

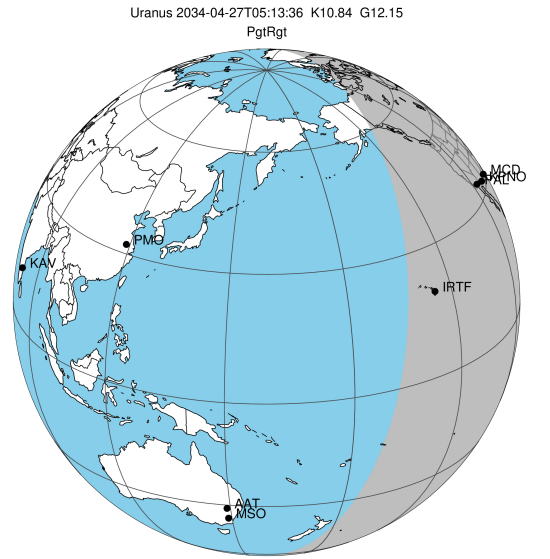
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-04-27T05:13:36.940  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3425431341355934464  
 2Mass ID (if available) : 06110374+2341027

Uranus 2034-04-27T05:13:36 K10.84 G12.15 PgtRgt

ICRS Star Coord at Epoch: 06h 11m 03.71875s +23:41:01.64699s

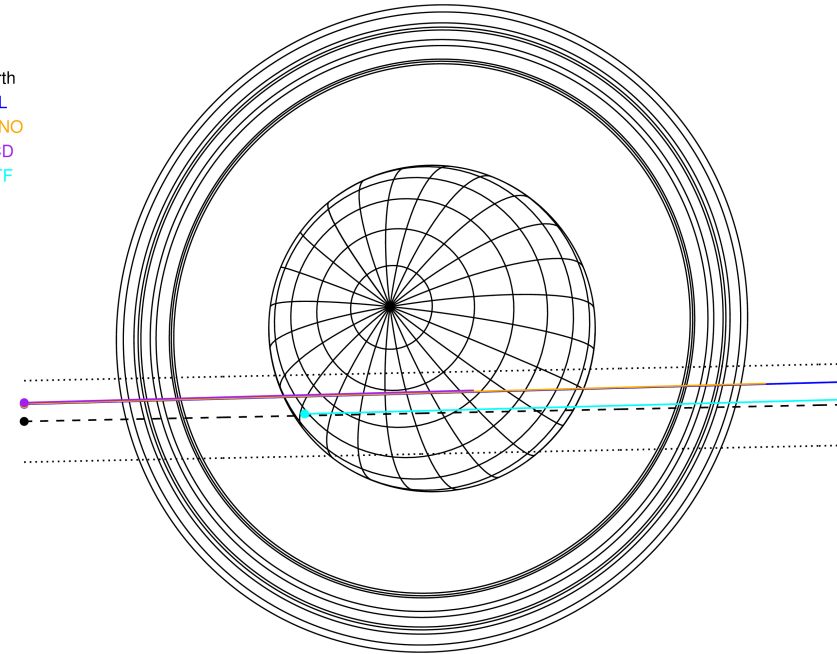
RUWE (>1.4 is poor) : 0.98  
 K magnitude : 10.843  
 G magnitude : 12.150  
 RP magnitude : 11.679  
 BP magnitude : 12.458  
 DUPflag : 0  
 Distance (au) : 19.477  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 23.06  
 Sun-Target sep (deg) : 55.97  
 Sun-Moon sep (deg) : 54.65  
 B (ring opening deg) : 73.14  
 PA of pole (deg) : 62.49

#	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



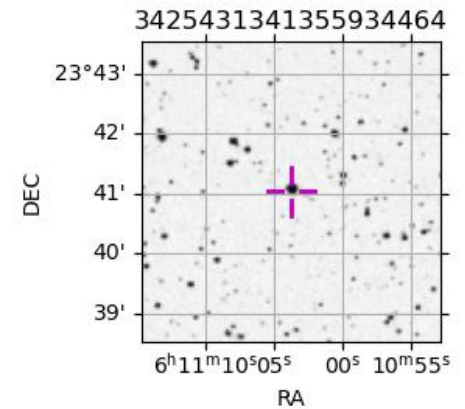
2034-04-27T05:13:36.9400 α: 06 11 03.7187 δ: +23 41 01.647 C/A 0.931° PA 1.17 deg v\_sky +23.06 km/s D 19.48 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PAL  
 KPNO  
 MCD  
 IRTF

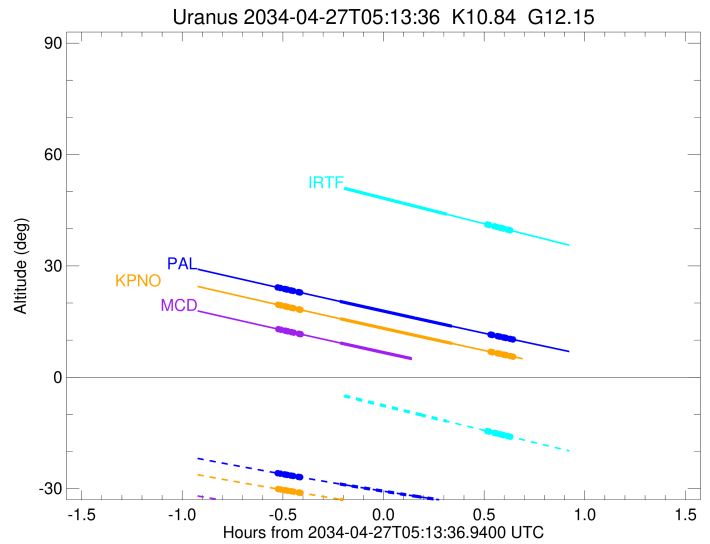
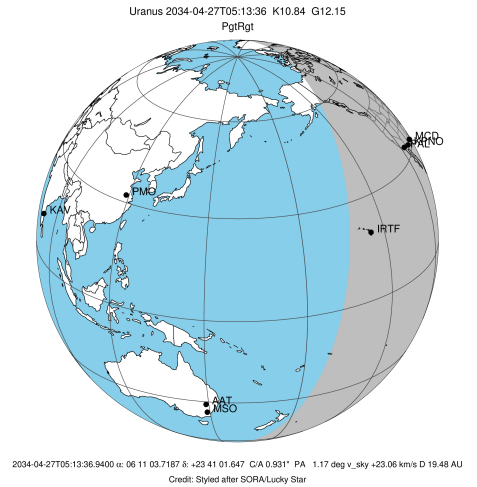


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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 27 04:42 - APR 27 05:52	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	APR 27 04:42 - APR 27 05:52	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+		APR 27 04:42 - APR 27 05:00	PinRin
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5		+	+++++	APR 27 05:32 - APR 27 05:51	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



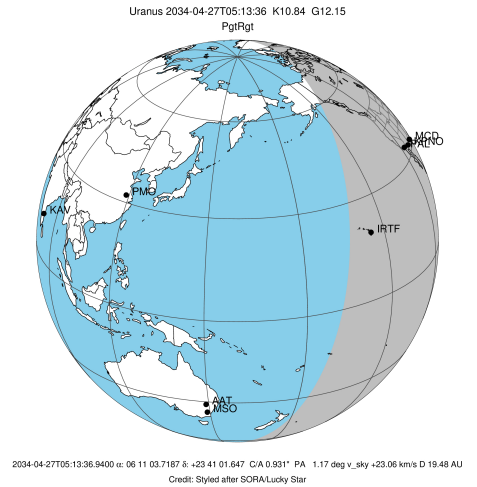
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-04-27T05:17:27.010  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3425431341355934464  
 2Mass ID (if available) : 06110374+2341027  
 ICRS Star Coord at Epoch: 06h 11m 03.71875s +23:41:01.64699s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 10.843  
 G magnitude : 12.150  
 RP magnitude : 11.679  
 BP magnitude : 12.458  
 DUPflag : 0  
 Distance (au) : 19.477  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 23.06  
 Sun-Target sep (deg) : 55.97  
 Sun-Moon sep (deg) : 54.46  
 B (ring opening deg) : 73.14  
 PA of pole (deg) : 62.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.717  
 C/A sky separation (km) : 10126.3  
 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



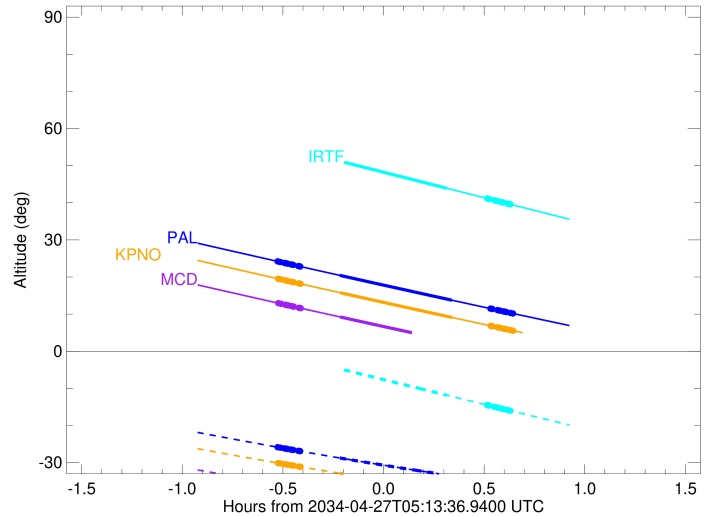
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-04-27T04:42:18.022		24.16	-25.88	50822.95	-23.23		
lambda	I	2034-04-27T04:42:52.273		24.04	-25.97	50026.71	-23.24		
delta	I	2034-04-27T04:44:06.614		23.79	-26.17	48300.35	-23.20		
gamma	I	2034-04-27T04:44:35.505		23.69	-26.25	47630.16	-23.19		
eta	I	2034-04-27T04:44:55.088		23.63	-26.30	47176.12	-23.18		
beta	I	2034-04-27T04:46:00.786		23.40	-26.47	45653.67	-23.14		
alpha	I	2034-04-27T04:46:42.715		23.26	-26.59	44687.37	-23.12		
4	I	2034-04-27T04:48:12.674		22.95	-26.82	42610.45	-23.05		
5	I	2034-04-27T04:48:29.443		22.90	-26.87	42212.33	-23.05		
6	I	2034-04-27T04:48:45.847		22.84	-26.91	41833.54	-23.02		
Uranus	I	2034-04-27T05:00:36.606		20.44	-28.75	25357.29		10.14	10.61
Uranus	E	2034-04-27T05:34:00.309		13.76	-33.51	25027.08		-16.78	-17.53
6	E	2034-04-27T05:45:30.833		11.49	-34.98	41820.29	23.13		
5	E	2034-04-27T05:45:51.142		11.43	-35.02	42291.14	23.16		
4	E	2034-04-27T05:46:00.776		11.40	-35.04	42525.96	23.17		
alpha	E	2034-04-27T05:47:36.069		11.09	-35.23	44740.38	23.24		
beta	E	2034-04-27T05:48:16.484		10.95	-35.32	45676.02	23.27		
eta	E	2034-04-27T05:49:20.870		10.74	-35.44	47176.12	23.31		
gamma	E	2034-04-27T05:49:39.962		10.68	-35.48	47621.22	23.32		
delta	E	2034-04-27T05:50:09.074		10.59	-35.54	48300.35	23.34		
lambda	E	2034-04-27T05:51:22.986		10.35	-35.69	50026.71	23.38		
epsilon	E	2034-04-27T05:52:19.585		10.16	-35.80	51350.62	23.37		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2034-04-27T05:17:31.640
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      : 3425431341355934464
2Mass ID (if available) : 06110374+2341027
ICRS Star Coord at Epoch: 06h 11m 03.71875s +23:41:01.64699s
RUWE (>1.4 is poor) : 0.98
K magnitude         : 10.843
G magnitude         : 12.150
RP magnitude        : 11.679
BP magnitude        : 12.458
DUPflag            : 0
Distance (au)       : 19.477
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : 23.06
Sun-Target sep (deg) : 55.97
Sun-Moon sep (deg)  : 54.39
B (ring opening deg) : 73.14
PA of pole (deg)    : 62.49
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.711
C/A sky separation (km) : 10045.7
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl.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
    
```

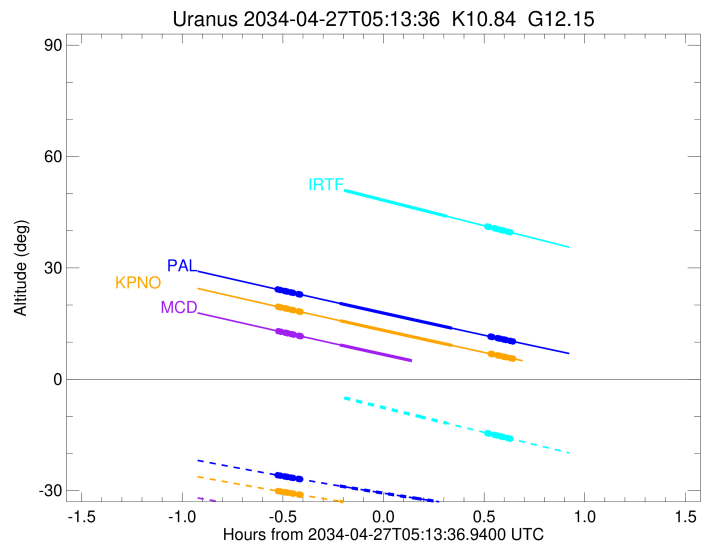
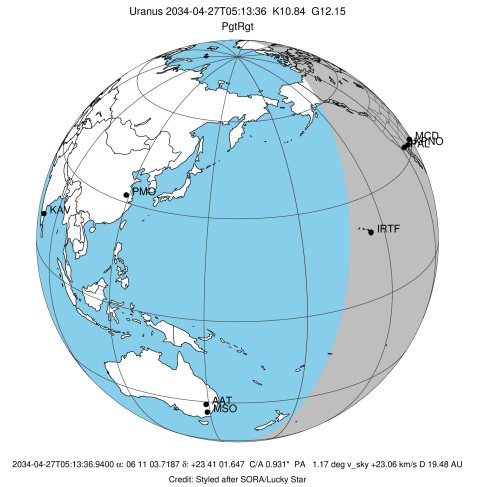


Uranus 2034-04-27T05:13:36 K10.84 G12.15



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-04-27T04:42:25.299		19.49	-30.15	50823.31	-23.27		
lambda	I	2034-04-27T04:42:59.502		19.37	-30.24	50026.71	-23.28		
delta	I	2034-04-27T04:44:13.705		19.12	-30.43	48300.35	-23.25		
gamma	I	2034-04-27T04:44:42.541		19.02	-30.50	47630.17	-23.23		
eta	I	2034-04-27T04:45:02.088		18.95	-30.55	47176.12	-23.22		
beta	I	2034-04-27T04:46:07.661		18.73	-30.72	45653.64	-23.19		
alpha	I	2034-04-27T04:46:49.507		18.59	-30.82	44687.40	-23.16		
4	I	2034-04-27T04:48:19.287		18.28	-31.05	42610.49	-23.10		
5	I	2034-04-27T04:48:36.030		18.23	-31.09	42212.19	-23.09		
6	I	2034-04-27T04:48:52.391		18.17	-31.13	41833.62	-23.06		
Uranus	I	2034-04-27T05:00:41.370		15.77	-32.87	25355.56		10.19	10.66
Uranus	E	2034-04-27T05:34:04.930		9.10	-37.28	25027.43		-16.78	-17.53
6	E	2034-04-27T05:45:33.793		6.85	-38.60	41820.37	23.18		
5	E	2034-04-27T05:45:54.051		6.78	-38.64	42291.02	23.21		
4	E	2034-04-27T05:46:03.670		6.75	-38.66	42525.97	23.22		
alpha	E	2034-04-27T05:47:38.770		6.44	-38.83	44740.43	23.28		
beta	E	2034-04-27T05:48:19.101		6.31	-38.90	45675.99	23.31		
eta	E	2034-04-27T05:49:23.359		6.11	-39.02	47176.12	23.35		
gamma	E	2034-04-27T05:49:42.413		6.04	-39.05	47621.22	23.37		
delta	E	2034-04-27T05:50:11.468		5.95	-39.10	48300.35	23.38		
lambda	E	2034-04-27T05:51:25.236		5.71	-39.23	50026.71	23.42		
epsilon	E	2034-04-27T05:52:21.751		5.53	-39.33	51351.21	23.42		

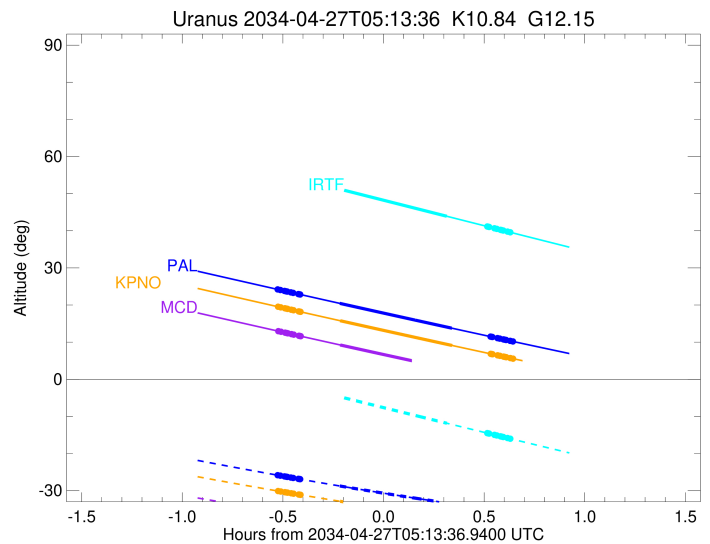
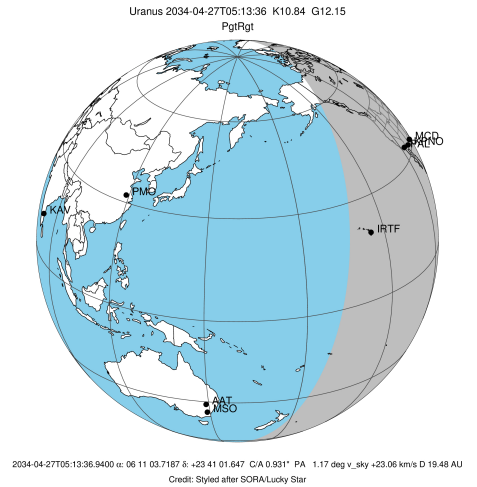
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-04-27T05:17:32.650  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : MCD  
 Location : McDonald Obs. 2.7m  
 Latitude (deg) : 30.67158  
 E. Longitude (deg) : 255.97844  
 Altitude (km) : 2.075  
 Gaia source ID : 3425431341355934464  
 2Mass ID (if available) : 06110374+2341027  
 ICRS Star Coord at Epoch: 06h 11m 03.71875s +23:41:01.64699s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 10.843  
 G magnitude : 12.150  
 RP magnitude : 11.679  
 BP magnitude : 12.458  
 DUPflag : 0  
 Distance (au) : 19.477  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 23.06  
 Sun-Target sep (deg) : 55.97  
 Sun-Moon sep (deg) : 54.30  
 B (ring opening deg) : 73.14  
 PA of pole (deg) : 62.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.698  
 C/A sky separation (km) : 9866.2  
 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	2034-04-27T04:42:29.852		12.91	-35.56	50824.18	-23.35		
lambda	I	2034-04-27T04:43:03.990		12.79	-35.64	50026.71	-23.35		
delta	I	2034-04-27T04:44:17.965		12.54	-35.81	48300.35	-23.32		
gamma	I	2034-04-27T04:44:46.711		12.45	-35.87	47630.18	-23.31		
eta	I	2034-04-27T04:45:06.197		12.38	-35.92	47176.12	-23.30		
beta	I	2034-04-27T04:46:11.567		12.16	-36.07	45653.56	-23.26		
alpha	I	2034-04-27T04:46:53.273		12.02	-36.16	44687.45	-23.24		
4	I	2034-04-27T04:48:22.755		11.72	-36.36	42610.59	-23.18		
5	I	2034-04-27T04:48:39.459		11.66	-36.40	42211.85	-23.17		
6	I	2034-04-27T04:48:55.742		11.61	-36.44	41833.80	-23.14		
Uranus	I	2034-04-27T05:00:41.574		9.24	-37.97	25351.56		10.29	10.76
Uranus	E	2034-04-27T05:34:07.060		2.65x	-41.67	25028.21		-16.77	-17.51
6	E	2034-04-27T05:45:33.108		0.45x	-42.69	41820.54	23.26		
5	E	2034-04-27T05:45:53.279		0.38x	-42.72	42290.77	23.29		
4	E	2034-04-27T05:46:02.875		0.35x	-42.74	42525.98	23.29		
alpha	E	2034-04-27T05:47:37.668		0.05x	-42.87	44740.54	23.36		
beta	E	2034-04-27T05:48:17.862		-0.08x	-42.92	45675.94	23.39		
eta	E	2034-04-27T05:49:21.919		-0.28x	-43.00	47176.12	23.43		
gamma	E	2034-04-27T05:49:40.914		-0.34x	-43.03	47621.23	23.44		
delta	E	2034-04-27T05:50:09.878		-0.43x	-43.07	48300.35	23.46		
lambda	E	2034-04-27T05:51:23.420		-0.67x	-43.16	50026.71	23.49		
epsilon	E	2034-04-27T05:52:19.817		-0.85x	-43.23	51352.45	23.49		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2034-04-27T05:16:46.330
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       : 3425431341355934464
2Mass ID (if available) : 06110374+2341027
ICRS Star Coord at Epoch: 06h 11m 03.71875s +23:41:01.64699s
RUWE (>1.4 is poor) : 0.98
K magnitude          : 10.843
G magnitude          : 12.150
RP magnitude         : 11.679
BP magnitude         : 12.458
DUPflag             : 0
Distance (au)        : 19.477
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : 23.06
Sun-Target sep (deg) : 55.97
Sun-Moon sep (deg)   : 54.86
B (ring opening deg) : 73.14
PA of pole (deg)     : 62.49
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.910
C/A sky separation (km) : 12852.6
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl.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	2034-04-27T04:41:36.506		55.57	-0.41x	50810.38	-22.67		
lambda	I	2034-04-27T04:42:11.053		55.44	-0.54x	50026.71	-22.67		
delta	I	2034-04-27T04:43:27.296		55.15	-0.83x	48300.35	-22.61		
gamma	I	2034-04-27T04:43:56.958		55.04	-0.94x	47629.95	-22.59		
eta	I	2034-04-27T04:44:17.057		54.96	-1.01x	47176.12	-22.57		
beta	I	2034-04-27T04:45:24.511		54.70	-1.27x	45654.82	-22.51		
alpha	I	2034-04-27T04:46:07.710		54.54	-1.43x	44686.60	-22.47		
4	I	2034-04-27T04:47:40.405		54.18	-1.78x	42608.86	-22.36		
5	I	2034-04-27T04:47:57.417		54.12	-1.85x	42217.50	-22.35		
6	I	2034-04-27T04:48:14.697		54.05	-1.91x	41830.69	-22.31		
Uranus	I	2034-04-27T05:00:42.054		51.19	-4.73x	25416.63		8.49	8.89
Uranus	E	2034-04-27T05:32:29.400		43.91	-11.84	25023.36		-16.85	-17.60
6	E	2034-04-27T05:44:32.257		41.16	-14.50	41817.64	22.40		
5	E	2034-04-27T05:44:53.511		41.08	-14.58	42294.93	22.44		
4	E	2034-04-27T05:45:03.308		41.04	-14.62	42525.95	22.45		
alpha	E	2034-04-27T05:46:41.432		40.67	-14.98	44738.67	22.57		
beta	E	2034-04-27T05:47:23.142		40.51	-15.13	45676.84	22.61		
eta	E	2034-04-27T05:48:29.321		40.26	-15.37	47176.12	22.68		
gamma	E	2034-04-27T05:48:48.937		40.18	-15.44	47621.13	22.69		
delta	E	2034-04-27T05:49:18.848		40.07	-15.55	48300.35	22.72		
lambda	E	2034-04-27T05:50:34.720		39.78	-15.83	50026.71	22.78		
epsilon	E	2034-04-27T05:51:31.893		39.56	-16.04	51330.61	22.79		