

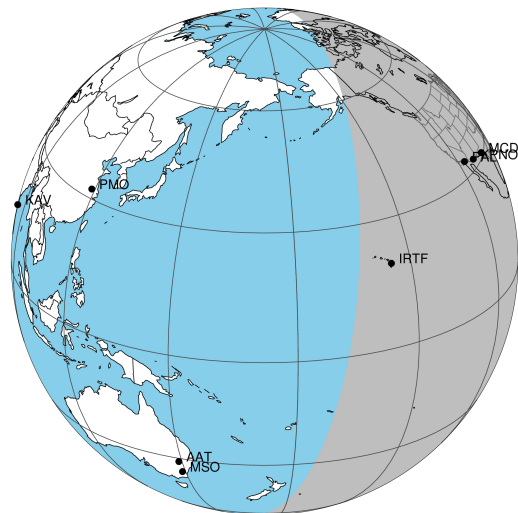
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-04-19T05:12:30.030
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3383342590299987328
 2Mass ID (if available) : 06283458+2336048

Uranus 2035-04-19T05:12:30 K10.67 G13.87 PgtRgt

ICRS Star Coord at Epoch: 06h 28m 34.58284s +23:36:04.65915s

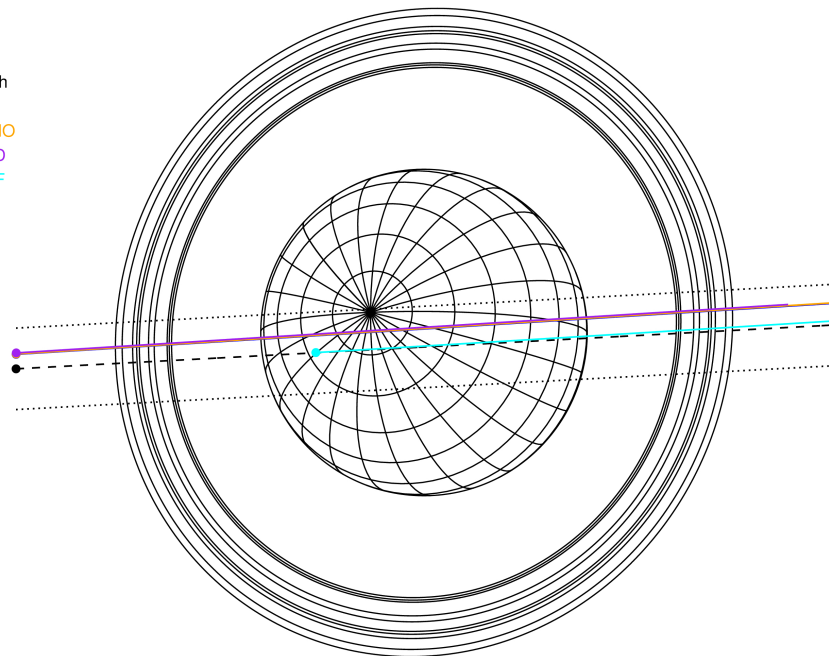
RUWE (>1.4 is poor) : 1.07
 K magnitude : 10.670
 G magnitude : 13.868
 RP magnitude : 12.965
 BP magnitude : 14.715
 DUPflag : 0
 Distance (au) : 19.223
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 17.55
 Sun-Target sep (deg) : 68.03
 Sun-Moon sep (deg) : 72.98
 B (ring opening deg) : 69.51
 PA of pole (deg) : 69.32

Uranus 2035-04-19T05:12:30 K10.67 G13.87
 PgtRgt



2035-04-19T05:12:30.0300 α: 06 28 34.5828 δ: +23 36 04.659 C/A 0.155° PA 3.08 deg v_sky +17.55 km/s D 19.22 AU
 Credit: Styled after SORA/Lucky Star

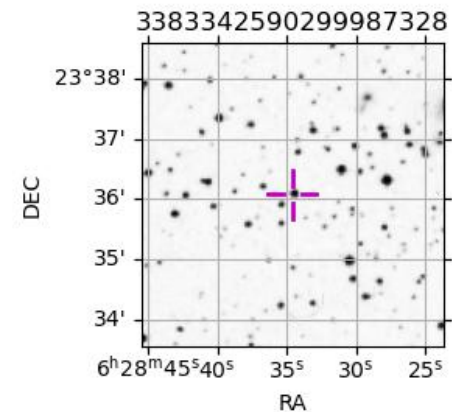
Earth
 PAL
 KPNO
 MCD
 IRTF



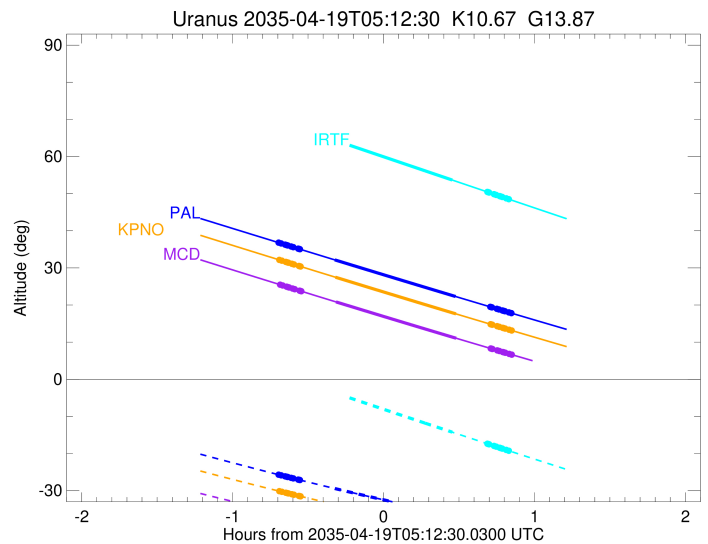
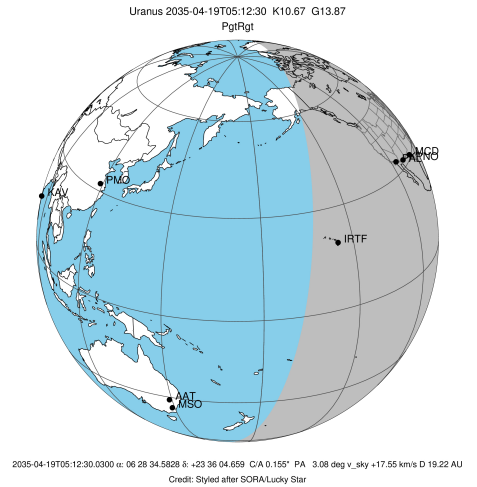
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+ +	+++++	APR 19 04:30 - APR 19 06:02	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	APR 19 04:30 - APR 19 06:03	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	APR 19 04:31 - APR 19 06:03	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+++++	APR 19 05:39 - APR 19 06:01	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

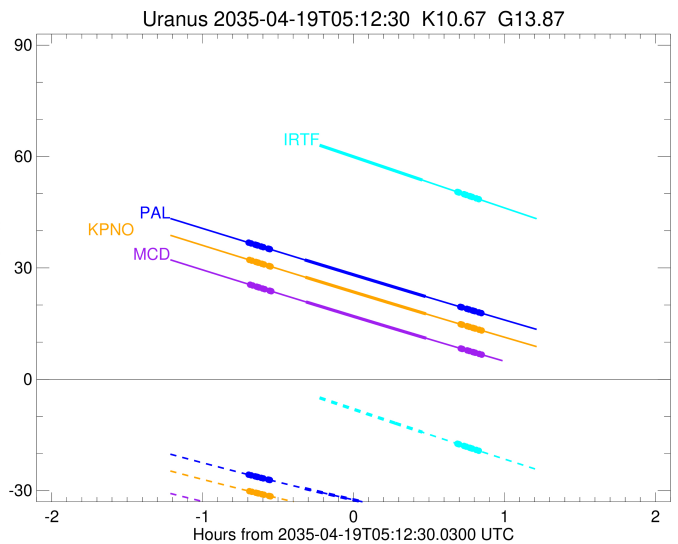
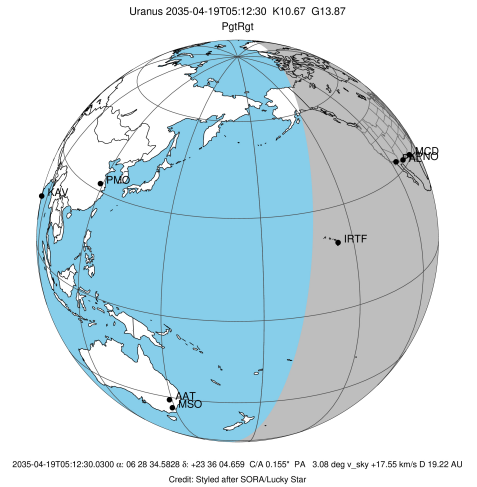


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-04-19T05:17:09.950
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3383342590299987328
 2Mass ID (if available) : 06283458+2336048
 ICRS Star Coord at Epoch: 06h 28m 34.58284s +23:36:04.65915s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 10.670
 G magnitude : 13.868
 RP magnitude : 12.965
 BP magnitude : 14.715
 DUPflag : 0
 Distance (au) : 19.223
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 17.55
 Sun-Target sep (deg) : 68.03
 Sun-Moon sep (deg) : 73.19
 B (ring opening deg) : 69.51
 PA of pole (deg) : 69.32
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.040
 C/A sky separation (km) : 555.6
 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



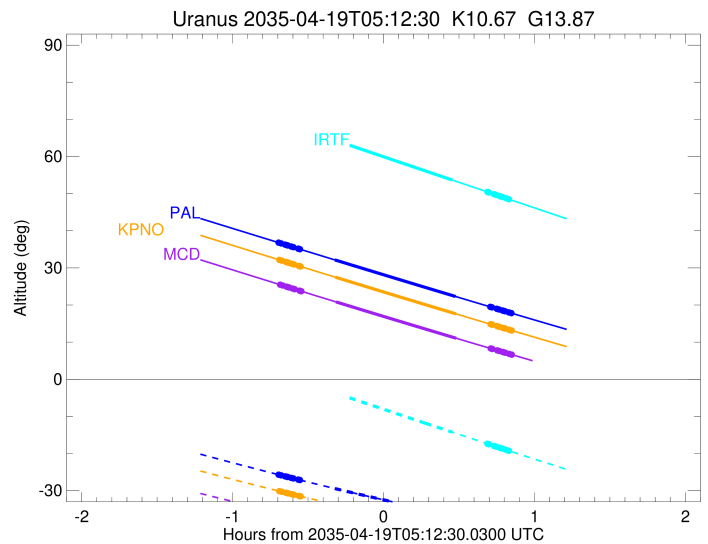
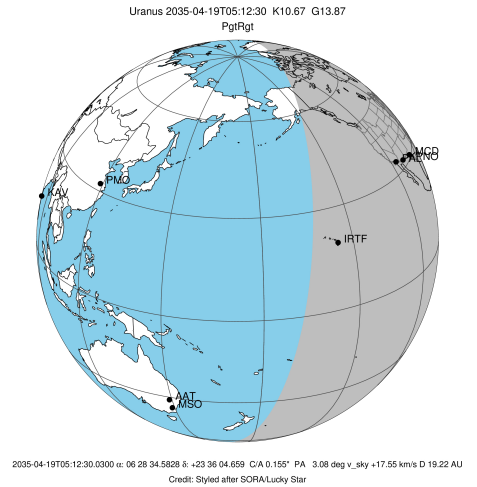
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-04-19T04:30:26.889		36.88	-25.64	51554.01	-18.32		
lambda	I	2035-04-19T04:31:50.239		36.59	-25.88	50026.71	-18.32		
delta	I	2035-04-19T04:33:24.442		36.26	-26.15	48300.35	-18.33		
gamma	I	2035-04-19T04:34:01.386		36.13	-26.26	47623.24	-18.33		
eta	I	2035-04-19T04:34:25.780		36.05	-26.33	47176.12	-18.33		
beta	I	2035-04-19T04:35:49.079		35.76	-26.56	45648.16	-18.33		
alpha	I	2035-04-19T04:36:39.742		35.58	-26.70	44722.72	-18.33		
4	I	2035-04-19T04:38:39.102		35.17	-27.04	42526.89	-18.33		
5	I	2035-04-19T04:38:51.471		35.13	-27.08	42314.90	-18.34		
6	I	2035-04-19T04:39:19.515		35.03	-27.15	41794.96	-18.34		
Uranus	I	2035-04-19T04:53:07.765		32.16	-29.43	25121.83		18.80	19.62
Uranus	E	2035-04-19T05:41:09.218		22.30	-36.55	25138.54		-18.41	-19.22
6	E	2035-04-19T05:54:58.421		19.50	-38.32	41879.62	18.49		
5	E	2035-04-19T05:55:13.022		19.45	-38.35	42155.38	18.50		
4	E	2035-04-19T05:55:38.704		19.36	-38.40	42615.81	18.49		
alpha	E	2035-04-19T05:57:31.797		18.98	-38.63	44715.05	18.50		
beta	E	2035-04-19T05:58:23.795		18.81	-38.73	45673.76	18.50		
eta	E	2035-04-19T05:59:44.935		18.54	-38.89	47176.12	18.50		
gamma	E	2035-04-19T06:00:09.431		18.45	-38.94	47629.39	18.50		
delta	E	2035-04-19T06:00:45.688		18.33	-39.01	48300.35	18.51		
lambda	E	2035-04-19T06:02:18.964		18.02	-39.19	50026.71	18.51		
epsilon	E	2035-04-19T06:02:57.794		17.89	-39.27	50745.49	18.51		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-04-19T05:17:21.830
 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 : 3383342590299987328
 2Mass ID (if available) : 06283458+2336048
 ICRS Star Coord at Epoch: 06h 28m 34.58284s +23:36:04.65915s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 10.670
 G magnitude : 13.868
 RP magnitude : 12.965
 BP magnitude : 14.715
 DUPflag : 0
 Distance (au) : 19.223
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 17.55
 Sun-Target sep (deg) : 68.03
 Sun-Moon sep (deg) : 73.12
 B (ring opening deg) : 69.51
 PA of pole (deg) : 69.32
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.045
 C/A sky separation (km) : 631.9
 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	2035-04-19T04:30:44.151		32.23	-30.09	51554.05	-18.35		
lambda	I	2035-04-19T04:32:07.361		31.94	-30.32	50026.71	-18.36		
delta	I	2035-04-19T04:33:41.402		31.61	-30.58	48300.35	-18.36		
gamma	I	2035-04-19T04:34:18.282		31.48	-30.68	47623.25	-18.36		
eta	I	2035-04-19T04:34:42.635		31.40	-30.74	47176.12	-18.36		
beta	I	2035-04-19T04:36:05.791		31.11	-30.97	45648.14	-18.36		
alpha	I	2035-04-19T04:36:56.363		30.93	-31.11	44722.77	-18.37		
4	I	2035-04-19T04:38:55.518		30.51	-31.43	42526.91	-18.37		
5	I	2035-04-19T04:39:07.866		30.47	-31.47	42314.91	-18.37		
6	I	2035-04-19T04:39:35.862		30.37	-31.54	41794.97	-18.37		
Uranus	I	2035-04-19T04:53:22.531		27.49	-33.72	25120.83		18.82	19.64
Uranus	E	2035-04-19T05:41:18.231		17.62	-40.35	25139.80		-18.38	-19.19
6	E	2035-04-19T05:55:05.957		14.82	-41.92	41879.63	18.53		
5	E	2035-04-19T05:55:20.530		14.77	-41.95	42155.39	18.53		
4	E	2035-04-19T05:55:46.159		14.69	-42.00	42615.83	18.53		
alpha	E	2035-04-19T05:57:39.028		14.31	-42.20	44715.11	18.54		
beta	E	2035-04-19T05:58:30.916		14.13	-42.29	45673.73	18.54		
eta	E	2035-04-19T05:59:51.895		13.86	-42.43	47176.12	18.54		
gamma	E	2035-04-19T06:00:16.341		13.78	-42.47	47629.39	18.54		
delta	E	2035-04-19T06:00:52.525		13.66	-42.53	48300.35	18.54		
lambda	E	2035-04-19T06:02:25.613		13.35	-42.69	50026.71	18.55		
epsilon	E	2035-04-19T06:03:04.369		13.22	-42.75	50745.56	18.55		

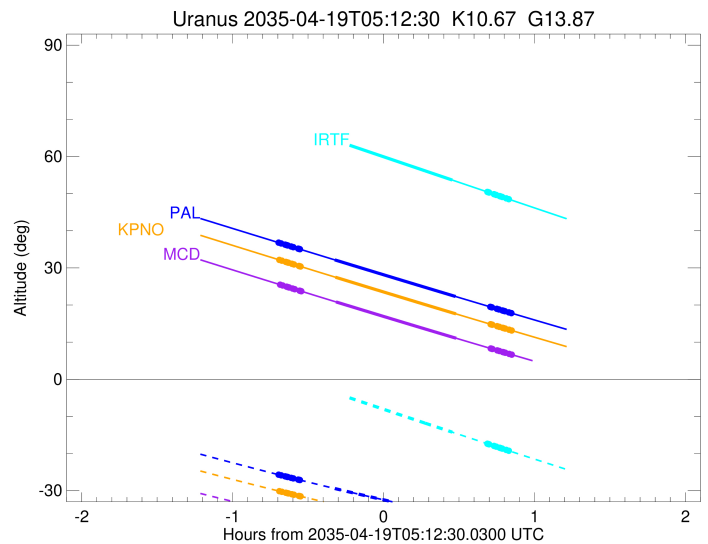
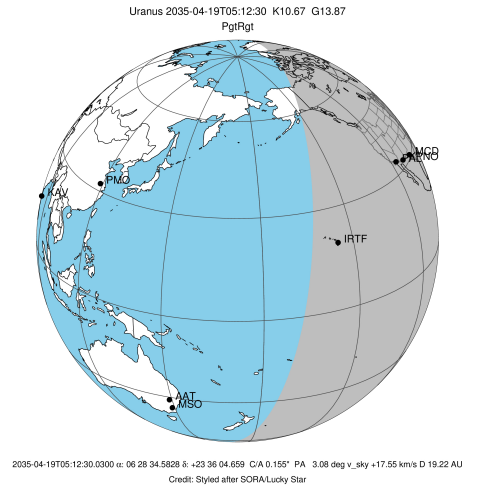
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-04-19T05:17:31.780
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3383342590299987328
 2Mass ID (if available) : 06283458+2336048
 ICRS Star Coord at Epoch: 06h 28m 34.58284s +23:36:04.65915s
 RUWE (>1.4 is poor) : 1.07
 K magnitude : 10.670
 G magnitude : 13.868
 RP magnitude : 12.965
 BP magnitude : 14.715
 DUPflag : 0
 Distance (au) : 19.223
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 17.55
 Sun-Target sep (deg) : 68.03
 Sun-Moon sep (deg) : 73.01
 B (ring opening deg) : 69.51
 PA of pole (deg) : 69.32
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.058
 C/A sky separation (km) : 811.7
 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_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	2035-04-19T04:31:02.725		25.56	-35.85	51554.16	-18.40		
lambda	I	2035-04-19T04:32:25.716		25.26	-36.06	50026.71	-18.41		
delta	I	2035-04-19T04:33:59.500		24.94	-36.30	48300.35	-18.41		
gamma	I	2035-04-19T04:34:36.279		24.81	-36.39	47623.26	-18.41		
eta	I	2035-04-19T04:35:00.567		24.72	-36.45	47176.12	-18.41		
beta	I	2035-04-19T04:36:23.500		24.43	-36.66	45648.08	-18.41		
alpha	I	2035-04-19T04:37:13.925		24.26	-36.79	44722.90	-18.42		
4	I	2035-04-19T04:39:12.760		23.84	-37.08	42526.94	-18.42		
5	I	2035-04-19T04:39:25.077		23.80	-37.11	42314.94	-18.42		
6	I	2035-04-19T04:39:52.998		23.70	-37.18	41794.99	-18.42		
Uranus	I	2035-04-19T04:53:37.116		20.84	-39.14	25118.34		18.88	19.70
Uranus	E	2035-04-19T05:41:23.786		11.05	-44.74	25142.66		-18.32	-19.12
6	E	2035-04-19T05:55:09.483		8.29	-45.93	41879.64	18.58		
5	E	2035-04-19T05:55:24.014		8.24	-45.95	42155.44	18.59		
4	E	2035-04-19T05:55:49.565		8.15	-45.98	42615.86	18.58		
alpha	E	2035-04-19T05:57:42.109		7.78	-46.13	44715.25	18.59		
beta	E	2035-04-19T05:58:33.833		7.61	-46.19	45673.67	18.59		
eta	E	2035-04-19T05:59:54.577		7.34	-46.29	47176.12	18.60		
gamma	E	2035-04-19T06:00:18.953		7.26	-46.32	47629.41	18.60		
delta	E	2035-04-19T06:00:55.029		7.14	-46.37	48300.35	18.60		
lambda	E	2035-04-19T06:02:27.843		6.84	-46.48	50026.71	18.60		
epsilon	E	2035-04-19T06:03:06.492		6.71	-46.52	50745.70	18.60		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2035-04-19T05:15:36.640
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      : 3383342590299987328
2Mass ID (if available) : 06283458+2336048
ICRS Star Coord at Epoch: 06h 28m 34.58284s +23:36:04.65915s
RUWE (>1.4 is poor) : 1.07
K magnitude          : 10.670
G magnitude          : 13.868
RP magnitude         : 12.965
BP magnitude         : 14.715
DUPflag             : 0
Distance (au)       : 19.223
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 17.55
Sun-Target sep (deg) : 68.03
Sun-Moon sep (deg)  : 73.63
B (ring opening deg) : 69.51
PA of pole (deg)    : 69.32
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.152
C/A sky separation (km) : 2123.4
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	2035-04-19T04:28:10.369		70.10	2.09x	51551.88	-18.08		
lambda	I	2035-04-19T04:29:34.736		69.78	1.76x	50026.71	-18.08		
delta	I	2035-04-19T04:31:10.233		69.42	1.40x	48300.35	-18.08		
gamma	I	2035-04-19T04:31:47.701		69.28	1.25x	47623.01	-18.08		
eta	I	2035-04-19T04:32:12.421		69.18	1.16x	47176.12	-18.08		
beta	I	2035-04-19T04:33:36.832		68.86	0.83x	45649.05	-18.08		
alpha	I	2035-04-19T04:34:28.352		68.67	0.64x	44720.76	-18.08		
4	I	2035-04-19T04:36:29.327		68.20	0.17x	42526.41	-18.07		
5	I	2035-04-19T04:36:41.842		68.16	0.12x	42314.29	-18.08		
6	I	2035-04-19T04:37:10.259		68.05	0.01x	41794.78	-18.08		
Uranus	I	2035-04-19T04:51:16.423		64.82	-3.23x	25163.08		17.83	18.62
Uranus	E	2035-04-19T05:39:50.292		53.67	-14.25	25100.15		-19.29	-20.13
6	E	2035-04-19T05:53:48.995		50.46	-17.37	41879.31	18.19		
5	E	2035-04-19T05:54:03.841		50.40	-17.43	42154.93	18.19		
4	E	2035-04-19T05:54:29.978		50.30	-17.52	42615.18	18.19		
alpha	E	2035-04-19T05:56:24.872		49.86	-17.95	44712.97	18.20		
beta	E	2035-04-19T05:57:17.911		49.66	-18.14	45674.69	18.20		
eta	E	2035-04-19T05:58:40.344		49.34	-18.45	47176.12	18.20		
gamma	E	2035-04-19T05:59:05.230		49.25	-18.54	47629.13	18.20		
delta	E	2035-04-19T05:59:42.100		49.11	-18.68	48300.35	18.21		
lambda	E	2035-04-19T06:01:16.913		48.75	-19.03	50026.71	18.21		
epsilon	E	2035-04-19T06:01:56.295		48.59	-19.17	50743.91	18.21		