

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-12-14T18:30:51.870  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3425562939154599296  
 2Mass ID (if available) : 06173939+2338537

Uranus 2033-12-14T18:30:51 K14.68 G17.63 PgtRgt

ICRS Star Coord at Epoch: 06h 17m 39.40123s +23:38:53.68776s

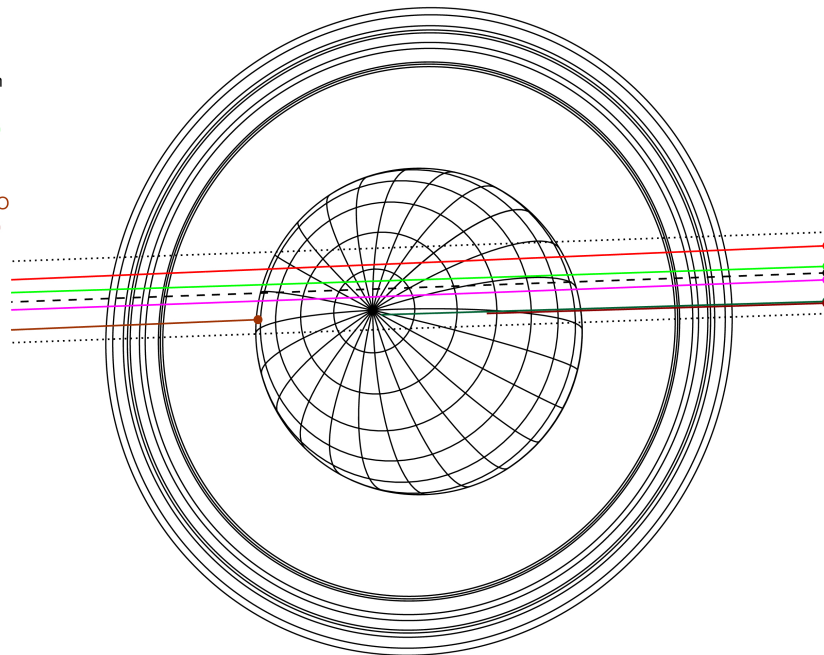
RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.676  
 G magnitude : 17.634  
 RP magnitude : 16.719  
 BP magnitude : 18.484  
 DUPflag : 0  
 Distance (au) : 17.990  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.81  
 Sun-Target sep (deg) : 168.56  
 Sun-Moon sep (deg) : 90.81  
 B (ring opening deg) : 71.80  
 PA of pole (deg) : 65.35

Uranus 2033-12-14T18:30:51 K14.68 G17.63  
 PgtRgt



2033-12-14T18:30:51.8700 ra: 06 17 39.4012 s: +23 38 53.688 C/A 0.536° PA 182.04 deg v\_sky -22.81 km/s D 17.99 AU  
 Credit: Styled after SORA/Lucky Star

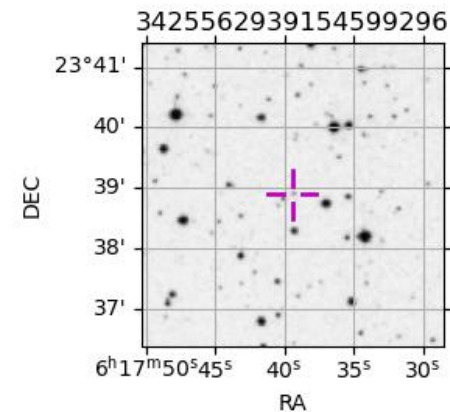
Earth  
 PIC  
 PMO  
 KAV  
 AAT  
 SAAO  
 MSO



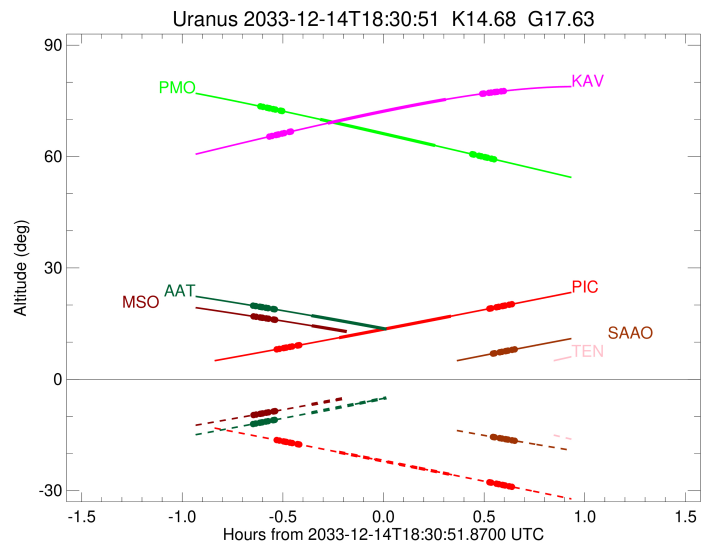
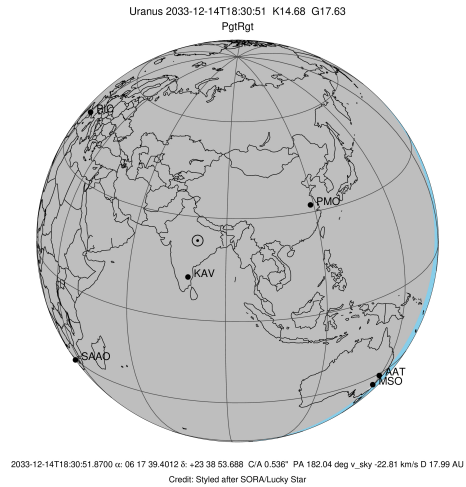
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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 14 17:59 - DEC 14 19:09	PieRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	DEC 14 17:54 - DEC 14 19:04	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	+++++	+ +	+++++	DEC 14 17:57 - DEC 14 19:06	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	+++++	+		DEC 14 17:52 - DEC 14 18:09	PinRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8			+++++	DEC 14 19:03 - DEC 14 19:10	PnnRne
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+		DEC 14 17:52 - DEC 14 18:09	PinRin

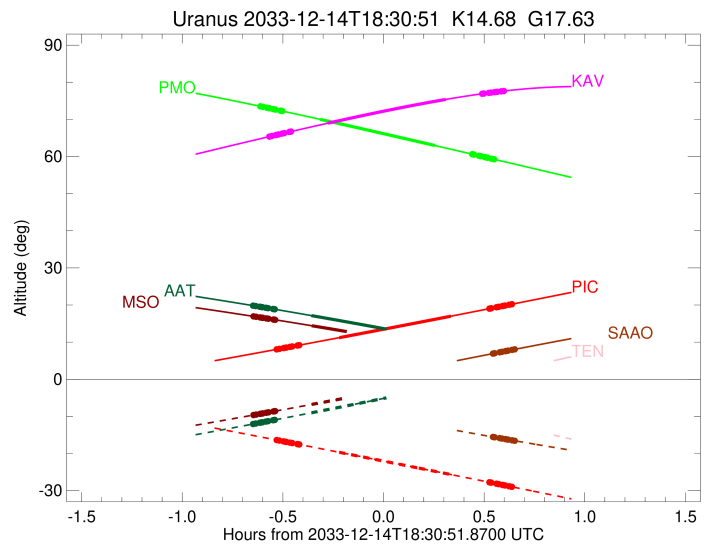
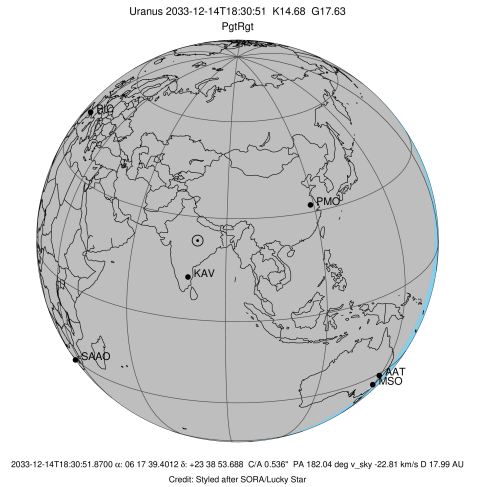


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-12-14T18:34:26.470  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 3425562939154599296  
 2Mass ID (if available) : 06173939+2338537  
 ICRS Star Coord at Epoch: 06h 17m 39.40123s +23:38:53.68776s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.676  
 G magnitude : 17.634  
 RP magnitude : 16.719  
 BP magnitude : 18.484  
 DUPflag : 0  
 Distance (au) : 17.990  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.81  
 Sun-Target sep (deg) : 168.56  
 Sun-Moon sep (deg) : 91.01  
 B (ring opening deg) : 71.80  
 PA of pole (deg) : 65.35  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.824  
 C/A sky separation (km) : 10750.2  
 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



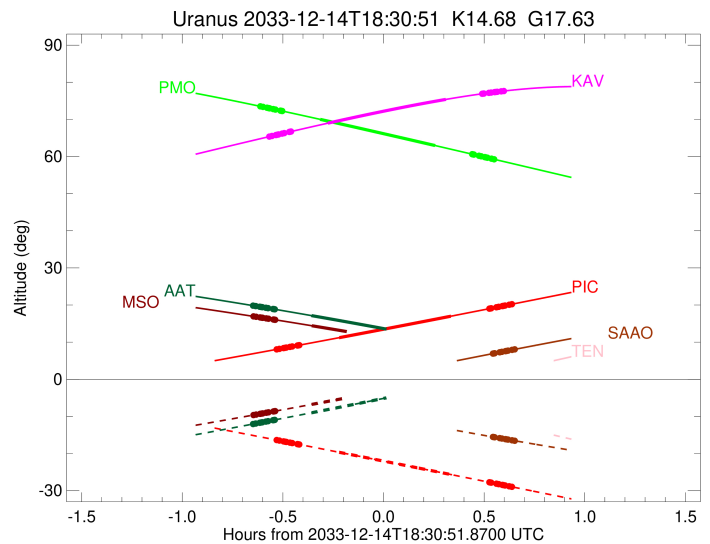
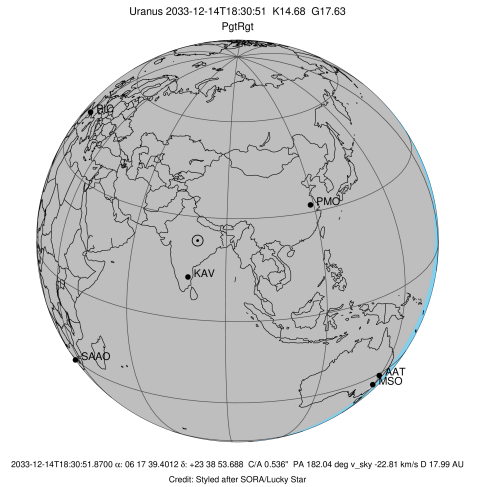
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-14T17:59:16.080		8.10	-16.42	50811.51	-23.12		
lambda	I	2033-12-14T17:59:50.001		8.19	-16.52	50026.71	-23.13		
delta	I	2033-12-14T18:01:04.710		8.40	-16.74	48300.35	-23.09		
gamma	I	2033-12-14T18:01:33.948		8.48	-16.82	47625.58	-23.07		
eta	I	2033-12-14T18:01:53.435		8.54	-16.88	47176.12	-23.06		
beta	I	2033-12-14T18:02:58.355		8.72	-17.07	45680.04	-23.02		
alpha	I	2033-12-14T18:03:40.212		8.84	-17.19	44718.08	-22.99		
4	I	2033-12-14T18:05:15.793		9.10	-17.47	42528.11	-22.92		
5	I	2033-12-14T18:05:26.858		9.13	-17.51	42260.76	-22.89		
6	I	2033-12-14T18:05:44.834		9.18	-17.56	41847.89	-22.89		
Uranus	I	2033-12-14T18:17:38.623		11.20	-19.67	25355.96		-11.05	-11.57
Uranus	E	2033-12-14T18:50:57.413		16.99	-25.66	25031.15		18.19	18.99
6	E	2033-12-14T19:02:26.835		19.02	-27.75	41848.67	22.97		
5	E	2033-12-14T19:02:41.034		19.07	-27.80	42174.67	22.97		
4	E	2033-12-14T19:02:59.566		19.12	-27.85	42615.60	23.01		
alpha	E	2033-12-14T19:04:31.512		19.39	-28.13	44734.90	23.09		
beta	E	2033-12-14T19:05:11.166		19.51	-28.25	45647.56	23.12		
eta	E	2033-12-14T19:06:17.185		19.71	-28.45	47176.12	23.16		
gamma	E	2033-12-14T19:06:36.541		19.76	-28.51	47624.54	23.17		
delta	E	2033-12-14T19:07:05.693		19.85	-28.60	48300.35	23.19		
lambda	E	2033-12-14T19:08:20.059		20.07	-28.83	50026.71	23.24		
epsilon	E	2033-12-14T19:09:17.356		20.24	-29.00	51358.98	23.23		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-12-14T18:29:12.600  
 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 : 3425562939154599296  
 2Mass ID (if available) : 06173939+2338537  
 ICRS Star Coord at Epoch: 06h 17m 39.40123s +23:38:53.68776s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.676  
 G magnitude : 17.634  
 RP magnitude : 16.719  
 BP magnitude : 18.484  
 DUPflag : 0  
 Distance (au) : 17.990  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.81  
 Sun-Target sep (deg) : 168.56  
 Sun-Moon sep (deg) : 91.65  
 B (ring opening deg) : 71.80  
 PA of pole (deg) : 65.35  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.621  
 C/A sky separation (km) : 8102.5  
 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\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



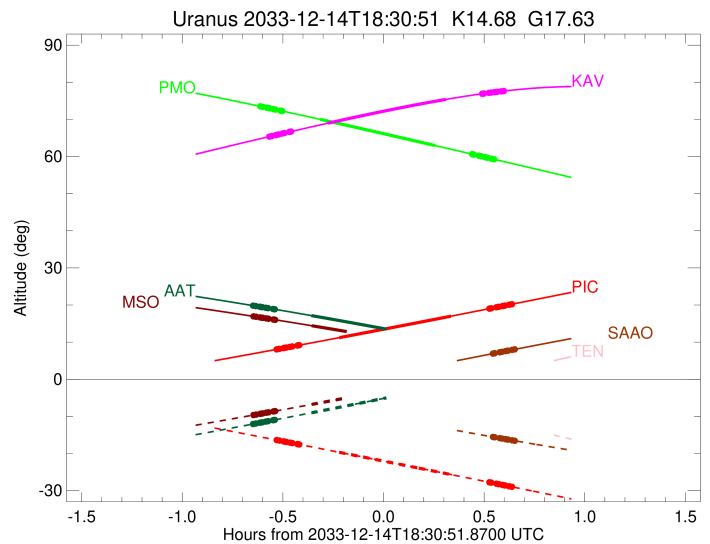
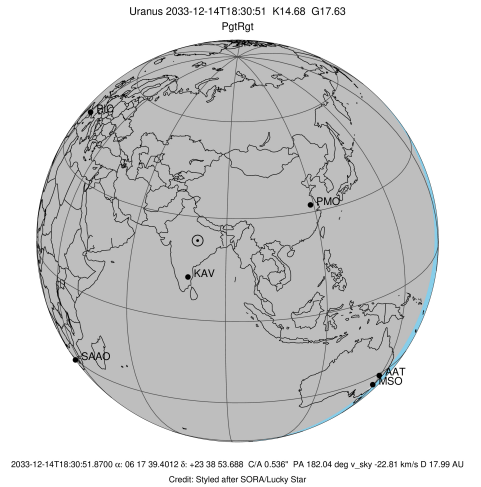
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-14T17:54:22.675		73.48	-63.23	50826.09	-23.82		
lambda	I	2033-12-14T17:54:56.209		73.37	-63.11	50026.71	-23.83		
delta	I	2033-12-14T17:56:08.686		73.14	-62.86	48300.35	-23.81		
gamma	I	2033-12-14T17:56:37.021		73.05	-62.76	47625.93	-23.80		
eta	I	2033-12-14T17:56:55.926		72.99	-62.70	47176.12	-23.79		
beta	I	2033-12-14T17:57:58.846		72.78	-62.48	45679.52	-23.76		
alpha	I	2033-12-14T17:58:39.470		72.65	-62.34	44715.71	-23.75		
4	I	2033-12-14T18:00:11.861		72.35	-62.01	42527.21	-23.70		
5	I	2033-12-14T18:00:22.256		72.32	-61.98	42266.30	-23.68		
6	I	2033-12-14T18:00:39.999		72.26	-61.92	41844.80	-23.68		
Uranus	I	2033-12-14T18:11:58.484		70.02	-59.55	25292.47		-12.71	-13.30
Uranus	E	2033-12-14T18:46:15.711		62.96	-52.31	25039.71		18.03	18.83
6	E	2033-12-14T18:57:18.865		60.64	-49.96	41846.34	23.64		
5	E	2033-12-14T18:57:32.880		60.59	-49.91	42177.71	23.64		
4	E	2033-12-14T18:57:50.770		60.52	-49.85	42616.05	23.66		
alpha	E	2033-12-14T18:59:20.174		60.21	-49.53	44733.33	23.71		
beta	E	2033-12-14T18:59:58.826		60.07	-49.40	45646.83	23.72		
eta	E	2033-12-14T19:01:03.219		59.85	-49.17	47176.12	23.75		
gamma	E	2033-12-14T19:01:22.110		59.78	-49.10	47624.78	23.75		
delta	E	2033-12-14T19:01:50.546		59.68	-49.00	48300.35	23.76		
lambda	E	2033-12-14T19:03:03.160		59.42	-48.75	50026.71	23.79		
epsilon	E	2033-12-14T19:03:59.783		59.23	-48.55	51374.02	23.78		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-12-14T18:31:57.840  
 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 : 3425562939154599296  
 2Mass ID (if available) : 06173939+2338537  
 ICRS Star Coord at Epoch: 06h 17m 39.40123s +23:38:53.68776s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.676  
 G magnitude : 17.634  
 RP magnitude : 16.719  
 BP magnitude : 18.484  
 DUPflag : 0  
 Distance (au) : 17.990  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.81  
 Sun-Target sep (deg) : 168.56  
 Sun-Moon sep (deg) : 91.67  
 B (ring opening deg) : 71.80  
 PA of pole (deg) : 65.35  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.435  
 C/A sky separation (km) : 5682.0  
 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\_itrfr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



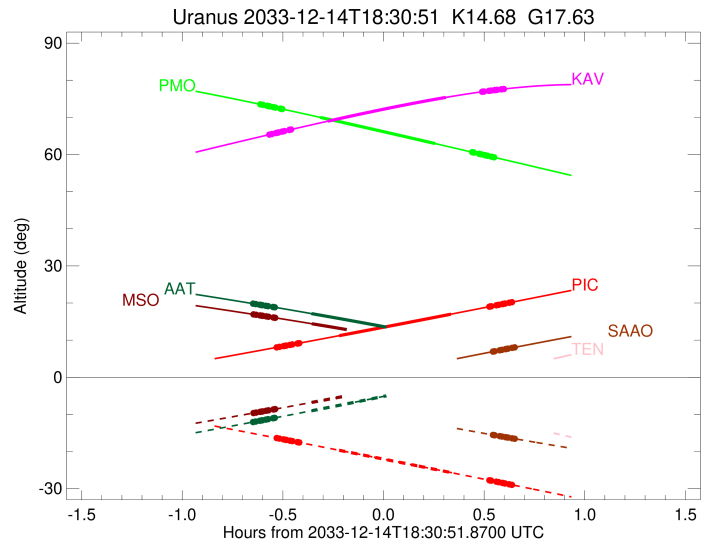
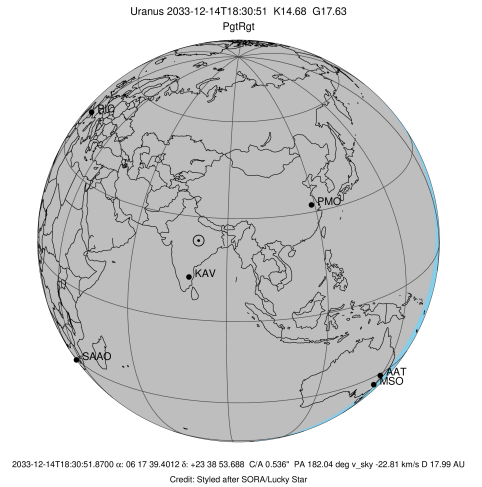
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-14T17:57:03.005		65.42	-75.26	50837.12	-24.03		
lambda	I	2033-12-14T17:57:36.715		65.54	-75.35	50026.71	-24.04		
delta	I	2033-12-14T17:58:48.548		65.79	-75.54	48300.35	-24.03		
gamma	I	2033-12-14T17:59:16.609		65.89	-75.61	47626.18	-24.02		
eta	I	2033-12-14T17:59:35.345		65.96	-75.66	47176.12	-24.02		
beta	I	2033-12-14T18:00:37.660		66.17	-75.82	45679.10	-24.01		
alpha	I	2033-12-14T18:01:17.927		66.32	-75.93	44714.00	-24.00		
4	I	2033-12-14T18:02:49.233		66.63	-76.16	42526.70	-23.98		
5	I	2033-12-14T18:02:59.304		66.67	-76.18	42270.25	-23.96		
6	I	2033-12-14T18:03:17.103		66.73	-76.23	41842.50	-23.97		
Uranus	I	2033-12-14T18:14:19.738		69.00	-77.69	25243.06		-13.89	-14.52
Uranus	E	2033-12-14T18:49:27.395		75.39	-78.99	25059.26		17.67	18.45
6	E	2033-12-14T19:00:17.892		76.91	-78.17	41843.69	24.00		
5	E	2033-12-14T19:00:31.951		76.94	-78.14	42181.35	24.00		
4	E	2033-12-14T19:00:49.429		76.97	-78.11	42616.39	24.01		
alpha	E	2033-12-14T19:02:17.505		77.15	-77.96	44731.49	24.04		
beta	E	2033-12-14T19:02:55.664		77.23	-77.89	45646.03	24.04		
eta	E	2033-12-14T19:03:59.246		77.35	-77.78	47176.12	24.06		
gamma	E	2033-12-14T19:04:17.906		77.38	-77.74	47625.07	24.06		
delta	E	2033-12-14T19:04:45.969		77.43	-77.69	48300.35	24.07		
lambda	E	2033-12-14T19:05:57.685		77.56	-77.55	50026.71	24.08		
epsilon	E	2033-12-14T19:06:54.355		77.66	-77.43	51391.49	24.07		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-12-14T18:27:28.510  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : AAT  
 Location : Siding Spring (AAT)  
 Latitude (deg) : -31.27703  
 E. Longitude (deg) : 149.06608  
 Altitude (km) : 1.164  
 Gaia source ID : 3425562939154599296  
 2Mass ID (if available) : 06173939+2338537  
 ICRS Star Coord at Epoch: 06h 17m 39.40123s +23:38:53.68776s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.676  
 G magnitude : 17.634  
 RP magnitude : 16.719  
 BP magnitude : 18.484  
 DUPflag : 0  
 Distance (au) : 17.990  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.81  
 Sun-Target sep (deg) : 168.56  
 Sun-Moon sep (deg) : 91.04  
 B (ring opening deg) : 71.80  
 PA of pole (deg) : 65.35  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.214  
 C/A sky separation (km) : 2794.8  
 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



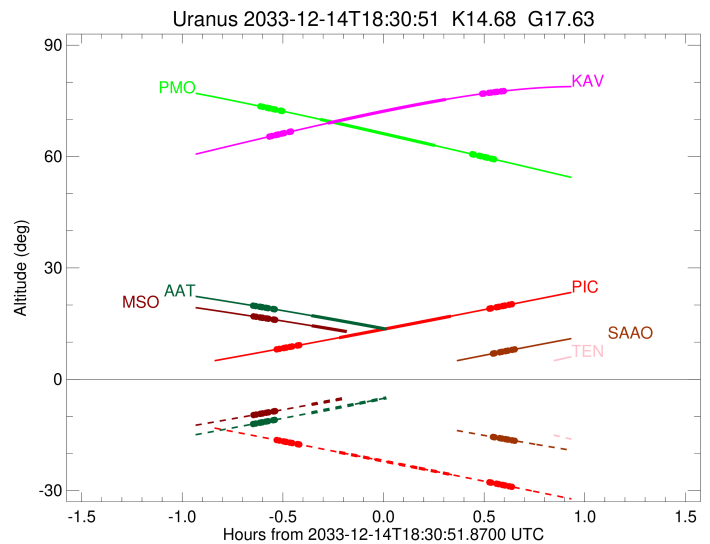
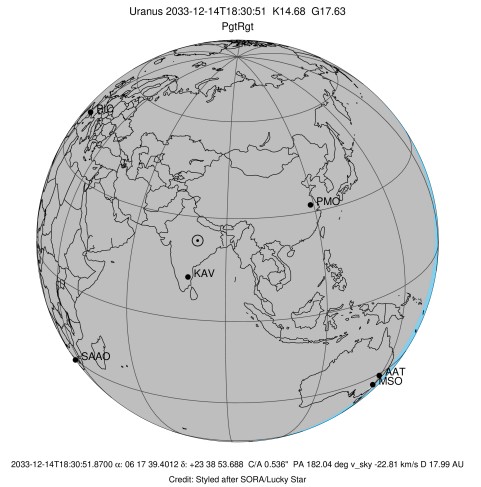
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-12-14T17:52:11.676		19.80	-12.02	50854.47	-24.01		
lambda	I	2033-12-14T17:52:46.149		19.71	-11.92	50026.71	-24.01		
delta	I	2033-12-14T17:53:58.055		19.53	-11.72	48300.35	-24.01		
gamma	I	2033-12-14T17:54:26.124		19.46	-11.64	47626.54	-24.00		
eta	I	2033-12-14T17:54:44.889		19.42	-11.58	47176.12	-24.00		
beta	I	2033-12-14T17:55:47.263		19.26	-11.40	45678.41	-24.00		
alpha	I	2033-12-14T17:56:27.630		19.16	-11.29	44711.57	-24.00		
4	I	2033-12-14T17:57:58.827		18.92	-11.03	42526.20	-23.99		
5	I	2033-12-14T17:58:08.632		18.90	-11.00	42275.66	-23.98		
6	I	2033-12-14T17:58:26.794		18.85	-10.94	41839.24	-23.98		
Uranus	I	2033-12-14T18:09:22.485		17.15	-9.03	25181.73		-15.23	-15.92
Uranus	E	2033-12-14T18:45:31.702		11.17	-2.45x	25090.52		17.07	17.83
6	E	2033-12-14T18:56:23.645		9.27	-0.40x	41841.01	23.90		
5	E	2033-12-14T18:56:38.028		9.23	-0.36x	42185.20	23.89		
4	E	2033-12-14T18:56:55.423		9.18	-0.30x	42616.55	23.91		
alpha	E	2033-12-14T18:58:23.874		8.92	-0.02x	44729.62	23.91		
beta	E	2033-12-14T18:59:02.276		8.81	0.10x	45645.30	23.91		
eta	E	2033-12-14T19:00:06.262		8.62	0.30x	47176.12	23.91		
gamma	E	2033-12-14T19:00:25.050		8.56	0.36x	47625.36	23.91		
delta	E	2033-12-14T19:00:53.278		8.48	0.45x	48300.35	23.91		
lambda	E	2033-12-14T19:02:05.471		8.27	0.68x	50026.71	23.91		
epsilon	E	2033-12-14T19:03:03.217		8.10	0.86x	51407.67	23.91		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-12-14T18:34:30.540  
 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 : 3425562939154599296  
 2Mass ID (if available) : 06173939+2338537  
 ICRS Star Coord at Epoch: 06h 17m 39.40123s +23:38:53.68776s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.676  
 G magnitude : 17.634  
 RP magnitude : 16.719  
 BP magnitude : 18.484  
 DUPflag : 0  
 Distance (au) : 17.990  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.81  
 Sun-Target sep (deg) : 168.56  
 Sun-Moon sep (deg) : 90.82  
 B (ring opening deg) : 71.80  
 PA of pole (deg) : 65.35  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.223  
 C/A sky separation (km) : 2908.0  
 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	2033-12-14T17:58:59.076	-5.03x	-4.53x	50850.60	-23.78			
lambda	I	2033-12-14T17:59:33.710	-4.92x	-4.63x	50026.71	-23.79			
delta	I	2033-12-14T18:00:46.285	-4.69x	-4.85x	48300.35	-23.79			
gamma	I	2033-12-14T18:01:14.616	-4.59x	-4.93x	47626.47	-23.79			
eta	I	2033-12-14T18:01:33.549	-4.53x	-4.99x	47176.12	-23.79			
beta	I	2033-12-14T18:02:36.482	-4.33x	-5.18	45678.56	-23.78			
alpha	I	2033-12-14T18:03:17.194	-4.20x	-5.30	44712.05	-23.78			
4	I	2033-12-14T18:04:49.218	-3.91x	-5.58	42526.27	-23.78			
5	I	2033-12-14T18:04:59.156	-3.88x	-5.61	42274.66	-23.77			
6	I	2033-12-14T18:05:17.406	-3.82x	-5.66	41839.85	-23.77			
Uranus	I	2033-12-14T18:16:18.919	-1.72x	-7.62	25189.77			-15.06	-15.74
Uranus	E	2033-12-14T18:52:36.451	4.98x	-13.78	25093.13			17.02	17.78
6	E	2033-12-14T19:03:29.700	6.92	-15.54	41840.63	23.88			
5	E	2033-12-14T19:03:44.134	6.96	-15.58	42185.77	23.87			
4	E	2033-12-14T19:04:01.521	7.01	-15.62	42616.56	23.89			
alpha	E	2033-12-14T19:05:30.028	7.27	-15.86	44729.33	23.89			
beta	E	2033-12-14T19:06:08.459	7.38	-15.96	45645.18	23.90			
eta	E	2033-12-14T19:07:12.481	7.57	-16.13	47176.12	23.90			
gamma	E	2033-12-14T19:07:31.277	7.63	-16.18	47625.41	23.90			
delta	E	2033-12-14T19:07:59.512	7.71	-16.25	48300.35	23.91			
lambda	E	2033-12-14T19:09:11.719	7.92	-16.44	50026.71	23.91			
epsilon	E	2033-12-14T19:10:09.593	8.09	-16.59	51410.67	23.91			

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2033-12-14T18:27:36.990  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : MSO  
 Location : Mt. Stromlo Observatory  
 Latitude (deg) : -35.32000  
 E. Longitude (deg) : 149.00833  
 Altitude (km) : 0.770  
 Gaia source ID : 3425562939154599296  
 2Mass ID (if available) : 06173939+2338537  
 ICRS Star Coord at Epoch: 06h 17m 39.40123s +23:38:53.68776s  
 RUWE (>1.4 is poor) : 0.95  
 K magnitude : 14.676  
 G magnitude : 17.634  
 RP magnitude : 16.719  
 BP magnitude : 18.484  
 DUPflag : 0  
 Distance (au) : 17.990  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -22.81  
 Sun-Target sep (deg) : 168.56  
 Sun-Moon sep (deg) : 91.00  
 B (ring opening deg) : 71.80  
 PA of pole (deg) : 65.35  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.192  
 C/A sky separation (km) : 2500.3  
 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	2033-12-14T17:52:18.898		16.91	-9.60	50856.03	-24.00		
lambda	I	2033-12-14T17:52:53.444		16.83	-9.51	50026.71	-24.01		
delta	I	2033-12-14T17:54:05.365		16.66	-9.31	48300.35	-24.00		
gamma	I	2033-12-14T17:54:33.438		16.59	-9.24	47626.57	-24.00		
eta	I	2033-12-14T17:54:52.208		16.55	-9.19	47176.12	-24.00		
beta	I	2033-12-14T17:55:54.594		16.40	-9.02	45678.35	-23.99		
alpha	I	2033-12-14T17:56:34.974		16.30	-8.91	44711.36	-23.99		
4	I	2033-12-14T17:58:06.172		16.09	-8.66	42526.17	-23.99		
5	I	2033-12-14T17:58:15.955		16.06	-8.63	42276.13	-23.97		
6	I	2033-12-14T17:58:34.151		16.02	-8.58	41838.94	-23.98		
Uranus	I	2033-12-14T18:09:29.351		14.42	-6.77	25176.32		-15.35	-16.04
Uranus	E	2033-12-14T18:45:42.170		8.75	-0.49x	25094.58		16.99	17.75
6	E	2033-12-14T18:56:34.124		6.96	1.46x	41840.69	23.90		
5	E	2033-12-14T18:56:48.537		6.92	1.51x	42185.67	23.90		
4	E	2033-12-14T18:57:05.912		6.87	1.56x	42616.56	23.91		
alpha	E	2033-12-14T18:58:34.350		6.62	1.83x	44729.40	23.91		
beta	E	2033-12-14T18:59:12.755		6.52	1.94x	45645.21	23.91		
eta	E	2033-12-14T19:00:16.745		6.34	2.14x	47176.12	23.91		
gamma	E	2033-12-14T19:00:35.534		6.28	2.19x	47625.39	23.91		
delta	E	2033-12-14T19:01:03.761		6.21	2.28x	48300.35	23.91		
lambda	E	2033-12-14T19:02:15.955		6.00	2.50x	50026.71	23.91		
epsilon	E	2033-12-14T19:03:13.783		5.84	2.67x	51409.57	23.91		