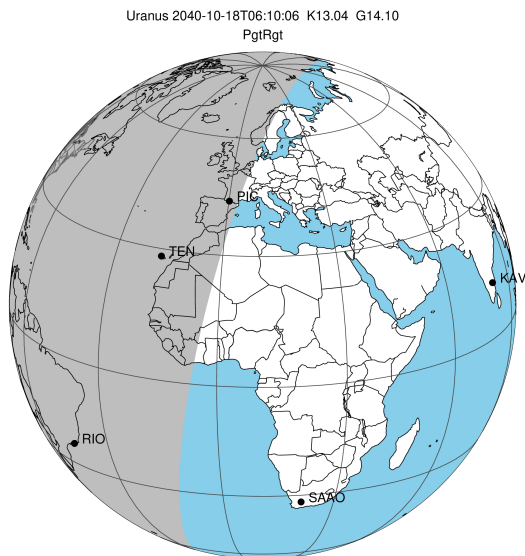


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-10-18T06:10:06.900
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 659702376757511168
 2Mass ID (if available) : 08390507+1902135

ICRS Star Coord at Epoch: 08h 39m 05.06814s +19:02:13.68469s

RUWE (>1.4 is poor) : 1.05
 K magnitude : 13.036
 G magnitude : 14.098
 RP magnitude : 13.707
 BP magnitude : 14.335
 DUPflag : 0
 Distance (au) : 18.735
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.93
 Sun-Target sep (deg) : 77.71
 Sun-Moon sep (deg) : 127.30
 B (ring opening deg) : 39.89
 PA of pole (deg) : 94.16

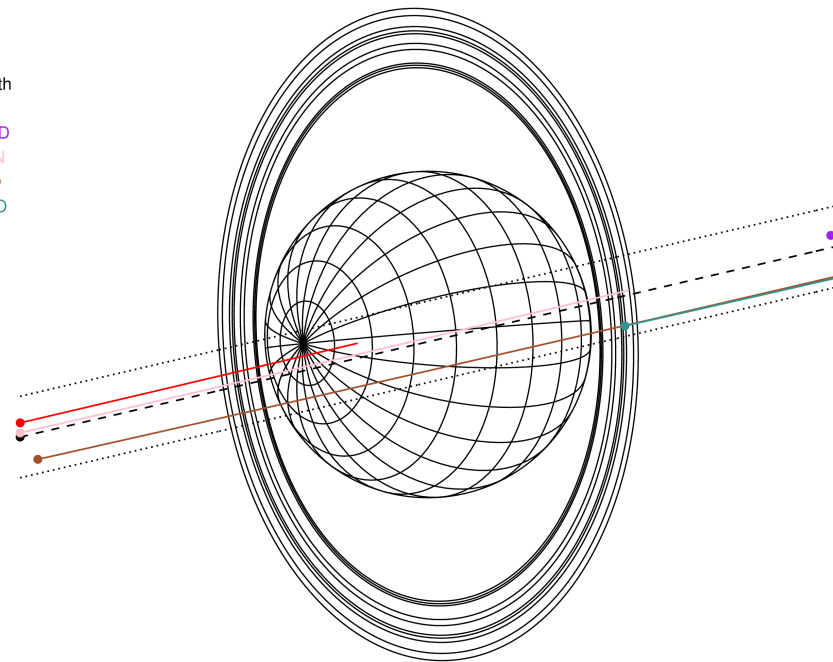
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2040-10-18T06:10:06.9000 cc: 08 39 05.0681 s: +19 02 13.685 C/A 0.082° PA 13.15 deg v_sky +12.93 km/s D 18.74 AU
 Credit: Styled after SORA/Lucky Star

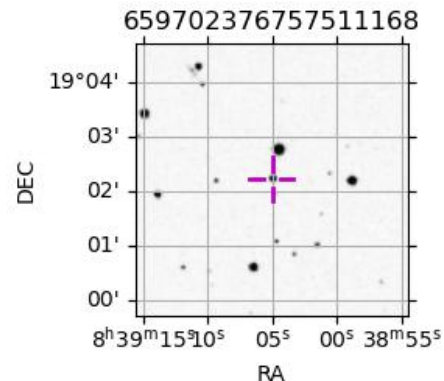
Uranus 2040-10-18T06:10:06 K13.04 G14.10 PgtRgt

Earth
 PIC
 MCD
 TEN
 RIO
 ESO



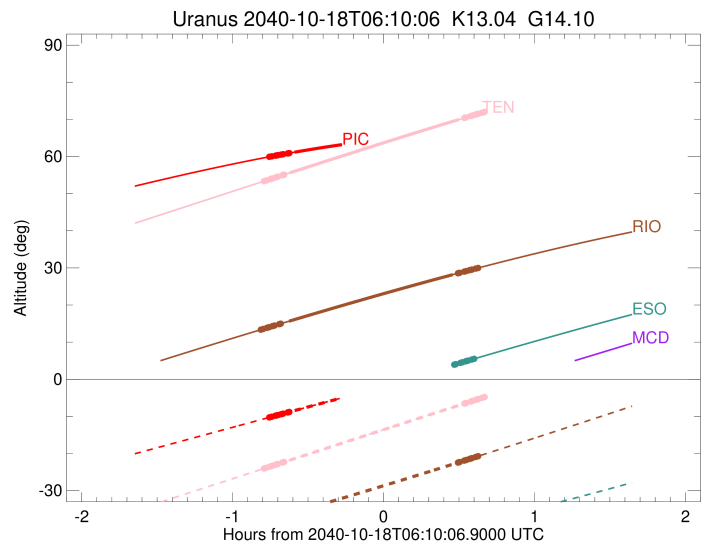
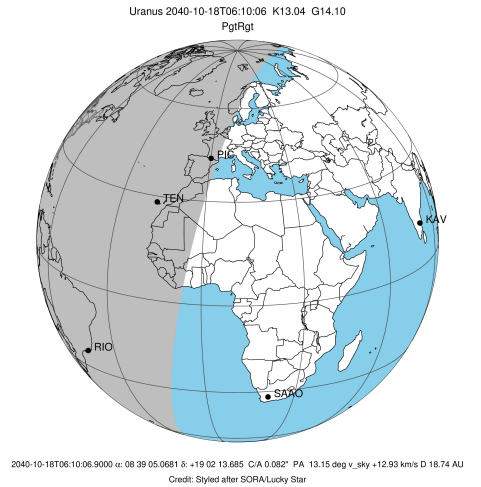
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+++++	+		OCT 18 05:25 - OCT 18 05:34	PinRin
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
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	+++++	+ +	+++++	OCT 18 05:22 - OCT 18 06:49	PieRie
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	+++++	+ +	+++++	OCT 18 05:21 - OCT 18 06:47	PieRie
ESO	European Southern Obs	-29.3	289.3			+++	OCT 18 06:43 - OCT 18 06:46	PnnRne
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



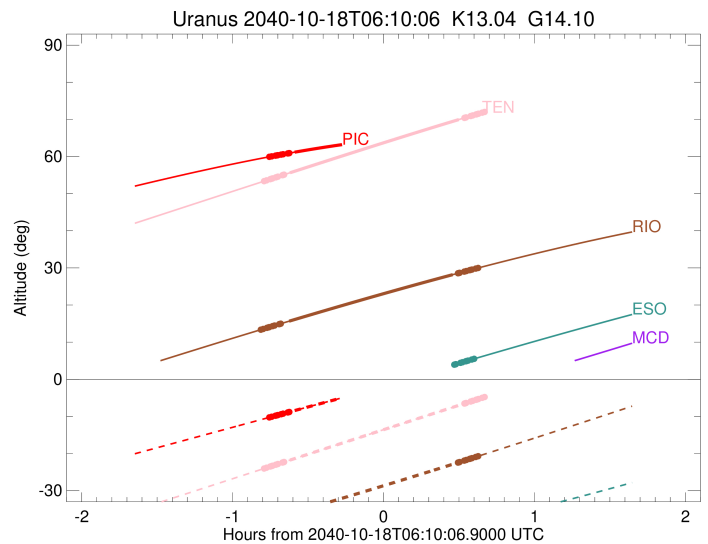
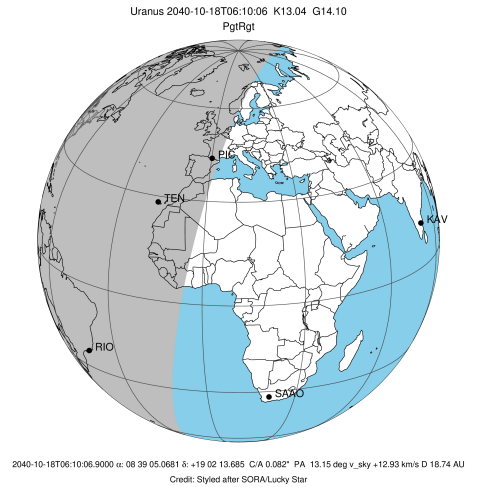
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2040-10-18T06:08:14.160
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       : 659702376757511168
2Mass ID (if available) : 08390507+1902135
ICRS Star Coord at Epoch: 08h 39m 05.06814s +19:02:13.68469s
RUWE (>1.4 is poor) : 1.05
K magnitude           : 13.036
G magnitude           : 14.098
RP magnitude          : 13.707
BP magnitude          : 14.335
DUPflag              : 0
Distance (au)         : 18.735
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : 12.93
Sun-Target sep (deg) : 77.71
Sun-Moon sep (deg)   : 128.11
B (ring opening deg) : 39.89
PA of pole (deg)     : 94.16
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.090
C/A sky separation (km) : 1222.5
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_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```



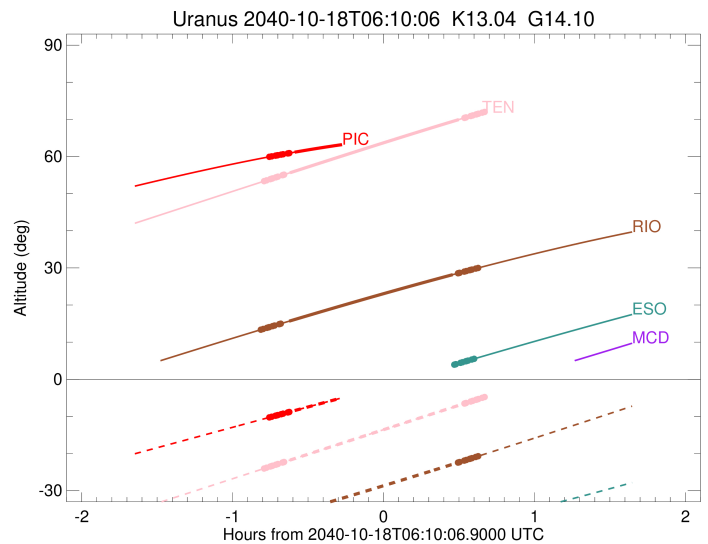
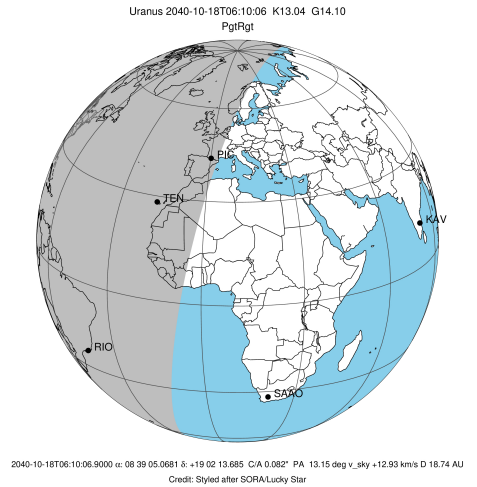
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-10-18T05:25:01.650		59.97	-10.21	50825.68	-19.52		
lambda	I	2040-10-18T05:25:42.577		60.06	-10.09	50026.71	-19.52		
delta	I	2040-10-18T05:27:11.020		60.24	-9.82	48300.35	-19.52		
gamma	I	2040-10-18T05:27:45.808		60.32	-9.71	47621.39	-19.52		
eta	I	2040-10-18T05:28:08.624		60.36	-9.64	47176.12	-19.52		
beta	I	2040-10-18T05:29:26.488		60.52	-9.41	45655.26	-19.51		
alpha	I	2040-10-18T05:30:12.513		60.62	-9.27	44751.95	-19.51		
4	I	2040-10-18T05:32:03.055		60.85	-8.93	42615.15	-19.51		
5	I	2040-10-18T05:32:21.028		60.88	-8.87	42300.56	-19.53		
6	I	2040-10-18T05:32:37.913		60.92	-8.82	41876.53	-19.48		
Uranus	I	2040-10-18T05:34:47.980		61.17	-8.43	25322.62		49.68	50.97
Uranus	E	2040-10-18T06:41:43.634		66.06	3.59x	25329.94		-48.62	-49.92
6	E	2040-10-18T06:44:08.138		66.10	4.02x	41798.94	19.42		
5	E	2040-10-18T06:44:22.607		66.10	4.06x	42172.15	19.47		
4	E	2040-10-18T06:44:42.592		66.11	4.12x	42526.78	19.45		
alpha	E	2040-10-18T06:46:34.727		66.13	4.44x	44685.45	19.44		
beta	E	2040-10-18T06:47:24.934		66.13	4.59x	45668.03	19.45		
eta	E	2040-10-18T06:48:42.426		66.14	4.81x	47176.12	19.45		
gamma	E	2040-10-18T06:49:05.818		66.14	4.88x	47631.03	19.45		
delta	E	2040-10-18T06:49:40.236		66.15	4.98x	48300.35	19.45		
lambda	E	2040-10-18T06:51:09.005		66.15	5.24x	50026.71	19.45		
epsilon	E	2040-10-18T06:52:23.852		66.15	5.46x	51482.34	19.45		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-10-18T06:06:27.130
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 659702376757511168
 2Mass ID (if available) : 08390507+1902135
 ICRS Star Coord at Epoch: 08h 39m 05.06814s +19:02:13.68469s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 13.036
 G magnitude : 14.098
 RP magnitude : 13.707
 BP magnitude : 14.335
 DUPflag : 0
 Distance (au) : 18.735
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.93
 Sun-Target sep (deg) : 77.71
 Sun-Moon sep (deg) : 128.25
 B (ring opening deg) : 39.89
 PA of pole (deg) : 94.16
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.038
 C/A sky separation (km) : 513.4
 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



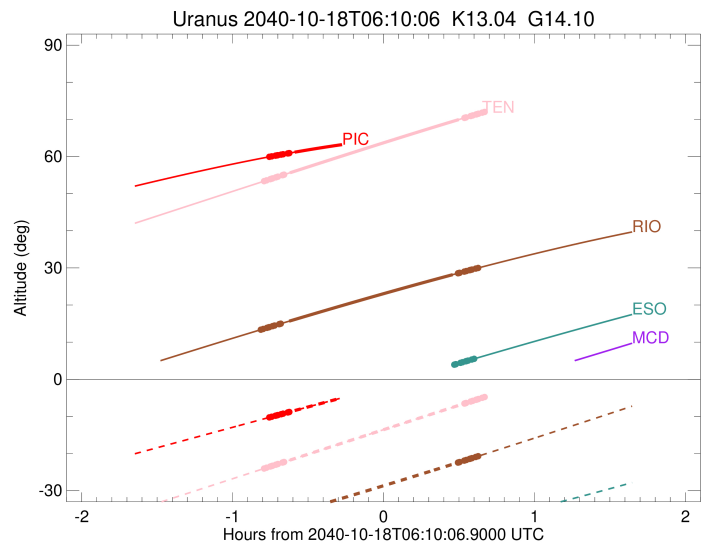
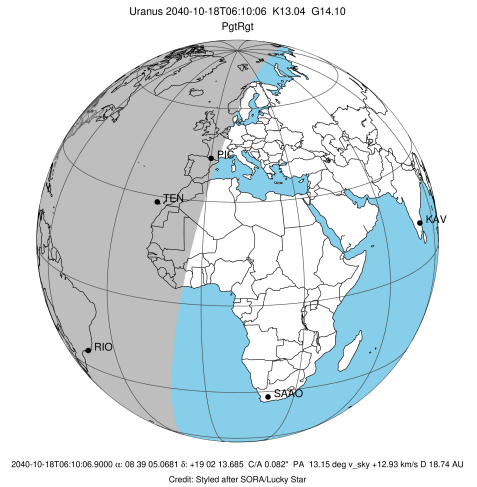
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-10-18T05:22:57.080		53.43	-23.97	50817.93	-19.51		
lambda	I	2040-10-18T05:23:37.626		53.58	-23.83	50026.71	-19.51		
delta	I	2040-10-18T05:25:06.107		53.91	-23.50	48300.35	-19.51		
gamma	I	2040-10-18T05:25:40.907		54.03	-23.37	47621.47	-19.51		
eta	I	2040-10-18T05:26:03.737		54.12	-23.29	47176.12	-19.51		
beta	I	2040-10-18T05:27:21.684		54.40	-23.00	45654.56	-19.50		
alpha	I	2040-10-18T05:28:07.677		54.57	-22.83	44751.71	-19.50		
4	I	2040-10-18T05:29:58.318		54.98	-22.43	42615.56	-19.50		
5	I	2040-10-18T05:30:16.357		55.04	-22.36	42298.67	-19.52		
6	I	2040-10-18T05:30:33.272		55.10	-22.30	41875.85	-19.47		
Uranus	I	2040-10-18T05:32:54.341		55.62	-21.78	25327.05		49.04	50.33
Uranus	E	2040-10-18T06:40:05.311		69.96	-7.02	25324.20		-49.45	-50.74
6	E	2040-10-18T06:42:16.002		70.41	-6.54	41798.18	19.35		
5	E	2040-10-18T06:42:30.361		70.45	-6.49	42170.07	19.39		
4	E	2040-10-18T06:42:50.621		70.52	-6.41	42527.19	19.38		
alpha	E	2040-10-18T06:44:43.082		70.90	-6.00	44685.18	19.37		
beta	E	2040-10-18T06:45:33.499		71.07	-5.82	45667.27	19.37		
eta	E	2040-10-18T06:46:51.332		71.33	-5.54	47176.12	19.37		
gamma	E	2040-10-18T06:47:14.824		71.40	-5.45	47631.11	19.37		
delta	E	2040-10-18T06:47:49.378		71.52	-5.33	48300.35	19.37		
lambda	E	2040-10-18T06:49:18.517		71.81	-5.00	50026.71	19.37		
epsilon	E	2040-10-18T06:50:33.240		72.06	-4.73x	51473.83	19.37		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-10-18T06:05:03.990
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 659702376757511168
 2Mass ID (if available) : 08390507+1902135
 ICRS Star Coord at Epoch: 08h 39m 05.06814s +19:02:13.68469s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 13.036
 G magnitude : 14.098
 RP magnitude : 13.707
 BP magnitude : 14.335
 DUPflag : 0
 Distance (au) : 18.735
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.93
 Sun-Target sep (deg) : 77.71
 Sun-Moon sep (deg) : 127.98
 B (ring opening deg) : 39.89
 PA of pole (deg) : 94.16
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.409
 C/A sky separation (km) : 5552.4
 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_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	2040-10-18T05:21:40.332		13.42	-38.33	50797.08	-19.60		
lambda	I	2040-10-18T05:22:19.625		13.56	-38.21	50026.71	-19.60		
delta	I	2040-10-18T05:23:47.724		13.86	-37.93	48300.35	-19.59		
gamma	I	2040-10-18T05:24:22.373		13.98	-37.82	47621.73	-19.58		
eta	I	2040-10-18T05:24:45.131		14.05	-37.75	47176.12	-19.58		
beta	I	2040-10-18T05:26:02.938		14.32	-37.50	45652.56	-19.56		
alpha	I	2040-10-18T05:26:48.656		14.47	-37.35	44750.74	-19.55		
4	I	2040-10-18T05:28:39.123		14.85	-37.00	42616.36	-19.54		
5	I	2040-10-18T05:28:57.274		14.91	-36.94	42292.55	-19.55		
6	I	2040-10-18T05:29:14.288		14.97	-36.88	41873.50	-19.50		
Uranus	I	2040-10-18T05:32:34.897		15.65	-36.24	25350.98		45.62	46.93
Uranus	E	2040-10-18T06:37:39.483		28.18	-22.89	25320.73		-49.96	-51.24
6	E	2040-10-18T06:39:42.103		28.55	-22.45	41796.39	19.30		
5	E	2040-10-18T06:39:56.132		28.59	-22.40	42164.73	19.35		
4	E	2040-10-18T06:40:16.964		28.66	-22.33	42528.83	19.34		
alpha	E	2040-10-18T06:42:09.272		28.99	-21.92	44684.68	19.34		
beta	E	2040-10-18T06:42:59.766		29.14	-21.74	45665.03	19.35		
eta	E	2040-10-18T06:44:17.760		29.37	-21.46	47176.12	19.35		
gamma	E	2040-10-18T06:44:41.278		29.44	-21.38	47631.33	19.36		
delta	E	2040-10-18T06:45:15.840		29.55	-21.26	48300.35	19.36		
lambda	E	2040-10-18T06:46:45.004		29.81	-20.94	50026.71	19.36		
epsilon	E	2040-10-18T06:47:58.334		30.02	-20.67	51446.90	19.36		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2040-10-18T06:04:03.620
 Event type : PgtRgt
 : Uranus occs: geocentric, 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 : 659702376757511168
 2Mass ID (if available) : 08390507+1902135
 ICRS Star Coord at Epoch: 08h 39m 05.06814s +19:02:13.68469s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 13.036
 G magnitude : 14.098
 RP magnitude : 13.707
 BP magnitude : 14.335
 DUPflag : 0
 Distance (au) : 18.735
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.93
 Sun-Target sep (deg) : 77.71
 Sun-Moon sep (deg) : 127.73
 B (ring opening deg) : 39.89
 PA of pole (deg) : 94.16
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.402
 C/A sky separation (km) : 5460.0
 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



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-10-18T05:21:20.724	-11.93x	-48.99	50798.01	-19.91			
lambda	I	2040-10-18T05:21:59.453	-11.79x	-48.94	50026.71	-19.91			
delta	I	2040-10-18T05:23:26.182	-11.48x	-48.83	48300.35	-19.90			
gamma	I	2040-10-18T05:24:00.293	-11.36x	-48.78	47621.72	-19.89			
eta	I	2040-10-18T05:24:22.696	-11.28x	-48.75	47176.12	-19.89			
beta	I	2040-10-18T05:25:39.286	-11.02x	-48.65	45652.65	-19.87			
alpha	I	2040-10-18T05:26:24.297	-10.86x	-48.59	44750.79	-19.86			
4	I	2040-10-18T05:28:13.038	-10.47x	-48.44	42616.34	-19.85			
5	I	2040-10-18T05:28:30.901	-10.41x	-48.41	42292.84	-19.86			
6	I	2040-10-18T05:28:47.642	-10.35x	-48.39	41873.61	-19.81			
Uranus	I	2040-10-18T05:32:01.892	-9.67x	-48.11	25349.69			45.80	47.11
Uranus	E	2040-10-18T06:36:12.912	3.53x	-40.26	25320.77			-49.95	-51.24
6	E	2040-10-18T06:38:13.848	3.93x	-39.96	41796.38	19.59			
5	E	2040-10-18T06:38:27.671	3.97x	-39.92	42164.69	19.63			
4	E	2040-10-18T06:38:48.205	4.04x	-39.87	42528.85	19.62			
alpha	E	2040-10-18T06:40:38.889	4.41x	-39.59	44684.68	19.62			
beta	E	2040-10-18T06:41:28.657	4.58x	-39.46	45665.00	19.63			
eta	E	2040-10-18T06:42:45.533	4.83x	-39.27	47176.12	19.63			
gamma	E	2040-10-18T06:43:08.715	4.91x	-39.21	47631.32	19.64			
delta	E	2040-10-18T06:43:42.783	5.02	-39.12	48300.35	19.64			
lambda	E	2040-10-18T06:45:10.677	5.31	-38.89	50026.71	19.64			
epsilon	E	2040-10-18T06:46:22.946	5.55	-38.70	51446.51	19.64			