

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-17T08:11:32.650
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3424692095882393600
 2Mass ID (if available) : 06020714+2338390

Uranus 2032-11-17T08:11:32 K13.60 G16.76 PgtRgt

ICRS Star Coord at Epoch: 06h 02m 07.24543s +23:38:36.96036s

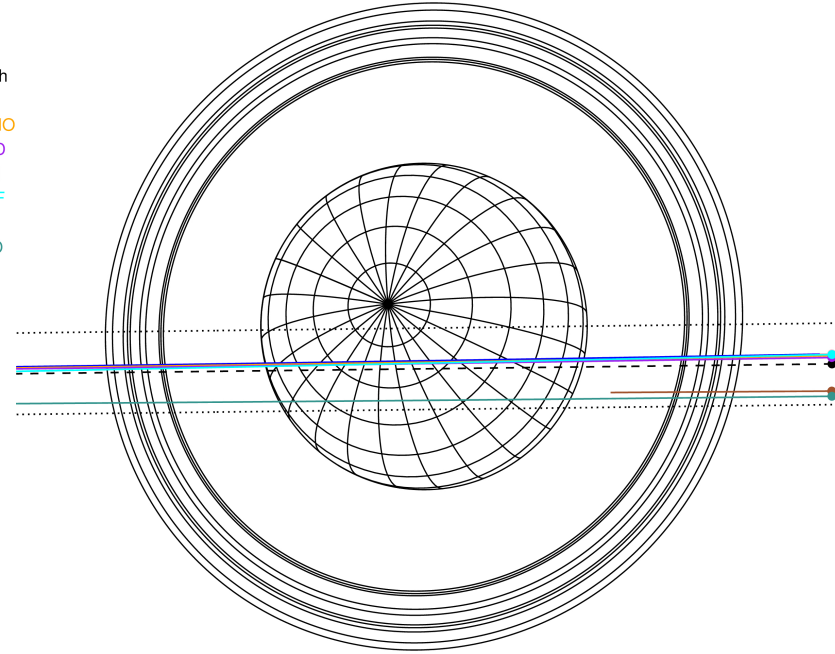
RUWE (>1.4 is poor) : 1.00
 K magnitude : 13.599
 G magnitude : 16.757
 RP magnitude : 15.736
 BP magnitude : 17.799
 DUPflag : 0
 Distance (au) : 18.211
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.90
 Sun-Target sep (deg) : 144.59
 Sun-Moon sep (deg) : 34.70
 B (ring opening deg) : 74.94
 PA of pole (deg) : 58.17

#	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



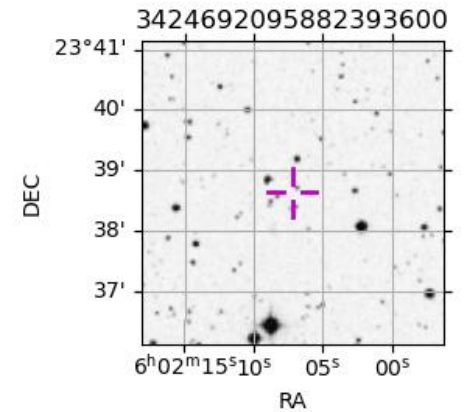
2032-11-17T08:11:32:6500 α: 06 02 07.2454 δ: +23 38 36.960 C/A 0.494° PA 0.69 deg v_sky -17.90 km/s D 18.21 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO



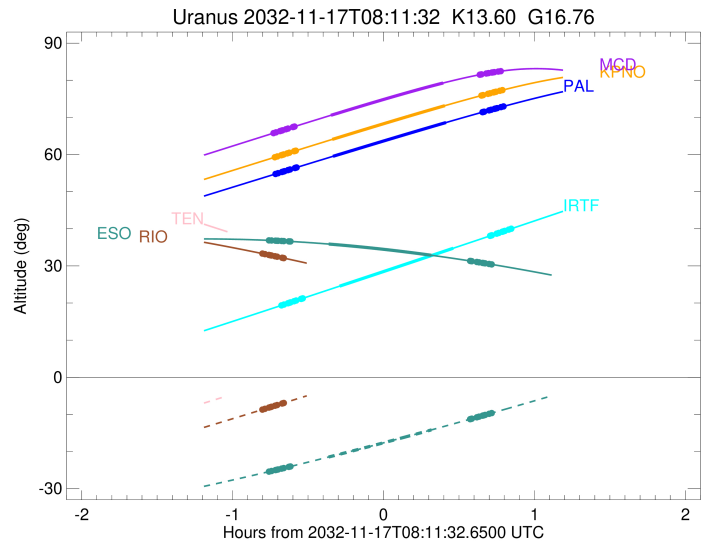
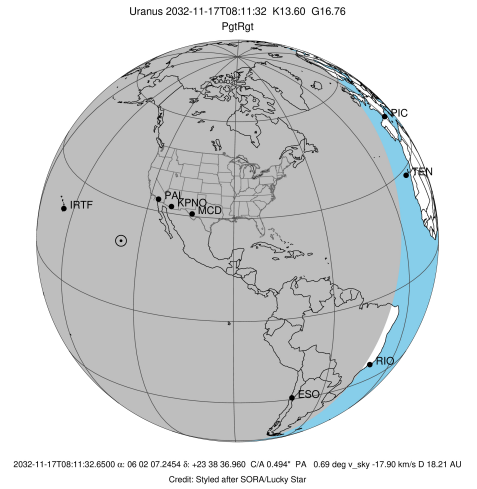
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	NOV 17 07:28 - NOV 17 08:58	PieRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	NOV 17 07:28 - NOV 17 08:58	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	NOV 17 07:27 - NOV 17 08:57	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	NOV 17 07:30 - NOV 17 09:02	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++			NOV 17 07:23 - NOV 17 07:31	PnnRin
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	NOV 17 07:25 - NOV 17 08:54	PieRie
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



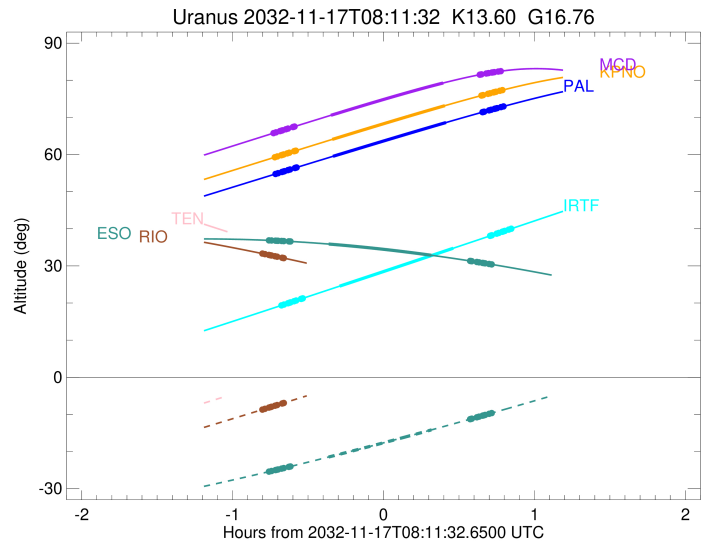
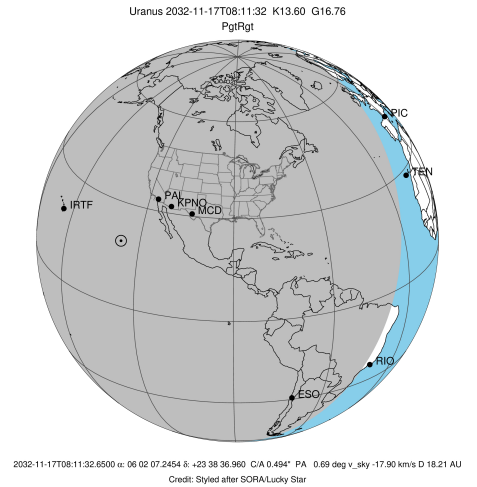
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-11-17T08:13:50.190
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       : 3424692095882393600
2Mass ID (if available) : 06020714+2338390
ICRS Star Coord at Epoch: 06h 02m 07.24543s +23:38:36.96036s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 13.599
G magnitude           : 16.757
RP magnitude          : 15.736
BP magnitude          : 17.799
DUPflag               : 0
Distance (au)         : 18.211
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -17.90
Sun-Target sep (deg) : 144.59
Sun-Moon sep (deg)   : 34.90
B (ring opening deg) : 74.94
PA of pole (deg)     : 58.17
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation ("): 0.407
C/A sky separation (km): 5370.4
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	2032-11-17T07:28:26.084		54.73	-75.92	51367.54	-18.53		
lambda	I	2032-11-17T07:29:38.393		54.98	-75.94	50026.71	-18.54		
delta	I	2032-11-17T07:31:11.520		55.30	-75.95	48300.35	-18.53		
gamma	I	2032-11-17T07:31:47.689		55.43	-75.95	47630.01	-18.53		
eta	I	2032-11-17T07:32:12.184		55.51	-75.95	47176.12	-18.53		
beta	I	2032-11-17T07:33:33.045		55.80	-75.95	45677.26	-18.52		
alpha	I	2032-11-17T07:34:23.253		55.97	-75.95	44748.99	-18.52		
4	I	2032-11-17T07:36:22.214		56.38	-75.93	42551.74	-18.51		
5	I	2032-11-17T07:36:34.405		56.43	-75.92	42311.53	-18.50		
6	I	2032-11-17T07:37:00.141		56.52	-75.92	41834.31	-18.49		
Uranus	I	2032-11-17T07:51:26.869		59.51	-75.33	25077.38		-14.09	-14.73
Uranus	E	2032-11-17T08:36:23.324		68.62	-69.98	25281.31		10.59	11.08
6	E	2032-11-17T08:50:53.891		71.41	-67.56	41829.25	18.57		
5	E	2032-11-17T08:51:11.918		71.47	-67.51	42166.99	18.58		
4	E	2032-11-17T08:51:34.638		71.54	-67.45	42600.28	18.59		
alpha	E	2032-11-17T08:53:27.373		71.89	-67.12	44692.44	18.60		
beta	E	2032-11-17T08:54:18.867		72.05	-66.97	45648.26	18.61		
eta	E	2032-11-17T08:55:40.926		72.31	-66.72	47176.12	18.61		
gamma	E	2032-11-17T08:56:04.956		72.38	-66.65	47623.46	18.62		
delta	E	2032-11-17T08:56:41.310		72.49	-66.54	48300.35	18.62		
lambda	E	2032-11-17T08:58:13.995		72.77	-66.27	50026.71	18.63		
epsilon	E	2032-11-17T08:58:58.784		72.91	-66.13	50861.26	18.62		

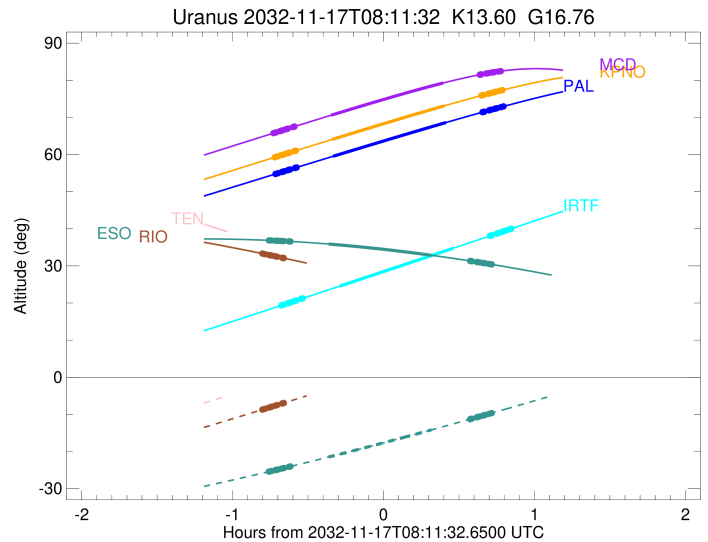
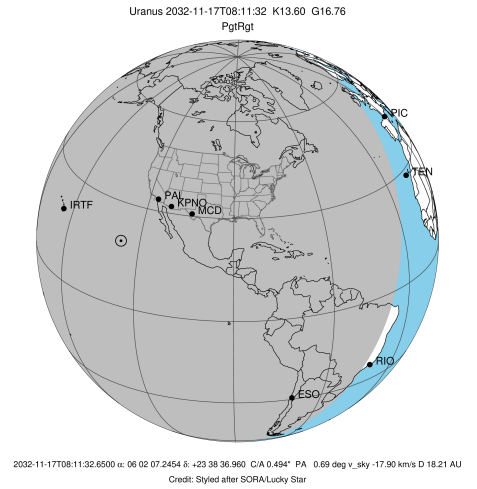
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-17T08:13:27.550
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 3424692095882393600
 2Mass ID (if available) : 06020714+2338390
 ICRS Star Coord at Epoch: 06h 02m 07.24543s +23:38:36.96036s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 13.599
 G magnitude : 16.757
 RP magnitude : 15.736
 BP magnitude : 17.799
 DUPflag : 0
 Distance (au) : 18.211
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.90
 Sun-Target sep (deg) : 144.59
 Sun-Moon sep (deg) : 34.97
 B (ring opening deg) : 74.94
 PA of pole (deg) : 58.17
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.424
 C/A sky separation (km) : 5595.3
 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	2032-11-17T07:28:08.697		59.23	-76.79	51365.80	-18.55		
lambda	I	2032-11-17T07:29:20.846		59.48	-76.71	50026.71	-18.56		
delta	I	2032-11-17T07:30:53.891		59.81	-76.60	48300.35	-18.55		
gamma	I	2032-11-17T07:31:30.029		59.94	-76.56	47630.03	-18.55		
eta	I	2032-11-17T07:31:54.504		60.03	-76.53	47176.12	-18.54		
beta	I	2032-11-17T07:33:15.297		60.31	-76.42	45677.32	-18.54		
alpha	I	2032-11-17T07:34:05.465		60.49	-76.35	44749.08	-18.53		
4	I	2032-11-17T07:36:04.336		60.90	-76.18	42551.99	-18.52		
5	I	2032-11-17T07:36:16.521		60.95	-76.16	42311.68	-18.51		
6	I	2032-11-17T07:36:42.265		61.04	-76.12	41834.05	-18.51		
Uranus	I	2032-11-17T07:51:08.760		64.07	-74.51	25073.98		-14.15	-14.79
Uranus	E	2032-11-17T08:35:56.845		73.17	-67.18	25285.89		10.50	10.99
6	E	2032-11-17T08:50:27.830		75.89	-64.41	41829.04	18.57		
5	E	2032-11-17T08:50:45.875		75.94	-64.35	42167.20	18.58		
4	E	2032-11-17T08:51:08.594		76.01	-64.28	42600.44	18.59		
alpha	E	2032-11-17T08:53:01.307		76.35	-63.91	44692.53	18.60		
beta	E	2032-11-17T08:53:52.790		76.50	-63.74	45648.32	18.61		
eta	E	2032-11-17T08:55:14.827		76.74	-63.47	47176.12	18.62		
gamma	E	2032-11-17T08:55:38.852		76.81	-63.40	47623.48	18.62		
delta	E	2032-11-17T08:56:15.197		76.91	-63.28	48300.35	18.63		
lambda	E	2032-11-17T08:57:47.858		77.18	-62.97	50026.71	18.64		
epsilon	E	2032-11-17T08:58:32.576		77.31	-62.82	50860.18	18.63		

```

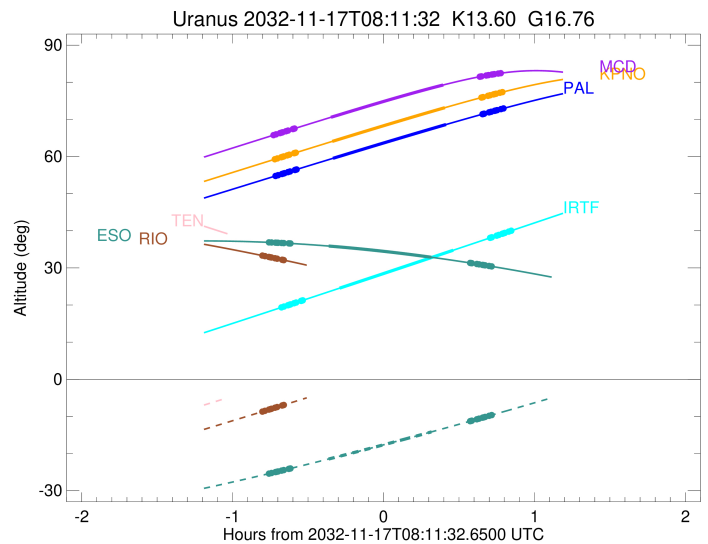
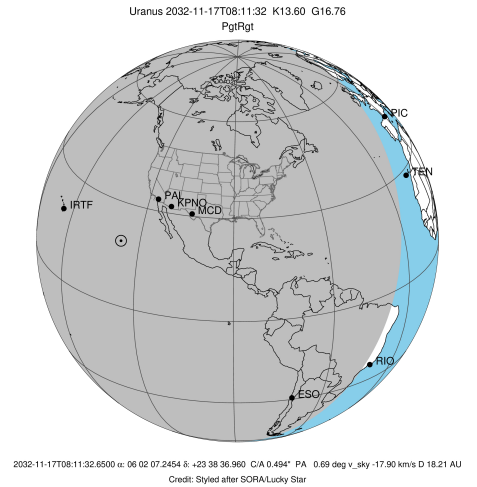
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-11-17T08:12:51.570
Event type          : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : MCD
Location            : McDonald Obs. 2.7m
Latitude (deg)      : 30.67158
E. Longitude (deg)  : 255.97844
Altitude (km)       : 2.075
Gaia source ID      : 3424692095882393600
2Mass ID (if available) : 06020714+2338390
ICRS Star Coord at Epoch: 06h 02m 07.24543s +23:38:36.96036s
RUWE (>1.4 is poor) : 1.00
K magnitude         : 13.599
G magnitude         : 16.757
RP magnitude        : 15.736
BP magnitude        : 17.799
DUPflag            : 0
Distance (au)       : 18.211
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -17.90
Sun-Target sep (deg) : 144.59
Sun-Moon sep (deg)  : 35.07
B (ring opening deg) : 74.94
PA of pole (deg)    : 58.17
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (" ) : 0.440
C/A sky separation (km) : 5816.0
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	2032-11-17T07:27:38.405		65.73	-74.50	51363.95	-18.57		
lambda	I	2032-11-17T07:28:50.370		65.98	-74.32	50026.71	-18.58		
delta	I	2032-11-17T07:30:23.312		66.31	-74.07	48300.35	-18.57		
gamma	I	2032-11-17T07:30:59.411		66.44	-73.98	47630.05	-18.57		
eta	I	2032-11-17T07:31:23.861		66.52	-73.91	47176.12	-18.56		
beta	I	2032-11-17T07:32:44.568		66.81	-73.70	45677.39	-18.56		
alpha	I	2032-11-17T07:33:34.685		66.99	-73.56	44749.17	-18.55		
4	I	2032-11-17T07:35:33.440		67.41	-73.23	42552.24	-18.54		
5	I	2032-11-17T07:35:45.617		67.45	-73.20	42311.83	-18.53		
6	I	2032-11-17T07:36:11.365		67.54	-73.13	41833.78	-18.52		
Uranus	I	2032-11-17T07:50:37.490		70.57	-70.60	25070.59		-14.20	-14.84
Uranus	E	2032-11-17T08:35:16.937		79.28	-61.82	25290.18		10.41	10.90
6	E	2032-11-17T08:49:48.407		81.51	-58.80	41828.86	18.57		
5	E	2032-11-17T08:50:06.471		81.55	-58.74	42167.38	18.58		
4	E	2032-11-17T08:50:29.191		81.60	-58.66	42600.59	18.59		
alpha	E	2032-11-17T08:52:21.894		81.83	-58.27	44692.62	18.60		
beta	E	2032-11-17T08:53:13.372		81.93	-58.09	45648.38	18.61		
eta	E	2032-11-17T08:54:35.398		82.09	-57.80	47176.12	18.62		
gamma	E	2032-11-17T08:54:59.422		82.13	-57.72	47623.49	18.62		
delta	E	2032-11-17T08:55:35.761		82.20	-57.59	48300.35	18.63		
lambda	E	2032-11-17T08:57:08.410		82.35	-57.27	50026.71	18.64		
epsilon	E	2032-11-17T08:57:53.071		82.43	-57.11	50859.23	18.63		

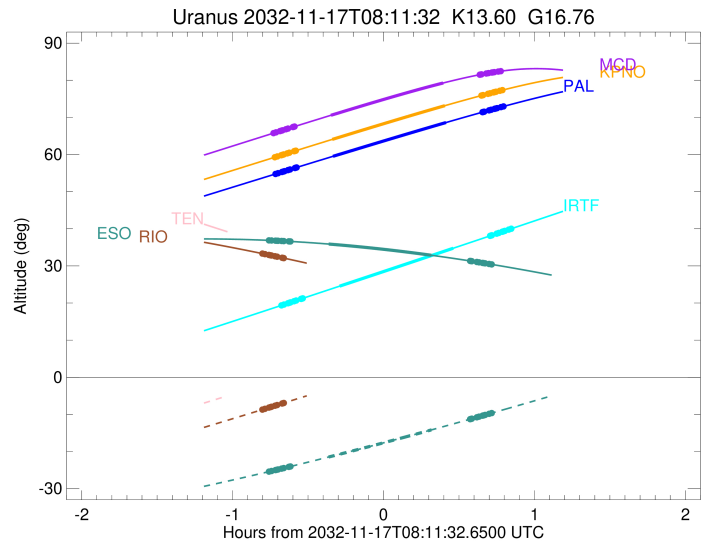
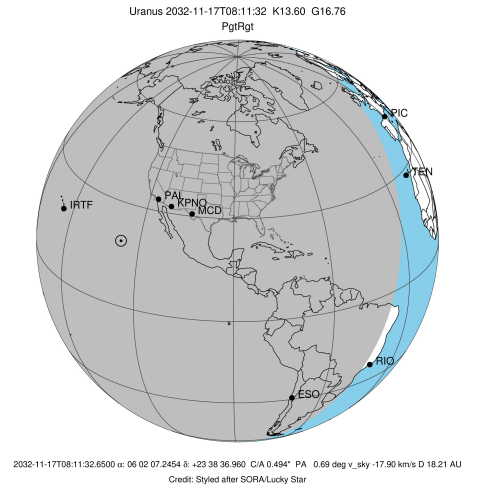
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-11-17T08:16:35.730
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      : 3424692095882393600
2Mass ID (if available) : 06020714+2338390
ICRS Star Coord at Epoch: 06h 02m 07.24543s +23:38:36.96036s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 13.599
G magnitude          : 16.757
RP magnitude         : 15.736
BP magnitude         : 17.799
DUPflag             : 0
Distance (au)       : 18.211
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -17.90
Sun-Target sep (deg) : 144.59
Sun-Moon sep (deg)  : 34.28
B (ring opening deg) : 74.94
PA of pole (deg)    : 58.17
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.435
C/A sky separation (km) : 5747.0
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_itrfr93_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	2032-11-17T07:30:46.958		19.32	-53.28	51366.54	-18.31		
lambda	I	2032-11-17T07:32:00.088		19.59	-53.56	50026.71	-18.32		
delta	I	2032-11-17T07:33:34.342		19.94	-53.93	48300.35	-18.31		
gamma	I	2032-11-17T07:34:10.948		20.08	-54.07	47630.02	-18.31		
eta	I	2032-11-17T07:34:35.740		20.17	-54.17	47176.12	-18.31		
beta	I	2032-11-17T07:35:57.576		20.48	-54.49	45677.30	-18.30		
alpha	I	2032-11-17T07:36:48.390		20.67	-54.69	44749.05	-18.30		
4	I	2032-11-17T07:38:48.787		21.12	-55.16	42551.92	-18.29		
5	I	2032-11-17T07:39:01.127		21.16	-55.20	42311.64	-18.28		
6	I	2032-11-17T07:39:27.194		21.26	-55.31	41834.12	-18.27		
Uranus	I	2032-11-17T07:54:04.698		24.54	-58.73	25073.75		-14.15	-14.79
Uranus	E	2032-11-17T08:39:15.910		34.76	-69.35	25292.42		10.37	10.85
6	E	2032-11-17T08:53:54.995		38.09	-72.80	41828.65	18.42		
5	E	2032-11-17T08:54:13.230		38.16	-72.87	42167.60	18.43		
4	E	2032-11-17T08:54:36.139		38.25	-72.96	42600.77	18.44		
alpha	E	2032-11-17T08:56:29.754		38.68	-73.40	44692.74	18.46		
beta	E	2032-11-17T08:57:21.645		38.88	-73.61	45648.47	18.46		
eta	E	2032-11-17T08:58:44.320		39.19	-73.93	47176.12	18.47		
gamma	E	2032-11-17T08:59:08.535		39.28	-74.02	47623.52	18.48		
delta	E	2032-11-17T08:59:45.159		39.42	-74.17	48300.35	18.48		
lambda	E	2032-11-17T09:01:18.529		39.78	-74.53	50026.71	18.50		
epsilon	E	2032-11-17T09:02:03.450		39.95	-74.71	50857.67	18.49		

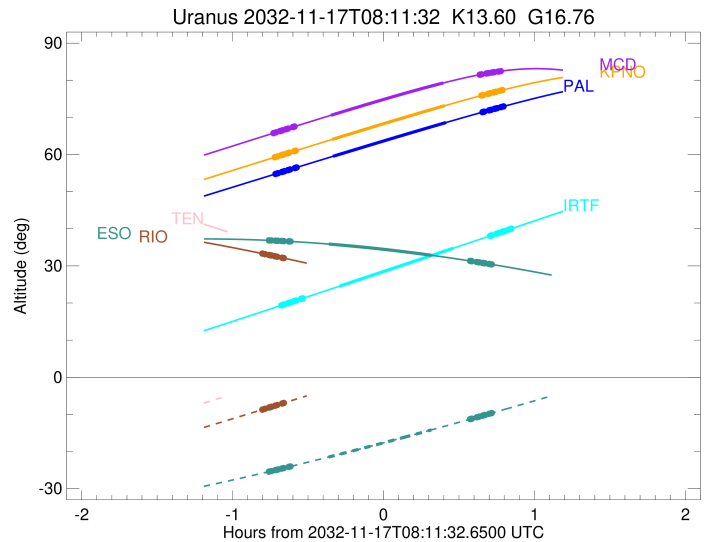
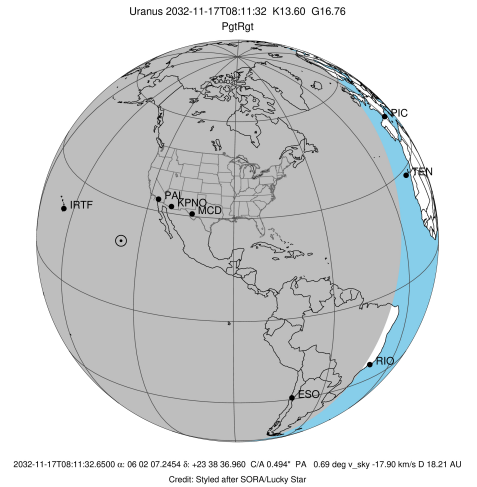
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-17T08:07:42.630
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 3424692095882393600
 2Mass ID (if available) : 06020714+2338390
 ICRS Star Coord at Epoch: 06h 02m 07.24543s +23:38:36.96036s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 13.599
 G magnitude : 16.757
 RP magnitude : 15.736
 BP magnitude : 17.799
 DUPflag : 0
 Distance (au) : 18.211
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -17.90
 Sun-Target sep (deg) : 144.59
 Sun-Moon sep (deg) : 35.44
 B (ring opening deg) : 74.94
 PA of pole (deg) : 58.17
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.795
 C/A sky separation (km) : 10502.2
 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_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	2032-11-17T07:23:14.424		33.34	-8.74	51327.51	-18.27		
lambda	I	2032-11-17T07:24:25.540		33.17	-8.50	50026.71	-18.28		
delta	I	2032-11-17T07:26:00.065		32.95	-8.17	48300.35	-18.25		
gamma	I	2032-11-17T07:26:36.793		32.86	-8.04	47630.44	-18.23		
eta	I	2032-11-17T07:27:01.717		32.80	-7.95	47176.12	-18.22		
beta	I	2032-11-17T07:28:23.925		32.61	-7.66	45678.63	-18.19		
alpha	I	2032-11-17T07:29:15.042		32.48	-7.48	44750.65	-18.17		
4	I	2032-11-17T07:31:16.268		32.19	-7.06	42557.39	-18.11		
5	I	2032-11-17T07:31:28.833		32.16	-7.02	42314.09	-18.10		
6	I	2032-11-17T07:31:55.680		32.10	-6.92	41828.56	-18.08		
Uranus	I	2032-11-17T07:46:55.658		29.84	-3.75x	25021.58		-14.93	-15.60
Uranus	E	2032-11-17T08:28:53.435		22.87	5.31x	25389.29		8.23	8.62
6	E	2032-11-17T08:44:09.752		20.14	8.66x	41824.46	18.00		
5	E	2032-11-17T08:44:28.882		20.08	8.74x	42172.32	18.02		
4	E	2032-11-17T08:44:52.319		20.01	8.82x	42604.05	18.03		
alpha	E	2032-11-17T08:46:48.279		19.66	9.25x	44694.92	18.08		
beta	E	2032-11-17T08:47:41.180		19.50	9.44x	45649.95	18.10		
eta	E	2032-11-17T08:49:05.369		19.24	9.75x	47176.12	18.13		
gamma	E	2032-11-17T08:49:30.056		19.16	9.84x	47623.93	18.14		
delta	E	2032-11-17T08:50:07.325		19.05	9.98x	48300.35	18.16		
lambda	E	2032-11-17T08:51:42.333		18.76	10.33x	50026.71	18.19		
epsilon	E	2032-11-17T08:52:26.822		18.62	10.49x	50836.04	18.18		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-11-17T08:09:55.860
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      : 3424692095882393600
2Mass ID (if available) : 06020714+2338390
ICRS Star Coord at Epoch: 06h 02m 07.24543s +23:38:36.96036s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 13.599
G magnitude          : 16.757
RP magnitude         : 15.736
BP magnitude         : 17.799
DUPflag             : 0
Distance (au)       : 18.211
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -17.90
Sun-Target sep (deg) : 144.59
Sun-Moon sep (deg)  : 35.20
B (ring opening deg) : 74.94
PA of pole (deg)    : 58.17
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.876
C/A sky separation (km) : 11571.5
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
    
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-17T07:25:51.804		36.88	-25.44	51321.00	-18.23		
lambda	I	2032-11-17T07:27:02.741		36.85	-25.25	50026.71	-18.23		
delta	I	2032-11-17T07:28:37.526		36.80	-25.00	48300.35	-18.19		
gamma	I	2032-11-17T07:29:14.361		36.78	-24.90	47630.50	-18.18		
eta	I	2032-11-17T07:29:39.366		36.76	-24.83	47176.12	-18.17		
beta	I	2032-11-17T07:31:01.836		36.72	-24.61	45678.83	-18.13		
alpha	I	2032-11-17T07:31:53.133		36.69	-24.47	44750.87	-18.10		
4	I	2032-11-17T07:33:54.811		36.61	-24.14	42558.37	-18.04		
5	I	2032-11-17T07:34:07.461		36.60	-24.10	42314.38	-18.02		
6	I	2032-11-17T07:34:34.511		36.59	-24.03	41827.61	-17.99		
Uranus	I	2032-11-17T07:49:42.975		35.89	-21.49	25016.71		-15.00	-15.68
Uranus	E	2032-11-17T08:30:33.668		32.87	-14.19	25414.19		7.60	7.95
6	E	2032-11-17T08:45:57.604		31.34	-11.29	41823.23	17.97		
5	E	2032-11-17T08:46:16.911		31.31	-11.23	42173.85	18.00		
4	E	2032-11-17T08:46:40.372		31.26	-11.16	42604.97	18.01		
alpha	E	2032-11-17T08:48:36.405		31.06	-10.79	44695.62	18.08		
beta	E	2032-11-17T08:49:29.307		30.96	-10.62	45650.42	18.10		
eta	E	2032-11-17T08:50:53.461		30.81	-10.35	47176.12	18.14		
gamma	E	2032-11-17T08:51:18.145		30.77	-10.27	47624.05	18.15		
delta	E	2032-11-17T08:51:55.386		30.70	-10.15	48300.35	18.17		
lambda	E	2032-11-17T08:53:30.308		30.52	-9.85	50026.71	18.21		
epsilon	E	2032-11-17T08:54:14.391		30.44	-9.71	50829.63	18.20		