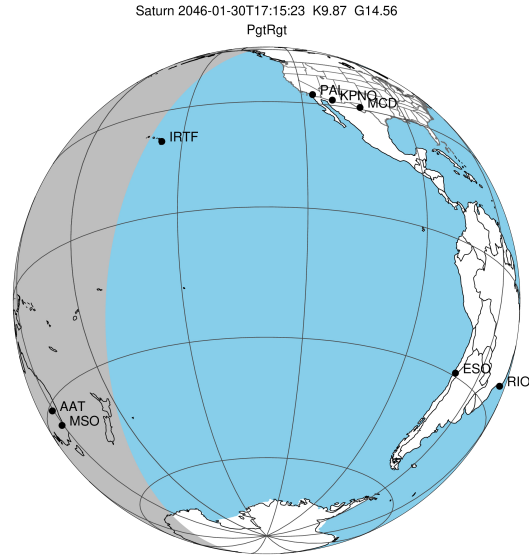


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-01-30T17:15:23.290
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4115744431101769088
 2Mass ID (if available) : 17153581-2135188

ICRS Star Coord at Epoch: 17h 15m 35.79705s -21:35:18.78879s

RUWE (>1.4 is poor) : 1.00
 K magnitude : 9.870
 G magnitude : 14.564
 RP magnitude : 13.358
 BP magnitude : 16.156
 DUPflag : 0
 Distance (au) : 10.620
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 28.48
 Sun-Target sep (deg) : 50.66
 Sun-Moon sep (deg) : 21.32
 B (ring opening deg) : 26.63
 PA of pole (deg) : 4.50

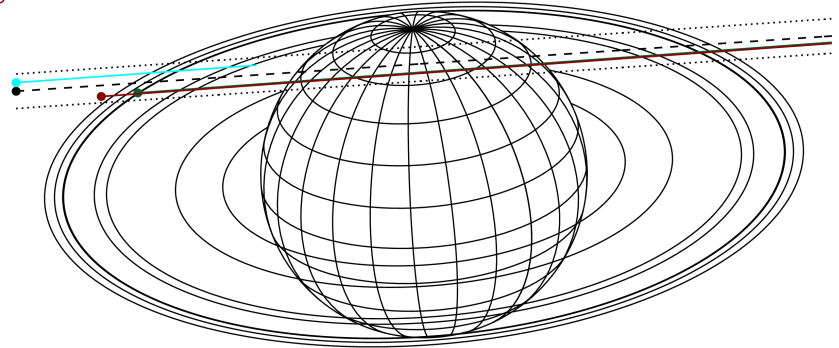
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring



2046-01-30T17:15:23.2900 ex: 17 15 35.7971 s: -21 35 18.789 C/A 5.304° PA 183.87 deg v_sky +28.48 km/s D 10.62 AU
 Credit: Styled after SORA/Lucky Star

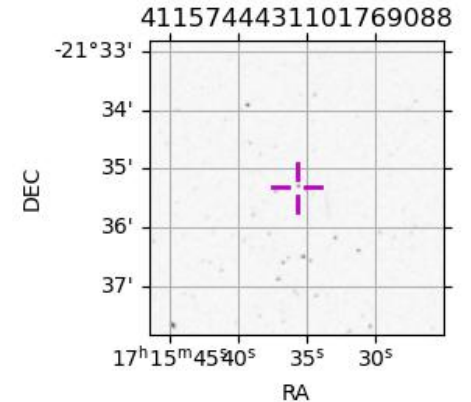
Saturn 2046-01-30T17:15:23 K9.87 G14.56 PgtRgt

Earth
 IRTF
 AAT
 MSO



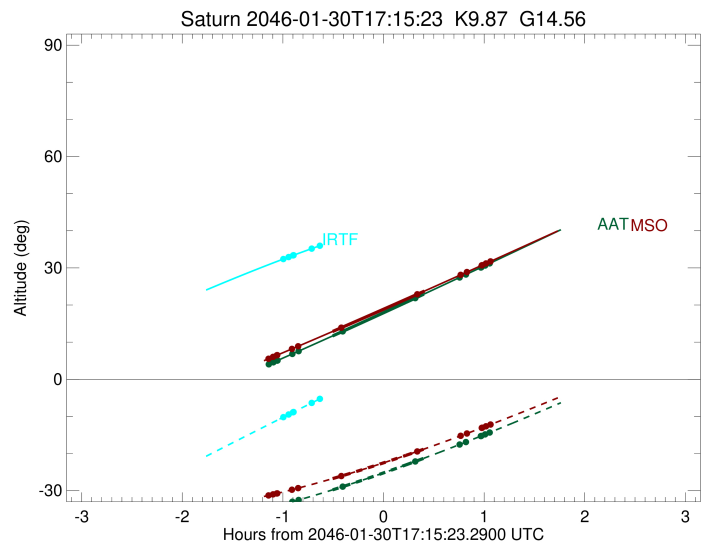
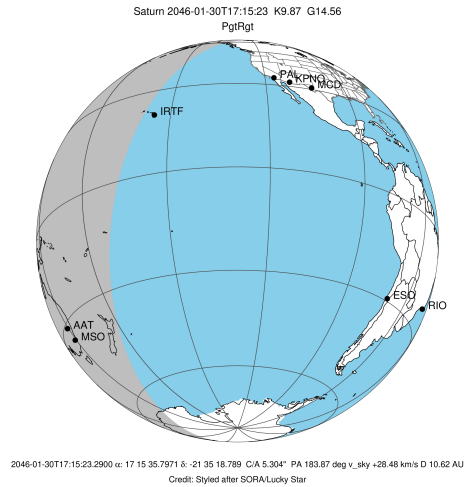
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
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	+ + + + +			JAN 30 16:15 - JAN 30 16:37	PnnRin
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+ + + + +	+ +	+ + + + +	JAN 30 16:11 - JAN 30 18:18	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+ + + + +	+ +	+ + + + +	JAN 30 16:06 - JAN 30 18:19	PieRie



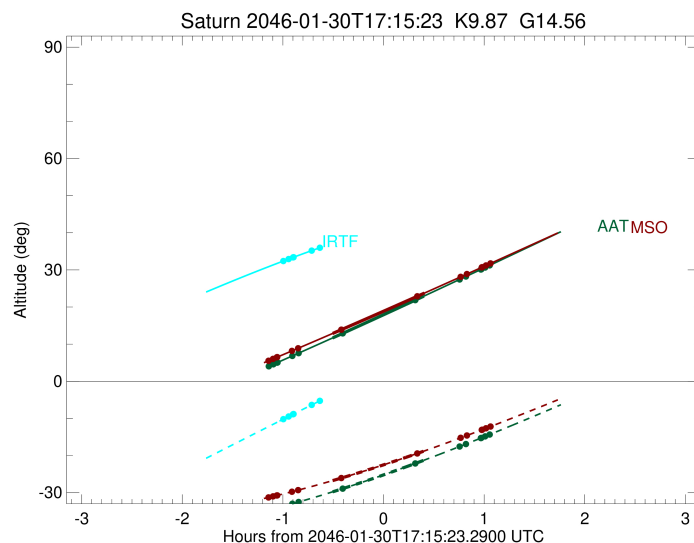
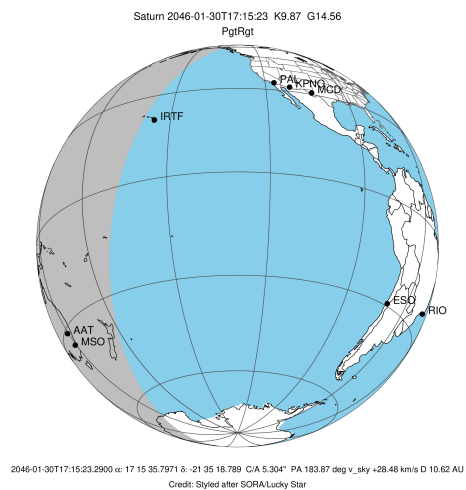
```

target                : Saturn
target radius (km)   : 60268.00
C/A epoch             : 2046-01-30T17:13:35.100
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        : 4115744431101769088
2Mass ID (if available) : 17153581-2135188
ICRS Star Coord at Epoch: 17h 15m 35.79705s -21:35:18.78879s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 9.870
G magnitude           : 14.564
RP magnitude          : 13.358
BP magnitude          : 16.156
DUPflag               : 0
Distance (au)         : 10.620
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : 28.48
Sun-Target sep (deg) : 50.66
Sun-Moon sep (deg)   : 21.33
B (ring opening deg) : 26.63
PA of pole (deg)     : 4.50
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 5.798
C/A sky separation (km) : 44655.6
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	2046-01-30T16:15:40.768		32.39	-10.20	140461.00	-19.83		
A (OER)	I	2046-01-30T16:18:49.344		32.92	-9.49	136774.40	-19.26		
Encke (OEG)	I	2046-01-30T16:21:28.689		33.37	-8.89	133744.89	-18.75		
Encke (IEG)	I	2046-01-30T16:21:45.862		33.42	-8.82	133423.31	-18.70		
A (IER)	I	2046-01-30T16:32:35.397		35.19	-6.37	122050.38	-16.21		
B (OER)	I	2046-01-30T16:37:23.235		35.96	-5.29	117571.16	-14.89		
Saturn	I	2046-01-30T16:50:09.790		37.92	-2.41x	59614.70		42.36	47.97
Saturn	E	2046-01-30T17:37:02.687		43.99	7.97x	59631.02		41.70	47.32
B (OER)	E	2046-01-30T17:51:26.509		45.42	11.10x	117571.16	14.84		
A (IER)	E	2046-01-30T17:56:15.299		45.85	12.14x	122050.38	16.15		
Encke (IEG)	E	2046-01-30T18:07:07.468		46.71	14.47x	133423.31	18.61		
Encke (OEG)	E	2046-01-30T18:07:24.719		46.73	14.53x	133744.89	18.67		
A (OER)	E	2046-01-30T18:10:04.813		46.92	15.10x	136774.40	19.17		
F ring	E	2046-01-30T18:13:14.326		47.13	15.77x	140461.00	19.73		

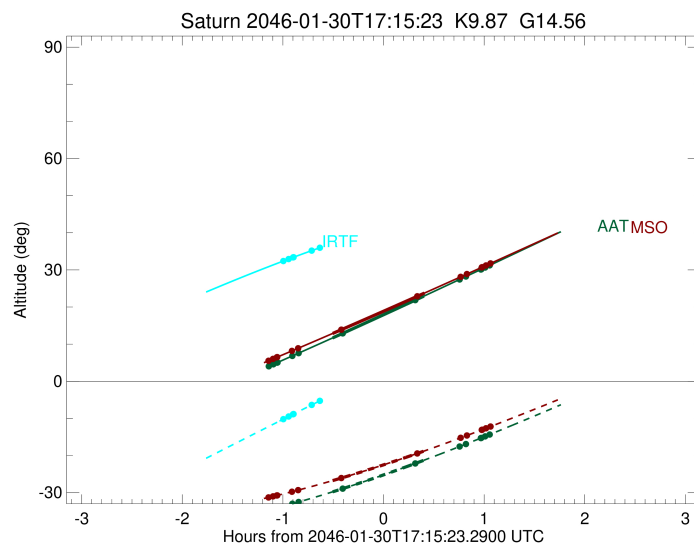
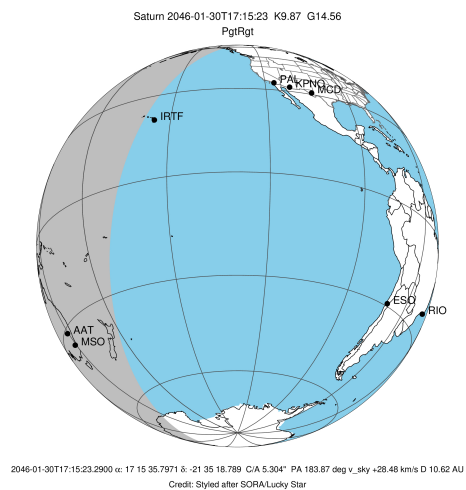
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-01-30T17:12:13.030
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4115744431101769088
 2Mass ID (if available) : 17153581-2135188
 ICRS Star Coord at Epoch: 17h 15m 35.79705s -21:35:18.78879s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 9.870
 G magnitude : 14.564
 RP magnitude : 13.358
 BP magnitude : 16.156
 DUPflag : 0
 Distance (au) : 10.620
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 28.48
 Sun-Target sep (deg) : 50.66
 Sun-Moon sep (deg) : 20.60
 B (ring opening deg) : 26.63
 PA of pole (deg) : 4.50
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.898
 C/A sky separation (km) : 37724.6
 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	2046-01-30T16:07:00.410		4.04x	-34.68	140461.00	-22.87		
A (OER)	I	2046-01-30T16:09:42.846		4.57x	-34.36	136774.40	-22.51		
Encke (OEG)	I	2046-01-30T16:11:58.365		5.02	-34.10	133744.89	-22.19		
Encke (IEG)	I	2046-01-30T16:12:12.866		5.07	-34.07	133423.31	-22.16		
A (IER)	I	2046-01-30T16:21:03.299		6.83	-32.99	122050.38	-20.66		
B (OER)	I	2046-01-30T16:24:44.049		7.57	-32.53	117571.16	-19.91		
B (IER)	I	2046-01-30T16:51:07.058	b	12.92	-28.91	91984.69	-11.38		
Saturn	I	2046-01-30T16:45:03.051		11.68	-29.78	59802.00		34.59	40.07
Saturn	E	2046-01-30T17:39:26.716		22.93	-21.28	59814.13		34.07	39.53
B (IER)	E	2046-01-30T17:34:22.266	b	21.87	-22.13	91984.69	11.35		
B (OER)	E	2046-01-30T18:00:53.183		27.45	-17.56	117571.17	19.77		
A (IER)	E	2046-01-30T18:04:35.556		28.23	-16.90	122050.38	20.50		
Encke (IEG)	E	2046-01-30T18:13:30.382		30.12	-15.30	133423.31	21.96		
Encke (OEG)	E	2046-01-30T18:13:45.014		30.17	-15.25	133744.89	22.00		
A (OER)	E	2046-01-30T18:16:01.771		30.65	-14.84	136774.40	22.31		
F ring	E	2046-01-30T18:18:45.752		31.24	-14.34	140461.00	22.65		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2046-01-30T17:12:22.750
 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 : 4115744431101769088
 2Mass ID (if available) : 17153581-2135188
 ICRS Star Coord at Epoch: 17h 15m 35.79705s -21:35:18.78879s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 9.870
 G magnitude : 14.564
 RP magnitude : 13.358
 BP magnitude : 16.156
 DUPflag : 0
 Distance (au) : 10.620
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 28.48
 Sun-Target sep (deg) : 50.66
 Sun-Moon sep (deg) : 20.63
 B (ring opening deg) : 26.63
 PA of pole (deg) : 4.50
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.853
 C/A sky separation (km) : 37379.8
 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	2046-01-30T16:06:50.961		5.52	-31.29	140461.00	-22.99		
A (OER)	I	2046-01-30T16:09:32.554		6.03	-31.00	136774.40	-22.64		
Encke (OEG)	I	2046-01-30T16:11:47.309		6.46	-30.76	133744.89	-22.32		
Encke (IEG)	I	2046-01-30T16:12:01.725		6.51	-30.74	133423.31	-22.29		
A (IER)	I	2046-01-30T16:20:48.482		8.18	-29.75	122050.38	-20.83		
B (OER)	I	2046-01-30T16:24:27.298		8.88	-29.33	117571.17	-20.10		
B (IER)	I	2046-01-30T16:50:17.572	b	13.90	-26.06	91984.69	-11.92		
Saturn	I	2046-01-30T16:45:02.694		12.87	-26.76	59810.16		34.24	39.71
Saturn	E	2046-01-30T17:39:46.449		23.75	-18.77	59822.77		33.70	39.14
B (IER)	E	2046-01-30T17:35:33.198	b	22.90	-19.44	91984.69	11.88		
B (OER)	E	2046-01-30T18:01:31.066		28.15	-15.21	117571.16	19.96		
A (IER)	E	2046-01-30T18:05:11.439		28.89	-14.60	122050.38	20.68		
Encke (IEG)	E	2046-01-30T18:14:02.414		30.70	-13.09	133423.31	22.10		
Encke (OEG)	E	2046-01-30T18:14:16.956		30.75	-13.05	133744.89	22.13		
A (OER)	E	2046-01-30T18:16:32.899		31.21	-12.66	136774.40	22.44		
F ring	E	2046-01-30T18:19:15.975		31.76	-12.19	140461.00	22.77		