

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-03-08T20:58:56.900
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3416207675751592448
 2Mass ID (if available) : 05282944+2324012

ICRS Star Coord at Epoch: 05h 28m 29.45218s +23:24:01.09888s

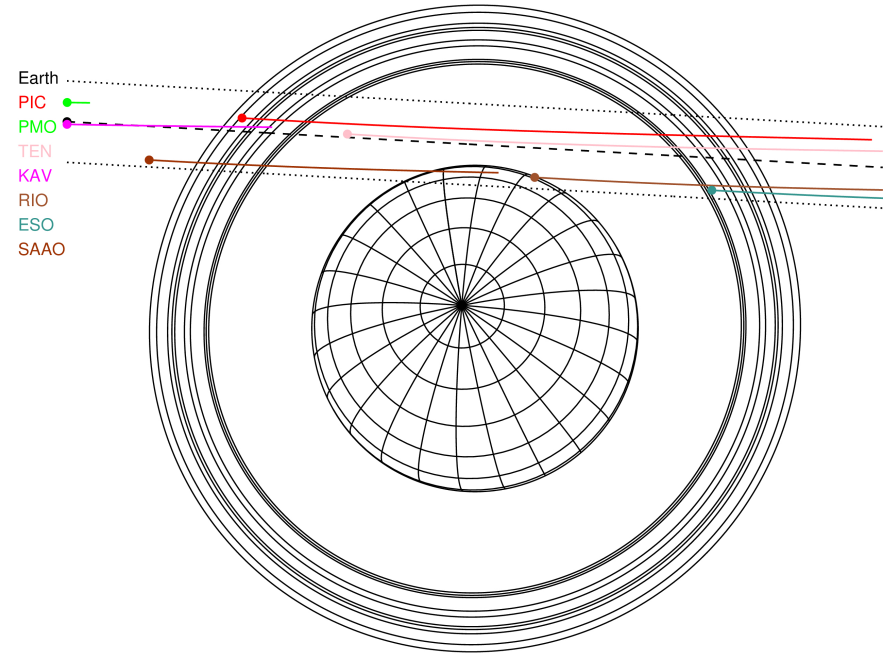
RUWE (>1.4 is poor) : 0.97
 K magnitude : 14.682
 G magnitude : 17.563
 RP magnitude : 16.626
 BP magnitude : 18.481
 DUPflag : 0
 Distance (au) : 18.970
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.05
 Sun-Target sep (deg) : 94.37
 Sun-Moon sep (deg) : 133.54
 B (ring opening deg) : 80.61
 PA of pole (deg) : 29.74

#	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



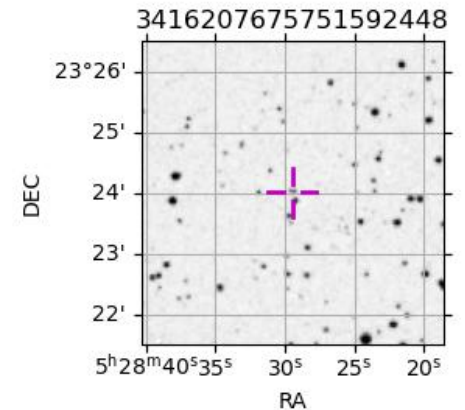
2032-03-08T20:58:56.9000 ra: 05 28 29.4522 s: +23 24 01.099 C/A 2.096° PA 176.79 deg v_sky + 4.06 km/s D 18.97 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2032-03-08T20:58:56 K14.68 G17.56 PtRgt



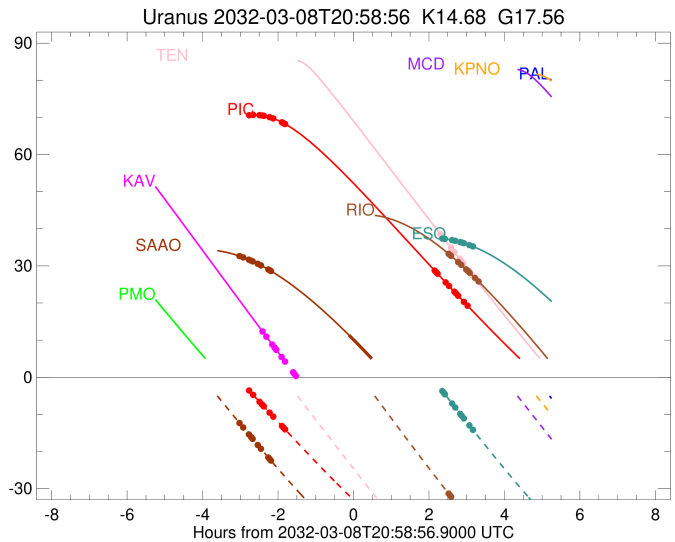
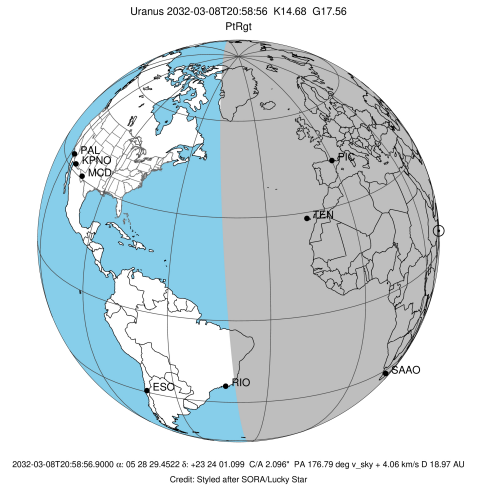
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++++		+++++++	MAR 08 18:29 - MAR 09 00:02	PnnRie
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 23:17 - MAR 09 00:10	PnnRne
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++			MAR 08 18:34 - MAR 08 19:04	PnnRin
RIO	Rio de Janeiro	-22.9	316.8			+++++++	MAR 08 23:30 - MAR 09 00:19	PnnRne
ESO	European Southern Obs	-29.3	289.3			+++++++	MAR 08 23:35 - MAR 09 00:10	PnnRne
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8	+++++++	+		MAR 08 17:57 - MAR 08 20:51	PinRin
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-03-08T21:09:45.810
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       : 3416207675751592448
2Mass ID (if available) : 05282944+2324012
ICRS Star Coord at Epoch: 05h 28m 29.45218s +23:24:01.09888s
RUWE (>1.4 is poor) : 0.97
K magnitude           : 14.682
G magnitude           : 17.563
RP magnitude          : 16.626
BP magnitude          : 18.481
DUPflag              : 0
Distance (au)        : 18.970
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : 4.05
Sun-Target sep (deg) : 94.37
Sun-Moon sep (deg)   : 133.81
B (ring opening deg) : 80.61
PA of pole (deg)     : 29.74
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.267
C/A sky separation (km) : 31189.0
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall11.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
  
```

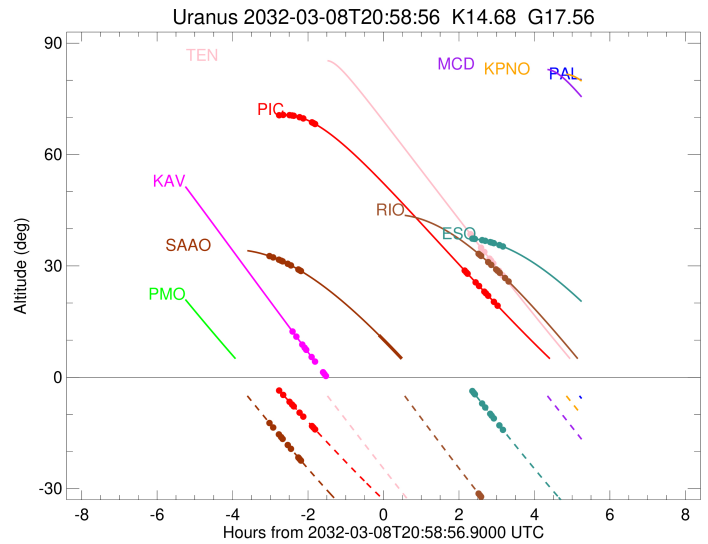
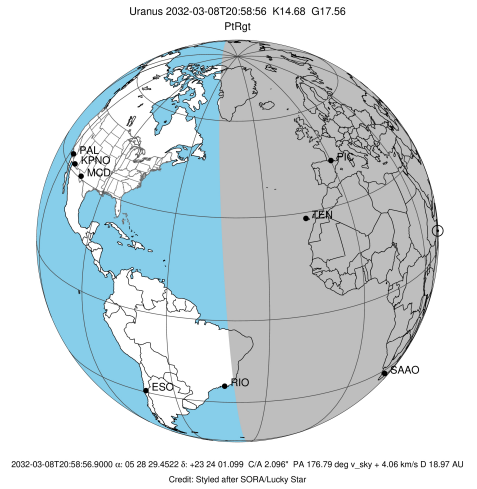


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-03-08T18:12:33.268		70.58	-3.50x	51241.78	-2.94		
lambda	I	2032-03-08T18:19:31.611		70.67	-4.77x	50026.71	-2.88		
delta	I	2032-03-08T18:29:37.391		70.61	-6.63	48300.35	-2.82		
gamma	I	2032-03-08T18:33:37.891		70.52	-7.36	47626.65	-2.79		
eta	I	2032-03-08T18:36:20.144		70.44	-7.86	47176.12	-2.77		
beta	I	2032-03-08T18:45:28.408		70.06	-9.53	45679.29	-2.69		
alpha	I	2032-03-08T18:51:15.878		69.73	-10.59	44752.41	-2.64		
4	I	2032-03-08T19:05:40.423		68.64	-13.23	42527.19	-2.51		
5	I	2032-03-08T19:07:46.788		68.45	-13.61	42202.54	-2.49		
6	I	2032-03-08T19:09:59.222		68.24	-14.01	41875.78	-2.46		

No planet occultations

6	E	2032-03-08T23:08:06.474		28.73	-49.25	41860.30	2.65		
5	E	2032-03-08T23:10:53.675		28.22	-49.45	42304.05	2.69		
4	E	2032-03-08T23:12:26.459		27.94	-49.56	42556.05	2.71		
alpha	E	2032-03-08T23:25:20.779		25.58	-50.37	44719.78	2.88		
beta	E	2032-03-08T23:30:41.444		24.61	-50.65	45651.83	2.94		
eta	E	2032-03-08T23:39:11.633		23.07	-51.02	47176.12	3.03		
gamma	E	2032-03-08T23:41:37.617		22.64	-51.11	47620.96	3.06		
delta	E	2032-03-08T23:45:18.260		21.97	-51.23	48300.35	3.10		
lambda	E	2032-03-08T23:54:27.495		20.33	-51.46	50026.71	3.19		
epsilon	E	2032-03-09T00:02:07.807		18.96	-51.58	51510.01	3.27		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-03-08T21:07:11.400
 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 : 3416207675751592448
 2Mass ID (if available) : 05282944+2324012
 ICRS Star Coord at Epoch: 05h 28m 29.45218s +23:24:01.09888s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 14.682
 G magnitude : 17.563
 RP magnitude : 16.626
 BP magnitude : 18.481
 DUPflag : 0
 Distance (au) : 18.970
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.05
 Sun-Target sep (deg) : 94.37
 Sun-Moon sep (deg) : 133.99
 B (ring opening deg) : 80.61
 PA of pole (deg) : 29.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.135
 C/A sky separation (km) : 29370.4
 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

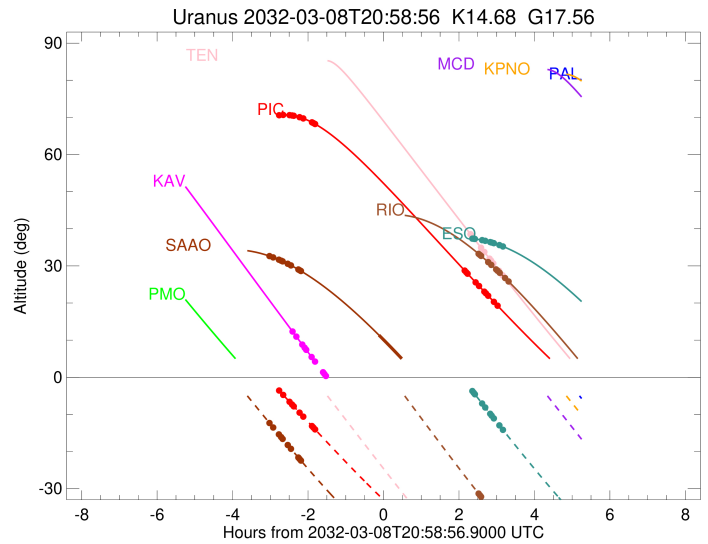
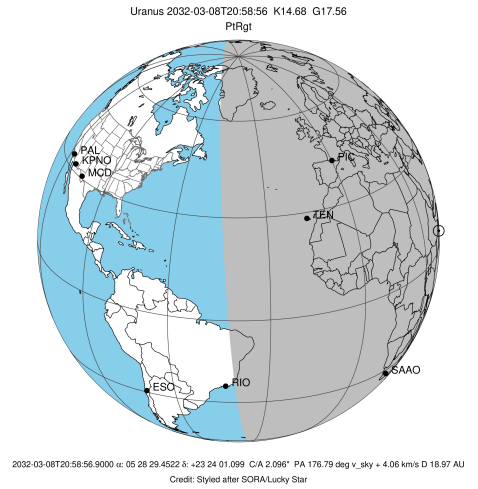


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-03-08T18:00:06.799		69.60	14.54x	51228.92	-3.01		
lambda	I	2032-03-08T18:06:50.550		71.07	13.10x	50026.71	-2.96		
delta	I	2032-03-08T18:16:40.140		73.20	10.98x	48300.35	-2.90		
gamma	I	2032-03-08T18:20:33.640		74.04	10.14x	47626.85	-2.87		
eta	I	2032-03-08T18:23:11.103		74.60	9.57x	47176.12	-2.85		
beta	I	2032-03-08T18:32:01.552		76.48	7.65x	45679.64	-2.79		
alpha	I	2032-03-08T18:37:36.757		77.66	6.43x	44752.32	-2.75		
4	I	2032-03-08T18:51:25.149		80.46	3.42x	42527.79	-2.63		
5	I	2032-03-08T18:53:27.342		80.86	2.97x	42198.77	-2.61		
6	I	2032-03-08T18:55:32.059		81.25	2.51x	41874.77	-2.59		

No planet occultations

6	E	2032-03-08T23:17:17.198		38.54	-53.03	41857.85	2.77		
5	E	2032-03-08T23:19:58.988		37.95	-53.52	42306.59	2.80		
4	E	2032-03-08T23:21:28.344		37.63	-53.79	42558.86	2.82		
alpha	E	2032-03-08T23:33:55.161		34.91	-55.96	44717.79	2.96		
beta	E	2032-03-08T23:39:07.679		33.78	-56.83	45650.84	3.01		
eta	E	2032-03-08T23:47:26.982		31.98	-58.18	47176.12	3.09		
gamma	E	2032-03-08T23:49:50.207		31.46	-58.55	47620.98	3.12		
delta	E	2032-03-08T23:53:27.004		30.68	-59.10	48300.35	3.15		
lambda	E	2032-03-09T00:02:28.271		28.73	-60.43	50026.71	3.23		
epsilon	E	2032-03-09T00:10:00.712		27.10	-61.45	51501.10	3.30		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-03-08T21:16:10.250
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 3416207675751592448
 2Mass ID (if available) : 05282944+2324012
 ICRS Star Coord at Epoch: 05h 28m 29.45218s +23:24:01.09888s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 14.682
 G magnitude : 17.563
 RP magnitude : 16.626
 BP magnitude : 18.481
 DUPflag : 0
 Distance (au) : 18.970
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.05
 Sun-Target sep (deg) : 94.37
 Sun-Moon sep (deg) : 132.72
 B (ring opening deg) : 80.61
 PA of pole (deg) : 29.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.260
 C/A sky separation (km) : 31098.1
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

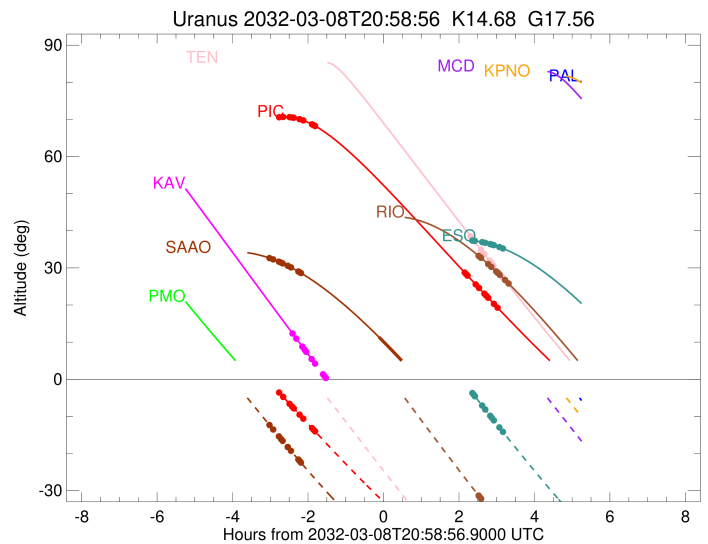
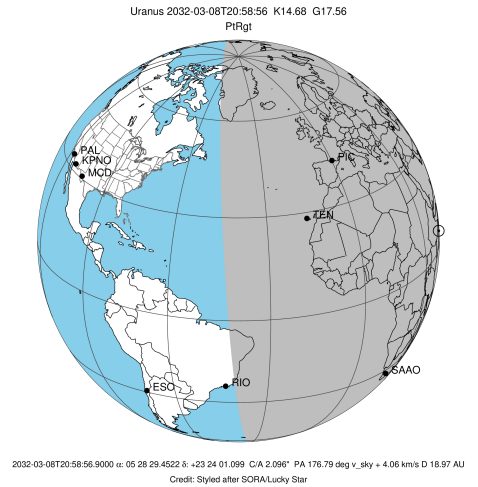


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-03-08T18:33:59.540		12.40	-80.40	51227.09	-3.13		
lambda	I	2032-03-08T18:40:27.403		10.93	-81.16	50026.71	-3.08		
delta	I	2032-03-08T18:49:53.655		8.79	-81.84	48300.35	-3.02		
gamma	I	2032-03-08T18:53:37.689		7.94	-81.94	47626.84	-2.99		
eta	I	2032-03-08T18:56:08.715		7.37	-81.94	47176.12	-2.98		
beta	I	2032-03-08T19:04:37.429		5.46	-81.62	45679.57	-2.91		
alpha	I	2032-03-08T19:09:58.968		4.25x	-81.16	44752.34	-2.86		
4	I	2032-03-08T19:23:15.285		1.27x	-79.37	42527.57	-2.73		
5	I	2032-03-08T19:25:12.410		0.83x	-79.05	42200.16	-2.71		
6	I	2032-03-08T19:27:13.145		0.38x	-78.71	41875.17	-2.68		

No planet occultations

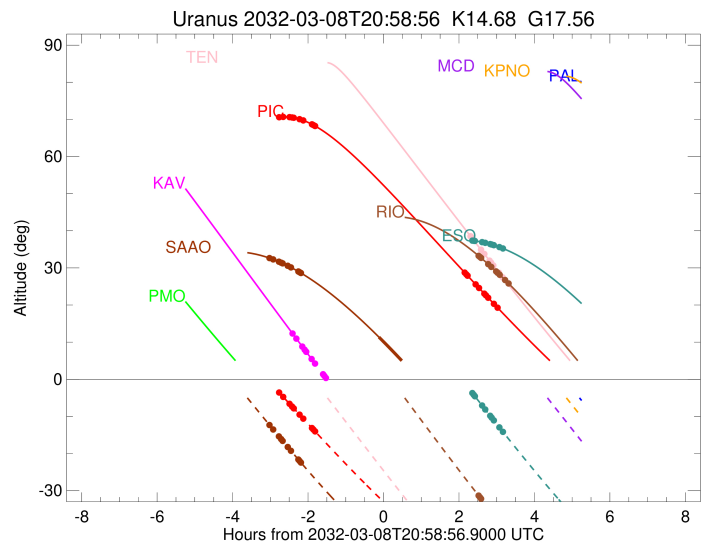
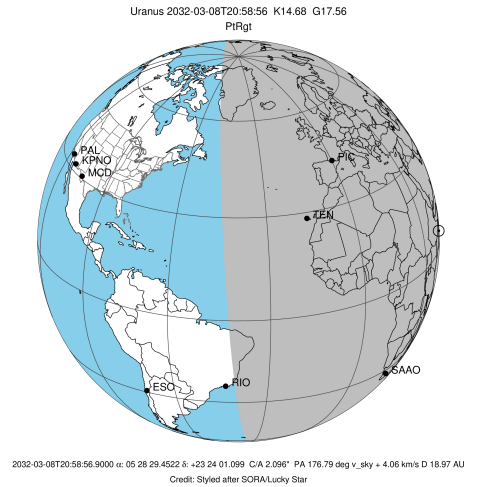
6	E	2032-03-08T23:02:42.653		-43.06x	-28.38	41860.40	2.95		
5	E	2032-03-08T23:05:12.782		-43.45x	-27.77	42303.94	2.99		
4	E	2032-03-08T23:06:36.159		-43.67x	-27.43	42555.94	3.01		
alpha	E	2032-03-08T23:18:13.131		-45.41x	-24.59	44719.83	3.19		
beta	E	2032-03-08T23:23:02.295		-46.10x	-23.42	45651.85	3.26		
eta	E	2032-03-08T23:30:43.069		-47.16x	-21.54	47176.12	3.36		
gamma	E	2032-03-08T23:32:55.076		-47.45x	-21.00	47620.96	3.38		
delta	E	2032-03-08T23:36:14.733		-47.88x	-20.19	48300.35	3.42		
lambda	E	2032-03-08T23:44:32.467		-48.91x	-18.17	50026.71	3.51		
epsilon	E	2032-03-08T23:51:30.377		-49.71x	-16.47	51509.74	3.59		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-03-08T20:57:03.600
 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 : 3416207675751592448
 2Mass ID (if available) : 05282944+2324012
 ICRS Star Coord at Epoch: 05h 28m 29.45218s +23:24:01.09888s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 14.682
 G magnitude : 17.563
 RP magnitude : 16.626
 BP magnitude : 18.481
 DUPflag : 0
 Distance (au) : 18.970
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.05
 Sun-Target sep (deg) : 94.37
 Sun-Moon sep (deg) : 134.04
 B (ring opening deg) : 80.61
 PA of pole (deg) : 29.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.759
 C/A sky separation (km) : 24202.1
 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



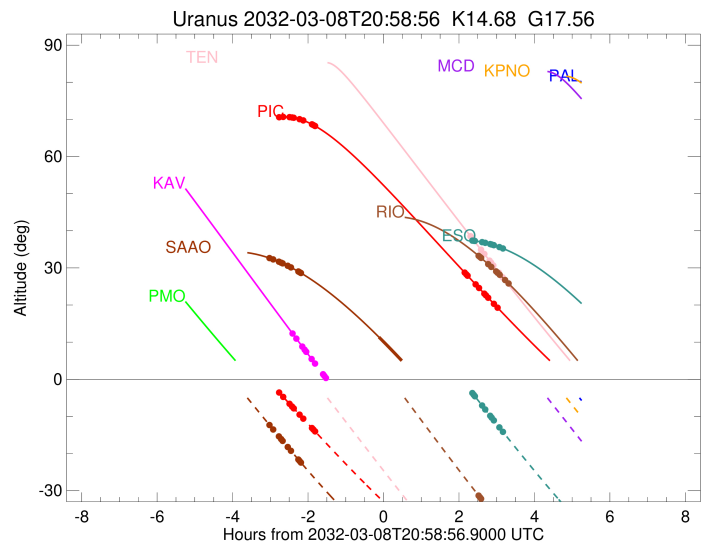
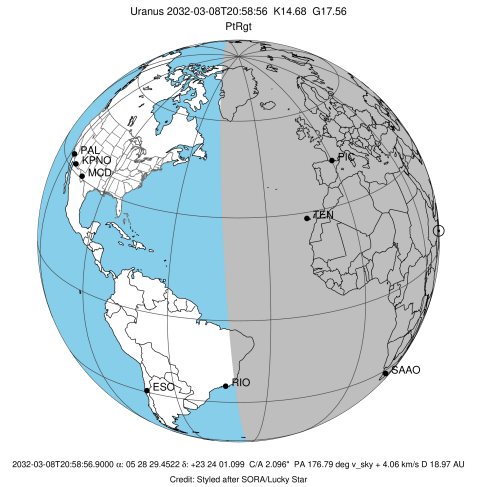
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-03-08T17:36:39.782		19.59	48.72x	51189.76	-3.34		
lambda	I	2032-03-08T17:42:30.721		20.66	47.46x	50026.71	-3.30		
delta	I	2032-03-08T17:51:17.553		22.24	45.54x	48300.35	-3.25		
gamma	I	2032-03-08T17:54:44.981		22.86	44.78x	47627.43	-3.23		
eta	I	2032-03-08T17:57:04.795		23.27	44.26x	47176.12	-3.22		
beta	I	2032-03-08T18:04:52.570		24.62	42.54x	45680.44	-3.17		
alpha	I	2032-03-08T18:09:46.588		25.46	41.44x	44751.72	-3.14		
4	I	2032-03-08T18:21:43.101		27.46	38.77x	42529.94	-3.06		
5	I	2032-03-08T18:23:31.957		27.76	38.36x	42189.26	-3.05		
6	I	2032-03-08T18:25:16.029		28.04	37.97x	41871.60	-3.04		
Uranus	I	2032-03-08T20:27:45.659		42.42	9.92x	25046.03		8.89	9.30
Uranus	E	2032-03-08T21:30:51.644		43.66	-4.60x	25322.92		5.97	6.25
6	E	2032-03-08T23:30:09.851		33.25	-31.33	41850.75	3.09		
5	E	2032-03-08T23:32:38.918		32.90	-31.87	42311.93	3.11		
4	E	2032-03-08T23:34:00.773		32.70	-32.16	42566.78	3.11		
alpha	E	2032-03-08T23:45:19.691		31.03	-34.58	44712.23	3.20		
beta	E	2032-03-08T23:50:10.511		30.29	-35.61	45648.22	3.24		
eta	E	2032-03-08T23:57:59.051		29.06	-37.25	47176.12	3.29		
gamma	E	2032-03-09T00:00:14.170		28.70	-37.72	47621.12	3.30		
delta	E	2032-03-09T00:03:39.315		28.15	-38.43	48300.35	3.32		
lambda	E	2032-03-09T00:12:15.125		26.74	-40.20	50026.71	3.37		
epsilon	E	2032-03-09T00:19:20.718		25.55	-41.65	51470.15	3.42		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-03-08T20:47:58.200
 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 : 3416207675751592448
 2Mass ID (if available) : 05282944+2324012
 ICRS Star Coord at Epoch: 05h 28m 29.45218s +23:24:01.09888s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 14.682
 G magnitude : 17.563
 RP magnitude : 16.626
 BP magnitude : 18.481
 DUPflag : 0
 Distance (au) : 18.970
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.05
 Sun-Target sep (deg) : 94.37
 Sun-Moon sep (deg) : 134.17
 B (ring opening deg) : 80.61
 PA of pole (deg) : 29.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.764
 C/A sky separation (km) : 24269.2
 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_itrfr93_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	2032-03-08T17:35:01.271	-5.17x	63.47x	51194.55	-3.50			
lambda	I	2032-03-08T17:40:38.152	-4.05x	62.95x	50026.71	-3.45			
delta	I	2032-03-08T17:49:01.946	-2.38x	62.07x	48300.35	-3.40			
gamma	I	2032-03-08T17:52:20.373	-1.73x	61.69x	47627.36	-3.38			
eta	I	2032-03-08T17:54:34.106	-1.29x	61.42x	47176.12	-3.37			
beta	I	2032-03-08T18:02:01.742	0.17x	60.49x	45680.36	-3.32			
alpha	I	2032-03-08T18:06:43.150	1.08x	59.86x	44751.81	-3.28			
4	I	2032-03-08T18:18:09.553	3.28x	58.22x	42529.68	-3.20			
5	I	2032-03-08T18:19:53.448	3.61x	57.96x	42190.22	-3.19			
6	I	2032-03-08T18:21:33.421	3.93x	57.71x	41871.96	-3.17			
Uranus	I	2032-03-08T20:20:21.282	24.23	35.25x	25055.60			8.80	9.21
Uranus	E	2032-03-08T21:20:17.035	31.77	22.44x	25329.76			5.88	6.16
6	E	2032-03-08T23:20:13.596	37.34	-3.71x	41849.93	3.04			
5	E	2032-03-08T23:22:45.281	37.30	-4.26x	42312.38	3.06			
4	E	2032-03-08T23:24:08.587	37.27	-4.56x	42567.70	3.07			
alpha	E	2032-03-08T23:35:38.450	36.95	-7.04	44711.54	3.15			
beta	E	2032-03-08T23:40:34.777	36.77	-8.11	45647.90	3.18			
eta	E	2032-03-08T23:48:32.736	36.42	-9.82	47176.12	3.22			
gamma	E	2032-03-08T23:50:50.689	36.31	-10.32	47621.14	3.23			
delta	E	2032-03-08T23:54:20.235	36.13	-11.07	48300.35	3.25			
lambda	E	2032-03-09T00:03:07.753	35.61	-12.95	50026.71	3.29			
epsilon	E	2032-03-09T00:10:22.072	35.13	-14.49	51464.84	3.34			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-03-08T21:14:33.100
 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 : 3416207675751592448
 2Mass ID (if available) : 05282944+2324012
 ICRS Star Coord at Epoch: 05h 28m 29.45218s +23:24:01.09888s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 14.682
 G magnitude : 17.563
 RP magnitude : 16.626
 BP magnitude : 18.481
 DUPflag : 0
 Distance (au) : 18.970
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 4.05
 Sun-Target sep (deg) : 94.37
 Sun-Moon sep (deg) : 133.13
 B (ring opening deg) : 80.61
 PA of pole (deg) : 29.74
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.779
 C/A sky separation (km) : 24469.9
 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	2032-03-08T17:57:36.262		32.65	-12.32	51172.65	-3.21		
lambda	I	2032-03-08T18:03:35.595		32.28	-13.55	50026.71	-3.18		
delta	I	2032-03-08T18:12:41.215		31.67	-15.41	48300.35	-3.15		
gamma	I	2032-03-08T18:16:15.362		31.40	-16.14	47627.65	-3.13		
eta	I	2032-03-08T18:18:39.629		31.22	-16.62	47176.12	-3.13		
beta	I	2032-03-08T18:26:40.873		30.57	-18.25	45680.65	-3.09		
alpha	I	2032-03-08T18:31:42.660		30.14	-19.26	44751.40	-3.07		
4	I	2032-03-08T18:43:54.571		29.00	-21.70	42530.73	-3.00		
5	I	2032-03-08T18:45:46.741		28.81	-22.07	42186.65	-3.00		
6	I	2032-03-08T18:47:32.061		28.64	-22.41	41870.57	-2.98		
Uranus	I	2032-03-08T20:51:36.363		11.37	-44.23	25045.99		8.89	9.30
Uranus	E	2032-03-08T21:41:24.241		2.57x	-50.19	25273.48		6.58	6.88
6	E	2032-03-08T23:34:44.849		-19.56x	-51.73	41852.34	3.38		
5	E	2032-03-08T23:37:00.464		-20.02x	-51.57	42310.97	3.40		
4	E	2032-03-08T23:38:14.987		-20.28x	-51.48	42565.02	3.41		
alpha	E	2032-03-08T23:48:35.767		-22.40x	-50.64	44713.48	3.51		
beta	E	2032-03-08T23:53:00.886		-23.30x	-50.24	45648.80	3.55		
eta	E	2032-03-09T00:00:07.884		-24.77x	-49.54	47176.12	3.61		
gamma	E	2032-03-09T00:02:11.012		-25.20x	-49.33	47621.07	3.62		
delta	E	2032-03-09T00:05:17.946		-25.84x	-49.00	48300.35	3.65		
lambda	E	2032-03-09T00:13:07.791		-27.47x	-48.13	50026.71	3.70		
epsilon	E	2032-03-09T00:19:37.508		-28.82x	-47.36	51478.23	3.76		