

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-04T17:19:46.440
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 866276972116954496
 2Mass ID (if available) : 07255916+2228035

Uranus 2038-03-04T17:19:46 K13.59 G15.31 PgtRgt

ICRS Star Coord at Epoch: 07h 25m 59.14436s +22:28:03.45908s

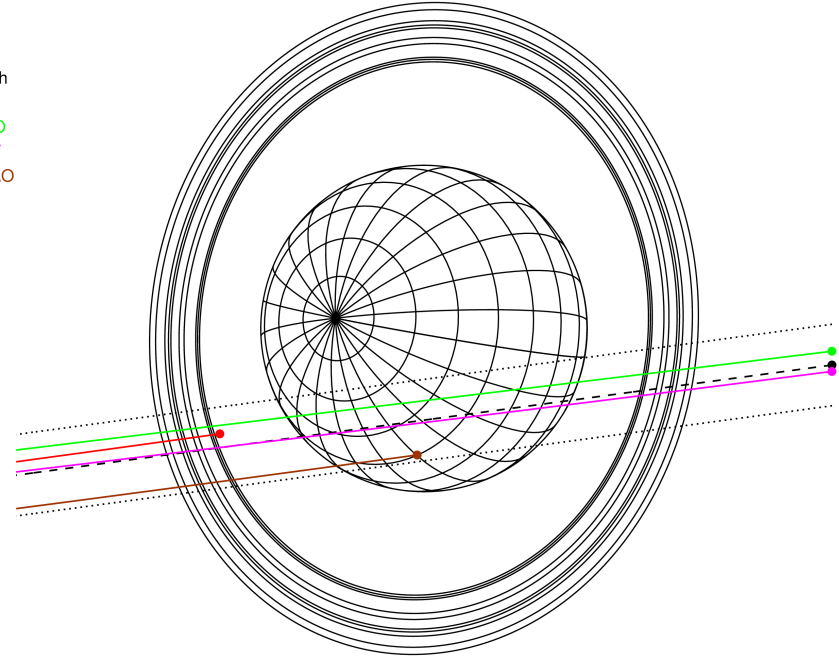
RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.585
 G magnitude : 15.311
 RP magnitude : 14.719
 BP magnitude : 15.744
 DUPflag : 0
 Distance (au) : 18.094
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.08
 Sun-Target sep (deg) : 126.09
 Sun-Moon sep (deg) : 139.91
 B (ring opening deg) : 56.91
 PA of pole (deg) : 83.35

Uranus 2038-03-04T17:19:46 K13.59 G15.31
 PgtRgt



2038-03-04T17:19:46.4400 a: 07 25 59.1444 & +22 28 03.459 C/A 1.079° PA 7.69 deg v_sky -11.08 km/s D 18.09 AU
 Credit: Styled after SORA/Lucky Star

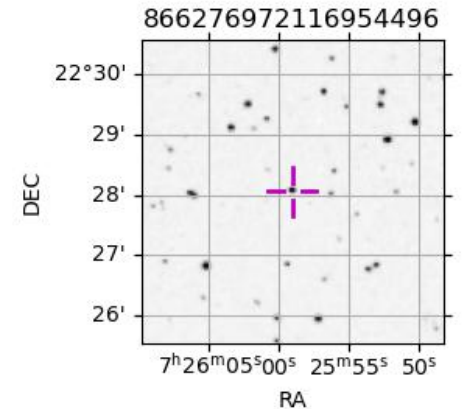
Earth
 PIC
 PMO
 KAV
 SAAO



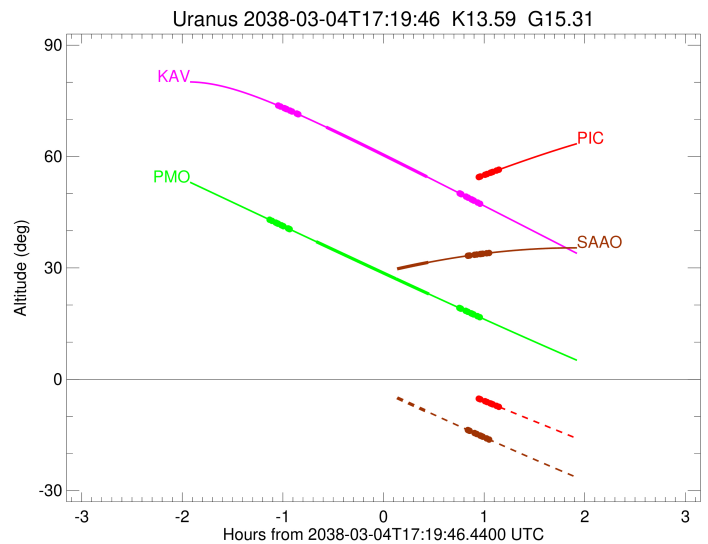
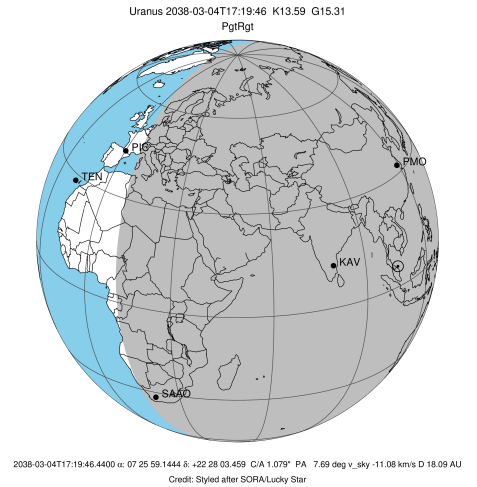
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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 04 18:16 - MAR 04 18:29	PnnRne
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	MAR 04 16:12 - MAR 04 18:17	PieRie
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					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +	+++++	MAR 04 16:17 - MAR 04 18:17	PieRie
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8		+	+++++	MAR 04 17:46 - MAR 04 18:23	PneRne
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

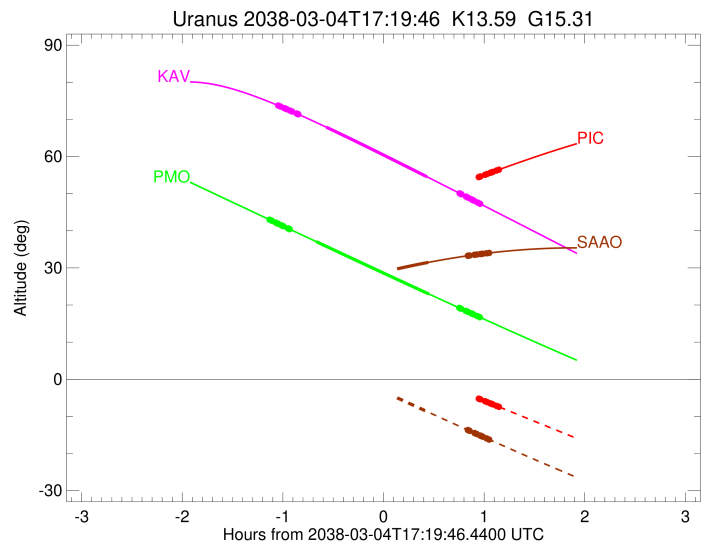
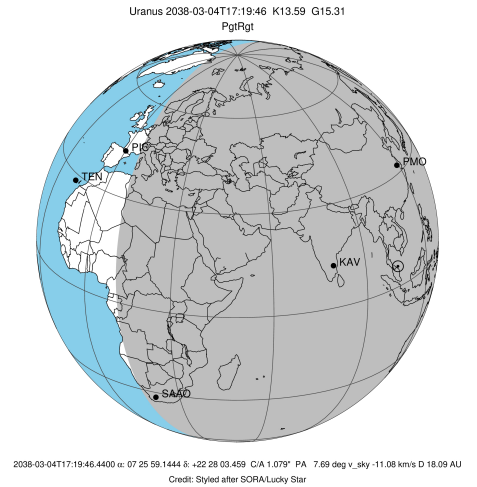


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-04T17:25:25.930
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 866276972116954496
 2Mass ID (if available) : 07255916+2228035
 ICRS Star Coord at Epoch: 07h 25m 59.14436s +22:28:03.45908s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.585
 G magnitude : 15.311
 RP magnitude : 14.719
 BP magnitude : 15.744
 DUPflag : 0
 Distance (au) : 18.094
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.08
 Sun-Target sep (deg) : 126.09
 Sun-Moon sep (deg) : 140.72
 B (ring opening deg) : 56.91
 PA of pole (deg) : 83.35
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.909
 C/A sky separation (km) : 11923.6
 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	2038-03-04T16:25:11.641		34.47	14.57x	50743.75	-12.92		
lambda	I	2038-03-04T16:26:07.144		34.64	14.41x	50026.71	-12.91		
delta	I	2038-03-04T16:28:20.963		35.05	14.04x	48300.35	-12.89		
gamma	I	2038-03-04T16:29:13.435		35.22	13.89x	47624.44	-12.88		
eta	I	2038-03-04T16:29:48.264		35.32	13.79x	47176.12	-12.87		
beta	I	2038-03-04T16:31:45.339		35.68	13.46x	45670.97	-12.84		
alpha	I	2038-03-04T16:32:59.943		35.91	13.25x	44706.26	-12.82		
4	I	2038-03-04T16:35:50.177		36.43	12.76x	42547.17	-12.78		
5	I	2038-03-04T16:36:18.107		36.52	12.68x	42197.13	-12.76		
6	I	2038-03-04T16:36:43.151		36.59	12.61x	41867.62	-12.75		
Uranus	I	2038-03-04T16:52:44.006		39.54	9.84x	25171.13		-32.05	-33.25
Uranus	E	2038-03-04T17:58:20.067		51.33	-1.89x	25335.12		23.66	24.65
6	E	2038-03-04T18:16:31.158		54.45	-5.22	41795.55	12.84		
5	E	2038-03-04T18:17:02.471		54.54	-5.31	42228.25	12.85		
4	E	2038-03-04T18:17:33.062		54.63	-5.41	42612.18	12.87		
alpha	E	2038-03-04T18:20:20.077		55.09	-5.91	44745.28	12.92		
beta	E	2038-03-04T18:21:30.573		55.29	-6.13	45661.49	12.94		
eta	E	2038-03-04T18:23:27.401		55.61	-6.49	47176.12	12.97		
gamma	E	2038-03-04T18:24:02.037		55.71	-6.59	47625.45	12.98		
delta	E	2038-03-04T18:24:54.017		55.85	-6.75	48300.35	12.99		
lambda	E	2038-03-04T18:27:06.753		56.22	-7.16	50026.71	13.02		
epsilon	E	2038-03-04T18:29:01.070		56.53	-7.51	51516.64	13.03		

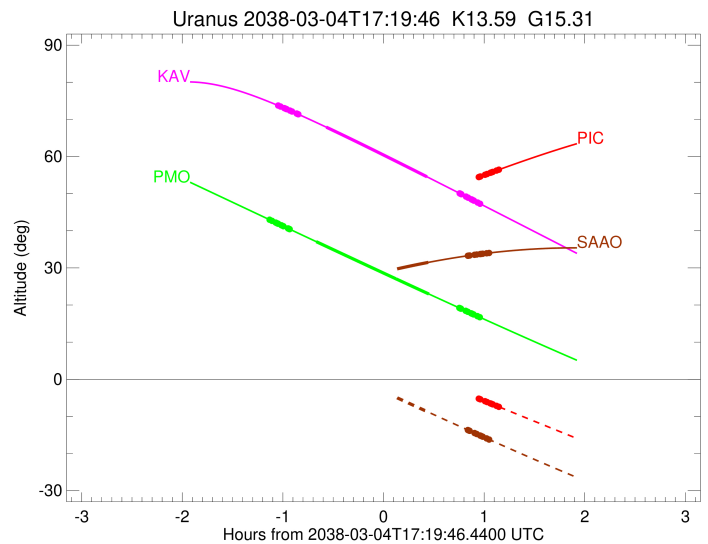
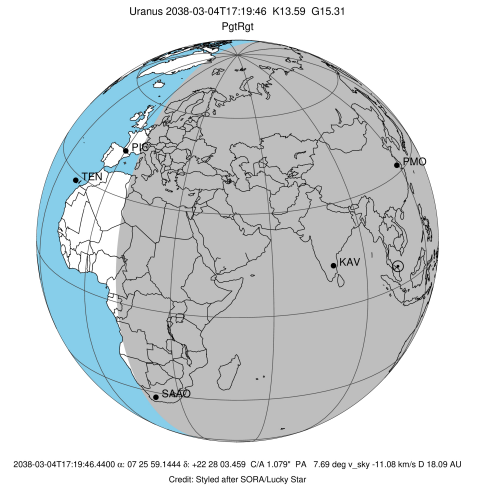
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-04T17:13:02.460
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 866276972116954496
 2Mass ID (if available) : 07255916+2228035
 ICRS Star Coord at Epoch: 07h 25m 59.14436s +22:28:03.45908s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.585
 G magnitude : 15.311
 RP magnitude : 14.719
 BP magnitude : 15.744
 DUPflag : 0
 Distance (au) : 18.094
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.08
 Sun-Target sep (deg) : 126.09
 Sun-Moon sep (deg) : 139.65
 B (ring opening deg) : 56.91
 PA of pole (deg) : 83.35
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.856
 C/A sky separation (km) : 11231.6
 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



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

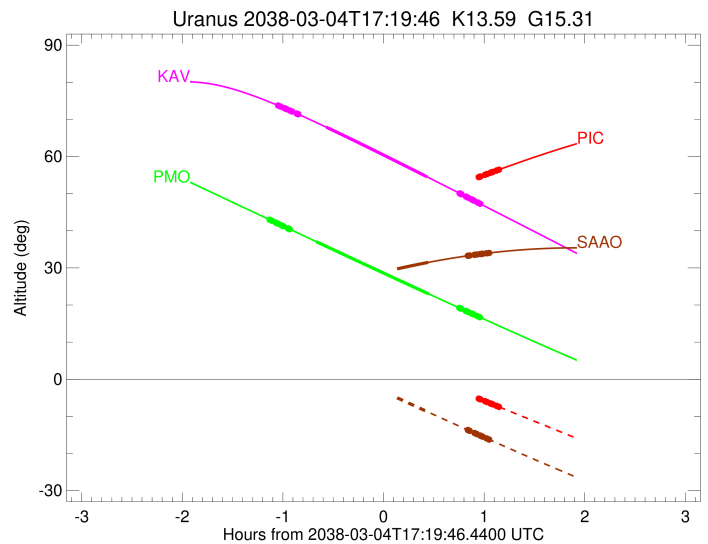
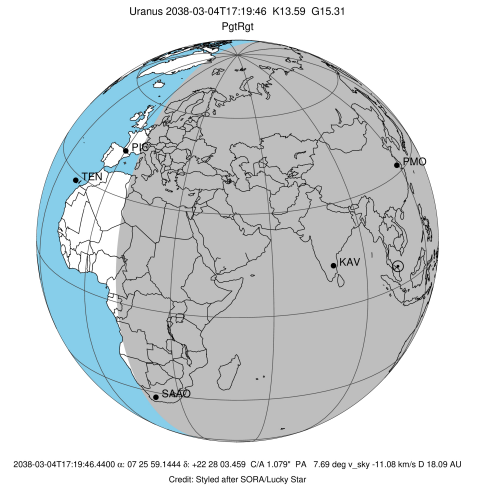
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-03-04T16:12:24.085		42.86	-64.31	50743.79	-13.06		
lambda	I	2038-03-04T16:13:19.028		42.67	-64.32	50026.71	-13.05		
delta	I	2038-03-04T16:15:31.513		42.20	-64.33	48300.35	-13.02		
gamma	I	2038-03-04T16:16:23.471		42.01	-64.33	47624.43	-13.00		
eta	I	2038-03-04T16:16:57.961		41.89	-64.33	47176.12	-12.99		
beta	I	2038-03-04T16:18:53.910		41.48	-64.32	45670.99	-12.96		
alpha	I	2038-03-04T16:20:07.807		41.22	-64.31	44706.28	-12.94		
4	I	2038-03-04T16:22:56.453		40.62	-64.28	42547.16	-12.90		
5	I	2038-03-04T16:23:24.122		40.52	-64.27	42197.16	-12.88		
6	I	2038-03-04T16:23:48.936		40.44	-64.27	41867.64	-12.87		
Uranus	I	2038-03-04T16:39:38.903		37.08	-63.75	25169.25		-32.14	-33.34
Uranus	E	2038-03-04T17:46:51.966		22.96	-56.72	25315.13		24.77	25.80
6	E	2038-03-04T18:04:55.660		19.23	-53.90	41795.85	12.65		
5	E	2038-03-04T18:05:27.660		19.12	-53.81	42230.89	12.66		
4	E	2038-03-04T18:05:58.450		19.01	-53.73	42611.52	12.68		
alpha	E	2038-03-04T18:08:48.105		18.43	-53.26	44744.60	12.71		
beta	E	2038-03-04T18:09:59.746		18.19	-53.06	45660.85	12.73		
eta	E	2038-03-04T18:11:58.620		17.78	-52.73	47176.12	12.75		
gamma	E	2038-03-04T18:12:33.876		17.66	-52.63	47625.61	12.75		
delta	E	2038-03-04T18:13:26.768		17.48	-52.48	48300.35	12.76		
lambda	E	2038-03-04T18:15:41.940		17.02	-52.09	50026.71	12.78		
epsilon	E	2038-03-04T18:17:38.827		16.62	-51.76	51521.63	12.79		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-04T17:15:28.760
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 866276972116954496
 2Mass ID (if available) : 07255916+2228035
 ICRS Star Coord at Epoch: 07h 25m 59.14436s +22:28:03.45908s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.585
 G magnitude : 15.311
 RP magnitude : 14.719
 BP magnitude : 15.744
 DUPflag : 0
 Distance (au) : 18.094
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.08
 Sun-Target sep (deg) : 126.09
 Sun-Moon sep (deg) : 140.08
 B (ring opening deg) : 56.91
 PA of pole (deg) : 83.35
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.115
 C/A sky separation (km) : 14626.5
 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_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	2038-03-04T16:17:29.727		73.64	-50.39	50745.69	-13.05		
lambda	I	2038-03-04T16:18:24.891		73.46	-50.61	50026.71	-13.02		
delta	I	2038-03-04T16:20:37.677		73.04	-51.15	48300.35	-12.98		
gamma	I	2038-03-04T16:21:29.831		72.87	-51.36	47624.07	-12.96		
eta	I	2038-03-04T16:22:04.422		72.75	-51.50	47176.12	-12.94		
beta	I	2038-03-04T16:24:00.824		72.37	-51.97	45672.28	-12.90		
alpha	I	2038-03-04T16:25:15.059		72.13	-52.27	44708.77	-12.86		
4	I	2038-03-04T16:28:04.855		71.56	-52.96	42550.38	-12.78		
5	I	2038-03-04T16:28:33.412		71.47	-53.08	42191.44	-12.76		
6	I	2038-03-04T16:28:58.542		71.38	-53.18	41865.04	-12.74		
Uranus	I	2038-03-04T16:45:40.460		67.91	-57.22	25204.30		-30.47	-31.63
Uranus	E	2038-03-04T17:45:41.813		54.55	-71.51	25378.81		21.07	21.97
6	E	2038-03-04T18:05:08.089		50.09	-75.92	41795.17	12.61		
5	E	2038-03-04T18:05:39.618		49.97	-76.04	42224.00	12.62		
4	E	2038-03-04T18:06:11.154		49.85	-76.15	42613.15	12.65		
alpha	E	2038-03-04T18:09:00.893		49.20	-76.77	44746.27	12.72		
beta	E	2038-03-04T18:10:12.501		48.93	-77.03	45662.44	12.75		
eta	E	2038-03-04T18:12:10.956		48.47	-77.45	47176.12	12.79		
gamma	E	2038-03-04T18:12:46.058		48.34	-77.57	47625.22	12.80		
delta	E	2038-03-04T18:13:38.767		48.13	-77.76	48300.35	12.82		
lambda	E	2038-03-04T18:15:53.241		47.62	-78.23	50026.71	12.86		
epsilon	E	2038-03-04T18:17:48.410		47.17	-78.63	51509.38	12.87		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2038-03-04T17:22:28.290
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 866276972116954496
 2Mass ID (if available) : 07255916+2228035
 ICRS Star Coord at Epoch: 07h 25m 59.14436s +22:28:03.45908s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 13.585
 G magnitude : 15.311
 RP magnitude : 14.719
 BP magnitude : 15.744
 DUPflag : 0
 Distance (au) : 18.094
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -11.08
 Sun-Target sep (deg) : 126.09
 Sun-Moon sep (deg) : 140.43
 B (ring opening deg) : 56.91
 PA of pole (deg) : 83.35
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.484
 C/A sky separation (km) : 19479.6
 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



b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2038-03-04T16:26:46.752		22.23	7.85x	50751.15	-12.42		
lambda	I	2038-03-04T16:27:45.206		22.37	7.65x	50026.71	-12.38		
delta	I	2038-03-04T16:30:05.130		22.70	7.15x	48300.35	-12.30		
gamma	I	2038-03-04T16:31:00.242		22.82	6.96x	47623.60	-12.26		
eta	I	2038-03-04T16:31:36.770		22.91	6.83x	47176.12	-12.24		
beta	I	2038-03-04T16:33:39.946		23.19	6.40x	45673.97	-12.16		
alpha	I	2038-03-04T16:34:58.643		23.37	6.12x	44712.31	-12.10		
4	I	2038-03-04T16:37:59.437		23.78	5.48x	42555.13	-11.95		
5	I	2038-03-04T16:38:30.915		23.86	5.37x	42183.93	-11.91		
6	I	2038-03-04T16:38:58.010		23.92	5.28x	41861.08	-11.88		
Uranus	I	2038-03-04T16:58:55.798		26.49	1.07x	25287.73		-26.25	-27.31
Uranus	E	2038-03-04T17:46:25.815		31.48	-8.83	25480.23		13.71	14.33
6	E	2038-03-04T18:10:00.662		33.27	-13.66	41794.75	11.93		
5	E	2038-03-04T18:10:33.064		33.30	-13.77	42213.10	11.96		
4	E	2038-03-04T18:11:07.349		33.34	-13.89	42615.12	12.00		
alpha	E	2038-03-04T18:14:05.479		33.53	-14.49	44748.57	12.15		
beta	E	2038-03-04T18:15:20.456		33.60	-14.74	45664.98	12.21		
eta	E	2038-03-04T18:17:23.709		33.72	-15.16	47176.12	12.29		
gamma	E	2038-03-04T18:18:00.160		33.76	-15.28	47624.59	12.32		
delta	E	2038-03-04T18:18:54.950		33.81	-15.46	48300.35	12.35		
lambda	E	2038-03-04T18:21:14.246		33.94	-15.93	50026.71	12.43		
epsilon	E	2038-03-04T18:23:11.287		34.04	-16.32	51485.84	12.48		