

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-15T02:40:29.910
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427500076781265152
 2Mass ID (if available) : 05515017+2338283

ICRS Star Coord at Epoch: 05h 51m 50.16688s +23:38:28.04722s

RUWE (>1.4 is poor) : 0.97
 K magnitude : 12.649
 G magnitude : 14.438
 RP magnitude : 13.830
 BP magnitude : 14.872
 DUPflag : 0
 Distance (au) : 18.131
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.25
 Sun-Target sep (deg) : 153.33
 Sun-Moon sep (deg) : 22.23
 B (ring opening deg) : 76.88
 PA of pole (deg) : 51.76

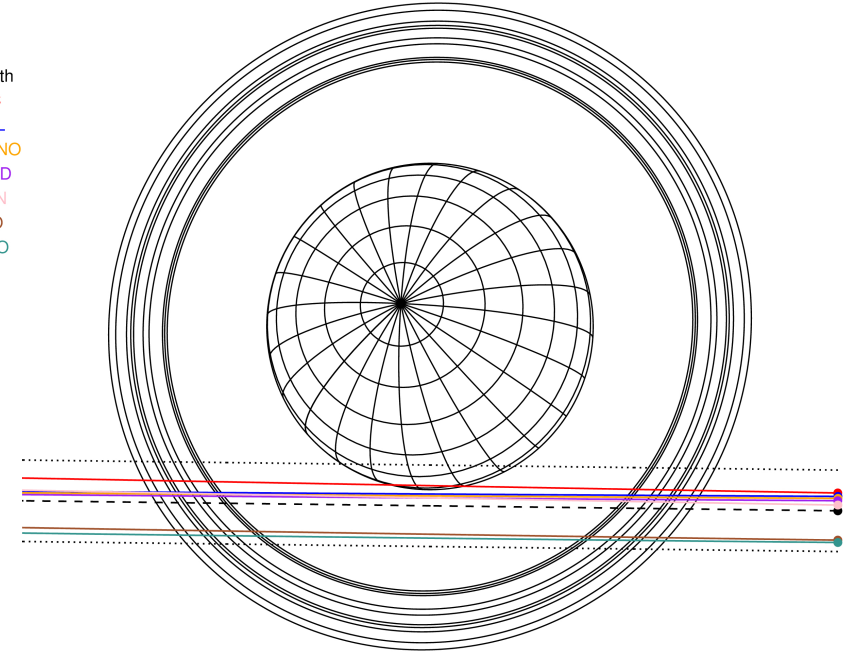
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2033-01-15T02:40:29.9100 α: 05 51.16688 s +23 38 28.047 C/A 2.129° PA 359.30 deg v_sky -20.25 km/s D 18.13 AU
 Credit: Styled after SORA/Lucky Star

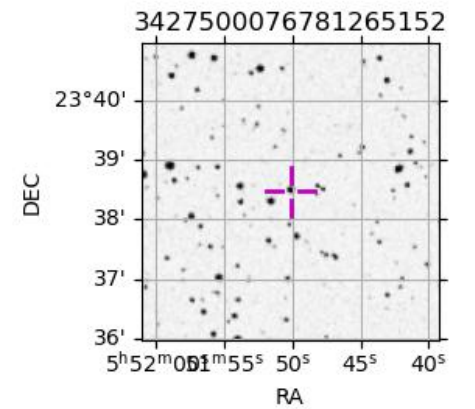
Uranus 2033-01-15T02:40:29 K12.65 G14.44 PtRgt

Earth
 PIC
 PAL
 KPNO
 MCD
 TEN
 RIO
 ESO

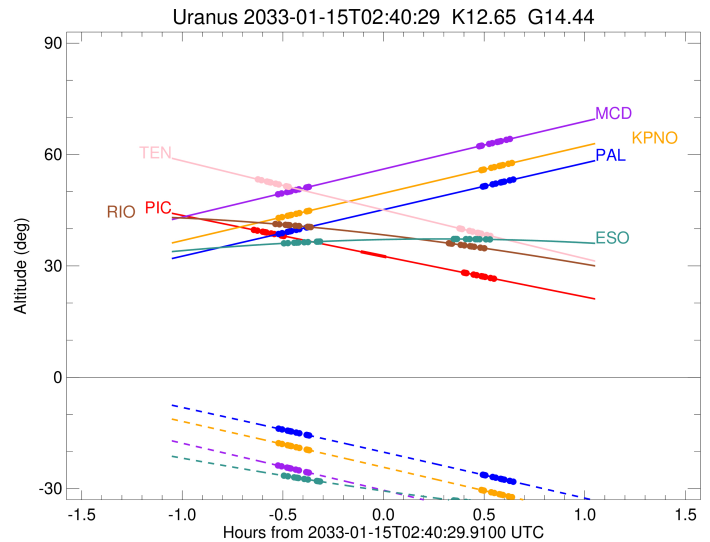
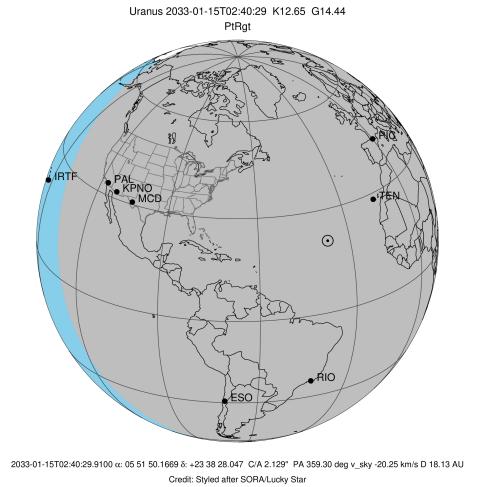


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	JAN 15 02:02 - JAN 15 03:13	PieRie
PAL	Palomar Mt (200")	33.4	243.1	+++++		+++++	JAN 15 02:09 - JAN 15 03:19	PnnRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	JAN 15 02:09 - JAN 15 03:18	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	JAN 15 02:09 - JAN 15 03:18	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++		+++++	JAN 15 02:03 - JAN 15 03:12	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	+++++		+++++	JAN 15 02:08 - JAN 15 03:10	PnnRie
ESO	European Southern Obs	-29.3	289.3	+++++		+++++	JAN 15 02:11 - JAN 15 03:12	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

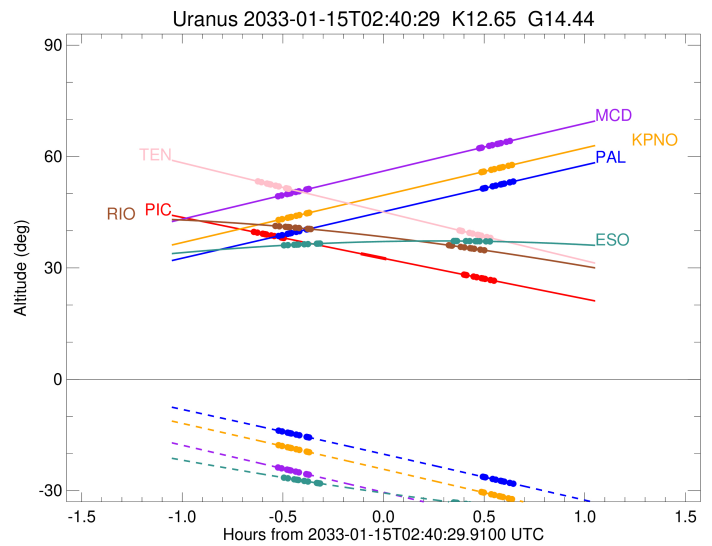
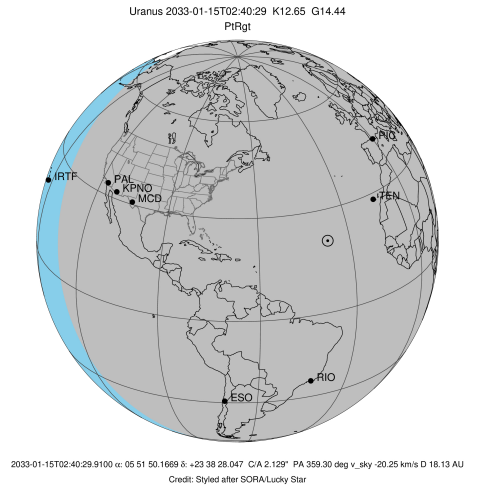


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-15T02:37:05.190
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3427500076781265152
 2Mass ID (if available) : 05515017+2338283
 ICRS Star Coord at Epoch: 05h 51m 50.16688s +23:38:28.04722s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 12.649
 G magnitude : 14.438
 RP magnitude : 13.830
 BP magnitude : 14.872
 DUPflag : 0
 Distance (au) : 18.131
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.25
 Sun-Target sep (deg) : 153.33
 Sun-Moon sep (deg) : 21.96
 B (ring opening deg) : 76.88
 PA of pole (deg) : 51.76
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.895
 C/A sky separation (km) : 24922.9
 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_itrff93_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	2033-01-15T02:02:13.395		39.63	-57.90	50763.42	-18.02		
lambda	I	2033-01-15T02:02:54.315		39.50	-57.80	50026.71	-17.96		
delta	I	2033-01-15T02:04:31.038		39.20	-57.55	48300.35	-17.73		
gamma	I	2033-01-15T02:05:09.119		39.09	-57.45	47626.82	-17.64		
eta	I	2033-01-15T02:05:34.719		39.01	-57.38	47176.12	-17.57		
beta	I	2033-01-15T02:07:01.889		38.74	-57.16	45654.18	-17.33		
alpha	I	2033-01-15T02:07:57.593		38.57	-57.01	44696.40	-17.16		
4	I	2033-01-15T02:10:01.533		38.19	-56.69	42588.85	-16.74		
5	I	2033-01-15T02:10:28.101		38.11	-56.62	42156.09	-16.66		
6	I	2033-01-15T02:10:46.219		38.05	-56.57	41849.42	-16.61		
Uranus	I	2033-01-15T02:33:43.068		33.83	-52.83	25261.36		-9.49	-9.94
Uranus	E	2033-01-15T02:41:18.814		32.43	-51.55	25453.47		-5.60	-5.87
6	E	2033-01-15T03:04:30.710		28.18	-47.53	41872.91	16.54		
5	E	2033-01-15T03:04:53.182		28.11	-47.46	42244.20	16.59		
4	E	2033-01-15T03:05:10.332		28.06	-47.41	42526.13	16.67		
alpha	E	2033-01-15T03:07:19.129		27.67	-47.03	44702.72	17.08		
beta	E	2033-01-15T03:08:14.074		27.50	-46.87	45646.56	17.25		
eta	E	2033-01-15T03:09:42.125		27.23	-46.61	47176.12	17.49		
gamma	E	2033-01-15T03:10:07.531		27.16	-46.53	47621.29	17.55		
delta	E	2033-01-15T03:10:46.110		27.04	-46.42	48300.35	17.65		
lambda	E	2033-01-15T03:12:23.314		26.74	-46.13	50026.71	17.87		
epsilon	E	2033-01-15T03:13:30.737		26.54	-45.93	51236.20	17.93		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-15T02:43:41.880
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3427500076781265152
 2Mass ID (if available) : 05515017+2338283
 ICRS Star Coord at Epoch: 05h 51m 50.16688s +23:38:28.04722s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 12.649
 G magnitude : 14.438
 RP magnitude : 13.830
 BP magnitude : 14.872
 DUPflag : 0
 Distance (au) : 18.131
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.25
 Sun-Target sep (deg) : 153.33
 Sun-Moon sep (deg) : 23.08
 B (ring opening deg) : 76.88
 PA of pole (deg) : 51.76
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.995
 C/A sky separation (km) : 26236.2
 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

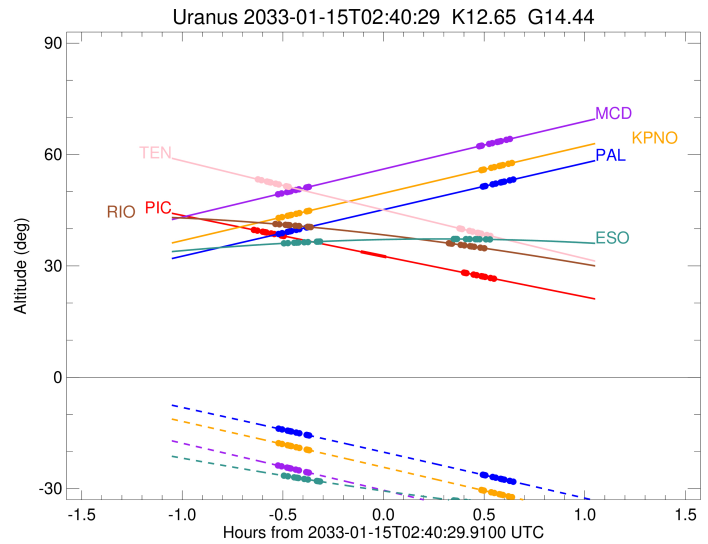
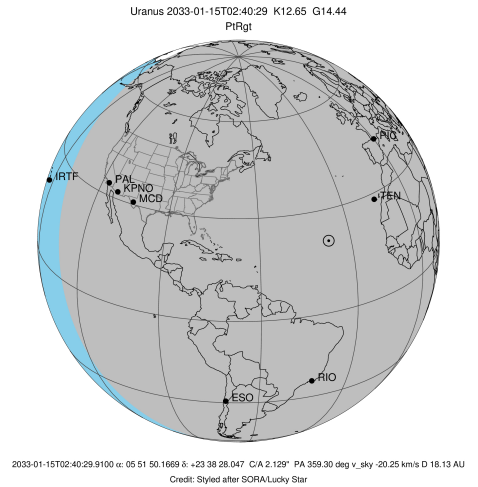


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-15T02:09:35.630		38.68	-13.92	50761.15	-17.71		
lambda	I	2033-01-15T02:10:17.161		38.82	-14.06	50026.71	-17.63		
delta	I	2033-01-15T02:11:55.743		39.17	-14.39	48300.35	-17.38		
gamma	I	2033-01-15T02:12:34.612		39.30	-14.52	47626.70	-17.28		
eta	I	2033-01-15T02:13:00.747		39.39	-14.60	47176.12	-17.20		
beta	I	2033-01-15T02:14:29.899		39.70	-14.90	45653.73	-16.93		
alpha	I	2033-01-15T02:15:26.967		39.90	-15.09	44695.77	-16.74		
4	I	2033-01-15T02:17:34.284		40.35	-15.52	42587.68	-16.27		
5	I	2033-01-15T02:18:01.571		40.44	-15.61	42155.72	-16.17		
6	I	2033-01-15T02:18:20.133		40.51	-15.68	41850.59	-16.11		

No planet occultations

6	E	2033-01-15T03:10:08.201		51.37	-26.26	41874.07	16.16		
5	E	2033-01-15T03:10:30.862		51.45	-26.34	42240.08	16.22		
4	E	2033-01-15T03:10:48.623		51.51	-26.40	42526.40	16.31		
alpha	E	2033-01-15T03:12:59.858		51.97	-26.85	44701.29	16.79		
beta	E	2033-01-15T03:13:55.754		52.16	-27.05	45645.93	16.98		
eta	E	2033-01-15T03:15:25.106		52.48	-27.35	47176.12	17.26		
gamma	E	2033-01-15T03:15:50.834		52.56	-27.44	47621.21	17.34		
delta	E	2033-01-15T03:16:29.883		52.70	-27.58	48300.35	17.45		
lambda	E	2033-01-15T03:18:08.107		53.04	-27.92	50026.71	17.70		
epsilon	E	2033-01-15T03:19:15.185		53.28	-28.15	51219.47	17.78		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-15T02:43:28.950
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3427500076781265152
 2Mass ID (if available) : 05515017+2338283
 ICRS Star Coord at Epoch: 05h 51m 50.16688s +23:38:28.04722s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 12.649
 G magnitude : 14.438
 RP magnitude : 13.830
 BP magnitude : 14.872
 DUPflag : 0
 Distance (au) : 18.131
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.25
 Sun-Target sep (deg) : 153.33
 Sun-Moon sep (deg) : 23.05
 B (ring opening deg) : 76.88
 PA of pole (deg) : 51.76
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.017
 C/A sky separation (km) : 26523.5
 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

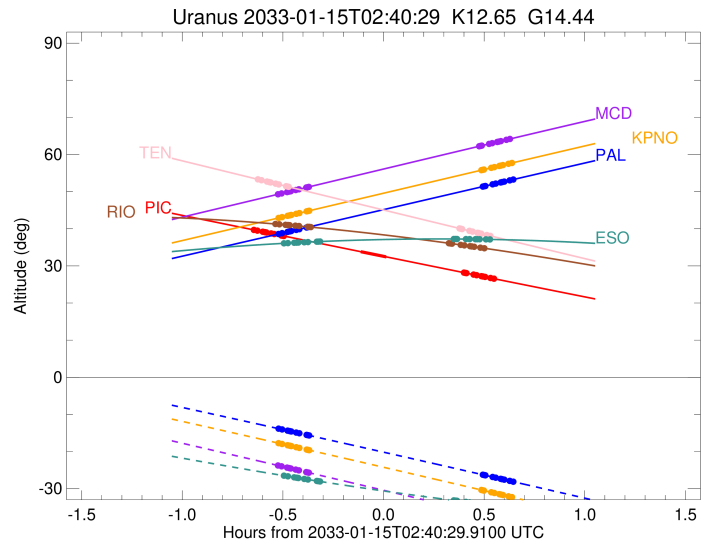
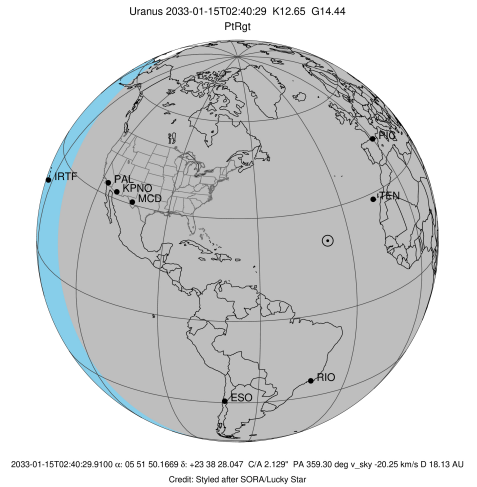


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-15T02:09:34.802		42.99	-17.83	50760.34	-17.66		
lambda	I	2033-01-15T02:10:16.396		43.14	-17.98	50026.71	-17.59		
delta	I	2033-01-15T02:11:55.269		43.49	-18.32	48300.35	-17.33		
gamma	I	2033-01-15T02:12:34.268		43.63	-18.45	47626.66	-17.22		
eta	I	2033-01-15T02:13:00.491		43.72	-18.54	47176.12	-17.14		
beta	I	2033-01-15T02:14:29.988		44.04	-18.85	45653.58	-16.86		
alpha	I	2033-01-15T02:15:27.303		44.24	-19.04	44695.56	-16.67		
4	I	2033-01-15T02:17:35.260		44.70	-19.48	42587.30	-16.18		
5	I	2033-01-15T02:18:02.677		44.79	-19.58	42155.61	-16.08		
6	I	2033-01-15T02:18:21.313		44.86	-19.64	41850.97	-16.02		

No planet occultations

6	E	2033-01-15T03:09:41.982		55.79	-30.37	41874.25	16.06		
5	E	2033-01-15T03:10:04.724		55.87	-30.45	42239.40	16.12		
4	E	2033-01-15T03:10:22.627		55.94	-30.51	42526.45	16.22		
alpha	E	2033-01-15T03:12:34.529		56.41	-30.98	44701.07	16.71		
beta	E	2033-01-15T03:13:30.685		56.60	-31.17	45645.83	16.91		
eta	E	2033-01-15T03:15:00.406		56.92	-31.49	47176.12	17.20		
gamma	E	2033-01-15T03:15:26.229		57.01	-31.58	47621.20	17.27		
delta	E	2033-01-15T03:16:05.418		57.15	-31.72	48300.35	17.39		
lambda	E	2033-01-15T03:17:43.961		57.50	-32.06	50026.71	17.65		
epsilon	E	2033-01-15T03:18:51.093		57.74	-32.30	51216.97	17.73		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-15T02:43:05.610
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3427500076781265152
 2Mass ID (if available) : 05515017+2338283
 ICRS Star Coord at Epoch: 05h 51m 50.16688s +23:38:28.04722s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 12.649
 G magnitude : 14.438
 RP magnitude : 13.830
 BP magnitude : 14.872
 DUPflag : 0
 Distance (au) : 18.131
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.25
 Sun-Target sep (deg) : 153.33
 Sun-Moon sep (deg) : 23.00
 B (ring opening deg) : 76.88
 PA of pole (deg) : 51.76
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.042
 C/A sky separation (km) : 26848.2
 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

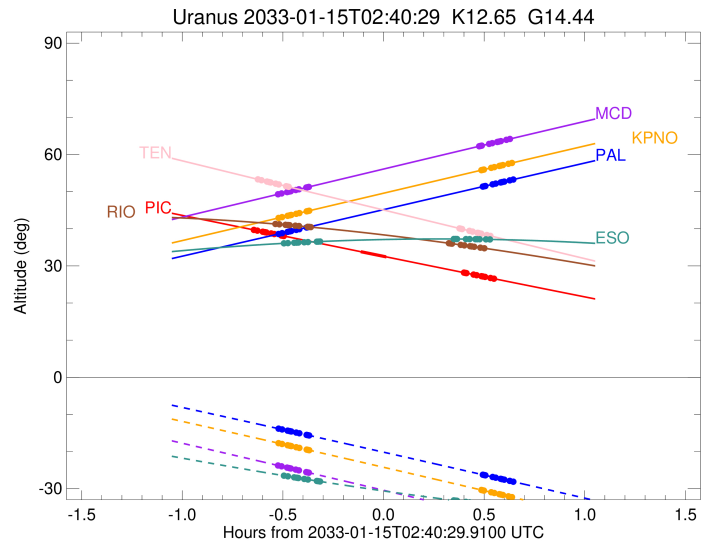
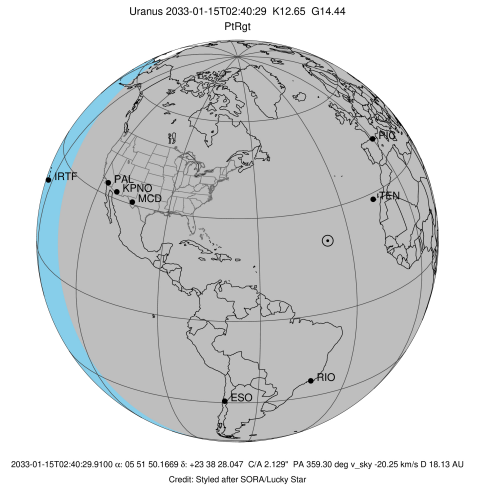


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-15T02:09:25.700		49.38	-23.84	50759.40	-17.62		
lambda	I	2033-01-15T02:10:07.357		49.53	-23.99	50026.71	-17.54		
delta	I	2033-01-15T02:11:46.543		49.88	-24.34	48300.35	-17.27		
gamma	I	2033-01-15T02:12:25.684		50.03	-24.48	47626.61	-17.15		
eta	I	2033-01-15T02:12:52.002		50.12	-24.57	47176.12	-17.08		
beta	I	2033-01-15T02:14:21.881		50.44	-24.89	45653.40	-16.78		
alpha	I	2033-01-15T02:15:19.469		50.65	-25.09	44695.31	-16.58		
4	I	2033-01-15T02:17:28.146		51.11	-25.54	42586.85	-16.08		
5	I	2033-01-15T02:17:55.707		51.21	-25.64	42155.50	-15.98		
6	I	2033-01-15T02:18:14.425		51.28	-25.71	41851.40	-15.91		

No planet occultations

6	E	2033-01-15T03:09:03.173		62.23	-36.55	41874.45	15.95		
5	E	2033-01-15T03:09:26.011		62.32	-36.63	42238.65	16.02		
4	E	2033-01-15T03:09:44.077		62.38	-36.69	42526.52	16.12		
alpha	E	2033-01-15T03:11:56.748		62.85	-37.17	44700.82	16.62		
beta	E	2033-01-15T03:12:53.202		63.06	-37.37	45645.72	16.83		
eta	E	2033-01-15T03:14:23.344		63.38	-37.69	47176.12	17.12		
gamma	E	2033-01-15T03:14:49.276		63.47	-37.78	47621.19	17.20		
delta	E	2033-01-15T03:15:28.625		63.61	-37.93	48300.35	17.32		
lambda	E	2033-01-15T03:17:07.530		63.96	-38.28	50026.71	17.59		
epsilon	E	2033-01-15T03:18:14.728		64.20	-38.52	51214.24	17.67		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-15T02:37:07.070
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3427500076781265152
 2Mass ID (if available) : 05515017+2338283
 ICRS Star Coord at Epoch: 05h 51m 50.16688s +23:38:28.04722s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 12.649
 G magnitude : 14.438
 RP magnitude : 13.830
 BP magnitude : 14.872
 DUPflag : 0
 Distance (au) : 18.131
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.25
 Sun-Target sep (deg) : 153.33
 Sun-Moon sep (deg) : 21.95
 B (ring opening deg) : 76.88
 PA of pole (deg) : 51.76
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.041
 C/A sky separation (km) : 26835.4
 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

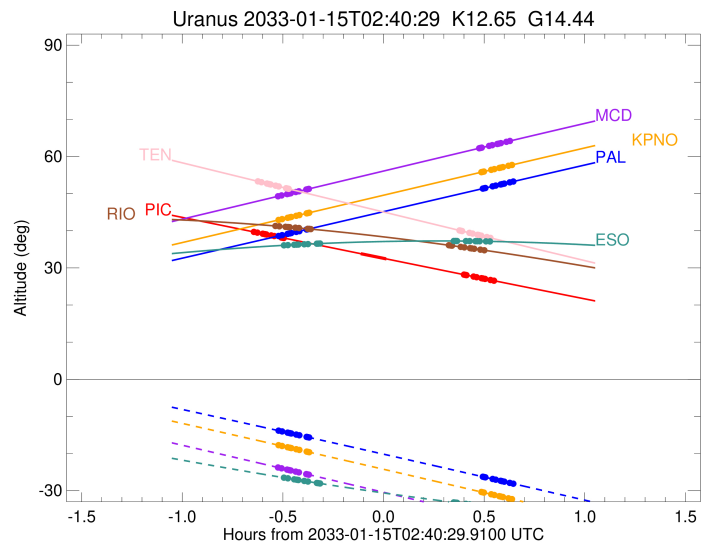
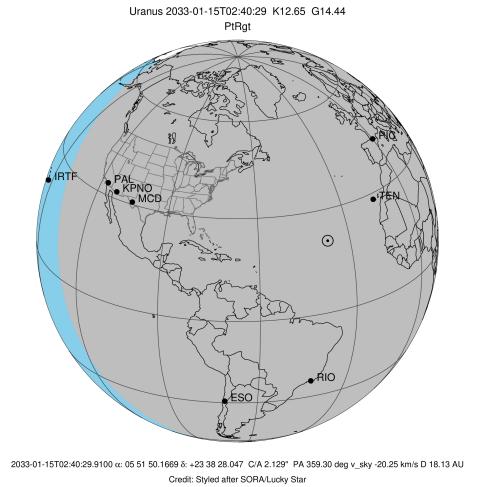


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-15T02:03:26.134		53.23	-77.00	50758.29	-17.65		
lambda	I	2033-01-15T02:04:07.642		53.08	-76.87	50026.71	-17.57		
delta	I	2033-01-15T02:05:46.634		52.72	-76.55	48300.35	-17.30		
gamma	I	2033-01-15T02:06:25.705		52.57	-76.43	47626.56	-17.19		
eta	I	2033-01-15T02:06:51.973		52.48	-76.34	47176.12	-17.11		
beta	I	2033-01-15T02:08:21.708		52.15	-76.05	45653.22	-16.81		
alpha	I	2033-01-15T02:09:19.209		51.93	-75.86	44695.07	-16.61		
4	I	2033-01-15T02:11:27.710		51.46	-75.44	42586.43	-16.10		
5	I	2033-01-15T02:11:55.206		51.36	-75.35	42155.40	-16.00		
6	I	2033-01-15T02:12:13.865		51.29	-75.29	41851.80	-15.94		

No planet occultations

6	E	2033-01-15T03:03:10.926		40.09	-64.55	41874.22	15.88		
5	E	2033-01-15T03:03:33.940		40.01	-64.47	42239.54	15.94		
4	E	2033-01-15T03:03:52.039		39.94	-64.41	42526.44	16.04		
alpha	E	2033-01-15T03:06:05.371		39.45	-63.92	44701.14	16.54		
beta	E	2033-01-15T03:07:02.099		39.25	-63.72	45645.87	16.74		
eta	E	2033-01-15T03:08:32.705		38.92	-63.39	47176.12	17.03		
gamma	E	2033-01-15T03:08:58.778		38.82	-63.29	47621.21	17.11		
delta	E	2033-01-15T03:09:38.340		38.68	-63.15	48300.35	17.22		
lambda	E	2033-01-15T03:11:17.799		38.32	-62.79	50026.71	17.49		
epsilon	E	2033-01-15T03:12:25.636		38.07	-62.54	51218.66	17.57		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-15T02:38:43.920
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3427500076781265152
 2Mass ID (if available) : 05515017+2338283
 ICRS Star Coord at Epoch: 05h 51m 50.16688s +23:38:28.04722s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 12.649
 G magnitude : 14.438
 RP magnitude : 13.830
 BP magnitude : 14.872
 DUPflag : 0
 Distance (au) : 18.131
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.25
 Sun-Target sep (deg) : 153.33
 Sun-Moon sep (deg) : 22.01
 B (ring opening deg) : 76.88
 PA of pole (deg) : 51.76
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.474
 C/A sky separation (km) : 32529.0
 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

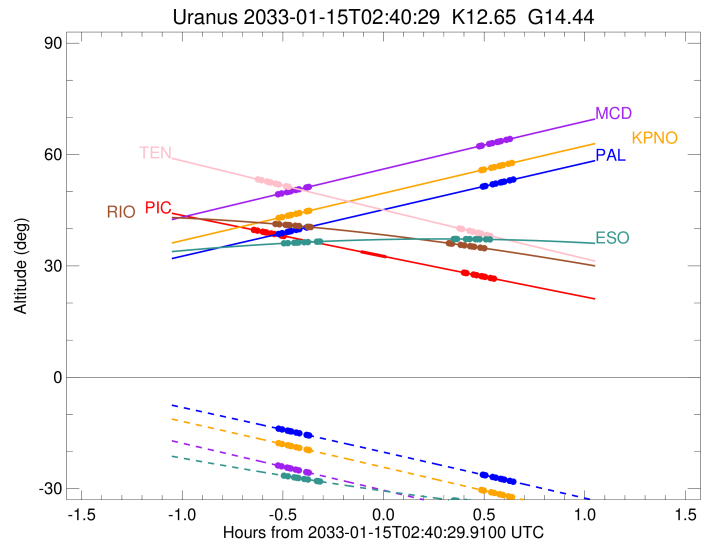
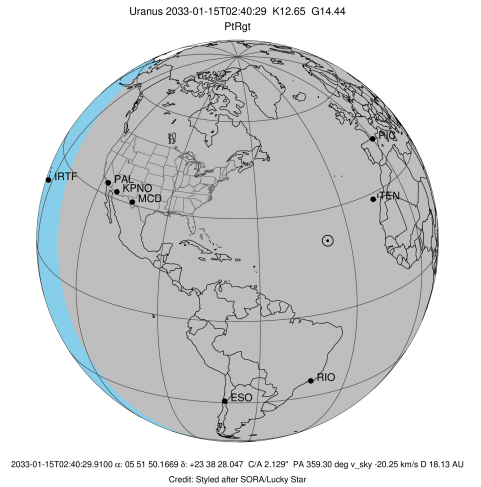


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-01-15T02:08:42.465		41.26	-44.26	50747.13	-15.99		
lambda	I	2033-01-15T02:09:27.704		41.20	-44.31	50026.71	-15.84		
delta	I	2033-01-15T02:11:18.219		41.06	-44.44	48300.35	-15.39		
gamma	I	2033-01-15T02:12:02.310		41.01	-44.49	47625.75	-15.20		
eta	I	2033-01-15T02:12:32.012		40.97	-44.52	47176.12	-15.07		
beta	I	2033-01-15T02:14:14.862		40.83	-44.63	45650.29	-14.57		
alpha	I	2033-01-15T02:15:21.657		40.74	-44.70	44691.23	-14.23		
4	I	2033-01-15T02:17:54.447		40.53	-44.85	42578.14	-13.33		
5	I	2033-01-15T02:18:26.994		40.48	-44.88	42155.03	-13.16		
6	I	2033-01-15T02:18:49.104		40.45	-44.90	41859.28	-13.03		

No planet occultations

6	E	2033-01-15T03:00:01.263		36.10	-46.17	41877.66	13.00		
5	E	2033-01-15T03:00:27.730		36.05	-46.17	42223.70	13.14		
4	E	2033-01-15T03:00:50.797		36.00	-46.17	42528.60	13.31		
alpha	E	2033-01-15T03:03:28.217		35.67	-46.17	44696.29	14.20		
beta	E	2033-01-15T03:04:34.103		35.53	-46.17	45643.87	14.54		
eta	E	2033-01-15T03:06:17.665		35.31	-46.16	47176.12	15.04		
gamma	E	2033-01-15T03:06:47.121		35.25	-46.16	47621.02	15.17		
delta	E	2033-01-15T03:07:31.625		35.15	-46.15	48300.35	15.36		
lambda	E	2033-01-15T03:09:22.404		34.91	-46.14	50026.71	15.80		
epsilon	E	2033-01-15T03:10:33.607		34.75	-46.12	51161.11	15.95		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-01-15T02:40:50.610
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3427500076781265152
 2Mass ID (if available) : 05515017+2338283
 ICRS Star Coord at Epoch: 05h 51m 50.16688s +23:38:28.04722s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 12.649
 G magnitude : 14.438
 RP magnitude : 13.830
 BP magnitude : 14.872
 DUPflag : 0
 Distance (au) : 18.131
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.25
 Sun-Target sep (deg) : 153.33
 Sun-Moon sep (deg) : 22.35
 B (ring opening deg) : 76.88
 PA of pole (deg) : 51.76
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.520
 C/A sky separation (km) : 33142.6
 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_itrff93_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	2033-01-15T02:11:15.133		36.10	-26.57	50746.49	-15.76		
lambda	I	2033-01-15T02:12:01.027		36.14	-26.69	50026.71	-15.59		
delta	I	2033-01-15T02:13:53.383		36.23	-26.96	48300.35	-15.13		
gamma	I	2033-01-15T02:14:38.279		36.27	-27.07	47625.67	-14.92		
eta	I	2033-01-15T02:15:08.538		36.29	-27.14	47176.12	-14.79		
beta	I	2033-01-15T02:16:53.519		36.37	-27.40	45650.02	-14.26		
alpha	I	2033-01-15T02:18:01.849		36.42	-27.56	44690.89	-13.89		
4	I	2033-01-15T02:20:38.779		36.52	-27.93	42577.25	-12.95		
5	I	2033-01-15T02:21:12.227		36.55	-28.01	42155.17	-12.76		
6	I	2033-01-15T02:21:34.995		36.56	-28.07	41860.03	-12.61		

No planet occultations

6	E	2033-01-15T03:01:29.375		37.25	-33.17	41878.01	12.62		
5	E	2033-01-15T03:01:56.429		37.25	-33.22	42221.51	12.76		
4	E	2033-01-15T03:02:20.347		37.24	-33.26	42529.03	12.95		
alpha	E	2033-01-15T03:05:01.622		37.22	-33.56	44695.66	13.89		
beta	E	2033-01-15T03:06:08.911		37.21	-33.69	45643.64	14.26		
eta	E	2033-01-15T03:07:54.392		37.19	-33.88	47176.12	14.79		
gamma	E	2033-01-15T03:08:24.339		37.19	-33.93	47621.00	14.92		
delta	E	2033-01-15T03:09:09.550		37.18	-34.01	48300.35	15.13		
lambda	E	2033-01-15T03:11:01.909		37.15	-34.21	50026.71	15.59		
epsilon	E	2033-01-15T03:12:13.504		37.13	-34.34	51153.05	15.76		