

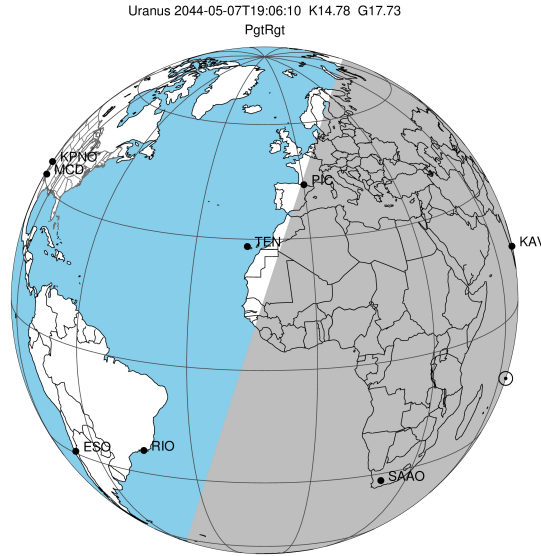
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2044-05-07T19:06:10.830
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 631015087596048896
 2Mass ID (if available) : 09203471+1616209

Uranus 2044-05-07T19:06:10 K14.78 G17.73 PgtRgt

ICRS Star Coord at Epoch: 09h 20m 34.69023s +16:16:20.76073s

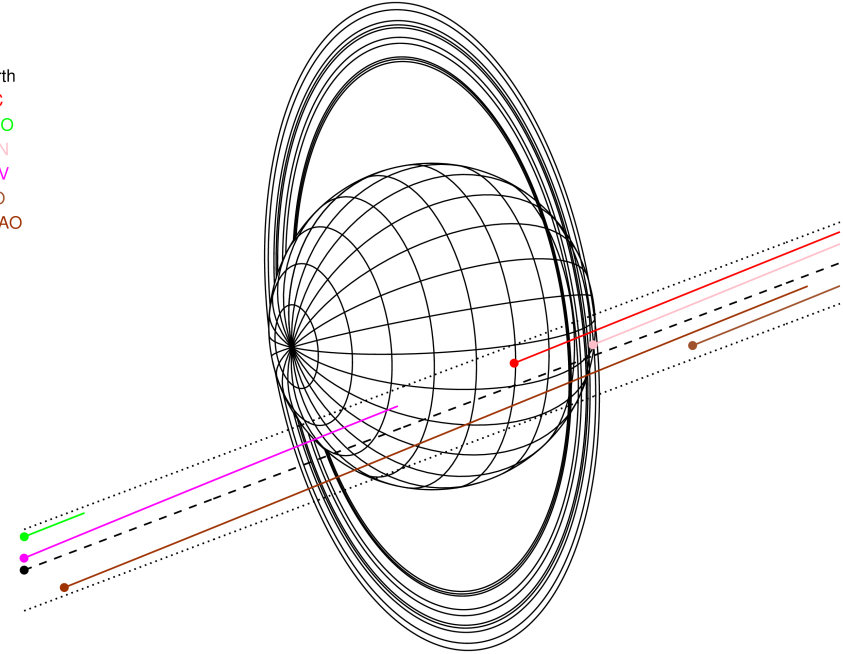
RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.779
 G magnitude : 17.729
 RP magnitude : 16.799
 BP magnitude : 18.643
 DUPflag : 0
 Distance (au) : 18.359
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 6.55
 Sun-Target sep (deg) : 90.22
 Sun-Moon sep (deg) : 41.23
 B (ring opening deg) : 29.76
 PA of pole (deg) : 98.47

#	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



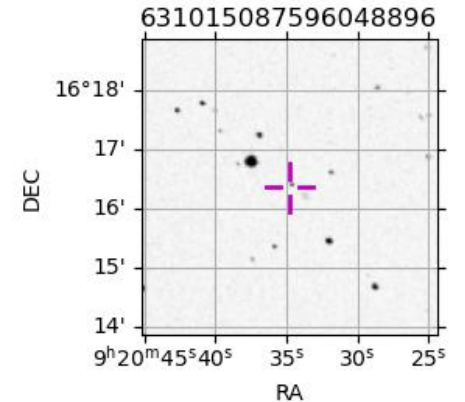
2044-05-07T19:06:10.8300 α: 09 20 34.69023 ♂: +16 16 20.761 C/A 0.969° PA 16.84 deg v_sky + 6.55 km/s D 18.36 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 SAAO

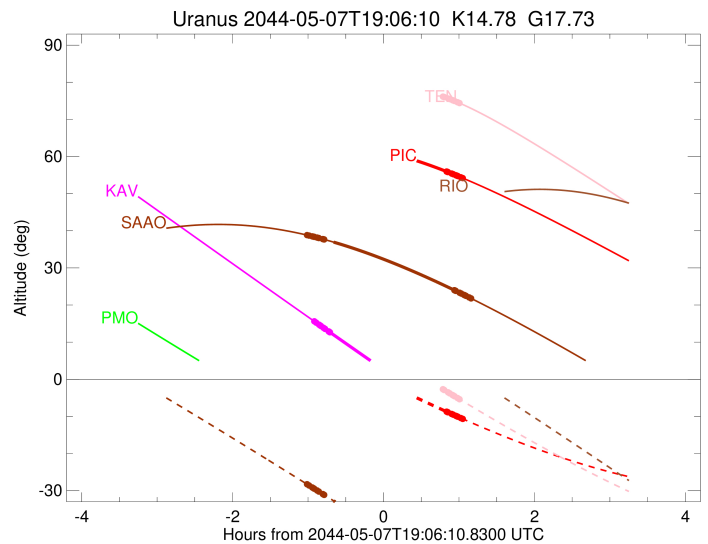
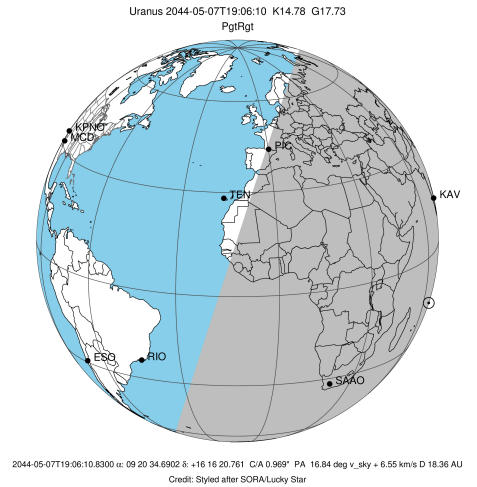


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1		+	+	MAY 07 20:08 - MAY 07 20:09	PneRne
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		+	++	MAY 07 20:04 - MAY 07 20:07	PneRne
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++++	+		MAY 07 18:11 - MAY 07 18:20	PinRin
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	+++++++	+ +	++++	MAY 07 18:06 - MAY 07 20:16	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

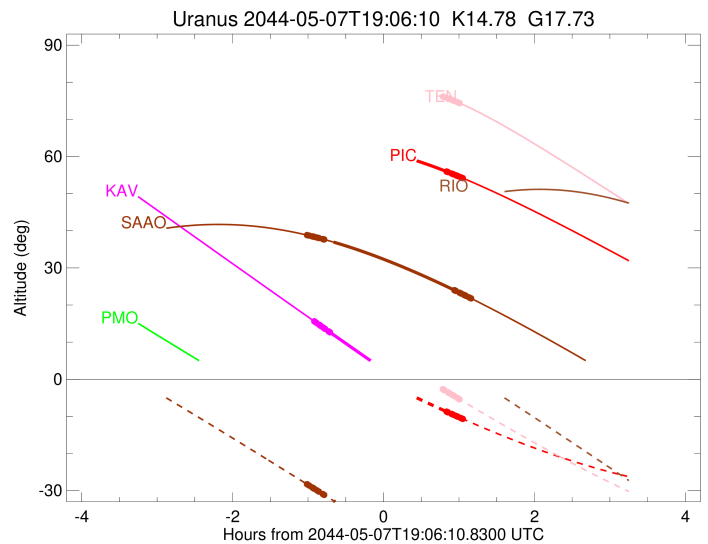
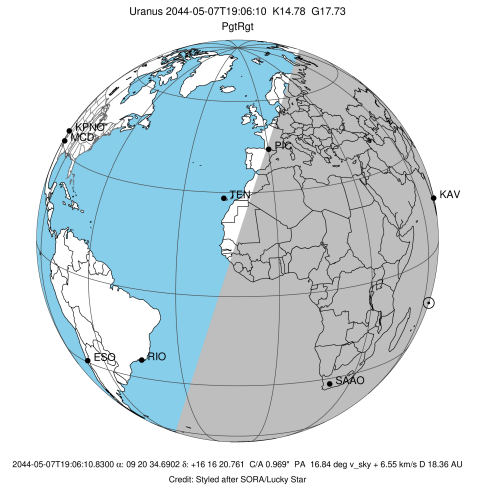


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2044-05-07T19:06:30.540
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 631015087596048896
 2Mass ID (if available) : 09203471+1616209
 ICRS Star Coord at Epoch: 09h 20m 34.69023s +16:16:20.76073s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.779
 G magnitude : 17.729
 RP magnitude : 16.799
 BP magnitude : 18.643
 DUPflag : 0
 Distance (au) : 18.359
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 6.55
 Sun-Target sep (deg) : 90.22
 Sun-Moon sep (deg) : 41.79
 B (ring opening deg) : 29.76
 PA of pole (deg) : 98.47
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.761
 C/A sky separation (km) : 10132.2
 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



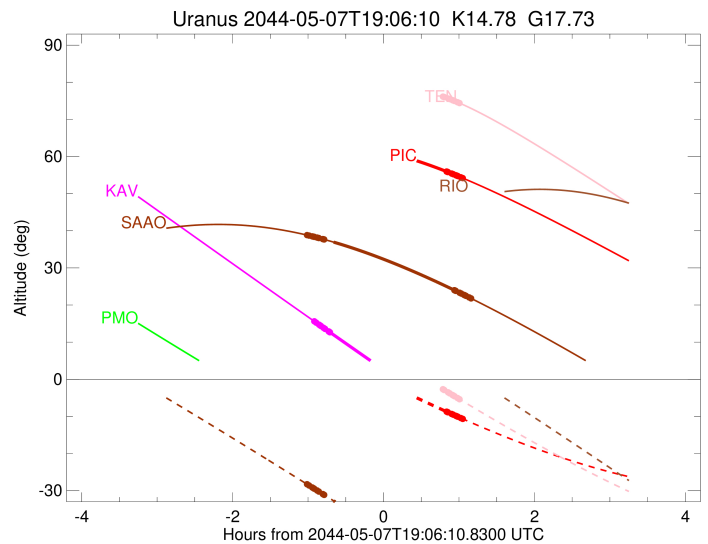
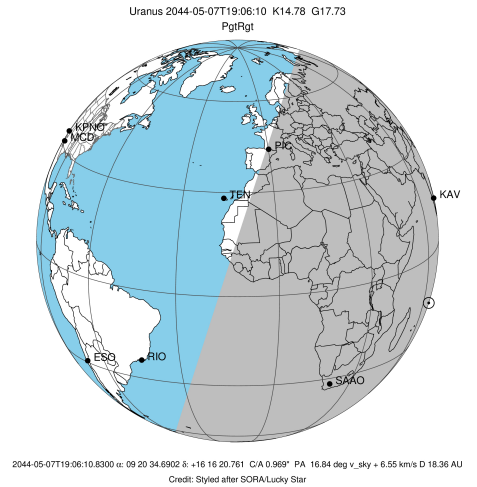
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2044-05-07T17:54:18.868		62.88	11.82x	50748.99	-11.98		
lambda	I	2044-05-07T17:55:19.168		62.92	11.64x	50026.71	-11.97		
delta	I	2044-05-07T17:57:43.446		63.01	11.21x	48300.35	-11.96		
gamma	I	2044-05-07T17:58:39.980		63.04	11.04x	47624.65	-11.95		
eta	I	2044-05-07T17:59:17.527		63.06	10.93x	47176.12	-11.94		
beta	I	2044-05-07T18:01:23.334		63.12	10.56x	45680.96	-11.93		
alpha	I	2044-05-07T18:02:42.812		63.15	10.32x	44728.98	-11.91		
4	I	2044-05-07T18:05:46.929	b	63.22	9.77x	42544.00	-11.88		
5	I	2044-05-07T18:06:16.348	b	63.23	9.69x	42155.49	-11.86		
6	I	2044-05-07T18:06:38.505	b	63.24	9.62x	41860.08	-11.84		
Uranus	I	2044-05-07T18:03:54.063		63.18	10.11x	25466.93		44.05	45.36
Uranus	E	2044-05-07T20:08:28.485		54.29	-10.57	25420.18		-58.75	-59.89
6	E	2044-05-07T19:56:20.258	b	55.96	-8.73	41799.93	11.99		
5	E	2044-05-07T19:57:01.255	b	55.87	-8.83	42309.85	12.00		
4	E	2044-05-07T19:57:19.364	b	55.83	-8.88	42612.38	12.03		
alpha	E	2044-05-07T20:00:13.371	b	55.44	-9.32	44694.57	12.07		
beta	E	2044-05-07T20:01:32.129	b	55.26	-9.52	45641.92	12.09		
eta	E	2044-05-07T20:03:39.516	b	54.97	-9.84	47176.12	12.11		
gamma	E	2044-05-07T20:04:16.618	b	54.88	-9.94	47625.58	12.12		
delta	E	2044-05-07T20:05:12.276	b	54.75	-10.08	48300.35	12.13		
lambda	E	2044-05-07T20:07:34.463	b	54.42	-10.43	50026.71	12.15		
epsilon	E	2044-05-07T20:09:39.125	b	54.13	-10.74	51543.20	12.17		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2044-05-07T19:04:31.550
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 631015087596048896
 2Mass ID (if available) : 09203471+1616209
 ICRS Star Coord at Epoch: 09h 20m 34.69023s +16:16:20.76073s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.779
 G magnitude : 17.729
 RP magnitude : 16.799
 BP magnitude : 18.643
 DUPflag : 0
 Distance (au) : 18.359
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 6.55
 Sun-Target sep (deg) : 90.22
 Sun-Moon sep (deg) : 41.94
 B (ring opening deg) : 29.76
 PA of pole (deg) : 98.47
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.909
 C/A sky separation (km) : 12106.0
 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	2044-05-07T17:51:14.004		65.43	23.36x	50751.94	-11.79		
lambda	I	2044-05-07T17:52:15.591		65.63	23.14x	50026.71	-11.77		
delta	I	2044-05-07T17:54:42.448		66.12	22.61x	48300.35	-11.74		
gamma	I	2044-05-07T17:55:40.048		66.31	22.40x	47624.43	-11.73		
eta	I	2044-05-07T17:56:18.287		66.44	22.26x	47176.12	-11.72		
beta	I	2044-05-07T17:58:26.544		66.86	21.79x	45680.79	-11.69		
alpha	I	2044-05-07T17:59:47.691		67.13	21.50x	44727.49	-11.67		
4	I	2044-05-07T18:02:55.395		67.74	20.81x	42545.79	-11.62		
5	I	2044-05-07T18:03:26.042		67.84	20.70x	42156.10	-11.59		
6	I	2044-05-07T18:03:48.867	b	67.91	20.62x	41858.28	-11.57		
Uranus	I	2044-05-07T18:03:44.310		67.90	20.64x	25478.79		40.45	41.75
Uranus	E	2044-05-07T20:04:53.863		74.65	-5.03	25425.25		-57.03	-58.22
6	E	2044-05-07T19:53:22.821	b	76.14	-2.67x	41798.97	11.62		
5	E	2044-05-07T19:54:05.222	b	76.06	-2.82x	42308.34	11.65		
4	E	2044-05-07T19:54:23.859	b	76.02	-2.88x	42613.26	11.68		
alpha	E	2044-05-07T19:57:22.962	b	75.66	-3.49x	44693.49	11.72		
beta	E	2044-05-07T19:58:44.202	b	75.49	-3.77x	45642.20	11.75		
eta	E	2044-05-07T20:00:55.193	b	75.20	-4.22x	47176.12	11.78		
gamma	E	2044-05-07T20:01:33.319	b	75.11	-4.35x	47625.36	11.79		
delta	E	2044-05-07T20:02:30.548	b	74.98	-4.54x	48300.35	11.80		
lambda	E	2044-05-07T20:04:56.633		74.64	-5.04	50026.71	11.83		
epsilon	E	2044-05-07T20:07:04.289		74.33	-5.47	51538.98	11.85		

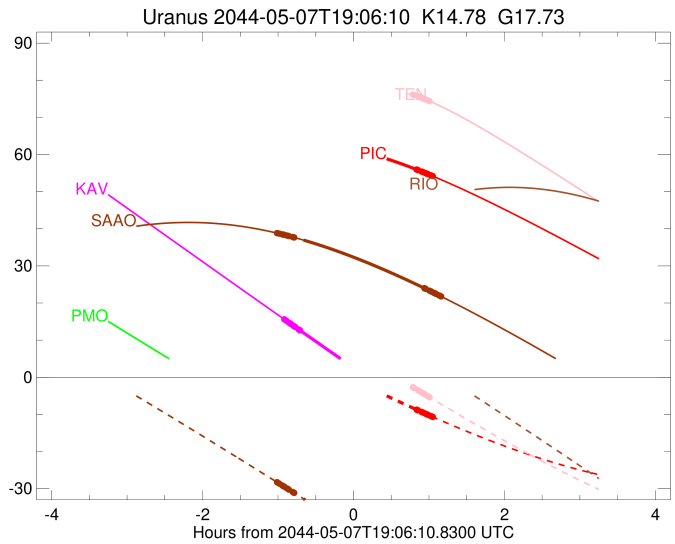
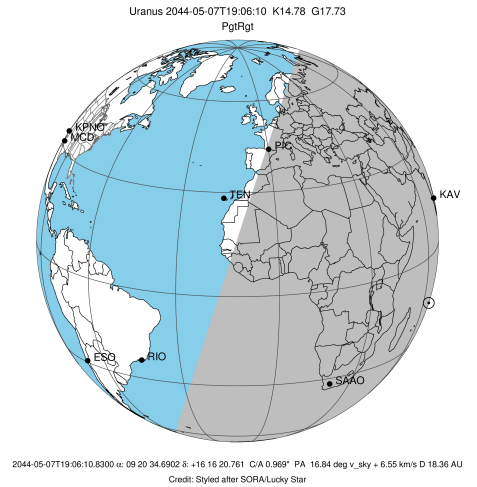
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2044-05-07T19:20:01.150
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 631015087596048896
 2Mass ID (if available) : 09203471+1616209
 ICRS Star Coord at Epoch: 09h 20m 34.69023s +16:16:20.76073s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.779
 G magnitude : 17.729
 RP magnitude : 16.799
 BP magnitude : 18.643
 DUPflag : 0
 Distance (au) : 18.359
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 6.55
 Sun-Target sep (deg) : 90.22
 Sun-Moon sep (deg) : 40.66
 B (ring opening deg) : 29.76
 PA of pole (deg) : 98.47
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.722
 C/A sky separation (km) : 9618.6
 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	2044-05-07T18:11:45.364		15.47	-59.49	50748.28	-12.54		
lambda	I	2044-05-07T18:12:42.911		15.24	-59.54	50026.71	-12.54		
delta	I	2044-05-07T18:15:00.653		14.69	-59.67	48300.35	-12.53		
gamma	I	2044-05-07T18:15:54.588		14.48	-59.71	47624.71	-12.52		
eta	I	2044-05-07T18:16:30.408		14.34	-59.74	47176.12	-12.52		
beta	I	2044-05-07T18:18:30.348		13.86	-59.84	45681.00	-12.51		
alpha	I	2044-05-07T18:19:46.057		13.56	-59.89	44729.41	-12.50		
4	I	2044-05-07T18:22:41.427	b	12.87	-60.01	42543.50	-12.49		
5	I	2044-05-07T18:23:09.267	b	12.76	-60.03	42155.35	-12.46		
6	I	2044-05-07T18:23:30.303	b	12.67	-60.04	41860.60	-12.45		
Uranus	I	2044-05-07T18:20:14.608		13.45	-59.92	25463.78		45.00	46.31
Uranus	E	2044-05-07T20:18:31.731		-14.25x	-51.81	25419.65		-58.93	-60.07
6	E	2044-05-07T20:07:09.768	b	-11.64x	-53.52	41800.09	12.90		
5	E	2044-05-07T20:07:47.837	b	-11.79x	-53.42	42310.07	12.92		
4	E	2044-05-07T20:08:04.673	b	-11.85x	-53.38	42612.23	12.95		
alpha	E	2044-05-07T20:10:46.355	b	-12.47x	-52.99	44694.74	12.99		
beta	E	2044-05-07T20:11:59.497	b	-12.75x	-52.81	45641.88	13.01		
eta	E	2044-05-07T20:13:57.837	b	-13.21x	-52.51	47176.12	13.04		
gamma	E	2044-05-07T20:14:32.303	b	-13.34x	-52.43	47625.61	13.05		
delta	E	2044-05-07T20:15:23.999	b	-13.54x	-52.29	48300.35	13.06		
lambda	E	2044-05-07T20:17:36.059	b	-14.04x	-51.96	50026.71	13.09		
epsilon	E	2044-05-07T20:19:31.868	b	-14.48x	-51.66	51543.69	13.11		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2044-05-07T19:18:54.730
 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 : 631015087596048896
 2Mass ID (if available) : 09203471+1616209
 ICRS Star Coord at Epoch: 09h 20m 34.69023s +16:16:20.76073s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.779
 G magnitude : 17.729
 RP magnitude : 16.799
 BP magnitude : 18.643
 DUPflag : 0
 Distance (au) : 18.359
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 6.55
 Sun-Target sep (deg) : 90.22
 Sun-Moon sep (deg) : 41.08
 B (ring opening deg) : 29.76
 PA of pole (deg) : 98.47
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.220
 C/A sky separation (km) : 16242.9
 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_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	2044-05-07T18:06:00.597		38.79	-28.40	50761.03	-11.54		
lambda	I	2044-05-07T18:07:04.341		38.70	-28.63	50026.71	-11.51		
delta	I	2044-05-07T18:09:34.625		38.49	-29.15	48300.35	-11.46		
gamma	I	2044-05-07T18:10:33.683		38.41	-29.36	47623.95	-11.44		
eta	I	2044-05-07T18:11:12.843		38.36	-29.50	47176.12	-11.43		
beta	I	2044-05-07T18:13:24.480		38.17	-29.96	45680.26	-11.38		
alpha	I	2044-05-07T18:14:48.032		38.05	-30.26	44724.04	-11.34		
4	I	2044-05-07T18:18:00.558		37.76	-30.94	42550.05	-11.26		
5	I	2044-05-07T18:18:33.479		37.71	-31.05	42158.15	-11.23		
6	I	2044-05-07T18:18:57.590		37.67	-31.14	41854.02	-11.20		
Uranus	I	2044-05-07T18:26:25.355		36.95	-32.72	25507.59		31.26	32.44
Uranus	E	2044-05-07T20:10:32.654		22.67	-54.50	25443.12		-51.31	-52.58
6	E	2044-05-07T20:02:30.936	b	24.00	-52.86	41797.22	11.46		
5	E	2044-05-07T20:03:14.159	b	23.88	-53.01	42304.51	11.49		
4	E	2044-05-07T20:03:33.155	b	23.83	-53.08	42614.80	11.53		
alpha	E	2044-05-07T20:06:33.933	b	23.33	-53.69	44691.36	11.62		
beta	E	2044-05-07T20:07:56.177	b	23.11	-53.97	45642.93	11.67		
eta	E	2044-05-07T20:10:07.786	b	22.74	-54.42	47176.12	11.73		
gamma	E	2044-05-07T20:10:46.011		22.64	-54.55	47624.88	11.75		
delta	E	2044-05-07T20:11:43.441		22.48	-54.74	48300.35	11.77		
lambda	E	2044-05-07T20:14:09.674		22.07	-55.23	50026.71	11.84		
epsilon	E	2044-05-07T20:16:16.241		21.71	-55.66	51527.87	11.87		