

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-11-15T19:41:45.720
 Event type : PRgt
 : Uranus occs: not geocentric or topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 670871353311230848
 2Mass ID (if available) : 08013616+2102156

ICRS Star Coord at Epoch: 08h 01m 36.15948s +21:02:15.49888s

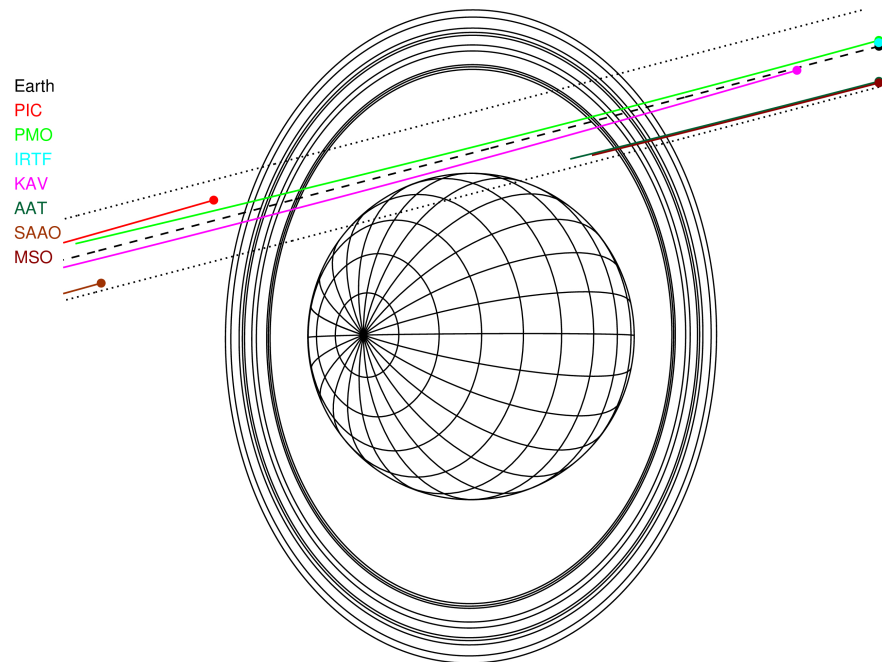
RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.861
 G magnitude : 16.500
 RP magnitude : 15.970
 BP magnitude : 16.877
 DUPflag : 0
 Distance (au) : 18.218
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.97
 Sun-Target sep (deg) : 114.82
 Sun-Moon sep (deg) : 22.77
 B (ring opening deg) : 48.75
 PA of pole (deg) : 89.24

#	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



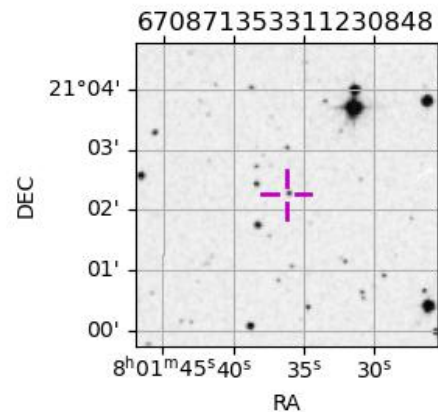
2038-11-15T19:41:45.7200 α: 08 01 36.1595 δ: +21 02 15.499 C/A 2.123° PA 195.12 deg v_sky - 5.97 km/s D 18.22 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2038-11-15T19:41:45 K14.86 G16.50 PRgt

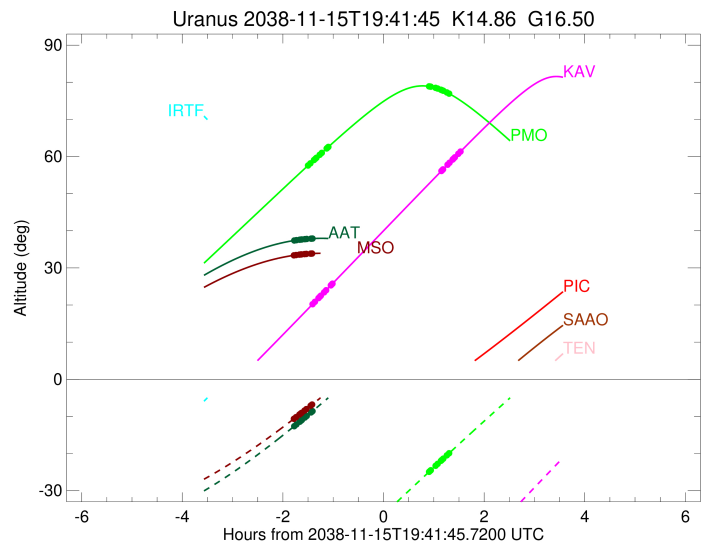
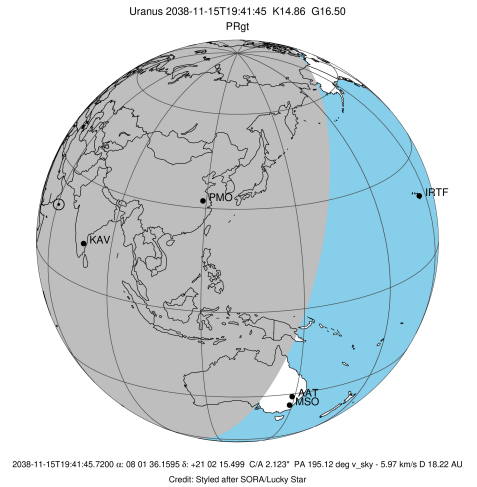


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	NOV 15 18:12 - NOV 15 21:00	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					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++		+++++	NOV 15 18:17 - NOV 15 21:14	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	+++++			NOV 15 17:55 - NOV 15 18:17	PnnRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++			NOV 15 17:55 - NOV 15 18:16	PnnRin



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-11-15T19:44:30.990
 Event type : PRgt
 : Uranus occs: not geocentric or 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 : 670871353311230848
 2Mass ID (if available) : 08013616+2102156
 ICRS Star Coord at Epoch: 08h 01m 36.15948s +21:02:15.49888s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.861
 G magnitude : 16.500
 RP magnitude : 15.970
 BP magnitude : 16.877
 DUPflag : 0
 Distance (au) : 18.218
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.97
 Sun-Target sep (deg) : 114.82
 Sun-Moon sep (deg) : 22.94
 B (ring opening deg) : 48.75
 PA of pole (deg) : 89.24
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.172
 C/A sky separation (km) : 28702.2
 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_itrff93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

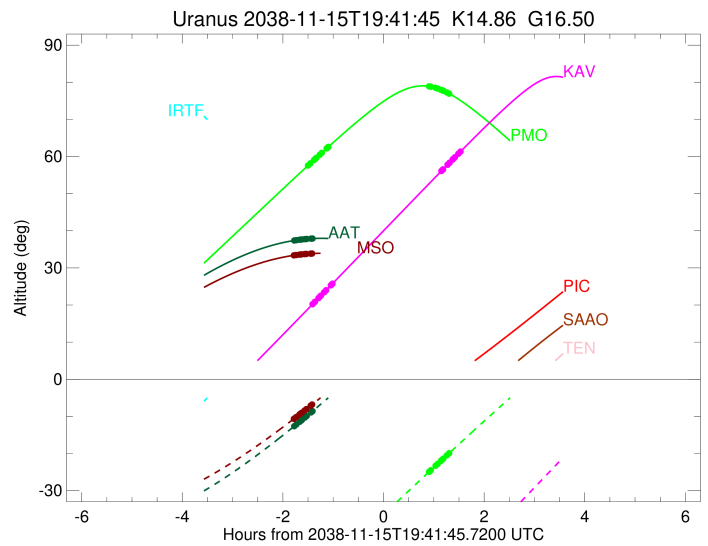
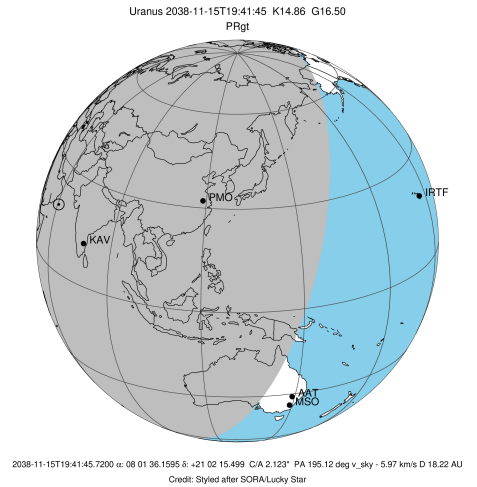


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-11-15T18:12:19.219		57.70	-55.26	50942.60	-6.79		
lambda	I	2038-11-15T18:14:35.300		58.17	-54.79	50026.71	-6.70		
delta	I	2038-11-15T18:18:55.225		59.07	-53.89	48300.35	-6.58		
gamma	I	2038-11-15T18:20:38.727		59.43	-53.54	47621.97	-6.53		
eta	I	2038-11-15T18:21:47.212		59.67	-53.30	47176.12	-6.49		
beta	I	2038-11-15T18:25:40.815		60.47	-52.49	45676.02	-6.36		
alpha	I	2038-11-15T18:28:07.846		60.98	-51.98	44747.89	-6.28		
4	I	2038-11-15T18:34:06.665		62.21	-50.73	42547.60	-6.03		
5	I	2038-11-15T18:34:47.687		62.34	-50.59	42310.43	-6.01		
6	I	2038-11-15T18:35:55.616		62.58	-50.35	41873.51	-5.94		

No planet occultations

6	E	2038-11-15T20:35:55.916		78.91	-24.98	41814.32	6.01		
5	E	2038-11-15T20:37:15.812		78.86	-24.70	42259.07	6.08		
4	E	2038-11-15T20:38:13.500		78.82	-24.50	42611.16	6.11		
alpha	E	2038-11-15T20:43:50.614		78.50	-23.32	44731.07	6.36		
beta	E	2038-11-15T20:46:19.303		78.32	-22.80	45671.78	6.45		
eta	E	2038-11-15T20:50:09.832		78.00	-21.99	47176.12	6.59		
gamma	E	2038-11-15T20:51:18.605		77.89	-21.75	47630.33	6.62		
delta	E	2038-11-15T20:52:59.342		77.73	-21.40	48300.35	6.68		
lambda	E	2038-11-15T20:57:15.346		77.27	-20.51	50026.71	6.81		
epsilon	E	2038-11-15T21:00:57.315		76.83	-19.73	51548.92	6.90		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-11-15T19:54:39.930
 Event type : PRgt
 : Uranus occs: not geocentric or 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 : 670871353311230848
 2Mass ID (if available) : 08013616+2102156
 ICRS Star Coord at Epoch: 08h 01m 36.15948s +21:02:15.49888s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.861
 G magnitude : 16.500
 RP magnitude : 15.970
 BP magnitude : 16.877
 DUPflag : 0
 Distance (au) : 18.218
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.97
 Sun-Target sep (deg) : 114.82
 Sun-Moon sep (deg) : 22.36
 B (ring opening deg) : 48.75
 PA of pole (deg) : 89.24
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.997
 C/A sky separation (km) : 26383.8
 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

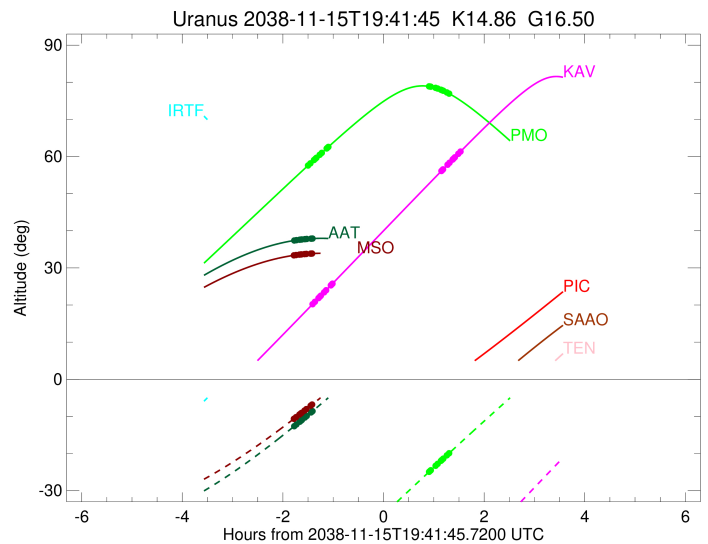
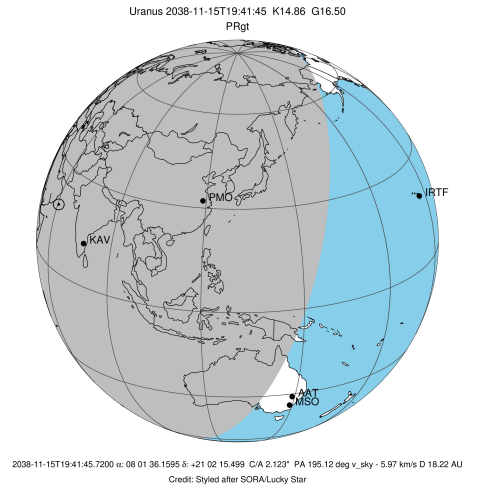


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-11-15T18:17:46.010		20.36	-83.26	50929.20	-6.83		
lambda	I	2038-11-15T18:19:59.039		20.87	-83.46	50026.71	-6.76		
delta	I	2038-11-15T18:24:15.991		21.87	-83.74	48300.35	-6.67		
gamma	I	2038-11-15T18:25:57.972		22.27	-83.80	47621.83	-6.63		
eta	I	2038-11-15T18:27:05.295		22.53	-83.83	47176.12	-6.61		
beta	I	2038-11-15T18:30:54.333		23.42	-83.84	45675.35	-6.51		
alpha	I	2038-11-15T18:33:17.863		23.98	-83.78	44746.99	-6.45		
4	I	2038-11-15T18:39:05.548		25.33	-83.41	42545.44	-6.27		
5	I	2038-11-15T18:39:45.063		25.48	-83.35	42308.72	-6.24		
6	I	2038-11-15T18:40:49.697		25.73	-83.25	41874.76	-6.19		

No planet occultations

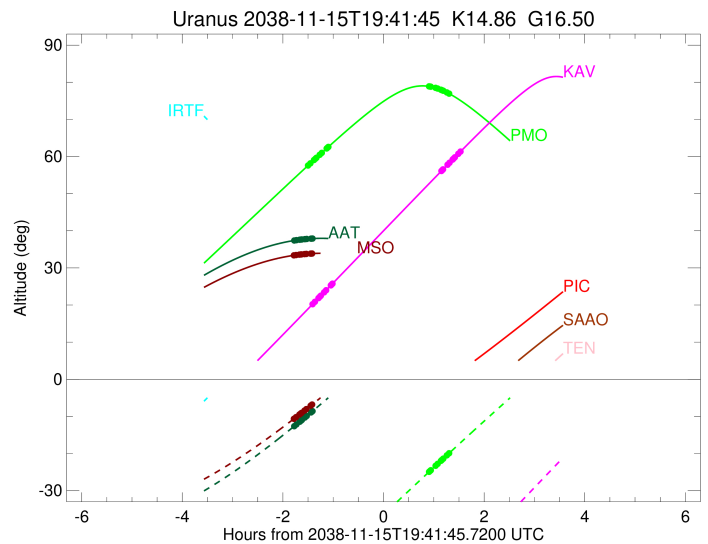
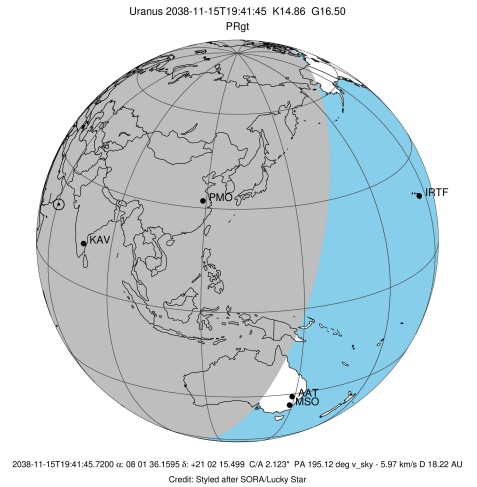
6	E	2038-11-15T20:50:39.693		56.06	-55.46	41811.31	6.43		
5	E	2038-11-15T20:51:53.543		56.34	-55.17	42252.49	6.48		
4	E	2038-11-15T20:52:49.116		56.56	-54.95	42612.82	6.51		
alpha	E	2038-11-15T20:58:06.438		57.78	-53.70	44728.56	6.71		
beta	E	2038-11-15T21:00:27.665		58.32	-53.14	45670.45	6.79		
eta	E	2038-11-15T21:04:07.272		59.16	-52.28	47176.12	6.91		
gamma	E	2038-11-15T21:05:12.923		59.42	-52.02	47630.57	6.94		
delta	E	2038-11-15T21:06:49.129		59.78	-51.64	48300.35	6.99		
lambda	E	2038-11-15T21:10:54.307		60.72	-50.68	50026.71	7.10		
epsilon	E	2038-11-15T21:14:28.035		61.54	-49.83	51552.78	7.18		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-11-15T19:32:40.840
 Event type : PRgt
 : Uranus occs: not geocentric or 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 : 670871353311230848
 2Mass ID (if available) : 08013616+2102156
 ICRS Star Coord at Epoch: 08h 01m 36.15948s +21:02:15.49888s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.861
 G magnitude : 16.500
 RP magnitude : 15.970
 BP magnitude : 16.877
 DUPflag : 0
 Distance (au) : 18.218
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.97
 Sun-Target sep (deg) : 114.82
 Sun-Moon sep (deg) : 23.34
 B (ring opening deg) : 48.75
 PA of pole (deg) : 89.24
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.769
 C/A sky separation (km) : 23376.5
 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	2038-11-15T17:55:55.958		37.41	-12.53	50898.38	-7.37		
lambda	I	2038-11-15T17:57:54.886		37.47	-12.17	50026.71	-7.31		
delta	I	2038-11-15T18:01:52.197		37.59	-11.44	48300.35	-7.24		
gamma	I	2038-11-15T18:03:26.209		37.64	-11.15	47621.56	-7.20		
eta	I	2038-11-15T18:04:28.137		37.66	-10.96	47176.12	-7.18		
beta	I	2038-11-15T18:07:58.679		37.75	-10.30	45673.78	-7.10		
alpha	I	2038-11-15T18:10:10.305		37.79	-9.89	44744.84	-7.05		
4	I	2038-11-15T18:15:27.095		37.88	-8.90	42541.37	-6.91		
5	I	2038-11-15T18:16:03.085		37.89	-8.79	42304.59	-6.89		
6	I	2038-11-15T18:17:00.667		37.90	-8.61	41876.83	-6.85		
Uranus	I	2038-11-15T19:05:35.586		37.18	0.85x	25549.77		-6.28	-6.57
Uranus	E	2038-11-15T19:59:03.452		33.52	11.72x	25436.18		23.58	24.57
6	E	2038-11-15T20:35:12.520		29.61	19.27x	41808.89	6.82		
5	E	2038-11-15T20:36:21.301		29.47	19.51x	42246.76	6.86		
4	E	2038-11-15T20:37:15.030		29.36	19.70x	42614.00	6.87		
alpha	E	2038-11-15T20:42:16.747		28.73	20.76x	44726.43	7.01		
beta	E	2038-11-15T20:44:32.366		28.44	21.24x	45669.31	7.07		
eta	E	2038-11-15T20:48:04.252		27.98	21.98x	47176.12	7.14		
gamma	E	2038-11-15T20:49:07.805		27.84	22.21x	47630.74	7.16		
delta	E	2038-11-15T20:50:41.064		27.64	22.54x	48300.35	7.20		
lambda	E	2038-11-15T20:54:39.747		27.10	23.38x	50026.71	7.27		
epsilon	E	2038-11-15T20:58:09.086		26.63	24.12x	51554.55	7.33		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-11-15T19:32:45.740
 Event type : PRgt
 : Uranus occs: not geocentric or 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 : 670871353311230848
 2Mass ID (if available) : 08013616+2102156
 ICRS Star Coord at Epoch: 08h 01m 36.15948s +21:02:15.49888s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.861
 G magnitude : 16.500
 RP magnitude : 15.970
 BP magnitude : 16.877
 DUPflag : 0
 Distance (au) : 18.218
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -5.97
 Sun-Target sep (deg) : 114.82
 Sun-Moon sep (deg) : 23.32
 B (ring opening deg) : 48.75
 PA of pole (deg) : 89.24
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.748
 C/A sky separation (km) : 23100.6
 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	2038-11-15T17:55:30.151		33.40	-10.55	50896.63	-7.37		
lambda	I	2038-11-15T17:57:28.802		33.47	-10.20	50026.71	-7.31		
delta	I	2038-11-15T18:01:25.981		33.58	-9.51	48300.35	-7.24		
gamma	I	2038-11-15T18:02:59.922		33.62	-9.23	47621.55	-7.21		
eta	I	2038-11-15T18:04:01.792		33.64	-9.05	47176.12	-7.19		
beta	I	2038-11-15T18:07:32.109		33.72	-8.43	45673.68	-7.11		
alpha	I	2038-11-15T18:09:43.563		33.77	-8.04	44744.70	-7.06		
4	I	2038-11-15T18:14:59.756		33.85	-7.10	42541.13	-6.92		
5	I	2038-11-15T18:15:35.679		33.86	-7.00	42304.30	-6.91		
6	I	2038-11-15T18:16:33.070		33.87	-6.82	41876.94	-6.87		
Uranus	I	2038-11-15T19:04:01.680		33.28	1.97x	25546.85		-7.21	-7.54
Uranus	E	2038-11-15T20:00:47.451		29.74	13.03x	25427.54		24.46	25.47
6	E	2038-11-15T20:35:53.235		26.21	20.06x	41808.61	6.84		
5	E	2038-11-15T20:37:01.697		26.08	20.29x	42246.07	6.88		
4	E	2038-11-15T20:37:55.413		25.98	20.47x	42614.13	6.89		
alpha	E	2038-11-15T20:42:56.355		25.40	21.49x	44726.17	7.03		
beta	E	2038-11-15T20:45:11.721		25.13	21.94x	45669.17	7.08		
eta	E	2038-11-15T20:48:43.265		24.71	22.66x	47176.12	7.15		
gamma	E	2038-11-15T20:49:46.725		24.58	22.87x	47630.76	7.17		
delta	E	2038-11-15T20:51:19.850		24.39	23.19x	48300.35	7.21		
lambda	E	2038-11-15T20:55:18.246		23.89	23.99x	50026.71	7.28		
epsilon	E	2038-11-15T20:58:47.410		23.45	24.70x	51554.71	7.33		