

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2035-02-07T19:10:53.110  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3383342830818157952  
 2Mass ID (if available) : 06282916+2336436

ICRS Star Coord at Epoch: 06h 28m 29.18095s +23:36:43.47750s

RUWE (>1.4 is poor) : 1.19  
 K magnitude : 14.226  
 G magnitude : 16.821  
 RP magnitude : 16.043  
 BP magnitude : 17.440  
 DUPflag : 0  
 Distance (au) : 18.136  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -15.80  
 Sun-Target sep (deg) : 138.17  
 Sun-Moon sep (deg) : 144.48  
 B (ring opening deg) : 69.53  
 PA of pole (deg) : 69.26

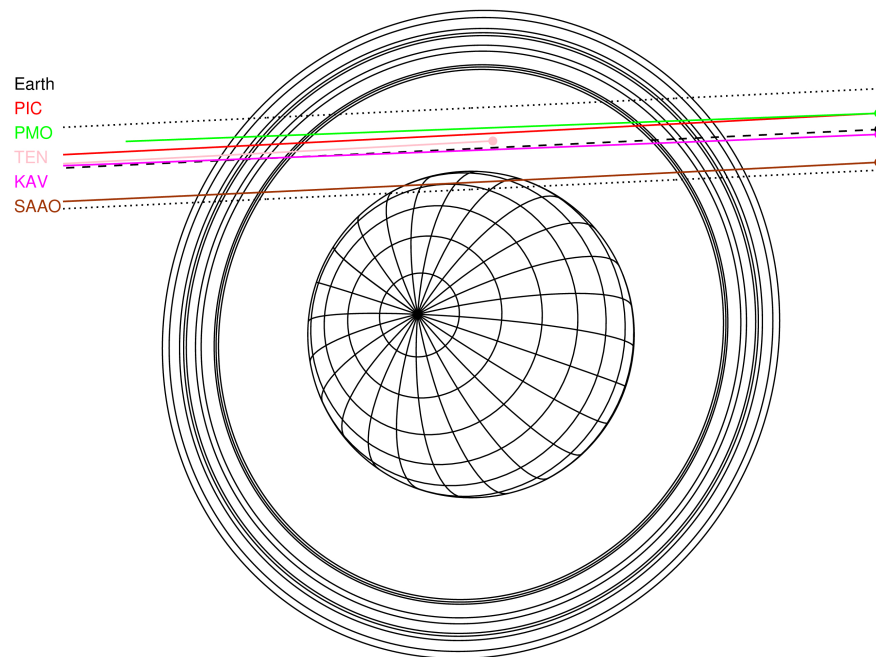
# a(km) ring

- 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



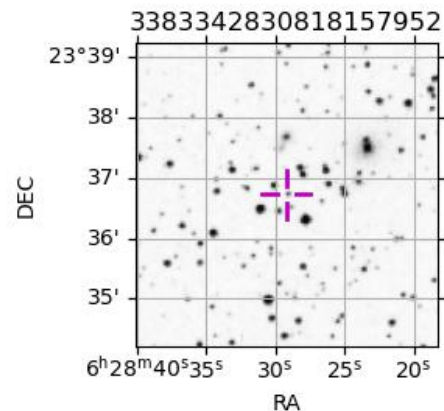
2035-02-07T19:10:53.1100 α: 06 28 29.1810 α: +23 36 43.478 C/A 2.216° PA 182.71 deg v\_sky -15.80 km/s D 18.14 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2035-02-07T19:10:53 K14.23 G16.82 PtRgt

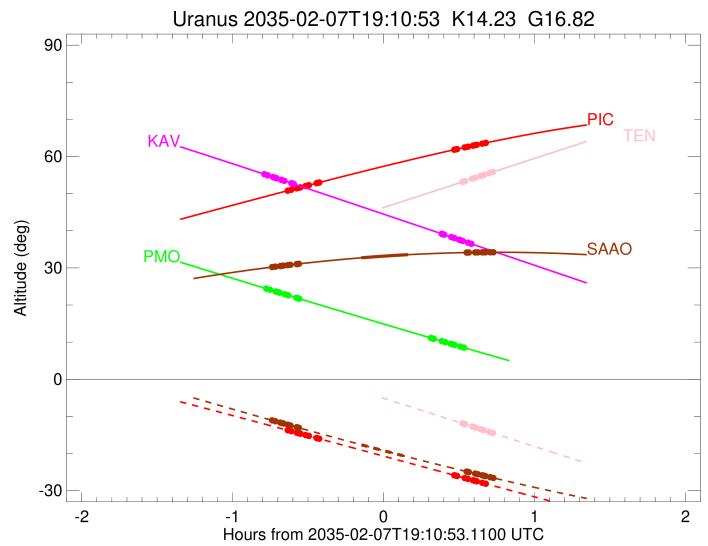
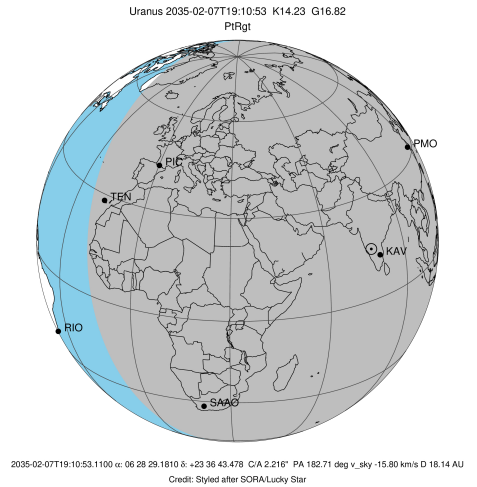


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	FEB 07 18:32 - FEB 07 19:51	PnnRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	FEB 07 18:23 - FEB 07 19:43	PnnRie
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5			+++++	FEB 07 19:42 - FEB 07 19:54	PnnRne
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++		+++++	FEB 07 18:23 - FEB 07 19:45	PnnRie
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++	+ +	+++++	FEB 07 18:26 - FEB 07 19:54	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2035-02-07T19:13:41.400  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : 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 : 3383342830818157952  
 2Mass ID (if available) : 06282916+2336436  
 ICRS Star Coord at Epoch: 06h 28m 29.18095s +23:36:43.47750s  
 RUWE (>1.4 is poor) : 1.19  
 K magnitude : 14.226  
 G magnitude : 16.821  
 RP magnitude : 16.043  
 BP magnitude : 17.440  
 DUPflag : 0  
 Distance (au) : 18.136  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -15.80  
 Sun-Target sep (deg) : 138.17  
 Sun-Moon sep (deg) : 145.26  
 B (ring opening deg) : 69.53  
 PA of pole (deg) : 69.26  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.379  
 C/A sky separation (km) : 31296.1  
 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



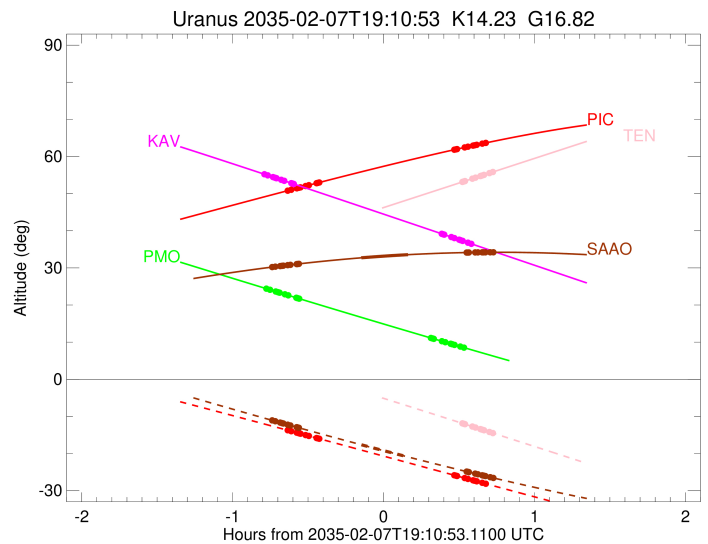
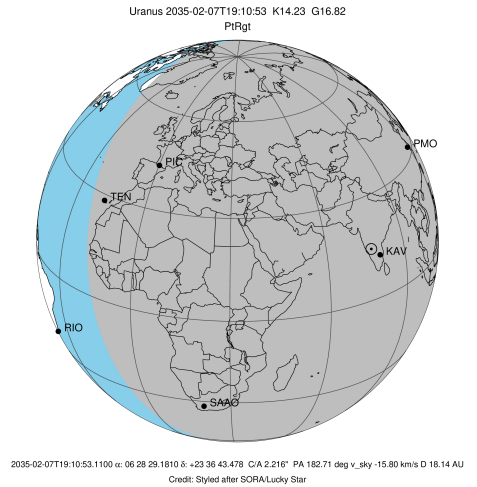
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-02-07T18:32:26.484	50.74	-13.67	51451.85	-13.46		
lambda	I	2035-02-07T18:34:13.742	51.05	-14.00	50026.71	-13.17		
delta	I	2035-02-07T18:36:26.445	51.44	-14.40	48300.35	-12.85		
gamma	I	2035-02-07T18:37:19.343	51.60	-14.56	47624.48	-12.71		
eta	I	2035-02-07T18:37:54.759	51.70	-14.67	47176.12	-12.61		
beta	I	2035-02-07T18:39:57.488	52.06	-15.04	45650.11	-12.26		
alpha	I	2035-02-07T18:41:14.867	52.29	-15.27	44711.55	-12.01		
4	I	2035-02-07T18:44:20.961	52.83	-15.84	42536.14	-11.38		
5	I	2035-02-07T18:44:43.969	52.90	-15.91	42272.54	-11.26		
6	I	2035-02-07T18:45:25.025	53.02	-16.03	41814.68	-11.13		

No planet occultations

6	E	2035-02-07T19:39:04.491	61.84	-25.86	41869.62	11.15		
5	E	2035-02-07T19:39:31.122	61.91	-25.94	42169.37	11.28		
4	E	2035-02-07T19:40:07.669	62.00	-26.06	42596.00	11.40		
alpha	E	2035-02-07T19:43:05.957	62.45	-26.60	44685.31	12.03		
beta	E	2035-02-07T19:44:27.250	62.65	-26.85	45678.34	12.29		
eta	E	2035-02-07T19:46:27.458	62.94	-27.21	47176.12	12.64		
gamma	E	2035-02-07T19:47:02.560	63.03	-27.32	47621.51	12.74		
delta	E	2035-02-07T19:47:55.568	63.15	-27.48	48300.35	12.88		
lambda	E	2035-02-07T19:50:07.948	63.47	-27.89	50026.71	13.20		
epsilon	E	2035-02-07T19:51:46.228	63.70	-28.19	51334.98	13.49		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2035-02-07T19:05:01.340  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : 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 : 3383342830818157952  
 2Mass ID (if available) : 06282916+2336436  
 ICRS Star Coord at Epoch: 06h 28m 29.18095s +23:36:43.47750s  
 RUWE (>1.4 is poor) : 1.19  
 K magnitude : 14.226  
 G magnitude : 16.821  
 RP magnitude : 16.043  
 BP magnitude : 17.440  
 DUPflag : 0  
 Distance (au) : 18.136  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -15.80  
 Sun-Target sep (deg) : 138.17  
 Sun-Moon sep (deg) : 144.04  
 B (ring opening deg) : 69.53  
 PA of pole (deg) : 69.26  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.451  
 C/A sky separation (km) : 32234.4  
 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

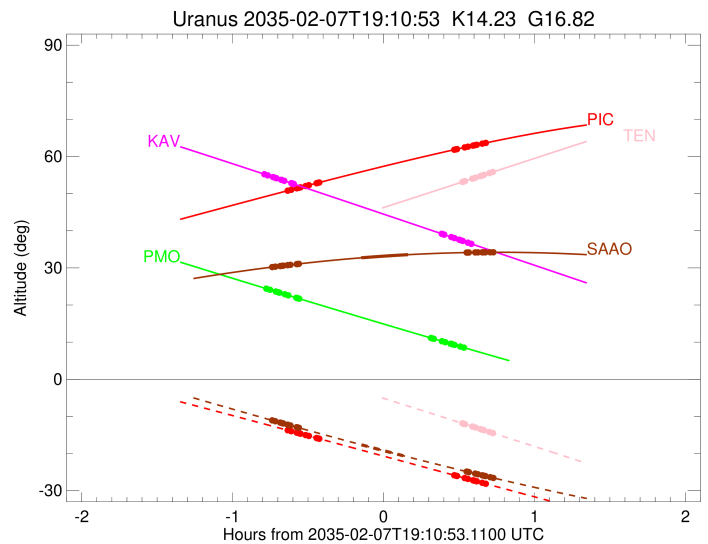
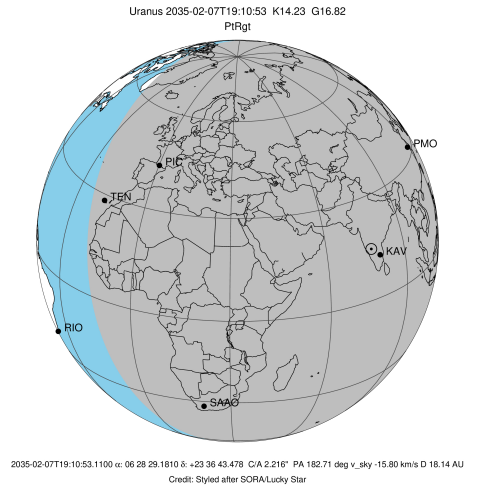


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-02-07T18:23:56.957		24.49	-56.99	51454.46	-13.09		
lambda	I	2035-02-07T18:25:47.600		24.10	-56.63	50026.71	-12.77		
delta	I	2035-02-07T18:28:04.593		23.63	-56.18	48300.35	-12.42		
gamma	I	2035-02-07T18:28:59.327		23.44	-56.00	47624.41	-12.27		
eta	I	2035-02-07T18:29:36.006		23.32	-55.88	47176.12	-12.17		
beta	I	2035-02-07T18:31:43.398		22.88	-55.46	45650.37	-11.79		
alpha	I	2035-02-07T18:33:04.061		22.60	-55.19	44711.00	-11.51		
4	I	2035-02-07T18:36:18.778		21.94	-54.55	42536.72	-10.82		
5	I	2035-02-07T18:36:43.198		21.85	-54.46	42271.07	-10.69		
6	I	2035-02-07T18:37:26.240		21.70	-54.32	41815.46	-10.55		

No planet occultations

6	E	2035-02-07T19:29:46.290		11.11	-43.57	41868.30	10.48		
5	E	2035-02-07T19:30:14.907		11.02	-43.47	42171.56	10.62		
4	E	2035-02-07T19:30:53.393		10.89	-43.34	42594.26	10.75		
alpha	E	2035-02-07T19:34:01.886		10.27	-42.68	44685.05	11.42		
beta	E	2035-02-07T19:35:27.390		9.99	-42.38	45677.91	11.69		
eta	E	2035-02-07T19:37:33.535		9.57	-41.94	47176.12	12.07		
gamma	E	2035-02-07T19:38:10.288		9.45	-41.81	47621.42	12.17		
delta	E	2035-02-07T19:39:05.755		9.27	-41.61	48300.35	12.31		
lambda	E	2035-02-07T19:41:24.023		8.81	-41.13	50026.71	12.65		
epsilon	E	2035-02-07T19:43:07.462		8.47	-40.77	51347.57	12.96		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2035-02-07T19:15:31.750  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : 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 : 3383342830818157952  
 2Mass ID (if available) : 06282916+2336436  
 ICRS Star Coord at Epoch: 06h 28m 29.18095s +23:36:43.47750s  
 RUWE (>1.4 is poor) : 1.19  
 K magnitude : 14.226  
 G magnitude : 16.821  
 RP magnitude : 16.043  
 BP magnitude : 17.440  
 DUPflag : 0  
 Distance (au) : 18.136  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -15.80  
 Sun-Target sep (deg) : 138.17  
 Sun-Moon sep (deg) : 145.39  
 B (ring opening deg) : 69.53  
 PA of pole (deg) : 69.26  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.287  
 C/A sky separation (km) : 30082.3  
 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



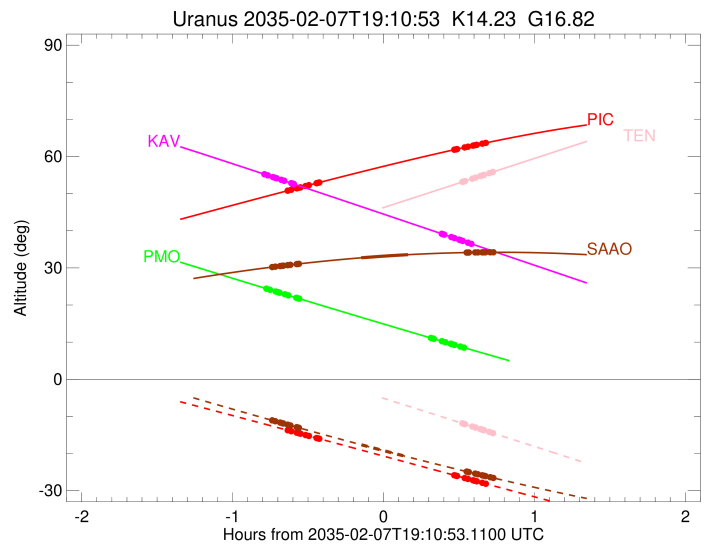
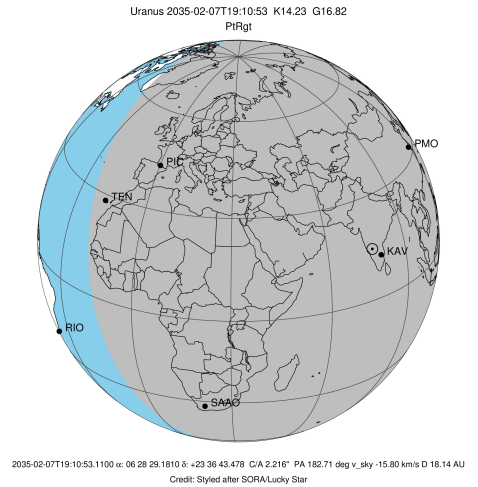
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-02-07T18:33:21.985		38.02	2.79x	51444.49	-13.73		
lambda	I	2035-02-07T18:35:06.463		38.40	2.42x	50026.71	-13.46		
delta	I	2035-02-07T18:37:16.053		38.87	1.97x	48300.35	-13.18		
gamma	I	2035-02-07T18:38:07.580		39.06	1.79x	47624.63	-13.05		
eta	I	2035-02-07T18:38:42.056		39.18	1.67x	47176.12	-12.97		
beta	I	2035-02-07T18:40:41.252		39.62	1.26x	45649.55	-12.66		
alpha	I	2035-02-07T18:41:55.985		39.89	0.99x	44712.71	-12.43		
4	I	2035-02-07T18:44:55.286		40.54	0.37x	42535.05	-11.87		
5	I	2035-02-07T18:45:16.946		40.62	0.29x	42275.32	-11.77		
6	I	2035-02-07T18:45:56.573		40.77	0.15x	41813.24	-11.66		

No planet occultations

6	E	2035-02-07T19:42:17.614		53.17	-11.88	41870.86	11.70		
5	E	2035-02-07T19:42:42.760		53.26	-11.97	42167.35	11.81		
4	E	2035-02-07T19:43:17.937		53.39	-12.10	42597.68	11.92		
alpha	E	2035-02-07T19:46:09.066		54.02	-12.72	44685.62	12.48		
beta	E	2035-02-07T19:47:27.548		54.31	-13.00	45678.74	12.71		
eta	E	2035-02-07T19:49:23.942		54.74	-13.42	47176.12	13.03		
gamma	E	2035-02-07T19:49:58.023		54.86	-13.55	47621.60	13.11		
delta	E	2035-02-07T19:50:49.529		55.05	-13.73	48300.35	13.24		
lambda	E	2035-02-07T19:52:58.460		55.53	-14.20	50026.71	13.53		
epsilon	E	2035-02-07T19:54:33.543		55.88	-14.54	51323.08	13.80		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2035-02-07T19:05:54.930  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : 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 : 3383342830818157952  
 2Mass ID (if available) : 06282916+2336436  
 ICRS Star Coord at Epoch: 06h 28m 29.18095s +23:36:43.47750s  
 RUWE (>1.4 is poor) : 1.19  
 K magnitude : 14.226  
 G magnitude : 16.821  
 RP magnitude : 16.043  
 BP magnitude : 17.440  
 DUPflag : 0  
 Distance (au) : 18.136  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -15.80  
 Sun-Target sep (deg) : 138.17  
 Sun-Moon sep (deg) : 144.32  
 B (ring opening deg) : 69.53  
 PA of pole (deg) : 69.26  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.190  
 C/A sky separation (km) : 28801.6  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl1.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



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

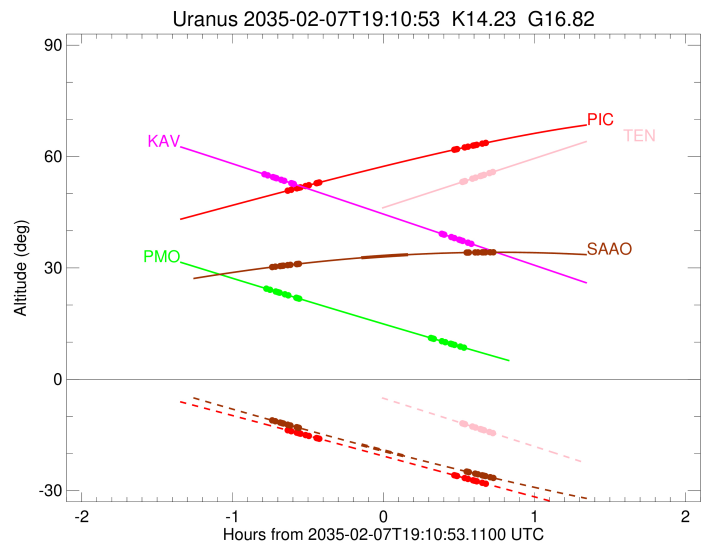
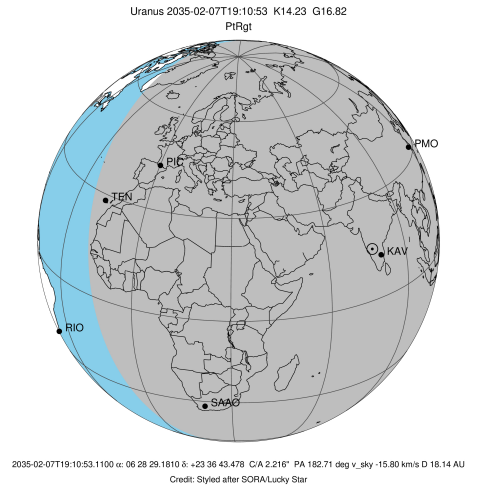
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-02-07T18:23:13.354		55.31	-80.97	51431.30	-14.17		
lambda	I	2035-02-07T18:24:53.518		54.93	-81.36	50026.71	-13.93		
delta	I	2035-02-07T18:26:58.657		54.46	-81.84	48300.35	-13.66		
gamma	I	2035-02-07T18:27:48.303		54.28	-82.03	47624.89	-13.55		
eta	I	2035-02-07T18:28:21.521		54.15	-82.16	47176.12	-13.47		
beta	I	2035-02-07T18:30:16.150		53.72	-82.59	45648.70	-13.19		
alpha	I	2035-02-07T18:31:27.572		53.45	-82.86	44714.52	-12.98		
4	I	2035-02-07T18:34:18.970		52.81	-83.50	42533.54	-12.48		
5	I	2035-02-07T18:34:39.045		52.73	-83.57	42279.31	-12.39		
6	I	2035-02-07T18:35:17.170		52.59	-83.71	41811.21	-12.29		

No planet occultations

6	E	2035-02-07T19:34:04.529		39.18	-81.01	41871.63	12.22		
5	E	2035-02-07T19:34:28.484		39.09	-80.92	42166.11	12.31		
4	E	2035-02-07T19:35:02.408		38.96	-80.79	42598.72	12.41		
alpha	E	2035-02-07T19:37:47.442		38.32	-80.15	44685.83	12.89		
beta	E	2035-02-07T19:39:03.534		38.03	-79.85	45678.96	13.09		
eta	E	2035-02-07T19:40:56.739		37.60	-79.41	47176.12	13.37		
gamma	E	2035-02-07T19:41:29.970		37.47	-79.28	47621.65	13.44		
delta	E	2035-02-07T19:42:20.244		37.28	-79.08	48300.35	13.55		
lambda	E	2035-02-07T19:44:26.396		36.80	-78.59	50026.71	13.81		
epsilon	E	2035-02-07T19:45:59.234		36.44	-78.22	51316.91	14.05		



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2035-02-07T19:11:43.240  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : 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 : 3383342830818157952  
 2Mass ID (if available) : 06282916+2336436  
 ICRS Star Coord at Epoch: 06h 28m 29.18095s +23:36:43.47750s  
 RUWE (>1.4 is poor) : 1.19  
 K magnitude : 14.226  
 G magnitude : 16.821  
 RP magnitude : 16.043  
 BP magnitude : 17.440  
 DUPflag : 0  
 Distance (au) : 18.136  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -15.80  
 Sun-Target sep (deg) : 138.17  
 Sun-Moon sep (deg) : 144.80  
 B (ring opening deg) : 69.53  
 PA of pole (deg) : 69.26  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.808  
 C/A sky separation (km) : 23782.1  
 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\_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	2035-02-07T18:26:22.455		30.20	-11.02	51398.91	-15.17		
lambda	I	2035-02-07T18:27:53.546		30.33	-11.31	50026.71	-15.00		
delta	I	2035-02-07T18:29:49.224		30.49	-11.68	48300.35	-14.84		
gamma	I	2035-02-07T18:30:34.805		30.56	-11.82	47625.50	-14.77		
eta	I	2035-02-07T18:31:05.279		30.60	-11.92	47176.12	-14.72		
beta	I	2035-02-07T18:32:49.823		30.74	-12.25	45646.81	-14.55		
alpha	I	2035-02-07T18:33:53.895		30.83	-12.45	44718.97	-14.42		
4	I	2035-02-07T18:36:27.444		31.03	-12.93	42530.34	-14.12		
5	I	2035-02-07T18:36:44.117		31.05	-12.98	42288.52	-14.06		
6	I	2035-02-07T18:37:18.678		31.09	-13.09	41806.55	-14.01		
Uranus	I	2035-02-07T19:02:05.316		32.72	-17.65	25558.36		0.70	0.74
Uranus	E	2035-02-07T19:20:38.198		33.56	-20.93	25311.81		13.93	14.56
6	E	2035-02-07T19:43:59.493		34.13	-24.87	41875.28	14.01		
5	E	2035-02-07T19:44:19.815		34.14	-24.93	42160.36	14.07		
4	E	2035-02-07T19:44:50.203		34.14	-25.01	42604.15	14.13		
alpha	E	2035-02-07T19:47:16.282		34.17	-25.41	44687.54	14.43		
beta	E	2035-02-07T19:48:24.492		34.18	-25.59	45680.11	14.55		
eta	E	2035-02-07T19:50:06.741		34.19	-25.87	47176.12	14.73		
gamma	E	2035-02-07T19:50:36.969		34.19	-25.95	47622.05	14.78		
delta	E	2035-02-07T19:51:22.764		34.20	-26.07	48300.35	14.85		
lambda	E	2035-02-07T19:53:18.393		34.21	-26.38	50026.71	15.01		
epsilon	E	2035-02-07T19:54:40.913		34.21	-26.60	51269.91	15.18		