

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2025-12-04T16:46:22.270  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 63053487160344320  
 2Mass ID (if available) : 03452211+1937501

ICRS Star Coord at Epoch: 03h 45m 22.11691s +19:37:50.23727s

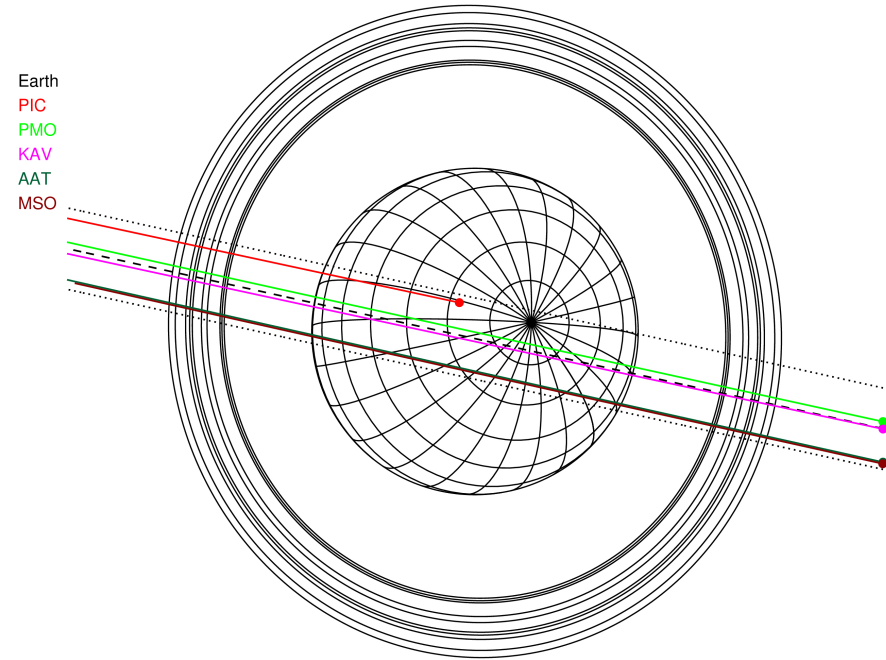
RUWE (>1.4 is poor) : 1.06  
 K magnitude : 14.737  
 G magnitude : 18.615  
 RP magnitude : 17.381  
 BP magnitude : 20.334  
 DUPflag : 0  
 Distance (au) : 18.537  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.56  
 Sun-Target sep (deg) : 166.10  
 Sun-Moon sep (deg) : 11.28  
 B (ring opening deg) : 69.52  
 PA of pole (deg) : -80.76

#	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



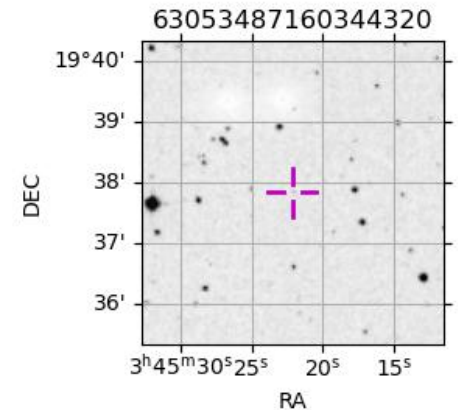
2025-12-04T16:46:22.2700 ra: 03 45 22.1169 s: +19 37 50.237 C/A 0.078° PA 347.59 deg v\_sky -22.56 km/s D 18.54 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2025-12-04T16:46:22 K14.74 G18.62 PgtRgt

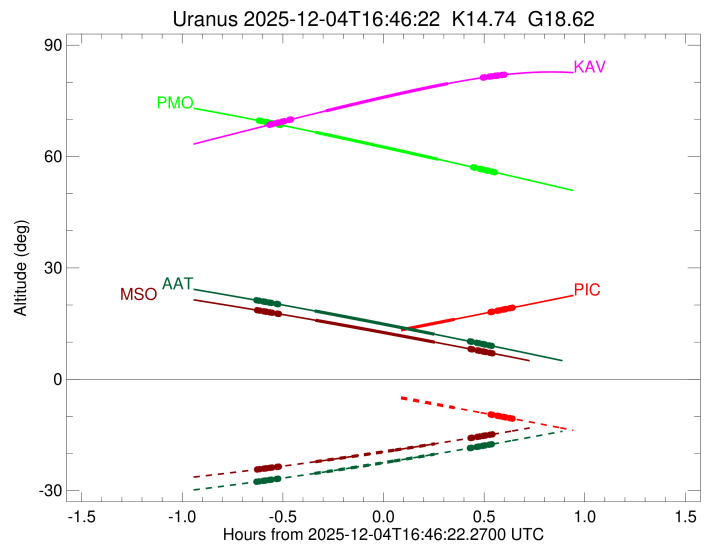
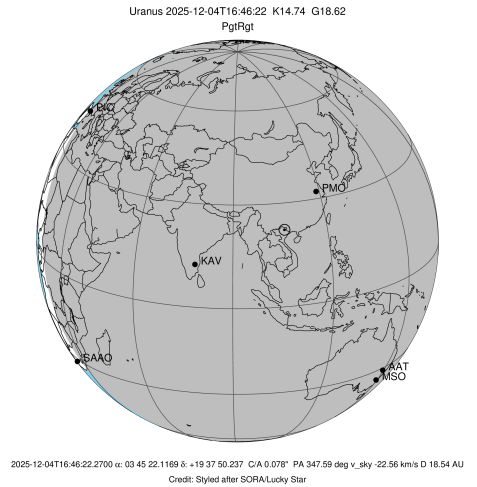


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1		+	+++++	DEC 04 17:07 - DEC 04 17:25	PneRne
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+	+++++	DEC 04 16:09 - DEC 04 17:19	PieRie
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					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+	+++++	DEC 04 16:12 - DEC 04 17:22	PieRie
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	+++++	+	+++++	DEC 04 16:08 - DEC 04 17:18	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+	+++++	DEC 04 16:08 - DEC 04 17:19	PieRie

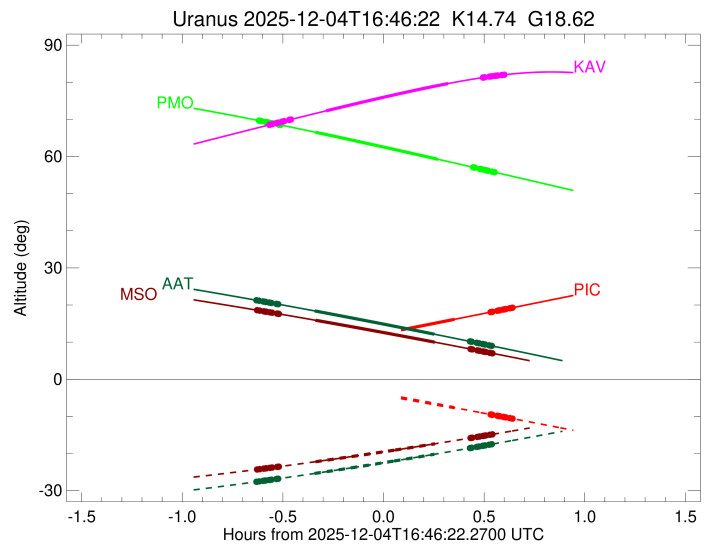
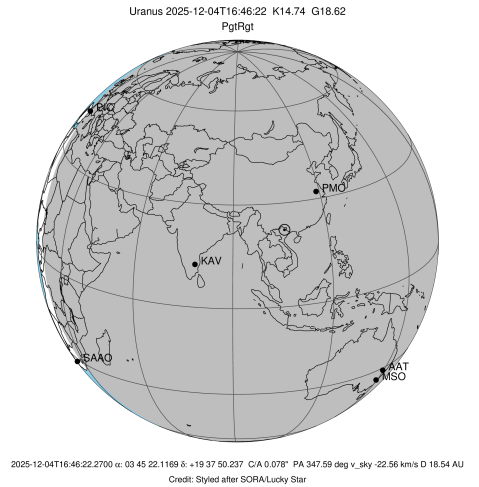


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2025-12-04T16:49:07.100  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 63053487160344320  
 2Mass ID (if available) : 03452211+1937501  
 ICRS Star Coord at Epoch: 03h 45m 22.11691s +19:37:50.23727s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 14.737  
 G magnitude : 18.615  
 RP magnitude : 17.381  
 BP magnitude : 20.334  
 DUPflag : 0  
 Distance (au) : 18.537  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.56  
 Sun-Target sep (deg) : 166.10  
 Sun-Moon sep (deg) : 11.51  
 B (ring opening deg) : 69.52  
 PA of pole (deg) : -80.76  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.290  
 C/A sky separation (km) : 3901.2  
 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	2025-12-04T16:13:52.079		6.68	1.05x	50744.59	-23.72		
lambda	I	2025-12-04T16:14:22.337		6.76	0.97x	50026.71	-23.72		
delta	I	2025-12-04T16:15:35.113		6.97	0.78x	48300.35	-23.72		
gamma	I	2025-12-04T16:16:03.756		7.06	0.70x	47620.97	-23.72		
eta	I	2025-12-04T16:16:22.512		7.11	0.66x	47176.12	-23.72		
beta	I	2025-12-04T16:17:27.178		7.30	0.49x	45641.68	-23.71		
alpha	I	2025-12-04T16:18:07.740		7.41	0.38x	44684.92	-23.71		
4	I	2025-12-04T16:19:37.566		7.67	0.15x	42552.85	-23.70		
5	I	2025-12-04T16:19:47.667		7.70	0.12x	42307.61	-23.70		
6	I	2025-12-04T16:20:07.137		7.76	0.07x	41834.82	-23.69		
Uranus	I	2025-12-04T16:30:47.472		9.62	-1.62x	25068.71		19.98	20.85
Uranus	E	2025-12-04T17:07:30.200		16.14	-7.66	25173.36		-17.58	-18.36
6	E	2025-12-04T17:18:18.423		18.09	-9.49	41831.53	23.77		
5	E	2025-12-04T17:18:32.101		18.13	-9.53	42170.05	23.79		
4	E	2025-12-04T17:18:49.864		18.19	-9.58	42596.95	23.79		
alpha	E	2025-12-04T17:20:20.417		18.46	-9.83	44752.40	23.80		
beta	E	2025-12-04T17:20:59.554		18.58	-9.95	45679.46	23.80		
eta	E	2025-12-04T17:22:02.372		18.77	-10.13	47176.12	23.81		
gamma	E	2025-12-04T17:22:21.497		18.82	-10.18	47631.55	23.81		
delta	E	2025-12-04T17:22:49.578		18.91	-10.26	48300.35	23.82		
lambda	E	2025-12-04T17:24:02.048		19.13	-10.47	50026.71	23.83		
epsilon	E	2025-12-04T17:25:05.749		19.32	-10.65	51544.63	23.83		

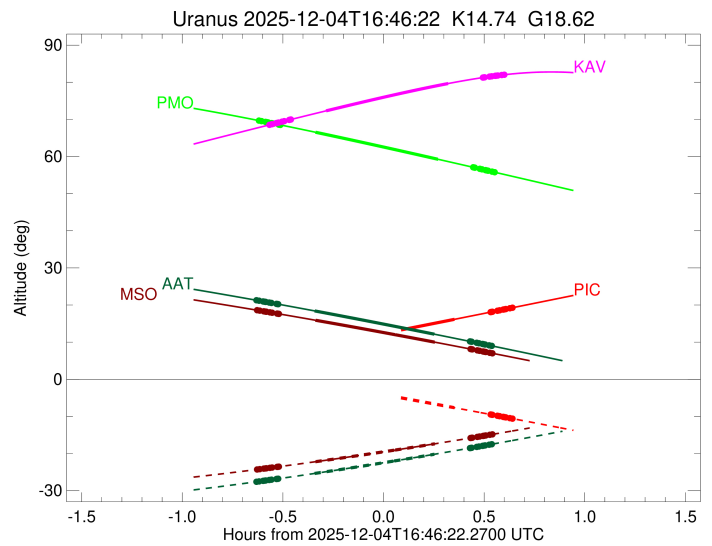
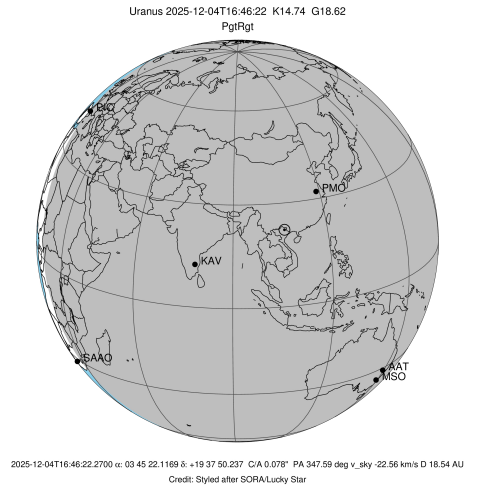
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2025-12-04T16:44:21.510  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 63053487160344320  
 2Mass ID (if available) : 03452211+1937501  
 ICRS Star Coord at Epoch: 03h 45m 22.11691s +19:37:50.23727s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 14.737  
 G magnitude : 18.615  
 RP magnitude : 17.381  
 BP magnitude : 20.334  
 DUPflag : 0  
 Distance (au) : 18.537  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.56  
 Sun-Target sep (deg) : 166.10  
 Sun-Moon sep (deg) : 11.00  
 B (ring opening deg) : 69.52  
 PA of pole (deg) : -80.76  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.008  
 C/A sky separation (km) : 106.2  
 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



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

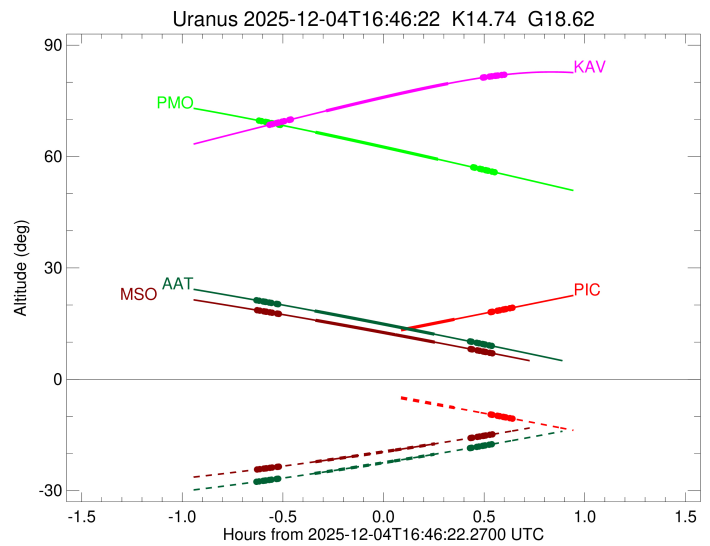
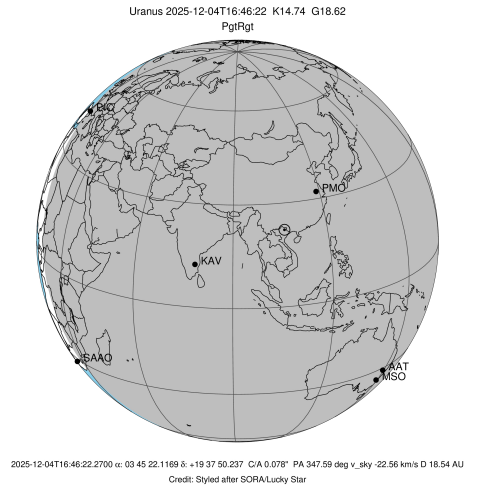
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2025-12-04T16:09:31.111		69.63	-79.91	50748.38	-24.28		
lambda	I	2025-12-04T16:10:00.840		69.54	-79.88	50026.71	-24.27		
delta	I	2025-12-04T16:11:11.960		69.33	-79.79	48300.35	-24.27		
gamma	I	2025-12-04T16:11:39.950		69.24	-79.75	47620.96	-24.27		
eta	I	2025-12-04T16:11:58.276		69.19	-79.73	47176.12	-24.27		
beta	I	2025-12-04T16:13:01.431		68.99	-79.64	45642.21	-24.27		
alpha	I	2025-12-04T16:13:41.080		68.87	-79.58	44684.64	-24.27		
4	I	2025-12-04T16:15:09.011		68.60	-79.45	42548.87	-24.27		
5	I	2025-12-04T16:15:18.896		68.57	-79.43	42303.87	-24.27		
6	I	2025-12-04T16:15:37.533		68.51	-79.40	41839.07	-24.26		
Uranus	I	2025-12-04T16:26:05.919		66.54	-78.22	25114.91		18.95	19.78
Uranus	E	2025-12-04T17:02:37.636		59.26	-72.23	25112.23		-19.01	-19.84
6	E	2025-12-04T17:13:06.617		57.10	-70.23	41835.43	24.21		
5	E	2025-12-04T17:13:19.751		57.06	-70.19	42166.03	24.22		
4	E	2025-12-04T17:13:37.186		57.00	-70.13	42593.46	24.22		
alpha	E	2025-12-04T17:15:06.248		56.69	-69.85	44752.40	24.22		
beta	E	2025-12-04T17:15:44.746		56.56	-69.72	45680.09	24.22		
eta	E	2025-12-04T17:16:46.473		56.34	-69.52	47176.12	24.22		
gamma	E	2025-12-04T17:17:05.278		56.28	-69.46	47631.58	24.22		
delta	E	2025-12-04T17:17:32.891		56.18	-69.37	48300.35	24.22		
lambda	E	2025-12-04T17:18:44.172		55.93	-69.13	50026.71	24.22		
epsilon	E	2025-12-04T17:19:47.086		55.72	-68.93	51550.40	24.22		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2025-12-04T16:47:26.340  
 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 : 63053487160344320  
 2Mass ID (if available) : 03452211+1937501  
 ICRS Star Coord at Epoch: 03h 45m 22.11691s +19:37:50.23727s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 14.737  
 G magnitude : 18.615  
 RP magnitude : 17.381  
 BP magnitude : 20.334  
 DUPflag : 0  
 Distance (au) : 18.537  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.56  
 Sun-Target sep (deg) : 166.10  
 Sun-Moon sep (deg) : 11.72  
 B (ring opening deg) : 69.52  
 PA of pole (deg) : -80.76  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.115  
 C/A sky separation (km) : 1542.4  
 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	2025-12-04T16:12:39.048		68.60	-54.74	50749.99	-24.30		
lambda	I	2025-12-04T16:13:08.816		68.71	-54.85	50026.71	-24.30		
delta	I	2025-12-04T16:14:19.869		68.98	-55.12	48300.35	-24.30		
gamma	I	2025-12-04T16:14:47.831		69.09	-55.23	47620.96	-24.30		
eta	I	2025-12-04T16:15:06.140		69.15	-55.30	47176.12	-24.30		
beta	I	2025-12-04T16:16:09.224		69.39	-55.53	45642.40	-24.30		
alpha	I	2025-12-04T16:16:48.839		69.54	-55.68	44684.62	-24.30		
4	I	2025-12-04T16:18:16.740		69.87	-56.02	42547.71	-24.29		
5	I	2025-12-04T16:18:26.629		69.91	-56.05	42302.60	-24.29		
6	I	2025-12-04T16:18:45.130		69.98	-56.12	41840.36	-24.28		
Uranus	I	2025-12-04T16:29:14.763		72.31	-58.50	25134.13		18.51	19.32
Uranus	E	2025-12-04T17:05:35.700		79.65	-66.54	25092.49		-19.45	-20.30
6	E	2025-12-04T17:16:00.817		81.27	-68.76	41837.10	24.31		
5	E	2025-12-04T17:16:13.783		81.30	-68.81	42164.49	24.32		
4	E	2025-12-04T17:16:31.135		81.34	-68.87	42591.92	24.32		
alpha	E	2025-12-04T17:17:59.870		81.53	-69.18	44752.32	24.33		
beta	E	2025-12-04T17:18:38.222		81.61	-69.31	45680.32	24.32		
eta	E	2025-12-04T17:19:39.673		81.73	-69.53	47176.12	24.33		
gamma	E	2025-12-04T17:19:58.396		81.77	-69.59	47631.58	24.33		
delta	E	2025-12-04T17:20:25.887		81.82	-69.69	48300.35	24.33		
lambda	E	2025-12-04T17:21:36.849		81.95	-69.93	50026.71	24.33		
epsilon	E	2025-12-04T17:22:39.553		82.06	-70.15	51552.26	24.33		

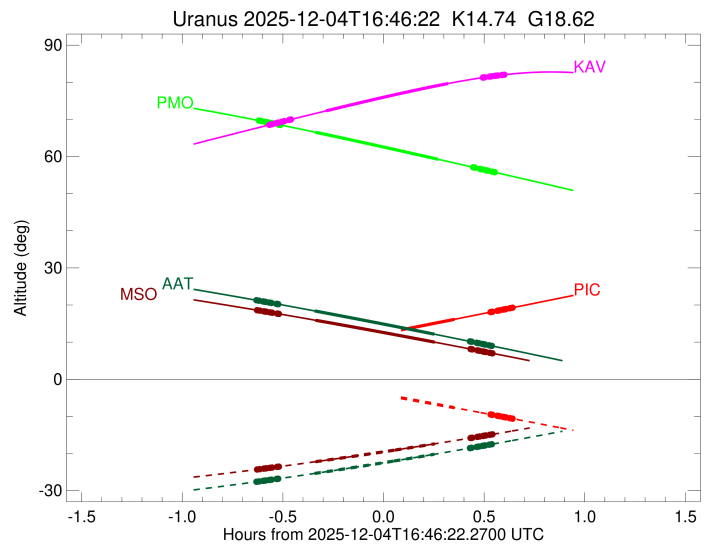
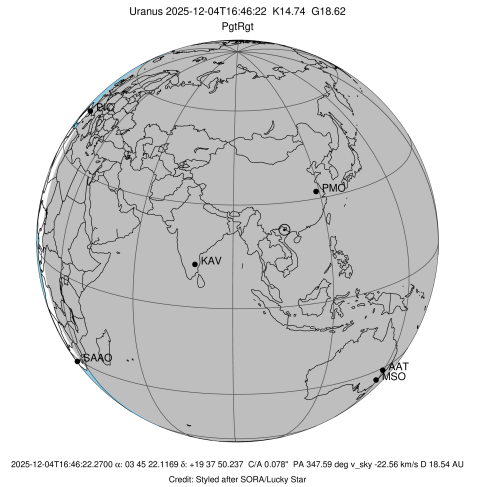
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2025-12-04T16:43:43.540  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : AAT  
 Location : Siding Spring (AAT)  
 Latitude (deg) : -31.27703  
 E. Longitude (deg) : 149.06608  
 Altitude (km) : 1.164  
 Gaia source ID : 63053487160344320  
 2Mass ID (if available) : 03452211+1937501  
 ICRS Star Coord at Epoch: 03h 45m 22.11691s +19:37:50.23727s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 14.737  
 G magnitude : 18.615  
 RP magnitude : 17.381  
 BP magnitude : 20.334  
 DUPflag : 0  
 Distance (au) : 18.537  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.56  
 Sun-Target sep (deg) : 166.10  
 Sun-Moon sep (deg) : 11.23  
 B (ring opening deg) : 69.52  
 PA of pole (deg) : -80.76  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.452  
 C/A sky separation (km) : 6072.5  
 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\_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	2025-12-04T16:08:46.471		21.24	-27.58	50758.91	-24.00		
lambda	I	2025-12-04T16:09:16.991		21.16	-27.51	50026.71	-23.99		
delta	I	2025-12-04T16:10:28.985		20.96	-27.37	48300.35	-23.97		
gamma	I	2025-12-04T16:10:57.327		20.89	-27.31	47621.01	-23.97		
eta	I	2025-12-04T16:11:15.893		20.84	-27.27	47176.12	-23.96		
beta	I	2025-12-04T16:12:19.842		20.66	-27.13	45643.30	-23.94		
alpha	I	2025-12-04T16:13:00.060		20.55	-27.05	44684.78	-23.94		
4	I	2025-12-04T16:14:29.568		20.31	-26.86	42543.40	-23.91		
5	I	2025-12-04T16:14:39.708		20.28	-26.84	42297.12	-23.90		
6	I	2025-12-04T16:14:58.045		20.23	-26.80	41845.31	-23.89		
Uranus	I	2025-12-04T16:25:50.411		18.41	-25.37	25217.44		16.49	17.23
Uranus	E	2025-12-04T17:01:30.519		12.15	-20.21	25054.76		-20.28	-21.16
6	E	2025-12-04T17:12:09.149		10.20	-18.54	41841.42	23.80		
5	E	2025-12-04T17:12:22.119		10.16	-18.51	42161.01	23.81		
4	E	2025-12-04T17:12:39.780		10.11	-18.46	42587.79	23.82		
alpha	E	2025-12-04T17:14:10.461		9.83	-18.22	44751.92	23.84		
beta	E	2025-12-04T17:14:49.628		9.70	-18.12	45680.79	23.85		
eta	E	2025-12-04T17:15:52.274		9.51	-17.95	47176.12	23.86		
gamma	E	2025-12-04T17:16:11.359		9.45	-17.90	47631.54	23.86		
delta	E	2025-12-04T17:16:39.381		9.36	-17.82	48300.35	23.87		
lambda	E	2025-12-04T17:17:51.687		9.14	-17.63	50026.71	23.88		
epsilon	E	2025-12-04T17:18:55.668		8.94	-17.46	51554.96	23.89		



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2025-12-04T16:43:55.420  
 Event type : PgtRgt  
 : Uranus 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 : 63053487160344320  
 2Mass ID (if available) : 03452211+1937501  
 ICRS Star Coord at Epoch: 03h 45m 22.11691s +19:37:50.23727s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 14.737  
 G magnitude : 18.615  
 RP magnitude : 17.381  
 BP magnitude : 20.334  
 DUPflag : 0  
 Distance (au) : 18.537  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.56  
 Sun-Target sep (deg) : 166.10  
 Sun-Moon sep (deg) : 11.28  
 B (ring opening deg) : 69.52  
 PA of pole (deg) : -80.76  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.471  
 C/A sky separation (km) : 6328.7  
 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\_itrf93\_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	2025-12-04T16:08:58.113		18.57	-24.27	50759.46	-23.97		
lambda	I	2025-12-04T16:09:28.693		18.49	-24.21	50026.71	-23.96		
delta	I	2025-12-04T16:10:40.774		18.30	-24.07	48300.35	-23.94		
gamma	I	2025-12-04T16:11:09.153		18.23	-24.02	47621.02	-23.93		
eta	I	2025-12-04T16:11:27.742		18.19	-23.98	47176.12	-23.93		
beta	I	2025-12-04T16:12:31.773		18.02	-23.86	45643.35	-23.91		
alpha	I	2025-12-04T16:13:12.046		17.92	-23.78	44684.80	-23.90		
4	I	2025-12-04T16:14:41.692		17.69	-23.60	42543.18	-23.87		
5	I	2025-12-04T16:14:51.852		17.66	-23.58	42296.81	-23.86		
6	I	2025-12-04T16:15:10.191		17.61	-23.54	41845.56	-23.86		
Uranus	I	2025-12-04T16:26:04.387		15.90	-22.21	25222.43		16.37	17.10
Uranus	E	2025-12-04T17:01:39.929		9.99	-17.39	25053.37		-20.31	-21.19
6	E	2025-12-04T17:12:19.651		8.14	-15.82	41841.69	23.77		
5	E	2025-12-04T17:12:32.622		8.10	-15.79	42160.81	23.78		
4	E	2025-12-04T17:12:50.302		8.05	-15.75	42587.53	23.78		
alpha	E	2025-12-04T17:14:21.102		7.78	-15.52	44751.88	23.81		
beta	E	2025-12-04T17:15:00.318		7.67	-15.42	45680.81	23.82		
eta	E	2025-12-04T17:16:03.034		7.49	-15.26	47176.12	23.83		
gamma	E	2025-12-04T17:16:22.140		7.43	-15.22	47631.54	23.84		
delta	E	2025-12-04T17:16:50.193		7.35	-15.15	48300.35	23.84		
lambda	E	2025-12-04T17:18:02.575		7.13	-14.96	50026.71	23.86		
epsilon	E	2025-12-04T17:19:06.622		6.94	-14.80	51555.04	23.87		