

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2031-02-26T09:14:58.570
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 50185593342556032
 2Mass ID (if available) : 04013248+1851204

Saturn 2031-02-26T09:14:58 K9.76 G12.34 PgtRgt

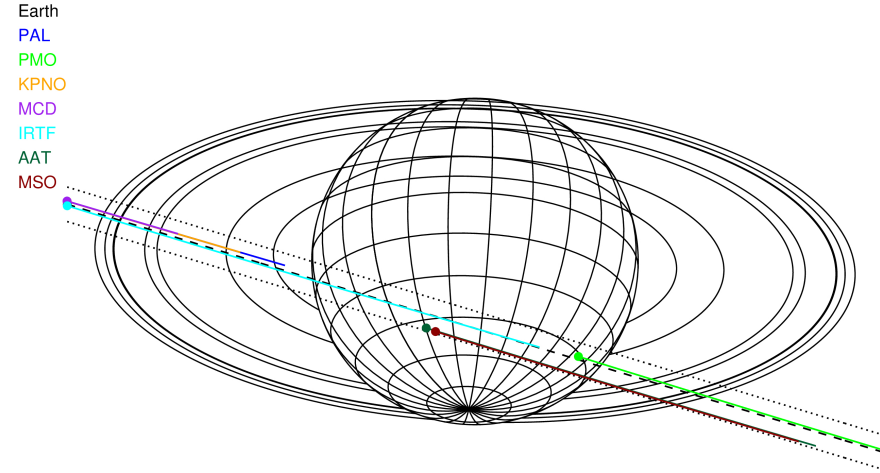
ICRS Star Coord at Epoch: 04h 01m 32.49801s +18:51:20.21562s

RUWE (>1.4 is poor) : 1.85
 K magnitude : 9.755
 G magnitude : 12.339
 RP magnitude : 11.554
 BP magnitude : 13.000
 DUPflag : 0
 Distance (au) : 9.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.35
 Sun-Target sep (deg) : 84.97
 Sun-Moon sep (deg) : 26.27
 B (ring opening deg) : -24.96
 PA of pole (deg) : -2.42

#	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

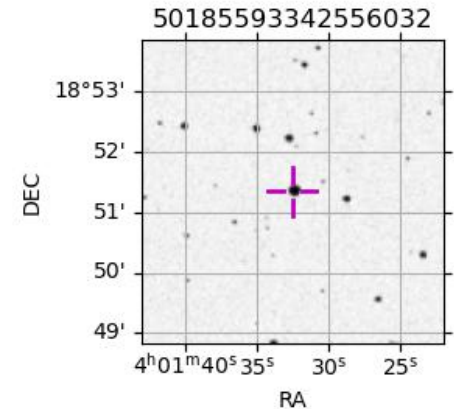


2031-02-26T09:14:58.5700 ex: 04 01 32.4980 s: +18 51 20.216 C/A 3.583° PA 343.10 deg v_sky +12.35 km/s D 09.09 AU
 Credit: Styled after SORA/Lucky Star

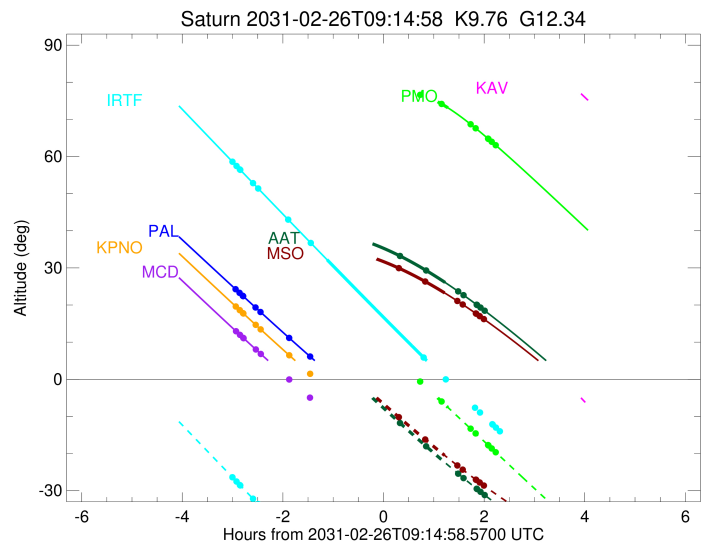
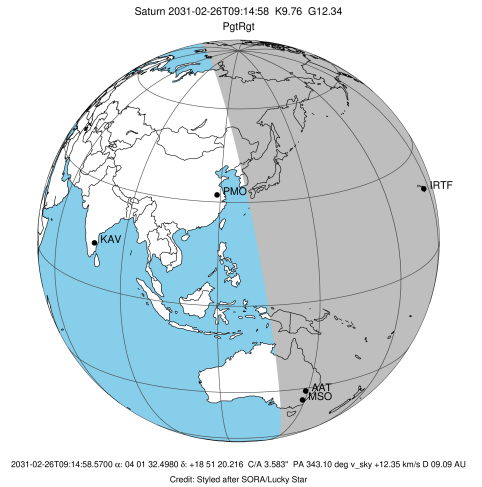


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+ + + + + + +			FEB 26 06:18 - FEB 26 07:47	PnnRin
PMO	Purple Mtn Obs	32.1	118.8		+	+ + + + + +	FEB 26 10:31 - FEB 26 11:28	PneRne
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + + + +			FEB 26 06:18 - FEB 26 07:22	PnnRin
MCD	McDonald Obs.	30.7	256.0	+ + + + + + +			FEB 26 06:19 - FEB 26 06:48	PnnRin
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+ + + + + + +	+		FEB 26 06:14 - FEB 26 08:07	PinRin
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		+	+ + + + + +	FEB 26 10:28 - FEB 26 11:15	PneRne
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0		+	+ + + + + +	FEB 26 10:27 - FEB 26 11:14	PneRne



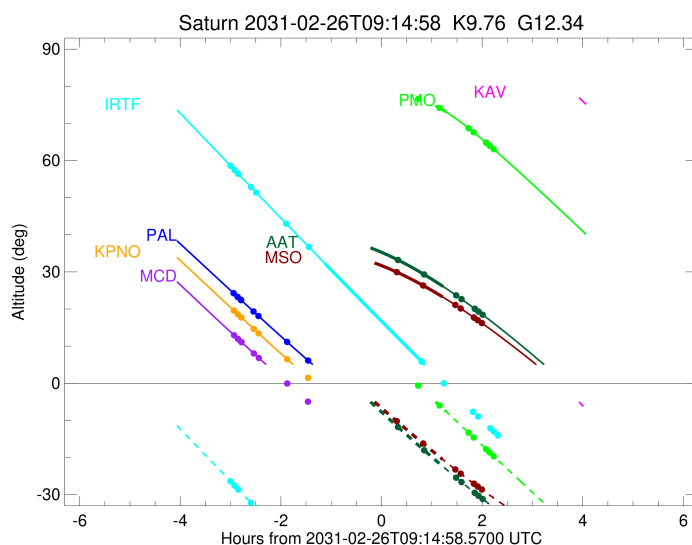
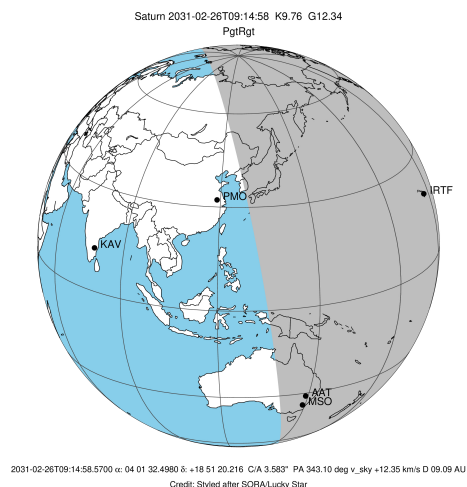
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2031-02-26T09:22:58.360
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 50185593342556032
 2Mass ID (if available) : 04013248+1851204
 ICRS Star Coord at Epoch: 04h 01m 32.49801s +18:51:20.21562s
 RUWE (>1.4 is poor) : 1.85
 K magnitude : 9.755
 G magnitude : 12.339
 RP magnitude : 11.554
 BP magnitude : 13.000
 DUPflag : 0
 Distance (au) : 9.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.35
 Sun-Target sep (deg) : 84.97
 Sun-Moon sep (deg) : 26.84
 B (ring opening deg) : -24.96
 PA of pole (deg) : -2.42
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.185
 C/A sky separation (km) : 20998.1
 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	2031-02-26T06:18:32.023		24.27	-56.13	140461.00	-12.98		
A (OER)	I	2031-02-26T06:23:16.439		23.28	-56.87	136774.40	-12.95		
Encke (OEG)	I	2031-02-26T06:27:10.716		22.47	-57.47	133744.89	-12.92		
Encke (IEG)	I	2031-02-26T06:27:35.616		22.39	-57.54	133423.31	-12.91		
A (IER)	I	2031-02-26T06:42:20.703		19.34	-59.67	122050.38	-12.78		
B (OER)	I	2031-02-26T06:48:12.124		18.13	-60.45	117571.16	-12.71		
B (IER)	I	2031-02-26T07:22:29.324		11.13	-64.06	91984.69	-12.08		
C (IER)	I	2031-02-26T07:47:31.126		6.11	-65.39	74490.58	-11.11		
Saturn	I	2031-02-26T08:07:13.595		2.23x	-65.51	60254.40		-5.98	-7.33
Saturn	E	2031-02-26T10:37:25.742		-24.10x	-46.33	59944.20		-30.68	-35.93
C (IER)	E	2031-02-26T10:10:06.614	b	-19.92x	-51.36	74490.58	11.30		
B (IER)	E	2031-02-26T10:34:36.138	b	-23.68x	-46.86	91984.69	12.40		
B (OER)	E	2031-02-26T11:07:50.665		-28.28x	-40.42	117571.16	13.17		
A (IER)	E	2031-02-26T11:13:29.526		-28.99x	-39.29	122050.38	13.26		
Encke (IEG)	E	2031-02-26T11:27:40.760		-30.68x	-36.44	133423.31	13.45		
Encke (OEG)	E	2031-02-26T11:28:04.663		-30.73x	-36.36	133744.89	13.46		
A (OER)	E	2031-02-26T11:31:49.441		-31.15x	-35.60	136774.40	13.50		
F ring	E	2031-02-26T11:36:22.043		-31.64x	-34.68	140461.00	13.55		

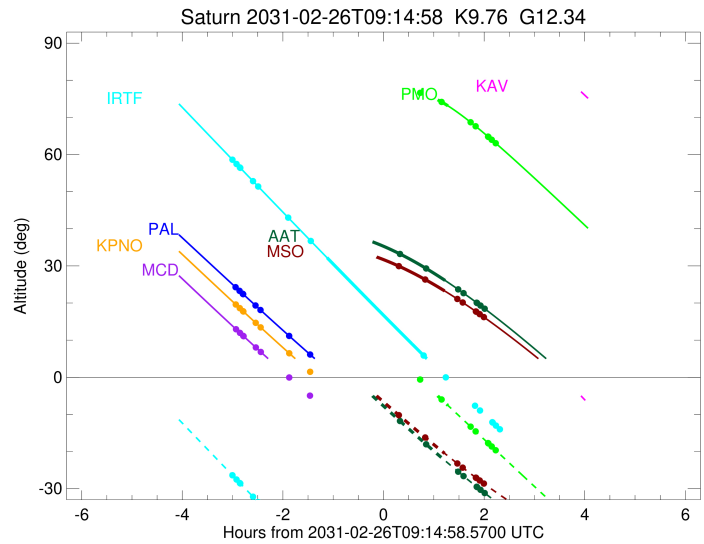
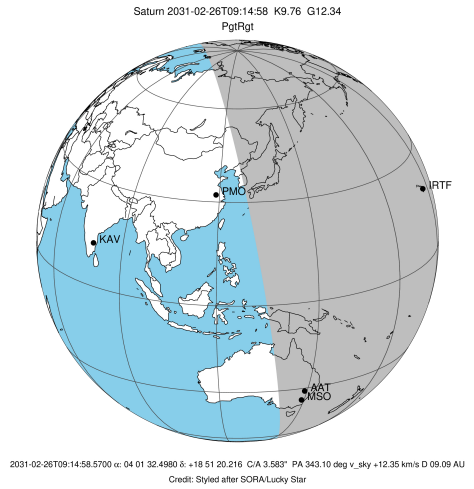
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2031-02-26T09:14:19.020
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 50185593342556032
 2Mass ID (if available) : 04013248+1851204
 ICRS Star Coord at Epoch: 04h 01m 32.49801s +18:51:20.21562s
 RUWE (>1.4 is poor) : 1.85
 K magnitude : 9.755
 G magnitude : 12.339
 RP magnitude : 11.554
 BP magnitude : 13.000
 DUPflag : 0
 Distance (au) : 9.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.35
 Sun-Target sep (deg) : 84.97
 Sun-Moon sep (deg) : 26.60
 B (ring opening deg) : -24.96
 PA of pole (deg) : -2.42
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.343
 C/A sky separation (km) : 22037.8
 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	2031-02-26T06:06:40.986		39.69	41.70x	140461.00	-13.14		
A (OER)	I	2031-02-26T06:11:22.006		40.68	41.09x	136774.40	-13.09		
Encke (OEG)	I	2031-02-26T06:15:13.736		41.50	40.58x	133744.89	-13.05		
Encke (IEG)	I	2031-02-26T06:15:38.379		41.59	40.52x	133423.31	-13.05		
A (IER)	I	2031-02-26T06:30:16.067		44.70	38.46x	122050.38	-12.86		
B (OER)	I	2031-02-26T06:36:05.527		45.93	37.59x	117571.16	-12.77		
B (IER)	I	2031-02-26T07:10:24.008		53.16	32.09x	91984.69	-12.00		
C (IER)	I	2031-02-26T07:35:44.576		58.40	27.66x	74490.58	-10.90		
Saturn	I	2031-02-26T07:56:18.466		62.54	23.89x	60255.71		-5.68	-6.97
Saturn	E	2031-02-26T10:31:49.382		73.12	-7.59	59905.06		-32.72	-38.10
C (IER)	E	2031-02-26T09:58:39.789	b	76.62	-0.62x	74490.58	10.77		
B (IER)	E	2031-02-26T10:24:18.425	b	74.16	-6.00	91984.69	11.85		
B (OER)	E	2031-02-26T10:59:04.076		68.67	-13.35	117571.16	12.59		
A (IER)	E	2031-02-26T11:04:58.635		67.60	-14.60	122050.38	12.67		
Encke (IEG)	E	2031-02-26T11:19:49.776		64.80	-17.76	133423.31	12.84		
Encke (OEG)	E	2031-02-26T11:20:14.809		64.72	-17.84	133744.89	12.85		
A (OER)	E	2031-02-26T11:24:10.250		63.96	-18.68	136774.40	12.89		
F ring	E	2031-02-26T11:28:55.852		63.02	-19.69	140461.00	12.93		

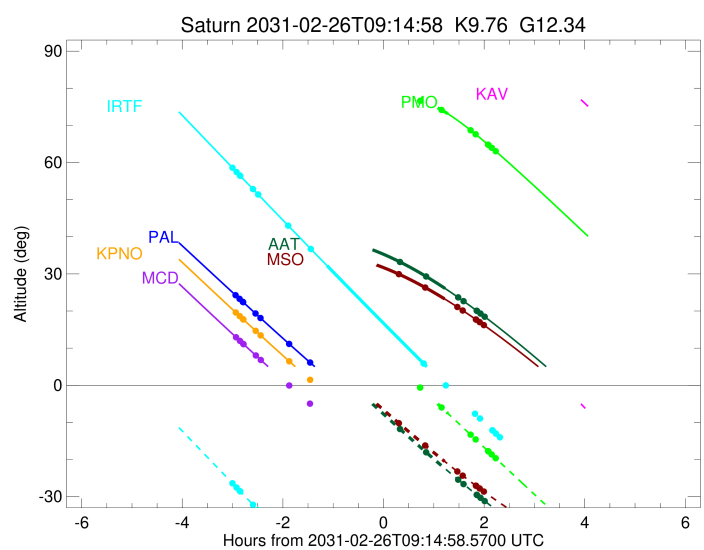
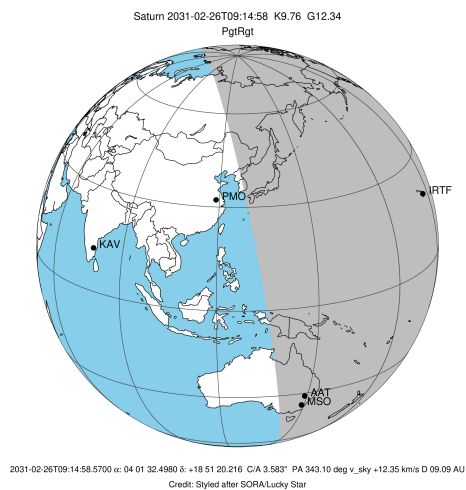
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2031-02-26T09:22:45.200
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 50185593342556032
 2Mass ID (if available) : 04013248+1851204
 ICRS Star Coord at Epoch: 04h 01m 32.49801s +18:51:20.21562s
 RUWE (>1.4 is poor) : 1.85
 K magnitude : 9.755
 G magnitude : 12.339
 RP magnitude : 11.554
 BP magnitude : 13.000
 DUPflag : 0
 Distance (au) : 9.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.35
 Sun-Target sep (deg) : 84.97
 Sun-Moon sep (deg) : 26.79
 B (ring opening deg) : -24.96
 PA of pole (deg) : -2.42
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.174
 C/A sky separation (km) : 20919.5
 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	2031-02-26T06:18:48.146		19.61	-60.35	140461.00	-13.01		
A (OER)	I	2031-02-26T06:23:31.950		18.62	-61.03	136774.40	-12.97		
Encke (OEG)	I	2031-02-26T06:27:25.710		17.81	-61.57	133744.89	-12.95		
Encke (IEG)	I	2031-02-26T06:27:50.554		17.72	-61.62	133423.31	-12.94		
A (IER)	I	2031-02-26T06:42:33.567		14.66	-63.47	122050.38	-12.81		
B (OER)	I	2031-02-26T06:48:24.111		13.45	-64.11	117571.16	-12.74		
B (IER)	I	2031-02-26T07:22:35.447		6.46	-66.64	91984.69	-12.12		
C (IER)	I	2031-02-26T07:47:31.788		1.46x	-66.88	74490.58	-11.16		
Saturn	I	2031-02-26T08:07:10.991		-2.40x	-66.06	60254.59		-5.94	-7.28
Saturn	E	2031-02-26T10:37:03.710		-28.06x	-42.81	59945.72		-30.60	-35.84
C (IER)	E	2031-02-26T10:10:01.335	b	-24.12x	-48.14	74490.58	11.35		
B (IER)	E	2031-02-26T10:34:25.106	b	-27.69x	-43.34	91984.69	12.44		
B (OER)	E	2031-02-26T11:07:33.272		-31.95x	-36.60	117571.16	13.21		
A (IER)	E	2031-02-26T11:13:11.154		-32.59x	-35.43	122050.38	13.30		
Encke (IEG)	E	2031-02-26T11:27:20.034		-34.10x	-32.49	133423.31	13.49		
Encke (OEG)	E	2031-02-26T11:27:43.872		-34.14x	-32.40	133744.89	13.49		
A (OER)	E	2031-02-26T11:31:28.052		-34.51x	-31.62	136774.40	13.53		
F ring	E	2031-02-26T11:35:59.941		-34.94x	-30.67	140461.00	13.58		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2031-02-26T09:22:17.970
 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 : 50185593342556032
 2Mass ID (if available) : 04013248+1851204
 ICRS Star Coord at Epoch: 04h 01m 32.49801s +18:51:20.21562s
 RUWE (>1.4 is poor) : 1.85
 K magnitude : 9.755
 G magnitude : 12.339
 RP magnitude : 11.554
 BP magnitude : 13.000
 DUPflag : 0
 Distance (au) : 9.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.35
 Sun-Target sep (deg) : 84.97
 Sun-Moon sep (deg) : 26.70
 B (ring opening deg) : -24.96
 PA of pole (deg) : -2.42
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.145
 C/A sky separation (km) : 20733.2
 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_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

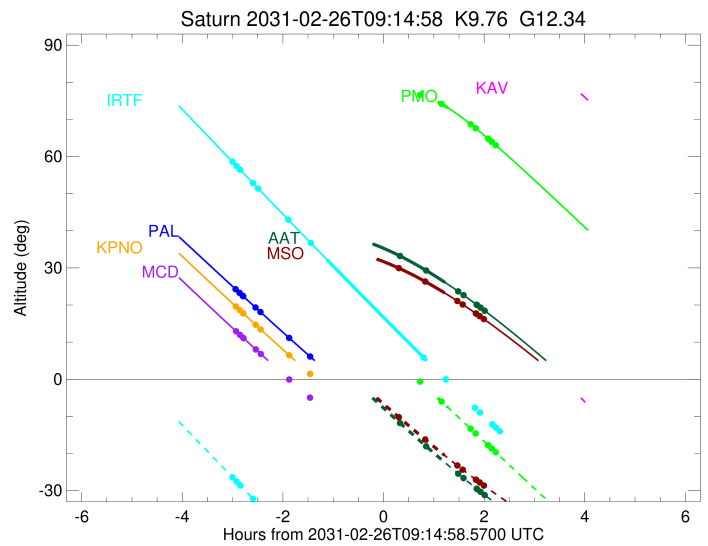
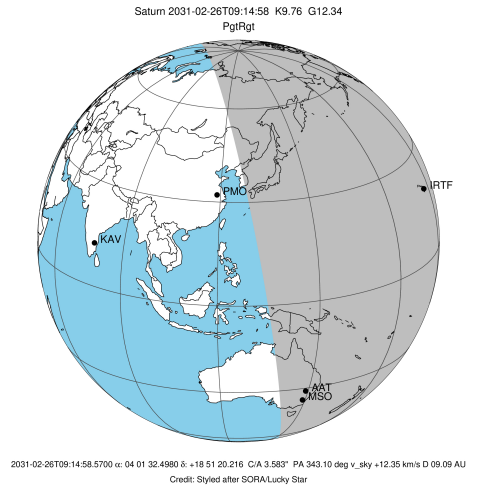


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2031-02-26T06:19:05.521		12.94	-65.34	140461.00	-13.06		
A (OER)	I	2031-02-26T06:23:48.189		11.96	-65.84	136774.40	-13.03		
Encke (OEG)	I	2031-02-26T06:27:40.990		11.15	-66.22	133744.89	-13.00		
Encke (IEG)	I	2031-02-26T06:28:05.731		11.06	-66.26	133423.31	-13.00		
A (IER)	I	2031-02-26T06:42:44.919		8.03	-67.41	122050.38	-12.87		
B (OER)	I	2031-02-26T06:48:33.850		6.83	-67.74	117571.16	-12.80		
B (IER)	I	2031-02-26T07:22:34.331		-0.07x	-68.02	91984.69	-12.19		
C (IER)	I	2031-02-26T07:47:20.208		-4.96x	-66.48	74490.58	-11.25		
Saturn	I	2031-02-26T08:06:56.025		-8.74x	-64.38	60255.22		-5.80	-7.11
Saturn	E	2031-02-26T10:36:27.572		-32.92x	-37.06	59948.86		-30.43	-35.66
C (IER)	E	2031-02-26T10:09:57.695	b	-29.47x	-42.57	74490.58	11.45		
B (IER)	E	2031-02-26T10:34:11.264	b	-32.64x	-37.54	91984.69	12.51		
B (OER)	E	2031-02-26T11:07:09.130		-36.23x	-30.56	117571.16	13.27		
A (IER)	E	2031-02-26T11:12:45.506		-36.75x	-29.37	122050.38	13.36		
Encke (IEG)	E	2031-02-26T11:26:50.834		-37.91x	-26.35	133423.31	13.54		
Encke (OEG)	E	2031-02-26T11:27:14.576		-37.94x	-26.26	133744.89	13.55		
A (OER)	E	2031-02-26T11:30:57.871		-38.22x	-25.46	136774.40	13.59		
F ring	E	2031-02-26T11:35:28.712		-38.53x	-24.49	140461.00	13.63		

```

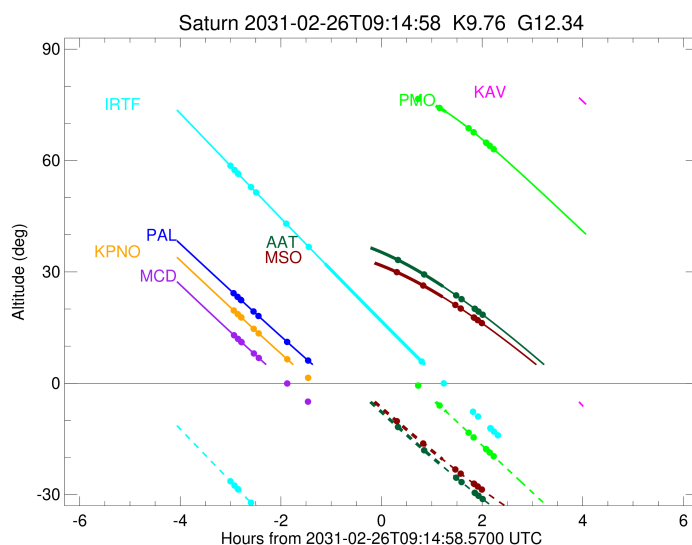
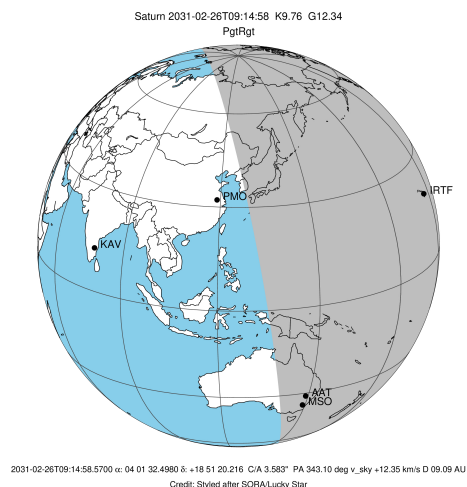
target                : Saturn
target radius (km)   : 60268.00
C/A epoch            : 2031-02-26T09:23:35.930
Event type          : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : IRTF
Location            : Mauna Kea/IRTF
Latitude (deg)      : 19.82622
E. Longitude (deg)  : 204.52800
Altitude (km)       : 4.168
Gaia source ID      : 50185593342556032
2Mass ID (if available) : 04013248+1851204
ICRS Star Coord at Epoch: 04h 01m 32.49801s +18:51:20.21562s
RUWE (>1.4 is poor) : 1.85
K magnitude          : 9.755
G magnitude          : 12.339
RP magnitude         : 11.554
BP magnitude         : 13.000
DUPflag             : 0
Distance (au)       : 9.089
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 12.35
Sun-Target sep (deg) : 84.97
Sun-Moon sep (deg)  : 27.17
B (ring opening deg) : -24.96
PA of pole (deg)    : -2.42
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 3.593
C/A sky separation (km) : 23682.4
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	2031-02-26T06:14:48.780		58.61	-26.40	140461.00	-12.63		
A (OER)	I	2031-02-26T06:19:41.317		57.46	-27.55	136774.40	-12.58		
Encke (OEG)	I	2031-02-26T06:23:42.568		56.51	-28.50	133744.89	-12.54		
Encke (IEG)	I	2031-02-26T06:24:08.224		56.41	-28.60	133423.31	-12.53		
A (IER)	I	2031-02-26T06:39:22.374		52.83	-32.18	122050.38	-12.34		
B (OER)	I	2031-02-26T06:45:26.643		51.41	-33.61	117571.16	-12.25		
B (IER)	I	2031-02-26T07:21:21.056		43.00	-42.03	91984.69	-11.40		
C (IER)	I	2031-02-26T07:48:18.414		36.71	-48.32	74490.58	-10.10		
Saturn	I	2031-02-26T08:07:38.658		32.21	-52.79	60242.41		-8.22	-10.06
Saturn	E	2031-02-26T10:38:02.606		-1.97x	-78.97	59895.59		-33.20	-38.61
C (IER)	E	2031-02-26T10:02:49.687	b	5.87	-76.56	74490.58	10.22		
B (IER)	E	2031-02-26T10:29:19.695	b	-0.04x	-78.92	91984.69	11.64		
B (OER)	E	2031-02-26T11:04:18.363		-7.71x	-76.88	117571.16	12.63		
A (IER)	E	2031-02-26T11:10:11.403		-8.98x	-76.05	122050.38	12.74		
Encke (IEG)	E	2031-02-26T11:24:55.294		-12.14x	-73.62	133423.31	12.98		
Encke (OEG)	E	2031-02-26T11:25:20.060		-12.23x	-73.54	133744.89	12.99		
A (OER)	E	2031-02-26T11:29:12.826		-13.05x	-72.83	136774.40	13.04		
F ring	E	2031-02-26T11:33:54.818		-14.05x	-71.95	140461.00	13.10		

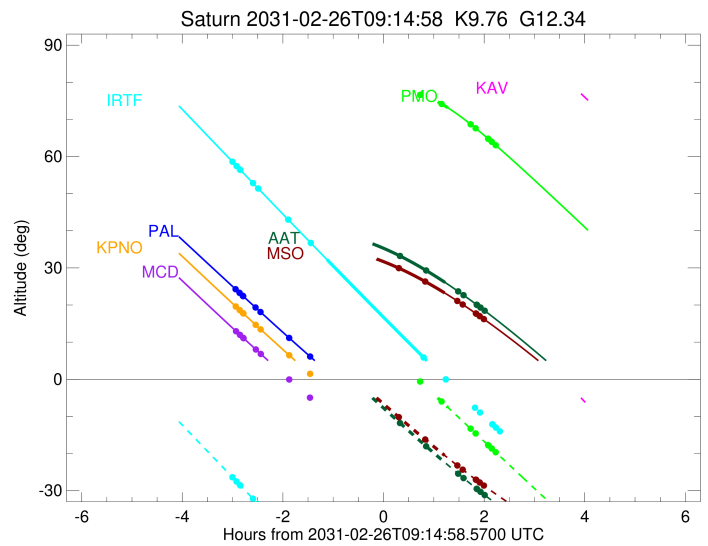
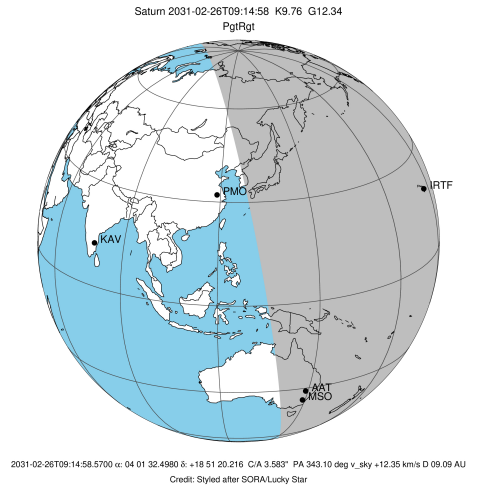
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2031-02-26T09:15:43.630
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 50185593342556032
 2Mass ID (if available) : 04013248+1851204
 ICRS Star Coord at Epoch: 04h 01m 32.49801s +18:51:20.21562s
 RUWE (>1.4 is poor) : 1.85
 K magnitude : 9.755
 G magnitude : 12.339
 RP magnitude : 11.554
 BP magnitude : 13.000
 DUPflag : 0
 Distance (au) : 9.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.35
 Sun-Target sep (deg) : 84.97
 Sun-Moon sep (deg) : 26.77
 B (ring opening deg) : -24.96
 PA of pole (deg) : -2.42
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.366
 C/A sky separation (km) : 28780.2
 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_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	2031-02-26T06:05:06.608		34.66	32.56x	140461.00	-12.39		
A (OER)	I	2031-02-26T06:10:05.089		35.16	31.51x	136774.40	-12.31		
Encke (OEG)	I	2031-02-26T06:14:11.874		35.56	30.64x	133744.89	-12.24		
Encke (IEG)	I	2031-02-26T06:14:38.154		35.60	30.55x	133423.31	-12.23		
A (IER)	I	2031-02-26T06:30:19.565		36.97	27.22x	122050.38	-11.92		
B (OER)	I	2031-02-26T06:36:37.844		37.45	25.88x	117571.16	-11.76		
B (IER)	I	2031-02-26T07:14:53.901		39.49	17.69x	91984.69	-10.36		
C (IER)	I	2031-02-26T07:46:04.903		39.95	11.02x	74490.58	-8.11		
Saturn	I	2031-02-26T08:01:56.548		39.75	7.63x	60210.49		-12.38	-15.08
Saturn	E	2031-02-26T10:28:27.774		26.07	-22.47	59787.00		-38.55	-44.15
C (IER)	E	2031-02-26T09:34:31.548	b	33.23	-11.76	74490.58	8.06		
B (IER)	E	2031-02-26T10:05:52.320	b	29.30	-18.06	91984.69	10.32		
B (OER)	E	2031-02-26T10:44:14.495		23.65	-25.47	117571.16	11.74		
A (IER)	E	2031-02-26T10:50:33.467		22.64	-26.65	122050.38	11.89		
Encke (IEG)	E	2031-02-26T11:06:16.399		20.06	-29.52	133423.31	12.21		
Encke (OEG)	E	2031-02-26T11:06:42.719		19.98	-29.60	133744.89	12.22		
A (OER)	E	2031-02-26T11:10:49.860		19.29	-30.34	136774.40	12.29		
F ring	E	2031-02-26T11:15:48.753		18.44	-31.22	140461.00	12.37		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2031-02-26T09:15:29.120
 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 : 50185593342556032
 2Mass ID (if available) : 04013248+1851204
 ICRS Star Coord at Epoch: 04h 01m 32.49801s +18:51:20.21562s
 RUWE (>1.4 is poor) : 1.85
 K magnitude : 9.755
 G magnitude : 12.339
 RP magnitude : 11.554
 BP magnitude : 13.000
 DUPflag : 0
 Distance (au) : 9.089
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.35
 Sun-Target sep (deg) : 84.97
 Sun-Moon sep (deg) : 26.74
 B (ring opening deg) : -24.96
 PA of pole (deg) : -2.42
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.402
 C/A sky separation (km) : 29019.5
 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	2031-02-26T06:05:06.691		31.08	31.82x	140461.00	-12.38		
A (OER)	I	2031-02-26T06:10:05.510		31.54	30.83x	136774.40	-12.30		
Encke (OEG)	I	2031-02-26T06:14:12.600		31.91	30.00x	133744.89	-12.22		
Encke (IEG)	I	2031-02-26T06:14:38.914		31.94	29.91x	133423.31	-12.22		
A (IER)	I	2031-02-26T06:30:21.761		33.20	26.74x	122050.38	-11.89		
B (OER)	I	2031-02-26T06:36:40.763		33.64	25.46x	117571.16	-11.74		
B (IER)	I	2031-02-26T07:15:04.469		35.50	17.63x	91984.69	-10.30		
C (IER)	I	2031-02-26T07:46:32.118		35.92	11.20x	74490.58	-7.99		
Saturn	I	2031-02-26T08:01:59.645		35.74	8.04x	60208.18		-12.63	-15.38
Saturn	E	2031-02-26T10:27:56.267		23.25	-20.51	59782.44		-38.76	-44.37
C (IER)	E	2031-02-26T09:33:08.032	b	29.95	-10.18	74490.58	7.94		
B (IER)	E	2031-02-26T10:04:45.309	b	26.32	-16.23	91984.69	10.27		
B (OER)	E	2031-02-26T10:43:14.712		21.06	-23.26	117571.16	11.72		
A (IER)	E	2031-02-26T10:49:34.313		20.12	-24.37	122050.38	11.88		
Encke (IEG)	E	2031-02-26T11:05:18.421		17.70	-27.07	133423.31	12.20		
Encke (OEG)	E	2031-02-26T11:05:44.767		17.63	-27.14	133744.89	12.21		
A (OER)	E	2031-02-26T11:09:52.140		16.98	-27.84	136774.40	12.28		
F ring	E	2031-02-26T11:14:51.279		16.18	-28.66	140461.00	12.36		