

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-10-21T14:57:23.930
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 674770496421166464
 2Mass ID (if available) : 07421982+2149393

Uranus 2037-10-21T14:57:23 K13.65 G15.03 PgtRgt

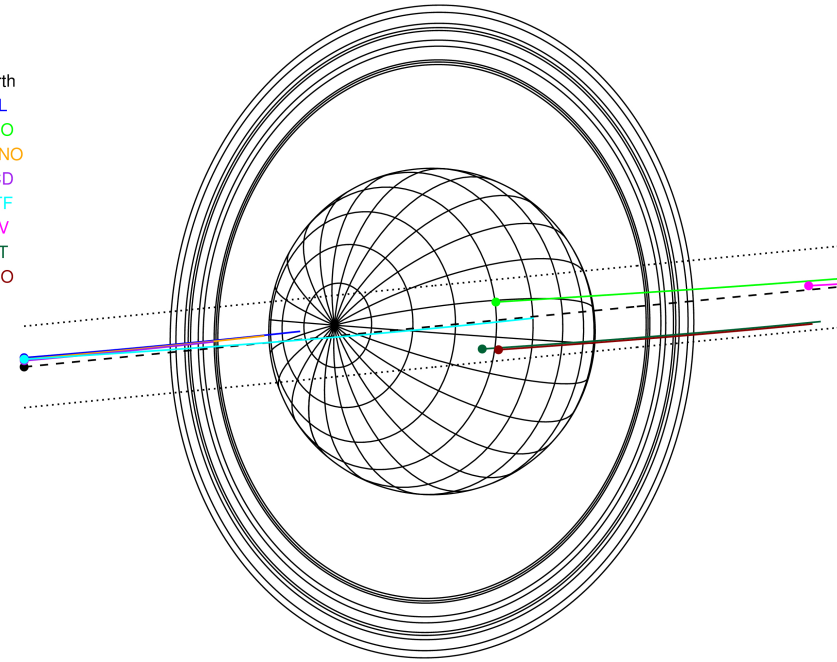
ICRS Star Coord at Epoch: 07h 42m 19.81979s +21:49:39.30436s

RUWE (>1.4 is poor) : 3.29
 K magnitude : 13.651
 G magnitude : 15.030
 RP magnitude : 14.559
 BP magnitude : 15.307
 DUPflag : 0
 Distance (au) : 18.614
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.22
 Sun-Target sep (deg) : 94.40
 Sun-Moon sep (deg) : 113.73
 B (ring opening deg) : 53.20
 PA of pole (deg) : 86.29



2037-10-21T14:57:23.9300 cr: 07 42 19.8198 s: +21 49 39.304 C/A 0.085° PA 242.36 deg v_sky + 4.22 km/s D 18.61 AU
 Credit: Styled after SORA/Lucky Star

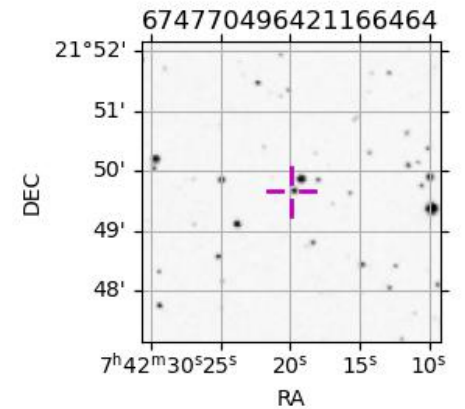
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 AAT
 MSO



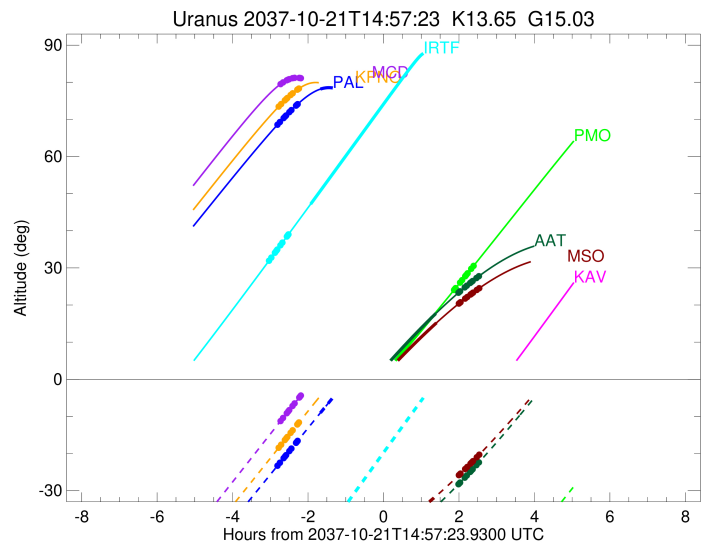
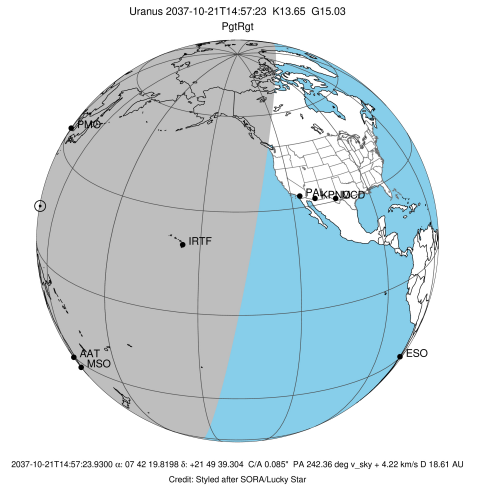
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+		OCT 21 12:10 - OCT 21 13:16	PinRin
PMO	Purple Mtn Obs. Nanki	32.1	118.8		+	+++++	OCT 21 16:14 - OCT 21 17:21	PneRne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++			OCT 21 12:12 - OCT 21 12:43	PnnRin
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++			OCT 21 12:15 - OCT 21 12:36	PnnRin
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+		OCT 21 11:56 - OCT 21 13:01	PinRin
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					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1		+	+++++	OCT 21 16:20 - OCT 21 17:30	PneRne
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0		+	+++++	OCT 21 16:21 - OCT 21 17:30	PneRne

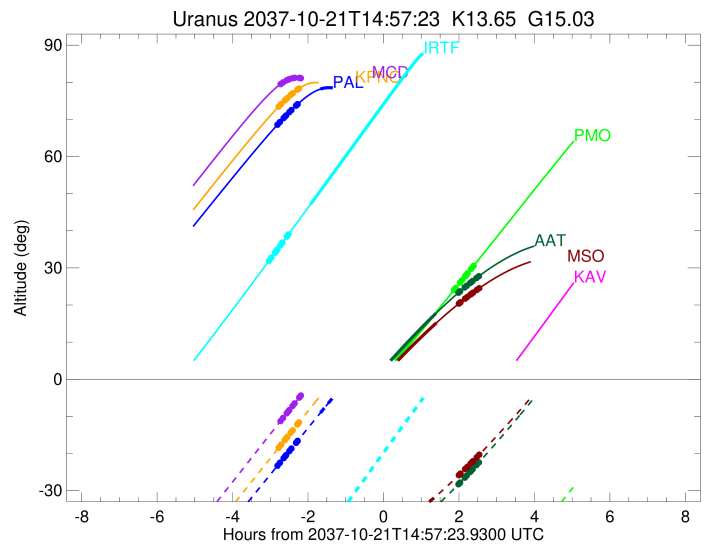
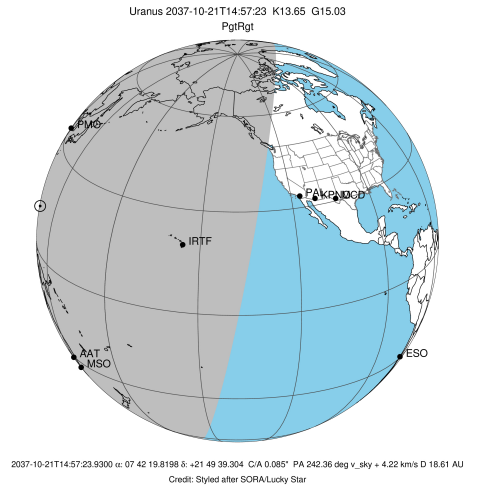


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-10-21T15:05:00.520
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 674770496421166464
 2Mass ID (if available) : 07421982+2149393
 ICRS Star Coord at Epoch: 07h 42m 19.81979s +21:49:39.30436s
 RUWE (>1.4 is poor) : 3.29
 K magnitude : 13.651
 G magnitude : 15.030
 RP magnitude : 14.559
 BP magnitude : 15.307
 DUPflag : 0
 Distance (au) : 18.614
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.22
 Sun-Target sep (deg) : 94.40
 Sun-Moon sep (deg) : 114.39
 B (ring opening deg) : 53.20
 PA of pole (deg) : 86.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.179
 C/A sky separation (km) : 2410.4
 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	2037-10-21T12:10:15.966		68.84	-22.99	50748.72	-4.86		
lambda	I	2037-10-21T12:12:44.604		69.30	-22.47	50026.71	-4.86		
delta	I	2037-10-21T12:18:40.374		70.38	-21.23	48300.35	-4.85		
gamma	I	2037-10-21T12:20:58.668		70.79	-20.75	47629.95	-4.85		
eta	I	2037-10-21T12:22:32.329		71.07	-20.42	47176.12	-4.84		
beta	I	2037-10-21T12:27:48.605		71.98	-19.32	45641.95	-4.84		
alpha	I	2037-10-21T12:31:03.599		72.53	-18.64	44698.70	-4.83		
4	I	2037-10-21T12:38:23.131		73.72	-17.11	42594.70	-4.83		
5	I	2037-10-21T12:39:34.038		73.91	-16.86	42260.96	-4.83		
6	I	2037-10-21T12:41:06.500		74.15	-16.54	41798.11	-4.83		
Uranus	I	2037-10-21T13:16:56.623		78.16	-9.08	25187.40		36.65	37.92
Uranus	E	2037-10-21T16:52:05.134		44.19	31.69x	25214.41		-35.06	-36.31
6	E	2037-10-21T17:28:47.613		36.50	36.97x	41878.08	4.94		
5	E	2037-10-21T17:29:51.837		36.27	37.11x	42218.05	4.94		
4	E	2037-10-21T17:30:59.697		36.04	37.25x	42543.31	4.94		
alpha	E	2037-10-21T17:38:26.695		34.48	38.20x	44735.02	4.95		
beta	E	2037-10-21T17:41:37.842		33.81	38.59x	45680.88	4.96		
eta	E	2037-10-21T17:46:38.772		32.77	39.19x	47176.12	4.96		
gamma	E	2037-10-21T17:48:08.618		32.45	39.37x	47622.19	4.97		
delta	E	2037-10-21T17:50:25.129		31.98	39.63x	48300.35	4.97		
lambda	E	2037-10-21T17:56:12.189		30.77	40.27x	50026.71	4.98		
epsilon	E	2037-10-21T18:01:16.022		29.72	40.81x	51540.69	4.99		

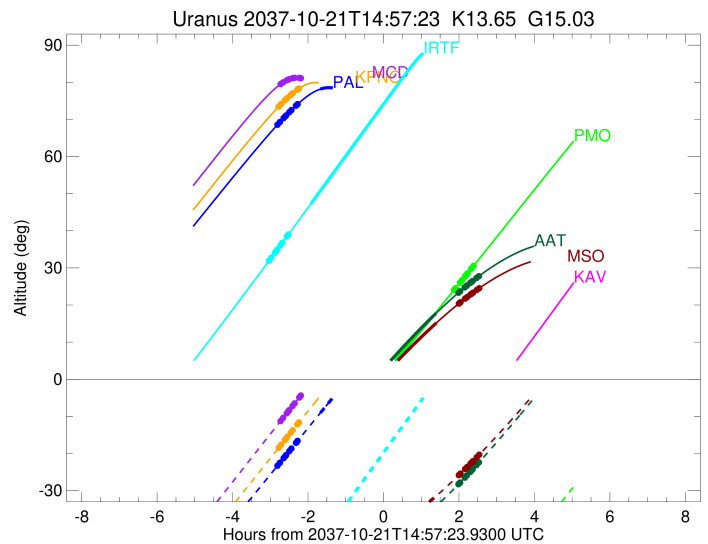
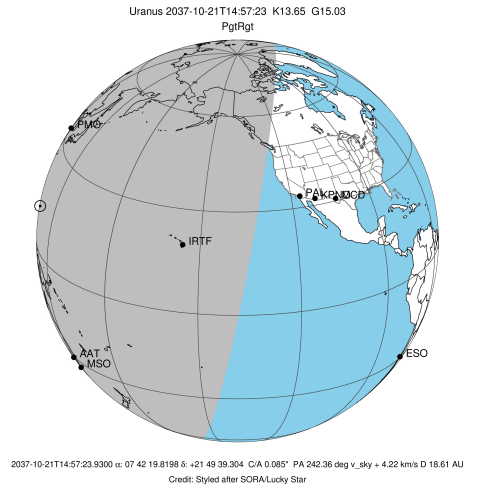
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-10-21T14:36:14.330
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 674770496421166464
 2Mass ID (if available) : 07421982+2149393
 ICRS Star Coord at Epoch: 07h 42m 19.81979s +21:49:39.30436s
 RUWE (>1.4 is poor) : 3.29
 K magnitude : 13.651
 G magnitude : 15.030
 RP magnitude : 14.559
 BP magnitude : 15.307
 DUPflag : 0
 Distance (au) : 18.614
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.22
 Sun-Target sep (deg) : 94.40
 Sun-Moon sep (deg) : 114.08
 B (ring opening deg) : 53.20
 PA of pole (deg) : 86.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.294
 C/A sky separation (km) : 3972.8
 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_itrff93_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

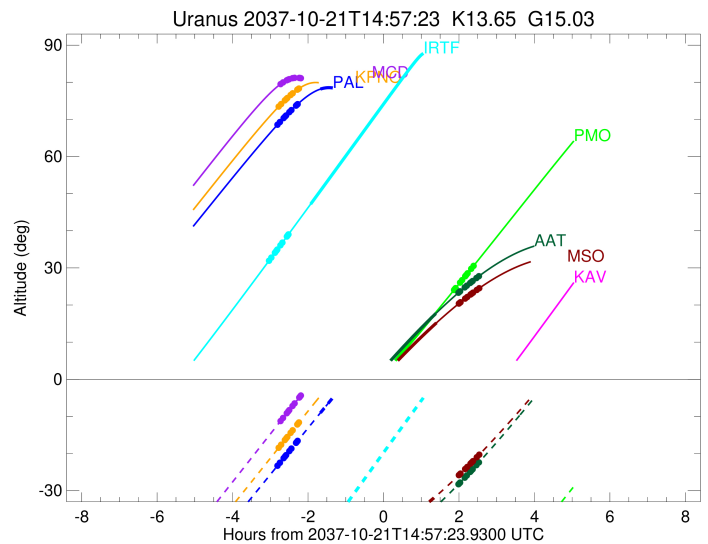
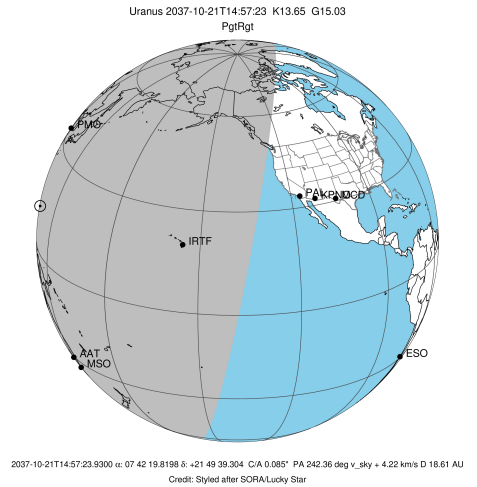
Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-10-21T12:05:40.426	-27.07x	-34.58	50745.39	-5.70		
lambda	I	2037-10-21T12:07:46.501	-26.81x	-35.02	50026.71	-5.70		
delta	I	2037-10-21T12:12:49.725	-26.16x	-36.08	48300.35	-5.69		
gamma	I	2037-10-21T12:14:47.669	-25.90x	-36.49	47629.68	-5.68		
eta	I	2037-10-21T12:16:07.481	-25.73x	-36.77	47176.12	-5.68		
beta	I	2037-10-21T12:20:37.131	-25.13x	-37.70	45642.41	-5.67		
alpha	I	2037-10-21T12:23:23.816	-24.75x	-38.28	44696.81	-5.67		
4	I	2037-10-21T12:29:39.256	-23.88x	-39.58	42591.82	-5.65		
5	I	2037-10-21T12:30:38.189	-23.75x	-39.78	42266.44	-5.65		
6	I	2037-10-21T12:31:58.569	-23.56x	-40.06	41799.43	-5.65		
Uranus	I	2037-10-21T13:02:35.950	-18.98x	-46.30	25185.15		36.78	38.06
Uranus	E	2037-10-21T16:14:10.037	16.71	-68.31	25214.01		-35.08	-36.33
6	E	2037-10-21T16:49:40.139	24.05	-64.87	41877.91	5.04		
5	E	2037-10-21T16:50:43.064	24.27	-64.74	42216.91	5.04		
4	E	2037-10-21T16:51:49.960	24.50	-64.59	42543.84	5.03		
alpha	E	2037-10-21T16:59:10.026	26.04	-63.59	44735.52	5.01		
beta	E	2037-10-21T17:02:18.796	26.70	-63.15	45680.81	5.01		
eta	E	2037-10-21T17:07:17.126	27.74	-62.41	47176.12	5.00		
gamma	E	2037-10-21T17:08:46.424	28.05	-62.19	47622.25	4.99		
delta	E	2037-10-21T17:11:02.263	28.53	-61.84	48300.35	4.99		
lambda	E	2037-10-21T17:16:48.703	29.74	-60.94	50026.71	4.98		
epsilon	E	2037-10-21T17:21:53.711	30.81	-60.11	51542.99	4.96		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-10-21T15:07:03.240
 Event type : PgtRgt
 : Uranus occs: geocentric, 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 : 674770496421166464
 2Mass ID (if available) : 07421982+2149393
 ICRS Star Coord at Epoch: 07h 42m 19.81979s +21:49:39.30436s
 RUWE (>1.4 is poor) : 3.29
 K magnitude : 13.651
 G magnitude : 15.030
 RP magnitude : 14.559
 BP magnitude : 15.307
 DUPflag : 0
 Distance (au) : 18.614
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.22
 Sun-Target sep (deg) : 94.40
 Sun-Moon sep (deg) : 114.34
 B (ring opening deg) : 53.20
 PA of pole (deg) : 86.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.178
 C/A sky separation (km) : 2405.2
 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	2037-10-21T12:12:11.486		73.71	-18.14	50748.92	-4.84		
lambda	I	2037-10-21T12:14:40.830		74.15	-17.62	50026.71	-4.83		
delta	I	2037-10-21T12:20:38.131		75.15	-16.35	48300.35	-4.83		
gamma	I	2037-10-21T12:22:56.995		75.52	-15.86	47629.96	-4.83		
eta	I	2037-10-21T12:24:31.039		75.77	-15.53	47176.12	-4.83		
beta	I	2037-10-21T12:29:48.559		76.58	-14.41	45641.94	-4.82		
alpha	I	2037-10-21T12:33:04.267		77.05	-13.72	44698.79	-4.82		
4	I	2037-10-21T12:40:25.339		78.02	-12.16	42594.82	-4.81		
5	I	2037-10-21T12:41:36.565		78.16	-11.91	42260.73	-4.81		
6	I	2037-10-21T12:43:09.261		78.34	-11.58	41798.06	-4.81		
Uranus	I	2037-10-21T13:19:05.438		79.72	-4.03x	25187.65		36.64	37.91
Uranus	E	2037-10-21T16:53:34.189		39.42	36.06x	25214.86		-35.03	-36.28
6	E	2037-10-21T17:30:01.911		31.68	40.87x	41878.10	4.97		
5	E	2037-10-21T17:31:05.647		31.46	40.99x	42218.17	4.98		
4	E	2037-10-21T17:32:12.948		31.22	41.12x	42543.25	4.98		
alpha	E	2037-10-21T17:39:36.451		29.66	41.95x	44734.97	4.99		
beta	E	2037-10-21T17:42:46.099		29.00	42.29x	45680.89	5.00		
eta	E	2037-10-21T17:47:44.626		27.95	42.80x	47176.12	5.00		
gamma	E	2037-10-21T17:49:13.750		27.64	42.95x	47622.18	5.01		
delta	E	2037-10-21T17:51:29.161		27.16	43.17x	48300.35	5.01		
lambda	E	2037-10-21T17:57:13.402		25.96	43.71x	50026.71	5.02		
epsilon	E	2037-10-21T18:02:14.711		24.91	44.15x	51540.53	5.03		

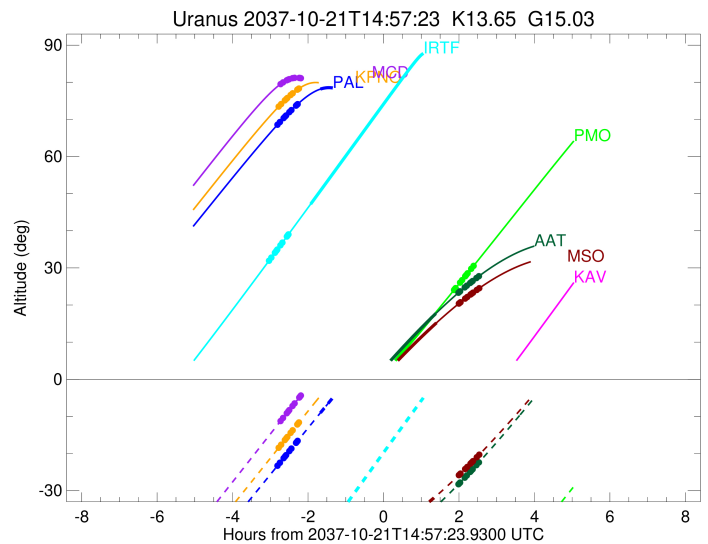
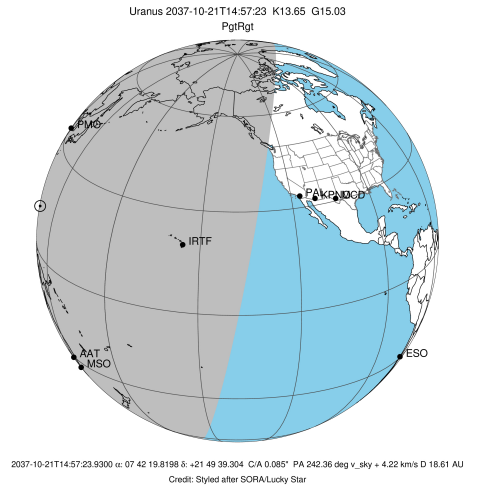
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-10-21T15:09:43.670
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 674770496421166464
 2Mass ID (if available) : 07421982+2149393
 ICRS Star Coord at Epoch: 07h 42m 19.81979s +21:49:39.30436s
 RUWE (>1.4 is poor) : 3.29
 K magnitude : 13.651
 G magnitude : 15.030
 RP magnitude : 14.559
 BP magnitude : 15.307
 DUPflag : 0
 Distance (au) : 18.614
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.22
 Sun-Target sep (deg) : 94.40
 Sun-Moon sep (deg) : 114.26
 B (ring opening deg) : 53.20
 PA of pole (deg) : 86.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.185
 C/A sky separation (km) : 2499.8
 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	2037-10-21T12:15:12.015		79.69	-10.94	50749.07	-4.82		
lambda	I	2037-10-21T12:17:41.995		79.97	-10.41	50026.71	-4.82		
delta	I	2037-10-21T12:23:40.653		80.55	-9.13	48300.35	-4.81		
gamma	I	2037-10-21T12:26:00.006		80.73	-8.63	47629.97	-4.81		
eta	I	2037-10-21T12:27:34.374		80.84	-8.30	47176.12	-4.81		
beta	I	2037-10-21T12:32:52.914		81.11	-7.17	45641.92	-4.81		
alpha	I	2037-10-21T12:36:09.187		81.20	-6.47	44698.84	-4.80		
4	I	2037-10-21T12:43:31.400		81.18	-4.91x	42594.89	-4.80		
5	I	2037-10-21T12:44:42.836		81.15	-4.65x	42260.60	-4.80		
6	I	2037-10-21T12:46:15.701		81.10	-4.33x	41798.03	-4.80		
Uranus	I	2037-10-21T13:22:14.353		76.98	3.24x	25187.71		36.63	37.90
Uranus	E	2037-10-21T16:55:11.993		32.49	41.39x	25216.17		-34.95	-36.20
6	E	2037-10-21T17:31:18.298		24.80	45.28x	41878.14	5.03		
5	E	2037-10-21T17:32:21.290		24.58	45.37x	42218.49	5.04		
4	E	2037-10-21T17:33:27.701		24.35	45.47x	42543.11	5.04		
alpha	E	2037-10-21T17:40:45.853		22.81	46.08x	44734.86	5.05		
beta	E	2037-10-21T17:43:53.228		22.15	46.31x	45680.90	5.06		
eta	E	2037-10-21T17:48:48.109		21.12	46.67x	47176.12	5.07		
gamma	E	2037-10-21T17:50:16.138		20.81	46.77x	47622.17	5.07		
delta	E	2037-10-21T17:52:29.889		20.34	46.91x	48300.35	5.07		
lambda	E	2037-10-21T17:58:09.886		19.15	47.26x	50026.71	5.08		
epsilon	E	2037-10-21T18:03:07.390		18.12	47.52x	51540.17	5.09		

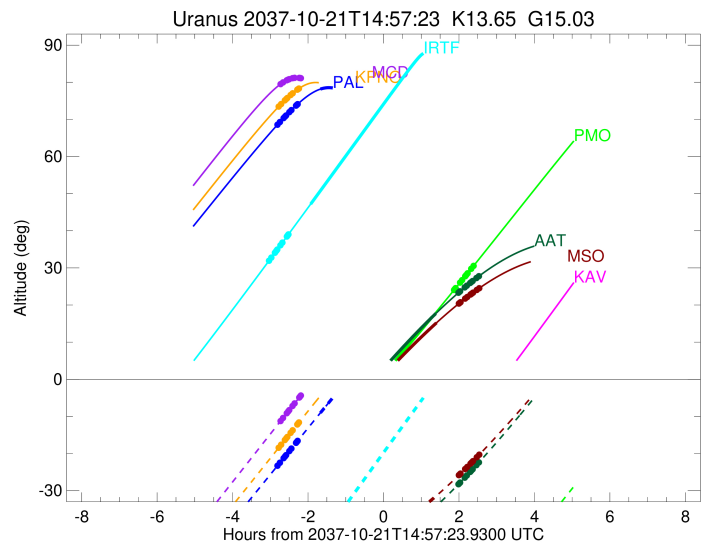
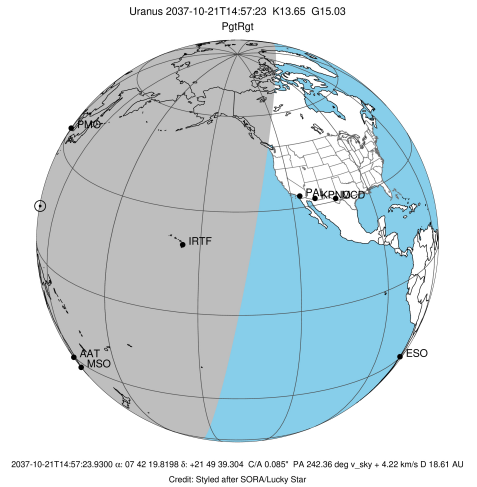
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2037-10-21T14:49:52.300
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: 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       : 674770496421166464
2Mass ID (if available) : 07421982+2149393
ICRS Star Coord at Epoch: 07h 42m 19.81979s +21:49:39.30436s
RUWE (>1.4 is poor) : 3.29
K magnitude           : 13.651
G magnitude           : 15.030
RP magnitude          : 14.559
BP magnitude          : 15.307
DUPflag              : 0
Distance (au)        : 18.614
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : 4.22
Sun-Target sep (deg) : 94.40
Sun-Moon sep (deg)   : 114.62
B (ring opening deg) : 53.20
PA of pole (deg)     : 86.29
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.035
C/A sky separation (km) : 466.5
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.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
    
```



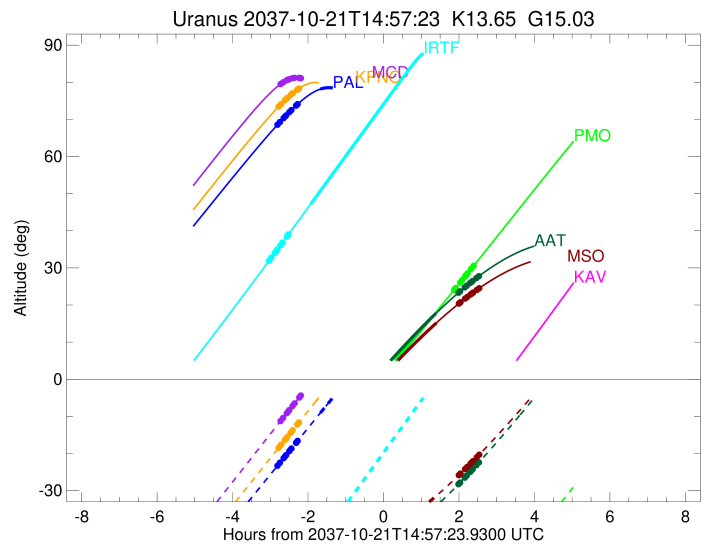
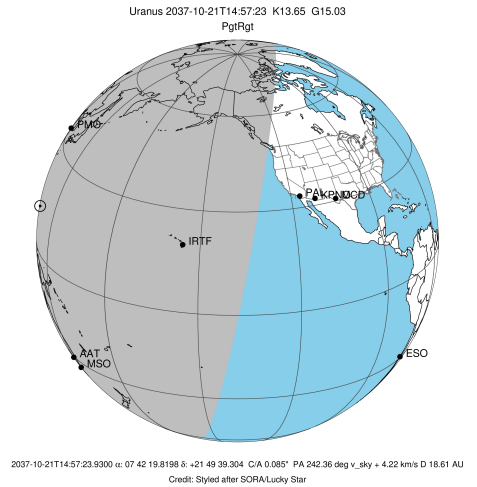
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-10-21T11:56:44.096		32.25	-62.03	50749.78	-5.06		
lambda	I	2037-10-21T11:59:06.965		32.79	-61.49	50026.71	-5.06		
delta	I	2037-10-21T12:04:48.768		34.10	-60.19	48300.35	-5.04		
gamma	I	2037-10-21T12:07:01.751		34.61	-59.68	47630.02	-5.04		
eta	I	2037-10-21T12:08:31.880		34.95	-59.33	47176.12	-5.03		
beta	I	2037-10-21T12:13:36.468		36.12	-58.16	45641.84	-5.02		
alpha	I	2037-10-21T12:16:44.332		36.84	-57.44	44699.28	-5.01		
4	I	2037-10-21T12:23:48.521		38.47	-55.80	42595.59	-5.00		
5	I	2037-10-21T12:24:57.627		38.73	-55.53	42259.16	-5.00		
6	I	2037-10-21T12:26:26.506		39.07	-55.19	41797.72	-4.99		
Uranus	I	2037-10-21T13:01:26.280		47.16	-47.02	25191.20		36.43	37.70
Uranus	E	2037-10-21T16:41:07.280		81.20	4.31x	25197.77		-36.04	-37.31
6	E	2037-10-21T17:18:52.528		72.48	12.89x	41877.26	4.67		
5	E	2037-10-21T17:20:00.137		72.22	13.15x	42213.22	4.67		
4	E	2037-10-21T17:21:13.277		71.93	13.42x	42545.56	4.67		
alpha	E	2037-10-21T17:29:06.284		70.10	15.19x	44736.74	4.67		
beta	E	2037-10-21T17:32:28.262		69.32	15.94x	45680.63	4.68		
eta	E	2037-10-21T17:37:47.352		68.08	17.13x	47176.12	4.68		
gamma	E	2037-10-21T17:39:22.711		67.71	17.48x	47622.38	4.68		
delta	E	2037-10-21T17:41:47.543		67.15	18.02x	48300.35	4.68		
lambda	E	2037-10-21T17:47:56.129		65.72	19.38x	50026.71	4.69		
epsilon	E	2037-10-21T17:53:20.200		64.46	20.57x	51545.82	4.69		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-10-21T14:37:29.530
 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 : 674770496421166464
 2Mass ID (if available) : 07421982+2149393
 ICRS Star Coord at Epoch: 07h 42m 19.81979s +21:49:39.30436s
 RUWE (>1.4 is poor) : 3.29
 K magnitude : 13.651
 G magnitude : 15.030
 RP magnitude : 14.559
 BP magnitude : 15.307
 DUPflag : 0
 Distance (au) : 18.614
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.22
 Sun-Target sep (deg) : 94.40
 Sun-Moon sep (deg) : 114.05
 B (ring opening deg) : 53.20
 PA of pole (deg) : 86.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.241
 C/A sky separation (km) : 3256.6
 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	2037-10-21T11:59:03.581	-33.55x	-40.48	50754.72	-5.53			
lambda	I	2037-10-21T12:01:15.238	-33.08x	-40.76	50026.71	-5.53			
delta	I	2037-10-21T12:06:27.981	-31.97x	-41.40	48300.35	-5.51			
gamma	I	2037-10-21T12:08:29.583	-31.54x	-41.64	47630.25	-5.51			
eta	I	2037-10-21T12:09:52.061	-31.25x	-41.80	47176.12	-5.50			
beta	I	2037-10-21T12:14:30.670	-30.26x	-42.34	45641.51	-5.49			
alpha	I	2037-10-21T12:17:22.109	-29.65x	-42.66	44701.25	-5.48			
4	I	2037-10-21T12:23:49.646	-28.28x	-43.35	42598.31	-5.47			
5	I	2037-10-21T12:24:54.471	-28.06x	-43.46	42253.50	-5.47			
6	I	2037-10-21T12:26:14.245	-27.77x	-43.59	41796.67	-5.46			
Uranus	I	2037-10-21T12:59:01.042	-20.89x	-46.34	25208.77			35.39	36.65
Uranus	E	2037-10-21T16:20:51.227	17.76	-34.23	25184.87			-36.80	-38.07
6	E	2037-10-21T16:56:37.739	23.31	-28.28	41875.28	4.81			
5	E	2037-10-21T16:57:43.214	23.47	-28.08	42204.27	4.81			
4	E	2037-10-21T16:58:56.899	23.65	-27.87	42550.11	4.80			
alpha	E	2037-10-21T17:06:37.688	24.75	-26.51	44739.87	4.79			
beta	E	2037-10-21T17:09:54.029	25.21	-25.92	45679.96	4.78			
eta	E	2037-10-21T17:15:06.476	25.93	-24.97	47176.12	4.77			
gamma	E	2037-10-21T17:16:40.047	26.14	-24.69	47622.80	4.77			
delta	E	2037-10-21T17:19:02.071	26.45	-24.26	48300.35	4.77			
lambda	E	2037-10-21T17:25:04.438	27.25	-23.14	50026.71	4.76			
epsilon	E	2037-10-21T17:30:25.343	27.93	-22.14	51552.74	4.75			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2037-10-21T14:38:34.070
 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 : 674770496421166464
 2Mass ID (if available) : 07421982+2149393
 ICRS Star Coord at Epoch: 07h 42m 19.81979s +21:49:39.30436s
 RUWE (>1.4 is poor) : 3.29
 K magnitude : 13.651
 G magnitude : 15.030
 RP magnitude : 14.559
 BP magnitude : 15.307
 DUPflag : 0
 Distance (au) : 18.614
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.22
 Sun-Target sep (deg) : 94.40
 Sun-Moon sep (deg) : 114.01
 B (ring opening deg) : 53.20
 PA of pole (deg) : 86.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.264
 C/A sky separation (km) : 3564.9
 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	2037-10-21T11:59:59.909	-33.79x	-37.28	50755.42	-5.52		
lambda	I	2037-10-21T12:02:12.025	-33.34x	-37.53	50026.71	-5.51		
delta	I	2037-10-21T12:07:25.549	-32.27x	-38.11	48300.35	-5.50		
gamma	I	2037-10-21T12:09:27.446	-31.85x	-38.33	47630.28	-5.49		
eta	I	2037-10-21T12:10:50.132	-31.57x	-38.47	47176.12	-5.49		
beta	I	2037-10-21T12:15:29.428	-30.62x	-38.96	45641.47	-5.48		
alpha	I	2037-10-21T12:18:21.242	-30.04x	-39.24	44701.49	-5.47		
4	I	2037-10-21T12:24:49.677	-28.72x	-39.87	42598.61	-5.46		
5	I	2037-10-21T12:25:54.849	-28.50x	-39.97	42252.83	-5.45		
6	I	2037-10-21T12:27:14.639	-28.23x	-40.09	41796.57	-5.45		
Uranus	I	2037-10-21T13:00:12.962	-21.58x	-42.54	25211.35		35.24	36.49
Uranus	E	2037-10-21T16:21:35.003	15.20	-31.37	25184.87		-36.80	-38.07
6	E	2037-10-21T16:57:16.880	20.40	-25.83	41875.16	4.82		
5	E	2037-10-21T16:58:22.175	20.55	-25.65	42203.80	4.82		
4	E	2037-10-21T16:59:35.797	20.71	-25.45	42550.36	4.82		
alpha	E	2037-10-21T17:07:15.282	21.74	-24.18	44740.02	4.80		
beta	E	2037-10-21T17:10:31.000	22.16	-23.63	45679.92	4.80		
eta	E	2037-10-21T17:15:42.515	22.82	-22.74	47176.12	4.79		
gamma	E	2037-10-21T17:17:15.801	23.02	-22.47	47622.82	4.79		
delta	E	2037-10-21T17:19:37.377	23.31	-22.07	48300.35	4.78		
lambda	E	2037-10-21T17:25:38.582	24.05	-21.02	50026.71	4.78		
epsilon	E	2037-10-21T17:30:58.470	24.68	-20.09	51552.96	4.77		