

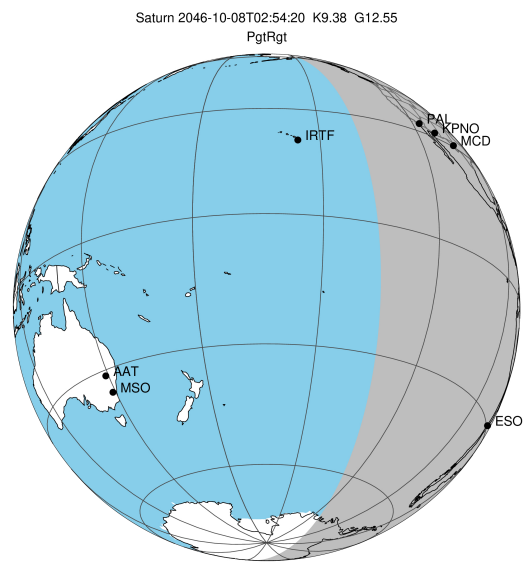
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-10-08T02:54:20.240
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4115566786925875968
 2Mass ID (if available) : 17072034-2139514

Saturn 2046-10-08T02:54:20 K9.38 G12.55 PgtRgt

ICRS Star Coord at Epoch: 17h 07m 20.31990s -21:39:51.85148s

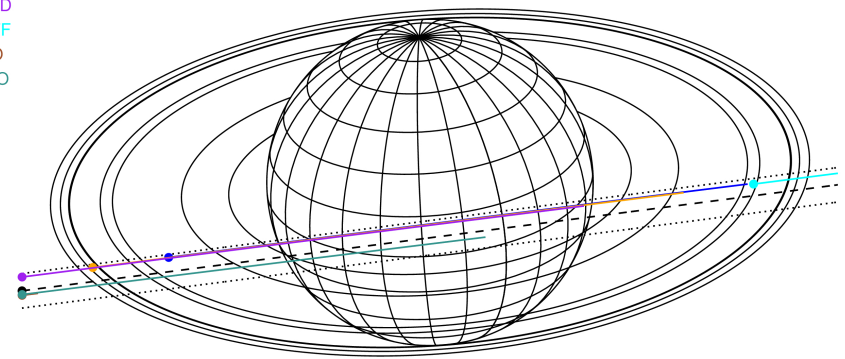
RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.383
 G magnitude : 12.550
 RP magnitude : 11.646
 BP magnitude : 13.399
 DUPflag : 0
 Distance (au) : 10.447
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 22.92
 Sun-Target sep (deg) : 63.43
 Sun-Moon sep (deg) : 41.22
 B (ring opening deg) : 26.85
 PA of pole (deg) : 4.30

#	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



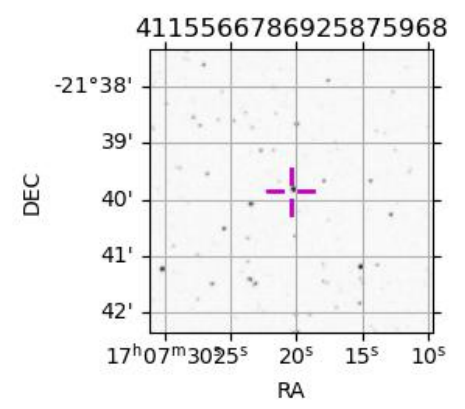
2046-10-08T02:54:20.2400 α: 17 07 20.3199 δ: -21 39 51.851 C/A 2.672° PA 7.40 deg v_sky +22.92 km/s D 10.45 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 IRTF
 RIO
 ESO

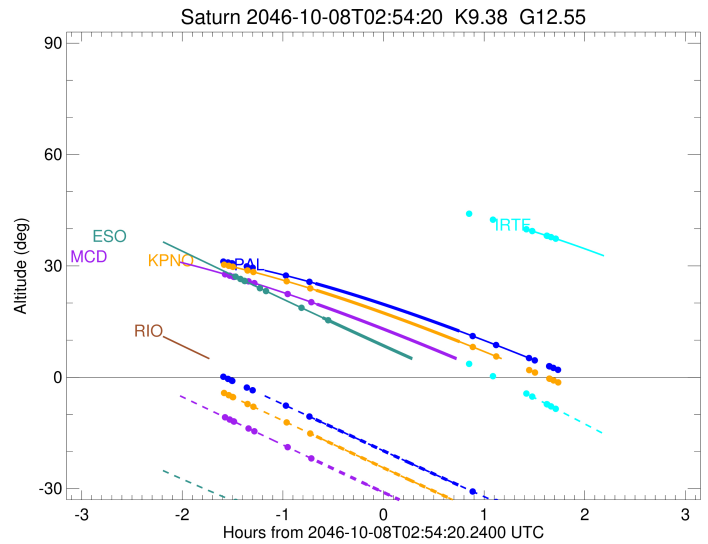
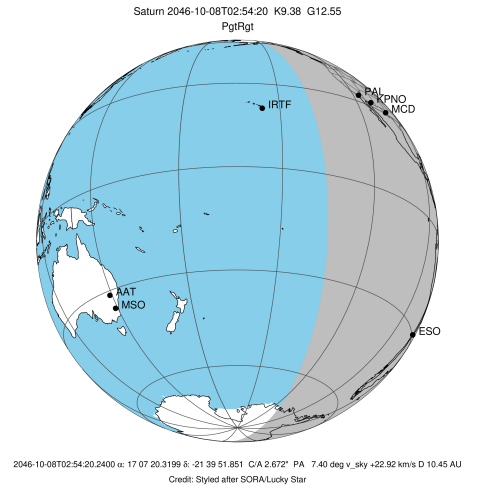


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	++	++	+++	OCT 08 01:56 - OCT 08 04:21	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+++++	++	++	OCT 08 01:24 - OCT 08 04:01	PieRie
MCD	McDonald Obs.	30.7	256.0	+++++	+		OCT 08 01:19 - OCT 08 02:14	PinRin
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5			+++++	OCT 08 04:23 - OCT 08 04:37	PnnRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3	+++++	+		OCT 08 01:26 - OCT 08 02:17	PinRin
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

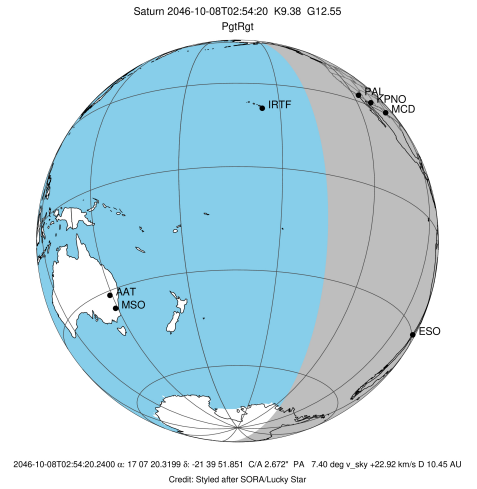


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-10-08T02:56:41.420
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4115566786925875968
 2Mass ID (if available) : 17072034-2139514
 ICRS Star Coord at Epoch: 17h 07m 20.31990s -21:39:51.85148s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.383
 G magnitude : 12.550
 RP magnitude : 11.646
 BP magnitude : 13.399
 DUPflag : 0
 Distance (au) : 10.447
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 22.92
 Sun-Target sep (deg) : 63.43
 Sun-Moon sep (deg) : 41.07
 B (ring opening deg) : 26.85
 PA of pole (deg) : 4.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.007
 C/A sky separation (km) : 15207.6
 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_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

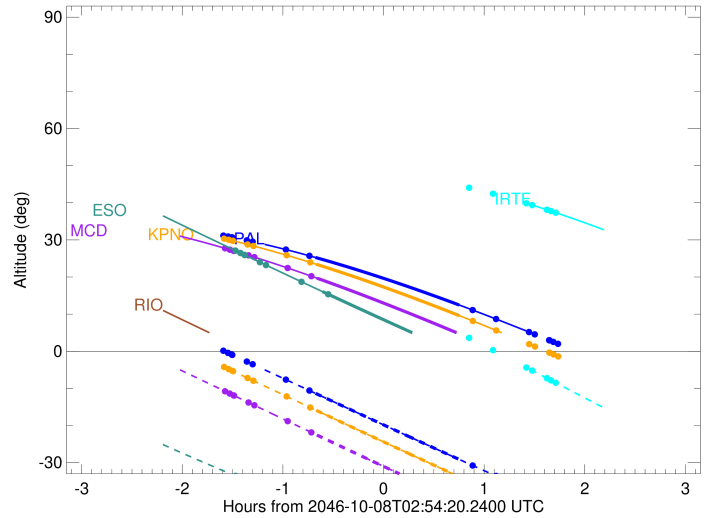


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-10-08T01:18:48.511		31.16	0.14x	140461.00	-22.01		
A (OER)	I	2046-10-08T01:21:36.158		30.91	-0.44x	136774.40	-21.97		
Encke (OEG)	I	2046-10-08T01:23:54.130		30.71	-0.92x	133744.89	-21.94		
Encke (IEG)	I	2046-10-08T01:24:08.787		30.69	-0.97x	133423.31	-21.94		
A (IER)	I	2046-10-08T01:32:48.755		29.87	-2.77x	122050.38	-21.80		
B (OER)	I	2046-10-08T01:36:14.536		29.53	-3.49x	117571.16	-21.73		
B (IER)	I	2046-10-08T01:56:06.402		27.40	-7.64	91984.69	-21.13		
C (IER)	I	2046-10-08T02:10:09.887		25.71	-10.58	74490.58	-20.26		
Saturn	I	2046-10-08T02:13:47.365		25.26	-11.34	60159.41		-15.67	-18.99
Saturn	E	2046-10-08T03:39:30.975		12.46	-29.15	60219.10		-10.44	-12.75
C (IER)	E	2046-10-08T03:47:27.779		11.11	-30.76	74490.58	20.39		
B (IER)	E	2046-10-08T04:01:25.519		8.69	-33.58	91984.69	21.29		
B (OER)	E	2046-10-08T04:21:07.078		5.18	-37.50	117571.16	21.95		
A (IER)	E	2046-10-08T04:24:30.816		4.56x	-38.16	122050.38	22.02		
Encke (IEG)	E	2046-10-08T04:33:05.276		2.99x	-39.83	133423.31	22.18		
Encke (OEG)	E	2046-10-08T04:33:19.770		2.94x	-39.88	133744.89	22.19		
A (OER)	E	2046-10-08T04:35:36.194		2.52x	-40.32	136774.40	22.22		
F ring	E	2046-10-08T04:38:21.914		2.01x	-40.85	140461.00	22.27		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-10-08T02:56:59.170
 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 : 4115566786925875968
 2Mass ID (if available) : 17072034-2139514
 ICRS Star Coord at Epoch: 17h 07m 20.31990s -21:39:51.85148s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.383
 G magnitude : 12.550
 RP magnitude : 11.646
 BP magnitude : 13.399
 DUPflag : 0
 Distance (au) : 10.447
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 22.92
 Sun-Target sep (deg) : 63.43
 Sun-Moon sep (deg) : 41.00
 B (ring opening deg) : 26.85
 PA of pole (deg) : 4.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.032
 C/A sky separation (km) : 15398.6
 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_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

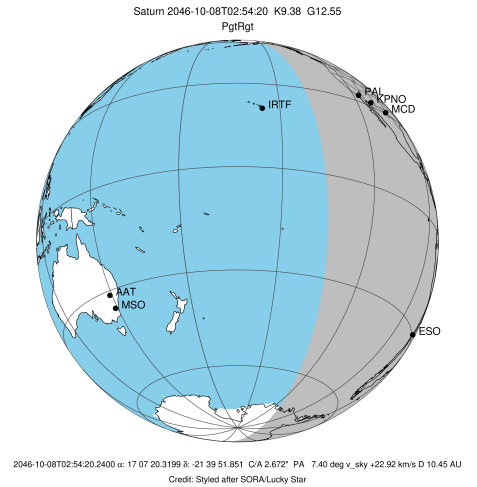


Saturn 2046-10-08T02:54:20 K9.38 G12.55

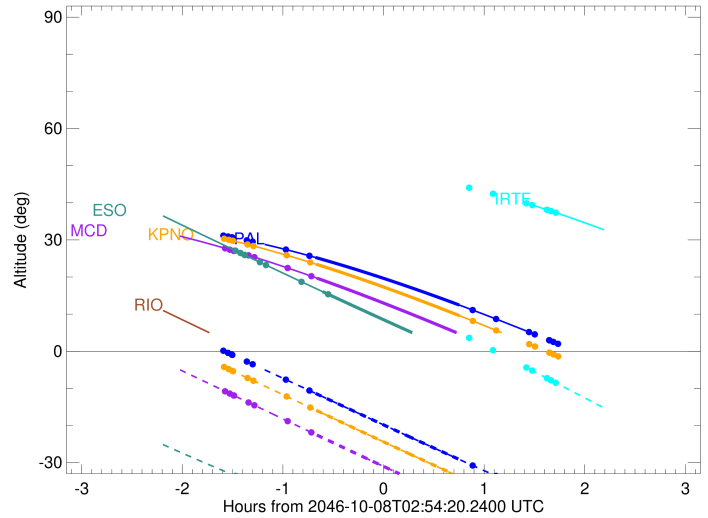


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-10-08T01:19:14.288		30.33	-4.23x	140461.00	-22.00		
A (OER)	I	2046-10-08T01:22:02.027		30.03	-4.82x	136774.40	-21.96		
Encke (OEG)	I	2046-10-08T01:24:20.077		29.78	-5.31	133744.89	-21.93		
Encke (IEG)	I	2046-10-08T01:24:34.742		29.76	-5.36	133423.31	-21.93		
A (IER)	I	2046-10-08T01:33:15.044		28.77	-7.20	122050.38	-21.78		
B (OER)	I	2046-10-08T01:36:40.978		28.37	-7.93	117571.16	-21.72		
B (IER)	I	2046-10-08T01:56:34.113		25.87	-12.16	91984.69	-21.10		
C (IER)	I	2046-10-08T02:10:39.280		23.95	-15.15	74490.58	-20.21		
Saturn	I	2046-10-08T02:14:09.634		23.45	-15.90	60157.57		-15.81	-19.15
Saturn	E	2046-10-08T03:39:43.619		9.57	-33.83	60217.27		-10.63	-12.98
C (IER)	E	2046-10-08T03:47:33.220		8.17	-35.43	74490.58	20.34		
B (IER)	E	2046-10-08T04:01:32.132		5.61	-38.26	91984.69	21.27		
B (OER)	E	2046-10-08T04:21:14.029		1.92x	-42.16	117571.16	21.95		
A (IER)	E	2046-10-08T04:24:37.734		1.28x	-42.82	122050.38	22.03		
Encke (IEG)	E	2046-10-08T04:33:12.028		-0.36x	-44.47	133423.31	22.19		
Encke (OEG)	E	2046-10-08T04:33:26.516		-0.41x	-44.52	133744.89	22.20		
A (OER)	E	2046-10-08T04:35:42.878		-0.84x	-44.95	136774.40	22.24		
F ring	E	2046-10-08T04:38:28.514		-1.38x	-45.47	140461.00	22.28		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-10-08T02:57:20.720
 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 : 4115566786925875968
 2Mass ID (if available) : 17072034-2139514
 ICRS Star Coord at Epoch: 17h 07m 20.31990s -21:39:51.85148s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.383
 G magnitude : 12.550
 RP magnitude : 11.646
 BP magnitude : 13.399
 DUPflag : 0
 Distance (au) : 10.447
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 22.92
 Sun-Target sep (deg) : 63.43
 Sun-Moon sep (deg) : 40.90
 B (ring opening deg) : 26.85
 PA of pole (deg) : 4.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.067
 C/A sky separation (km) : 15659.7
 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

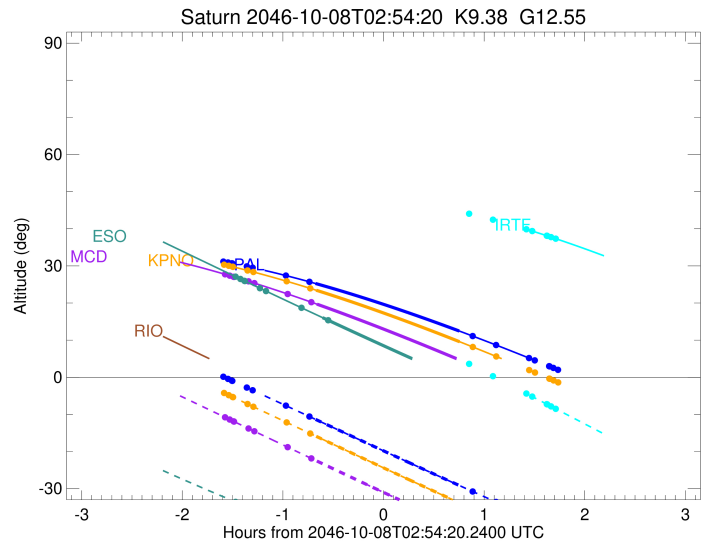
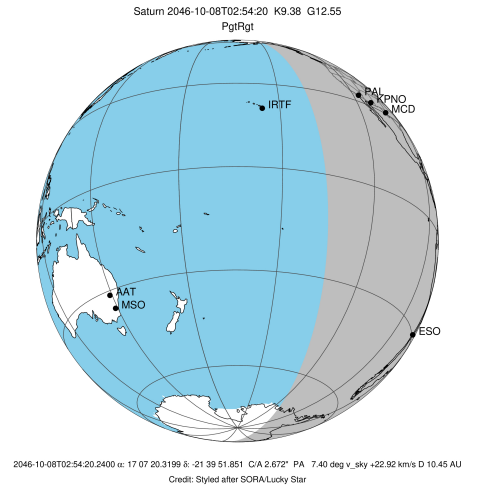


Saturn 2046-10-08T02:54:20 K9.38 G12.55



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-10-08T01:19:49.214		27.74	-10.78	140461.00	-21.99		
A (OER)	I	2046-10-08T01:22:37.013		27.37	-11.38	136774.40	-21.95		
Encke (OEG)	I	2046-10-08T01:24:55.117		27.07	-11.87	133744.89	-21.92		
Encke (IEG)	I	2046-10-08T01:25:09.788		27.03	-11.93	133423.31	-21.92		
A (IER)	I	2046-10-08T01:33:50.348		25.85	-13.80	122050.38	-21.77		
B (OER)	I	2046-10-08T01:37:16.411		25.36	-14.54	117571.17	-21.70		
B (IER)	I	2046-10-08T01:57:10.847		22.43	-18.82	91984.69	-21.06		
C (IER)	I	2046-10-08T02:11:18.044		20.23	-21.85	74490.58	-20.14		
Saturn	I	2046-10-08T02:14:38.414		19.69	-22.57	60155.03		-16.00	-19.37
Saturn	E	2046-10-08T03:39:57.249	4.62x	-40.45	60214.74			-10.90	-13.30
C (IER)	E	2046-10-08T03:47:36.724	3.16x	-41.99	74490.58		20.29		
B (IER)	E	2046-10-08T04:01:37.039	0.46x	-44.77	91984.69		21.25		
B (OER)	E	2046-10-08T04:21:19.097	-3.41x	-48.56	117571.16		21.96		
A (IER)	E	2046-10-08T04:24:42.706	-4.09x	-49.20	122050.38		22.04		
Encke (IEG)	E	2046-10-08T04:33:16.645	-5.80x	-50.78	133423.31		22.21		
Encke (OEG)	E	2046-10-08T04:33:31.121	-5.85x	-50.82	133744.89		22.22		
A (OER)	E	2046-10-08T04:35:47.365	-6.30x	-51.24	136774.40		22.26		
F ring	E	2046-10-08T04:38:32.848	-6.86x	-51.73	140461.00		22.30		

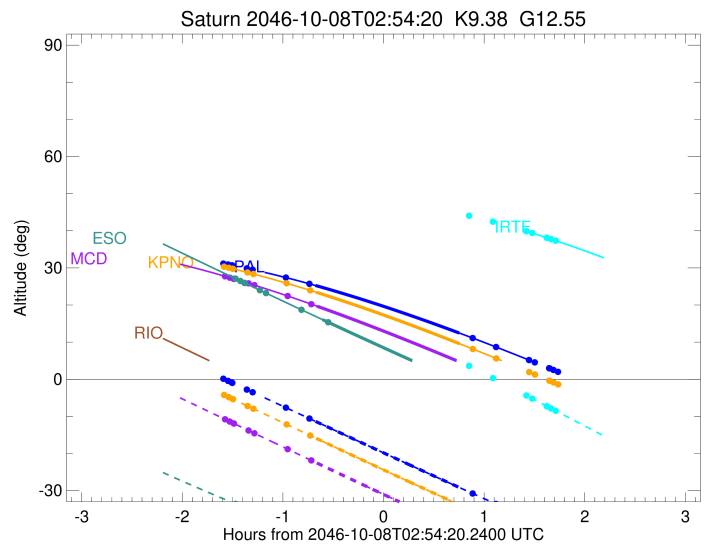
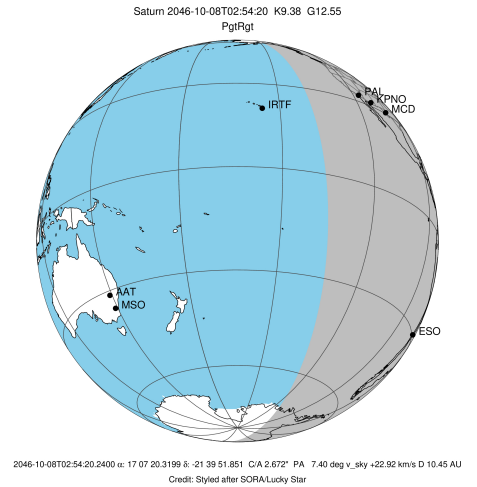
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-10-08T02:54:32.760
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4115566786925875968
 2Mass ID (if available) : 17072034-2139514
 ICRS Star Coord at Epoch: 17h 07m 20.31990s -21:39:51.85148s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.383
 G magnitude : 12.550
 RP magnitude : 11.646
 BP magnitude : 13.399
 DUPflag : 0
 Distance (au) : 10.447
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 22.92
 Sun-Target sep (deg) : 63.43
 Sun-Moon sep (deg) : 41.65
 B (ring opening deg) : 26.85
 PA of pole (deg) : 4.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.109
 C/A sky separation (km) : 15980.2
 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



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	2046-10-08T01:16:57.439		45.41	37.26x	140461.00	-21.92		
A (OER)	I	2046-10-08T01:19:45.793		45.66	36.66x	136774.40	-21.88		
Encke (OEG)	I	2046-10-08T01:22:04.389		45.85	36.16x	133744.89	-21.84		
Encke (IEG)	I	2046-10-08T01:22:19.114		45.88	36.10x	133423.31	-21.84		
A (IER)	I	2046-10-08T01:31:01.824		46.56	34.21x	122050.38	-21.67		
B (OER)	I	2046-10-08T01:34:28.870		46.81	33.46x	117571.16	-21.59		
B (IER)	I	2046-10-08T01:54:30.735		47.93	29.03x	91984.69	-20.90		
C (IER)	I	2046-10-08T02:08:45.634		48.40	25.84x	74490.58	-19.92		
Saturn	I	2046-10-08T02:11:33.279		48.46	25.21x	60146.78		-16.59	-20.07
Saturn	E	2046-10-08T03:37:33.021		44.85	5.44x	60214.82		-10.89	-13.29
C (IER)	E	2046-10-08T03:45:20.768		44.06	3.62x	74490.58	19.96		
B (IER)	E	2046-10-08T03:59:33.994		42.45	0.30x	91984.69	20.94		
B (OER)	E	2046-10-08T04:19:33.036		39.87	-4.39x	117571.16	21.65		
A (IER)	E	2046-10-08T04:22:59.529		39.39	-5.19	122050.38	21.73		
Encke (IEG)	E	2046-10-08T04:31:40.750		38.14	-7.23	133423.31	21.90		
Encke (OEG)	E	2046-10-08T04:31:55.432		38.10	-7.29	133744.89	21.91		
A (OER)	E	2046-10-08T04:34:13.609		37.76	-7.83	136774.40	21.94		
F ring	E	2046-10-08T04:37:01.444		37.34	-8.49	140461.00	21.99		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-10-08T02:58:30.770
 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 : 4115566786925875968
 2Mass ID (if available) : 17072034-2139514
 ICRS Star Coord at Epoch: 17h 07m 20.31990s -21:39:51.85148s
 RUWE (>1.4 is poor) : 0.91
 K magnitude : 9.383
 G magnitude : 12.550
 RP magnitude : 11.646
 BP magnitude : 13.399
 DUPflag : 0
 Distance (au) : 10.447
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 22.92
 Sun-Target sep (deg) : 63.43
 Sun-Moon sep (deg) : 40.66
 B (ring opening deg) : 26.85
 PA of pole (deg) : 4.30
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 2.974
 C/A sky separation (km) : 22534.0
 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_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	2046-10-08T01:26:05.233		27.11	-33.57	140461.00	-21.37		
A (OER)	I	2046-10-08T01:28:58.057		26.49	-34.11	136774.40	-21.29		
Encke (OEG)	I	2046-10-08T01:31:20.578		25.98	-34.55	133744.89	-21.22		
Encke (IEG)	I	2046-10-08T01:31:35.735		25.93	-34.60	133423.31	-21.21		
A (IER)	I	2046-10-08T01:40:35.777		24.00	-36.25	122050.38	-20.89		
B (OER)	I	2046-10-08T01:44:10.981		23.23	-36.90	117571.16	-20.73		
B (IER)	I	2046-10-08T02:05:24.150		18.72	-40.61	91984.69	-19.28		
C (IER)	I	2046-10-08T02:21:20.829	b	15.36	-43.23	74490.58	-17.06		
Saturn	I	2046-10-08T02:17:57.764		16.07	-42.68	60060.16		-21.98	-26.30
Saturn	E	2046-10-08T03:38:58.643		-0.51x	-52.86	60139.05		-17.13	-20.70
C (IER)	E	2046-10-08T03:41:32.829		-1.01x	-53.06	74490.58	17.19		
B (IER)	E	2046-10-08T03:57:21.218		-4.11x	-54.08	91984.69	19.47		
B (OER)	E	2046-10-08T04:18:19.874		-8.12x	-54.85	117571.17	21.01		
A (IER)	E	2046-10-08T04:21:52.209		-8.79x	-54.91	122050.38	21.18		
Encke (IEG)	E	2046-10-08T04:30:44.520		-10.44x	-54.97	133423.31	21.54		
Encke (OEG)	E	2046-10-08T04:30:59.449		-10.49x	-54.97	133744.89	21.55		
A (OER)	E	2046-10-08T04:33:19.798		-10.92x	-54.96	136774.40	21.62		
F ring	E	2046-10-08T04:36:09.918		-11.44x	-54.94	140461.00	21.72		