

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2041-12-23T07:49:21.110
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 612235566432802816
 2Mass ID (if available) : 08570178+1756353

ICRS Star Coord at Epoch: 08h 57m 01.78217s +17:56:35.01014s

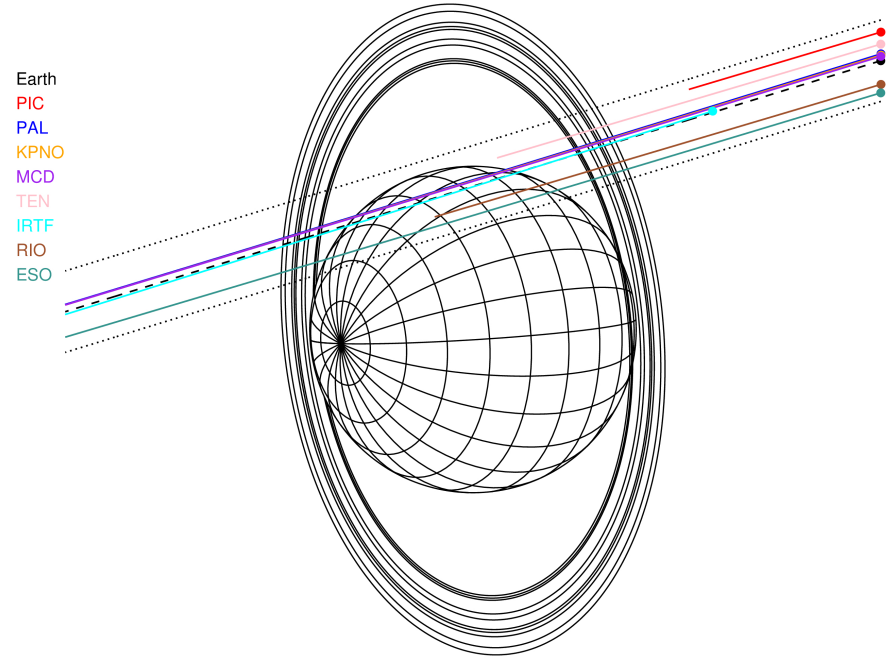
RUWE (>1.4 is poor) : 0.92
 K magnitude : 13.860
 G magnitude : 15.557
 RP magnitude : 14.954
 BP magnitude : 15.999
 DUPflag : 0
 Distance (au) : 17.729
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.10
 Sun-Target sep (deg) : 139.66
 Sun-Moon sep (deg) : 139.40
 B (ring opening deg) : 35.55
 PA of pole (deg) : 96.13

#	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



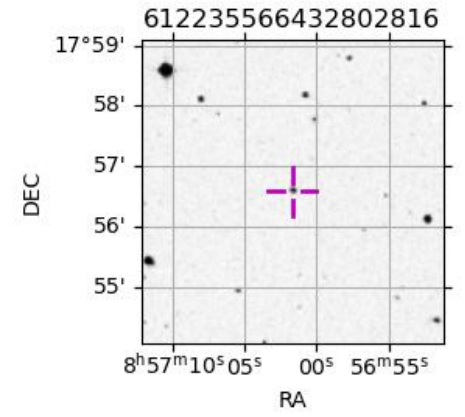
2041-12-23T07:49:21.1100 ex: 08 57 01.7822 s: +17 56 35.010 C/A 1.6811 PA 197.10 deg v_sky -16.10 km/s D 17.73 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2041-12-23T07:49:21 K13.86 G15.56 PgtRgt

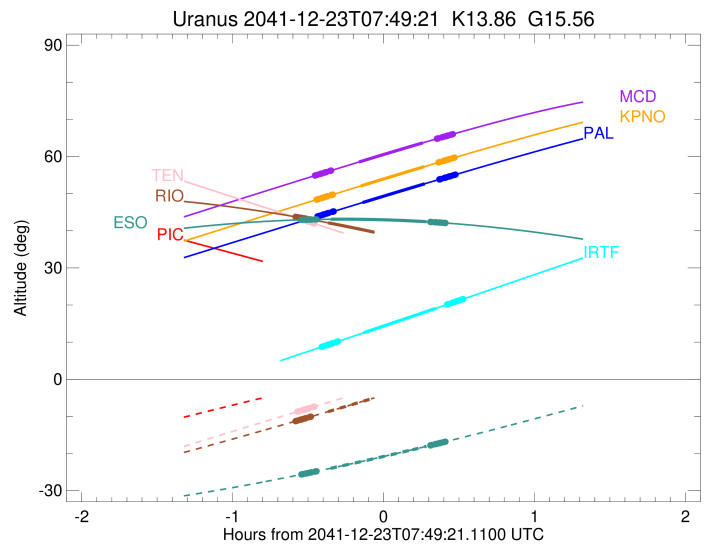
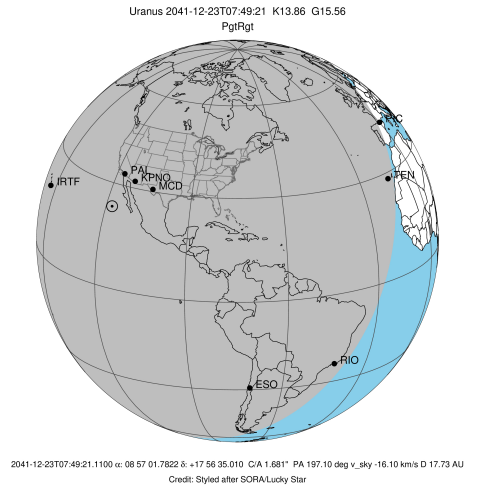


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+ +	+++++	DEC 23 07:23 - DEC 23 08:17	PieRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	DEC 23 07:22 - DEC 23 08:17	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	DEC 23 07:22 - DEC 23 08:16	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++			DEC 23 07:15 - DEC 23 07:21	PnnRin
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	DEC 23 07:25 - DEC 23 08:20	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++	+		DEC 23 07:14 - DEC 23 07:27	PinRin
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	DEC 23 07:16 - DEC 23 08:13	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



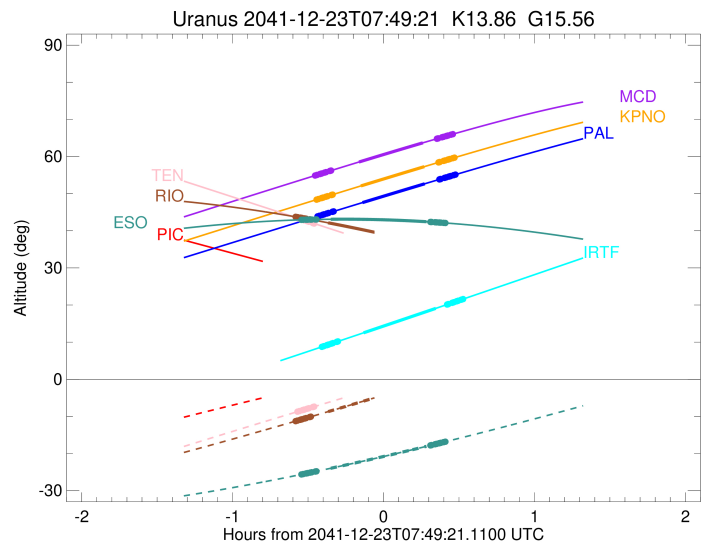
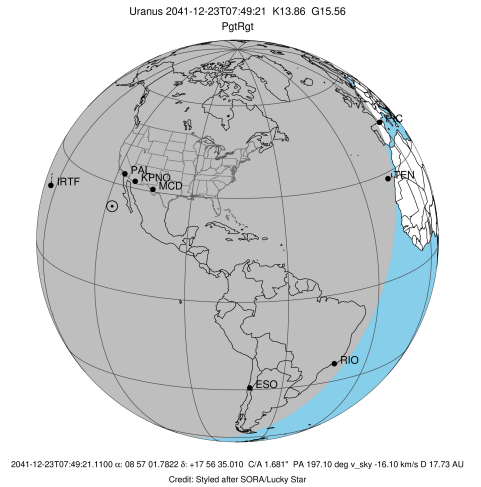
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2041-12-23T07:53:26.640
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 612235566432802816
 2Mass ID (if available) : 08570178+1756353
 ICRS Star Coord at Epoch: 08h 57m 01.78217s +17:56:35.01014s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 13.860
 G magnitude : 15.557
 RP magnitude : 14.954
 BP magnitude : 15.999
 DUPflag : 0
 Distance (au) : 17.729
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.10
 Sun-Target sep (deg) : 139.66
 Sun-Moon sep (deg) : 139.40
 B (ring opening deg) : 35.55
 PA of pole (deg) : 96.13
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.742
 C/A sky separation (km) : 22404.1
 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	2041-12-23T07:23:17.655		43.92	-78.99	50919.56	-24.81		
lambda	I	2041-12-23T07:23:53.606		44.04	-79.05	50026.71	-24.78		
delta	I	2041-12-23T07:25:03.595		44.29	-79.17	48300.35	-24.55		
gamma	I	2041-12-23T07:25:30.905		44.38	-79.21	47631.27	-24.45		
eta	I	2041-12-23T07:25:49.547		44.44	-79.24	47176.12	-24.38		
beta	I	2041-12-23T07:26:52.831		44.66	-79.33	45641.80	-24.13		
alpha	I	2041-12-23T07:27:30.326		44.79	-79.39	44752.43	-23.98		
4	I	2041-12-23T07:29:04.463		45.12	-79.52	42528.41	-23.54		
5	I	2041-12-23T07:29:18.743		45.17	-79.54	42154.83	-23.45		
6	I	2041-12-23T07:29:36.045		45.23	-79.56	41811.25	-23.38		
Uranus	I	2041-12-23T07:40:59.055		47.59	-80.17	25540.53		-14.36	-15.01
Uranus	E	2041-12-23T08:05:45.766		52.67	-79.37	25479.40		31.06	32.24
6	E	2041-12-23T08:11:31.557		53.83	-78.81	41817.14	23.46		
5	E	2041-12-23T08:11:49.900		53.89	-78.77	42267.49	23.53		
4	E	2041-12-23T08:12:03.877		53.94	-78.75	42576.23	23.62		
alpha	E	2041-12-23T08:13:33.359		54.24	-78.58	44701.54	24.07		
beta	E	2041-12-23T08:14:13.546		54.37	-78.50	45666.20	24.22		
eta	E	2041-12-23T08:15:15.754		54.58	-78.38	47176.12	24.47		
gamma	E	2041-12-23T08:15:33.948		54.64	-78.34	47622.04	24.54		
delta	E	2041-12-23T08:16:01.529		54.74	-78.29	48300.35	24.64		
lambda	E	2041-12-23T08:17:11.240		54.97	-78.15	50026.71	24.88		
epsilon	E	2041-12-23T08:17:50.877		55.10	-78.06	51015.43	24.91		

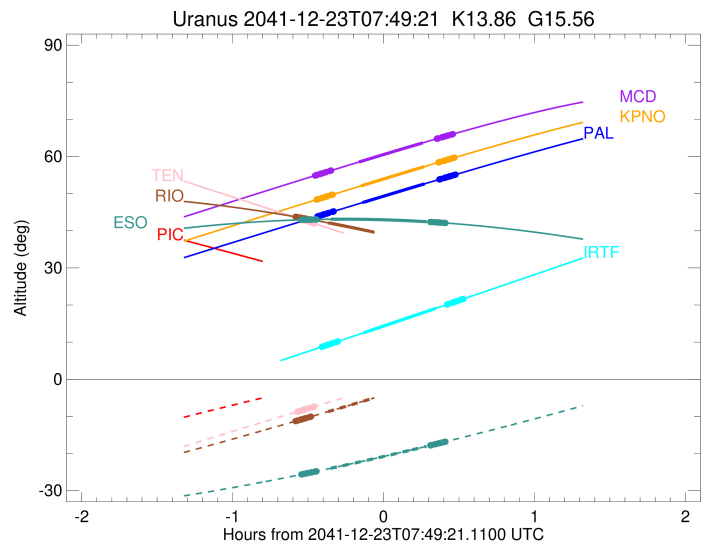
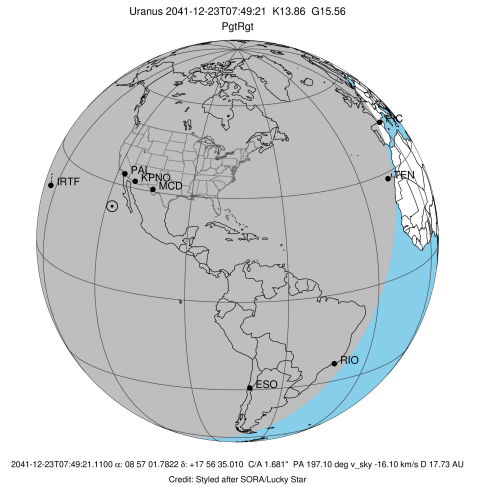
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2041-12-23T07:53:01.670
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      : 612235566432802816
2Mass ID (if available) : 08570178+1756353
ICRS Star Coord at Epoch: 08h 57m 01.78217s +17:56:35.01014s
RUWE (>1.4 is poor) : 0.92
K magnitude          : 13.860
G magnitude          : 15.557
RP magnitude         : 14.954
BP magnitude         : 15.999
DUPflag             : 0
Distance (au)       : 17.729
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -16.10
Sun-Target sep (deg) : 139.66
Sun-Moon sep (deg)  : 139.48
B (ring opening deg) : 35.55
PA of pole (deg)    : 96.13
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.732
C/A sky separation (km) : 22276.1
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
    
```



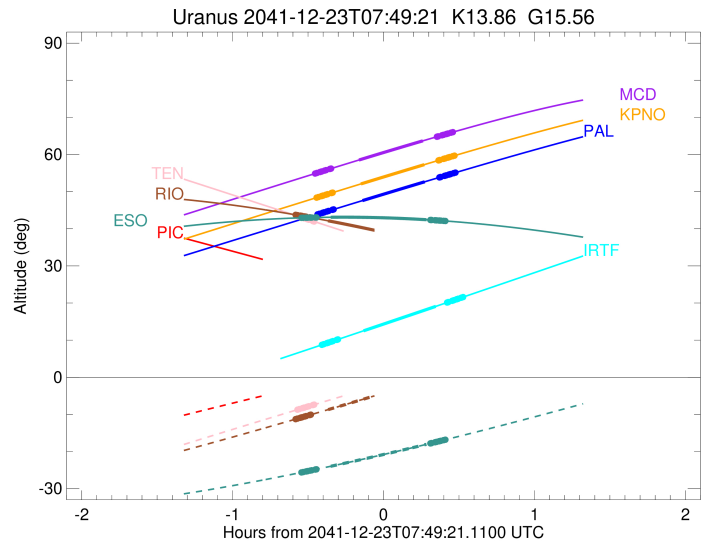
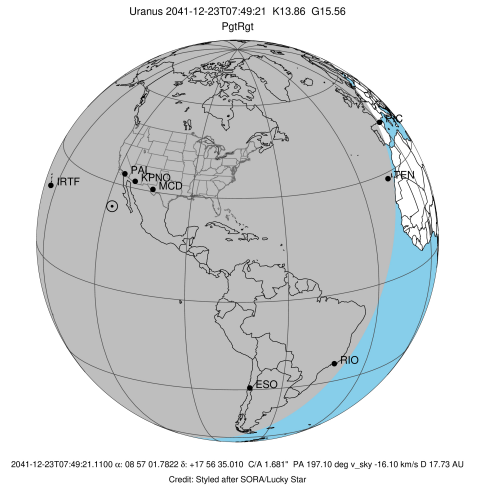
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2041-12-23T07:22:55.027		48.43	-81.61	50920.71	-24.89		
lambda	I	2041-12-23T07:23:30.909		48.56	-81.62	50026.71	-24.86		
delta	I	2041-12-23T07:24:40.668		48.80	-81.63	48300.35	-24.63		
gamma	I	2041-12-23T07:25:07.886		48.90	-81.63	47631.27	-24.53		
eta	I	2041-12-23T07:25:26.464		48.96	-81.63	47176.12	-24.47		
beta	I	2041-12-23T07:26:29.525		49.18	-81.63	45641.82	-24.22		
alpha	I	2041-12-23T07:27:06.885		49.31	-81.62	44752.43	-24.07		
4	I	2041-12-23T07:28:40.661		49.64	-81.60	42528.48	-23.63		
5	I	2041-12-23T07:28:54.887		49.69	-81.60	42154.84	-23.55		
6	I	2041-12-23T07:29:12.113		49.75	-81.59	41811.40	-23.48		
Uranus	I	2041-12-23T07:40:21.272		52.08	-81.01	25539.24		-14.87	-15.54
Uranus	E	2041-12-23T08:05:33.750		57.28	-77.81	25477.57		31.45	32.64
6	E	2041-12-23T08:11:09.807		58.41	-76.88	41817.27	23.55		
5	E	2041-12-23T08:11:28.096		58.47	-76.83	42267.72	23.62		
4	E	2041-12-23T08:11:42.011		58.52	-76.79	42576.37	23.70		
alpha	E	2041-12-23T08:13:11.169		58.82	-76.54	44701.46	24.15		
beta	E	2041-12-23T08:13:51.230		58.95	-76.42	45666.26	24.30		
eta	E	2041-12-23T08:14:53.236		59.16	-76.24	47176.12	24.55		
gamma	E	2041-12-23T08:15:11.375		59.22	-76.19	47622.03	24.62		
delta	E	2041-12-23T08:15:38.872		59.31	-76.11	48300.35	24.72		
lambda	E	2041-12-23T08:16:48.379		59.54	-75.90	50026.71	24.95		
epsilon	E	2041-12-23T08:17:27.940		59.68	-75.78	51016.33	24.98		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2041-12-23T07:52:22.230
 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 : 612235566432802816
 2Mass ID (if available) : 08570178+1756353
 ICRS Star Coord at Epoch: 08h 57m 01.78217s +17:56:35.01014s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 13.860
 G magnitude : 15.557
 RP magnitude : 14.954
 BP magnitude : 15.999
 DUPflag : 0
 Distance (au) : 17.729
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.10
 Sun-Target sep (deg) : 139.66
 Sun-Moon sep (deg) : 139.59
 B (ring opening deg) : 35.55
 PA of pole (deg) : 96.13
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.727
 C/A sky separation (km) : 22202.3
 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	2041-12-23T07:22:19.390	54.92	-80.69	50921.54	-24.96		
lambda	I	2041-12-23T07:22:55.199	55.04	-80.60	50026.71	-24.93		
delta	I	2041-12-23T07:24:04.748	55.29	-80.43	48300.35	-24.71		
gamma	I	2041-12-23T07:24:31.881	55.38	-80.36	47631.28	-24.61		
eta	I	2041-12-23T07:24:50.402	55.45	-80.32	47176.12	-24.54		
beta	I	2041-12-23T07:25:53.264	55.67	-80.15	45641.84	-24.30		
alpha	I	2041-12-23T07:26:30.506	55.80	-80.06	44752.43	-24.15		
4	I	2041-12-23T07:28:03.970	56.12	-79.81	42528.52	-23.71		
5	I	2041-12-23T07:28:18.150	56.17	-79.77	42154.84	-23.63		
6	I	2041-12-23T07:28:35.313	56.23	-79.73	41811.50	-23.56		
Uranus	I	2041-12-23T07:39:35.272	58.52	-77.84	25538.38		-15.20	-15.88
Uranus	E	2041-12-23T08:05:01.050	63.70	-72.93	25476.69		31.65	32.84
6	E	2041-12-23T08:10:32.009	64.78	-71.81	41817.32	23.62		
5	E	2041-12-23T08:10:50.251	64.84	-71.74	42267.83	23.69		
4	E	2041-12-23T08:11:04.120	64.89	-71.70	42576.43	23.77		
alpha	E	2041-12-23T08:12:33.024	65.18	-71.39	44701.42	24.21		
beta	E	2041-12-23T08:13:12.980	65.31	-71.26	45666.28	24.36		
eta	E	2041-12-23T08:14:14.824	65.51	-71.04	47176.12	24.61		
gamma	E	2041-12-23T08:14:32.916	65.57	-70.98	47622.03	24.68		
delta	E	2041-12-23T08:15:00.345	65.66	-70.89	48300.35	24.78		
lambda	E	2041-12-23T08:16:09.682	65.88	-70.65	50026.71	25.01		
epsilon	E	2041-12-23T08:16:49.165	66.01	-70.51	51016.70	25.04		

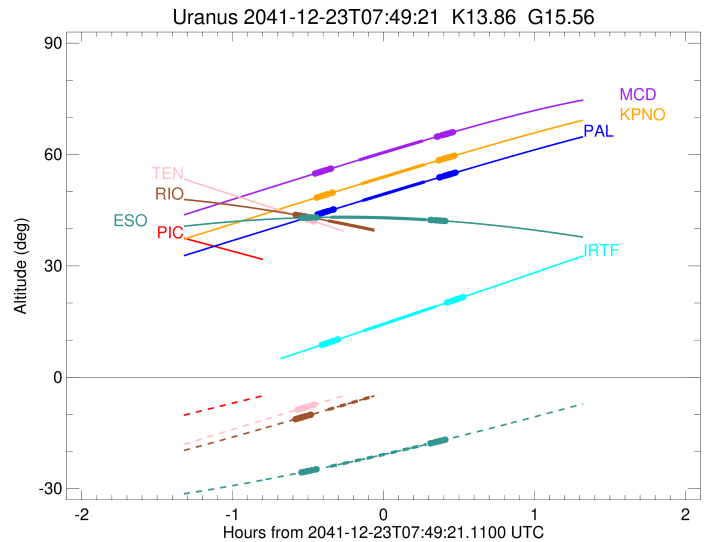
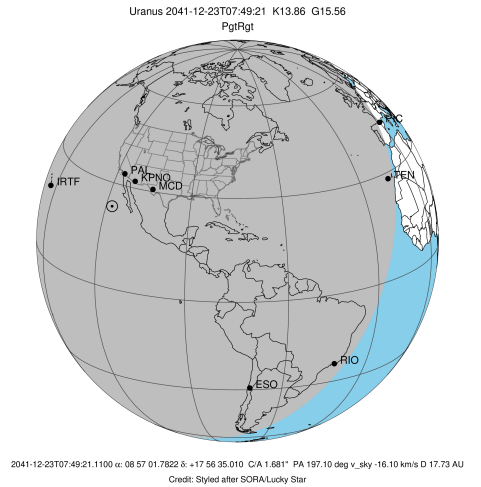
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2041-12-23T07:45:00.850
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : TEN
 Location : Teide Obs./Tenerife
 Latitude (deg) : 28.30050
 E. Longitude (deg) : 343.48909
 Altitude (km) : 2.395
 Gaia source ID : 612235566432802816
 2Mass ID (if available) : 08570178+1756353
 ICRS Star Coord at Epoch: 08h 57m 01.78217s +17:56:35.01014s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 13.860
 G magnitude : 15.557
 RP magnitude : 14.954
 BP magnitude : 15.999
 DUPflag : 0
 Distance (au) : 17.729
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.10
 Sun-Target sep (deg) : 139.66
 Sun-Moon sep (deg) : 140.19
 B (ring opening deg) : 35.55
 PA of pole (deg) : 96.13
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.921
 C/A sky separation (km) : 24695.0
 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	2041-12-23T07:15:20.151		43.38	-8.69	50904.79	-24.10		
lambda	I	2041-12-23T07:15:56.563		43.25	-8.57	50026.71	-24.05		
delta	I	2041-12-23T07:17:08.792		42.98	-8.32	48300.35	-23.75		
gamma	I	2041-12-23T07:17:37.040		42.88	-8.23	47631.17	-23.63		
eta	I	2041-12-23T07:17:56.335		42.81	-8.16	47176.12	-23.54		
beta	I	2041-12-23T07:19:01.987		42.57	-7.94	45641.54	-23.22		
alpha	I	2041-12-23T07:19:40.963		42.42	-7.81	44752.34	-23.03		
4	I	2041-12-23T07:21:19.289		42.06	-7.47	42527.61	-22.46		
5	I	2041-12-23T07:21:34.214		42.01	-7.42	42154.91	-22.35		
6	I	2041-12-23T07:21:52.442		41.94	-7.36	41809.25	-22.26		
Uranus	I	2041-12-23T07:38:16.450		38.31	-4.05x	25557.76		-3.70	-3.87
Uranus	E	2041-12-23T07:51:37.221		35.36	-1.39x	25523.49		20.13	21.00
6	E	2041-12-23T08:02:08.723		33.04	0.69x	41814.51	22.19		
5	E	2041-12-23T08:02:27.746		32.97	0.75x	42262.21	22.28		
4	E	2041-12-23T08:02:42.732		32.92	0.80x	42573.06	22.39		
alpha	E	2041-12-23T08:04:17.019		32.57	1.11x	44703.51	22.94		
beta	E	2041-12-23T08:04:58.944		32.42	1.24x	45664.95	23.14		
eta	E	2041-12-23T08:06:04.018		32.18	1.46x	47176.12	23.45		
gamma	E	2041-12-23T08:06:23.011		32.11	1.52x	47622.25	23.53		
delta	E	2041-12-23T08:06:51.751		32.00	1.61x	48300.35	23.66		
lambda	E	2041-12-23T08:08:04.282		31.73	1.85x	50026.71	23.94		
epsilon	E	2041-12-23T08:08:44.564		31.59	1.98x	50994.20	23.99		

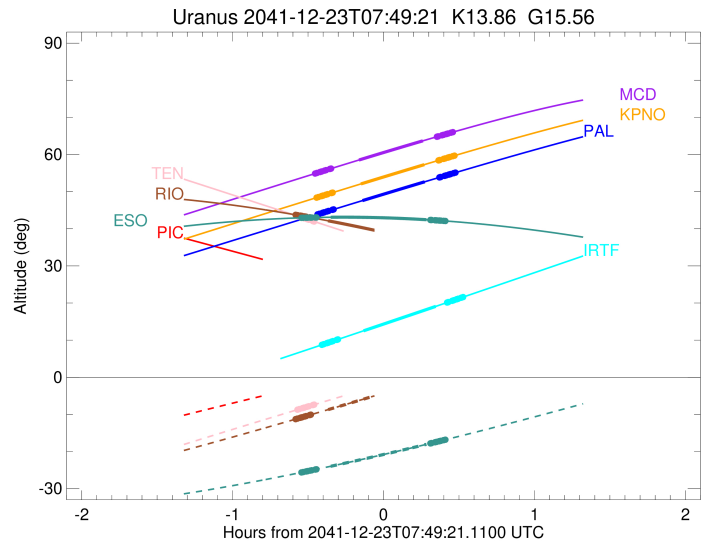
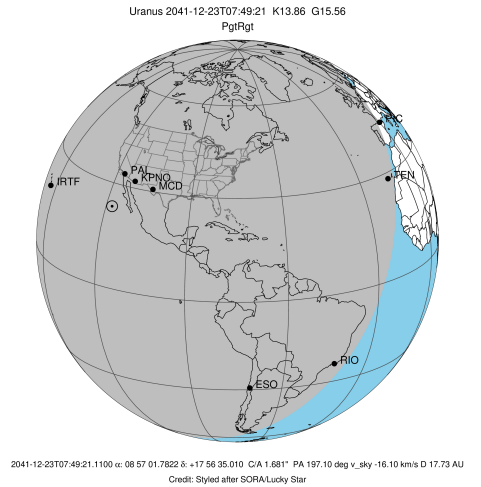
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2041-12-23T07:55:50.550
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      : 612235566432802816
2Mass ID (if available) : 08570178+1756353
ICRS Star Coord at Epoch: 08h 57m 01.78217s +17:56:35.01014s
RUWE (>1.4 is poor) : 0.92
K magnitude         : 13.860
G magnitude         : 15.557
RP magnitude        : 14.954
BP magnitude        : 15.999
DUPflag            : 0
Distance (au)       : 17.729
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -16.10
Sun-Target sep (deg) : 139.66
Sun-Moon sep (deg)  : 138.85
B (ring opening deg) : 35.55
PA of pole (deg)    : 96.13
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.658
C/A sky separation (km) : 21319.5
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl.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
    
```



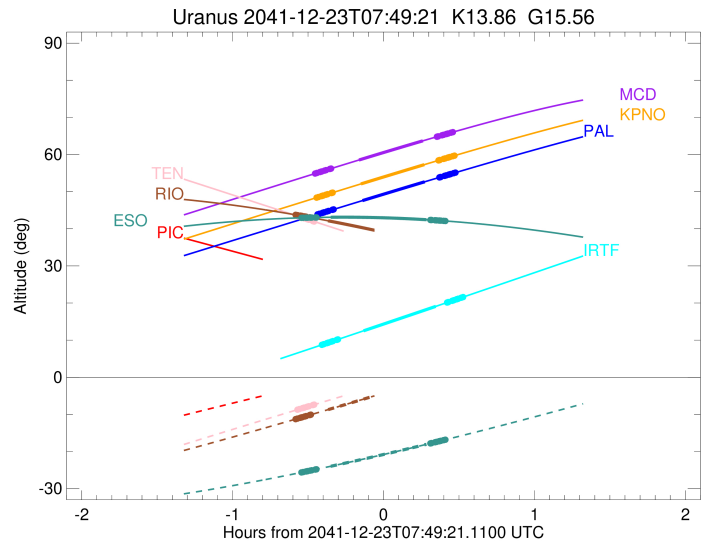
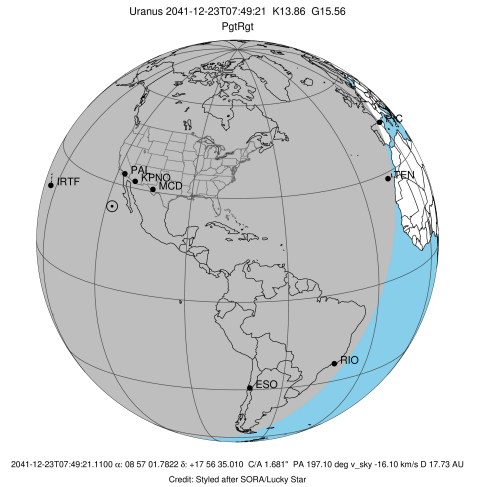
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2041-12-23T07:25:01.279		8.78	-49.08	50926.09	-24.75		
lambda	I	2041-12-23T07:25:37.568		8.91	-49.22	50026.71	-24.73		
delta	I	2041-12-23T07:26:47.647		9.18	-49.49	48300.35	-24.53		
gamma	I	2041-12-23T07:27:14.968		9.28	-49.59	47631.30	-24.44		
eta	I	2041-12-23T07:27:33.612		9.35	-49.66	47176.12	-24.38		
beta	I	2041-12-23T07:28:36.847		9.59	-49.91	45641.93	-24.17		
alpha	I	2041-12-23T07:29:14.285		9.73	-50.05	44752.43	-24.04		
4	I	2041-12-23T07:30:48.099		10.09	-50.41	42528.81	-23.65		
5	I	2041-12-23T07:31:02.333		10.14	-50.46	42154.89	-23.57		
6	I	2041-12-23T07:31:19.509		10.21	-50.53	41812.15	-23.51		
Uranus	I	2041-12-23T07:41:24.070		12.51	-52.83	25531.06		-17.77	-18.56
Uranus	E	2041-12-23T08:10:07.728		19.10	-59.42	25462.01		34.74	35.98
6	E	2041-12-23T08:14:35.096		20.12	-60.44	41818.45	23.64		
5	E	2041-12-23T08:14:53.467		20.19	-60.51	42269.97	23.70		
4	E	2041-12-23T08:15:07.233		20.25	-60.57	42577.74	23.78		
alpha	E	2041-12-23T08:16:36.120		20.59	-60.91	44700.62	24.18		
beta	E	2041-12-23T08:17:16.217		20.74	-61.06	45666.80	24.31		
eta	E	2041-12-23T08:18:18.193		20.98	-61.30	47176.12	24.54		
gamma	E	2041-12-23T08:18:36.337		21.05	-61.36	47621.95	24.60		
delta	E	2041-12-23T08:19:03.860		21.16	-61.47	48300.35	24.69		
lambda	E	2041-12-23T08:20:13.467		21.42	-61.74	50026.71	24.91		
epsilon	E	2041-12-23T08:20:53.500		21.58	-61.89	51026.05	24.93		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2041-12-23T07:45:00.430
 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 : 612235566432802816
 2Mass ID (if available) : 08570178+1756353
 ICRS Star Coord at Epoch: 08h 57m 01.78217s +17:56:35.01014s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 13.860
 G magnitude : 15.557
 RP magnitude : 14.954
 BP magnitude : 15.999
 DUPflag : 0
 Distance (au) : 17.729
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.10
 Sun-Target sep (deg) : 139.66
 Sun-Moon sep (deg) : 140.29
 B (ring opening deg) : 35.55
 PA of pole (deg) : 96.13
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.447
 C/A sky separation (km) : 18611.5
 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	2041-12-23T07:14:33.441		43.74	-11.25	50950.18	-25.93		
lambda	I	2041-12-23T07:15:09.005		43.67	-11.13	50026.71	-25.93		
delta	I	2041-12-23T07:16:15.790		43.54	-10.92	48300.35	-25.77		
gamma	I	2041-12-23T07:16:41.781		43.48	-10.83	47631.41	-25.70		
eta	I	2041-12-23T07:16:59.511		43.45	-10.77	47176.12	-25.66		
beta	I	2041-12-23T07:17:59.533		43.33	-10.57	45642.45	-25.49		
alpha	I	2041-12-23T07:18:35.043		43.26	-10.46	44752.31	-25.39		
4	I	2041-12-23T07:20:03.613		43.07	-10.17	42530.29	-25.10		
5	I	2041-12-23T07:20:17.112		43.05	-10.12	42155.46	-25.04		
6	I	2041-12-23T07:20:33.140		43.01	-10.07	41815.18	-25.00		
Uranus	I	2041-12-23T07:27:20.060		42.15	-8.72	25500.99		-26.11	-27.17
Uranus	E	2041-12-23T08:02:35.590		37.05	-1.56x	25432.02		40.73	42.04
6	E	2041-12-23T08:04:58.784		36.68	-1.06x	41821.03	24.94		
5	E	2041-12-23T08:05:16.515		36.63	-1.00x	42274.63	24.98		
4	E	2041-12-23T08:05:29.373		36.59	-0.96x	42580.64	25.04		
alpha	E	2041-12-23T08:06:53.868		36.37	-0.66x	44698.92	25.33		
beta	E	2041-12-23T08:07:32.326		36.27	-0.53x	45667.92	25.43		
eta	E	2041-12-23T08:08:31.636		36.11	-0.33x	47176.12	25.59		
gamma	E	2041-12-23T08:08:49.036		36.06	-0.27x	47621.78	25.64		
delta	E	2041-12-23T08:09:15.472		35.99	-0.17x	48300.35	25.70		
lambda	E	2041-12-23T08:10:22.440		35.81	0.06x	50026.71	25.86		
epsilon	E	2041-12-23T08:11:01.779		35.70	0.19x	51045.49	25.86		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2041-12-23T07:47:26.710
 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 : 612235566432802816
 2Mass ID (if available) : 08570178+1756353
 ICRS Star Coord at Epoch: 08h 57m 01.78217s +17:56:35.01014s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 13.860
 G magnitude : 15.557
 RP magnitude : 14.954
 BP magnitude : 15.999
 DUPflag : 0
 Distance (au) : 17.729
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.10
 Sun-Target sep (deg) : 139.66
 Sun-Moon sep (deg) : 140.07
 B (ring opening deg) : 35.55
 PA of pole (deg) : 96.13
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.331
 C/A sky separation (km) : 17108.5
 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	2041-12-23T07:16:51.746		42.95	-25.61	50960.86	-26.29		
lambda	I	2041-12-23T07:17:27.236		42.96	-25.53	50026.71	-26.29		
delta	I	2041-12-23T07:18:33.064		42.99	-25.38	48300.35	-26.16		
gamma	I	2041-12-23T07:18:58.661		42.99	-25.32	47631.45	-26.10		
eta	I	2041-12-23T07:19:16.117		43.00	-25.28	47176.12	-26.07		
beta	I	2041-12-23T07:20:15.161		43.02	-25.14	45642.71	-25.93		
alpha	I	2041-12-23T07:20:50.078		43.02	-25.06	44752.19	-25.85		
4	I	2041-12-23T07:22:16.972		43.05	-24.85	42531.05	-25.61		
5	I	2041-12-23T07:22:30.249		43.05	-24.82	42155.90	-25.55		
6	I	2041-12-23T07:22:45.879		43.05	-24.78	41816.59	-25.53		
Uranus	I	2041-12-23T07:28:20.968		43.11	-23.98	25486.32		-29.53	-30.68
Uranus	E	2041-12-23T08:06:26.780		42.44	-18.07	25416.53		43.75	45.06
6	E	2041-12-23T08:07:55.903		42.38	-17.82	41822.67	25.53		
5	E	2041-12-23T08:08:13.429		42.37	-17.77	42277.47	25.55		
4	E	2041-12-23T08:08:25.867		42.36	-17.74	42582.44	25.61		
alpha	E	2041-12-23T08:09:48.504		42.30	-17.51	44697.87	25.85		
beta	E	2041-12-23T08:10:26.297		42.27	-17.41	45668.63	25.93		
eta	E	2041-12-23T08:11:24.467		42.22	-17.25	47176.12	26.06		
gamma	E	2041-12-23T08:11:41.549		42.21	-17.20	47621.68	26.10		
delta	E	2041-12-23T08:12:07.521		42.19	-17.13	48300.35	26.16		
lambda	E	2041-12-23T08:13:13.351		42.14	-16.94	50026.71	26.29		
epsilon	E	2041-12-23T08:13:52.549		42.11	-16.83	51058.58	26.29		