

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-02-04T12:15:14.990  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 675910415101233152  
 2Mass ID (if available) : 08101213+2041012

ICRS Star Coord at Epoch: 08h 10m 12.12373s +20:41:01.15347s

RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.338  
 G magnitude : 16.430  
 RP magnitude : 15.757  
 BP magnitude : 16.961  
 DUPflag : 0  
 Distance (au) : 17.630  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.29  
 Sun-Target sep (deg) : 165.48  
 Sun-Moon sep (deg) : 86.60  
 B (ring opening deg) : 46.74  
 PA of pole (deg) : 90.41

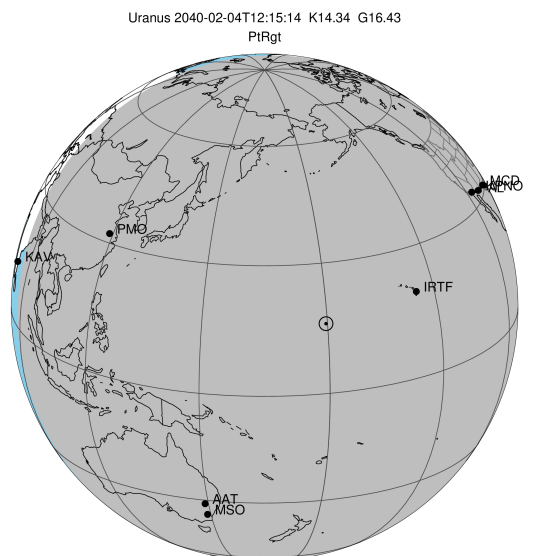
# a(km) ring

- 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

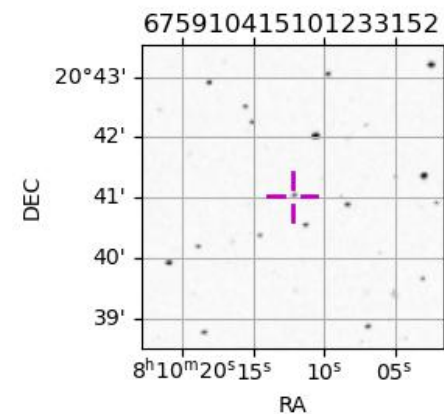
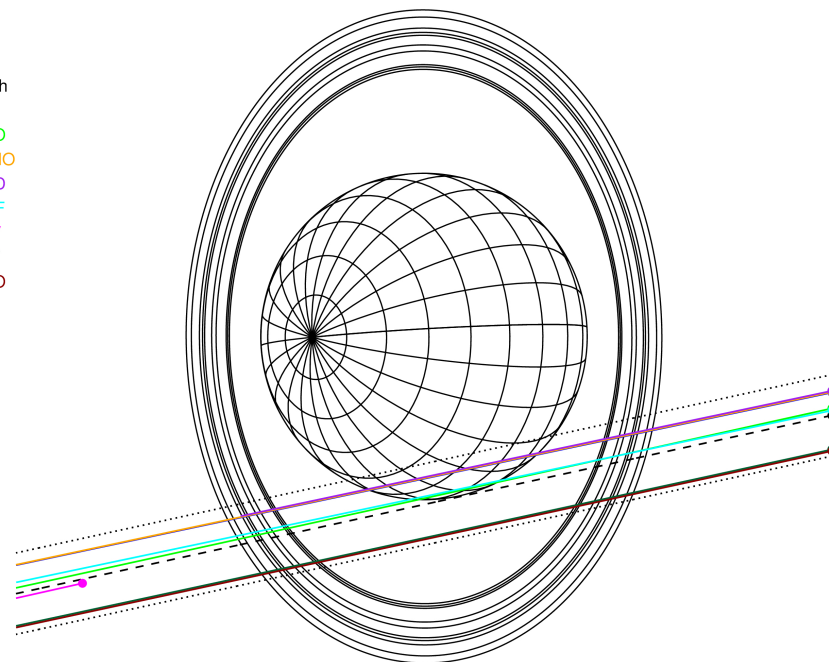
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	FEB 04 11:48 - FEB 04 12:38	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	FEB 04 11:55 - FEB 04 12:44	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	FEB 04 11:48 - FEB 04 12:38	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	FEB 04 11:47 - FEB 04 12:37	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	FEB 04 11:50 - FEB 04 12:38	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	+++++		+++++	FEB 04 11:55 - FEB 04 12:39	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++		+++++	FEB 04 11:55 - FEB 04 12:39	PnnRie

Uranus 2040-02-04T12:15:14 K14.34 G16.43 PtRgt

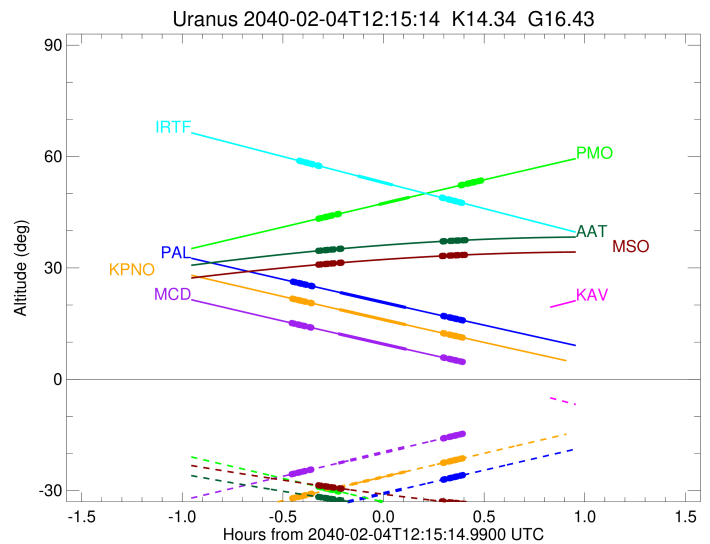
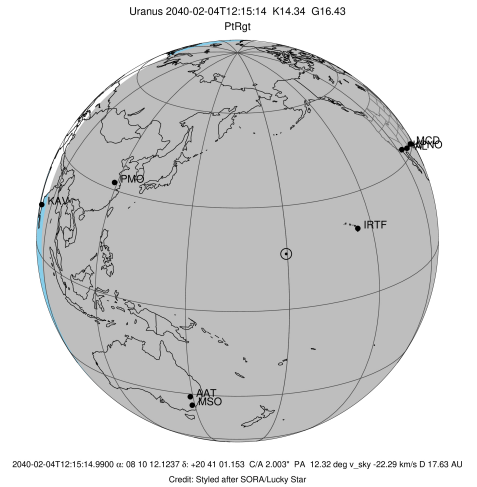


2040-02-04T12:15:14.9900 α: 08 10 12.1237 β: +20 41 01.153 C/A 2.003° PA 12.32 deg v\_sky -22.29 km/s D 17.63 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 KAV  
 AAT  
 MSO

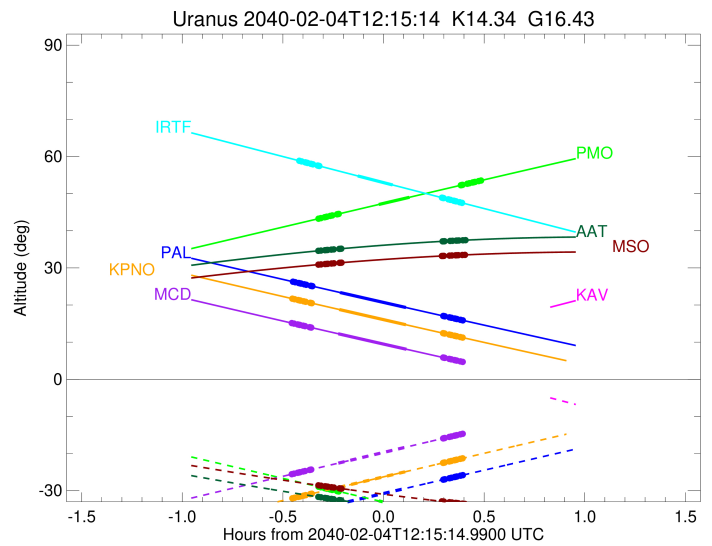
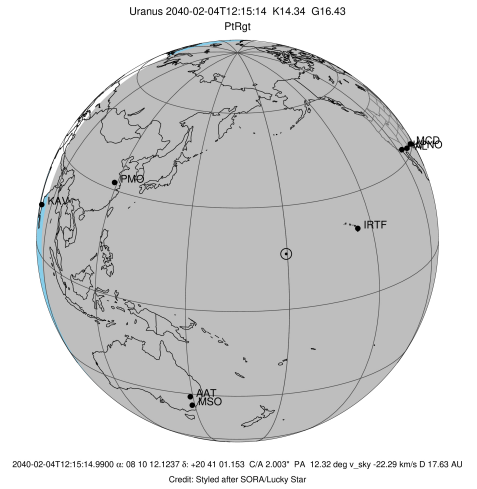


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-02-04T12:12:01.370  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 675910415101233152  
 2Mass ID (if available) : 08101213+2041012  
 ICRS Star Coord at Epoch: 08h 10m 12.12373s +20:41:01.15347s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.338  
 G magnitude : 16.430  
 RP magnitude : 15.757  
 BP magnitude : 16.961  
 DUPflag : 0  
 Distance (au) : 17.630  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.29  
 Sun-Target sep (deg) : 165.48  
 Sun-Moon sep (deg) : 86.90  
 B (ring opening deg) : 46.74  
 PA of pole (deg) : 90.41  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.704  
 C/A sky separation (km) : 21793.6  
 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\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



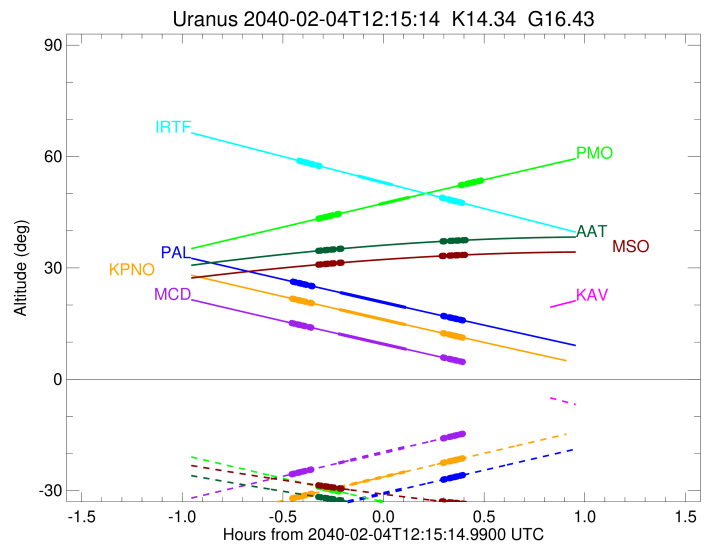
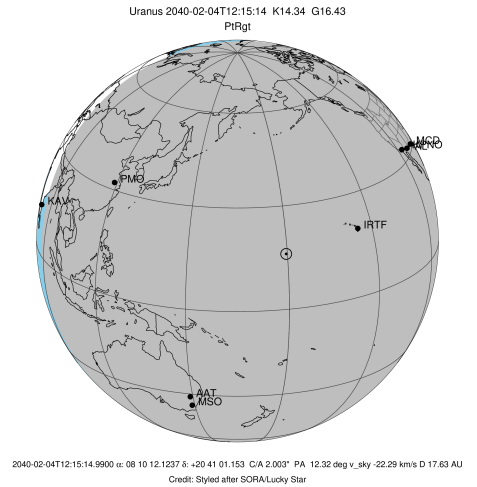
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-02-04T11:48:11.170		26.29	-36.43	51280.45	-27.40		
lambda	I	2040-02-04T11:48:56.899		26.14	-36.27	50026.71	-27.34		
delta	I	2040-02-04T11:50:00.330		25.92	-36.05	48300.35	-27.09		
gamma	I	2040-02-04T11:50:25.249		25.83	-35.96	47626.49	-26.99		
eta	I	2040-02-04T11:50:41.957		25.77	-35.91	47176.12	-26.92		
beta	I	2040-02-04T11:51:38.199		25.58	-35.71	45670.65	-26.67		
alpha	I	2040-02-04T11:52:12.556		25.46	-35.59	44752.37	-26.50		
4	I	2040-02-04T11:53:36.139		25.17	-35.30	42576.09	-26.07		
5	I	2040-02-04T11:53:52.706		25.11	-35.24	42164.26	-25.98		
6	I	2040-02-04T11:54:04.090		25.07	-35.20	41796.82	-25.85		
Uranus	I	2040-02-04T12:02:16.378		23.38	-33.49	25416.51		-27.58	-28.68
Uranus	E	2040-02-04T12:21:55.998		19.33	-29.37	25522.88		13.44	14.05
6	E	2040-02-04T12:33:05.120		17.05	-27.04	41867.03	25.78		
5	E	2040-02-04T12:33:21.263		17.00	-26.98	42300.98	25.91		
4	E	2040-02-04T12:33:32.904		16.96	-26.94	42608.80	26.00		
alpha	E	2040-02-04T12:34:53.227		16.68	-26.66	44702.78	26.41		
beta	E	2040-02-04T12:35:30.055		16.56	-26.53	45670.98	26.58		
eta	E	2040-02-04T12:36:26.359		16.37	-26.34	47176.12	26.83		
gamma	E	2040-02-04T12:36:43.274		16.31	-26.28	47630.49	26.90		
delta	E	2040-02-04T12:37:08.133		16.23	-26.19	48300.35	27.00		
lambda	E	2040-02-04T12:38:11.797		16.01	-25.97	50026.71	27.23		
epsilon	E	2040-02-04T12:38:38.926		15.92	-25.88	50766.81	27.29		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-02-04T12:18:19.670  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : 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 : 675910415101233152  
 2Mass ID (if available) : 08101213+2041012  
 ICRS Star Coord at Epoch: 08h 10m 12.12373s +20:41:01.15347s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.338  
 G magnitude : 16.430  
 RP magnitude : 15.757  
 BP magnitude : 16.961  
 DUPflag : 0  
 Distance (au) : 17.630  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.29  
 Sun-Target sep (deg) : 165.48  
 Sun-Moon sep (deg) : 87.33  
 B (ring opening deg) : 46.74  
 PA of pole (deg) : 90.41  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.937  
 C/A sky separation (km) : 24768.6  
 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\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



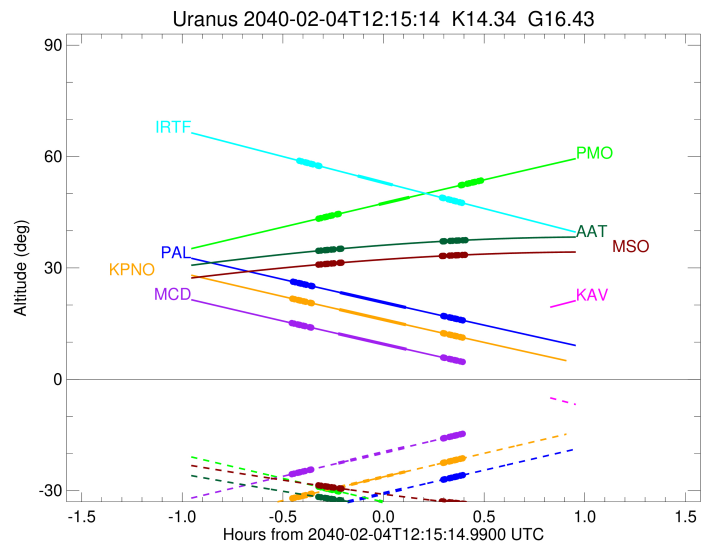
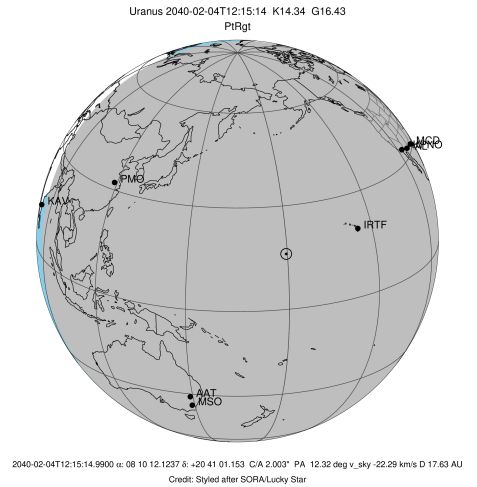
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-02-04T11:55:49.165		43.25	-28.93	51256.99	-26.62		
lambda	I	2040-02-04T11:56:35.352		43.41	-29.10	50026.71	-26.53		
delta	I	2040-02-04T11:57:40.813		43.64	-29.33	48300.35	-26.21		
gamma	I	2040-02-04T11:58:06.579		43.74	-29.42	47626.84	-26.07		
eta	I	2040-02-04T11:58:23.899		43.80	-29.48	47176.12	-25.97		
beta	I	2040-02-04T11:59:22.252		44.00	-29.69	45671.88	-25.64		
alpha	I	2040-02-04T11:59:58.054		44.13	-29.81	44752.43	-25.40		
4	I	2040-02-04T12:01:25.355		44.44	-30.12	42579.64	-24.82		
5	I	2040-02-04T12:01:42.809		44.50	-30.18	42167.51	-24.70		
6	I	2040-02-04T12:01:54.955		44.55	-30.23	41798.02	-24.54		
Uranus	I	2040-02-04T12:13:51.125		47.08	-32.76	25499.71		-17.33	-18.10
Uranus	E	2040-02-04T12:22:58.919		49.02	-34.69	25558.51		1.56	1.63
6	E	2040-02-04T12:38:19.111		52.27	-37.94	41864.09	24.58		
5	E	2040-02-04T12:38:36.222		52.33	-38.00	42296.51	24.74		
4	E	2040-02-04T12:38:48.613		52.37	-38.05	42610.94	24.87		
alpha	E	2040-02-04T12:40:12.198		52.67	-38.34	44705.39	25.46		
beta	E	2040-02-04T12:40:50.317		52.80	-38.48	45672.39	25.69		
eta	E	2040-02-04T12:41:48.396		53.00	-38.68	47176.12	26.03		
gamma	E	2040-02-04T12:42:05.826		53.07	-38.74	47630.73	26.13		
delta	E	2040-02-04T12:42:31.386		53.15	-38.83	48300.35	26.27		
lambda	E	2040-02-04T12:43:36.698		53.38	-39.06	50026.71	26.59		
epsilon	E	2040-02-04T12:44:04.131		53.48	-39.16	50758.01	26.69		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-02-04T12:11:54.260  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : 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 : 675910415101233152  
 2Mass ID (if available) : 08101213+2041012  
 ICRS Star Coord at Epoch: 08h 10m 12.12373s +20:41:01.15347s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.338  
 G magnitude : 16.430  
 RP magnitude : 15.757  
 BP magnitude : 16.961  
 DUPflag : 0  
 Distance (au) : 17.630  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.29  
 Sun-Target sep (deg) : 165.48  
 Sun-Moon sep (deg) : 86.82  
 B (ring opening deg) : 46.74  
 PA of pole (deg) : 90.41  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.698  
 C/A sky separation (km) : 21715.0  
 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



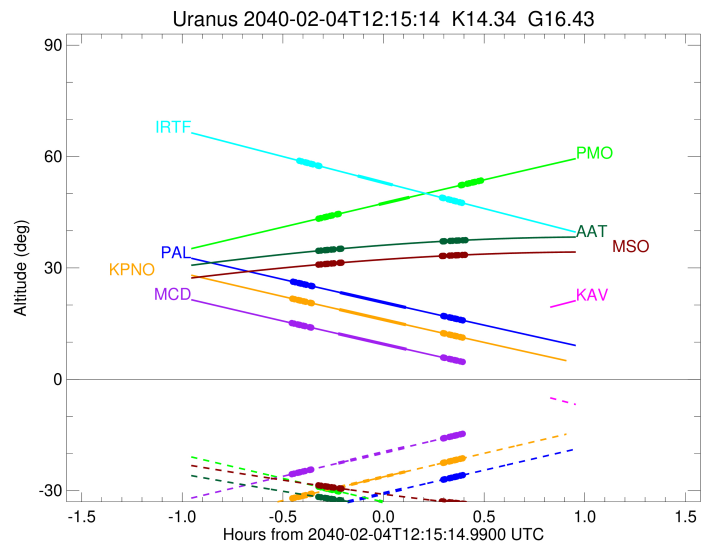
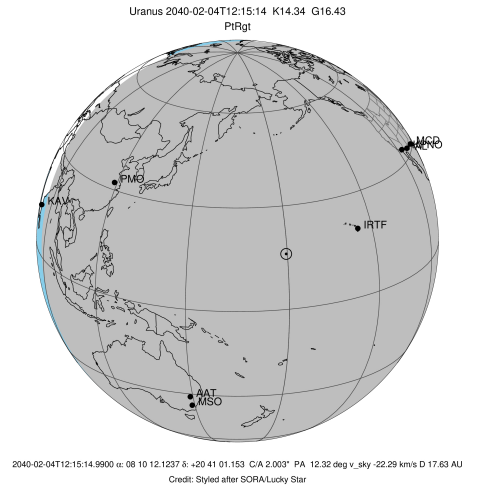
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-02-04T11:48:00.385		21.72	-32.08	51281.13	-27.38		
lambda	I	2040-02-04T11:48:46.168		21.56	-31.92	50026.71	-27.32		
delta	I	2040-02-04T11:49:49.636		21.34	-31.69	48300.35	-27.08		
gamma	I	2040-02-04T11:50:14.568		21.25	-31.60	47626.48	-26.98		
eta	I	2040-02-04T11:50:31.284		21.19	-31.54	47176.12	-26.91		
beta	I	2040-02-04T11:51:27.552		21.00	-31.34	45670.61	-26.66		
alpha	I	2040-02-04T11:52:01.922		20.88	-31.22	44752.37	-26.49		
4	I	2040-02-04T11:53:25.531		20.59	-30.93	42575.99	-26.07		
5	I	2040-02-04T11:53:42.100		20.53	-30.87	42164.18	-25.98		
6	I	2040-02-04T11:53:53.482		20.49	-30.83	41796.79	-25.85		
Uranus	I	2040-02-04T12:02:02.734		18.80	-29.09	25414.66		-27.78	-28.88
Uranus	E	2040-02-04T12:21:55.449		14.69	-24.88	25521.75		13.65	14.27
6	E	2040-02-04T12:33:01.331		12.42	-22.52	41867.10	25.77		
5	E	2040-02-04T12:33:17.472		12.36	-22.47	42301.07	25.90		
4	E	2040-02-04T12:33:29.112		12.32	-22.43	42608.75	25.99		
alpha	E	2040-02-04T12:34:49.467		12.05	-22.14	44702.73	26.40		
beta	E	2040-02-04T12:35:26.312		11.92	-22.01	45670.94	26.57		
eta	E	2040-02-04T12:36:22.648		11.73	-21.82	47176.12	26.81		
gamma	E	2040-02-04T12:36:39.573		11.67	-21.76	47630.48	26.88		
delta	E	2040-02-04T12:37:04.448		11.59	-21.67	48300.35	26.98		
lambda	E	2040-02-04T12:38:08.156		11.37	-21.44	50026.71	27.21		
epsilon	E	2040-02-04T12:38:35.314		11.28	-21.35	50767.03	27.27		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-02-04T12:11:49.930  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : 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 : 675910415101233152  
 2Mass ID (if available) : 08101213+2041012  
 ICRS Star Coord at Epoch: 08h 10m 12.12373s +20:41:01.15347s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.338  
 G magnitude : 16.430  
 RP magnitude : 15.757  
 BP magnitude : 16.961  
 DUPflag : 0  
 Distance (au) : 17.630  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.29  
 Sun-Target sep (deg) : 165.48  
 Sun-Moon sep (deg) : 86.72  
 B (ring opening deg) : 46.74  
 PA of pole (deg) : 90.41  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.686  
 C/A sky separation (km) : 21556.3  
 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\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



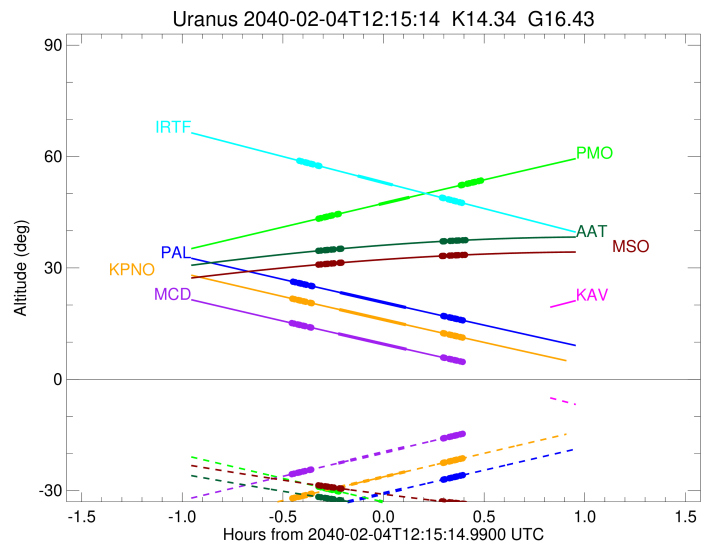
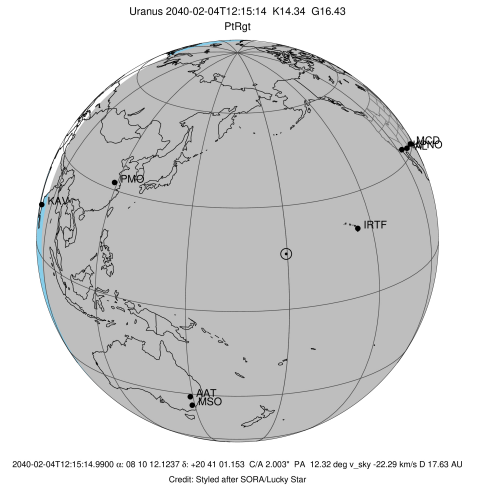
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-02-04T11:47:49.706		15.15	-25.59	51282.55	-27.36		
lambda	I	2040-02-04T11:48:35.569		14.99	-25.42	50026.71	-27.30		
delta	I	2040-02-04T11:49:39.066		14.77	-25.19	48300.35	-27.07		
gamma	I	2040-02-04T11:50:04.009		14.68	-25.10	47626.46	-26.97		
eta	I	2040-02-04T11:50:20.729		14.63	-25.05	47176.12	-26.90		
beta	I	2040-02-04T11:51:17.011		14.43	-24.84	45670.53	-26.66		
alpha	I	2040-02-04T11:51:51.381		14.31	-24.72	44752.35	-26.49		
4	I	2040-02-04T11:53:14.987		14.02	-24.42	42575.78	-26.08		
5	I	2040-02-04T11:53:31.547		13.96	-24.36	42164.00	-25.99		
6	I	2040-02-04T11:53:42.916		13.93	-24.32	41796.73	-25.86		
Uranus	I	2040-02-04T12:01:45.810		12.26	-22.60	25410.96		-28.17	-29.28
Uranus	E	2040-02-04T12:22:03.703		8.09	-18.26	25519.44		14.08	14.72
6	E	2040-02-04T12:33:02.687		5.85	-15.92	41867.23	25.78		
5	E	2040-02-04T12:33:18.814		5.80	-15.86	42301.26	25.91		
4	E	2040-02-04T12:33:30.442		5.76	-15.82	42608.64	26.00		
alpha	E	2040-02-04T12:34:50.793		5.49	-15.54	44702.61	26.40		
beta	E	2040-02-04T12:35:27.644		5.37	-15.41	45670.88	26.56		
eta	E	2040-02-04T12:36:23.999		5.18	-15.21	47176.12	26.80		
gamma	E	2040-02-04T12:36:40.930		5.12	-15.15	47630.47	26.87		
delta	E	2040-02-04T12:37:05.817		5.04	-15.06	48300.35	26.97		
lambda	E	2040-02-04T12:38:09.560		4.82x	-14.84	50026.71	27.20		
epsilon	E	2040-02-04T12:38:36.752		4.73x	-14.74	50767.46	27.25		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-02-04T12:12:41.710  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : 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 : 675910415101233152  
 2Mass ID (if available) : 08101213+2041012  
 ICRS Star Coord at Epoch: 08h 10m 12.12373s +20:41:01.15347s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.338  
 G magnitude : 16.430  
 RP magnitude : 15.757  
 BP magnitude : 16.961  
 DUPflag : 0  
 Distance (au) : 17.630  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.29  
 Sun-Target sep (deg) : 165.48  
 Sun-Moon sep (deg) : 87.34  
 B (ring opening deg) : 46.74  
 PA of pole (deg) : 90.41  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.918  
 C/A sky separation (km) : 24528.5  
 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	2040-02-04T11:50:05.197		58.86	-71.98	51256.64	-26.83		
lambda	I	2040-02-04T11:50:51.019		58.69	-71.80	50026.71	-26.74		
delta	I	2040-02-04T11:51:55.969		58.43	-71.55	48300.35	-26.42		
gamma	I	2040-02-04T11:52:21.530		58.33	-71.45	47626.84	-26.28		
eta	I	2040-02-04T11:52:38.710		58.27	-71.38	47176.12	-26.19		
beta	I	2040-02-04T11:53:36.582		58.04	-71.16	45671.88	-25.86		
alpha	I	2040-02-04T11:54:12.080		57.90	-71.02	44752.43	-25.62		
4	I	2040-02-04T11:55:38.610		57.56	-70.68	42579.60	-25.05		
5	I	2040-02-04T11:55:55.902		57.50	-70.61	42167.47	-24.93		
6	I	2040-02-04T11:56:07.931		57.45	-70.57	41798.00	-24.77		
Uranus	I	2040-02-04T12:07:34.439		54.77	-67.89	25493.02		-18.32	-19.13
Uranus	E	2040-02-04T12:17:59.287		52.34	-65.45	25556.79		3.30	3.45
6	E	2040-02-04T12:32:41.093		48.91	-61.99	41864.55	24.72		
5	E	2040-02-04T12:32:58.083		48.85	-61.93	42297.23	24.88		
4	E	2040-02-04T12:33:10.375		48.80	-61.88	42610.63	25.00		
alpha	E	2040-02-04T12:34:33.572		48.48	-61.55	44704.97	25.57		
beta	E	2040-02-04T12:35:11.541		48.33	-61.40	45672.17	25.79		
eta	E	2040-02-04T12:36:09.413		48.10	-61.18	47176.12	26.12		
gamma	E	2040-02-04T12:36:26.783		48.04	-61.11	47630.69	26.22		
delta	E	2040-02-04T12:36:52.262		47.94	-61.01	48300.35	26.35		
lambda	E	2040-02-04T12:37:57.384		47.68	-60.75	50026.71	26.66		
epsilon	E	2040-02-04T12:38:24.797		47.58	-60.64	50759.37	26.75		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-02-04T12:15:35.180  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : 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 : 675910415101233152  
 2Mass ID (if available) : 08101213+2041012  
 ICRS Star Coord at Epoch: 08h 10m 12.12373s +20:41:01.15347s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.338  
 G magnitude : 16.430  
 RP magnitude : 15.757  
 BP magnitude : 16.961  
 DUPflag : 0  
 Distance (au) : 17.630  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.29  
 Sun-Target sep (deg) : 165.48  
 Sun-Moon sep (deg) : 87.17  
 B (ring opening deg) : 46.74  
 PA of pole (deg) : 90.41  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.412  
 C/A sky separation (km) : 30841.1  
 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

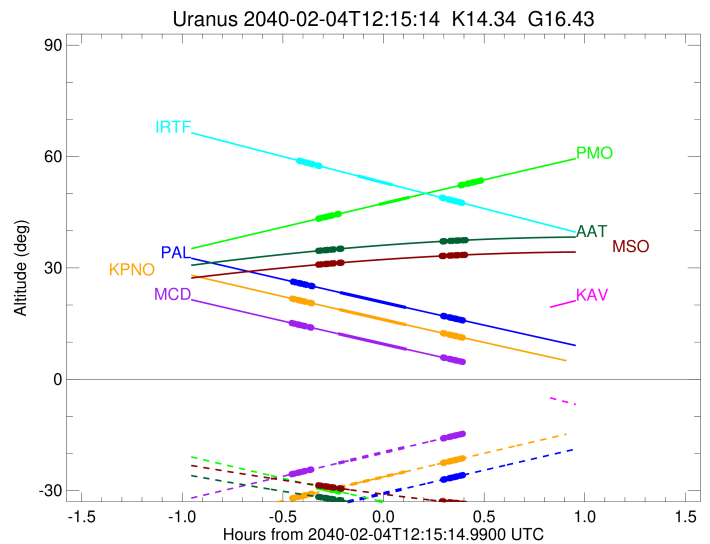
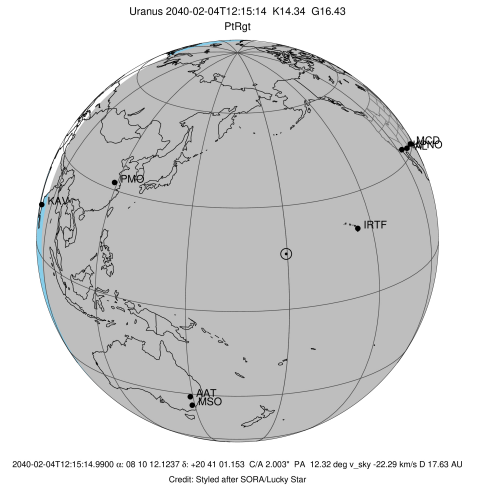


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2040-02-04T11:55:48.019		34.60	-31.69	51198.50	-24.29		
lambda	I	2040-02-04T11:56:36.296		34.67	-31.80	50026.71	-24.10		
delta	I	2040-02-04T11:57:48.765		34.77	-31.97	48300.35	-23.54		
gamma	I	2040-02-04T11:58:17.490		34.81	-32.03	47627.69	-23.30		
eta	I	2040-02-04T11:58:36.943		34.84	-32.08	47176.12	-23.13		
beta	I	2040-02-04T11:59:42.796		34.93	-32.23	45674.65	-22.53		
alpha	I	2040-02-04T12:00:23.825		34.99	-32.32	44751.81	-22.11		
4	I	2040-02-04T12:02:04.880		35.12	-32.55	42588.11	-21.03		
5	I	2040-02-04T12:02:25.482		35.15	-32.60	42177.36	-20.80		
6	I	2040-02-04T12:02:40.653		35.17	-32.63	41802.08	-20.53		

No planet occultations

6	E	2040-02-04T12:32:51.798		37.16	-36.39	41857.15	20.55		
5	E	2040-02-04T12:33:12.518		37.17	-36.43	42285.49	20.81		
4	E	2040-02-04T12:33:27.830		37.19	-36.46	42614.36	21.04		
alpha	E	2040-02-04T12:35:05.200		37.27	-36.64	44711.01	22.12		
beta	E	2040-02-04T12:35:48.718		37.30	-36.72	45675.02	22.54		
eta	E	2040-02-04T12:36:54.355		37.35	-36.84	47176.12	23.14		
gamma	E	2040-02-04T12:37:13.945		37.37	-36.88	47631.12	23.31		
delta	E	2040-02-04T12:37:42.505		37.39	-36.93	48300.35	23.55		
lambda	E	2040-02-04T12:38:54.929		37.44	-37.06	50026.71	24.11		
epsilon	E	2040-02-04T12:39:24.656		37.46	-37.11	50746.75	24.31		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2040-02-04T12:15:29.820  
 Event type : PtRgt  
 : Uranus occs: topocentric, not geocentric  
 : 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 : 675910415101233152  
 2Mass ID (if available) : 08101213+2041012  
 ICRS Star Coord at Epoch: 08h 10m 12.12373s +20:41:01.15347s  
 RUWE (>1.4 is poor) : 1.01  
 K magnitude : 14.338  
 G magnitude : 16.430  
 RP magnitude : 15.757  
 BP magnitude : 16.961  
 DUPflag : 0  
 Distance (au) : 17.630  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.29  
 Sun-Target sep (deg) : 165.48  
 Sun-Moon sep (deg) : 87.12  
 B (ring opening deg) : 46.74  
 PA of pole (deg) : 90.41  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.431  
 C/A sky separation (km) : 31088.3  
 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	2040-02-04T11:55:49.237		30.88	-28.57	51196.02	-24.16		
lambda	I	2040-02-04T11:56:37.688		30.94	-28.68	50026.71	-23.96		
delta	I	2040-02-04T11:57:50.606		31.04	-28.83	48300.35	-23.38		
gamma	I	2040-02-04T11:58:19.522		31.08	-28.90	47627.72	-23.14		
eta	I	2040-02-04T11:58:39.112		31.10	-28.94	47176.12	-22.97		
beta	I	2040-02-04T11:59:45.450		31.19	-29.08	45674.76	-22.35		
alpha	I	2040-02-04T12:00:26.818		31.24	-29.17	44751.76	-21.92		
4	I	2040-02-04T12:02:08.781		31.37	-29.38	42588.47	-20.82		
5	I	2040-02-04T12:02:29.588		31.39	-29.42	42177.85	-20.58		
6	I	2040-02-04T12:02:44.960		31.41	-29.46	41802.30	-20.31		

No planet occultations

6	E	2040-02-04T12:32:39.197		33.21	-32.89	41856.80	20.32		
5	E	2040-02-04T12:33:00.148		33.23	-32.93	42284.93	20.59		
4	E	2040-02-04T12:33:15.651		33.24	-32.95	42614.48	20.83		
alpha	E	2040-02-04T12:34:53.924		33.31	-33.12	44711.27	21.94		
beta	E	2040-02-04T12:35:37.789		33.34	-33.20	45675.13	22.37		
eta	E	2040-02-04T12:36:43.911		33.39	-33.31	47176.12	22.98		
gamma	E	2040-02-04T12:37:03.638		33.41	-33.34	47631.14	23.15		
delta	E	2040-02-04T12:37:32.390		33.43	-33.39	48300.35	23.40		
lambda	E	2040-02-04T12:38:45.266		33.48	-33.51	50026.71	23.97		
epsilon	E	2040-02-04T12:39:15.152		33.50	-33.56	50746.44	24.17		