

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-11-28T00:33:18.580
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3377150793646825472
 2Mass ID (if available) : 06225571+2219572

Saturn 2032-11-28T00:33:18 K9.41 G12.03 PgtRgt

ICRS Star Coord at Epoch: 06h 22m 55.70205s +22:19:57.18088s

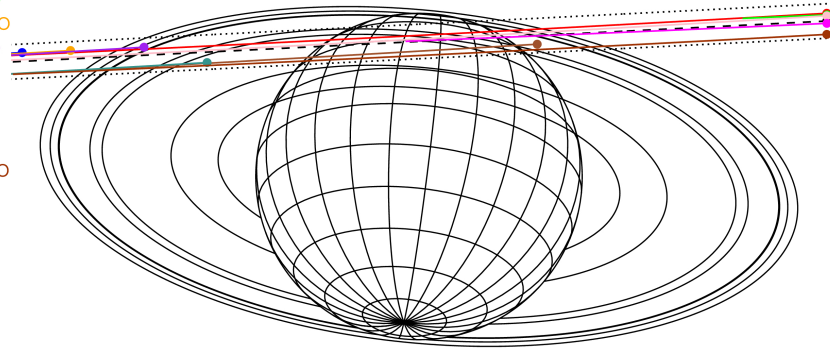
RUWE (>1.4 is poor) : 1.26
 K magnitude : 9.414
 G magnitude : 12.028
 RP magnitude : 11.227
 BP magnitude : 12.708
 DUPflag : 0
 Distance (au) : 8.143
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.28
 Sun-Target sep (deg) : 150.55
 Sun-Moon sep (deg) : 93.95
 B (ring opening deg) : -25.94
 PA of pole (deg) : -5.93

#	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



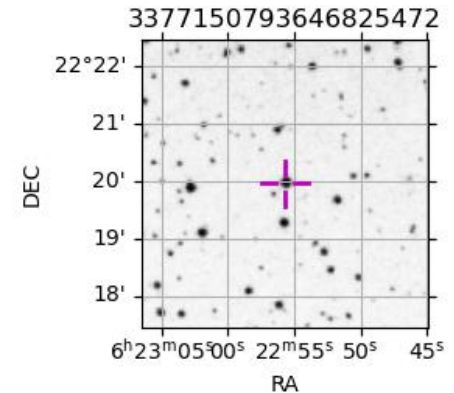
2032-11-28T00:33:18.5800 α: 06 22 55.7021 δ: +22 19 57.181 C/A 8.431° PA 182.87 deg v_sky -16.28 km/s D 08.14 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PAL
 PMO
 KPNO
 MCD
 TEN
 KAV
 RIO
 ESO
 SAAO

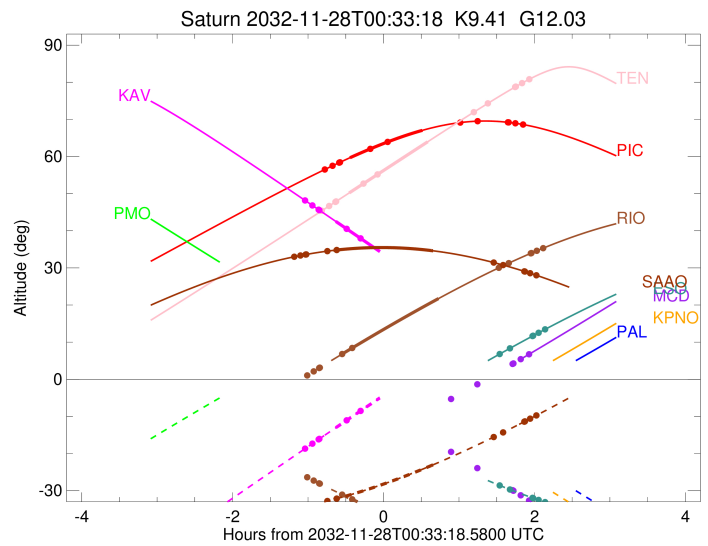
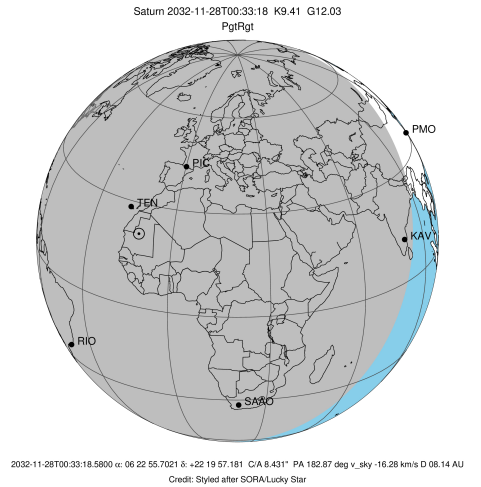


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+	+	+	NOV 27 23:46 - NOV 28 02:24	PieRie
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			+	NOV 28 02:22 - NOV 28 02:29	PnnRne
TEN	Teide Obs./Ten	28.3	343.5	+	+	+	NOV 27 23:44 - NOV 28 02:29	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8	+	+		NOV 27 23:30 - NOV 27 23:55	PinRin
RIO	Rio de Janeiro	-22.9	316.8		+	+	NOV 28 00:00 - NOV 28 02:40	PieRie
ESO	European South	-29.3	289.3			+	NOV 28 02:05 - NOV 28 02:41	PnnRne
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8	+	+	+	NOV 27 23:22 - NOV 28 02:34	PieRie
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



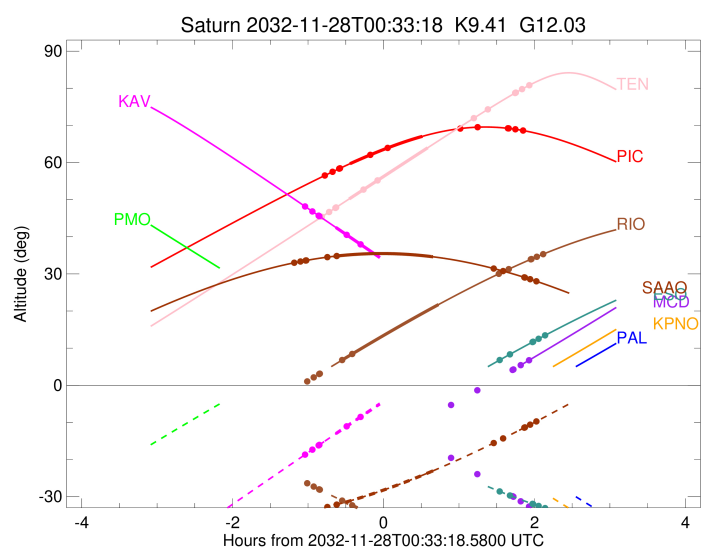
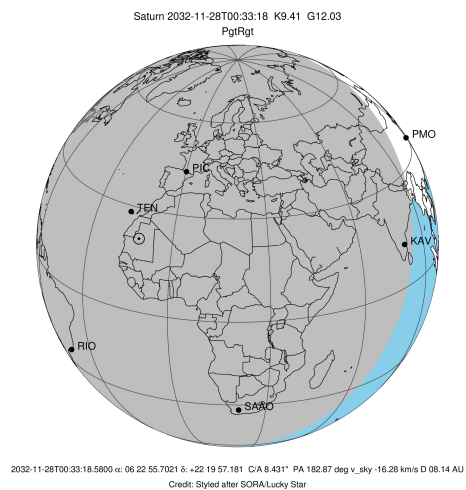
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-11-28T00:35:08.680
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3377150793646825472
 2Mass ID (if available) : 06225571+2219572
 ICRS Star Coord at Epoch: 06h 22m 55.70205s +22:19:57.18088s
 RUWE (>1.4 is poor) : 1.26
 K magnitude : 9.414
 G magnitude : 12.028
 RP magnitude : 11.227
 BP magnitude : 12.708
 DUPflag : 0
 Distance (au) : 8.143
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.28
 Sun-Target sep (deg) : 150.55
 Sun-Moon sep (deg) : 94.74
 B (ring opening deg) : -25.94
 PA of pole (deg) : -5.93
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.811
 C/A sky separation (km) : 52037.7
 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_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	2032-11-27T23:46:39.337		56.51	-68.61	140461.00	-10.28		
A (OER)	I	2032-11-27T23:52:47.598		57.50	-68.58	136774.40	-9.74		
Encke (OEG)	I	2032-11-27T23:58:06.966		58.35	-68.49	133744.89	-9.23		
Encke (IEG)	I	2032-11-27T23:58:41.915		58.44	-68.48	133423.31	-9.17		
A (IER)	I	2032-11-28T00:22:49.412	b	62.06	-67.36	122050.38	-6.42		
B (OER)	I	2032-11-28T00:36:22.636	b	63.90	-66.29	117571.16	-4.56		
Saturn	I	2032-11-28T00:06:35.727		59.67	-68.24	59306.88		57.82	62.55
Saturn	E	2032-11-28T01:04:14.755		67.06	-63.26	59588.95		45.14	50.70
B (OER)	E	2032-11-28T01:34:52.697		69.17	-59.02	117571.16	4.57		
A (IER)	E	2032-11-28T01:48:23.247		69.53	-56.94	122050.38	6.44		
Encke (IEG)	E	2032-11-28T02:12:25.711		69.21	-53.01	133423.31	9.20		
Encke (OEG)	E	2032-11-28T02:13:00.547		69.19	-52.92	133744.89	9.26		
A (OER)	E	2032-11-28T02:18:18.914		68.95	-52.02	136774.40	9.77		
F ring	E	2032-11-28T02:24:26.077		68.61	-50.97	140461.00	10.31		

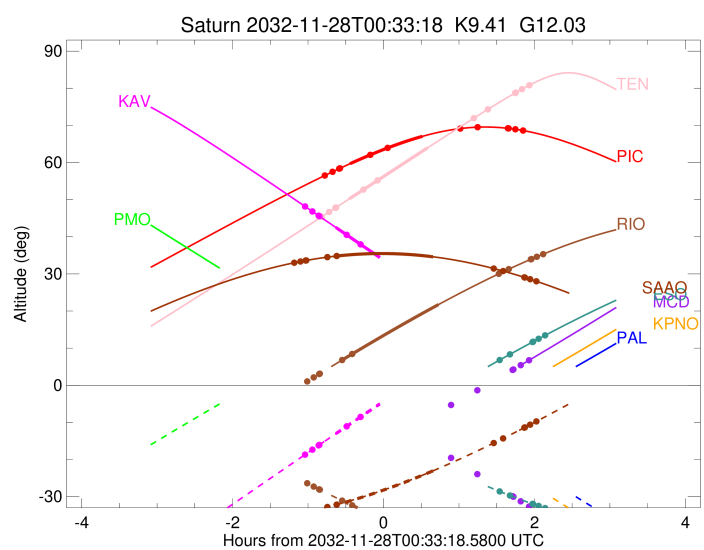
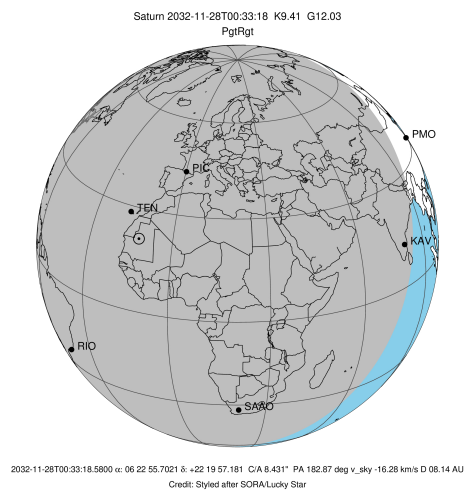
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-11-28T00:38:42.880
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3377150793646825472
 2Mass ID (if available) : 06225571+2219572
 ICRS Star Coord at Epoch: 06h 22m 55.70205s +22:19:57.18088s
 RUWE (>1.4 is poor) : 1.26
 K magnitude : 9.414
 G magnitude : 12.028
 RP magnitude : 11.227
 BP magnitude : 12.708
 DUPflag : 0
 Distance (au) : 8.143
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.28
 Sun-Target sep (deg) : 150.55
 Sun-Moon sep (deg) : 93.67
 B (ring opening deg) : -25.94
 PA of pole (deg) : -5.93
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 9.089
 C/A sky separation (km) : 53678.0
 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	2032-11-27T23:55:11.615		-21.16x	-0.88x	140461.00	-9.38		
A (OER)	I	2032-11-28T00:01:57.068		-20.11x	-2.20x	136774.40	-8.80		
Encke (OEG)	I	2032-11-28T00:07:52.247		-19.17x	-3.38x	133744.89	-8.25		
Encke (IEG)	I	2032-11-28T00:08:31.358		-19.07x	-3.51x	133423.31	-8.19		
A (IER)	I	2032-11-28T00:36:53.968	b	-14.35x	-9.21	122050.38	-5.02		
B (OER)	I	2032-11-28T00:57:13.904	b	-10.78x	-13.37	117571.17	-2.26		
Saturn	I	2032-11-28T00:12:37.042		-18.41x	-4.32x	59264.40		59.92	64.44
Saturn	E	2032-11-28T01:05:23.407		-9.31x	-15.05	59533.67		47.54	53.01
B (OER)	E	2032-11-28T01:28:03.259		-5.12x	-19.77	117571.17	2.27		
A (IER)	E	2032-11-28T01:48:12.896		-1.29x	-24.00	122050.38	5.08		
Encke (IEG)	E	2032-11-28T02:16:09.360		4.17x	-29.93	133423.31	8.35		
Encke (OEG)	E	2032-11-28T02:16:47.738		4.30x	-30.06	133744.89	8.41		
A (OER)	E	2032-11-28T02:22:36.012		5.45	-31.30	136774.40	8.98		
F ring	E	2032-11-28T02:29:13.053		6.77	-32.71	140461.00	9.58		

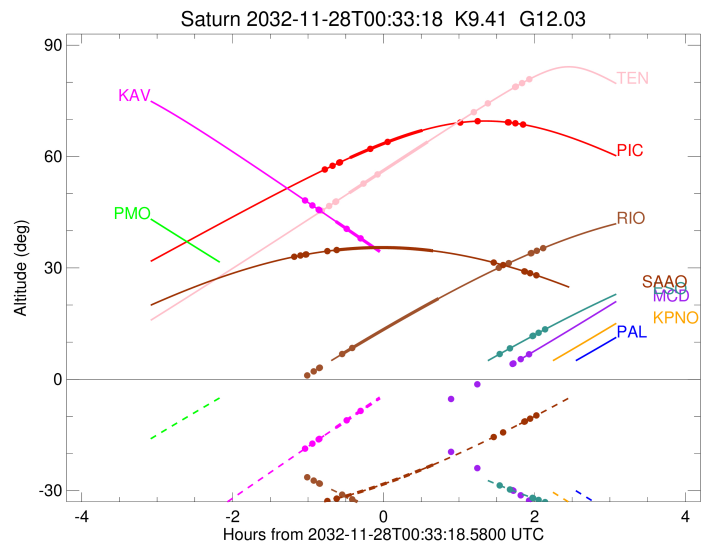
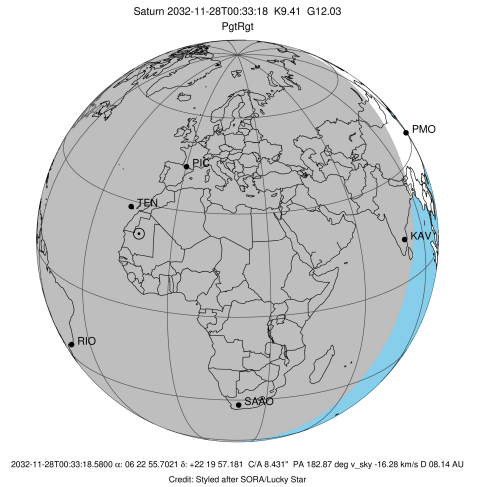
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-11-28T00:36:58.530
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 3377150793646825472
 2Mass ID (if available) : 06225571+2219572
 ICRS Star Coord at Epoch: 06h 22m 55.70205s +22:19:57.18088s
 RUWE (>1.4 is poor) : 1.26
 K magnitude : 9.414
 G magnitude : 12.028
 RP magnitude : 11.227
 BP magnitude : 12.708
 DUPflag : 0
 Distance (au) : 8.143
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.28
 Sun-Target sep (deg) : 150.55
 Sun-Moon sep (deg) : 94.66
 B (ring opening deg) : -25.94
 PA of pole (deg) : -5.93
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.580
 C/A sky separation (km) : 50672.7
 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_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	2032-11-27T23:44:16.608		45.39	-72.83	140461.00	-10.80		
A (OER)	I	2032-11-27T23:50:05.552		46.68	-74.03	136774.40	-10.32		
Encke (OEG)	I	2032-11-27T23:55:05.562		47.78	-75.04	133744.89	-9.87		
Encke (IEG)	I	2032-11-27T23:55:38.223		47.90	-75.15	133423.31	-9.82		
A (IER)	I	2032-11-28T00:17:25.614	b	52.72	-79.31	122050.38	-7.47		
B (OER)	I	2032-11-28T00:28:27.239	b	55.15	-81.10	117571.16	-6.04		
Saturn	I	2032-11-28T00:06:00.079		50.19	-77.20	59338.14		56.32	61.19
Saturn	E	2032-11-28T01:08:27.452		63.98	-82.47	59641.00		42.90	48.50
B (OER)	E	2032-11-28T01:45:31.557		72.04	-76.49	117571.16	6.08		
A (IER)	E	2032-11-28T01:56:28.893		74.36	-74.29	122050.38	7.52		
Encke (IEG)	E	2032-11-28T02:18:06.739		78.76	-69.76	133423.31	9.90		
Encke (OEG)	E	2032-11-28T02:18:39.150		78.86	-69.65	133744.89	9.95		
A (OER)	E	2032-11-28T02:23:36.829		79.80	-68.59	136774.40	10.40		
F ring	E	2032-11-28T02:29:22.995		80.85	-67.35	140461.00	10.89		

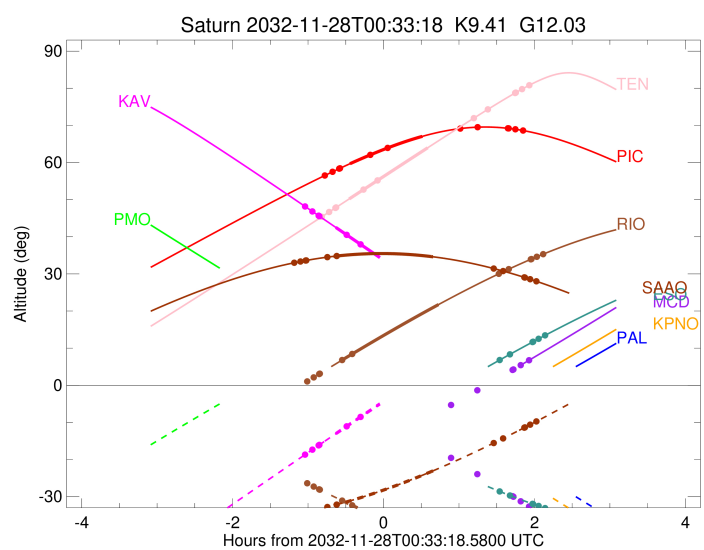
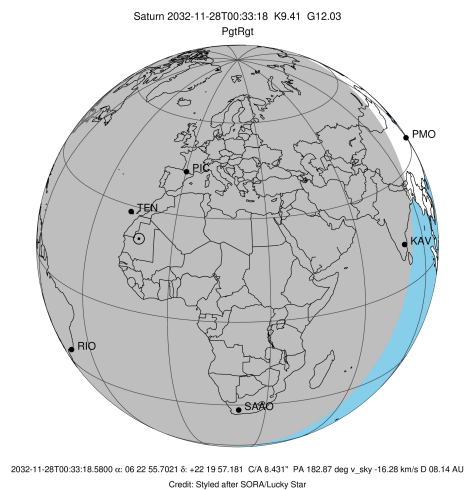
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-11-28T00:27:29.090
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 3377150793646825472
 2Mass ID (if available) : 06225571+2219572
 ICRS Star Coord at Epoch: 06h 22m 55.70205s +22:19:57.18088s
 RUWE (>1.4 is poor) : 1.26
 K magnitude : 9.414
 G magnitude : 12.028
 RP magnitude : 11.227
 BP magnitude : 12.708
 DUPflag : 0
 Distance (au) : 8.143
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.28
 Sun-Target sep (deg) : 150.55
 Sun-Moon sep (deg) : 94.51
 B (ring opening deg) : -25.94
 PA of pole (deg) : -5.93
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.477
 C/A sky separation (km) : 50065.2
 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

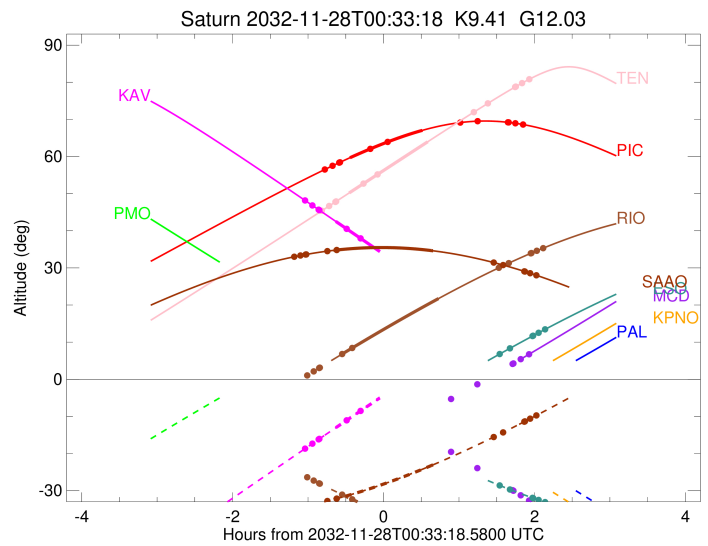
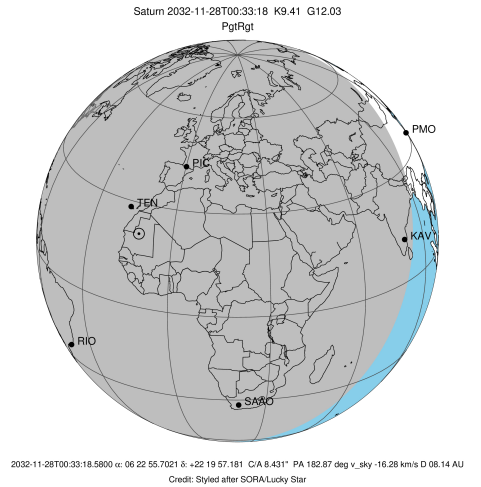
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2032-11-27T23:30:57.609		48.17	-18.68	140461.00	-10.81		
A (OER)	I	2032-11-27T23:36:46.331		46.83	-17.34	136774.40	-10.33		
Encke (OEG)	I	2032-11-27T23:41:46.116		45.67	-16.19	133744.89	-9.88		
Encke (IEG)	I	2032-11-27T23:42:18.747		45.55	-16.06	133423.31	-9.83		
A (IER)	I	2032-11-28T00:04:02.456	b	40.52	-11.06	122050.38	-7.52		
B (OER)	I	2032-11-28T00:14:57.216	b	37.99	-8.55	117571.16	-6.14		
Saturn	I	2032-11-27T23:55:21.908		42.53	-13.05	59364.53		55.08	60.06
Saturn	E	2032-11-28T01:00:13.790		27.49	1.75x	59646.89		42.65	48.25
B (OER)	E	2032-11-28T01:36:02.980		19.20	9.77x	117571.16	6.10		
A (IER)	E	2032-11-28T01:47:02.981		16.67	12.20x	122050.38	7.45		
Encke (IEG)	E	2032-11-28T02:09:03.120		11.61	17.01x	133423.31	9.68		
Encke (OEG)	E	2032-11-28T02:09:36.268		11.49	17.13x	133744.89	9.73		
A (OER)	E	2032-11-28T02:14:41.027		10.32	18.23x	136774.40	10.15		
F ring	E	2032-11-28T02:20:36.056		8.97	19.50x	140461.00	10.61		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-11-28T00:38:49.700
 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 : 3377150793646825472
 2Mass ID (if available) : 06225571+2219572
 ICRS Star Coord at Epoch: 06h 22m 55.70205s +22:19:57.18088s
 RUWE (>1.4 is poor) : 1.26
 K magnitude : 9.414
 G magnitude : 12.028
 RP magnitude : 11.227
 BP magnitude : 12.708
 DUPflag : 0
 Distance (au) : 8.143
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.28
 Sun-Target sep (deg) : 150.55
 Sun-Moon sep (deg) : 94.11
 B (ring opening deg) : -25.94
 PA of pole (deg) : -5.93
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.824
 C/A sky separation (km) : 46204.0
 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	2032-11-27T23:32:41.272		1.04x	-26.40	140461.00	-12.08		
A (OER)	I	2032-11-27T23:37:50.712		2.12x	-27.30	136774.40	-11.74		
Encke (OEG)	I	2032-11-27T23:42:12.228		3.03x	-28.05	133744.89	-11.43		
Encke (IEG)	I	2032-11-27T23:42:40.417		3.13x	-28.13	133423.31	-11.39		
A (IER)	I	2032-11-28T00:00:27.791		6.80	-31.08	122050.38	-9.85		
B (OER)	I	2032-11-28T00:08:22.225	b	8.42	-32.34	117571.16	-9.02		
Saturn	I	2032-11-28T00:00:57.745		6.91	-31.16	59446.69		51.35	56.61
Saturn	E	2032-11-28T01:17:04.580		21.75	-41.39	59787.36		36.51	42.06
B (OER)	E	2032-11-28T02:05:14.134		30.06	-45.03	117571.16	9.14		
A (IER)	E	2032-11-28T02:13:02.025		31.30	-45.36	122050.38	9.99		
Encke (IEG)	E	2032-11-28T02:30:33.031		33.94	-45.80	133423.31	11.58		
Encke (OEG)	E	2032-11-28T02:31:00.754		34.01	-45.81	133744.89	11.62		
A (OER)	E	2032-11-28T02:35:17.870		34.62	-45.85	136774.40	11.94		
F ring	E	2032-11-28T02:40:21.901		35.33	-45.87	140461.00	12.30		

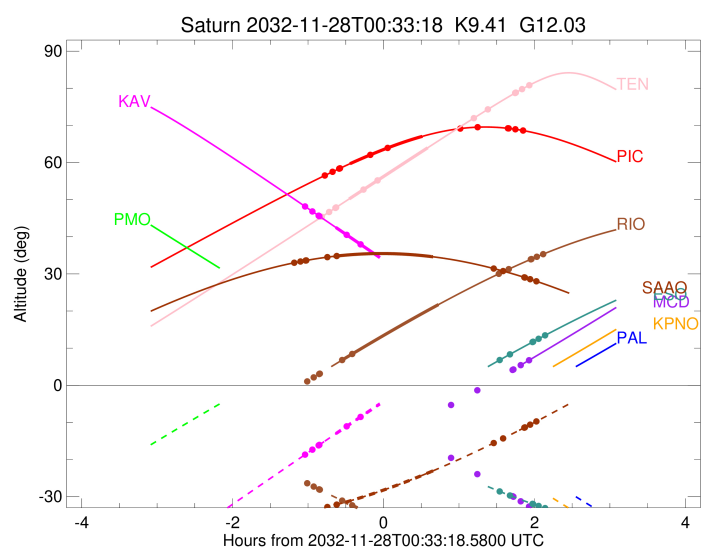
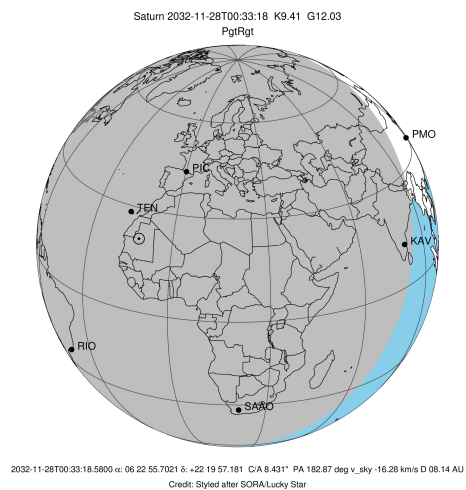
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-11-28T00:39:17.810
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 3377150793646825472
 2Mass ID (if available) : 06225571+2219572
 ICRS Star Coord at Epoch: 06h 22m 55.70205s +22:19:57.18088s
 RUWE (>1.4 is poor) : 1.26
 K magnitude : 9.414
 G magnitude : 12.028
 RP magnitude : 11.227
 BP magnitude : 12.708
 DUPflag : 0
 Distance (au) : 8.143
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.28
 Sun-Target sep (deg) : 150.55
 Sun-Moon sep (deg) : 93.72
 B (ring opening deg) : -25.94
 PA of pole (deg) : -5.93
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.895
 C/A sky separation (km) : 46623.4
 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	2032-11-27T23:33:35.509		-24.15x	-2.47x	140461.00	-11.81		
A (OER)	I	2032-11-27T23:38:52.154		-23.03x	-3.50x	136774.40	-11.47		
Encke (OEG)	I	2032-11-27T23:43:20.017		-22.08x	-4.37x	133744.89	-11.15		
Encke (IEG)	I	2032-11-27T23:43:48.905		-21.97x	-4.46x	133423.31	-11.11		
A (IER)	I	2032-11-28T00:02:05.863	b	-18.11x	-7.96	122050.38	-9.55		
B (OER)	I	2032-11-28T00:10:16.283	b	-16.39x	-9.50	117571.16	-8.70		
Saturn	I	2032-11-28T00:01:30.567		-18.23x	-7.85	59435.27		51.86	57.09
Saturn	E	2032-11-28T01:17:28.110		-2.60x	-21.33	59776.99		36.97	42.53
B (OER)	E	2032-11-28T02:05:56.257		6.84	-28.63	117571.16	8.85		
A (IER)	E	2032-11-28T02:13:58.176		8.35	-29.71	122050.38	9.72		
Encke (IEG)	E	2032-11-28T02:31:53.587		11.66	-31.96	133423.31	11.36		
Encke (OEG)	E	2032-11-28T02:32:21.859		11.75	-32.01	133744.89	11.39		
A (OER)	E	2032-11-28T02:36:43.884		12.54	-32.52	136774.40	11.73		
F ring	E	2032-11-28T02:41:53.339		13.46	-33.11	140461.00	12.09		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2032-11-28T00:32:56.230
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 3377150793646825472
 2Mass ID (if available) : 06225571+2219572
 ICRS Star Coord at Epoch: 06h 22m 55.70205s +22:19:57.18088s
 RUWE (>1.4 is poor) : 1.26
 K magnitude : 9.414
 G magnitude : 12.028
 RP magnitude : 11.227
 BP magnitude : 12.708
 DUPflag : 0
 Distance (au) : 8.143
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.28
 Sun-Target sep (deg) : 150.55
 Sun-Moon sep (deg) : 94.48
 B (ring opening deg) : -25.94
 PA of pole (deg) : -5.93
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.555
 C/A sky separation (km) : 44615.2
 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	2032-11-27T23:22:22.743		33.00	-34.69	140461.00	-12.62		
A (OER)	I	2032-11-27T23:27:18.723		33.34	-34.39	136774.40	-12.29		
Encke (OEG)	I	2032-11-27T23:31:28.164		33.60	-34.11	133744.89	-12.00		
Encke (IEG)	I	2032-11-27T23:31:55.007		33.63	-34.08	133423.31	-11.96		
A (IER)	I	2032-11-27T23:48:43.048		34.52	-32.79	122050.38	-10.54		
B (OER)	I	2032-11-27T23:56:03.536	b	34.82	-32.15	117571.16	-9.79		
Saturn	I	2032-11-27T23:53:37.049		34.72	-32.37	59495.37		49.20	54.59
Saturn	E	2032-11-28T01:12:44.130		34.61	-23.04	59821.58		34.97	40.46
B (OER)	E	2032-11-28T02:01:10.458		31.42	-15.53	117571.16	9.78		
A (IER)	E	2032-11-28T02:08:31.611		30.75	-14.30	122050.38	10.52		
Encke (IEG)	E	2032-11-28T02:25:22.479		29.06	-11.41	133423.31	11.92		
Encke (OEG)	E	2032-11-28T02:25:49.420		29.01	-11.33	133744.89	11.95		
A (OER)	E	2032-11-28T02:29:59.811		28.56	-10.60	136774.40	12.24		
F ring	E	2032-11-28T02:34:57.028		28.00	-9.72	140461.00	12.56		