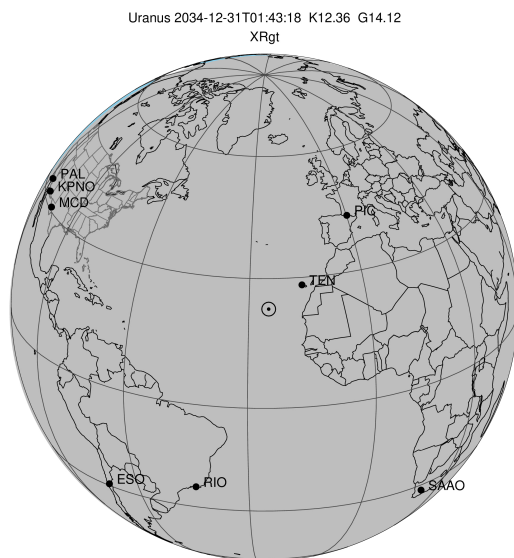


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-31T01:43:18.010  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3382447038078043392  
 2Mass ID (if available) : 06345556+2331413

ICRS Star Coord at Epoch: 06h 34m 55.56208s +23:31:40.96940s

RUWE (>1.4 is poor) : 2.11  
 K magnitude : 12.357  
 G magnitude : 14.122  
 RP magnitude : 13.543  
 BP magnitude : 14.536  
 DUPflag : 0  
 Distance (au) : 17.906  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.37  
 Sun-Target sep (deg) : 179.00  
 Sun-Moon sep (deg) : 75.43  
 B (ring opening deg) : 68.17  
 PA of pole (deg) : 71.39

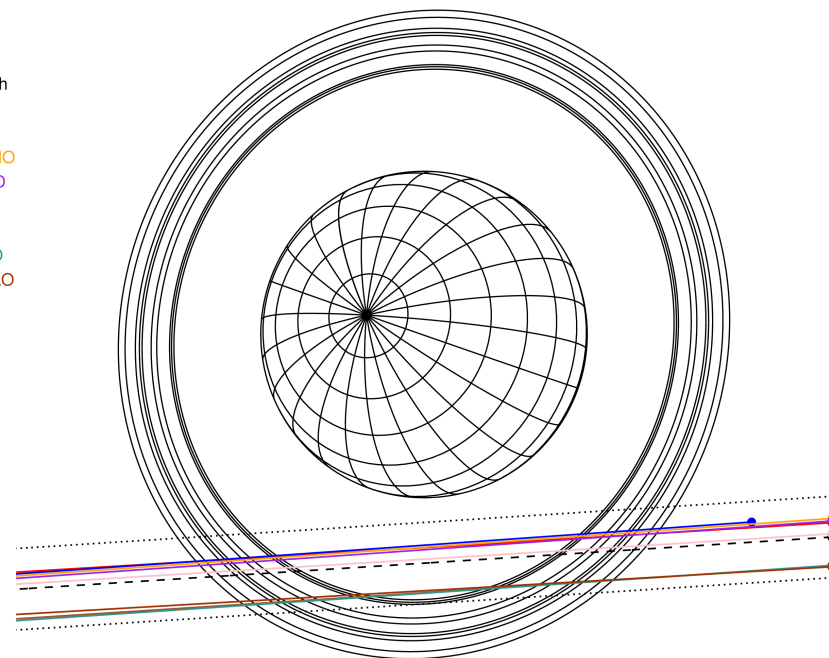
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2034-12-31T01:43:18.0100 α: 06 34 55.5621 δ: +23 31 40.969 C/A 2.744" PA 3.66 deg v\_sky -23.37 km/s D 17.91 AU  
 Credit: Styled after SORA/Lucky Star

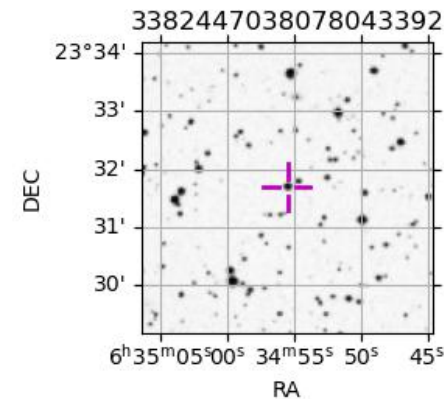
Uranus 2034-12-31T01:43:18 K12.36 G14.12 XRgt

Earth  
 PIC  
 PAL  
 KPNO  
 MCD  
 TEN  
 RIO  
 ESO  
 SAAO



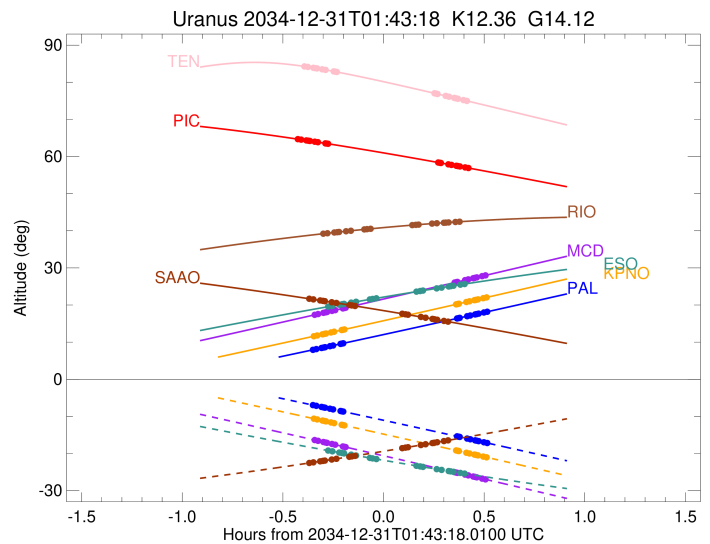
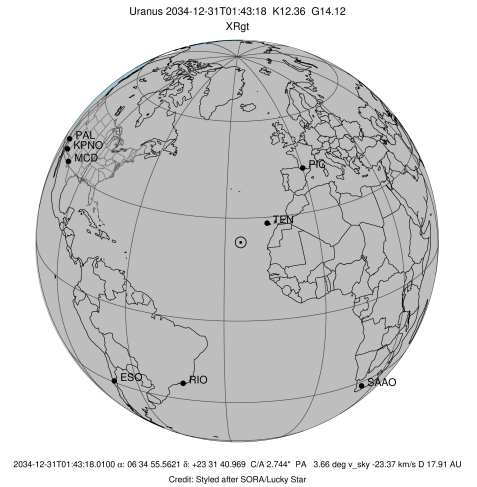
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	DEC 31 01:17 - DEC 31 02:08	PnnRie
PAL	Palomar Mt (200")	33.4	243.1	+++++		+++++	DEC 31 01:22 - DEC 31 02:13	PnnRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	DEC 31 01:22 - DEC 31 02:13	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	DEC 31 01:22 - DEC 31 02:13	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++		+++++	DEC 31 01:19 - DEC 31 02:07	PnnRie
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	+++++		+++++	DEC 31 01:25 - DEC 31 02:05	PnnRie
ESO	European Southern Obs	-29.3	289.3	+++++		+++++	DEC 31 01:26 - DEC 31 02:07	PnnRie
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++		+++++	DEC 31 01:21 - DEC 31 02:02	PnnRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2034-12-31T01:42:01.990
Event type          : XRgt
: No Uranus occs
: 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      : 3382447038078043392
2Mass ID (if available) : 06345556+2331413
ICRS Star Coord at Epoch: 06h 34m 55.56208s +23:31:40.96940s
RUWE (>1.4 is poor) : 2.11
K magnitude          : 12.357
G magnitude          : 14.122
RP magnitude         : 13.543
BP magnitude         : 14.536
DUPflag             : 0
Distance (au)        : 17.906
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.37
Sun-Target sep (deg) : 179.00
Sun-Moon sep (deg)  : 76.16
B (ring opening deg) : 68.17
PA of pole (deg)    : 71.39
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.566
C/A sky separation (km) : 33317.8
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
  
```

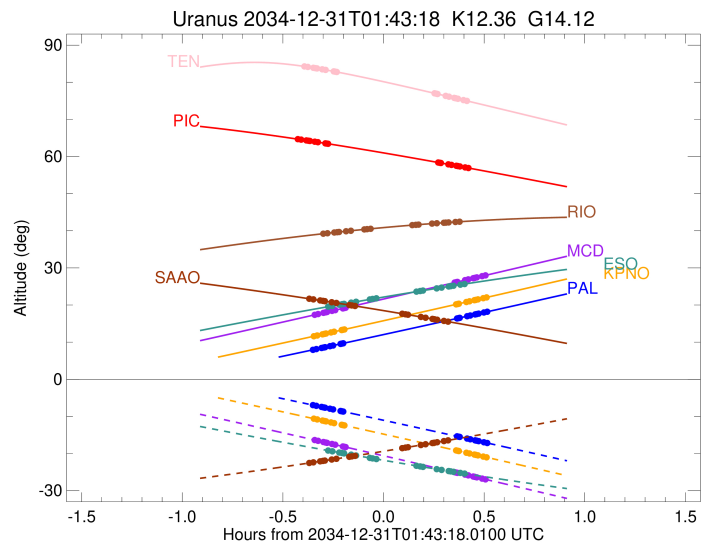
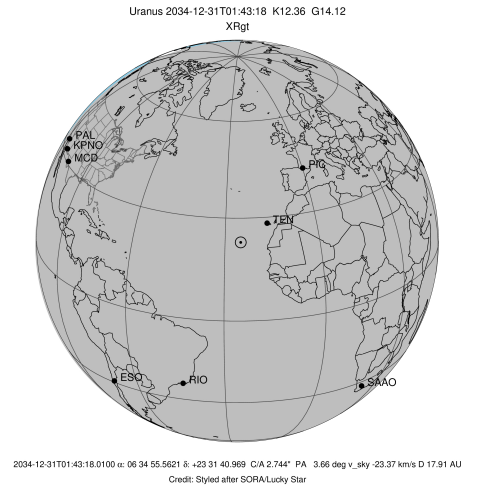


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-31T01:17:38.356		64.70	-64.89	51300.26	-18.93		
lambda	I	2034-12-31T01:18:45.845		64.55	-64.74	50026.71	-18.68		
delta	I	2034-12-31T01:20:19.675		64.34	-64.54	48300.35	-18.11		
gamma	I	2034-12-31T01:20:57.158		64.25	-64.46	47626.19	-17.86		
eta	I	2034-12-31T01:21:22.477		64.19	-64.40	47176.12	-17.69		
beta	I	2034-12-31T01:22:50.447		63.99	-64.21	45646.66	-17.05		
alpha	I	2034-12-31T01:23:45.540		63.86	-64.08	44717.01	-16.63		
4	I	2034-12-31T01:26:01.194		63.54	-63.78	42536.23	-15.42		
5	I	2034-12-31T01:26:19.413		63.50	-63.73	42269.87	-15.30		
6	I	2034-12-31T01:26:49.092		63.43	-63.67	41817.32	-14.95		

No planet occultations

6	E	2034-12-31T01:59:32.845		58.40	-58.77	41795.49	14.94		
5	E	2034-12-31T02:00:07.125		58.31	-58.68	42313.93	15.28		
4	E	2034-12-31T02:00:21.229		58.27	-58.64	42534.58	15.40		
alpha	E	2034-12-31T02:02:39.561		57.89	-58.27	44751.91	16.62		
beta	E	2034-12-31T02:03:32.595		57.75	-58.13	45646.02	17.03		
eta	E	2034-12-31T02:05:00.781		57.51	-57.89	47176.12	17.67		
gamma	E	2034-12-31T02:05:26.431		57.44	-57.82	47631.58	17.84		
delta	E	2034-12-31T02:06:03.657		57.33	-57.72	48300.35	18.09		
lambda	E	2034-12-31T02:07:37.606		57.07	-57.47	50026.71	18.66		
epsilon	E	2034-12-31T02:08:16.501		56.96	-57.36	50756.60	18.91		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-31T01:47:05.680  
 Event type : XRgt  
 : No Uranus occs  
 : 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 : 3382447038078043392  
 2Mass ID (if available) : 06345556+2331413  
 ICRS Star Coord at Epoch: 06h 34m 55.56208s +23:31:40.96940s  
 RUWE (>1.4 is poor) : 2.11  
 K magnitude : 12.357  
 G magnitude : 14.122  
 RP magnitude : 13.543  
 BP magnitude : 14.536  
 DUPflag : 0  
 Distance (au) : 17.906  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.37  
 Sun-Target sep (deg) : 179.00  
 Sun-Moon sep (deg) : 75.82  
 B (ring opening deg) : 68.17  
 PA of pole (deg) : 71.39  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.535  
 C/A sky separation (km) : 32917.5  
 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\_itrfr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



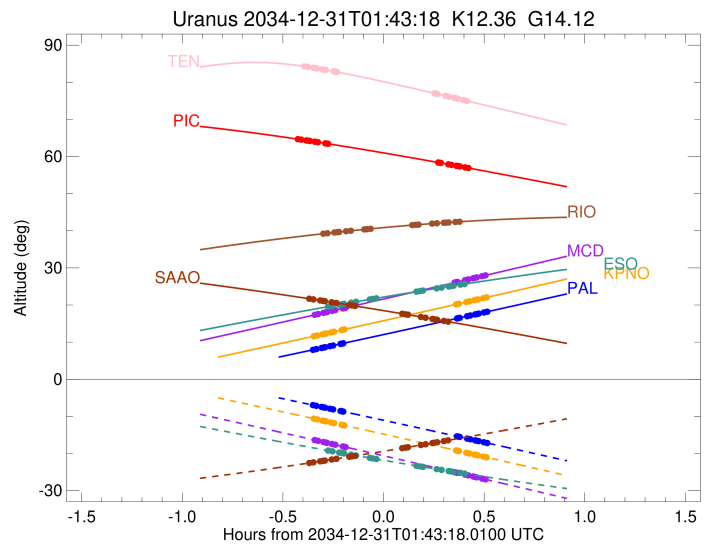
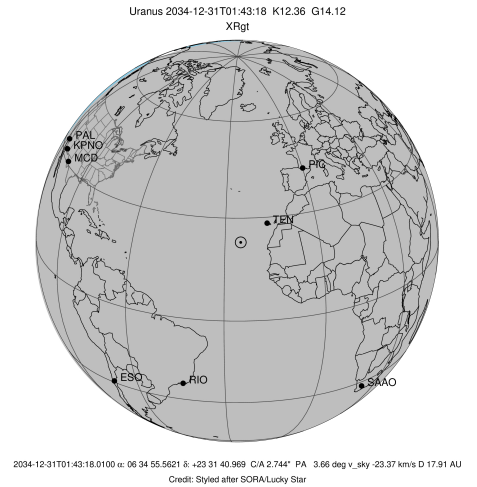
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-31T01:22:08.434		7.91	-6.93	51307.52	-18.82		
lambda	I	2034-12-31T01:23:16.715		8.13	-7.15	50026.71	-18.58		
delta	I	2034-12-31T01:24:51.001		8.43	-7.46	48300.35	-18.03		
gamma	I	2034-12-31T01:25:28.631		8.55	-7.58	47626.08	-17.80		
eta	I	2034-12-31T01:25:54.025		8.64	-7.66	47176.12	-17.64		
beta	I	2034-12-31T01:27:22.158		8.92	-7.94	45646.96	-17.03		
alpha	I	2034-12-31T01:28:17.330		9.10	-8.12	44716.26	-16.64		
4	I	2034-12-31T01:30:32.577		9.54	-8.56	42536.93	-15.49		
5	I	2034-12-31T01:30:50.863		9.60	-8.62	42268.11	-15.37		
6	I	2034-12-31T01:31:20.184		9.69	-8.71	41818.25	-15.05		

No planet occultations

6	E	2034-12-31T02:05:10.336	16.37	-15.36	41795.54	15.09
5	E	2034-12-31T02:05:44.291	16.49	-15.48	42313.85	15.41
4	E	2034-12-31T02:05:58.289	16.53	-15.52	42534.72	15.53
alpha	E	2034-12-31T02:08:15.783	16.99	-15.98	44751.93	16.69
beta	E	2034-12-31T02:09:08.626	17.17	-16.16	45646.06	17.08
eta	E	2034-12-31T02:10:36.613	17.46	-16.45	47176.12	17.70
gamma	E	2034-12-31T02:11:02.231	17.55	-16.53	47631.58	17.86
delta	E	2034-12-31T02:11:39.427	17.67	-16.66	48300.35	18.10
lambda	E	2034-12-31T02:13:13.381	17.99	-16.97	50026.71	18.64
epsilon	E	2034-12-31T02:13:52.305	18.12	-17.10	50756.54	18.89

```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2034-12-31T01:47:07.240
Event type           : XRgt
: No Uranus occs
: 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       : 3382447038078043392
2Mass ID (if available) : 06345556+2331413
ICRS Star Coord at Epoch: 06h 34m 55.56208s +23:31:40.96940s
RUWE (>1.4 is poor) : 2.11
K magnitude           : 12.357
G magnitude           : 14.122
RP magnitude          : 13.543
BP magnitude          : 14.536
DUPflag              : 0
Distance (au)        : 17.906
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -23.37
Sun-Target sep (deg) : 179.00
Sun-Moon sep (deg)   : 75.88
B (ring opening deg) : 68.17
PA of pole (deg)     : 71.39
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.559
C/A sky separation (km) : 33238.4
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_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```

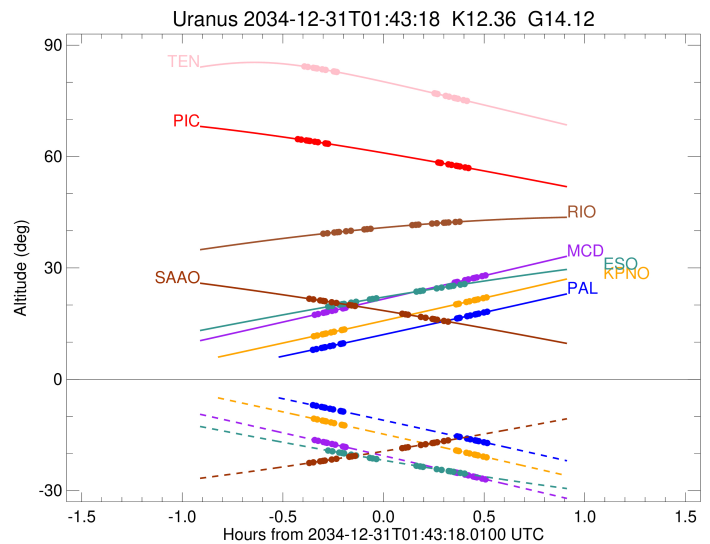
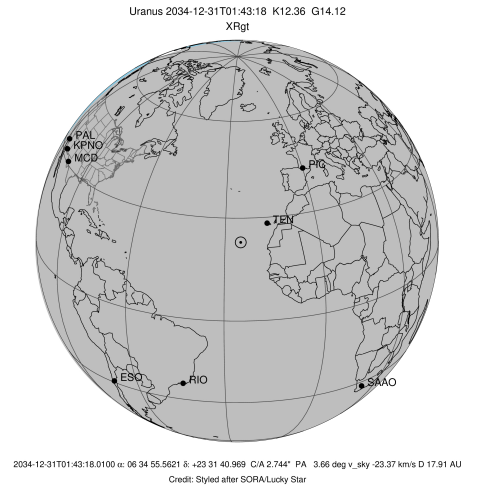


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-31T01:22:24.292		11.57	-10.59	51304.37	-18.71		
lambda	I	2034-12-31T01:23:32.814		11.80	-10.82	50026.71	-18.46		
delta	I	2034-12-31T01:25:07.746		12.11	-11.13	48300.35	-17.90		
gamma	I	2034-12-31T01:25:45.662		12.24	-11.26	47626.13	-17.66		
eta	I	2034-12-31T01:26:11.264		12.32	-11.34	47176.12	-17.49		
beta	I	2034-12-31T01:27:40.199		12.62	-11.64	45646.82	-16.86		
alpha	I	2034-12-31T01:28:35.910		12.81	-11.82	44716.63	-16.46		
4	I	2034-12-31T01:30:52.885		13.26	-12.28	42536.57	-15.27		
5	I	2034-12-31T01:31:11.355		13.33	-12.34	42269.03	-15.15		
6	I	2034-12-31T01:31:41.221		13.43	-12.44	41817.76	-14.81		

No planet occultations

6	E	2034-12-31T02:04:53.621	20.17	-19.16	41795.43	14.85
5	E	2034-12-31T02:05:28.116	20.29	-19.27	42314.03	15.19
4	E	2034-12-31T02:05:42.292	20.33	-19.32	42534.39	15.31
alpha	E	2034-12-31T02:08:01.513	20.81	-19.80	44751.87	16.51
beta	E	2034-12-31T02:08:54.897	20.99	-19.98	45645.92	16.92
eta	E	2034-12-31T02:10:23.684	21.30	-20.28	47176.12	17.55
gamma	E	2034-12-31T02:10:49.510	21.39	-20.37	47631.58	17.72
delta	E	2034-12-31T02:11:26.992	21.52	-20.50	48300.35	17.96
lambda	E	2034-12-31T02:13:01.591	21.84	-20.82	50026.71	18.53
epsilon	E	2034-12-31T02:13:40.799	21.97	-20.96	50757.40	18.78

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-31T01:47:04.460  
 Event type : XRgt  
 : No Uranus occs  
 : 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 : 3382447038078043392  
 2Mass ID (if available) : 06345556+2331413  
 ICRS Star Coord at Epoch: 06h 34m 55.56208s +23:31:40.96940s  
 RUWE (>1.4 is poor) : 2.11  
 K magnitude : 12.357  
 G magnitude : 14.122  
 RP magnitude : 13.543  
 BP magnitude : 14.536  
 DUPflag : 0  
 Distance (au) : 17.906  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.37  
 Sun-Target sep (deg) : 179.00  
 Sun-Moon sep (deg) : 75.96  
 B (ring opening deg) : 68.17  
 PA of pole (deg) : 71.39  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.590  
 C/A sky separation (km) : 33634.8  
 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

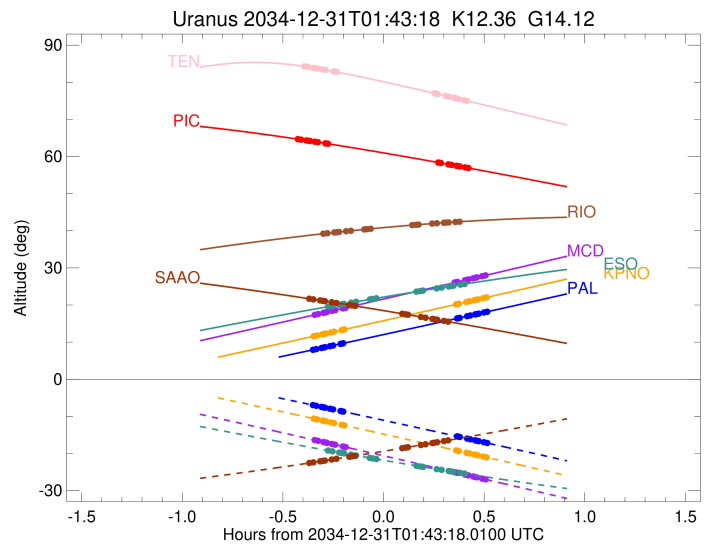
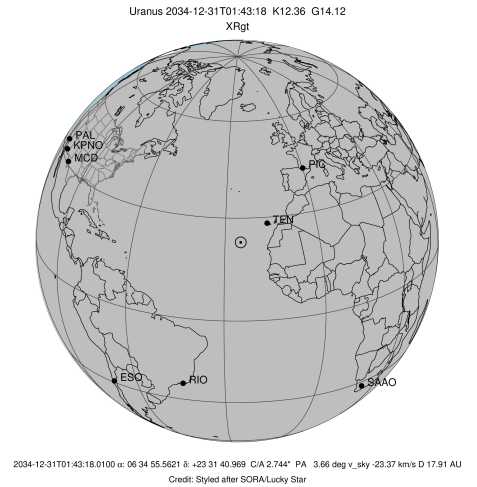


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-31T01:22:39.854		17.33	-16.35	51300.37	-18.58		
lambda	I	2034-12-31T01:23:48.661		17.57	-16.58	50026.71	-18.32		
delta	I	2034-12-31T01:25:24.393		17.90	-16.91	48300.35	-17.74		
gamma	I	2034-12-31T01:26:02.666		18.03	-17.04	47626.19	-17.49		
eta	I	2034-12-31T01:26:28.530		18.12	-17.13	47176.12	-17.31		
beta	I	2034-12-31T01:27:58.472		18.43	-17.44	45646.63	-16.66		
alpha	I	2034-12-31T01:28:54.866		18.62	-17.63	44717.10	-16.24		
4	I	2034-12-31T01:31:14.064		19.10	-18.11	42536.11	-15.00		
5	I	2034-12-31T01:31:32.770		19.17	-18.18	42270.18	-14.87		
6	I	2034-12-31T01:32:03.349		19.27	-18.28	41817.14	-14.52		

No planet occultations

6	E	2034-12-31T02:04:27.336		26.04	-25.02	41795.32	14.55		
5	E	2034-12-31T02:05:02.535		26.16	-25.15	42314.23	14.91		
4	E	2034-12-31T02:05:16.945		26.21	-25.20	42534.00	15.03		
alpha	E	2034-12-31T02:07:38.391		26.71	-25.69	44751.78	16.28		
beta	E	2034-12-31T02:08:32.467		26.90	-25.88	45645.76	16.71		
eta	E	2034-12-31T02:10:02.267		27.21	-26.19	47176.12	17.37		
gamma	E	2034-12-31T02:10:28.355		27.30	-26.29	47631.57	17.55		
delta	E	2034-12-31T02:11:06.195		27.44	-26.42	48300.35	17.80		
lambda	E	2034-12-31T02:12:41.599		27.77	-26.75	50026.71	18.38		
epsilon	E	2034-12-31T02:13:21.163		27.91	-26.89	50758.50	18.64		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-31T01:42:43.400  
 Event type : XRgt  
 : No Uranus occs  
 : 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 : 3382447038078043392  
 2Mass ID (if available) : 06345556+2331413  
 ICRS Star Coord at Epoch: 06h 34m 55.56208s +23:31:40.96940s  
 RUWE (>1.4 is poor) : 2.11  
 K magnitude : 12.357  
 G magnitude : 14.122  
 RP magnitude : 13.543  
 BP magnitude : 14.536  
 DUPflag : 0  
 Distance (au) : 17.906  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.37  
 Sun-Target sep (deg) : 179.00  
 Sun-Moon sep (deg) : 76.30  
 B (ring opening deg) : 68.17  
 PA of pole (deg) : 71.39  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.705  
 C/A sky separation (km) : 35132.1  
 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

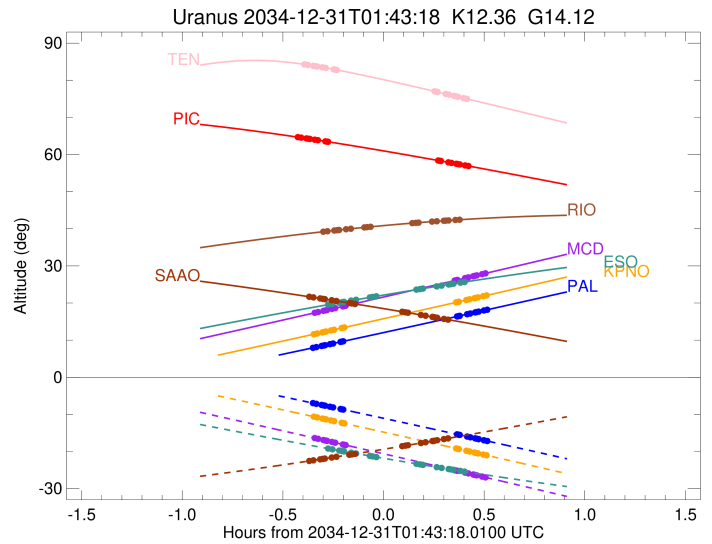
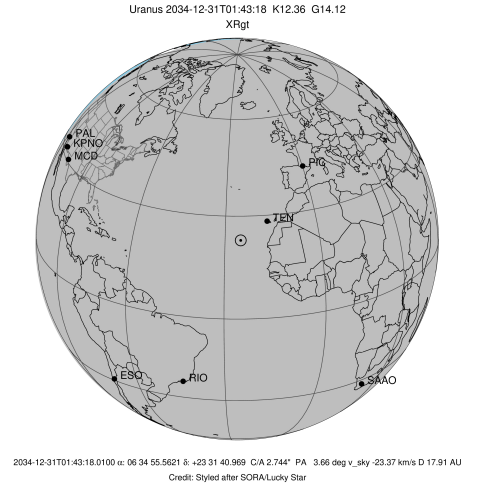


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-31T01:19:36.391		84.29	-84.40	51282.08	-18.16		
lambda	I	2034-12-31T01:20:45.830		84.13	-84.28	50026.71	-17.86		
delta	I	2034-12-31T01:22:24.313		83.90	-84.10	48300.35	-17.19		
gamma	I	2034-12-31T01:23:03.851		83.80	-84.02	47626.48	-16.90		
eta	I	2034-12-31T01:23:30.664		83.74	-83.96	47176.12	-16.69		
beta	I	2034-12-31T01:25:04.378		83.49	-83.76	45645.84	-15.93		
alpha	I	2034-12-31T01:26:03.386		83.34	-83.63	44719.17	-15.43		
4	I	2034-12-31T01:28:31.650		82.92	-83.27	42534.22	-13.95		
5	I	2034-12-31T01:28:51.297		82.87	-83.22	42275.15	-13.79		
6	I	2034-12-31T01:29:24.981		82.77	-83.14	41814.48	-13.37		

No planet occultations

6	E	2034-12-31T01:58:26.947		77.05	-77.72	41794.99	13.36		
5	E	2034-12-31T01:59:05.220		76.92	-77.59	42314.81	13.79		
4	E	2034-12-31T01:59:20.689		76.86	-77.54	42532.68	13.94		
alpha	E	2034-12-31T02:01:51.571		76.33	-77.02	44751.45	15.42		
beta	E	2034-12-31T02:02:48.494		76.13	-76.82	45645.22	15.92		
eta	E	2034-12-31T02:04:22.373		75.80	-76.50	47176.12	16.69		
gamma	E	2034-12-31T02:04:49.501		75.70	-76.40	47631.57	16.89		
delta	E	2034-12-31T02:05:28.758		75.56	-76.27	48300.35	17.18		
lambda	E	2034-12-31T02:07:07.293		75.21	-75.92	50026.71	17.85		
epsilon	E	2034-12-31T02:07:48.198		75.07	-75.78	50762.18	18.15		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-31T01:44:16.130  
 Event type : XRgt  
 : No Uranus occs  
 : 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 : 3382447038078043392  
 2Mass ID (if available) : 06345556+2331413  
 ICRS Star Coord at Epoch: 06h 34m 55.56208s +23:31:40.96940s  
 RUWE (>1.4 is poor) : 2.11  
 K magnitude : 12.357  
 G magnitude : 14.122  
 RP magnitude : 13.543  
 BP magnitude : 14.536  
 DUPflag : 0  
 Distance (au) : 17.906  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.37  
 Sun-Target sep (deg) : 179.00  
 Sun-Moon sep (deg) : 76.08  
 B (ring opening deg) : 68.17  
 PA of pole (deg) : 71.39  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.107  
 C/A sky separation (km) : 40349.0  
 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\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk

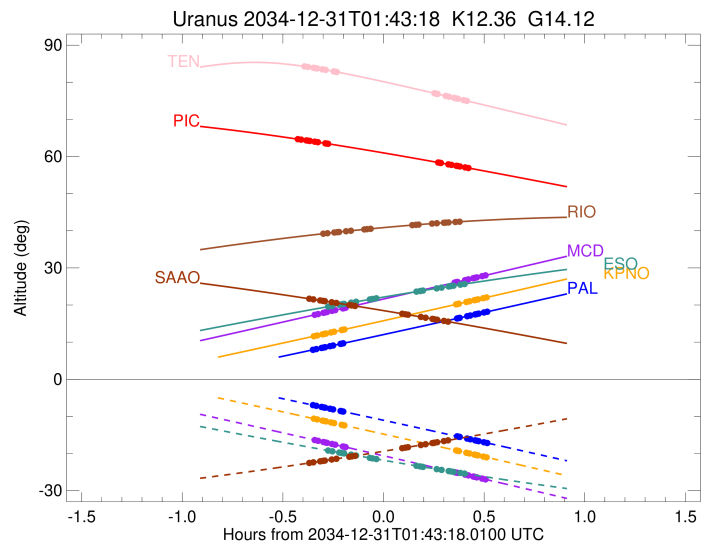
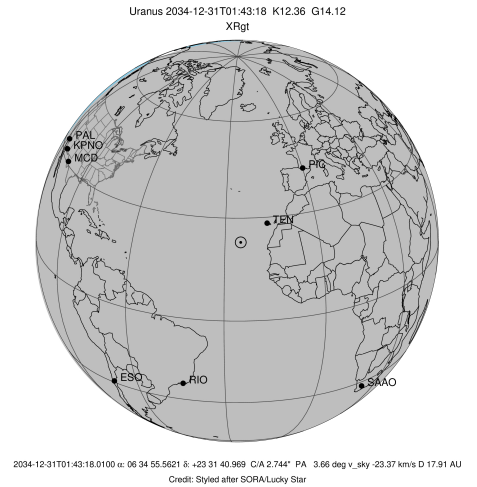


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2034-12-31T01:25:17.229		39.20	-39.16	51221.83	-15.18		
lambda	I	2034-12-31T01:26:36.842		39.34	-39.30	50026.71	-14.68		
delta	I	2034-12-31T01:28:38.920		39.54	-39.51	48300.35	-13.57		
gamma	I	2034-12-31T01:29:29.359		39.62	-39.59	47627.45	-13.10		
eta	I	2034-12-31T01:30:04.288		39.68	-39.65	47176.12	-12.74		
beta	I	2034-12-31T01:32:11.100		39.88	-39.86	45643.46	-11.38		
alpha	I	2034-12-31T01:33:35.087		40.01	-40.00	44726.80	-10.43		
4	I	2034-12-31T01:37:43.093		40.38	-40.39	42528.26	-7.20		
5	I	2034-12-31T01:38:18.320		40.43	-40.44	42294.07	-6.75		
6	I	2034-12-31T01:39:37.692		40.55	-40.56	41804.03	-5.56		

No planet occultations

6	E	2034-12-31T01:51:42.157		41.51	-41.58	41795.87	5.56		
5	E	2034-12-31T01:53:06.144		41.61	-41.69	42313.60	6.75		
4	E	2034-12-31T01:53:36.973		41.65	-41.73	42527.39	7.20		
alpha	E	2034-12-31T01:57:47.491		41.93	-42.04	44748.69	10.44		
beta	E	2034-12-31T01:59:09.316		42.02	-42.14	45642.96	11.39		
eta	E	2034-12-31T02:01:16.182		42.16	-42.28	47176.12	12.76		
gamma	E	2034-12-31T02:01:51.388		42.19	-42.32	47631.40	13.11		
delta	E	2034-12-31T02:02:41.486		42.25	-42.38	48300.35	13.59		
lambda	E	2034-12-31T02:04:43.464		42.37	-42.51	50026.71	14.69		
epsilon	E	2034-12-31T02:05:34.426		42.42	-42.56	50786.43	15.19		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2034-12-31T01:45:43.600  
 Event type : XRgt  
 : No Uranus occs  
 : 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 : 3382447038078043392  
 2Mass ID (if available) : 06345556+2331413  
 ICRS Star Coord at Epoch: 06h 34m 55.56208s +23:31:40.96940s  
 RUWE (>1.4 is poor) : 2.11  
 K magnitude : 12.357  
 G magnitude : 14.122  
 RP magnitude : 13.543  
 BP magnitude : 14.536  
 DUPflag : 0  
 Distance (au) : 17.906  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.37  
 Sun-Target sep (deg) : 179.00  
 Sun-Moon sep (deg) : 75.90  
 B (ring opening deg) : 68.17  
 PA of pole (deg) : 71.39  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.113  
 C/A sky separation (km) : 40432.4  
 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\_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	2034-12-31T01:26:44.274		19.55	-19.20	51221.77	-15.04		
lambda	I	2034-12-31T01:28:04.640		19.76	-19.41	50026.71	-14.54		
delta	I	2034-12-31T01:30:07.976		20.09	-19.74	48300.35	-13.44		
gamma	I	2034-12-31T01:30:58.977		20.22	-19.88	47627.45	-12.95		
eta	I	2034-12-31T01:31:34.314		20.32	-19.97	47176.12	-12.59		
beta	I	2034-12-31T01:33:42.767		20.65	-20.32	45643.44	-11.23		
alpha	I	2034-12-31T01:35:08.019		20.87	-20.54	44726.87	-10.26		
4	I	2034-12-31T01:39:21.553		21.53	-21.21	42528.19	-6.98		
5	I	2034-12-31T01:39:57.895		21.62	-21.30	42294.36	-6.52		
6	I	2034-12-31T01:41:20.766		21.84	-21.52	41803.83	-5.28		

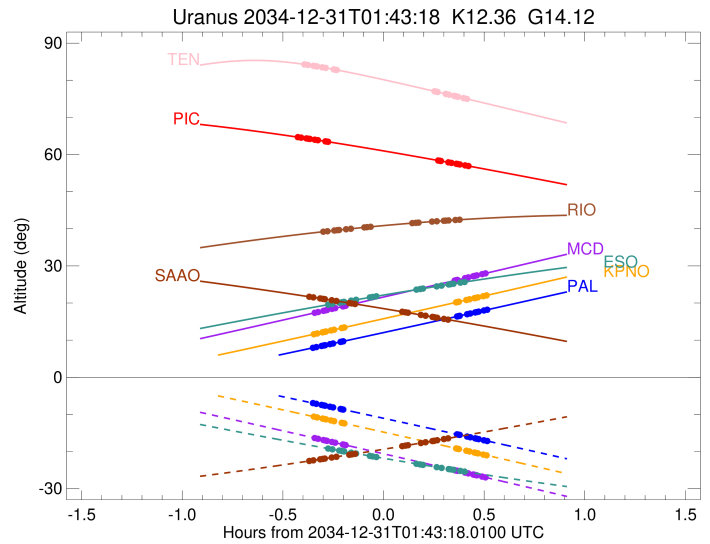
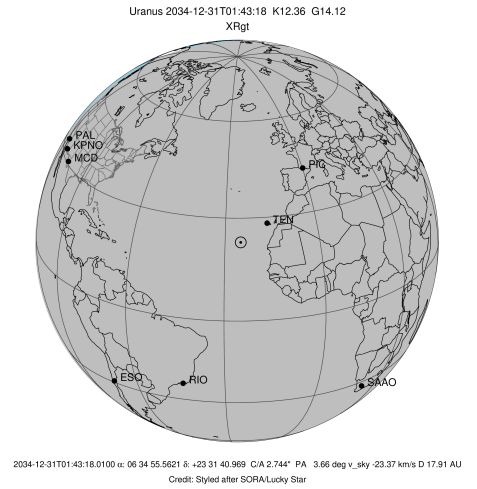
No planet occultations

6	E	2034-12-31T01:52:56.144		23.58	-23.29	41796.00	5.29		
5	E	2034-12-31T01:54:23.645		23.79	-23.51	42313.41	6.53		
4	E	2034-12-31T01:54:55.529		23.87	-23.58	42527.28	6.98		
alpha	E	2034-12-31T01:59:11.456		24.49	-24.21	44748.56	10.28		
beta	E	2034-12-31T02:00:34.466		24.69	-24.42	45642.90	11.24		
eta	E	2034-12-31T02:02:42.868		24.99	-24.73	47176.12	12.62		
gamma	E	2034-12-31T02:03:18.451		25.07	-24.81	47631.39	12.97		
delta	E	2034-12-31T02:04:09.060		25.19	-24.93	48300.35	13.46		
lambda	E	2034-12-31T02:06:12.166		25.48	-25.23	50026.71	14.57		
epsilon	E	2034-12-31T02:07:03.630		25.60	-25.35	50787.49	15.07		



```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch             : 2034-12-31T01:40:27.920
Event type            : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
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        : 3382447038078043392
2Mass ID (if available) : 06345556+2331413
ICRS Star Coord at Epoch: 06h 34m 55.56208s +23:31:40.96940s
RUWE (>1.4 is poor)  : 2.11
K magnitude           : 12.357
G magnitude           : 14.122
RP magnitude          : 13.543
BP magnitude          : 14.536
DUPflag               : 0
Distance (au)         : 17.906
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -23.37
Sun-Target sep (deg)  : 179.00
Sun-Moon sep (deg)    : 75.56
B (ring opening deg)  : 68.17
PA of pole (deg)      : 71.39
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.085
C/A sky separation (km) : 40069.0
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	2034-12-31T01:21:06.165		21.70	-22.56	51223.17	-15.30		
lambda	I	2034-12-31T01:22:25.164		21.52	-22.38	50026.71	-14.82		
delta	I	2034-12-31T01:24:25.875		21.23	-22.10	48300.35	-13.76		
gamma	I	2034-12-31T01:25:15.620		21.12	-21.99	47627.41	-13.29		
eta	I	2034-12-31T01:25:50.010		21.04	-21.91	47176.12	-12.95		
beta	I	2034-12-31T01:27:54.387		20.74	-21.62	45643.54	-11.65		
alpha	I	2034-12-31T01:29:16.253		20.55	-21.43	44726.48	-10.74		
4	I	2034-12-31T01:33:13.034		19.98	-20.87	42528.52	-7.72		
5	I	2034-12-31T01:33:45.879		19.90	-20.79	42293.01	-7.32		
6	I	2034-12-31T01:34:57.491		19.73	-20.62	41804.68	-6.27		

No planet occultations

6	E	2034-12-31T01:48:43.654	17.67	-18.59	41795.55	6.27
5	E	2034-12-31T01:49:59.930	17.48	-18.39	42314.06	7.32
4	E	2034-12-31T01:50:28.451	17.41	-18.32	42527.75	7.72
alpha	E	2034-12-31T01:54:28.096	16.79	-17.71	44749.02	10.73
beta	E	2034-12-31T01:55:47.961	16.58	-17.51	45643.14	11.63
eta	E	2034-12-31T01:57:52.659	16.26	-17.19	47176.12	12.93
gamma	E	2034-12-31T01:58:27.408	16.17	-17.10	47631.42	13.27
delta	E	2034-12-31T01:59:16.937	16.04	-16.97	48300.35	13.74
lambda	E	2034-12-31T02:01:17.876	15.72	-16.65	50026.71	14.79
epsilon	E	2034-12-31T02:02:08.342	15.59	-16.52	50783.67	15.27