

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-12-24T14:09:07.030
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 869289462178092160
 2Mass ID (if available) : 07164605+2242430

Uranus 2036-12-24T14:09:07 K14.72 G16.77 PgtRgt

ICRS Star Coord at Epoch: 07h 16m 46.06155s +22:42:43.08204s

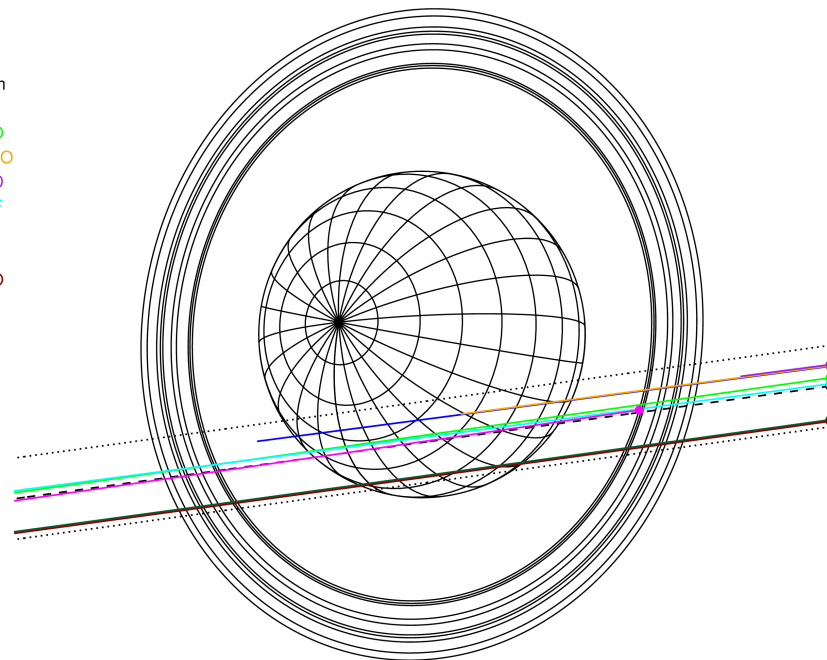
RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.722
 G magnitude : 16.767
 RP magnitude : 16.159
 BP magnitude : 17.234
 DUPflag : 0
 Distance (au) : 17.814
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.33
 Sun-Target sep (deg) : 165.18
 Sun-Moon sep (deg) : 118.28
 B (ring opening deg) : 58.99
 PA of pole (deg) : 81.64

Uranus 2036-12-24T14:09:07 K14.72 G16.77 PgtRgt



2036-12-24T14:09:07.0300 α: 07 16 46.0615 δ: +22 42 43.082 C/A 1.288° PA 7.87 deg v_sky -22.33 km/s D 17.81 AU
 Credit: Styled after SORA/Lucky Star

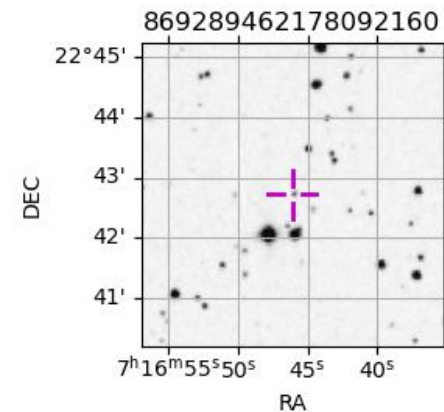
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 AAT
 MSO



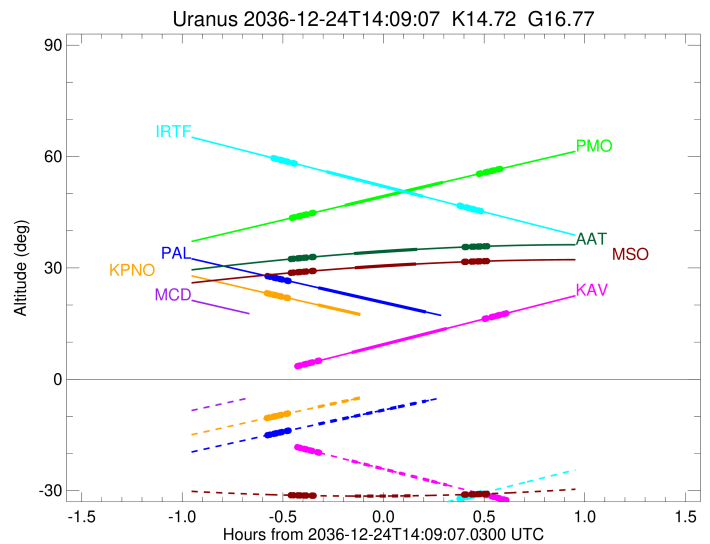
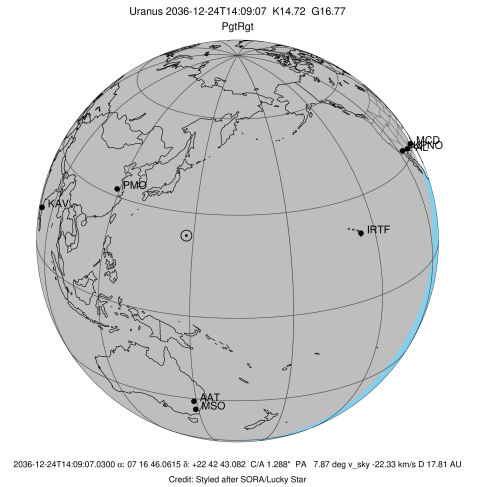
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+ +		DEC 24 13:34 - DEC 24 14:21	PieRin
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	DEC 24 13:41 - DEC 24 14:43	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+		DEC 24 13:34 - DEC 24 13:49	PinRin
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	DEC 24 13:36 - DEC 24 14:38	PieRie
KAV	Kavalur Observatory	12.6	78.8		+ + +	+++++	DEC 24 13:49 - DEC 24 14:45	PieRie
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	+++++	+ +	+++++	DEC 24 13:41 - DEC 24 14:40	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +	+++++	DEC 24 13:41 - DEC 24 14:39	PieRie

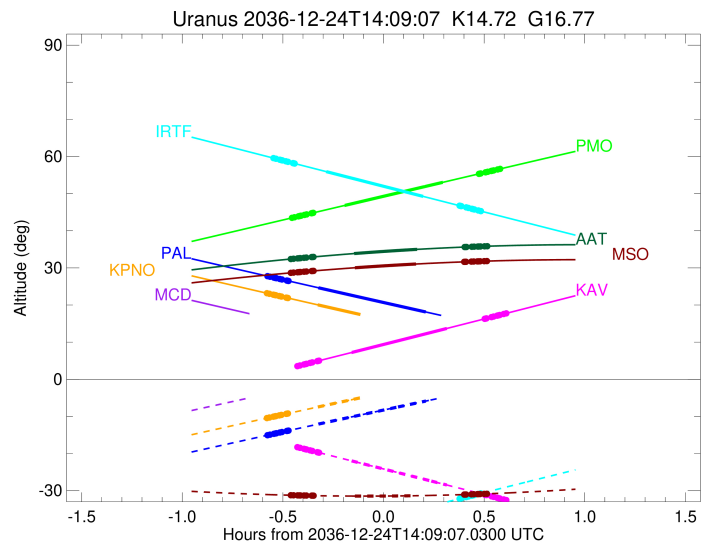
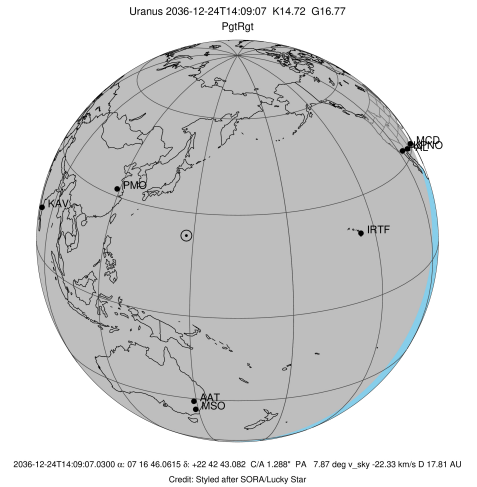


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-12-24T14:05:37.080
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 869289462178092160
 2Mass ID (if available) : 07164605+2242430
 ICRS Star Coord at Epoch: 07h 16m 46.06155s +22:42:43.08204s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.722
 G magnitude : 16.767
 RP magnitude : 16.159
 BP magnitude : 17.234
 DUPflag : 0
 Distance (au) : 17.814
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.33
 Sun-Target sep (deg) : 165.18
 Sun-Moon sep (deg) : 118.22
 B (ring opening deg) : 58.99
 PA of pole (deg) : 81.64
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.025
 C/A sky separation (km) : 13237.0
 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	2036-12-24T13:34:22.624		27.81	-15.10	51407.48	-25.06		
lambda	I	2036-12-24T13:35:17.872		27.62	-14.92	50026.71	-24.97		
delta	I	2036-12-24T13:36:27.122		27.38	-14.69	48300.35	-24.89		
gamma	I	2036-12-24T13:36:54.143		27.29	-14.60	47628.12	-24.86		
eta	I	2036-12-24T13:37:12.332		27.22	-14.54	47176.12	-24.84		
beta	I	2036-12-24T13:38:14.042		27.01	-14.34	45646.41	-24.76		
alpha	I	2036-12-24T13:38:50.378		26.89	-14.22	44750.48	-24.72		
4	I	2036-12-24T13:40:20.419		26.58	-13.92	42526.50	-24.59		
5	I	2036-12-24T13:40:29.066		26.55	-13.89	42298.85	-24.55		
6	I	2036-12-24T13:40:48.833		26.48	-13.83	41847.64	-24.56		
Uranus	I	2036-12-24T13:49:41.852		24.65	-12.08	25161.40		-29.70	-30.85
Uranus	E	2036-12-24T14:21:43.753		18.12	-5.87	25358.92		20.45	21.33
6	E	2036-12-24T14:31:52.291		16.08	-3.95x	41853.80	24.47		
5	E	2036-12-24T14:32:05.556		16.04	-3.91x	42154.83	24.47		
4	E	2036-12-24T14:32:23.888		15.98	-3.85x	42611.46	24.50		
alpha	E	2036-12-24T14:33:48.391		15.69	-3.58x	44685.81	24.62		
beta	E	2036-12-24T14:34:28.317		15.56	-3.46x	45665.71	24.67		
eta	E	2036-12-24T14:35:29.523		15.36	-3.27x	47176.12	24.74		
gamma	E	2036-12-24T14:35:47.538		15.29	-3.21x	47622.03	24.76		
delta	E	2036-12-24T14:36:14.917		15.20	-3.12x	48300.35	24.79		
lambda	E	2036-12-24T14:37:24.460		14.97	-2.91x	50026.71	24.86		
epsilon	E	2036-12-24T14:38:06.736		14.83	-2.77x	51078.41	24.95		

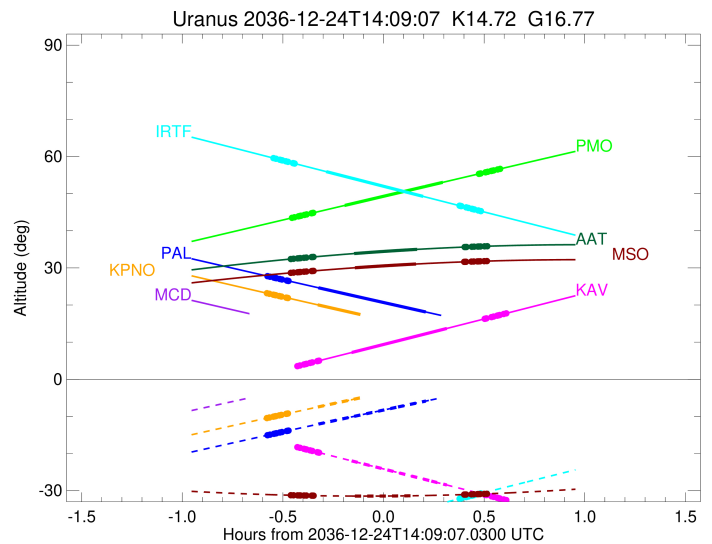
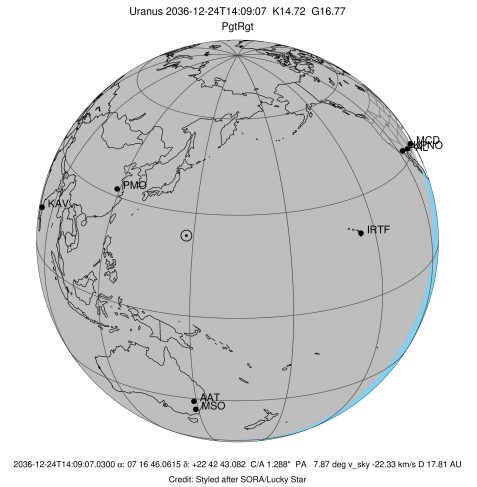
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-12-24T14:12:02.430
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 869289462178092160
 2Mass ID (if available) : 07164605+2242430
 ICRS Star Coord at Epoch: 07h 16m 46.06155s +22:42:43.08204s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.722
 G magnitude : 16.767
 RP magnitude : 16.159
 BP magnitude : 17.234
 DUPflag : 0
 Distance (au) : 17.814
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.33
 Sun-Target sep (deg) : 165.18
 Sun-Moon sep (deg) : 119.15
 B (ring opening deg) : 58.99
 PA of pole (deg) : 81.64
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.214
 C/A sky separation (km) : 15683.6
 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	2036-12-24T13:41:39.520		43.45	-57.40	51420.29	-24.84		
lambda	I	2036-12-24T13:42:35.815		43.65	-57.59	50026.71	-24.72		
delta	I	2036-12-24T13:43:45.795		43.89	-57.84	48300.35	-24.62		
gamma	I	2036-12-24T13:44:13.134		43.99	-57.94	47627.89	-24.58		
eta	I	2036-12-24T13:44:31.527		44.06	-58.00	47176.12	-24.55		
beta	I	2036-12-24T13:45:34.035		44.28	-58.22	45645.76	-24.44		
alpha	I	2036-12-24T13:46:10.855		44.41	-58.35	44749.88	-24.37		
4	I	2036-12-24T13:47:42.200		44.73	-58.67	42526.95	-24.19		
5	I	2036-12-24T13:47:51.113		44.76	-58.70	42296.13	-24.15		
6	I	2036-12-24T13:48:10.997		44.83	-58.77	41849.88	-24.15		
Uranus	I	2036-12-24T13:57:30.804		46.82	-60.73	25189.33		-28.51	-29.64
Uranus	E	2036-12-24T14:26:45.910		53.04	-66.80	25411.79		17.41	18.18
6	E	2036-12-24T14:37:33.851		55.33	-68.99	41856.55	24.21		
5	E	2036-12-24T14:37:47.053		55.38	-69.04	42154.99	24.22		
4	E	2036-12-24T14:38:05.543		55.44	-69.10	42609.89	24.26		
alpha	E	2036-12-24T14:39:30.867		55.74	-69.38	44686.47	24.45		
beta	E	2036-12-24T14:40:10.975		55.89	-69.52	45664.42	24.52		
eta	E	2036-12-24T14:41:12.563		56.10	-69.72	47176.12	24.63		
gamma	E	2036-12-24T14:41:30.651		56.17	-69.78	47621.83	24.66		
delta	E	2036-12-24T14:41:58.146		56.26	-69.88	48300.35	24.70		
lambda	E	2036-12-24T14:43:07.892		56.51	-70.11	50026.71	24.80		
epsilon	E	2036-12-24T14:43:51.191		56.66	-70.25	51101.92	24.93		

```

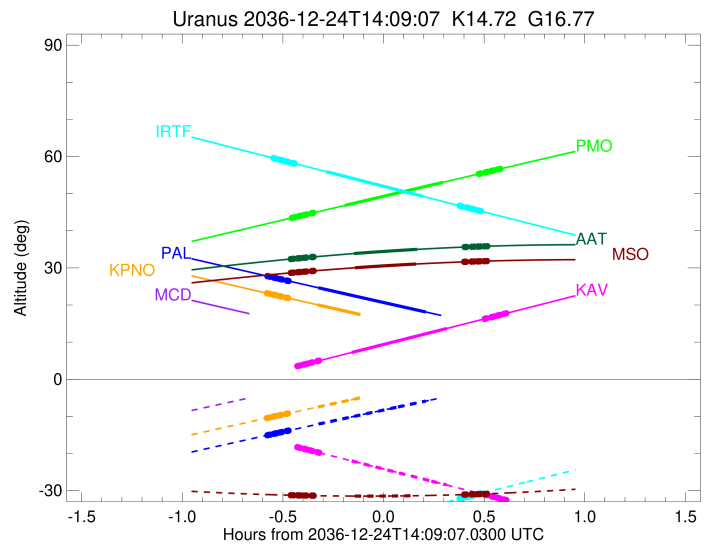
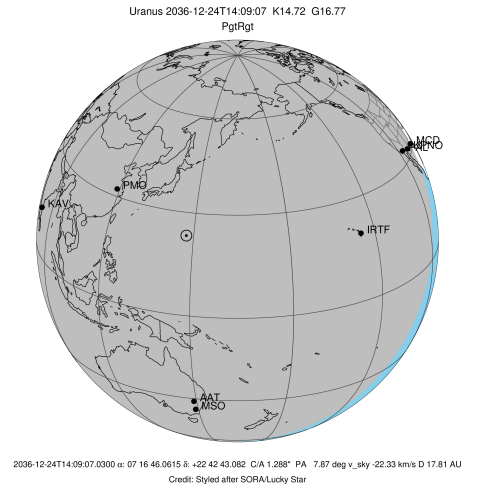
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2036-12-24T14:05:30.410
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : KPNO
Location             : Kitt Peak Natl Obs
Latitude (deg)       : 31.96333
E. Longitude (deg)  : 248.40000
Altitude (km)        : 2.120
Gaia source ID       : 869289462178092160
2Mass ID (if available) : 07164605+2242430
ICRS Star Coord at Epoch: 07h 16m 46.06155s +22:42:43.08204s
RUWE (>1.4 is poor) : 1.08
K magnitude          : 14.722
G magnitude          : 16.767
RP magnitude         : 16.159
BP magnitude         : 17.234
DUPflag             : 0
Distance (au)        : 17.814
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -22.33
Sun-Target sep (deg) : 165.18
Sun-Moon sep (deg)  : 118.15
B (ring opening deg) : 58.99
PA of pole (deg)    : 81.64
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.018
C/A sky separation (km) : 13153.4
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	2036-12-24T13:34:12.017		23.22	-10.49	51406.95	-25.03		
lambda	I	2036-12-24T13:35:07.298		23.02	-10.31	50026.71	-24.94		
delta	I	2036-12-24T13:36:16.614		22.78	-10.08	48300.35	-24.87		
gamma	I	2036-12-24T13:36:43.661		22.69	-9.99	47628.13	-24.84		
eta	I	2036-12-24T13:37:01.866		22.63	-9.93	47176.12	-24.82		
beta	I	2036-12-24T13:38:03.631		22.41	-9.73	45646.44	-24.74		
alpha	I	2036-12-24T13:38:39.999		22.29	-9.61	44750.51	-24.70		
4	I	2036-12-24T13:40:10.116		21.98	-9.31	42526.48	-24.57		
5	I	2036-12-24T13:40:18.764		21.95	-9.28	42298.95	-24.53		
6	I	2036-12-24T13:40:38.555		21.88	-9.22	41847.55	-24.54		
Uranus	I	2036-12-24T13:49:31.471		20.05	-7.47	25160.55		-29.74	-30.89
Uranus	E	2036-12-24T14:21:40.784		13.48	-1.28x	25357.29		20.54	21.43
6	E	2036-12-24T14:31:48.927		11.44	0.63x	41853.71	24.45		
5	E	2036-12-24T14:32:02.210		11.40	0.67x	42154.83	24.44		
4	E	2036-12-24T14:32:20.558		11.34	0.73x	42611.50	24.48		
alpha	E	2036-12-24T14:33:45.138		11.05	0.99x	44685.79	24.60		
beta	E	2036-12-24T14:34:25.106		10.92	1.12x	45665.75	24.64		
eta	E	2036-12-24T14:35:26.373		10.71	1.31x	47176.12	24.72		
gamma	E	2036-12-24T14:35:44.408		10.65	1.36x	47622.03	24.73		
delta	E	2036-12-24T14:36:11.817		10.56	1.45x	48300.35	24.76		
lambda	E	2036-12-24T14:37:21.436		10.33	1.66x	50026.71	24.83		
epsilon	E	2036-12-24T14:38:03.733		10.19	1.79x	51077.75	24.92		

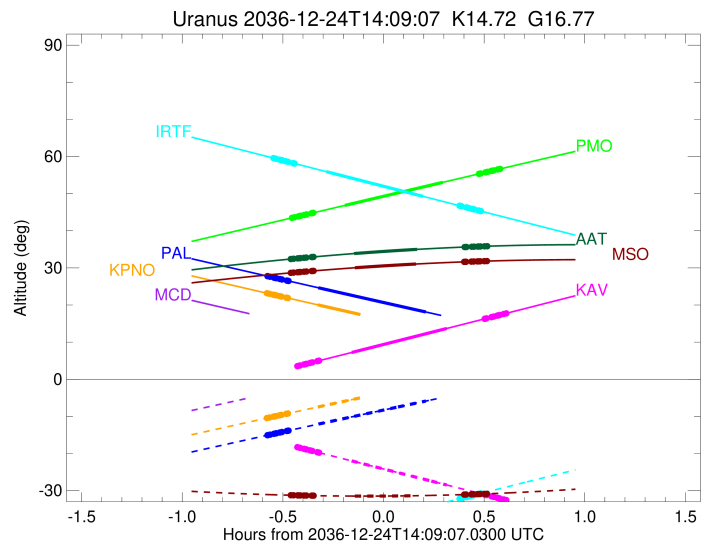
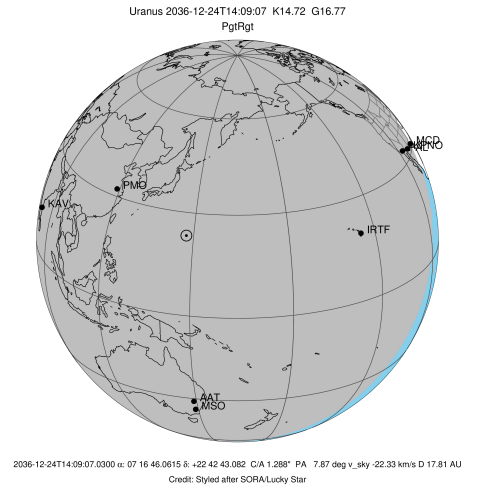
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2036-12-24T14:06:21.850
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      : 869289462178092160
2Mass ID (if available) : 07164605+2242430
ICRS Star Coord at Epoch: 07h 16m 46.06155s +22:42:43.08204s
RUWE (>1.4 is poor) : 1.08
K magnitude          : 14.722
G magnitude          : 16.767
RP magnitude         : 16.159
BP magnitude         : 17.234
DUPflag             : 0
Distance (au)       : 17.814
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -22.33
Sun-Target sep (deg) : 165.18
Sun-Moon sep (deg)  : 118.64
B (ring opening deg) : 58.99
PA of pole (deg)    : 81.64
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.238
C/A sky separation (km) : 15996.0
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
    
```



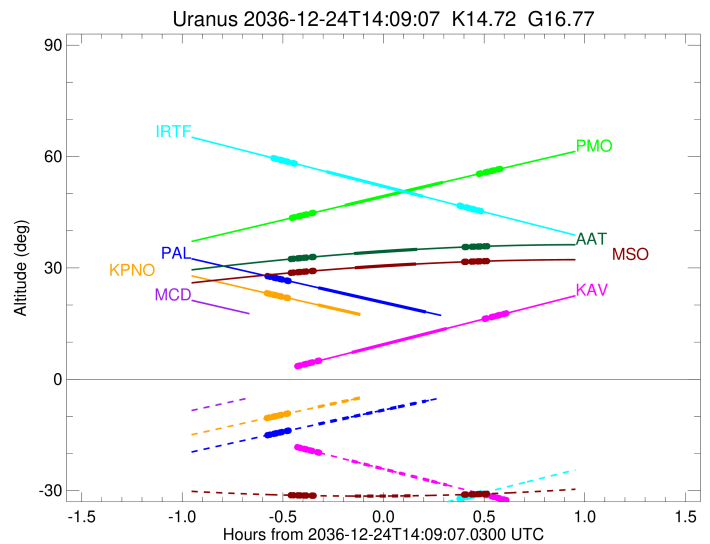
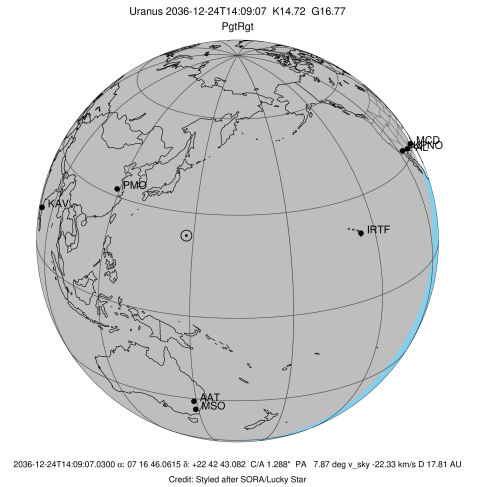
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-12-24T13:36:08.023		59.62	-44.85	51424.73	-24.91		
lambda	I	2036-12-24T13:37:04.341		59.40	-44.63	50026.71	-24.78		
delta	I	2036-12-24T13:38:14.145		59.13	-44.37	48300.35	-24.68		
gamma	I	2036-12-24T13:38:41.424		59.03	-44.27	47627.81	-24.63		
eta	I	2036-12-24T13:38:59.773		58.96	-44.20	47176.12	-24.60		
beta	I	2036-12-24T13:40:02.163		58.71	-43.96	45645.56	-24.48		
alpha	I	2036-12-24T13:40:38.916		58.57	-43.82	44749.67	-24.41		
4	I	2036-12-24T13:42:10.111		58.22	-43.47	42527.11	-24.22		
5	I	2036-12-24T13:42:19.055		58.19	-43.44	42295.28	-24.17		
6	I	2036-12-24T13:42:38.850		58.11	-43.36	41850.53	-24.17		
Uranus	I	2036-12-24T13:52:02.492		55.94	-41.22	25197.01		-28.18	-29.30
Uranus	E	2036-12-24T14:20:54.250		49.27	-34.65	25414.25		17.26	18.03
6	E	2036-12-24T14:31:47.328		46.76	-32.19	41856.53	24.11		
5	E	2036-12-24T14:32:00.588		46.71	-32.14	42154.99	24.11		
4	E	2036-12-24T14:32:19.157		46.64	-32.07	42609.91	24.16		
alpha	E	2036-12-24T14:33:44.832		46.31	-31.74	44686.46	24.35		
beta	E	2036-12-24T14:34:25.103		46.15	-31.59	45664.44	24.42		
eta	E	2036-12-24T14:35:26.933		45.92	-31.36	47176.12	24.53		
gamma	E	2036-12-24T14:35:45.092		45.85	-31.29	47621.84	24.56		
delta	E	2036-12-24T14:36:12.693		45.74	-31.19	48300.35	24.60		
lambda	E	2036-12-24T14:37:22.707		45.47	-30.92	50026.71	24.71		
epsilon	E	2036-12-24T14:38:06.139		45.31	-30.76	51101.14	24.83		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-12-24T14:13:42.370
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 869289462178092160
 2Mass ID (if available) : 07164605+2242430
 ICRS Star Coord at Epoch: 07h 16m 46.06155s +22:42:43.08204s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.722
 G magnitude : 16.767
 RP magnitude : 16.159
 BP magnitude : 17.234
 DUPflag : 0
 Distance (au) : 17.814
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.33
 Sun-Target sep (deg) : 165.18
 Sun-Moon sep (deg) : 118.84
 B (ring opening deg) : 58.99
 PA of pole (deg) : 81.64
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.286
 C/A sky separation (km) : 16618.0
 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



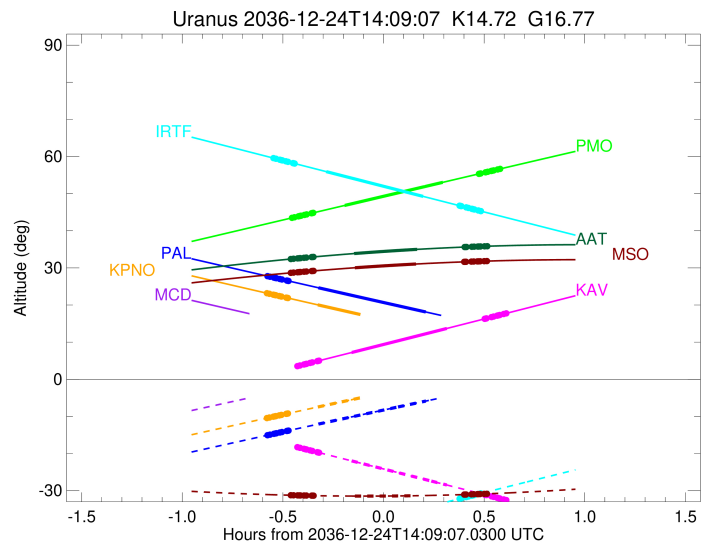
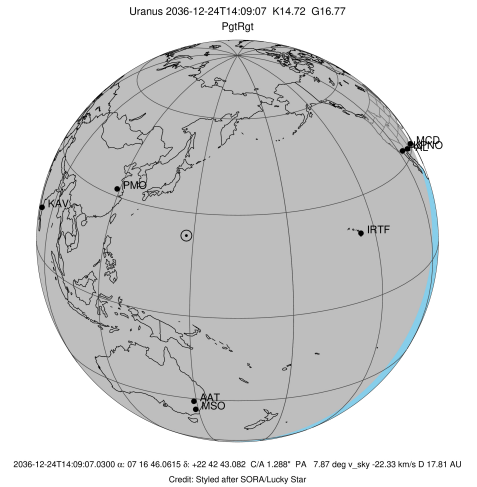
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2036-12-24T13:43:15.959		3.50x	-18.25	51425.03	-24.41		
lambda	I	2036-12-24T13:44:13.462		3.72x	-18.47	50026.71	-24.28		
delta	I	2036-12-24T13:45:24.734		3.98x	-18.74	48300.35	-24.17		
gamma	I	2036-12-24T13:45:52.591		4.09x	-18.85	47627.80	-24.12		
eta	I	2036-12-24T13:46:11.331		4.16x	-18.92	47176.12	-24.09		
beta	I	2036-12-24T13:47:15.061		4.40x	-19.16	45645.53	-23.97		
alpha	I	2036-12-24T13:47:52.612		4.54x	-19.30	44749.63	-23.89		
4	I	2036-12-24T13:49:25.816		4.90x	-19.66	42527.15	-23.69		
5	I	2036-12-24T13:49:34.972		4.93x	-19.69	42295.05	-23.64		
6	I	2036-12-24T13:49:55.193		5.01	-19.77	41850.72	-23.64		
Uranus	I	2036-12-24T13:59:36.075		7.20	-21.98	25202.68		-27.94	-29.04
Uranus	E	2036-12-24T14:28:01.168		13.69	-28.49	25432.48		16.10	16.82
6	E	2036-12-24T14:39:16.933		16.28	-31.07	41857.62	23.75		
5	E	2036-12-24T14:39:30.316		16.33	-31.12	42155.17	23.75		
4	E	2036-12-24T14:39:49.148		16.40	-31.19	42609.21	23.80		
alpha	E	2036-12-24T14:41:16.118		16.73	-31.53	44686.78	24.01		
beta	E	2036-12-24T14:41:56.909		16.89	-31.68	45663.90	24.09		
eta	E	2036-12-24T14:42:59.587		17.13	-31.92	47176.12	24.21		
gamma	E	2036-12-24T14:43:17.979		17.20	-31.99	47621.76	24.25		
delta	E	2036-12-24T14:43:45.936		17.31	-32.10	48300.35	24.30		
lambda	E	2036-12-24T14:44:56.817		17.58	-32.37	50026.71	24.41		
epsilon	E	2036-12-24T14:45:41.188		17.75	-32.54	51111.44	24.55		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-12-24T14:09:36.720
 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 : 869289462178092160
 2Mass ID (if available) : 07164605+2242430
 ICRS Star Coord at Epoch: 07h 16m 46.06155s +22:42:43.08204s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.722
 G magnitude : 16.767
 RP magnitude : 16.159
 BP magnitude : 17.234
 DUPflag : 0
 Distance (au) : 17.814
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.33
 Sun-Target sep (deg) : 165.18
 Sun-Moon sep (deg) : 118.79
 B (ring opening deg) : 58.99
 PA of pole (deg) : 81.64
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.700
 C/A sky separation (km) : 21967.1
 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	2036-12-24T13:41:17.013		32.37	-35.24	51458.92	-23.69		
lambda	I	2036-12-24T13:42:17.808		32.46	-35.27	50026.71	-23.48		
delta	I	2036-12-24T13:43:31.664		32.57	-35.29	48300.35	-23.27		
gamma	I	2036-12-24T13:44:00.653		32.61	-35.30	47627.13	-23.18		
eta	I	2036-12-24T13:44:20.137		32.63	-35.31	47176.12	-23.12		
beta	I	2036-12-24T13:45:26.755		32.73	-35.33	45643.94	-22.89		
alpha	I	2036-12-24T13:46:06.132		32.78	-35.34	44747.42	-22.74		
4	I	2036-12-24T13:47:44.229		32.91	-35.37	42529.20	-22.35		
5	I	2036-12-24T13:47:54.428		32.93	-35.38	42286.34	-22.27		
6	I	2036-12-24T13:48:15.152		32.96	-35.38	41856.70	-22.23		
Uranus	I	2036-12-24T14:00:21.065		33.86	-35.50	25333.70		-21.78	-22.71
Uranus	E	2036-12-24T14:19:09.565		35.00	-35.38	25531.60		7.39	7.74
6	E	2036-12-24T14:33:18.171		35.62	-35.04	41862.59	22.26		
5	E	2036-12-24T14:33:32.085		35.63	-35.04	42156.93	22.30		
4	E	2036-12-24T14:33:51.980		35.64	-35.02	42605.51	22.38		
alpha	E	2036-12-24T14:35:24.339		35.69	-34.98	44688.55	22.77		
beta	E	2036-12-24T14:36:07.085		35.72	-34.95	45661.42	22.92		
eta	E	2036-12-24T14:37:12.914		35.75	-34.91	47176.12	23.14		
gamma	E	2036-12-24T14:37:32.130		35.76	-34.90	47621.46	23.21		
delta	E	2036-12-24T14:38:01.328		35.78	-34.88	48300.35	23.30		
lambda	E	2036-12-24T14:39:15.091		35.82	-34.84	50026.71	23.51		
epsilon	E	2036-12-24T14:40:02.946		35.84	-34.81	51154.72	23.72		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2036-12-24T14:09:32.640
 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 : 869289462178092160
 2Mass ID (if available) : 07164605+2242430
 ICRS Star Coord at Epoch: 07h 16m 46.06155s +22:42:43.08204s
 RUWE (>1.4 is poor) : 1.08
 K magnitude : 14.722
 G magnitude : 16.767
 RP magnitude : 16.159
 BP magnitude : 17.234
 DUPflag : 0
 Distance (au) : 17.814
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.33
 Sun-Target sep (deg) : 165.18
 Sun-Moon sep (deg) : 118.74
 B (ring opening deg) : 58.99
 PA of pole (deg) : 81.64
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.719
 C/A sky separation (km) : 22210.0
 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_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	2036-12-24T13:41:16.880		28.65	-31.23	51460.30	-23.62		
lambda	I	2036-12-24T13:42:17.941		28.73	-31.25	50026.71	-23.40		
delta	I	2036-12-24T13:43:32.063		28.83	-31.28	48300.35	-23.18		
gamma	I	2036-12-24T13:44:01.164		28.87	-31.29	47627.10	-23.09		
eta	I	2036-12-24T13:44:20.722		28.89	-31.29	47176.12	-23.03		
beta	I	2036-12-24T13:45:27.613		28.98	-31.31	45643.88	-22.79		
alpha	I	2036-12-24T13:46:07.161		29.03	-31.32	44747.31	-22.64		
4	I	2036-12-24T13:47:45.704		29.15	-31.35	42529.32	-22.24		
5	I	2036-12-24T13:47:55.979		29.17	-31.35	42285.92	-22.16		
6	I	2036-12-24T13:48:16.772		29.19	-31.36	41856.96	-22.12		
Uranus	I	2036-12-24T14:00:34.877		30.04	-31.47	25341.83		-21.36	-22.27
Uranus	E	2036-12-24T14:18:47.804		31.05	-31.37	25535.45		6.85	7.17
6	E	2036-12-24T14:33:10.089		31.63	-31.06	41862.83	22.14		
5	E	2036-12-24T14:33:24.059		31.64	-31.05	42157.06	22.19		
4	E	2036-12-24T14:33:44.043		31.65	-31.05	42605.31	22.27		
alpha	E	2036-12-24T14:35:16.850		31.70	-31.00	44688.65	22.67		
beta	E	2036-12-24T14:35:59.771		31.72	-30.98	45661.29	22.82		
eta	E	2036-12-24T14:37:05.876		31.75	-30.94	47176.12	23.05		
gamma	E	2036-12-24T14:37:25.167		31.76	-30.93	47621.45	23.12		
delta	E	2036-12-24T14:37:54.477		31.78	-30.92	48300.35	23.21		
lambda	E	2036-12-24T14:39:08.510		31.81	-30.88	50026.71	23.43		
epsilon	E	2036-12-24T14:39:56.622		31.84	-30.85	51156.90	23.65		