

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-03-12T20:13:17.460
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 49393670092704896
 2Mass ID (if available) : 04160521+2113206

ICRS Star Coord at Epoch: 04h 16m 05.20400s +21:13:20.56629s

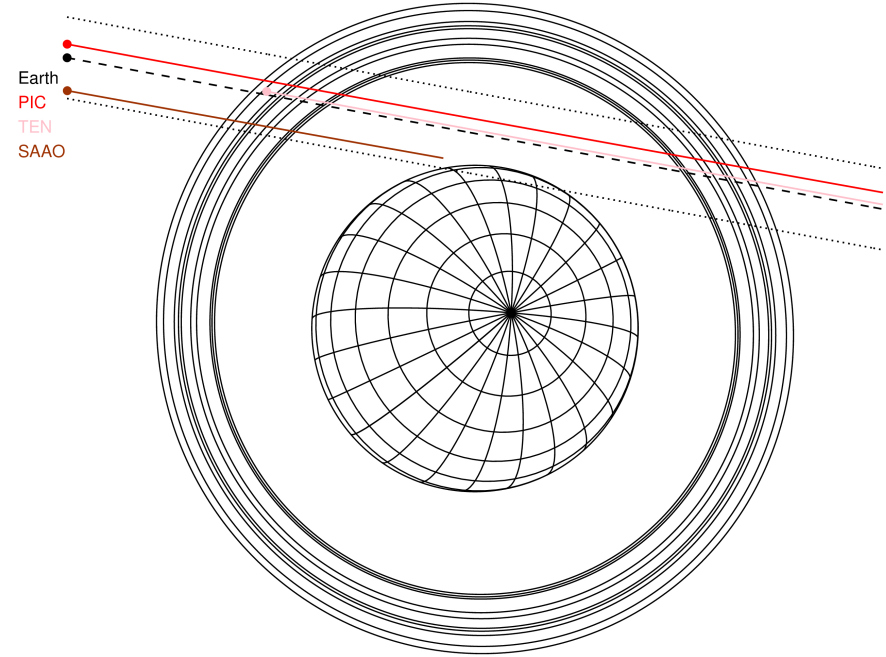
RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.879
 G magnitude : 17.793
 RP magnitude : 16.922
 BP magnitude : 18.604
 DUPflag : 0
 Distance (au) : 19.602
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 14.77
 Sun-Target sep (deg) : 73.51
 Sun-Moon sep (deg) : 131.51
 B (ring opening deg) : 76.01
 PA of pole (deg) : -66.60

#	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



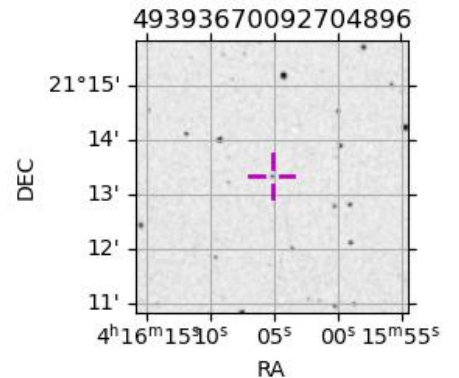
2028-03-12T20:13:17.4600 ex: 04 16 05.2040 s: +21 13 20.566 C/A 2.116° PA 169.49 deg v_sky +14.77 km/s D 19.60 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2028-03-12T20:13:17 K14.88 G17.79 XRgt

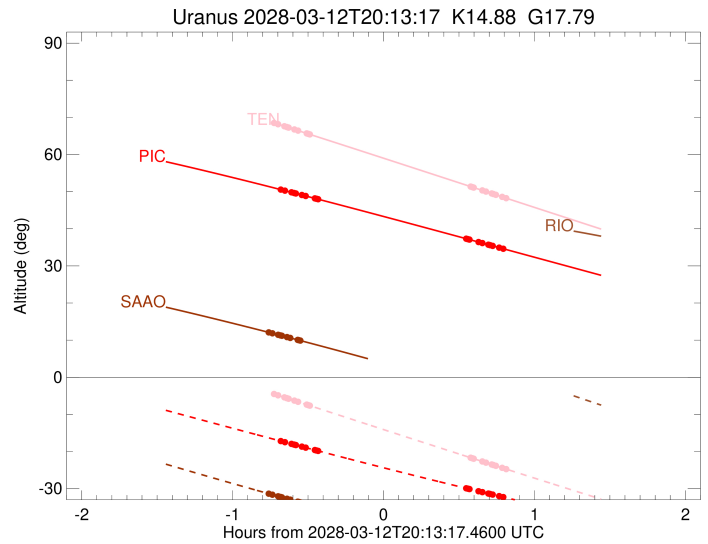
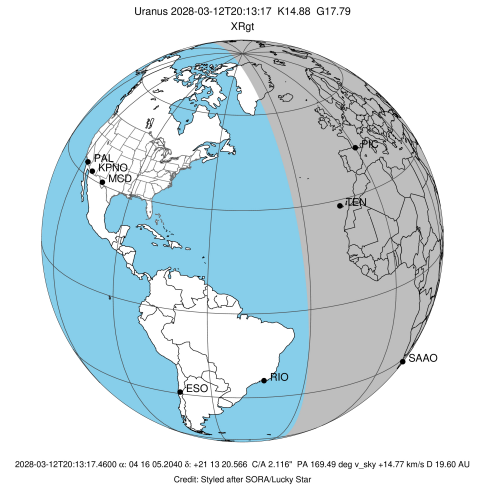


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	MAR 12 19:32 - MAR 12 21:00	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	+++++		+++++	MAR 12 19:33 - MAR 12 21:01	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					PnnRnn
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++			MAR 12 19:27 - MAR 12 19:40	PnnRin
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-03-12T20:17:47.800
 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 : 49393670092704896
 2Mass ID (if available) : 04160521+2113206
 ICRS Star Coord at Epoch: 04h 16m 05.20400s +21:13:20.56629s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.879
 G magnitude : 17.793
 RP magnitude : 16.922
 BP magnitude : 18.604
 DUPflag : 0
 Distance (au) : 19.602
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 14.77
 Sun-Target sep (deg) : 73.51
 Sun-Moon sep (deg) : 132.42
 B (ring opening deg) : 76.01
 PA of pole (deg) : -66.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.271
 C/A sky separation (km) : 32290.7
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

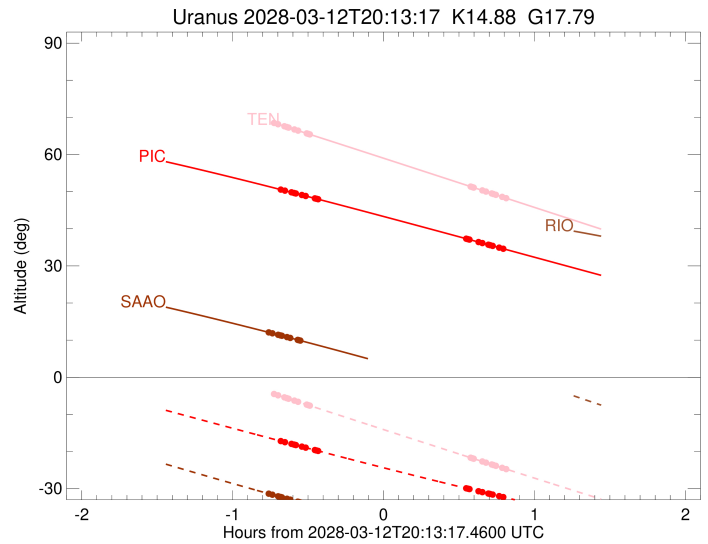
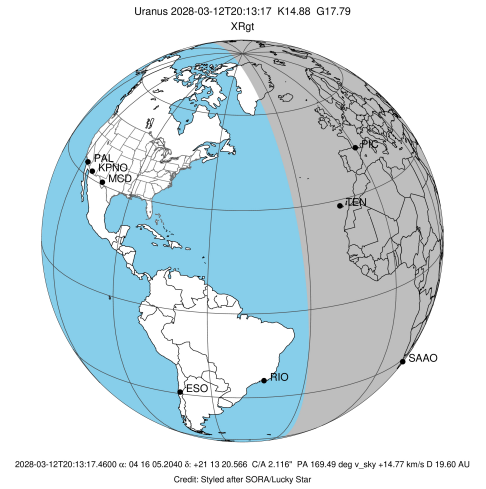


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-03-12T19:32:35.201		50.53	-17.21	51079.01	-11.32		
lambda	I	2028-03-12T19:34:08.260		50.27	-17.49	50026.71	-11.22		
delta	I	2028-03-12T19:36:44.142		49.81	-17.95	48300.35	-10.92		
gamma	I	2028-03-12T19:37:45.966		49.64	-18.14	47629.18	-10.79		
eta	I	2028-03-12T19:38:28.130		49.51	-18.26	47176.12	-10.70		
beta	I	2028-03-12T19:40:50.712		49.10	-18.69	45673.88	-10.37		
alpha	I	2028-03-12T19:42:22.072		48.83	-18.96	44737.05	-10.13		
4	I	2028-03-12T19:45:57.663		48.20	-19.60	42614.82	-9.54		
5	I	2028-03-12T19:46:31.437		48.10	-19.69	42293.45	-9.45		
6	I	2028-03-12T19:47:19.845		47.96	-19.84	41840.32	-9.30		

No planet occultations

6	E	2028-03-12T20:46:11.773		37.32	-29.91	41879.33	9.35		
5	E	2028-03-12T20:46:58.480		37.18	-30.03	42299.86	9.50		
4	E	2028-03-12T20:47:28.299		37.09	-30.12	42590.89	9.60		
alpha	E	2028-03-12T20:50:59.987		36.44	-30.69	44691.34	10.20		
beta	E	2028-03-12T20:52:35.821		36.15	-30.95	45676.90	10.45		
eta	E	2028-03-12T20:54:57.001		35.72	-31.33	47176.12	10.78		
gamma	E	2028-03-12T20:55:38.158		35.59	-31.44	47621.65	10.87		
delta	E	2028-03-12T20:56:40.203		35.40	-31.60	48300.35	11.01		
lambda	E	2028-03-12T20:59:14.842		34.92	-32.01	50026.71	11.32		
epsilon	E	2028-03-12T21:00:19.944		34.73	-32.18	50767.46	11.41		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-03-12T20:16:59.040
 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 : 49393670092704896
 2Mass ID (if available) : 04160521+2113206
 ICRS Star Coord at Epoch: 04h 16m 05.20400s +21:13:20.56629s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.879
 G magnitude : 17.793
 RP magnitude : 16.922
 BP magnitude : 18.604
 DUPflag : 0
 Distance (au) : 19.602
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 14.77
 Sun-Target sep (deg) : 73.51
 Sun-Moon sep (deg) : 132.48
 B (ring opening deg) : 76.01
 PA of pole (deg) : -66.60
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.149
 C/A sky separation (km) : 30557.1
 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



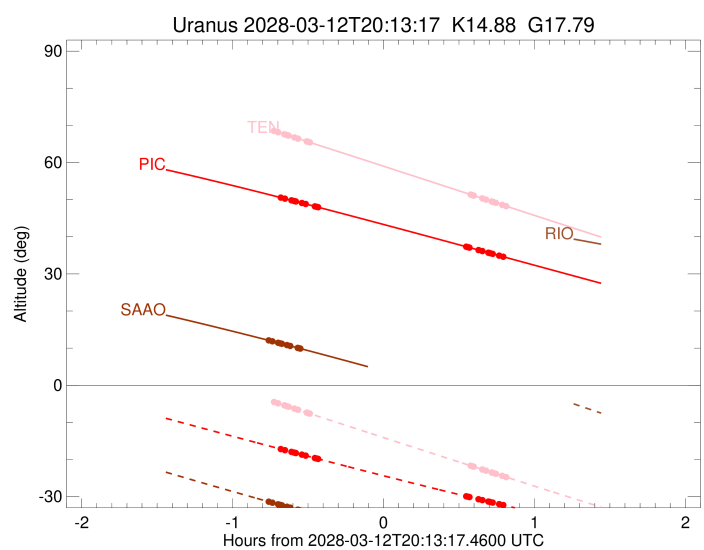
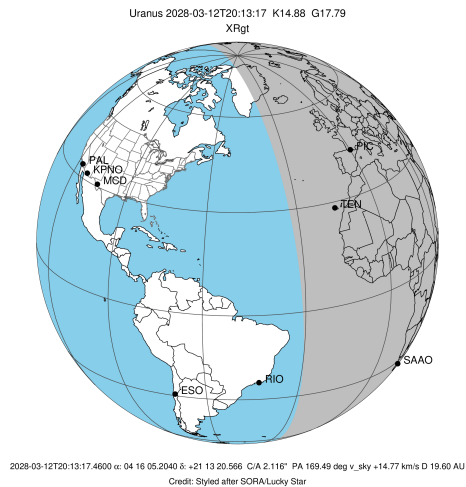
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-03-12T19:29:52.282		68.49	-4.53x	51095.54	-11.63		
lambda	I	2028-03-12T19:31:24.173		68.16	-4.86x	50026.71	-11.56		
delta	I	2028-03-12T19:33:55.201		67.61	-5.42	48300.35	-11.30		
gamma	I	2028-03-12T19:34:54.874		67.40	-5.64	47629.38	-11.19		
eta	I	2028-03-12T19:35:35.527		67.25	-5.79	47176.12	-11.11		
beta	I	2028-03-12T19:37:52.519		66.76	-6.29	45673.07	-10.83		
alpha	I	2028-03-12T19:39:19.592		66.44	-6.61	44738.53	-10.63		
4	I	2028-03-12T19:42:44.096		65.71	-7.36	42614.01	-10.14		
5	I	2028-03-12T19:43:16.049		65.59	-7.48	42290.05	-10.06		
6	I	2028-03-12T19:44:01.358		65.43	-7.65	41837.71	-9.93		

No planet occultations

6	E	2028-03-12T20:47:57.814		51.36	-21.68	41879.63	9.99		
5	E	2028-03-12T20:48:41.315		51.20	-21.84	42296.67	10.12		
4	E	2028-03-12T20:49:09.341		51.10	-21.94	42588.25	10.20		
alpha	E	2028-03-12T20:52:30.104		50.36	-22.67	44690.22	10.70		
beta	E	2028-03-12T20:54:01.734		50.02	-23.00	45676.19	10.91		
eta	E	2028-03-12T20:56:17.435		49.52	-23.49	47176.12	11.19		
gamma	E	2028-03-12T20:56:57.108		49.37	-23.63	47621.52	11.27		
delta	E	2028-03-12T20:57:57.056		49.15	-23.85	48300.35	11.38		
lambda	E	2028-03-12T21:00:26.967		48.60	-24.39	50026.71	11.65		
epsilon	E	2028-03-12T21:01:30.853		48.37	-24.62	50774.17	11.73		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2028-03-12T20:17:59.810
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      : 49393670092704896
2Mass ID (if available) : 04160521+2113206
ICRS Star Coord at Epoch: 04h 16m 05.20400s +21:13:20.56629s
RUWE (>1.4 is poor) : 1.01
K magnitude         : 14.879
G magnitude         : 17.793
RP magnitude        : 16.922
BP magnitude        : 18.604
DUPflag            : 0
Distance (au)       : 19.602
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : 14.77
Sun-Target sep (deg) : 73.51
Sun-Moon sep (deg)  : 132.07
B (ring opening deg) : 76.01
PA of pole (deg)    : -66.60
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.786
C/A sky separation (km) : 25396.8
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_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	2028-03-12T19:27:41.443		12.09	-31.37	51147.97	-12.79		
lambda	I	2028-03-12T19:29:09.055		11.83	-31.64	50026.71	-12.75		
delta	I	2028-03-12T19:31:25.317		11.44	-32.07	48300.35	-12.59		
gamma	I	2028-03-12T19:32:18.725		11.28	-32.24	47629.96	-12.52		
eta	I	2028-03-12T19:32:55.053		11.18	-32.35	47176.12	-12.47		
beta	I	2028-03-12T19:34:56.648		10.82	-32.73	45670.49	-12.30		
alpha	I	2028-03-12T19:36:12.522		10.60	-32.96	44742.57	-12.17		
4	I	2028-03-12T19:39:09.838		10.07	-33.51	42610.84	-11.88		
5	I	2028-03-12T19:39:37.556		9.99	-33.60	42279.20	-11.83		
6	I	2028-03-12T19:40:15.781		9.88	-33.71	41830.26	-11.76		

No planet occultations

6	E	2028-03-12T20:54:01.405	-3.95x	-46.00	41879.58	11.87
5	E	2028-03-12T20:54:37.435	-4.07x	-46.08	42287.66	11.95
4	E	2028-03-12T20:55:01.268	-4.14x	-46.14	42581.41	12.00
alpha	E	2028-03-12T20:57:54.349	-4.71x	-46.55	44687.81	12.30
beta	E	2028-03-12T20:59:14.411	-4.97x	-46.73	45674.19	12.43
eta	E	2028-03-12T21:01:14.287	-5.37x	-47.01	47176.12	12.61
gamma	E	2028-03-12T21:01:49.511	-5.48x	-47.09	47621.25	12.66
delta	E	2028-03-12T21:02:42.985	-5.66x	-47.21	48300.35	12.74
lambda	E	2028-03-12T21:04:57.607	-6.10x	-47.51	50026.71	12.91
epsilon	E	2028-03-12T21:05:56.953	-6.29x	-47.65	50794.90	12.95