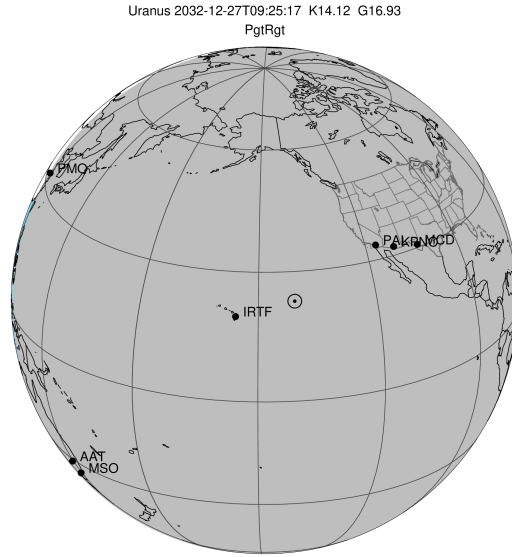


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-27T09:25:17.550  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3427814704610664576  
 2Mass ID (if available) : 05550790+2338562

ICRS Star Coord at Epoch: 05h 55m 07.85048s +23:38:55.83951s

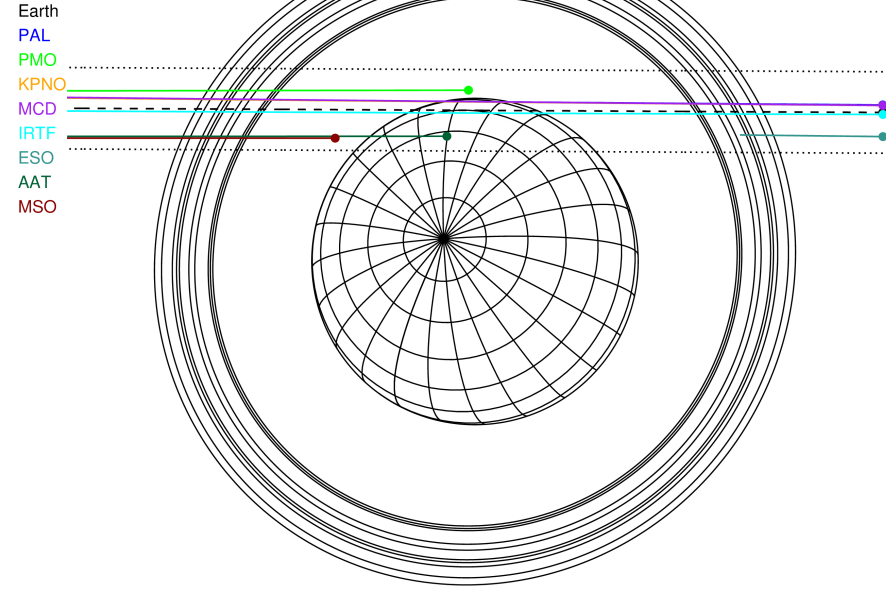
RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.123  
 G magnitude : 16.929  
 RP magnitude : 16.087  
 BP magnitude : 17.556  
 DUPflag : 0  
 Distance (au) : 18.041  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 173.16  
 Sun-Moon sep (deg) : 124.80  
 B (ring opening deg) : 76.27  
 PA of pole (deg) : 53.97

#	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



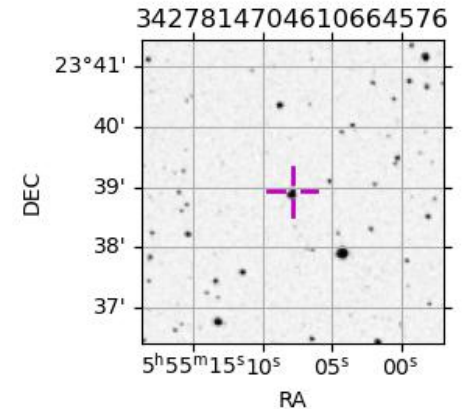
2032-12-27T09:25:17.5500 ra: 05 55 07.8505 s: +23 38 55.840 C/A 1.816° PA 179.70 deg v\_sky -23.22 km/s D 18.04 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2032-12-27T09:25:17 K14.12 G16.93 PgtRgt

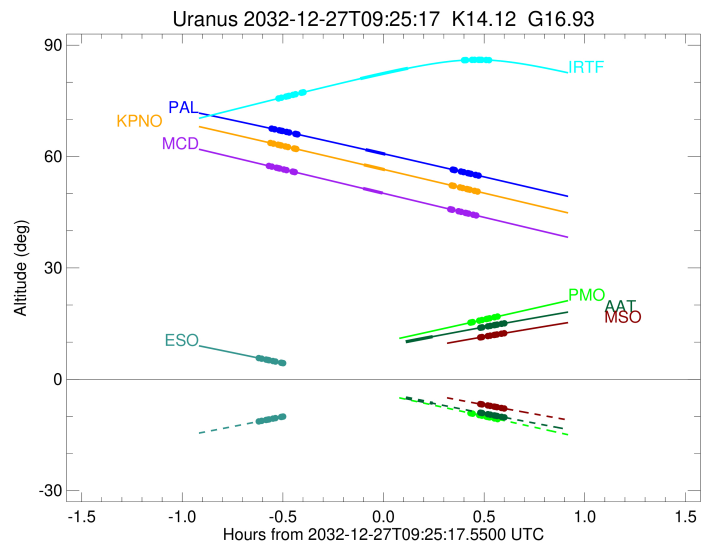
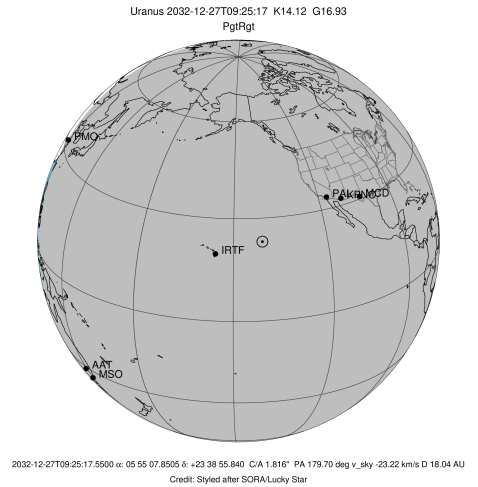


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	DEC 27 08:51 - DEC 27 09:53	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8			+++++	DEC 27 09:51 - DEC 27 09:59	PnnRne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	DEC 27 08:51 - DEC 27 09:53	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	DEC 27 08:51 - DEC 27 09:53	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	DEC 27 08:53 - DEC 27 09:56	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3	+++++			DEC 27 08:48 - DEC 27 08:51	PnnRin
AAT	Siding Spring (AAT)	-31.3	149.1		+	+++++	DEC 27 09:39 - DEC 27 10:01	PneRne
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0			+++++	DEC 27 09:54 - DEC 27 10:01	PnnRne



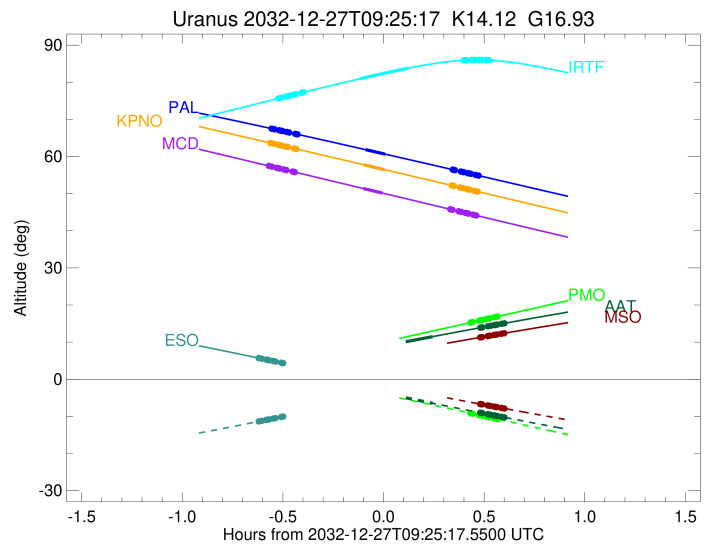
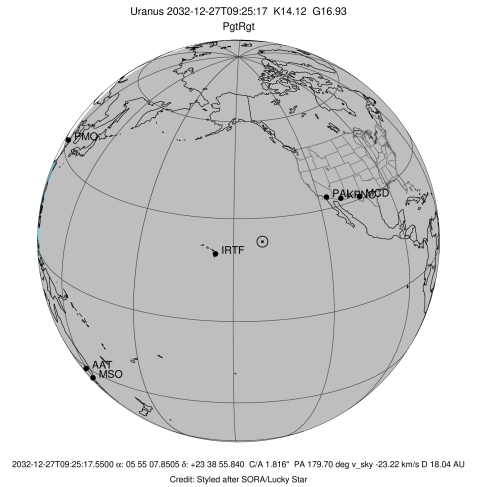
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-27T09:23:15.170  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3427814704610664576  
 2Mass ID (if available) : 05550790+2338562  
 ICRS Star Coord at Epoch: 05h 55m 07.85048s +23:38:55.83951s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.123  
 G magnitude : 16.929  
 RP magnitude : 16.087  
 BP magnitude : 17.556  
 DUPflag : 0  
 Distance (au) : 18.041  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 173.16  
 Sun-Moon sep (deg) : 125.70  
 B (ring opening deg) : 76.27  
 PA of pole (deg) : 53.97  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.913  
 C/A sky separation (km) : 25027.4  
 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	2032-12-27T08:51:52.287		67.53	-72.96	51238.99	-21.00		
lambda	I	2032-12-27T08:52:50.489		67.34	-72.78	50026.71	-20.74		
delta	I	2032-12-27T08:54:14.228		67.06	-72.53	48300.35	-20.48		
gamma	I	2032-12-27T08:54:46.973		66.95	-72.43	47631.44	-20.37		
eta	I	2032-12-27T08:55:09.365		66.88	-72.36	47176.12	-20.29		
beta	I	2032-12-27T08:56:23.522		66.63	-72.14	45681.16	-20.02		
alpha	I	2032-12-27T08:57:10.273		66.48	-72.00	44750.20	-19.84		
4	I	2032-12-27T08:59:00.031		66.11	-71.66	42597.59	-19.33		
5	I	2032-12-27T08:59:16.180		66.05	-71.61	42290.50	-19.29		
6	I	2032-12-27T08:59:41.820		65.97	-71.53	41797.16	-19.14		
Uranus	I	2032-12-27T09:19:57.352		61.85	-67.66	25457.67		5.76	6.03
Uranus	E	2032-12-27T09:25:49.395		60.64	-66.50	25289.77		9.46	9.89
6	E	2032-12-27T09:45:55.795		56.47	-62.46	41861.56	19.11		
5	E	2032-12-27T09:46:16.894		56.40	-62.39	42274.70	19.25		
4	E	2032-12-27T09:46:30.082		56.35	-62.35	42528.29	19.29		
alpha	E	2032-12-27T09:48:22.106		55.96	-61.96	44718.39	19.80		
beta	E	2032-12-27T09:49:09.410		55.80	-61.80	45655.03	19.98		
eta	E	2032-12-27T09:50:24.986		55.54	-61.55	47176.12	20.25		
gamma	E	2032-12-27T09:50:47.009		55.46	-61.47	47622.95	20.33		
delta	E	2032-12-27T09:51:20.244		55.35	-61.36	48300.35	20.44		
lambda	E	2032-12-27T09:52:44.174		55.05	-61.07	50026.71	20.70		
epsilon	E	2032-12-27T09:53:52.110		54.82	-60.84	51439.30	20.95		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-12-27T09:29:18.100
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       : 3427814704610664576
2Mass ID (if available) : 05550790+2338562
ICRS Star Coord at Epoch: 05h 55m 07.85048s +23:38:55.83951s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 14.123
G magnitude           : 16.929
RP magnitude          : 16.087
BP magnitude          : 17.556
DUPflag              : 0
Distance (au)         : 18.041
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -23.22
Sun-Target sep (deg) : 173.16
Sun-Moon sep (deg)   : 124.50
B (ring opening deg) : 76.27
PA of pole (deg)     : 53.97
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.050
C/A sky separation (km) : 26827.8
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
  
```



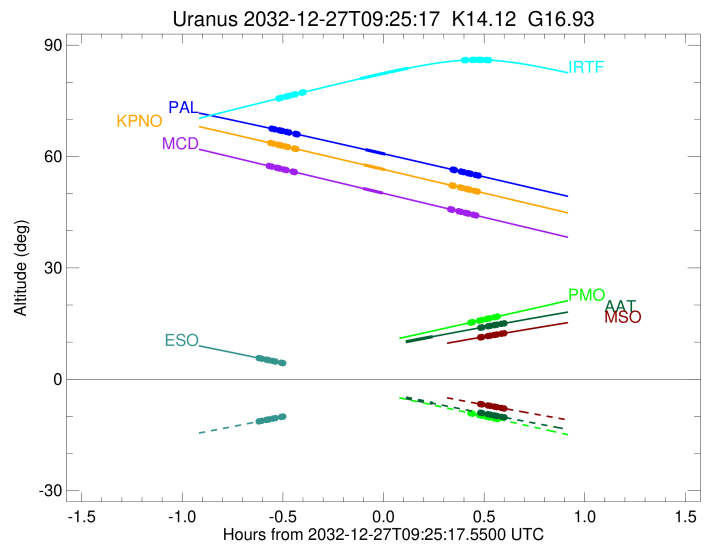
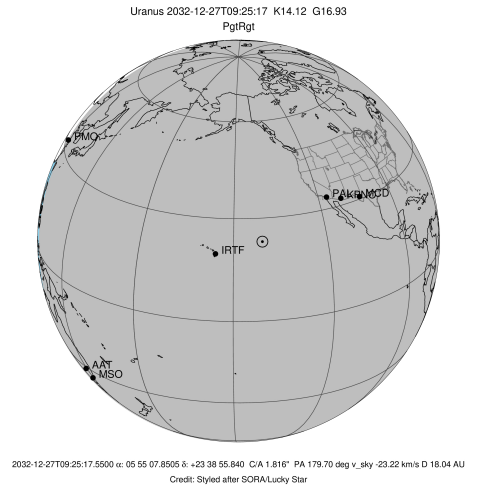
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-27T08:58:05.611		4.77x	1.06x	51259.02	-20.12		
lambda	I	2032-12-27T08:59:07.435		4.97x	0.87x	50026.71	-19.83		
delta	I	2032-12-27T09:00:35.125		5.25	0.59x	48300.35	-19.53		
gamma	I	2032-12-27T09:01:09.482		5.36	0.49x	47631.37	-19.41		
eta	I	2032-12-27T09:01:32.994		5.44	0.41x	47176.12	-19.32		
beta	I	2032-12-27T09:02:51.012		5.69	0.17x	45681.23	-19.00		
alpha	I	2032-12-27T09:03:40.283		5.85	0.02x	44750.87	-18.79		
4	I	2032-12-27T09:05:36.693		6.22	-0.35x	42595.18	-18.19		
5	I	2032-12-27T09:05:53.476		6.28	-0.40x	42294.13	-18.14		
6	I	2032-12-27T09:06:20.919		6.37	-0.49x	41798.17	-17.98		

No planet occultations

6	E	2032-12-27T09:51:13.636	15.27	-9.14	41859.94	18.04
5	E	2032-12-27T09:51:36.232	15.34	-9.22	42277.78	18.21
4	E	2032-12-27T09:51:50.007	15.39	-9.26	42528.97	18.26
alpha	E	2032-12-27T09:53:48.055	15.79	-9.65	44719.75	18.85
beta	E	2032-12-27T09:54:37.635	15.95	-9.81	45655.77	19.07
eta	E	2032-12-27T09:55:56.639	16.22	-10.07	47176.12	19.39
gamma	E	2032-12-27T09:56:19.633	16.30	-10.15	47623.10	19.48
delta	E	2032-12-27T09:56:54.276	16.41	-10.26	48300.35	19.61
lambda	E	2032-12-27T09:58:21.599	16.71	-10.55	50026.71	19.92
epsilon	E	2032-12-27T09:59:32.537	16.95	-10.79	51447.95	20.21

```

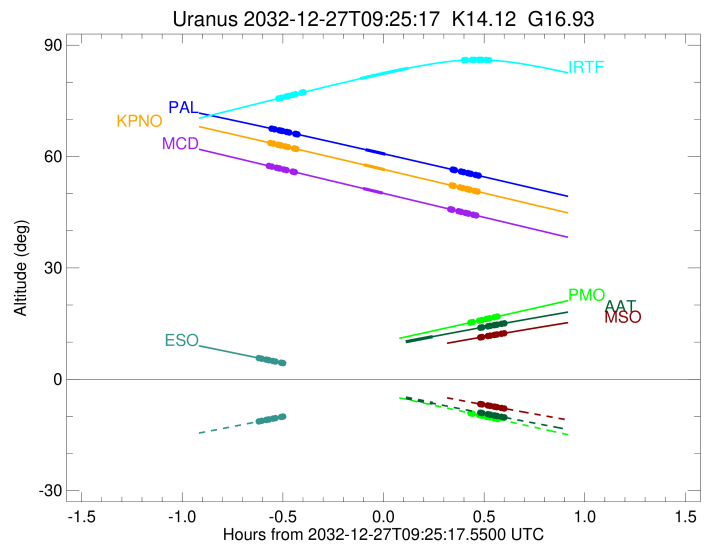
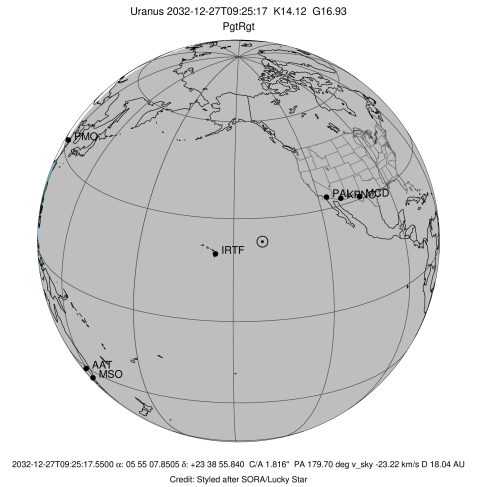
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-12-27T09:22:55.160
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : KPNO
Location             : Kitt Peak Natl Obs
Latitude (deg)       : 31.96333
E. Longitude (deg)   : 248.40000
Altitude (km)        : 2.120
Gaia source ID       : 3427814704610664576
2Mass ID (if available) : 05550790+2338562
ICRS Star Coord at Epoch: 05h 55m 07.85048s +23:38:55.83951s
RUWE (>1.4 is poor) : 1.00
K magnitude          : 14.123
G magnitude          : 16.929
RP magnitude         : 16.087
BP magnitude         : 17.556
DUPflag             : 0
Distance (au)        : 18.041
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.22
Sun-Target sep (deg) : 173.16
Sun-Moon sep (deg)   : 125.71
B (ring opening deg) : 76.27
PA of pole (deg)     : 53.97
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.910
C/A sky separation (km) : 24987.9
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.bsp
earthstns_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-27T08:51:30.453		63.67	-69.60	51238.41	-21.00		
lambda	I	2032-12-27T08:52:28.621		63.47	-69.40	50026.71	-20.75		
delta	I	2032-12-27T08:53:52.348		63.17	-69.12	48300.35	-20.49		
gamma	I	2032-12-27T08:54:25.086		63.06	-69.01	47631.44	-20.38		
eta	I	2032-12-27T08:54:47.474		62.98	-68.94	47176.12	-20.30		
beta	I	2032-12-27T08:56:01.613		62.72	-68.69	45681.15	-20.03		
alpha	I	2032-12-27T08:56:48.352		62.56	-68.53	44750.18	-19.84		
4	I	2032-12-27T08:58:38.066		62.17	-68.16	42597.66	-19.34		
5	I	2032-12-27T08:58:54.218		62.12	-68.11	42290.40	-19.30		
6	I	2032-12-27T08:59:19.843		62.03	-68.02	41797.13	-19.15		
Uranus	I	2032-12-27T09:19:27.501		57.78	-63.88	25461.83		5.64	5.90
Uranus	E	2032-12-27T09:25:39.293		56.46	-62.59	25284.96		9.54	9.99
6	E	2032-12-27T09:45:38.037		52.21	-58.39	41861.58	19.11		
5	E	2032-12-27T09:45:59.129		52.13	-58.32	42274.65	19.26		
4	E	2032-12-27T09:46:12.318		52.09	-58.27	42528.28	19.30		
alpha	E	2032-12-27T09:48:04.336		51.69	-57.88	44718.37	19.80		
beta	E	2032-12-27T09:48:51.643		51.52	-57.71	45655.02	19.98		
eta	E	2032-12-27T09:50:07.227		51.25	-57.45	47176.12	20.25		
gamma	E	2032-12-27T09:50:29.253		51.18	-57.37	47622.94	20.32		
delta	E	2032-12-27T09:51:02.493		51.06	-57.25	48300.35	20.43		
lambda	E	2032-12-27T09:52:26.441		50.76	-56.96	50026.71	20.69		
epsilon	E	2032-12-27T09:53:34.391		50.52	-56.72	51439.20	20.95		

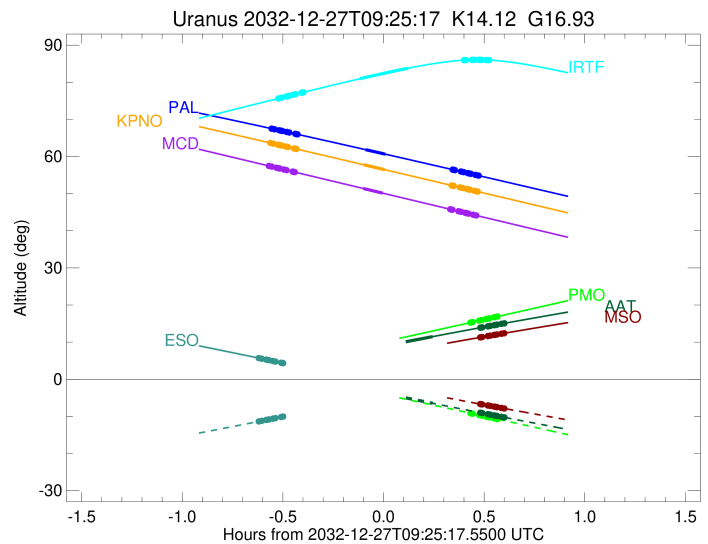
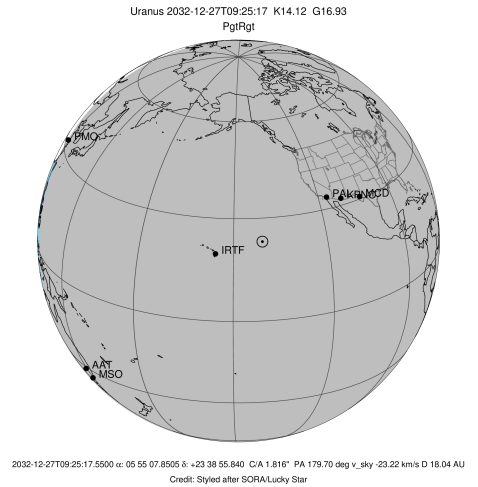
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-12-27T09:22:28.850
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       : 3427814704610664576
2Mass ID (if available) : 05550790+2338562
ICRS Star Coord at Epoch: 05h 55m 07.85048s +23:38:55.83951s
RUWE (>1.4 is poor) : 1.00
K magnitude           : 14.123
G magnitude           : 16.929
RP magnitude          : 16.087
BP magnitude          : 17.556
DUPflag              : 0
Distance (au)        : 18.041
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.22
Sun-Target sep (deg) : 173.16
Sun-Moon sep (deg)   : 125.71
B (ring opening deg) : 76.27
PA of pole (deg)     : 53.97
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.913
C/A sky separation (km) : 25035.3
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
  
```



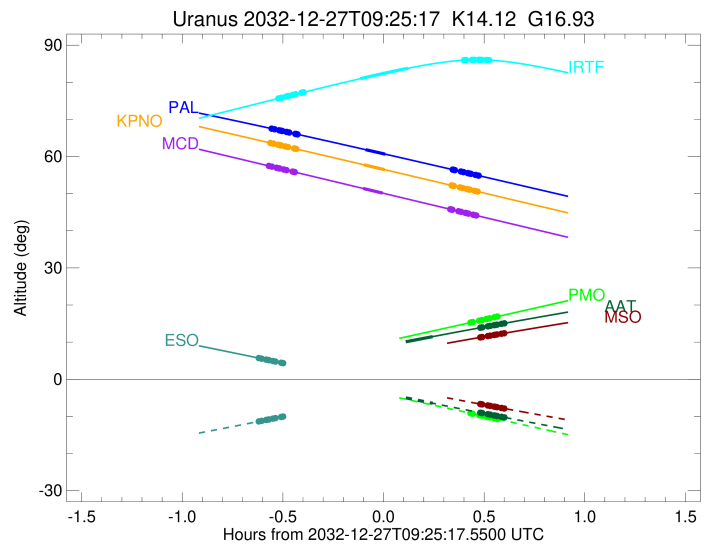
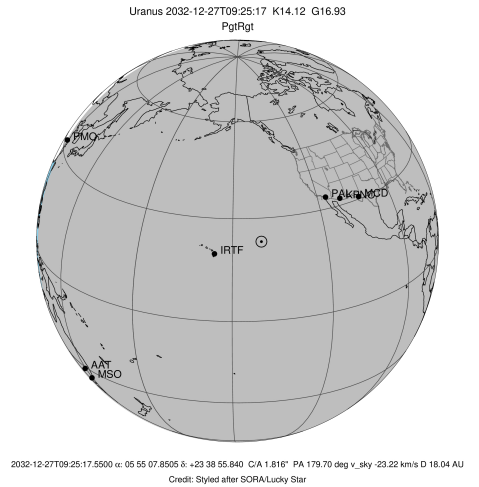
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-27T08:51:03.143		57.49	-63.71	51238.53	-20.97		
lambda	I	2032-12-27T08:52:01.409		57.28	-63.50	50026.71	-20.71		
delta	I	2032-12-27T08:53:25.274		56.98	-63.21	48300.35	-20.45		
gamma	I	2032-12-27T08:53:58.068		56.86	-63.09	47631.44	-20.34		
eta	I	2032-12-27T08:54:20.495		56.78	-63.01	47176.12	-20.26		
beta	I	2032-12-27T08:55:34.766		56.51	-62.75	45681.15	-19.99		
alpha	I	2032-12-27T08:56:21.592		56.34	-62.58	44750.19	-19.81		
4	I	2032-12-27T08:58:11.523		55.95	-62.19	42597.64	-19.30		
5	I	2032-12-27T08:58:27.704		55.89	-62.13	42290.44	-19.26		
6	I	2032-12-27T08:58:53.384		55.80	-62.04	41797.14	-19.11		
Uranus	I	2032-12-27T09:19:12.520		51.41	-57.69	25457.49		5.76	6.03
Uranus	E	2032-12-27T09:25:01.538		50.15	-56.44	25291.44		9.42	9.86
6	E	2032-12-27T09:45:11.994		45.80	-52.10	41861.51	19.07		
5	E	2032-12-27T09:45:33.149		45.72	-52.02	42274.80	19.21		
4	E	2032-12-27T09:45:46.363		45.67	-51.97	42528.31	19.25		
alpha	E	2032-12-27T09:47:38.649		45.27	-51.57	44718.44	19.75		
beta	E	2032-12-27T09:48:26.062		45.10	-51.40	45655.06	19.93		
eta	E	2032-12-27T09:49:41.813		44.83	-51.13	47176.12	20.20		
gamma	E	2032-12-27T09:50:03.888		44.75	-51.05	47622.95	20.28		
delta	E	2032-12-27T09:50:37.200		44.63	-50.93	48300.35	20.39		
lambda	E	2032-12-27T09:52:01.328		44.33	-50.63	50026.71	20.65		
epsilon	E	2032-12-27T09:53:09.443		44.08	-50.38	51439.70	20.90		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-27T09:25:49.460  
 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 : 3427814704610664576  
 2Mass ID (if available) : 05550790+2338562  
 ICRS Star Coord at Epoch: 05h 55m 07.85048s +23:38:55.83951s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.123  
 G magnitude : 16.929  
 RP magnitude : 16.087  
 BP magnitude : 17.556  
 DUPflag : 0  
 Distance (au) : 18.041  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 173.16  
 Sun-Moon sep (deg) : 125.49  
 B (ring opening deg) : 76.27  
 PA of pole (deg) : 53.97  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.777  
 C/A sky separation (km) : 23248.8  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



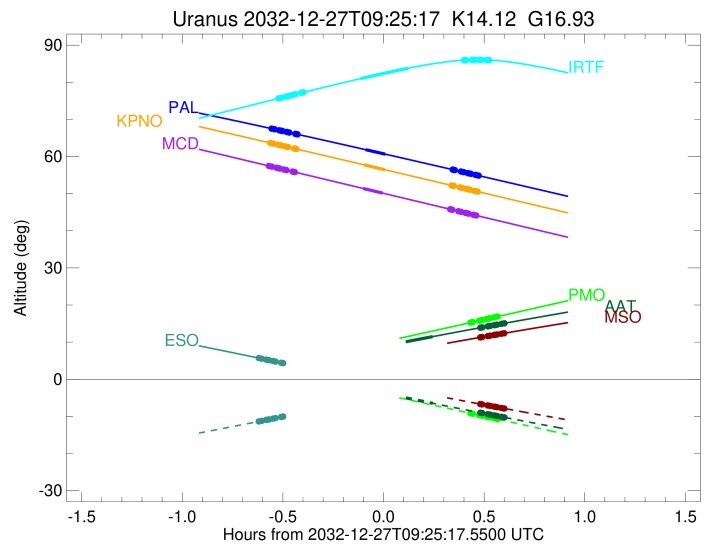
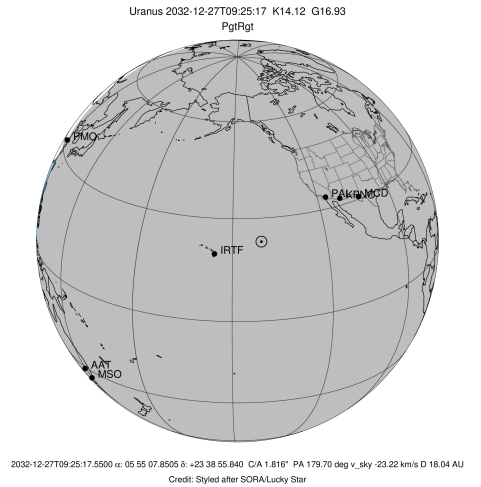
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-27T08:53:55.466		75.64	-68.98	51224.94	-21.51		
lambda	I	2032-12-27T08:54:51.579		75.85	-69.19	50026.71	-21.28		
delta	I	2032-12-27T08:56:13.106		76.15	-69.50	48300.35	-21.06		
gamma	I	2032-12-27T08:56:44.929		76.27	-69.62	47631.48	-20.97		
eta	I	2032-12-27T08:57:06.677		76.35	-69.70	47176.12	-20.91		
beta	I	2032-12-27T08:58:18.579		76.61	-69.98	45681.07	-20.68		
alpha	I	2032-12-27T08:59:03.836		76.78	-70.15	44749.64	-20.52		
4	I	2032-12-27T09:00:49.549		77.17	-70.55	42599.30	-20.10		
5	I	2032-12-27T09:01:05.329		77.23	-70.61	42287.68	-20.07		
6	I	2032-12-27T09:01:29.833		77.32	-70.70	41796.52	-19.94		
Uranus	I	2032-12-27T09:18:22.922		80.97	-74.54	25536.90		2.68	2.81
Uranus	E	2032-12-27T09:32:35.520		83.78	-77.72	25155.95		11.64	12.18
6	E	2032-12-27T09:49:18.952		85.95	-81.36	41863.50	19.95		
5	E	2032-12-27T09:49:38.876		85.97	-81.43	42270.73	20.08		
4	E	2032-12-27T09:49:51.729		85.98	-81.48	42527.56	20.11		
alpha	E	2032-12-27T09:51:39.418		86.04	-81.86	44716.63	20.53		
beta	E	2032-12-27T09:52:25.105		86.05	-82.01	45654.07	20.69		
eta	E	2032-12-27T09:53:38.237		86.05	-82.27	47176.12	20.92		
gamma	E	2032-12-27T09:53:59.558		86.05	-82.34	47622.75	20.98		
delta	E	2032-12-27T09:54:31.782		86.04	-82.45	48300.35	21.07		
lambda	E	2032-12-27T09:55:53.266		86.01	-82.73	50026.71	21.29		
epsilon	E	2032-12-27T09:56:58.753		85.96	-82.95	51426.58	21.52		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-27T09:21:18.330  
 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 : 3427814704610664576  
 2Mass ID (if available) : 05550790+2338562  
 ICRS Star Coord at Epoch: 05h 55m 07.85048s +23:38:55.83951s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.123  
 G magnitude : 16.929  
 RP magnitude : 16.087  
 BP magnitude : 17.556  
 DUPflag : 0  
 Distance (au) : 18.041  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 173.16  
 Sun-Moon sep (deg) : 125.23  
 B (ring opening deg) : 76.27  
 PA of pole (deg) : 53.97  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.552  
 C/A sky separation (km) : 20307.9  
 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	2032-12-27T08:48:04.650		5.71	-11.36	51196.03	-21.91		
lambda	I	2032-12-27T08:48:58.332		5.55	-11.20	50026.71	-21.73		
delta	I	2032-12-27T08:50:18.067		5.30	-10.96	48300.35	-21.57		
gamma	I	2032-12-27T08:50:49.124		5.20	-10.87	47631.55	-21.50		
eta	I	2032-12-27T08:51:10.331		5.13	-10.81	47176.12	-21.45		
beta	I	2032-12-27T08:52:20.305		4.91x	-10.60	45680.79	-21.28		
alpha	I	2032-12-27T08:53:04.281		4.77x	-10.47	44748.40	-21.17		
4	I	2032-12-27T08:54:46.230		4.45x	-10.16	42602.37	-20.86		
5	I	2032-12-27T08:55:01.893		4.40x	-10.11	42282.02	-20.84		
6	I	2032-12-27T08:55:25.207		4.33x	-10.04	41795.58	-20.75		
Uranus	I	2032-12-27T09:10:13.043		1.50x	-7.33	25558.28		-0.48	-0.51
Uranus	E	2032-12-27T09:31:48.482		-2.72x	-3.26x	25062.02		12.99	13.58
6	E	2032-12-27T09:46:30.956		-5.64x	-0.43x	41865.97	20.67		
5	E	2032-12-27T09:46:49.823		-5.70x	-0.37x	42265.23	20.76		
4	E	2032-12-27T09:47:02.535		-5.74x	-0.33x	42526.78	20.78		
alpha	E	2032-12-27T09:48:46.985		-6.09x	0.01x	44714.29	21.08		
beta	E	2032-12-27T09:49:31.580		-6.24x	0.16x	45652.82	21.19		
eta	E	2032-12-27T09:50:43.151		-6.48x	0.39x	47176.12	21.35		
gamma	E	2032-12-27T09:51:04.032		-6.55x	0.46x	47622.51	21.40		
delta	E	2032-12-27T09:51:35.657		-6.66x	0.56x	48300.35	21.47		
lambda	E	2032-12-27T09:52:55.775		-6.93x	0.82x	50026.71	21.63		
epsilon	E	2032-12-27T09:53:59.536		-7.14x	1.03x	51409.25	21.80		

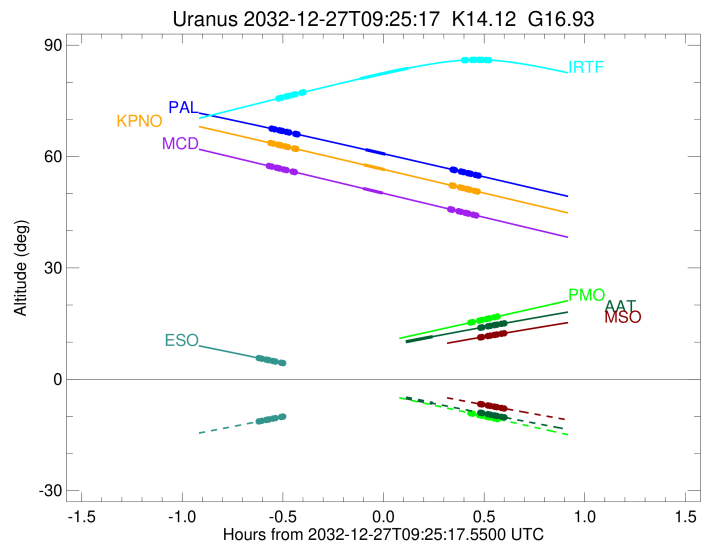
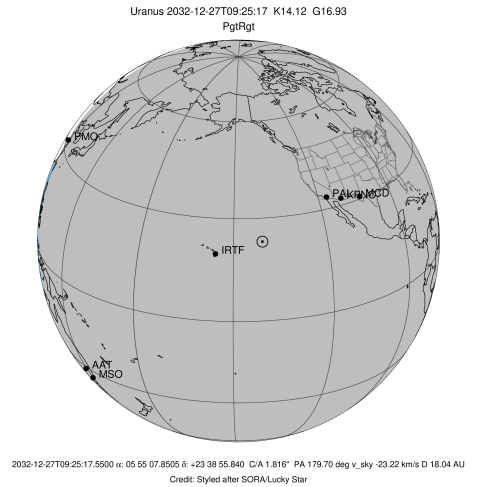
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-27T09:28:49.610  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : AAT  
 Location : Siding Spring (AAT)  
 Latitude (deg) : -31.27703  
 E. Longitude (deg) : 149.06608  
 Altitude (km) : 1.164  
 Gaia source ID : 3427814704610664576  
 2Mass ID (if available) : 05550790+2338562  
 ICRS Star Coord at Epoch: 05h 55m 07.85048s +23:38:55.83951s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.123  
 G magnitude : 16.929  
 RP magnitude : 16.087  
 BP magnitude : 17.556  
 DUPflag : 0  
 Distance (au) : 18.041  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 173.16  
 Sun-Moon sep (deg) : 124.51  
 B (ring opening deg) : 76.27  
 PA of pole (deg) : 53.97  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.499  
 C/A sky separation (km) : 19619.7  
 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	2032-12-27T08:55:27.023		3.53x	1.85x	51195.23	-22.02		
lambda	I	2032-12-27T08:56:20.371		3.70x	1.68x	50026.71	-21.86		
delta	I	2032-12-27T08:57:39.615		3.94x	1.43x	48300.35	-21.71		
gamma	I	2032-12-27T08:58:10.463		4.04x	1.33x	47631.55	-21.65		
eta	I	2032-12-27T08:58:31.522		4.10x	1.26x	47176.12	-21.61		
beta	I	2032-12-27T08:59:40.972		4.31x	1.04x	45680.77	-21.45		
alpha	I	2032-12-27T09:00:24.594		4.45x	0.90x	44748.33	-21.35		
4	I	2032-12-27T09:02:05.601		4.76x	0.58x	42602.56	-21.07		
5	I	2032-12-27T09:02:21.139		4.80x	0.53x	42281.63	-21.05		
6	I	2032-12-27T09:02:44.197		4.88x	0.46x	41795.53	-20.97		
Uranus	I	2032-12-27T09:17:09.837		7.49	-2.27x	25556.53		-0.89	-0.94
Uranus	E	2032-12-27T09:39:54.261		11.48	-6.45	25044.66		13.22	13.83
6	E	2032-12-27T09:54:10.338		13.89	-9.01	41866.93	21.04		
5	E	2032-12-27T09:54:28.725		13.94	-9.06	42262.93	21.13		
4	E	2032-12-27T09:54:41.338		13.98	-9.10	42526.54	21.14		
alpha	E	2032-12-27T09:56:24.007		14.26	-9.40	44713.30	21.43		
beta	E	2032-12-27T09:57:07.909		14.38	-9.53	45652.30	21.53		
eta	E	2032-12-27T09:58:18.387		14.57	-9.74	47176.12	21.69		
gamma	E	2032-12-27T09:58:38.944		14.63	-9.80	47622.40	21.73		
delta	E	2032-12-27T09:59:10.093		14.72	-9.89	48300.35	21.80		
lambda	E	2032-12-27T10:00:29.019		14.93	-10.12	50026.71	21.95		
epsilon	E	2032-12-27T10:01:31.466		15.10	-10.30	51400.73	22.11		



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-27T09:28:40.190  
 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 : 3427814704610664576  
 2Mass ID (if available) : 05550790+2338562  
 ICRS Star Coord at Epoch: 05h 55m 07.85048s +23:38:55.83951s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.123  
 G magnitude : 16.929  
 RP magnitude : 16.087  
 BP magnitude : 17.556  
 DUPflag : 0  
 Distance (au) : 18.041  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.22  
 Sun-Target sep (deg) : 173.16  
 Sun-Moon sep (deg) : 124.50  
 B (ring opening deg) : 76.27  
 PA of pole (deg) : 53.97  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.477  
 C/A sky separation (km) : 19326.4  
 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	2032-12-27T08:55:12.197		1.40x	3.72x	51192.59	-22.07		
lambda	I	2032-12-27T08:56:05.299		1.56x	3.55x	50026.71	-21.91		
delta	I	2032-12-27T08:57:24.338		1.79x	3.31x	48300.35	-21.77		
gamma	I	2032-12-27T08:57:55.102		1.88x	3.22x	47631.55	-21.71		
eta	I	2032-12-27T08:58:16.101		1.94x	3.15x	47176.12	-21.67		
beta	I	2032-12-27T08:59:25.346		2.14x	2.94x	45680.73	-21.52		
alpha	I	2032-12-27T09:00:08.833		2.27x	2.81x	44748.20	-21.42		
4	I	2032-12-27T09:01:49.464		2.56x	2.51x	42602.82	-21.15		
5	I	2032-12-27T09:02:04.985		2.61x	2.46x	42281.09	-21.14		
6	I	2032-12-27T09:02:27.928		2.68x	2.39x	41795.46	-21.05		
Uranus	I	2032-12-27T09:16:45.482		5.14	-0.19x	25555.01		-1.14	-1.19
Uranus	E	2032-12-27T09:40:00.266		9.02	-4.27x	25039.80		13.29	13.89
6	E	2032-12-27T09:54:08.511		11.28	-6.68	41867.17	21.12		
5	E	2032-12-27T09:54:26.791		11.33	-6.73	42262.35	21.20		
4	E	2032-12-27T09:54:39.388		11.36	-6.76	42526.48	21.22		
alpha	E	2032-12-27T09:56:21.698		11.63	-7.05	44713.06	21.50		
beta	E	2032-12-27T09:57:05.470		11.74	-7.17	45652.17	21.60		
eta	E	2032-12-27T09:58:15.755		11.93	-7.37	47176.12	21.75		
gamma	E	2032-12-27T09:58:36.256		11.98	-7.43	47622.38	21.79		
delta	E	2032-12-27T09:59:07.326		12.06	-7.51	48300.35	21.85		
lambda	E	2032-12-27T10:00:26.062		12.26	-7.73	50026.71	22.00		
epsilon	E	2032-12-27T10:01:28.285		12.42	-7.90	51398.81	22.16		