

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-08T22:22:21.670
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 866276452427567744
 2Mass ID (if available) : 07253903+2228393

ICRS Star Coord at Epoch: 07h 25m 39.03329s +22:28:39.57504s

RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.872
 G magnitude : 18.139
 RP magnitude : 17.167
 BP magnitude : 19.063
 DUPflag : 0
 Distance (au) : 18.152
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.22
 Sun-Target sep (deg) : 121.80
 Sun-Moon sep (deg) : 89.41
 B (ring opening deg) : 56.99
 PA of pole (deg) : 83.29

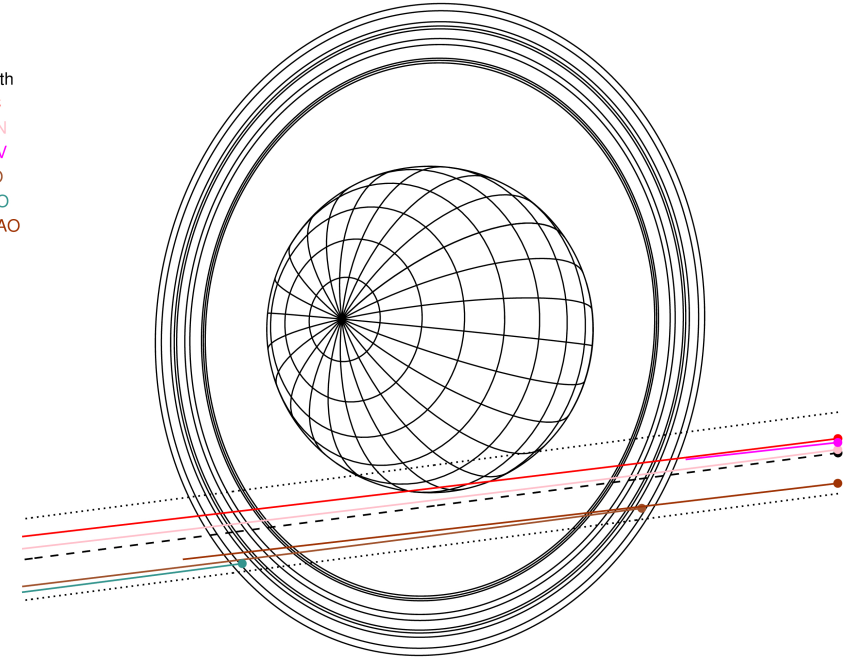
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2038-03-08T22:22:21.6700 α: 07 25 39.0333 δ: +22 28 39.575 C/A 2.082" PA 7.46 deg v_sky - 9.22 km/s D 18.15 AU
 Credit: Styled after SORA/Lucky Star

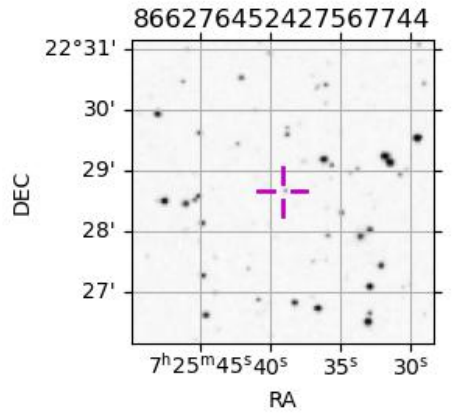
Uranus 2038-03-08T22:22:21 K14.87 G18.14 PtRgt

Earth
 PIC
 TEN
 KAV
 RIO
 ESO
 SAAO

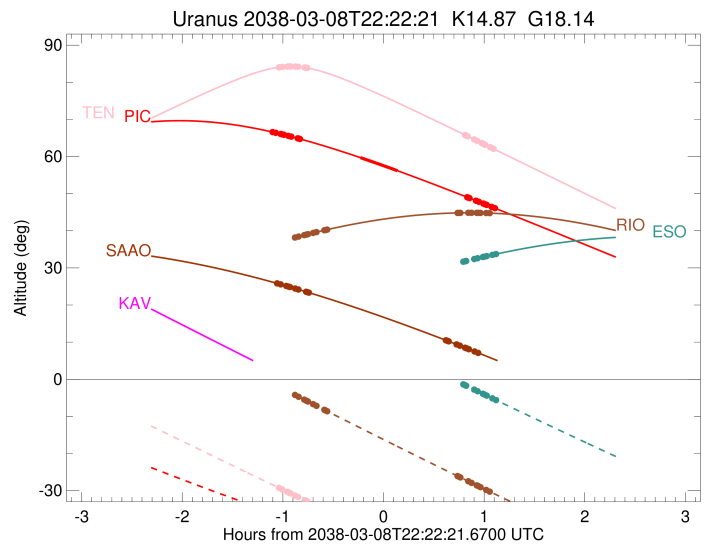
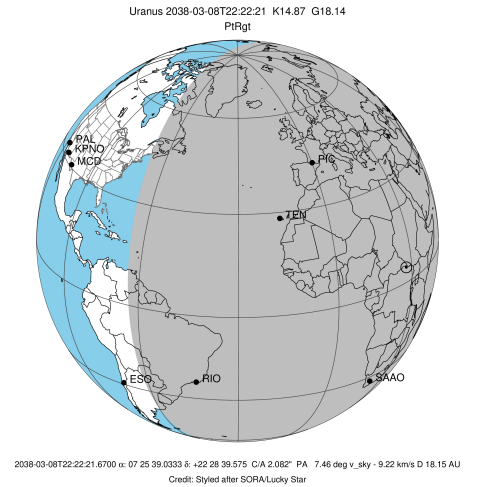


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+ +	+++++	MAR 08 21:16 - MAR 08 23:29	PieRie
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	+++++		+++++	MAR 08 21:20 - MAR 08 23:28	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	+++++		+++++	MAR 08 21:35 - MAR 08 23:26	PnnRie
ESO	European Southern Obs	-29.3	289.3			++	MAR 08 23:27 - MAR 08 23:30	PnnRne
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++		+++++	MAR 08 21:19 - MAR 08 23:19	PnnRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

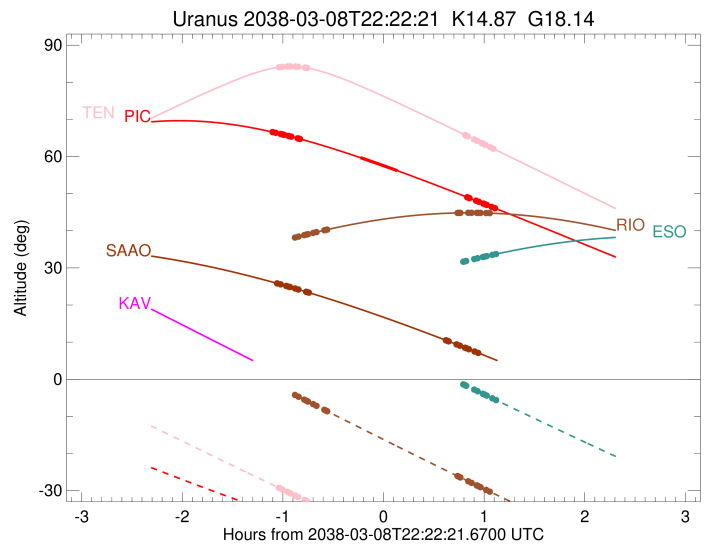
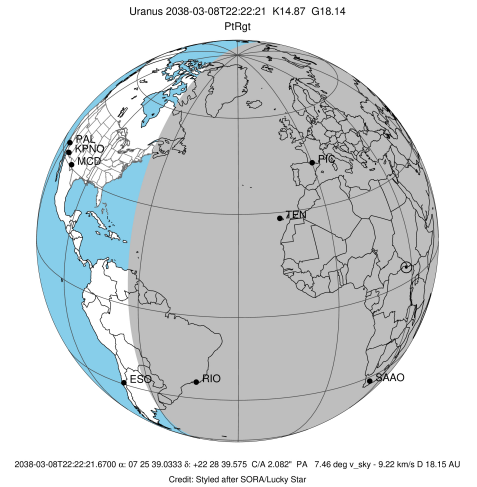


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-08T22:19:17.030
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 866276452427567744
 2Mass ID (if available) : 07253903+2228393
 ICRS Star Coord at Epoch: 07h 25m 39.03329s +22:28:39.57504s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.872
 G magnitude : 18.139
 RP magnitude : 17.167
 BP magnitude : 19.063
 DUPflag : 0
 Distance (au) : 18.152
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.22
 Sun-Target sep (deg) : 121.80
 Sun-Moon sep (deg) : 90.16
 B (ring opening deg) : 56.99
 PA of pole (deg) : 83.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.879
 C/A sky separation (km) : 24732.4
 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_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	2038-03-08T21:16:52.959		66.52	-35.96	50779.13	-9.86		
lambda	I	2038-03-08T21:18:09.608		66.39	-36.16	50026.71	-9.79		
delta	I	2038-03-08T21:21:06.990		66.07	-36.61	48300.35	-9.67		
gamma	I	2038-03-08T21:22:17.268		65.94	-36.79	47622.48	-9.62		
eta	I	2038-03-08T21:23:03.756		65.86	-36.91	47176.12	-9.58		
beta	I	2038-03-08T21:25:41.120		65.56	-37.31	45677.92	-9.46		
alpha	I	2038-03-08T21:27:21.823		65.36	-37.56	44722.79	-9.37		
4	I	2038-03-08T21:31:15.957		64.90	-38.14	42570.64	-9.15		
5	I	2038-03-08T21:32:00.862		64.81	-38.25	42165.52	-9.10		
6	I	2038-03-08T21:32:35.752		64.73	-38.34	41846.90	-9.05		
Uranus	I	2038-03-08T22:08:36.530		59.70	-43.31	25470.43		-14.52	-15.17
Uranus	E	2038-03-08T22:30:36.284		56.19	-45.92	25558.86		0.58	0.61
6	E	2038-03-08T23:12:10.655		49.06	-49.71	41794.84	8.95		
5	E	2038-03-08T23:12:54.240		48.93	-49.76	42217.95	8.99		
4	E	2038-03-08T23:13:39.023		48.80	-49.82	42614.38	9.05		
alpha	E	2038-03-08T23:17:33.572		48.10	-50.08	44747.95	9.26		
beta	E	2038-03-08T23:19:11.944		47.81	-50.18	45664.39	9.34		
eta	E	2038-03-08T23:21:52.616		47.33	-50.34	47176.12	9.46		
gamma	E	2038-03-08T23:22:39.959		47.19	-50.39	47624.67	9.49		
delta	E	2038-03-08T23:23:50.966		46.98	-50.46	48300.35	9.54		
lambda	E	2038-03-08T23:26:50.852		46.44	-50.63	50026.71	9.65		
epsilon	E	2038-03-08T23:29:21.342		45.99	-50.76	51485.81	9.71		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-08T22:20:38.280
 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 : 866276452427567744
 2Mass ID (if available) : 07253903+2228393
 ICRS Star Coord at Epoch: 07h 25m 39.03329s +22:28:39.57504s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.872
 G magnitude : 18.139
 RP magnitude : 17.167
 BP magnitude : 19.063
 DUPflag : 0
 Distance (au) : 18.152
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.22
 Sun-Target sep (deg) : 121.80
 Sun-Moon sep (deg) : 90.28
 B (ring opening deg) : 56.99
 PA of pole (deg) : 83.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.021
 C/A sky separation (km) : 26606.2
 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

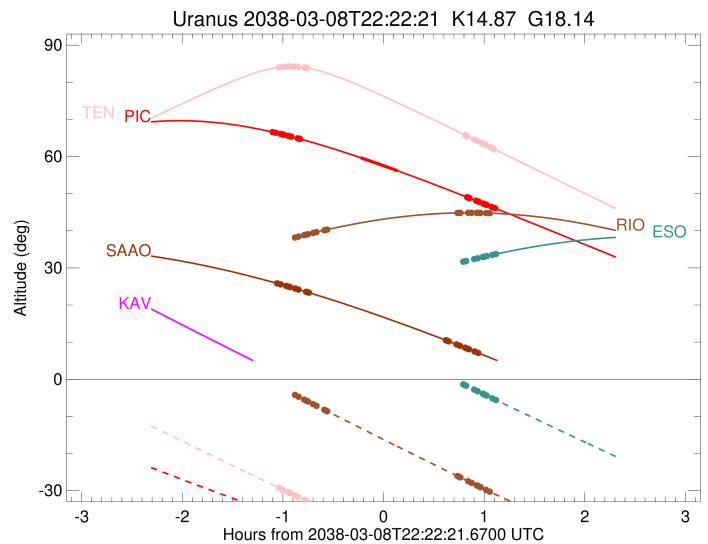
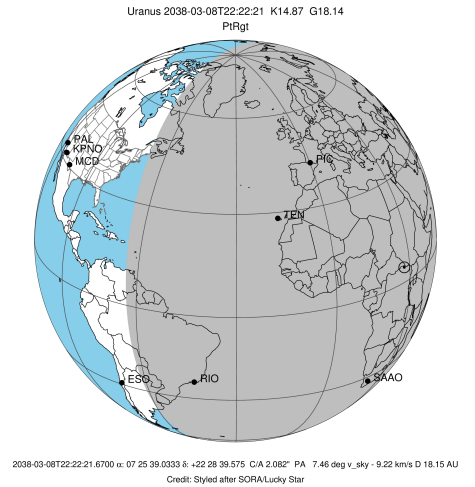


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-03-08T21:20:41.246		84.09	-29.40	50786.30	-9.69		
lambda	I	2038-03-08T21:22:00.048		84.15	-29.68	50026.71	-9.61		
delta	I	2038-03-08T21:25:01.018		84.25	-30.33	48300.35	-9.47		
gamma	I	2038-03-08T21:26:12.873		84.26	-30.59	47622.32	-9.40		
eta	I	2038-03-08T21:27:00.420		84.27	-30.76	47176.12	-9.36		
beta	I	2038-03-08T21:29:41.691		84.24	-31.34	45678.44	-9.21		
alpha	I	2038-03-08T21:31:25.078		84.19	-31.71	44724.48	-9.11		
4	I	2038-03-08T21:35:26.456		83.97	-32.57	42573.11	-8.84		
5	I	2038-03-08T21:36:13.411		83.91	-32.74	42163.42	-8.78		
6	I	2038-03-08T21:36:49.898		83.86	-32.87	41844.56	-8.72		

No planet occultations

6	E	2038-03-08T23:10:59.088		65.82	-51.99	41794.75	8.66		
5	E	2038-03-08T23:11:43.807		65.65	-52.13	42213.46	8.71		
4	E	2038-03-08T23:12:30.541		65.48	-52.27	42615.10	8.78		
alpha	E	2038-03-08T23:16:31.475		64.60	-53.01	44748.80	9.03		
beta	E	2038-03-08T23:18:12.226		64.23	-53.32	45665.40	9.13		
eta	E	2038-03-08T23:20:56.141		63.63	-53.81	47176.12	9.28		
gamma	E	2038-03-08T23:21:44.348		63.45	-53.95	47624.43	9.32		
delta	E	2038-03-08T23:22:56.641		63.19	-54.17	48300.35	9.38		
lambda	E	2038-03-08T23:25:59.348		62.52	-54.71	50026.71	9.52		
epsilon	E	2038-03-08T23:28:30.766		61.96	-55.15	51475.57	9.59		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-08T22:23:41.680
 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 : 866276452427567744
 2Mass ID (if available) : 07253903+2228393
 ICRS Star Coord at Epoch: 07h 25m 39.03329s +22:28:39.57504s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.872
 G magnitude : 18.139
 RP magnitude : 17.167
 BP magnitude : 19.063
 DUPflag : 0
 Distance (au) : 18.152
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.22
 Sun-Target sep (deg) : 121.80
 Sun-Moon sep (deg) : 90.02
 B (ring opening deg) : 56.99
 PA of pole (deg) : 83.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.436
 C/A sky separation (km) : 32065.6
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

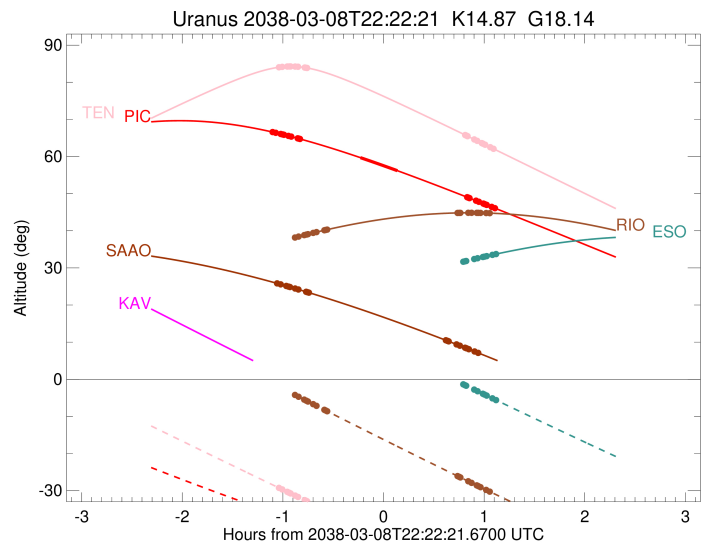
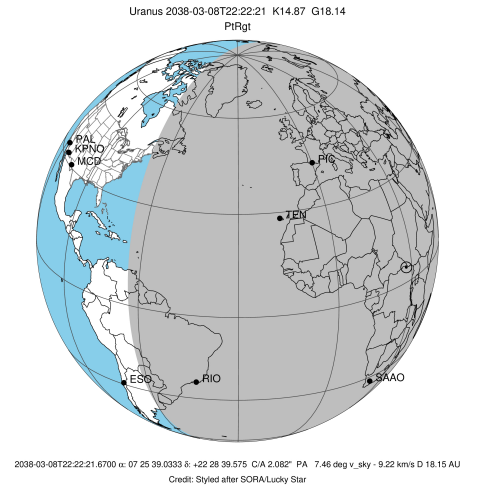


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-03-08T21:30:15.006		38.26	-4.38x	50812.16	-8.79		
lambda	I	2038-03-08T21:31:45.200		38.44	-4.72x	50026.71	-8.66		
delta	I	2038-03-08T21:35:07.150		38.83	-5.49	48300.35	-8.43		
gamma	I	2038-03-08T21:36:28.086		38.99	-5.80	47621.85	-8.33		
eta	I	2038-03-08T21:37:21.791		39.09	-6.01	47176.12	-8.27		
beta	I	2038-03-08T21:40:25.603		39.43	-6.71	45679.80	-8.02		
alpha	I	2038-03-08T21:42:24.590		39.64	-7.16	44729.71	-7.85		
4	I	2038-03-08T21:47:08.013		40.14	-8.24	42580.99	-7.40		
5	I	2038-03-08T21:48:05.915		40.24	-8.46	42158.12	-7.28		
6	I	2038-03-08T21:48:51.293		40.32	-8.63	41836.83	-7.19		

No planet occultations

6	E	2038-03-08T23:06:24.928	44.81	-26.05	41795.48	7.19
5	E	2038-03-08T23:07:17.499	44.82	-26.25	42199.19	7.28
4	E	2038-03-08T23:08:14.980	44.82	-26.46	42616.46	7.40
alpha	E	2038-03-08T23:12:55.847	44.84	-27.48	44750.96	7.85
beta	E	2038-03-08T23:14:51.424	44.84	-27.90	45668.57	8.02
eta	E	2038-03-08T23:17:56.325	44.83	-28.58	47176.12	8.27
gamma	E	2038-03-08T23:18:50.231	44.83	-28.77	47623.69	8.34
delta	E	2038-03-08T23:20:10.916	44.82	-29.07	48300.35	8.44
lambda	E	2038-03-08T23:23:32.788	44.78	-29.80	50026.71	8.66
epsilon	E	2038-03-08T23:26:14.230	44.74	-30.38	51439.09	8.79

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-08T22:27:14.310
 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 : 866276452427567744
 2Mass ID (if available) : 07253903+2228393
 ICRS Star Coord at Epoch: 07h 25m 39.03329s +22:28:39.57504s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.872
 G magnitude : 18.139
 RP magnitude : 17.167
 BP magnitude : 19.063
 DUPflag : 0
 Distance (au) : 18.153
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.22
 Sun-Target sep (deg) : 121.80
 Sun-Moon sep (deg) : 89.79
 B (ring opening deg) : 56.99
 PA of pole (deg) : 83.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.462
 C/A sky separation (km) : 32410.7
 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

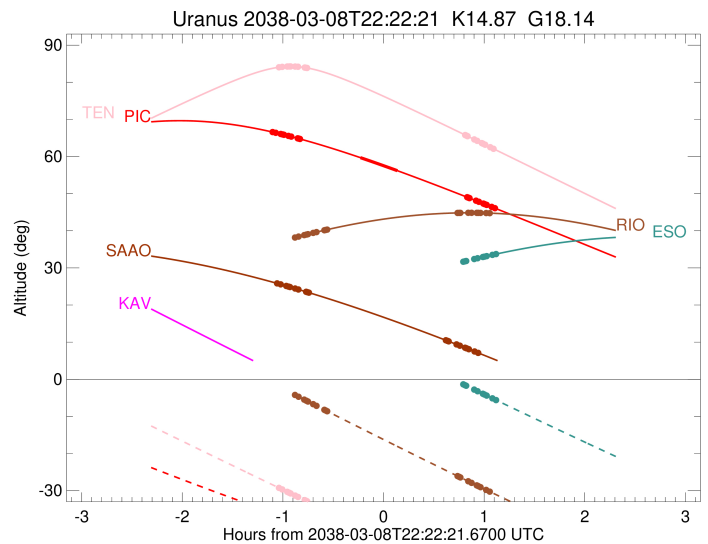
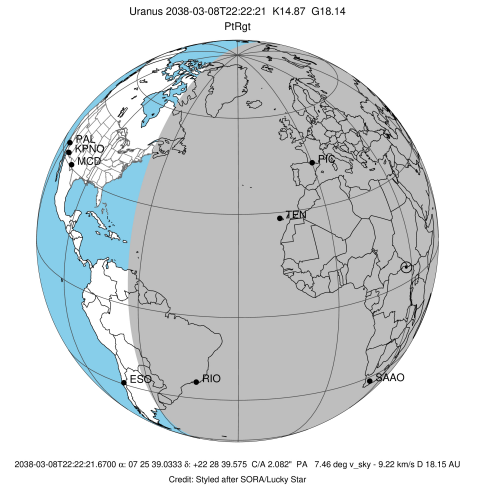


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-03-08T21:33:45.050		17.80	19.62x	50812.81	-8.60		
lambda	I	2038-03-08T21:35:17.333		18.06	19.29x	50026.71	-8.47		
delta	I	2038-03-08T21:38:43.911		18.64	18.54x	48300.35	-8.24		
gamma	I	2038-03-08T21:40:06.759		18.87	18.24x	47621.84	-8.14		
eta	I	2038-03-08T21:41:01.750		19.02	18.04x	47176.12	-8.07		
beta	I	2038-03-08T21:44:10.098		19.54	17.35x	45679.83	-7.82		
alpha	I	2038-03-08T21:46:12.139		19.87	16.91x	44729.88	-7.65		
4	I	2038-03-08T21:51:03.358		20.66	15.85x	42581.29	-7.19		
5	I	2038-03-08T21:52:03.027		20.82	15.63x	42157.96	-7.07		
6	I	2038-03-08T21:52:49.832		20.95	15.46x	41836.51	-6.98		

No planet occultations

6	E	2038-03-08T23:09:49.592		31.65	-1.35x	41795.65	7.02		
5	E	2038-03-08T23:10:43.339		31.75	-1.54x	42197.74	7.11		
4	E	2038-03-08T23:11:42.344		31.86	-1.75x	42616.51	7.23		
alpha	E	2038-03-08T23:16:29.097		32.39	-2.79x	44751.13	7.70		
beta	E	2038-03-08T23:18:26.876		32.60	-3.22x	45668.91	7.88		
eta	E	2038-03-08T23:21:34.942		32.93	-3.90x	47176.12	8.13		
gamma	E	2038-03-08T23:22:29.717		33.03	-4.10x	47623.61	8.20		
delta	E	2038-03-08T23:23:51.683		33.17	-4.39x	48300.35	8.31		
lambda	E	2038-03-08T23:27:16.528		33.51	-5.13	50026.71	8.54		
epsilon	E	2038-03-08T23:29:59.626		33.78	-5.72	51434.46	8.68		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-08T22:14:50.280
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 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 : 866276452427567744
 2Mass ID (if available) : 07253903+2228393
 ICRS Star Coord at Epoch: 07h 25m 39.03329s +22:28:39.57504s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.872
 G magnitude : 18.139
 RP magnitude : 17.167
 BP magnitude : 19.063
 DUPflag : 0
 Distance (au) : 18.152
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -9.22
 Sun-Target sep (deg) : 121.80
 Sun-Moon sep (deg) : 89.67
 B (ring opening deg) : 56.99
 PA of pole (deg) : 83.29
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.383
 C/A sky separation (km) : 31367.8
 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	2038-03-08T21:19:35.927		25.75	-47.71	50810.72	-8.86		
lambda	I	2038-03-08T21:21:05.176		25.56	-47.89	50026.71	-8.74		
delta	I	2038-03-08T21:24:25.181		25.13	-48.27	48300.35	-8.52		
gamma	I	2038-03-08T21:25:45.248		24.96	-48.42	47621.88	-8.43		
eta	I	2038-03-08T21:26:38.350		24.84	-48.51	47176.12	-8.36		
beta	I	2038-03-08T21:29:39.873		24.44	-48.84	45679.72	-8.13		
alpha	I	2038-03-08T21:31:37.192		24.18	-49.05	44729.33	-7.97		
4	I	2038-03-08T21:36:15.781		23.56	-49.52	42580.35	-7.55		
5	I	2038-03-08T21:37:12.388		23.43	-49.62	42158.48	-7.44		
6	I	2038-03-08T21:37:56.679		23.33	-49.69	41837.50	-7.35		

No planet occultations

6	E	2038-03-08T22:59:26.904		10.52	-53.12	41795.21	7.25		
5	E	2038-03-08T23:00:19.262		10.37	-53.11	42201.86	7.34		
4	E	2038-03-08T23:01:16.077		10.21	-53.09	42616.32	7.44		
alpha	E	2038-03-08T23:05:56.500		9.39	-52.97	44750.61	7.84		
beta	E	2038-03-08T23:07:52.289		9.05	-52.92	45667.96	7.99		
eta	E	2038-03-08T23:10:58.176		8.50	-52.81	47176.12	8.22		
gamma	E	2038-03-08T23:11:52.469		8.34	-52.78	47623.83	8.28		
delta	E	2038-03-08T23:13:13.770		8.10	-52.73	48300.35	8.36		
lambda	E	2038-03-08T23:16:37.611		7.50	-52.59	50026.71	8.57		
epsilon	E	2038-03-08T23:19:21.893		7.00	-52.46	51447.01	8.68		