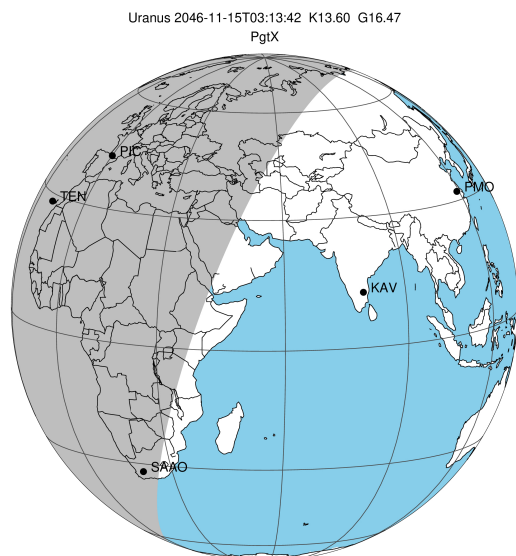


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-11-15T03:13:42.430
 Event type : PgtX
 : Uranus occs: geocentric, topocentric
 : No ring occs
 Gaia source ID : 3882208470565017728
 2Mass ID (if available) : 10300251+1013151

ICRS Star Coord at Epoch: 10h 30m 02.44370s +10:13:15.44979s

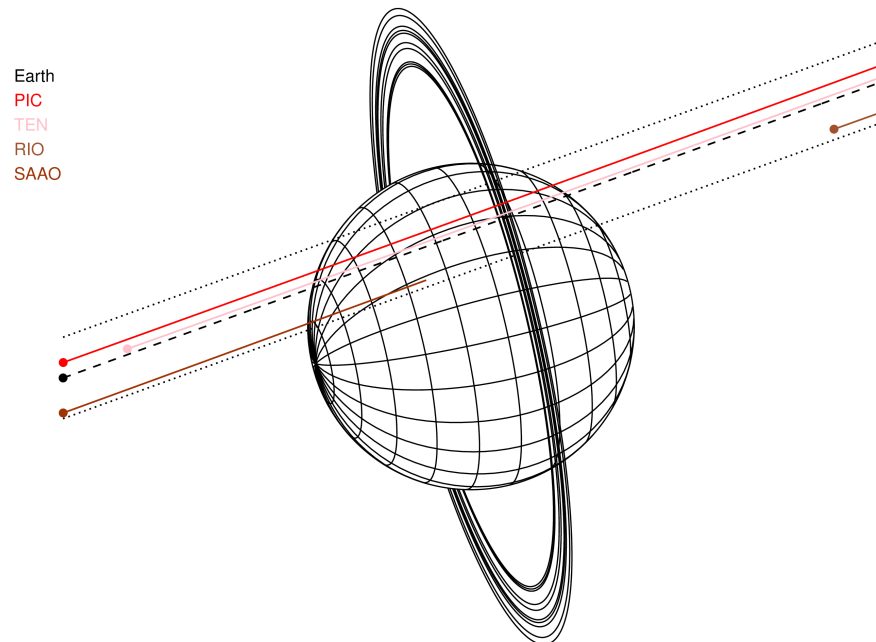
RUWE (>1.4 is poor) : 1.09
 K magnitude : 13.599
 G magnitude : 16.475
 RP magnitude : 15.550
 BP magnitude : 17.368
 DUPflag : 0
 Distance (au) : 18.519
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 13.59
 Sun-Target sep (deg) : 76.84
 Sun-Moon sep (deg) : 86.97
 B (ring opening deg) : 12.01
 PA of pole (deg) : 103.51

#	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



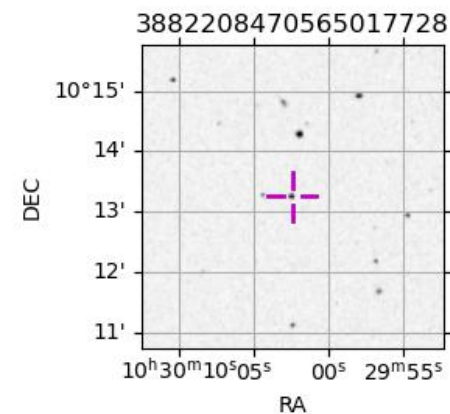
2046-11-15T03:13:42.4300 ex: 10 30 02.4437 8: +10 13 15.450 C/A 1.048° PA 199.88 deg v_sky +13.58 km/s D 18.52 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2046-11-15T03:13:42 K13.60 G16.47 PgtX

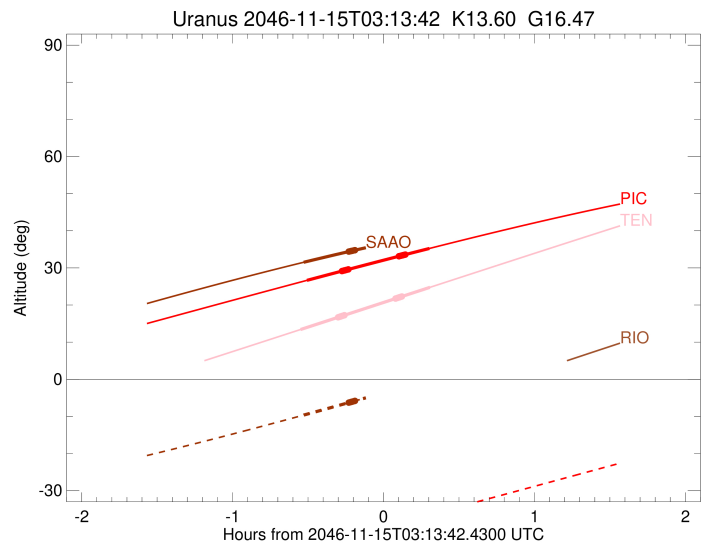
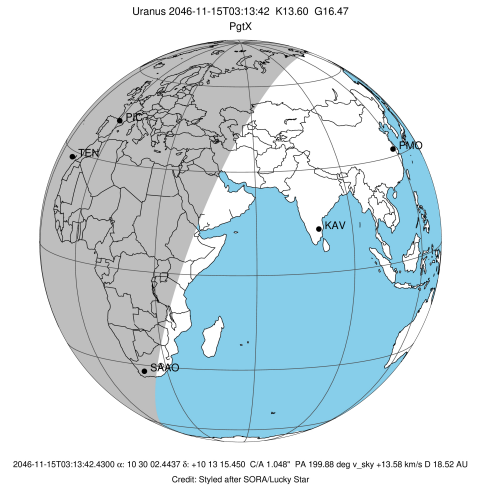


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1		+	+	NOV 15 02:43 - NOV 15 03:31	PieRnn
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		+	+	NOV 15 02:40 - NOV 15 03:32	PieRnn
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		+		NOV 15 02:41 - NOV 15 02:41	PinRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



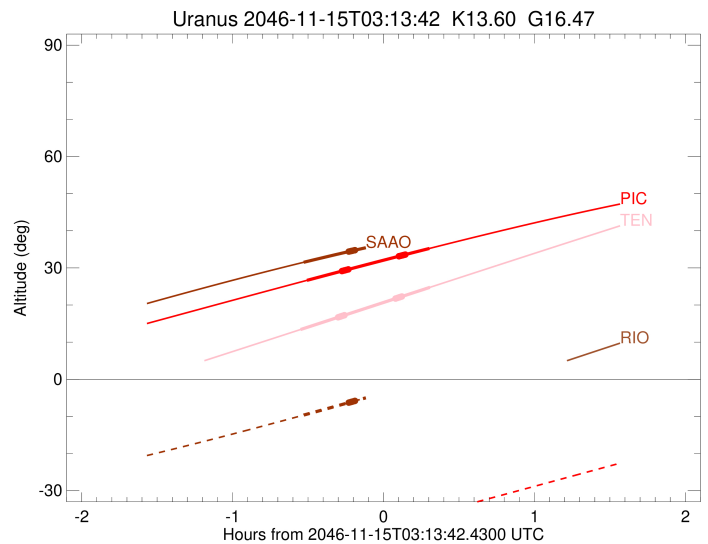
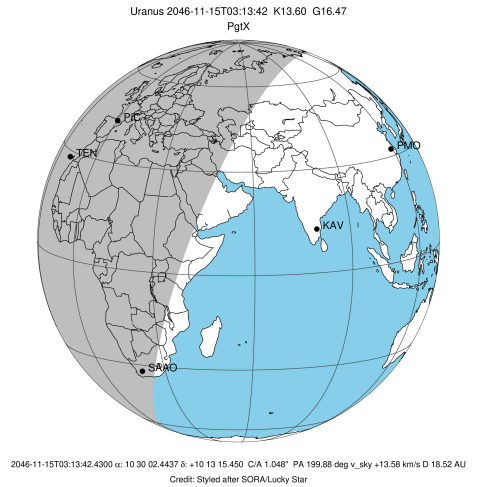
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-11-15T03:07:34.500
 Event type : PgtX
 : Uranus occs: geocentric, topocentric
 : No ring occs
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3882208470565017728
 2Mass ID (if available) : 10300251+1013151
 ICRS Star Coord at Epoch: 10h 30m 02.44370s +10:13:15.44979s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 13.599
 G magnitude : 16.475
 RP magnitude : 15.550
 BP magnitude : 17.368
 DUPflag : 0
 Distance (au) : 18.520
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 13.59
 Sun-Target sep (deg) : 76.84
 Sun-Moon sep (deg) : 87.42
 B (ring opening deg) : 12.01
 PA of pole (deg) : 103.51
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.221
 C/A sky separation (km) : 16398.9
 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	2046-11-15T02:57:05.983	b	29.13	-42.73	51531.11	-60.67		
lambda	I	2046-11-15T02:57:30.799	b	29.20	-42.65	50026.71	-60.51		
delta	I	2046-11-15T02:57:59.390	b	29.29	-42.57	48300.35	-60.24		
gamma	I	2046-11-15T02:58:10.607	b	29.32	-42.54	47625.23	-60.13		
eta	I	2046-11-15T02:58:18.080	b	29.34	-42.51	47176.12	-60.05		
beta	I	2046-11-15T02:58:43.599	b	29.42	-42.44	45658.16	-59.77		
alpha	I	2046-11-15T02:58:59.553	b	29.47	-42.39	44684.62	-59.58		
4	I	2046-11-15T02:59:34.774	b	29.57	-42.29	42605.87	-59.14		
5	I	2046-11-15T02:59:40.040	b	29.59	-42.27	42162.96	-58.72		
6	I	2046-11-15T02:59:43.778	b	29.60	-42.26	41879.38	-58.66		
Uranus	I	2046-11-15T02:43:15.351		26.64	-45.16	25541.55		54.63	55.85
Uranus	E	2046-11-15T03:31:58.099		35.24	-36.47	25547.06		-42.40	-43.72
6	E	2046-11-15T03:19:48.230	b	33.14	-38.67	41804.22	58.50		
5	E	2046-11-15T03:19:56.977	b	33.16	-38.64	42259.46	58.56		
4	E	2046-11-15T03:19:57.302	b	33.16	-38.64	42526.14	58.99		
alpha	E	2046-11-15T03:20:35.525	b	33.27	-38.53	44742.78	59.42		
beta	E	2046-11-15T03:20:51.257	b	33.32	-38.48	45649.93	59.60		
eta	E	2046-11-15T03:21:16.784	b	33.39	-38.40	47176.12	59.88		
gamma	E	2046-11-15T03:21:24.253	b	33.41	-38.38	47623.66	59.95		
delta	E	2046-11-15T03:21:35.530	b	33.45	-38.35	48300.35	60.06		
lambda	E	2046-11-15T03:22:04.208	b	33.53	-38.26	50026.71	60.33		
epsilon	E	2046-11-15T03:22:16.402	b	33.57	-38.22	50763.01	60.48		

```

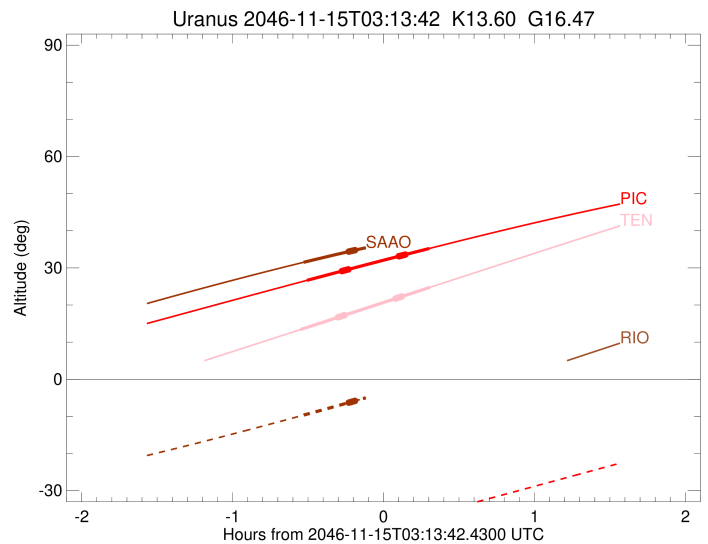
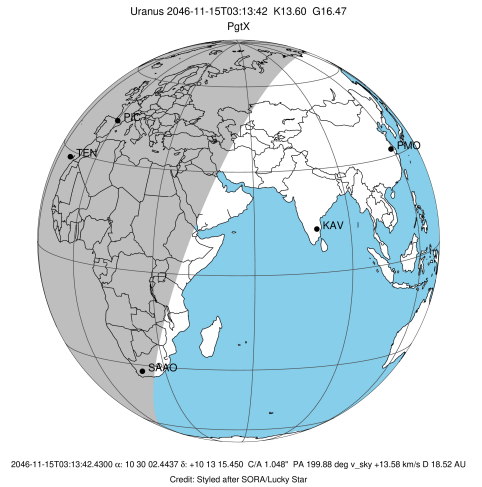
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2046-11-15T03:06:23.780
Event type          : PgtX
: Uranus occs: geocentric, topocentric
: No ring occs
Observer code       : TEN
Location            : Teide Obs./Tenerife
Latitude (deg)      : 28.30050
E. Longitude (deg)  : 343.48909
Altitude (km)       : 2.395
Gaia source ID      : 3882208470565017728
2Mass ID (if available) : 10300251+1013151
ICRS Star Coord at Epoch: 10h 30m 02.44370s +10:13:15.44979s
RUWE (>1.4 is poor) : 1.09
K magnitude         : 13.599
G magnitude         : 16.475
RP magnitude        : 15.550
BP magnitude        : 17.368
DUPflag            : 0
Distance (au)       : 18.520
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 13.59
Sun-Target sep (deg) : 76.84
Sun-Moon sep (deg)  : 87.25
B (ring opening deg) : 12.01
PA of pole (deg)    : 103.51
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.104
C/A sky separation (km) : 14831.8
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	2046-11-15T02:55:34.900	b	16.68	-59.79	51535.30	-61.63		
lambda	I	2046-11-15T02:55:59.393	b	16.77	-59.70	50026.71	-61.50		
delta	I	2046-11-15T02:56:27.511	b	16.87	-59.60	48300.35	-61.29		
gamma	I	2046-11-15T02:56:38.532	b	16.91	-59.56	47625.41	-61.19		
eta	I	2046-11-15T02:56:45.877	b	16.94	-59.54	47176.12	-61.13		
beta	I	2046-11-15T02:57:10.916	b	17.03	-59.45	45658.88	-60.90		
alpha	I	2046-11-15T02:57:26.615	b	17.09	-59.39	44684.66	-60.75		
4	I	2046-11-15T02:58:01.150	b	17.22	-59.27	42606.98	-60.41		
5	I	2046-11-15T02:58:06.120	b	17.23	-59.25	42164.42	-59.99		
6	I	2046-11-15T02:58:09.880	b	17.25	-59.24	41879.57	-59.95		
Uranus	I	2046-11-15T02:40:42.349		13.39	-62.98	25539.89		58.57	59.72
Uranus	E	2046-11-15T03:32:11.393		24.77	-51.82	25545.04		-46.81	-48.12
6	E	2046-11-15T03:18:28.010	b	21.73	-54.82	41803.14	59.74		
5	E	2046-11-15T03:18:36.564	b	21.77	-54.79	42262.57	59.79		
4	E	2046-11-15T03:18:36.799	b	21.77	-54.79	42526.01	60.20		
alpha	E	2046-11-15T03:19:14.295	b	21.90	-54.65	44743.68	60.54		
beta	E	2046-11-15T03:19:29.704	b	21.96	-54.60	45650.56	60.68		
eta	E	2046-11-15T03:19:54.789	b	22.05	-54.51	47176.12	60.90		
gamma	E	2046-11-15T03:20:02.137	b	22.08	-54.48	47623.83	60.96		
delta	E	2046-11-15T03:20:13.226	b	22.12	-54.44	48300.35	61.05		
lambda	E	2046-11-15T03:20:41.453	b	22.23	-54.34	50026.71	61.26		
epsilon	E	2046-11-15T03:20:53.400	b	22.27	-54.29	50759.11	61.39		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2046-11-15T03:11:48.370
Event type          : PgtX
: Uranus occs: geocentric, topocentric
: No ring occs
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      : 3882208470565017728
2Mass ID (if available) : 10300251+1013151
ICRS Star Coord at Epoch: 10h 30m 02.44370s +10:13:15.44979s
RUWE (>1.4 is poor) : 1.09
K magnitude         : 13.599
G magnitude         : 16.475
RP magnitude        : 15.550
BP magnitude        : 17.368
DUPflag            : 0
Distance (au)       : 18.520
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : 13.59
Sun-Target sep (deg) : 76.84
Sun-Moon sep (deg)  : 87.51
B (ring opening deg) : 12.01
PA of pole (deg)    : 103.51
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.687
C/A sky separation (km) : 9231.4
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	2046-11-15T02:59:49.879	b	34.38	-6.30	51547.17	-62.31		
lambda	I	2046-11-15T03:00:14.285	b	34.45	-6.23	50026.71	-62.27		
delta	I	2046-11-15T03:00:42.028	b	34.52	-6.14	48300.35	-62.19		
gamma	I	2046-11-15T03:00:52.873	b	34.55	-6.11	47626.06	-62.15		
eta	I	2046-11-15T03:01:00.114	b	34.56	-6.08	47176.12	-62.13		
beta	I	2046-11-15T03:01:24.650	b	34.63	-6.01	45661.47	-62.06		
alpha	I	2046-11-15T03:01:40.217	b	34.67	-5.96	44685.20	-62.01		
4	I	2046-11-15T03:02:14.067	b	34.76	-5.85	42610.51	-61.93		
5	I	2046-11-15T03:02:18.285	b	34.77	-5.84	42170.45	-61.56		
6	I	2046-11-15T03:02:22.363	b	34.78	-5.82	41879.69	-61.55		
Uranus	I	2046-11-15T02:41:57.383		31.51	-9.65	25535.47		71.22	72.00
Uranus	E	2046-11-15T03:41:44.490		40.33	1.82x	25539.39		-59.80	-60.92
6	E	2046-11-15T03:23:49.702	b	37.94	-1.70x	41799.96	61.43		
5	E	2046-11-15T03:23:57.930	b	37.96	-1.67x	42272.66	61.43		
4	E	2046-11-15T03:23:58.013	b	37.96	-1.67x	42526.08	61.80		
alpha	E	2046-11-15T03:24:34.613	b	38.04	-1.55x	44746.40	61.89		
beta	E	2046-11-15T03:24:49.569	b	38.08	-1.50x	45652.80	61.93		
eta	E	2046-11-15T03:25:14.178	b	38.14	-1.42x	47176.12	62.01		
gamma	E	2046-11-15T03:25:21.407	b	38.15	-1.40x	47624.42	62.03		
delta	E	2046-11-15T03:25:32.302	b	38.18	-1.36x	48300.35	62.06		
lambda	E	2046-11-15T03:26:00.103	b	38.24	-1.27x	50026.71	62.13		
epsilon	E	2046-11-15T03:26:11.727	b	38.27	-1.24x	50749.11	62.18		