

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-01-18T11:24:47.450  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3427506222878418176  
 2Mass ID (if available) : 05511829+2338249

Uranus 2033-01-18T11:24:47 K14.67 G17.34 PgtRgt

ICRS Star Coord at Epoch: 05h 51m 18.30722s +23:38:25.02148s

RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.666  
 G magnitude : 17.344  
 RP magnitude : 16.500  
 BP magnitude : 18.069  
 DUPflag : 0  
 Distance (au) : 18.158  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.38  
 Sun-Target sep (deg) : 149.79  
 Sun-Moon sep (deg) : 63.11  
 B (ring opening deg) : 76.97  
 PA of pole (deg) : 51.38

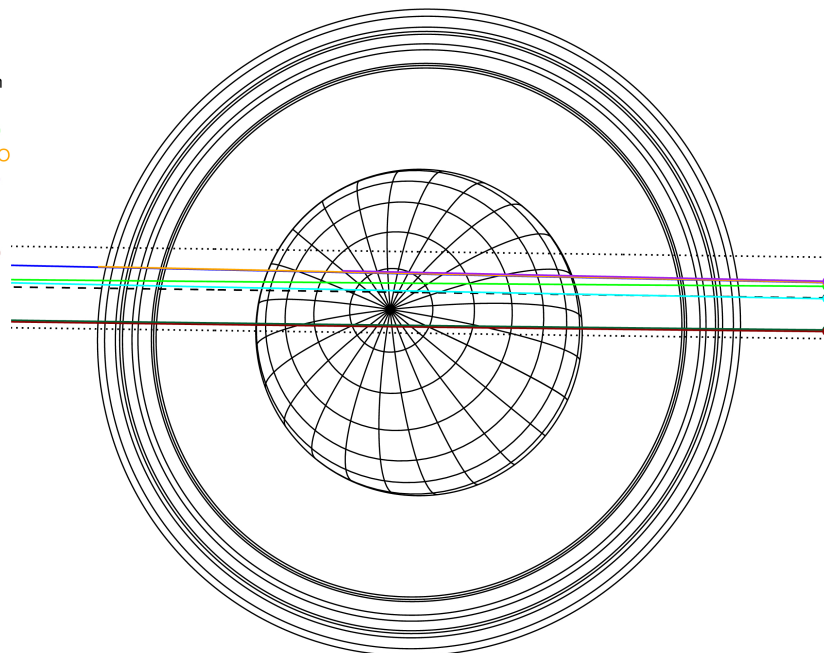
Uranus 2033-01-18T11:24:47 K14.67 G17.34  
 PgtRgt



2033-01-18T11:24:47.4500 ra: 05 51 18.30722 s: +23 38 25.021 C/A 0.483° PA 179.23 deg v\_sky -19.38 km/s D 18.16 AU

Credit: Styled after SORA/Lucky Star

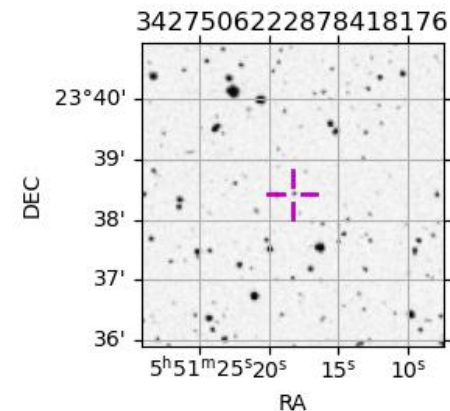
Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 AAT  
 MSO



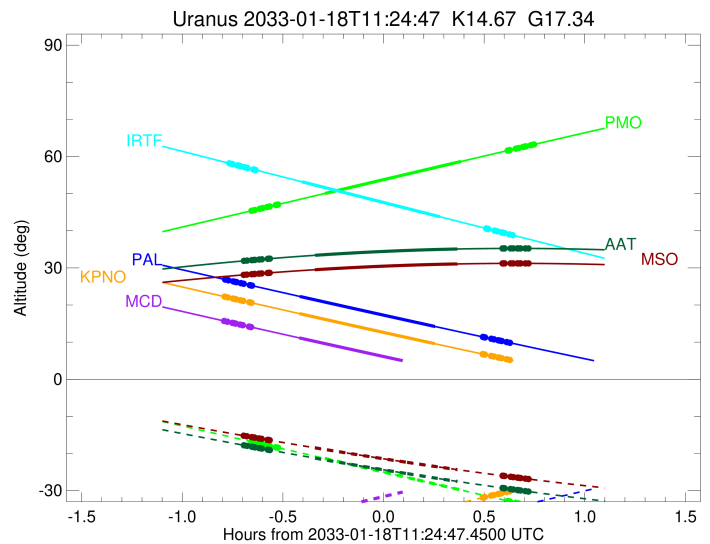
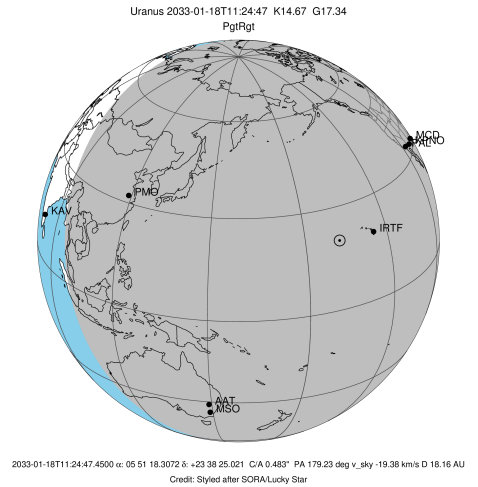
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+ +	+++++	JAN 18 10:37 - JAN 18 12:02	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	JAN 18 10:45 - JAN 18 12:09	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	JAN 18 10:37 - JAN 18 12:02	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+		JAN 18 10:37 - JAN 18 10:59	PinRin
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	JAN 18 10:39 - JAN 18 12:03	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 18 10:43 - JAN 18 12:08	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +	+++++	JAN 18 10:43 - JAN 18 12:08	PieRie

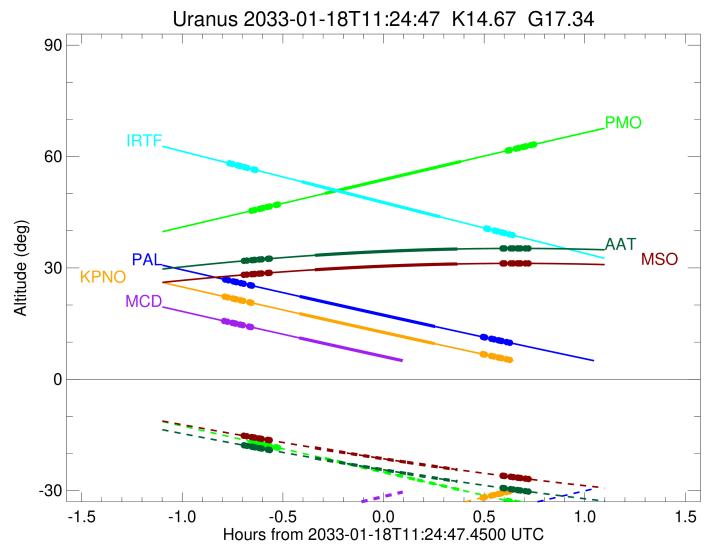
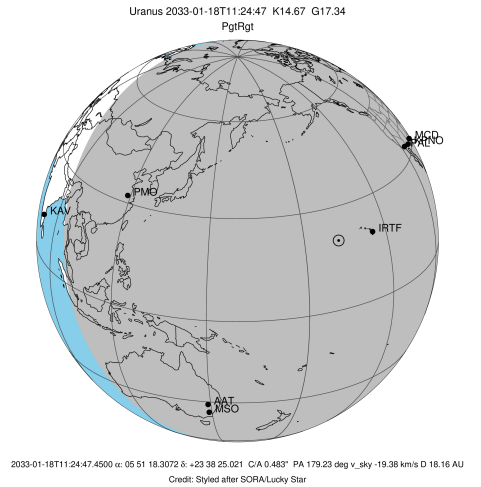


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-01-18T11:20:08.960  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3427506222878418176  
 2Mass ID (if available) : 05511829+2338249  
 ICRS Star Coord at Epoch: 05h 51m 18.30722s +23:38:25.02148s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.666  
 G magnitude : 17.344  
 RP magnitude : 16.500  
 BP magnitude : 18.069  
 DUPflag : 0  
 Distance (au) : 18.158  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.38  
 Sun-Target sep (deg) : 149.79  
 Sun-Moon sep (deg) : 63.03  
 B (ring opening deg) : 76.97  
 PA of pole (deg) : 51.38  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.695  
 C/A sky separation (km) : 9148.0  
 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	2033-01-18T10:37:48.690		26.81	-52.38	50906.67	-19.52		
lambda	I	2033-01-18T10:38:33.836		26.66	-52.22	50026.71	-19.48		
delta	I	2033-01-18T10:40:02.500		26.35	-51.92	48300.35	-19.46		
gamma	I	2033-01-18T10:40:36.969		26.24	-51.80	47629.89	-19.45		
eta	I	2033-01-18T10:41:00.310		26.16	-51.72	47176.12	-19.44		
beta	I	2033-01-18T10:42:18.004		25.89	-51.45	45667.31	-19.41		
alpha	I	2033-01-18T10:43:06.984		25.72	-51.28	44717.34	-19.39		
4	I	2033-01-18T10:44:55.525		25.35	-50.91	42611.55	-19.34		
5	I	2033-01-18T10:45:18.099		25.28	-50.83	42183.86	-19.34		
6	I	2033-01-18T10:45:36.986		25.21	-50.76	41820.17	-19.32		
Uranus	I	2033-01-18T10:59:50.277		22.31	-47.81	25403.63		-6.76	-7.08
Uranus	E	2033-01-18T11:40:10.140		14.21	-39.38	25043.92		12.52	13.09
6	E	2033-01-18T11:54:24.996		11.41	-36.40	41835.70	19.19		
5	E	2033-01-18T11:54:49.513		11.33	-36.32	42307.69	19.21		
4	E	2033-01-18T11:55:02.465		11.28	-36.27	42543.56	19.21		
alpha	E	2033-01-18T11:56:56.036		10.91	-35.87	44733.32	19.25		
beta	E	2033-01-18T11:57:44.390		10.75	-35.71	45663.08	19.27		
eta	E	2033-01-18T11:59:02.866		10.50	-35.43	47176.12	19.29		
gamma	E	2033-01-18T11:59:26.100		10.42	-35.35	47624.40	19.30		
delta	E	2033-01-18T12:00:01.119		10.31	-35.23	48300.35	19.31		
lambda	E	2033-01-18T12:01:30.480		10.02	-34.92	50026.71	19.33		
epsilon	E	2033-01-18T12:02:46.138		9.77	-34.66	51489.82	19.36		

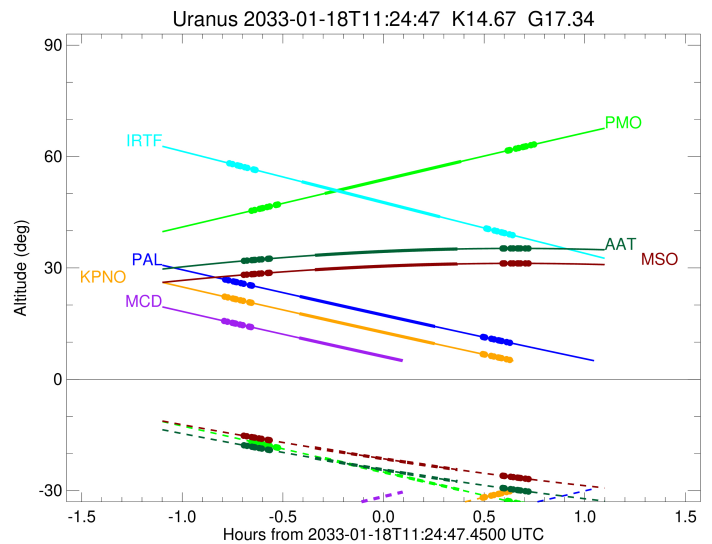
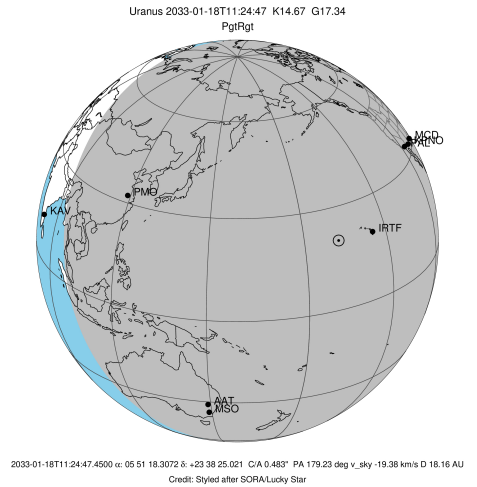
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-01-18T11:27:45.950  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 3427506222878418176  
 2Mass ID (if available) : 05511829+2338249  
 ICRS Star Coord at Epoch: 05h 51m 18.30722s +23:38:25.02148s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.666  
 G magnitude : 17.344  
 RP magnitude : 16.500  
 BP magnitude : 18.069  
 DUPflag : 0  
 Distance (au) : 18.158  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.38  
 Sun-Target sep (deg) : 149.79  
 Sun-Moon sep (deg) : 63.99  
 B (ring opening deg) : 76.97  
 PA of pole (deg) : 51.38  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.585  
 C/A sky separation (km) : 7705.5  
 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\_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	2033-01-18T10:45:39.620		45.44	-16.86	50901.64	-19.74		
lambda	I	2033-01-18T10:46:23.995		45.60	-17.01	50026.71	-19.71		
delta	I	2033-01-18T10:47:51.606		45.91	-17.31	48300.35	-19.70		
gamma	I	2033-01-18T10:48:25.655		46.03	-17.43	47629.82	-19.69		
eta	I	2033-01-18T10:48:48.700		46.11	-17.51	47176.12	-19.68		
beta	I	2033-01-18T10:50:05.411		46.39	-17.77	45666.95	-19.67		
alpha	I	2033-01-18T10:50:53.754		46.56	-17.94	44716.67	-19.66		
4	I	2033-01-18T10:52:40.756		46.94	-18.30	42611.09	-19.63		
5	I	2033-01-18T10:53:03.059		47.02	-18.38	42182.52	-19.63		
6	I	2033-01-18T10:53:21.549		47.08	-18.44	41821.04	-19.61		
Uranus	I	2033-01-18T11:07:16.738		50.04	-21.33	25379.77		-7.27	-7.61
Uranus	E	2033-01-18T11:47:57.349		58.68	-29.85	25067.70		12.21	12.77
6	E	2033-01-18T12:01:48.105		61.60	-32.77	41837.74	19.68		
5	E	2033-01-18T12:02:11.851		61.69	-32.86	42305.99	19.69		
4	E	2033-01-18T12:02:24.477		61.73	-32.90	42541.89	19.69		
alpha	E	2033-01-18T12:04:15.325		62.12	-33.29	44731.91	19.73		
beta	E	2033-01-18T12:05:02.543		62.28	-33.46	45662.18	19.74		
eta	E	2033-01-18T12:06:19.210		62.55	-33.73	47176.12	19.76		
gamma	E	2033-01-18T12:06:41.887		62.63	-33.81	47624.19	19.76		
delta	E	2033-01-18T12:07:16.095		62.75	-33.93	48300.35	19.77		
lambda	E	2033-01-18T12:08:43.374		63.06	-34.24	50026.71	19.79		
epsilon	E	2033-01-18T12:09:56.803		63.31	-34.49	51480.39	19.82		

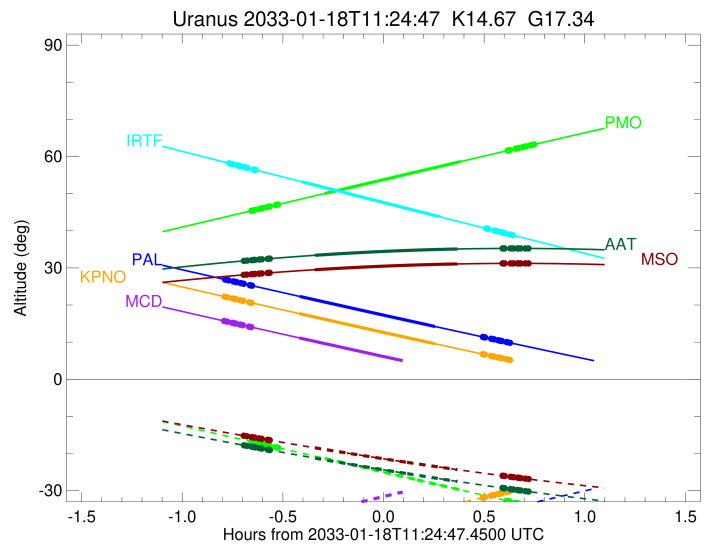
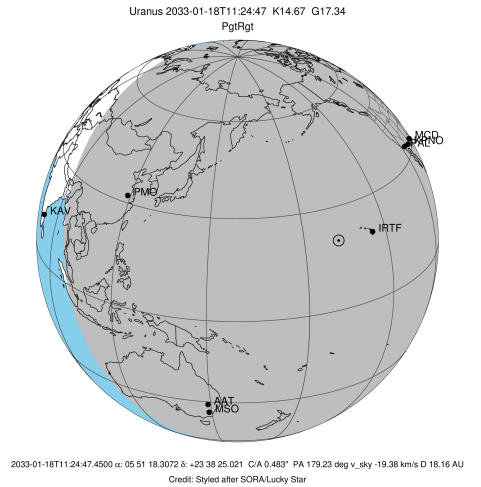
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-01-18T11:20:02.570
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       : 3427506222878418176
2Mass ID (if available) : 05511829+2338249
ICRS Star Coord at Epoch: 05h 51m 18.30722s +23:38:25.02148s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 14.666
G magnitude           : 17.344
RP magnitude          : 16.500
BP magnitude          : 18.069
DUPflag              : 0
Distance (au)         : 18.158
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -19.38
Sun-Target sep (deg) : 149.79
Sun-Moon sep (deg)   : 62.96
B (ring opening deg) : 76.97
PA of pole (deg)     : 51.38
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.700
C/A sky separation (km) : 9221.7
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_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```



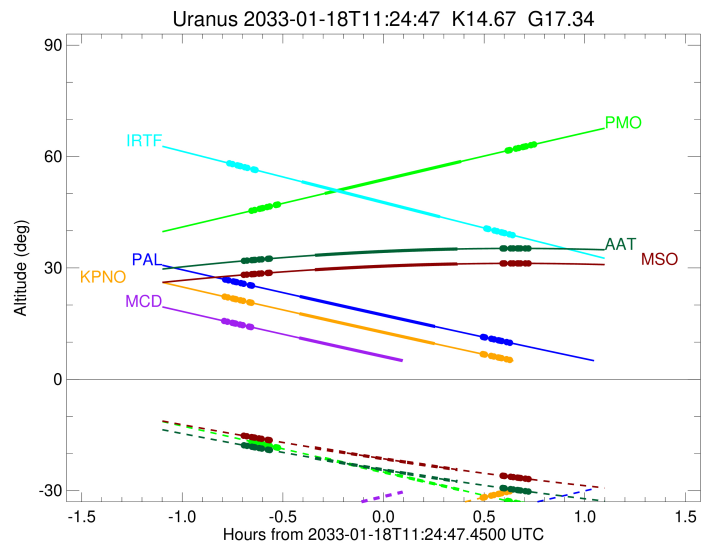
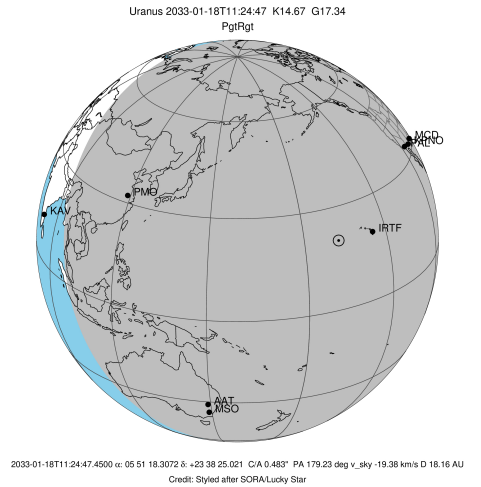
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-18T10:37:38.411		22.21	-48.17	50907.06	-19.48		
lambda	I	2033-01-18T10:38:23.666		22.05	-48.01	50026.71	-19.45		
delta	I	2033-01-18T10:39:52.506		21.75	-47.70	48300.35	-19.42		
gamma	I	2033-01-18T10:40:27.045		21.63	-47.58	47629.89	-19.41		
eta	I	2033-01-18T10:40:50.434		21.55	-47.49	47176.12	-19.40		
beta	I	2033-01-18T10:42:08.284		21.28	-47.22	45667.34	-19.37		
alpha	I	2033-01-18T10:42:57.363		21.11	-47.04	44717.39	-19.35		
4	I	2033-01-18T10:44:46.133		20.74	-46.66	42611.58	-19.30		
5	I	2033-01-18T10:45:08.750		20.66	-46.58	42183.96	-19.30		
6	I	2033-01-18T10:45:27.685		20.60	-46.51	41820.11	-19.28		
Uranus	I	2033-01-18T10:59:43.081		17.69	-43.49	25405.06		-6.73	-7.05
Uranus	E	2033-01-18T11:40:04.407		9.59	-34.92	25042.96		12.53	13.10
6	E	2033-01-18T11:54:21.455		6.78	-31.89	41835.62	19.15		
5	E	2033-01-18T11:54:46.036		6.70	-31.80	42307.76	19.17		
4	E	2033-01-18T11:54:59.018		6.66	-31.76	42543.63	19.17		
alpha	E	2033-01-18T11:56:52.846		6.29	-31.36	44733.38	19.21		
beta	E	2033-01-18T11:57:41.308		6.13	-31.19	45663.11	19.23		
eta	E	2033-01-18T11:58:59.957		5.88	-30.91	47176.12	19.25		
gamma	E	2033-01-18T11:59:23.242		5.80	-30.83	47624.41	19.26		
delta	E	2033-01-18T11:59:58.337		5.69	-30.70	48300.35	19.27		
lambda	E	2033-01-18T12:01:27.894		5.40	-30.39	50026.71	19.29		
epsilon	E	2033-01-18T12:02:43.735		5.16	-30.12	51490.18	19.32		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-01-18T11:19:59.840  
 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 : 3427506222878418176  
 2Mass ID (if available) : 05511829+2338249  
 ICRS Star Coord at Epoch: 05h 51m 18.30722s +23:38:25.02148s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.666  
 G magnitude : 17.344  
 RP magnitude : 16.500  
 BP magnitude : 18.069  
 DUPflag : 0  
 Distance (au) : 18.158  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.38  
 Sun-Target sep (deg) : 149.79  
 Sun-Moon sep (deg) : 62.86  
 B (ring opening deg) : 76.97  
 PA of pole (deg) : 51.38  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.714  
 C/A sky separation (km) : 9398.7  
 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  
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 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



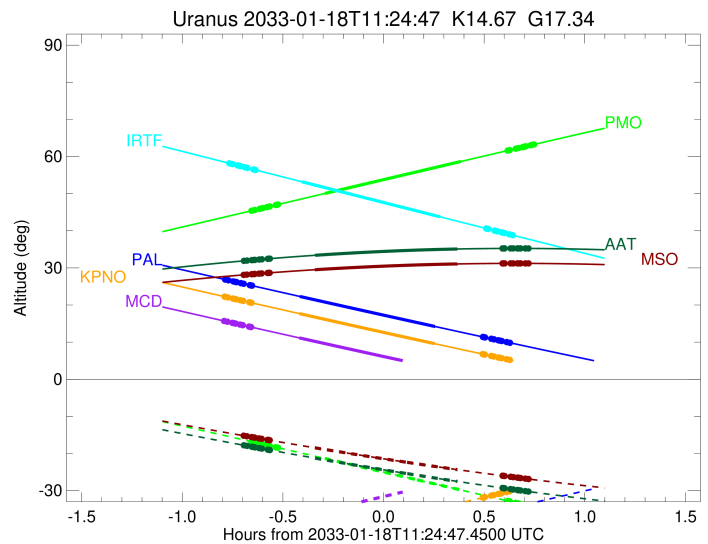
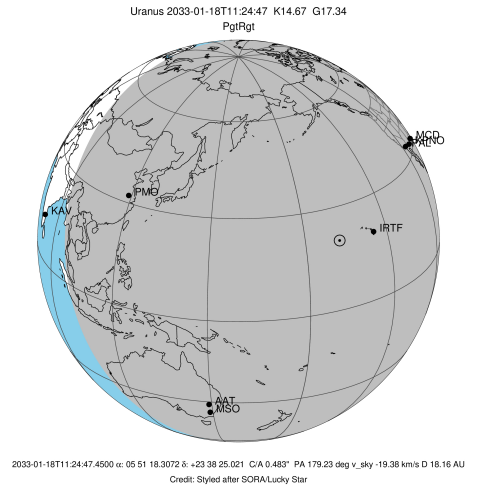
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-18T10:37:30.266		15.65	-41.76	50908.15	-19.42		
lambda	I	2033-01-18T10:38:15.727		15.50	-41.59	50026.71	-19.38		
delta	I	2033-01-18T10:39:44.865		15.20	-41.27	48300.35	-19.35		
gamma	I	2033-01-18T10:40:19.520		15.08	-41.15	47629.91	-19.34		
eta	I	2033-01-18T10:40:42.990		15.00	-41.06	47176.12	-19.33		
beta	I	2033-01-18T10:42:01.106		14.73	-40.78	45667.41	-19.30		
alpha	I	2033-01-18T10:42:50.353		14.56	-40.61	44717.52	-19.28		
4	I	2033-01-18T10:44:39.516		14.19	-40.22	42611.67	-19.23		
5	I	2033-01-18T10:45:02.203		14.12	-40.13	42184.21	-19.23		
6	I	2033-01-18T10:45:21.231		14.05	-40.07	41819.95	-19.21		
Uranus	I	2033-01-18T10:59:40.435		11.15	-36.99	25408.68		-6.65	-6.96
Uranus	E	2033-01-18T11:40:01.196		3.15x	-28.34	25040.81		12.56	13.13
6	E	2033-01-18T11:54:22.058		0.38x	-25.29	41835.43	19.08		
5	E	2033-01-18T11:54:46.747		0.30x	-25.20	42307.90	19.09		
4	E	2033-01-18T11:54:59.779		0.26x	-25.16	42543.78	19.10		
alpha	E	2033-01-18T11:56:54.025		-0.11x	-24.75	44733.50	19.14		
beta	E	2033-01-18T11:57:42.660		-0.26x	-24.58	45663.19	19.16		
eta	E	2033-01-18T11:59:01.585		-0.51x	-24.30	47176.12	19.18		
gamma	E	2033-01-18T11:59:24.954		-0.59x	-24.22	47624.43	19.19		
delta	E	2033-01-18T12:00:00.171		-0.70x	-24.10	48300.35	19.20		
lambda	E	2033-01-18T12:01:30.040		-0.99x	-23.78	50026.71	19.22		
epsilon	E	2033-01-18T12:02:46.182		-1.23x	-23.51	51490.96	19.25		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-01-18T11:21:07.380  
 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 : 3427506222878418176  
 2Mass ID (if available) : 05511829+2338249  
 ICRS Star Coord at Epoch: 05h 51m 18.30722s +23:38:25.02148s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.666  
 G magnitude : 17.344  
 RP magnitude : 16.500  
 BP magnitude : 18.069  
 DUPflag : 0  
 Distance (au) : 18.158  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.38  
 Sun-Target sep (deg) : 149.79  
 Sun-Moon sep (deg) : 63.44  
 B (ring opening deg) : 76.97  
 PA of pole (deg) : 51.38  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.492  
 C/A sky separation (km) : 6480.2  
 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



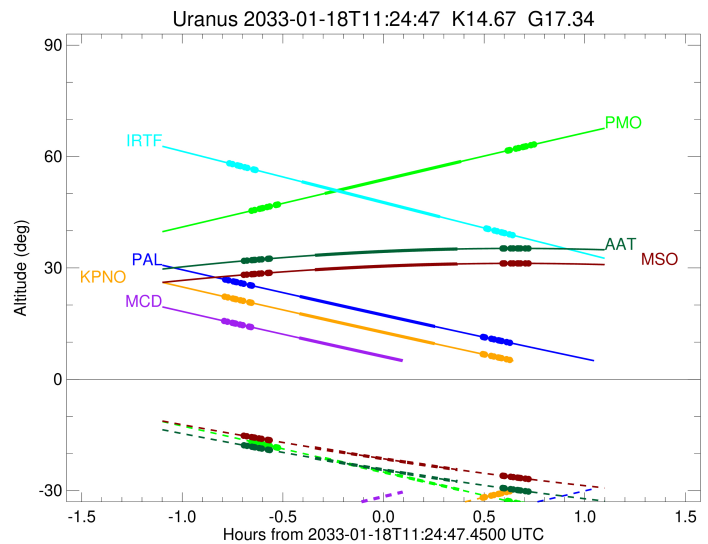
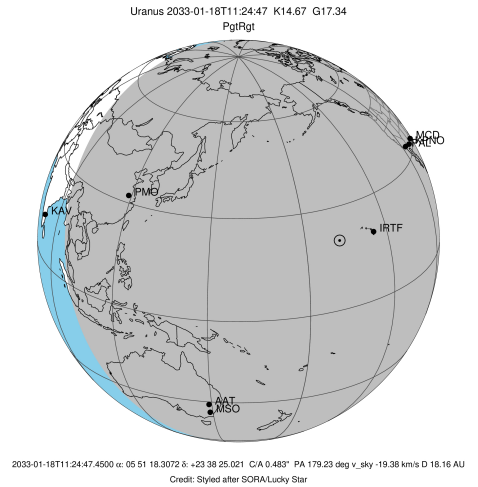
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-18T10:39:02.989		58.12	-88.27	50890.40	-19.92		
lambda	I	2033-01-18T10:39:46.380		57.96	-88.11	50026.71	-19.90		
delta	I	2033-01-18T10:41:13.158		57.62	-87.79	48300.35	-19.89		
gamma	I	2033-01-18T10:41:46.889		57.49	-87.67	47629.67	-19.88		
eta	I	2033-01-18T10:42:09.706		57.41	-87.58	47176.12	-19.88		
beta	I	2033-01-18T10:43:25.711		57.12	-87.30	45666.20	-19.86		
alpha	I	2033-01-18T10:44:13.615		56.93	-87.12	44715.35	-19.85		
4	I	2033-01-18T10:45:59.517		56.53	-86.71	42610.19	-19.83		
5	I	2033-01-18T10:46:21.698		56.44	-86.63	42180.09	-19.83		
6	I	2033-01-18T10:46:39.787		56.37	-86.56	41822.67	-19.82		
Uranus	I	2033-01-18T11:00:23.969		53.22	-83.37	25347.10		-7.92	-8.29
Uranus	E	2033-01-18T11:41:38.856		43.76	-73.72	25082.34		12.02	12.57
6	E	2033-01-18T11:55:24.701		40.62	-70.49	41838.55	19.71		
5	E	2033-01-18T11:55:48.336		40.53	-70.40	42305.27	19.72		
4	E	2033-01-18T11:56:00.941		40.48	-70.35	42541.26	19.72		
alpha	E	2033-01-18T11:57:51.669		40.06	-69.92	44731.38	19.74		
beta	E	2033-01-18T11:58:38.863		39.88	-69.74	45661.85	19.75		
eta	E	2033-01-18T11:59:55.525		39.59	-69.44	47176.12	19.76		
gamma	E	2033-01-18T12:00:18.197		39.50	-69.35	47624.11	19.76		
delta	E	2033-01-18T12:00:52.414		39.37	-69.22	48300.35	19.77		
lambda	E	2033-01-18T12:02:19.733		39.04	-68.87	50026.71	19.78		
epsilon	E	2033-01-18T12:03:33.067		38.76	-68.59	51477.25	19.80		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-01-18T11:25:37.460  
 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 : 3427506222878418176  
 2Mass ID (if available) : 05511829+2338249  
 ICRS Star Coord at Epoch: 05h 51m 18.30722s +23:38:25.02148s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.666  
 G magnitude : 17.344  
 RP magnitude : 16.500  
 BP magnitude : 18.069  
 DUPflag : 0  
 Distance (au) : 18.158  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.38  
 Sun-Target sep (deg) : 149.79  
 Sun-Moon sep (deg) : 63.61  
 B (ring opening deg) : 76.97  
 PA of pole (deg) : 51.38  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.084  
 C/A sky separation (km) : 1100.1  
 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\_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	2033-01-18T10:43:25.815		31.92	-17.83	50860.79	-20.08		
lambda	I	2033-01-18T10:44:07.368		31.97	-17.94	50026.71	-20.07		
delta	I	2033-01-18T10:45:33.372		32.09	-18.18	48300.35	-20.07		
gamma	I	2033-01-18T10:46:06.807		32.13	-18.27	47629.22	-20.07		
eta	I	2033-01-18T10:46:29.380		32.16	-18.34	47176.12	-20.07		
beta	I	2033-01-18T10:47:44.719		32.25	-18.55	45664.00	-20.07		
alpha	I	2033-01-18T10:48:32.205		32.31	-18.68	44711.51	-20.07		
4	I	2033-01-18T10:50:16.806		32.45	-18.96	42607.11	-20.07		
5	I	2033-01-18T10:50:38.961		32.47	-19.03	42173.40	-20.08		
6	I	2033-01-18T10:50:56.209		32.49	-19.07	41827.68	-20.07		
Uranus	I	2033-01-18T11:04:22.195		33.40	-21.24	25232.73		-9.88	-10.34
Uranus	E	2033-01-18T11:46:50.196		35.09	-27.52	25185.73		10.59	11.08
6	E	2033-01-18T12:00:16.266		35.24	-29.28	41844.37	20.08		
5	E	2033-01-18T12:00:38.931		35.24	-29.33	42299.34	20.08		
4	E	2033-01-18T12:00:51.335		35.24	-29.36	42536.94	20.08		
alpha	E	2033-01-18T12:02:40.153		35.25	-29.59	44727.23	20.08		
beta	E	2033-01-18T12:03:26.607		35.25	-29.68	45659.31	20.08		
eta	E	2033-01-18T12:04:42.140		35.25	-29.84	47176.12	20.08		
gamma	E	2033-01-18T12:05:04.418		35.25	-29.89	47623.54	20.08		
delta	E	2033-01-18T12:05:38.118		35.25	-29.95	48300.35	20.08		
lambda	E	2033-01-18T12:07:04.077		35.24	-30.13	50026.71	20.08		
epsilon	E	2033-01-18T12:08:14.839		35.24	-30.27	51447.92	20.09		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-01-18T11:25:35.730  
 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 : 3427506222878418176  
 2Mass ID (if available) : 05511829+2338249  
 ICRS Star Coord at Epoch: 05h 51m 18.30722s +23:38:25.02148s  
 RUWE (>1.4 is poor) : 1.03  
 K magnitude : 14.666  
 G magnitude : 17.344  
 RP magnitude : 16.500  
 BP magnitude : 18.069  
 DUPflag : 0  
 Distance (au) : 18.158  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -19.38  
 Sun-Target sep (deg) : 149.79  
 Sun-Moon sep (deg) : 63.56  
 B (ring opening deg) : 76.97  
 PA of pole (deg) : 51.38  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.065  
 C/A sky separation (km) : 854.4  
 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	2033-01-18T10:43:21.986		28.14	-15.24	50859.39	-20.06		
lambda	I	2033-01-18T10:44:03.500		28.19	-15.35	50026.71	-20.06		
delta	I	2033-01-18T10:45:29.570		28.30	-15.58	48300.35	-20.06		
gamma	I	2033-01-18T10:46:03.032		28.34	-15.67	47629.19	-20.06		
eta	I	2033-01-18T10:46:25.621		28.37	-15.73	47176.12	-20.06		
beta	I	2033-01-18T10:47:41.022		28.45	-15.92	45663.89	-20.06		
alpha	I	2033-01-18T10:48:28.547		28.51	-16.05	44711.32	-20.06		
4	I	2033-01-18T10:50:13.224		28.63	-16.32	42606.95	-20.05		
5	I	2033-01-18T10:50:35.405		28.66	-16.38	42173.09	-20.06		
6	I	2033-01-18T10:50:52.636		28.68	-16.42	41827.93	-20.06		
Uranus	I	2033-01-18T11:04:19.108		29.51	-18.47	25227.39		-9.96	-10.42
Uranus	E	2033-01-18T11:46:50.361		31.07	-24.34	25190.79		10.51	11.00
6	E	2033-01-18T12:00:17.043		31.21	-25.98	41844.62	20.07		
5	E	2033-01-18T12:00:39.700		31.21	-26.03	42299.07	20.07		
4	E	2033-01-18T12:00:52.118		31.21	-26.05	42536.77	20.06		
alpha	E	2033-01-18T12:02:41.021		31.22	-26.26	44727.05	20.07		
beta	E	2033-01-18T12:03:27.515		31.22	-26.35	45659.20	20.07		
eta	E	2033-01-18T12:04:43.113		31.22	-26.50	47176.12	20.07		
gamma	E	2033-01-18T12:05:05.409		31.22	-26.54	47623.52	20.07		
delta	E	2033-01-18T12:05:39.137		31.22	-26.61	48300.35	20.07		
lambda	E	2033-01-18T12:07:05.166		31.21	-26.77	50026.71	20.07		
epsilon	E	2033-01-18T12:08:15.920		31.21	-26.90	51446.59	20.07		