

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T19:39:22.460
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3424858701956124416
 2Mass ID (if available) : 06010896+2338432

ICRS Star Coord at Epoch: 06h 01m 08.98603s +23:38:43.05723s

RUWE (>1.4 is poor) : 0.99
 K magnitude : 10.868
 G magnitude : 12.405
 RP magnitude : 11.865
 BP magnitude : 12.774
 DUPflag : 0
 Distance (au) : 18.152
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.77
 Sun-Target sep (deg) : 151.35
 Sun-Moon sep (deg) : 49.22
 B (ring opening deg) : 75.13
 PA of pole (deg) : 57.62

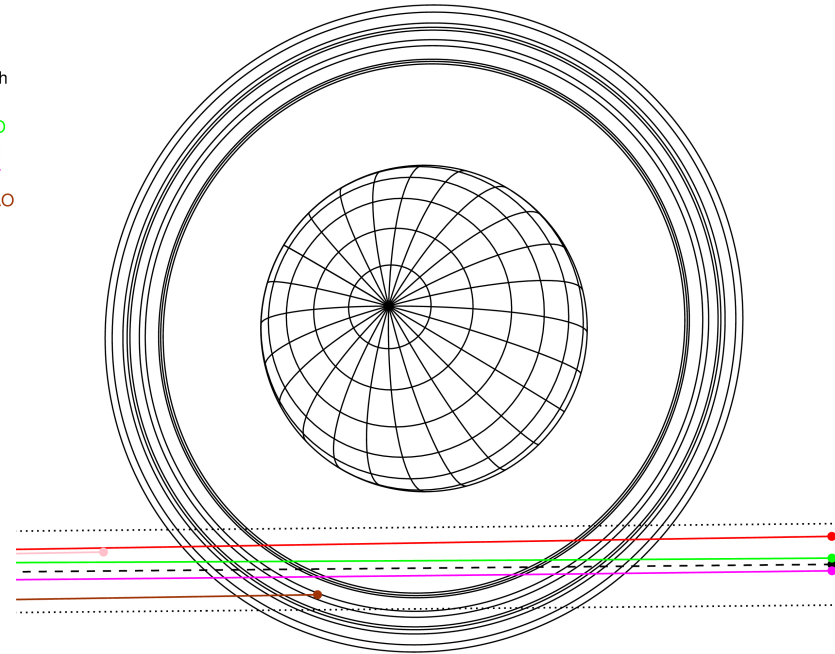
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon



2032-11-23T19:39:22.4600 a: 06 01 08.98603 s: +23 38 43.0572 C/A 2.843° PA 0.52 deg v_sky -19.77 km/s D 18.15 AU
 Credit: Styled after SORA/Lucky Star

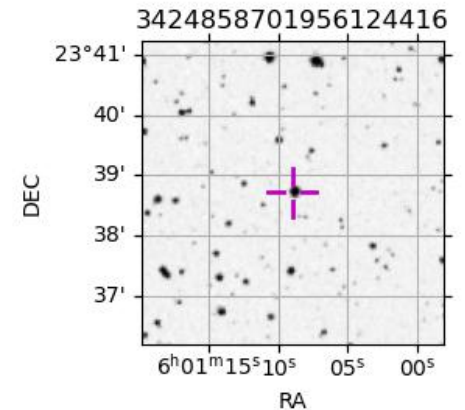
Uranus 2032-11-23T19:39:22 K10.87 G12.41 XRgt

Earth
 PIC
 PMO
 TEN
 KAV
 SAAO

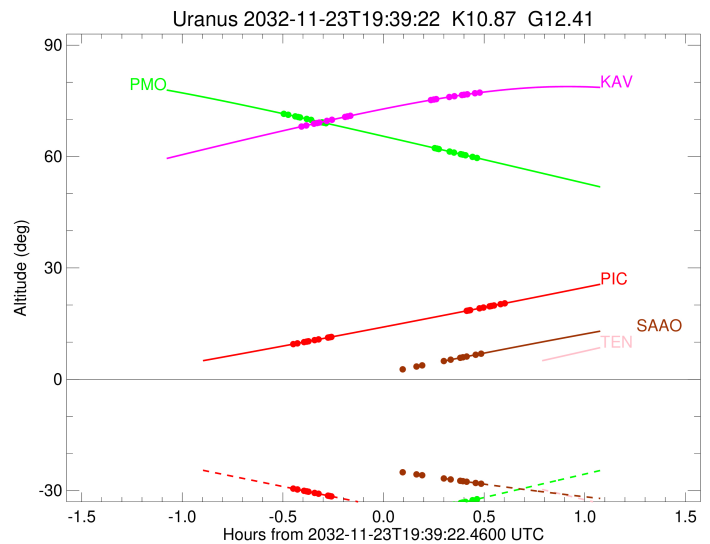
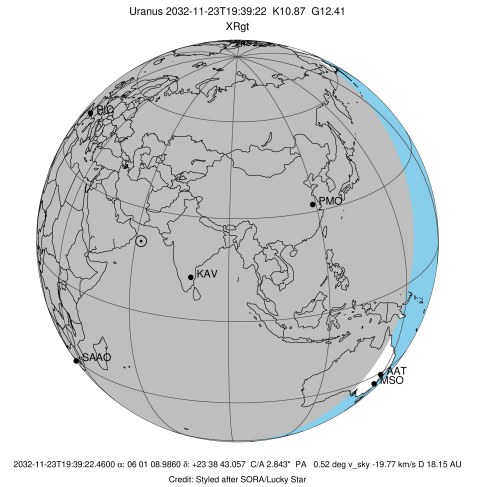


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1	+++++		+++++	NOV 23 19:12 - NOV 23 20:15	PnnRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++		+++++	NOV 23 19:09 - NOV 23 20:06	PnnRie
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	+++++		+++++	NOV 23 19:15 - NOV 23 20:07	PnnRie
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		+	+++++	NOV 23 19:59 - NOV 23 20:07	PnnRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T19:43:09.860
 Event type : XRgt
 : No Uranus occs
 : 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 : 3424858701956124416
 2Mass ID (if available) : 06010896+2338432
 ICRS Star Coord at Epoch: 06h 01m 08.98603s +23:38:43.05723s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 10.868
 G magnitude : 12.405
 RP magnitude : 11.865
 BP magnitude : 12.774
 DUPflag : 0
 Distance (au) : 18.152
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.77
 Sun-Target sep (deg) : 151.35
 Sun-Moon sep (deg) : 49.86
 B (ring opening deg) : 75.13
 PA of pole (deg) : 57.62
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.550
 C/A sky separation (km) : 33572.2
 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

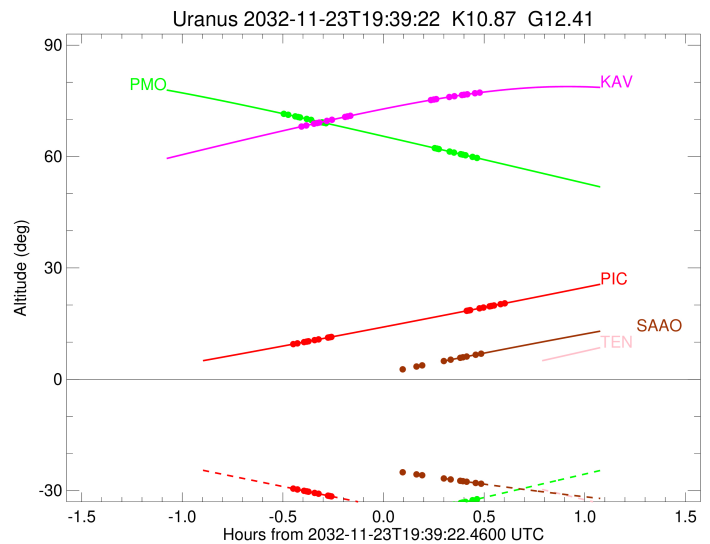
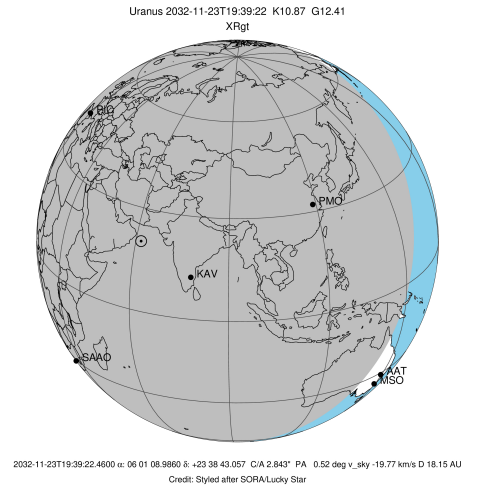


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-23T19:12:34.645		9.48	-29.47	51065.84	-14.99		
lambda	I	2032-11-23T19:13:44.077		9.68	-29.69	50026.71	-14.84		
delta	I	2032-11-23T19:15:42.231		10.01	-30.05	48300.35	-14.37		
gamma	I	2032-11-23T19:16:29.077		10.15	-30.19	47631.56	-14.18		
eta	I	2032-11-23T19:17:01.364		10.24	-30.29	47176.12	-14.03		
beta	I	2032-11-23T19:18:49.840		10.54	-30.62	45680.30	-13.52		
alpha	I	2032-11-23T19:19:59.668		10.74	-30.84	44747.75	-13.17		
4	I	2032-11-23T19:22:49.243		11.22	-31.36	42598.36	-12.23		
5	I	2032-11-23T19:23:13.320		11.29	-31.43	42290.95	-12.04		
6	I	2032-11-23T19:23:54.931		11.41	-31.56	41797.69	-11.80		

No planet occultations

6	E	2032-11-23T20:04:08.745		18.43	-38.92	41809.99	11.84		
5	E	2032-11-23T20:04:40.985		18.52	-39.02	42196.03	12.09		
4	E	2032-11-23T20:05:15.301		18.62	-39.12	42613.45	12.28		
alpha	E	2032-11-23T20:07:59.366		19.11	-39.62	44705.87	13.22		
beta	E	2032-11-23T20:09:10.424		19.32	-39.84	45657.05	13.58		
eta	E	2032-11-23T20:11:00.161		19.65	-40.17	47176.12	14.10		
gamma	E	2032-11-23T20:11:31.903		19.74	-40.27	47625.87	14.24		
delta	E	2032-11-23T20:12:18.930		19.88	-40.41	48300.35	14.44		
lambda	E	2032-11-23T20:14:16.506		20.23	-40.76	50026.71	14.91		
epsilon	E	2032-11-23T20:15:05.569		20.38	-40.91	50762.99	15.06		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T19:37:31.000
 Event type : XRgt
 : No Uranus occs
 : 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 : 3424858701956124416
 2Mass ID (if available) : 06010896+2338432
 ICRS Star Coord at Epoch: 06h 01m 08.98603s +23:38:43.05723s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 10.868
 G magnitude : 12.405
 RP magnitude : 11.865
 BP magnitude : 12.774
 DUPflag : 0
 Distance (au) : 18.152
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.77
 Sun-Target sep (deg) : 151.35
 Sun-Moon sep (deg) : 49.64
 B (ring opening deg) : 75.13
 PA of pole (deg) : 57.62
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.762
 C/A sky separation (km) : 36363.8
 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



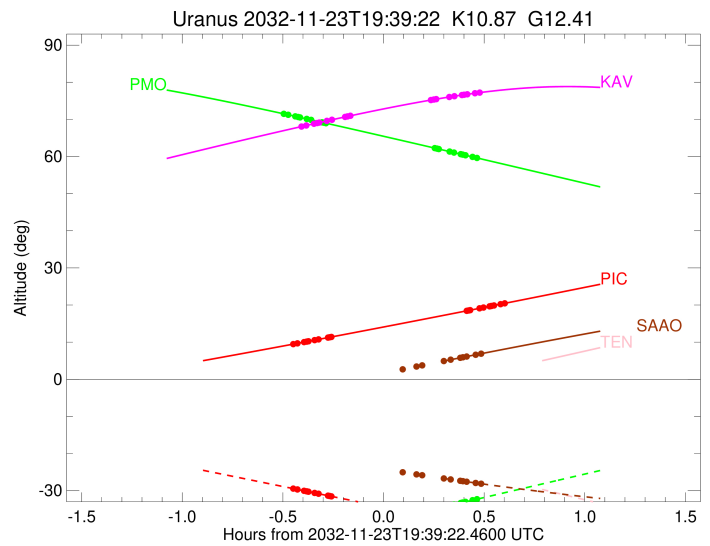
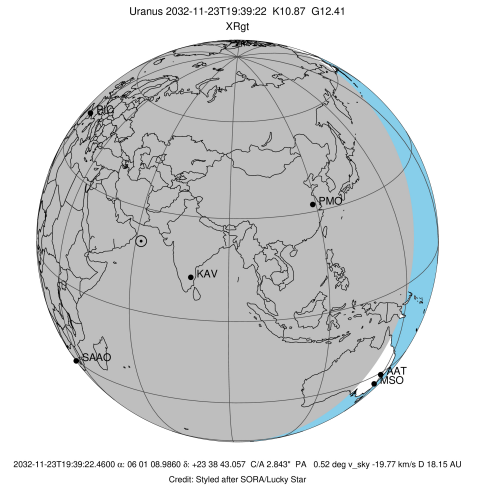
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-23T19:09:48.091		71.47	-44.47	51031.77	-14.20		
lambda	I	2032-11-23T19:10:59.076		71.24	-44.22	50026.71	-14.00		
delta	I	2032-11-23T19:13:05.092		70.82	-43.78	48300.35	-13.39		
gamma	I	2032-11-23T19:13:55.537		70.65	-43.60	47631.49	-13.13		
eta	I	2032-11-23T19:14:30.476		70.54	-43.47	47176.12	-12.94		
beta	I	2032-11-23T19:16:29.191		70.14	-43.05	45679.54	-12.25		
alpha	I	2032-11-23T19:17:46.848		69.88	-42.78	44745.64	-11.77		
4	I	2032-11-23T19:20:59.936		69.23	-42.10	42602.79	-10.46		
5	I	2032-11-23T19:21:29.587		69.13	-41.99	42282.90	-10.19		
6	I	2032-11-23T19:22:18.579		68.96	-41.82	41795.94	-9.83		

No planet occultations

6	E	2032-11-23T19:54:35.493		62.28	-34.98	41806.40	9.82		
5	E	2032-11-23T19:55:15.345		62.15	-34.84	42204.06	10.18		
4	E	2032-11-23T19:55:55.251		62.01	-34.69	42614.99	10.45		
alpha	E	2032-11-23T19:59:03.735		61.35	-34.03	44708.81	11.76		
beta	E	2032-11-23T20:00:22.987		61.07	-33.75	45658.77	12.24		
eta	E	2032-11-23T20:02:23.569		60.64	-33.33	47176.12	12.92		
gamma	E	2032-11-23T20:02:58.156		60.52	-33.20	47626.29	13.11		
delta	E	2032-11-23T20:03:49.065		60.34	-33.03	48300.35	13.37		
lambda	E	2032-11-23T20:05:55.259		59.90	-32.58	50026.71	13.98		
epsilon	E	2032-11-23T20:06:46.976		59.72	-32.40	50755.63	14.18		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T19:40:31.620
 Event type : XRgt
 : No Uranus occs
 : 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 : 3424858701956124416
 2Mass ID (if available) : 06010896+2338432
 ICRS Star Coord at Epoch: 06h 01m 08.98603s +23:38:43.05723s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 10.868
 G magnitude : 12.405
 RP magnitude : 11.865
 BP magnitude : 12.774
 DUPflag : 0
 Distance (au) : 18.152
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.77
 Sun-Target sep (deg) : 151.35
 Sun-Moon sep (deg) : 50.00
 B (ring opening deg) : 75.13
 PA of pole (deg) : 57.62
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.940
 C/A sky separation (km) : 38705.6
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.bsp
 ural61.bsp
 vgr2.ural61.bsp
 peph.ural60.bsp
 earthstns_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk

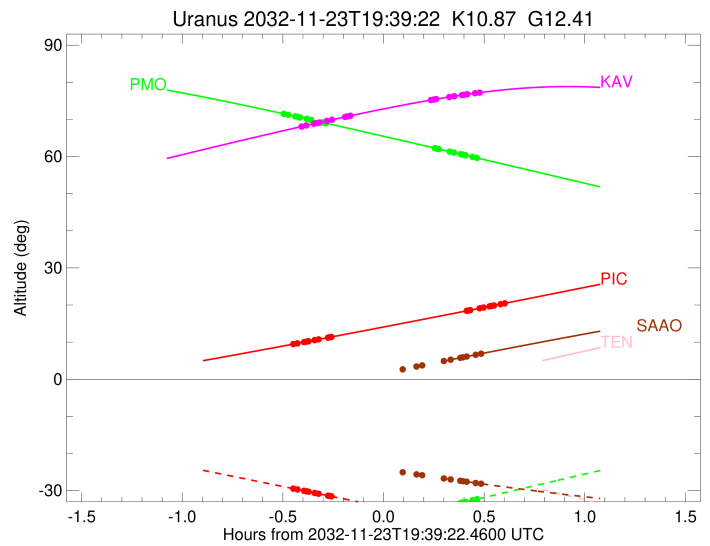
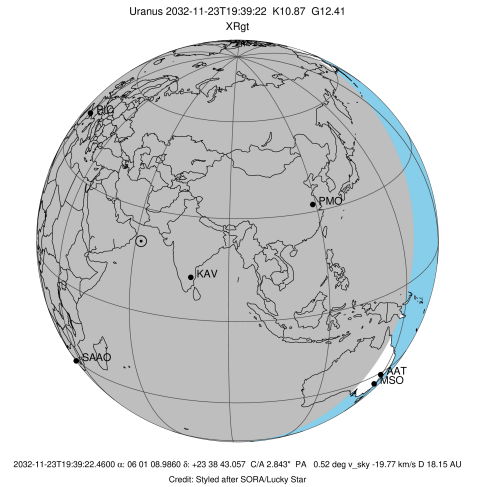


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-11-23T19:15:07.233		68.12	-76.76	51006.95	-13.16		
lambda	I	2032-11-23T19:16:22.138		68.37	-76.52	50026.71	-12.89		
delta	I	2032-11-23T19:18:39.995		68.84	-76.07	48300.35	-12.14		
gamma	I	2032-11-23T19:19:35.866		69.02	-75.89	47631.40	-11.81		
eta	I	2032-11-23T19:20:14.819		69.15	-75.76	47176.12	-11.57		
beta	I	2032-11-23T19:22:29.256		69.60	-75.32	45678.75	-10.69		
alpha	I	2032-11-23T19:23:59.310		69.90	-75.02	44743.58	-10.04		
4	I	2032-11-23T19:27:53.265		70.66	-74.22	42606.39	-8.23		
5	I	2032-11-23T19:28:33.035		70.79	-74.09	42274.62	-7.83		
6	I	2032-11-23T19:29:36.880		71.00	-73.87	41794.99	-7.30		

No planet occultations

6	E	2032-11-23T19:53:24.937		75.20	-68.75	41802.58	7.31		
5	E	2032-11-23T19:54:19.601		75.34	-68.55	42214.21	7.84		
4	E	2032-11-23T19:55:09.623		75.47	-68.36	42616.14	8.24		
alpha	E	2032-11-23T19:58:58.515		76.04	-67.51	44712.29	10.06		
beta	E	2032-11-23T20:00:29.963		76.25	-67.17	45660.75	10.70		
eta	E	2032-11-23T20:02:45.934		76.56	-66.66	47176.12	11.58		
gamma	E	2032-11-23T20:03:24.439		76.64	-66.52	47626.75	11.82		
delta	E	2032-11-23T20:04:20.622		76.77	-66.31	48300.35	12.16		
lambda	E	2032-11-23T20:06:38.267		77.05	-65.79	50026.71	12.92		
epsilon	E	2032-11-23T20:07:33.604		77.16	-65.59	50749.35	13.18		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-11-23T19:43:22.150
 Event type : XRgt
 : No Uranus occs
 : 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 : 3424858701956124416
 2Mass ID (if available) : 06010896+2338432
 ICRS Star Coord at Epoch: 06h 01m 08.98603s +23:38:43.05723s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 10.868
 G magnitude : 12.405
 RP magnitude : 11.865
 BP magnitude : 12.774
 DUPflag : 0
 Distance (au) : 18.152
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -19.77
 Sun-Target sep (deg) : 151.35
 Sun-Moon sep (deg) : 49.67
 B (ring opening deg) : 75.13
 PA of pole (deg) : 57.62
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 3.146
 C/A sky separation (km) : 41411.4
 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	2032-11-23T19:20:36.466	-1.88x	-21.48	50975.57	-11.50			
lambda	I	2032-11-23T19:21:59.805	-1.62x	-21.69	50026.71	-11.15			
delta	I	2032-11-23T19:24:41.669	-1.11x	-22.10	48300.35	-10.16			
gamma	I	2032-11-23T19:25:48.950	-0.90x	-22.27	47631.22	-9.72			
eta	I	2032-11-23T19:26:36.543	-0.75x	-22.39	47176.12	-9.40			
beta	I	2032-11-23T19:29:26.973	-0.22x	-22.81	45677.40	-8.16			
alpha	I	2032-11-23T19:31:28.644	0.16x	-23.11	44740.13	-7.20			
4	I	2032-11-23T19:37:51.176	1.34x	-24.03	42611.65	-3.86			
5	I	2032-11-23T19:39:34.254	1.66x	-24.28	42256.57	-2.83			
6	I	2032-11-23T20:07:31.618	6.72	-28.02	41840.32	-0.03			

No planet occultations

6	E	2032-11-23T11:28:51.272	-98.32x	66.44x	41840.29	0.00			
5	E	2032-11-23T19:49:10.197	3.42x	-25.62	42234.44	2.83			
4	E	2032-11-23T19:51:03.730	3.77x	-25.87	42616.39	3.87			
alpha	E	2032-11-23T19:57:20.638	4.90x	-26.71	44717.40	7.22			
beta	E	2032-11-23T19:59:23.527	5.27	-26.98	45663.48	8.18			
eta	E	2032-11-23T20:02:15.187	5.78	-27.35	47176.12	9.43			
gamma	E	2032-11-23T20:03:02.228	5.92	-27.45	47627.36	9.76			
delta	E	2032-11-23T20:04:09.675	6.12	-27.60	48300.35	10.20			
lambda	E	2032-11-23T20:06:50.928	6.60	-27.94	50026.71	11.19			
epsilon	E	2032-11-23T20:07:54.035	6.79	-28.07	50744.65	11.55			