

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-11-23T13:43:15.730
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3404366863232345216
 2Mass ID (if available) : 05412751+2331058

ICRS Star Coord at Epoch: 05h 41m 27.51973s +23:31:05.54780s

RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.570
 G magnitude : 18.392
 RP magnitude : 17.304
 BP magnitude : 19.611
 DUPflag : 0
 Distance (au) : 18.192
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.62
 Sun-Target sep (deg) : 154.87
 Sun-Moon sep (deg) : 90.01
 B (ring opening deg) : 78.72
 PA of pole (deg) : 43.74

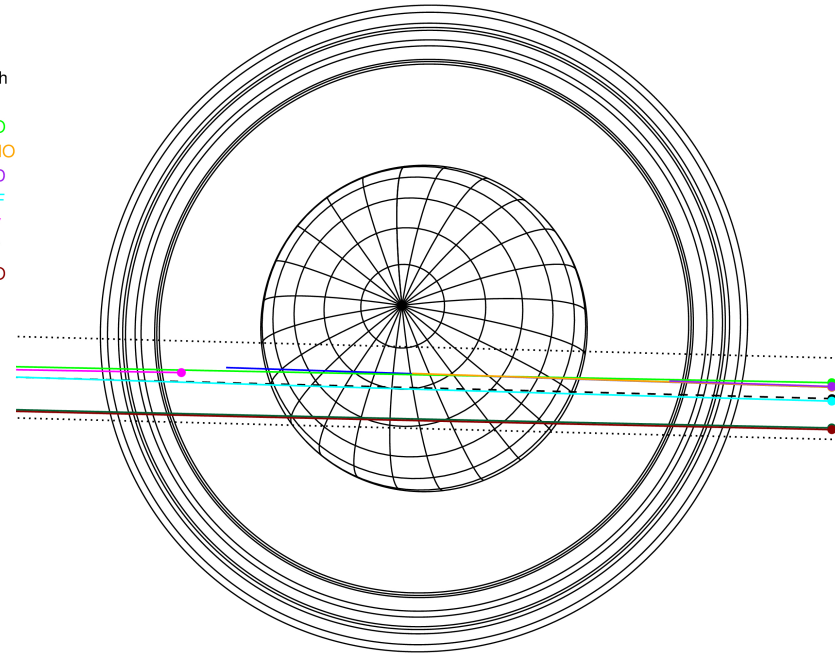
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2031-11-23T13:43:15.7300 ra: 05 41 27.5197 s: +23 31 05.548 C/A 0.699° PA 358.50 deg v_sky -20.62 km/s D 18.19 AU
 Credit: Styled after SORA/Lucky Star

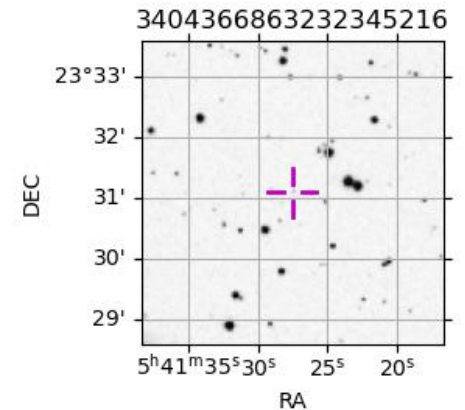
Uranus 2031-11-23T13:43:15 K14.57 G18.39 PgtRgt

Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 KAV
 AAT
 MSO

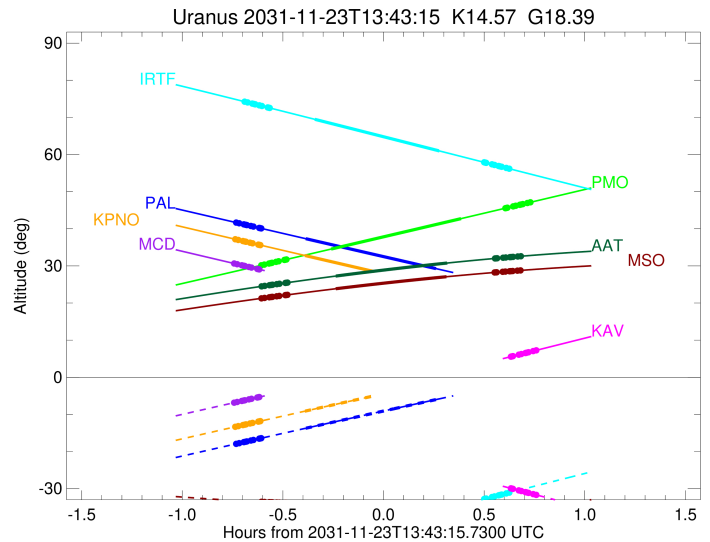
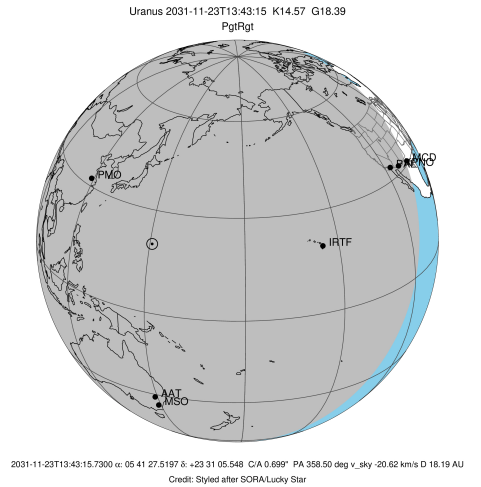


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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 23 12:59 - NOV 23 13:58	PieRin
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	NOV 23 13:06 - NOV 23 14:27	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+		NOV 23 12:58 - NOV 23 13:19	PinRin
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++			NOV 23 12:58 - NOV 23 13:06	PnnRin
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	NOV 23 13:01 - NOV 23 14:20	PieRie
KAV	Kavalur Observatory	12.6	78.8			+++++	NOV 23 14:21 - NOV 23 14:28	PnnRne
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	+++++	+ +	+++++	NOV 23 13:06 - NOV 23 14:24	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +	+++++	NOV 23 13:06 - NOV 23 14:24	PieRie

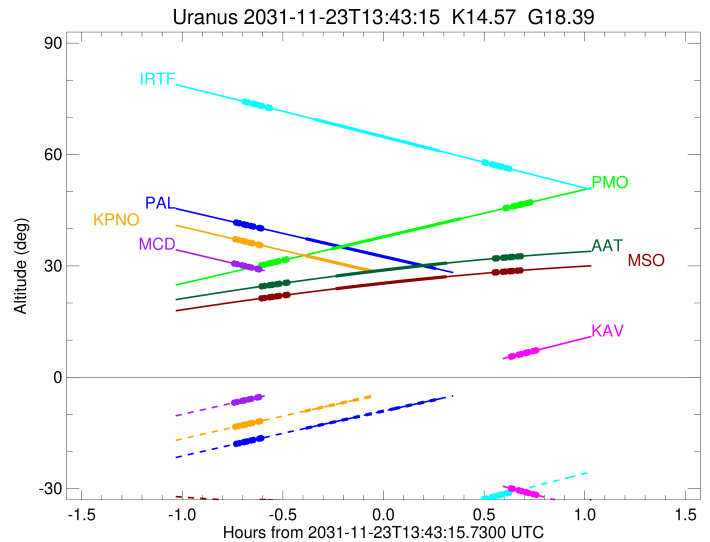
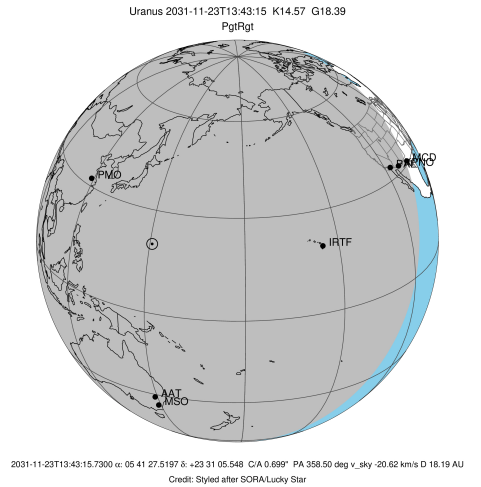


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-11-23T13:39:22.090
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3404366863232345216
 2Mass ID (if available) : 05412751+2331058
 ICRS Star Coord at Epoch: 05h 41m 27.51973s +23:31:05.54780s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.570
 G magnitude : 18.392
 RP magnitude : 17.304
 BP magnitude : 19.611
 DUPflag : 0
 Distance (au) : 18.193
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.62
 Sun-Target sep (deg) : 154.87
 Sun-Moon sep (deg) : 90.52
 B (ring opening deg) : 78.72
 PA of pole (deg) : 43.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.541
 C/A sky separation (km) : 7137.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.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	2031-11-23T12:59:14.674		41.69	-17.95	51280.78	-20.86		
lambda	I	2031-11-23T13:00:14.878		41.48	-17.75	50026.71	-20.82		
delta	I	2031-11-23T13:01:37.815		41.19	-17.47	48300.35	-20.81		
gamma	I	2031-11-23T13:02:10.047		41.08	-17.36	47629.85	-20.80		
eta	I	2031-11-23T13:02:31.866		41.00	-17.29	47176.12	-20.79		
beta	I	2031-11-23T13:03:44.044		40.75	-17.04	45675.51	-20.78		
alpha	I	2031-11-23T13:04:30.047		40.59	-16.88	44718.98	-20.76		
4	I	2031-11-23T13:06:11.671		40.23	-16.54	42609.26	-20.73		
5	I	2031-11-23T13:06:31.112		40.17	-16.47	42214.75	-20.72		
6	I	2031-11-23T13:06:50.935		40.10	-16.41	41794.82	-20.72		
Uranus	I	2031-11-23T13:20:04.496		37.33	-13.73	25115.69		-9.95	-10.42
Uranus	E	2031-11-23T13:58:56.469		29.26	-6.01	25420.47		5.50	5.75
6	E	2031-11-23T14:12:14.737		26.52	-3.41x	41878.04	20.63		
5	E	2031-11-23T14:12:31.426		26.47	-3.36x	42227.95	20.63		
4	E	2031-11-23T14:12:46.278		26.41	-3.31x	42527.20	20.64		
alpha	E	2031-11-23T14:14:32.783		26.05	-2.97x	44728.75	20.67		
beta	E	2031-11-23T14:15:17.416		25.90	-2.82x	45651.81	20.68		
eta	E	2031-11-23T14:16:31.084		25.65	-2.59x	47176.12	20.69		
gamma	E	2031-11-23T14:16:52.614		25.57	-2.52x	47621.68	20.70		
delta	E	2031-11-23T14:17:25.399		25.46	-2.41x	48300.35	20.70		
lambda	E	2031-11-23T14:18:48.754		25.18	-2.15x	50026.71	20.72		
epsilon	E	2031-11-23T14:19:41.669		25.00	-1.98x	51123.23	20.75		

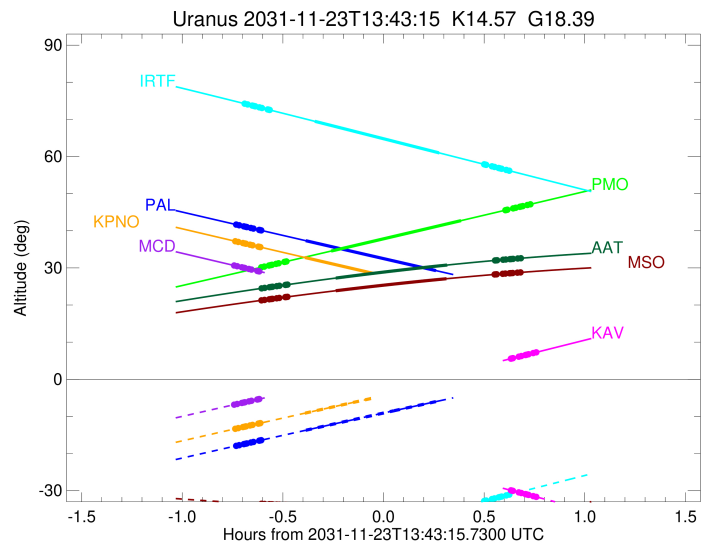
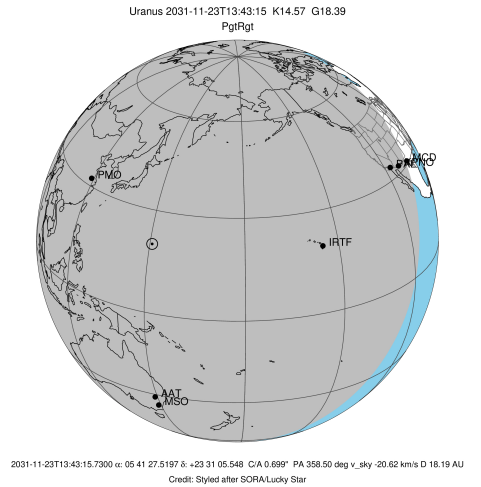
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-11-23T13:46:53.620
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3404366863232345216
 2Mass ID (if available) : 05412751+2331058
 ICRS Star Coord at Epoch: 05h 41m 27.51973s +23:31:05.54780s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.570
 G magnitude : 18.392
 RP magnitude : 17.304
 BP magnitude : 19.611
 DUPflag : 0
 Distance (au) : 18.192
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.62
 Sun-Target sep (deg) : 154.87
 Sun-Moon sep (deg) : 90.61
 B (ring opening deg) : 78.72
 PA of pole (deg) : 43.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.550
 C/A sky separation (km) : 7262.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.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	2031-11-23T13:06:44.051		30.14	-51.62	51276.74	-20.76		
lambda	I	2031-11-23T13:07:44.335		30.35	-51.83	50026.71	-20.73		
delta	I	2031-11-23T13:09:07.639		30.65	-52.12	48300.35	-20.72		
gamma	I	2031-11-23T13:09:40.007		30.76	-52.23	47629.89	-20.71		
eta	I	2031-11-23T13:10:01.920		30.83	-52.31	47176.12	-20.71		
beta	I	2031-11-23T13:11:14.405		31.09	-52.56	45675.37	-20.69		
alpha	I	2031-11-23T13:12:00.604		31.25	-52.73	44718.64	-20.68		
4	I	2031-11-23T13:13:42.594		31.61	-53.08	42609.50	-20.65		
5	I	2031-11-23T13:14:02.084		31.67	-53.15	42215.51	-20.64		
6	I	2031-11-23T13:14:22.023		31.74	-53.22	41794.80	-20.64		
Uranus	I	2031-11-23T13:27:38.053		34.53	-56.00	25119.39		-9.91	-10.37
Uranus	E	2031-11-23T14:06:22.975		42.73	-63.93	25429.27		5.32	5.57
6	E	2031-11-23T14:19:37.736		45.55	-66.54	41877.84	20.75		
5	E	2031-11-23T14:19:54.289		45.61	-66.60	42226.68	20.75		
4	E	2031-11-23T14:20:09.103		45.66	-66.64	42527.04	20.76		
alpha	E	2031-11-23T14:21:55.017		46.04	-66.99	44729.26	20.79		
beta	E	2031-11-23T14:22:39.370		46.19	-67.13	45652.09	20.81		
eta	E	2031-11-23T14:23:52.567		46.45	-67.36	47176.12	20.83		
gamma	E	2031-11-23T14:24:13.958		46.53	-67.43	47621.64	20.83		
delta	E	2031-11-23T14:24:46.534		46.65	-67.54	48300.35	20.84		
lambda	E	2031-11-23T14:26:09.340		46.94	-67.80	50026.71	20.86		
epsilon	E	2031-11-23T14:27:02.198		47.13	-67.97	51129.50	20.89		

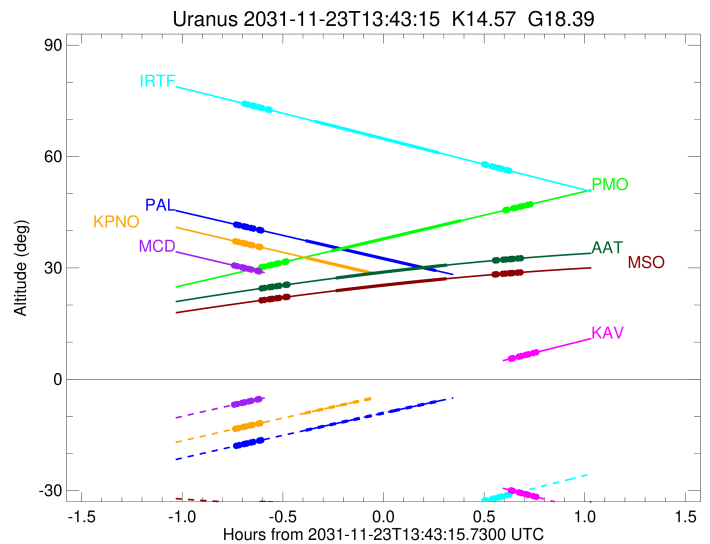
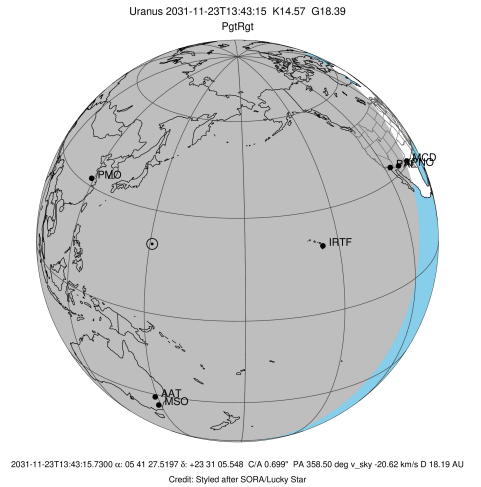
```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2031-11-23T13:39:09.210
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        : 3404366863232345216
2Mass ID (if available) : 05412751+2331058
ICRS Star Coord at Epoch: 05h 41m 27.51973s +23:31:05.54780s
RUWE (>1.4 is poor)  : 1.05
K magnitude           : 14.570
G magnitude           : 18.392
RP magnitude          : 17.304
BP magnitude          : 19.611
DUPflag              : 0
Distance (au)         : 18.193
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -20.62
Sun-Target sep (deg)  : 154.87
Sun-Moon sep (deg)    : 90.45
B (ring opening deg)  : 78.72
PA of pole (deg)      : 43.74
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.538
C/A sky separation (km) : 7096.2
NAIF SPICE kernels    : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.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	2031-11-23T12:58:58.231		37.20	-13.36	51280.64	-20.84		
lambda	I	2031-11-23T12:59:58.495		36.99	-13.16	50026.71	-20.80		
delta	I	2031-11-23T13:01:21.526		36.70	-12.88	48300.35	-20.78		
gamma	I	2031-11-23T13:01:53.794		36.58	-12.77	47629.85	-20.77		
eta	I	2031-11-23T13:02:15.637		36.51	-12.69	47176.12	-20.77		
beta	I	2031-11-23T13:03:27.896		36.25	-12.45	45675.51	-20.75		
alpha	I	2031-11-23T13:04:13.951		36.09	-12.29	44718.96	-20.74		
4	I	2031-11-23T13:05:55.687		35.73	-11.95	42609.27	-20.70		
5	I	2031-11-23T13:06:15.148		35.66	-11.88	42214.79	-20.70		
6	I	2031-11-23T13:06:34.996		35.59	-11.81	41794.82	-20.69		
Uranus	I	2031-11-23T13:19:49.360		32.80	-9.13	25116.28		-9.95	-10.41
Uranus	E	2031-11-23T13:58:45.863		24.67	-1.40x	25419.45		5.52	5.78
6	E	2031-11-23T14:12:05.136		21.91	1.18x	41878.05	20.60		
5	E	2031-11-23T14:12:21.853		21.86	1.23x	42228.06	20.60		
4	E	2031-11-23T14:12:36.721		21.81	1.28x	42527.22	20.61		
alpha	E	2031-11-23T14:14:23.373		21.44	1.62x	44728.70	20.64		
beta	E	2031-11-23T14:15:08.071		21.29	1.77x	45651.79	20.65		
eta	E	2031-11-23T14:16:21.847		21.03	2.00x	47176.12	20.66		
gamma	E	2031-11-23T14:16:43.408		20.96	2.07x	47621.69	20.67		
delta	E	2031-11-23T14:17:16.240		20.85	2.18x	48300.35	20.67		
lambda	E	2031-11-23T14:18:39.717		20.56	2.44x	50026.71	20.69		
epsilon	E	2031-11-23T14:19:32.687		20.38	2.61x	51122.74	20.72		

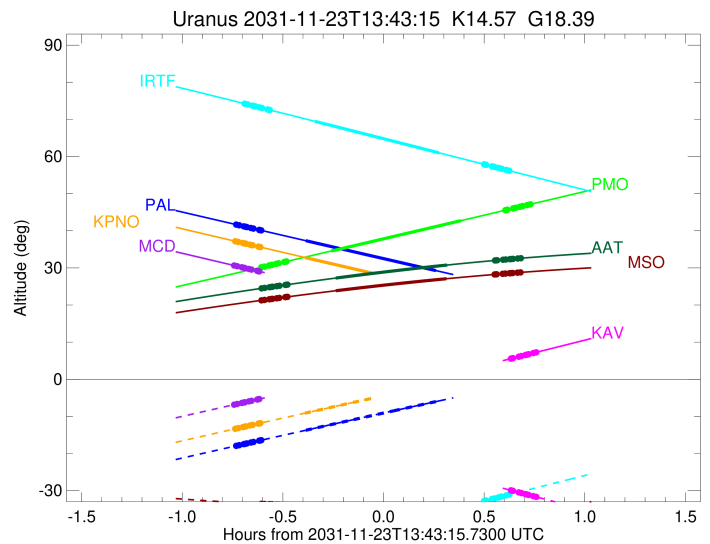
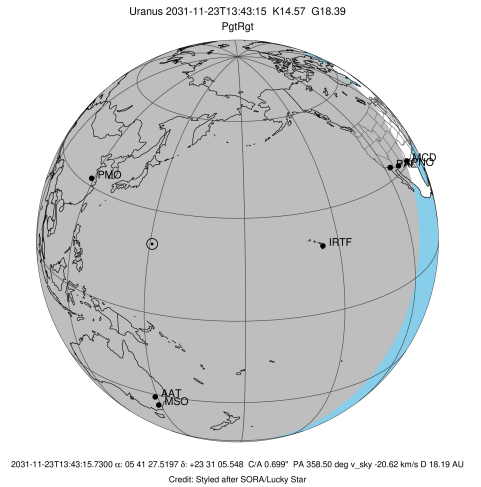
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-11-23T13:38:55.800
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3404366863232345216
 2Mass ID (if available) : 05412751+2331058
 ICRS Star Coord at Epoch: 05h 41m 27.51973s +23:31:05.54780s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.570
 G magnitude : 18.392
 RP magnitude : 17.304
 BP magnitude : 19.611
 DUPflag : 0
 Distance (au) : 18.193
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.62
 Sun-Target sep (deg) : 154.87
 Sun-Moon sep (deg) : 90.35
 B (ring opening deg) : 78.72
 PA of pole (deg) : 43.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.527
 C/A sky separation (km) : 6949.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.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	2031-11-23T12:58:38.431		30.67	-6.86	51279.72	-20.80		
lambda	I	2031-11-23T12:59:38.752		30.45	-6.66	50026.71	-20.77		
delta	I	2031-11-23T13:01:01.919		30.16	-6.38	48300.35	-20.75		
gamma	I	2031-11-23T13:01:34.239		30.05	-6.27	47629.86	-20.74		
eta	I	2031-11-23T13:01:56.118		29.97	-6.20	47176.12	-20.74		
beta	I	2031-11-23T13:03:08.495		29.71	-5.95	45675.47	-20.72		
alpha	I	2031-11-23T13:03:54.627		29.55	-5.80	44718.87	-20.71		
4	I	2031-11-23T13:05:36.512		29.19	-5.45	42609.35	-20.67		
5	I	2031-11-23T13:05:55.995		29.12	-5.39	42215.03	-20.67		
6	I	2031-11-23T13:06:15.885		29.05	-5.32	41794.81	-20.66		
Uranus	I	2031-11-23T13:19:31.126		26.26	-2.66x	25118.87		-9.92	-10.38
Uranus	E	2031-11-23T13:58:37.116		18.10	4.98x	25416.30		5.58	5.84
6	E	2031-11-23T14:11:57.515		15.36	7.52x	41878.10	20.56		
5	E	2031-11-23T14:12:14.273		15.30	7.57x	42228.38	20.57		
4	E	2031-11-23T14:12:29.157		15.25	7.62x	42527.26	20.57		
alpha	E	2031-11-23T14:14:16.002		14.89	7.95x	44728.58	20.60		
beta	E	2031-11-23T14:15:00.788		14.74	8.09x	45651.72	20.61		
eta	E	2031-11-23T14:16:14.711		14.48	8.32x	47176.12	20.62		
gamma	E	2031-11-23T14:16:36.315		14.41	8.39x	47621.70	20.63		
delta	E	2031-11-23T14:17:09.212		14.30	8.49x	48300.35	20.63		
lambda	E	2031-11-23T14:18:32.858		14.01	8.75x	50026.71	20.65		
epsilon	E	2031-11-23T14:19:25.871		13.83	8.92x	51121.41	20.68		

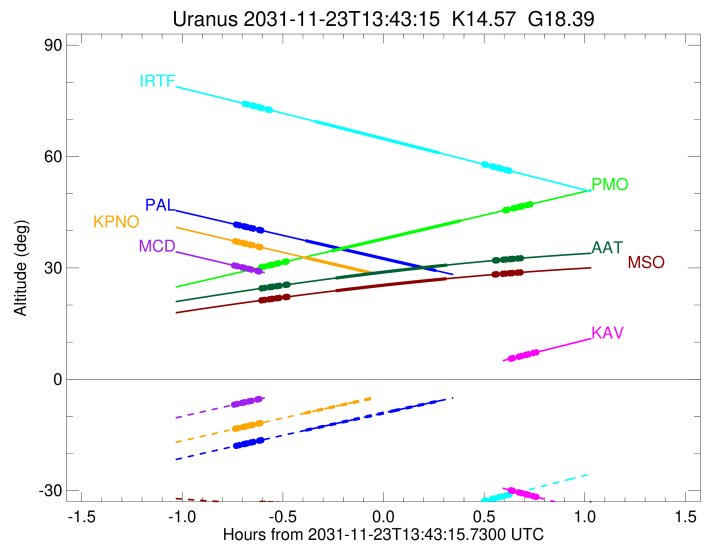
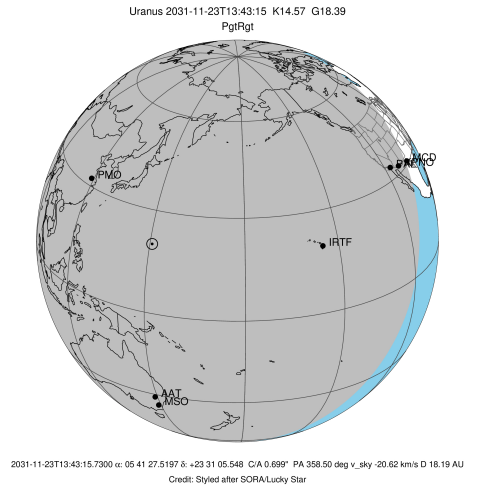
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2031-11-23T13:41:08.390
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       : 3404366863232345216
2Mass ID (if available) : 05412751+2331058
ICRS Star Coord at Epoch: 05h 41m 27.51973s +23:31:05.54780s
RUWE (>1.4 is poor) : 1.05
K magnitude           : 14.570
G magnitude           : 18.392
RP magnitude          : 17.304
BP magnitude          : 19.611
DUPflag              : 0
Distance (au)         : 18.192
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -20.62
Sun-Target sep (deg) : 154.87
Sun-Moon sep (deg)   : 90.88
B (ring opening deg) : 78.72
PA of pole (deg)     : 43.74
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.723
C/A sky separation (km) : 9545.3
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.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
    
```



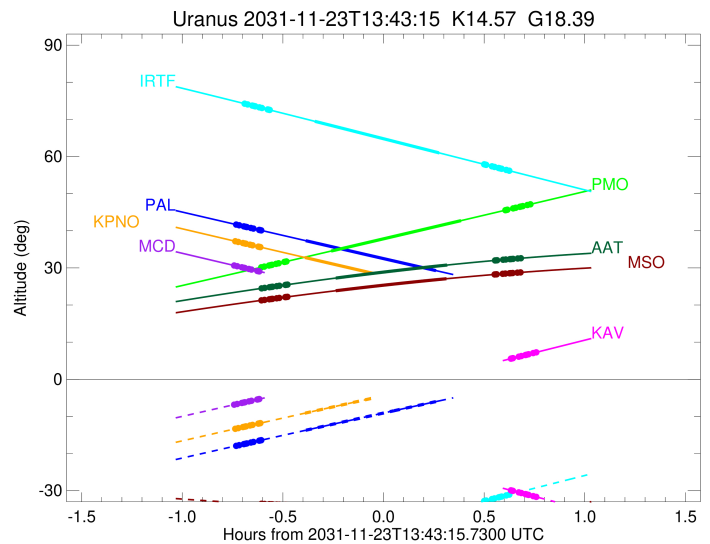
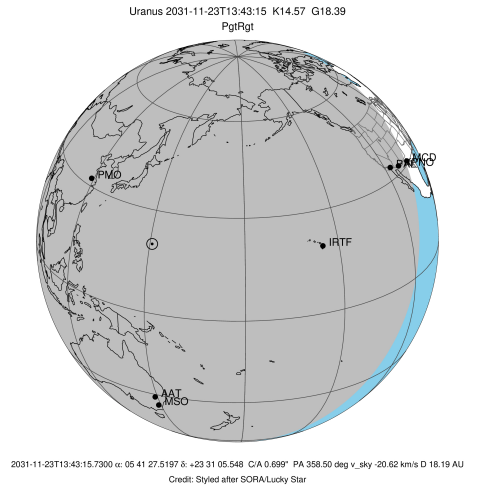
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-11-23T13:01:44.945		74.27	-49.36	51297.76	-20.89		
lambda	I	2031-11-23T13:02:45.914		74.04	-49.12	50026.71	-20.84		
delta	I	2031-11-23T13:04:08.823		73.72	-48.80	48300.35	-20.81		
gamma	I	2031-11-23T13:04:41.066		73.60	-48.68	47629.65	-20.79		
eta	I	2031-11-23T13:05:02.881		73.52	-48.59	47176.12	-20.79		
beta	I	2031-11-23T13:06:15.075		73.25	-48.31	45676.21	-20.76		
alpha	I	2031-11-23T13:07:01.075		73.07	-48.13	44720.74	-20.74		
4	I	2031-11-23T13:08:43.055		72.69	-47.74	42607.85	-20.68		
5	I	2031-11-23T13:09:02.680		72.61	-47.66	42210.49	-20.66		
6	I	2031-11-23T13:09:22.320		72.54	-47.59	41795.03	-20.66		
Uranus	I	2031-11-23T13:22:45.151		69.49	-44.48	25073.92		-10.43	-10.91
Uranus	E	2031-11-23T13:59:52.519		60.98	-35.89	25467.38		4.46	4.67
6	E	2031-11-23T14:13:17.923		57.90	-32.80	41877.22	20.62		
5	E	2031-11-23T14:13:34.457		57.83	-32.73	42223.03	20.62		
4	E	2031-11-23T14:13:49.499		57.78	-32.68	42526.63	20.63		
alpha	E	2031-11-23T14:15:36.078		57.37	-32.27	44730.61	20.69		
beta	E	2031-11-23T14:16:20.620		57.20	-32.10	45652.84	20.71		
eta	E	2031-11-23T14:17:34.104		56.92	-31.82	47176.12	20.74		
gamma	E	2031-11-23T14:17:55.578		56.83	-31.73	47621.54	20.75		
delta	E	2031-11-23T14:18:28.287		56.71	-31.61	48300.35	20.76		
lambda	E	2031-11-23T14:19:51.392		56.39	-31.29	50026.71	20.79		
epsilon	E	2031-11-23T14:20:45.115		56.18	-31.08	51143.93	20.84		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-11-23T13:48:10.020
 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 : 3404366863232345216
 2Mass ID (if available) : 05412751+2331058
 ICRS Star Coord at Epoch: 05h 41m 27.51973s +23:31:05.54780s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.570
 G magnitude : 18.392
 RP magnitude : 17.304
 BP magnitude : 19.611
 DUPflag : 0
 Distance (au) : 18.192
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.62
 Sun-Target sep (deg) : 154.87
 Sun-Moon sep (deg) : 89.96
 B (ring opening deg) : 78.72
 PA of pole (deg) : 43.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.574
 C/A sky separation (km) : 7571.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.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



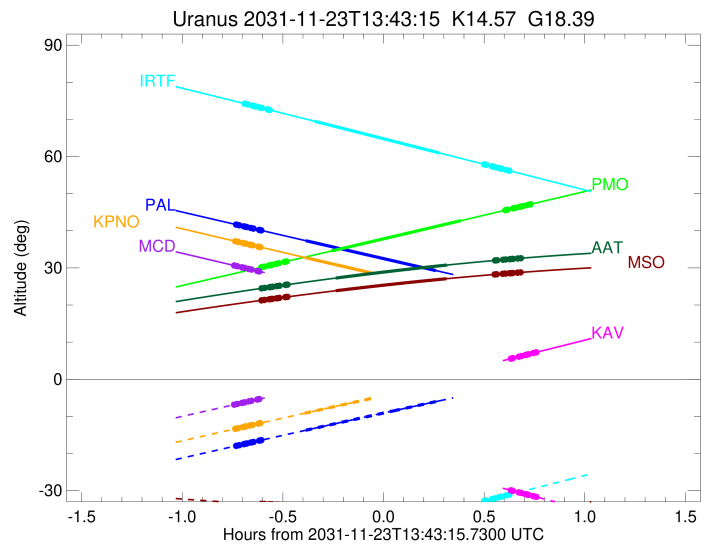
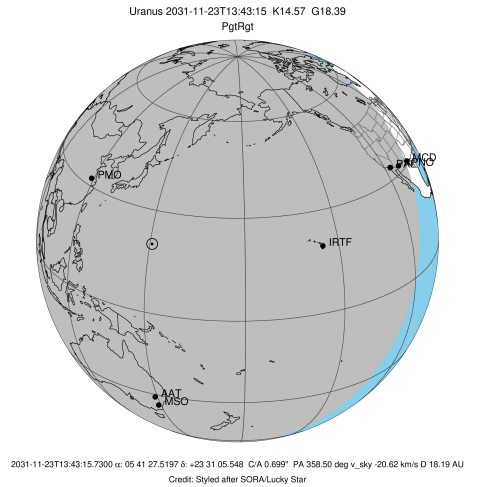
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-11-23T13:07:30.188	-10.82x	-12.74	51278.52	-20.46			
lambda	I	2031-11-23T13:08:31.458	-10.59x	-12.97	50026.71	-20.43			
delta	I	2031-11-23T13:09:56.006	-10.29x	-13.30	48300.35	-20.41			
gamma	I	2031-11-23T13:10:28.860	-10.17x	-13.43	47629.87	-20.40			
eta	I	2031-11-23T13:10:51.101	-10.09x	-13.51	47176.12	-20.40			
beta	I	2031-11-23T13:12:04.671	-9.82x	-13.80	45675.45	-20.38			
alpha	I	2031-11-23T13:12:51.561	-9.65x	-13.98	44718.83	-20.37			
4	I	2031-11-23T13:14:35.113	-9.27x	-14.38	42609.36	-20.34			
5	I	2031-11-23T13:14:54.914	-9.20x	-14.46	42215.05	-20.33			
6	I	2031-11-23T13:15:15.132	-9.13x	-14.53	41794.81	-20.33			
Uranus	I	2031-11-23T13:28:43.993	-6.17x	-17.66	25114.27	-20.33		-9.97	-10.43
Uranus	E	2031-11-23T14:07:50.105	2.53x	-26.78	25436.33	-20.33		5.17	5.41
6	E	2031-11-23T14:21:16.500	5.56	-29.93	41877.71	20.47			
5	E	2031-11-23T14:21:33.249	5.62	-29.99	42225.89	20.47			
4	E	2031-11-23T14:21:48.294	5.68	-30.05	42526.94	20.48			
alpha	E	2031-11-23T14:23:35.643	6.08	-30.47	44729.56	20.52			
beta	E	2031-11-23T14:24:20.576	6.25	-30.64	45652.26	20.54			
eta	E	2031-11-23T14:25:34.726	6.53	-30.93	47176.12	20.56			
gamma	E	2031-11-23T14:25:56.395	6.61	-31.02	47621.62	20.56			
delta	E	2031-11-23T14:26:29.396	6.73	-31.15	48300.35	20.57			
lambda	E	2031-11-23T14:27:53.273	7.05	-31.47	50026.71	20.59			
epsilon	E	2031-11-23T14:28:46.978	7.25	-31.68	51133.00	20.63			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-11-23T13:45:23.090
 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 : 3404366863232345216
 2Mass ID (if available) : 05412751+2331058
 ICRS Star Coord at Epoch: 05h 41m 27.51973s +23:31:05.54780s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.570
 G magnitude : 18.392
 RP magnitude : 17.304
 BP magnitude : 19.611
 DUPflag : 0
 Distance (au) : 18.192
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.62
 Sun-Target sep (deg) : 154.87
 Sun-Moon sep (deg) : 90.48
 B (ring opening deg) : 78.72
 PA of pole (deg) : 43.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.075
 C/A sky separation (km) : 14188.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.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	2031-11-23T13:06:46.705		24.47	-37.50	51330.10	-20.33		
lambda	I	2031-11-23T13:07:51.032		24.61	-37.55	50026.71	-20.24		
delta	I	2031-11-23T13:09:16.462		24.80	-37.61	48300.35	-20.17		
gamma	I	2031-11-23T13:09:49.749		24.87	-37.63	47629.25	-20.15		
eta	I	2031-11-23T13:10:12.250		24.92	-37.65	47176.12	-20.13		
beta	I	2031-11-23T13:11:26.807		25.08	-37.70	45677.45	-20.06		
alpha	I	2031-11-23T13:12:14.306		25.19	-37.74	44724.17	-20.02		
4	I	2031-11-23T13:14:00.459		25.41	-37.81	42604.76	-19.89		
5	I	2031-11-23T13:14:21.098		25.46	-37.82	42202.32	-19.86		
6	I	2031-11-23T13:14:41.042		25.50	-37.84	41795.82	-19.85		
Uranus	I	2031-11-23T13:29:00.111		27.26	-38.28	25013.59		-11.09	-11.60
Uranus	E	2031-11-23T14:02:15.441		30.77	-38.44	25536.76		2.19	2.30
6	E	2031-11-23T14:16:32.572		32.01	-38.13	41875.12	19.91		
5	E	2031-11-23T14:16:49.376		32.03	-38.12	42213.38	19.92		
4	E	2031-11-23T14:17:05.330		32.05	-38.12	42526.00	19.95		
alpha	E	2031-11-23T14:18:55.566		32.20	-38.06	44734.20	20.08		
beta	E	2031-11-23T14:19:41.366		32.26	-38.03	45654.97	20.13		
eta	E	2031-11-23T14:20:56.799		32.36	-37.99	47176.12	20.20		
gamma	E	2031-11-23T14:21:18.832		32.38	-37.98	47621.31	20.22		
delta	E	2031-11-23T14:21:52.398		32.43	-37.96	48300.35	20.24		
lambda	E	2031-11-23T14:23:17.531		32.53	-37.91	50026.71	20.31		
epsilon	E	2031-11-23T14:24:14.500		32.60	-37.87	51185.04	20.40		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-11-23T13:45:18.110
 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 : 3404366863232345216
 2Mass ID (if available) : 05412751+2331058
 ICRS Star Coord at Epoch: 05h 41m 27.51973s +23:31:05.54780s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 14.570
 G magnitude : 18.392
 RP magnitude : 17.304
 BP magnitude : 19.611
 DUPflag : 0
 Distance (au) : 18.192
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.62
 Sun-Target sep (deg) : 154.87
 Sun-Moon sep (deg) : 90.42
 B (ring opening deg) : 78.72
 PA of pole (deg) : 43.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.095
 C/A sky separation (km) : 14446.0
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.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	2031-11-23T13:06:43.816		21.24	-33.55	51332.09	-20.28		
lambda	I	2031-11-23T13:07:48.388		21.37	-33.59	50026.71	-20.19		
delta	I	2031-11-23T13:09:14.023		21.55	-33.65	48300.35	-20.13		
gamma	I	2031-11-23T13:09:47.393		21.62	-33.67	47629.22	-20.10		
eta	I	2031-11-23T13:10:09.950		21.66	-33.69	47176.12	-20.08		
beta	I	2031-11-23T13:11:24.699		21.81	-33.74	45677.53	-20.01		
alpha	I	2031-11-23T13:12:12.321		21.91	-33.77	44724.38	-19.96		
4	I	2031-11-23T13:13:58.806		22.12	-33.83	42604.56	-19.83		
5	I	2031-11-23T13:14:19.521		22.16	-33.85	42201.83	-19.80		
6	I	2031-11-23T13:14:39.497		22.20	-33.86	41795.89	-19.79		
Uranus	I	2031-11-23T13:29:03.136		23.85	-34.27	25011.17		-11.12	-11.63
Uranus	E	2031-11-23T14:02:03.080		27.08	-34.42	25539.35		2.06	2.16
6	E	2031-11-23T14:16:24.774		28.23	-34.15	41874.99	19.84		
5	E	2031-11-23T14:16:41.617		28.26	-34.14	42212.89	19.86		
4	E	2031-11-23T14:16:57.642		28.28	-34.13	42525.98	19.89		
alpha	E	2031-11-23T14:18:48.223		28.41	-34.08	44734.38	20.02		
beta	E	2031-11-23T14:19:34.152		28.46	-34.06	45655.08	20.07		
eta	E	2031-11-23T14:20:49.786		28.55	-34.02	47176.12	20.14		
gamma	E	2031-11-23T14:21:11.877		28.58	-34.01	47621.30	20.16		
delta	E	2031-11-23T14:21:45.532		28.62	-33.99	48300.35	20.19		
lambda	E	2031-11-23T14:23:10.879		28.72	-33.94	50026.71	20.26		
epsilon	E	2031-11-23T14:24:08.088		28.78	-33.91	51187.13	20.35		