

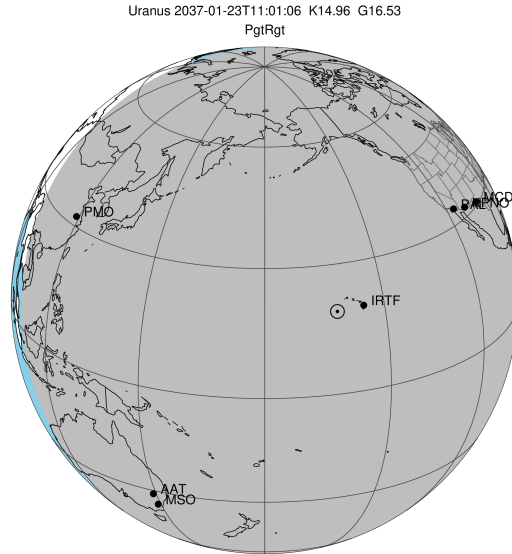
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-01-23T11:01:06.280  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3367529070469443712  
 2Mass ID (if available) : 07111715+2252369

Uranus 2037-01-23T11:01:06 K14.96 G16.53 PgtRgt

ICRS Star Coord at Epoch: 07h 11m 17.15211s +22:52:36.92701s

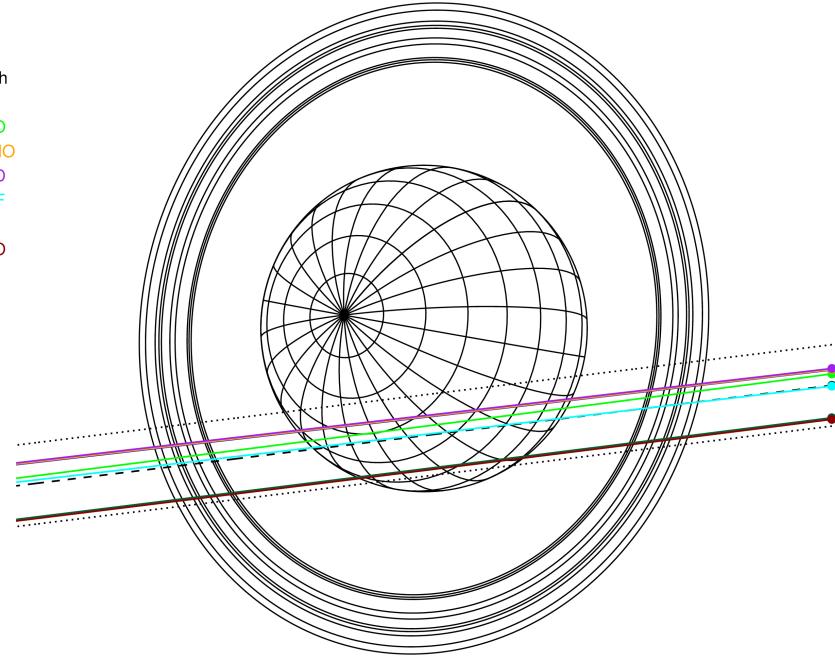
RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.956  
 G magnitude : 16.530  
 RP magnitude : 15.959  
 BP magnitude : 16.931  
 DUPflag : 0  
 Distance (au) : 17.817  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.04  
 Sun-Target sep (deg) : 163.10  
 Sun-Moon sep (deg) : 86.34  
 B (ring opening deg) : 60.21  
 PA of pole (deg) : 80.49

#	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



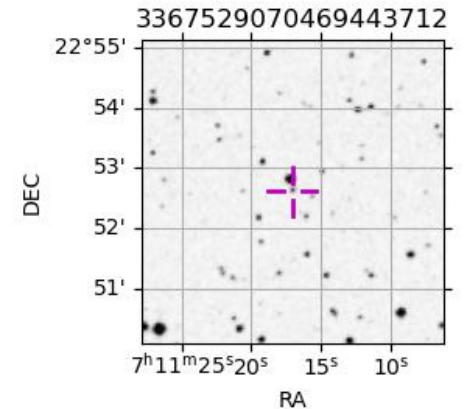
2037-01-23T11:01:06.2800 a: 07 11 17.15211 s +22 52 36.927 C/A 1.281" PA 7.02 deg v\_sky -22.04 km/s D 17.82 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 AAT  
 MSO

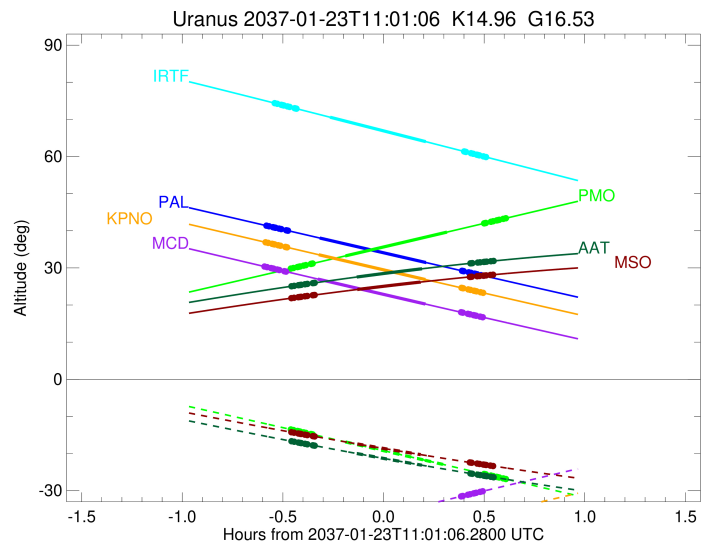
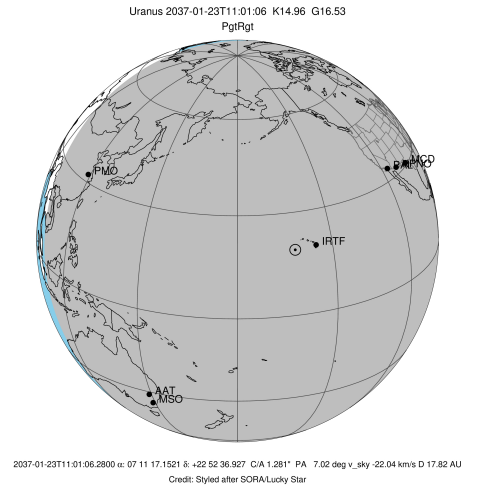


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+ +	+++++	JAN 23 10:25 - JAN 23 11:30	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	JAN 23 10:33 - JAN 23 11:37	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	JAN 23 10:25 - JAN 23 11:30	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	JAN 23 10:25 - JAN 23 11:30	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	JAN 23 10:28 - JAN 23 11:31	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	+++++	+ +	+++++	JAN 23 10:33 - JAN 23 11:33	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +	+++++	JAN 23 10:33 - JAN 23 11:33	PieRie

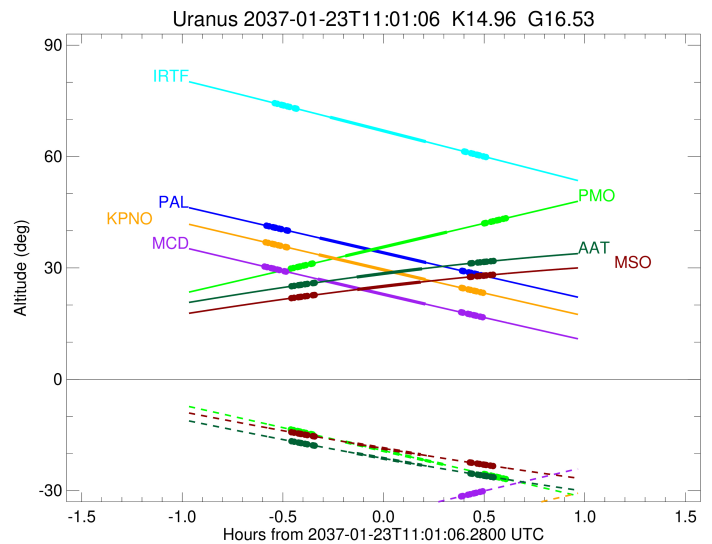
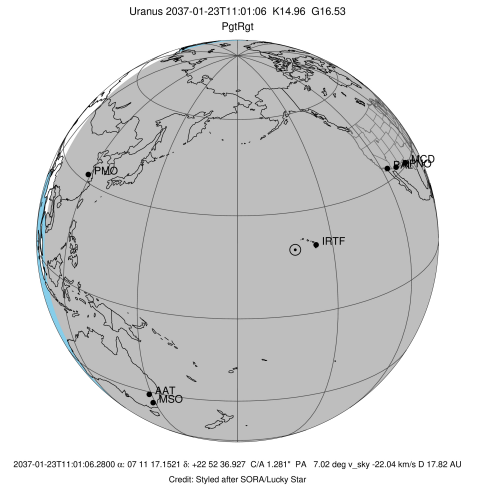


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-01-23T10:57:50.820  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3367529070469443712  
 2Mass ID (if available) : 07111715+2252369  
 ICRS Star Coord at Epoch: 07h 11m 17.15211s +22:52:36.92701s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.956  
 G magnitude : 16.530  
 RP magnitude : 15.959  
 BP magnitude : 16.931  
 DUPflag : 0  
 Distance (au) : 17.817  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.04  
 Sun-Target sep (deg) : 163.10  
 Sun-Moon sep (deg) : 86.89  
 B (ring opening deg) : 60.21  
 PA of pole (deg) : 80.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.069  
 C/A sky separation (km) : 13819.6  
 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



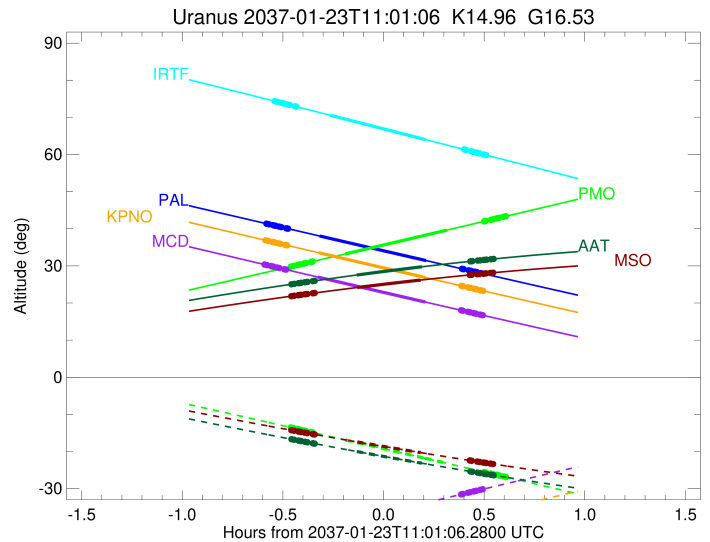
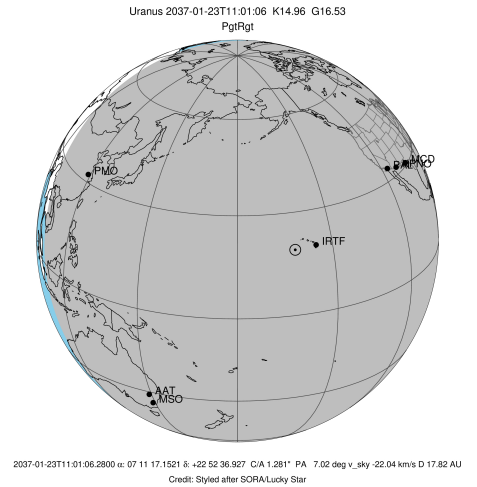
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-01-23T10:25:56.752		41.43	-54.54	51550.72	-24.44		
lambda	I	2037-01-23T10:26:59.199		41.21	-54.33	50026.71	-24.37		
delta	I	2037-01-23T10:28:10.140		40.96	-54.09	48300.35	-24.30		
gamma	I	2037-01-23T10:28:38.021		40.87	-54.00	47623.38	-24.26		
eta	I	2037-01-23T10:28:56.464		40.80	-53.93	47176.12	-24.24		
beta	I	2037-01-23T10:29:59.944		40.58	-53.72	45642.13	-24.16		
alpha	I	2037-01-23T10:30:38.308		40.45	-53.59	44720.96	-24.10		
4	I	2037-01-23T10:32:08.068		40.13	-53.28	42569.45	-23.98		
5	I	2037-01-23T10:32:23.688		40.08	-53.23	42197.02	-23.94		
6	I	2037-01-23T10:32:37.232		40.03	-53.18	41879.35	-23.92		
Uranus	I	2037-01-23T10:42:04.466		38.05	-51.24	25156.45		-28.33	-29.45
Uranus	E	2037-01-23T11:13:49.666		31.43	-44.66	25367.80		18.97	19.80
6	E	2037-01-23T11:24:28.397		29.22	-42.44	41800.83	23.84		
5	E	2037-01-23T11:24:45.453		29.16	-42.38	42220.52	23.85		
4	E	2037-01-23T11:25:01.744		29.11	-42.33	42600.58	23.89		
alpha	E	2037-01-23T11:26:29.536		28.81	-42.02	44696.50	24.01		
beta	E	2037-01-23T11:27:10.578		28.66	-41.88	45680.39	24.06		
eta	E	2037-01-23T11:28:12.713		28.45	-41.66	47176.12	24.14		
gamma	E	2037-01-23T11:28:31.350		28.39	-41.60	47626.16	24.16		
delta	E	2037-01-23T11:28:59.239		28.29	-41.50	48300.35	24.19		
lambda	E	2037-01-23T11:30:10.497		28.04	-41.25	50026.71	24.26		
epsilon	E	2037-01-23T11:30:43.901		27.93	-41.14	50837.69	24.33		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-01-23T11:04:46.140  
 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 : 3367529070469443712  
 2Mass ID (if available) : 07111715+2252369  
 ICRS Star Coord at Epoch: 07h 11m 17.15211s +22:52:36.92701s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.956  
 G magnitude : 16.530  
 RP magnitude : 15.959  
 BP magnitude : 16.931  
 DUPflag : 0  
 Distance (au) : 17.817  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.04  
 Sun-Target sep (deg) : 163.10  
 Sun-Moon sep (deg) : 86.84  
 B (ring opening deg) : 60.21  
 PA of pole (deg) : 80.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.176  
 C/A sky separation (km) : 15197.9  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ural11.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ural11.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



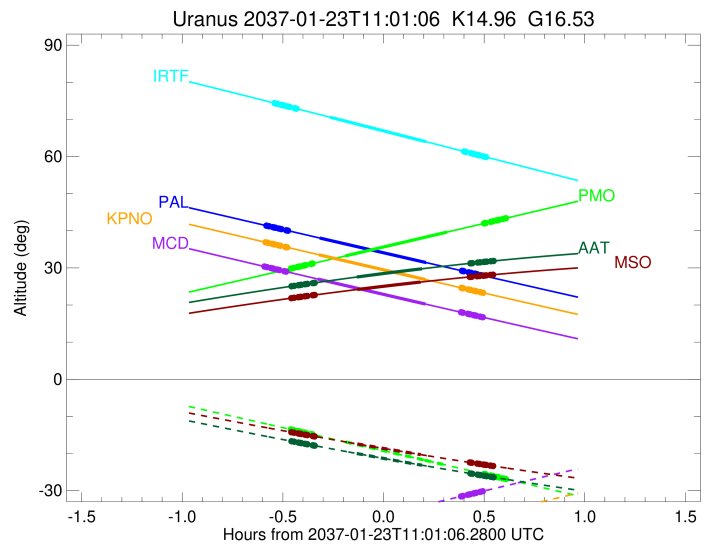
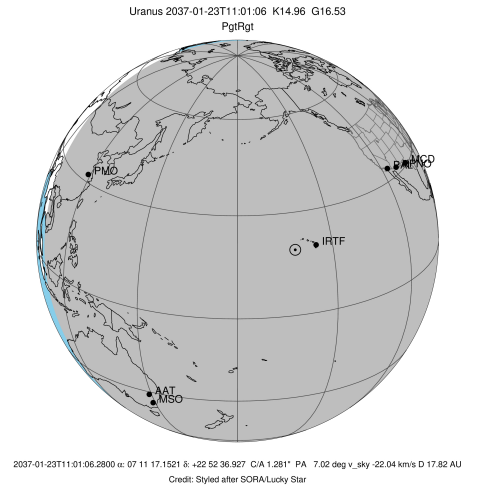
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-01-23T10:33:12.708		29.76	-13.47	51551.75	-24.17		
lambda	I	2037-01-23T10:34:15.929		29.98	-13.68	50026.71	-24.09		
delta	I	2037-01-23T10:35:27.736		30.23	-13.93	48300.35	-24.00		
gamma	I	2037-01-23T10:35:55.974		30.33	-14.03	47623.30	-23.96		
eta	I	2037-01-23T10:36:14.650		30.39	-14.09	47176.12	-23.93		
beta	I	2037-01-23T10:37:18.964		30.62	-14.31	45642.28	-23.84		
alpha	I	2037-01-23T10:37:57.896		30.76	-14.44	44720.19	-23.77		
4	I	2037-01-23T10:39:28.879		31.07	-14.76	42570.58	-23.62		
5	I	2037-01-23T10:39:44.845		31.13	-14.81	42195.26	-23.57		
6	I	2037-01-23T10:39:58.565		31.18	-14.86	41879.19	-23.56		
Uranus	I	2037-01-23T10:49:43.738		33.23	-16.87	25170.81		-27.77	-28.87
Uranus	E	2037-01-23T11:20:00.673		39.64	-23.18	25400.99		17.17	17.93
6	E	2037-01-23T11:31:04.154		41.99	-25.50	41801.87	23.63		
5	E	2037-01-23T11:31:21.130		42.05	-25.56	42216.95	23.65		
4	E	2037-01-23T11:31:37.774		42.11	-25.62	42602.11	23.70		
alpha	E	2037-01-23T11:33:06.082		42.42	-25.93	44695.41	23.85		
beta	E	2037-01-23T11:33:47.403		42.57	-26.08	45680.13	23.92		
eta	E	2037-01-23T11:34:49.879		42.79	-26.29	47176.12	24.02		
gamma	E	2037-01-23T11:35:08.597		42.85	-26.36	47625.94	24.05		
delta	E	2037-01-23T11:35:36.620		42.95	-26.46	48300.35	24.09		
lambda	E	2037-01-23T11:36:48.154		43.21	-26.71	50026.71	24.18		
epsilon	E	2037-01-23T11:37:22.089		43.33	-26.83	50847.95	24.26		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-01-23T10:57:38.420  
 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 : 3367529070469443712  
 2Mass ID (if available) : 07111715+2252369  
 ICRS Star Coord at Epoch: 07h 11m 17.15211s +22:52:36.92701s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.956  
 G magnitude : 16.530  
 RP magnitude : 15.959  
 BP magnitude : 16.931  
 DUPflag : 0  
 Distance (au) : 17.817  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.04  
 Sun-Target sep (deg) : 163.10  
 Sun-Moon sep (deg) : 86.83  
 B (ring opening deg) : 60.21  
 PA of pole (deg) : 80.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.064  
 C/A sky separation (km) : 13746.0  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ural11.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ural11.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	2037-01-23T10:25:40.830		36.96	-50.50	51550.64	-24.42		
lambda	I	2037-01-23T10:26:43.321		36.74	-50.28	50026.71	-24.35		
delta	I	2037-01-23T10:27:54.315		36.49	-50.03	48300.35	-24.28		
gamma	I	2037-01-23T10:28:22.217		36.39	-49.93	47623.39	-24.24		
eta	I	2037-01-23T10:28:40.673		36.32	-49.87	47176.12	-24.22		
beta	I	2037-01-23T10:29:44.197		36.10	-49.65	45642.12	-24.14		
alpha	I	2037-01-23T10:30:22.583		35.96	-49.51	44721.01	-24.09		
4	I	2037-01-23T10:31:52.405		35.65	-49.20	42569.38	-23.97		
5	I	2037-01-23T10:32:08.027		35.59	-49.14	42197.14	-23.92		
6	I	2037-01-23T10:32:21.581		35.54	-49.09	41879.36	-23.91		
Uranus	I	2037-01-23T10:41:48.676		33.54	-47.10	25155.66		-28.37	-29.48
Uranus	E	2037-01-23T11:13:40.658		26.85	-40.34	25366.23		19.05	19.88
6	E	2037-01-23T11:24:19.016		24.63	-38.07	41800.79	23.82		
5	E	2037-01-23T11:24:36.095		24.57	-38.01	42220.68	23.83		
4	E	2037-01-23T11:24:52.390		24.52	-37.96	42600.51	23.87		
alpha	E	2037-01-23T11:26:20.262		24.21	-37.65	44696.55	23.98		
beta	E	2037-01-23T11:27:01.339		24.07	-37.50	45680.40	24.04		
eta	E	2037-01-23T11:28:03.532		23.85	-37.28	47176.12	24.11		
gamma	E	2037-01-23T11:28:22.187		23.79	-37.21	47626.17	24.13		
delta	E	2037-01-23T11:28:50.102		23.69	-37.11	48300.35	24.17		
lambda	E	2037-01-23T11:30:01.433		23.45	-36.86	50026.71	24.24		
epsilon	E	2037-01-23T11:30:34.853		23.33	-36.74	50837.26	24.30		

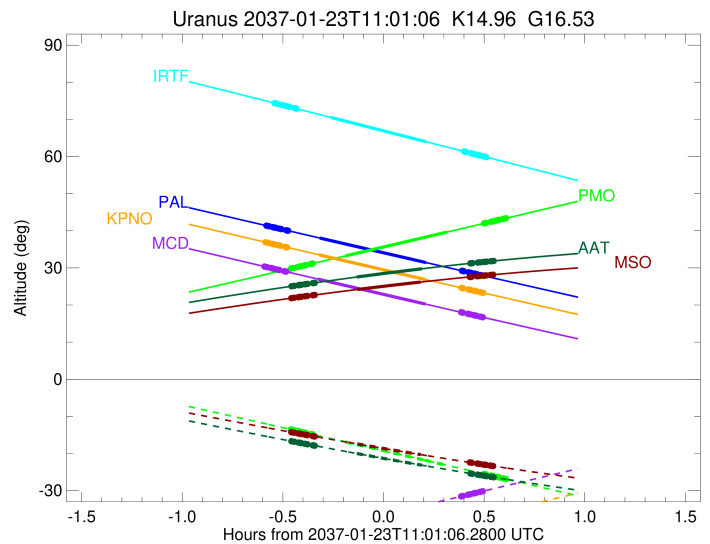
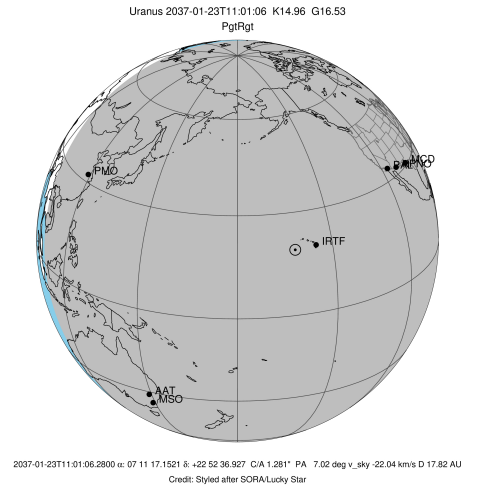
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-01-23T10:57:25.760  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : MCD  
 Location : McDonald Obs. 2.7m  
 Latitude (deg) : 30.67158  
 E. Longitude (deg) : 255.97844  
 Altitude (km) : 2.075  
 Gaia source ID : 3367529070469443712  
 2Mass ID (if available) : 07111715+2252369  
 ICRS Star Coord at Epoch: 07h 11m 17.15211s +22:52:36.92701s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.956  
 G magnitude : 16.530  
 RP magnitude : 15.959  
 BP magnitude : 16.931  
 DUPflag : 0  
 Distance (au) : 17.817  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.04  
 Sun-Target sep (deg) : 163.10  
 Sun-Moon sep (deg) : 86.74  
 B (ring opening deg) : 60.21  
 PA of pole (deg) : 80.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.050  
 C/A sky separation (km) : 13568.5  
 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	2037-01-23T10:25:21.661		30.42	-44.22	51550.42	-24.40		
lambda	I	2037-01-23T10:26:24.204		30.20	-44.00	50026.71	-24.33		
delta	I	2037-01-23T10:27:35.260		29.95	-43.74	48300.35	-24.26		
gamma	I	2037-01-23T10:28:03.185		29.85	-43.64	47623.41	-24.23		
eta	I	2037-01-23T10:28:21.656		29.79	-43.58	47176.12	-24.20		
beta	I	2037-01-23T10:29:25.230		29.56	-43.35	45642.10	-24.13		
alpha	I	2037-01-23T10:30:03.635		29.43	-43.21	44721.15	-24.07		
4	I	2037-01-23T10:31:33.523		29.11	-42.89	42569.18	-23.96		
5	I	2037-01-23T10:31:49.135		29.05	-42.83	42197.45	-23.91		
6	I	2037-01-23T10:32:02.701		29.00	-42.78	41879.38	-23.90		
Uranus	I	2037-01-23T10:41:28.915		27.01	-40.75	25153.71		-28.44	-29.56
Uranus	E	2037-01-23T11:13:35.051		20.26	-33.84	25362.59		19.24	20.08
6	E	2037-01-23T11:24:11.826		18.06	-31.56	41800.69	23.80		
5	E	2037-01-23T11:24:28.940		18.00	-31.50	42221.04	23.81		
4	E	2037-01-23T11:24:45.224		17.94	-31.44	42600.36	23.85		
alpha	E	2037-01-23T11:26:13.181		17.64	-31.13	44696.66	23.96		
beta	E	2037-01-23T11:26:54.294		17.50	-30.98	45680.42	24.02		
eta	E	2037-01-23T11:27:56.550		17.28	-30.76	47176.12	24.09		
gamma	E	2037-01-23T11:28:15.226		17.22	-30.69	47626.19	24.11		
delta	E	2037-01-23T11:28:43.171		17.12	-30.59	48300.35	24.14		
lambda	E	2037-01-23T11:29:54.585		16.87	-30.34	50026.71	24.21		
epsilon	E	2037-01-23T11:30:28.007		16.76	-30.22	50836.31	24.27		

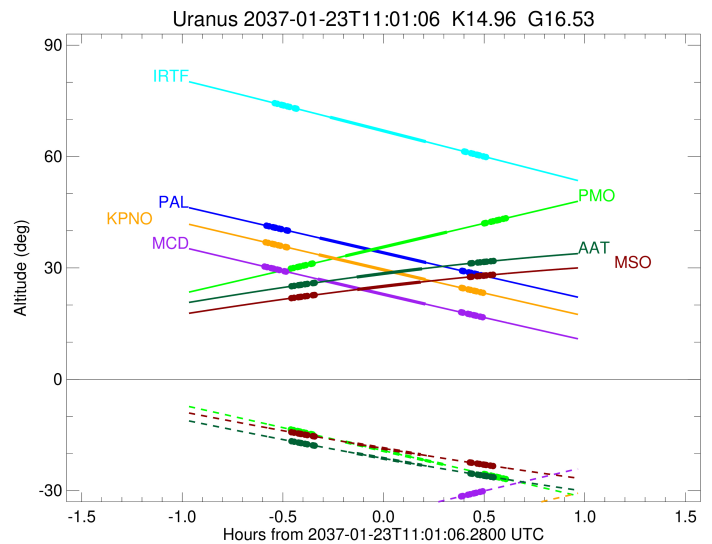
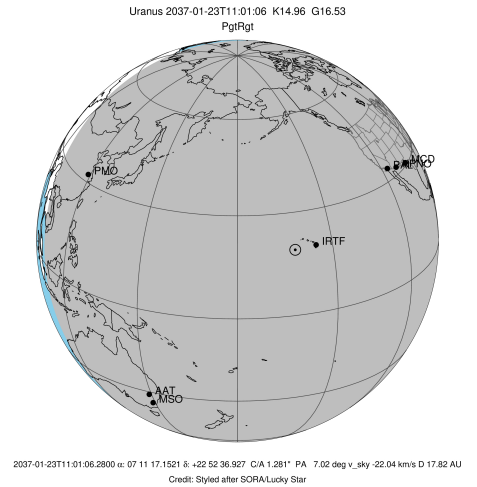
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2037-01-23T10:59:18.950
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      : 3367529070469443712
2Mass ID (if available) : 07111715+2252369
ICRS Star Coord at Epoch: 07h 11m 17.15211s +22:52:36.92701s
RUWE (>1.4 is poor) : 1.00
K magnitude         : 14.956
G magnitude         : 16.530
RP magnitude        : 15.959
BP magnitude        : 16.931
DUPflag            : 0
Distance (au)       : 17.817
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -22.04
Sun-Target sep (deg) : 163.10
Sun-Moon sep (deg)  : 87.20
B (ring opening deg) : 60.21
PA of pole (deg)    : 80.49
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.276
C/A sky separation (km) : 16484.6
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
    
```



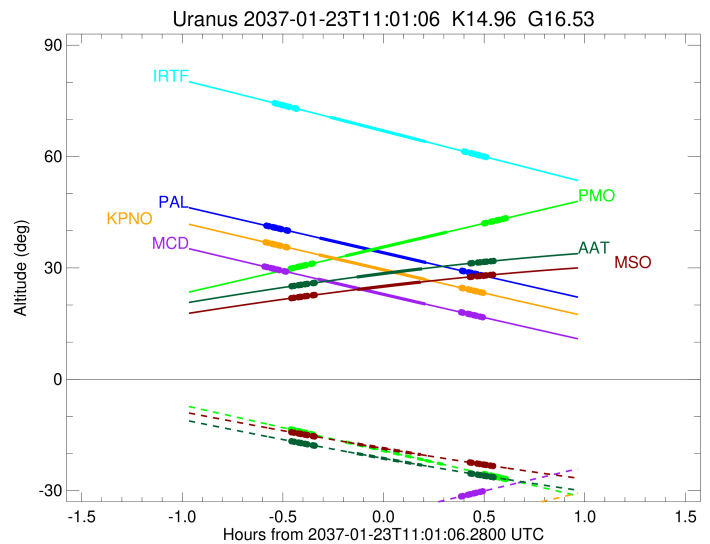
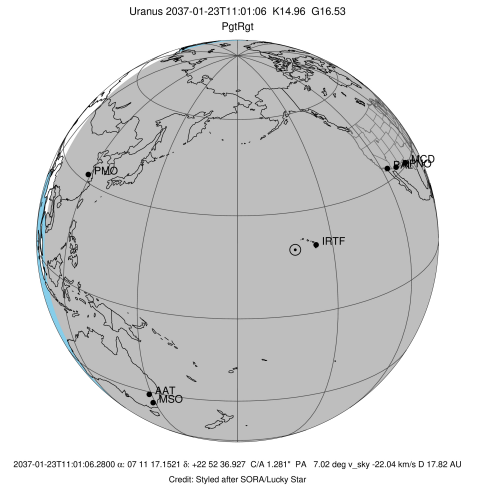
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2037-01-23T10:28:23.490		74.44	-88.68	51553.39	-24.24		
lambda	I	2037-01-23T10:29:26.601		74.20	-88.92	50026.71	-24.15		
delta	I	2037-01-23T10:30:38.262		73.93	-89.17	48300.35	-24.03		
gamma	I	2037-01-23T10:31:06.467		73.82	-89.27	47623.13	-23.99		
eta	I	2037-01-23T10:31:25.115		73.75	-89.33	47176.12	-23.95		
beta	I	2037-01-23T10:32:29.384		73.51	-89.51	45642.56	-23.84		
alpha	I	2037-01-23T10:33:08.394		73.36	-89.58	44718.84	-23.75		
4	I	2037-01-23T10:34:39.352		73.01	-89.54	42572.45	-23.58		
5	I	2037-01-23T10:34:55.530		72.95	-89.51	42192.38	-23.51		
6	I	2037-01-23T10:35:09.233		72.89	-89.48	41878.86	-23.49		
Uranus	I	2037-01-23T10:45:09.482		70.60	-87.28	25193.73		-26.85	-27.93
Uranus	E	2037-01-23T11:13:42.447		64.01	-80.57	25423.46		15.86	16.57
6	E	2037-01-23T11:25:07.093		61.37	-77.89	41802.46	23.45		
5	E	2037-01-23T11:25:24.084		61.31	-77.82	42215.06	23.47		
4	E	2037-01-23T11:25:40.969		61.24	-77.75	42602.89	23.53		
alpha	E	2037-01-23T11:27:09.814		60.90	-77.41	44694.86	23.70		
beta	E	2037-01-23T11:27:51.392		60.74	-77.24	45679.98	23.79		
eta	E	2037-01-23T11:28:54.206		60.50	-77.00	47176.12	23.90		
gamma	E	2037-01-23T11:29:13.010		60.43	-76.92	47625.84	23.93		
delta	E	2037-01-23T11:29:41.168		60.32	-76.81	48300.35	23.98		
lambda	E	2037-01-23T11:30:53.004		60.04	-76.53	50026.71	24.09		
epsilon	E	2037-01-23T11:31:27.268		59.91	-76.40	50852.81	24.18		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-01-23T11:02:41.670  
 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 : 3367529070469443712  
 2Mass ID (if available) : 07111715+2252369  
 ICRS Star Coord at Epoch: 07h 11m 17.15211s +22:52:36.92701s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.956  
 G magnitude : 16.530  
 RP magnitude : 15.959  
 BP magnitude : 16.931  
 DUPflag : 0  
 Distance (au) : 17.817  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.04  
 Sun-Target sep (deg) : 163.10  
 Sun-Moon sep (deg) : 86.76  
 B (ring opening deg) : 60.21  
 PA of pole (deg) : 80.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.689  
 C/A sky separation (km) : 21820.2  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ural11.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ural11.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	2037-01-23T10:33:23.267		25.02	-16.64	51555.27	-23.04		
lambda	I	2037-01-23T10:34:29.828		25.17	-16.84	50026.71	-22.88		
delta	I	2037-01-23T10:35:45.596		25.34	-17.05	48300.35	-22.68		
gamma	I	2037-01-23T10:36:15.530		25.40	-17.14	47622.65	-22.60		
eta	I	2037-01-23T10:36:35.316		25.45	-17.20	47176.12	-22.54		
beta	I	2037-01-23T10:37:43.726		25.60	-17.39	45643.66	-22.33		
alpha	I	2037-01-23T10:38:25.689		25.69	-17.51	44714.50	-22.17		
4	I	2037-01-23T10:40:03.002		25.90	-17.79	42578.61	-21.83		
5	I	2037-01-23T10:40:21.096		25.94	-17.84	42183.42	-21.73		
6	I	2037-01-23T10:40:35.776		25.97	-17.89	41877.25	-21.68		
Uranus	I	2037-01-23T10:53:07.687		27.54	-20.00	25319.92		-21.35	-22.26
Uranus	E	2037-01-23T11:12:33.770		29.76	-23.15	25530.10		7.23	7.57
6	E	2037-01-23T11:26:58.983		31.23	-25.37	41806.55	21.71		
5	E	2037-01-23T11:27:16.555		31.25	-25.41	42203.66	21.76		
4	E	2037-01-23T11:27:35.457		31.28	-25.46	42607.34	21.87		
alpha	E	2037-01-23T11:29:10.265		31.43	-25.70	44691.70	22.21		
beta	E	2037-01-23T11:29:54.618		31.50	-25.81	45678.86	22.37		
eta	E	2037-01-23T11:31:01.293		31.60	-25.97	47176.12	22.58		
gamma	E	2037-01-23T11:31:21.153		31.64	-26.02	47625.15	22.64		
delta	E	2037-01-23T11:31:50.919		31.68	-26.09	48300.35	22.73		
lambda	E	2037-01-23T11:33:06.541		31.80	-26.28	50026.71	22.93		
epsilon	E	2037-01-23T11:33:44.030		31.85	-26.37	50888.07	23.09		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2037-01-23T11:02:34.890  
 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 : 3367529070469443712  
 2Mass ID (if available) : 07111715+2252369  
 ICRS Star Coord at Epoch: 07h 11m 17.15211s +22:52:36.92701s  
 RUWE (>1.4 is poor) : 1.00  
 K magnitude : 14.956  
 G magnitude : 16.530  
 RP magnitude : 15.959  
 BP magnitude : 16.931  
 DUPflag : 0  
 Distance (au) : 17.817  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.04  
 Sun-Target sep (deg) : 163.10  
 Sun-Moon sep (deg) : 86.71  
 B (ring opening deg) : 60.21  
 PA of pole (deg) : 80.49  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.707  
 C/A sky separation (km) : 22064.6  
 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	2037-01-23T10:33:20.644		21.81	-14.22	51555.24	-22.97		
lambda	I	2037-01-23T10:34:27.422		21.95	-14.40	50026.71	-22.81		
delta	I	2037-01-23T10:35:43.456		22.11	-14.61	48300.35	-22.60		
gamma	I	2037-01-23T10:36:13.501		22.17	-14.69	47622.62	-22.51		
eta	I	2037-01-23T10:36:33.361		22.21	-14.74	47176.12	-22.45		
beta	I	2037-01-23T10:37:42.039		22.35	-14.93	45643.72	-22.23		
alpha	I	2037-01-23T10:38:24.191		22.44	-15.05	44714.29	-22.08		
4	I	2037-01-23T10:40:01.921		22.64	-15.31	42578.92	-21.73		
5	I	2037-01-23T10:40:20.132		22.67	-15.36	42183.00	-21.62		
6	I	2037-01-23T10:40:34.879		22.70	-15.40	41877.15	-21.57		
Uranus	I	2037-01-23T10:53:18.738		24.19	-17.42	25328.18		-20.95	-21.85
Uranus	E	2037-01-23T11:12:09.394		26.19	-20.29	25534.02		6.71	7.03
6	E	2037-01-23T11:26:47.968		27.56	-22.40	41806.76	21.60		
5	E	2037-01-23T11:27:05.596		27.59	-22.44	42203.15	21.65		
4	E	2037-01-23T11:27:24.623		27.62	-22.49	42607.53	21.76		
alpha	E	2037-01-23T11:28:59.852		27.76	-22.71	44691.57	22.11		
beta	E	2037-01-23T11:29:44.398		27.82	-22.81	45678.80	22.27		
eta	E	2037-01-23T11:30:51.344		27.92	-22.97	47176.12	22.49		
gamma	E	2037-01-23T11:31:11.280		27.94	-23.01	47625.12	22.55		
delta	E	2037-01-23T11:31:41.161		27.99	-23.08	48300.35	22.64		
lambda	E	2037-01-23T11:32:57.054		28.09	-23.26	50026.71	22.85		
epsilon	E	2037-01-23T11:33:34.744		28.14	-23.34	50889.73	23.01		