

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-10-21T13:52:06.170
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 6772479808740923008
 2Mass ID (if available) : 19292908-2158119

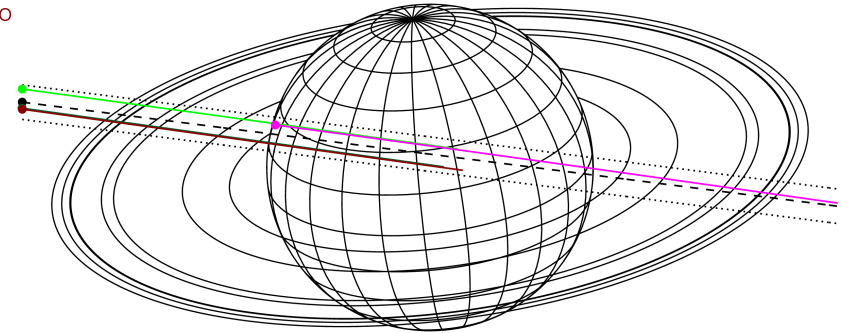
Saturn 2049-10-21T13:52:06 K9.95 G12.34 PgtRgt

ICRS Star Coord at Epoch: 19h 29m 29.09959s -21:58:12.15695s

RUWE (>1.4 is poor) : 0.98
 K magnitude : 9.946
 G magnitude : 12.340
 RP magnitude : 11.606
 BP magnitude : 12.938
 DUPflag : 0
 Distance (au) : 10.071
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 13.35
 Sun-Target sep (deg) : 82.75
 Sun-Moon sep (deg) : 141.56
 B (ring opening deg) : 23.86
 PA of pole (deg) : 6.76



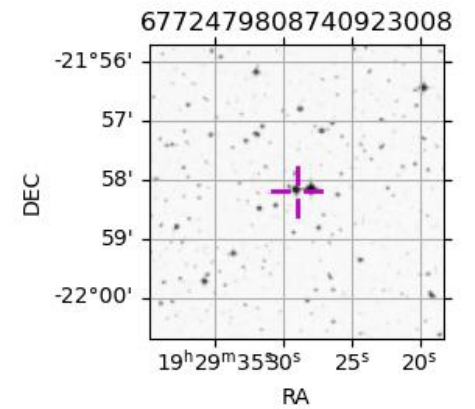
Earth
 PMO
 KAV
 AAT
 MSO



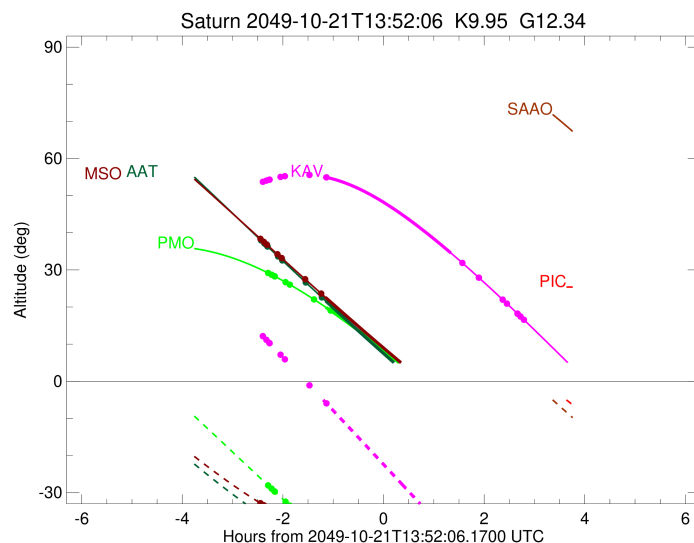
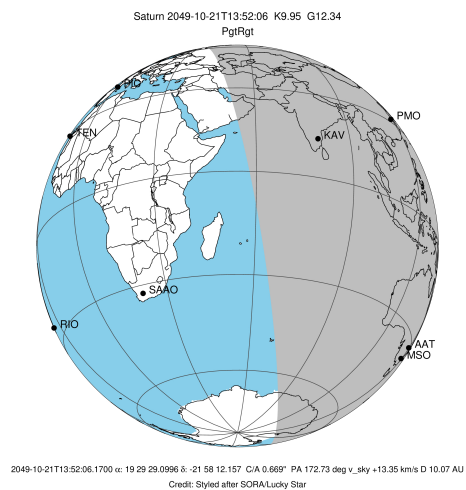
2049-10-21T13:52:06.1700 ex: 19 29 29.0996 s: -21 58 12.157 C/A 0.669° PA 172.73 deg v_sky +13.35 km/s D 10.07 AU
 Credit: Styled after SORA/Lucky Star

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					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8	+	+		OCT 21 11:34 - OCT 21 12:43	PinRin
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					PnnRnn
KAV	Kavalur Observ	12.6	78.8		+	+	OCT 21 15:12 - OCT 21 16:39	PneRne
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European South	-29.3	289.3					PnnRnn
AAT	Siding Spring	-31.3	149.1	+	+		OCT 21 11:26 - OCT 21 12:43	PinRin
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0	+	+		OCT 21 11:25 - OCT 21 12:42	PinRin



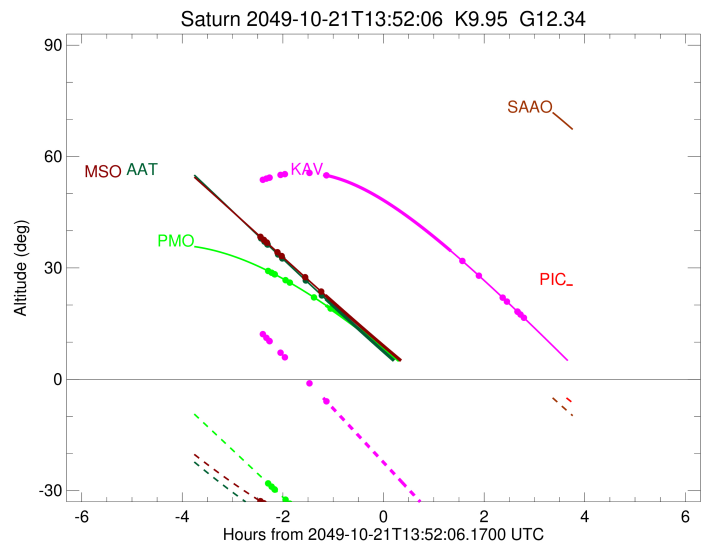
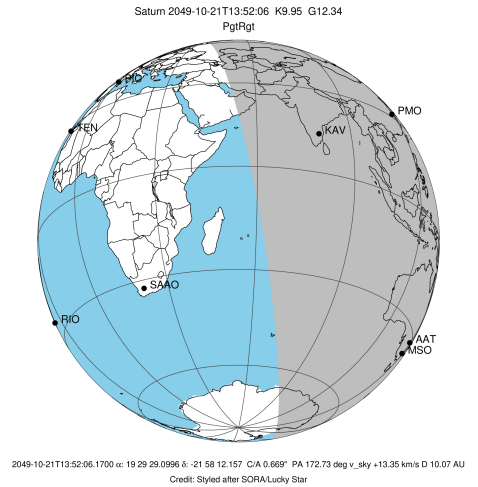
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-10-21T13:58:58.920
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 6772479808740923008
 2Mass ID (if available) : 19292908-2158119
 ICRS Star Coord at Epoch: 19h 29m 29.09959s -21:58:12.15695s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 9.946
 G magnitude : 12.340
 RP magnitude : 11.606
 BP magnitude : 12.938
 DUPflag : 0
 Distance (au) : 10.071
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 13.35
 Sun-Target sep (deg) : 82.75
 Sun-Moon sep (deg) : 141.00
 B (ring opening deg) : 23.86
 PA of pole (deg) : 6.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.115
 C/A sky separation (km) : 8145.0
 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	2049-10-21T11:34:36.449		29.17	-28.07	140461.00	-14.79		
A (OER)	I	2049-10-21T11:38:45.678		28.69	-28.95	136774.40	-14.79		
Encke (OEG)	I	2049-10-21T11:42:10.467		28.30	-29.67	133744.89	-14.79		
Encke (IEG)	I	2049-10-21T11:42:32.204		28.25	-29.75	133423.31	-14.79		
A (IER)	I	2049-10-21T11:55:20.934		26.69	-32.45	122050.38	-14.79		
B (OER)	I	2049-10-21T12:00:23.727		26.04	-33.51	117571.16	-14.79		
B (IER)	I	2049-10-21T12:29:15.600		22.04	-39.54	91984.69	-14.74		
C (IER)	I	2049-10-21T12:49:06.024	b	19.04	-43.61	74490.58	-14.63		
Saturn	I	2049-10-21T12:43:25.267		19.92	-42.45	60130.69		20.42	24.52
Saturn	E	2049-10-21T15:13:51.928		-7.13x	-67.58	60254.40		-6.29	-7.72
C (IER)	E	2049-10-21T15:27:16.008		-9.80x	-68.51	74490.58	15.00		
B (IER)	E	2049-10-21T15:46:34.532		-13.69x	-69.11	91984.69	15.19		
B (OER)	E	2049-10-21T16:14:29.112		-19.41x	-68.32	117571.16	15.36		
A (IER)	E	2049-10-21T16:19:20.585		-20.41x	-67.99	122050.38	15.38		
Encke (IEG)	E	2049-10-21T16:31:38.884		-22.96x	-66.93	133423.31	15.43		
Encke (OEG)	E	2049-10-21T16:31:59.726		-23.03x	-66.90	133744.89	15.43		
A (OER)	E	2049-10-21T16:35:15.987		-23.72x	-66.57	136774.40	15.44		
F ring	E	2049-10-21T16:39:14.615		-24.54x	-66.14	140461.00	15.46		

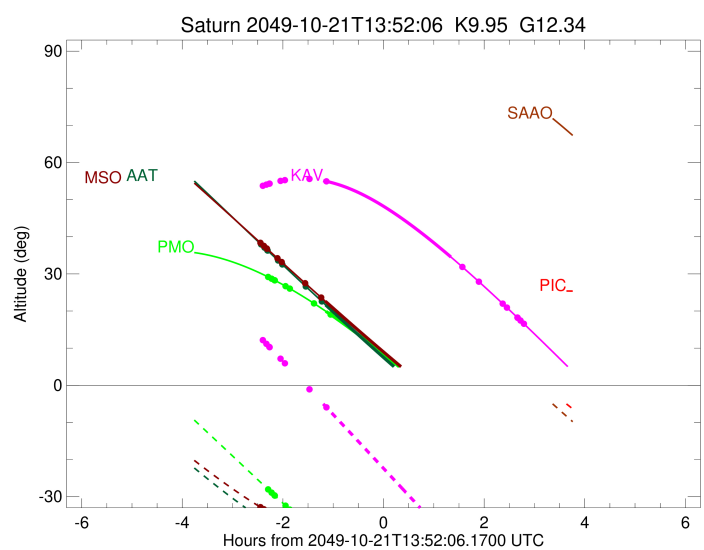
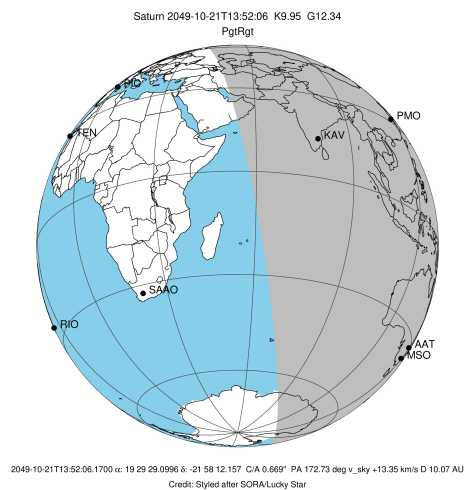
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-10-21T13:56:02.070
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 6772479808740923008
 2Mass ID (if available) : 19292908-2158119
 ICRS Star Coord at Epoch: 19h 29m 29.09959s -21:58:12.15695s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 9.946
 G magnitude : 12.340
 RP magnitude : 11.606
 BP magnitude : 12.938
 DUPflag : 0
 Distance (au) : 10.071
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 13.35
 Sun-Target sep (deg) : 82.75
 Sun-Moon sep (deg) : 141.59
 B (ring opening deg) : 23.86
 PA of pole (deg) : 6.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 1.079
 C/A sky separation (km) : 7882.6
 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	2049-10-21T11:28:17.267		53.74	12.14x	140461.00	-14.56		
A (OER)	I	2049-10-21T11:32:30.542		54.06	11.14x	136774.40	-14.55		
Encke (OEG)	I	2049-10-21T11:35:58.705		54.30	10.32x	133744.89	-14.55		
Encke (IEG)	I	2049-10-21T11:36:20.802		54.32	10.23x	133423.31	-14.55		
A (IER)	I	2049-10-21T11:49:22.586		55.05	7.13x	122050.38	-14.54		
B (OER)	I	2049-10-21T11:54:30.670		55.26	5.91x	117571.16	-14.54		
B (IER)	I	2049-10-21T12:23:54.132		55.58	-1.11x	91984.69	-14.47		
C (IER)	I	2049-10-21T12:44:07.088	b	54.93	-5.97	74490.58	-14.36		
Saturn	I	2049-10-21T12:39:04.207		55.16	-4.75x	60135.88		20.01	24.05
Saturn	E	2049-10-21T15:12:33.957		34.53	-41.95	60253.51		-6.50	-7.97
C (IER)	E	2049-10-21T15:26:04.063		31.89	-45.24	74490.58	14.71		
B (IER)	E	2049-10-21T15:45:45.516		27.93	-50.04	91984.69	14.89		
B (OER)	E	2049-10-21T16:14:12.621		22.00	-56.98	117571.16	15.07		
A (IER)	E	2049-10-21T16:19:09.606		20.95	-58.19	122050.38	15.09		
Encke (IEG)	E	2049-10-21T16:31:41.609		18.26	-61.25	133423.31	15.15		
Encke (OEG)	E	2049-10-21T16:32:02.832		18.19	-61.34	133744.89	15.15		
A (OER)	E	2049-10-21T16:35:22.666		17.47	-62.15	136774.40	15.17		
F ring	E	2049-10-21T16:39:25.595		16.59	-63.14	140461.00	15.18		

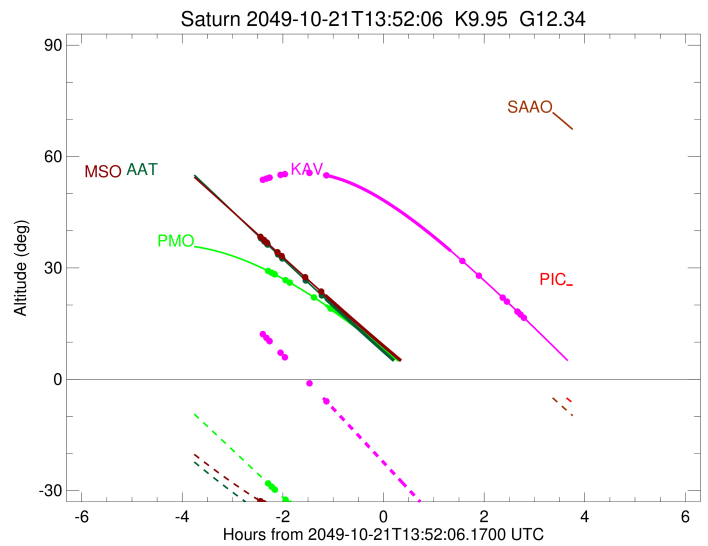
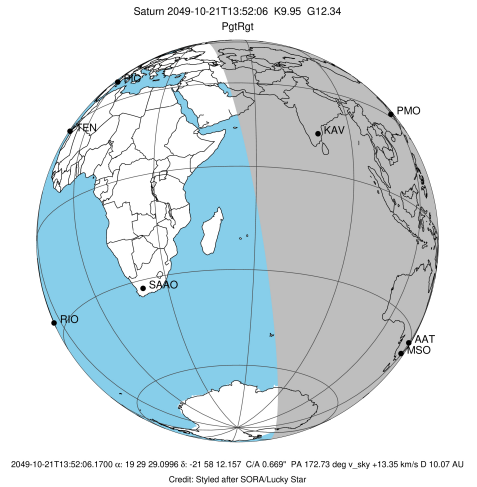
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-10-21T13:58:17.670
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 6772479808740923008
 2Mass ID (if available) : 19292908-2158119
 ICRS Star Coord at Epoch: 19h 29m 29.09959s -21:58:12.15695s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 9.946
 G magnitude : 12.340
 RP magnitude : 11.606
 BP magnitude : 12.938
 DUPflag : 0
 Distance (au) : 10.071
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 13.35
 Sun-Target sep (deg) : 82.75
 Sun-Moon sep (deg) : 141.16
 B (ring opening deg) : 23.86
 PA of pole (deg) : 6.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.127
 C/A sky separation (km) : 928.7
 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_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	2049-10-21T11:26:12.367		37.93	-35.90	140461.00	-15.10		
A (OER)	I	2049-10-21T11:30:16.392		37.06	-36.51	136774.40	-15.11		
Encke (OEG)	I	2049-10-21T11:33:36.813		36.35	-37.00	133744.89	-15.12		
Encke (IEG)	I	2049-10-21T11:33:58.081		36.27	-37.05	133423.31	-15.12		
A (IER)	I	2049-10-21T11:46:29.546		33.60	-38.82	122050.38	-15.15		
B (OER)	I	2049-10-21T11:51:25.128		32.55	-39.48	117571.16	-15.16		
B (IER)	I	2049-10-21T12:19:29.550		26.60	-42.87	91984.69	-15.22		
C (IER)	I	2049-10-21T12:38:37.478		22.58	-44.75	74490.58	-15.26		
Saturn	I	2049-10-21T12:43:04.238		21.65	-45.13	60200.39		14.16	17.20
Saturn	E	2049-10-21T15:12:40.953		-8.00x	-43.27	60215.35		-12.46	-15.18
C (IER)	E	2049-10-21T15:19:14.351		-9.19x	-42.56	74490.58	15.58		
B (IER)	E	2049-10-21T15:37:55.811		-12.52x	-40.34	91984.69	15.62		
B (OER)	E	2049-10-21T16:05:12.043		-17.15x	-36.58	117571.16	15.66		
A (IER)	E	2049-10-21T16:09:58.056		-17.93x	-35.87	122050.38	15.66		
Encke (IEG)	E	2049-10-21T16:22:03.743		-19.87x	-34.00	133423.31	15.68		
Encke (OEG)	E	2049-10-21T16:22:24.252		-19.92x	-33.95	133744.89	15.68		
A (OER)	E	2049-10-21T16:25:37.436		-20.43x	-33.43	136774.40	15.68		
F ring	E	2049-10-21T16:29:32.457		-21.03x	-32.80	140461.00	15.69		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2049-10-21T13:57:56.040
 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 : 6772479808740923008
 2Mass ID (if available) : 19292908-2158119
 ICRS Star Coord at Epoch: 19h 29m 29.09959s -21:58:12.15695s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 9.946
 G magnitude : 12.340
 RP magnitude : 11.606
 BP magnitude : 12.938
 DUPflag : 0
 Distance (au) : 10.071
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 13.35
 Sun-Target sep (deg) : 82.75
 Sun-Moon sep (deg) : 141.21
 B (ring opening deg) : 23.86
 PA of pole (deg) : 6.76
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 0.086
 C/A sky separation (km) : 630.4
 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_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	2049-10-21T11:25:25.566		38.36	-32.85	140461.00	-15.10		
A (OER)	I	2049-10-21T11:29:29.577		37.52	-33.41	136774.40	-15.11		
Encke (OEG)	I	2049-10-21T11:32:49.989		36.84	-33.86	133744.89	-15.12		
Encke (IEG)	I	2049-10-21T11:33:11.256		36.77	-33.91	133423.31	-15.12		
A (IER)	I	2049-10-21T11:45:42.720		34.20	-35.54	122050.38	-15.15		
B (OER)	I	2049-10-21T11:50:38.315		33.20	-36.15	117571.16	-15.16		
B (IER)	I	2049-10-21T12:18:42.920		27.48	-39.26	91984.69	-15.22		
C (IER)	I	2049-10-21T12:37:51.053		23.61	-40.97	74490.58	-15.26		
Saturn	I	2049-10-21T12:42:41.767		22.64	-41.35	60203.02		13.87	16.86
Saturn	E	2049-10-21T15:12:21.674		-5.78x	-39.77	60213.36		-12.70	-15.46
C (IER)	E	2049-10-21T15:18:37.182		-6.86x	-39.16	74490.58	15.57		
B (IER)	E	2049-10-21T15:37:19.717		-10.03x	-37.15	91984.69	15.60		
B (OER)	E	2049-10-21T16:04:37.697		-14.42x	-33.71	117571.16	15.64		
A (IER)	E	2049-10-21T16:09:24.033		-15.16x	-33.06	122050.38	15.65		
Encke (IEG)	E	2049-10-21T16:21:30.554		-16.98x	-31.34	133423.31	15.66		
Encke (OEG)	E	2049-10-21T16:21:51.086		-17.03x	-31.29	133744.89	15.66		
A (OER)	E	2049-10-21T16:25:04.497		-17.51x	-30.82	136774.40	15.67		
F ring	E	2049-10-21T16:28:59.794		-18.08x	-30.23	140461.00	15.67		