

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-01-13T23:00:32.650
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3413219070002139648
 2Mass ID (if available) : 04533087+2235460

ICRS Star Coord at Epoch: 04h 53m 30.86820s +22:35:46.04136s

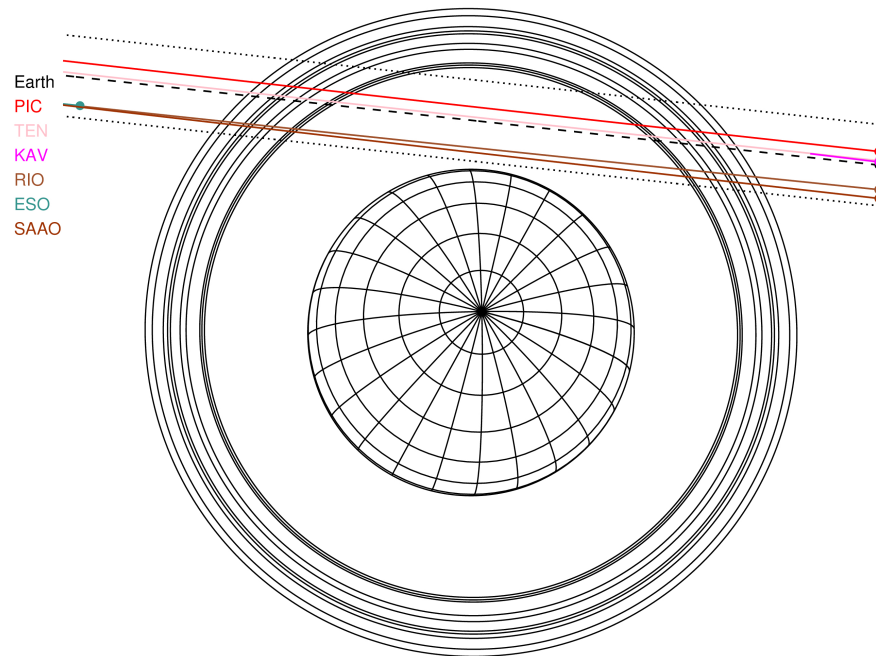
RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.973
 G magnitude : 18.130
 RP magnitude : 17.197
 BP magnitude : 18.998
 DUPflag : 0
 Distance (au) : 18.440
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.91
 Sun-Target sep (deg) : 141.29
 Sun-Moon sep (deg) : 25.78
 B (ring opening deg) : 81.70
 PA of pole (deg) : -27.29

#	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



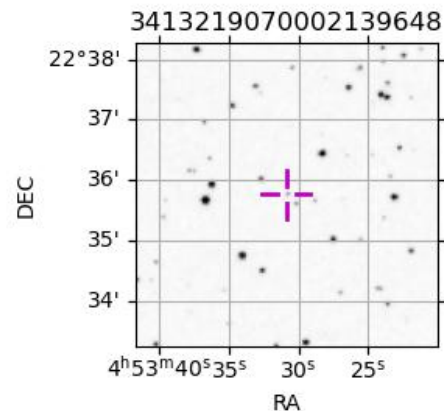
2030-01-13T23:00:32.6500 ra: 04 53 30.8682 s: +22 35 46.041 C/A 2.476° PA 173.73 deg v_sky -16.91 km/s D 18.44 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2030-01-13T23:00:32 K14.97 G18.13 XRgt

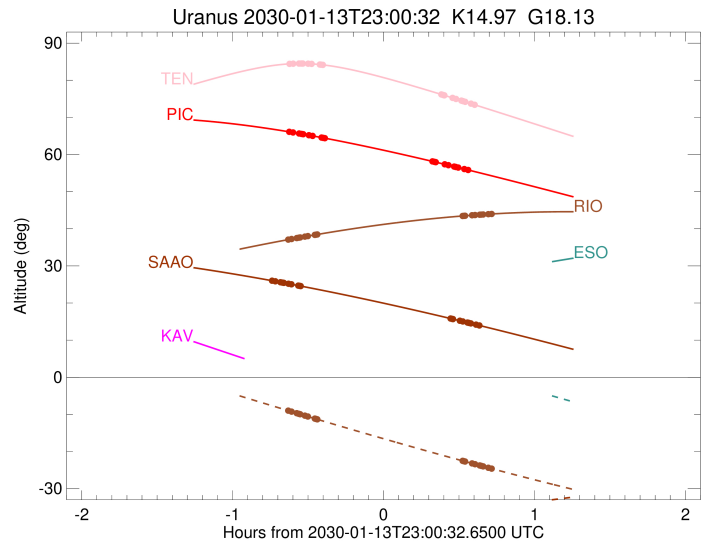
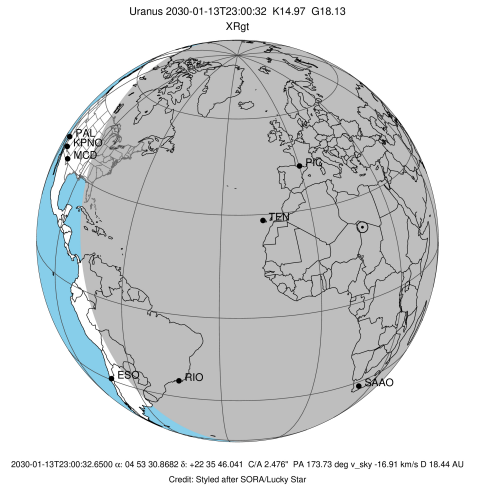


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	JAN 13 22:22 - JAN 13 23:34	PnnRie
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	+++++		+++++	JAN 13 22:22 - JAN 13 23:37	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	+++++		+++++	JAN 13 22:22 - JAN 13 23:43	PnnRie
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	+++++		+++++	JAN 13 22:15 - JAN 13 23:38	PnnRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-01-13T22:58:21.870
 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 : 3413219070002139648
 2Mass ID (if available) : 04533087+2235460
 ICRS Star Coord at Epoch: 04h 53m 30.86820s +22:35:46.04136s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.973
 G magnitude : 18.130
 RP magnitude : 17.197
 BP magnitude : 18.998
 DUPflag : 0
 Distance (au) : 18.440
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.91
 Sun-Target sep (deg) : 141.29
 Sun-Moon sep (deg) : 26.38
 B (ring opening deg) : 81.70
 PA of pole (deg) : -27.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.630
 C/A sky separation (km) : 35171.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

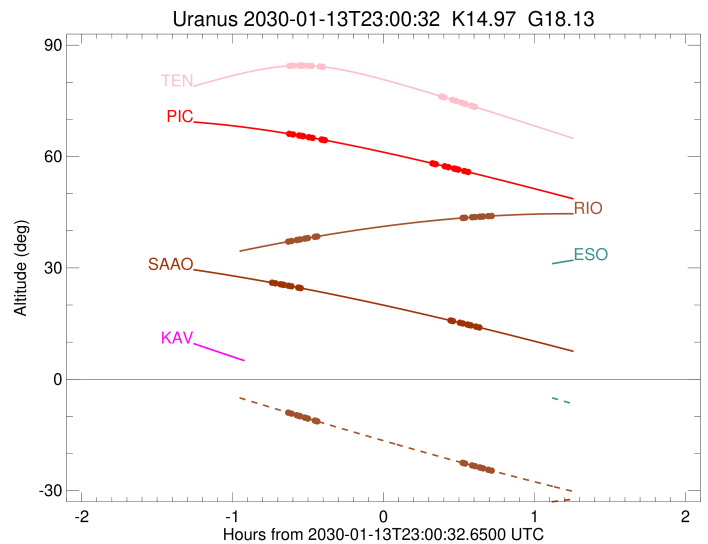
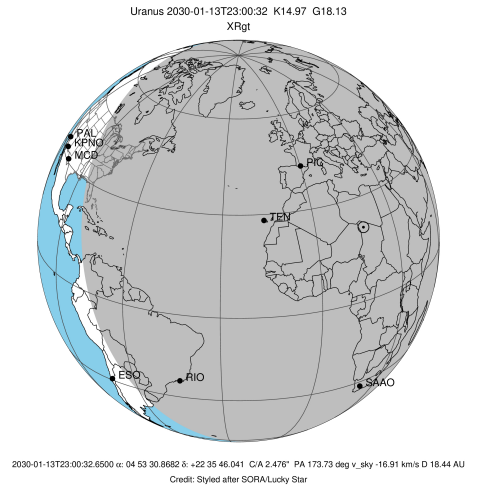


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-01-13T22:22:37.819		66.17	-59.27	51492.18	-12.57		
lambda	I	2030-01-13T22:24:36.521		65.94	-59.57	50026.71	-12.17		
delta	I	2030-01-13T22:27:01.036		65.66	-59.92	48300.35	-11.71		
gamma	I	2030-01-13T22:27:59.296		65.55	-60.06	47623.77	-11.51		
eta	I	2030-01-13T22:28:38.413		65.47	-60.16	47176.12	-11.37		
beta	I	2030-01-13T22:30:53.292		65.20	-60.48	45675.88	-10.86		
alpha	I	2030-01-13T22:32:26.102		65.01	-60.70	44685.66	-10.49		
4	I	2030-01-13T22:35:52.508		64.58	-61.18	42616.48	-9.55		
5	I	2030-01-13T22:36:24.365		64.51	-61.26	42308.04	-9.40		
6	I	2030-01-13T22:37:12.638		64.41	-61.37	41869.35	-9.16		

No planet occultations

6	E	2030-01-13T23:20:02.657		58.15	-66.33	41876.37	9.14		
5	E	2030-01-13T23:20:47.731		58.03	-66.40	42295.25	9.38		
4	E	2030-01-13T23:21:19.238		57.94	-66.44	42591.42	9.53		
alpha	E	2030-01-13T23:24:51.676		57.37	-66.74	44717.89	10.46		
beta	E	2030-01-13T23:26:19.225		57.14	-66.86	45650.92	10.83		
eta	E	2030-01-13T23:28:36.731		56.76	-67.04	47176.12	11.34		
gamma	E	2030-01-13T23:29:15.745		56.65	-67.08	47621.33	11.48		
delta	E	2030-01-13T23:30:14.385		56.49	-67.16	48300.35	11.68		
lambda	E	2030-01-13T23:32:39.336		56.09	-67.33	50026.71	12.13		
epsilon	E	2030-01-13T23:34:26.813		55.80	-67.45	51347.56	12.52		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-01-13T22:59:44.660
 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 : 3413219070002139648
 2Mass ID (if available) : 04533087+2235460
 ICRS Star Coord at Epoch: 04h 53m 30.86820s +22:35:46.04136s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.973
 G magnitude : 18.130
 RP magnitude : 17.197
 BP magnitude : 18.998
 DUPflag : 0
 Distance (au) : 18.440
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.91
 Sun-Target sep (deg) : 141.29
 Sun-Moon sep (deg) : 26.27
 B (ring opening deg) : 81.70
 PA of pole (deg) : -27.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.511
 C/A sky separation (km) : 33583.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.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

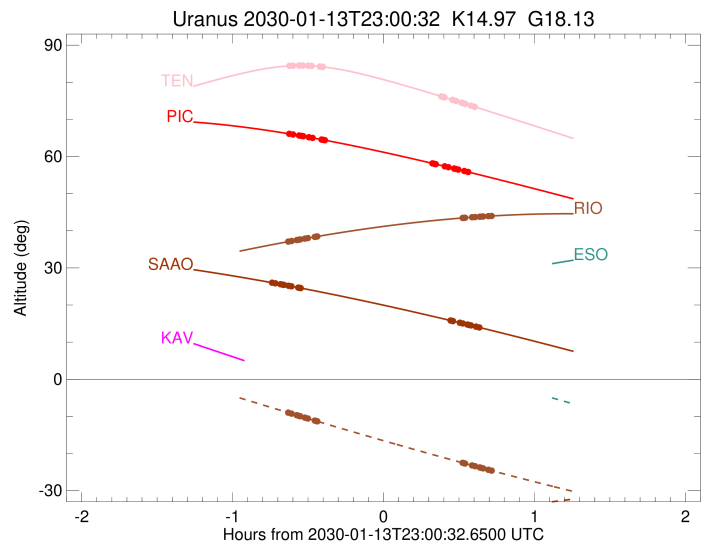
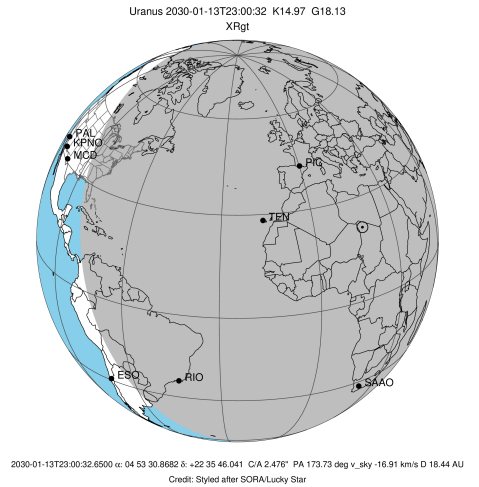


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-01-13T22:22:47.135		84.41	-50.55	51483.29	-13.11		
lambda	I	2030-01-13T22:24:39.916		84.47	-50.96	50026.71	-12.76		
delta	I	2030-01-13T22:26:57.300		84.51	-51.47	48300.35	-12.36		
gamma	I	2030-01-13T22:27:52.397		84.51	-51.67	47623.99	-12.19		
eta	I	2030-01-13T22:28:29.324		84.51	-51.81	47176.12	-12.07		
beta	I	2030-01-13T22:30:35.857		84.47	-52.27	45676.56	-11.63		
alpha	I	2030-01-13T22:32:02.364		84.42	-52.59	44685.25	-11.31		
4	I	2030-01-13T22:35:11.948		84.24	-53.28	42616.23	-10.51		
5	I	2030-01-13T22:35:40.999		84.21	-53.39	42305.77	-10.39		
6	I	2030-01-13T22:36:24.528		84.16	-53.55	41867.45	-10.19		

No planet occultations

6	E	2030-01-13T23:23:34.693		76.18	-63.90	41875.10	10.18		
5	E	2030-01-13T23:24:15.036		76.04	-64.05	42291.48	10.38		
4	E	2030-01-13T23:24:43.680		75.94	-64.15	42588.65	10.50		
alpha	E	2030-01-13T23:27:59.058		75.26	-64.86	44719.89	11.29		
beta	E	2030-01-13T23:29:20.222		74.98	-65.15	45649.96	11.61		
eta	E	2030-01-13T23:31:29.194		74.53	-65.62	47176.12	12.05		
gamma	E	2030-01-13T23:32:05.967		74.40	-65.75	47621.43	12.17		
delta	E	2030-01-13T23:33:01.359		74.20	-65.95	48300.35	12.34		
lambda	E	2030-01-13T23:35:18.964		73.71	-66.45	50026.71	12.74		
epsilon	E	2030-01-13T23:37:00.293		73.35	-66.81	51331.60	13.09		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-01-13T23:02:55.660
 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 : 3413219070002139648
 2Mass ID (if available) : 04533087+2235460
 ICRS Star Coord at Epoch: 04h 53m 30.86820s +22:35:46.04136s
 RUWE (>1.4 is poor) : 1.04
 K magnitude : 14.973
 G magnitude : 18.130
 RP magnitude : 17.197
 BP magnitude : 18.998
 DUPflag : 0
 Distance (au) : 18.440
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -16.91
 Sun-Target sep (deg) : 141.29
 Sun-Moon sep (deg) : 25.81
 B (ring opening deg) : 81.70
 PA of pole (deg) : -27.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.155
 C/A sky separation (km) : 28826.6
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



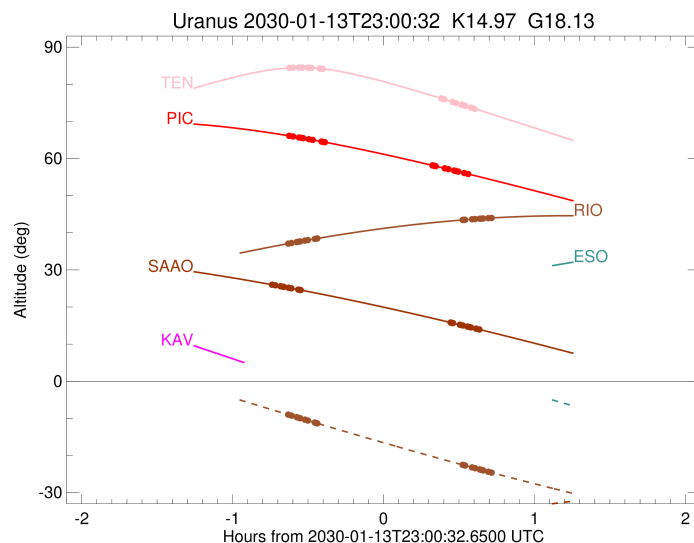
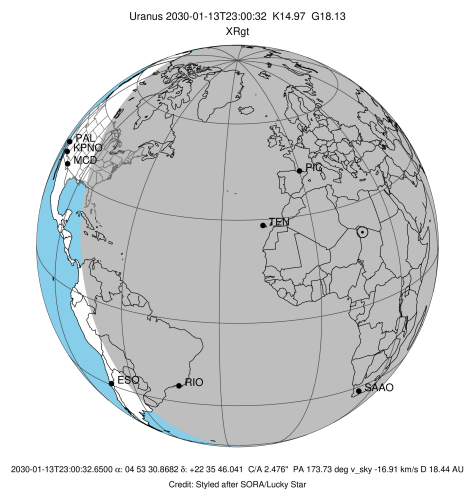
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-01-13T22:22:20.070		37.04	-8.92	51454.78	-14.33		
lambda	I	2030-01-13T22:24:00.745		37.25	-9.26	50026.71	-14.09		
delta	I	2030-01-13T22:26:04.442		37.50	-9.68	48300.35	-13.82		
gamma	I	2030-01-13T22:26:53.526		37.60	-9.85	47624.63	-13.71		
eta	I	2030-01-13T22:27:26.335		37.67	-9.96	47176.12	-13.63		
beta	I	2030-01-13T22:29:17.364		37.89	-10.33	45678.23	-13.35		
alpha	I	2030-01-13T22:30:32.427		38.04	-10.59	44684.65	-13.14		
4	I	2030-01-13T22:33:12.906		38.35	-11.13	42614.72	-12.66		
5	I	2030-01-13T22:33:37.406		38.40	-11.21	42298.50	-12.58		
6	I	2030-01-13T22:34:13.067		38.47	-11.33	41861.92	-12.46		

No planet occultations

6	E	2030-01-13T23:32:02.194		43.45	-22.52	41871.04	12.48		
5	E	2030-01-13T23:32:34.710		43.48	-22.62	42280.69	12.60		
4	E	2030-01-13T23:32:58.639		43.50	-22.69	42581.21	12.68		
alpha	E	2030-01-13T23:35:44.477		43.64	-23.20	44725.14	13.17		
beta	E	2030-01-13T23:36:53.966		43.70	-23.41	45647.60	13.37		
eta	E	2030-01-13T23:38:47.070		43.79	-23.75	47176.12	13.66		
gamma	E	2030-01-13T23:39:19.614		43.81	-23.85	47621.78	13.73		
delta	E	2030-01-13T23:40:08.819		43.85	-24.00	48300.35	13.85		
lambda	E	2030-01-13T23:42:12.287		43.94	-24.37	50026.71	14.11		
epsilon	E	2030-01-13T23:43:40.954		44.00	-24.64	51285.87	14.36		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2030-01-13T22:57:11.030
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      : 3413219070002139648
2Mass ID (if available) : 04533087+2235460
ICRS Star Coord at Epoch: 04h 53m 30.86820s +22:35:46.04136s
RUWE (>1.4 is poor) : 1.04
K magnitude         : 14.973
G magnitude         : 18.130
RP magnitude        : 17.197
BP magnitude        : 18.998
DUPflag            : 0
Distance (au)       : 18.440
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -16.91
Sun-Target sep (deg) : 141.29
Sun-Moon sep (deg)  : 26.42
B (ring opening deg) : 81.70
PA of pole (deg)    : -27.29
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.098
C/A sky separation (km) : 28053.4
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
ural11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.ural11.bsp
ural161.bsp
vgr2.ural161.bsp
peph.ural160.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	2030-01-13T22:15:54.635		26.05	-35.99	51447.15	-14.48		
lambda	I	2030-01-13T22:17:33.717		25.85	-36.04	50026.71	-14.24		
delta	I	2030-01-13T22:19:35.975		25.59	-36.09	48300.35	-13.99		
gamma	I	2030-01-13T22:20:24.432		25.49	-36.12	47624.79	-13.89		
eta	I	2030-01-13T22:20:56.823		25.43	-36.13	47176.12	-13.81		
beta	I	2030-01-13T22:22:46.273		25.19	-36.18	45678.55	-13.55		
alpha	I	2030-01-13T22:24:00.209		25.04	-36.21	44684.62	-13.36		
4	I	2030-01-13T22:26:37.915		24.70	-36.26	42614.25	-12.90		
5	I	2030-01-13T22:27:02.039		24.64	-36.27	42296.75	-12.84		
6	I	2030-01-13T22:27:36.945		24.57	-36.28	41860.68	-12.72		

No planet occultations

6	E	2030-01-13T23:27:13.650		15.82	-35.55	41870.63	12.66		
5	E	2030-01-13T23:27:45.668		15.74	-35.52	42279.67	12.77		
4	E	2030-01-13T23:28:09.308		15.67	-35.51	42580.55	12.84		
alpha	E	2030-01-13T23:30:53.429		15.23	-35.38	44725.58	13.29		
beta	E	2030-01-13T23:32:02.294		15.04	-35.33	45647.42	13.47		
eta	E	2030-01-13T23:33:54.659		14.74	-35.23	47176.12	13.73		
gamma	E	2030-01-13T23:34:27.029		14.65	-35.21	47621.81	13.80		
delta	E	2030-01-13T23:35:15.996		14.52	-35.16	48300.35	13.91		
lambda	E	2030-01-13T23:37:19.026		14.18	-35.06	50026.71	14.15		
epsilon	E	2030-01-13T23:38:47.272		13.93	-34.98	51282.61	14.38		