

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2036-02-15T08:23:59.260  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3379635999161844480  
 2Mass ID (if available) : 06474120+2322392

Uranus 2036-02-15T08:23:59 K14.83 G16.43 PgtRgt

ICRS Star Coord at Epoch: 06h 47m 41.21555s +23:22:39.08834s

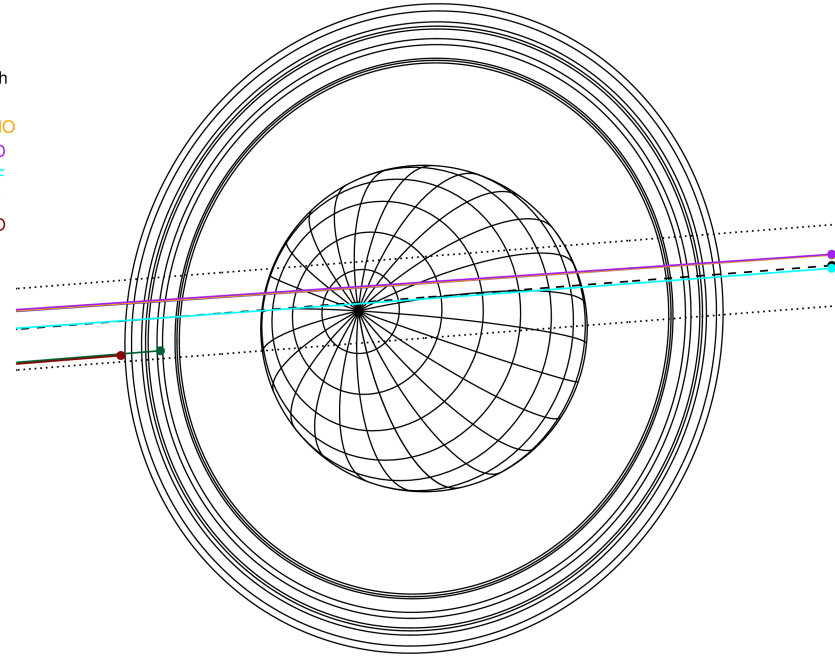
RUWE (>1.4 is poor) : 1.15  
 K magnitude : 14.826  
 G magnitude : 16.429  
 RP magnitude : 15.914  
 BP magnitude : 16.758  
 DUPflag : 0  
 Distance (au) : 18.105  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -14.71  
 Sun-Target sep (deg) : 135.20  
 Sun-Moon sep (deg) : 90.96  
 B (ring opening deg) : 65.41  
 PA of pole (deg) : 74.98

Uranus 2036-02-15T08:23:59 K14.83 G16.43  
 PgtRgt



2036-02-15T08:23:59.2600 α: 06 47 41.2155 δ: +23 22 39.088 C/A 0.376° PA 184.48 deg v\_sky -14.71 km/s D 18.11 AU  
 Credit: Styled after SORA/Lucky Star

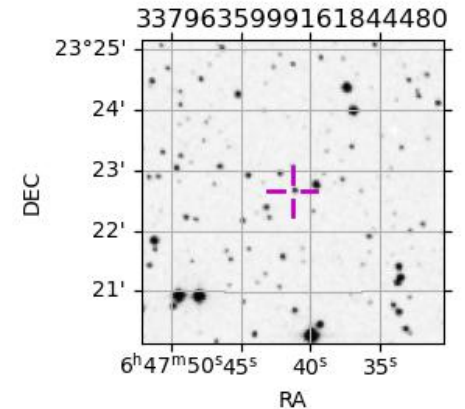
Earth  
 PAL  
 KPNO  
 MCD  
 IRTF  
 AAT  
 MSO



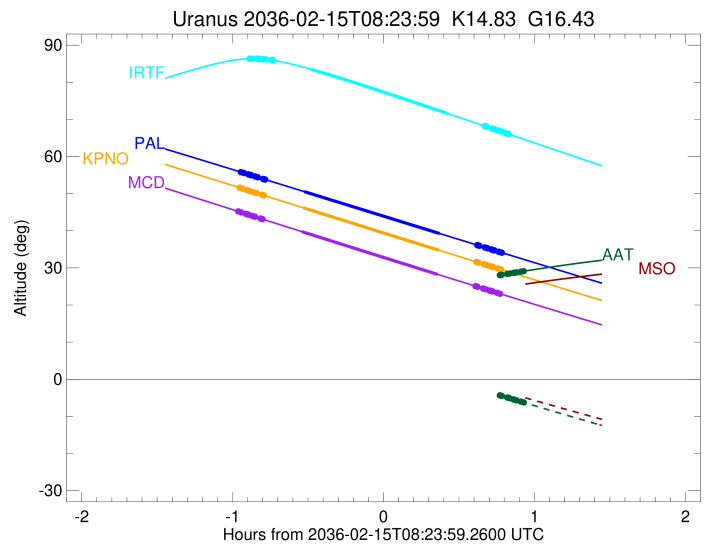
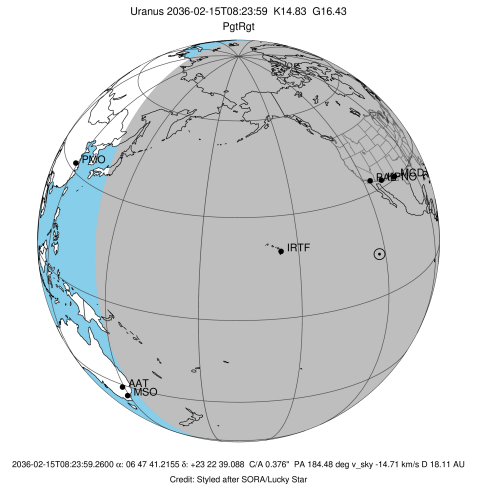
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+ +	+++++	FEB 15 07:27 - FEB 15 09:11	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	FEB 15 07:27 - FEB 15 09:10	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	FEB 15 07:26 - FEB 15 09:10	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	FEB 15 07:31 - FEB 15 09:13	PieRie
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			+++++	FEB 15 09:14 - FEB 15 09:19	PnnRne
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



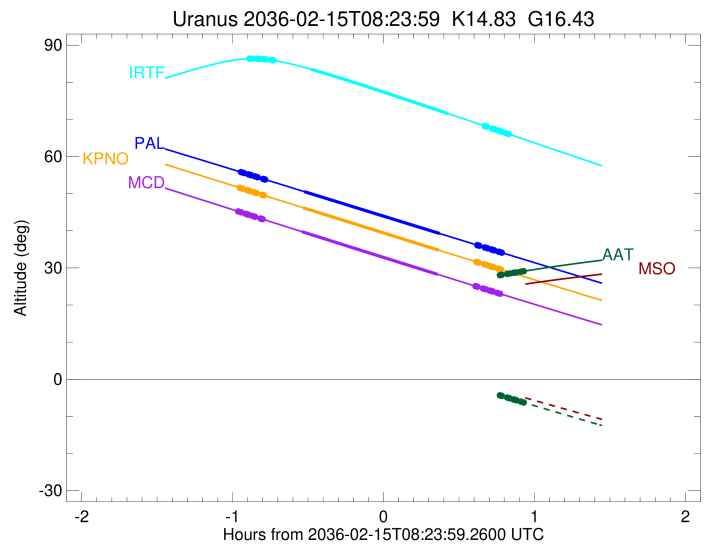
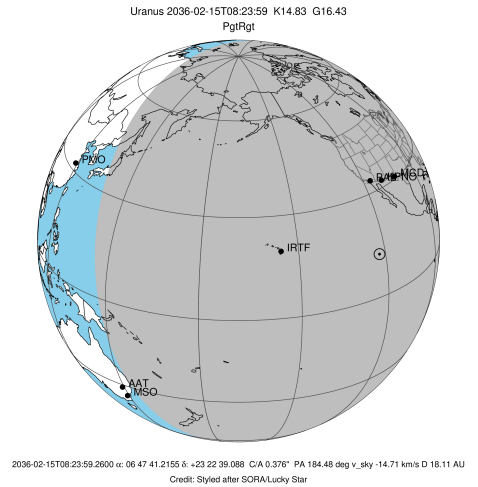
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2036-02-15T08:19:26.350  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3379635999161844480  
 2Mass ID (if available) : 06474120+2322392  
 ICRS Star Coord at Epoch: 06h 47m 41.21555s +23:22:39.08834s  
 RUWE (>1.4 is poor) : 1.15  
 K magnitude : 14.826  
 G magnitude : 16.429  
 RP magnitude : 15.914  
 BP magnitude : 16.758  
 DUPflag : 0  
 Distance (au) : 18.105  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -14.71  
 Sun-Target sep (deg) : 135.20  
 Sun-Moon sep (deg) : 91.65  
 B (ring opening deg) : 65.41  
 PA of pole (deg) : 74.98  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.536  
 C/A sky separation (km) : 7042.5  
 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	2036-02-15T07:27:39.471		55.74	-68.19	50837.92	-16.19		
lambda	I	2036-02-15T07:28:29.541		55.56	-68.26	50026.71	-16.20		
delta	I	2036-02-15T07:30:16.167		55.19	-68.39	48300.35	-16.18		
gamma	I	2036-02-15T07:30:58.092		55.05	-68.45	47622.00	-16.18		
eta	I	2036-02-15T07:31:25.659		54.95	-68.48	47176.12	-16.17		
beta	I	2036-02-15T07:33:00.651		54.62	-68.59	45641.79	-16.16		
alpha	I	2036-02-15T07:33:56.206		54.43	-68.66	44748.18	-16.15		
4	I	2036-02-15T07:36:09.219		53.97	-68.80	42588.29	-16.12		
5	I	2036-02-15T07:36:32.342		53.89	-68.82	42211.15	-16.11		
6	I	2036-02-15T07:36:56.245		53.80	-68.85	41821.89	-16.11		
Uranus	I	2036-02-15T07:52:27.739		50.55	-69.50	25233.05		-19.88	-20.74
Uranus	E	2036-02-15T08:46:18.703		39.26	-67.17	25076.47		24.56	25.58
6	E	2036-02-15T09:01:19.448		36.13	-65.44	41865.05	15.96		
5	E	2036-02-15T09:01:41.764		36.05	-65.39	42231.55	15.96		
4	E	2036-02-15T09:02:02.920		35.98	-65.35	42569.06	15.97		
alpha	E	2036-02-15T09:04:14.953		35.52	-65.06	44695.58	16.00		
beta	E	2036-02-15T09:05:16.588		35.30	-64.93	45677.86	16.00		
eta	E	2036-02-15T09:06:50.297		34.98	-64.72	47176.12	16.01		
gamma	E	2036-02-15T09:07:18.606		34.88	-64.66	47629.39	16.01		
delta	E	2036-02-15T09:08:00.500		34.73	-64.56	48300.35	16.02		
lambda	E	2036-02-15T09:09:48.250		34.36	-64.32	50026.71	16.03		
epsilon	E	2036-02-15T09:11:12.190		34.07	-64.12	51372.22	16.02		

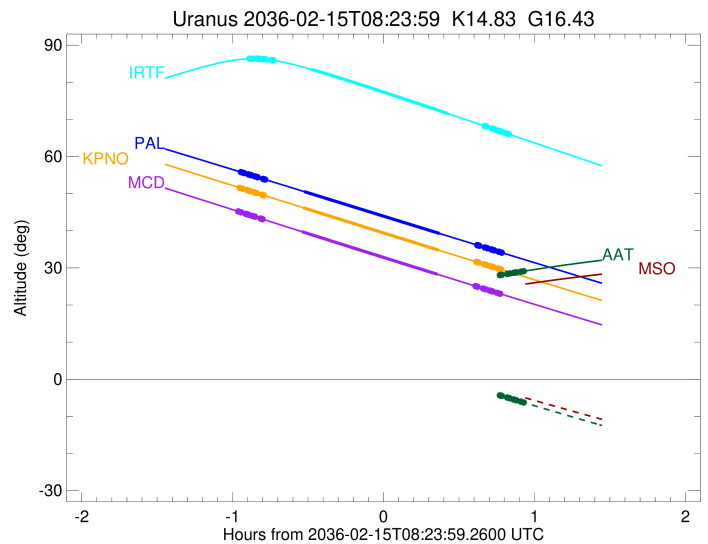
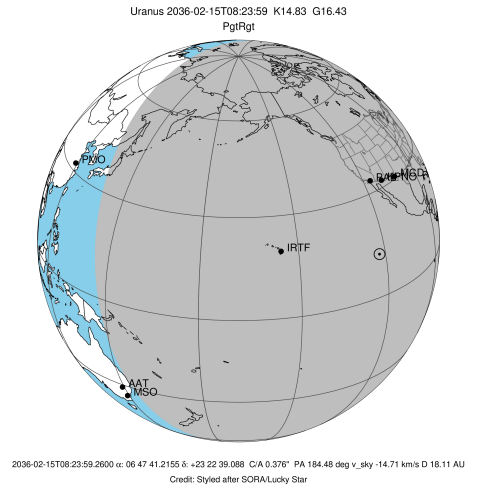
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2036-02-15T08:19:01.880
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      : 3379635999161844480
2Mass ID (if available) : 06474120+2322392
ICRS Star Coord at Epoch: 06h 47m 41.21555s +23:22:39.08834s
RUWE (>1.4 is poor) : 1.15
K magnitude          : 14.826
G magnitude          : 16.429
RP magnitude         : 15.914
BP magnitude         : 16.758
DUPflag             : 0
Distance (au)       : 18.105
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -14.71
Sun-Target sep (deg) : 135.20
Sun-Moon sep (deg)  : 91.59
B (ring opening deg) : 65.41
PA of pole (deg)    : 74.98
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.540
C/A sky separation (km) : 7085.9
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	2036-02-15T07:27:10.775		51.51	-70.75	50837.85	-16.17		
lambda	I	2036-02-15T07:28:00.908		51.34	-70.78	50026.71	-16.18		
delta	I	2036-02-15T07:29:47.680		50.96	-70.84	48300.35	-16.16		
gamma	I	2036-02-15T07:30:29.663		50.81	-70.86	47622.00	-16.15		
eta	I	2036-02-15T07:30:57.268		50.71	-70.87	47176.12	-16.15		
beta	I	2036-02-15T07:32:32.394		50.37	-70.91	45641.79	-16.13		
alpha	I	2036-02-15T07:33:28.028		50.18	-70.93	44748.19	-16.13		
4	I	2036-02-15T07:35:41.233		49.70	-70.96	42588.31	-16.10		
5	I	2036-02-15T07:36:04.393		49.62	-70.97	42211.12	-16.08		
6	I	2036-02-15T07:36:28.328		49.54	-70.97	41821.91	-16.08		
Uranus	I	2036-02-15T07:52:01.509		46.22	-70.80	25233.58		-19.86	-20.73
Uranus	E	2036-02-15T08:45:56.270		34.78	-65.75	25076.37		24.57	25.58
6	E	2036-02-15T09:00:58.979		31.61	-63.47	41865.10	15.93		
5	E	2036-02-15T09:01:21.330		31.53	-63.41	42231.43	15.93		
4	E	2036-02-15T09:01:42.545		31.46	-63.35	42569.13	15.94		
alpha	E	2036-02-15T09:03:54.860		30.99	-63.00	44695.62	15.96		
beta	E	2036-02-15T09:04:56.624		30.78	-62.83	45677.84	15.97		
eta	E	2036-02-15T09:06:30.536		30.45	-62.57	47176.12	15.98		
gamma	E	2036-02-15T09:06:58.905		30.35	-62.49	47629.39	15.98		
delta	E	2036-02-15T09:07:40.890		30.20	-62.38	48300.35	15.98		
lambda	E	2036-02-15T09:09:28.872		29.83	-62.08	50026.71	15.99		
epsilon	E	2036-02-15T09:10:52.966		29.53	-61.84	51371.78	15.98		

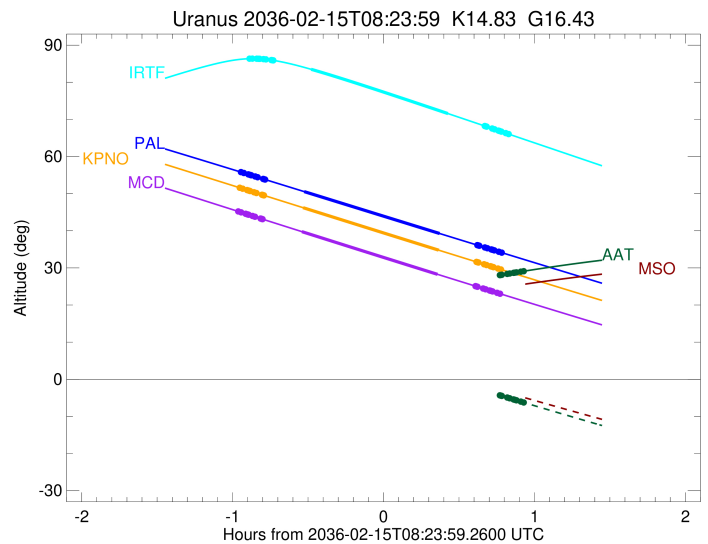
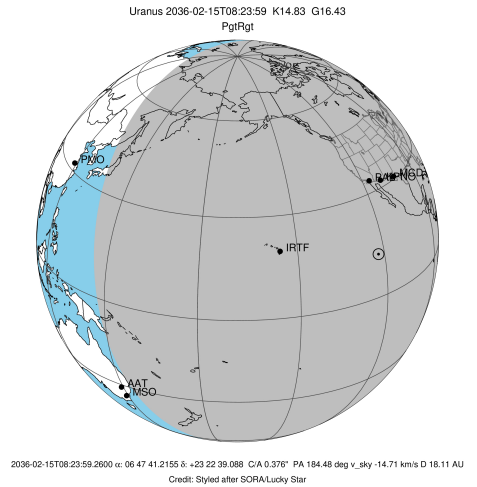
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2036-02-15T08:18:33.280  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : MCD  
 Location : McDonald Obs. 2.7m  
 Latitude (deg) : 30.67158  
 E. Longitude (deg) : 255.97844  
 Altitude (km) : 2.075  
 Gaia source ID : 3379635999161844480  
 2Mass ID (if available) : 06474120+2322392  
 ICRS Star Coord at Epoch: 06h 47m 41.21555s +23:22:39.08834s  
 RUWE (>1.4 is poor) : 1.15  
 K magnitude : 14.826  
 G magnitude : 16.429  
 RP magnitude : 15.914  
 BP magnitude : 16.758  
 DUPflag : 0  
 Distance (au) : 18.105  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -14.71  
 Sun-Target sep (deg) : 135.20  
 Sun-Moon sep (deg) : 91.50  
 B (ring opening deg) : 65.41  
 PA of pole (deg) : 74.98  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.551  
 C/A sky separation (km) : 7234.8  
 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	2036-02-15T07:26:35.074		45.14	-71.88	50837.26	-16.13		
lambda	I	2036-02-15T07:27:25.306		44.96	-71.84	50026.71	-16.13		
delta	I	2036-02-15T07:29:12.372		44.57	-71.74	48300.35	-16.12		
gamma	I	2036-02-15T07:29:54.472		44.42	-71.70	47621.99	-16.11		
eta	I	2036-02-15T07:30:22.154		44.32	-71.68	47176.12	-16.10		
beta	I	2036-02-15T07:31:57.550		43.98	-71.58	45641.78	-16.09		
alpha	I	2036-02-15T07:32:53.341		43.78	-71.52	44748.23	-16.08		
4	I	2036-02-15T07:35:06.936		43.30	-71.37	42588.43	-16.05		
5	I	2036-02-15T07:35:30.185		43.22	-71.34	42210.89	-16.04		
6	I	2036-02-15T07:35:54.174		43.13	-71.31	41822.03	-16.03		
Uranus	I	2036-02-15T07:51:31.258		39.77	-69.86	25236.04		-19.78	-20.64
Uranus	E	2036-02-15T08:45:29.494		28.26	-61.74	25076.11		24.57	25.59
6	E	2036-02-15T09:00:35.871		25.08	-58.95	41865.23	15.87		
5	E	2036-02-15T09:00:58.275		25.00	-58.88	42231.10	15.87		
4	E	2036-02-15T09:01:19.607		24.93	-58.81	42569.31	15.88		
alpha	E	2036-02-15T09:03:32.419		24.46	-58.39	44695.71	15.90		
beta	E	2036-02-15T09:04:34.406		24.24	-58.20	45677.80	15.91		
eta	E	2036-02-15T09:06:08.673		23.92	-57.90	47176.12	15.92		
gamma	E	2036-02-15T09:06:37.147		23.82	-57.80	47629.37	15.92		
delta	E	2036-02-15T09:07:19.290		23.67	-57.67	48300.35	15.92		
lambda	E	2036-02-15T09:09:07.673		23.29	-57.32	50026.71	15.93		
epsilon	E	2036-02-15T09:10:32.004		23.00	-57.05	51370.62	15.92		

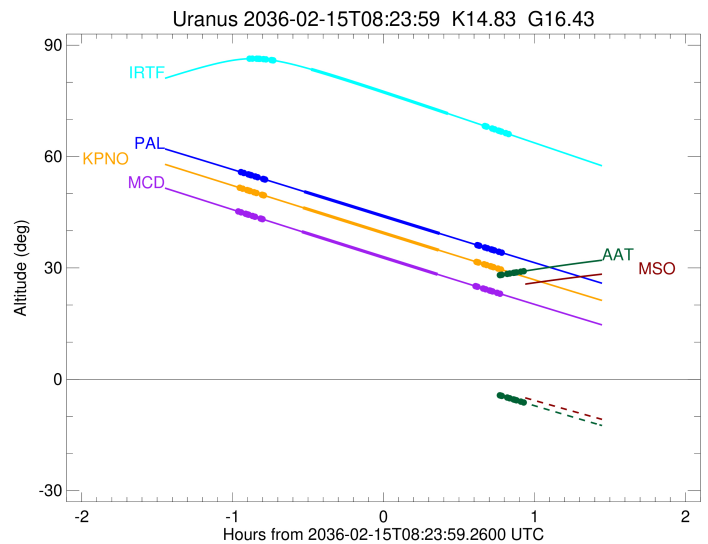
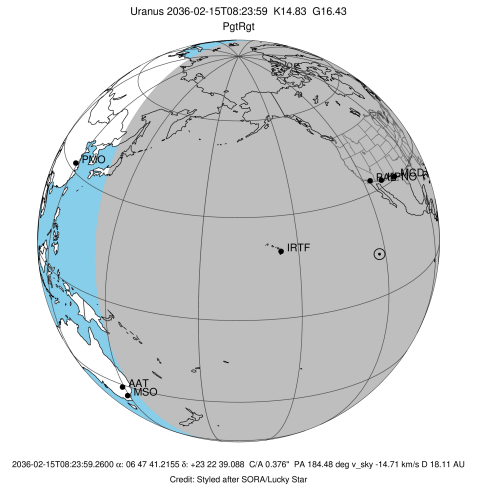
```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2036-02-15T08:22:26.870
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        : 3379635999161844480
2Mass ID (if available) : 06474120+2322392
ICRS Star Coord at Epoch: 06h 47m 41.21555s +23:22:39.08834s
RUWE (>1.4 is poor)  : 1.15
K magnitude           : 14.826
G magnitude           : 16.429
RP magnitude          : 15.914
BP magnitude          : 16.758
DUPflag              : 0
Distance (au)         : 18.105
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -14.71
Sun-Target sep (deg)  : 135.20
Sun-Moon sep (deg)    : 91.91
B (ring opening deg)  : 65.41
PA of pole (deg)      : 74.98
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.352
C/A sky separation (km) : 4615.9
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	2036-02-15T07:31:02.663		86.36	-45.22	50849.57	-16.43		
lambda	I	2036-02-15T07:31:52.724		86.37	-45.42	50026.71	-16.44		
delta	I	2036-02-15T07:33:37.779		86.35	-45.83	48300.35	-16.43		
gamma	I	2036-02-15T07:34:19.060		86.33	-45.99	47622.16	-16.43		
eta	I	2036-02-15T07:34:46.214		86.32	-46.10	47176.12	-16.43		
beta	I	2036-02-15T07:36:19.704		86.24	-46.46	45642.08	-16.42		
alpha	I	2036-02-15T07:37:14.438		86.18	-46.68	44747.31	-16.42		
4	I	2036-02-15T07:39:25.275		85.99	-47.19	42586.01	-16.40		
5	I	2036-02-15T07:39:47.644		85.95	-47.28	42215.33	-16.39		
6	I	2036-02-15T07:40:11.455		85.91	-47.37	41819.75	-16.39		
Uranus	I	2036-02-15T07:55:11.390		83.50	-50.89	25192.50		-21.16	-22.07
Uranus	E	2036-02-15T08:49:37.345		71.57	-63.59	25085.95		24.30	25.31
6	E	2036-02-15T09:04:16.380		68.22	-66.96	41862.99	16.33		
5	E	2036-02-15T09:04:38.690		68.13	-67.04	42236.53	16.33		
4	E	2036-02-15T09:04:58.836		68.06	-67.12	42566.27	16.34		
alpha	E	2036-02-15T09:07:08.064		67.56	-67.61	44694.15	16.35		
beta	E	2036-02-15T09:08:08.502		67.33	-67.84	45678.47	16.35		
eta	E	2036-02-15T09:09:40.183		66.98	-68.19	47176.12	16.35		
gamma	E	2036-02-15T09:10:07.912		66.88	-68.29	47629.63	16.36		
delta	E	2036-02-15T09:10:48.919		66.72	-68.44	48300.35	16.36		
lambda	E	2036-02-15T09:12:34.449		66.31	-68.84	50026.71	16.36		
epsilon	E	2036-02-15T09:13:57.737		66.00	-69.16	51389.47	16.35		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2036-02-15T08:27:38.620  
 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 : 3379635999161844480  
 2Mass ID (if available) : 06474120+2322392  
 ICRS Star Coord at Epoch: 06h 47m 41.21555s +23:22:39.08834s  
 RUWE (>1.4 is poor) : 1.15  
 K magnitude : 14.826  
 G magnitude : 16.429  
 RP magnitude : 15.914  
 BP magnitude : 16.758  
 DUPflag : 0  
 Distance (au) : 18.105  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -14.71  
 Sun-Target sep (deg) : 135.20  
 Sun-Moon sep (deg) : 91.31  
 B (ring opening deg) : 65.41  
 PA of pole (deg) : 74.98  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.005  
 C/A sky separation (km) : 70.0  
 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\_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	2036-02-15T07:35:42.348		14.55	15.47x	50873.46	-16.28		
lambda	I	2036-02-15T07:36:34.348		14.70	15.28x	50026.71	-16.28		
delta	I	2036-02-15T07:38:20.358		14.99	14.91x	48300.35	-16.29		
gamma	I	2036-02-15T07:39:01.981		15.10	14.76x	47622.48	-16.29		
eta	I	2036-02-15T07:39:29.387		15.18	14.66x	47176.12	-16.29		
beta	I	2036-02-15T07:41:03.616		15.44	14.33x	45642.77	-16.29		
alpha	I	2036-02-15T07:41:58.940		15.59	14.13x	44745.44	-16.29		
4	I	2036-02-15T07:44:10.841		15.95	13.67x	42581.56	-16.29		
5	I	2036-02-15T07:44:32.678		16.01	13.59x	42223.44	-16.29		
6	I	2036-02-15T07:44:57.273		16.07	13.50x	41815.81	-16.28		
Uranus	I	2036-02-15T07:59:43.446		18.42	10.37x	25128.95		-23.07	-24.04
Uranus	E	2036-02-15T08:55:31.230		26.29	-1.31x	25130.24		23.03	24.00
6	E	2036-02-15T09:10:16.678		28.06	-4.33x	41858.66	16.37		
5	E	2036-02-15T09:10:39.929		28.10	-4.41x	42246.24	16.37		
4	E	2036-02-15T09:10:58.997		28.14	-4.48x	42560.89	16.37		
alpha	E	2036-02-15T09:13:08.189		28.38	-4.91x	44691.60	16.38		
beta	E	2036-02-15T09:14:08.746		28.50	-5.12	45679.51	16.38		
eta	E	2036-02-15T09:15:40.212		28.66	-5.43	47176.12	16.38		
gamma	E	2036-02-15T09:16:07.926		28.72	-5.52	47630.05	16.38		
delta	E	2036-02-15T09:16:48.849		28.79	-5.66	48300.35	16.38		
lambda	E	2036-02-15T09:18:34.240		28.98	-6.02	50026.71	16.38		
epsilon	E	2036-02-15T09:19:59.386		29.14	-6.31	51421.55	16.38		