

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-14T03:26:30.950
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427682492633067392
 2Mass ID (if available) : 05481110+2337412

ICRS Star Coord at Epoch: 05h 48m 11.11440s +23:37:41.22173s

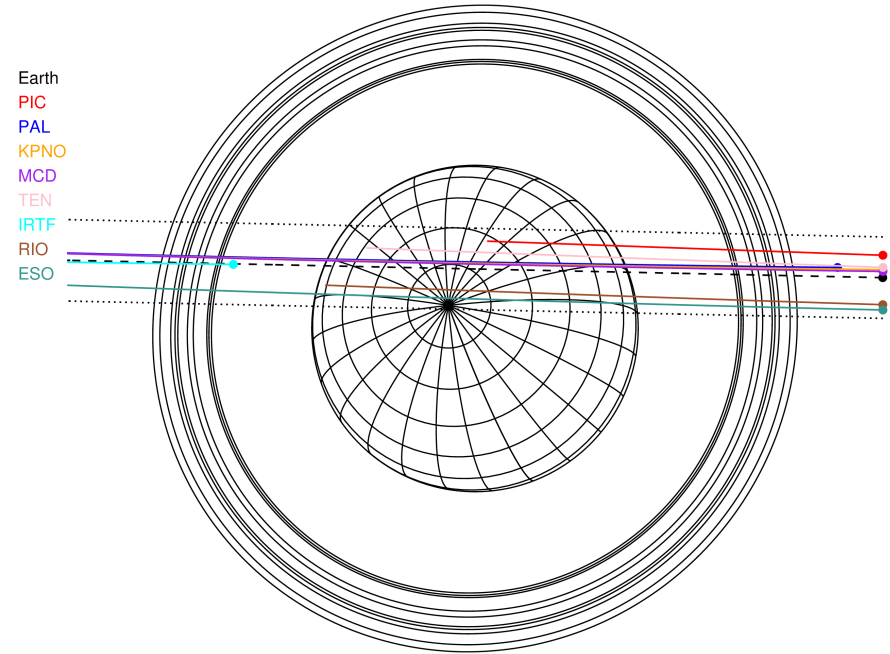
RUWE (>1.4 is poor) : 0.92
 K magnitude : 14.913
 G magnitude : 17.543
 RP magnitude : 16.682
 BP magnitude : 18.318
 DUPflag : 0
 Distance (au) : 18.468
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.43
 Sun-Target sep (deg) : 122.01
 Sun-Moon sep (deg) : 56.45
 B (ring opening deg) : 77.53
 PA of pole (deg) : 49.09

#	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



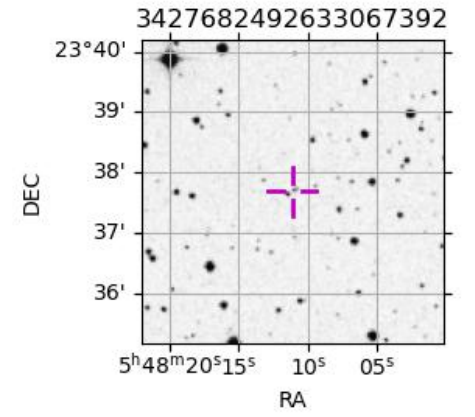
2033-02-14T03:26:30.9500 α: 05 48 11.1144 δ: +23 37 41.222 C/A 0.702° PA 178.78 deg v_sky - 9.43 km/s D 18.47 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2033-02-14T03:26:30 K14.91 G17.54 PgtRgt

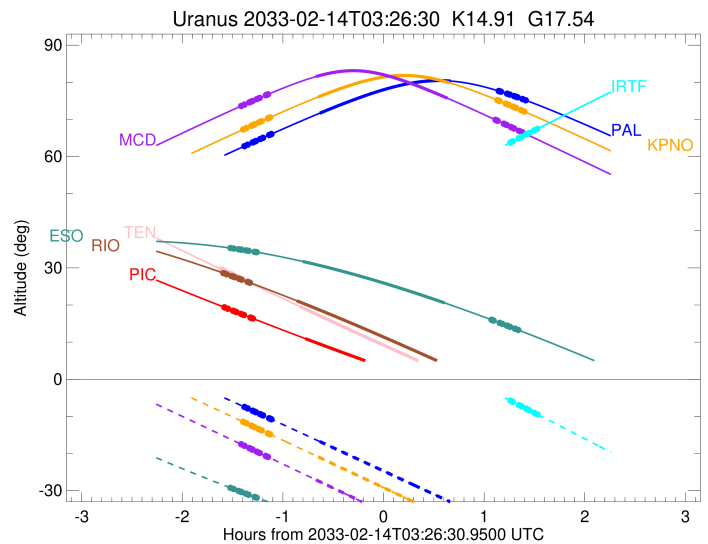
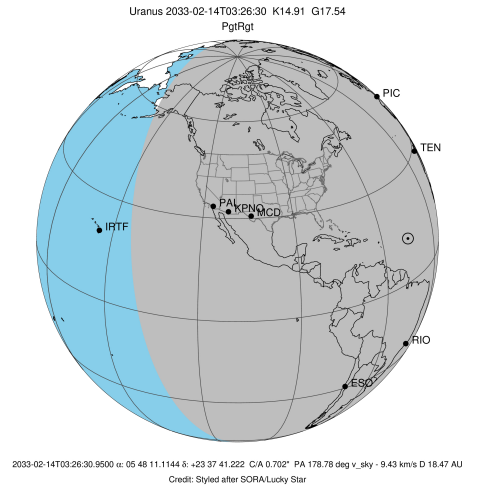


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+		FEB 14 01:52 - FEB 14 02:39	PinRin
PAL	Palomar Mt (200")	33.4	243.1	+++++	+ +	+++++	FEB 14 02:04 - FEB 14 04:51	PieRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	FEB 14 02:03 - FEB 14 04:51	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	FEB 14 02:02 - FEB 14 04:49	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+		FEB 14 01:50 - FEB 14 02:36	PinRin
IRTF	Mauna Kea/IRTF	19.8	204.5			+++++	FEB 14 04:42 - FEB 14 04:58	PnnRne
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++	+		FEB 14 01:51 - FEB 14 02:34	PinRin
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	FEB 14 01:55 - FEB 14 04:47	PieRie
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

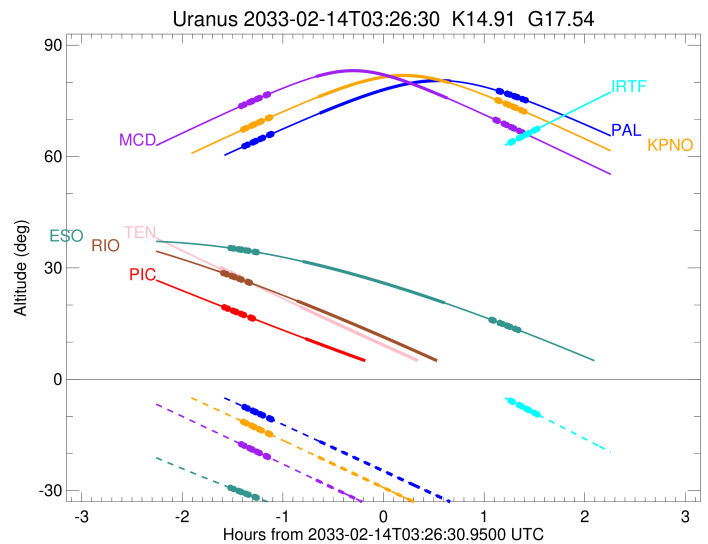
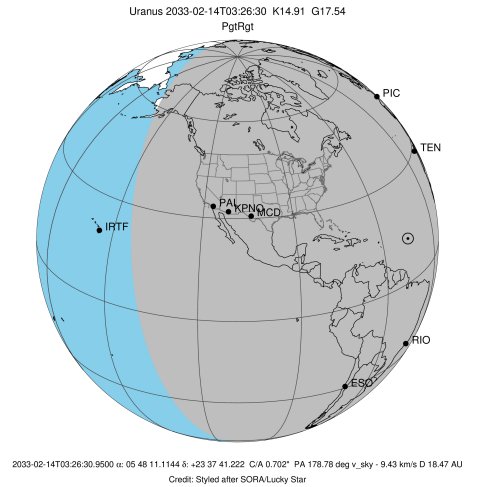


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-14T03:18:06.330
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3427682492633067392
 2Mass ID (if available) : 05481110+2337412
 ICRS Star Coord at Epoch: 05h 48m 11.11440s +23:37:41.22173s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 14.913
 G magnitude : 17.543
 RP magnitude : 16.682
 BP magnitude : 18.318
 DUPflag : 0
 Distance (au) : 18.468
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.43
 Sun-Target sep (deg) : 122.01
 Sun-Moon sep (deg) : 56.17
 B (ring opening deg) : 77.53
 PA of pole (deg) : 49.09
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.026
 C/A sky separation (km) : 13736.8
 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	2033-02-14T01:52:20.242		19.25	-53.36	50773.16	-9.27		
lambda	I	2033-02-14T01:53:40.898		19.01	-53.19	50026.71	-9.25		
delta	I	2033-02-14T01:56:47.912		18.46	-52.79	48300.35	-9.21		
gamma	I	2033-02-14T01:58:01.109		18.24	-52.63	47626.41	-9.20		
eta	I	2033-02-14T01:58:50.080		18.10	-52.53	47176.12	-9.19		
beta	I	2033-02-14T02:01:36.402		17.61	-52.16	45650.89	-9.16		
alpha	I	2033-02-14T02:03:21.204		17.30	-51.93	44690.90	-9.13		
4	I	2033-02-14T02:07:14.084		16.61	-51.40	42570.87	-9.08		
5	I	2033-02-14T02:07:59.604		16.48	-51.30	42157.43	-9.06		
6	I	2033-02-14T02:08:32.119		16.39	-51.23	41866.67	-9.05		
Uranus	I	2033-02-14T02:39:53.346		10.95	-46.61	25500.86		-3.94	-4.12
Uranus	E	2033-02-14T03:55:32.322		-1.29x	-33.87	25005.73		12.41	12.98
6	E	2033-02-14T04:27:17.789		-5.94x	-28.15	41795.08	8.82		
5	E	2033-02-14T04:28:13.692		-6.07x	-27.98	42282.94	8.83		
4	E	2033-02-14T04:28:50.309		-6.16x	-27.87	42599.51	8.84		
alpha	E	2033-02-14T04:32:52.878		-6.72x	-27.14	44752.43	8.88		
beta	E	2033-02-14T04:34:37.008		-6.96x	-26.82	45679.52	8.90		
eta	E	2033-02-14T04:37:25.019		-7.34x	-26.31	47176.12	8.92		
gamma	E	2033-02-14T04:38:15.766		-7.46x	-26.16	47629.11	8.93		
delta	E	2033-02-14T04:39:30.894		-7.63x	-25.93	48300.35	8.94		
lambda	E	2033-02-14T04:42:43.763		-8.07x	-25.34	50026.71	8.96		
epsilon	E	2033-02-14T04:45:33.543		-8.44x	-24.82	51549.81	8.98		

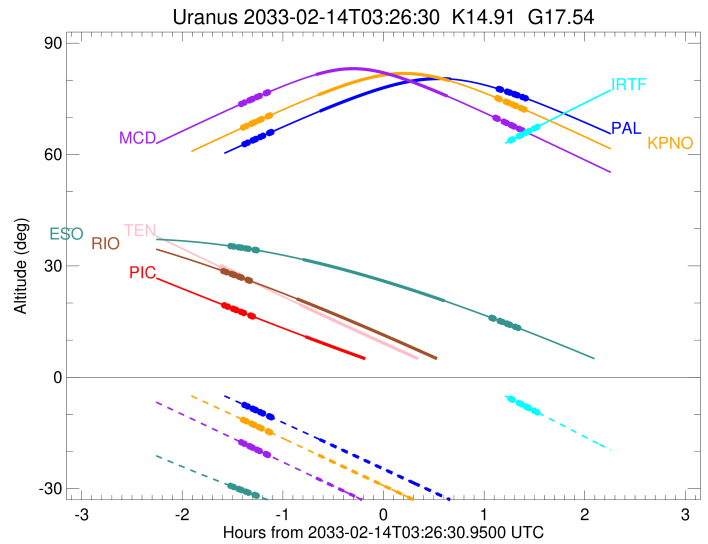
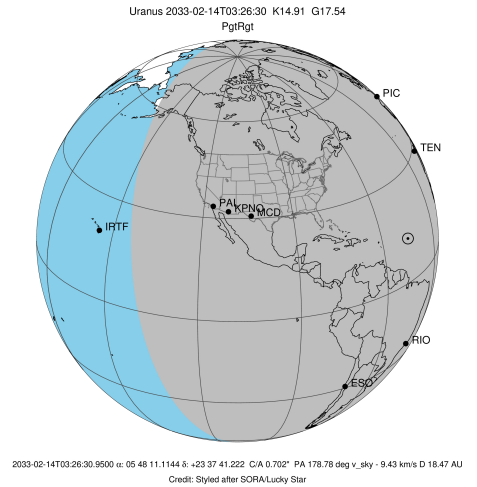
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-14T03:27:50.630
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3427682492633067392
 2Mass ID (if available) : 05481110+2337412
 ICRS Star Coord at Epoch: 05h 48m 11.11440s +23:37:41.22173s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 14.913
 G magnitude : 17.543
 RP magnitude : 16.682
 BP magnitude : 18.318
 DUPflag : 0
 Distance (au) : 18.468
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.43
 Sun-Target sep (deg) : 122.01
 Sun-Moon sep (deg) : 57.26
 B (ring opening deg) : 77.53
 PA of pole (deg) : 49.09
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.777
 C/A sky separation (km) : 10409.0
 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	2033-02-14T02:04:17.091		62.94	-7.61	50766.30	-9.72		
lambda	I	2033-02-14T02:05:33.206		63.20	-7.87	50026.71	-9.71		
delta	I	2033-02-14T02:08:31.064		63.80	-8.48	48300.35	-9.70		
gamma	I	2033-02-14T02:09:40.602		64.04	-8.72	47626.13	-9.69		
eta	I	2033-02-14T02:10:27.043		64.19	-8.88	47176.12	-9.69		
beta	I	2033-02-14T02:13:04.761		64.73	-9.42	45649.92	-9.67		
alpha	I	2033-02-14T02:14:43.908		65.06	-9.76	44689.80	-9.66		
4	I	2033-02-14T02:18:23.844		65.80	-10.52	42568.02	-9.63		
5	I	2033-02-14T02:19:06.312		65.94	-10.66	42158.88	-9.63		
6	I	2033-02-14T02:19:36.906		66.04	-10.77	41868.60	-9.62		
Uranus	I	2033-02-14T02:48:25.303		71.66	-16.75	25449.41		-5.42	-5.67
Uranus	E	2033-02-14T04:06:30.471		80.34	-33.05	25037.94		12.03	12.58
6	E	2033-02-14T04:35:07.830		77.67	-38.97	41795.80	9.62		
5	E	2033-02-14T04:35:59.685		77.55	-39.15	42288.94	9.62		
4	E	2033-02-14T04:36:32.174		77.47	-39.26	42595.98	9.63		
alpha	E	2033-02-14T04:40:15.534		76.93	-40.03	44752.33	9.65		
beta	E	2033-02-14T04:41:51.275		76.69	-40.35	45678.72	9.67		
eta	E	2033-02-14T04:44:26.133		76.28	-40.88	47176.12	9.68		
gamma	E	2033-02-14T04:45:12.874		76.16	-41.04	47628.71	9.69		
delta	E	2033-02-14T04:46:22.197		75.98	-41.28	48300.35	9.69		
lambda	E	2033-02-14T04:49:20.189		75.49	-41.88	50026.71	9.71		
epsilon	E	2033-02-14T04:51:57.431		75.05	-42.41	51553.87	9.72		

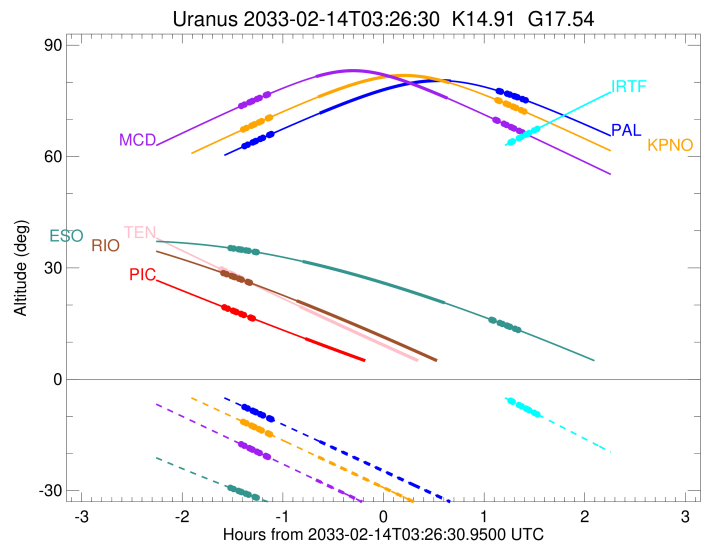
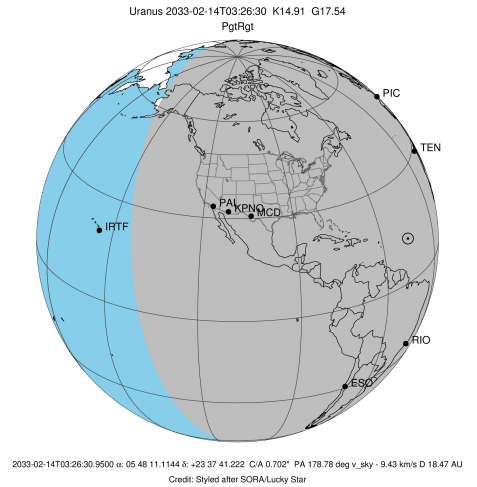
```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch              : 2033-02-14T03:27:00.210
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        : 3427682492633067392
2Mass ID (if available) : 05481110+2337412
ICRS Star Coord at Epoch: 05h 48m 11.11440s +23:37:41.22173s
RUWE (>1.4 is poor)  : 0.92
K magnitude           : 14.913
G magnitude           : 17.543
RP magnitude          : 16.682
BP magnitude          : 18.318
DUPflag              : 0
Distance (au)         : 18.468
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -9.43
Sun-Target sep (deg)  : 122.01
Sun-Moon sep (deg)    : 57.23
B (ring opening deg)  : 77.53
PA of pole (deg)      : 49.09
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.764
C/A sky separation (km) : 10230.4
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_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	2033-02-14T02:03:31.586		67.43	-11.60	50765.65	-9.75		
lambda	I	2033-02-14T02:04:47.409		67.69	-11.87	50026.71	-9.74		
delta	I	2033-02-14T02:07:44.737		68.29	-12.49	48300.35	-9.73		
gamma	I	2033-02-14T02:08:54.069		68.53	-12.74	47626.11	-9.72		
eta	I	2033-02-14T02:09:40.367		68.69	-12.90	47176.12	-9.72		
beta	I	2033-02-14T02:12:17.617		69.22	-13.45	45649.83	-9.70		
alpha	I	2033-02-14T02:13:56.462		69.55	-13.80	44689.70	-9.69		
4	I	2033-02-14T02:17:35.731		70.29	-14.57	42567.76	-9.67		
5	I	2033-02-14T02:18:18.029		70.43	-14.72	42159.03	-9.66		
6	I	2033-02-14T02:18:48.529		70.53	-14.82	41868.76	-9.65		
Uranus	I	2033-02-14T02:47:30.343		76.04	-20.90	25445.38		-5.52	-5.78
Uranus	E	2033-02-14T04:05:46.841		79.87	-37.48	25039.73		12.01	12.56
6	E	2033-02-14T04:34:20.436		75.21	-43.44	41795.83	9.63		
5	E	2033-02-14T04:35:12.249		75.05	-43.62	42289.12	9.63		
4	E	2033-02-14T04:35:44.667		74.95	-43.73	42595.87	9.64		
alpha	E	2033-02-14T04:39:27.820		74.26	-44.50	44752.32	9.66		
beta	E	2033-02-14T04:41:03.474		73.95	-44.83	45678.70	9.67		
eta	E	2033-02-14T04:43:38.213		73.46	-45.36	47176.12	9.69		
gamma	E	2033-02-14T04:44:24.919		73.31	-45.52	47628.70	9.69		
delta	E	2033-02-14T04:45:34.195		73.09	-45.76	48300.35	9.70		
lambda	E	2033-02-14T04:48:32.079		72.51	-46.36	50026.71	9.71		
epsilon	E	2033-02-14T04:51:09.248		72.00	-46.90	51553.95	9.72		

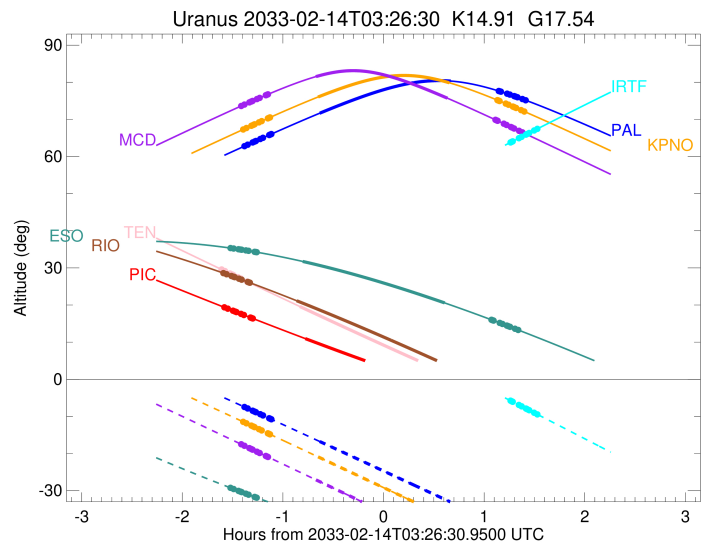
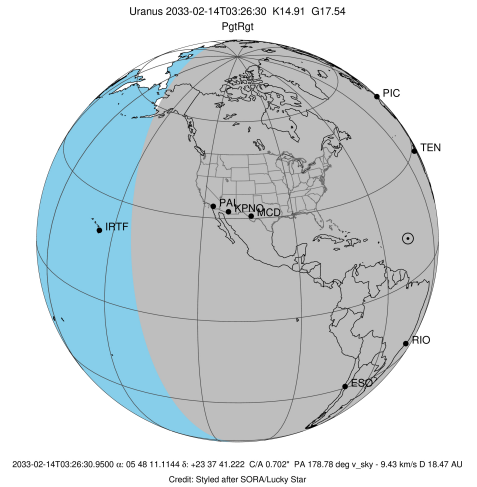
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-14T03:25:44.870
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3427682492633067392
 2Mass ID (if available) : 05481110+2337412
 ICRS Star Coord at Epoch: 05h 48m 11.11440s +23:37:41.22173s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 14.913
 G magnitude : 17.543
 RP magnitude : 16.682
 BP magnitude : 18.318
 DUPflag : 0
 Distance (au) : 18.468
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.43
 Sun-Target sep (deg) : 122.01
 Sun-Moon sep (deg) : 57.17
 B (ring opening deg) : 77.53
 PA of pole (deg) : 49.09
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.753
 C/A sky separation (km) : 10079.6
 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	2033-02-14T02:02:21.179		73.75	-17.65	50765.00	-9.78		
lambda	I	2033-02-14T02:03:36.705		74.01	-17.92	50026.71	-9.77		
delta	I	2033-02-14T02:06:33.495		74.60	-18.55	48300.35	-9.76		
gamma	I	2033-02-14T02:07:42.621		74.82	-18.80	47626.08	-9.75		
eta	I	2033-02-14T02:08:28.776		74.98	-18.97	47176.12	-9.75		
beta	I	2033-02-14T02:11:05.561		75.49	-19.53	45649.75	-9.73		
alpha	I	2033-02-14T02:12:44.107		75.81	-19.88	44689.60	-9.72		
4	I	2033-02-14T02:16:22.727		76.52	-20.66	42567.51	-9.69		
5	I	2033-02-14T02:17:04.860		76.65	-20.82	42159.17	-9.69		
6	I	2033-02-14T02:17:35.269		76.75	-20.92	41868.92	-9.68		
Uranus	I	2033-02-14T02:46:11.145		81.53	-27.08	25441.54		-5.61	-5.87
Uranus	E	2033-02-14T04:04:38.170		75.71	-43.85	25041.02		11.99	12.54
6	E	2033-02-14T04:33:09.974		69.92	-49.80	41795.85	9.63		
5	E	2033-02-14T04:34:01.794		69.73	-49.97	42289.22	9.63		
4	E	2033-02-14T04:34:34.194		69.62	-50.08	42595.81	9.64		
alpha	E	2033-02-14T04:38:17.380		68.84	-50.85	44752.32	9.66		
beta	E	2033-02-14T04:39:53.056		68.51	-51.17	45678.68	9.67		
eta	E	2033-02-14T04:42:27.848		67.96	-51.70	47176.12	9.68		
gamma	E	2033-02-14T04:43:14.571		67.80	-51.86	47628.70	9.69		
delta	E	2033-02-14T04:44:23.879		67.56	-52.09	48300.35	9.69		
lambda	E	2033-02-14T04:47:21.856		66.93	-52.69	50026.71	9.71		
epsilon	E	2033-02-14T04:49:59.127		66.37	-53.22	51553.98	9.71		

```

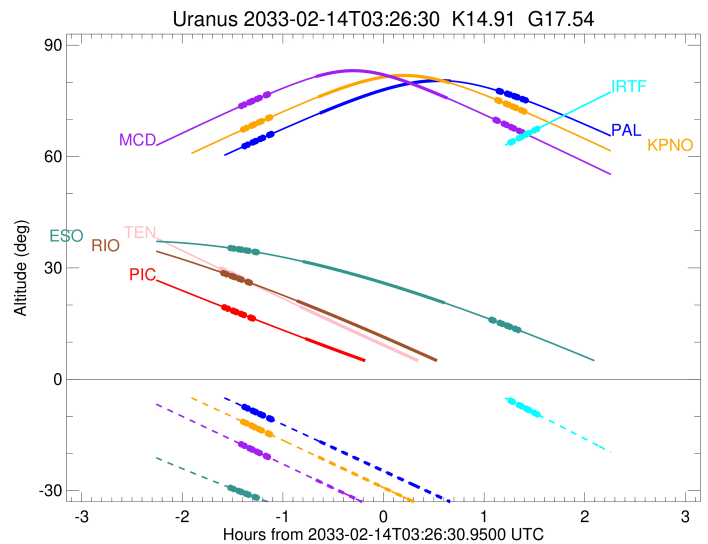
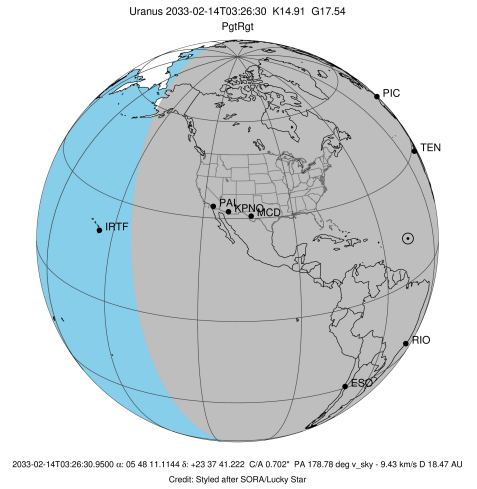
target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2033-02-14T03:16:07.650
Event type            : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code         : TEN
Location              : Teide Obs./Tenerife
Latitude (deg)        : 28.30050
E. Longitude (deg)    : 343.48909
Altitude (km)         : 2.395
Gaia source ID        : 3427682492633067392
2Mass ID (if available) : 05481110+2337412
ICRS Star Coord at Epoch: 05h 48m 11.11440s +23:37:41.22173s
RUWE (>1.4 is poor) : 0.92
K magnitude           : 14.913
G magnitude           : 17.543
RP magnitude          : 16.682
BP magnitude          : 18.318
DUPflag              : 0
Distance (au)         : 18.468
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -9.43
Sun-Target sep (deg) : 122.01
Sun-Moon sep (deg)   : 56.14
B (ring opening deg) : 77.53
PA of pole (deg)     : 49.09
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.892
C/A sky separation (km) : 11952.7
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_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	2033-02-14T01:50:41.225		29.42	-73.23	50767.56	-9.48		
lambda	I	2033-02-14T01:51:59.440		29.14	-73.10	50026.71	-9.47		
delta	I	2033-02-14T01:55:02.068		28.48	-72.78	48300.35	-9.44		
gamma	I	2033-02-14T01:56:13.533		28.23	-72.64	47626.20	-9.43		
eta	I	2033-02-14T01:57:01.293		28.06	-72.55	47176.12	-9.42		
beta	I	2033-02-14T01:59:43.580		27.47	-72.23	45650.15	-9.39		
alpha	I	2033-02-14T02:01:25.723		27.11	-72.02	44690.06	-9.37		
4	I	2033-02-14T02:05:12.585		26.30	-71.54	42568.76	-9.33		
5	I	2033-02-14T02:05:56.562		26.14	-71.44	42158.47	-9.32		
6	I	2033-02-14T02:06:28.175		26.03	-71.37	41868.10	-9.31		
Uranus	I	2033-02-14T02:36:35.946		19.61	-66.58	25469.16		-4.90	-5.13
Uranus	E	2033-02-14T03:55:05.770		3.41x	-50.88	25017.44		12.27	12.84
6	E	2033-02-14T04:25:44.876	-2.63x	-44.27	41795.34	9.03			
5	E	2033-02-14T04:26:39.782	-2.81x	-44.07	42285.54	9.03			
4	E	2033-02-14T04:27:15.074	-2.93x	-43.94	42598.05	9.04			
alpha	E	2033-02-14T04:31:12.664	-3.69x	-43.08	44752.42	9.07			
beta	E	2033-02-14T04:32:54.646	-4.02x	-42.71	45679.21	9.08			
eta	E	2033-02-14T04:35:39.429	-4.54x	-42.11	47176.12	9.10			
gamma	E	2033-02-14T04:36:29.204	-4.70x	-41.93	47628.95	9.10			
delta	E	2033-02-14T04:37:42.959	-4.94x	-41.66	48300.35	9.11			
lambda	E	2033-02-14T04:40:52.387	-5.54x	-40.97	50026.71	9.12			
epsilon	E	2033-02-14T04:43:39.493	-6.07x	-40.36	51551.76	9.13			

```

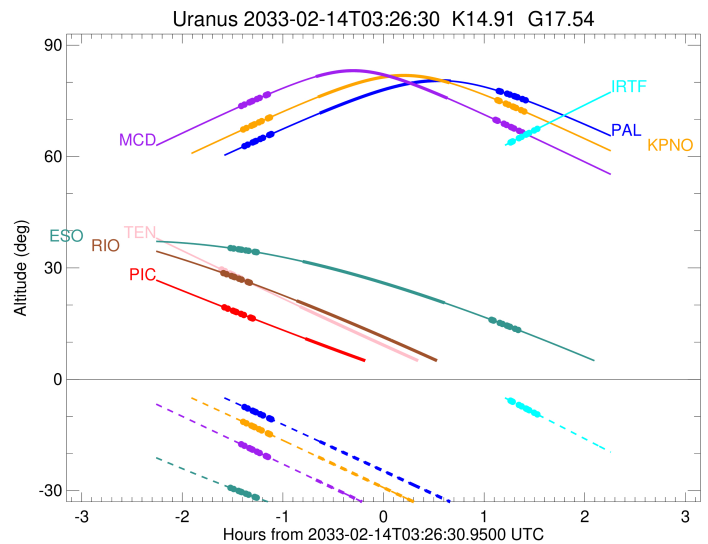
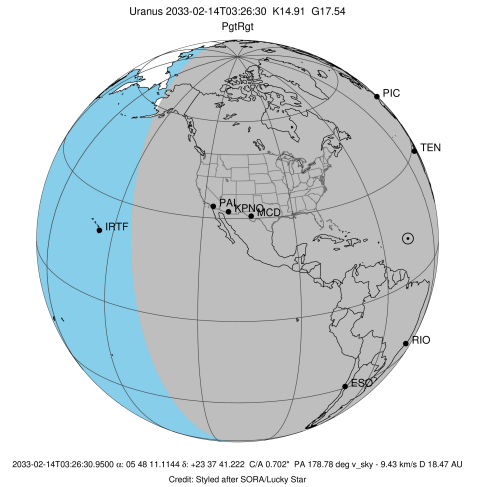
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-02-14T03:34:14.370
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : IRTF
Location             : Mauna Kea/IRTF
Latitude (deg)       : 19.82622
E. Longitude (deg)   : 204.52800
Altitude (km)        : 4.168
Gaia source ID       : 3427682492633067392
2Mass ID (if available) : 05481110+2337412
ICRS Star Coord at Epoch: 05h 48m 11.11440s +23:37:41.22173s
RUWE (>1.4 is poor) : 0.92
K magnitude          : 14.913
G magnitude          : 17.543
RP magnitude         : 16.682
BP magnitude         : 18.318
DUPflag             : 0
Distance (au)        : 18.468
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -9.43
Sun-Target sep (deg) : 122.01
Sun-Moon sep (deg)   : 57.34
B (ring opening deg) : 77.53
PA of pole (deg)     : 49.09
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.721
C/A sky separation (km) : 9661.8
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.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	2033-02-14T02:09:20.984		28.84	28.18x	50765.56	-9.58		
lambda	I	2033-02-14T02:10:38.122		29.13	27.91x	50026.71	-9.58		
delta	I	2033-02-14T02:13:38.482		29.81	27.28x	48300.35	-9.57		
gamma	I	2033-02-14T02:14:48.975		30.08	27.04x	47626.10	-9.56		
eta	I	2033-02-14T02:15:36.039		30.25	26.87x	47176.12	-9.56		
beta	I	2033-02-14T02:18:15.845		30.86	26.31x	45649.80	-9.55		
alpha	I	2033-02-14T02:19:56.254		31.24	25.96x	44689.66	-9.54		
4	I	2033-02-14T02:23:38.881		32.08	25.17x	42567.63	-9.52		
5	I	2033-02-14T02:24:21.785		32.24	25.02x	42159.11	-9.52		
6	I	2033-02-14T02:24:52.733		32.36	24.91x	41868.85	-9.51		
Uranus	I	2033-02-14T02:53:52.290		38.95	18.66x	25439.54		-5.66	-5.92
Uranus	E	2033-02-14T04:13:42.825		57.24	0.78x	25050.74		11.87	12.42
6	E	2033-02-14T04:42:10.321		63.77	-5.75	41796.09	9.66		
5	E	2033-02-14T04:43:02.105		63.97	-5.94	42290.62	9.66		
4	E	2033-02-14T04:43:34.129		64.09	-6.07	42594.89	9.67		
alpha	E	2033-02-14T04:47:16.684		64.94	-6.92	44752.24	9.70		
beta	E	2033-02-14T04:48:52.001		65.31	-7.29	45678.45	9.71		
eta	E	2033-02-14T04:51:26.236		65.90	-7.88	47176.12	9.72		
gamma	E	2033-02-14T04:52:12.765		66.07	-8.06	47628.59	9.73		
delta	E	2033-02-14T04:53:21.804		66.34	-8.33	48300.35	9.73		
lambda	E	2033-02-14T04:56:19.023		67.01	-9.01	50026.71	9.75		
epsilon	E	2033-02-14T04:58:55.640		67.61	-9.62	51554.61	9.76		

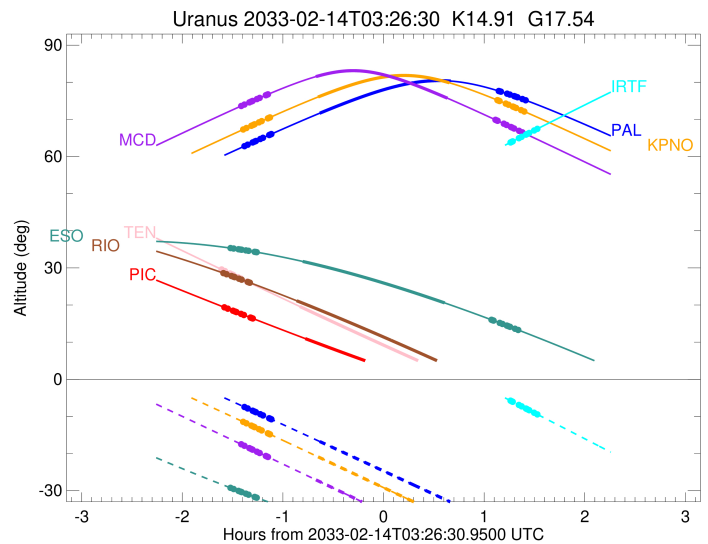
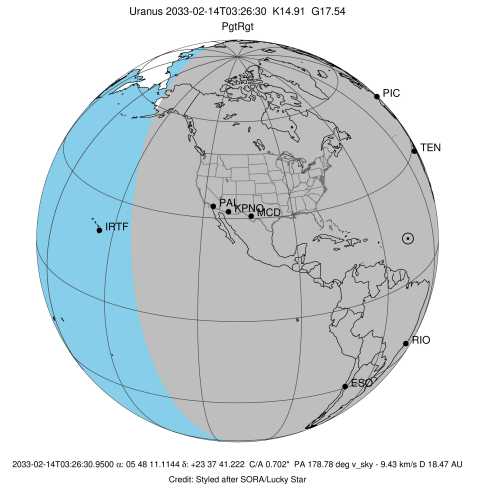
```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2033-02-14T03:17:12.140
Event type            : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code         : RIO
Location              : Rio de Janeiro
Latitude (deg)        : -22.89506
E. Longitude (deg)    : 316.77708
Altitude (km)         : 0.033
Gaia source ID        : 3427682492633067392
2Mass ID (if available) : 05481110+2337412
ICRS Star Coord at Epoch: 05h 48m 11.11440s +23:37:41.22173s
RUWE (>1.4 is poor)  : 0.92
K magnitude           : 14.913
G magnitude           : 17.543
RP magnitude          : 16.682
BP magnitude          : 18.318
DUPflag              : 0
Distance (au)         : 18.468
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -9.43
Sun-Target sep (deg)  : 122.01
Sun-Moon sep (deg)    : 56.16
B (ring opening deg) : 77.53
PA of pole (deg)      : 49.09
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.440
C/A sky separation (km) : 5897.6
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	2033-02-14T01:51:44.351		28.48	-49.81	50753.99	-9.86		
lambda	I	2033-02-14T01:52:58.158		28.29	-49.95	50026.71	-9.85		
delta	I	2033-02-14T01:55:53.479		27.82	-50.27	48300.35	-9.84		
gamma	I	2033-02-14T01:57:02.061		27.63	-50.39	47625.52	-9.84		
eta	I	2033-02-14T01:57:47.748		27.51	-50.47	47176.12	-9.84		
beta	I	2033-02-14T02:00:23.257		27.08	-50.74	45648.01	-9.83		
alpha	I	2033-02-14T02:02:00.829		26.81	-50.91	44687.81	-9.82		
4	I	2033-02-14T02:05:37.406		26.21	-51.26	42562.29	-9.80		
5	I	2033-02-14T02:06:18.269		26.10	-51.32	42162.75	-9.80		
6	I	2033-02-14T02:06:48.429		26.02	-51.37	41872.05	-9.80		
Uranus	I	2033-02-14T02:34:43.726		21.16	-53.44	25345.97		-7.59	-7.94
Uranus	E	2033-02-14T03:59:36.287		4.76x	-52.07	25098.90		11.27	11.79
6	E	2033-02-14T04:28:00.026		-1.10x	-49.18	41796.87	9.52		
5	E	2033-02-14T04:28:52.847		-1.29x	-49.08	42294.23	9.52		
4	E	2033-02-14T04:29:24.619		-1.40x	-49.01	42592.38	9.52		
alpha	E	2033-02-14T04:33:11.133		-2.19x	-48.55	44751.97	9.52		
beta	E	2033-02-14T04:34:48.166		-2.53x	-48.35	45677.84	9.53		
eta	E	2033-02-14T04:37:25.539		-3.08x	-48.02	47176.12	9.52		
gamma	E	2033-02-14T04:38:13.020		-3.25x	-47.91	47628.33	9.52		
delta	E	2033-02-14T04:39:23.582		-3.49x	-47.76	48300.35	9.52		
lambda	E	2033-02-14T04:42:24.867		-4.13x	-47.36	50026.71	9.52		
epsilon	E	2033-02-14T04:45:05.407		-4.70x	-47.00	51555.27	9.52		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-14T03:20:44.780
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 3427682492633067392
 2Mass ID (if available) : 05481110+2337412
 ICRS Star Coord at Epoch: 05h 48m 11.11440s +23:37:41.22173s
 RUWE (>1.4 is poor) : 0.92
 K magnitude : 14.913
 G magnitude : 17.543
 RP magnitude : 16.682
 BP magnitude : 18.318
 DUPflag : 0
 Distance (au) : 18.468
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.43
 Sun-Target sep (deg) : 122.01
 Sun-Moon sep (deg) : 56.49
 B (ring opening deg) : 77.53
 PA of pole (deg) : 49.09
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.345
 C/A sky separation (km) : 4622.3
 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	2033-02-14T01:55:58.074		35.30	-29.36	50752.36	-9.95		
lambda	I	2033-02-14T01:57:11.016		35.22	-29.57	50026.71	-9.95		
delta	I	2033-02-14T02:00:04.617		35.03	-30.07	48300.35	-9.94		
gamma	I	2033-02-14T02:01:12.515		34.95	-30.27	47625.41	-9.94		
eta	I	2033-02-14T02:01:57.723		34.90	-30.40	47176.12	-9.94		
beta	I	2033-02-14T02:04:31.627		34.71	-30.83	45647.68	-9.93		
alpha	I	2033-02-14T02:06:08.136		34.59	-31.11	44687.50	-9.93		
4	I	2033-02-14T02:09:42.320		34.32	-31.70	42561.23	-9.92		
5	I	2033-02-14T02:10:22.535		34.27	-31.82	42163.60	-9.92		
6	I	2033-02-14T02:10:52.377		34.23	-31.90	41872.63	-9.92		
Uranus	I	2033-02-14T02:38:21.427		31.74	-36.26	25321.45		-8.02	-8.39
Uranus	E	2033-02-14T04:03:02.433		20.56	-46.00	25124.43		10.94	11.45
6	E	2033-02-14T04:30:47.210		16.04	-47.51	41797.38	9.73		
5	E	2033-02-14T04:31:39.049		15.89	-47.54	42296.14	9.73		
4	E	2033-02-14T04:32:09.752		15.81	-47.56	42590.94	9.73		
alpha	E	2033-02-14T04:35:51.635		15.18	-47.68	44751.77	9.73		
beta	E	2033-02-14T04:37:26.607		14.91	-47.72	45677.45	9.73		
eta	E	2033-02-14T04:40:00.726		14.46	-47.79	47176.12	9.73		
gamma	E	2033-02-14T04:40:47.199		14.33	-47.81	47628.17	9.73		
delta	E	2033-02-14T04:41:56.305		14.13	-47.83	48300.35	9.73		
lambda	E	2033-02-14T04:44:53.815		13.62	-47.89	50026.71	9.72		
epsilon	E	2033-02-14T04:47:31.014		13.16	-47.93	51555.21	9.72		