

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-08-05T11:11:38.180
 Event type : PRgt
 : Uranus occs: not geocentric or topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3413044969208307840
 2Mass ID (if available) : 04462256+2218451

ICRS Star Coord at Epoch: 04h 46m 22.57681s +22:18:44.93297s

RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.382
 G magnitude : 15.440
 RP magnitude : 14.740
 BP magnitude : 15.971
 DUPflag : 0
 Distance (au) : 19.802
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.15
 Sun-Target sep (deg) : 60.14
 Sun-Moon sep (deg) : 118.45
 B (ring opening deg) : 81.04
 PA of pole (deg) : -38.14

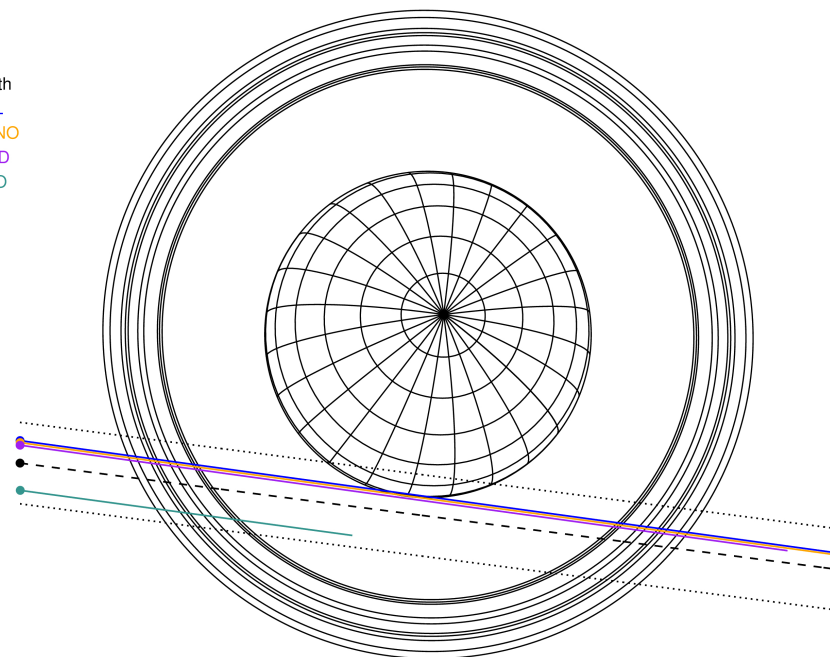
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2028-08-05T11:11:38.1800 ex: 04 46 22.5768 s: +22 18 44.933 C/A 1.961" PA 352.59 deg v_sky +21.15 km/s D 19.80 AU
 Credit: Styled after SORA/Lucky Star

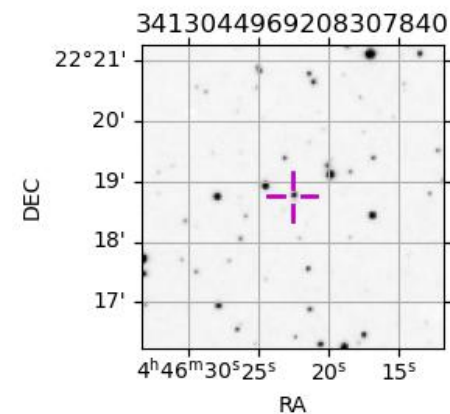
Uranus 2028-08-05T11:11:38 K13.38 G15.44 PRgt

Earth
 PAL
 KPNO
 MCD
 ESO

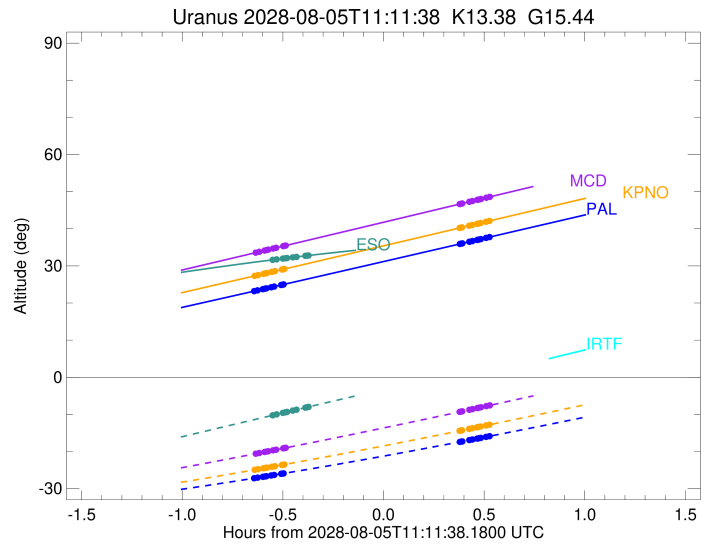
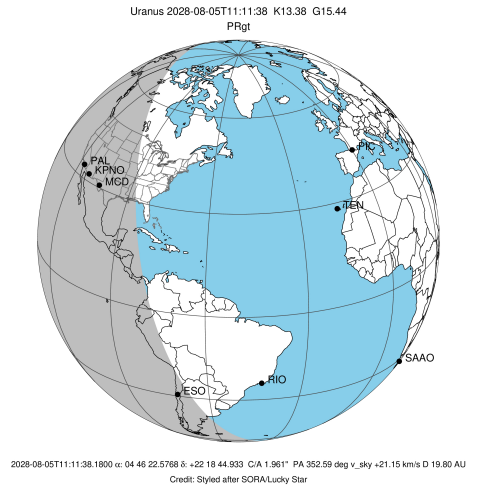


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++		+++++	AUG 05 10:33 - AUG 05 11:43	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	AUG 05 10:33 - AUG 05 11:43	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	AUG 05 10:33 - AUG 05 11:43	PnnRie
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					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3	+++++			AUG 05 10:38 - AUG 05 10:49	PnnRin
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-08-05T11:07:53.060
 Event type : PRgt
 : Uranus occs: not geocentric or 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 : 3413044969208307840
 2Mass ID (if available) : 04462256+2218451
 ICRS Star Coord at Epoch: 04h 46m 22.57681s +22:18:44.93297s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.382
 G magnitude : 15.440
 RP magnitude : 14.740
 BP magnitude : 15.971
 DUPflag : 0
 Distance (au) : 19.802
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.15
 Sun-Target sep (deg) : 60.14
 Sun-Moon sep (deg) : 119.19
 B (ring opening deg) : 81.04
 PA of pole (deg) : -38.14
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.752
 C/A sky separation (km) : 25167.8
 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_itrfr93_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

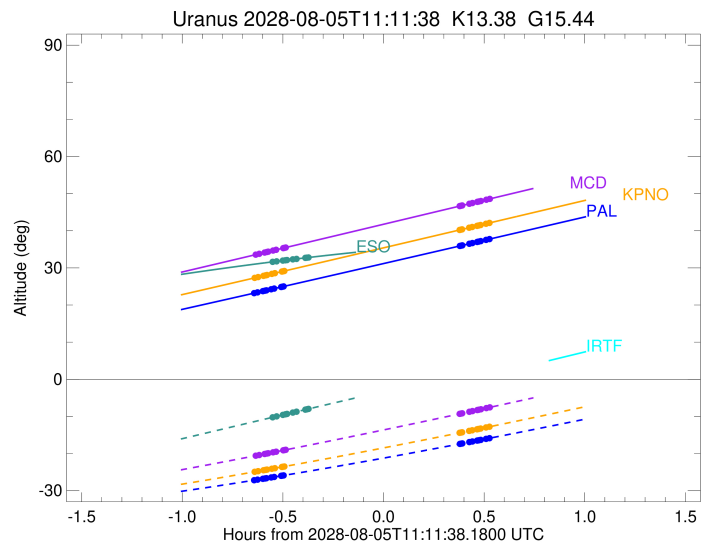
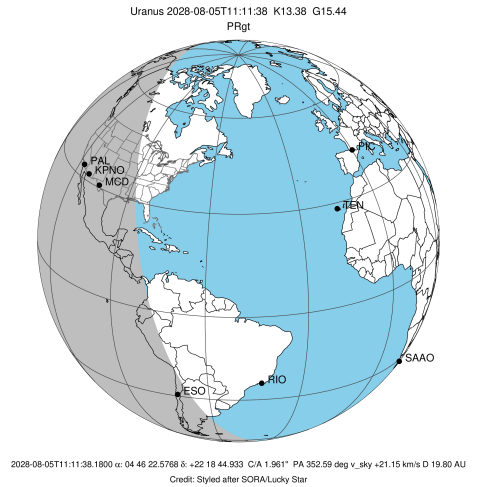
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-08-05T10:33:19.273		23.25	-27.16	50880.17	-18.26		
lambda	I	2028-08-05T10:34:05.988		23.41	-27.04	50026.71	-18.22		
delta	I	2028-08-05T10:35:41.364		23.74	-26.81	48300.35	-17.98		
gamma	I	2028-08-05T10:36:19.119		23.87	-26.72	47623.35	-17.88		
eta	I	2028-08-05T10:36:44.179		23.95	-26.66	47176.12	-17.81		
beta	I	2028-08-05T10:38:10.943		24.25	-26.45	45641.65	-17.56		
alpha	I	2028-08-05T10:39:03.053		24.43	-26.32	44732.29	-17.39		
4	I	2028-08-05T10:41:08.377		24.86	-26.01	42576.08	-16.94		
5	I	2028-08-05T10:41:29.294		24.93	-25.96	42219.24	-16.85		
6	I	2028-08-05T10:41:54.315		25.02	-25.89	41808.85	-16.77		

No planet occultations

6	E	2028-08-05T11:34:21.997		35.90	-17.42	41814.03	16.69		
5	E	2028-08-05T11:34:42.812		35.98	-17.36	42163.59	16.77		
4	E	2028-08-05T11:35:04.449		36.05	-17.30	42526.68	16.86		
alpha	E	2028-08-05T11:37:10.756		36.49	-16.93	44684.67	17.29		
beta	E	2028-08-05T11:38:07.617		36.69	-16.77	45673.02	17.47		
eta	E	2028-08-05T11:39:33.055		36.99	-16.52	47176.12	17.71		
gamma	E	2028-08-05T11:39:58.268		37.08	-16.45	47623.52	17.78		
delta	E	2028-08-05T11:40:36.233		37.21	-16.34	48300.35	17.88		
lambda	E	2028-08-05T11:42:12.184		37.54	-16.06	50026.71	18.10		
epsilon	E	2028-08-05T11:43:06.678		37.73	-15.90	51016.57	18.15		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2028-08-05T11:07:57.440
Event type           : PRgt
: Uranus occs: not geocentric or 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       : 3413044969208307840
2Mass ID (if available) : 04462256+2218451
ICRS Star Coord at Epoch: 04h 46m 22.57681s +22:18:44.93297s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 13.382
G magnitude           : 15.440
RP magnitude          : 14.740
BP magnitude          : 15.971
DUPflag              : 0
Distance (au)         : 19.802
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : 21.15
Sun-Target sep (deg) : 60.14
Sun-Moon sep (deg)   : 119.23
B (ring opening deg) : 81.04
PA of pole (deg)     : -38.14
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.775
C/A sky separation (km) : 25486.7
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.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
    
```



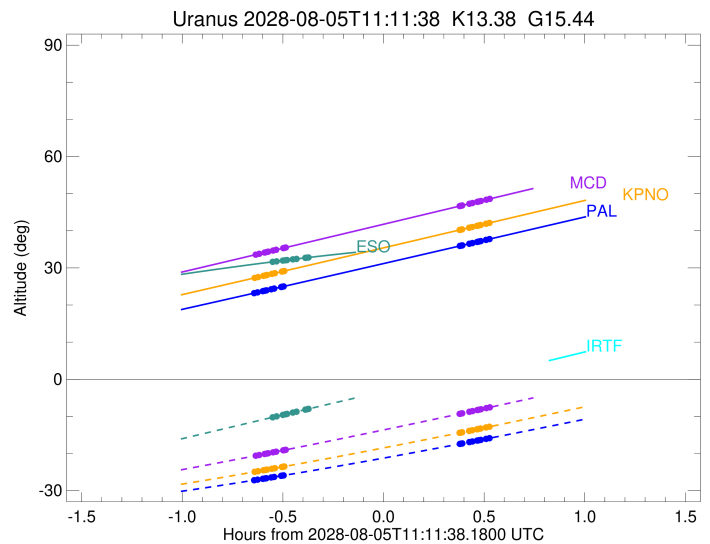
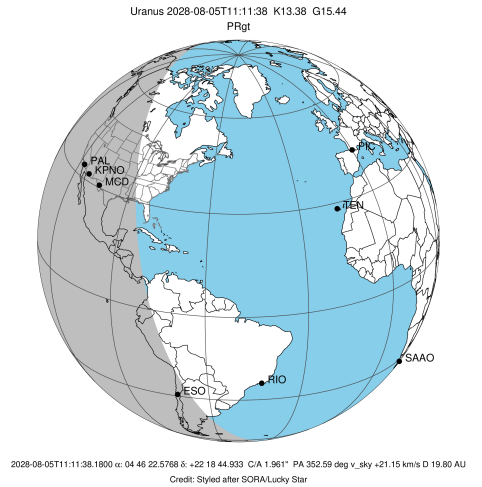
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-08-05T10:33:29.190	27.37	-24.89	50877.99	-18.15		
lambda	I	2028-08-05T10:34:16.071	27.53	-24.76	50026.71	-18.10		
delta	I	2028-08-05T10:35:52.063	27.86	-24.51	48300.35	-17.86		
gamma	I	2028-08-05T10:36:30.076	28.00	-24.41	47623.31	-17.76		
eta	I	2028-08-05T10:36:55.308	28.09	-24.34	47176.12	-17.69		
beta	I	2028-08-05T10:38:22.701	28.39	-24.10	45641.69	-17.43		
alpha	I	2028-08-05T10:39:15.232	28.57	-23.96	44732.02	-17.25		
4	I	2028-08-05T10:41:21.614	29.02	-23.62	42575.65	-16.79		
5	I	2028-08-05T10:41:42.742	29.09	-23.56	42218.50	-16.70		
6	I	2028-08-05T10:42:07.967	29.18	-23.49	41808.55	-16.61		

No planet occultations

6	E	2028-08-05T11:34:17.388	40.21	-14.44	41813.68	16.54		
5	E	2028-08-05T11:34:38.387	40.29	-14.37	42163.25	16.62		
4	E	2028-08-05T11:35:00.237	40.36	-14.30	42526.60	16.71		
alpha	E	2028-08-05T11:37:07.596	40.82	-13.92	44684.69	17.16		
beta	E	2028-08-05T11:38:04.882	41.02	-13.74	45672.88	17.34		
eta	E	2028-08-05T11:39:30.940	41.32	-13.48	47176.12	17.59		
gamma	E	2028-08-05T11:39:56.322	41.41	-13.40	47623.48	17.66		
delta	E	2028-08-05T11:40:34.543	41.55	-13.28	48300.35	17.76		
lambda	E	2028-08-05T11:42:11.102	41.89	-12.98	50026.71	17.99		
epsilon	E	2028-08-05T11:43:05.768	42.09	-12.81	51013.77	18.04		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-08-05T11:08:10.210
 Event type : PRgt
 : Uranus occs: not geocentric or 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 : 3413044969208307840
 2Mass ID (if available) : 04462256+2218451
 ICRS Star Coord at Epoch: 04h 46m 22.57681s +22:18:44.93297s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.382
 G magnitude : 15.440
 RP magnitude : 14.740
 BP magnitude : 15.971
 DUPflag : 0
 Distance (au) : 19.802
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.15
 Sun-Target sep (deg) : 60.14
 Sun-Moon sep (deg) : 119.28
 B (ring opening deg) : 81.04
 PA of pole (deg) : -38.14
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.803
 C/A sky separation (km) : 25887.1
 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



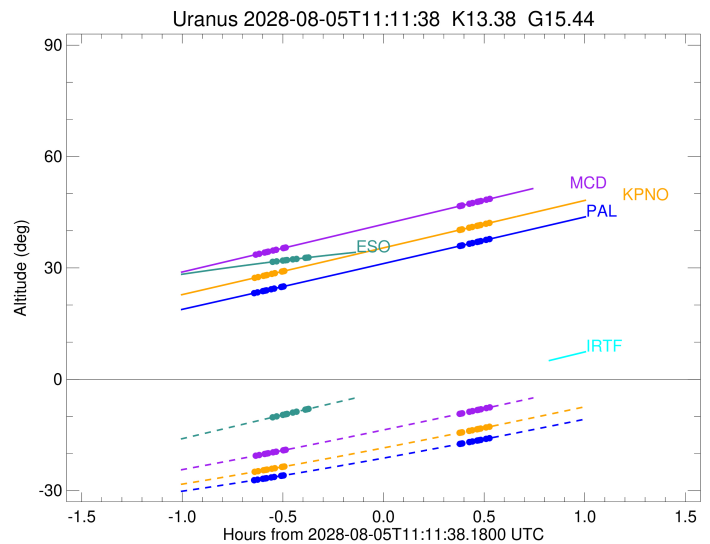
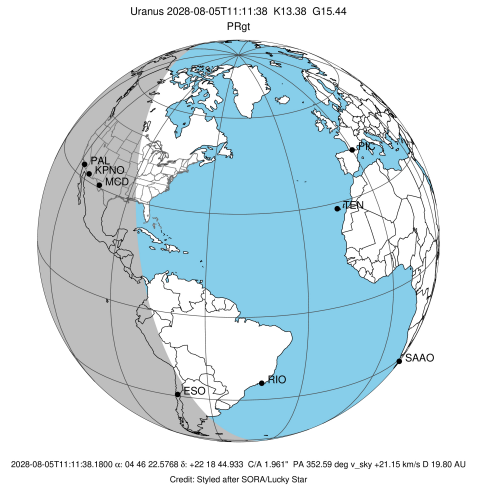
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-08-05T10:33:48.654		33.63	-20.54	50875.21	-18.00		
lambda	I	2028-08-05T10:34:35.762		33.80	-20.40	50026.71	-17.95		
delta	I	2028-08-05T10:36:12.573		34.14	-20.12	48300.35	-17.70		
gamma	I	2028-08-05T10:36:50.930		34.28	-20.01	47623.27	-17.60		
eta	I	2028-08-05T10:37:16.391		34.37	-19.93	47176.12	-17.53		
beta	I	2028-08-05T10:38:44.621		34.68	-19.67	45641.75	-17.26		
alpha	I	2028-08-05T10:39:37.712		34.87	-19.51	44731.68	-17.07		
4	I	2028-08-05T10:41:45.501		35.33	-19.14	42575.11	-16.60		
5	I	2028-08-05T10:42:06.909		35.41	-19.07	42217.54	-16.50		
6	I	2028-08-05T10:42:32.403		35.50	-19.00	41808.16	-16.41		

No planet occultations

6	E	2028-08-05T11:34:18.758		46.65	-9.32	41813.26	16.34		
5	E	2028-08-05T11:34:40.001		46.72	-9.25	42162.82	16.42		
4	E	2028-08-05T11:35:02.132		46.80	-9.18	42526.51	16.52		
alpha	E	2028-08-05T11:37:10.875		47.26	-8.77	44684.72	16.99		
beta	E	2028-08-05T11:38:08.717		47.47	-8.58	45672.71	17.17		
eta	E	2028-08-05T11:39:35.588		47.79	-8.30	47176.12	17.43		
gamma	E	2028-08-05T11:40:01.194		47.88	-8.21	47623.44	17.50		
delta	E	2028-08-05T11:40:39.749		48.02	-8.09	48300.35	17.61		
lambda	E	2028-08-05T11:42:17.104		48.37	-7.77	50026.71	17.85		
epsilon	E	2028-08-05T11:43:12.004		48.56	-7.59	51010.33	17.90		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-08-05T11:09:28.590
 Event type : PRgt
 : Uranus occs: not geocentric or 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 : 3413044969208307840
 2Mass ID (if available) : 04462256+2218451
 ICRS Star Coord at Epoch: 04h 46m 22.57681s +22:18:44.93297s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.382
 G magnitude : 15.440
 RP magnitude : 14.740
 BP magnitude : 15.971
 DUPflag : 0
 Distance (au) : 19.802
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 21.15
 Sun-Target sep (deg) : 60.14
 Sun-Moon sep (deg) : 119.07
 B (ring opening deg) : 81.04
 PA of pole (deg) : -38.14
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.282
 C/A sky separation (km) : 32773.4
 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_itrfr93_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	2028-08-05T10:38:55.999		31.67	-10.17	50828.45	-15.78		
lambda	I	2028-08-05T10:39:46.907		31.77	-9.99	50026.71	-15.65		
delta	I	2028-08-05T10:41:38.783		31.98	-9.60	48300.35	-15.20		
gamma	I	2028-08-05T10:42:23.659		32.06	-9.44	47622.50	-15.01		
eta	I	2028-08-05T10:42:53.538		32.11	-9.33	47176.12	-14.87		
beta	I	2028-08-05T10:44:38.353		32.31	-8.96	45643.20	-14.37		
alpha	I	2028-08-05T10:45:43.131		32.42	-8.73	44724.85	-14.02		
4	I	2028-08-05T10:48:21.782		32.71	-8.17	42564.65	-13.10		
5	I	2028-08-05T10:48:49.676		32.76	-8.08	42199.76	-12.91		
6	I	2028-08-05T10:49:21.390		32.81	-7.96	41801.63	-12.73		

No planet occultations

6	E	2028-08-05T11:30:11.907		36.37	0.56x	41805.74	12.71		
5	E	2028-08-05T11:30:39.108		36.40	0.66x	42156.75	12.89		
4	E	2028-08-05T11:31:07.743		36.44	0.75x	42526.03	13.08		
alpha	E	2028-08-05T11:33:47.145		36.61	1.30x	44685.98	13.99		
beta	E	2028-08-05T11:34:56.572		36.68	1.54x	45669.24	14.34		
eta	E	2028-08-05T11:36:39.821		36.79	1.89x	47176.12	14.83		
gamma	E	2028-08-05T11:37:09.789		36.82	1.99x	47622.66	14.97		
delta	E	2028-08-05T11:37:54.777		36.87	2.15x	48300.35	15.16		
lambda	E	2028-08-05T11:39:46.969		36.98	2.53x	50026.71	15.61		
epsilon	E	2028-08-05T11:40:45.676		37.03	2.73x	50949.35	15.73		