

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-02-06T00:56:51.640
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3415398130250812800
 2Mass ID (if available) : 05101333+2302409

ICRS Star Coord at Epoch: 05h 10m 13.32866s +23:02:40.88249s

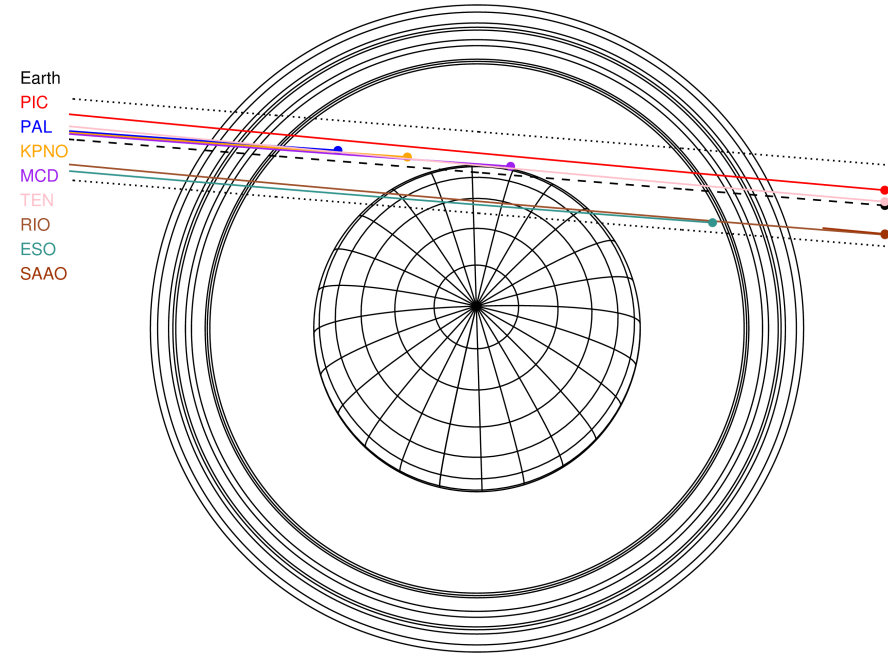
RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.507
 G magnitude : 16.097
 RP magnitude : 15.300
 BP magnitude : 16.766
 DUPflag : 0
 Distance (au) : 18.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.44
 Sun-Target sep (deg) : 121.97
 Sun-Moon sep (deg) : 41.38
 B (ring opening deg) : 82.13
 PA of pole (deg) : 1.72

#	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



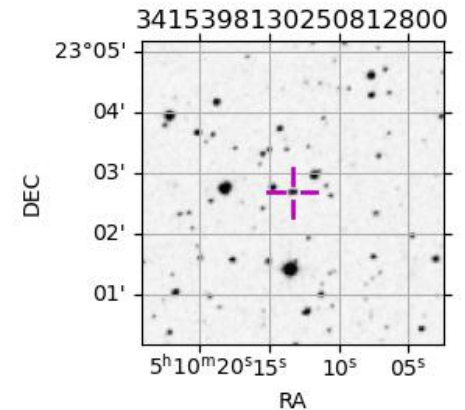
2031-02-06T00:56:51.6400 α: 05 10 13.3287 δ: +23 02 40.882 C/A 1.812" PA 175.36 deg v_sky - 9.44 km/s D 18.60 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2031-02-06T00:56:51 K13.51 G16.10 PgtRgt

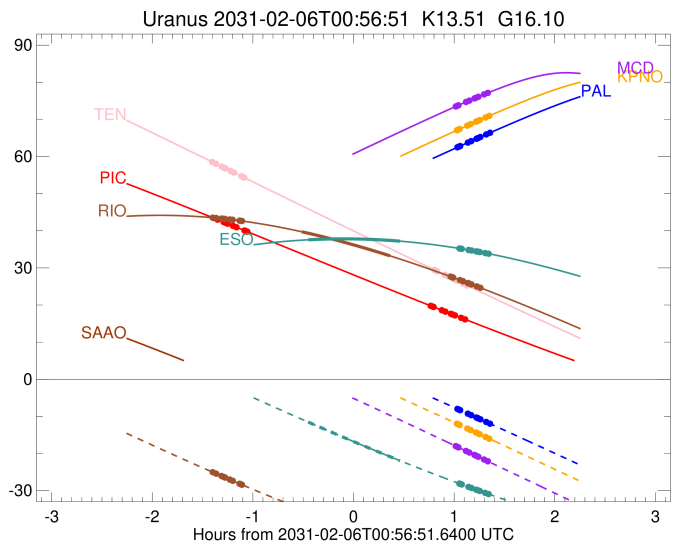
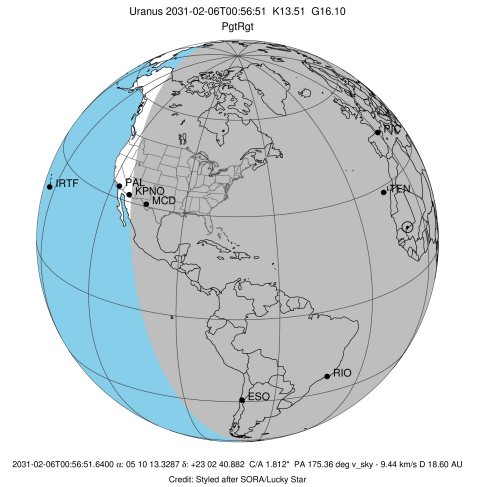


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	FEB 05 23:34 - FEB 06 02:03	PnnRie
PAL	Palomar Mt (200")	33.4	243.1			+++++	FEB 06 01:58 - FEB 06 02:18	PnnRne
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4			+++++	FEB 06 01:58 - FEB 06 02:17	PnnRne
MCD	McDonald Obs. 2.7m	30.7	256.0			+++++	FEB 06 01:57 - FEB 06 02:16	PnnRne
TEN	Teide Obs./Tenerife	28.3	343.5	+++++		+++++	FEB 05 23:33 - FEB 06 02:04	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	+++++	+ +	+++++	FEB 05 23:33 - FEB 06 02:12	PieRie
ESO	European Southern Obs	-29.3	289.3		+ +	+++++	FEB 06 00:29 - FEB 06 02:17	PieRne
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 : 2031-02-06T00:48:04.020
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 3415398130250812800
 2Mass ID (if available) : 05101333+2302409
 ICRS Star Coord at Epoch: 05h 10m 13.32866s +23:02:40.88249s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.507
 G magnitude : 16.097
 RP magnitude : 15.300
 BP magnitude : 16.766
 DUPflag : 0
 Distance (au) : 18.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.44
 Sun-Target sep (deg) : 121.97
 Sun-Moon sep (deg) : 41.19
 B (ring opening deg) : 82.13
 PA of pole (deg) : 1.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.028
 C/A sky separation (km) : 27369.3
 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

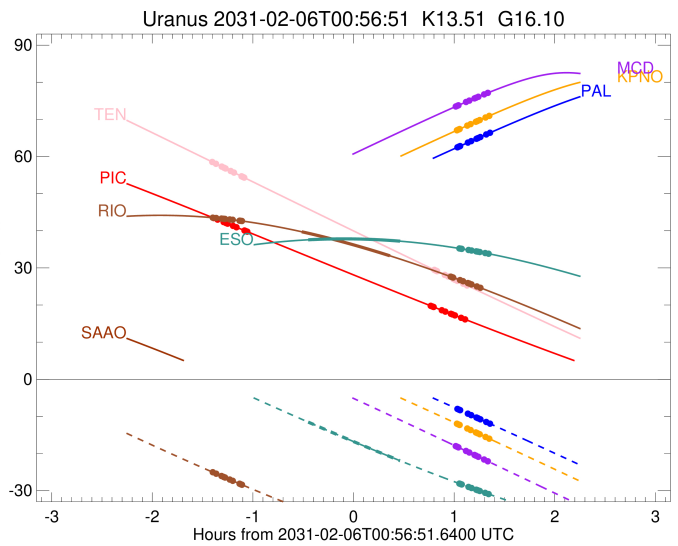
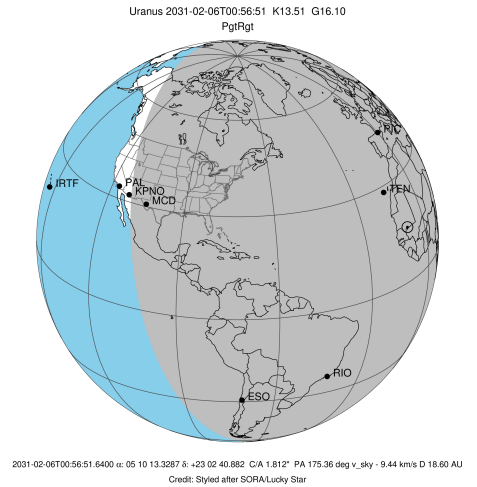


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-02-05T23:34:14.284		43.29	-61.73	50805.90	-8.11		
lambda	I	2031-02-05T23:35:50.425		43.00	-61.83	50026.71	-8.08		
delta	I	2031-02-05T23:39:25.945		42.35	-62.04	48300.35	-7.94		
gamma	I	2031-02-05T23:40:51.680		42.08	-62.12	47621.91	-7.88		
eta	I	2031-02-05T23:41:48.363		41.91	-62.16	47176.12	-7.84		
beta	I	2031-02-05T23:45:01.202		41.32	-62.32	45676.61	-7.70		
alpha	I	2031-02-05T23:47:03.505		40.95	-62.42	44739.74	-7.60		
4	I	2031-02-05T23:51:49.898		40.07	-62.61	42599.24	-7.35		
5	I	2031-02-05T23:52:28.069		39.96	-62.63	42315.20	-7.32		
6	I	2031-02-05T23:53:30.658		39.77	-62.66	41864.55	-7.26		

No planet occultations

6	E	2031-02-06T01:42:57.326		19.77	-56.88	41866.16	7.12		
5	E	2031-02-06T01:43:46.929		19.62	-56.78	42220.95	7.17		
4	E	2031-02-06T01:44:29.827		19.49	-56.69	42531.79	7.20		
alpha	E	2031-02-06T01:49:24.430		18.62	-56.07	44687.89	7.44		
beta	E	2031-02-06T01:51:35.630		18.23	-55.78	45669.44	7.53		
eta	E	2031-02-06T01:54:53.931		17.64	-55.35	47176.12	7.66		
gamma	E	2031-02-06T01:55:52.358		17.47	-55.22	47624.79	7.70		
delta	E	2031-02-06T01:57:19.826		17.21	-55.02	48300.35	7.75		
lambda	E	2031-02-06T02:01:00.840		16.56	-54.52	50026.71	7.87		
epsilon	E	2031-02-06T02:03:14.958		16.16	-54.21	51086.88	7.90		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-02-06T01:03:38.330
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 3415398130250812800
 2Mass ID (if available) : 05101333+2302409
 ICRS Star Coord at Epoch: 05h 10m 13.32866s +23:02:40.88249s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.507
 G magnitude : 16.097
 RP magnitude : 15.300
 BP magnitude : 16.766
 DUPflag : 0
 Distance (au) : 18.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.44
 Sun-Target sep (deg) : 121.97
 Sun-Moon sep (deg) : 42.24
 B (ring opening deg) : 82.13
 PA of pole (deg) : 1.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.951
 C/A sky separation (km) : 26323.8
 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

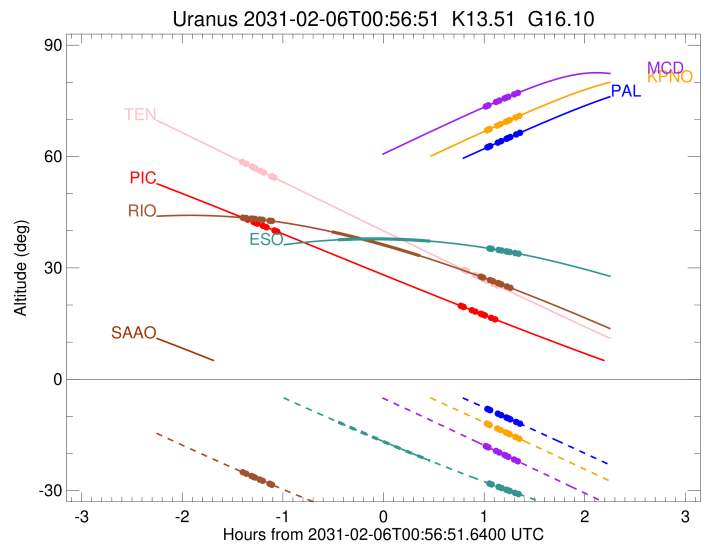
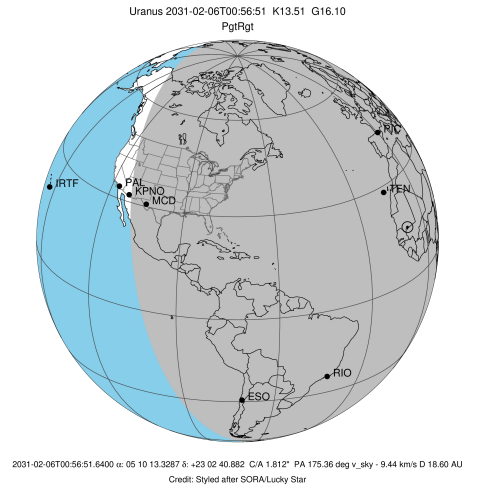


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-02-05T23:49:02.772		35.42	16.94x	50805.80	-8.19		
lambda	I	2031-02-05T23:50:37.901		35.75	16.66x	50026.71	-8.17		
delta	I	2031-02-05T23:54:10.772		36.49	16.03x	48300.35	-8.05		
gamma	I	2031-02-05T23:55:35.286		36.79	15.78x	47621.92	-8.00		
eta	I	2031-02-05T23:56:31.109		36.98	15.61x	47176.12	-7.97		
beta	I	2031-02-05T23:59:40.681		37.64	15.05x	45676.56	-7.85		
alpha	I	2031-02-06T00:01:40.593		38.06	14.69x	44739.86	-7.76		
4	I	2031-02-06T00:06:20.422		39.04	13.85x	42599.50	-7.54		
5	I	2031-02-06T00:06:57.645		39.17	13.73x	42315.22	-7.51		
6	I	2031-02-06T00:07:58.582		39.38	13.55x	41864.29	-7.47		

No planet occultations

6	E	2031-02-06T01:58:51.457		62.49	-8.00	41864.33	7.54		
5	E	2031-02-06T01:59:37.895		62.65	-8.16	42216.49	7.59		
4	E	2031-02-06T02:00:18.913		62.79	-8.30	42530.60	7.62		
alpha	E	2031-02-06T02:04:57.716		63.73	-9.24	44687.15	7.85		
beta	E	2031-02-06T02:07:02.060		64.15	-9.67	45668.45	7.94		
eta	E	2031-02-06T02:10:10.369		64.78	-10.31	47176.12	8.07		
gamma	E	2031-02-06T02:11:05.887		64.97	-10.50	47625.06	8.10		
delta	E	2031-02-06T02:12:28.948		65.25	-10.78	48300.35	8.16		
lambda	E	2031-02-06T02:15:59.041		65.95	-11.50	50026.71	8.28		
epsilon	E	2031-02-06T02:18:08.967		66.38	-11.94	51106.57	8.31		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-02-06T01:03:05.160
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 3415398130250812800
 2Mass ID (if available) : 05101333+2302409
 ICRS Star Coord at Epoch: 05h 10m 13.32866s +23:02:40.88249s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.507
 G magnitude : 16.097
 RP magnitude : 15.300
 BP magnitude : 16.766
 DUPflag : 0
 Distance (au) : 18.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.44
 Sun-Target sep (deg) : 121.97
 Sun-Moon sep (deg) : 42.24
 B (ring opening deg) : 82.13
 PA of pole (deg) : 1.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.929
 C/A sky separation (km) : 26033.4
 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

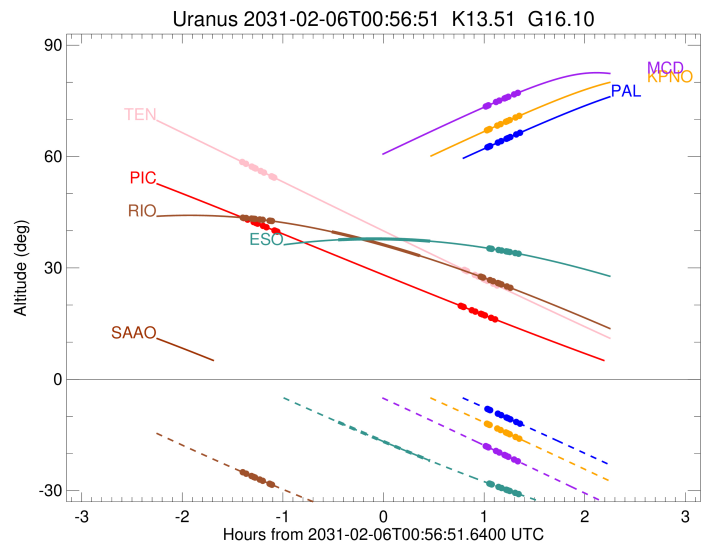
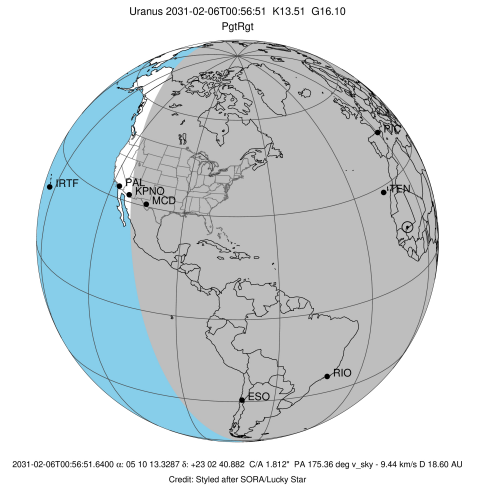


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-02-05T23:48:25.926		39.58	13.94x	50807.37	-8.26		
lambda	I	2031-02-05T23:50:00.506		39.91	13.65x	50026.71	-8.23		
delta	I	2031-02-05T23:53:31.660		40.66	12.99x	48300.35	-8.12		
gamma	I	2031-02-05T23:54:55.465		40.96	12.73x	47621.94	-8.07		
eta	I	2031-02-05T23:55:50.814		41.15	12.56x	47176.12	-8.04		
beta	I	2031-02-05T23:58:58.728		41.82	11.97x	45676.45	-7.92		
alpha	I	2031-02-06T00:00:57.491		42.24	11.59x	44740.09	-7.83		
4	I	2031-02-06T00:05:34.537		43.22	10.72x	42599.83	-7.62		
5	I	2031-02-06T00:06:11.423		43.35	10.60x	42315.24	-7.59		
6	I	2031-02-06T00:07:11.746		43.57	10.41x	41863.97	-7.55		

No planet occultations

6	E	2031-02-06T01:58:33.807		67.08	-11.98	41864.06	7.62		
5	E	2031-02-06T01:59:19.749		67.24	-12.14	42215.86	7.67		
4	E	2031-02-06T02:00:00.453		67.38	-12.28	42530.44	7.69		
alpha	E	2031-02-06T02:04:36.827		68.31	-13.24	44687.06	7.91		
beta	E	2031-02-06T02:06:40.171		68.73	-13.67	45668.32	8.00		
eta	E	2031-02-06T02:09:47.079		69.36	-14.32	47176.12	8.13		
gamma	E	2031-02-06T02:10:42.202		69.54	-14.51	47625.09	8.16		
delta	E	2031-02-06T02:12:04.678		69.82	-14.80	48300.35	8.21		
lambda	E	2031-02-06T02:15:33.375		70.51	-15.53	50026.71	8.33		
epsilon	E	2031-02-06T02:17:42.766		70.93	-15.98	51108.91	8.36		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-02-06T01:02:06.890
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 3415398130250812800
 2Mass ID (if available) : 05101333+2302409
 ICRS Star Coord at Epoch: 05h 10m 13.32866s +23:02:40.88249s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.507
 G magnitude : 16.097
 RP magnitude : 15.300
 BP magnitude : 16.766
 DUPflag : 0
 Distance (au) : 18.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.44
 Sun-Target sep (deg) : 121.97
 Sun-Moon sep (deg) : 42.22
 B (ring opening deg) : 82.13
 PA of pole (deg) : 1.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.905
 C/A sky separation (km) : 25701.8
 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



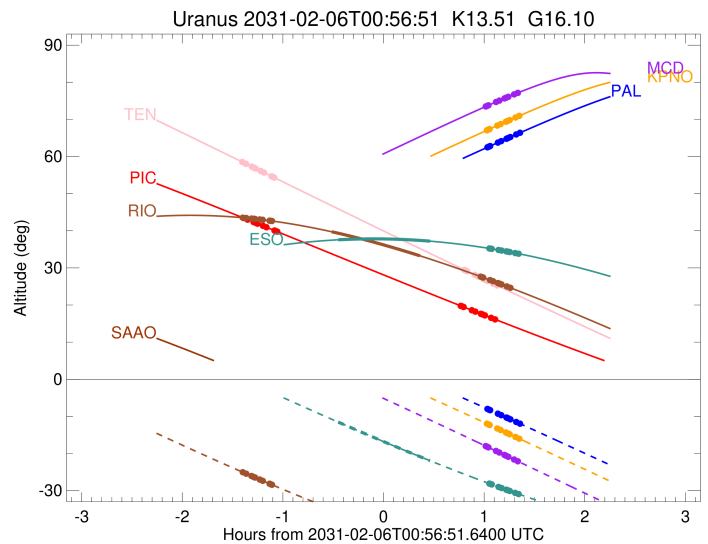
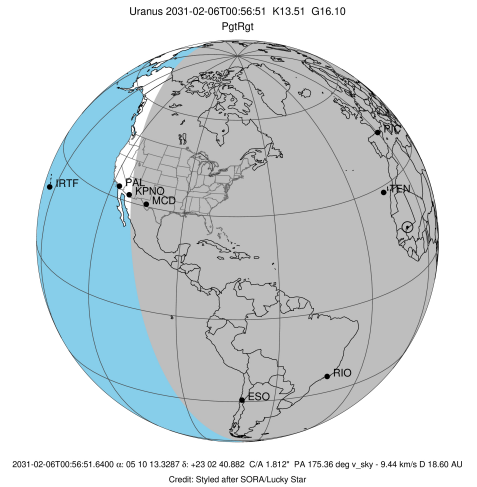
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-02-05T23:47:25.842		45.75	8.91x	50809.29	-8.33		
lambda	I	2031-02-05T23:48:59.760		46.09	8.60x	50026.71	-8.31		
delta	I	2031-02-05T23:52:28.860		46.84	7.91x	48300.35	-8.20		
gamma	I	2031-02-05T23:53:51.819		47.14	7.64x	47621.97	-8.15		
eta	I	2031-02-05T23:54:46.606		47.33	7.46x	47176.12	-8.12		
beta	I	2031-02-05T23:57:52.556		48.00	6.85x	45676.32	-8.01		
alpha	I	2031-02-05T23:59:49.966		48.43	6.46x	44740.36	-7.92		
4	I	2031-02-06T00:04:23.759		49.41	5.55x	42600.22	-7.71		
5	I	2031-02-06T00:05:00.254		49.54	5.43x	42315.25	-7.69		
6	I	2031-02-06T00:05:59.863		49.76	5.23x	41863.59	-7.64		

No planet occultations

6	E	2031-02-06T01:57:52.342		73.49	-18.01	41863.77	7.70		
5	E	2031-02-06T01:58:37.742		73.64	-18.17	42215.20	7.75		
4	E	2031-02-06T01:59:18.097		73.77	-18.32	42530.27	7.77		
alpha	E	2031-02-06T02:03:51.807		74.67	-19.29	44686.96	7.99		
beta	E	2031-02-06T02:05:54.056		75.06	-19.73	45668.18	8.07		
eta	E	2031-02-06T02:08:59.431		75.66	-20.39	47176.12	8.19		
gamma	E	2031-02-06T02:09:54.122		75.83	-20.58	47625.13	8.23		
delta	E	2031-02-06T02:11:15.958		76.09	-20.87	48300.35	8.27		
lambda	E	2031-02-06T02:14:43.135		76.74	-21.61	50026.71	8.39		
epsilon	E	2031-02-06T02:16:51.930		77.13	-22.07	51111.37	8.41		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2031-02-06T00:48:11.680
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: 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       : 3415398130250812800
2Mass ID (if available) : 05101333+2302409
ICRS Star Coord at Epoch: 05h 10m 13.32866s +23:02:40.88249s
RUWE (>1.4 is poor) : 1.06
K magnitude          : 13.507
G magnitude          : 16.097
RP magnitude         : 15.300
BP magnitude         : 16.766
DUPflag             : 0
Distance (au)        : 18.605
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -9.44
Sun-Target sep (deg) : 121.97
Sun-Moon sep (deg)   : 41.27
B (ring opening deg) : 82.13
PA of pole (deg)     : 1.72
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.887
C/A sky separation (km) : 25465.7
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.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
  
```

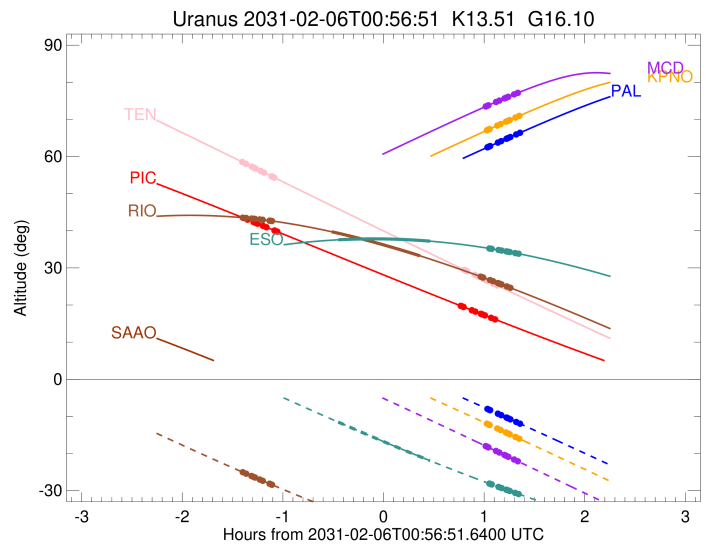
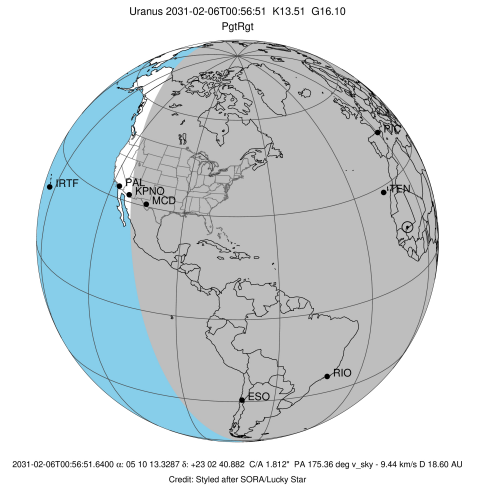


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2031-02-05T23:33:19.410		58.38	-62.44	50815.41	-8.45		
lambda	I	2031-02-05T23:34:52.803		58.04	-62.75	50026.71	-8.42		
delta	I	2031-02-05T23:38:19.203		57.28	-63.46	48300.35	-8.31		
gamma	I	2031-02-05T23:39:41.106		56.98	-63.74	47622.06	-8.26		
eta	I	2031-02-05T23:40:35.223		56.78	-63.92	47176.12	-8.22		
beta	I	2031-02-05T23:43:38.954		56.10	-64.54	45675.95	-8.10		
alpha	I	2031-02-05T23:45:34.831		55.67	-64.92	44741.08	-8.02		
4	I	2031-02-05T23:50:05.385		54.68	-65.82	42601.21	-7.80		
5	I	2031-02-05T23:50:41.625		54.54	-65.94	42315.23	-7.78		
6	I	2031-02-05T23:51:40.644		54.33	-66.14	41862.62	-7.73		

No planet occultations

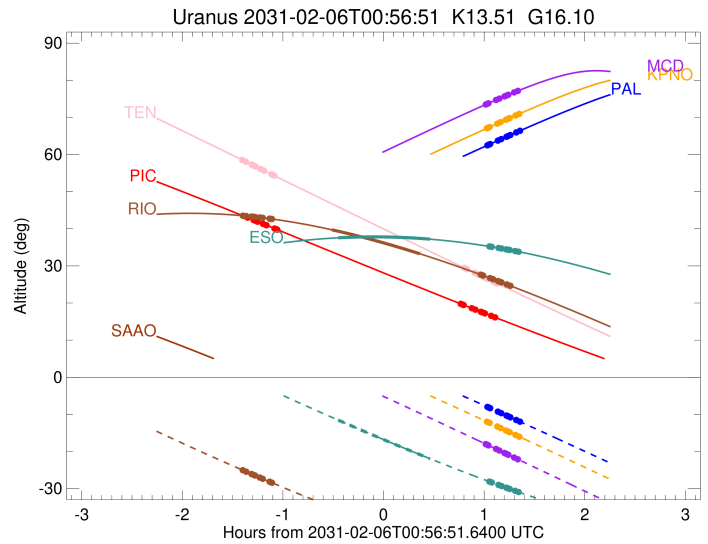
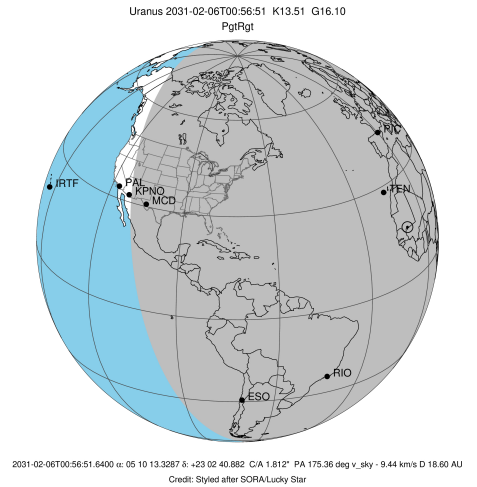
6	E	2031-02-06T01:45:06.147		29.46	-76.29	41864.25	7.58		
5	E	2031-02-06T01:45:52.386		29.29	-76.22	42216.34	7.62		
4	E	2031-02-06T01:46:33.283		29.15	-76.15	42530.57	7.64		
alpha	E	2031-02-06T01:51:11.835		28.14	-75.64	44687.16	7.84		
beta	E	2031-02-06T01:53:16.420		27.70	-75.39	45668.48	7.92		
eta	E	2031-02-06T01:56:25.460		27.02	-74.99	47176.12	8.03		
gamma	E	2031-02-06T01:57:21.274		26.82	-74.87	47625.04	8.06		
delta	E	2031-02-06T01:58:44.847		26.52	-74.69	48300.35	8.10		
lambda	E	2031-02-06T02:02:16.566		25.76	-74.19	50026.71	8.20		
epsilon	E	2031-02-06T02:04:27.492		25.29	-73.88	51104.66	8.22		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-02-06T00:52:26.620
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 3415398130250812800
 2Mass ID (if available) : 05101333+2302409
 ICRS Star Coord at Epoch: 05h 10m 13.32866s +23:02:40.88249s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.507
 G magnitude : 16.097
 RP magnitude : 15.300
 BP magnitude : 16.766
 DUPflag : 0
 Distance (au) : 18.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.44
 Sun-Target sep (deg) : 121.97
 Sun-Moon sep (deg) : 41.42
 B (ring opening deg) : 82.13
 PA of pole (deg) : 1.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.472
 C/A sky separation (km) : 19858.5
 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	2031-02-05T23:33:30.949		43.50	-25.15	50844.71	-9.08		
lambda	I	2031-02-05T23:35:01.012		43.44	-25.45	50026.71	-9.07		
delta	I	2031-02-05T23:38:12.064		43.29	-26.07	48300.35	-9.00		
gamma	I	2031-02-05T23:39:27.469		43.23	-26.31	47622.51	-8.98		
eta	I	2031-02-05T23:40:17.257		43.19	-26.48	47176.12	-8.96		
beta	I	2031-02-05T23:43:05.593		43.05	-27.02	45673.96	-8.89		
alpha	I	2031-02-05T23:44:50.389		42.95	-27.36	44744.41	-8.84		
4	I	2031-02-05T23:48:53.970		42.72	-28.14	42605.98	-8.72		
5	I	2031-02-05T23:49:27.207		42.69	-28.24	42314.03	-8.71		
6	I	2031-02-05T23:50:20.178		42.63	-28.41	41857.06	-8.68		
Uranus	I	2031-02-06T00:26:00.819		39.73	-34.95	25264.41		5.58	5.84
Uranus	E	2031-02-06T01:18:35.630		33.26	-43.28	25133.72		6.74	7.05
6	E	2031-02-06T01:54:51.688		27.64	-47.68	41858.41	8.56		
5	E	2031-02-06T01:55:31.800		27.53	-47.75	42203.78	8.58		
4	E	2031-02-06T01:56:09.419		27.42	-47.82	42527.86	8.60		
alpha	E	2031-02-06T02:00:18.836		26.73	-48.22	44685.56	8.70		
beta	E	2031-02-06T02:02:11.196		26.41	-48.40	45665.62	8.75		
eta	E	2031-02-06T02:05:03.243		25.93	-48.66	47176.12	8.81		
gamma	E	2031-02-06T02:05:54.238		25.78	-48.74	47625.78	8.83		
delta	E	2031-02-06T02:07:10.558		25.56	-48.85	48300.35	8.85		
lambda	E	2031-02-06T02:10:24.965		25.01	-49.13	50026.71	8.91		
epsilon	E	2031-02-06T02:12:31.628		24.64	-49.30	51157.26	8.91		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-02-06T00:57:22.650
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 3415398130250812800
 2Mass ID (if available) : 05101333+2302409
 ICRS Star Coord at Epoch: 05h 10m 13.32866s +23:02:40.88249s
 RUWE (>1.4 is poor) : 1.06
 K magnitude : 13.507
 G magnitude : 16.097
 RP magnitude : 15.300
 BP magnitude : 16.766
 DUPflag : 0
 Distance (au) : 18.605
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.44
 Sun-Target sep (deg) : 121.97
 Sun-Moon sep (deg) : 41.72
 B (ring opening deg) : 82.13
 PA of pole (deg) : 1.72
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.433
 C/A sky separation (km) : 19333.1
 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_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	2031-02-05T23:37:57.577		34.92	-1.03x	50845.73	-9.08		
lambda	I	2031-02-05T23:39:27.741		35.03	-1.34x	50026.71	-9.07		
delta	I	2031-02-05T23:42:38.673		35.27	-2.00x	48300.35	-9.01		
gamma	I	2031-02-05T23:43:53.992		35.36	-2.25x	47622.53	-8.99		
eta	I	2031-02-05T23:44:43.713		35.42	-2.42x	47176.12	-8.97		
beta	I	2031-02-05T23:47:31.752		35.61	-3.00x	45673.88	-8.91		
alpha	I	2031-02-05T23:49:16.274		35.73	-3.36x	44744.53	-8.86		
4	I	2031-02-05T23:53:19.057		35.99	-4.19x	42606.17	-8.76		
5	I	2031-02-05T23:53:52.202		36.02	-4.30x	42313.93	-8.74		
6	I	2031-02-05T23:54:44.964		36.08	-4.48x	41856.80	-8.72		
Uranus	I	2031-02-06T00:29:50.226		37.57	-11.53	25279.32		5.43	5.69
Uranus	E	2031-02-06T01:24:36.835		37.20	-21.94	25155.27		6.56	6.87
6	E	2031-02-06T02:00:00.049		35.24	-28.10	41857.59	8.69		
5	E	2031-02-06T02:00:39.477		35.19	-28.21	42202.17	8.71		
4	E	2031-02-06T02:01:16.718		35.15	-28.31	42527.59	8.72		
alpha	E	2031-02-06T02:05:22.596		34.83	-28.99	44685.40	8.83		
beta	E	2031-02-06T02:07:13.370		34.69	-29.29	45665.22	8.87		
eta	E	2031-02-06T02:10:03.112		34.46	-29.75	47176.12	8.93		
gamma	E	2031-02-06T02:10:53.430		34.39	-29.89	47625.89	8.95		
delta	E	2031-02-06T02:12:08.713		34.28	-30.09	48300.35	8.97		
lambda	E	2031-02-06T02:15:20.532		34.00	-30.60	50026.71	9.03		
epsilon	E	2031-02-06T02:17:26.375		33.82	-30.93	51164.97	9.03		