

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-02-04T17:14:05.690
 Event type : PgtX
 : Uranus occs: geocentric, topocentric
 : No ring occs
 Gaia source ID : 3881566866875100416
 2Mass ID (if available) : 10073892+1222367

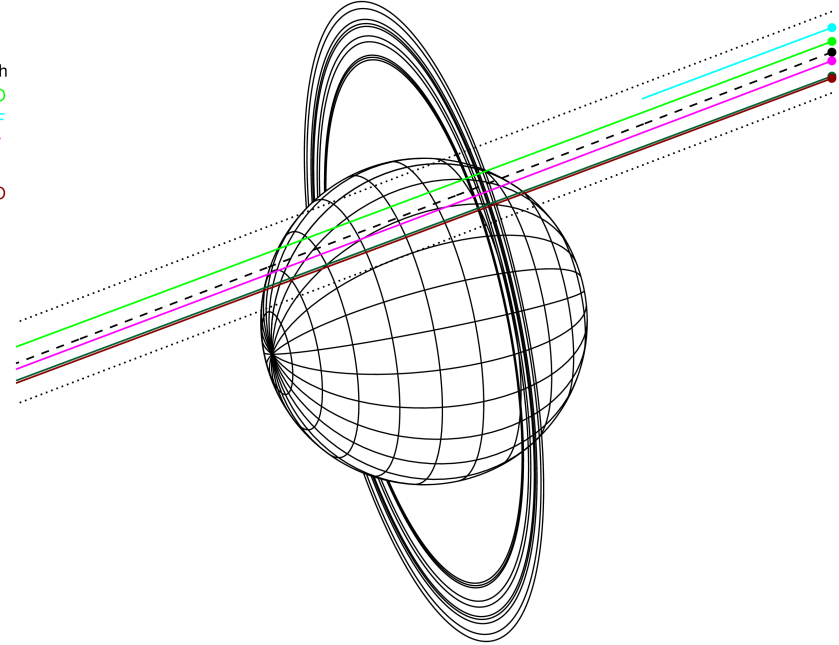
Uranus 2046-02-04T17:14:05 K12.41 G13.82 PgtX

ICRS Star Coord at Epoch: 10h 07m 38.92701s +12:22:36.17996s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.415
 G magnitude : 13.820
 RP magnitude : 13.333
 BP magnitude : 14.144
 DUPflag : 0
 Distance (au) : 17.380
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.14
 Sun-Target sep (deg) : 165.86
 Sun-Moon sep (deg) : 152.24
 B (ring opening deg) : 17.84
 PA of pole (deg) : 102.18



2046-02-04T17:14:05.6900 cc: 10 07 38.9270 s: +12 22 36.180 C/A 1.329° PA 200.87 deg v_sky -22.14 km/s D 17.38 AU
 Credit: Styled after SORA/Lucky Star

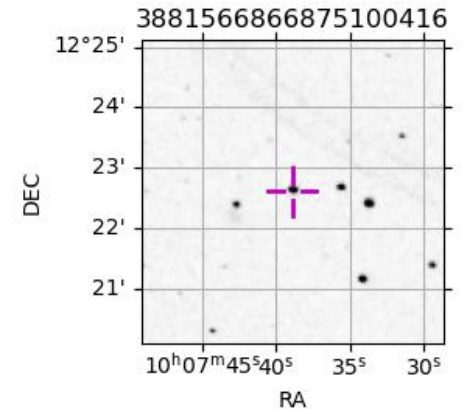
Earth
 PMO
 IRTF
 KAV
 AAT
 MSO



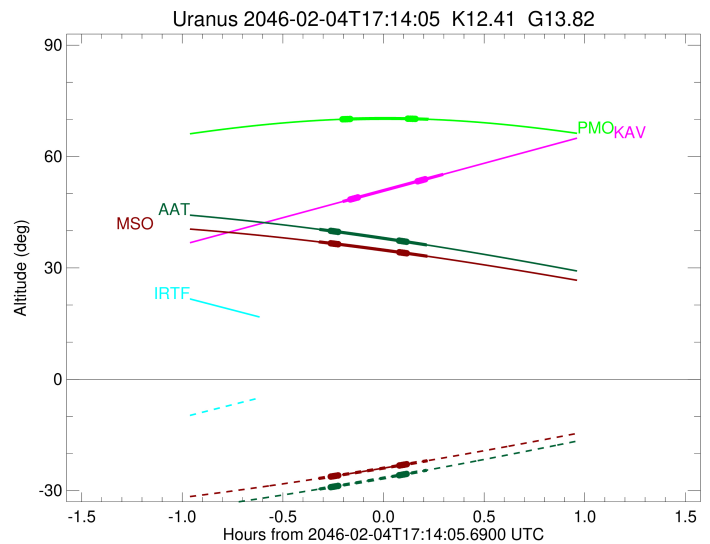
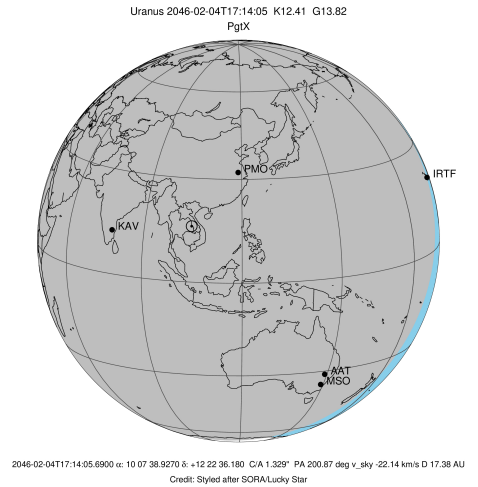
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8		+	+	FEB 04 17:01 - FEB 04 17:27	PieRnn
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		+	+	FEB 04 17:01 - FEB 04 17:31	PieRnn
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		+	+	FEB 04 16:55 - FEB 04 17:27	PieRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0		+	+	FEB 04 16:54 - FEB 04 17:27	PieRnn

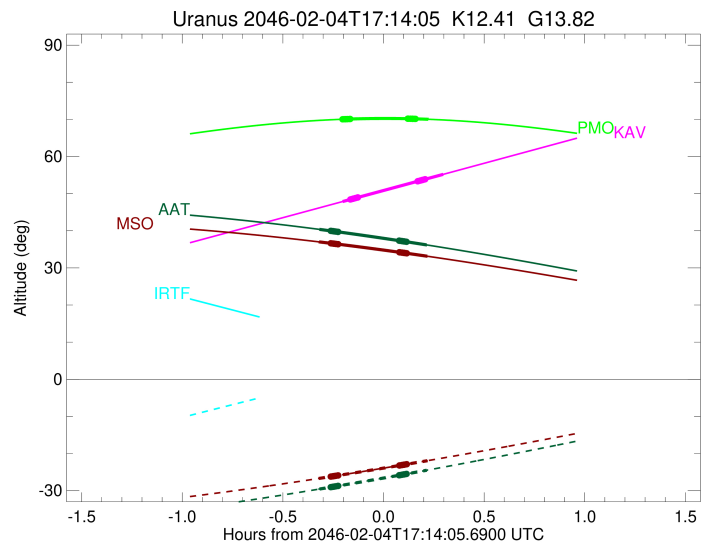
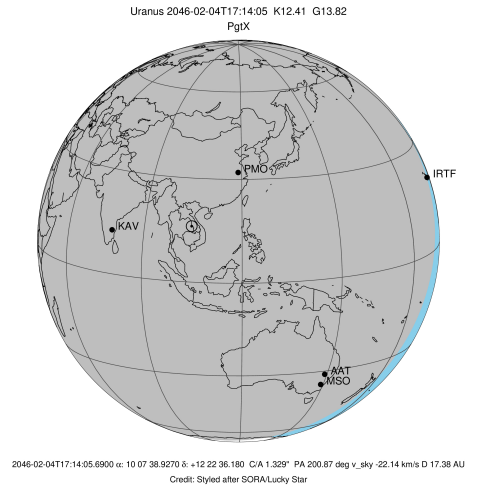


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-02-04T17:14:35.240
 Event type : PgtX
 : Uranus occs: geocentric, topocentric
 : No ring occs
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3881566866875100416
 2Mass ID (if available) : 10073892+1222367
 ICRS Star Coord at Epoch: 10h 07m 38.92701s +12:22:36.17996s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.415
 G magnitude : 13.820
 RP magnitude : 13.333
 BP magnitude : 14.144
 DUPflag : 0
 Distance (au) : 17.380
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.14
 Sun-Target sep (deg) : 165.86
 Sun-Moon sep (deg) : 152.53
 B (ring opening deg) : 17.84
 PA of pole (deg) : 102.18
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.480
 C/A sky separation (km) : 18653.3
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



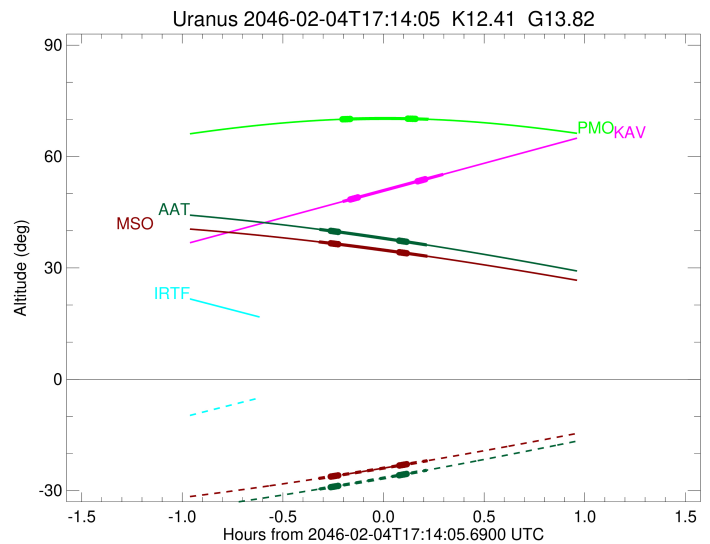
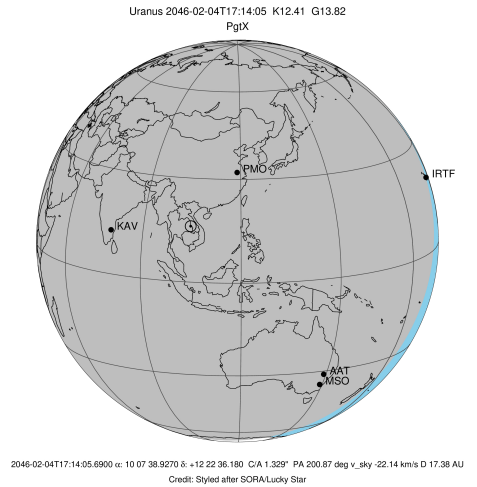
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2046-02-04T17:01:56.770	b	70.04	-71.31	50873.25	-67.75		
lambda	I	2046-02-04T17:02:09.311	b	70.05	-71.28	50026.71	-67.41		
delta	I	2046-02-04T17:02:34.997	b	70.06	-71.23	48300.35	-67.00		
gamma	I	2046-02-04T17:02:45.085	b	70.07	-71.21	47625.25	-66.84		
eta	I	2046-02-04T17:02:51.811	b	70.07	-71.20	47176.12	-66.72		
beta	I	2046-02-04T17:03:14.225	b	70.08	-71.15	45680.35	-66.28		
alpha	I	2046-02-04T17:03:28.874	b	70.09	-71.12	44739.01	-66.07		
4	I	2046-02-04T17:04:02.741	b	70.11	-71.05	42530.38	-65.28		
5	I	2046-02-04T17:04:05.699	b	70.11	-71.05	42203.34	-64.95		
6	I	2046-02-04T17:04:10.793	b	70.11	-71.04	41848.68	-64.83		
Uranus	I	2046-02-04T17:01:40.352		70.03	-71.34	25541.28		-32.85	-34.06
Uranus	E	2046-02-04T17:27:29.144		70.03	-67.69	25525.72		48.05	49.35
6	E	2046-02-04T17:21:19.184	b	70.19	-68.65	41863.36	64.85		
5	E	2046-02-04T17:21:23.517	b	70.19	-68.64	42194.87	64.97		
4	E	2046-02-04T17:21:29.953	b	70.19	-68.63	42611.63	65.29		
alpha	E	2046-02-04T17:22:01.319	b	70.18	-68.55	44725.96	66.09		
beta	E	2046-02-04T17:22:16.025	b	70.18	-68.51	45652.92	66.30		
eta	E	2046-02-04T17:22:38.757	b	70.17	-68.45	47176.11	66.73		
gamma	E	2046-02-04T17:22:45.564	b	70.17	-68.43	47630.75	66.85		
delta	E	2046-02-04T17:22:55.568	b	70.16	-68.41	48300.35	67.02		
lambda	E	2046-02-04T17:23:21.251	b	70.15	-68.34	50026.71	67.42		
epsilon	E	2046-02-04T17:23:43.853	b	70.14	-68.28	51554.17	67.76		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-02-04T17:16:55.610
 Event type : PgtX
 : Uranus occs: geocentric, topocentric
 : No ring occs
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 3881566866875100416
 2Mass ID (if available) : 10073892+1222367
 ICRS Star Coord at Epoch: 10h 07m 38.92701s +12:22:36.17996s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.415
 G magnitude : 13.820
 RP magnitude : 13.333
 BP magnitude : 14.144
 DUPflag : 0
 Distance (au) : 17.380
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.14
 Sun-Target sep (deg) : 165.86
 Sun-Moon sep (deg) : 152.08
 B (ring opening deg) : 17.84
 PA of pole (deg) : 102.18
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.233
 C/A sky separation (km) : 15540.6
 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



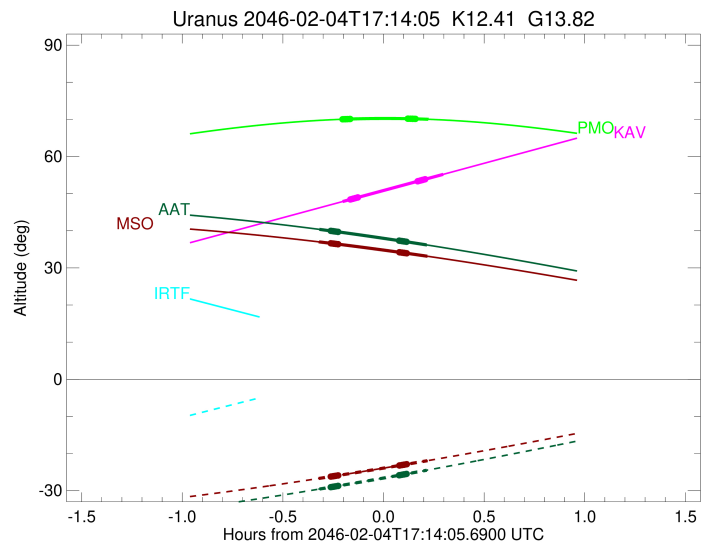
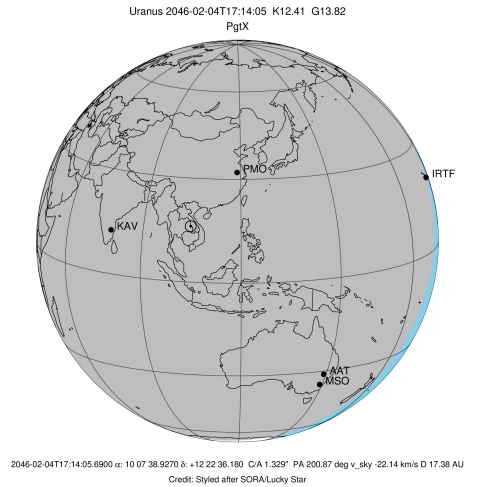
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2046-02-04T17:04:17.087	b	48.45	-62.14	50854.77	-69.19		
lambda	I	2046-02-04T17:04:29.087	b	48.50	-62.19	50026.71	-68.94		
delta	I	2046-02-04T17:04:54.176	b	48.61	-62.29	48300.35	-68.67		
gamma	I	2046-02-04T17:05:04.020	b	48.65	-62.33	47624.90	-68.56		
eta	I	2046-02-04T17:05:10.570	b	48.67	-62.35	47176.11	-68.48		
beta	I	2046-02-04T17:05:32.377	b	48.76	-62.44	45679.87	-68.19		
alpha	I	2046-02-04T17:05:46.682	b	48.82	-62.50	44736.92	-68.07		
4	I	2046-02-04T17:06:19.394	b	48.95	-62.63	42528.96	-67.53		
5	I	2046-02-04T17:06:22.196	b	48.96	-62.64	42209.37	-67.25		
6	I	2046-02-04T17:06:27.188	b	48.98	-62.66	41845.30	-67.16		
Uranus	I	2046-02-04T17:01:54.818		47.88	-61.57	25532.71		-41.37	-42.67
Uranus	E	2046-02-04T17:31:54.853		55.20	-68.75	25517.33		56.35	57.55
6	E	2046-02-04T17:24:15.750	b	53.33	-66.92	41860.48	67.24		
5	E	2046-02-04T17:24:20.045	b	53.35	-66.94	42200.71	67.33		
4	E	2046-02-04T17:24:25.972	b	53.37	-66.97	42613.16	67.60		
alpha	E	2046-02-04T17:24:56.324	b	53.50	-67.09	44723.39	68.15		
beta	E	2046-02-04T17:25:10.628	b	53.56	-67.14	45651.57	68.27		
eta	E	2046-02-04T17:25:32.747	b	53.65	-67.23	47176.12	68.56		
gamma	E	2046-02-04T17:25:39.372	b	53.67	-67.26	47630.54	68.64		
delta	E	2046-02-04T17:25:49.122	b	53.71	-67.30	48300.35	68.75		
lambda	E	2046-02-04T17:26:14.181	b	53.82	-67.40	50026.71	69.03		
epsilon	E	2046-02-04T17:26:36.233	b	53.91	-67.48	51551.30	69.27		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-02-04T17:11:00.170
 Event type : PgtX
 : Uranus occs: geocentric, topocentric
 : No ring occs
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 3881566866875100416
 2Mass ID (if available) : 10073892+1222367
 ICRS Star Coord at Epoch: 10h 07m 38.92701s +12:22:36.17996s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.415
 G magnitude : 13.820
 RP magnitude : 13.333
 BP magnitude : 14.144
 DUPflag : 0
 Distance (au) : 17.380
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.14
 Sun-Target sep (deg) : 165.86
 Sun-Moon sep (deg) : 153.01
 B (ring opening deg) : 17.84
 PA of pole (deg) : 102.18
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.084
 C/A sky separation (km) : 13662.2
 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	2046-02-04T16:58:27.068	b	39.96	-29.05	50843.81	-69.97		
lambda	I	2046-02-04T16:58:38.770	b	39.94	-29.02	50026.71	-69.78		
delta	I	2046-02-04T16:59:03.547	b	39.89	-28.96	48300.35	-69.57		
gamma	I	2046-02-04T16:59:13.265	b	39.87	-28.94	47624.68	-69.48		
eta	I	2046-02-04T16:59:19.724	b	39.86	-28.92	47176.12	-69.42		
beta	I	2046-02-04T16:59:41.221	b	39.81	-28.86	45679.52	-69.19		
alpha	I	2046-02-04T16:59:55.358	b	39.78	-28.83	44735.59	-69.13		
4	I	2046-02-04T17:00:27.477	b	39.72	-28.75	42528.21	-68.70		
5	I	2046-02-04T17:00:30.215	b	39.71	-28.74	42213.16	-68.45		
6	I	2046-02-04T17:00:35.165	b	39.70	-28.73	41843.22	-68.37		
Uranus	I	2046-02-04T16:55:00.086		40.38	-29.57	25527.61		-46.24	-47.55
Uranus	E	2046-02-04T17:27:00.093		36.18	-24.50	25513.60		60.34	61.45
6	E	2046-02-04T17:18:44.406	b	37.34	-25.86	41858.76	68.32		
5	E	2046-02-04T17:18:48.705	b	37.33	-25.85	42204.17	68.40		
4	E	2046-02-04T17:18:54.372	b	37.32	-25.84	42613.92	68.65		
alpha	E	2046-02-04T17:19:24.294	b	37.25	-25.75	44721.91	69.07		
beta	E	2046-02-04T17:19:38.428	b	37.22	-25.72	45650.82	69.14		
eta	E	2046-02-04T17:20:00.290	b	37.17	-25.66	47176.12	69.36		
gamma	E	2046-02-04T17:20:06.837	b	37.15	-25.64	47630.41	69.42		
delta	E	2046-02-04T17:20:16.481	b	37.13	-25.61	48300.35	69.51		
lambda	E	2046-02-04T17:20:41.281	b	37.07	-25.54	50026.71	69.71		
epsilon	E	2046-02-04T17:21:03.089	b	37.02	-25.49	51548.87	69.90		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2046-02-04T17:11:00.560
 Event type : PgtX
 : Uranus occs: geocentric, topocentric
 : No ring occs
 Observer code : MSO
 Location : Mt. Stromlo Observatory
 Latitude (deg) : -35.32000
 E. Longitude (deg) : 149.00833
 Altitude (km) : 0.770
 Gaia source ID : 3881566866875100416
 2Mass ID (if available) : 10073892+1222367
 ICRS Star Coord at Epoch: 10h 07m 38.92701s +12:22:36.17996s
 RUWE (>1.4 is poor) : 0.96
 K magnitude : 12.415
 G magnitude : 13.820
 RP magnitude : 13.333
 BP magnitude : 14.144
 DUPflag : 0
 Distance (au) : 17.380
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.14
 Sun-Target sep (deg) : 165.86
 Sun-Moon sep (deg) : 152.99
 B (ring opening deg) : 17.84
 PA of pole (deg) : 102.18
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.056
 C/A sky separation (km) : 13317.1
 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_itrff93_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	2046-02-04T16:58:27.514	b	36.62	-26.21	50841.95	-70.06		
lambda	I	2046-02-04T16:58:39.174	b	36.60	-26.18	50026.71	-69.87		
delta	I	2046-02-04T16:59:03.916	b	36.55	-26.12	48300.35	-69.67		
gamma	I	2046-02-04T16:59:13.620	b	36.54	-26.10	47624.64	-69.59		
eta	I	2046-02-04T16:59:20.068	b	36.52	-26.08	47176.11	-69.53		
beta	I	2046-02-04T16:59:41.528	b	36.48	-26.03	45679.46	-69.32		
alpha	I	2046-02-04T16:59:55.647	b	36.46	-26.00	44735.35	-69.26		
4	I	2046-02-04T17:00:27.689	b	36.40	-25.92	42528.09	-68.85		
5	I	2046-02-04T17:00:30.419	b	36.39	-25.92	42213.82	-68.60		
6	I	2046-02-04T17:00:35.367	b	36.38	-25.91	41842.85	-68.53		
Uranus	I	2046-02-04T16:54:50.344		37.01	-26.71	25526.77		-47.04	-48.35
Uranus	E	2046-02-04T17:27:10.604		33.14	-21.94	25512.95		61.07	62.16
6	E	2046-02-04T17:18:48.572	b	34.22	-23.23	41858.43	68.48		
5	E	2046-02-04T17:18:52.875	b	34.21	-23.21	42204.82	68.56		
4	E	2046-02-04T17:18:58.497	b	34.20	-23.20	42614.06	68.80		
alpha	E	2046-02-04T17:19:28.360	b	34.13	-23.12	44721.63	69.21		
beta	E	2046-02-04T17:19:42.470	b	34.10	-23.09	45650.68	69.26		
eta	E	2046-02-04T17:20:04.297	b	34.06	-23.03	47176.11	69.47		
gamma	E	2046-02-04T17:20:10.833	b	34.04	-23.02	47630.38	69.53		
delta	E	2046-02-04T17:20:20.463	b	34.02	-22.99	48300.35	69.61		
lambda	E	2046-02-04T17:20:45.227	b	33.97	-22.93	50026.71	69.81		
epsilon	E	2046-02-04T17:21:07.000	b	33.93	-22.87	51548.34	69.99		