

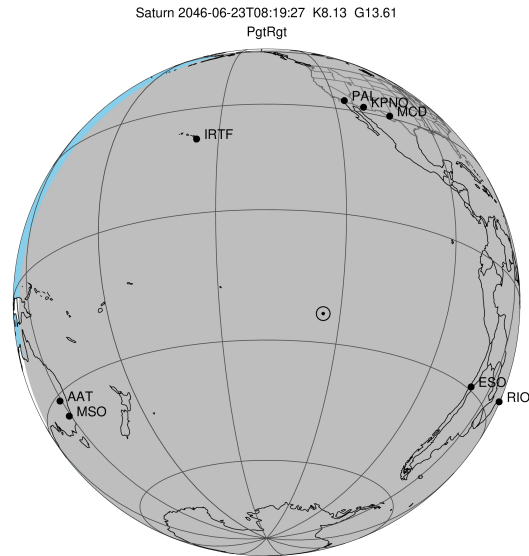
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-23T08:19:27.130
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4115644135022847232
 2Mass ID (if available) : 17095535-2123568

Saturn 2046-06-23T08:19:27 K8.13 G13.61 PgtRgt

ICRS Star Coord at Epoch: 17h 09m 55.33950s -21:23:56.99554s

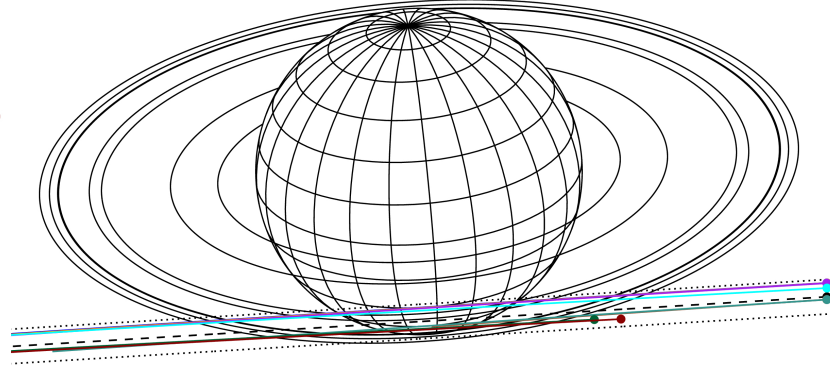
RUWE (>1.4 is poor) : 1.06
 K magnitude : 8.135
 G magnitude : 13.607
 RP magnitude : 12.175
 BP magnitude : 16.237
 DUPflag : 0
 Distance (au) : 9.042
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 166.84
 Sun-Moon sep (deg) : 69.11
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.36

#	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



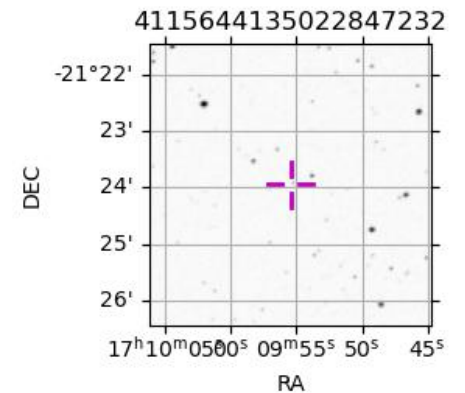
2046-06-23T08:19:27.1300 α: 17 09 55.3395 δ: -21 23 56.996 C/A 8.438° PA 3.48 deg v_sky -19.42 km/s D 09.04 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 IRTF
 RIO
 ESO
 AAT
 MSO

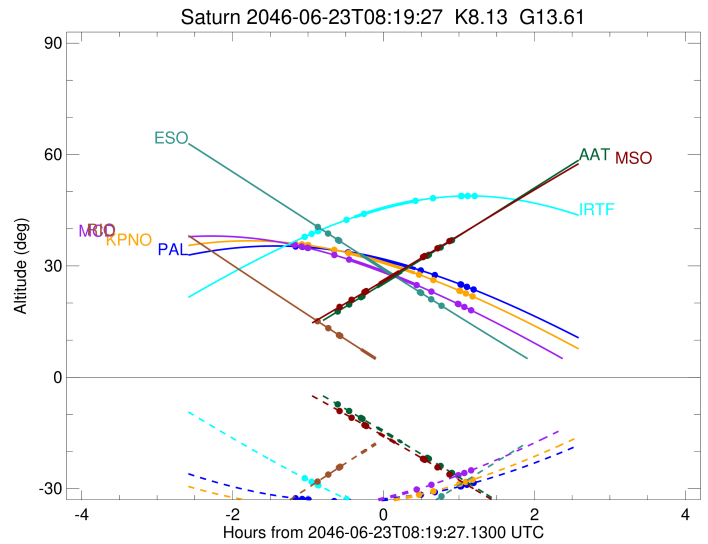
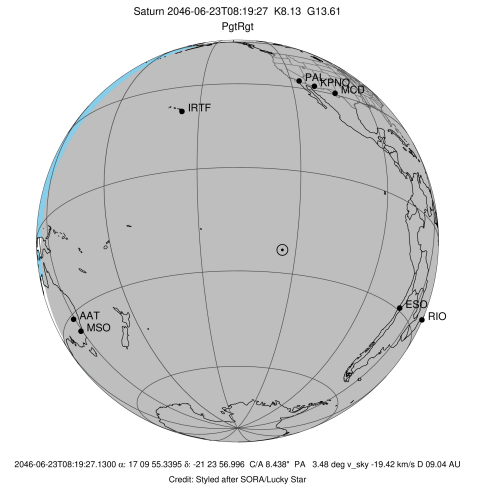


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+	+	+	JUN 23 07:09 - JUN 23 09:31	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+	+	+	JUN 23 07:09 - JUN 23 09:30	PieRie
MCD	McDonald Obs.	30.7	256.0	+	+	+	JUN 23 07:08 - JUN 23 09:29	PieRie
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+	+	+	JUN 23 07:16 - JUN 23 09:32	PieRie
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+	+		JUN 23 07:26 - JUN 23 08:01	PinRin
ESO	European South	-29.3	289.3	+	+	+	JUN 23 07:27 - JUN 23 09:05	PieRie
AAT	Siding Spring	-31.3	149.1	+	+	+	JUN 23 07:42 - JUN 23 09:14	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+	JUN 23 07:44 - JUN 23 09:12	PieRie



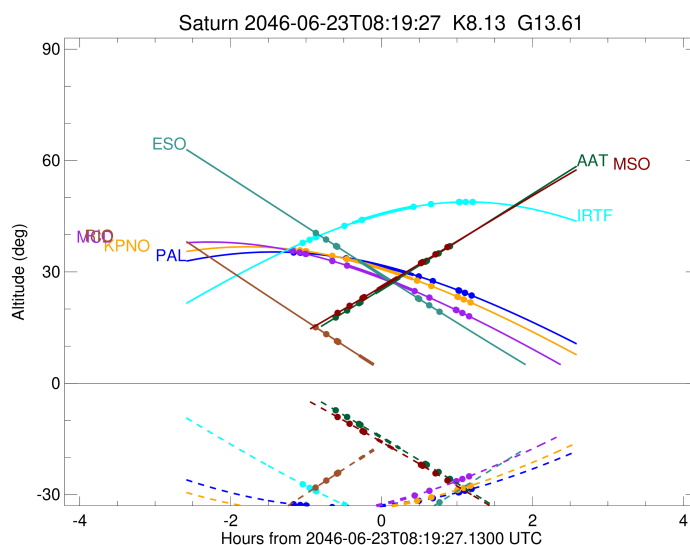
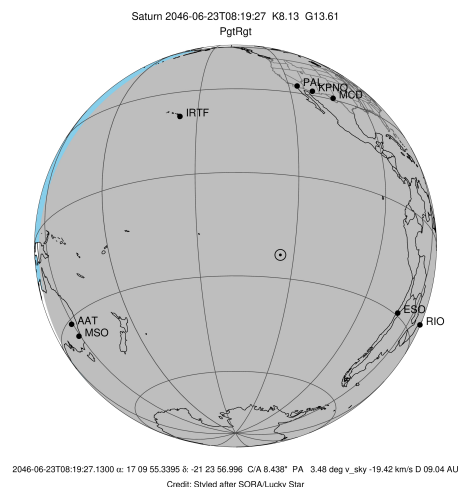
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-23T08:17:58.690
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4115644135022847232
 2Mass ID (if available) : 17095535-2123568
 ICRS Star Coord at Epoch: 17h 09m 55.33950s -21:23:56.99554s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 8.135
 G magnitude : 13.607
 RP magnitude : 12.175
 BP magnitude : 16.237
 DUPflag : 0
 Distance (au) : 9.042
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 166.84
 Sun-Moon sep (deg) : 69.48
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.650
 C/A sky separation (km) : 50171.4
 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	2046-06-23T07:09:31.103		35.23	-32.60	140461.00	-11.94		
A (OER)	I	2046-06-23T07:14:47.639		35.13	-32.80	136774.40	-11.35		
Encke (OEG)	I	2046-06-23T07:19:21.269		35.02	-32.94	133744.89	-10.79		
Encke (IEG)	I	2046-06-23T07:19:51.154		35.01	-32.96	133423.31	-10.73		
A (IER)	I	2046-06-23T07:40:12.377		34.24	-33.36	122050.38	-7.76		
B (OER)	I	2046-06-23T07:51:08.547		33.66	-33.40	117571.16	-5.85		
Saturn	I	2046-06-23T07:51:08.822		33.66	-33.40	59443.39		-49.62	-54.99
Saturn	E	2046-06-23T08:44:52.614		29.23	-31.90	59471.02		-48.48	-53.90
B (OER)	E	2046-06-23T08:49:30.025		28.73	-31.64	117571.16	5.84		
A (IER)	E	2046-06-23T09:00:27.495		27.51	-30.94	122050.38	7.75		
Encke (IEG)	E	2046-06-23T09:20:52.888		25.00	-29.38	133423.31	10.68		
Encke (OEG)	E	2046-06-23T09:21:22.902		24.93	-29.33	133744.89	10.75		
A (OER)	E	2046-06-23T09:25:57.770		24.33	-28.93	136774.40	11.29		
F ring	E	2046-06-23T09:31:15.865		23.62	-28.45	140461.00	11.88		

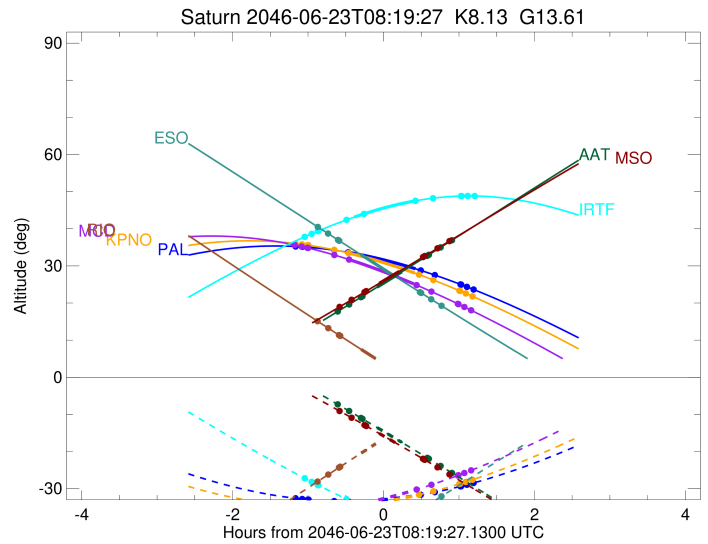
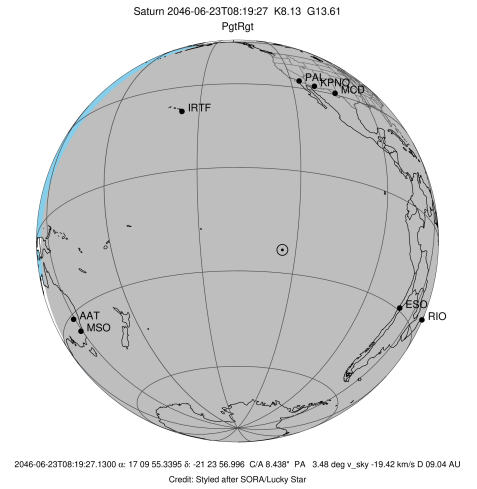
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-23T08:17:32.000
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4115644135022847232
 2Mass ID (if available) : 17095535-2123568
 ICRS Star Coord at Epoch: 17h 09m 55.33950s -21:23:56.99554s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 8.135
 G magnitude : 13.607
 RP magnitude : 12.175
 BP magnitude : 16.237
 DUPflag : 0
 Distance (au) : 9.042
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 166.84
 Sun-Moon sep (deg) : 69.44
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.671
 C/A sky separation (km) : 50308.5
 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	2046-06-23T07:09:18.329		36.03	-34.60	140461.00	-11.88		
A (OER)	I	2046-06-23T07:14:36.523		35.81	-34.69	136774.40	-11.28		
Encke (OEG)	I	2046-06-23T07:19:11.837		35.59	-34.75	133744.89	-10.72		
Encke (IEG)	I	2046-06-23T07:19:41.923		35.57	-34.75	133423.31	-10.66		
A (IER)	I	2046-06-23T07:40:15.849		34.33	-34.72	122050.38	-7.64		
B (OER)	I	2046-06-23T07:51:26.508	b	33.49	-34.52	117571.16	-5.68		
Saturn	I	2046-06-23T07:50:52.965		33.53	-34.54	59439.67		-49.78	-55.14
Saturn	E	2046-06-23T08:44:15.282		28.08	-31.91	59465.80		-48.69	-54.11
B (OER)	E	2046-06-23T08:48:06.360		27.60	-31.61	117571.16	5.67		
A (IER)	E	2046-06-23T08:59:18.706		26.16	-30.69	122050.38	7.62		
Encke (IEG)	E	2046-06-23T09:19:57.840		23.30	-28.71	133423.31	10.60		
Encke (OEG)	E	2046-06-23T09:20:28.086		23.23	-28.66	133744.89	10.66		
A (OER)	E	2046-06-23T09:25:04.930		22.55	-28.17	136774.40	11.22		
F ring	E	2046-06-23T09:30:25.045		21.76	-27.59	140461.00	11.81		

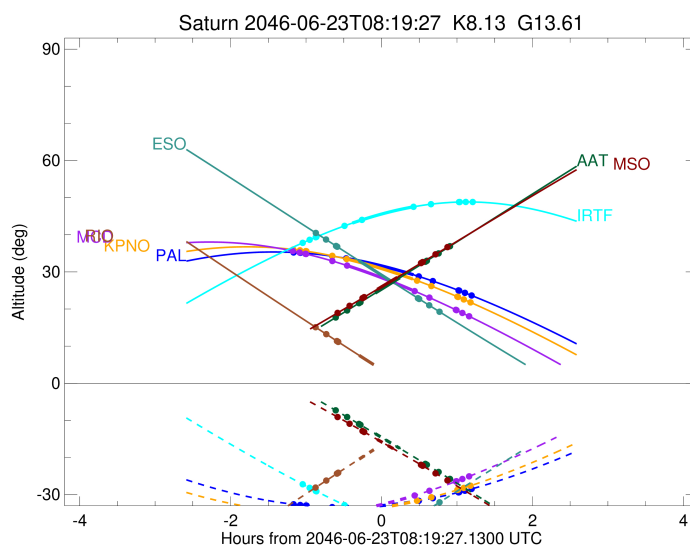
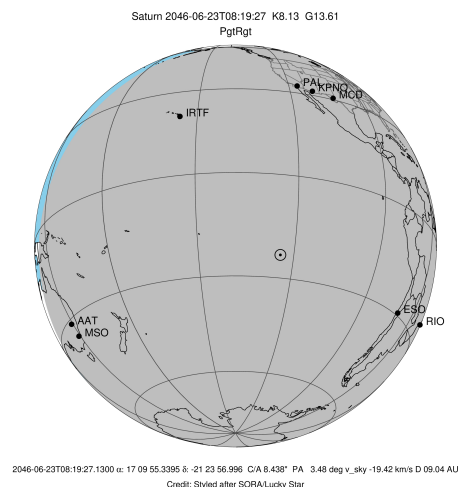
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-23T08:16:55.540
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4115644135022847232
 2Mass ID (if available) : 17095535-2123568
 ICRS Star Coord at Epoch: 17h 09m 55.33950s -21:23:56.99554s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 8.135
 G magnitude : 13.607
 RP magnitude : 12.175
 BP magnitude : 16.237
 DUPflag : 0
 Distance (au) : 9.042
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 166.84
 Sun-Moon sep (deg) : 69.38
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.699
 C/A sky separation (km) : 50491.7
 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_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	2046-06-23T07:08:57.971		35.62	-36.02	140461.00	-11.80		
A (OER)	I	2046-06-23T07:14:18.598		35.23	-35.94	136774.40	-11.19		
Encke (OEG)	I	2046-06-23T07:18:56.368		34.87	-35.85	133744.89	-10.62		
Encke (IEG)	I	2046-06-23T07:19:26.745		34.83	-35.84	133423.31	-10.55		
A (IER)	I	2046-06-23T07:40:19.041		32.94	-35.15	122050.38	-7.47		
B (OER)	I	2046-06-23T07:51:51.139	b	31.73	-34.57	117571.16	-5.43		
Saturn	I	2046-06-23T07:50:30.370		31.88	-34.65	59434.71		-49.99	-55.33
Saturn	E	2046-06-23T08:43:25.209		25.17	-30.48	59458.79		-48.98	-54.38
B (OER)	E	2046-06-23T08:46:11.349		24.76	-30.20	117571.16	5.42		
A (IER)	E	2046-06-23T08:57:45.670		23.04	-28.94	122050.38	7.44		
Encke (IEG)	E	2046-06-23T09:18:44.616		19.75	-26.43	133423.31	10.48		
Encke (OEG)	E	2046-06-23T09:19:15.195		19.67	-26.37	133744.89	10.55		
A (OER)	E	2046-06-23T09:23:54.897		18.91	-25.77	136774.40	11.11		
F ring	E	2046-06-23T09:29:17.946		18.02	-25.06	140461.00	11.71		

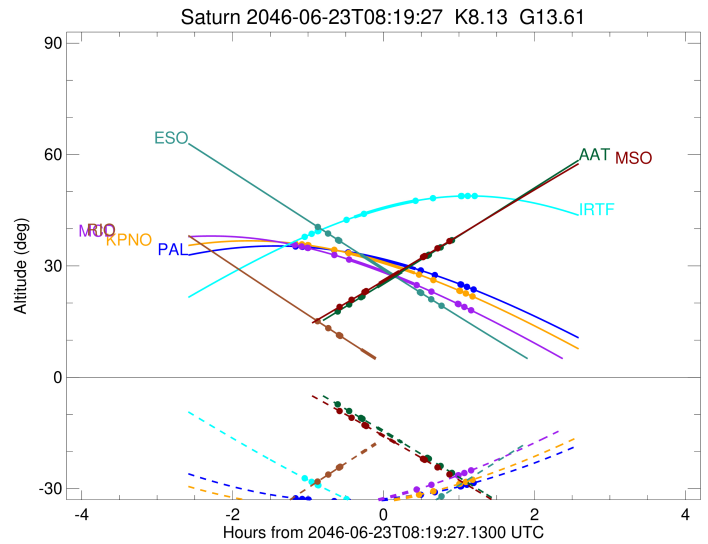
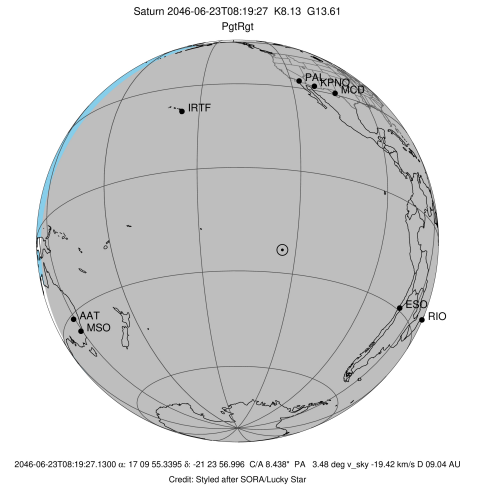
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target                : Saturn
target radius (km)   : 60268.00
C/A epoch             : 2046-06-23T08:21:16.570
Event type            : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code         : IRTF
Location               : Mauna Kea/IRTF
Latitude (deg)        : 19.82622
E. Longitude (deg)    : 204.52800
Altitude (km)         : 4.168
Gaia source ID        : 4115644135022847232
2Mass ID (if available) : 17095535-2123568
ICRS Star Coord at Epoch: 17h 09m 55.33950s -21:23:56.99554s
RUWE (>1.4 is poor) : 1.06
K magnitude           : 8.135
G magnitude           : 13.607
RP magnitude          : 12.175
BP magnitude          : 16.237
DUPflag               : 0
Distance (au)         : 9.042
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -19.42
Sun-Target sep (deg)  : 166.84
Sun-Moon sep (deg)    : 69.82
B (ring opening deg) : 26.54
PA of pole (deg)     : 4.36
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 7.827
C/A sky separation (km) : 51332.8
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
    
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2046-06-23T07:16:45.312		37.82	-27.19	140461.00	-11.43		
A (OER)	I	2046-06-23T07:22:17.189		38.64	-28.17	136774.40	-10.78		
Encke (OEG)	I	2046-06-23T07:27:06.270		39.34	-29.00	133744.89	-10.17		
Encke (IEG)	I	2046-06-23T07:27:37.990		39.42	-29.09	133423.31	-10.10		
A (IER)	I	2046-06-23T07:49:59.179		42.39	-32.81	122050.38	-6.70		
B (OER)	I	2046-06-23T08:03:36.640	b	43.98	-34.93	117571.16	-4.21		
Saturn	I	2046-06-23T07:56:09.998		43.14	-33.79	59400.82		-51.41	-56.67
Saturn	E	2046-06-23T08:46:25.803		47.62	-40.74	59437.40		-49.87	-55.23
B (OER)	E	2046-06-23T08:45:25.428	b	47.56	-40.62	117571.16	4.22		
A (IER)	E	2046-06-23T08:59:00.929		48.25	-42.15	122050.38	6.72		
Encke (IEG)	E	2046-06-23T09:21:18.167		48.81	-44.24	133423.31	10.14		
Encke (OEG)	E	2046-06-23T09:21:49.783		48.82	-44.28	133744.89	10.21		
A (OER)	E	2046-06-23T09:26:37.878		48.84	-44.66	136774.40	10.82		
F ring	E	2046-06-23T09:32:08.557		48.83	-45.06	140461.00	11.47		

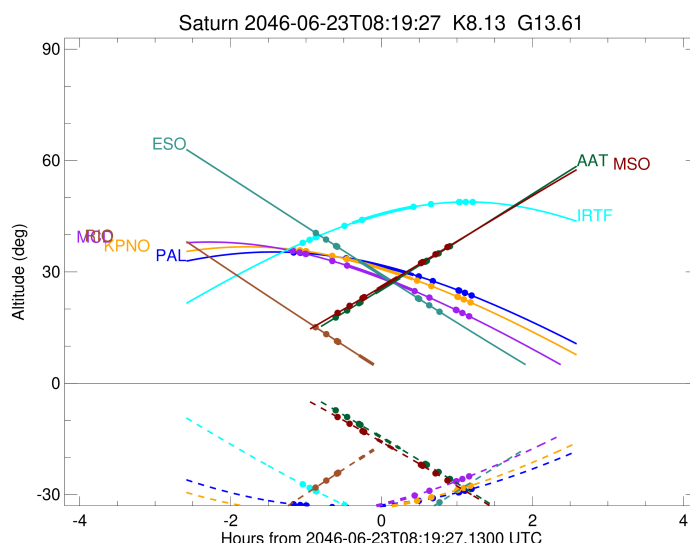
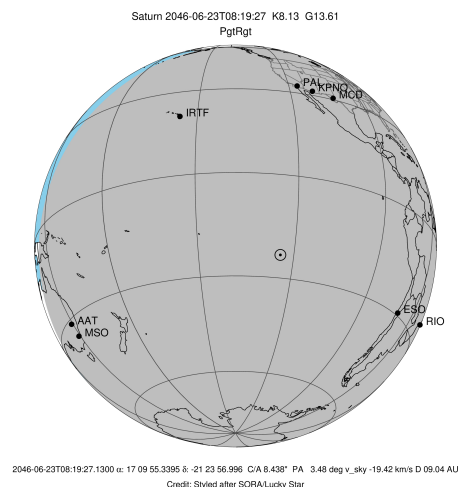
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-23T08:13:54.410
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4115644135022847232
 2Mass ID (if available) : 17095535-2123568
 ICRS Star Coord at Epoch: 17h 09m 55.33950s -21:23:56.99554s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 8.135
 G magnitude : 13.607
 RP magnitude : 12.175
 BP magnitude : 16.237
 DUPflag : 0
 Distance (au) : 9.042
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 166.84
 Sun-Moon sep (deg) : 68.86
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.759
 C/A sky separation (km) : 57443.6
 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



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	2046-06-23T07:26:56.736		15.12	-28.12	140461.00	-7.84		
A (OER)	I	2046-06-23T07:35:26.219		13.25	-26.23	136774.40	-6.62		
Encke (OEG)	I	2046-06-23T07:43:52.744		11.40	-24.37	133744.89	-5.33		
Encke (IEG)	I	2046-06-23T07:44:54.040		11.18	-24.14	133423.31	-5.17		
Saturn	I	2046-06-23T08:01:37.143		7.53	-20.46	59199.72		-60.43	-64.89
Saturn	E	2046-06-23T08:26:14.149		2.23x	-15.08	59206.95		-60.08	-64.58
Encke (IEG)	E	2046-06-23T08:45:52.550		-1.94x	-10.83	133423.31	5.13		
Encke (OEG)	E	2046-06-23T08:46:54.257		-2.16x	-10.61	133744.89	5.29		
A (OER)	E	2046-06-23T08:55:24.737		-3.95x	-8.78	136774.40	6.56		
F ring	E	2046-06-23T09:03:59.203		-5.73x	-6.95	140461.00	7.75		

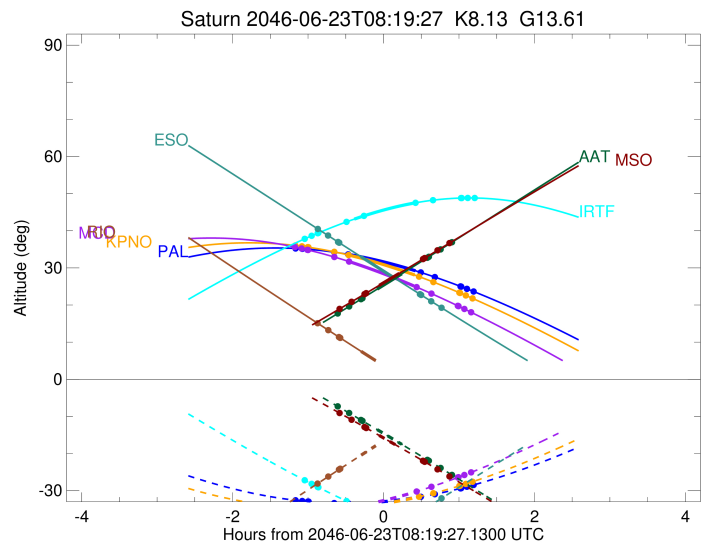
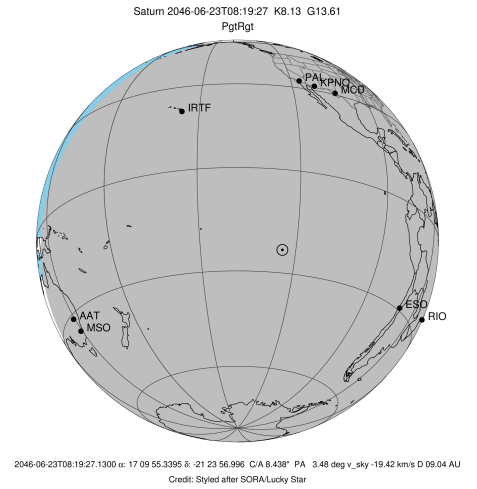
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-23T08:14:39.490
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4115644135022847232
 2Mass ID (if available) : 17095535-2123568
 ICRS Star Coord at Epoch: 17h 09m 55.33950s -21:23:56.99554s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 8.135
 G magnitude : 13.607
 RP magnitude : 12.175
 BP magnitude : 16.237
 DUPflag : 0
 Distance (au) : 9.042
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 166.84
 Sun-Moon sep (deg) : 69.26
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.710
 C/A sky separation (km) : 57120.7
 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_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	2046-06-23T07:27:08.381		40.51	-53.42	140461.00	-8.15		
A (OER)	I	2046-06-23T07:35:15.385		38.74	-51.65	136774.40	-6.98		
Encke (OEG)	I	2046-06-23T07:43:10.971		37.01	-49.92	133744.89	-5.75		
Encke (IEG)	I	2046-06-23T07:44:07.642		36.81	-49.71	133423.31	-5.60		
Saturn	I	2046-06-23T08:01:24.282		33.05	-45.94	59210.45		-59.91	-64.43
Saturn	E	2046-06-23T08:27:57.508		27.31	-40.17	59220.21		-59.45	-64.01
Encke (IEG)	E	2046-06-23T08:48:44.227		22.85	-35.68	133423.31	5.57		
Encke (OEG)	E	2046-06-23T08:49:41.236		22.65	-35.48	133744.89	5.72		
A (OER)	E	2046-06-23T08:57:40.081		20.94	-33.76	136774.40	6.92		
F ring	E	2046-06-23T09:05:51.210		19.20	-32.00	140461.00	8.07		

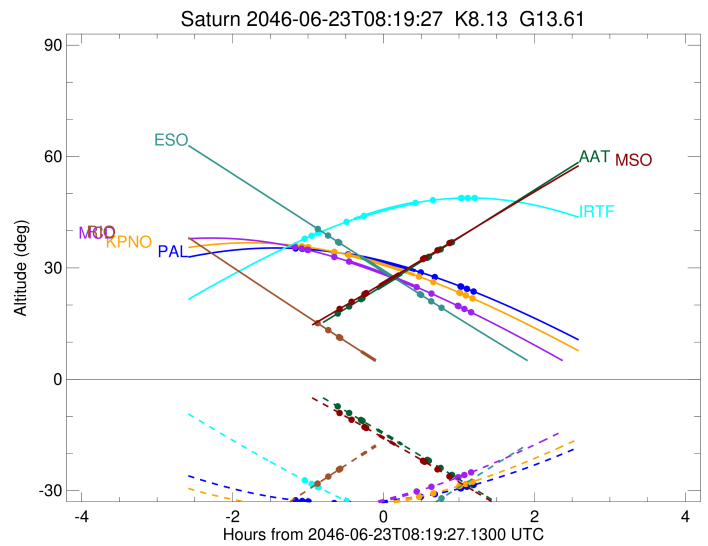
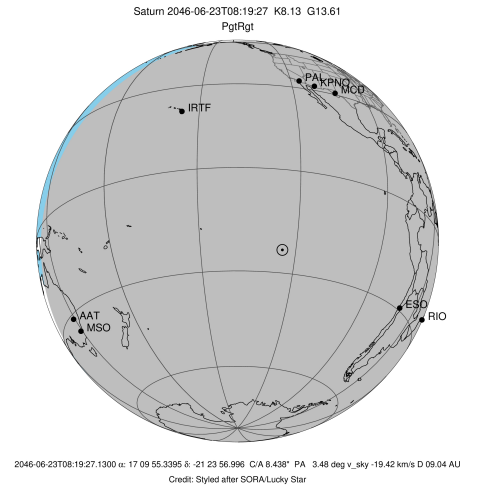
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-23T08:24:08.220
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4115644135022847232
 2Mass ID (if available) : 17095535-2123568
 ICRS Star Coord at Epoch: 17h 09m 55.33950s -21:23:56.99554s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 8.135
 G magnitude : 13.607
 RP magnitude : 12.175
 BP magnitude : 16.237
 DUPflag : 0
 Distance (au) : 9.042
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 166.84
 Sun-Moon sep (deg) : 69.73
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.852
 C/A sky separation (km) : 58051.1
 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	2046-06-23T07:42:56.290		17.70	-7.27	140461.00	-7.42		
A (OER)	I	2046-06-23T07:52:00.234		19.58	-9.07	136774.40	-6.11		
Encke (OEG)	I	2046-06-23T08:01:21.735		21.54	-10.93	133744.89	-4.66		
Encke (IEG)	I	2046-06-23T08:02:32.181		21.78	-11.17	133423.31	-4.47		
Saturn	I	2046-06-23T08:14:21.511		24.27	-13.54	59171.30		-61.83	-66.13
Saturn	E	2046-06-23T08:33:59.553		28.41	-17.53	59190.69		-60.87	-65.28
Encke (IEG)	E	2046-06-23T08:54:42.664		32.82	-21.79	133423.31	4.50		
Encke (OEG)	E	2046-06-23T08:55:52.700		33.07	-22.03	133744.89	4.69		
A (OER)	E	2046-06-23T09:05:10.428		35.05	-23.96	136774.40	6.16		
F ring	E	2046-06-23T09:14:09.915		36.97	-25.83	140461.00	7.49		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-06-23T08:23:54.430
 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 : 4115644135022847232
 2Mass ID (if available) : 17095535-2123568
 ICRS Star Coord at Epoch: 17h 09m 55.33950s -21:23:56.99554s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 8.135
 G magnitude : 13.607
 RP magnitude : 12.175
 BP magnitude : 16.237
 DUPflag : 0
 Distance (au) : 9.042
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.42
 Sun-Target sep (deg) : 166.84
 Sun-Moon sep (deg) : 69.73
 B (ring opening deg) : 26.54
 PA of pole (deg) : 4.36
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.908
 C/A sky separation (km) : 58418.5
 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	2046-06-23T07:44:24.648		18.93	-9.07	140461.00	-7.14		
A (OER)	I	2046-06-23T07:53:56.116		20.84	-10.88	136774.40	-5.75		
Encke (OEG)	I	2046-06-23T08:04:07.919		22.89	-12.83	133744.89	-4.14		
Encke (IEG)	I	2046-06-23T08:05:27.693		23.15	-13.09	133423.31	-3.92		
Saturn	I	2046-06-23T08:15:56.514		25.27	-15.11	59159.23		-62.44	-66.67
Saturn	E	2046-06-23T08:31:57.104		28.52	-18.24	59174.90		-61.65	-65.97
Encke (IEG)	E	2046-06-23T08:51:16.490		32.46	-22.05	133423.31	3.94		
Encke (OEG)	E	2046-06-23T08:52:35.861		32.73	-22.31	133744.89	4.16		
A (OER)	E	2046-06-23T09:02:43.982		34.80	-24.33	136774.40	5.79		
F ring	E	2046-06-23T09:12:11.134		36.74	-26.22	140461.00	7.20		