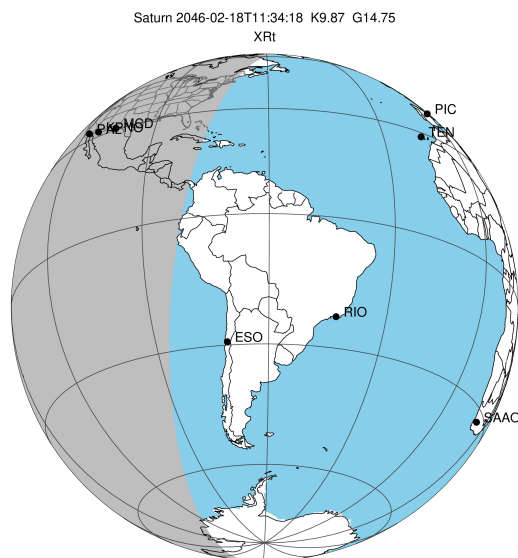


target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2046-02-18T11:34:18.590  
 Event type : XRT  
 : No Saturn occs  
 : Ring occs: topocentric, not geocentric  
 Gaia source ID : 4115035486621485312  
 2Mass ID (if available) : 17215213-2140389

Saturn 2046-02-18T11:34:18 K9.87 G14.75 XRT

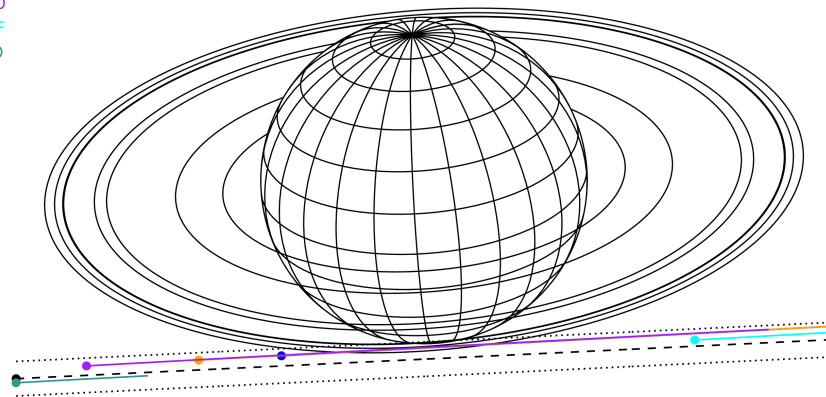
ICRS Star Coord at Epoch: 17h 21m 52.13416s -21:40:39.16180s

RUWE (>1.4 is poor) : 1.00  
 K magnitude : 9.866  
 G magnitude : 14.752  
 RP magnitude : 13.534  
 BP magnitude : 16.383  
 DUPflag : 0  
 Distance (au) : 10.351  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 20.64  
 Sun-Target sep (deg) : 68.19  
 Sun-Moon sep (deg) : 146.75  
 B (ring opening deg) : 26.60  
 PA of pole (deg) : 4.66



2046-02-18T11:34:18.5900 α: 17 21 52.1342 δ: -21 40 39.162 C/A 8.779° PA 2.74 deg v\_sky +20.64 km/s D 10.35 AU  
 Credit: Styled after SORA/Lucky Star

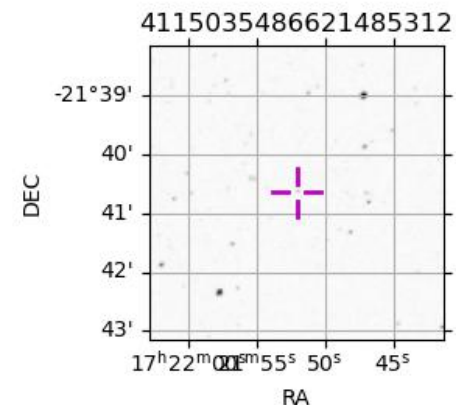
Earth  
 PAL  
 KPNO  
 MCD  
 IRTF  
 ESO



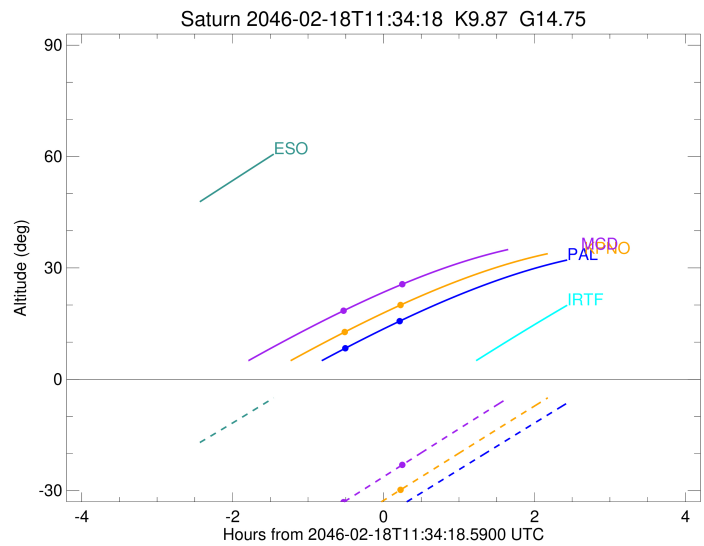
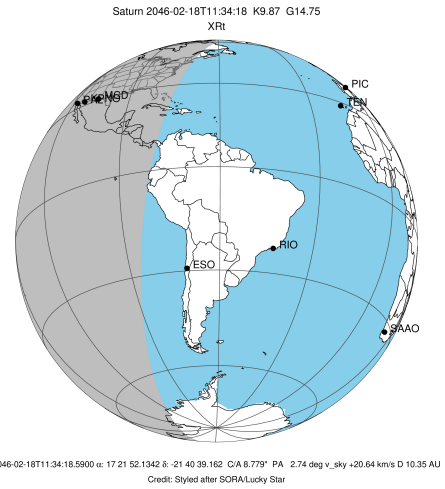
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

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	+		+	FEB 18 11:03 - FEB 18 11:47	PnnRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+		+	FEB 18 11:03 - FEB 18 11:48	PnnRie
MCD	McDonald Obs.	30.7	256.0	+		+	FEB 18 11:02 - FEB 18 11:49	PnnRie
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					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
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



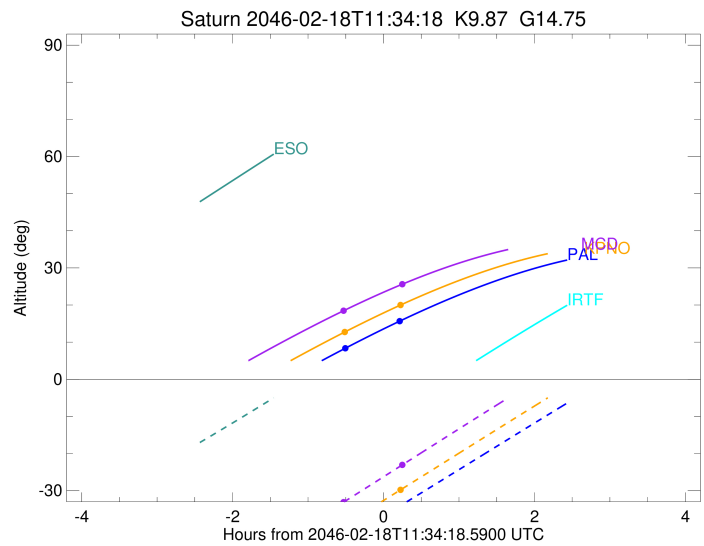
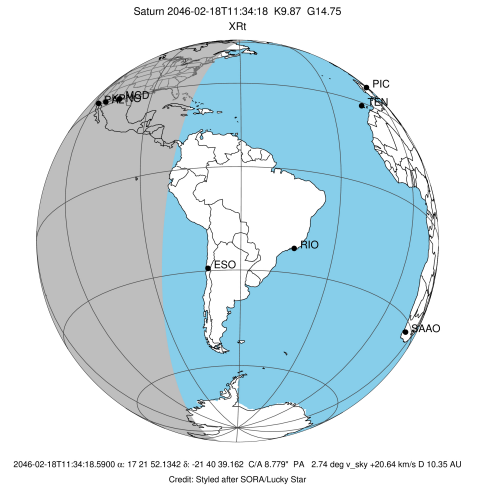
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2046-02-18T11:30:52.730  
 Event type : XRt  
 : No Saturn occs  
 : Ring occs: topocentric, not geocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 4115035486621485312  
 2Mass ID (if available) : 17215213-2140389  
 ICRS Star Coord at Epoch: 17h 21m 52.13416s -21:40:39.16180s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 9.866  
 G magnitude : 14.752  
 RP magnitude : 13.534  
 BP magnitude : 16.383  
 DUPflag : 0  
 Distance (au) : 10.351  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 20.64  
 Sun-Target sep (deg) : 68.19  
 Sun-Moon sep (deg) : 147.54  
 B (ring opening deg) : 26.60  
 PA of pole (deg) : 4.66  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 8.229  
 C/A sky separation (km) : 61775.8  
 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	2046-02-18T11:03:32.165		8.28	-43.08	140461.00	-3.93		
No planet occultations									
F ring	E	2046-02-18T11:47:22.179		15.69	-34.13	140461.00	3.91		

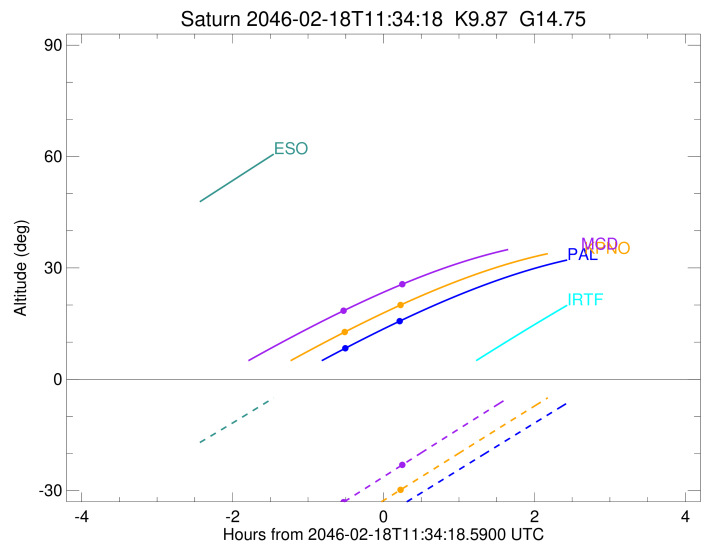
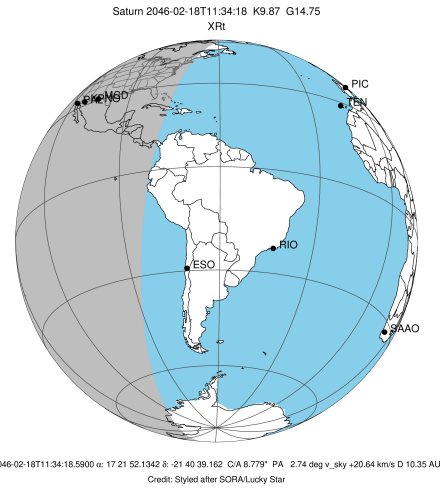
target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2046-02-18T11:31:02.850  
 Event type : XRt  
 : No Saturn occs  
 : Ring occs: topocentric, not geocentric  
 Observer code : KPNO  
 Location : Kitt Peak Natl Obs  
 Latitude (deg) : 31.96333  
 E. Longitude (deg) : 248.40000  
 Altitude (km) : 2.120  
 Gaia source ID : 4115035486621485312  
 2Mass ID (if available) : 17215213-2140389  
 ICRS Star Coord at Epoch: 17h 21m 52.13416s -21:40:39.16180s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 9.866  
 G magnitude : 14.752  
 RP magnitude : 13.534  
 BP magnitude : 16.383  
 DUPflag : 0  
 Distance (au) : 10.351  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 20.64  
 Sun-Target sep (deg) : 68.19  
 Sun-Moon sep (deg) : 147.55  
 B (ring opening deg) : 26.60  
 PA of pole (deg) : 4.66  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 8.221  
 C/A sky separation (km) : 61719.4  
 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	2046-02-18T11:03:06.204		12.66	-39.20	140461.00	-4.02		
No planet occultations									
F ring	E	2046-02-18T11:48:03.218		20.03	-29.75	140461.00	4.00		

target : Saturn  
 target radius (km) : 60268.00  
 C/A epoch : 2046-02-18T11:31:22.340  
 Event type : XRt  
 : No Saturn occs  
 : Ring occs: topocentric, not geocentric  
 Observer code : MCD  
 Location : McDonald Obs. 2.7m  
 Latitude (deg) : 30.67158  
 E. Longitude (deg) : 255.97844  
 Altitude (km) : 2.075  
 Gaia source ID : 4115035486621485312  
 2Mass ID (if available) : 17215213-2140389  
 ICRS Star Coord at Epoch: 17h 21m 52.13416s -21:40:39.16180s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 9.866  
 G magnitude : 14.752  
 RP magnitude : 13.534  
 BP magnitude : 16.383  
 DUPflag : 0  
 Distance (au) : 10.351  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 20.64  
 Sun-Target sep (deg) : 68.19  
 Sun-Moon sep (deg) : 147.54  
 B (ring opening deg) : 26.60  
 PA of pole (deg) : 4.66  
 Pole direction: RA (deg): 40.60000  
 Dec (deg): 83.50000  
 C/A sky separation (") : 8.205  
 C/A sky separation (km) : 61596.7  
 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	2046-02-18T11:02:11.201		18.40	-33.19	140461.00	-4.21		
No planet occultations									
F ring	E	2046-02-18T11:49:26.480		25.63	-23.02	140461.00	4.20		