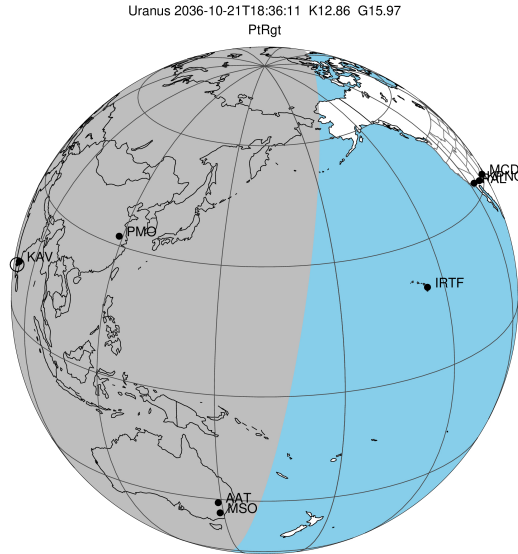


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-10-21T18:36:11.990
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 866311778531852288
 2Mass ID (if available) : 07225785+2229215

ICRS Star Coord at Epoch: 07h 22m 57.86343s +22:29:21.48859s

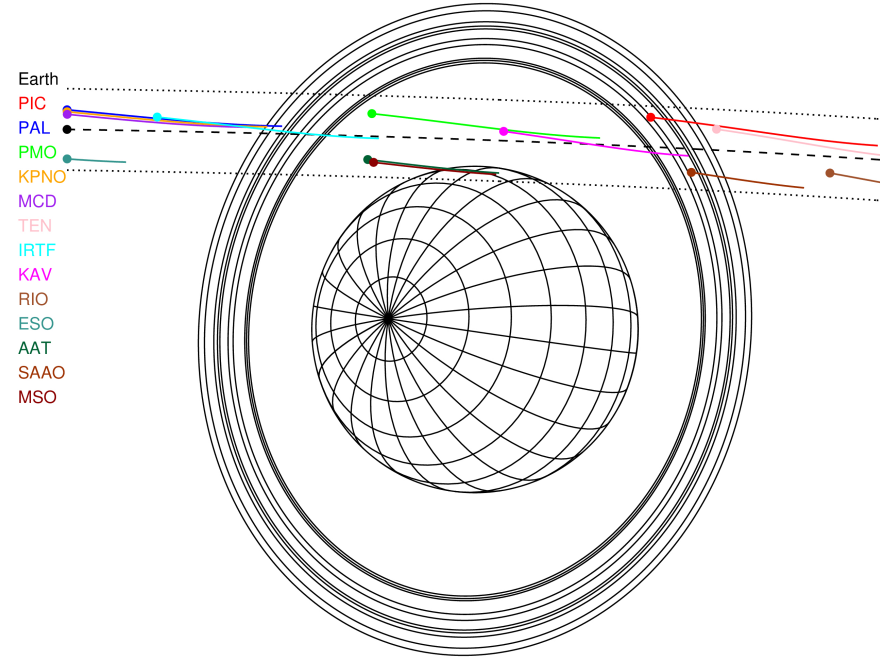
RUWE (>1.4 is poor) : 4.87
 K magnitude : 12.856
 G magnitude : 15.974
 RP magnitude : 14.952
 BP magnitude : 16.860
 DUPflag : 0
 Distance (au) : 18.590
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 1.66
 Sun-Target sep (deg) : 99.34
 Sun-Moon sep (deg) : 128.45
 B (ring opening deg) : 57.60
 PA of pole (deg) : 82.90

#	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



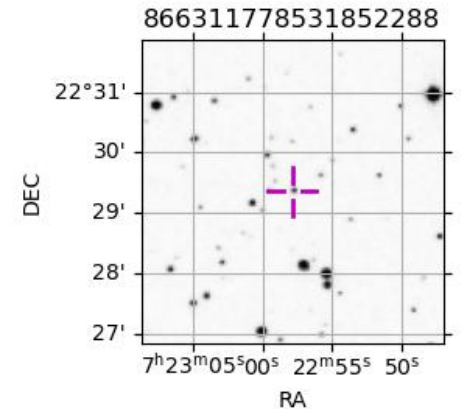
2036-10-21T18:36:11.9900 ra: 07 22 57.8634 s: +22 29 21.489 C/A 2.177 PA 182.05 deg v_sky + 1.65 km/s D 18.59 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2036-10-21T18:36:11 K12.86 G15.97 PtRgt



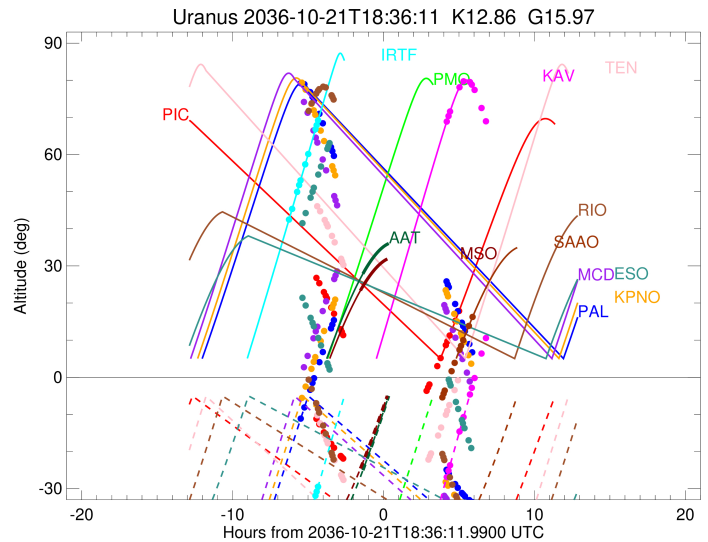
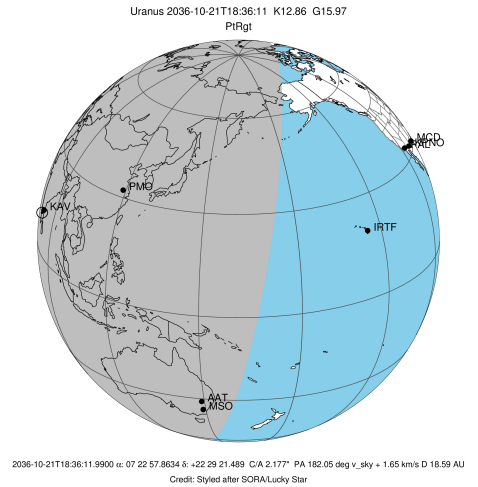
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1			+++++	OCT 21 22:23 - OCT 21 23:31	PnnRne
PAL	Palomar Mt (200")	33.4	243.1	++			OCT 21 13:05 - OCT 21 13:21	PnnRin
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+			OCT 21 13:10 - OCT 21 13:10	PnnRin
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	+++++			OCT 21 12:19 - OCT 21 14:15	PnnRin
KAV	Kavalur Observatory	12.6	78.8			+++++	OCT 21 22:48 - OCT 21 23:54	PnnRne
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		+		OCT 21 17:14 - OCT 21 17:14	PinRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8			+++++	OCT 21 23:38 - OCT 22 00:24	PnnRne
MSO	Mt. Stromlo Observato	-35.3	149.0		+		OCT 21 17:04 - OCT 21 17:04	PinRnn



```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2036-10-21T18:29:10.820
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      : 866311778531852288
2Mass ID (if available) : 07225785+2229215
ICRS Star Coord at Epoch: 07h 22m 57.86343s +22:29:21.48859s
RUWE (>1.4 is poor) : 4.87
K magnitude         : 12.856
G magnitude         : 15.974
RP magnitude        : 14.952
BP magnitude        : 16.860
DUPflag            : 0
Distance (au)       : 18.590
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 1.66
Sun-Target sep (deg) : 99.34
Sun-Moon sep (deg)  : 128.01
B (ring opening deg) : 57.60
PA of pole (deg)    : 82.90
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.630
C/A sky separation (km) : 35460.9
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall11.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
  
```



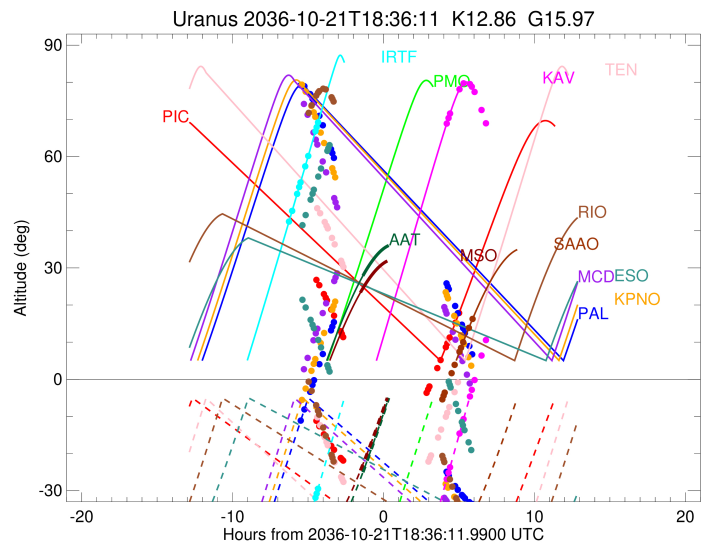
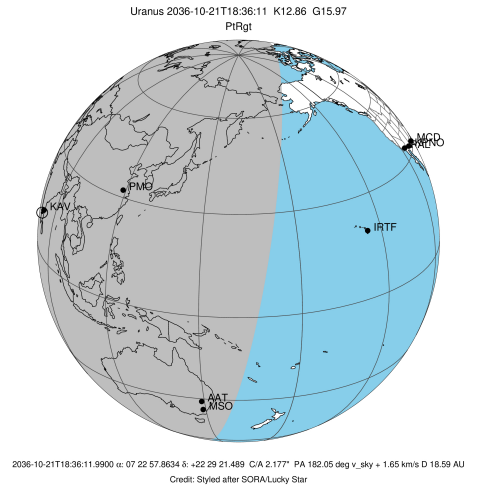
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-10-21T14:08:50.374	-11.11x	26.84x	51225.35	-1.62			
lambda	I	2036-10-21T14:21:11.535	-12.67x	25.32x	50026.71	-1.60			
delta	I	2036-10-21T14:39:26.402	-14.85x	22.92x	48300.35	-1.55			
gamma	I	2036-10-21T14:46:47.912	-15.68x	21.91x	47620.96	-1.53			
eta	I	2036-10-21T14:51:40.781	-16.21x	21.23x	47176.12	-1.51			
beta	I	2036-10-21T15:08:52.654	-17.99x	18.73x	45647.99	-1.45			
alpha	I	2036-10-21T15:19:48.586	-19.03x	17.08x	44710.97	-1.40			
4	I	2036-10-21T15:46:40.371	-21.25x	12.86x	42555.20	-1.28			
5	I	2036-10-21T15:51:05.234	-21.57x	12.15x	42230.16	-1.25			
6	I	2036-10-21T15:55:38.111	-21.88x	11.40x	41875.81	-1.23			

No planet occultations

6	E	2036-10-21T21:27:52.074	-3.59x	-46.76	41868.63	1.07			
5	E	2036-10-21T21:32:16.604	-2.93x	-47.41	42158.73	1.08			
4	E	2036-10-21T21:39:05.209	-1.89x	-48.38	42605.77	1.10			
alpha	E	2036-10-21T22:09:20.762	2.90x	-52.32	44684.62	1.18			
beta	E	2036-10-21T22:23:10.561	5.16	-53.87	45674.29	1.20			
eta	E	2036-10-21T22:43:42.817	8.61	-55.81	47176.12	1.23			
gamma	E	2036-10-21T22:49:46.861	9.64	-56.30	47625.79	1.24			
delta	E	2036-10-21T22:58:49.444	11.20	-56.93	48300.35	1.25			
lambda	E	2036-10-21T23:21:43.399	15.20	-58.06	50026.71	1.26			
epsilon	E	2036-10-21T23:31:10.664	16.87	-58.31	50744.97	1.27			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-10-21T19:01:24.210
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 866311778531852288
 2Mass ID (if available) : 07225785+2229215
 ICRS Star Coord at Epoch: 07h 22m 57.86343s +22:29:21.48859s
 RUWE (>1.4 is poor) : 4.87
 K magnitude : 12.856
 G magnitude : 15.974
 RP magnitude : 14.952
 BP magnitude : 16.860
 DUPflag : 0
 Distance (au) : 18.589
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 1.66
 Sun-Target sep (deg) : 99.34
 Sun-Moon sep (deg) : 129.18
 B (ring opening deg) : 57.60
 PA of pole (deg) : 82.90
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.434
 C/A sky separation (km) : 32821.3
 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



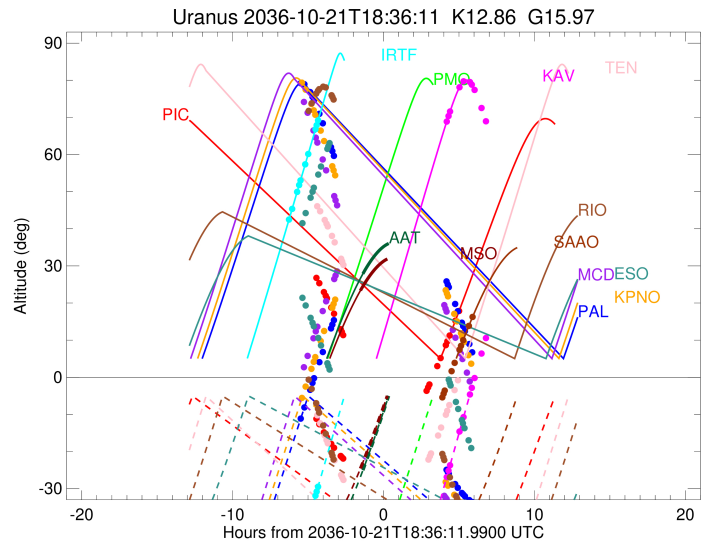
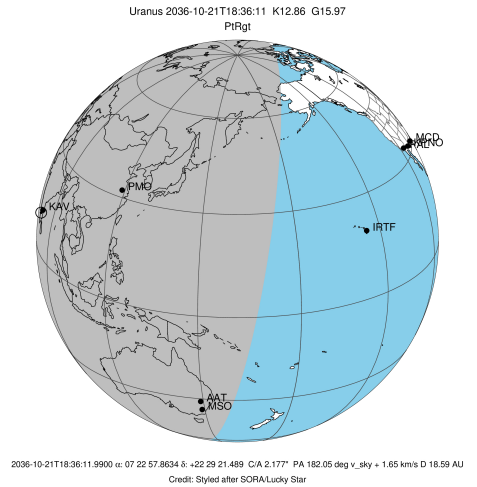
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-10-21T13:05:57.279		79.19	-11.40	51265.62	-1.30		
lambda	I	2036-10-21T13:21:57.297		78.93	-8.08	50026.71	-1.28		
delta	I	2036-10-21T13:44:53.962		76.79	-3.34x	48300.35	-1.23		
gamma	I	2036-10-21T13:54:09.045		75.51	-1.45x	47621.04	-1.22		
eta	I	2036-10-21T14:00:16.967		74.57	-0.20x	47176.12	-1.20		
beta	I	2036-10-21T14:21:49.498		70.88	4.16x	45646.07	-1.16		
alpha	I	2036-10-21T14:35:17.309		68.36	6.85x	44715.73	-1.13		
4	I	2036-10-21T15:08:12.932		61.85	13.30x	42548.63	-1.07		
5	I	2036-10-21T15:13:13.051		60.83	14.26x	42243.33	-1.05		
6	I	2036-10-21T15:18:47.067		59.69	15.33x	41872.28	-1.04		

No planet occultations

6	E	2036-10-21T22:47:06.827		-24.96x	25.77x	41868.24	1.33		
5	E	2036-10-21T22:50:39.243		-25.40x	25.16x	42158.46	1.35		
4	E	2036-10-21T22:56:08.177		-26.05x	24.21x	42605.99	1.37		
alpha	E	2036-10-21T23:20:26.293		-28.71x	19.85x	44684.62	1.47		
beta	E	2036-10-21T23:31:28.785		-29.78x	17.80x	45674.14	1.51		
eta	E	2036-10-21T23:47:44.895		-31.16x	14.73x	47176.12	1.56		
gamma	E	2036-10-21T23:52:31.018		-31.52x	13.82x	47625.69	1.58		
delta	E	2036-10-21T23:59:35.600		-32.03x	12.45x	48300.35	1.60		
lambda	E	2036-10-22T00:17:18.999		-33.08x	8.99x	50026.71	1.65		
epsilon	E	2036-10-22T00:24:33.570		-33.43x	7.56x	50746.05	1.67		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-10-21T19:02:08.660
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 866311778531852288
 2Mass ID (if available) : 07225785+2229215
 ICRS Star Coord at Epoch: 07h 22m 57.86343s +22:29:21.48859s
 RUWE (>1.4 is poor) : 4.87
 K magnitude : 12.856
 G magnitude : 15.974
 RP magnitude : 14.952
 BP magnitude : 16.860
 DUPflag : 0
 Distance (au) : 18.589
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 1.66
 Sun-Target sep (deg) : 99.34
 Sun-Moon sep (deg) : 129.14
 B (ring opening deg) : 57.60
 PA of pole (deg) : 82.90
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.440
 C/A sky separation (km) : 32894.3
 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

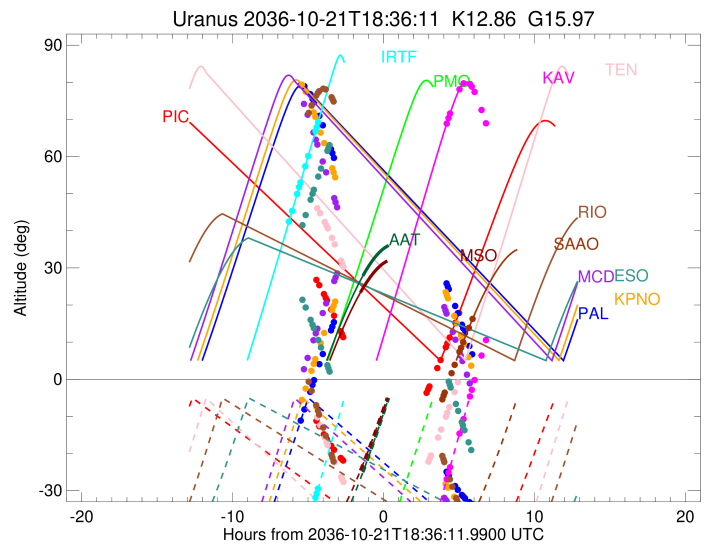
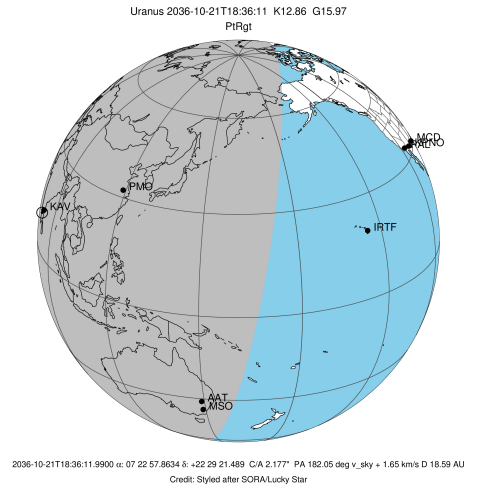


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-10-21T13:10:37.636		79.49	-5.84	51267.09	-1.29		
lambda	I	2036-10-21T13:26:47.447		77.45	-2.46x	50026.71	-1.27		
delta	I	2036-10-21T13:49:53.632		73.57	2.32x	48300.35	-1.23		
gamma	I	2036-10-21T13:59:11.568		71.84	4.23x	47621.04	-1.21		
eta	I	2036-10-21T14:05:21.074		70.65	5.48x	47176.12	-1.20		
beta	I	2036-10-21T14:26:57.219		66.35	9.84x	45646.04	-1.16		
alpha	I	2036-10-21T14:40:25.667		63.58	12.52x	44715.80	-1.13		
4	I	2036-10-21T15:13:18.565		56.70	18.89x	42548.59	-1.07		
5	I	2036-10-21T15:18:17.637		55.64	19.83x	42243.40	-1.06		
6	I	2036-10-21T15:23:50.489		54.47	20.87x	41872.26	-1.05		

No planet occultations

6	E	2036-10-21T22:43:48.954		-28.22x	23.39x	41868.25	1.34		
5	E	2036-10-21T22:47:19.942		-28.62x	22.75x	42158.46	1.36		
4	E	2036-10-21T22:52:46.678		-29.22x	21.74x	42605.99	1.38		
alpha	E	2036-10-21T23:16:55.562		-31.61x	17.19x	44684.62	1.48		
beta	E	2036-10-21T23:27:54.187		-32.54x	15.07x	45674.15	1.52		
eta	E	2036-10-21T23:44:05.045		-33.71x	11.89x	47176.12	1.57		
gamma	E	2036-10-21T23:48:49.746		-34.01x	10.94x	47625.70	1.59		
delta	E	2036-10-21T23:55:52.313		-34.41x	9.54x	48300.35	1.61		
lambda	E	2036-10-22T00:13:31.237		-35.19x	5.98x	50026.71	1.65		
epsilon	E	2036-10-22T00:20:44.191		-35.42x	4.51x	50745.99	1.67		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-10-21T18:55:59.110
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 866311778531852288
 2Mass ID (if available) : 07225785+2229215
 ICRS Star Coord at Epoch: 07h 22m 57.86343s +22:29:21.48859s
 RUWE (>1.4 is poor) : 4.87
 K magnitude : 12.856
 G magnitude : 15.974
 RP magnitude : 14.952
 BP magnitude : 16.860
 DUPflag : 0
 Distance (au) : 18.590
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 1.66
 Sun-Target sep (deg) : 99.34
 Sun-Moon sep (deg) : 129.41
 B (ring opening deg) : 57.60
 PA of pole (deg) : 82.90
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.235
 C/A sky separation (km) : 30128.8
 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

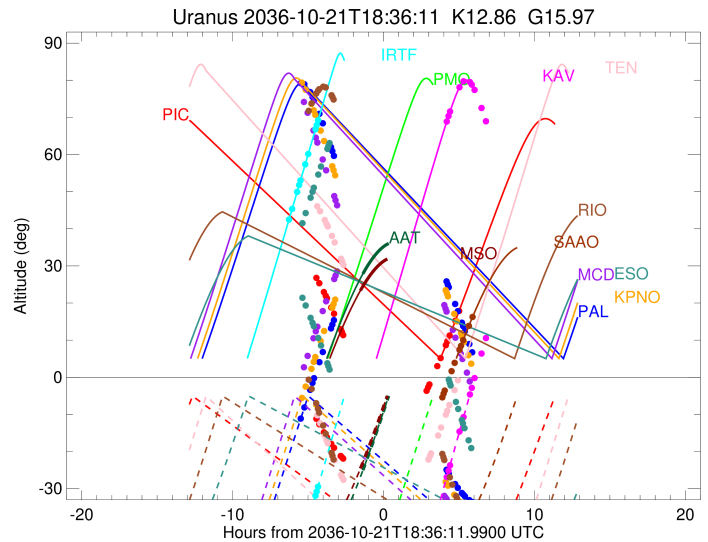
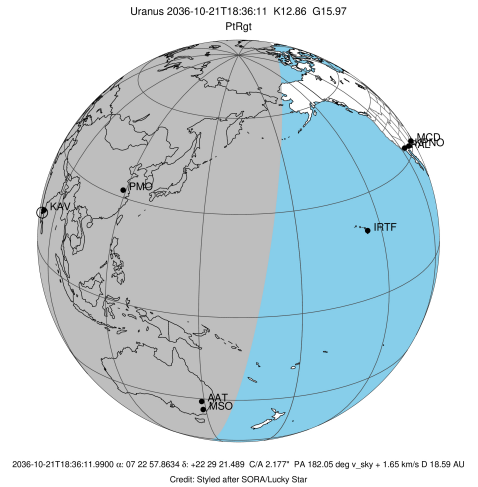


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-10-21T12:19:25.625		42.22	-56.84	51271.09	-1.52		
lambda	I	2036-10-21T12:33:14.527		45.40	-53.63	50026.71	-1.48		
delta	I	2036-10-21T12:53:05.485		49.99	-48.99	48300.35	-1.42		
gamma	I	2036-10-21T13:01:08.304		51.85	-47.11	47621.06	-1.39		
eta	I	2036-10-21T13:06:29.212		53.08	-45.86	47176.12	-1.38		
beta	I	2036-10-21T13:25:22.169		57.45	-41.42	45645.64	-1.32		
alpha	I	2036-10-21T13:37:12.744		60.20	-38.64	44717.00	-1.28		
4	I	2036-10-21T14:06:28.081		66.98	-31.75	42546.69	-1.20		
5	I	2036-10-21T14:10:50.872		67.99	-30.72	42247.51	-1.18		
6	I	2036-10-21T14:15:51.914		69.15	-29.54	41870.90	-1.17		

No planet occultations

6	E	2036-10-21T23:33:17.549	-15.91x	52.42x	41865.84	1.41
5	E	2036-10-21T23:36:37.612	-16.58x	51.95x	42156.84	1.42
4	E	2036-10-21T23:41:52.840	-17.63x	51.18x	42608.07	1.44
alpha	E	2036-10-22T00:05:05.447	-22.17x	47.47x	44684.73	1.53
beta	E	2036-10-22T00:15:43.200	-24.18x	45.63x	45675.03	1.57
eta	E	2036-10-22T00:31:24.529	-27.09x	42.78x	47176.12	1.62
gamma	E	2036-10-22T00:36:01.228	-27.92x	41.91x	47625.97	1.63
delta	E	2036-10-22T00:42:51.603	-29.14x	40.61x	48300.35	1.65
lambda	E	2036-10-22T01:00:00.240	-32.09x	37.25x	50026.71	1.70
epsilon	E	2036-10-22T01:06:59.595	-33.25x	35.84x	50744.48	1.72

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-10-21T18:06:11.340
 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 : 866311778531852288
 2Mass ID (if available) : 07225785+2229215
 ICRS Star Coord at Epoch: 07h 22m 57.86343s +22:29:21.48859s
 RUWE (>1.4 is poor) : 4.87
 K magnitude : 12.856
 G magnitude : 15.974
 RP magnitude : 14.952
 BP magnitude : 16.860
 DUPflag : 0
 Distance (au) : 18.590
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 1.66
 Sun-Target sep (deg) : 99.34
 Sun-Moon sep (deg) : 128.03
 B (ring opening deg) : 57.60
 PA of pole (deg) : 82.90
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.326
 C/A sky separation (km) : 31356.0
 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

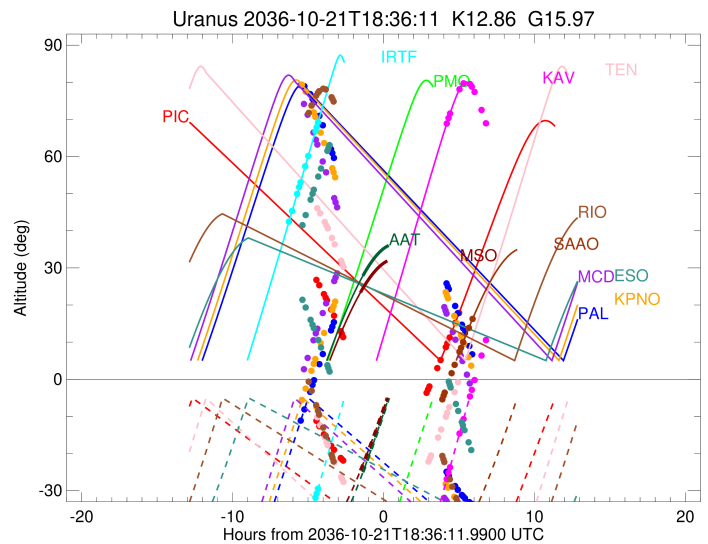
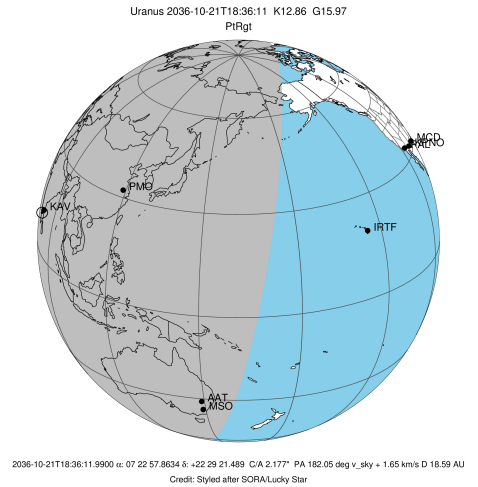


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-10-21T13:08:29.313	-52.03x	-11.83	51241.60	-1.99			
lambda	I	2036-10-21T13:18:42.684	-50.97x	-14.30	50026.71	-1.96			
delta	I	2036-10-21T13:33:35.993	-49.21x	-17.90	48300.35	-1.90			
gamma	I	2036-10-21T13:39:35.477	-48.42x	-19.35	47620.99	-1.88			
eta	I	2036-10-21T13:43:33.580	-47.89x	-20.31	47176.12	-1.86			
beta	I	2036-10-21T13:57:29.491	-45.88x	-23.68	45646.99	-1.80			
alpha	I	2036-10-21T14:06:14.503	-44.54x	-25.81	44713.44	-1.75			
4	I	2036-10-21T14:27:33.437	-41.02x	-30.98	42551.34	-1.64			
5	I	2036-10-21T14:30:53.011	-40.44x	-31.79	42237.92	-1.62			
6	I	2036-10-21T14:34:27.617	-39.81x	-32.66	41873.82	-1.60			

No planet occultations

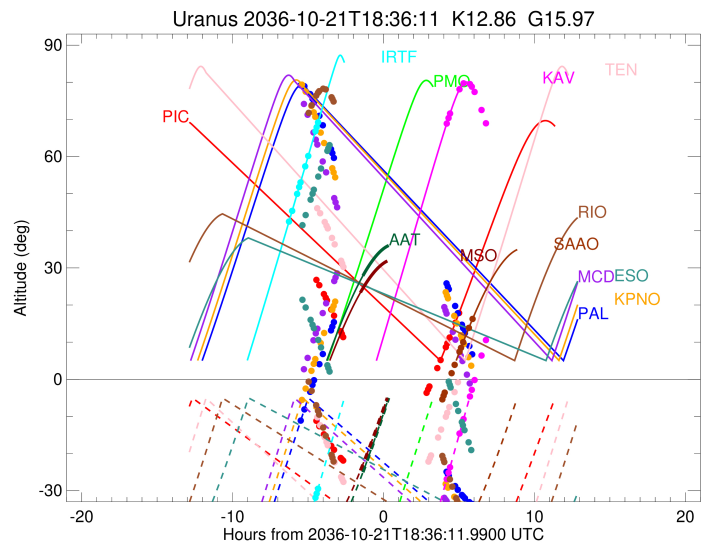
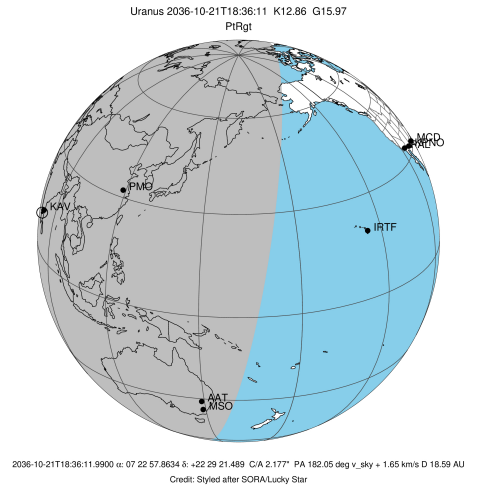
6	E	2036-10-21T22:48:01.626	68.97	-26.79	41861.54	0.92			
5	E	2036-10-21T22:53:06.019	70.03	-25.56	42155.19	0.93			
4	E	2036-10-21T23:01:17.645	71.70	-23.58	42611.18	0.94			
alpha	E	2036-10-21T23:37:31.524	78.01	-14.81	44685.36	0.97			
beta	E	2036-10-21T23:54:24.712	79.72	-10.74	45676.76	0.98			
eta	E	2036-10-22T00:19:30.622	79.55	-4.71x	47176.12	1.01			
gamma	E	2036-10-22T00:26:56.679	78.86	-2.92x	47626.63	1.01			
delta	E	2036-10-22T00:37:57.767	77.44	-0.28x	48300.35	1.02			
lambda	E	2036-10-22T01:05:38.857	72.59	6.32x	50026.71	1.05			
epsilon	E	2036-10-22T01:16:54.941	70.33	9.00x	50743.96	1.07			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-10-21T18:30:57.350
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 866311778531852288
 2Mass ID (if available) : 07225785+2229215
 ICRS Star Coord at Epoch: 07h 22m 57.86343s +22:29:21.48859s
 RUWE (>1.4 is poor) : 4.87
 K magnitude : 12.856
 G magnitude : 15.974
 RP magnitude : 14.952
 BP magnitude : 16.860
 DUPflag : 0
 Distance (au) : 18.590
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 1.66
 Sun-Target sep (deg) : 99.34
 Sun-Moon sep (deg) : 128.78
 B (ring opening deg) : 57.60
 PA of pole (deg) : 82.90
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.833
 C/A sky separation (km) : 24708.6
 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	2036-10-21T11:59:02.480		-29.51x	-40.41	51297.09	-2.00		
lambda	I	2036-10-21T12:09:39.715		-27.27x	-41.71	50026.71	-1.98		
delta	I	2036-10-21T12:24:24.684		-24.17x	-43.33	48300.35	-1.93		
gamma	I	2036-10-21T12:30:19.370		-22.94x	-43.92	47621.15	-1.90		
eta	I	2036-10-21T12:34:13.903		-22.12x	-44.30	47176.12	-1.89		
beta	I	2036-10-21T12:47:53.892		-19.28x	-45.46	45644.68	-1.84		
alpha	I	2036-10-21T12:56:19.007		-17.54x	-46.08	44719.78	-1.81		
4	I	2036-10-21T13:16:53.484		-13.32x	-47.21	42543.37	-1.73		
5	I	2036-10-21T13:19:49.511		-12.72x	-47.33	42254.72	-1.72		
6	I	2036-10-21T13:23:20.582		-12.01x	-47.45	41868.34	-1.70		
Uranus	I	2036-10-21T17:14:05.521		27.85	-25.10	25524.37		8.79	9.20
Uranus	E	2036-10-21T19:51:37.125		36.11	6.44x	25543.98		-5.77	-6.04
6	E	2036-10-22T00:28:30.622		-0.27x	62.87x	41858.08	1.40		
5	E	2036-10-22T00:31:50.662		-0.92x	63.38x	42154.82	1.41		
4	E	2036-10-22T00:37:15.593		-1.97x	64.20x	42612.93	1.43		
alpha	E	2036-10-22T01:00:54.365		-6.61x	67.28x	44685.96	1.49		
beta	E	2036-10-22T01:11:52.637		-8.80x	68.39x	45677.57	1.51		
eta	E	2036-10-22T01:28:08.255		-12.08x	69.56x	47176.12	1.55		
gamma	E	2036-10-22T01:32:57.366		-13.06x	69.79x	47626.93	1.56		
delta	E	2036-10-22T01:40:05.408		-14.52x	70.01x	48300.35	1.58		
lambda	E	2036-10-22T01:58:03.010		-18.21x	69.97x	50026.71	1.62		
epsilon	E	2036-10-22T02:05:23.698		-19.73x	69.71x	50745.22	1.64		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-10-21T18:15:39.070
 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 : 866311778531852288
 2Mass ID (if available) : 07225785+2229215
 ICRS Star Coord at Epoch: 07h 22m 57.86343s +22:29:21.48859s
 RUWE (>1.4 is poor) : 4.87
 K magnitude : 12.856
 G magnitude : 15.974
 RP magnitude : 14.952
 BP magnitude : 16.860
 DUPflag : 0
 Distance (au) : 18.590
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 1.66
 Sun-Target sep (deg) : 99.34
 Sun-Moon sep (deg) : 127.53
 B (ring opening deg) : 57.60
 PA of pole (deg) : 82.90
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.106
 C/A sky separation (km) : 28389.6
 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



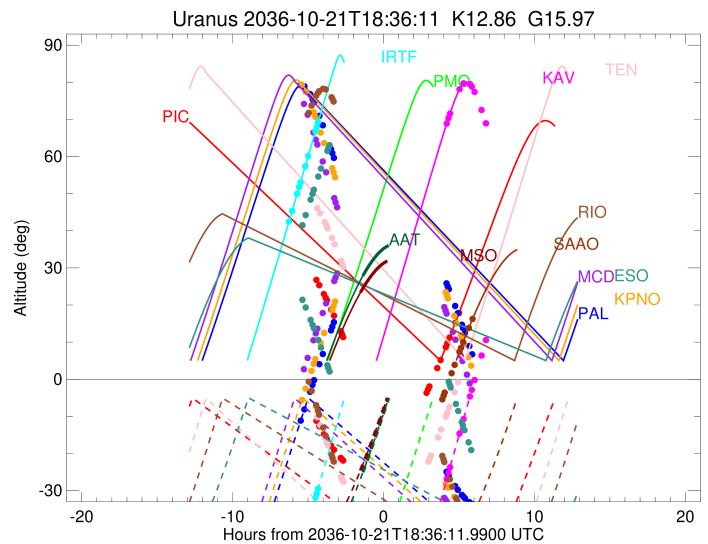
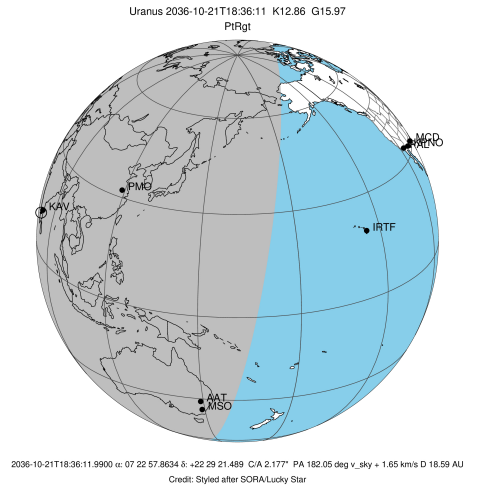
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-10-21T13:21:39.197	-53.80x	43.48x	51291.73	-1.97		
lambda	I	2036-10-21T13:32:20.737	-56.05x	41.30x	50026.71	-1.96		
delta	I	2036-10-21T13:47:05.475	-59.15x	38.27x	48300.35	-1.94		
gamma	I	2036-10-21T13:52:57.041	-60.37x	37.06x	47621.12	-1.93		
eta	I	2036-10-21T13:56:48.577	-61.17x	36.25x	47176.12	-1.92		
beta	I	2036-10-21T14:10:12.691	-63.93x	33.46x	45645.10	-1.89		
alpha	I	2036-10-21T14:18:25.430	-65.60x	31.74x	44718.42	-1.86		
4	I	2036-10-21T14:38:15.233	-69.55x	27.57x	42545.25	-1.80		
5	I	2036-10-21T14:41:07.206	-70.10x	26.96x	42250.52	-1.79		
6	I	2036-10-21T14:44:27.131	-70.74x	26.26x	41869.90	-1.78		

No planet occultations

6	E	2036-10-21T22:30:20.467	-5.36x	-46.58	41858.90	1.30		
5	E	2036-10-21T22:33:57.298	-4.66x	-46.53	42154.84	1.30		
4	E	2036-10-21T22:39:51.880	-3.51x	-46.41	42612.62	1.30		
alpha	E	2036-10-21T23:06:20.076	1.53x	-45.31	44685.94	1.30		
beta	E	2036-10-21T23:18:59.681	3.88x	-44.48	45677.60	1.30		
eta	E	2036-10-21T23:38:14.482	7.38	-42.87	47176.12	1.29		
gamma	E	2036-10-21T23:44:03.772	8.42	-42.31	47626.99	1.29		
delta	E	2036-10-21T23:52:46.910	9.95	-41.41	48300.35	1.28		
lambda	E	2036-10-22T00:15:17.656	13.79	-38.75	50026.71	1.27		
epsilon	E	2036-10-22T00:24:45.283	15.35	-37.51	50746.34	1.26		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-10-21T18:30:45.780
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 866311778531852288
 2Mass ID (if available) : 07225785+2229215
 ICRS Star Coord at Epoch: 07h 22m 57.86343s +22:29:21.48859s
 RUWE (>1.4 is poor) : 4.87
 K magnitude : 12.856
 G magnitude : 15.974
 RP magnitude : 14.952
 BP magnitude : 16.860
 DUPflag : 0
 Distance (au) : 18.590
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 1.66
 Sun-Target sep (deg) : 99.34
 Sun-Moon sep (deg) : 128.75
 B (ring opening deg) : 57.60
 PA of pole (deg) : 82.90
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.814
 C/A sky separation (km) : 24451.1
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-10-21T11:59:02.880	-30.17x	-37.10	51300.48	-2.00			
lambda	I	2036-10-21T12:09:41.646	-28.01x	-38.28	50026.71	-1.98			
delta	I	2036-10-21T12:24:25.819	-25.03x	-39.75	48300.35	-1.93			
gamma	I	2036-10-21T12:30:19.975	-23.84x	-40.29	47621.17	-1.91			
eta	I	2036-10-21T12:34:14.103	-23.06x	-40.62	47176.12	-1.89			
beta	I	2036-10-21T12:47:52.257	-20.33x	-41.67	45644.56	-1.85			
alpha	I	2036-10-21T12:56:15.569	-18.67x	-42.22	44720.12	-1.81			
4	I	2036-10-21T13:16:45.448	-14.63x	-43.24	42542.99	-1.74			
5	I	2036-10-21T13:19:39.971	-14.06x	-43.34	42255.56	-1.73			
6	I	2036-10-21T13:23:10.431	-13.38x	-43.45	41868.02	-1.71			
Uranus	I	2036-10-21T17:04:12.170	23.33	-24.62	25515.12			9.91	10.37
Uranus	E	2036-10-21T20:01:51.695	31.81	9.09x	25538.33			-6.78	-7.09
6	E	2036-10-22T00:27:56.729	-1.91x	59.88x	41857.72	1.41			
5	E	2036-10-22T00:31:15.614	-2.52x	60.33x	42154.83	1.42			
4	E	2036-10-22T00:36:38.972	-3.52x	61.03x	42613.10	1.43			
alpha	E	2036-10-22T01:00:11.428	-7.94x	63.67x	44686.05	1.49			
beta	E	2036-10-22T01:11:07.583	-10.03x	64.60x	45677.67	1.52			
eta	E	2036-10-22T01:27:20.897	-13.17x	65.59x	47176.12	1.56			
gamma	E	2036-10-22T01:32:09.572	-14.11x	65.78x	47626.97	1.57			
delta	E	2036-10-22T01:39:17.051	-15.50x	65.97x	48300.35	1.58			
lambda	E	2036-10-22T01:57:14.099	-19.05x	65.98x	50026.71	1.62			
epsilon	E	2036-10-22T02:04:35.065	-20.51x	65.79x	50745.54	1.64			