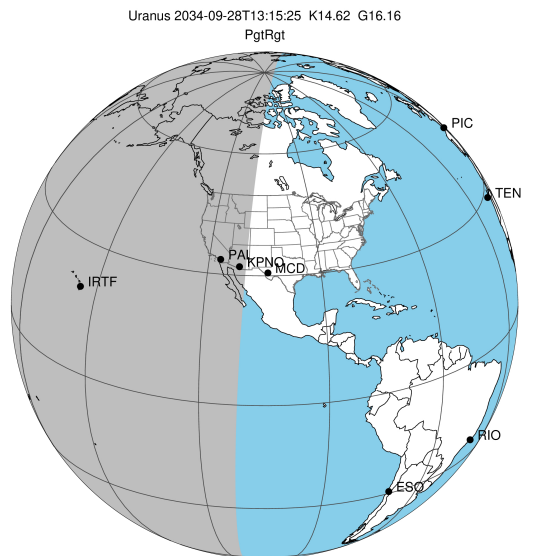


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-09-28T13:15:25.130  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3379726846311279616  
 2Mass ID (if available) : 06432270+2321521

ICRS Star Coord at Epoch: 06h 43m 22.71108s +23:21:52.19773s

RUWE (>1.4 is poor) : 1.08  
 K magnitude : 14.622  
 G magnitude : 16.164  
 RP magnitude : 15.695  
 BP magnitude : 16.460  
 DUPflag : 0  
 Distance (au) : 18.965  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 8.98  
 Sun-Target sep (deg) : 85.07  
 Sun-Moon sep (deg) : 89.11  
 B (ring opening deg) : 66.36  
 PA of pole (deg) : 73.99

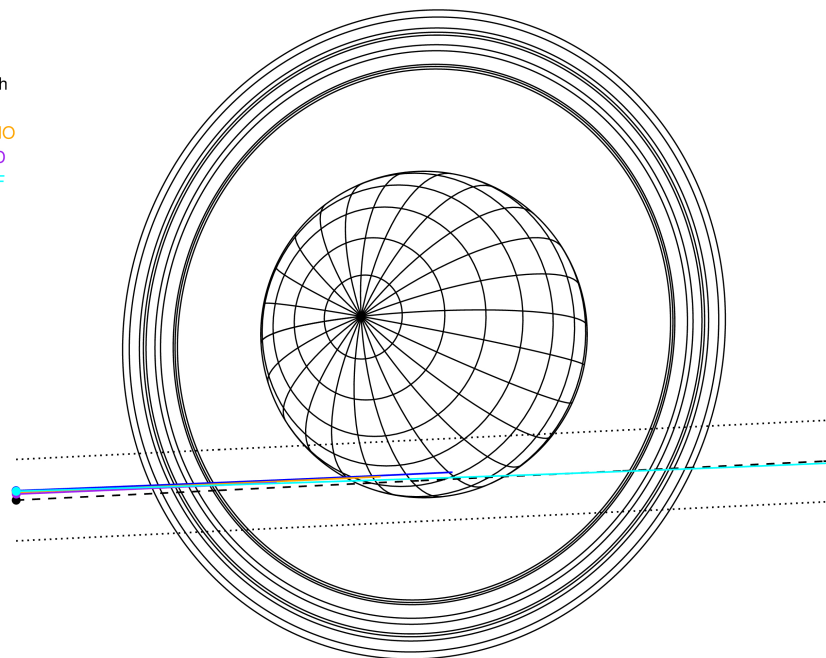
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2034-09-28T13:15:25.1300 a: 06 43 22.71111 s: +23 21 52.198 C/A 1.659° PA 2.76 deg v\_sky + 8.98 km/s D 18.96 AU  
 Credit: Styled after SORA/Lucky Star

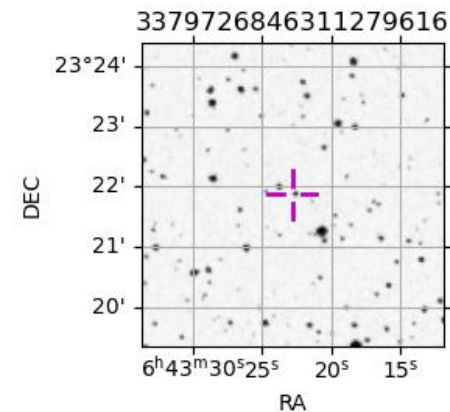
Uranus 2034-09-28T13:15:25 K14.62 G16.16 PgtRgt

Earth  
 PAL  
 KPNO  
 MCD  
 IRTF

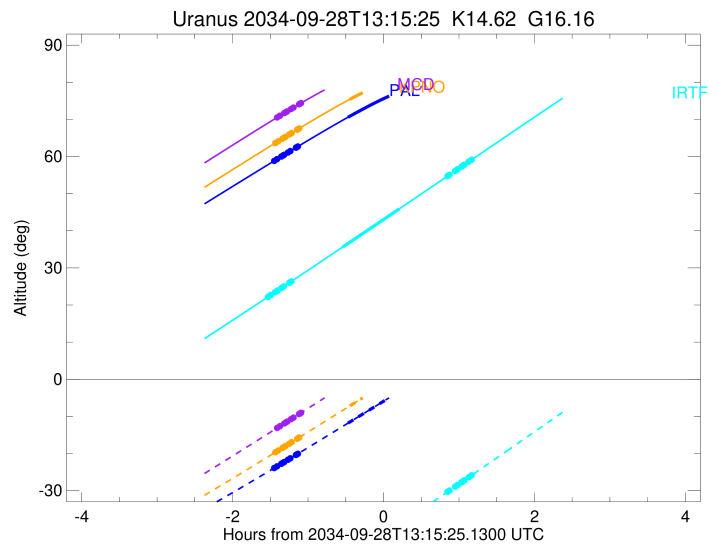
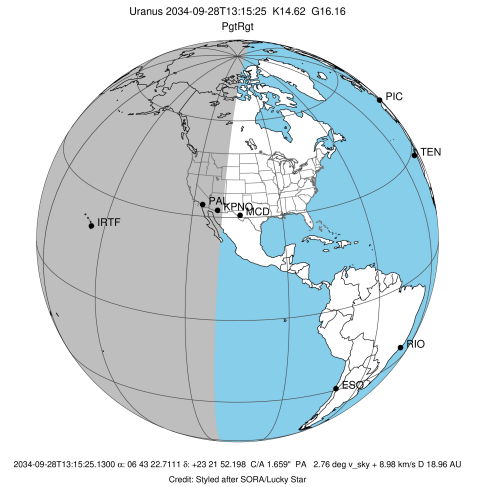


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+		SEP 28 11:48 - SEP 28 12:47	PinRin
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+		SEP 28 11:49 - SEP 28 12:48	PinRin
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++			SEP 28 11:50 - SEP 28 12:09	PnnRin
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	SEP 28 11:43 - SEP 28 14:25	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					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



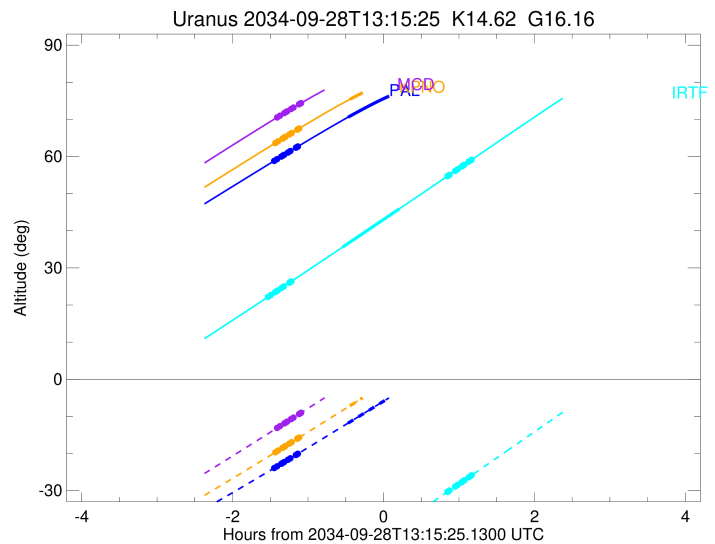
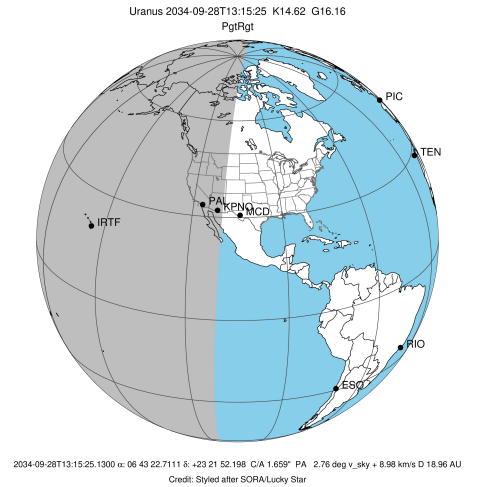
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-09-28T13:13:05.590  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3379726846311279616  
 2Mass ID (if available) : 06432270+2321521  
 ICRS Star Coord at Epoch: 06h 43m 22.71108s +23:21:52.19773s  
 RUWE (>1.4 is poor) : 1.08  
 K magnitude : 14.622  
 G magnitude : 16.164  
 RP magnitude : 15.695  
 BP magnitude : 16.460  
 DUPflag : 0  
 Distance (au) : 18.965  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 8.98  
 Sun-Target sep (deg) : 85.07  
 Sun-Moon sep (deg) : 90.08  
 B (ring opening deg) : 66.36  
 PA of pole (deg) : 73.99  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.582  
 C/A sky separation (km) : 21755.6  
 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	2034-09-28T11:48:06.239		58.74	-24.00	51376.48	-8.51		
lambda	I	2034-09-28T11:50:45.803		59.29	-23.46	50026.71	-8.43		
delta	I	2034-09-28T11:54:11.500		60.00	-22.76	48300.35	-8.35		
gamma	I	2034-09-28T11:55:32.880		60.28	-22.49	47621.89	-8.32		
eta	I	2034-09-28T11:56:26.530		60.46	-22.30	47176.12	-8.30		
beta	I	2034-09-28T11:59:28.404		61.09	-21.68	45673.63	-8.22		
alpha	I	2034-09-28T12:01:29.588		61.50	-21.27	44685.55	-8.16		
4	I	2034-09-28T12:05:45.660		62.37	-20.40	42616.45	-8.03		
5	I	2034-09-28T12:06:40.155		62.56	-20.21	42170.59	-8.00		
6	I	2034-09-28T12:07:18.346		62.69	-20.08	41867.76	-7.96		
Uranus	I	2034-09-28T12:47:10.098		70.58	-11.83	25533.71		5.15	5.39
Uranus	E	2034-09-28T13:38:05.432		78.70	-1.19x	25273.10		-17.70	-18.49
6	E	2034-09-28T14:14:55.018		79.81	6.49x	41797.11	7.88		
5	E	2034-09-28T14:15:59.546		79.75	6.71x	42307.12	7.91		
4	E	2034-09-28T14:16:27.231		79.72	6.81x	42547.11	7.94		
alpha	E	2034-09-28T14:21:01.787		79.39	7.75x	44742.41	8.06		
beta	E	2034-09-28T14:22:56.406		79.23	8.15x	45667.65	8.12		
eta	E	2034-09-28T14:26:01.483		78.94	8.79x	47176.12	8.19		
gamma	E	2034-09-28T14:26:56.366		78.84	8.98x	47626.33	8.21		
delta	E	2034-09-28T14:28:18.274		78.70	9.26x	48300.35	8.24		
lambda	E	2034-09-28T14:31:46.752		78.31	9.98x	50026.71	8.32		
epsilon	E	2034-09-28T14:34:14.472		78.01	10.49x	51258.69	8.39		

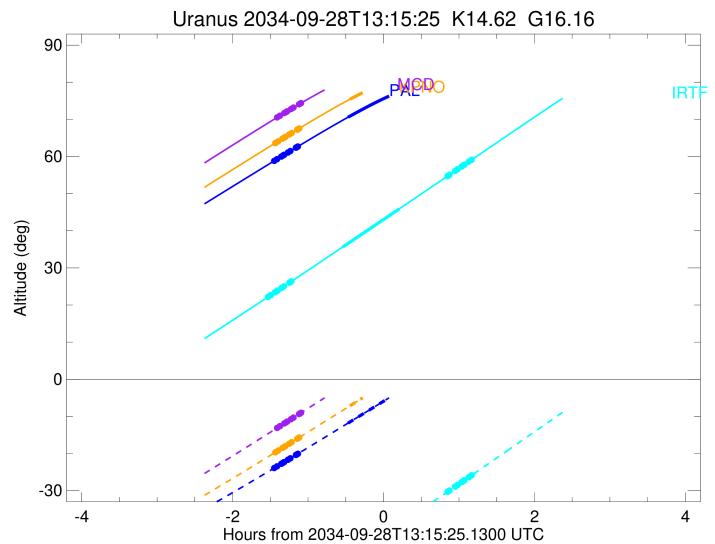
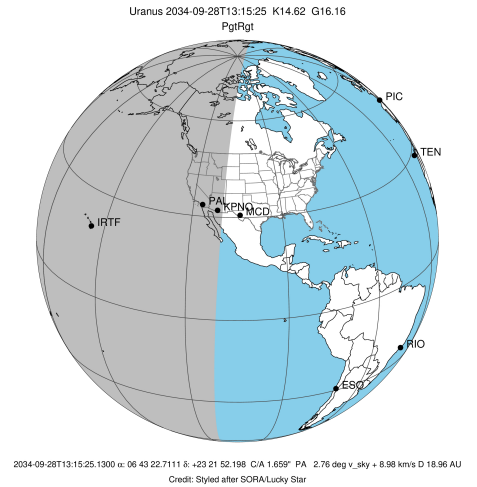
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2034-09-28T13:14:06.020
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      : 3379726846311279616
2Mass ID (if available) : 06432270+2321521
ICRS Star Coord at Epoch: 06h 43m 22.71108s +23:21:52.19773s
RUWE (>1.4 is poor) : 1.08
K magnitude          : 14.622
G magnitude          : 16.164
RP magnitude         : 15.695
BP magnitude         : 16.460
DUPflag             : 0
Distance (au)       : 18.965
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 8.98
Sun-Target sep (deg) : 85.07
Sun-Moon sep (deg)  : 90.09
B (ring opening deg) : 66.36
PA of pole (deg)    : 73.99
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.593
C/A sky separation (km) : 21916.4
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_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	2034-09-28T11:49:01.625		63.55	-19.76	51378.17	-8.47		
lambda	I	2034-09-28T11:51:42.138		64.11	-19.20	50026.71	-8.39		
delta	I	2034-09-28T11:55:08.820		64.83	-18.47	48300.35	-8.31		
gamma	I	2034-09-28T11:56:30.600		65.11	-18.19	47621.88	-8.28		
eta	I	2034-09-28T11:57:24.512		65.30	-18.00	47176.12	-8.26		
beta	I	2034-09-28T12:00:27.286		65.93	-17.36	45673.71	-8.18		
alpha	I	2034-09-28T12:02:29.095		66.35	-16.93	44685.60	-8.12		
4	I	2034-09-28T12:06:46.532		67.23	-16.03	42616.43	-7.98		
5	I	2034-09-28T12:07:41.303		67.42	-15.84	42170.88	-7.95		
6	I	2034-09-28T12:08:19.764		67.55	-15.70	41867.58	-7.92		
Uranus	I	2034-09-28T12:48:38.111		75.41	-7.17	25536.64		4.84	5.07
Uranus	E	2034-09-28T13:38:36.626		81.50	3.43x	25278.20		-17.54	-18.31
6	E	2034-09-28T14:15:46.395		78.73	11.26x	41797.15	7.85		
5	E	2034-09-28T14:16:51.106		78.57	11.49x	42307.02	7.88		
4	E	2034-09-28T14:17:18.906		78.50	11.58x	42547.22	7.91		
alpha	E	2034-09-28T14:21:54.206		77.79	12.54x	44742.35	8.04		
beta	E	2034-09-28T14:23:49.123		77.48	12.94x	45667.69	8.10		
eta	E	2034-09-28T14:26:54.619		76.96	13.59x	47176.12	8.17		
gamma	E	2034-09-28T14:27:49.619		76.81	13.78x	47626.32	8.20		
delta	E	2034-09-28T14:29:11.697		76.57	14.06x	48300.35	8.23		
lambda	E	2034-09-28T14:32:40.568		75.97	14.78x	50026.71	8.30		
epsilon	E	2034-09-28T14:35:08.628		75.53	15.30x	51259.44	8.38		

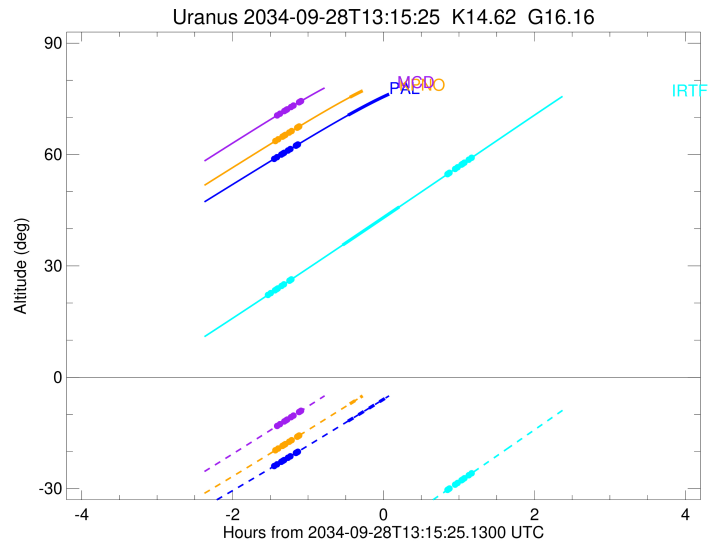
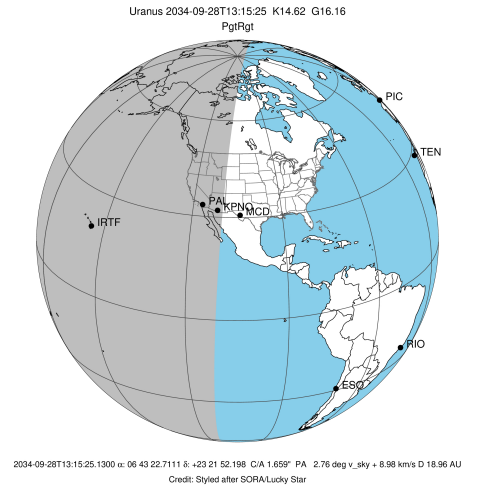
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-09-28T13:15:36.910  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : MCD  
 Location : McDonald Obs. 2.7m  
 Latitude (deg) : 30.67158  
 E. Longitude (deg) : 255.97844  
 Altitude (km) : 2.075  
 Gaia source ID : 3379726846311279616  
 2Mass ID (if available) : 06432270+2321521  
 ICRS Star Coord at Epoch: 06h 43m 22.71108s +23:21:52.19773s  
 RUWE (>1.4 is poor) : 1.08  
 K magnitude : 14.622  
 G magnitude : 16.164  
 RP magnitude : 15.695  
 BP magnitude : 16.460  
 DUPflag : 0  
 Distance (au) : 18.965  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 8.98  
 Sun-Target sep (deg) : 85.07  
 Sun-Moon sep (deg) : 90.10  
 B (ring opening deg) : 66.36  
 PA of pole (deg) : 73.99  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.602  
 C/A sky separation (km) : 22035.2  
 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\_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	2034-09-28T11:50:25.680		70.45	-13.21	51379.83	-8.43		
lambda	I	2034-09-28T11:53:07.133		71.00	-12.63	50026.71	-8.35		
delta	I	2034-09-28T11:56:34.779		71.72	-11.89	48300.35	-8.27		
gamma	I	2034-09-28T11:57:56.944		72.00	-11.59	47621.86	-8.24		
eta	I	2034-09-28T11:58:51.108		72.18	-11.40	47176.12	-8.22		
beta	I	2034-09-28T12:01:54.740		72.80	-10.74	45673.80	-8.14		
alpha	I	2034-09-28T12:03:57.136		73.21	-10.30	44685.65	-8.08		
4	I	2034-09-28T12:08:15.839		74.08	-9.38	42616.41	-7.94		
5	I	2034-09-28T12:09:10.861		74.26	-9.18	42171.16	-7.91		
6	I	2034-09-28T12:09:49.571		74.39	-9.04	41867.41	-7.88		
Uranus	I	2034-09-28T12:50:29.903		81.37	-0.29x	25538.97		4.58	4.80
Uranus	E	2034-09-28T13:39:44.720		80.52	10.26x	25281.46		-17.43	-18.20
6	E	2034-09-28T14:17:08.000		73.79	18.16x	41797.16	7.84		
5	E	2034-09-28T14:18:12.792		73.57	18.38x	42306.98	7.87		
4	E	2034-09-28T14:18:40.639		73.48	18.48x	42547.26	7.90		
alpha	E	2034-09-28T14:23:16.225		72.55	19.44x	44742.33	8.04		
beta	E	2034-09-28T14:25:11.238		72.16	19.83x	45667.71	8.09		
eta	E	2034-09-28T14:28:16.846		71.53	20.48x	47176.12	8.17		
gamma	E	2034-09-28T14:29:11.871		71.34	20.67x	47626.32	8.19		
delta	E	2034-09-28T14:30:33.981		71.06	20.95x	48300.35	8.22		
lambda	E	2034-09-28T14:34:02.900		70.34	21.67x	50026.71	8.30		
epsilon	E	2034-09-28T14:36:30.982		69.83	22.18x	51259.57	8.38		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2034-09-28T13:05:52.740
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       : 3379726846311279616
2Mass ID (if available) : 06432270+2321521
ICRS Star Coord at Epoch: 06h 43m 22.71108s +23:21:52.19773s
RUWE (>1.4 is poor) : 1.08
K magnitude           : 14.622
G magnitude           : 16.164
RP magnitude          : 15.695
BP magnitude          : 16.460
DUPflag              : 0
Distance (au)         : 18.965
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : 8.98
Sun-Target sep (deg)  : 85.07
Sun-Moon sep (deg)   : 89.79
B (ring opening deg) : 66.36
PA of pole (deg)     : 73.99
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.639
C/A sky separation (km) : 22543.5
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	2034-09-28T11:43:09.555		22.08	-61.74	51378.59	-8.65		
lambda	I	2034-09-28T11:45:46.963		22.67	-61.24	50026.71	-8.56		
delta	I	2034-09-28T11:49:09.763		23.43	-60.58	48300.35	-8.47		
gamma	I	2034-09-28T11:50:30.067		23.73	-60.32	47621.87	-8.43		
eta	I	2034-09-28T11:51:23.023		23.93	-60.14	47176.12	-8.40		
beta	I	2034-09-28T11:54:22.676		24.60	-59.55	45673.77	-8.31		
alpha	I	2034-09-28T11:56:22.519		25.05	-59.15	44685.63	-8.25		
4	I	2034-09-28T12:00:36.123		26.01	-58.30	42616.41	-8.09		
5	I	2034-09-28T12:01:30.118		26.21	-58.11	42171.12	-8.06		
6	I	2034-09-28T12:02:08.110		26.35	-57.98	41867.43	-8.03		
Uranus	I	2034-09-28T12:42:55.766		35.61	-49.29	25543.40		4.04	4.23
Uranus	E	2034-09-28T13:27:58.272		45.91	-39.17	25309.69		-16.48	-17.22
6	E	2034-09-28T14:06:13.038		54.70	-30.36	41797.61	7.81		
5	E	2034-09-28T14:07:17.872		54.94	-30.10	42305.89	7.84		
4	E	2034-09-28T14:07:46.150		55.05	-30.00	42548.41	7.87		
alpha	E	2034-09-28T14:12:22.493		56.11	-28.92	44741.62	8.01		
beta	E	2034-09-28T14:14:18.053		56.56	-28.48	45668.25	8.06		
eta	E	2034-09-28T14:17:24.271		57.27	-27.75	47176.12	8.14		
gamma	E	2034-09-28T14:18:19.480		57.48	-27.54	47626.17	8.16		
delta	E	2034-09-28T14:19:41.913		57.80	-27.22	48300.35	8.19		
lambda	E	2034-09-28T14:23:11.631		58.60	-26.40	50026.71	8.27		
epsilon	E	2034-09-28T14:25:41.563		59.18	-25.82	51270.01	8.35		