

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-11-15T08:18:15.710
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3377578946047661056
 2Mass ID (if available) : 06221925+2336109

Uranus 2033-11-15T08:18:15 K13.78 G17.78 PgtRgt

ICRS Star Coord at Epoch: 06h 22m 19.22490s +23:36:10.68369s

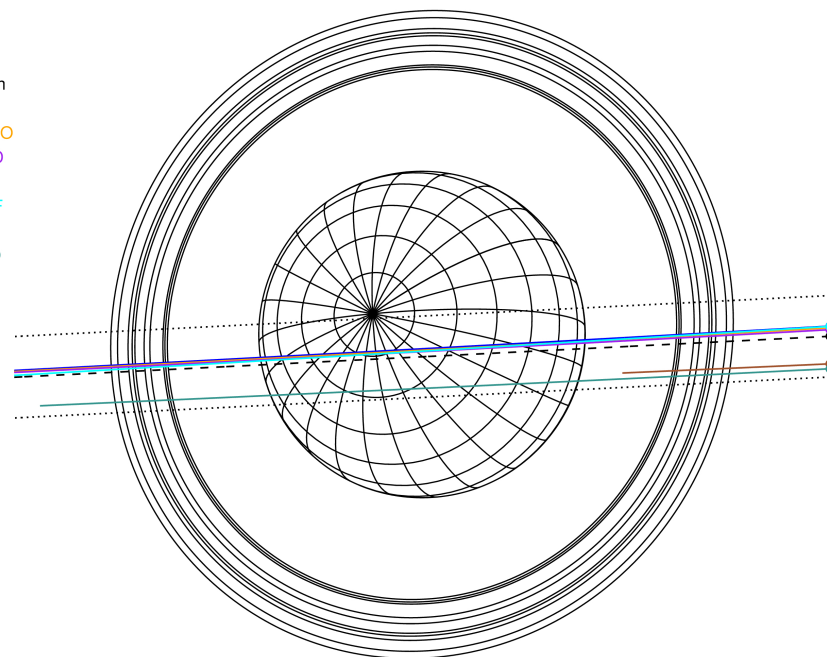
RUWE (>1.4 is poor) : 1.11
 K magnitude : 13.781
 G magnitude : 17.783
 RP magnitude : 16.505
 BP magnitude : 19.456
 DUPflag : 0
 Distance (au) : 18.217
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.64
 Sun-Target sep (deg) : 137.70
 Sun-Moon sep (deg) : 64.61
 B (ring opening deg) : 70.84
 PA of pole (deg) : 67.22

Uranus 2033-11-15T08:18:15 K13.78 G17.78
 PgtRgt



2033-11-15T08:18:15.7100 α: 06 22 19.2249 δ: +23 36 10.684 C/A 0.255° PA 2.87 deg v_sky -15.64 km/s D 18.22 AU
 Credit: Styled after SORA/Lucky Star

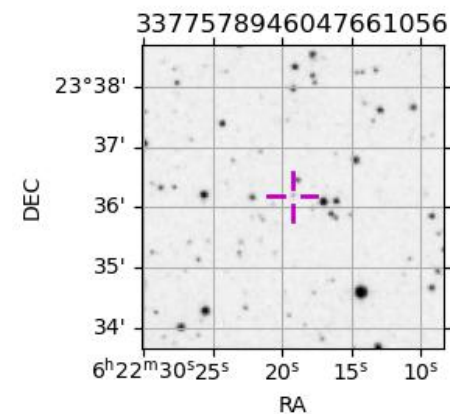
Earth
 PAL
 KPNO
 MCD
 TEN
 IRTF
 RIO
 ESO



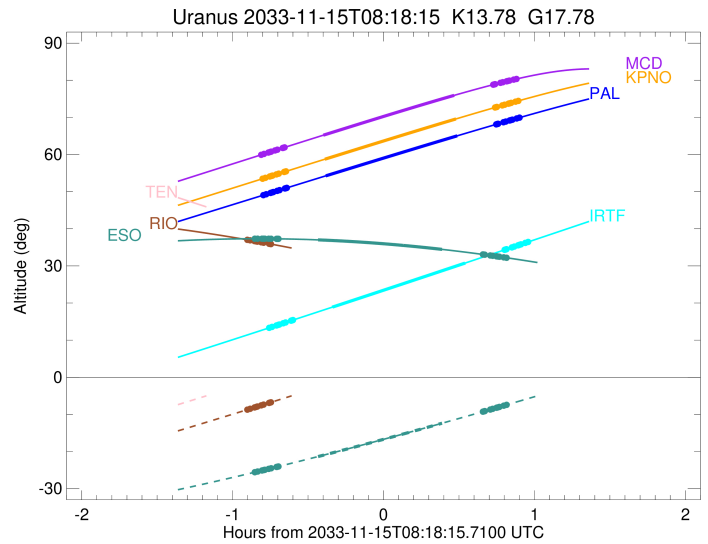
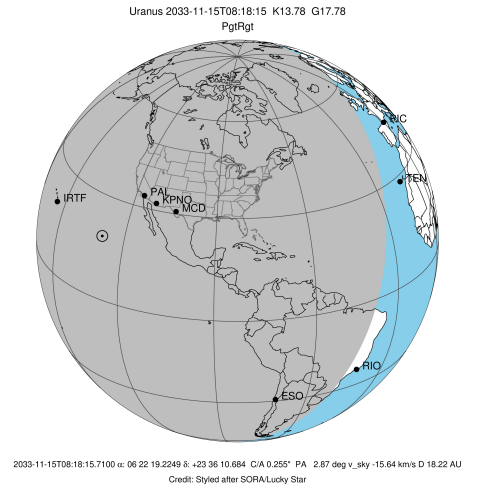
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	NOV 15 07:30 - NOV 15 09:12	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	NOV 15 07:30 - NOV 15 09:12	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	NOV 15 07:30 - NOV 15 09:11	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	NOV 15 07:33 - NOV 15 09:16	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++			NOV 15 07:24 - NOV 15 07:33	PnnRin
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	NOV 15 07:27 - NOV 15 09:07	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



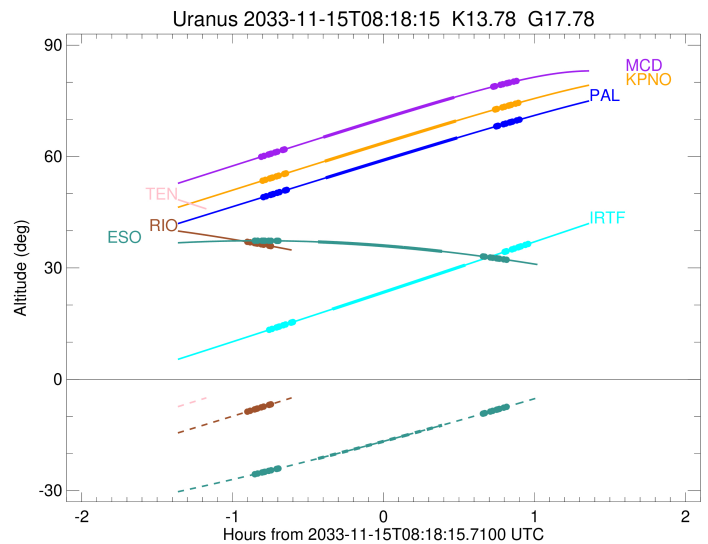
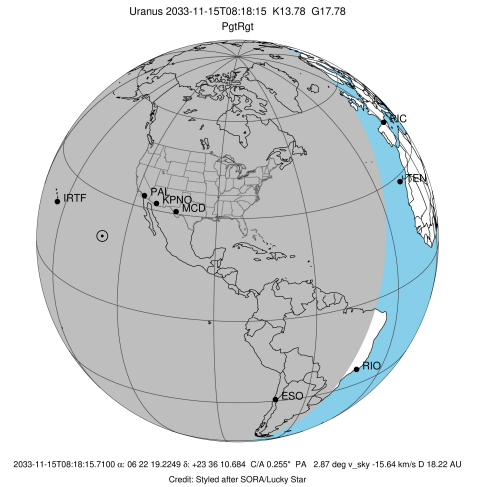
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-11-15T08:21:24.770
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3377578946047661056
 2Mass ID (if available) : 06221925+2336109
 ICRS Star Coord at Epoch: 06h 22m 19.22490s +23:36:10.68369s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 13.781
 G magnitude : 17.783
 RP magnitude : 16.505
 BP magnitude : 19.456
 DUPflag : 0
 Distance (au) : 18.217
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.64
 Sun-Target sep (deg) : 137.70
 Sun-Moon sep (deg) : 65.50
 B (ring opening deg) : 70.84
 PA of pole (deg) : 67.22
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.170
 C/A sky separation (km) : 2240.1
 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	2033-11-15T07:30:55.198		49.15	-75.40	50747.76	-16.64		
lambda	I	2033-11-15T07:31:38.535		49.30	-75.40	50026.71	-16.64		
delta	I	2033-11-15T07:33:22.289		49.66	-75.40	48300.35	-16.64		
gamma	I	2033-11-15T07:34:03.018		49.81	-75.39	47622.62	-16.64		
eta	I	2033-11-15T07:34:29.852		49.90	-75.39	47176.12	-16.64		
beta	I	2033-11-15T07:35:59.713		50.21	-75.37	45679.55	-16.64		
alpha	I	2033-11-15T07:36:56.285		50.41	-75.36	44743.29	-16.64		
4	I	2033-11-15T07:39:06.852		50.87	-75.32	42560.84	-16.64		
5	I	2033-11-15T07:39:29.883		50.95	-75.31	42181.13	-16.64		
6	I	2033-11-15T07:39:48.324		51.01	-75.30	41878.81	-16.64		
Uranus	I	2033-11-15T07:55:17.501		54.25	-74.50	25100.92		-17.86	-18.65
Uranus	E	2033-11-15T08:47:33.591		65.04	-67.68	25171.98		16.34	17.07
6	E	2033-11-15T09:03:00.880		68.12	-64.97	41794.98	16.74		
5	E	2033-11-15T09:03:30.972		68.22	-64.88	42294.62	16.74		
4	E	2033-11-15T09:03:47.928		68.28	-64.83	42577.01	16.74		
alpha	E	2033-11-15T09:05:53.685		68.69	-64.45	44691.60	16.75		
beta	E	2033-11-15T09:06:50.814		68.87	-64.27	45643.59	16.75		
eta	E	2033-11-15T09:08:22.225		69.17	-63.99	47176.12	16.75		
gamma	E	2033-11-15T09:08:49.331		69.26	-63.91	47630.25	16.75		
delta	E	2033-11-15T09:09:29.325		69.39	-63.79	48300.35	16.76		
lambda	E	2033-11-15T09:11:12.347		69.72	-63.47	50026.71	16.76		
epsilon	E	2033-11-15T09:12:43.504		70.01	-63.19	51554.53	16.76		

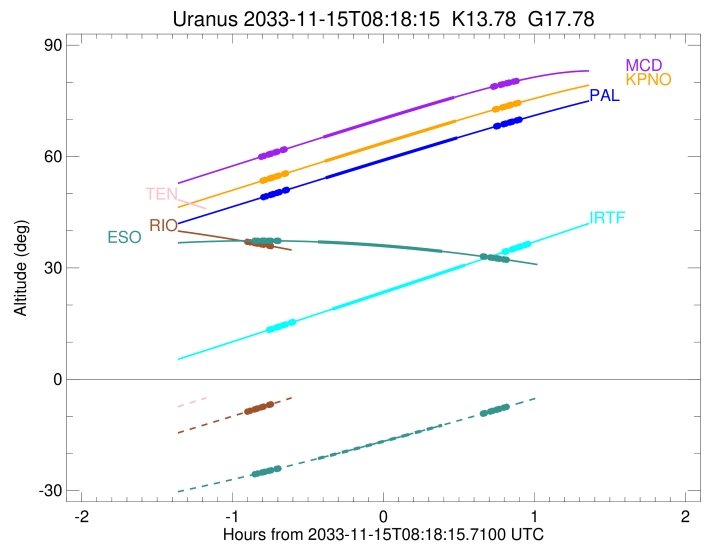
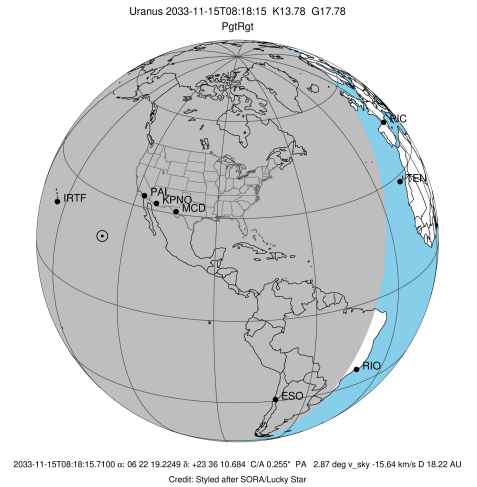
```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2033-11-15T08:20:59.980
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        : 3377578946047661056
2Mass ID (if available) : 06221925+2336109
ICRS Star Coord at Epoch: 06h 22m 19.22490s +23:36:10.68369s
RUWE (>1.4 is poor)  : 1.11
K magnitude           : 13.781
G magnitude           : 17.783
RP magnitude          : 16.505
BP magnitude          : 19.456
DUPflag              : 0
Distance (au)         : 18.217
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -15.64
Sun-Target sep (deg)  : 137.70
Sun-Moon sep (deg)    : 65.51
B (ring opening deg)  : 70.84
PA of pole (deg)      : 67.22
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.187
C/A sky separation (km) : 2465.1
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	2033-11-15T07:30:36.497		53.57	-76.07	50748.07	-16.67		
lambda	I	2033-11-15T07:31:19.784		53.73	-76.02	50026.71	-16.66		
delta	I	2033-11-15T07:33:03.378		54.09	-75.88	48300.35	-16.67		
gamma	I	2033-11-15T07:33:44.044		54.24	-75.83	47622.64	-16.67		
eta	I	2033-11-15T07:34:10.838		54.33	-75.79	47176.12	-16.67		
beta	I	2033-11-15T07:35:40.562		54.65	-75.66	45679.59	-16.67		
alpha	I	2033-11-15T07:36:37.062		54.85	-75.58	44743.16	-16.67		
4	I	2033-11-15T07:38:47.445		55.31	-75.38	42560.57	-16.66		
5	I	2033-11-15T07:39:10.412		55.39	-75.34	42181.50	-16.67		
6	I	2033-11-15T07:39:28.853		55.46	-75.31	41878.76	-16.67		
Uranus	I	2033-11-15T07:54:56.579		58.74	-73.49	25097.65		-17.93	-18.72
Uranus	E	2033-11-15T08:47:05.710		69.60	-64.66	25175.71		16.26	16.99
6	E	2033-11-15T09:02:32.796		72.67	-61.65	41794.96	16.76		
5	E	2033-11-15T09:03:02.880		72.76	-61.55	42294.87	16.76		
4	E	2033-11-15T09:03:19.791		72.82	-61.49	42576.81	16.75		
alpha	E	2033-11-15T09:05:25.458		73.22	-61.07	44691.51	16.76		
beta	E	2033-11-15T09:06:22.550		73.41	-60.88	45643.63	16.76		
eta	E	2033-11-15T09:07:53.887		73.70	-60.58	47176.12	16.77		
gamma	E	2033-11-15T09:08:20.972		73.79	-60.49	47630.27	16.77		
delta	E	2033-11-15T09:09:00.933		73.91	-60.36	48300.35	16.77		
lambda	E	2033-11-15T09:10:43.873		74.24	-60.01	50026.71	16.77		
epsilon	E	2033-11-15T09:12:14.963		74.52	-59.71	51554.62	16.78		

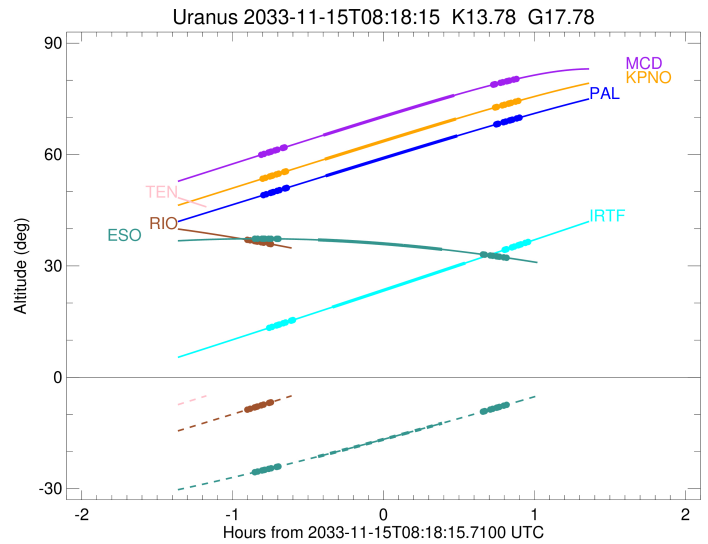
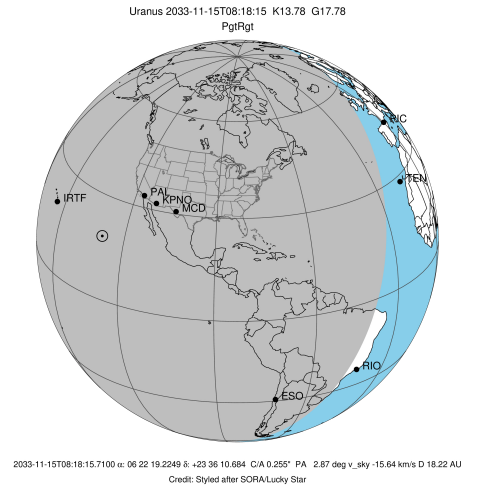
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-11-15T08:20:20.060
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3377578946047661056
 2Mass ID (if available) : 06221925+2336109
 ICRS Star Coord at Epoch: 06h 22m 19.22490s +23:36:10.68369s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 13.781
 G magnitude : 17.783
 RP magnitude : 16.505
 BP magnitude : 19.456
 DUPflag : 0
 Distance (au) : 18.217
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.64
 Sun-Target sep (deg) : 137.70
 Sun-Moon sep (deg) : 65.51
 B (ring opening deg) : 70.84
 PA of pole (deg) : 67.22
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.203
 C/A sky separation (km) : 2685.7
 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	2033-11-15T07:30:03.512		60.01	-73.64	50748.40	-16.70		
lambda	I	2033-11-15T07:30:46.736		60.17	-73.53	50026.71	-16.70		
delta	I	2033-11-15T07:32:30.131		60.54	-73.26	48300.35	-16.70		
gamma	I	2033-11-15T07:33:10.720		60.68	-73.15	47622.66	-16.70		
eta	I	2033-11-15T07:33:37.464		60.78	-73.08	47176.12	-16.70		
beta	I	2033-11-15T07:35:07.019		61.10	-72.84	45679.64	-16.70		
alpha	I	2033-11-15T07:36:03.428		61.30	-72.69	44743.02	-16.70		
4	I	2033-11-15T07:38:13.583		61.77	-72.33	42560.29	-16.69		
5	I	2033-11-15T07:38:36.477		61.85	-72.26	42181.88	-16.69		
6	I	2033-11-15T07:38:54.914		61.92	-72.21	41878.70	-16.69		
Uranus	I	2033-11-15T07:54:20.926		65.22	-69.49	25094.36		-18.00	-18.79
Uranus	E	2033-11-15T08:46:22.448		75.94	-59.17	25179.19		16.18	16.90
6	E	2033-11-15T09:01:49.336		78.81	-55.94	41794.94	16.77		
5	E	2033-11-15T09:02:19.411		78.90	-55.83	42295.09	16.77		
4	E	2033-11-15T09:02:36.282		78.95	-55.77	42576.62	16.77		
alpha	E	2033-11-15T09:04:41.868		79.31	-55.33	44691.43	16.77		
beta	E	2033-11-15T09:05:38.925		79.47	-55.13	45643.66	16.78		
eta	E	2033-11-15T09:07:10.193		79.72	-54.81	47176.12	16.78		
gamma	E	2033-11-15T09:07:37.260		79.79	-54.72	47630.28	16.78		
delta	E	2033-11-15T09:08:17.192		79.90	-54.58	48300.35	16.78		
lambda	E	2033-11-15T09:10:00.058		80.18	-54.21	50026.71	16.78		
epsilon	E	2033-11-15T09:11:31.089		80.41	-53.89	51554.69	16.79		

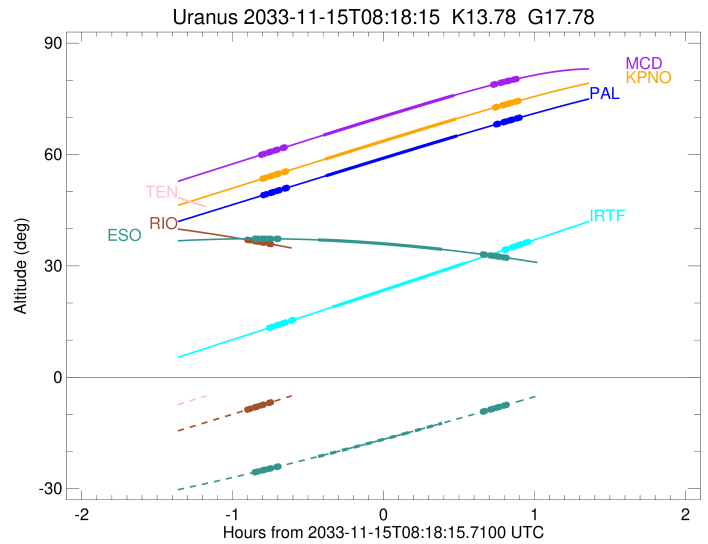
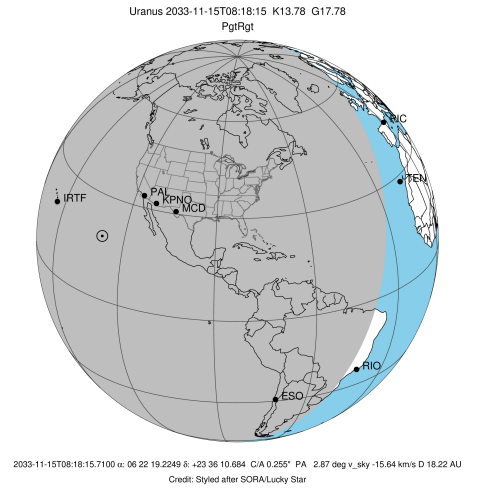
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-11-15T08:24:20.170
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      : 3377578946047661056
2Mass ID (if available) : 06221925+2336109
ICRS Star Coord at Epoch: 06h 22m 19.22490s +23:36:10.68369s
RUWE (>1.4 is poor) : 1.11
K magnitude          : 13.781
G magnitude          : 17.783
RP magnitude         : 16.505
BP magnitude         : 19.456
DUPflag             : 0
Distance (au)        : 18.217
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -15.64
Sun-Target sep (deg) : 137.70
Sun-Moon sep (deg)  : 65.29
B (ring opening deg) : 70.84
PA of pole (deg)    : 67.22
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation ("): 0.198
C/A sky separation (km): 2614.6
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
    
```



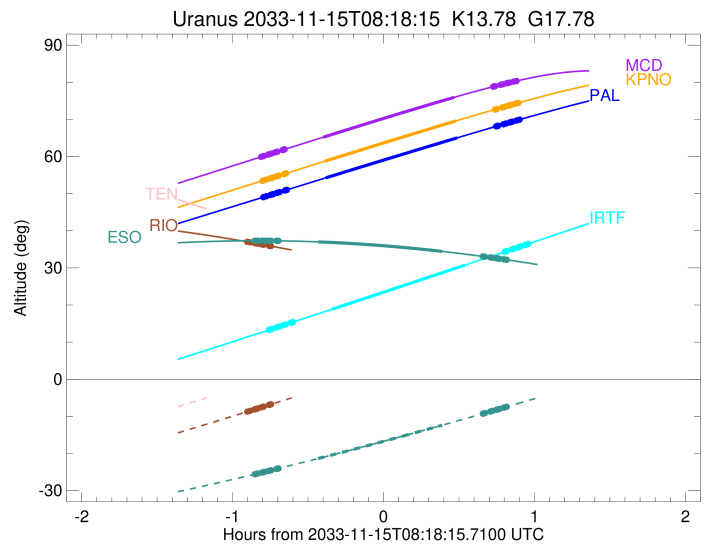
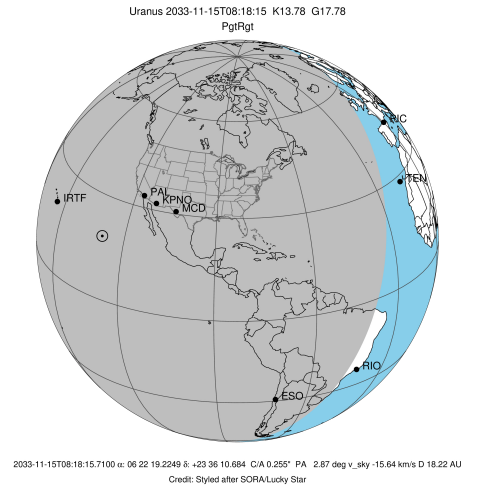
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-11-15T07:33:13.999		13.41	-53.87	50747.90	-16.40		
lambda	I	2033-11-15T07:33:57.972		13.57	-54.04	50026.71	-16.40		
delta	I	2033-11-15T07:35:43.223		13.96	-54.45	48300.35	-16.40		
gamma	I	2033-11-15T07:36:24.539		14.11	-54.62	47622.63	-16.40		
eta	I	2033-11-15T07:36:51.758		14.21	-54.72	47176.12	-16.40		
beta	I	2033-11-15T07:38:22.907		14.55	-55.08	45679.57	-16.41		
alpha	I	2033-11-15T07:39:20.296		14.76	-55.30	44743.21	-16.41		
4	I	2033-11-15T07:41:32.730		15.25	-55.82	42560.67	-16.40		
5	I	2033-11-15T07:41:56.068		15.33	-55.91	42181.36	-16.41		
6	I	2033-11-15T07:42:14.788		15.40	-55.99	41878.78	-16.41		
Uranus	I	2033-11-15T07:57:56.758		18.90	-59.67	25097.75		-17.93	-18.72
Uranus	E	2033-11-15T08:50:43.543		30.77	-72.09	25181.57		16.13	16.85
6	E	2033-11-15T09:06:21.300		34.31	-75.76	41794.92	16.59		
5	E	2033-11-15T09:06:51.720		34.43	-75.88	42295.41	16.59		
4	E	2033-11-15T09:07:08.730		34.49	-75.95	42576.35	16.59		
alpha	E	2033-11-15T09:09:15.671		34.97	-76.45	44691.31	16.60		
beta	E	2033-11-15T09:10:13.340		35.19	-76.67	45643.72	16.60		
eta	E	2033-11-15T09:11:45.559		35.54	-77.04	47176.12	16.61		
gamma	E	2033-11-15T09:12:12.907		35.64	-77.14	47630.30	16.61		
delta	E	2033-11-15T09:12:53.250		35.80	-77.30	48300.35	16.61		
lambda	E	2033-11-15T09:14:37.167		36.19	-77.71	50026.71	16.62		
epsilon	E	2033-11-15T09:16:09.123		36.54	-78.07	51554.82	16.62		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-11-15T08:14:09.290
 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 : 3377578946047661056
 2Mass ID (if available) : 06221925+2336109
 ICRS Star Coord at Epoch: 06h 22m 19.22490s +23:36:10.68369s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 13.781
 G magnitude : 17.783
 RP magnitude : 16.505
 BP magnitude : 19.456
 DUPflag : 0
 Distance (au) : 18.217
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.64
 Sun-Target sep (deg) : 137.70
 Sun-Moon sep (deg) : 64.76
 B (ring opening deg) : 70.84
 PA of pole (deg) : 67.22
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.558
 C/A sky separation (km) : 7371.0
 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	2033-11-15T07:24:32.657		36.97	-8.64	50756.96	-16.59		
lambda	I	2033-11-15T07:25:16.698		36.88	-8.49	50026.71	-16.58		
delta	I	2033-11-15T07:27:00.879		36.68	-8.12	48300.35	-16.56		
gamma	I	2033-11-15T07:27:41.776		36.59	-7.98	47623.11	-16.56		
eta	I	2033-11-15T07:28:08.777		36.54	-7.88	47176.12	-16.55		
beta	I	2033-11-15T07:29:39.105		36.36	-7.57	45680.41	-16.54		
alpha	I	2033-11-15T07:30:36.304		36.24	-7.36	44740.13	-16.53		
4	I	2033-11-15T07:32:47.979		35.97	-6.90	42555.03	-16.49		
5	I	2033-11-15T07:33:10.504		35.92	-6.82	42189.63	-16.50		
6	I	2033-11-15T07:33:29.744		35.88	-6.75	41877.23	-16.49		
Uranus	I	2033-11-15T07:49:10.569		33.81	-3.42x	25046.87		-18.96	-19.79
Uranus	E	2033-11-15T08:39:24.759		26.09	7.51x	25267.93		14.08	14.72
6	E	2033-11-15T08:55:29.152		23.33	11.07x	41794.75	16.41		
5	E	2033-11-15T08:56:00.175		23.24	11.18x	42300.27	16.42		
4	E	2033-11-15T08:56:16.700		23.19	11.24x	42571.98	16.42		
alpha	E	2033-11-15T08:58:25.119		22.82	11.72x	44689.58	16.44		
beta	E	2033-11-15T08:59:23.469		22.65	11.93x	45644.68	16.45		
eta	E	2033-11-15T09:00:56.452		22.37	12.28x	47176.12	16.46		
gamma	E	2033-11-15T09:01:24.053		22.29	12.38x	47630.58	16.47		
delta	E	2033-11-15T09:02:04.719		22.17	12.53x	48300.35	16.47		
lambda	E	2033-11-15T09:03:49.485		21.86	12.92x	50026.71	16.48		
epsilon	E	2033-11-15T09:05:22.179		21.58	13.26x	51555.12	16.49		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-11-15T08:16:45.700
 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 : 3377578946047661056
 2Mass ID (if available) : 06221925+2336109
 ICRS Star Coord at Epoch: 06h 22m 19.22490s +23:36:10.68369s
 RUWE (>1.4 is poor) : 1.11
 K magnitude : 13.781
 G magnitude : 17.783
 RP magnitude : 16.505
 BP magnitude : 19.456
 DUPflag : 0
 Distance (au) : 18.217
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -15.64
 Sun-Target sep (deg) : 137.70
 Sun-Moon sep (deg) : 65.00
 B (ring opening deg) : 70.84
 PA of pole (deg) : 67.22
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.639
 C/A sky separation (km) : 8437.1
 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	2033-11-15T07:27:30.311		37.32	-25.51	50758.78	-16.56		
lambda	I	2033-11-15T07:28:14.550		37.32	-25.39	50026.71	-16.54		
delta	I	2033-11-15T07:29:58.953		37.32	-25.11	48300.35	-16.53		
gamma	I	2033-11-15T07:30:39.937		37.32	-25.00	47623.19	-16.52		
eta	I	2033-11-15T07:31:07.005		37.32	-24.93	47176.12	-16.51		
beta	I	2033-11-15T07:32:37.548		37.31	-24.68	45680.52	-16.49		
alpha	I	2033-11-15T07:33:34.935		37.31	-24.52	44739.60	-16.48		
4	I	2033-11-15T07:35:47.001		37.29	-24.15	42554.13	-16.44		
5	I	2033-11-15T07:36:09.479		37.29	-24.09	42191.07	-16.45		
6	I	2033-11-15T07:36:28.890		37.29	-24.04	41876.90	-16.44		
Uranus	I	2033-11-15T07:52:14.759		37.01	-21.36	25041.94		-19.06	-19.89
Uranus	E	2033-11-15T08:41:33.635		34.45	-12.38	25293.10		13.44	14.05
6	E	2033-11-15T08:57:43.635		33.09	-9.28	41794.78	16.43		
5	E	2033-11-15T08:58:14.700		33.04	-9.17	42301.64	16.44		
4	E	2033-11-15T08:58:31.013		33.02	-9.12	42570.63	16.43		
alpha	E	2033-11-15T09:00:39.321		32.82	-8.71	44689.09	16.47		
beta	E	2033-11-15T09:01:37.608		32.73	-8.52	45645.01	16.48		
eta	E	2033-11-15T09:03:10.375		32.58	-8.22	47176.12	16.50		
gamma	E	2033-11-15T09:03:37.916		32.54	-8.13	47630.66	16.51		
delta	E	2033-11-15T09:04:18.478		32.47	-7.99	48300.35	16.51		
lambda	E	2033-11-15T09:06:02.960		32.30	-7.65	50026.71	16.53		
epsilon	E	2033-11-15T09:07:35.348		32.15	-7.35	51554.70	16.54		