

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2030-03-07T22:38:48.340
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 31196722588576128
 2Mass ID (if available) : 03111926+1542361

Saturn 2030-03-07T22:38:48 K6.22 G8.80 PgtRgt

ICRS Star Coord at Epoch: 03h 11m 19.24982s +15:42:35.64972s

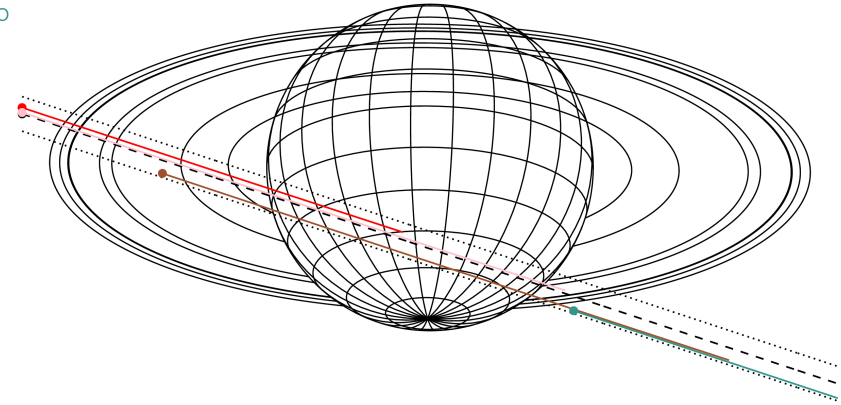
RUWE (>1.4 is poor) : 0.99
 K magnitude : 6.224
 G magnitude : 8.804
 RP magnitude : 8.027
 BP magnitude : 9.455
 DUPflag : 0
 Distance (au) : 9.523
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.38
 Sun-Target sep (deg) : 62.75
 Sun-Moon sep (deg) : 21.60
 B (ring opening deg) : -22.16
 PA of pole (deg) : -0.88

#	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



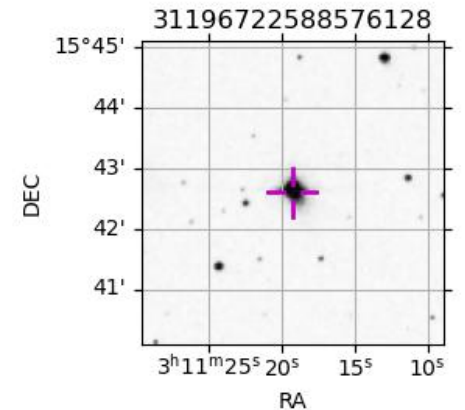
2030-03-07T22:38:48.3400 ex: 03 11 19.2498 8: +15 42 35.650 C/A 4.129° PA 341.70 deg v_sky +23.38 km/s D 09.52 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 TEN
 RIO
 ESO

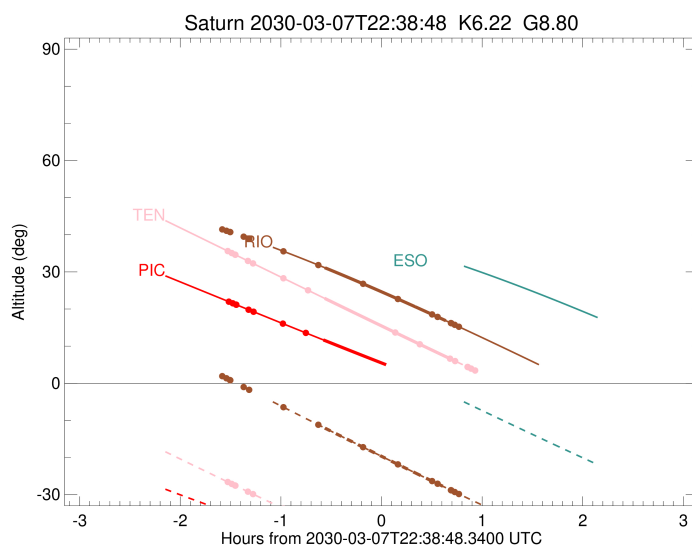
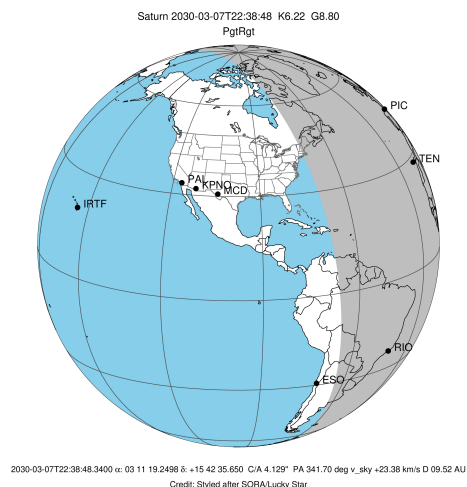


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1	+	+	+	MAR 07 21:07 - MAR 07 22:04	PinRin
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	+	+	+	MAR 07 21:07 - MAR 07 23:22	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8		+	+	MAR 07 21:40 - MAR 07 23:25	PieRie
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn

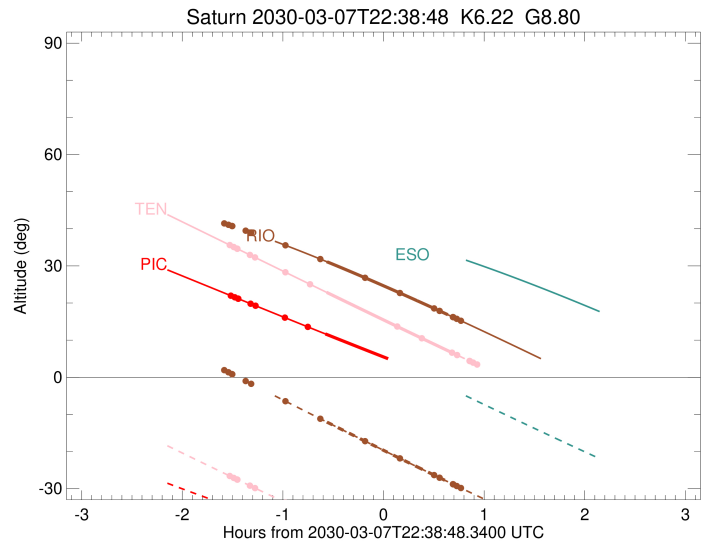
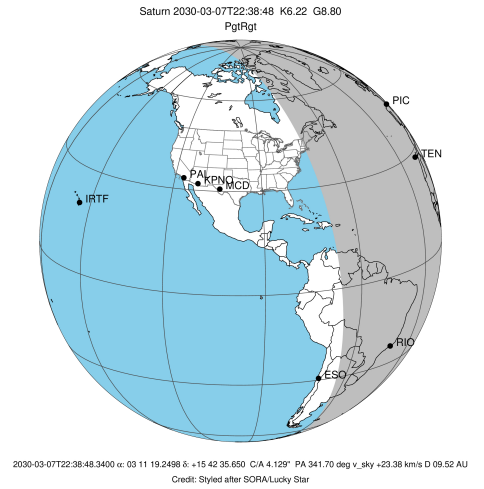


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2030-03-07T22:42:59.260
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 31196722588576128
 2Mass ID (if available) : 03111926+1542361
 ICRS Star Coord at Epoch: 03h 11m 19.24982s +15:42:35.64972s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 6.224
 G magnitude : 8.804
 RP magnitude : 8.027
 BP magnitude : 9.455
 DUPflag : 0
 Distance (au) : 9.523
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.38
 Sun-Target sep (deg) : 62.75
 Sun-Moon sep (deg) : 22.24
 B (ring opening deg) : -22.16
 PA of pole (deg) : -0.88
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 3.740
 C/A sky separation (km) : 25827.2
 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



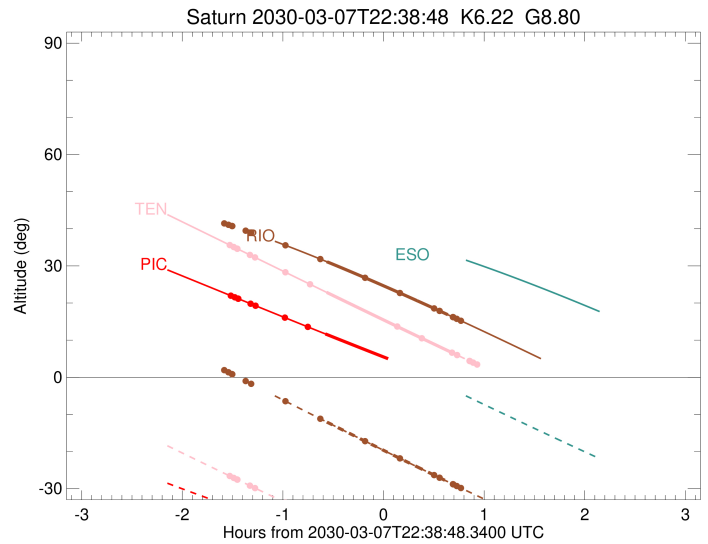
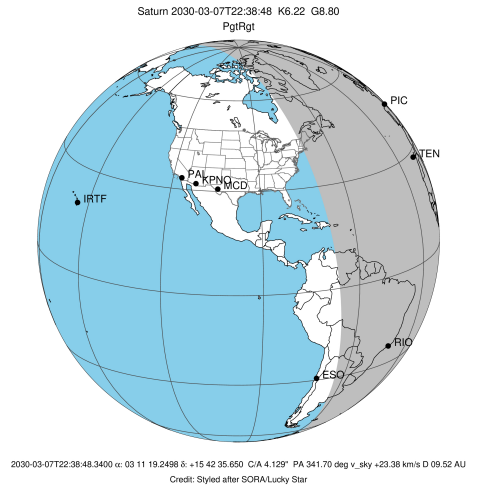
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2030-03-07T21:07:46.329		21.98	-34.80	140461.00	-26.41		
A (OER)	I	2030-03-07T21:10:06.254		21.55	-35.17	136774.40	-26.28		
Encke (OEG)	I	2030-03-07T21:12:01.783		21.19	-35.47	133744.89	-26.16		
Encke (IEG)	I	2030-03-07T21:12:14.077		21.16	-35.50	133423.31	-26.15		
A (IER)	I	2030-03-07T21:19:33.214		19.81	-36.64	122050.38	-25.62		
B (OER)	I	2030-03-07T21:22:28.901		19.27	-37.09	117571.16	-25.36		
B (IER)	I	2030-03-07T21:40:01.237		16.06	-39.71	91984.69	-22.97		
C (IER)	I	2030-03-07T21:53:42.768		13.57	-41.64	74490.58	-19.23		
Saturn	I	2030-03-07T22:04:09.492		11.67	-43.04	60251.41		-7.58	-9.29
Saturn	E	2030-03-07T23:21:25.468		-1.88x	-50.69	59895.42		-38.92	-44.52
C (IER)	E	2030-03-07T22:50:59.146	b	3.34x	-48.34	74490.58	19.17		
B (IER)	E	2030-03-07T23:04:41.905	b	0.97x	-49.52	91984.69	22.98		
B (OER)	E	2030-03-07T23:22:11.117		-2.01x	-50.74	117571.16	25.49		
A (IER)	E	2030-03-07T23:25:05.882		-2.50x	-50.91	122050.38	25.76		
Encke (IEG)	E	2030-03-07T23:32:22.342		-3.71x	-51.29	133423.31	26.33		
Encke (OEG)	E	2030-03-07T23:32:34.554		-3.75x	-51.30	133744.89	26.34		
A (OER)	E	2030-03-07T23:34:29.295		-4.06x	-51.39	136774.40	26.46		
F ring	E	2030-03-07T23:36:48.224		-4.45x	-51.49	140461.00	26.61		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2030-03-07T22:43:14.500
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 31196722588576128
 2Mass ID (if available) : 03111926+1542361
 ICRS Star Coord at Epoch: 03h 11m 19.24982s +15:42:35.64972s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 6.224
 G magnitude : 8.804
 RP magnitude : 8.027
 BP magnitude : 9.455
 DUPflag : 0
 Distance (au) : 9.523
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.38
 Sun-Target sep (deg) : 62.75
 Sun-Moon sep (deg) : 22.42
 B (ring opening deg) : -22.16
 PA of pole (deg) : -0.88
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.012
 C/A sky separation (km) : 27708.1
 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_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	2030-03-07T21:07:07.772		35.61	-26.59	140461.00	-25.94		
A (OER)	I	2030-03-07T21:09:30.283		35.09	-27.11	136774.40	-25.79		
Encke (OEG)	I	2030-03-07T21:11:28.053		34.65	-27.53	133744.89	-25.66		
Encke (IEG)	I	2030-03-07T21:11:40.591		34.61	-27.58	133423.31	-25.64		
A (IER)	I	2030-03-07T21:19:09.326		32.96	-29.20	122050.38	-25.02		
B (OER)	I	2030-03-07T21:22:09.411		32.29	-29.85	117571.16	-24.72		
B (IER)	I	2030-03-07T21:40:19.373		28.28	-33.76	91984.69	-21.88		
C (IER)	I	2030-03-07T21:55:01.840		25.04	-36.89	74490.58	-17.28		
Saturn	I	2030-03-07T22:04:53.783		22.87	-38.97	60242.65		-9.39	-11.48
Saturn	E	2030-03-07T23:21:09.546		6.31	-54.07	59866.69		-40.71	-46.33
C (IER)	E	2030-03-07T22:46:55.275	b	13.69	-47.56	74490.58	17.25		
B (IER)	E	2030-03-07T23:01:39.137	b	10.50	-50.43	91984.69	21.87		
B (OER)	E	2030-03-07T23:19:46.641	b	6.61	-53.82	117571.16	24.83		
A (IER)	E	2030-03-07T23:22:45.879		5.97	-54.36	122050.38	25.15		
Encke (IEG)	E	2030-03-07T23:30:12.099		4.38x	-55.68	133423.31	25.80		
Encke (OEG)	E	2030-03-07T23:30:24.560		4.34x	-55.72	133744.89	25.82		
A (OER)	E	2030-03-07T23:32:21.579		3.92x	-56.06	136774.40	25.96		
F ring	E	2030-03-07T23:34:43.138		3.42x	-56.46	140461.00	26.12		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2030-03-07T22:41:19.680
 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 : 31196722588576128
 2Mass ID (if available) : 03111926+1542361
 ICRS Star Coord at Epoch: 03h 11m 19.24982s +15:42:35.64972s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 6.224
 G magnitude : 8.804
 RP magnitude : 8.027
 BP magnitude : 9.455
 DUPflag : 0
 Distance (au) : 9.523
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 23.38
 Sun-Target sep (deg) : 62.75
 Sun-Moon sep (deg) : 22.38
 B (ring opening deg) : -22.16
 PA of pole (deg) : -0.88
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 4.799
 C/A sky separation (km) : 33142.9
 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_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	2030-03-07T21:03:50.722		41.45	1.92x	140461.00	-24.68		
A (OER)	I	2030-03-07T21:06:20.815		41.07	1.34x	136774.40	-24.45		
Encke (OEG)	I	2030-03-07T21:08:25.263		40.76	0.86x	133744.89	-24.24		
Encke (IEG)	I	2030-03-07T21:08:38.536		40.73	0.81x	133423.31	-24.22		
A (IER)	I	2030-03-07T21:16:37.068		39.49	-1.02x	122050.38	-23.27		
B (OER)	I	2030-03-07T21:19:51.424		38.97	-1.76x	117571.16	-22.81		
B (IER)	I	2030-03-07T21:40:21.357		35.55	-6.45	91984.69	-18.23		
C (IER)	I	2030-03-07T22:01:08.984		31.84	-11.19	74490.58	-8.81		
Saturn	I	2030-03-07T22:05:01.877		31.12	-12.07	60206.15		-14.77	-17.93
Saturn	E	2030-03-07T23:17:09.689		16.85	-28.14	59779.70		-46.07	-51.60
C (IER)	E	2030-03-07T22:27:46.589	b	26.81	-17.20	74490.58	8.83		
B (IER)	E	2030-03-07T22:48:33.853	b	22.70	-21.84	91984.69	18.20		
B (OER)	E	2030-03-07T23:09:04.980	b	18.53	-26.37	117571.16	22.82		
A (IER)	E	2030-03-07T23:12:19.178	b	17.86	-27.08	122050.38	23.30		
Encke (IEG)	E	2030-03-07T23:20:16.915		16.20	-28.82	133423.31	24.27		
Encke (OEG)	E	2030-03-07T23:20:30.158		16.16	-28.86	133744.89	24.29		
A (OER)	E	2030-03-07T23:22:34.311		15.72	-29.31	136774.40	24.51		
F ring	E	2030-03-07T23:25:04.009		15.20	-29.85	140461.00	24.74		