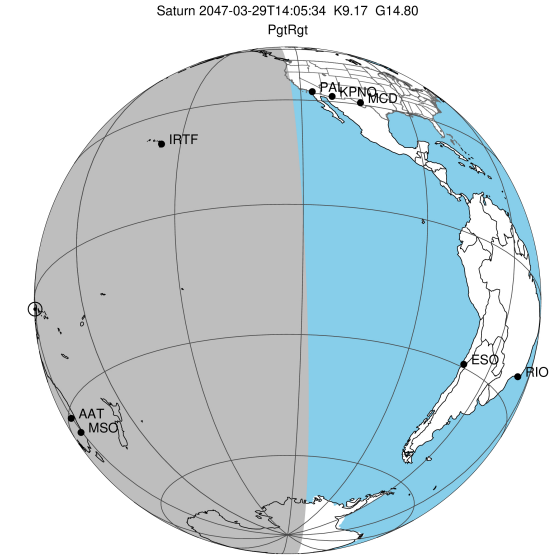


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-29T14:05:34.500
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4090524275738786176
 2Mass ID (if available) : 18161721-2218192

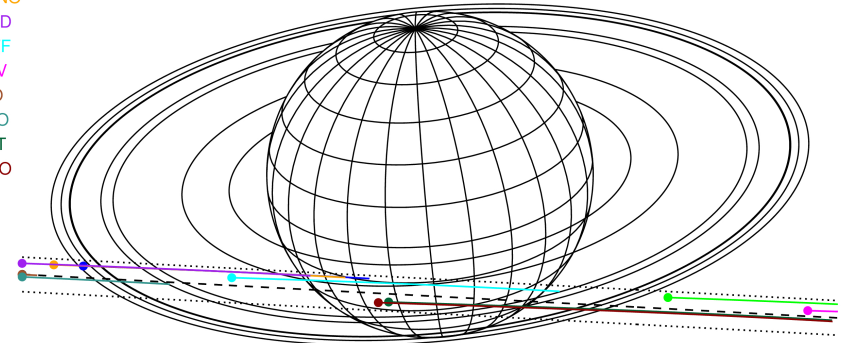
Saturn 2047-03-29T14:05:34 K9.17 G14.80 PgtRgt

ICRS Star Coord at Epoch: 18h 16m 17.20769s -22:18:19.47598s

RUWE (>1.4 is poor) : 0.96
 K magnitude : 9.171
 G magnitude : 14.795
 RP magnitude : 13.399
 BP magnitude : 17.236
 DUPflag : 0
 Distance (au) : 9.920
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.30
 Sun-Target sep (deg) : 94.38
 Sun-Moon sep (deg) : 127.86
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.82



Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 RIO
 ESO
 AAT
 MSO

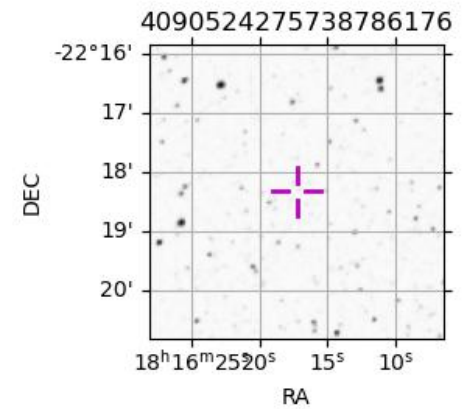


2047-03-29T14:05:34.5000 α: 18 16 17.2077 δ: -22 18 19.476 C/A 6.232° PA 356.95 deg v_sky + 7.30 km/s D 09.92 AU
 Credit: Styled after SORA/Lucky Star

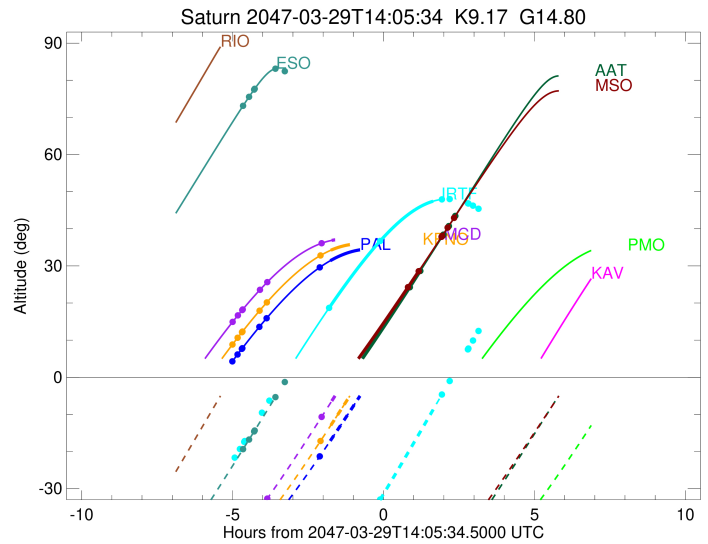
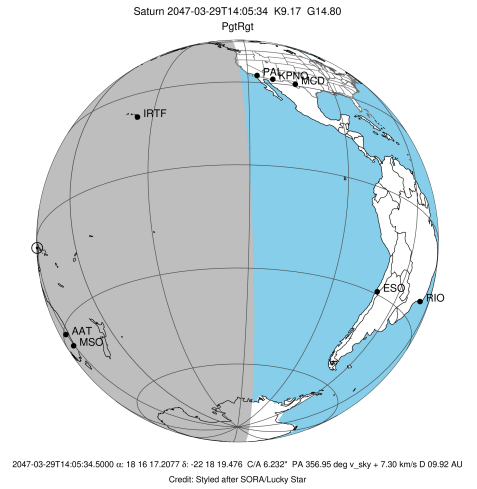
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1	+ + + + +	+		MAR 29 09:15 - MAR 29 12:19	PinRin
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+ + + + +	+		MAR 29 09:05 - MAR 29 12:20	PinRin
MCD	McDonald Obs.	30.7	256.0	+ + + + +	+		MAR 29 09:05 - MAR 29 12:22	PinRin
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+ +		MAR 29 12:15 - MAR 29 15:44	PieRnn
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3	+ + + + +			MAR 29 09:26 - MAR 29 10:30	PnnRin
AAT	Siding Spring	-31.3	149.1		+	+ + + + +	MAR 29 15:17 - MAR 29 16:28	PneRne
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0		+	+ + + + +	MAR 29 15:16 - MAR 29 16:25	PneRne

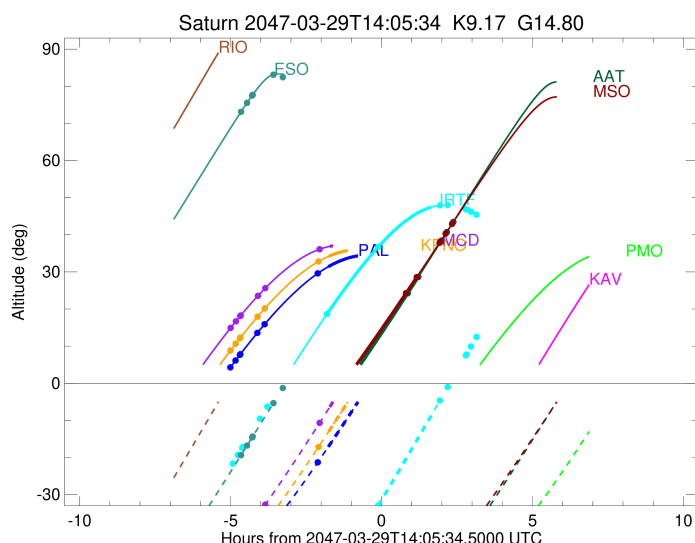
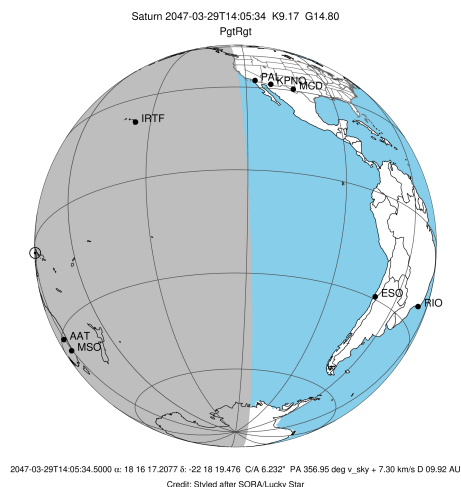


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-29T14:07:14.480
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 4090524275738786176
 2Mass ID (if available) : 18161721-2218192
 ICRS Star Coord at Epoch: 18h 16m 17.20769s -22:18:19.47598s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 9.171
 G magnitude : 14.795
 RP magnitude : 13.399
 BP magnitude : 17.236
 DUPflag : 0
 Distance (au) : 9.919
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.30
 Sun-Target sep (deg) : 94.38
 Sun-Moon sep (deg) : 128.38
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.510
 C/A sky separation (km) : 39641.4
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-03-29T09:05:02.065		4.26x	-49.55	140461.00	-6.04		
A (OER)	I	2047-03-29T09:15:18.345		6.11	-48.46	136774.40	-5.93		
Encke (OEG)	I	2047-03-29T09:23:53.871		7.64	-47.46	133744.89	-5.83		
Encke (IEG)	I	2047-03-29T09:24:49.113		7.80	-47.35	133423.31	-5.82		
A (IER)	I	2047-03-29T09:58:40.474		13.55	-42.74	122050.38	-5.37		
B (OER)	I	2047-03-29T10:12:52.659		15.84	-40.55	117571.16	-5.14		
B (IER)	I	2047-03-29T11:58:35.660		29.57	-21.35	91984.69	-2.65		
Saturn	I	2047-03-29T12:19:35.750		31.38	-17.16	59946.15		-28.88	-33.98
Saturn	E	2047-03-29T15:54:00.167		25.82	27.22x	59598.81		-44.39	-49.96
B (IER)	E	2047-03-29T14:25:37.133	b	33.42	8.93x	91984.69	2.62		
B (OER)	E	2047-03-29T16:12:19.338		23.51	30.90x	117571.16	5.09		
A (IER)	E	2047-03-29T16:26:40.260		21.56	33.74x	122050.38	5.31		
Encke (IEG)	E	2047-03-29T17:00:54.406		16.48	40.30x	133423.31	5.75		
Encke (OEG)	E	2047-03-29T17:01:50.314		16.34	40.48x	133744.89	5.76		
A (OER)	E	2047-03-29T17:10:32.181		14.96	42.08x	136774.40	5.85		
F ring	E	2047-03-29T17:20:56.367		13.26	43.96x	140461.00	5.96		

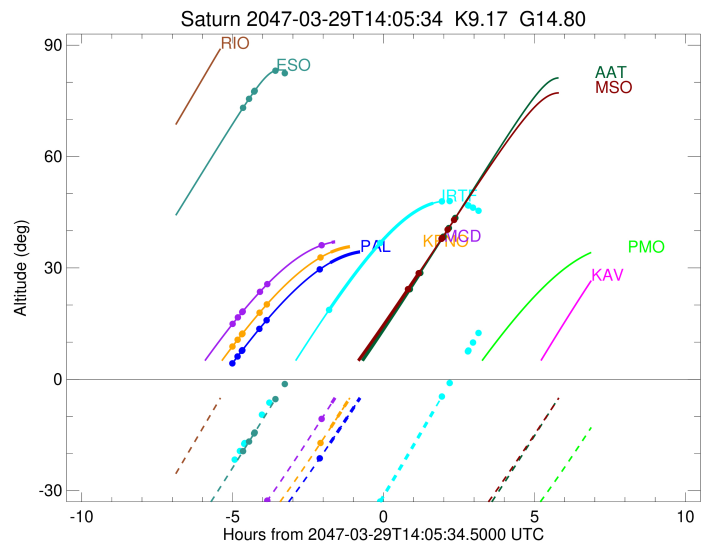
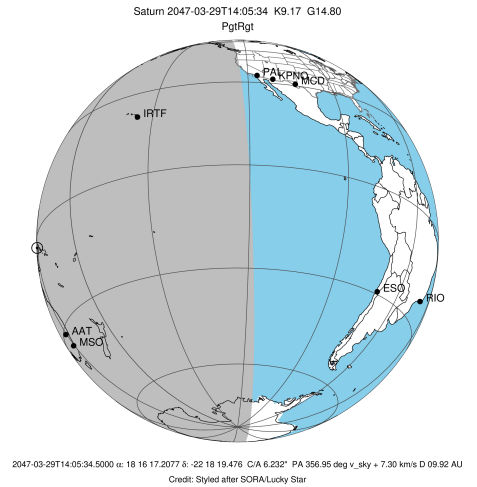
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-29T14:08:13.620
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 4090524275738786176
 2Mass ID (if available) : 18161721-2218192
 ICRS Star Coord at Epoch: 18h 16m 17.20769s -22:18:19.47598s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 9.171
 G magnitude : 14.795
 RP magnitude : 13.399
 BP magnitude : 17.236
 DUPflag : 0
 Distance (au) : 9.919
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.30
 Sun-Target sep (deg) : 94.38
 Sun-Moon sep (deg) : 128.42
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.531
 C/A sky separation (km) : 39794.8
 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

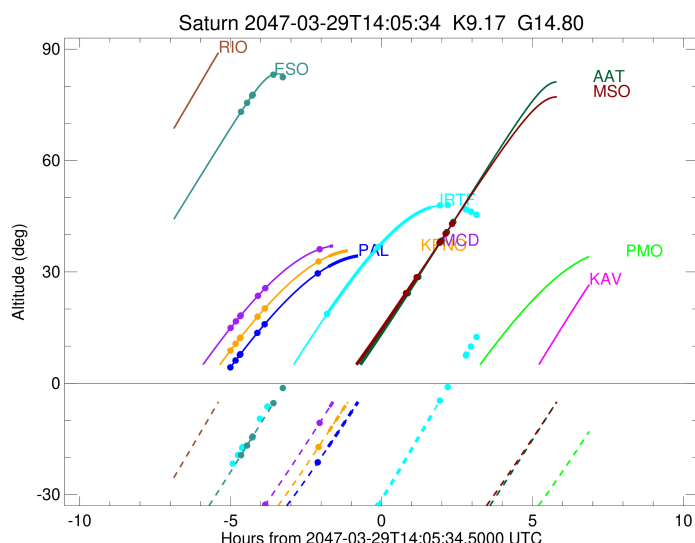
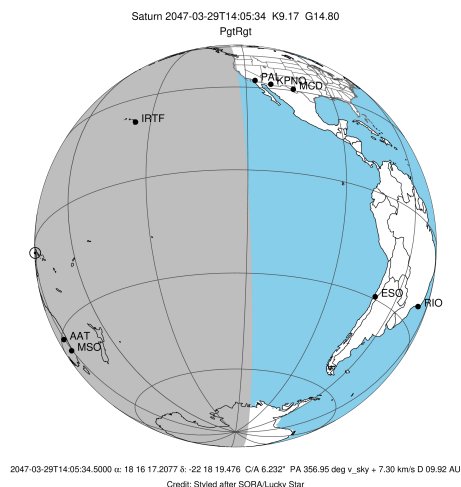
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-03-29T09:05:11.067		8.80	-48.30	140461.00	-6.01		
A (OER)	I	2047-03-29T09:15:30.314		10.62	-46.93	136774.40	-5.90		
Encke (OEG)	I	2047-03-29T09:24:08.362		12.12	-45.72	133744.89	-5.80		
Encke (IEG)	I	2047-03-29T09:25:03.877		12.28	-45.59	133423.31	-5.79		
A (IER)	I	2047-03-29T09:59:05.669		17.91	-40.25	122050.38	-5.34		
B (OER)	I	2047-03-29T10:13:22.552		20.12	-37.80	117571.16	-5.11		
B (IER)	I	2047-03-29T12:00:05.596		32.79	-17.23	91984.69	-2.60		
Saturn	I	2047-03-29T12:20:47.389		34.21	-12.96	59944.82		-28.95	-34.06
Saturn	E	2047-03-29T15:54:30.510		24.16	31.97x	59593.05		-44.63	-50.20
B (IER)	E	2047-03-29T14:24:22.990	b	33.62	13.17x	91984.69	2.58		
B (OER)	E	2047-03-29T16:11:39.362		21.73	35.42x	117571.16	5.09		
A (IER)	E	2047-03-29T16:26:00.192		19.58	38.25x	122050.38	5.31		
Encke (IEG)	E	2047-03-29T17:00:12.414		14.08	44.73x	133423.31	5.75		
Encke (OEG)	E	2047-03-29T17:01:08.242		13.92	44.90x	133744.89	5.77		
A (OER)	E	2047-03-29T17:09:49.312		12.44	46.47x	136774.40	5.86		
F ring	E	2047-03-29T17:20:12.422		10.65	48.29x	140461.00	5.97		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-29T14:09:38.180
 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 : 4090524275738786176
 2Mass ID (if available) : 18161721-2218192
 ICRS Star Coord at Epoch: 18h 16m 17.20769s -22:18:19.47598s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 9.171
 G magnitude : 14.795
 RP magnitude : 13.399
 BP magnitude : 17.236
 DUPflag : 0
 Distance (au) : 9.919
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.30
 Sun-Target sep (deg) : 94.38
 Sun-Moon sep (deg) : 128.48
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.561
 C/A sky separation (km) : 40006.8
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-03-29T09:05:35.723		14.90	-44.87	140461.00	-5.97		
A (OER)	I	2047-03-29T09:15:58.998		16.65	-43.19	136774.40	-5.86		
Encke (OEG)	I	2047-03-29T09:24:40.447		18.09	-41.74	133744.89	-5.76		
Encke (IEG)	I	2047-03-29T09:25:36.329		18.24	-41.59	133423.31	-5.75		
A (IER)	I	2047-03-29T09:59:51.995		23.54	-35.47	122050.38	-5.30		
B (OER)	I	2047-03-29T10:14:15.050		25.58	-32.75	117571.16	-5.08		
B (IER)	I	2047-03-29T12:02:18.564		36.09	-10.74	91984.69	-2.53		
Saturn	I	2047-03-29T12:22:37.277		36.87	-6.42	59943.08		-29.03	-34.15
Saturn	E	2047-03-29T15:55:07.129		20.57	38.63x	59585.26		-44.96	-50.52
B (IER)	E	2047-03-29T14:22:40.768	b	32.47	19.39x	91984.69	2.52		
B (OER)	E	2047-03-29T16:10:40.910		18.09	41.70x	117571.16	5.09		
A (IER)	E	2047-03-29T16:25:01.119		15.71	44.45x	122050.38	5.32		
Encke (IEG)	E	2047-03-29T16:59:09.693		9.73	50.64x	133423.31	5.77		
Encke (OEG)	E	2047-03-29T17:00:05.389		9.56	50.80x	133744.89	5.78		
A (OER)	E	2047-03-29T17:08:45.152		7.98	52.26x	136774.40	5.88		
F ring	E	2047-03-29T17:19:06.550		6.07	53.93x	140461.00	5.99		

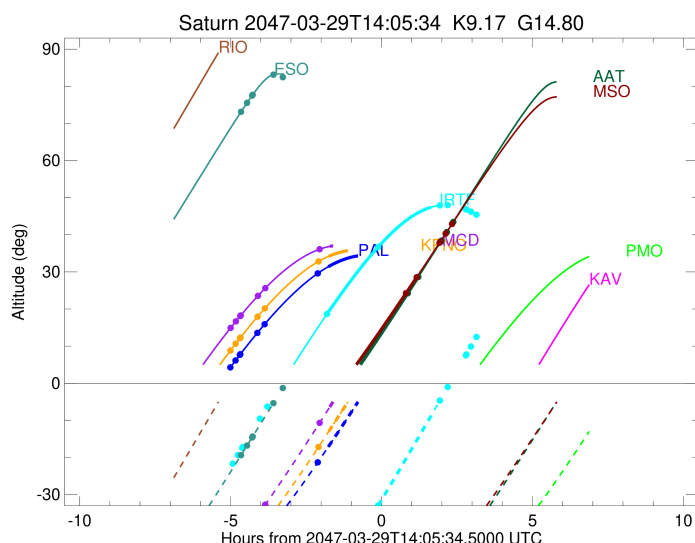
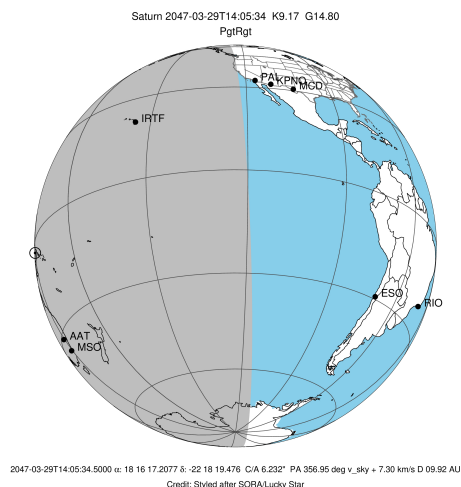
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-29T13:59:29.100
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 4090524275738786176
 2Mass ID (if available) : 18161721-2218192
 ICRS Star Coord at Epoch: 18h 16m 17.20769s -22:18:19.47598s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 9.171
 G magnitude : 14.795
 RP magnitude : 13.399
 BP magnitude : 17.236
 DUPflag : 0
 Distance (au) : 9.920
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.30
 Sun-Target sep (deg) : 94.38
 Sun-Moon sep (deg) : 128.07
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 5.665
 C/A sky separation (km) : 40753.6
 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	2047-03-29T09:09:40.496		-21.68x	-60.14	140461.00	-6.04		
A (OER)	I	2047-03-29T09:19:57.678		-19.36x	-61.67	136774.40	-5.91		
Encke (OEG)	I	2047-03-29T09:28:35.274		-17.42x	-62.84	133744.89	-5.80		
Encke (IEG)	I	2047-03-29T09:29:30.816		-17.21x	-62.96	133423.31	-5.78		
A (IER)	I	2047-03-29T10:03:46.024		-9.58x	-66.20	122050.38	-5.26		
B (OER)	I	2047-03-29T10:18:17.724		-6.38x	-66.77	117571.16	-5.01		
B (IER)	I	2047-03-29T12:17:08.230	b	18.63	-54.30	91984.69	-1.83		
Saturn	I	2047-03-29T12:15:33.461		18.31	-54.59	59904.33		-30.91	-36.17
Saturn	E	2047-03-29T15:44:25.815		47.44	-8.68	59588.05		-44.84	-50.41
B (IER)	E	2047-03-29T13:58:26.374	b	36.64	-33.04	91984.69	1.80		
B (OER)	E	2047-03-29T16:01:43.929		47.92	-4.63x	117571.16	4.76		
A (IER)	E	2047-03-29T16:17:01.812		48.00	-1.04x	122050.38	4.99		
Encke (IEG)	E	2047-03-29T16:53:16.017		46.87	7.49x	133423.31	5.45		
Encke (OEG)	E	2047-03-29T16:54:14.961		46.81	7.72x	133744.89	5.46		
A (OER)	E	2047-03-29T17:03:24.699		46.23	9.88x	136774.40	5.56		
F ring	E	2047-03-29T17:14:21.216		45.40	12.45x	140461.00	5.67		

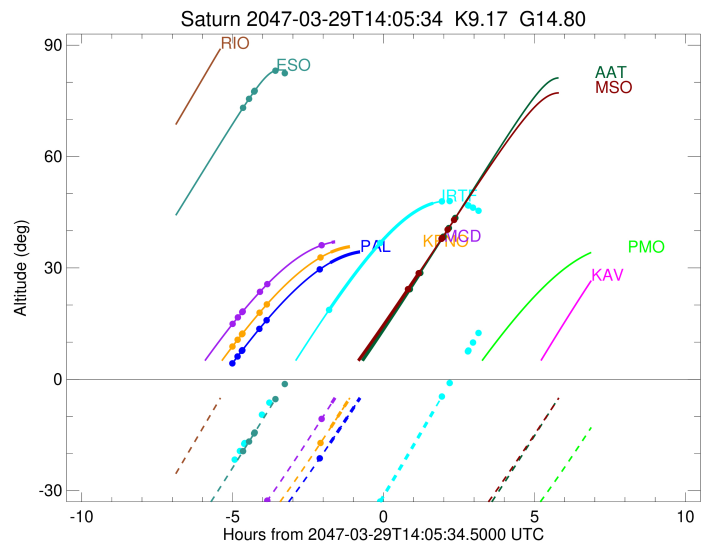
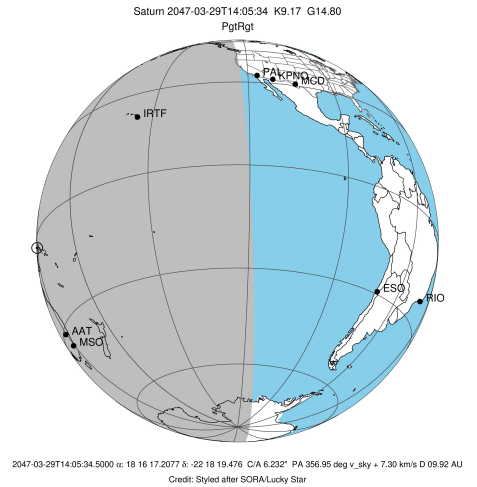
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-29T14:13:38.160
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4090524275738786176
 2Mass ID (if available) : 18161721-2218192
 ICRS Star Coord at Epoch: 18h 16m 17.20769s -22:18:19.47598s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 9.171
 G magnitude : 14.795
 RP magnitude : 13.399
 BP magnitude : 17.236
 DUPflag : 0
 Distance (au) : 9.919
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.30
 Sun-Target sep (deg) : 94.38
 Sun-Moon sep (deg) : 128.70
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.498
 C/A sky separation (km) : 46751.7
 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	2047-03-29T09:26:12.833		73.08	-19.41	140461.00	-5.24		
A (OER)	I	2047-03-29T09:38:07.220		75.50	-16.83	136774.40	-5.08		
Encke (OEG)	I	2047-03-29T09:48:11.668		77.46	-14.64	133744.89	-4.94		
Encke (IEG)	I	2047-03-29T09:49:16.855		77.66	-14.40	133423.31	-4.93		
A (IER)	I	2047-03-29T10:30:29.439		83.12	-5.41	122050.38	-4.25		
B (OER)	I	2047-03-29T10:48:50.523		82.49	-1.40x	117571.16	-3.88		
Saturn	I	2047-03-29T12:45:30.554		59.82	23.56x	59778.72		-36.64	-42.19
Saturn	E	2047-03-29T15:39:18.636		22.07	53.51x	59412.40		-52.45	-57.63
B (OER)	E	2047-03-29T15:19:03.836	b	26.39	51.09x	117571.16	3.96		
A (IER)	E	2047-03-29T15:37:00.931	b	22.56	53.26x	122050.38	4.35		
Encke (IEG)	E	2047-03-29T16:17:09.807		14.10	56.57x	133423.31	5.07		
Encke (OEG)	E	2047-03-29T16:18:13.163		13.88	56.62x	133744.89	5.08		
A (OER)	E	2047-03-29T16:28:00.336		11.85	57.03x	136774.40	5.23		
F ring	E	2047-03-29T16:39:33.702		9.47	57.31x	140461.00	5.40		

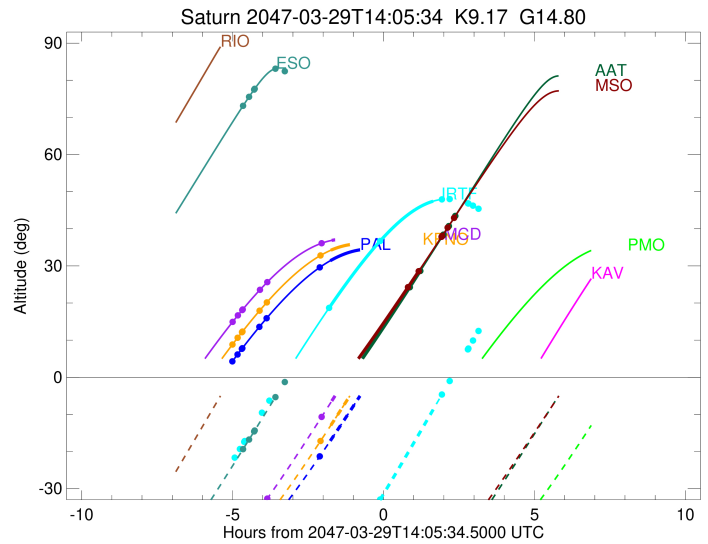
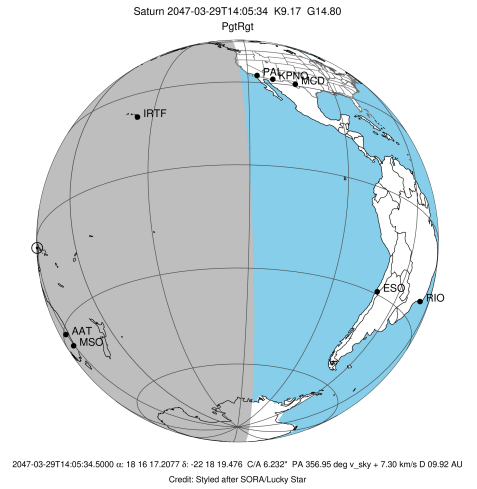
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-29T13:54:58.410
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 4090524275738786176
 2Mass ID (if available) : 18161721-2218192
 ICRS Star Coord at Epoch: 18h 16m 17.20769s -22:18:19.47598s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 9.171
 G magnitude : 14.795
 RP magnitude : 13.399
 BP magnitude : 17.236
 DUPflag : 0
 Distance (au) : 9.920
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.30
 Sun-Target sep (deg) : 94.38
 Sun-Moon sep (deg) : 127.52
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.611
 C/A sky separation (km) : 47564.3
 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	2047-03-29T09:39:10.804		-31.14x	-21.13	140461.00	-5.32		
A (OER)	I	2047-03-29T09:50:55.789		-29.90x	-23.61	136774.40	-5.13		
Encke (OEG)	I	2047-03-29T10:00:56.279		-28.76x	-25.71	133744.89	-4.96		
Encke (IEG)	I	2047-03-29T10:02:01.288		-28.63x	-25.94	133423.31	-4.94		
A (IER)	I	2047-03-29T10:43:56.232		-23.09x	-34.58	122050.38	-4.07		
B (OER)	I	2047-03-29T11:03:22.716		-20.18x	-38.46	117571.16	-3.60		
Saturn	I	2047-03-29T12:33:25.028		-4.67x	-54.45	59711.48		-39.57	-45.18
Saturn	E	2047-03-29T15:17:16.506		28.32	-57.99	59429.33		-51.70	-56.94
B (OER)	E	2047-03-29T14:58:03.411	b	24.28	-60.02	117571.16	3.41		
A (IER)	E	2047-03-29T15:18:38.764		28.61	-57.82	122050.38	3.83		
Encke (IEG)	E	2047-03-29T16:03:30.680		38.15	-51.33	133423.31	4.58		
Encke (OEG)	E	2047-03-29T16:04:40.757		38.40	-51.14	133744.89	4.60		
A (OER)	E	2047-03-29T16:15:29.195		40.72	-49.31	136774.40	4.75		
F ring	E	2047-03-29T16:28:13.012		43.44	-47.07	140461.00	4.91		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-03-29T13:55:24.240
 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 : 4090524275738786176
 2Mass ID (if available) : 18161721-2218192
 ICRS Star Coord at Epoch: 18h 16m 17.20769s -22:18:19.47598s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 9.171
 G magnitude : 14.795
 RP magnitude : 13.399
 BP magnitude : 17.236
 DUPflag : 0
 Distance (au) : 9.920
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.30
 Sun-Target sep (deg) : 94.38
 Sun-Moon sep (deg) : 127.55
 B (ring opening deg) : 26.07
 PA of pole (deg) : 5.82
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.661
 C/A sky separation (km) : 47922.0
 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	2047-03-29T09:40:28.252		-27.47x	-20.66	140461.00	-5.27		
A (OER)	I	2047-03-29T09:52:20.916		-26.30x	-23.04	136774.40	-5.07		
Encke (OEG)	I	2047-03-29T10:02:28.644		-25.22x	-25.05	133744.89	-4.89		
Encke (IEG)	I	2047-03-29T10:03:34.480		-25.10x	-25.27	133423.31	-4.87		
A (IER)	I	2047-03-29T10:46:10.767		-19.82x	-33.54	122050.38	-3.99		
B (OER)	I	2047-03-29T11:06:06.178		-17.00x	-37.26	117571.16	-3.50		
Saturn	I	2047-03-29T12:34:54.939		-2.45x	-51.61	59701.32		-40.00	-45.62
Saturn	E	2047-03-29T15:16:30.423		28.76	-54.68	59419.12		-52.15	-57.36
B (OER)	E	2047-03-29T14:54:24.872	b	24.30	-56.64	117571.16	3.32		
A (IER)	E	2047-03-29T15:15:27.060	b	28.55	-54.79	122050.38	3.76		
Encke (IEG)	E	2047-03-29T16:00:54.616		37.82	-49.07	133423.31	4.54		
Encke (OEG)	E	2047-03-29T16:02:05.353		38.06	-48.90	133744.89	4.55		
A (OER)	E	2047-03-29T16:12:59.441		40.30	-47.25	136774.40	4.71		
F ring	E	2047-03-29T16:25:48.976		42.93	-45.21	140461.00	4.87		