

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-12-23T21:47:20.450
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3380087451763928448
 2Mass ID (if available) : 06563972+2311219

Uranus 2035-12-23T21:47:20 K14.79 G17.13 PgtRgt

ICRS Star Coord at Epoch: 06h 56m 39.73255s +23:11:21.84754s

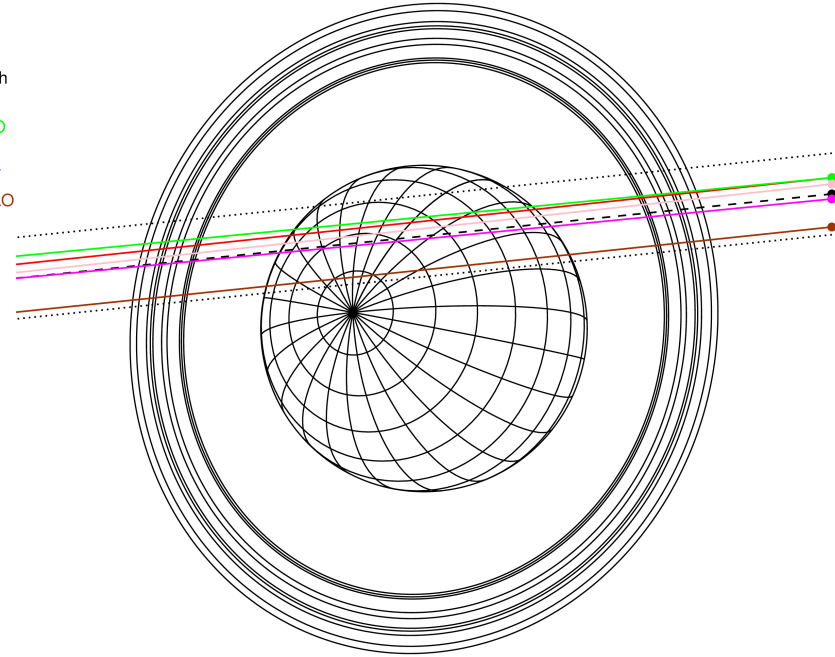
RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.786
 G magnitude : 17.130
 RP magnitude : 16.449
 BP magnitude : 17.675
 DUPflag : 0
 Distance (au) : 17.863
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.74
 Sun-Target sep (deg) : 168.38
 Sun-Moon sep (deg) : 104.81
 B (ring opening deg) : 63.45
 PA of pole (deg) : 77.28

Uranus 2035-12-23T21:47:20 K14.79 G17.13
 PgtRgt



2035-12-23T21:47:20.4500 ra: 06 56 39.73256 s: +23 11 21.848 C/A 1.120° PA 185.89 deg v_sky -22.74 km/s D 17.86 AU
 Credit: Styled after SORA/Lucky Star

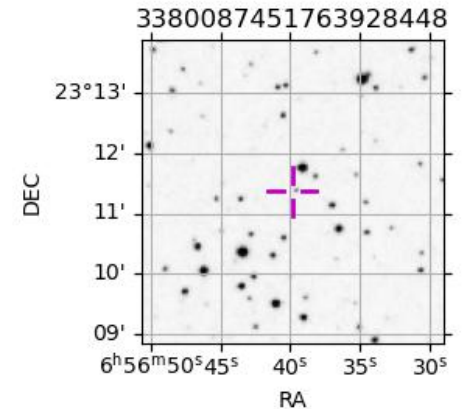
Earth
 PIC
 PMO
 TEN
 KAV
 SAAO



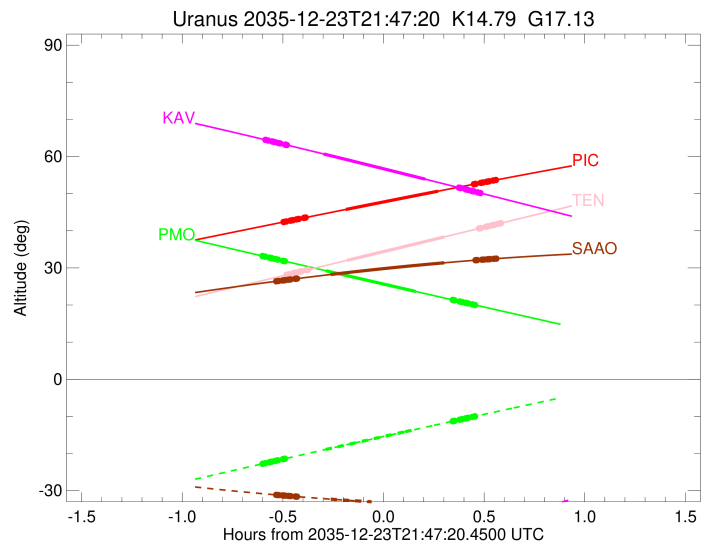
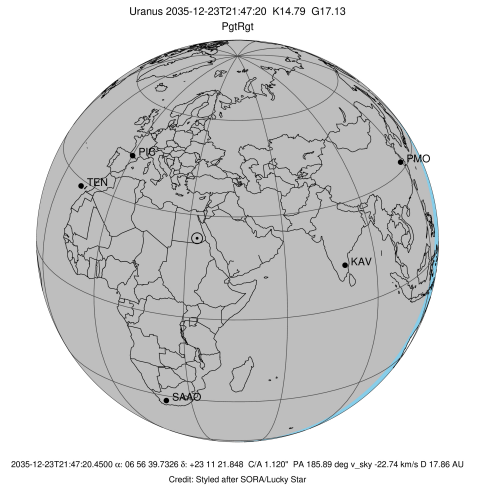
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+ +	+++++	DEC 23 21:17 - DEC 23 22:21	PieRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	DEC 23 21:11 - DEC 23 22:14	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	+++++	+ +	+++++	DEC 23 21:18 - DEC 23 22:22	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +	+++++	DEC 23 21:12 - DEC 23 22:16	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	+++++	+ +	+++++	DEC 23 21:15 - DEC 23 22:21	PieRie
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



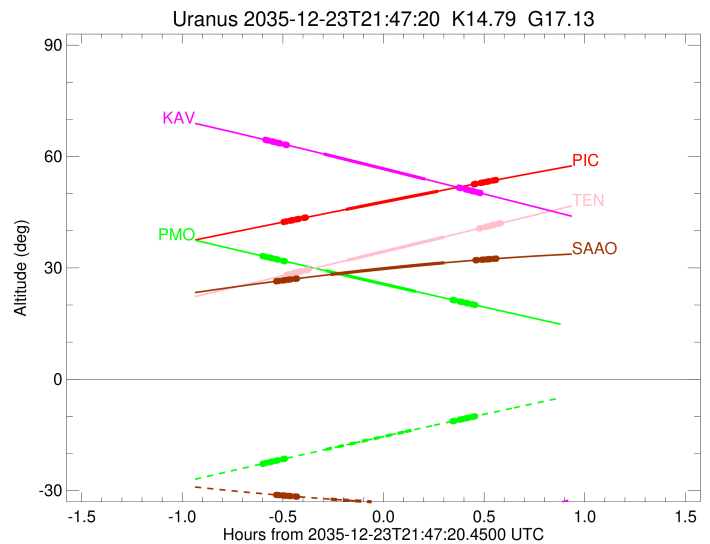
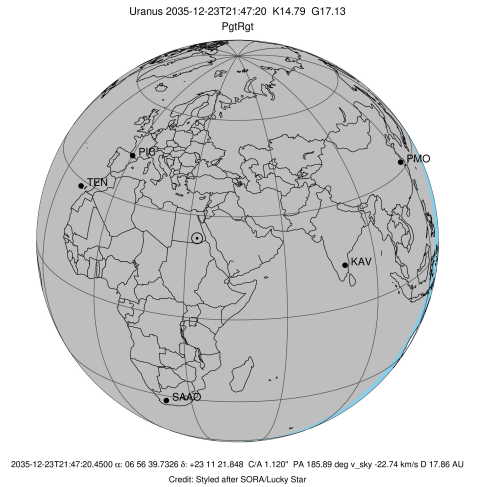
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-12-23T21:49:59.270
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3380087451763928448
 2Mass ID (if available) : 06563972+2311219
 ICRS Star Coord at Epoch: 06h 56m 39.73255s +23:11:21.84754s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.786
 G magnitude : 17.130
 RP magnitude : 16.449
 BP magnitude : 17.675
 DUPflag : 0
 Distance (au) : 17.863
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.74
 Sun-Target sep (deg) : 168.38
 Sun-Moon sep (deg) : 105.35
 B (ring opening deg) : 63.45
 PA of pole (deg) : 77.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.289
 C/A sky separation (km) : 16702.2
 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



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

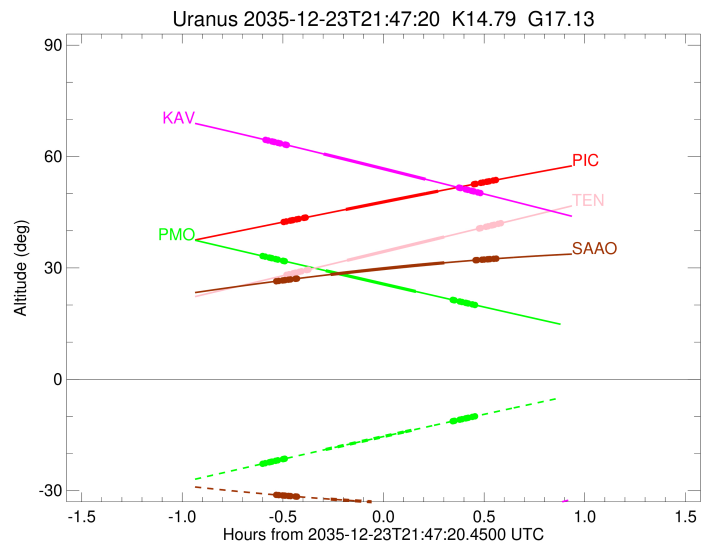
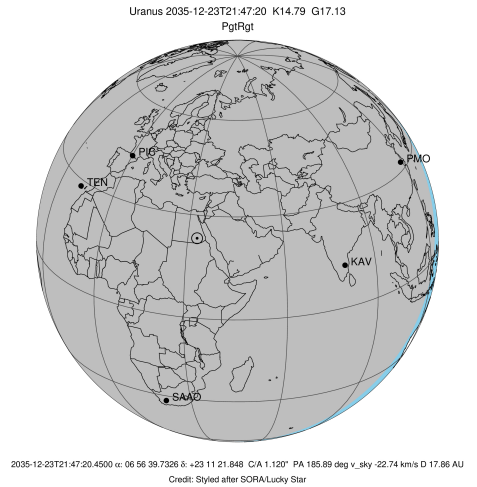
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-12-23T21:17:46.757		42.41	-51.68	50861.46	-23.99		
lambda	I	2035-12-23T21:18:21.653		42.51	-51.79	50026.71	-23.90		
delta	I	2035-12-23T21:19:34.063		42.74	-52.00	48300.35	-23.79		
gamma	I	2035-12-23T21:20:02.507		42.82	-52.08	47624.48	-23.74		
eta	I	2035-12-23T21:20:21.407		42.88	-52.13	47176.12	-23.71		
beta	I	2035-12-23T21:21:25.265		43.07	-52.32	45666.94	-23.59		
alpha	I	2035-12-23T21:22:05.773		43.20	-52.44	44711.48	-23.50		
4	I	2035-12-23T21:23:37.149		43.47	-52.70	42574.51	-23.30		
5	I	2035-12-23T21:23:52.610		43.52	-52.75	42227.79	-23.30		
6	I	2035-12-23T21:24:07.926		43.57	-52.79	41863.65	-23.23		
Uranus	I	2035-12-23T21:36:04.482		45.74	-54.85	25438.42		-12.98	-13.57
Uranus	E	2035-12-23T22:03:37.397		50.67	-59.40	25159.86		24.33	25.34
6	E	2035-12-23T22:14:14.780		52.53	-61.05	41794.84	23.29		
5	E	2035-12-23T22:14:36.552		52.60	-61.11	42298.45	23.36		
4	E	2035-12-23T22:14:47.046		52.63	-61.14	42535.98	23.36		
alpha	E	2035-12-23T22:16:19.893		52.89	-61.37	44700.26	23.56		
beta	E	2035-12-23T22:17:00.781		53.01	-61.47	45670.17	23.66		
eta	E	2035-12-23T22:18:04.284		53.20	-61.63	47176.12	23.77		
gamma	E	2035-12-23T22:18:23.403		53.25	-61.68	47630.93	23.80		
delta	E	2035-12-23T22:18:51.497		53.33	-61.75	48300.35	23.85		
lambda	E	2035-12-23T22:20:03.699		53.54	-61.93	50026.71	23.97		
epsilon	E	2035-12-23T22:21:07.245		53.72	-62.09	51552.62	24.07		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-12-23T21:43:41.160
 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 : 3380087451763928448
 2Mass ID (if available) : 06563972+2311219
 ICRS Star Coord at Epoch: 06h 56m 39.73255s +23:11:21.84754s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.786
 G magnitude : 17.130
 RP magnitude : 16.449
 BP magnitude : 17.675
 DUPflag : 0
 Distance (au) : 17.863
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.74
 Sun-Target sep (deg) : 168.38
 Sun-Moon sep (deg) : 105.40
 B (ring opening deg) : 63.45
 PA of pole (deg) : 77.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.342
 C/A sky separation (km) : 17381.0
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



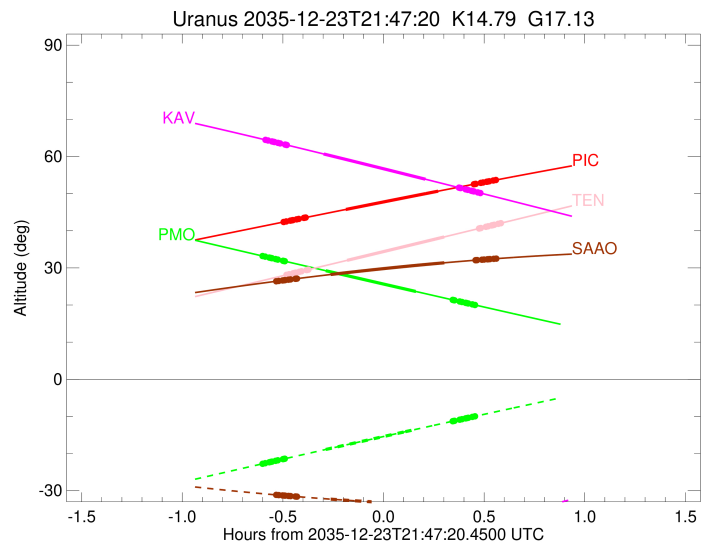
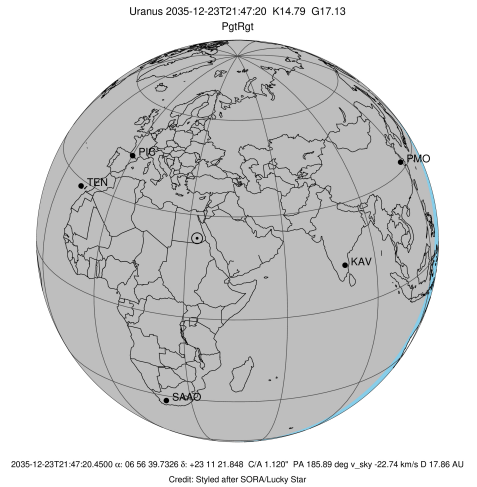
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-12-23T21:11:29.828		33.15	-22.72	50862.84	-23.82		
lambda	I	2035-12-23T21:12:05.038		33.03	-22.60	50026.71	-23.72		
delta	I	2035-12-23T21:13:18.008		32.77	-22.35	48300.35	-23.60		
gamma	I	2035-12-23T21:13:46.683		32.67	-22.26	47624.51	-23.54		
eta	I	2035-12-23T21:14:05.743		32.61	-22.19	47176.12	-23.51		
beta	I	2035-12-23T21:15:10.155		32.38	-21.97	45667.07	-23.38		
alpha	I	2035-12-23T21:15:51.055		32.24	-21.83	44711.24	-23.28		
4	I	2035-12-23T21:17:23.345		31.91	-21.52	42574.14	-23.06		
5	I	2035-12-23T21:17:38.922		31.86	-21.46	42228.46	-23.06		
6	I	2035-12-23T21:17:54.443		31.81	-21.41	41863.37	-22.98		
Uranus	I	2035-12-23T21:30:07.742		29.24	-18.91	25448.76		-12.40	-12.96
Uranus	E	2035-12-23T21:56:58.880		23.65	-13.49	25175.58		23.80	24.80
6	E	2035-12-23T22:07:54.701		21.39	-11.31	41794.78	22.90		
5	E	2035-12-23T22:08:16.916		21.32	-11.24	42299.71	22.97		
4	E	2035-12-23T22:08:27.478		21.28	-11.20	42535.25	22.97		
alpha	E	2035-12-23T22:10:01.848		20.96	-10.89	44699.55	23.19		
beta	E	2035-12-23T22:10:43.431		20.82	-10.75	45670.61	23.29		
eta	E	2035-12-23T22:11:47.897		20.59	-10.54	47176.12	23.41		
gamma	E	2035-12-23T22:12:07.311		20.53	-10.48	47630.99	23.45		
delta	E	2035-12-23T22:12:35.828		20.43	-10.38	48300.35	23.50		
lambda	E	2035-12-23T22:13:49.110		20.18	-10.14	50026.71	23.62		
epsilon	E	2035-12-23T22:14:53.629		19.96	-9.93	51553.57	23.72		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-12-23T21:51:07.300
 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 : 3380087451763928448
 2Mass ID (if available) : 06563972+2311219
 ICRS Star Coord at Epoch: 06h 56m 39.73255s +23:11:21.84754s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.786
 G magnitude : 17.130
 RP magnitude : 16.449
 BP magnitude : 17.675
 DUPflag : 0
 Distance (au) : 17.863
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.74
 Sun-Target sep (deg) : 168.38
 Sun-Moon sep (deg) : 105.13
 B (ring opening deg) : 63.45
 PA of pole (deg) : 77.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.201
 C/A sky separation (km) : 15561.1
 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_itrfr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



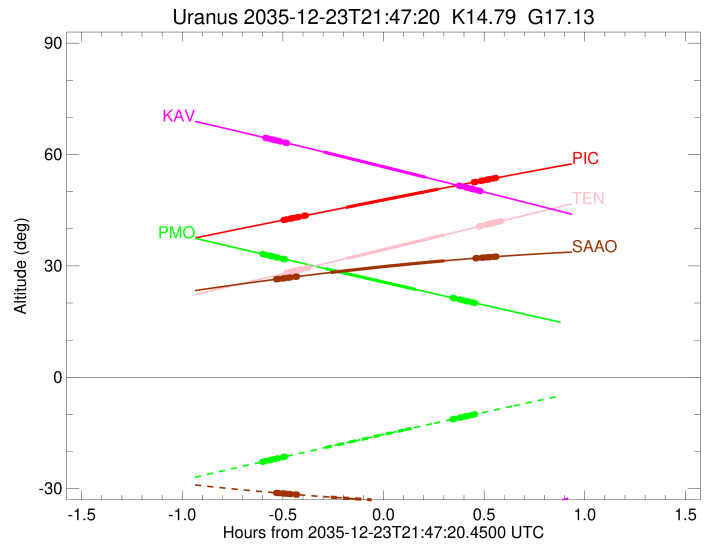
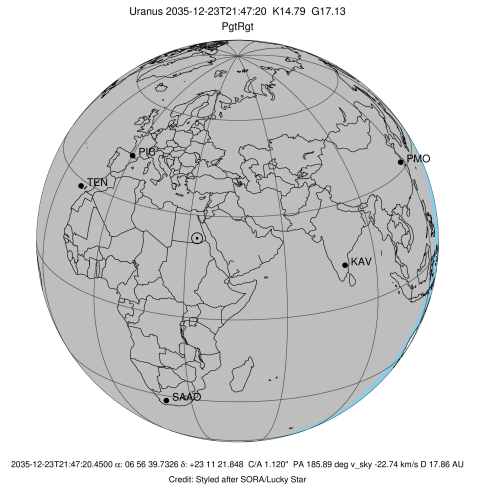
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-12-23T21:18:38.265		28.17	-39.25	50855.32	-24.12		
lambda	I	2035-12-23T21:19:12.709		28.29	-39.38	50026.71	-24.04		
delta	I	2035-12-23T21:20:24.674		28.55	-39.64	48300.35	-23.94		
gamma	I	2035-12-23T21:20:52.934		28.65	-39.74	47624.36	-23.90		
eta	I	2035-12-23T21:21:11.699		28.72	-39.81	47176.12	-23.87		
beta	I	2035-12-23T21:22:15.105		28.95	-40.04	45666.46	-23.78		
alpha	I	2035-12-23T21:22:55.226		29.10	-40.19	44712.33	-23.70		
4	I	2035-12-23T21:24:25.787		29.42	-40.52	42575.74	-23.53		
5	I	2035-12-23T21:24:41.250		29.48	-40.57	42225.60	-23.53		
6	I	2035-12-23T21:24:56.286		29.53	-40.63	41864.57	-23.47		
Uranus	I	2035-12-23T21:36:31.396		32.04	-43.16	25415.08		-14.21	-14.86
Uranus	E	2035-12-23T22:05:27.177		38.35	-49.51	25141.18		24.94	25.97
6	E	2035-12-23T22:15:47.113		40.61	-51.78	41794.95	23.56		
5	E	2035-12-23T22:16:08.547		40.69	-51.86	42296.87	23.62		
4	E	2035-12-23T22:16:19.055		40.73	-51.90	42536.89	23.61		
alpha	E	2035-12-23T22:17:50.941		41.06	-52.24	44701.12	23.79		
beta	E	2035-12-23T22:18:31.392		41.21	-52.39	45669.65	23.87		
eta	E	2035-12-23T22:19:34.365		41.44	-52.62	47176.12	23.97		
gamma	E	2035-12-23T22:19:53.323		41.51	-52.69	47630.86	24.00		
delta	E	2035-12-23T22:20:21.194		41.61	-52.79	48300.35	24.04		
lambda	E	2035-12-23T22:21:32.850		41.87	-53.05	50026.71	24.14		
epsilon	E	2035-12-23T22:22:35.898		42.10	-53.28	51551.29	24.23		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-12-23T21:44:46.440
 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 : 3380087451763928448
 2Mass ID (if available) : 06563972+2311219
 ICRS Star Coord at Epoch: 06h 56m 39.73255s +23:11:21.84754s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.786
 G magnitude : 17.130
 RP magnitude : 16.449
 BP magnitude : 17.675
 DUPflag : 0
 Distance (au) : 17.863
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.74
 Sun-Target sep (deg) : 168.38
 Sun-Moon sep (deg) : 105.70
 B (ring opening deg) : 63.45
 PA of pole (deg) : 77.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.078
 C/A sky separation (km) : 13965.0
 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_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	2035-12-23T21:12:22.061		64.44	-53.14	50843.55	-24.64		
lambda	I	2035-12-23T21:12:55.290		64.32	-53.01	50026.71	-24.56		
delta	I	2035-12-23T21:14:05.679		64.07	-52.75	48300.35	-24.49		
gamma	I	2035-12-23T21:14:33.315		63.97	-52.64	47624.13	-24.45		
eta	I	2035-12-23T21:14:51.645		63.90	-52.57	47176.12	-24.43		
beta	I	2035-12-23T21:15:53.620		63.68	-52.34	45665.53	-24.35		
alpha	I	2035-12-23T21:16:32.670		63.54	-52.19	44713.95	-24.28		
4	I	2035-12-23T21:18:00.993		63.22	-51.86	42578.02	-24.14		
5	I	2035-12-23T21:18:16.333		63.16	-51.80	42221.55	-24.15		
6	I	2035-12-23T21:18:30.758		63.11	-51.75	41866.21	-24.10		
Uranus	I	2035-12-23T21:29:29.969		60.69	-49.26	25376.06		-16.09	-16.81
Uranus	E	2035-12-23T21:59:50.445		53.89	-42.34	25123.72		25.51	26.56
6	E	2035-12-23T22:09:47.009		51.63	-40.07	41795.10	24.04		
5	E	2035-12-23T22:10:07.915		51.55	-39.99	42295.25	24.09		
4	E	2035-12-23T22:10:18.343		51.51	-39.95	42537.81	24.09		
alpha	E	2035-12-23T22:11:48.490		51.17	-39.61	44701.95	24.22		
beta	E	2035-12-23T22:12:28.179		51.02	-39.45	45669.14	24.29		
eta	E	2035-12-23T22:13:30.126		50.79	-39.22	47176.12	24.37		
gamma	E	2035-12-23T22:13:48.778		50.71	-39.15	47630.78	24.39		
delta	E	2035-12-23T22:14:16.215		50.61	-39.04	48300.35	24.42		
lambda	E	2035-12-23T22:15:26.799		50.34	-38.77	50026.71	24.50		
epsilon	E	2035-12-23T22:16:28.901		50.11	-38.54	51549.87	24.57		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-12-23T21:48:34.960
 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 : 3380087451763928448
 2Mass ID (if available) : 06563972+2311219
 ICRS Star Coord at Epoch: 06h 56m 39.73255s +23:11:21.84754s
 RUWE (>1.4 is poor) : 1.03
 K magnitude : 14.786
 G magnitude : 17.130
 RP magnitude : 16.449
 BP magnitude : 17.675
 DUPflag : 0
 Distance (au) : 17.863
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.74
 Sun-Target sep (deg) : 168.38
 Sun-Moon sep (deg) : 105.18
 B (ring opening deg) : 63.45
 PA of pole (deg) : 77.28
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.705
 C/A sky separation (km) : 9134.7
 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	2035-12-23T21:15:34.731		26.42	-31.17	50820.44	-25.12		
lambda	I	2035-12-23T21:16:06.367		26.49	-31.21	50026.71	-25.08		
delta	I	2035-12-23T21:17:15.238		26.62	-31.29	48300.35	-25.05		
gamma	I	2035-12-23T21:17:42.258		26.67	-31.33	47623.66	-25.04		
eta	I	2035-12-23T21:18:00.137		26.71	-31.35	47176.12	-25.03		
beta	I	2035-12-23T21:19:00.647		26.82	-31.43	45663.47	-25.00		
alpha	I	2035-12-23T21:19:38.412		26.90	-31.47	44717.56	-24.97		
4	I	2035-12-23T21:21:04.197		27.06	-31.58	42583.02	-24.91		
5	I	2035-12-23T21:21:19.627		27.09	-31.60	42212.66	-24.93		
6	I	2035-12-23T21:21:33.146		27.12	-31.61	41869.59	-24.90		
Uranus	I	2035-12-23T21:31:34.363		28.22	-32.30	25280.35		-20.06	-20.93
Uranus	E	2035-12-23T22:05:26.289		31.37	-33.90	25092.15		26.52	27.59
6	E	2035-12-23T22:14:43.122		32.07	-34.15	41796.14	24.94		
5	E	2035-12-23T22:15:02.862		32.09	-34.16	42288.09	24.97		
4	E	2035-12-23T22:15:13.457		32.10	-34.16	42541.90	24.96		
alpha	E	2035-12-23T22:16:40.543		32.20	-34.19	44705.59	25.01		
beta	E	2035-12-23T22:17:18.785		32.25	-34.20	45666.94	25.04		
eta	E	2035-12-23T22:18:19.015		32.32	-34.22	47176.12	25.08		
gamma	E	2035-12-23T22:18:37.129		32.34	-34.23	47630.45	25.09		
delta	E	2035-12-23T22:19:03.824		32.37	-34.23	48300.35	25.10		
lambda	E	2035-12-23T22:20:12.555		32.44	-34.25	50026.71	25.13		
epsilon	E	2035-12-23T22:21:12.763		32.51	-34.27	51540.83	25.17		