

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-14T04:47:37.930
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427682492633067648
 2Mass ID (if available) : 05481086+2337429

ICRS Star Coord at Epoch: 05h 48m 10.86267s +23:37:42.97114s

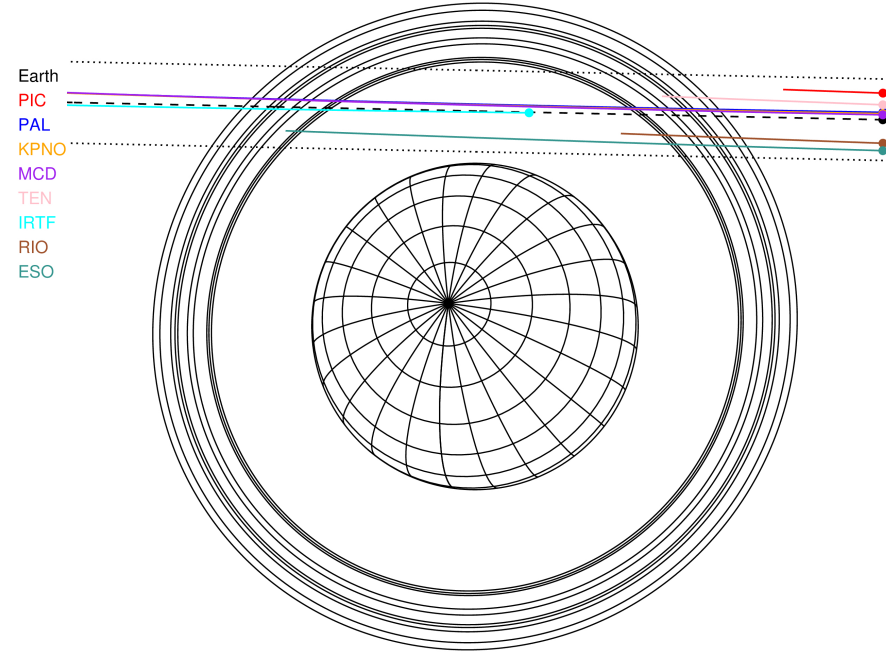
RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.598
 G magnitude : 18.294
 RP magnitude : 17.244
 BP magnitude : 19.440
 DUPflag : 0
 Distance (au) : 18.468
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.40
 Sun-Target sep (deg) : 121.95
 Sun-Moon sep (deg) : 57.12
 B (ring opening deg) : 77.53
 PA of pole (deg) : 49.08

#	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



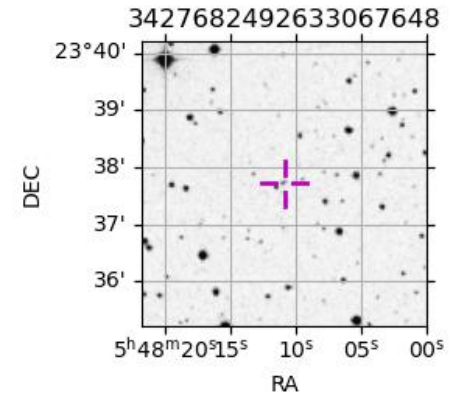
2033-02-14T04:47:37.9300 α: 05 48 10.8627 δ: +23 37 42.971 C/A 2.525° PA 178.78 deg v_sky - 9.40 km/s D 18.47 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2033-02-14T04:47:37 K14.60 G18.29 XRgt

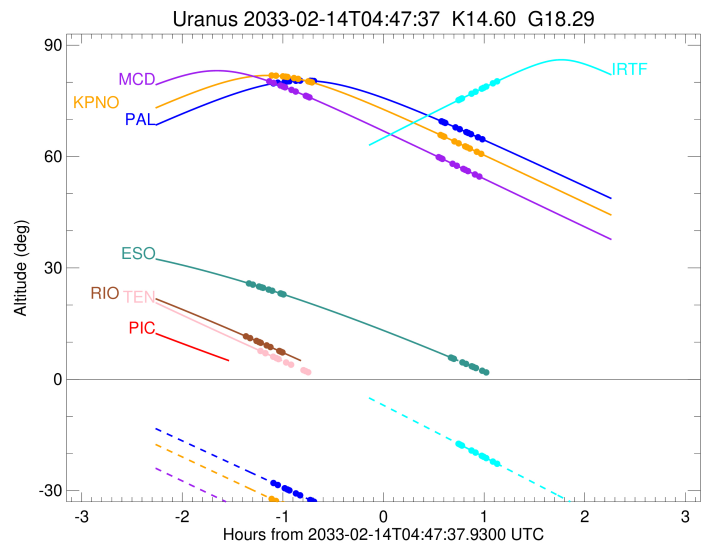
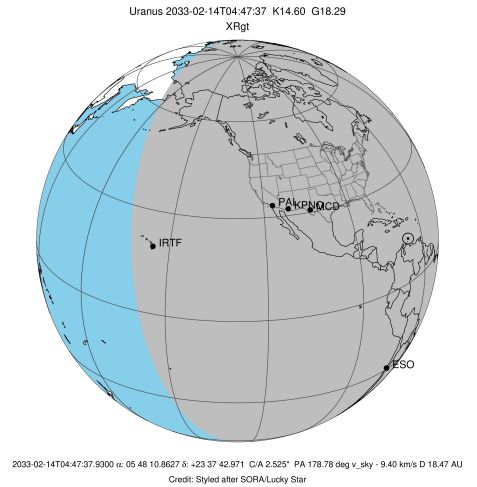


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++		+++++	FEB 14 03:42 - FEB 14 05:47	PnnRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	FEB 14 03:41 - FEB 14 05:46	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	FEB 14 03:40 - FEB 14 05:45	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	++++			FEB 14 03:34 - FEB 14 03:45	PnnRin
IRTF	Mauna Kea/IRTF	19.8	204.5			+++++	FEB 14 05:32 - FEB 14 05:56	PnnRne
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++			FEB 14 03:26 - FEB 14 03:47	PnnRin
ESO	European Southern Obs	-29.3	289.3	+++++		+++	FEB 14 03:28 - FEB 14 05:29	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 : 2033-02-14T04:45:33.500
 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 : 3427682492633067648
 2Mass ID (if available) : 05481086+2337429
 ICRS Star Coord at Epoch: 05h 48m 10.86267s +23:37:42.97114s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.598
 G magnitude : 18.294
 RP magnitude : 17.244
 BP magnitude : 19.440
 DUPflag : 0
 Distance (au) : 18.468
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.40
 Sun-Target sep (deg) : 121.95
 Sun-Moon sep (deg) : 57.79
 B (ring opening deg) : 77.53
 PA of pole (deg) : 49.08
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.599
 C/A sky separation (km) : 34812.2
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

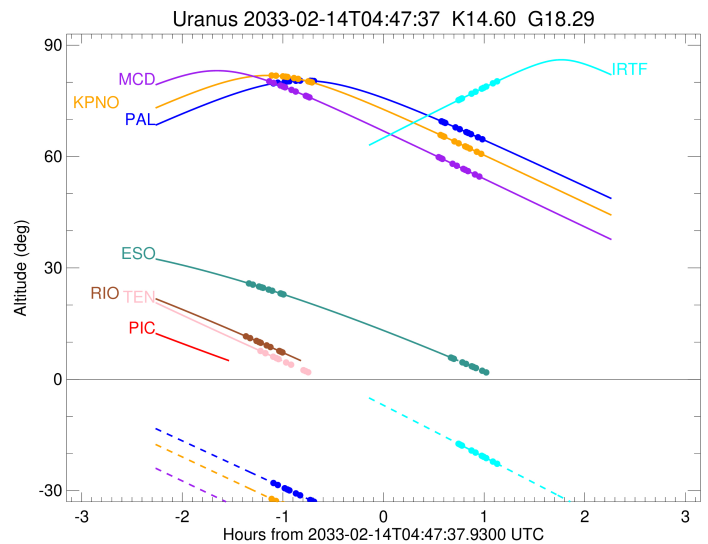
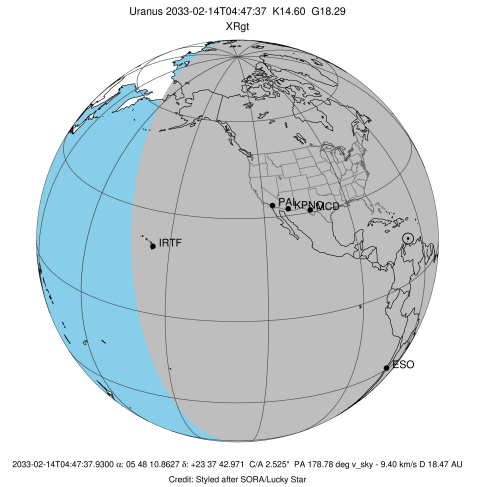


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-02-14T03:42:38.334		79.75	-28.08	50890.67	-7.25		
lambda	I	2033-02-14T03:44:39.157		79.90	-28.50	50026.71	-7.09		
delta	I	2033-02-14T03:48:46.992		80.16	-29.36	48300.35	-6.83		
gamma	I	2033-02-14T03:50:25.988		80.24	-29.71	47629.15	-6.72		
eta	I	2033-02-14T03:51:33.753		80.29	-29.94	47176.12	-6.65		
beta	I	2033-02-14T03:55:26.514		80.41	-30.75	45662.05	-6.36		
alpha	I	2033-02-14T03:57:59.154		80.45	-31.28	44706.83	-6.16		
4	I	2033-02-14T04:03:56.716		80.41	-32.52	42598.33	-5.63		
5	I	2033-02-14T04:05:15.458		80.38	-32.79	42161.27	-5.50		
6	I	2033-02-14T04:06:14.097		80.35	-33.00	41841.27	-5.39		

No planet occultations

6	E	2033-02-14T05:22:03.555		69.53	-48.45	41800.52	5.37		
5	E	2033-02-14T05:23:24.012		69.27	-48.71	42234.87	5.48		
4	E	2033-02-14T05:24:34.720		69.04	-48.94	42614.97	5.60		
alpha	E	2033-02-14T05:30:36.784		67.85	-50.12	44746.59	6.12		
beta	E	2033-02-14T05:33:06.933		67.36	-50.61	45681.02	6.32		
eta	E	2033-02-14T05:36:58.211		66.59	-51.35	47176.12	6.60		
gamma	E	2033-02-14T05:38:06.705		66.36	-51.57	47630.98	6.68		
delta	E	2033-02-14T05:39:46.109		66.03	-51.89	48300.35	6.79		
lambda	E	2033-02-14T05:43:55.743		65.19	-52.68	50026.71	7.04		
epsilon	E	2033-02-14T05:47:18.777		64.51	-53.32	51475.03	7.19		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-14T04:44:37.620
 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 : 3427682492633067648
 2Mass ID (if available) : 05481086+2337429
 ICRS Star Coord at Epoch: 05h 48m 10.86267s +23:37:42.97114s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.598
 G magnitude : 18.294
 RP magnitude : 17.244
 BP magnitude : 19.440
 DUPflag : 0
 Distance (au) : 18.468
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.40
 Sun-Target sep (deg) : 121.95
 Sun-Moon sep (deg) : 57.74
 B (ring opening deg) : 77.53
 PA of pole (deg) : 49.08
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.590
 C/A sky separation (km) : 34698.2
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

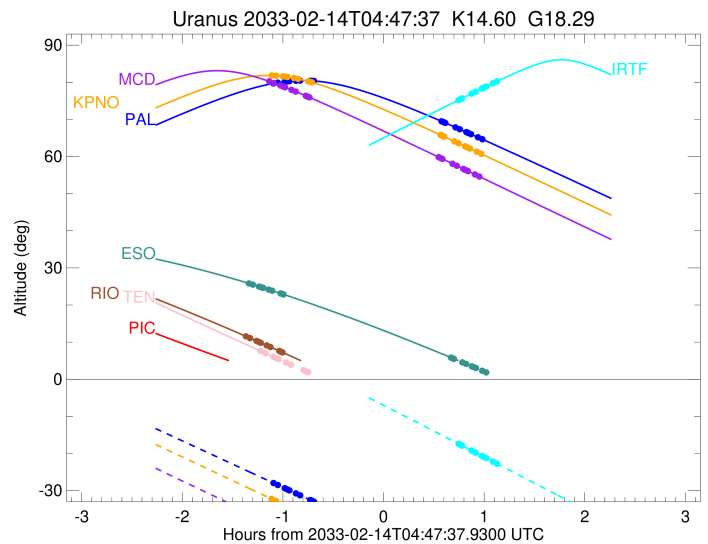
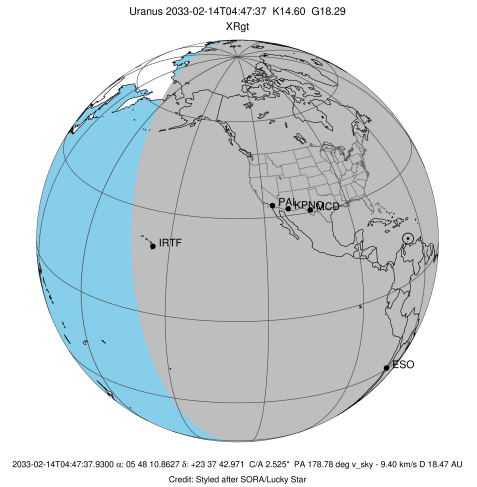


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-02-14T03:41:33.146		81.82	-32.37	50889.27	-7.28		
lambda	I	2033-02-14T03:43:33.302		81.77	-32.79	50026.71	-7.12		
delta	I	2033-02-14T03:47:40.091		81.60	-33.66	48300.35	-6.87		
gamma	I	2033-02-14T03:49:18.641		81.51	-34.01	47629.13	-6.76		
eta	I	2033-02-14T03:50:26.082		81.44	-34.25	47176.12	-6.68		
beta	I	2033-02-14T03:54:17.675		81.14	-35.06	45661.94	-6.40		
alpha	I	2033-02-14T03:56:49.460		80.90	-35.60	44706.65	-6.20		
4	I	2033-02-14T04:02:44.661		80.25	-36.84	42598.11	-5.67		
5	I	2033-02-14T04:04:02.780		80.09	-37.12	42161.08	-5.55		
6	I	2033-02-14T04:05:00.862		79.97	-37.32	41841.55	-5.44		

No planet occultations

6	E	2033-02-14T05:21:27.114		65.84	-52.97	41800.44	5.40		
5	E	2033-02-14T05:22:47.089		65.57	-53.23	42235.16	5.51		
4	E	2033-02-14T05:23:57.288		65.33	-53.46	42614.93	5.64		
alpha	E	2033-02-14T05:29:57.481		64.07	-54.62	44746.64	6.15		
beta	E	2033-02-14T05:32:27.005		63.55	-55.10	45681.02	6.35		
eta	E	2033-02-14T05:36:17.484		62.75	-55.83	47176.12	6.62		
gamma	E	2033-02-14T05:37:25.772		62.51	-56.05	47630.98	6.70		
delta	E	2033-02-14T05:39:04.901		62.16	-56.36	48300.35	6.81		
lambda	E	2033-02-14T05:43:13.943		61.29	-57.14	50026.71	7.05		
epsilon	E	2033-02-14T05:46:36.648		60.58	-57.77	51475.44	7.21		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-14T04:43:18.670
 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 : 3427682492633067648
 2Mass ID (if available) : 05481086+2337429
 ICRS Star Coord at Epoch: 05h 48m 10.86267s +23:37:42.97114s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.598
 G magnitude : 18.294
 RP magnitude : 17.244
 BP magnitude : 19.440
 DUPflag : 0
 Distance (au) : 18.468
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.40
 Sun-Target sep (deg) : 121.95
 Sun-Moon sep (deg) : 57.65
 B (ring opening deg) : 77.53
 PA of pole (deg) : 49.08
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.586
 C/A sky separation (km) : 34641.8
 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

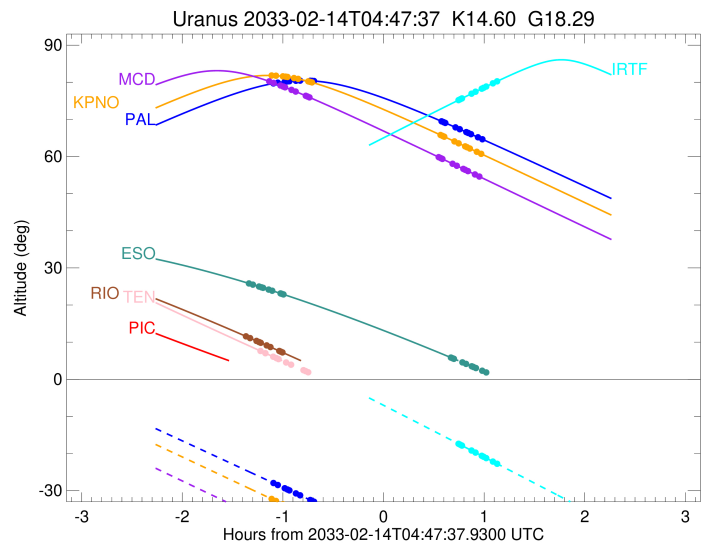
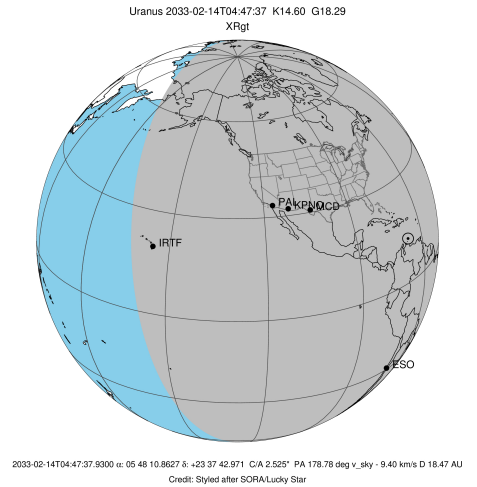


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-02-14T03:40:07.321		80.15	-38.65	50888.16	-7.29		
lambda	I	2033-02-14T03:42:07.104		79.82	-39.08	50026.71	-7.13		
delta	I	2033-02-14T03:46:13.419		79.13	-39.95	48300.35	-6.88		
gamma	I	2033-02-14T03:47:51.769		78.84	-40.30	47629.11	-6.77		
eta	I	2033-02-14T03:48:59.066		78.65	-40.54	47176.12	-6.69		
beta	I	2033-02-14T03:52:50.149		77.95	-41.36	45661.86	-6.41		
alpha	I	2033-02-14T03:55:21.562		77.48	-41.89	44706.52	-6.21		
4	I	2033-02-14T04:01:15.738		76.37	-43.14	42597.95	-5.69		
5	I	2033-02-14T04:02:33.580		76.12	-43.41	42160.94	-5.57		
6	I	2033-02-14T04:03:31.397		75.93	-43.62	41841.74	-5.46		

No planet occultations

6	E	2033-02-14T05:20:20.932		59.88	-59.16	41800.43	5.41		
5	E	2033-02-14T05:21:40.775		59.59	-59.41	42235.20	5.52		
4	E	2033-02-14T05:22:50.858		59.34	-59.63	42614.93	5.65		
alpha	E	2033-02-14T05:28:50.726		58.05	-60.74	44746.65	6.15		
beta	E	2033-02-14T05:31:20.206		57.51	-61.20	45681.02	6.35		
eta	E	2033-02-14T05:35:10.702		56.68	-61.89	47176.12	6.62		
gamma	E	2033-02-14T05:36:19.013		56.43	-62.09	47630.98	6.70		
delta	E	2033-02-14T05:37:58.187		56.08	-62.39	48300.35	6.80		
lambda	E	2033-02-14T05:42:07.405		55.18	-63.12	50026.71	7.05		
epsilon	E	2033-02-14T05:45:30.297		54.45	-63.70	51475.35	7.20		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-14T04:37:01.710
 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 : 3427682492633067648
 2Mass ID (if available) : 05481086+2337429
 ICRS Star Coord at Epoch: 05h 48m 10.86267s +23:37:42.97114s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.598
 G magnitude : 18.294
 RP magnitude : 17.244
 BP magnitude : 19.440
 DUPflag : 0
 Distance (au) : 18.468
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.40
 Sun-Target sep (deg) : 121.95
 Sun-Moon sep (deg) : 56.65
 B (ring opening deg) : 77.53
 PA of pole (deg) : 49.08
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.774
 C/A sky separation (km) : 37157.3
 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



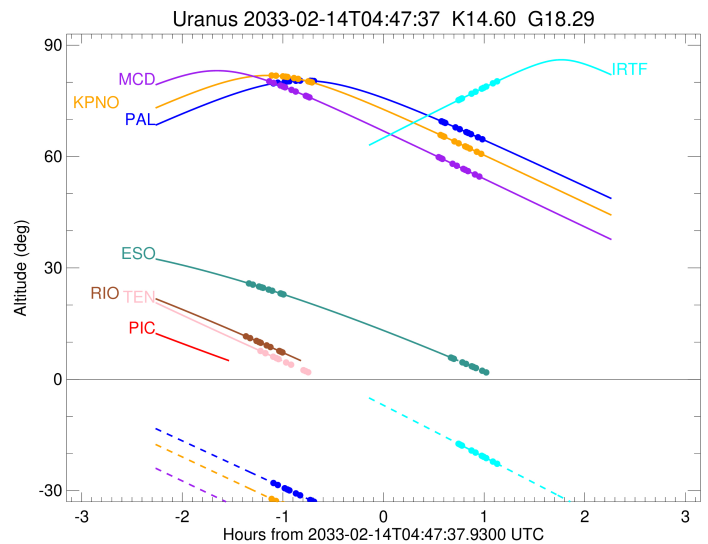
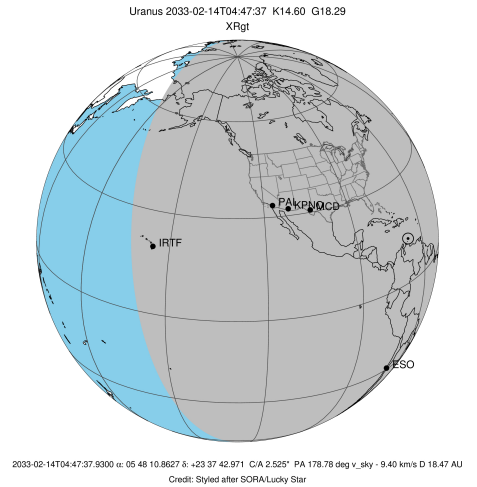
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-02-14T03:34:56.387		7.48	-55.13	50906.21	-6.49		
lambda	I	2033-02-14T03:37:14.320		7.02	-54.65	50026.71	-6.31		
delta	I	2033-02-14T03:41:54.869		6.07	-53.67	48300.35	-6.00		
gamma	I	2033-02-14T03:43:48.004		5.69	-53.28	47629.41	-5.86		
eta	I	2033-02-14T03:45:05.945		5.42	-53.00	47176.12	-5.77		
beta	I	2033-02-14T03:49:36.266		4.51x	-52.05	45663.43	-5.42		
alpha	I	2033-02-14T03:52:36.597		3.91x	-51.41	44709.22	-5.17		
4	I	2033-02-14T03:59:52.288		2.46x	-49.86	42601.50	-4.50		
5	I	2033-02-14T04:01:31.823		2.13x	-49.50	42164.58	-4.33		
6	I	2033-02-14T04:02:48.527		1.87x	-49.23	41837.09	-4.18		

No planet occultations

6	E	2033-02-14T05:08:13.106		-10.65x	-34.97	41803.52	4.12		
5	E	2033-02-14T05:09:53.814		-10.95x	-34.60	42225.05	4.26		
4	E	2033-02-14T05:11:26.388		-11.23x	-34.26	42616.07	4.43		
alpha	E	2033-02-14T05:18:52.370		-12.57x	-32.62	44744.49	5.07		
beta	E	2033-02-14T05:21:52.732		-13.11x	-31.96	45680.64	5.31		
eta	E	2033-02-14T05:26:25.740		-13.92x	-30.96	47176.12	5.64		
gamma	E	2033-02-14T05:27:45.793		-14.15x	-30.66	47631.18	5.73		
delta	E	2033-02-14T05:29:41.322		-14.49x	-30.24	48300.35	5.85		
lambda	E	2033-02-14T05:34:28.985		-15.33x	-29.18	50026.71	6.14		
epsilon	E	2033-02-14T05:38:17.641		-15.99x	-28.34	51455.44	6.32		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2033-02-14T04:52:41.330
Event type           : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Observer code        : IRTF
Location             : Mauna Kea/IRTF
Latitude (deg)       : 19.82622
E. Longitude (deg)   : 204.52800
Altitude (km)        : 4.168
Gaia source ID       : 3427682492633067648
2Mass ID (if available) : 05481086+2337429
ICRS Star Coord at Epoch: 05h 48m 10.86267s +23:37:42.97114s
RUWE (>1.4 is poor) : 1.03
K magnitude           : 14.598
G magnitude           : 18.294
RP magnitude          : 17.244
BP magnitude          : 19.440
DUPflag              : 0
Distance (au)         : 18.469
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -9.40
Sun-Target sep (deg) : 121.95
Sun-Moon sep (deg)   : 58.02
B (ring opening deg) : 77.53
PA of pole (deg)     : 49.08
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.506
C/A sky separation (km) : 33572.0
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_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```

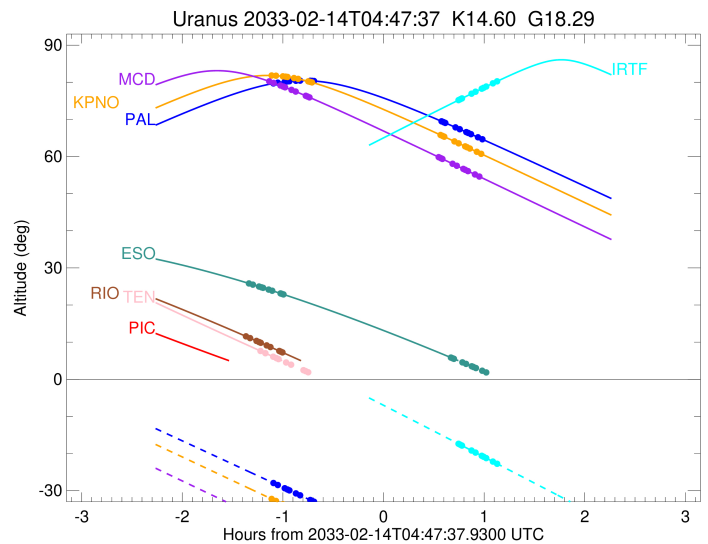
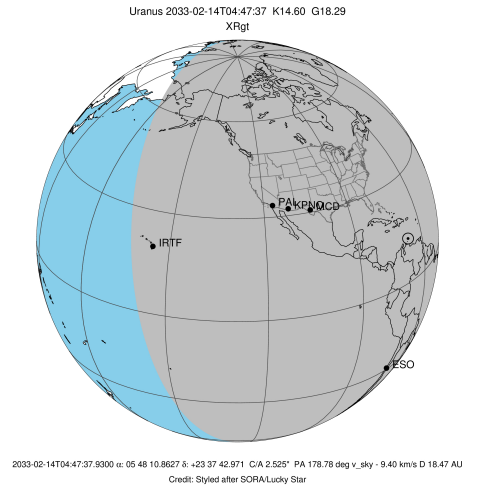


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-02-14T03:47:42.380		51.27	6.69x	50883.75	-7.42		
lambda	I	2033-02-14T03:49:39.293		51.72	6.25x	50026.71	-7.28		
delta	I	2033-02-14T03:53:40.120		52.64	5.34x	48300.35	-7.05		
gamma	I	2033-02-14T03:55:15.953		53.00	4.98x	47629.03	-6.96		
eta	I	2033-02-14T03:56:21.382		53.25	4.73x	47176.12	-6.89		
beta	I	2033-02-14T04:00:05.315		54.11	3.88x	45661.43	-6.64		
alpha	I	2033-02-14T04:02:31.229		54.67	3.33x	44705.78	-6.46		
4	I	2033-02-14T04:08:09.427		55.96	2.05x	42596.89	-6.01		
5	I	2033-02-14T04:09:22.965		56.25	1.77x	42160.05	-5.90		
6	I	2033-02-14T04:10:17.095		56.45	1.56x	41843.05	-5.80		

No planet occultations

6	E	2033-02-14T05:32:10.399		75.16	-17.34	41799.25	5.83		
5	E	2033-02-14T05:33:25.748		75.44	-17.63	42239.82	5.92		
4	E	2033-02-14T05:34:30.267		75.68	-17.88	42614.17	6.04		
alpha	E	2033-02-14T05:40:09.326		76.94	-19.20	44747.58	6.50		
beta	E	2033-02-14T05:42:30.998		77.46	-19.75	45681.14	6.68		
eta	E	2033-02-14T05:46:10.649		78.27	-20.61	47176.12	6.93		
gamma	E	2033-02-14T05:47:15.926		78.50	-20.86	47630.86	7.00		
delta	E	2033-02-14T05:48:50.876		78.85	-21.23	48300.35	7.10		
lambda	E	2033-02-14T05:52:50.068		79.71	-22.16	50026.71	7.33		
epsilon	E	2033-02-14T05:56:06.681		80.41	-22.93	51485.26	7.47		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-14T04:36:23.460
 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 : 3427682492633067648
 2Mass ID (if available) : 05481086+2337429
 ICRS Star Coord at Epoch: 05h 48m 10.86267s +23:37:42.97114s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.598
 G magnitude : 18.294
 RP magnitude : 17.244
 BP magnitude : 19.440
 DUPflag : 0
 Distance (au) : 18.468
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.40
 Sun-Target sep (deg) : 121.95
 Sun-Moon sep (deg) : 56.58
 B (ring opening deg) : 77.53
 PA of pole (deg) : 49.08
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.320
 C/A sky separation (km) : 31080.6
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

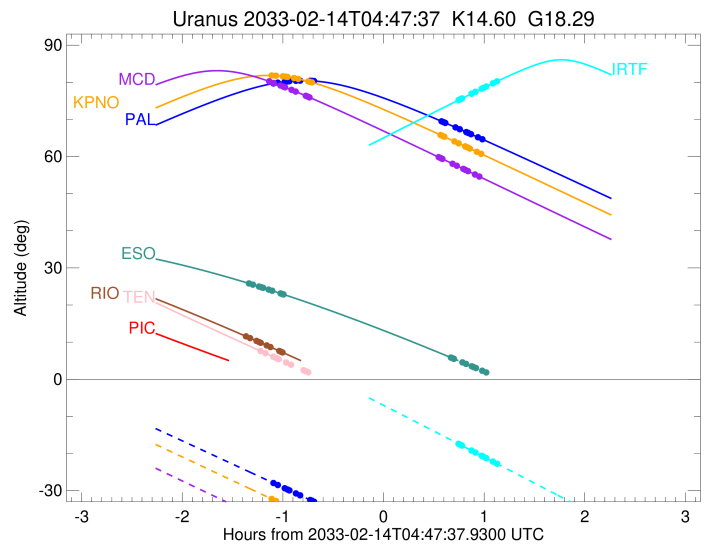
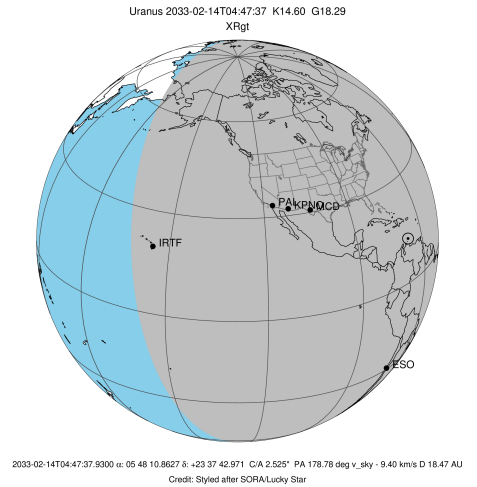


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-02-14T03:26:17.256		11.44	-54.00	50856.90	-7.71		
lambda	I	2033-02-14T03:28:05.924		11.08	-53.94	50026.71	-7.60		
delta	I	2033-02-14T03:31:55.928		10.32	-53.79	48300.35	-7.41		
gamma	I	2033-02-14T03:33:27.071		10.02	-53.73	47628.56	-7.33		
eta	I	2033-02-14T03:34:29.027		9.82	-53.68	47176.12	-7.27		
beta	I	2033-02-14T03:38:00.464		9.12	-53.52	45659.30	-7.07		
alpha	I	2033-02-14T03:40:17.074		8.66	-53.40	44702.42	-6.93		
4	I	2033-02-14T03:45:29.553		7.62	-53.09	42592.26	-6.58		
5	I	2033-02-14T03:46:36.114		7.40	-53.02	42157.16	-6.49		
6	I	2033-02-14T03:47:24.023		7.24	-52.97	41848.20	-6.42		

No planet occultations

6	E	2033-02-14T05:23:13.401	-12.87x	-41.17	41797.97	6.28			
5	E	2033-02-14T05:24:24.747	-13.13x	-40.97	42245.43	6.34			
4	E	2033-02-14T05:25:24.116	-13.34x	-40.81	42613.09	6.43			
alpha	E	2033-02-14T05:30:46.994	-14.51x	-39.89	44748.55	6.76			
beta	E	2033-02-14T05:33:03.680	-15.00x	-39.50	45681.22	6.89			
eta	E	2033-02-14T05:36:37.856	-15.78x	-38.88	47176.12	7.07			
gamma	E	2033-02-14T05:37:41.911	-16.01x	-38.69	47630.72	7.12			
delta	E	2033-02-14T05:39:15.447	-16.35x	-38.42	48300.35	7.19			
lambda	E	2033-02-14T05:43:12.548	-17.22x	-37.71	50026.71	7.36			
epsilon	E	2033-02-14T05:46:30.078	-17.94x	-37.12	51494.12	7.47			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-02-14T04:38:52.160
 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 : 3427682492633067648
 2Mass ID (if available) : 05481086+2337429
 ICRS Star Coord at Epoch: 05h 48m 10.86267s +23:37:42.97114s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.598
 G magnitude : 18.294
 RP magnitude : 17.244
 BP magnitude : 19.440
 DUPflag : 0
 Distance (au) : 18.468
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.40
 Sun-Target sep (deg) : 121.95
 Sun-Moon sep (deg) : 56.91
 B (ring opening deg) : 77.53
 PA of pole (deg) : 49.08
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.207
 C/A sky separation (km) : 29562.3
 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	2033-02-14T03:28:03.355		25.72	-42.80	50848.02	-8.05		
lambda	I	2033-02-14T03:29:46.253		25.49	-42.99	50026.71	-7.95		
delta	I	2033-02-14T03:33:25.784		24.97	-43.38	48300.35	-7.78		
gamma	I	2033-02-14T03:34:52.550		24.77	-43.53	47628.39	-7.71		
eta	I	2033-02-14T03:35:51.403		24.63	-43.63	47176.12	-7.66		
beta	I	2033-02-14T03:39:11.855		24.15	-43.96	45658.50	-7.48		
alpha	I	2033-02-14T03:41:20.801		23.84	-44.17	44701.18	-7.36		
4	I	2033-02-14T03:46:13.883		23.12	-44.63	42590.37	-7.05		
5	I	2033-02-14T03:47:15.706		22.97	-44.73	42156.33	-6.97		
6	I	2033-02-14T03:47:59.883		22.86	-44.79	41850.18	-6.91		

No planet occultations

6	E	2033-02-14T05:27:40.607		5.87	-47.35	41797.10	6.79		
5	E	2033-02-14T05:28:47.513		5.66	-47.31	42249.88	6.84		
4	E	2033-02-14T05:29:41.780		5.50	-47.27	42612.06	6.92		
alpha	E	2033-02-14T05:34:43.470		4.55x	-47.03	44749.31	7.21		
beta	E	2033-02-14T05:36:51.706		4.14x	-46.92	45681.23	7.32		
eta	E	2033-02-14T05:40:13.595		3.50x	-46.73	47176.12	7.49		
gamma	E	2033-02-14T05:41:14.116		3.31x	-46.67	47630.59	7.53		
delta	E	2033-02-14T05:42:42.656		3.03x	-46.58	48300.35	7.60		
lambda	E	2033-02-14T05:46:27.627		2.31x	-46.34	50026.71	7.75		
epsilon	E	2033-02-14T05:49:36.677		1.70x	-46.13	51502.52	7.84		