

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-10-15T04:20:20.490
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 144669483673478144
 2Mass ID (if available) : 04300406+2143591

ICRS Star Coord at Epoch: 04h 30m 04.07059s +21:43:59.11193s

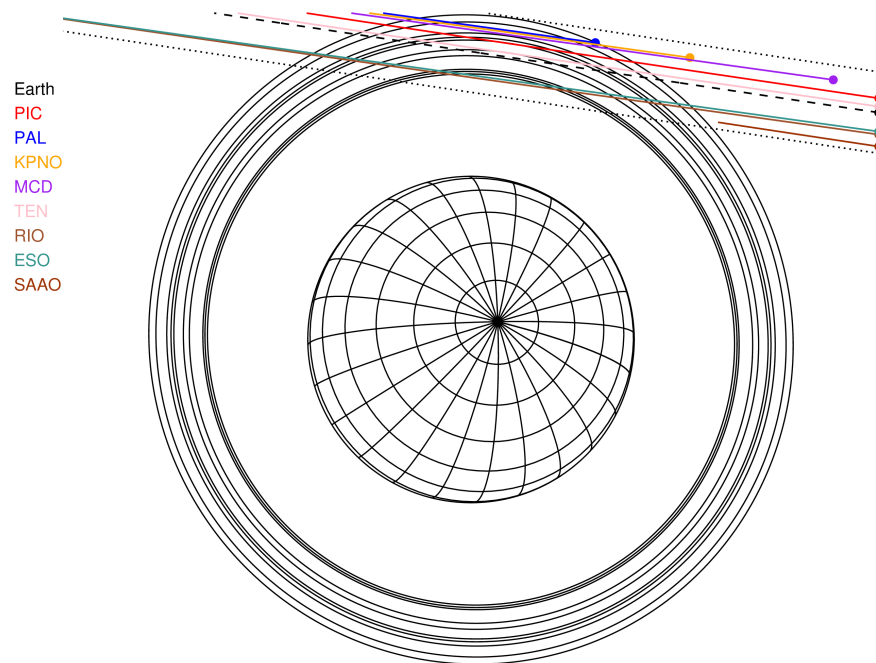
RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.306
 G magnitude : 16.800
 RP magnitude : 16.031
 BP magnitude : 17.426
 DUPflag : 0
 Distance (au) : 18.690
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.60
 Sun-Target sep (deg) : 132.01
 Sun-Moon sep (deg) : 52.82
 B (ring opening deg) : 78.63
 PA of pole (deg) : -56.42

#	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



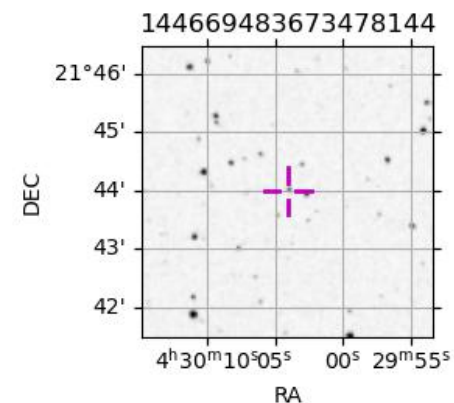
2027-10-15T04:20:20.4900 cc: 04 30 04.0706 s: +21 43 59.112 C/A 3.294" PA 171.49 deg v_sky -13.60 km/s D 18.69 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2027-10-15T04:20:20 K14.31 G16.80 XRgt



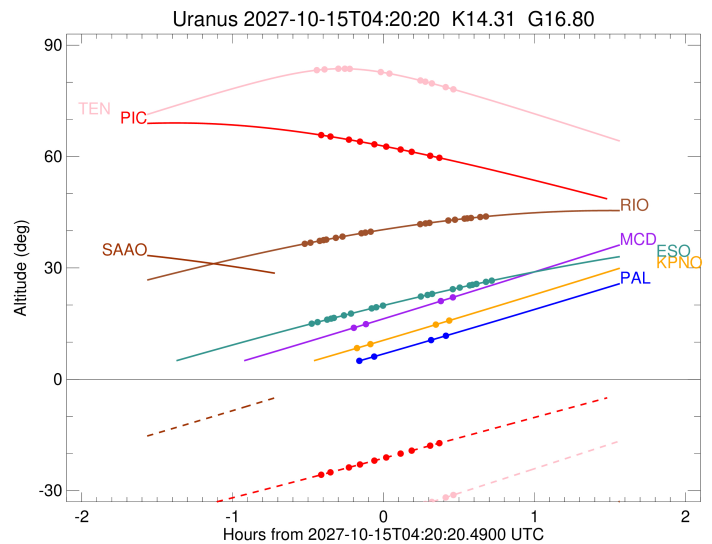
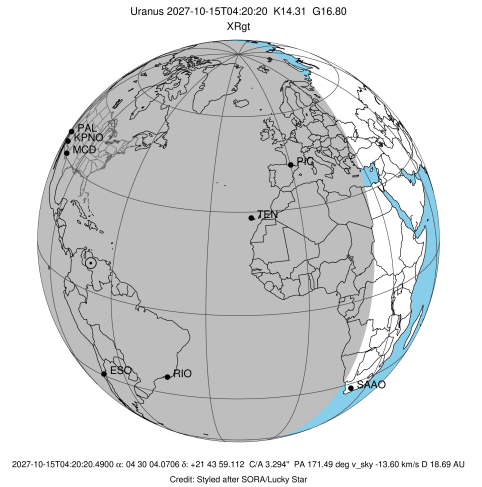
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	OCT 15 03:54 - OCT 15 04:42	PnnRie
PAL	Palomar Mt (200")	33.4	243.1	+		++	OCT 15 04:16 - OCT 15 04:45	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	++		++	OCT 15 04:08 - OCT 15 04:46	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	++		++	OCT 15 04:07 - OCT 15 04:48	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++		+++++	OCT 15 03:52 - OCT 15 04:48	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	+++++		+++++	OCT 15 03:48 - OCT 15 05:01	PnnRie
ESO	European Southern Obs	-29.3	289.3	+++++		+++++	OCT 15 03:51 - OCT 15 05:03	PnnRie
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            : 2027-10-15T04:17:58.390
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       : 144669483673478144
2Mass ID (if available) : 04300406+2143591
ICRS Star Coord at Epoch: 04h 30m 04.07059s +21:43:59.11193s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.306
G magnitude           : 16.800
RP magnitude          : 16.031
BP magnitude          : 17.426
DUPflag              : 0
Distance (au)        : 18.690
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -13.60
Sun-Target sep (deg) : 132.01
Sun-Moon sep (deg)   : 53.64
B (ring opening deg) : 78.63
PA of pole (deg)     : -56.42
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.447
C/A sky separation (km) : 46721.1
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_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```

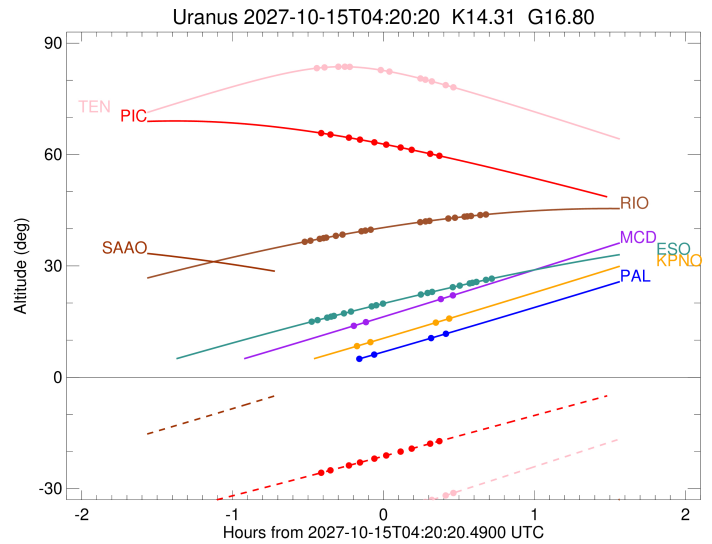
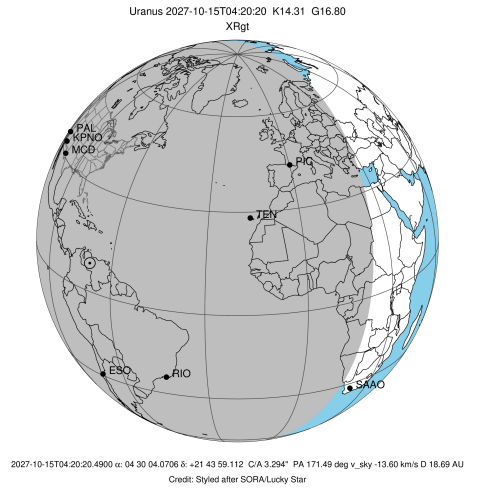


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-10-15T03:54:35.196		65.88	-25.91	51496.45	-5.62		
lambda	I	2027-10-15T03:59:17.991		65.38	-25.06	50026.71	-4.71		
delta	I	2027-10-15T04:06:40.673		64.53	-23.74	48300.35	-3.06		
gamma	I	2027-10-15T04:11:09.673		63.99	-22.93	47621.62	-1.98		
eta	I	2027-10-15T04:17:11.852		63.23	-21.84	47176.14	-0.47		

No planet occultations

eta	E	2027-10-15T04:20:56.603		62.73	-21.16	47176.14	0.47		
gamma	E	2027-10-15T04:26:58.559		61.91	-20.06	47621.09	1.98		
delta	E	2027-10-15T04:31:27.899		61.28	-19.24	48300.35	3.06		
lambda	E	2027-10-15T04:38:50.766		60.21	-17.90	50026.71	4.71		
epsilon	E	2027-10-15T04:42:46.603		59.63	-17.18	51233.10	5.61		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-10-15T04:26:47.380
 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 : 144669483673478144
 2Mass ID (if available) : 04300406+2143591
 ICRS Star Coord at Epoch: 04h 30m 04.07059s +21:43:59.11193s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.306
 G magnitude : 16.800
 RP magnitude : 16.031
 BP magnitude : 17.426
 DUPflag : 0
 Distance (au) : 18.690
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.60
 Sun-Target sep (deg) : 132.01
 Sun-Moon sep (deg) : 52.45
 B (ring opening deg) : 78.63
 PA of pole (deg) : -56.42
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.595
 C/A sky separation (km) : 48733.5
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

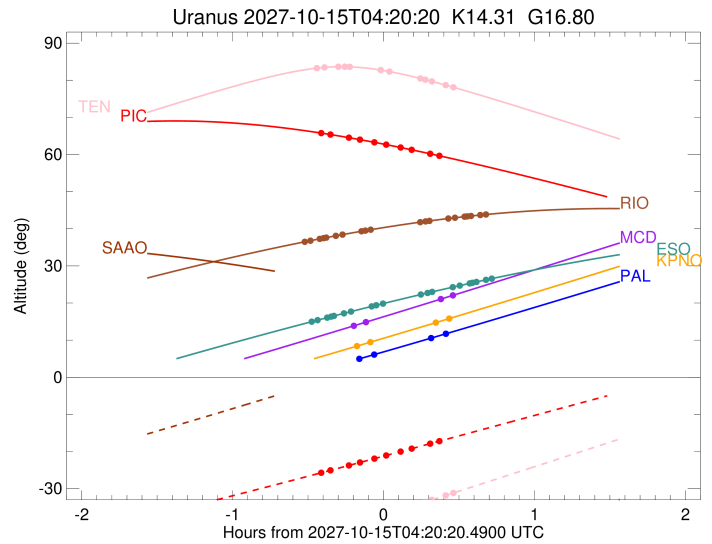
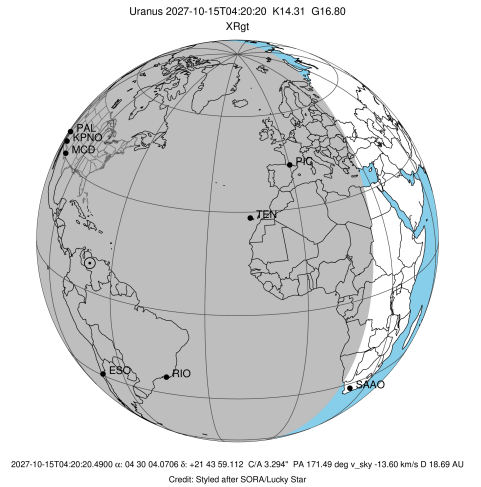


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-10-15T04:09:26.269		4.71x	-36.97	51467.83	-3.97		
lambda	I	2027-10-15T04:16:44.287		6.13	-38.43	50026.71	-2.52		

No planet occultations

lambda	E	2027-10-15T04:39:10.580		10.53	-42.87	50026.71	2.53		
epsilon	E	2027-10-15T04:45:37.924		11.81	-44.12	51273.92	3.99		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-10-15T04:26:59.710
 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 : 144669483673478144
 2Mass ID (if available) : 04300406+2143591
 ICRS Star Coord at Epoch: 04h 30m 04.07059s +21:43:59.11193s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.306
 G magnitude : 16.800
 RP magnitude : 16.031
 BP magnitude : 17.426
 DUPflag : 0
 Distance (au) : 18.690
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.60
 Sun-Target sep (deg) : 132.01
 Sun-Moon sep (deg) : 52.48
 B (ring opening deg) : 78.63
 PA of pole (deg) : -56.42
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.574
 C/A sky separation (km) : 48447.1
 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



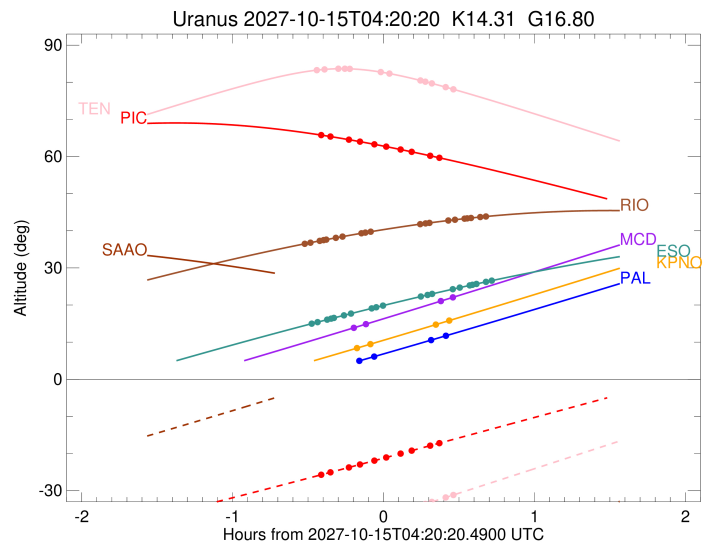
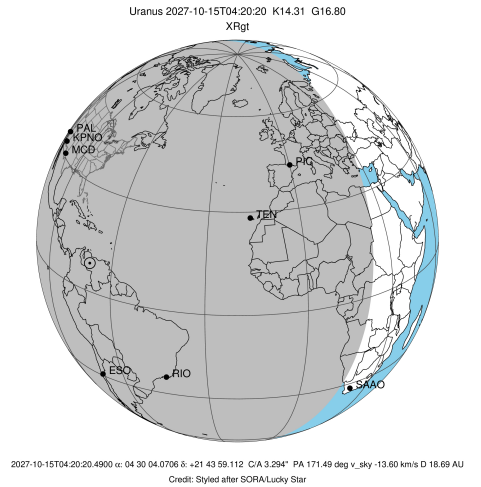
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-10-15T04:08:33.839		8.15	-41.44	51472.37	-4.23		
lambda	I	2027-10-15T04:15:13.729		9.48	-42.78	50026.71	-2.92		

No planet occultations

lambda	E	2027-10-15T04:41:04.182		14.71	-47.86	50026.71	2.93		
epsilon	E	2027-10-15T04:46:53.501		15.90	-48.97	51266.42	4.25		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2027-10-15T04:27:06.740
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      : 144669483673478144
2Mass ID (if available) : 04300406+2143591
ICRS Star Coord at Epoch: 04h 30m 04.07059s +21:43:59.11193s
RUWE (>1.4 is poor) : 0.99
K magnitude         : 14.306
G magnitude         : 16.800
RP magnitude        : 16.031
BP magnitude        : 17.426
DUPflag            : 0
Distance (au)       : 18.690
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -13.60
Sun-Target sep (deg) : 132.01
Sun-Moon sep (deg)  : 52.55
B (ring opening deg) : 78.63
PA of pole (deg)    : -56.42
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 3.546
C/A sky separation (km) : 48070.2
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
  
```

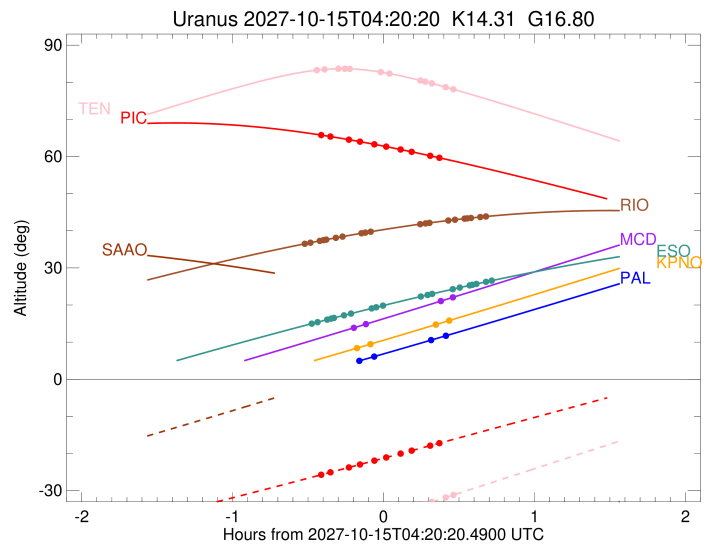
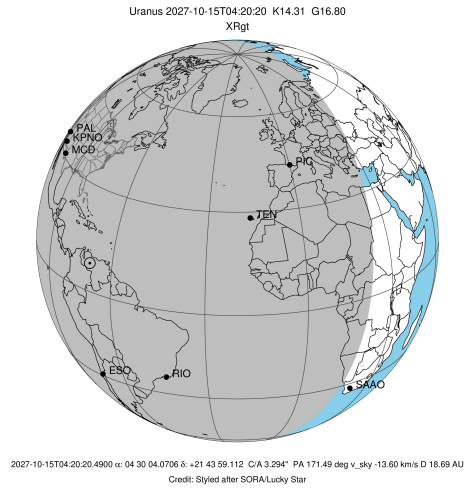


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-10-15T04:07:22.809		13.62	-47.72	51477.85	-4.55		
lambda	I	2027-10-15T04:13:25.543		14.86	-48.92	50026.71	-3.37		

No planet occultations

lambda	E	2027-10-15T04:43:04.227		21.04	-54.54	50026.71	3.39		
epsilon	E	2027-10-15T04:48:16.590		22.14	-55.48	51257.17	4.58		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-10-15T04:19:55.720
 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 : 144669483673478144
 2Mass ID (if available) : 04300406+2143591
 ICRS Star Coord at Epoch: 04h 30m 04.07059s +21:43:59.11193s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.306
 G magnitude : 16.800
 RP magnitude : 16.031
 BP magnitude : 17.426
 DUPflag : 0
 Distance (au) : 18.690
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.60
 Sun-Target sep (deg) : 132.01
 Sun-Moon sep (deg) : 53.60
 B (ring opening deg) : 78.63
 PA of pole (deg) : -56.42
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.337
 C/A sky separation (km) : 45240.5
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

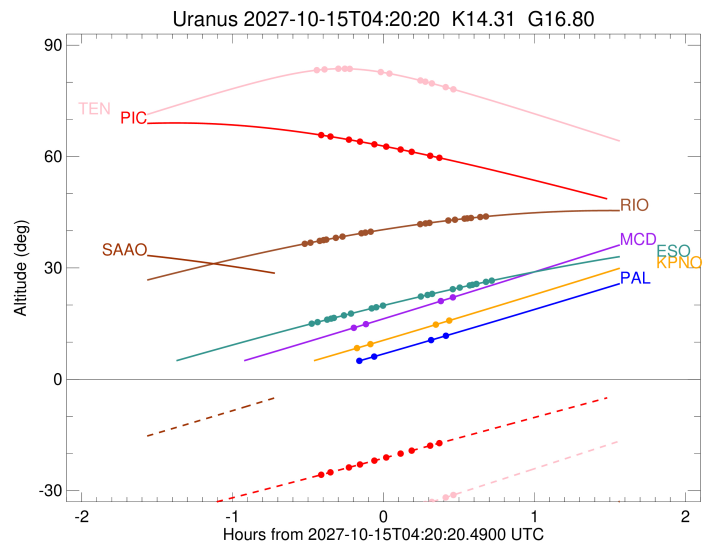
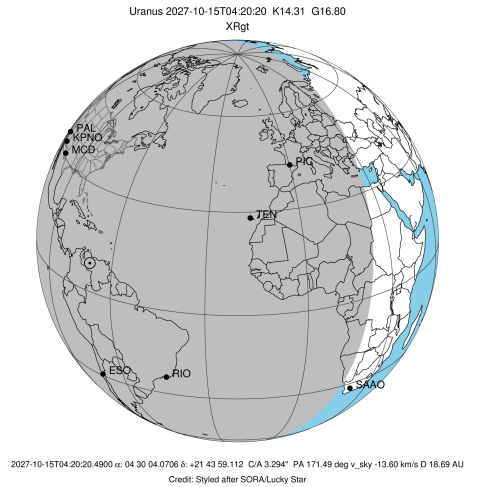


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-10-15T03:52:56.858		83.20	-43.08	51509.32	-6.52		
lambda	I	2027-10-15T03:56:56.593		83.47	-42.23	50026.71	-5.79		
delta	I	2027-10-15T04:02:27.213		83.65	-41.06	48300.35	-4.63		
gamma	I	2027-10-15T04:05:03.780		83.66	-40.50	47622.04	-4.03		
eta	I	2027-10-15T04:07:01.021		83.62	-40.08	47176.12	-3.57		
beta	I	2027-10-15T04:19:25.195		82.74	-37.41	45673.81	-0.42		

No planet occultations

beta	E	2027-10-15T04:22:35.128		82.36	-36.73	45674.71	0.42		
eta	E	2027-10-15T04:34:57.065		80.51	-34.05	47176.12	3.57		
gamma	E	2027-10-15T04:36:53.983		80.17	-33.62	47620.97	4.03		
delta	E	2027-10-15T04:39:30.724		79.71	-33.05	48300.35	4.63		
lambda	E	2027-10-15T04:45:01.110		78.70	-31.85	50026.71	5.80		
epsilon	E	2027-10-15T04:48:13.744		78.09	-31.15	51204.69	6.52		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-10-15T04:24:09.040
 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 : 144669483673478144
 2Mass ID (if available) : 04300406+2143591
 ICRS Star Coord at Epoch: 04h 30m 04.07059s +21:43:59.11193s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.306
 G magnitude : 16.800
 RP magnitude : 16.031
 BP magnitude : 17.426
 DUPflag : 0
 Distance (au) : 18.690
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.60
 Sun-Target sep (deg) : 132.01
 Sun-Moon sep (deg) : 53.09
 B (ring opening deg) : 78.63
 PA of pole (deg) : -56.42
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.998
 C/A sky separation (km) : 40640.0
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

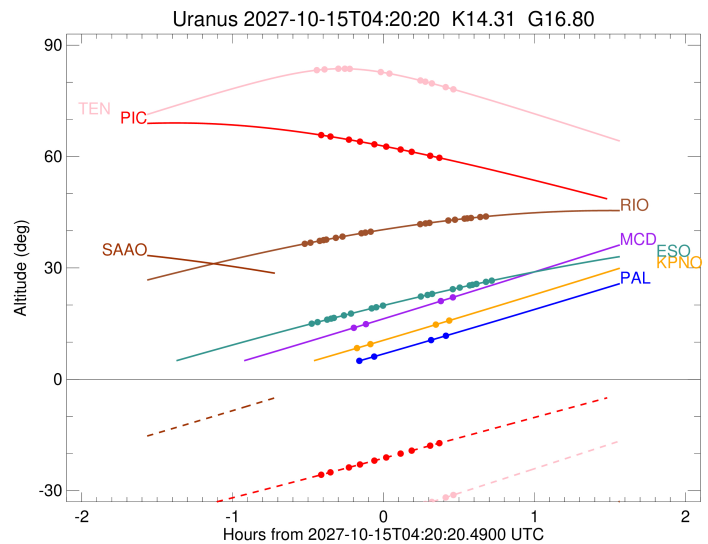
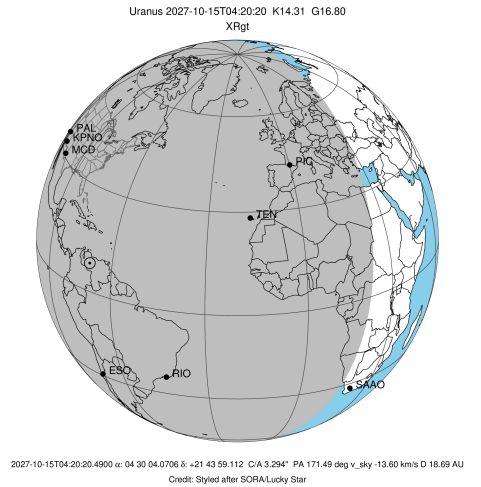


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-10-15T03:48:18.606		36.39	-54.49	51535.31	-8.52		
lambda	I	2027-10-15T03:51:19.911		36.80	-54.13	50026.71	-8.09		
delta	I	2027-10-15T03:55:01.822		37.29	-53.67	48300.35	-7.46		
gamma	I	2027-10-15T03:56:34.336		37.49	-53.48	47622.92	-7.18		
eta	I	2027-10-15T03:57:37.421		37.62	-53.34	47176.12	-6.98		
beta	I	2027-10-15T04:01:25.874		38.10	-52.84	45666.34	-6.22		
alpha	I	2027-10-15T04:04:11.344		38.45	-52.47	44687.68	-5.62		
4	I	2027-10-15T04:11:26.888		39.31	-51.45	42615.86	-3.85		
5	I	2027-10-15T04:12:50.496		39.48	-51.25	42304.35	-3.46		
6	I	2027-10-15T04:15:23.586		39.77	-50.88	41837.27	-2.78		

No planet occultations

6	E	2027-10-15T04:34:42.766		41.76	-47.85	41820.95	2.78		
5	E	2027-10-15T04:37:11.780		41.99	-47.44	42276.93	3.47		
4	E	2027-10-15T04:38:43.619		42.13	-47.18	42613.45	3.86		
alpha	E	2027-10-15T04:46:02.300		42.76	-45.93	44707.65	5.64		
beta	E	2027-10-15T04:48:45.579		42.97	-45.46	45679.65	6.24		
eta	E	2027-10-15T04:52:31.106		43.26	-44.80	47176.12	7.01		
gamma	E	2027-10-15T04:53:33.663		43.34	-44.61	47621.04	7.21		
delta	E	2027-10-15T04:55:06.030		43.45	-44.34	48300.35	7.50		
lambda	E	2027-10-15T04:58:46.877		43.70	-43.68	50026.71	8.13		
epsilon	E	2027-10-15T05:01:00.200		43.84	-43.27	51133.89	8.57		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2027-10-15T04:26:42.210
 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 : 144669483673478144
 2Mass ID (if available) : 04300406+2143591
 ICRS Star Coord at Epoch: 04h 30m 04.07059s +21:43:59.11193s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.306
 G magnitude : 16.800
 RP magnitude : 16.031
 BP magnitude : 17.426
 DUPflag : 0
 Distance (au) : 18.690
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -13.60
 Sun-Target sep (deg) : 132.01
 Sun-Moon sep (deg) : 52.68
 B (ring opening deg) : 78.63
 PA of pole (deg) : -56.42
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.025
 C/A sky separation (km) : 41001.2
 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_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	2027-10-15T03:51:03.385		14.84	-51.40	51533.51	-8.29		
lambda	I	2027-10-15T03:54:09.718		15.39	-51.57	50026.71	-7.85		
delta	I	2027-10-15T03:57:58.899		16.06	-51.76	48300.35	-7.21		
gamma	I	2027-10-15T03:59:34.818		16.34	-51.83	47622.85	-6.92		
eta	I	2027-10-15T04:00:40.360		16.53	-51.88	47176.12	-6.71		
beta	I	2027-10-15T04:04:39.030		17.22	-52.04	45666.74	-5.92		
alpha	I	2027-10-15T04:07:33.786		17.72	-52.14	44688.01	-5.29		
4	I	2027-10-15T04:15:30.161		19.07	-52.35	42616.11	-3.36		
5	I	2027-10-15T04:17:08.310		19.34	-52.38	42302.67	-2.91		
6	I	2027-10-15T04:20:20.563		19.88	-52.43	41835.02	-2.05		

No planet occultations

6	E	2027-10-15T04:34:54.275		22.24	-52.45	41822.85	2.05		
5	E	2027-10-15T04:38:02.205		22.74	-52.42	42279.31	2.92		
4	E	2027-10-15T04:39:48.577		23.02	-52.39	42613.93	3.37		
alpha	E	2027-10-15T04:47:47.433		24.25	-52.20	44707.07	5.32		
beta	E	2027-10-15T04:50:39.614		24.69	-52.11	45679.53	5.96		
eta	E	2027-10-15T04:54:34.783		25.28	-51.97	47176.12	6.76		
gamma	E	2027-10-15T04:55:39.628		25.44	-51.92	47621.03	6.96		
delta	E	2027-10-15T04:57:15.140		25.68	-51.86	48300.35	7.26		
lambda	E	2027-10-15T05:01:02.577		26.23	-51.68	50026.71	7.91		
epsilon	E	2027-10-15T05:03:19.816		26.56	-51.56	51137.51	8.36		