

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2033-04-26T08:41:41.370  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3425075069527522816  
 2Mass ID (if available) : 06103940+2246371

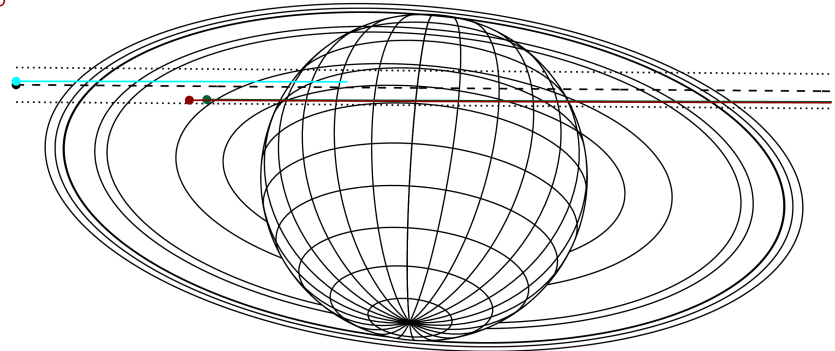
Saturn 2033-04-26T08:41:41 K7.25 G11.02 PgtRgt

ICRS Star Coord at Epoch: 06h 10m 39.39495s +22:46:37.24832s

RUWE (>1.4 is poor) : 0.89  
 K magnitude : 7.255  
 G magnitude : 11.023  
 RP magnitude : 10.006  
 BP magnitude : 12.099  
 DUPflag : 0  
 Distance (au) : 9.534  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 26.10  
 Sun-Target sep (deg) : 56.48  
 Sun-Moon sep (deg) : 94.80  
 B (ring opening deg) : -26.67  
 PA of pole (deg) : -5.74



Earth  
 IRTF  
 AAT  
 MSO

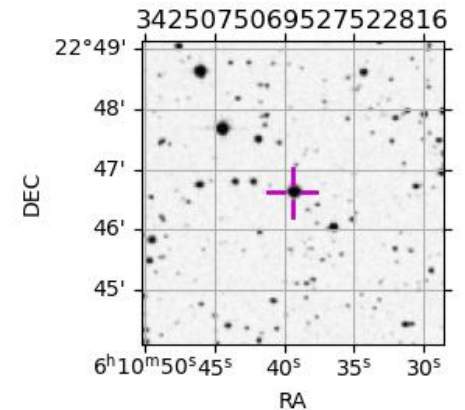


2033-04-26T08:41:41.3700 ex: 06 10 39.3950 R: +22 46 37.248 C/A 4.778° PA 179.54 deg v\_sky +26.10 km/s D 09.53 AU  
 Credit: Styled after SORA/Lucky Star

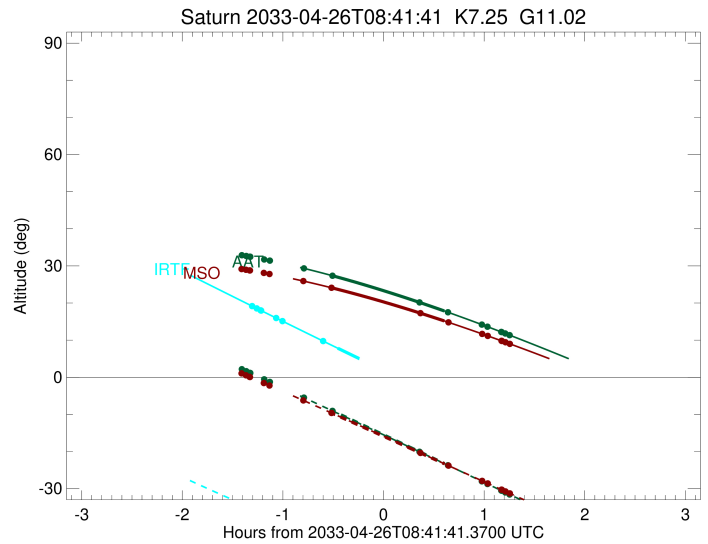
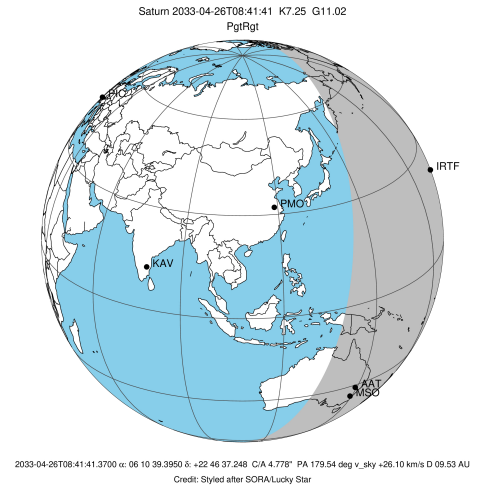
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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	+ + + + + +	+		APR 26 07:23 - APR 26 08:14	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	+	+	+ + + + + +	APR 26 07:54 - APR 26 09:56	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+ + + + + +	APR 26 07:53 - APR 26 09:56	PieRie



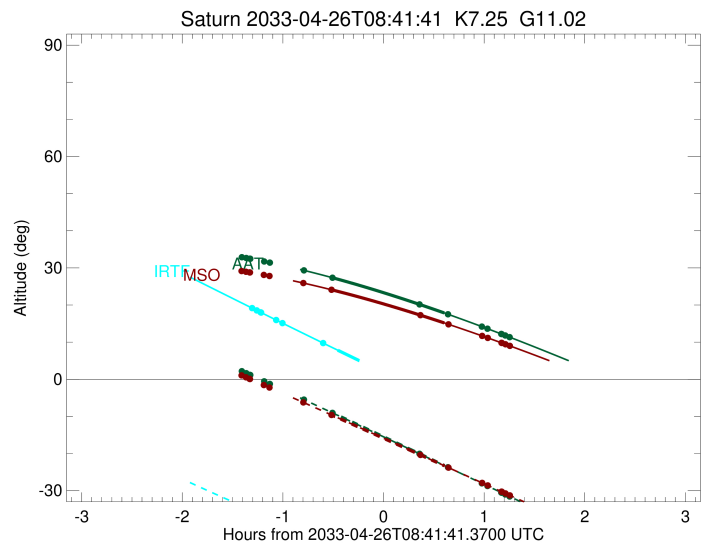
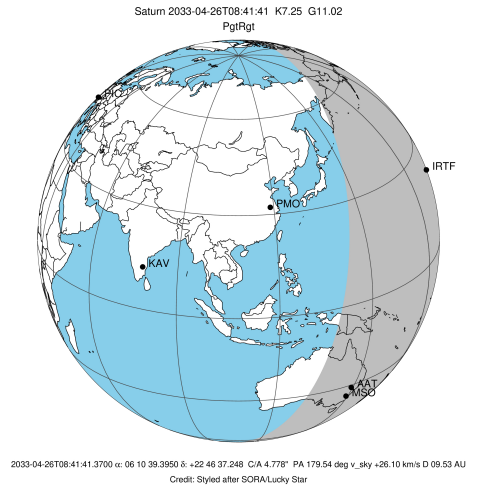
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2033-04-26T08:45:21.240  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : IRTF  
 Location : Mauna Kea/IRTF  
 Latitude (deg) : 19.82622  
 E. Longitude (deg) : 204.52800  
 Altitude (km) : 4.168  
 Gaia source ID : 3425075069527522816  
 2Mass ID (if available) : 06103940+2246371  
 ICRS Star Coord at Epoch: 06h 10m 39.39495s +22:46:37.24832s  
 RUWE (>1.4 is poor) : 0.89  
 K magnitude : 7.255  
 G magnitude : 11.023  
 RP magnitude : 10.006  
 BP magnitude : 12.099  
 DUPflag : 0  
 Distance (au) : 9.534  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 26.10  
 Sun-Target sep (deg) : 56.48  
 Sun-Moon sep (deg) : 94.75  
 B (ring opening deg) : -26.67  
 PA of pole (deg) : -5.74  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 5.105  
 C/A sky separation (km) : 35299.3  
 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

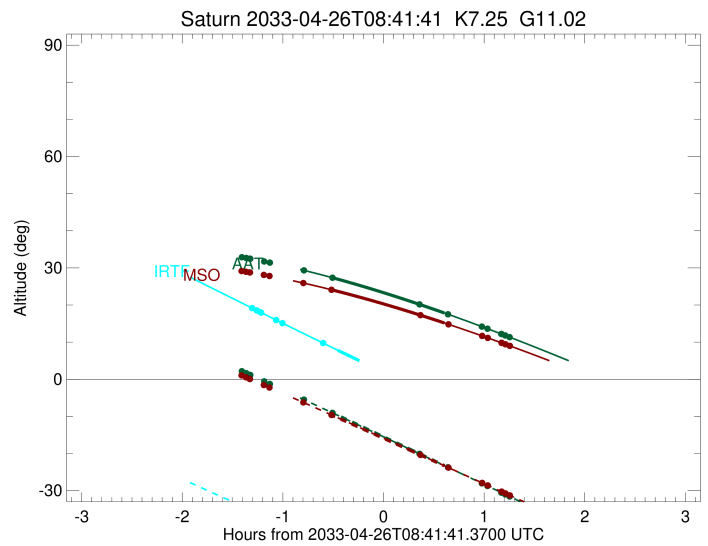
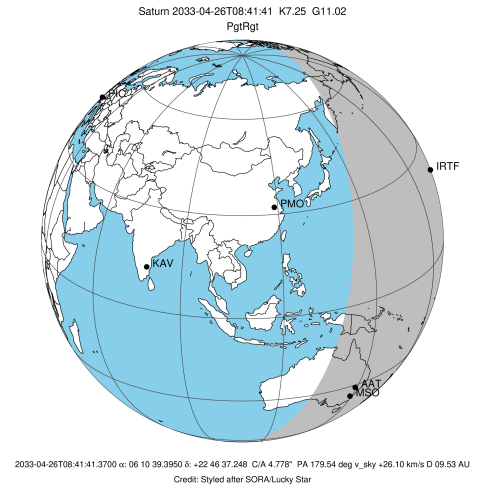
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2033-04-26T07:23:18.064		19.18	-35.28	140461.00	-22.12		
A (OER)	I	2033-04-26T07:26:05.720		18.55	-35.82	136774.40	-21.86		
Encke (OEG)	I	2033-04-26T07:28:25.050		18.03	-36.27	133744.89	-21.63		
Encke (IEG)	I	2033-04-26T07:28:39.929		17.98	-36.32	133423.31	-21.60		
A (IER)	I	2033-04-26T07:37:39.248		15.97	-38.03	122050.38	-20.53		
B (OER)	I	2033-04-26T07:41:20.294		15.15	-38.72	117571.16	-19.99		
B (IER)	I	2033-04-26T08:05:38.268		9.76	-43.10	91984.69	-14.41		
Saturn	I	2033-04-26T08:14:25.646		7.82	-44.59	59969.11		26.93	31.85
Saturn	E	2033-04-26T09:16:01.892		-5.46x	-53.14	59753.02		36.59	42.14
B (IER)	E	2033-04-26T09:08:05.798	b	-3.78x	-52.27	91984.69	14.44		
B (OER)	E	2033-04-26T09:32:16.064		-8.86x	-54.64	117571.16	20.15		
A (IER)	E	2033-04-26T09:35:55.253		-9.62x	-54.93	122050.38	20.71		
Encke (IEG)	E	2033-04-26T09:44:49.440		-11.46x	-55.54	133423.31	21.82		
Encke (OEG)	E	2033-04-26T09:45:04.165		-11.51x	-55.55	133744.89	21.85		
A (OER)	E	2033-04-26T09:47:22.031		-11.98x	-55.69	136774.40	22.09		
F ring	E	2033-04-26T09:50:07.856		-12.55x	-55.84	140461.00	22.37		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2033-04-26T08:43:55.000  
 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 : 3425075069527522816  
 2Mass ID (if available) : 06103940+2246371  
 ICRS Star Coord at Epoch: 06h 10m 39.39495s +22:46:37.24832s  
 RUWE (>1.4 is poor) : 0.89  
 K magnitude : 7.255  
 G magnitude : 11.023  
 RP magnitude : 10.006  
 BP magnitude : 12.099  
 DUPflag : 0  
 Distance (au) : 9.534  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 26.10  
 Sun-Target sep (deg) : 56.48  
 Sun-Moon sep (deg) : 95.14  
 B (ring opening deg) : -26.67  
 PA of pole (deg) : -5.74  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 4.109  
 C/A sky separation (km) : 28410.9  
 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	2033-04-26T07:17:11.921		32.88	2.18x	140461.00	-23.47		
A (OER)	I	2033-04-26T07:19:49.530		32.66	1.64x	136774.40	-23.31		
Encke (OEG)	I	2033-04-26T07:21:59.864		32.48	1.19x	133744.89	-23.17		
Encke (IEG)	I	2033-04-26T07:22:13.745		32.46	1.15x	133423.31	-23.16		
A (IER)	I	2033-04-26T07:30:31.268		31.73	-0.56x	122050.38	-22.53		
B (OER)	I	2033-04-26T07:33:51.411		31.42	-1.25x	117571.16	-22.22		
B (IER)	I	2033-04-26T07:54:13.080		29.34	-5.48	91984.69	-19.30		
C (IER)	I	2033-04-26T08:11:15.627	b	27.35	-9.06	74490.58	-14.39		
Saturn	I	2033-04-26T08:09:41.571		27.54	-8.73	60093.13		20.23	24.31
Saturn	E	2033-04-26T09:17:56.415		17.86	-23.24	59908.19		29.82	35.00
C (IER)	E	2033-04-26T09:03:04.628	b	20.18	-20.06	74490.58	14.37		
B (IER)	E	2033-04-26T09:20:05.429		17.52	-23.70	91984.69	19.38		
B (OER)	E	2033-04-26T09:40:20.129		14.19	-28.03	117571.16	22.38		
A (IER)	E	2033-04-26T09:43:38.792		13.63	-28.74	122050.38	22.70		
Encke (IEG)	E	2033-04-26T09:51:52.276		12.22	-30.50	133423.31	23.36		
Encke (OEG)	E	2033-04-26T09:52:06.037		12.18	-30.55	133744.89	23.38		
A (OER)	E	2033-04-26T09:54:15.226		11.81	-31.01	136774.40	23.52		
F ring	E	2033-04-26T09:56:51.406		11.35	-31.57	140461.00	23.69		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2033-04-26T08:43:48.710  
 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 : 3425075069527522816  
 2Mass ID (if available) : 06103940+2246371  
 ICRS Star Coord at Epoch: 06h 10m 39.39495s +22:46:37.24832s  
 RUWE (>1.4 is poor) : 0.89  
 K magnitude : 7.255  
 G magnitude : 11.023  
 RP magnitude : 10.006  
 BP magnitude : 12.099  
 DUPflag : 0  
 Distance (au) : 9.534  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 26.10  
 Sun-Target sep (deg) : 56.48  
 Sun-Moon sep (deg) : 95.09  
 B (ring opening deg) : -26.67  
 PA of pole (deg) : -5.74  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 4.069  
 C/A sky separation (km) : 28135.7  
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2033-04-26T07:17:01.552		29.15	1.05x	140461.00	-23.53		
A (OER)	I	2033-04-26T07:19:38.695		28.96	0.53x	136774.40	-23.38		
Encke (OEG)	I	2033-04-26T07:21:48.624		28.79	0.11x	133744.89	-23.25		
Encke (IEG)	I	2033-04-26T07:22:02.460		28.78	0.07x	133423.31	-23.23		
A (IER)	I	2033-04-26T07:30:18.234		28.11	-1.56x	122050.38	-22.62		
B (OER)	I	2033-04-26T07:33:37.566		27.83	-2.21x	117571.16	-22.32		
B (IER)	I	2033-04-26T07:53:51.972		25.92	-6.23	91984.69	-19.47		
C (IER)	I	2033-04-26T08:10:40.622	b	24.11	-9.61	74490.58	-14.71		
Saturn	I	2033-04-26T08:09:30.496		24.24	-9.37	60097.30		19.98	24.01
Saturn	E	2033-04-26T09:17:55.140		15.18	-23.29	59913.99		29.55	34.71
C (IER)	E	2033-04-26T09:03:36.758	b	17.28	-20.36	74490.58	14.70		
B (IER)	E	2033-04-26T09:20:23.672		14.81	-23.80	91984.69	19.54		
B (OER)	E	2033-04-26T09:40:31.374		11.68	-27.91	117571.16	22.47		
A (IER)	E	2033-04-26T09:43:49.284		11.15	-28.59	122050.38	22.79		
Encke (IEG)	E	2033-04-26T09:52:01.174		9.82	-30.26	133423.31	23.43		
Encke (OEG)	E	2033-04-26T09:52:14.895		9.78	-30.31	133744.89	23.44		
A (OER)	E	2033-04-26T09:54:23.723		9.43	-30.74	136774.40	23.59		
F ring	E	2033-04-26T09:56:59.491		9.00	-31.27	140461.00	23.75		