

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-02-10T16:56:48.790  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 4069670461482190208  
 2Mass ID (if available) : 18041903-2222341

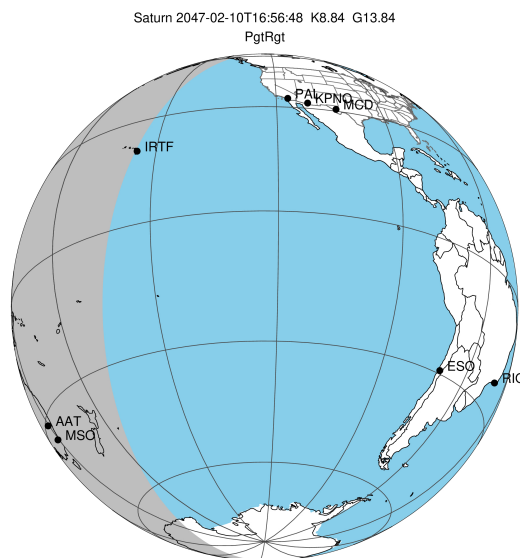
Saturn 2047-02-10T16:56:48 K8.84 G13.84 PgtRgt

ICRS Star Coord at Epoch: 18h 04m 19.02362s -22:22:34.18140s

RUWE (>1.4 is poor) : 1.07  
 K magnitude : 8.842  
 G magnitude : 13.836  
 RP magnitude : 12.601  
 BP magnitude : 15.522  
 DUPflag : 0  
 Distance (au) : 10.647  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 28.65  
 Sun-Target sep (deg) : 50.22  
 Sun-Moon sep (deg) : 128.54  
 B (ring opening deg) : 26.41  
 PA of pole (deg) : 5.60

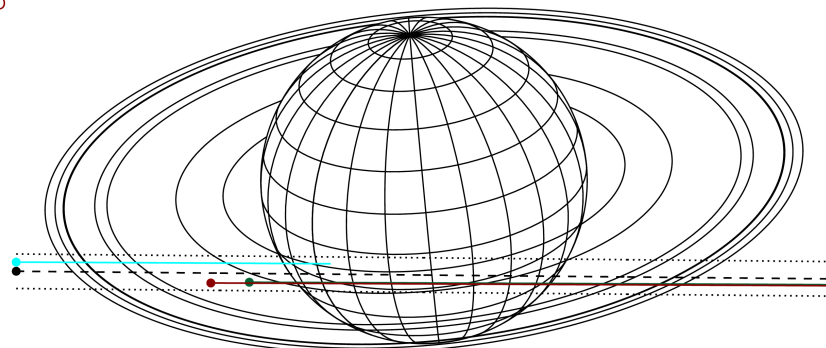
# a(km) ring

- 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



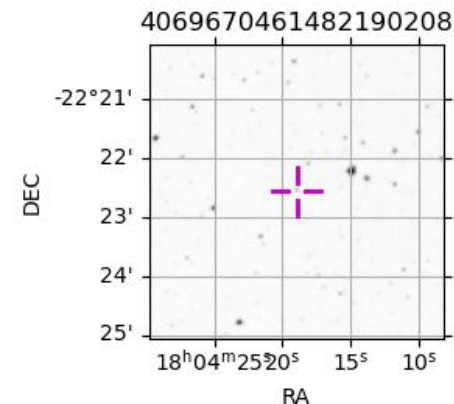
2047-02-10T16:56:48.7900 xi: 18 04 19.0236 s: -22 22 34.181 C/A 4.522° PA 359.46 deg v\_sky +28.65 km/s D 10.65 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 IRTF  
 AAT  
 MSO

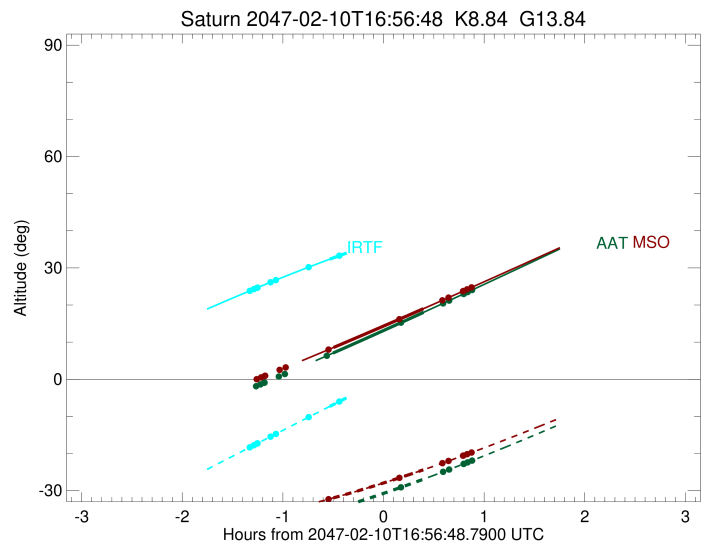
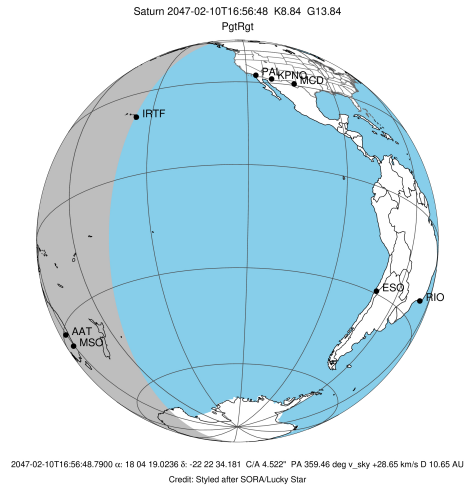


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+ + + + +	+		FEB 10 15:37 - FEB 10 16:24	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 10 16:22 - FEB 10 17:49	PieRie
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+	+ + + + +	FEB 10 16:23 - FEB 10 17:49	PieRie



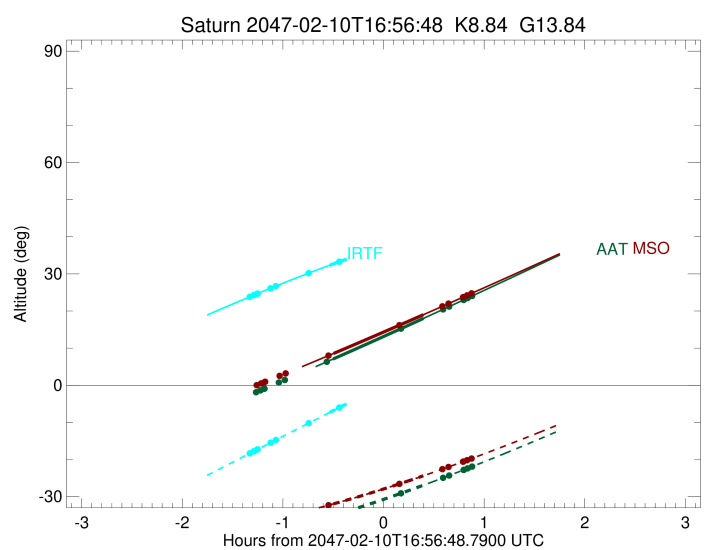
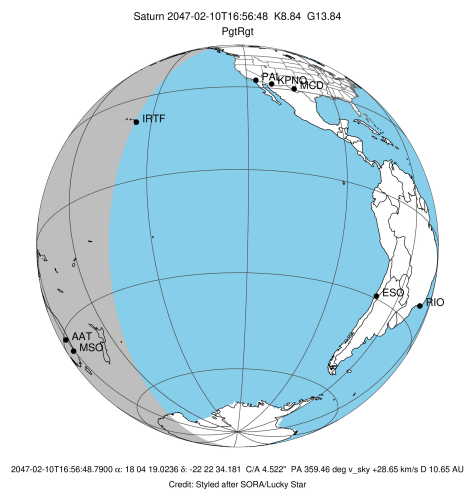
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-02-10T16:55:00.490  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : IRTF  
 Location : Mauna Kea/IRTF  
 Latitude (deg) : 19.82622  
 E. Longitude (deg) : 204.52800  
 Altitude (km) : 4.168  
 Gaia source ID : 4069670461482190208  
 2Mass ID (if available) : 18041903-2222341  
 ICRS Star Coord at Epoch: 18h 04m 19.02362s -22:22:34.18140s  
 RUWE (>1.4 is poor) : 1.07  
 K magnitude : 8.842  
 G magnitude : 13.836  
 RP magnitude : 12.601  
 BP magnitude : 15.522  
 DUPflag : 0  
 Distance (au) : 10.647  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 28.65  
 Sun-Target sep (deg) : 50.22  
 Sun-Moon sep (deg) : 129.30  
 B (ring opening deg) : 26.41  
 PA of pole (deg) : 5.60  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 4.009  
 C/A sky separation (km) : 30960.2  
 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	2047-02-10T15:37:03.007		23.82	-18.35	140461.00	-25.37		
A (OER)	I	2047-02-10T15:39:28.915		24.27	-17.78	136774.40	-25.16		
Encke (OEG)	I	2047-02-10T15:41:29.805		24.65	-17.31	133744.89	-24.96		
Encke (IEG)	I	2047-02-10T15:41:42.693		24.69	-17.26	133423.31	-24.94		
A (IER)	I	2047-02-10T15:49:26.567		26.13	-15.47	122050.38	-24.06		
B (OER)	I	2047-02-10T15:52:34.426		26.70	-14.74	117571.16	-23.62		
B (IER)	I	2047-02-10T16:12:08.973		30.19	-10.22	91984.69	-19.44		
C (IER)	I	2047-02-10T16:30:27.402	b	33.29	-6.00	74490.58	-11.59		
Saturn	I	2047-02-10T16:24:42.334		32.34	-7.32	60061.59		-22.35	-26.72
Saturn	E	2047-02-10T17:25:12.567		41.25	6.43x	59853.30		-32.71	-38.09
C (IER)	E	2047-02-10T17:04:49.895	b	38.55	1.83x	74490.58	11.48		
B (IER)	E	2047-02-10T17:23:15.728	b	41.01	5.99x	91984.69	19.35		
B (OER)	E	2047-02-10T17:42:55.488		43.29	10.39x	117571.17	23.52		
A (IER)	E	2047-02-10T17:46:04.227		43.62	11.08x	122050.38	23.94		
Encke (IEG)	E	2047-02-10T17:53:50.401		44.39	12.80x	133423.31	24.81		
Encke (OEG)	E	2047-02-10T17:54:03.356		44.41	12.85x	133744.89	24.83		
A (OER)	E	2047-02-10T17:56:04.881		44.60	13.30x	136774.40	25.02		
F ring	E	2047-02-10T17:58:31.576		44.82	13.84x	140461.00	25.24		

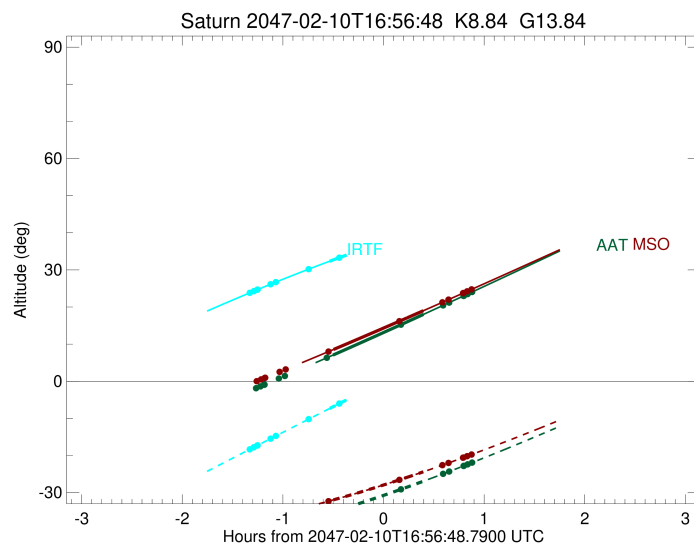
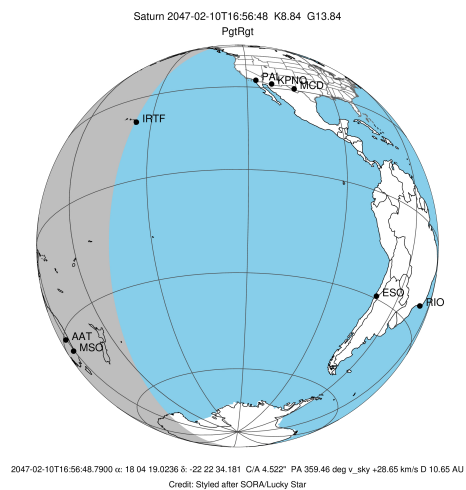
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-02-10T16:53:43.870  
 Event type : PgtRgt  
 : Saturn occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : AAT  
 Location : Siding Spring (AAT)  
 Latitude (deg) : -31.27703  
 E. Longitude (deg) : 149.06608  
 Altitude (km) : 1.164  
 Gaia source ID : 4069670461482190208  
 2Mass ID (if available) : 18041903-2222341  
 ICRS Star Coord at Epoch: 18h 04m 19.02362s -22:22:34.18140s  
 RUWE (>1.4 is poor) : 1.07  
 K magnitude : 8.842  
 G magnitude : 13.836  
 RP magnitude : 12.601  
 BP magnitude : 15.522  
 DUPflag : 0  
 Distance (au) : 10.647  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 28.65  
 Sun-Target sep (deg) : 50.22  
 Sun-Moon sep (deg) : 129.26  
 B (ring opening deg) : 26.41  
 PA of pole (deg) : 5.60  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 4.899  
 C/A sky separation (km) : 37832.3  
 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\_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	2047-02-10T15:40:47.690	-1.88x	-40.47	140461.00	-23.64			
A (OER)	I	2047-02-10T15:43:24.796	-1.38x	-40.22	136774.40	-23.28			
Encke (OEG)	I	2047-02-10T15:45:35.799	-0.97x	-40.00	133744.89	-22.96			
Encke (IEG)	I	2047-02-10T15:45:49.813	-0.92x	-39.97	133423.31	-22.93			
A (IER)	I	2047-02-10T15:54:21.799	0.72x	-39.08	122050.38	-21.43			
B (OER)	I	2047-02-10T15:57:54.416	1.40x	-38.68	117571.16	-20.69			
B (IER)	I	2047-02-10T16:22:57.765	6.32	-35.61	91984.69	-12.34			
Saturn	I	2047-02-10T16:26:42.793		7.06	-35.11	59922.95		-29.50	-34.66
Saturn	E	2047-02-10T17:20:37.840		18.01	-26.92	59697.83		-39.41	-45.02
B (IER)	E	2047-02-10T17:07:07.409	b	15.23	-29.12	91984.69	12.24		
B (OER)	E	2047-02-10T17:32:21.844		20.44	-24.94	117571.16	20.54		
A (IER)	E	2047-02-10T17:35:56.038		21.18	-24.32	122050.38	21.27		
Encke (IEG)	E	2047-02-10T17:44:32.090		22.98	-22.82	133423.31	22.74		
Encke (OEG)	E	2047-02-10T17:44:46.222		23.03	-22.78	133744.89	22.77		
A (OER)	E	2047-02-10T17:46:58.339		23.49	-22.39	136774.40	23.09		
F ring	E	2047-02-10T17:49:36.821		24.04	-21.92	140461.00	23.43		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2047-02-10T16:53:52.040  
 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 : 4069670461482190208  
 2Mass ID (if available) : 18041903-2222341  
 ICRS Star Coord at Epoch: 18h 04m 19.02362s -22:22:34.18140s  
 RUWE (>1.4 is poor) : 1.07  
 K magnitude : 8.842  
 G magnitude : 13.836  
 RP magnitude : 12.601  
 BP magnitude : 15.522  
 DUPflag : 0  
 Distance (au) : 10.647  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 28.65  
 Sun-Target sep (deg) : 50.22  
 Sun-Moon sep (deg) : 129.26  
 B (ring opening deg) : 26.41  
 PA of pole (deg) : 5.60  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 4.945  
 C/A sky separation (km) : 38185.3  
 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\_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	2047-02-10T15:41:09.408	0.02x	-36.84	140461.00	-23.52			
A (OER)	I	2047-02-10T15:43:47.360	0.50x	-36.61	136774.40	-23.15			
Encke (OEG)	I	2047-02-10T15:45:59.125	0.90x	-36.41	133744.89	-22.83			
Encke (IEG)	I	2047-02-10T15:46:13.225	0.94x	-36.38	133423.31	-22.79			
A (IER)	I	2047-02-10T15:54:48.840	2.52x	-35.56	122050.38	-21.26			
B (OER)	I	2047-02-10T15:58:23.349	3.18x	-35.20	117571.16	-20.49			
B (IER)	I	2047-02-10T16:23:58.120	7.98	-32.31	91984.69	-11.80			
Saturn	I	2047-02-10T16:27:01.385	8.57	-31.94	59915.16			-29.87	-35.06
Saturn	E	2047-02-10T17:20:35.313	19.01	-24.39	59688.85			-39.78	-45.40
B (IER)	E	2047-02-10T17:06:10.890	b	16.16	-26.58	91984.69	11.70		
B (OER)	E	2047-02-10T17:31:56.788		21.27	-22.59	117571.16	20.35		
A (IER)	E	2047-02-10T17:35:32.830		21.99	-22.01	122050.38	21.10		
Encke (IEG)	E	2047-02-10T17:44:12.379		23.72	-20.59	133423.31	22.61		
Encke (OEG)	E	2047-02-10T17:44:26.592		23.77	-20.55	133744.89	22.64		
A (OER)	E	2047-02-10T17:46:39.431		24.22	-20.19	136774.40	22.96		
F ring	E	2047-02-10T17:49:18.711		24.75	-19.74	140461.00	23.32		