

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-04-11T04:36:16.030
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3416547871518972800
 2Mass ID (if available) : 05313439+2326136

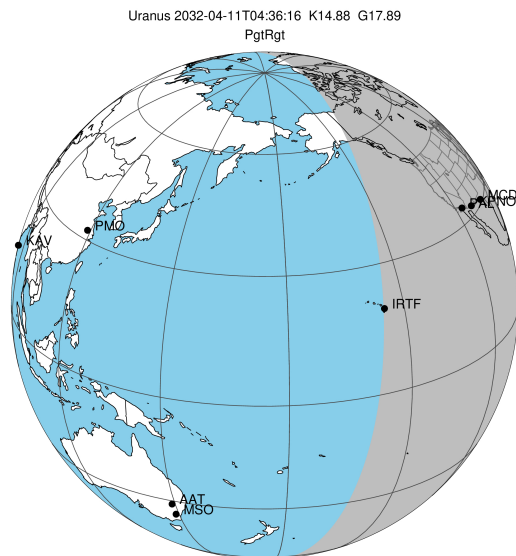
Uranus 2032-04-11T04:36:16 K14.88 G17.89 PgtRgt

ICRS Star Coord at Epoch: 05h 31m 34.40137s +23:26:13.40325s

RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.875
 G magnitude : 17.894
 RP magnitude : 17.003
 BP magnitude : 18.749
 DUPflag : 0
 Distance (au) : 19.514
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.30
 Sun-Target sep (deg) : 62.07
 Sun-Moon sep (deg) : 47.97
 B (ring opening deg) : 80.20
 PA of pole (deg) : 33.49

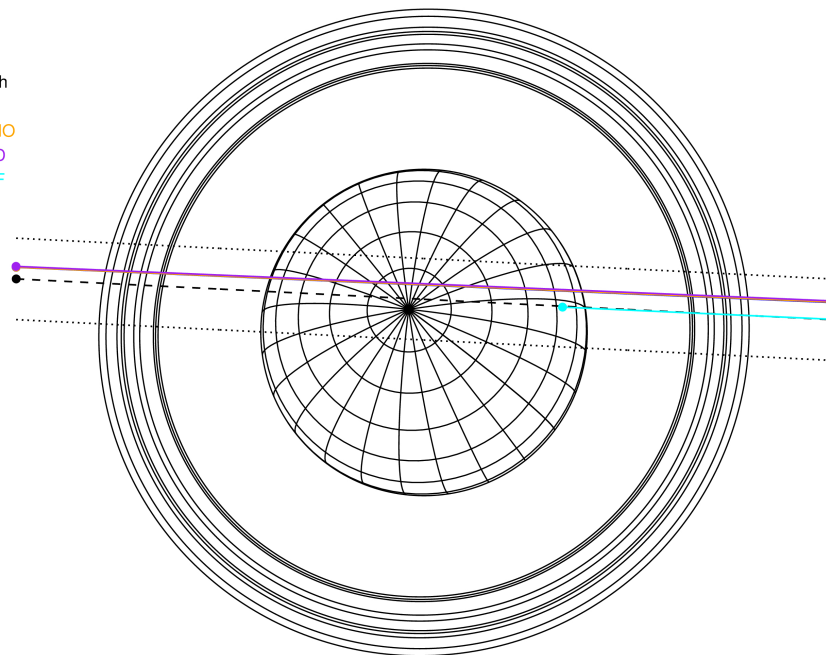
a(km) ring

- 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



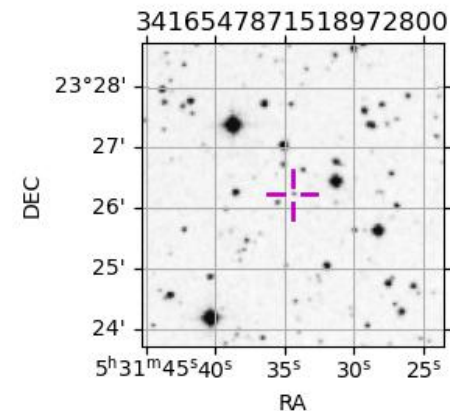
2032-04-11T04:36:16.0300 ex: 05 31 34.4014 d: +23 26 13.403 C/A 0.373° PA 177.13 deg v_sky +20.30 km/s D 19.51 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 KPNO
 MCD
 IRTF

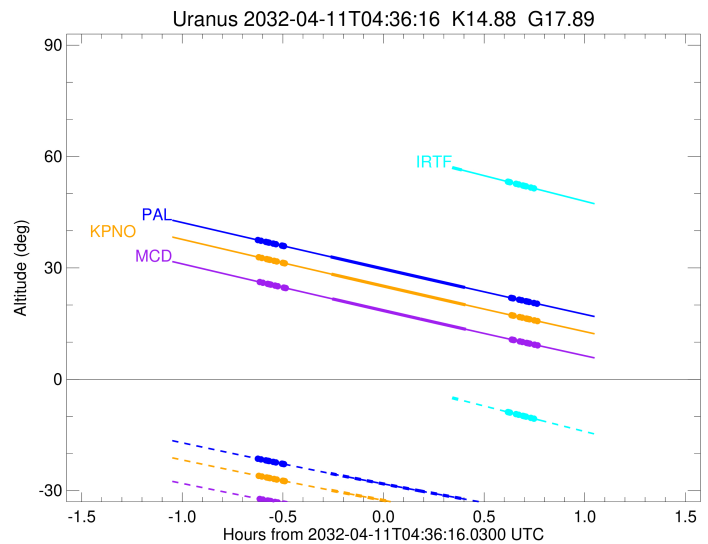
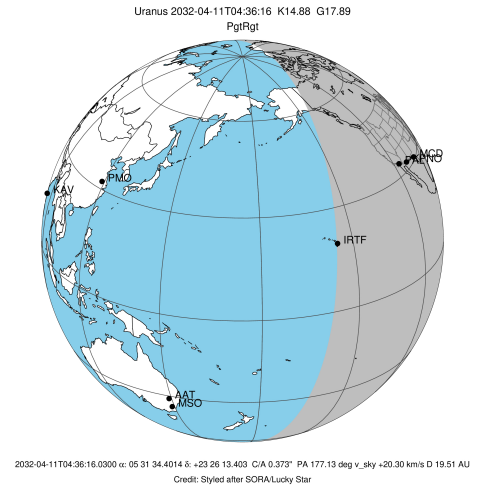


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+ +	+++++	APR 11 03:58 - APR 11 05:21	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	APR 11 03:58 - APR 11 05:22	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	APR 11 03:59 - APR 11 05:22	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+++++	APR 11 04:59 - APR 11 05:21	PneRne
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					PnnRnn
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



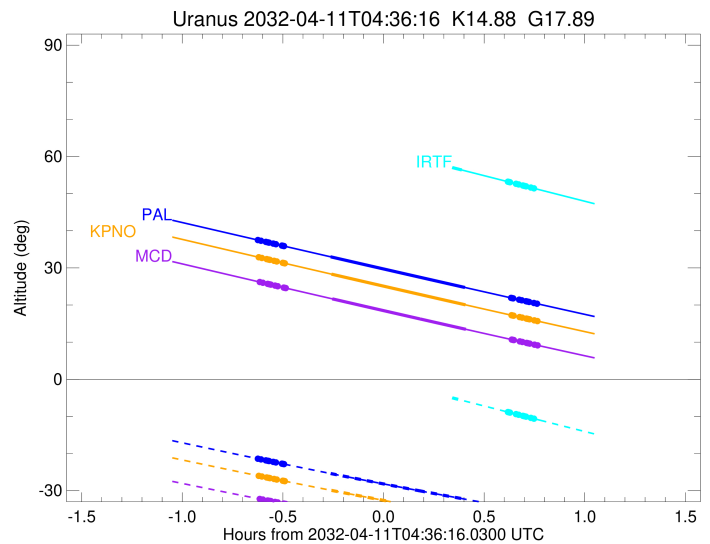
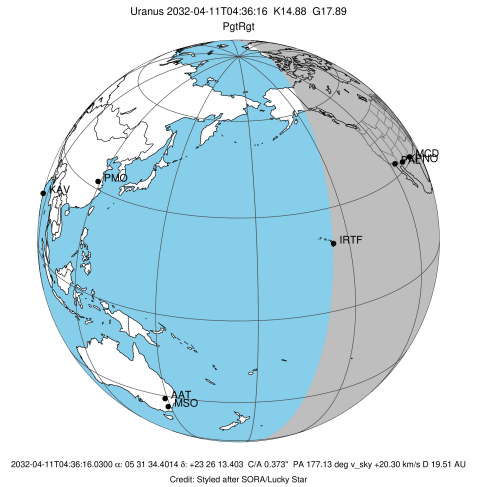
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-04-11T04:40:25.570
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3416547871518972800
 2Mass ID (if available) : 05313439+2326136
 ICRS Star Coord at Epoch: 05h 31m 34.40137s +23:26:13.40325s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.875
 G magnitude : 17.894
 RP magnitude : 17.003
 BP magnitude : 18.749
 DUPflag : 0
 Distance (au) : 19.514
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.30
 Sun-Target sep (deg) : 62.07
 Sun-Moon sep (deg) : 48.85
 B (ring opening deg) : 80.20
 PA of pole (deg) : 33.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.525
 C/A sky separation (km) : 7425.8
 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_itrfr93_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	2032-04-11T03:58:39.597		37.53	-21.38	51347.66	-19.98		
lambda	I	2032-04-11T03:59:45.784		37.30	-21.58	50026.71	-19.95		
delta	I	2032-04-11T04:01:12.339		37.00	-21.85	48300.35	-19.94		
gamma	I	2032-04-11T04:01:46.253		36.88	-21.96	47624.27	-19.93		
eta	I	2032-04-11T04:02:08.740		36.81	-22.03	47176.12	-19.93		
beta	I	2032-04-11T04:03:24.292		36.54	-22.26	45671.41	-19.91		
alpha	I	2032-04-11T04:04:10.696		36.38	-22.40	44745.97	-19.90		
4	I	2032-04-11T04:06:01.855		36.00	-22.75	42534.45	-19.87		
5	I	2032-04-11T04:06:15.414		35.95	-22.79	42272.04	-19.88		
6	I	2032-04-11T04:06:35.169		35.88	-22.85	41874.39	-19.86		
Uranus	I	2032-04-11T04:20:30.344		32.98	-25.39	25190.70		7.82	8.19
Uranus	E	2032-04-11T05:00:34.420		24.72	-32.30	25496.74		-3.18	-3.33
6	E	2032-04-11T05:14:15.841		21.93	-34.49	41795.21	19.99		
5	E	2032-04-11T05:14:37.220		21.86	-34.55	42224.81	20.01		
4	E	2032-04-11T05:14:56.966		21.79	-34.60	42614.91	20.00		
alpha	E	2032-04-11T05:16:40.383		21.44	-34.87	44686.04	20.03		
beta	E	2032-04-11T05:17:28.219		21.28	-34.99	45645.84	20.05		
eta	E	2032-04-11T05:18:44.506		21.02	-35.19	47176.12	20.07		
gamma	E	2032-04-11T05:19:06.950		20.95	-35.24	47626.64	20.08		
delta	E	2032-04-11T05:19:40.500		20.83	-35.33	48300.35	20.08		
lambda	E	2032-04-11T05:21:06.410		20.54	-35.55	50026.71	20.10		
epsilon	E	2032-04-11T05:21:57.601		20.37	-35.68	51056.19	20.14		

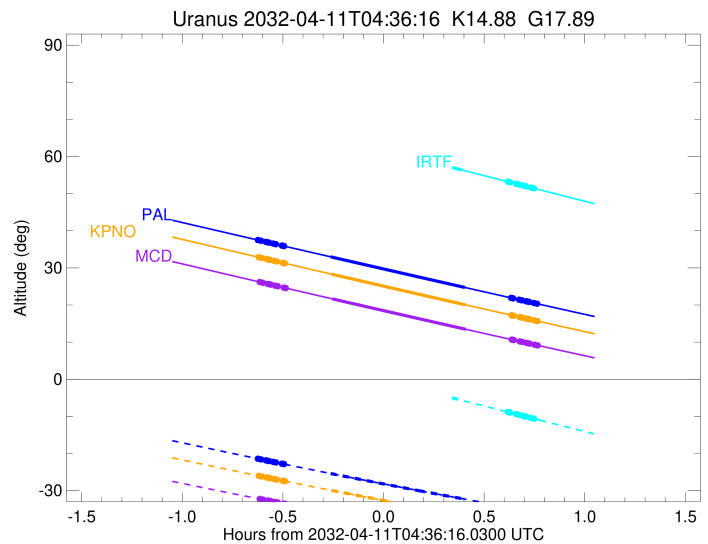
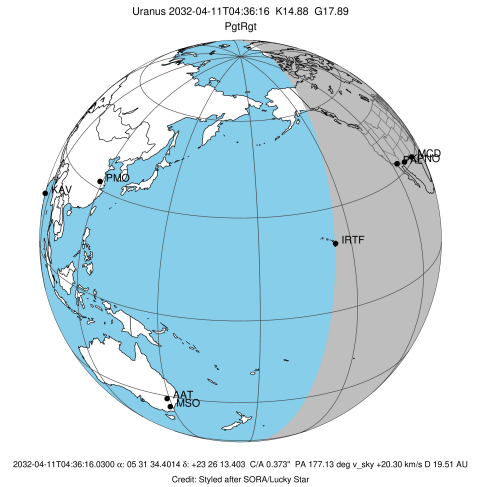
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-04-11T04:40:36.860
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      : 3416547871518972800
2Mass ID (if available) : 05313439+2326136
ICRS Star Coord at Epoch: 05h 31m 34.40137s +23:26:13.40325s
RUWE (>1.4 is poor) : 1.01
K magnitude          : 14.875
G magnitude          : 17.894
RP magnitude         : 17.003
BP magnitude         : 18.749
DUPflag             : 0
Distance (au)       : 19.514
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 20.30
Sun-Target sep (deg) : 62.07
Sun-Moon sep (deg)  : 48.82
B (ring opening deg) : 80.20
PA of pole (deg)    : 33.49
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.528
C/A sky separation (km) : 7475.1
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_itrfr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```



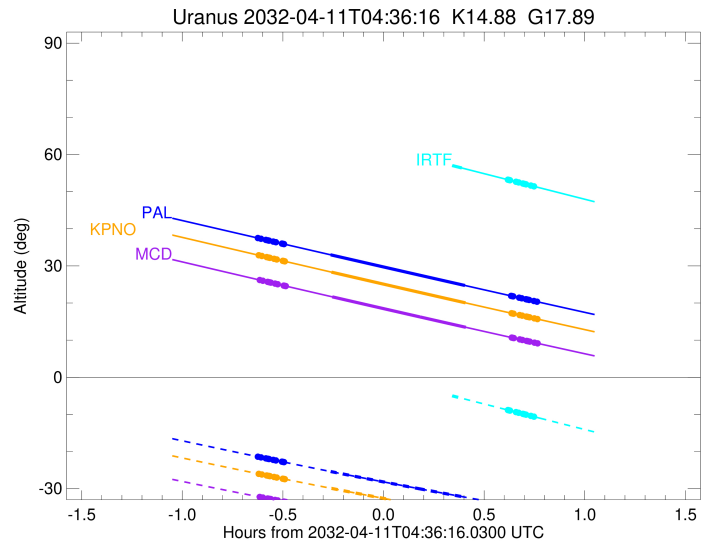
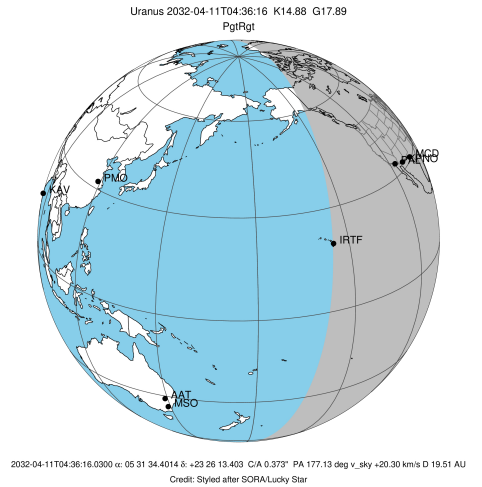
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-04-11T03:58:55.073		32.90	-25.99	51347.85	-20.01		
lambda	I	2032-04-11T04:00:01.185		32.67	-26.20	50026.71	-19.98		
delta	I	2032-04-11T04:01:27.629		32.36	-26.46	48300.35	-19.96		
gamma	I	2032-04-11T04:02:01.500		32.25	-26.56	47624.26	-19.96		
eta	I	2032-04-11T04:02:23.958		32.17	-26.63	47176.12	-19.95		
beta	I	2032-04-11T04:03:39.415		31.90	-26.86	45671.40	-19.94		
alpha	I	2032-04-11T04:04:25.760		31.74	-27.00	44745.96	-19.92		
4	I	2032-04-11T04:06:16.778		31.35	-27.34	42534.47	-19.90		
5	I	2032-04-11T04:06:30.318		31.31	-27.38	42272.10	-19.90		
6	I	2032-04-11T04:06:50.051		31.24	-27.44	41874.37	-19.89		
Uranus	I	2032-04-11T04:20:44.304		28.32	-29.93	25189.81		7.83	8.20
Uranus	E	2032-04-11T05:00:43.024		20.05	-36.60	25497.59		-3.16	-3.31
6	E	2032-04-11T05:14:23.355		17.26	-38.68	41795.20	20.02		
5	E	2032-04-11T05:14:44.710		17.18	-38.73	42224.93	20.03		
4	E	2032-04-11T05:15:04.421		17.12	-38.78	42614.92	20.03		
alpha	E	2032-04-11T05:16:47.681		16.77	-39.03	44686.03	20.07		
beta	E	2032-04-11T05:17:35.445		16.61	-39.14	45645.82	20.08		
eta	E	2032-04-11T05:18:51.616		16.35	-39.33	47176.12	20.10		
gamma	E	2032-04-11T05:19:14.025		16.27	-39.38	47626.64	20.11		
delta	E	2032-04-11T05:19:47.524		16.16	-39.46	48300.35	20.12		
lambda	E	2032-04-11T05:21:13.301		15.87	-39.67	50026.71	20.14		
epsilon	E	2032-04-11T05:22:04.437		15.70	-39.79	51056.71	20.17		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-04-11T04:40:47.460
 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 : 3416547871518972800
 2Mass ID (if available) : 05313439+2326136
 ICRS Star Coord at Epoch: 05h 31m 34.40137s +23:26:13.40325s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.875
 G magnitude : 17.894
 RP magnitude : 17.003
 BP magnitude : 18.749
 DUPflag : 0
 Distance (au) : 19.514
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.30
 Sun-Target sep (deg) : 62.07
 Sun-Moon sep (deg) : 48.76
 B (ring opening deg) : 80.20
 PA of pole (deg) : 33.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.539
 C/A sky separation (km) : 7630.4
 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	2032-04-11T03:59:12.920		26.23	-32.21	51348.77	-20.05		
lambda	I	2032-04-11T04:00:18.956		25.99	-32.41	50026.71	-20.01		
delta	I	2032-04-11T04:01:45.243		25.69	-32.66	48300.35	-20.00		
gamma	I	2032-04-11T04:02:19.054		25.57	-32.76	47624.25	-19.99		
eta	I	2032-04-11T04:02:41.471		25.50	-32.82	47176.12	-19.99		
beta	I	2032-04-11T04:03:56.797		25.23	-33.04	45671.35	-19.97		
alpha	I	2032-04-11T04:04:43.062		25.07	-33.18	44745.89	-19.96		
4	I	2032-04-11T04:06:33.884		24.68	-33.50	42534.56	-19.93		
5	I	2032-04-11T04:06:47.394		24.63	-33.54	42272.33	-19.94		
6	I	2032-04-11T04:07:07.109		24.57	-33.59	41874.30	-19.92		
Uranus	I	2032-04-11T04:21:00.425		21.66	-35.94	25186.54		7.87	8.23
Uranus	E	2032-04-11T05:00:48.342		13.46	-42.03	25499.97		-3.09	-3.24
6	E	2032-04-11T05:14:27.519		10.69	-43.86	41795.18	20.06		
5	E	2032-04-11T05:14:48.853		10.62	-43.90	42225.26	20.07		
4	E	2032-04-11T05:15:08.512		10.56	-43.94	42614.97	20.07		
alpha	E	2032-04-11T05:16:51.570		10.21	-44.16	44685.99	20.10		
beta	E	2032-04-11T05:17:39.241		10.05	-44.26	45645.78	20.12		
eta	E	2032-04-11T05:18:55.263		9.80	-44.42	47176.12	20.14		
gamma	E	2032-04-11T05:19:17.625		9.72	-44.46	47626.62	20.15		
delta	E	2032-04-11T05:19:51.057		9.61	-44.53	48300.35	20.16		
lambda	E	2032-04-11T05:21:16.657		9.32	-44.71	50026.71	20.18		
epsilon	E	2032-04-11T05:22:07.754		9.15	-44.81	51058.06	20.21		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-04-11T04:38:46.320
 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 : 3416547871518972800
 2Mass ID (if available) : 05313439+2326136
 ICRS Star Coord at Epoch: 05h 31m 34.40137s +23:26:13.40325s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.875
 G magnitude : 17.894
 RP magnitude : 17.003
 BP magnitude : 18.749
 DUPflag : 0
 Distance (au) : 19.514
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.30
 Sun-Target sep (deg) : 62.07
 Sun-Moon sep (deg) : 48.92
 B (ring opening deg) : 80.20
 PA of pole (deg) : 33.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.351
 C/A sky separation (km) : 4970.6
 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	2032-04-11T03:56:15.936		70.91	9.07x	51331.49	-19.89		
lambda	I	2032-04-11T03:57:21.597		70.66	8.82x	50026.71	-19.87		
delta	I	2032-04-11T03:58:48.498		70.33	8.48x	48300.35	-19.86		
gamma	I	2032-04-11T03:59:22.525		70.20	8.35x	47624.51	-19.86		
eta	I	2032-04-11T03:59:45.104		70.12	8.26x	47176.12	-19.86		
beta	I	2032-04-11T04:01:00.858		69.83	7.96x	45672.28	-19.85		
alpha	I	2032-04-11T04:01:47.395		69.65	7.78x	44746.97	-19.85		
4	I	2032-04-11T04:03:38.938		69.23	7.35x	42533.04	-19.83		
5	I	2032-04-11T04:03:52.645		69.18	7.29x	42268.02	-19.84		
6	I	2032-04-11T04:04:12.201		69.10	7.22x	41875.49	-19.83		
Uranus	I	2032-04-11T04:18:02.948		65.93	3.98x	25244.78		7.21	7.55
Uranus	E	2032-04-11T04:59:38.830		56.37	-5.67	25455.57		-4.10	-4.30
6	E	2032-04-11T05:13:18.880		53.23	-8.82	41795.69	19.92		
5	E	2032-04-11T05:13:40.044		53.15	-8.90	42219.88	19.93		
4	E	2032-04-11T05:14:00.101		53.07	-8.98	42614.07	19.92		
alpha	E	2032-04-11T05:15:44.050		52.67	-9.38	44686.67	19.94		
beta	E	2032-04-11T05:16:32.130		52.49	-9.56	45646.62	19.94		
eta	E	2032-04-11T05:17:48.799		52.20	-9.85	47176.12	19.96		
gamma	E	2032-04-11T05:18:11.389		52.11	-9.94	47626.94	19.96		
delta	E	2032-04-11T05:18:45.126		51.98	-10.07	48300.35	19.96		
lambda	E	2032-04-11T05:20:11.584		51.65	-10.40	50026.71	19.97		
epsilon	E	2032-04-11T05:21:02.106		51.46	-10.59	51035.92	19.99		