

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-10-12T02:36:27.890  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3426134444683611136  
 2Mass ID (if available) : 06051247+2337428

Uranus 2032-10-12T02:36:27 K14.26 G16.04 PgtRgt

ICRS Star Coord at Epoch: 06h 05m 12.47145s +23:37:42.68906s

RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.260  
 G magnitude : 16.043  
 RP magnitude : 15.449  
 BP magnitude : 16.442  
 DUPflag : 0  
 Distance (au) : 18.705  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -2.70  
 Sun-Target sep (deg) : 107.68  
 Sun-Moon sep (deg) : 162.16  
 B (ring opening deg) : 74.35  
 PA of pole (deg) : 59.85

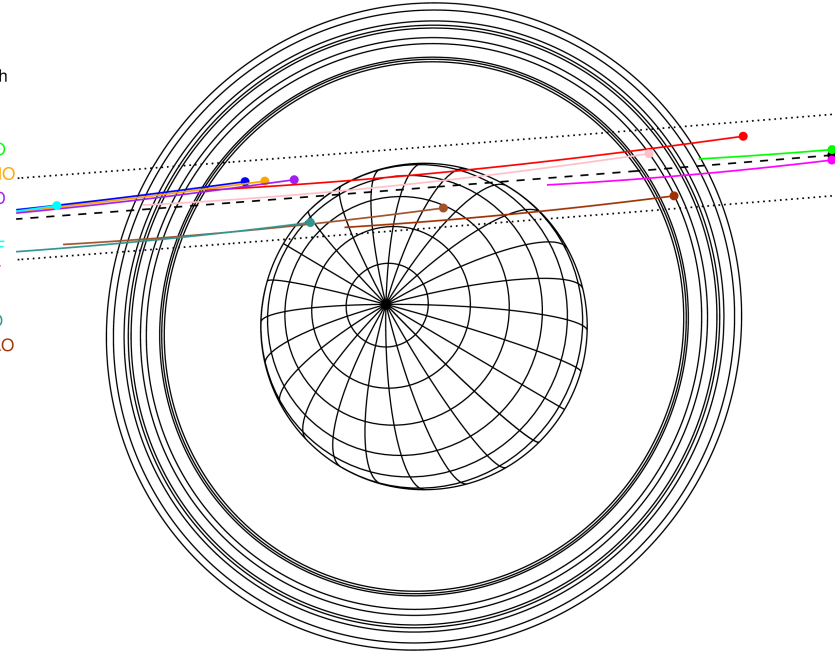
# a(km) ring

- 1 41837.2 6
- 2 42235.0 5
- 3 42571.2 4
- 4 44718.5 alpha
- 5 45661.1 beta
- 6 47176.1 eta
- 7 47626.3 gamma
- 8 48300.3 delta
- 9 50026.7 lambda
- 10 51149.4 epsilon



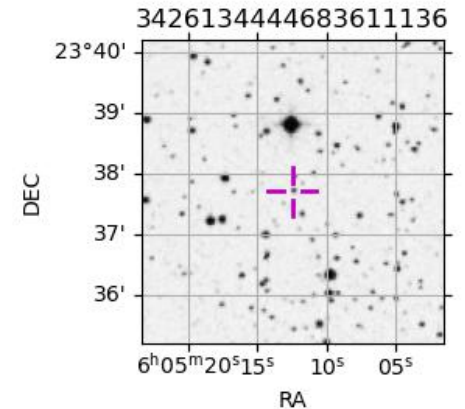
2032-10-12T02:36:27.8900 α: 06 05 12.4714 s: +23 37 42.689 C/A 1.614" PA 186.43 deg v\_sky - 2.70 km/s D 18.71 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PIC  
 PAL  
 PMO  
 KPNO  
 MCD  
 TEN  
 IRTF  
 KAV  
 RIO  
 ESO  
 SAO

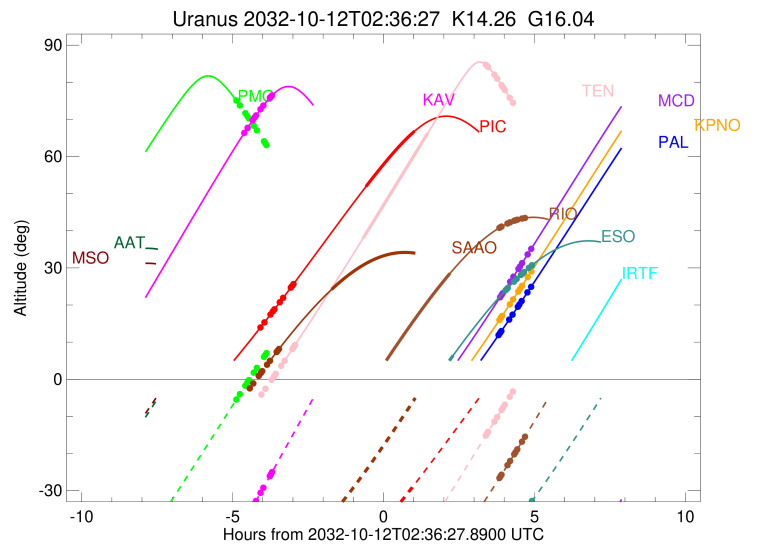
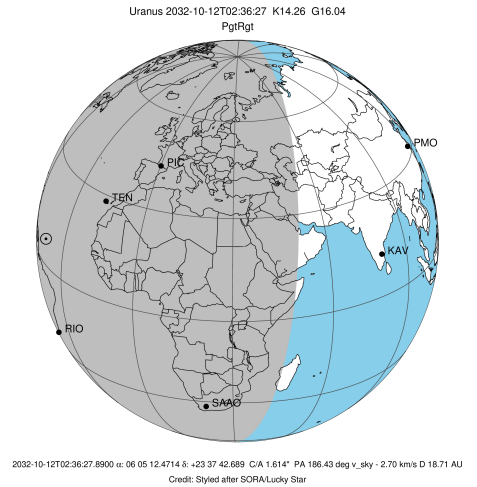


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+	OCT 11 22:29 - OCT 12 05:46	PieRie
PAL	Palomar Mt (200")	33.4	243.1			+++++	OCT 12 06:24 - OCT 12 07:27	PnnRne
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+			OCT 11 21:41 - OCT 11 21:41	PnnRin
KPNO	Kitt Peak Natl Obs	32.0	248.4			+++++	OCT 12 06:26 - OCT 12 07:27	PnnRne
MCD	McDonald Obs. 2.7m	30.7	256.0			+++++	OCT 12 06:27 - OCT 12 07:27	PnnRne
TEN	Teide Obs./Tenerife	28.3	343.5	++++	+ +	+++++	OCT 11 23:20 - OCT 12 06:37	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++			OCT 11 21:57 - OCT 11 22:54	PnnRin
RIO	Rio de Janeiro	-22.9	316.8		+	+++++	OCT 12 04:48 - OCT 12 07:15	PneRne
ESO	European Southern Obs	-29.3	289.3		+	+++++	OCT 12 04:55 - OCT 12 07:29	PneRne
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	++++	+		OCT 11 22:51 - OCT 12 00:53	PinRin
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

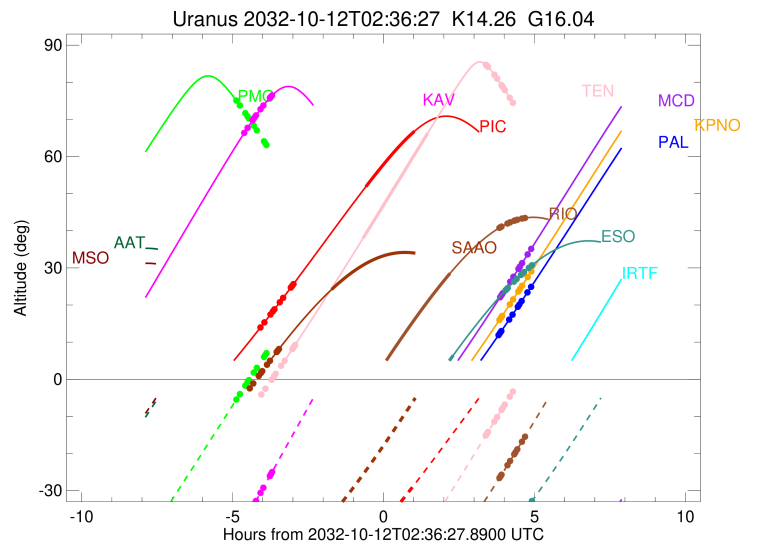
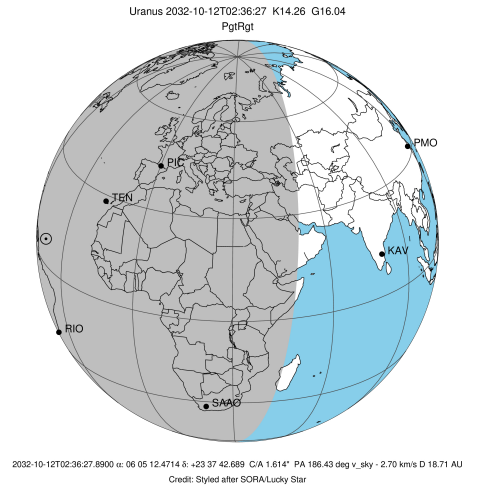


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-10-12T02:52:36.240  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 3426134444683611136  
 2Mass ID (if available) : 06051247+2337428  
 ICRS Star Coord at Epoch: 06h 05m 12.47145s +23:37:42.68906s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.260  
 G magnitude : 16.043  
 RP magnitude : 15.449  
 BP magnitude : 16.442  
 DUPflag : 0  
 Distance (au) : 18.705  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -2.70  
 Sun-Target sep (deg) : 107.68  
 Sun-Moon sep (deg) : 162.84  
 B (ring opening deg) : 74.35  
 PA of pole (deg) : 59.85  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.752  
 C/A sky separation (km) : 23763.9  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-10-11T22:29:35.176		13.56	-50.96	51494.11	-2.38		
lambda	I	2032-10-11T22:39:49.907		15.34	-51.88	50026.71	-2.39		
delta	I	2032-10-11T22:51:54.343		17.47	-52.81	48300.35	-2.38		
gamma	I	2032-10-11T22:56:39.735		18.31	-53.14	47621.63	-2.38		
eta	I	2032-10-11T22:59:47.300		18.86	-53.33	47176.12	-2.37		
beta	I	2032-10-11T23:10:34.420		20.79	-53.92	45643.06	-2.36		
alpha	I	2032-10-11T23:17:18.750		22.00	-54.21	44689.15	-2.35		
4	I	2032-10-11T23:32:28.386		24.73	-54.65	42560.69	-2.33		
5	I	2032-10-11T23:35:19.079		25.25	-54.70	42158.87	-2.32		
6	I	2032-10-11T23:37:28.091		25.64	-54.73	41862.23	-2.32		
Uranus	I	2032-10-12T02:01:17.263		51.86	-43.93	25525.26		3.80	3.98
Uranus	E	2032-10-12T03:37:59.653		66.80	-28.35	25195.60		12.69	13.27
6	E	2032-10-12T05:46:39.467		66.57	-5.01	41797.08	2.62		
5	E	2032-10-12T05:49:29.418		66.22	-4.49x	42233.99	2.63		
4	E	2032-10-12T05:51:55.763		65.92	-4.05x	42616.40	2.65		
alpha	E	2032-10-12T06:04:59.619		64.19	-1.67x	44713.78	2.70		
beta	E	2032-10-12T06:10:47.079		63.37	-0.62x	45660.31	2.72		
eta	E	2032-10-12T06:20:00.884		62.02	1.04x	47176.12	2.75		
gamma	E	2032-10-12T06:22:44.039		61.60	1.53x	47626.01	2.76		
delta	E	2032-10-12T06:26:47.705		60.98	2.26x	48300.35	2.77		
lambda	E	2032-10-12T06:37:07.088		59.35	4.10x	50026.71	2.80		
epsilon	E	2032-10-12T06:41:38.775		58.62	4.90x	50789.03	2.82		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-10-12T03:07:56.230  
 Event type : PgtRgt  
 : Uranus 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 : 3426134444683611136  
 2Mass ID (if available) : 06051247+2337428  
 ICRS Star Coord at Epoch: 06h 05m 12.47145s +23:37:42.68906s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.260  
 G magnitude : 16.043  
 RP magnitude : 15.449  
 BP magnitude : 16.442  
 DUPflag : 0  
 Distance (au) : 18.705  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -2.70  
 Sun-Target sep (deg) : 107.68  
 Sun-Moon sep (deg) : 162.64  
 B (ring opening deg) : 74.35  
 PA of pole (deg) : 59.85  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.934  
 C/A sky separation (km) : 26233.3  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ural11.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ural11.bsp  
 ural61.bsp  
 vgr2.ural61.bsp  
 peph.ural60.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk

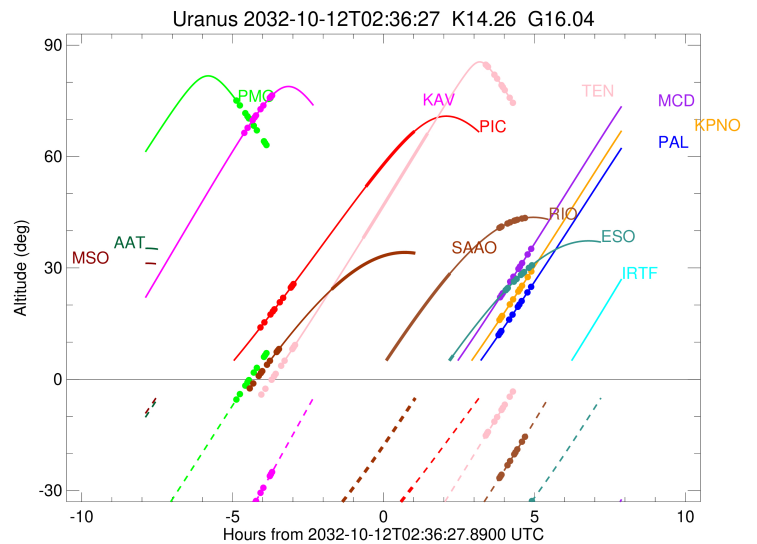
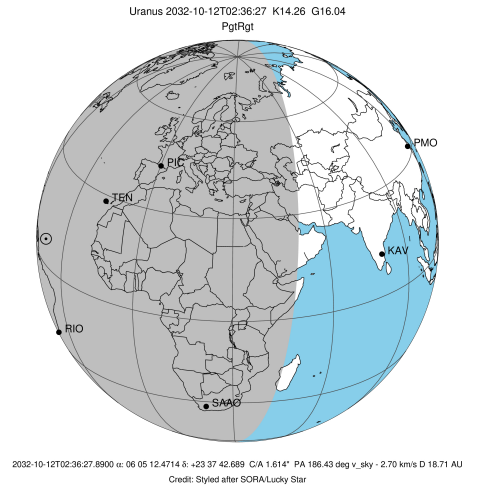


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-10-11T21:42:30.202	-20.52x	39.14x	51486.80	-1.97			
lambda	I	2032-10-11T21:54:55.747	-22.18x	37.32x	50026.71	-1.94			
delta	I	2032-10-11T22:09:52.478	-24.07x	35.00x	48300.35	-1.91			
gamma	I	2032-10-11T22:15:49.917	-24.78x	34.04x	47621.52	-1.89			
eta	I	2032-10-11T22:19:46.002	-25.23x	33.39x	47176.12	-1.88			
beta	I	2032-10-11T22:33:28.745	-26.74x	31.09x	45642.62	-1.85			
alpha	I	2032-10-11T22:42:09.138	-27.62x	29.59x	44688.23	-1.82			
4	I	2032-10-11T23:01:54.414	-29.42x	26.06x	42563.62	-1.77			
5	I	2032-10-11T23:05:42.995	-29.73x	25.36x	42157.34	-1.75			
6	I	2032-10-11T23:08:34.268	-29.96x	24.84x	41859.78	-1.74			

No planet occultations

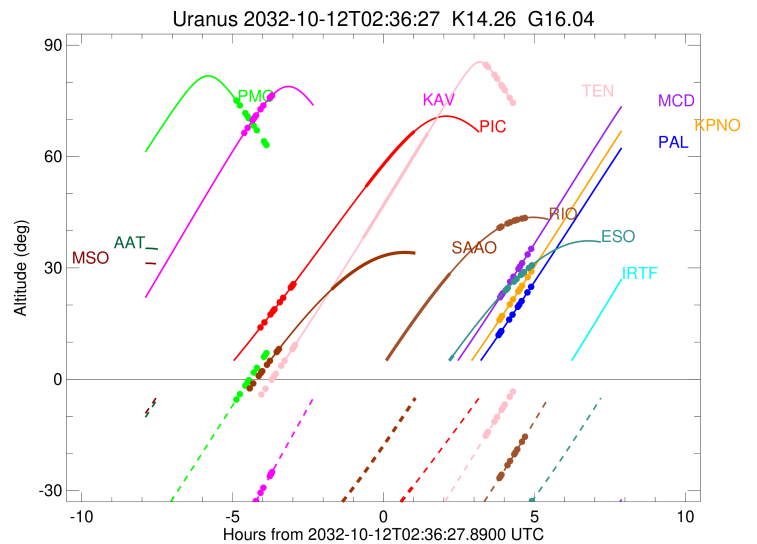
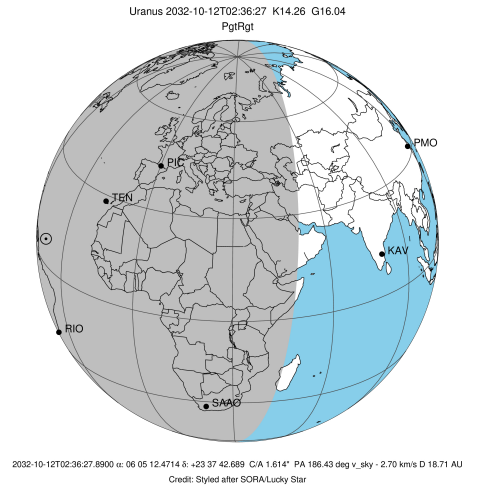
6	E	2032-10-12T06:24:37.604	11.79	-59.84	41797.32	2.20			
5	E	2032-10-12T06:27:58.717	12.45	-60.25	42232.72	2.22			
4	E	2032-10-12T06:30:52.456	13.02	-60.59	42616.45	2.24			
alpha	E	2032-10-12T06:46:07.923	16.05	-62.17	44713.50	2.33			
beta	E	2032-10-12T06:52:48.158	17.38	-62.75	45660.20	2.37			
eta	E	2032-10-12T07:03:19.256	19.50	-63.50	47176.12	2.43			
gamma	E	2032-10-12T07:06:23.643	20.12	-63.68	47626.00	2.45			
delta	E	2032-10-12T07:10:57.774	21.04	-63.92	48300.35	2.47			
lambda	E	2032-10-12T07:22:28.088	23.38	-64.33	50026.71	2.53			
epsilon	E	2032-10-12T07:27:27.639	24.40	-64.42	50788.00	2.56			

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-10-12T01:56:23.080  
 Event type : PgtRgt  
 : Uranus 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 : 3426134444683611136  
 2Mass ID (if available) : 06051247+2337428  
 ICRS Star Coord at Epoch: 06h 05m 12.47145s +23:37:42.68906s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.260  
 G magnitude : 16.043  
 RP magnitude : 15.449  
 BP magnitude : 16.442  
 DUPflag : 0  
 Distance (au) : 18.706  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -2.70  
 Sun-Target sep (deg) : 107.68  
 Sun-Moon sep (deg) : 161.61  
 B (ring opening deg) : 74.35  
 PA of pole (deg) : 59.85  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.822  
 C/A sky separation (km) : 24721.4  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-10-11T21:41:55.857		75.46	-5.90	51505.81	-2.70		
lambda	I	2032-10-11T21:51:04.754		73.76	-3.97x	50026.71	-2.68		
delta	I	2032-10-11T22:01:52.797		71.66	-1.70x	48300.35	-2.65		
gamma	I	2032-10-11T22:06:09.966		70.82	-0.80x	47621.78	-2.63		
eta	I	2032-10-11T22:08:59.684		70.25	-0.21x	47176.12	-2.62		
beta	I	2032-10-11T22:18:48.647		68.26	1.85x	45643.55	-2.58		
alpha	I	2032-10-11T22:24:59.609		67.00	3.14x	44690.07	-2.56		
4	I	2032-10-11T22:39:05.045		64.08	6.06x	42558.50	-2.49		
5	I	2032-10-11T22:41:43.277		63.53	6.61x	42160.21	-2.47		
6	I	2032-10-11T22:43:44.485		63.11	7.03x	41863.89	-2.46		
Uranus	I	2032-10-12T01:18:55.228		30.26	36.39x	25510.81		4.54	4.76
Uranus	E	2032-10-12T02:28:55.177		15.84	45.93x	25297.18		10.71	11.20
6	E	2032-10-12T05:18:06.795		-15.43x	45.37x	41798.23	2.05		
5	E	2032-10-12T05:21:41.093		-16.00x	44.97x	42228.05	2.05		
4	E	2032-10-12T05:24:52.528		-16.50x	44.60x	42616.56	2.06		
alpha	E	2032-10-12T05:41:39.885		-19.07x	42.49x	44711.46	2.09		
beta	E	2032-10-12T05:49:08.763		-20.17x	41.48x	45658.95	2.11		
eta	E	2032-10-12T06:01:05.708		-21.87x	39.77x	47176.12	2.13		
gamma	E	2032-10-12T06:04:36.896		-22.35x	39.25x	47625.66	2.13		
delta	E	2032-10-12T06:09:52.957		-23.06x	38.45x	48300.35	2.14		
lambda	E	2032-10-12T06:23:17.212		-24.80x	36.34x	50026.71	2.15		
epsilon	E	2032-10-12T06:29:15.867		-25.54x	35.37x	50800.66	2.17		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-10-12T03:11:20.650  
 Event type : PgtRgt  
 : Uranus 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 : 3426134444683611136  
 2Mass ID (if available) : 06051247+2337428  
 ICRS Star Coord at Epoch: 06h 05m 12.47145s +23:37:42.68906s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.260  
 G magnitude : 16.043  
 RP magnitude : 15.449  
 BP magnitude : 16.442  
 DUPflag : 0  
 Distance (au) : 18.705  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -2.70  
 Sun-Target sep (deg) : 107.68  
 Sun-Moon sep (deg) : 162.70  
 B (ring opening deg) : 74.35  
 PA of pole (deg) : 59.85  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.913  
 C/A sky separation (km) : 25950.8  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ural11.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ural11.bsp  
 ural61.bsp  
 vgr2.ural61.bsp  
 peph.ural60.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk

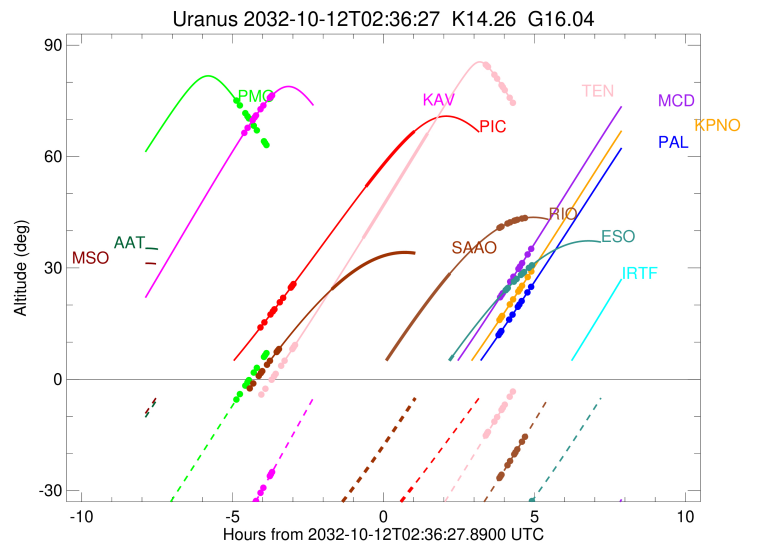
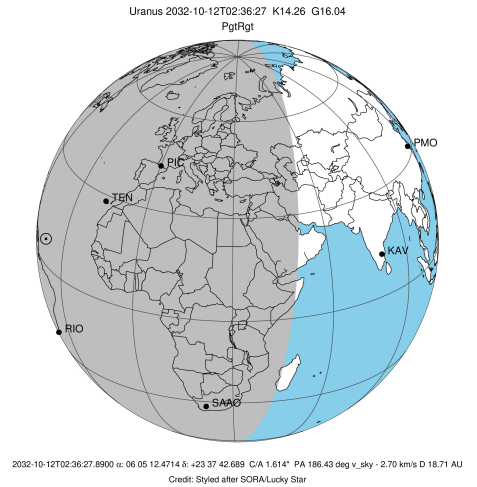


Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-10-11T21:44:58.960	-24.71x	36.52x	51486.73	-1.95		
lambda	I	2032-10-11T21:57:31.073	-26.25x	34.45x	50026.71	-1.93		
delta	I	2032-10-11T22:12:34.580	-27.95x	31.86x	48300.35	-1.89		
gamma	I	2032-10-11T22:18:34.336	-28.58x	30.80x	47621.52	-1.88		
eta	I	2032-10-11T22:22:31.826	-28.99x	30.09x	47176.12	-1.87		
beta	I	2032-10-11T22:36:18.635	-30.29x	27.59x	45642.63	-1.84		
alpha	I	2032-10-11T22:45:00.898	-31.04x	25.97x	44688.25	-1.82		
4	I	2032-10-11T23:04:48.312	-32.49x	22.20x	42563.54	-1.77		
5	I	2032-10-11T23:08:36.840	-32.72x	21.46x	42157.37	-1.75		
6	I	2032-10-11T23:11:28.041	-32.89x	20.91x	41859.85	-1.74		

No planet occultations

6	E	2032-10-12T06:26:23.667	15.87	-63.53	41797.18	2.26		
5	E	2032-10-12T06:29:40.597	16.53	-63.83	42233.51	2.27		
4	E	2032-10-12T06:32:29.963	17.11	-64.08	42616.41	2.30		
alpha	E	2032-10-12T06:47:25.624	20.15	-65.13	44713.80	2.38		
beta	E	2032-10-12T06:53:57.461	21.49	-65.45	45660.37	2.42		
eta	E	2032-10-12T07:04:15.760	23.62	-65.76	47176.12	2.48		
gamma	E	2032-10-12T07:07:16.542	24.24	-65.81	47626.04	2.50		
delta	E	2032-10-12T07:11:45.351	25.17	-65.85	48300.35	2.52		
lambda	E	2032-10-12T07:23:02.707	27.52	-65.73	50026.71	2.58		
epsilon	E	2032-10-12T07:27:56.308	28.54	-65.59	50786.70	2.61		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-10-12T03:15:17.230  
 Event type : PgtRgt  
 : Uranus 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 : 3426134444683611136  
 2Mass ID (if available) : 06051247+2337428  
 ICRS Star Coord at Epoch: 06h 05m 12.47145s +23:37:42.68906s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.260  
 G magnitude : 16.043  
 RP magnitude : 15.449  
 BP magnitude : 16.442  
 DUPflag : 0  
 Distance (au) : 18.705  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -2.70  
 Sun-Target sep (deg) : 107.68  
 Sun-Moon sep (deg) : 162.79  
 B (ring opening deg) : 74.35  
 PA of pole (deg) : 59.85  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.885  
 C/A sky separation (km) : 25567.5  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ural11.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ural11.bsp  
 ural61.bsp  
 vgr2.ural61.bsp  
 peph.ural60.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk

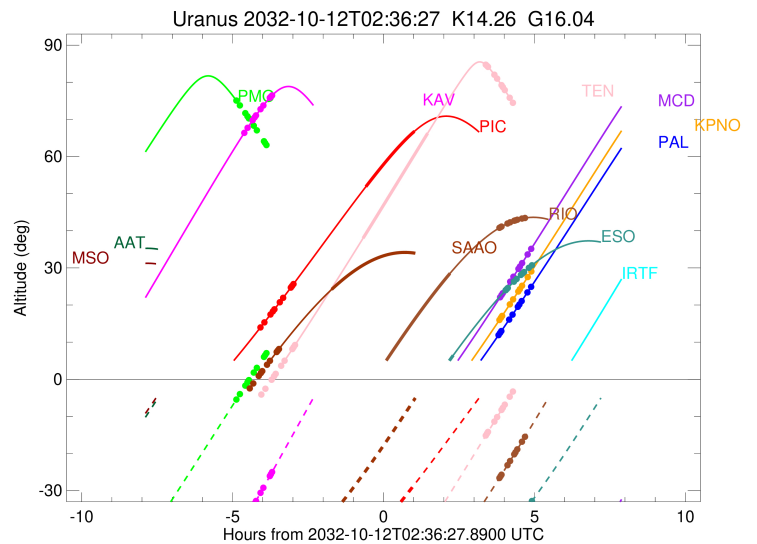
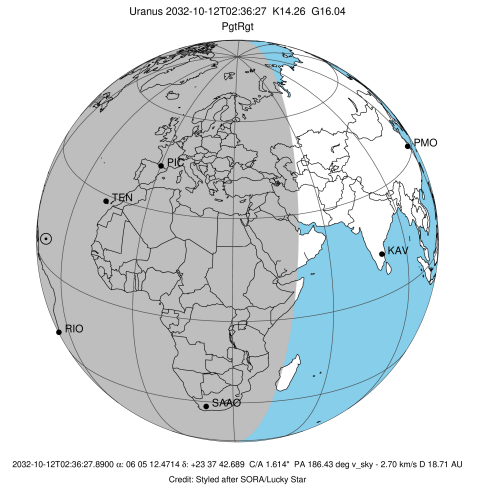


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-10-11T21:49:22.516	-29.82x	31.31x	51486.58	-1.93			
lambda	I	2032-10-11T22:02:01.099	-31.08x	28.97x	50026.71	-1.91			
delta	I	2032-10-11T22:17:10.521	-32.42x	26.10x	48300.35	-1.88			
gamma	I	2032-10-11T22:23:12.008	-32.90x	24.94x	47621.52	-1.87			
eta	I	2032-10-11T22:27:10.441	-33.20x	24.17x	47176.12	-1.86			
beta	I	2032-10-11T22:40:59.226	-34.12x	21.46x	45642.64	-1.84			
alpha	I	2032-10-11T22:49:41.654	-34.60x	19.72x	44688.27	-1.82			
4	I	2032-10-11T23:09:26.272	-35.42x	15.73x	42563.42	-1.77			
5	I	2032-10-11T23:13:13.580	-35.53x	14.96x	42157.43	-1.76			
6	I	2032-10-11T23:16:03.820	-35.60x	14.38x	41859.97	-1.75			

No planet occultations

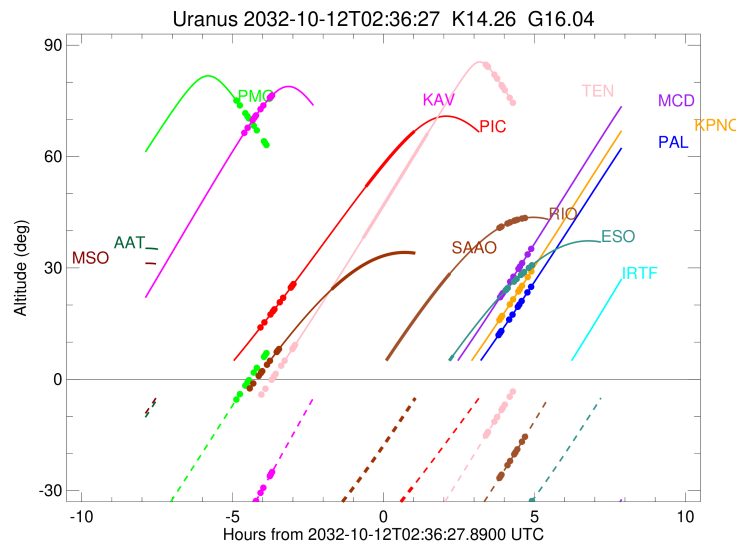
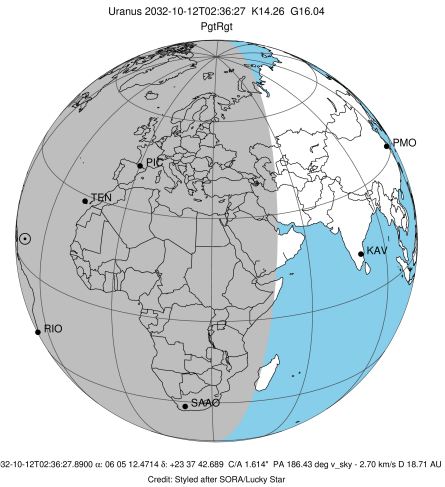
6	E	2032-10-12T06:27:46.383	21.99	-66.87	41797.01	2.33			
5	E	2032-10-12T06:30:57.787	22.66	-66.97	42234.47	2.34			
4	E	2032-10-12T06:33:41.527	23.23	-67.03	42616.37	2.37			
alpha	E	2032-10-12T06:48:11.426	26.27	-67.09	44714.16	2.45			
beta	E	2032-10-12T06:54:32.391	27.60	-66.96	45660.58	2.49			
eta	E	2032-10-12T07:04:34.165	29.72	-66.55	47176.12	2.55			
gamma	E	2032-10-12T07:07:30.298	30.34	-66.39	47626.09	2.56			
delta	E	2032-10-12T07:11:52.259	31.27	-66.12	48300.35	2.59			
lambda	E	2032-10-12T07:22:52.981	33.61	-65.26	50026.71	2.64			
epsilon	E	2032-10-12T07:27:39.063	34.63	-64.81	50785.22	2.67			

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-10-12T03:03:28.280  
 Event type : PgtRgt  
 : Uranus 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 : 3426134444683611136  
 2Mass ID (if available) : 06051247+2337428  
 ICRS Star Coord at Epoch: 06h 05m 12.47145s +23:37:42.68906s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.260  
 G magnitude : 16.043  
 RP magnitude : 15.449  
 BP magnitude : 16.442  
 DUPflag : 0  
 Distance (au) : 18.705  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -2.70  
 Sun-Target sep (deg) : 107.68  
 Sun-Moon sep (deg) : 163.00  
 B (ring opening deg) : 74.35  
 PA of pole (deg) : 59.85  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.652  
 C/A sky separation (km) : 22410.9  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itrff93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-10-11T22:31:14.072	-4.57x	-50.82	51497.07	-2.31			
lambda	I	2032-10-11T22:41:48.774	-2.53x	-52.91	50026.71	-2.32			
delta	I	2032-10-11T22:54:12.869	-0.11x	-55.30	48300.35	-2.32			
gamma	I	2032-10-11T22:59:05.245	0.85x	-56.22	47621.67	-2.32			
eta	I	2032-10-11T23:02:17.194	1.49x	-56.81	47176.12	-2.32			
beta	I	2032-10-11T23:13:17.795	3.68x	-58.81	45643.23	-2.32			
alpha	I	2032-10-11T23:20:09.260	5.06	-60.00	44689.49	-2.31			
4	I	2032-10-11T23:35:31.998	8.19	-62.53	42559.72	-2.30			
5	I	2032-10-11T23:38:23.643	8.77	-62.97	42159.46	-2.30			
6	I	2032-10-11T23:40:33.837	9.22	-63.30	41863.02	-2.30			
Uranus	I	2032-10-12T01:55:39.394	37.95	-64.57	25548.40			2.13	2.23
Uranus	E	2032-10-12T04:04:21.342	66.30	-40.34	25127.82			13.87	14.50
6	E	2032-10-12T05:59:21.500	84.78	-15.24	41796.43	2.77			
5	E	2032-10-12T06:02:04.040	84.45	-14.65	42237.98	2.78			
4	E	2032-10-12T06:04:20.738	84.13	-14.14	42616.15	2.80			
alpha	E	2032-10-12T06:16:44.319	82.05	-11.41	44715.35	2.85			
beta	E	2032-10-12T06:22:13.792	81.01	-10.21	45661.23	2.87			
eta	E	2032-10-12T06:30:59.327	79.25	-8.28	47176.12	2.90			
gamma	E	2032-10-12T06:33:34.410	78.72	-7.71	47626.24	2.91			
delta	E	2032-10-12T06:37:25.882	77.92	-6.86	48300.35	2.92			
lambda	E	2032-10-12T06:47:14.739	75.85	-4.71x	50026.71	2.94			
epsilon	E	2032-10-12T06:51:30.697	74.93	-3.78x	50781.82	2.96			

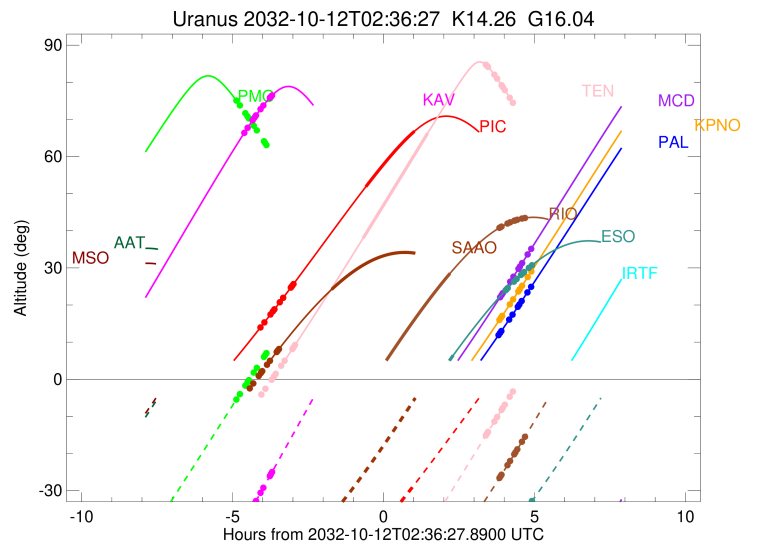
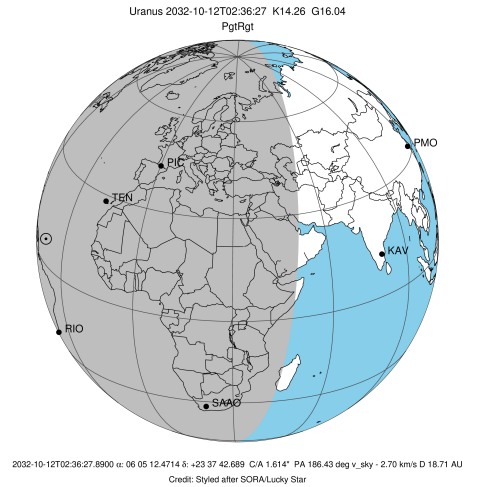
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-10-12T02:05:25.790  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : KAV  
 Location : Kavalur Observatory  
 Latitude (deg) : 12.57556  
 E. Longitude (deg) : 78.83167  
 Altitude (km) : 0.722  
 Gaia source ID : 3426134444683611136  
 2Mass ID (if available) : 06051247+2337428  
 ICRS Star Coord at Epoch: 06h 05m 12.47145s +23:37:42.68906s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.260  
 G magnitude : 16.043  
 RP magnitude : 15.449  
 BP magnitude : 16.442  
 DUPflag : 0  
 Distance (au) : 18.705  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -2.70  
 Sun-Target sep (deg) : 107.68  
 Sun-Moon sep (deg) : 161.72  
 B (ring opening deg) : 74.35  
 PA of pole (deg) : 59.85  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.573  
 C/A sky separation (km) : 21340.4  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-10-11T21:57:44.620		65.95	-38.96	51515.24	-2.86		
lambda	I	2032-10-11T22:06:25.725		67.76	-36.84	50026.71	-2.85		
delta	I	2032-10-11T22:16:32.763		69.80	-34.37	48300.35	-2.84		
gamma	I	2032-10-11T22:20:32.256		70.59	-33.40	47621.95	-2.83		
eta	I	2032-10-11T22:23:09.979		71.09	-32.76	47176.12	-2.82		
beta	I	2032-10-11T22:32:14.116		72.79	-30.55	45644.21	-2.80		
alpha	I	2032-10-11T22:37:54.413		73.79	-29.16	44691.37	-2.79		
4	I	2032-10-11T22:50:45.283		75.86	-26.03	42555.32	-2.76		
5	I	2032-10-11T22:53:05.851		76.20	-25.46	42162.59	-2.75		
6	I	2032-10-11T22:54:55.246		76.45	-25.01	41866.35	-2.74		
Uranus	I	2032-10-12T00:49:46.006		67.49	2.88x	25558.82		-0.28	-0.29
Uranus	E	2032-10-12T03:18:31.126		34.17	38.12x	25122.21		13.96	14.60
6	E	2032-10-12T05:19:12.231		6.61	63.11x	41796.83	2.44		
5	E	2032-10-12T05:22:15.766		5.92	63.61x	42235.37	2.44		
4	E	2032-10-12T05:24:52.977		5.33	64.03x	42616.32	2.45		
alpha	E	2032-10-12T05:39:06.104		2.13x	66.10x	44714.20	2.47		
beta	E	2032-10-12T05:45:27.761		0.71x	66.92x	45660.54	2.47		
eta	E	2032-10-12T05:55:40.533		-1.57x	68.05x	47176.12	2.48		
gamma	E	2032-10-12T05:58:42.115		-2.24x	68.34x	47626.05	2.48		
delta	E	2032-10-12T06:03:14.086		-3.25x	68.73x	48300.35	2.48		
lambda	E	2032-10-12T06:14:49.833		-5.81x	69.48x	50026.71	2.48		
epsilon	E	2032-10-12T06:19:56.566		-6.93x	69.69x	50788.12	2.49		



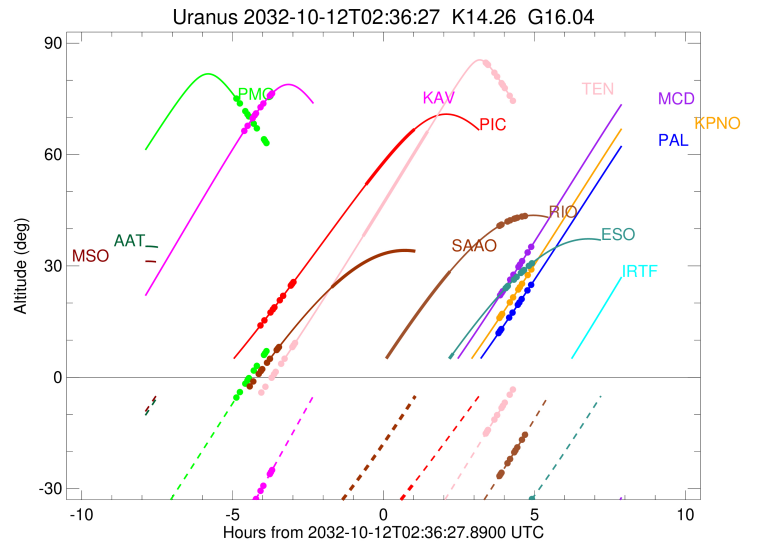
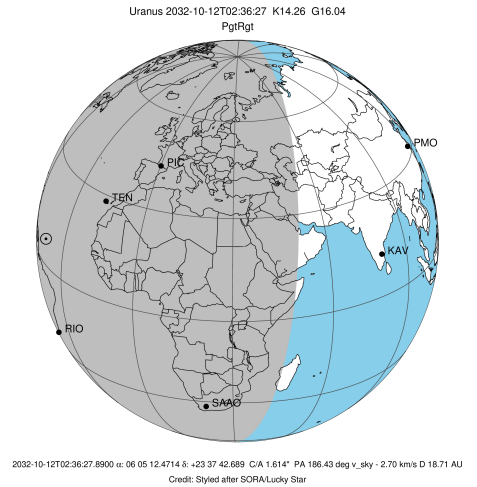
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-10-12T03:13:02.150  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : RIO  
 Location : Rio de Janeiro  
 Latitude (deg) : -22.89506  
 E. Longitude (deg) : 316.77708  
 Altitude (km) : 0.033  
 Gaia source ID : 3426134444683611136  
 2Mass ID (if available) : 06051247+2337428  
 ICRS Star Coord at Epoch: 06h 05m 12.47145s +23:37:42.68906s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.260  
 G magnitude : 16.043  
 RP magnitude : 15.449  
 BP magnitude : 16.442  
 DUPflag : 0  
 Distance (au) : 18.705  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -2.70  
 Sun-Target sep (deg) : 107.68  
 Sun-Moon sep (deg) : 162.81  
 B (ring opening deg) : 74.35  
 PA of pole (deg) : 59.85  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.328  
 C/A sky separation (km) : 18009.7  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

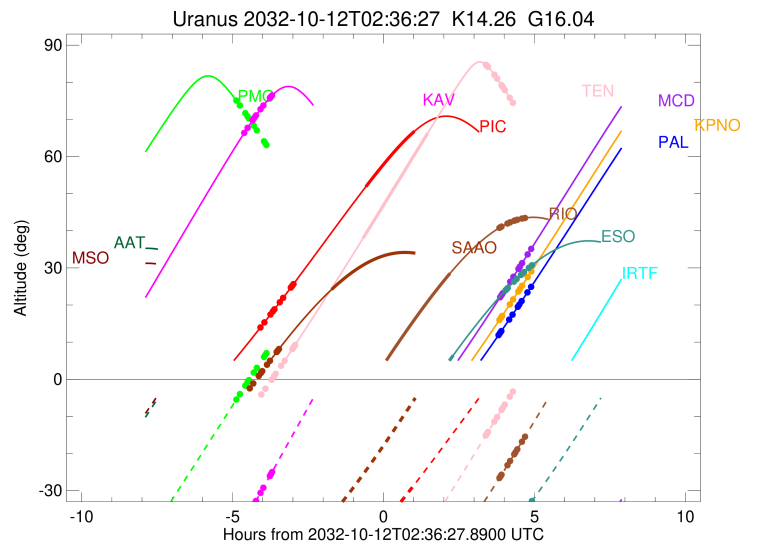
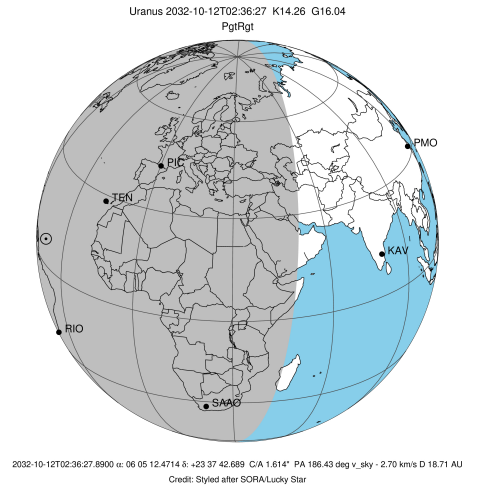
Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-10-11T22:07:17.172	-55.30x	-16.97	51513.20	-2.18		
lambda	I	2032-10-11T22:18:36.280	-52.72x	-19.47	50026.71	-2.19		
delta	I	2032-10-11T22:31:41.623	-49.74x	-22.33	48300.35	-2.20		
gamma	I	2032-10-11T22:36:49.320	-48.57x	-23.45	47621.93	-2.21		
eta	I	2032-10-11T22:40:11.251	-47.81x	-24.18	47176.12	-2.21		
beta	I	2032-10-11T22:51:43.575	-45.19x	-26.66	45644.16	-2.22		
alpha	I	2032-10-11T22:58:52.948	-43.56x	-28.19	44691.32	-2.22		
4	I	2032-10-11T23:14:54.708	-39.94x	-31.56	42555.26	-2.23		
5	I	2032-10-11T23:17:48.321	-39.29x	-32.17	42162.67	-2.23		
6	I	2032-10-11T23:20:03.108	-38.78x	-32.63	41866.44	-2.23		
Uranus	I	2032-10-12T01:25:53.708	-10.94x	-54.77	25550.01		-1.96	-2.05
Uranus	E	2032-10-12T04:48:45.415	28.54	-46.13	25029.62		15.45	16.14
6	E	2032-10-12T06:26:32.740	40.77	-26.67	41795.17	2.98		
5	E	2032-10-12T06:29:08.606	40.98	-26.12	42249.12	2.98		
4	E	2032-10-12T06:31:11.276	41.14	-25.68	42614.87	2.99		
alpha	E	2032-10-12T06:42:50.117	41.95	-23.16	44719.79	3.03		
beta	E	2032-10-12T06:47:59.375	42.27	-22.04	45663.80	3.05		
eta	E	2032-10-12T06:56:13.770	42.70	-20.23	47176.12	3.07		
gamma	E	2032-10-12T06:58:40.372	42.81	-19.70	47626.89	3.08		
delta	E	2032-10-12T07:02:18.834	42.97	-18.90	48300.35	3.09		
lambda	E	2032-10-12T07:11:35.966	43.29	-16.84	50026.71	3.11		
epsilon	E	2032-10-12T07:15:32.923	43.40	-15.97	50764.57	3.12		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-10-12T03:16:03.120  
 Event type : PgtRgt  
 : Uranus 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 : 3426134444683611136  
 2Mass ID (if available) : 06051247+2337428  
 ICRS Star Coord at Epoch: 06h 05m 12.47145s +23:37:42.68906s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.260  
 G magnitude : 16.043  
 RP magnitude : 15.449  
 BP magnitude : 16.442  
 DUPflag : 0  
 Distance (au) : 18.705  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -2.70  
 Sun-Target sep (deg) : 107.68  
 Sun-Moon sep (deg) : 162.68  
 B (ring opening deg) : 74.35  
 PA of pole (deg) : 59.85  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.363  
 C/A sky separation (km) : 18486.0  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itrff93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-10-11T21:47:38.255	-82.69x	12.73x	51512.98	-2.07		
lambda	I	2032-10-11T21:59:34.138	-80.69x	10.12x	50026.71	-2.08		
delta	I	2032-10-11T22:13:26.260	-78.04x	7.10x	48300.35	-2.07		
gamma	I	2032-10-11T22:18:53.449	-76.94x	5.92x	47621.92	-2.07		
eta	I	2032-10-11T22:22:28.503	-76.20x	5.14x	47176.12	-2.07		
beta	I	2032-10-11T22:34:47.869	-73.63x	2.46x	45644.09	-2.07		
alpha	I	2032-10-11T22:42:27.936	-72.01x	0.80x	44691.17	-2.07		
4	I	2032-10-11T22:59:41.960	-68.30x	-2.91x	42555.66	-2.07		
5	I	2032-10-11T23:02:49.593	-67.63x	-3.58x	42162.34	-2.06		
6	I	2032-10-11T23:05:15.021	-67.10x	-4.10x	41866.13	-2.06		
Uranus	I	2032-10-12T01:23:18.091	-36.97x	-32.16	25553.98		-1.46	-1.53
Uranus	E	2032-10-12T04:55:09.647	6.47	-52.78	25031.76		15.41	16.11
6	E	2032-10-12T06:38:45.749	23.91	-41.84	41795.15	2.86		
5	E	2032-10-12T06:41:27.864	24.30	-41.41	42249.44	2.87		
4	E	2032-10-12T06:43:35.108	24.61	-41.08	42614.82	2.88		
alpha	E	2032-10-12T06:55:39.501	26.28	-39.11	44719.97	2.93		
beta	E	2032-10-12T07:00:59.217	27.00	-38.21	45663.91	2.95		
eta	E	2032-10-12T07:09:29.328	28.09	-36.75	47176.12	2.98		
gamma	E	2032-10-12T07:12:00.383	28.41	-36.31	47626.92	2.99		
delta	E	2032-10-12T07:15:45.258	28.87	-35.65	48300.35	3.00		
lambda	E	2032-10-12T07:25:17.738	30.00	-33.94	50026.71	3.03		
epsilon	E	2032-10-12T07:29:20.467	30.46	-33.20	50763.63	3.04		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-10-12T02:39:23.240  
 Event type : PgtRgt  
 : Uranus 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 : 3426134444683611136  
 2Mass ID (if available) : 06051247+2337428  
 ICRS Star Coord at Epoch: 06h 05m 12.47145s +23:37:42.68906s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.260  
 G magnitude : 16.043  
 RP magnitude : 15.449  
 BP magnitude : 16.442  
 DUPflag : 0  
 Distance (au) : 18.705  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -2.70  
 Sun-Target sep (deg) : 107.68  
 Sun-Moon sep (deg) : 162.20  
 B (ring opening deg) : 74.35  
 PA of pole (deg) : 59.85  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.205  
 C/A sky separation (km) : 16349.4  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-10-11T22:08:21.303	-2.89x	-50.14	51524.99	-2.65			
lambda	I	2032-10-11T22:17:45.672	-1.11x	-50.28	50026.71	-2.66			
delta	I	2032-10-11T22:28:33.714	0.91x	-50.27	48300.35	-2.67			
gamma	I	2032-10-11T22:32:47.726	1.70x	-50.23	47622.17	-2.67			
eta	I	2032-10-11T22:35:34.647	2.21x	-50.18	47176.12	-2.67			
beta	I	2032-10-11T22:45:06.772	3.95x	-49.95	45645.06	-2.68			
alpha	I	2032-10-11T22:51:01.802	5.02	-49.74	44693.02	-2.68			
4	I	2032-10-11T23:04:21.166	7.39	-49.09	42551.78	-2.68			
5	I	2032-10-11T23:06:42.649	7.80	-48.95	42165.83	-2.68			
6	I	2032-10-11T23:08:35.174	8.13	-48.84	41868.95	-2.68			
Uranus	I	2032-10-12T00:53:14.914	24.18	-36.55	25521.92			-3.98	-4.17
Uranus	E	2032-10-12T04:20:01.565	32.28	3.38x	25023.77			15.54	16.24
6	E	2032-10-12T05:55:18.286	22.78	23.51x	41795.19	2.92			
5	E	2032-10-12T05:57:57.442	22.42	24.07x	42248.87	2.92			
4	E	2032-10-12T06:00:03.118	22.14	24.51x	42614.91	2.92			
alpha	E	2032-10-12T06:12:01.781	20.47	27.02x	44719.60	2.94			
beta	E	2032-10-12T06:17:21.739	19.70	28.14x	45663.66	2.94			
eta	E	2032-10-12T06:25:55.586	18.44	29.92x	47176.12	2.95			
gamma	E	2032-10-12T06:28:28.468	18.06	30.45x	47626.84	2.95			
delta	E	2032-10-12T06:32:16.778	17.48	31.24x	48300.35	2.95			
lambda	E	2032-10-12T06:42:01.412	15.97	33.26x	50026.71	2.95			
epsilon	E	2032-10-12T06:46:11.586	15.31	34.12x	50765.99	2.96			