 10:10	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + +	+ +	+ + + + +	JUN 18 06:45 - JUN 18 10:10	PieRie
MCD	McDonald Obs.	30.7	256.0	+ + + + +	+ +	+ + + + +	JUN 18 06:45 - JUN 18 10:09	PieRie
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ + + + +	+ +	+ + + + +	JUN 18 06:51 - JUN 18 10:12	PieRie
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+ + + + +	+		JUN 18 06:48 - JUN 18 07:43	PinRin
ESO	European South	-29.3	289.3	+ + + + +	+ +	+ + + + +	JUN 18 06:49 - JUN 18 10:00	PieRie
AAT	Siding Spring	-31.3	149.1		+ +	+ + + + +	JUN 18 07:53 - JUN 18 10:09	PieRne
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0		+	+ + + + +	JUN 18 07:26 - JUN 18 10:08	PieRie



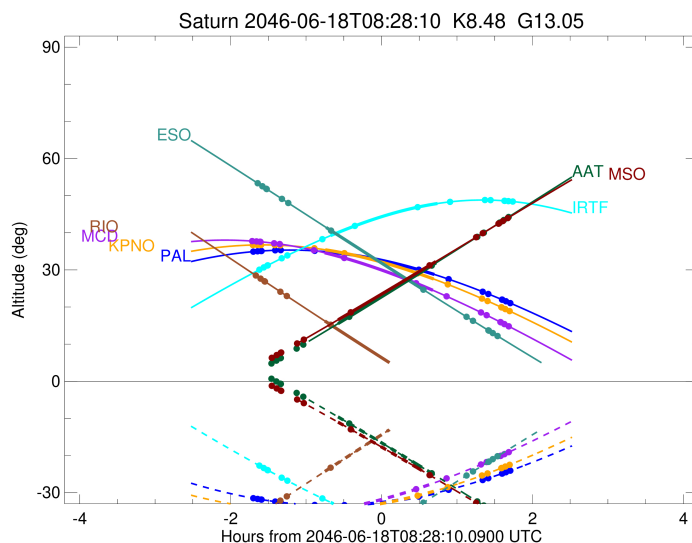
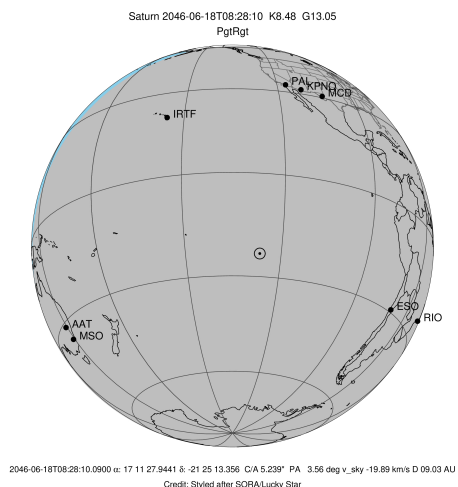
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-18T08:26:59.930
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4115632310948587136
 2Mass ID (if available) : 17112795-2125133
 ICRS Star Coord at Epoch: 17h 11m 27.94407s -21:25:13.35598s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.483
 G magnitude : 13.045
 RP magnitude : 11.818
 BP magnitude : 14.687
 DUPflag : 0
 Distance (au) : 9.027
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.89
 Sun-Target sep (deg) : 171.91
 Sun-Moon sep (deg) : 7.82
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.40
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.446
 C/A sky separation (km) : 29110.0
 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	2046-06-18T06:46:16.012		34.92	-31.50	140461.00	-18.01		
A (OER)	I	2046-06-18T06:49:41.522		35.02	-31.70	136774.40	-17.87		
Encke (OEG)	I	2046-06-18T06:52:31.618		35.09	-31.86	133744.89	-17.75		
Encke (IEG)	I	2046-06-18T06:52:49.742		35.09	-31.88	133423.31	-17.74		
A (IER)	I	2046-06-18T07:03:40.622		35.28	-32.41	122050.38	-17.19		
B (OER)	I	2046-06-18T07:08:03.281		35.32	-32.60	117571.16	-16.92		
B (IER)	I	2046-06-18T07:35:04.605		35.13	-33.32	91984.69	-14.33		
C (IER)	I	2046-06-18T07:58:47.876	b	34.34	-33.36	74490.58	-9.77		
Saturn	I	2046-06-18T07:43:53.863		34.90	-33.40	59982.87		-26.43	-31.29
Saturn	E	2046-06-18T09:10:10.434		28.77	-30.17	60008.60		-25.11	-29.83
C (IER)	E	2046-06-18T08:57:50.135	b	30.04	-31.06	74490.58	9.76		
B (IER)	E	2046-06-18T09:21:36.247		27.49	-29.23	91984.69	14.29		
B (OER)	E	2046-06-18T09:48:43.756		24.10	-26.59	117571.16	16.84		
A (IER)	E	2046-06-18T09:53:07.667		23.51	-26.11	122050.38	17.10		
Encke (IEG)	E	2046-06-18T10:04:01.932		21.99	-24.86	133423.31	17.64		
Encke (OEG)	E	2046-06-18T10:04:20.156		21.95	-24.83	133744.89	17.65		
A (OER)	E	2046-06-18T10:07:11.205		21.54	-24.49	136774.40	17.77		
F ring	E	2046-06-18T10:10:37.903		21.04	-24.07	140461.00	17.90		

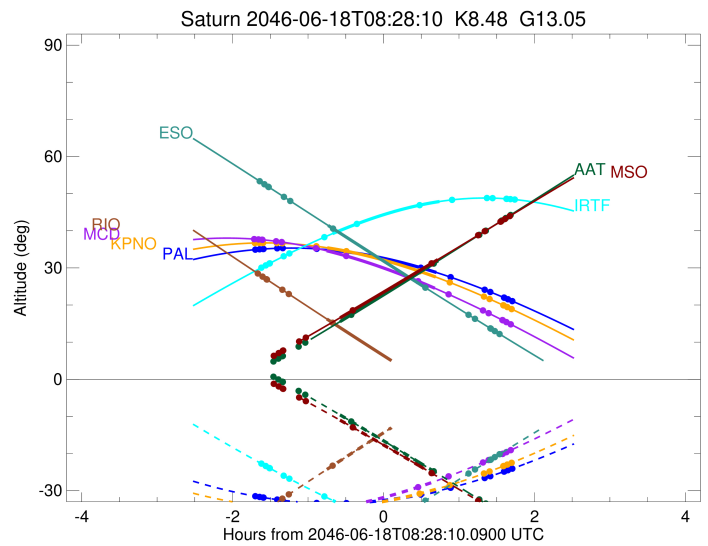
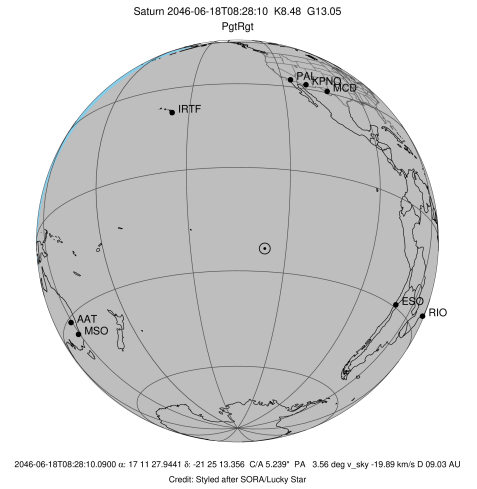
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-18T08:26:34.320
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4115632310948587136
 2Mass ID (if available) : 17112795-2125133
 ICRS Star Coord at Epoch: 17h 11m 27.94407s -21:25:13.35598s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.483
 G magnitude : 13.045
 RP magnitude : 11.818
 BP magnitude : 14.687
 DUPflag : 0
 Distance (au) : 9.027
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.89
 Sun-Target sep (deg) : 171.91
 Sun-Moon sep (deg) : 7.76
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.40
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.465
 C/A sky separation (km) : 29237.0
 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	2046-06-18T06:45:54.864		36.70	-33.92	140461.00	-17.99		
A (OER)	I	2046-06-18T06:49:20.535		36.72	-34.05	136774.40	-17.86		
Encke (OEG)	I	2046-06-18T06:52:10.781		36.73	-34.16	133744.89	-17.73		
Encke (IEG)	I	2046-06-18T06:52:28.922		36.73	-34.17	133423.31	-17.72		
A (IER)	I	2046-06-18T07:03:20.564		36.69	-34.50	122050.38	-17.16		
B (OER)	I	2046-06-18T07:07:43.625		36.63	-34.60	117571.16	-16.89		
B (IER)	I	2046-06-18T07:34:49.425		35.83	-34.78	91984.69	-14.27		
C (IER)	I	2046-06-18T07:58:44.352	b	34.50	-34.30	74490.58	-9.63		
Saturn	I	2046-06-18T07:43:31.508		35.41	-34.67	59981.11		-26.51	-31.39
Saturn	E	2046-06-18T09:09:42.352		27.54	-29.64	60005.64		-25.26	-30.00
C (IER)	E	2046-06-18T08:56:55.981	b	29.08	-30.81	74490.58	9.62		
B (IER)	E	2046-06-18T09:20:54.694		26.09	-28.51	91984.69	14.21		
B (OER)	E	2046-06-18T09:48:08.395		22.26	-25.38	117571.16	16.79		
A (IER)	E	2046-06-18T09:52:33.049		21.61	-24.82	122050.38	17.06		
Encke (IEG)	E	2046-06-18T10:03:28.995		19.93	-23.40	133423.31	17.60		
Encke (OEG)	E	2046-06-18T10:03:47.263		19.89	-23.36	133744.89	17.61		
A (OER)	E	2046-06-18T10:06:38.721		19.44	-22.97	136774.40	17.73		
F ring	E	2046-06-18T10:10:05.902		18.89	-22.50	140461.00	17.86		

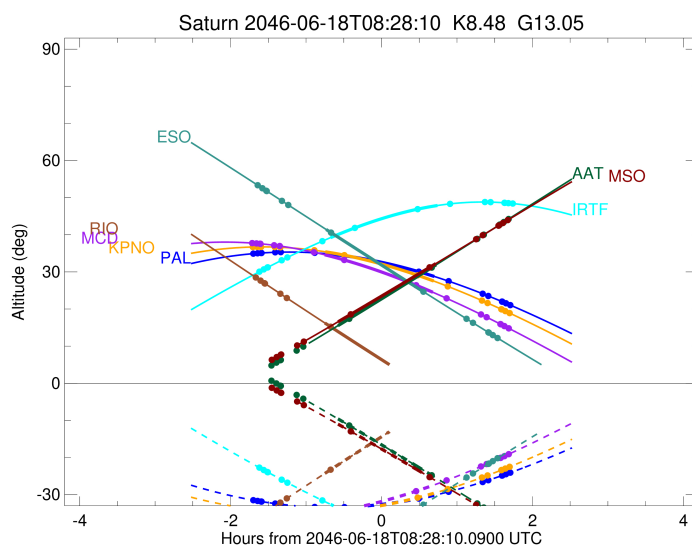
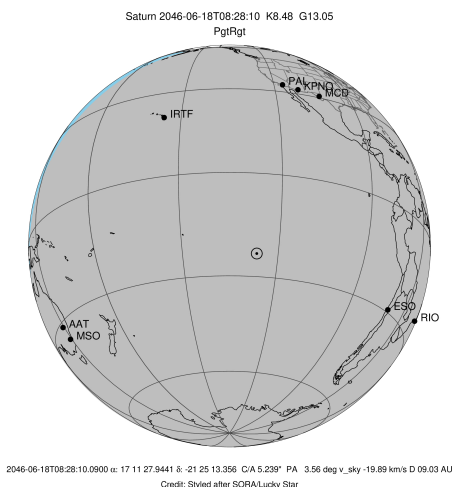
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-18T08:25:59.020
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4115632310948587136
 2Mass ID (if available) : 17112795-2125133
 ICRS Star Coord at Epoch: 17h 11m 27.94407s -21:25:13.35598s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.483
 G magnitude : 13.045
 RP magnitude : 11.818
 BP magnitude : 14.687
 DUPflag : 0
 Distance (au) : 9.027
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.89
 Sun-Target sep (deg) : 171.91
 Sun-Moon sep (deg) : 7.66
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.40
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.491
 C/A sky separation (km) : 29405.8
 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	2046-06-18T06:45:22.307		37.76	-36.02	140461.00	-17.97		
A (OER)	I	2046-06-18T06:48:48.282		37.67	-36.06	136774.40	-17.81		
Encke (OEG)	I	2046-06-18T06:51:38.805		37.58	-36.08	133744.89	-17.70		
Encke (IEG)	I	2046-06-18T06:51:56.977		37.58	-36.08	133423.31	-17.69		
A (IER)	I	2046-06-18T07:02:49.934		37.17	-36.08	122050.38	-17.12		
B (OER)	I	2046-06-18T07:07:13.655		36.97	-36.04	117571.16	-16.84		
B (IER)	I	2046-06-18T07:34:26.274		35.29	-35.36	91984.69	-14.17		
C (IER)	I	2046-06-18T07:58:38.017	b	33.20	-34.12	74490.58	-9.43		
Saturn	I	2046-06-18T07:42:59.364		34.61	-34.99	59978.82		-26.63	-31.52
Saturn	E	2046-06-18T09:09:04.978		24.50	-27.50	60001.62		-25.47	-30.23
C (IER)	E	2046-06-18T08:55:42.395	b	26.41	-29.06	74490.58	9.41		
B (IER)	E	2046-06-18T09:19:59.244		22.87	-26.14	91984.69	14.11		
B (OER)	E	2046-06-18T09:47:22.154		18.52	-22.40	117571.16	16.72		
A (IER)	E	2046-06-18T09:51:47.942		17.79	-21.75	122050.38	16.98		
Encke (IEG)	E	2046-06-18T10:02:46.483		15.93	-20.11	133423.31	17.53		
Encke (OEG)	E	2046-06-18T10:03:04.820		15.88	-20.06	133744.89	17.54		
A (OER)	E	2046-06-18T10:05:56.915		15.39	-19.62	136774.40	17.66		
F ring	E	2046-06-18T10:09:24.848		14.79	-19.09	140461.00	17.80		

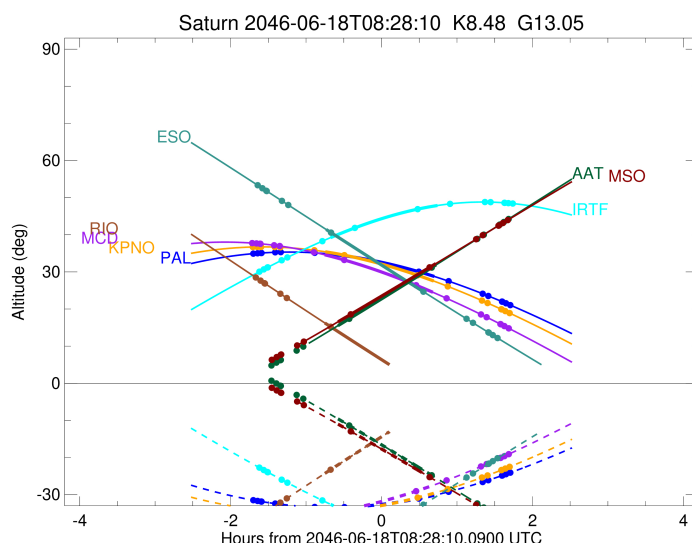
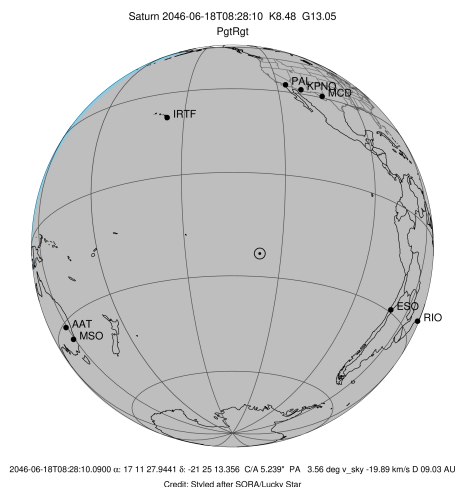
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-18T08:30:09.340
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4115632310948587136
 2Mass ID (if available) : 17112795-2125133
 ICRS Star Coord at Epoch: 17h 11m 27.94407s -21:25:13.35598s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.483
 G magnitude : 13.045
 RP magnitude : 11.818
 BP magnitude : 14.687
 DUPflag : 0
 Distance (au) : 9.028
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.89
 Sun-Target sep (deg) : 171.91
 Sun-Moon sep (deg) : 8.09
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.40
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.635
 C/A sky separation (km) : 30349.8
 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	2046-06-18T06:51:06.263		30.06	-22.73	140461.00	-17.72		
A (OER)	I	2046-06-18T06:54:35.117		30.68	-23.37	136774.40	-17.58		
Encke (OEG)	I	2046-06-18T06:57:28.090		31.18	-23.91	133744.89	-17.45		
Encke (IEG)	I	2046-06-18T06:57:46.527		31.24	-23.96	133423.31	-17.43		
A (IER)	I	2046-06-18T07:08:49.637		33.14	-25.98	122050.38	-16.84		
B (OER)	I	2046-06-18T07:13:17.912		33.89	-26.78	117571.16	-16.55		
B (IER)	I	2046-06-18T07:41:11.235		38.29	-31.57	91984.69	-13.68		
C (IER)	I	2046-06-18T08:07:05.501	b	41.86	-35.63	74490.58	-8.26		
Saturn	I	2046-06-18T07:47:41.297		39.24	-32.62	59953.76		-27.86	-32.88
Saturn	E	2046-06-18T09:12:36.032		47.88	-43.60	59990.18		-26.06	-30.88
C (IER)	E	2046-06-18T08:56:54.711	b	46.90	-42.05	74490.58	8.28		
B (IER)	E	2046-06-18T09:22:44.121		48.33	-44.45	91984.69	13.72		
B (OER)	E	2046-06-18T09:50:30.563		48.82	-46.17	117571.16	16.63		
A (IER)	E	2046-06-18T09:54:57.502		48.79	-46.35	122050.38	16.93		
Encke (IEG)	E	2046-06-18T10:05:57.021		48.61	-46.69	133423.31	17.54		
Encke (OEG)	E	2046-06-18T10:06:15.352		48.60	-46.70	133744.89	17.55		
A (OER)	E	2046-06-18T10:09:07.317		48.52	-46.76	136774.40	17.68		
F ring	E	2046-06-18T10:12:34.918		48.41	-46.81	140461.00	17.83		

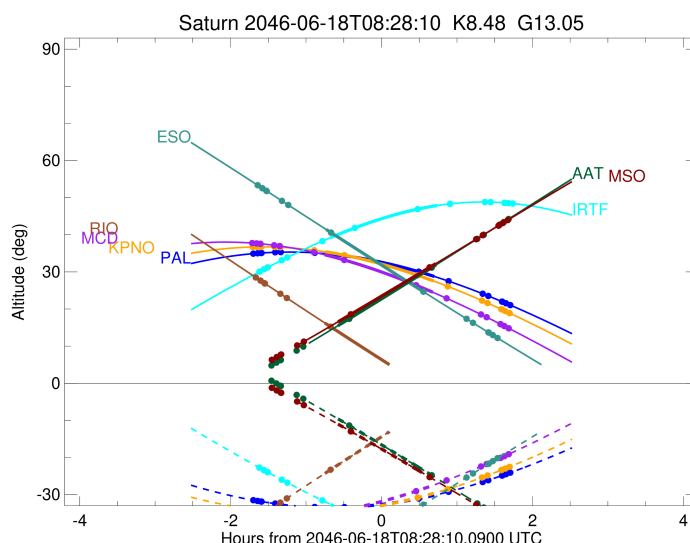
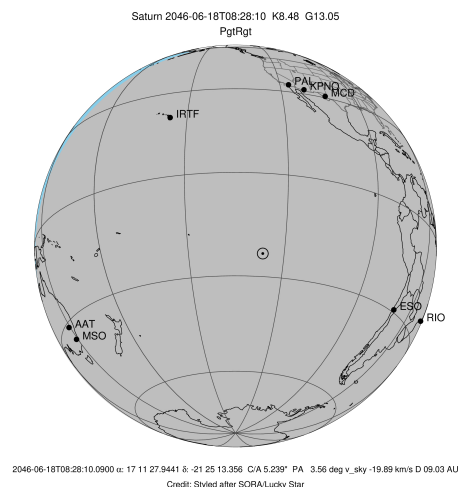
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-18T08:22:53.990
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4115632310948587136
 2Mass ID (if available) : 17112795-2125133
 ICRS Star Coord at Epoch: 17h 11m 27.94407s -21:25:13.35598s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.483
 G magnitude : 13.045
 RP magnitude : 11.818
 BP magnitude : 14.687
 DUPflag : 0
 Distance (au) : 9.027
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.89
 Sun-Target sep (deg) : 171.91
 Sun-Moon sep (deg) : 6.51
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.40
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.541
 C/A sky separation (km) : 36281.0
 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	2046-06-18T06:48:15.342		28.50	-36.52	140461.00	-16.39		
A (OER)	I	2046-06-18T06:52:01.847		27.65	-35.67	136774.40	-16.16		
Encke (OEG)	I	2046-06-18T06:55:10.542		26.94	-34.97	133744.89	-15.95		
Encke (IEG)	I	2046-06-18T06:55:30.719		26.86	-34.89	133423.31	-15.93		
A (IER)	I	2046-06-18T07:07:46.080		24.11	-32.15	122050.38	-14.96		
B (OER)	I	2046-06-18T07:12:50.201		22.98	-31.02	117571.16	-14.48		
B (IER)	I	2046-06-18T07:47:44.765	b	15.22	-23.27	91984.69	-9.33		
Saturn	I	2046-06-18T07:43:07.140		16.24	-24.29	59838.48		-33.18	-38.59
Saturn	E	2046-06-18T09:02:51.048		-1.04x	-6.96	59852.67		-32.55	-37.92
B (IER)	E	2046-06-18T08:59:51.296	b	-0.41x	-7.60	91984.69	9.26		
B (OER)	E	2046-06-18T09:35:08.867		-7.78x	-0.16x	117571.16	14.28		
A (IER)	E	2046-06-18T09:40:17.606		-8.84x	0.91x	122050.38	14.73		
Encke (IEG)	E	2046-06-18T09:52:45.425		-11.37x	3.48x	133423.31	15.64		
Encke (OEG)	E	2046-06-18T09:53:05.969		-11.44x	3.55x	133744.89	15.66		
A (OER)	E	2046-06-18T09:56:18.166		-12.08x	4.21x	136774.40	15.86		
F ring	E	2046-06-18T10:00:09.031		-12.85x	4.99x	140461.00	16.08		

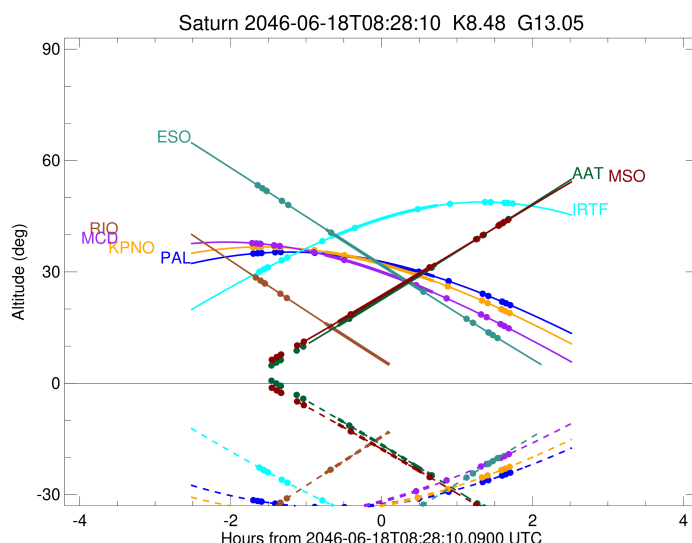
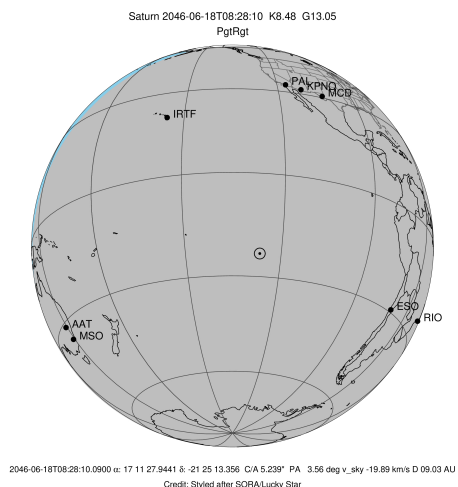
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-18T08:23:43.350
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4115632310948587136
 2Mass ID (if available) : 17112795-2125133
 ICRS Star Coord at Epoch: 17h 11m 27.94407s -21:25:13.35598s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.483
 G magnitude : 13.045
 RP magnitude : 11.818
 BP magnitude : 14.687
 DUPflag : 0
 Distance (au) : 9.027
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.89
 Sun-Target sep (deg) : 171.91
 Sun-Moon sep (deg) : 6.68
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.40
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.496
 C/A sky separation (km) : 35983.1
 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

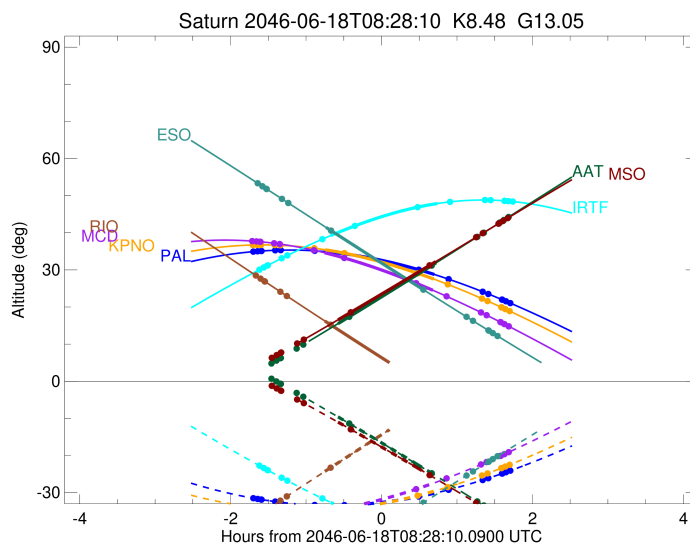
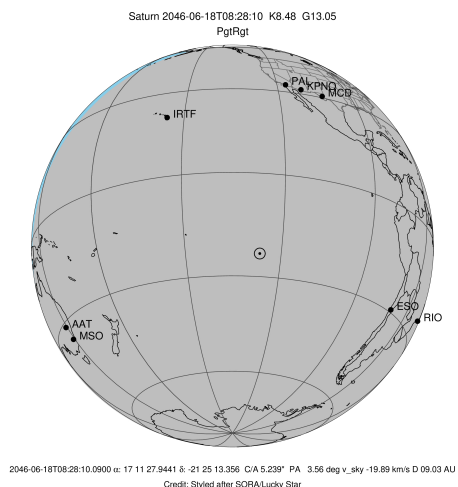
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-06-18T06:49:45.825		53.34	-61.34	140461.00	-16.59		
A (OER)	I	2046-06-18T06:53:29.574		52.53	-60.52	136774.40	-16.36		
Encke (OEG)	I	2046-06-18T06:56:35.890		51.85	-59.85	133744.89	-16.16		
Encke (IEG)	I	2046-06-18T06:56:55.807		51.78	-59.77	133423.31	-16.13		
A (IER)	I	2046-06-18T07:09:00.997		49.13	-57.14	122050.38	-15.19		
B (OER)	I	2046-06-18T07:14:00.422		48.03	-56.05	117571.16	-14.72		
B (IER)	I	2046-06-18T07:48:05.704	b	40.57	-48.60	91984.69	-9.69		
Saturn	I	2046-06-18T07:44:06.598		41.44	-49.47	59843.14		-32.97	-38.37
Saturn	E	2046-06-18T09:03:28.921		24.24	-32.28	59861.25		-32.16	-37.51
B (IER)	E	2046-06-18T09:01:31.860	b	24.66	-32.69	91984.69	9.63		
B (OER)	E	2046-06-18T09:35:55.830		17.33	-25.35	117571.16	14.54		
A (IER)	E	2046-06-18T09:40:59.024		16.27	-24.28	122050.38	14.99		
Encke (IEG)	E	2046-06-18T09:53:14.396		13.69	-21.69	133423.31	15.90		
Encke (OEG)	E	2046-06-18T09:53:34.613		13.62	-21.62	133744.89	15.92		
A (OER)	E	2046-06-18T09:56:43.793		12.96	-20.96	136774.40	16.11		
F ring	E	2046-06-18T10:00:31.109		12.17	-20.17	140461.00	16.32		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-18T08:32:40.460
 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 : 4115632310948587136
 2Mass ID (if available) : 17112795-2125133
 ICRS Star Coord at Epoch: 17h 11m 27.94407s -21:25:13.35598s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.483
 G magnitude : 13.045
 RP magnitude : 11.818
 BP magnitude : 14.687
 DUPflag : 0
 Distance (au) : 9.028
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.89
 Sun-Target sep (deg) : 171.91
 Sun-Moon sep (deg) : 7.71
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.40
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.671
 C/A sky separation (km) : 37128.4
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-06-18T07:00:42.208		4.80x	0.68x	140461.00	-16.00		
A (OER)	I	2046-06-18T07:04:34.260		5.57	-0.05x	136774.40	-15.77		
Encke (OEG)	I	2046-06-18T07:07:47.635		6.21	-0.67x	133744.89	-15.56		
Encke (IEG)	I	2046-06-18T07:08:08.315		6.28	-0.73x	133423.31	-15.54		
A (IER)	I	2046-06-18T07:20:42.887		8.81	-3.14x	122050.38	-14.56		
B (OER)	I	2046-06-18T07:25:55.678		9.87	-4.15x	117571.16	-14.07		
B (IER)	I	2046-06-18T08:02:33.201	b	17.38	-11.38	91984.69	-8.52		
Saturn	I	2046-06-18T07:53:31.540		15.51	-9.58	59801.34		-34.80	-40.28
Saturn	E	2046-06-18T09:11:44.820		31.94	-25.55	59849.61		-32.68	-38.06
B (IER)	E	2046-06-18T09:08:10.658	b	31.18	-24.80	91984.69	8.58		
B (OER)	E	2046-06-18T09:44:27.473		38.93	-32.41	117571.16	14.24		
A (IER)	E	2046-06-18T09:49:36.330		40.03	-33.50	122050.38	14.75		
Encke (IEG)	E	2046-06-18T10:02:00.348		42.69	-36.12	133423.31	15.77		
Encke (OEG)	E	2046-06-18T10:02:20.719		42.77	-36.20	133744.89	15.80		
A (OER)	E	2046-06-18T10:05:31.137		43.45	-36.87	136774.40	16.02		
F ring	E	2046-06-18T10:09:19.510		44.26	-37.68	140461.00	16.26		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-18T08:32:27.110
 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 : 4115632310948587136
 2Mass ID (if available) : 17112795-2125133
 ICRS Star Coord at Epoch: 17h 11m 27.94407s -21:25:13.35598s
 RUWE (>1.4 is poor) : 1.12
 K magnitude : 8.483
 G magnitude : 13.045
 RP magnitude : 11.818
 BP magnitude : 14.687
 DUPflag : 0
 Distance (au) : 9.028
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.89
 Sun-Target sep (deg) : 171.91
 Sun-Moon sep (deg) : 7.65
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.40
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.726
 C/A sky separation (km) : 37490.5
 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	2046-06-18T07:00:57.575		6.32	-1.23x	140461.00	-15.92		
A (OER)	I	2046-06-18T07:04:50.891		7.06	-1.93x	136774.40	-15.68		
Encke (OEG)	I	2046-06-18T07:08:05.410		7.68	-2.52x	133744.89	-15.47		
Encke (IEG)	I	2046-06-18T07:08:26.218		7.75	-2.58x	133423.31	-15.44		
A (IER)	I	2046-06-18T07:21:06.288		10.19	-4.91x	122050.38	-14.44		
B (OER)	I	2046-06-18T07:26:21.964		11.21	-5.88	117571.16	-13.93		
B (IER)	I	2046-06-18T08:03:47.040	b	18.58	-12.97	91984.69	-8.14		
Saturn	I	2046-06-18T07:53:32.797		16.55	-11.00	59792.94		-35.16	-40.66
Saturn	E	2046-06-18T09:11:17.277		32.23	-26.26	59840.65		-33.08	-38.48
B (IER)	E	2046-06-18T09:06:29.340	b	31.25	-25.29	91984.69	8.19		
B (OER)	E	2046-06-18T09:43:34.469		38.84	-32.77	117571.16	14.09		
A (IER)	E	2046-06-18T09:48:46.380		39.90	-33.82	122050.38	14.62		
Encke (IEG)	E	2046-06-18T10:01:16.353		42.47	-36.37	133423.31	15.67		
Encke (OEG)	E	2046-06-18T10:01:36.864		42.54	-36.44	133744.89	15.69		
A (OER)	E	2046-06-18T10:04:48.555		43.19	-37.09	136774.40	15.92		
F ring	E	2046-06-18T10:08:38.353		43.98	-37.87	140461.00	16.17		