

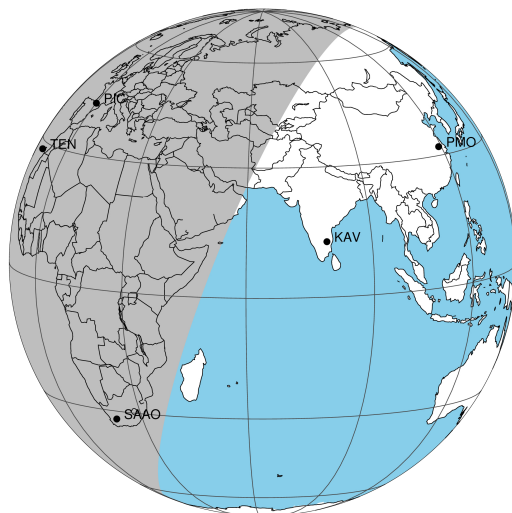
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2047-11-23T02:27:32.140  
 Event type : PgtX  
 : Uranus occs: geocentric, topocentric  
 : No ring occs  
 Gaia source ID : 3866155944396821120  
 2Mass ID (if available) : 10481238+0825527

Uranus 2047-11-23T02:27:32 K12.97 G14.44 PgtX

ICRS Star Coord at Epoch: 10h 48m 12.35250s +08:25:52.79253s

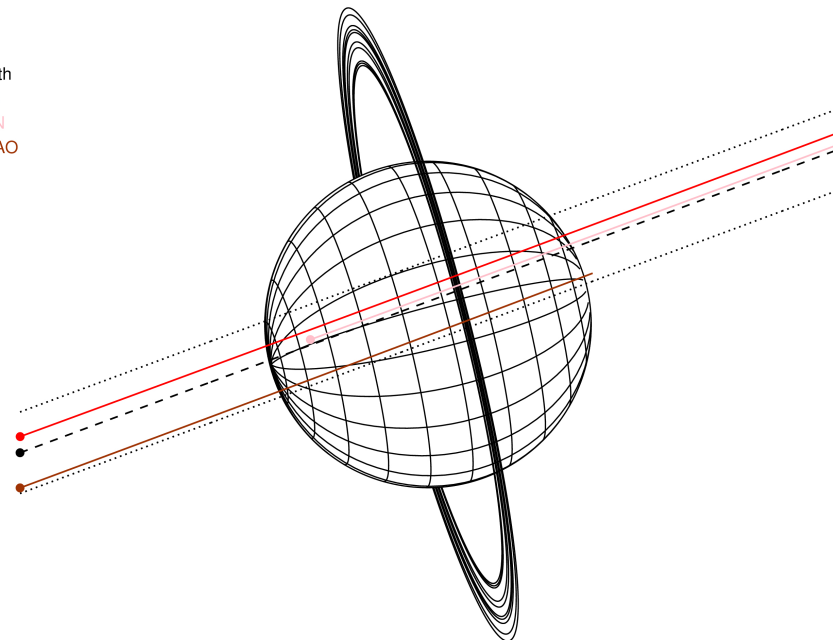
RUWE (>1.4 is poor) : 0.00  
 K magnitude : 12.971  
 G magnitude : 14.440  
 RP magnitude : 13.939  
 BP magnitude : 14.746  
 DUPflag : 1  
 Distance (au) : 18.451  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 12.12  
 Sun-Target sep (deg) : 79.80  
 Sun-Moon sep (deg) : 154.34  
 B (ring opening deg) : 7.23  
 PA of pole (deg) : 104.36

Uranus 2047-11-23T02:27:32 K12.97 G14.44  
 PgtX



2047-11-23T02:27:32.1400 ex: 10 48 12.3525 s: +08 25 52.793 C/A 0.243° PA 200.33 deg v\_sky +12.12 km/s D 18.45 AU  
 Credit: Styled after SORA/Lucky Star

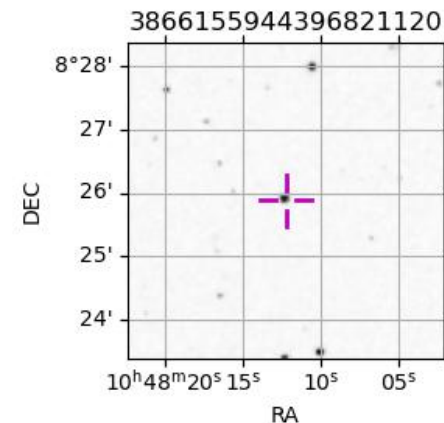
Earth  
 PIC  
 TEN  
 SAAO



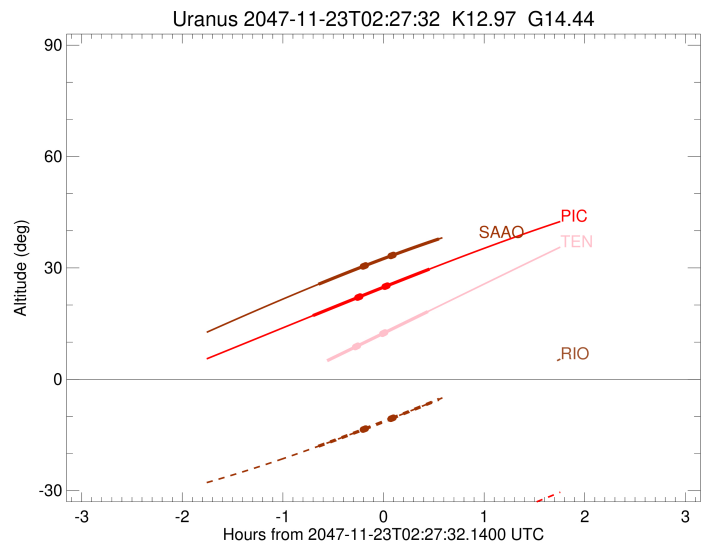
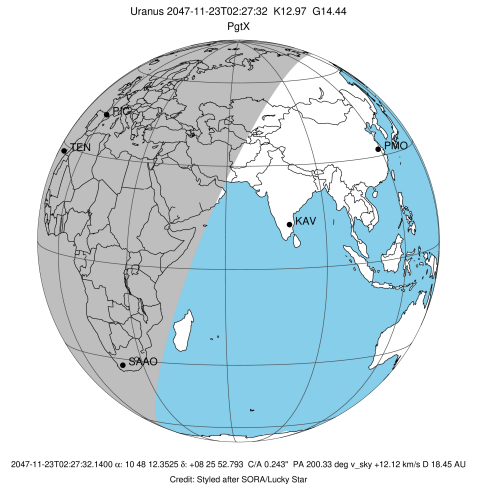
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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		+	+	NOV 23 01:45 - NOV 23 02:54	PieRnn
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
TEN	Teide Obs./Tenerife	28.3	343.5		+		NOV 23 02:53 - NOV 23 02:53	PneRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
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		+	+	NOV 23 01:48 - NOV 23 03:00	PieRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

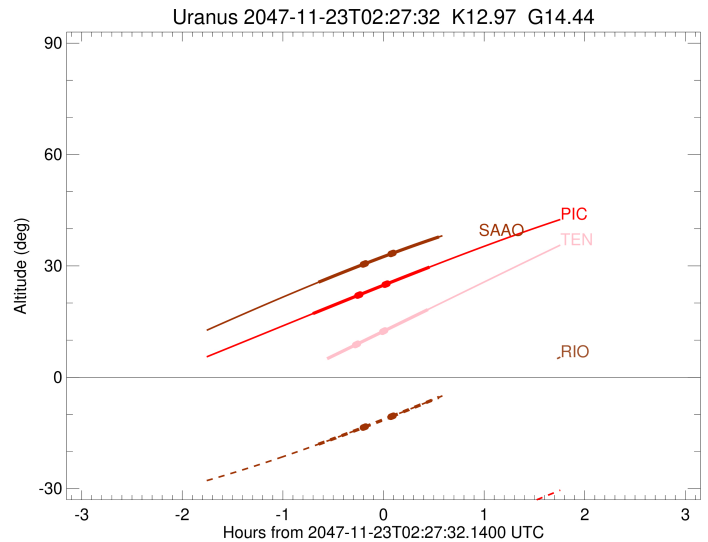
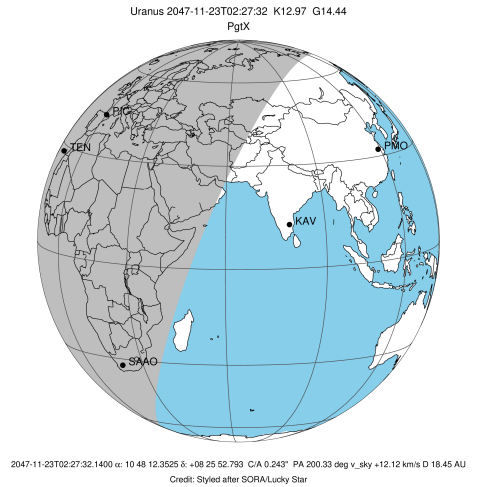


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2047-11-23T02:20:07.370  
 Event type : PgtX  
 : Uranus occs: geocentric, topocentric  
 : No ring occs  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 3866155944396821120  
 2Mass ID (if available) : 10481238+0825527  
 ICRS Star Coord at Epoch: 10h 48m 12.35250s +08:25:52.79253s  
 RUWE (>1.4 is poor) : 0.00  
 K magnitude : 12.971  
 G magnitude : 14.440  
 RP magnitude : 13.939  
 BP magnitude : 14.746  
 DUPflag : 1  
 Distance (au) : 18.451  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 12.12  
 Sun-Target sep (deg) : 79.80  
 Sun-Moon sep (deg) : 153.84  
 B (ring opening deg) : 7.23  
 PA of pole (deg) : 104.36  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.421  
 C/A sky separation (km) : 5639.2  
 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\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



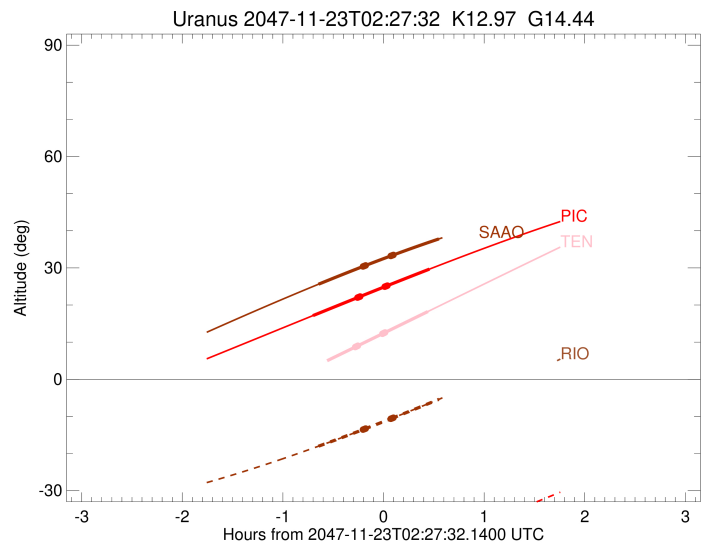
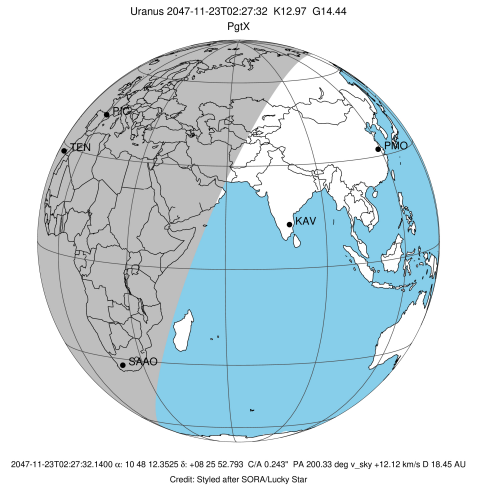
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2047-11-23T02:12:09.034	b	22.02	-52.00	50778.29	-93.82		
lambda	I	2047-11-23T02:12:17.042	b	22.05	-51.98	50026.71	-93.85		
delta	I	2047-11-23T02:12:35.440	b	22.10	-51.93	48300.35	-93.82		
gamma	I	2047-11-23T02:12:42.572	b	22.12	-51.91	47631.23	-93.81		
eta	I	2047-11-23T02:12:47.424	b	22.14	-51.89	47176.12	-93.81		
beta	I	2047-11-23T02:13:03.620	b	22.19	-51.85	45650.53	-93.76		
alpha	I	2047-11-23T02:13:14.696	b	22.22	-51.82	44712.45	-93.98		
4	I	2047-11-23T02:13:34.553	b	22.28	-51.76	42574.35	-93.34		
5	I	2047-11-23T02:13:40.953	b	22.30	-51.75	42280.97	-93.90		
6	I	2047-11-23T02:13:40.896	b	22.30	-51.75	41859.84	-93.01		
Uranus	I	2047-11-23T01:45:31.195		17.16	-56.30	25549.95		80.10	80.53
Uranus	E	2047-11-23T02:54:53.261		29.66	-44.61	25550.77		-69.89	-70.72
6	E	2047-11-23T02:28:13.094	b	24.93	-49.28	41825.18	92.84		
5	E	2047-11-23T02:28:12.780	b	24.92	-49.28	42172.97	93.74		
4	E	2047-11-23T02:28:19.495	b	24.94	-49.26	42580.21	93.18		
alpha	E	2047-11-23T02:28:39.617	b	25.00	-49.20	44732.83	93.82		
beta	E	2047-11-23T02:28:50.684	b	25.04	-49.17	45667.16	93.61		
eta	E	2047-11-23T02:29:06.651	b	25.09	-49.13	47176.12	93.66		
gamma	E	2047-11-23T02:29:11.401	b	25.10	-49.11	47621.00	93.66		
delta	E	2047-11-23T02:29:18.654	b	25.12	-49.09	48300.35	93.67		
lambda	E	2047-11-23T02:29:37.081	b	25.18	-49.04	50026.70	93.69		
epsilon	E	2047-11-23T02:29:52.513	b	25.22	-48.99	51472.75	93.66		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2047-11-23T02:18:59.550  
 Event type : PgtX  
 : Uranus occs: geocentric, topocentric  
 : No ring occs  
 Observer code : TEN  
 Location : Teide Obs./Tenerife  
 Latitude (deg) : 28.30050  
 E. Longitude (deg) : 343.48909  
 Altitude (km) : 2.395  
 Gaia source ID : 3866155944396821120  
 2Mass ID (if available) : 10481238+0825527  
 ICRS Star Coord at Epoch: 10h 48m 12.35250s +08:25:52.79253s  
 RUWE (>1.4 is poor) : 0.00  
 K magnitude : 12.971  
 G magnitude : 14.440  
 RP magnitude : 13.939  
 BP magnitude : 14.746  
 DUPflag : 1  
 Distance (au) : 18.451  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 12.12  
 Sun-Target sep (deg) : 79.80  
 Sun-Moon sep (deg) : 153.61  
 B (ring opening deg) : 7.23  
 PA of pole (deg) : 104.36  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.308  
 C/A sky separation (km) : 4117.0  
 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	2047-11-23T02:10:49.910	b	8.71	-70.45	50783.34	-94.35		
lambda	I	2047-11-23T02:10:57.928	b	8.74	-70.42	50026.71	-94.36		
delta	I	2047-11-23T02:11:16.227	b	8.81	-70.36	48300.34	-94.33		
gamma	I	2047-11-23T02:11:23.320	b	8.84	-70.33	47631.28	-94.31		
eta	I	2047-11-23T02:11:28.147	b	8.86	-70.31	47176.11	-94.30		
beta	I	2047-11-23T02:11:44.241	b	8.91	-70.26	45651.11	-94.25		
alpha	I	2047-11-23T02:11:55.288	b	8.95	-70.22	44711.31	-94.45		
4	I	2047-11-23T02:12:15.037	b	9.03	-70.15	42572.73	-93.81		
5	I	2047-11-23T02:12:21.269	b	9.05	-70.13	42283.32	-94.37		
6	I	2047-11-23T02:12:21.282	b	9.05	-70.13	41858.50	-93.47		
Uranus	I	2047-11-23T01:44:13.343		2.87x	-75.78	25549.85		81.96	82.31
Uranus	E	2047-11-23T02:53:57.976		18.24	-61.22	25550.44		-73.26	-73.97
6	E	2047-11-23T02:26:47.942	b	12.24	-67.08	41823.68	93.43		
5	E	2047-11-23T02:26:47.559	b	12.24	-67.08	42174.90	94.33		
4	E	2047-11-23T02:26:54.340	b	12.26	-67.06	42578.57	93.76		
alpha	E	2047-11-23T02:27:14.310	b	12.33	-66.99	44731.74	94.39		
beta	E	2047-11-23T02:27:25.335	b	12.37	-66.95	45667.82	94.18		
eta	E	2047-11-23T02:27:41.207	b	12.43	-66.89	47176.12	94.22		
gamma	E	2047-11-23T02:27:45.929	b	12.45	-66.88	47621.03	94.23		
delta	E	2047-11-23T02:27:53.138	b	12.48	-66.85	48300.34	94.24		
lambda	E	2047-11-23T02:28:11.455	b	12.54	-66.79	50026.71	94.26		
epsilon	E	2047-11-23T02:28:26.873	b	12.60	-66.73	51480.12	94.24		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2047-11-23T02:24:37.510  
 Event type : PgtX  
 : Uranus occs: geocentric, topocentric  
 : No ring occs  
 Observer code : SAAO  
 Location : So. Afr. Astro. Obs. (Sutherland)  
 Latitude (deg) : -32.37953  
 E. Longitude (deg) : 20.81070  
 Altitude (km) : 1.768  
 Gaia source ID : 3866155944396821120  
 2Mass ID (if available) : 10481238+0825527  
 ICRS Star Coord at Epoch: 10h 48m 12.35250s +08:25:52.79253s  
 RUWE (>1.4 is poor) : 0.00  
 K magnitude : 12.971  
 G magnitude : 14.440  
 RP magnitude : 13.939  
 BP magnitude : 14.746  
 DUPflag : 1  
 Distance (au) : 18.451  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 12.12  
 Sun-Target sep (deg) : 79.80  
 Sun-Moon sep (deg) : 154.19  
 B (ring opening deg) : 7.23  
 PA of pole (deg) : 104.36  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.119  
 C/A sky separation (km) : 1599.1  
 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	2047-11-23T02:15:28.339	b	30.41	-13.53	50805.85	-92.39		
lambda	I	2047-11-23T02:15:36.775	b	30.44	-13.51	50026.71	-92.34		
delta	I	2047-11-23T02:15:55.478	b	30.49	-13.45	48300.34	-92.26		
gamma	I	2047-11-23T02:16:02.729	b	30.51	-13.43	47631.46	-92.23		
eta	I	2047-11-23T02:16:07.666	b	30.53	-13.42	47176.12	-92.21		
beta	I	2047-11-23T02:16:24.064	b	30.58	-13.37	45653.43	-92.11		
alpha	I	2047-11-23T02:16:35.457	b	30.61	-13.34	44707.02	-92.26		
4	I	2047-11-23T02:16:55.720	b	30.67	-13.28	42566.47	-91.55		
5	I	2047-11-23T02:17:01.493	b	30.69	-13.26	42291.75	-92.10		
6	I	2047-11-23T02:17:01.892	b	30.69	-13.26	41853.13	-91.20		
Uranus	I	2047-11-23T01:48:48.277		25.61	-18.03	25550.08		77.83	78.35
Uranus	E	2047-11-23T03:00:35.902		37.81	-5.39	25549.84		-82.27	-82.61
6	E	2047-11-23T02:31:42.969	b	33.20	-10.67	41818.23	90.89		
5	E	2047-11-23T02:31:42.414	b	33.20	-10.67	42182.75	91.79		
4	E	2047-11-23T02:31:49.724	b	33.22	-10.65	42572.43	91.24		
alpha	E	2047-11-23T02:32:10.192	b	33.28	-10.59	44727.60	91.94		
beta	E	2047-11-23T02:32:21.580	b	33.31	-10.56	45670.16	91.79		
eta	E	2047-11-23T02:32:37.876	b	33.35	-10.51	47176.11	91.88		
gamma	E	2047-11-23T02:32:42.720	b	33.37	-10.49	47621.16	91.90		
delta	E	2047-11-23T02:32:50.109	b	33.39	-10.47	48300.35	91.93		
lambda	E	2047-11-23T02:33:08.880	b	33.44	-10.42	50026.71	92.01		
epsilon	E	2047-11-23T02:33:24.937	b	33.48	-10.37	51504.51	92.08		