

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-04T03:06:29.640
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4069549652636377472
 2Mass ID (if available) : 17591171-2222593

Saturn 2047-07-04T03:06:29 K9.00 G14.31 PgtRgt

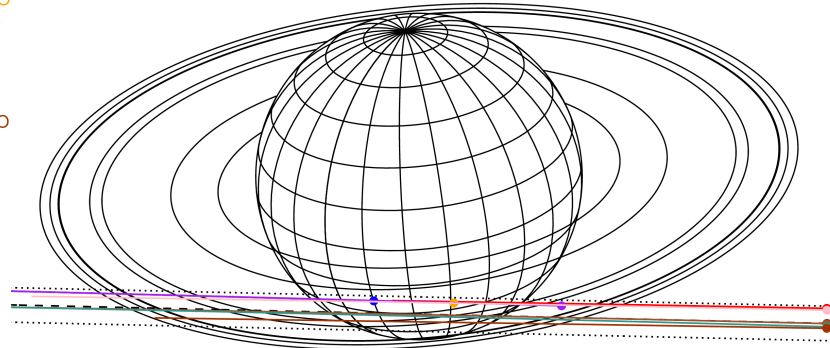
ICRS Star Coord at Epoch: 17h 59m 11.72141s -22:22:59.30499s

RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.000
 G magnitude : 14.314
 RP magnitude : 13.018
 BP magnitude : 16.276
 DUPflag : 0
 Distance (au) : 9.048
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.56
 Sun-Target sep (deg) : 168.31
 Sun-Moon sep (deg) : 33.12
 B (ring opening deg) : 26.54
 PA of pole (deg) : 5.50



2047-07-04T03:06:29.6400 at: 17 59 11.7214 s -22 22 59.305 C/A 7.745° PA 358.70 deg v_sky -19.56 km/s D 09.05 AU
 Credit: Styled after SORA/Lucky Star

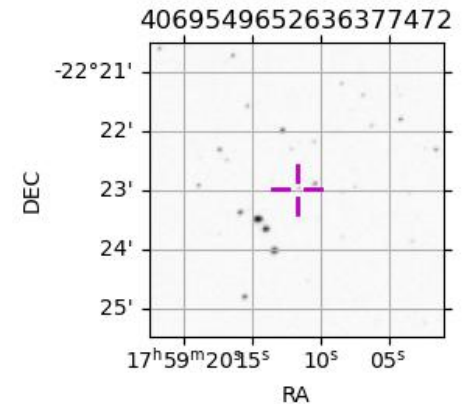
Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 RIO
 ESO
 SAAO



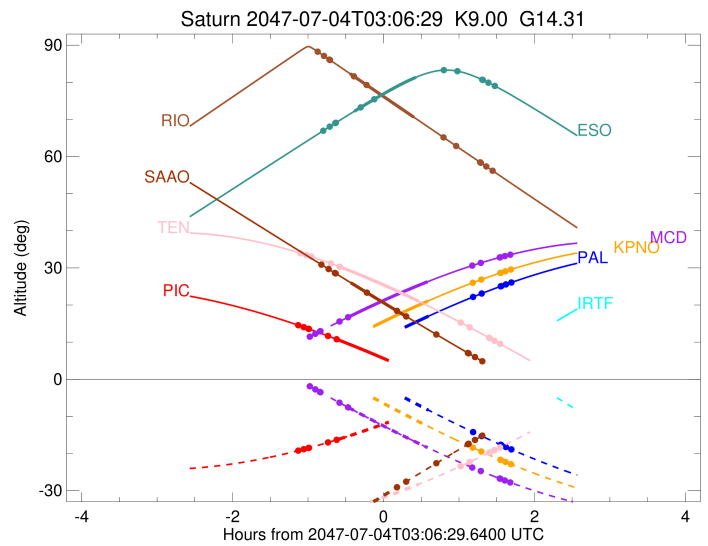
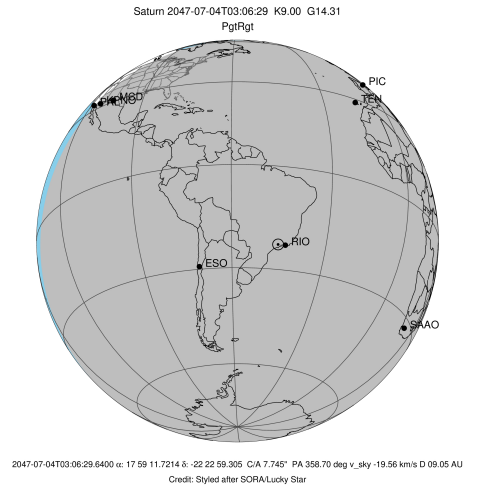
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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	+ + + + +	+		JUL 04 01:58 - JUL 04 02:30	PinRin
PAL	Palomar Mt (20	33.4	243.1		+	+ + + + +	JUL 04 03:42 - JUL 04 04:48	PneRne
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4		+	+ + + + +	JUL 04 03:41 - JUL 04 04:47	PneRne
MCD	McDonald Obs.	30.7	256.0		+ +	+ + + + +	JUL 04 02:31 - JUL 04 04:47	PieRie
TEN	Teide Obs./Ten	28.3	343.5	+ + + + +	+ +	+ + + + +	JUL 04 02:00 - JUL 04 04:39	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	+ + + +	+ +	+ + + + +	JUL 04 02:14 - JUL 04 04:33	PieRie
ESO	European South	-29.3	289.3	+ + + +	+ +	+ + + + +	JUL 04 02:18 - JUL 04 04:35	PieRie
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8	+ + + +	+ +	+ + + + +	JUL 04 02:17 - JUL 04 04:19	PieRie
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn

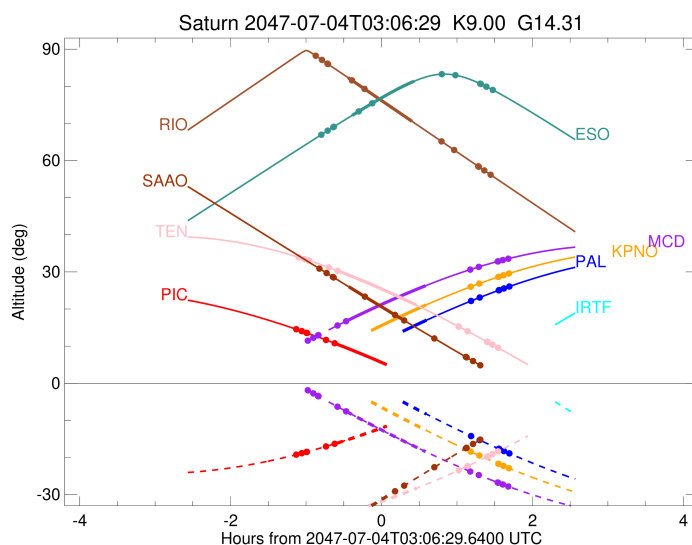
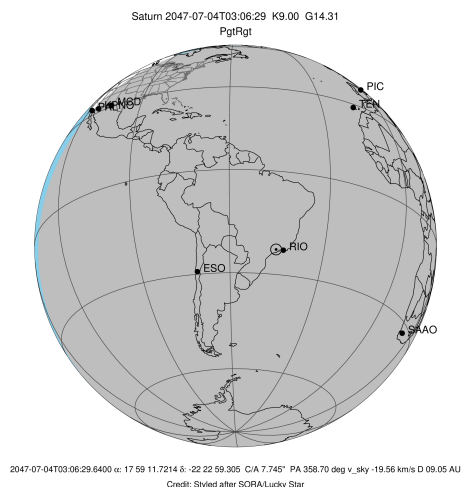


target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-04T03:02:47.460
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 4069549652636377472
 2Mass ID (if available) : 17591171-2222593
 ICRS Star Coord at Epoch: 17h 59m 11.72141s -22:22:59.30499s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.000
 G magnitude : 14.314
 RP magnitude : 13.018
 BP magnitude : 16.276
 DUPflag : 0
 Distance (au) : 9.048
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.56
 Sun-Target sep (deg) : 168.31
 Sun-Moon sep (deg) : 33.79
 B (ring opening deg) : 26.54
 PA of pole (deg) : 5.50
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.006
 C/A sky separation (km) : 45980.0
 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



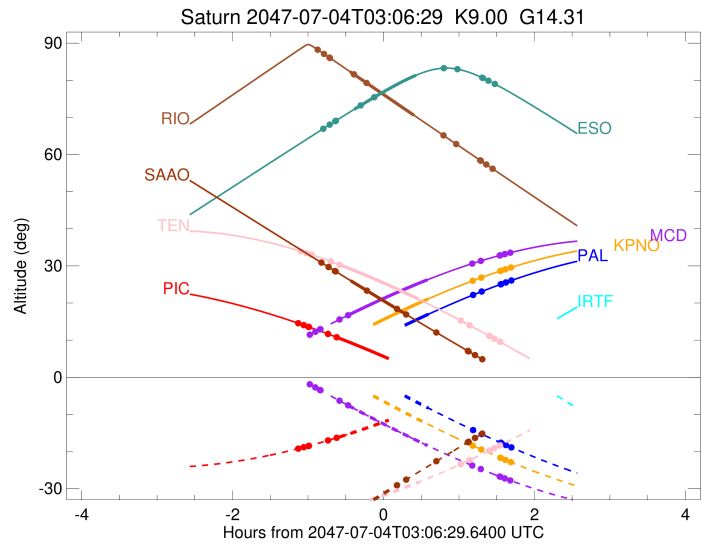
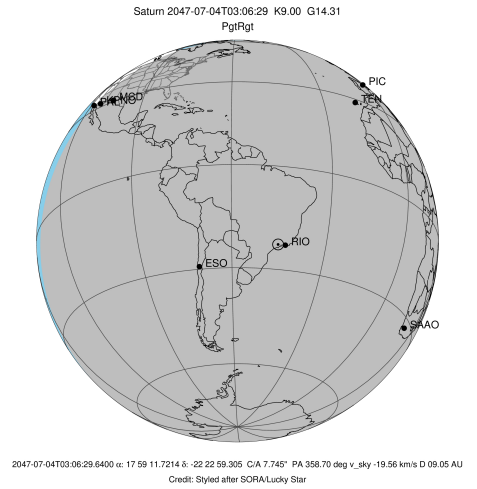
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-07-04T01:58:43.552		14.56	-19.23	140461.00	-14.22		
A (OER)	I	2047-07-04T02:03:06.691		14.04	-18.84	136774.40	-13.80		
Encke (OEG)	I	2047-07-04T02:06:49.291		13.60	-18.51	133744.89	-13.42		
Encke (IEG)	I	2047-07-04T02:07:13.296		13.55	-18.47	133423.31	-13.37		
A (IER)	I	2047-07-04T02:22:24.074		11.67	-17.02	122050.38	-11.52		
B (OER)	I	2047-07-04T02:29:10.154		10.79	-16.32	117571.16	-10.52		
Saturn	I	2047-07-04T02:30:59.415		10.55	-16.13	59465.53		-48.70	-54.12
Saturn	E	2047-07-04T03:34:59.724		1.33x	-8.35	59716.55		-38.38	-43.97
B (OER)	E	2047-07-04T04:09:48.039		-4.23x	-3.38x	117571.16	10.46		
A (IER)	E	2047-07-04T04:16:36.858		-5.35x	-2.36x	122050.38	11.43		
Encke (IEG)	E	2047-07-04T04:31:56.050		-7.92x	-0.01x	133423.31	13.23		
Encke (OEG)	E	2047-07-04T04:32:20.316		-7.99x	0.05x	133744.89	13.27		
A (OER)	E	2047-07-04T04:36:05.422		-8.62x	0.64x	136774.40	13.64		
F ring	E	2047-07-04T04:40:31.729		-9.38x	1.34x	140461.00	14.04		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-04T03:10:28.260
 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 : 4069549652636377472
 2Mass ID (if available) : 17591171-2222593
 ICRS Star Coord at Epoch: 17h 59m 11.72141s -22:22:59.30499s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.000
 G magnitude : 14.314
 RP magnitude : 13.018
 BP magnitude : 16.276
 DUPflag : 0
 Distance (au) : 9.048
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.56
 Sun-Target sep (deg) : 168.31
 Sun-Moon sep (deg) : 32.73
 B (ring opening deg) : 26.54
 PA of pole (deg) : 5.50
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.069
 C/A sky separation (km) : 46392.3
 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



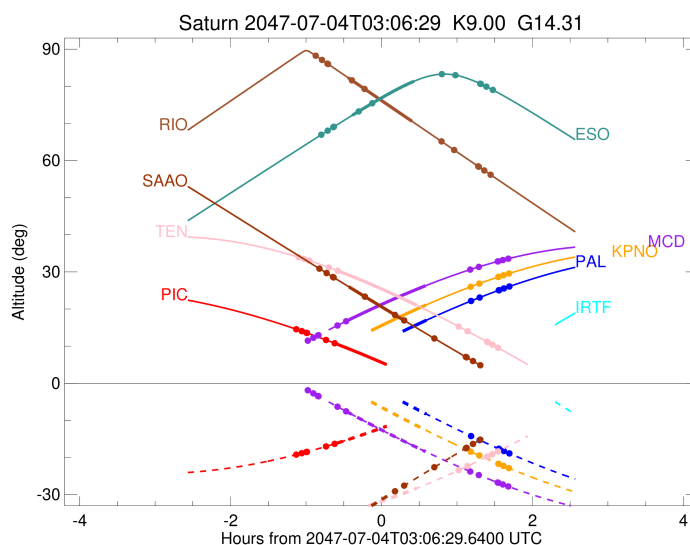
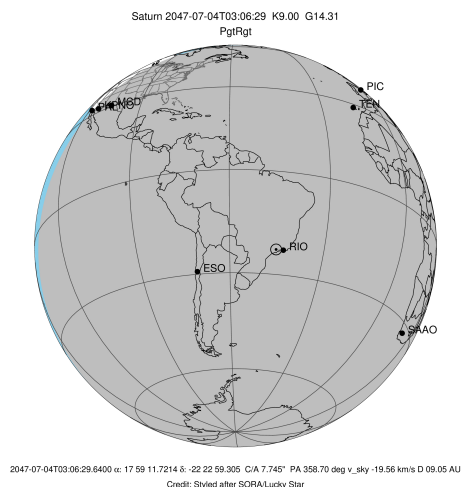
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-07-04T02:08:38.688		0.90x	8.98x	140461.00	-14.13		
A (OER)	I	2047-07-04T02:13:03.339		1.72x	8.13x	136774.40	-13.72		
Encke (OEG)	I	2047-07-04T02:16:47.187		2.40x	7.40x	133744.89	-13.34		
Encke (IEG)	I	2047-07-04T02:17:11.326		2.48x	7.33x	133423.31	-13.30		
A (IER)	I	2047-07-04T02:32:27.360		5.25	4.40x	122050.38	-11.45		
B (OER)	I	2047-07-04T02:39:16.234	b	6.47	3.11x	117571.16	-10.45		
Saturn	I	2047-07-04T02:39:06.815		6.44	3.13x	59441.97		-49.68	-55.04
Saturn	E	2047-07-04T03:42:07.749		16.97	-8.30	59717.51		-38.34	-43.93
B (OER)	E	2047-07-04T04:17:54.784		22.20	-14.26	117571.16	10.53		
A (IER)	E	2047-07-04T04:24:40.182		23.11	-15.33	122050.38	11.55		
Encke (IEG)	E	2047-07-04T04:39:47.948		25.05	-17.65	133423.31	13.43		
Encke (OEG)	E	2047-07-04T04:40:11.857		25.10	-17.71	133744.89	13.47		
A (OER)	E	2047-07-04T04:43:53.540		25.56	-18.27	136774.40	13.86		
F ring	E	2047-07-04T04:48:15.545		26.08	-18.91	140461.00	14.28		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-04T03:10:16.520
 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 : 4069549652636377472
 2Mass ID (if available) : 17591171-2222593
 ICRS Star Coord at Epoch: 17h 59m 11.72141s -22:22:59.30499s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.000
 G magnitude : 14.314
 RP magnitude : 13.018
 BP magnitude : 16.276
 DUPflag : 0
 Distance (au) : 9.048
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.56
 Sun-Target sep (deg) : 168.31
 Sun-Moon sep (deg) : 32.79
 B (ring opening deg) : 26.54
 PA of pole (deg) : 5.50
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.062
 C/A sky separation (km) : 46347.2
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-07-04T02:08:25.564		5.41	4.39x	140461.00	-14.17		
A (OER)	I	2047-07-04T02:12:49.462		6.22	3.54x	136774.40	-13.76		
Encke (OEG)	I	2047-07-04T02:16:32.653		6.89	2.83x	133744.89	-13.38		
Encke (IEG)	I	2047-07-04T02:16:56.720		6.97	2.75x	133423.31	-13.34		
A (IER)	I	2047-07-04T02:32:09.780		9.69	-0.15x	122050.38	-11.49		
B (OER)	I	2047-07-04T02:38:57.100	b	10.88	-1.42x	117571.16	-10.49		
Saturn	I	2047-07-04T02:38:55.397		10.87	-1.42x	59443.54		-49.62	-54.98
Saturn	E	2047-07-04T03:41:55.795		21.09	-12.67	59718.43		-38.30	-43.89
B (OER)	E	2047-07-04T04:17:39.405		26.03	-18.45	117571.16	10.57		
A (IER)	E	2047-07-04T04:24:23.507		26.87	-19.48	122050.38	11.58		
Encke (IEG)	E	2047-07-04T04:39:28.982		28.65	-21.70	133423.31	13.46		
Encke (OEG)	E	2047-07-04T04:39:52.839		28.70	-21.75	133744.89	13.50		
A (OER)	E	2047-07-04T04:43:34.055		29.10	-22.28	136774.40	13.88		
F ring	E	2047-07-04T04:47:55.543		29.58	-22.89	140461.00	14.31		

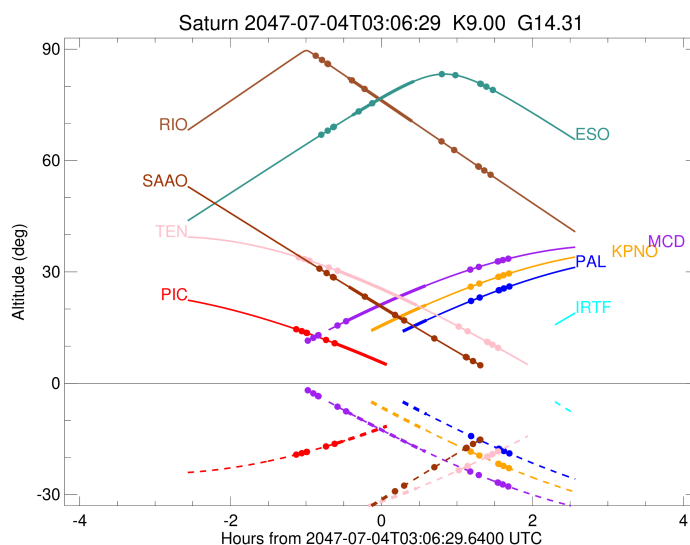
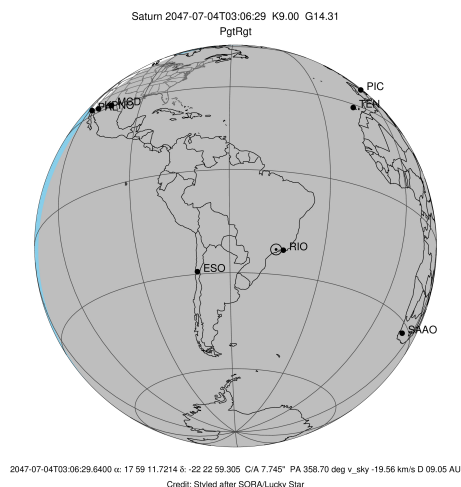
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-04T03:09:53.640
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4069549652636377472
 2Mass ID (if available) : 17591171-2222593
 ICRS Star Coord at Epoch: 17h 59m 11.72141s -22:22:59.30499s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.000
 G magnitude : 14.314
 RP magnitude : 13.018
 BP magnitude : 16.276
 DUPflag : 0
 Distance (au) : 9.048
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.56
 Sun-Target sep (deg) : 168.31
 Sun-Moon sep (deg) : 32.90
 B (ring opening deg) : 26.54
 PA of pole (deg) : 5.50
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.047
 C/A sky separation (km) : 46249.3
 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

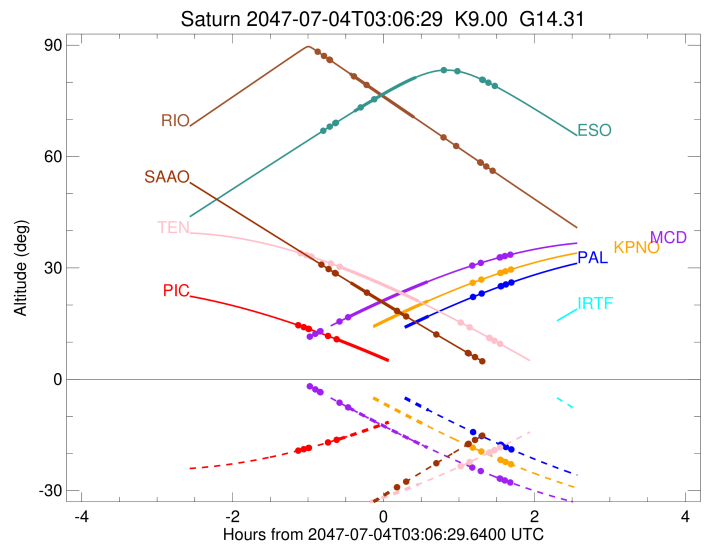
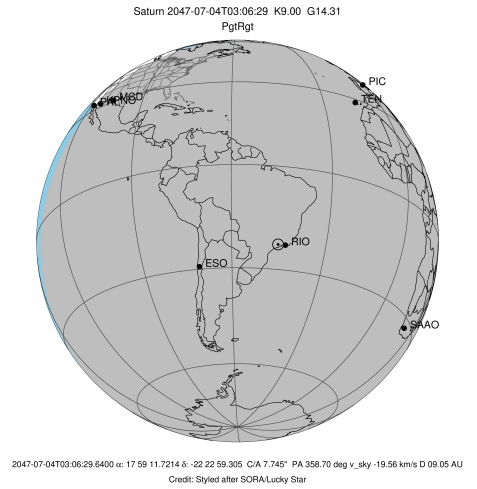
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-07-04T02:07:54.486		11.47	-1.89x	140461.00	-14.24		
A (OER)	I	2047-07-04T02:12:17.178		12.25	-2.72x	136774.40	-13.82		
Encke (OEG)	I	2047-07-04T02:15:59.306		12.90	-3.42x	133744.89	-13.45		
Encke (IEG)	I	2047-07-04T02:16:23.255		12.97	-3.50x	133423.31	-13.41		
A (IER)	I	2047-07-04T02:31:31.315		15.57	-6.31	122050.38	-11.56		
B (OER)	I	2047-07-04T02:38:15.897		16.70	-7.55	117571.16	-10.56		
Saturn	I	2047-07-04T02:38:30.435		16.74	-7.59	59446.81		-49.48	-54.85
Saturn	E	2047-07-04T03:41:35.195		26.28	-18.42	59720.63		-38.21	-43.80
B (OER)	E	2047-07-04T04:17:16.234		30.64	-23.81	117571.16	10.64		
A (IER)	E	2047-07-04T04:23:58.031		31.36	-24.75	122050.38	11.64		
Encke (IEG)	E	2047-07-04T04:38:59.653		32.83	-26.75	133423.31	13.51		
Encke (OEG)	E	2047-07-04T04:39:23.426		32.86	-26.80	133744.89	13.55		
A (OER)	E	2047-07-04T04:43:03.898		33.19	-27.27	136774.40	13.93		
F ring	E	2047-07-04T04:47:24.577		33.57	-27.81	140461.00	14.35		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-04T03:03:02.220
 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 : 4069549652636377472
 2Mass ID (if available) : 17591171-2222593
 ICRS Star Coord at Epoch: 17h 59m 11.72141s -22:22:59.30499s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.000
 G magnitude : 14.314
 RP magnitude : 13.018
 BP magnitude : 16.276
 DUPflag : 0
 Distance (au) : 9.048
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.56
 Sun-Target sep (deg) : 168.31
 Sun-Moon sep (deg) : 33.93
 B (ring opening deg) : 26.54
 PA of pole (deg) : 5.50
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.090
 C/A sky separation (km) : 46530.9
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-07-04T02:00:39.559		33.94	-37.56	140461.00	-14.14		
A (OER)	I	2047-07-04T02:05:04.387		33.47	-37.31	136774.40	-13.70		
Encke (OEG)	I	2047-07-04T02:08:48.753		33.06	-37.07	133744.89	-13.30		
Encke (IEG)	I	2047-07-04T02:09:12.969		33.01	-37.05	133423.31	-13.26		
A (IER)	I	2047-07-04T02:24:35.840		31.20	-35.93	122050.38	-11.30		
B (OER)	I	2047-07-04T02:31:31.087		30.32	-35.36	117571.16	-10.25		
Saturn	I	2047-07-04T02:32:02.056		30.26	-35.32	59449.91		-49.35	-54.73
Saturn	E	2047-07-04T03:34:26.285		21.01	-28.28	59699.76		-39.07	-44.68
B (OER)	E	2047-07-04T04:08:07.167		15.23	-23.38	117571.16	10.19		
A (IER)	E	2047-07-04T04:15:05.113		13.98	-22.29	122050.38	11.22		
Encke (IEG)	E	2047-07-04T04:30:36.393		11.14	-19.77	133423.31	13.12		
Encke (OEG)	E	2047-07-04T04:31:00.871		11.07	-19.71	133744.89	13.16		
A (OER)	E	2047-07-04T04:34:47.757		10.37	-19.08	136774.40	13.54		
F ring	E	2047-07-04T04:39:15.773		9.53	-18.33	140461.00	13.96		

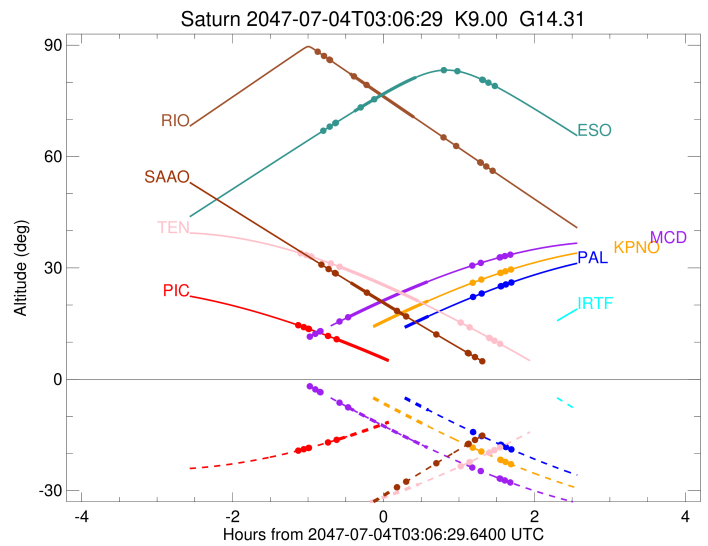
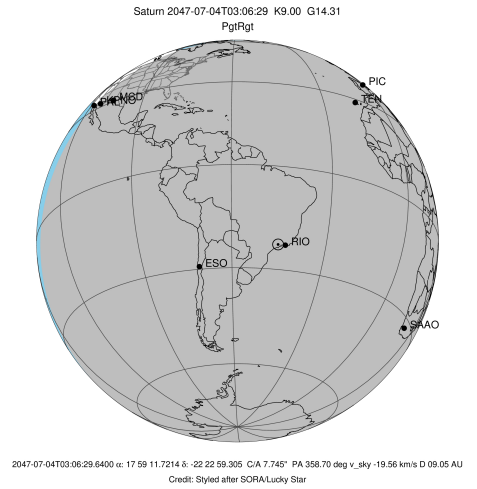
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-04T03:05:07.020
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4069549652636377472
 2Mass ID (if available) : 17591171-2222593
 ICRS Star Coord at Epoch: 17h 59m 11.72141s -22:22:59.30499s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.000
 G magnitude : 14.314
 RP magnitude : 13.018
 BP magnitude : 16.276
 DUPflag : 0
 Distance (au) : 9.048
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.56
 Sun-Target sep (deg) : 168.31
 Sun-Moon sep (deg) : 33.85
 B (ring opening deg) : 26.54
 PA of pole (deg) : 5.50
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.769
 C/A sky separation (km) : 50981.7
 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	2047-07-04T02:14:10.765		88.24	-80.08	140461.00	-12.57		
A (OER)	I	2047-07-04T02:19:11.168		87.10	-81.23	136774.40	-11.97		
Encke (OEG)	I	2047-07-04T02:23:30.170		86.11	-82.23	133744.89	-11.42		
Encke (IEG)	I	2047-07-04T02:23:58.413		86.00	-82.34	133423.31	-11.35		
A (IER)	I	2047-07-04T02:43:00.117	b	81.60	-86.72	122050.38	-8.44		
B (OER)	I	2047-07-04T02:52:53.271	b	79.32	-88.99	117571.16	-6.63		
Saturn	I	2047-07-04T02:39:49.641		82.34	-85.99	59322.90		-54.77	-59.77
Saturn	E	2047-07-04T03:30:48.017		70.55	-82.27	59553.93		-45.06	-50.62
B (OER)	E	2047-07-04T03:54:33.049		65.07	-76.80	117571.16	6.63		
A (IER)	E	2047-07-04T04:04:26.552		62.80	-74.52	122050.38	8.43		
Encke (IEG)	E	2047-07-04T04:23:31.749		58.40	-70.14	133423.31	11.30		
Encke (OEG)	E	2047-07-04T04:24:00.126		58.29	-70.03	133744.89	11.36		
A (OER)	E	2047-07-04T04:28:20.456		57.30	-69.03	136774.40	11.91		
F ring	E	2047-07-04T04:33:22.616		56.14	-67.87	140461.00	12.49		

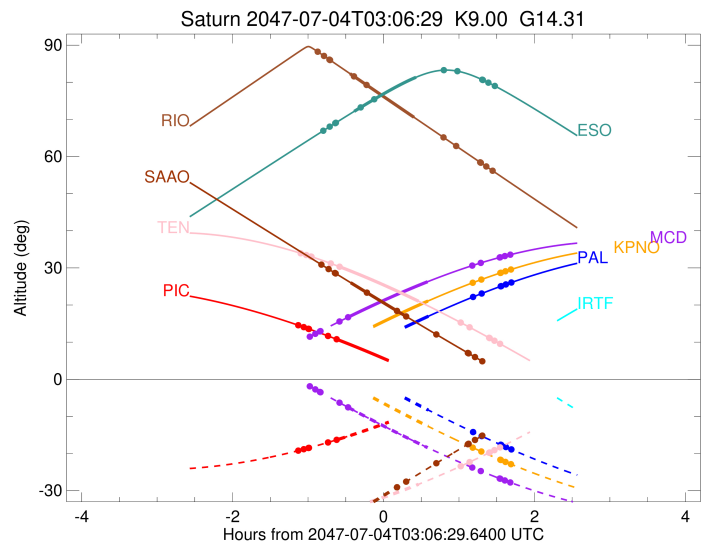
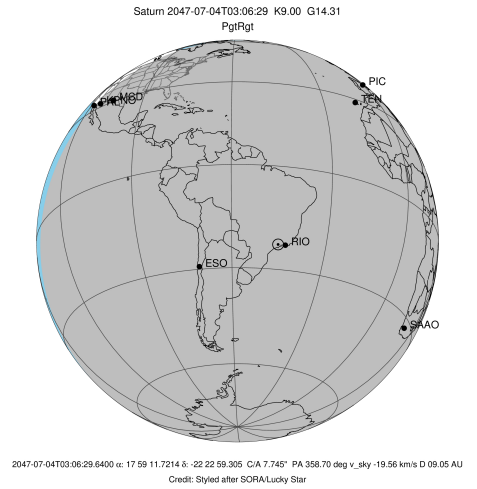
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-04T03:07:34.140
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4069549652636377472
 2Mass ID (if available) : 17591171-2222593
 ICRS Star Coord at Epoch: 17h 59m 11.72141s -22:22:59.30499s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.000
 G magnitude : 14.314
 RP magnitude : 13.018
 BP magnitude : 16.276
 DUPflag : 0
 Distance (au) : 9.048
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.56
 Sun-Target sep (deg) : 168.31
 Sun-Moon sep (deg) : 33.48
 B (ring opening deg) : 26.54
 PA of pole (deg) : 5.50
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.861
 C/A sky separation (km) : 51586.9
 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	2047-07-04T02:18:36.326		66.95	-56.16	140461.00	-12.33		
A (OER)	I	2047-07-04T02:23:42.910		68.05	-57.28	136774.40	-11.71		
Encke (OEG)	I	2047-07-04T02:28:07.984		68.99	-58.24	133744.89	-11.14		
Encke (IEG)	I	2047-07-04T02:28:36.938		69.09	-58.35	133423.31	-11.07		
A (IER)	I	2047-07-04T02:48:20.894	b	73.23	-62.64	122050.38	-8.00		
B (OER)	I	2047-07-04T02:58:58.036	b	75.39	-64.94	117571.16	-6.02		
Saturn	I	2047-07-04T02:43:08.900		72.16	-61.51	59303.04		-55.64	-60.58
Saturn	E	2047-07-04T03:32:22.353		81.36	-72.08	59535.84		-45.81	-51.34
B (OER)	E	2047-07-04T03:54:50.966		83.27	-76.69	117571.16	6.04		
A (IER)	E	2047-07-04T04:05:26.353		82.99	-78.74	122050.38	8.02		
Encke (IEG)	E	2047-07-04T04:25:08.315		80.68	-82.04	133423.31	11.08		
Encke (OEG)	E	2047-07-04T04:25:37.244		80.60	-82.10	133744.89	11.15		
A (OER)	E	2047-07-04T04:30:02.138		79.88	-82.67	136774.40	11.72		
F ring	E	2047-07-04T04:35:08.611		78.99	-83.21	140461.00	12.33		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-07-04T03:01:43.230
 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 : 4069549652636377472
 2Mass ID (if available) : 17591171-2222593
 ICRS Star Coord at Epoch: 17h 59m 11.72141s -22:22:59.30499s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 9.000
 G magnitude : 14.314
 RP magnitude : 13.018
 BP magnitude : 16.276
 DUPflag : 0
 Distance (au) : 9.048
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.56
 Sun-Target sep (deg) : 168.31
 Sun-Moon sep (deg) : 33.94
 B (ring opening deg) : 26.54
 PA of pole (deg) : 5.50
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 8.180
 C/A sky separation (km) : 53680.3
 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	2047-07-04T02:17:05.531		30.89	-41.72	140461.00	-11.09		
A (OER)	I	2047-07-04T02:22:49.158		29.69	-40.51	136774.40	-10.36		
Encke (OEG)	I	2047-07-04T02:27:51.691		28.63	-39.45	133744.89	-9.66		
Encke (IEG)	I	2047-07-04T02:28:25.106		28.52	-39.33	133423.31	-9.58		
A (IER)	I	2047-07-04T02:53:15.862	b	23.34	-34.10	122050.38	-5.50		
B (OER)	I	2047-07-04T03:15:30.488	b	18.76	-29.45	117572.04	-1.13		
Saturn	I	2047-07-04T02:40:27.102		26.00	-36.79	59252.14		-57.95	-62.67
Saturn	E	2047-07-04T03:23:24.996		17.15	-27.81	59445.57		-49.53	-54.90
B (OER)	E	2047-07-04T03:26:30.775		16.52	-27.16	117573.01	1.14		
A (IER)	E	2047-07-04T03:48:46.799		12.02	-22.56	122050.38	5.49		
Encke (IEG)	E	2047-07-04T04:13:45.590		7.05	-17.46	133423.31	9.50		
Encke (OEG)	E	2047-07-04T04:14:19.294		6.94	-17.35	133744.89	9.58		
A (OER)	E	2047-07-04T04:19:24.668		5.95	-16.32	136774.40	10.25		
F ring	E	2047-07-04T04:25:12.001		4.82x	-15.15	140461.00	10.96		