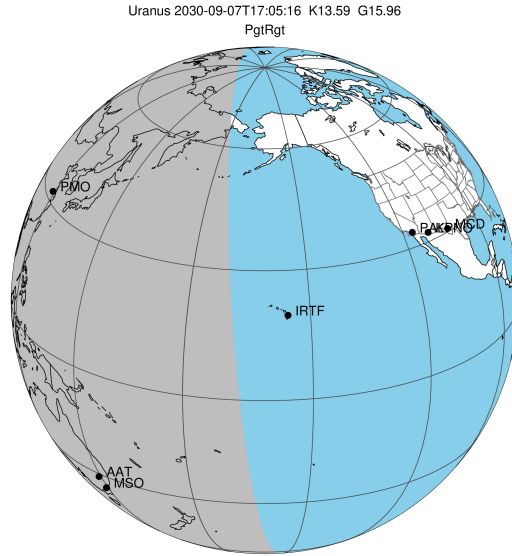


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-07T17:05:16.870
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3416120749908253184
 2Mass ID (if available) : 05262087+2317060

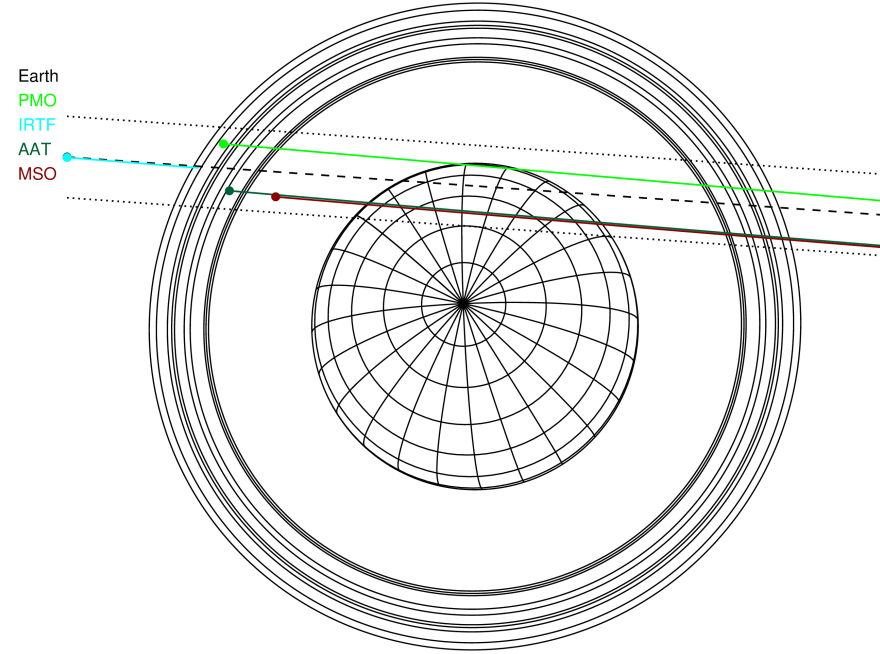
Uranus 2030-09-07T17:05:16 K13.59 G15.96 PgtRgt

ICRS Star Coord at Epoch: 05h 26m 20.87832s +23:17:05.99780s

RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.587
 G magnitude : 15.957
 RP magnitude : 15.161
 BP magnitude : 16.614
 DUPflag : 0
 Distance (au) : 19.280
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 10.25
 Sun-Target sep (deg) : 82.43
 Sun-Moon sep (deg) : 150.71
 B (ring opening deg) : 80.94
 PA of pole (deg) : 27.20



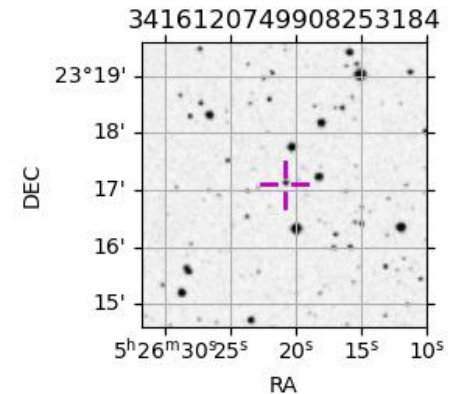
2030-09-07T17:05:16.8700 ex: 05 26 20.8783 s: +23 17 05.998 C/A 1.573° PA 175.94 deg v_sky +10.25 km/s D 19.28 AU
 Credit: Styled after SORA/Lucky Star



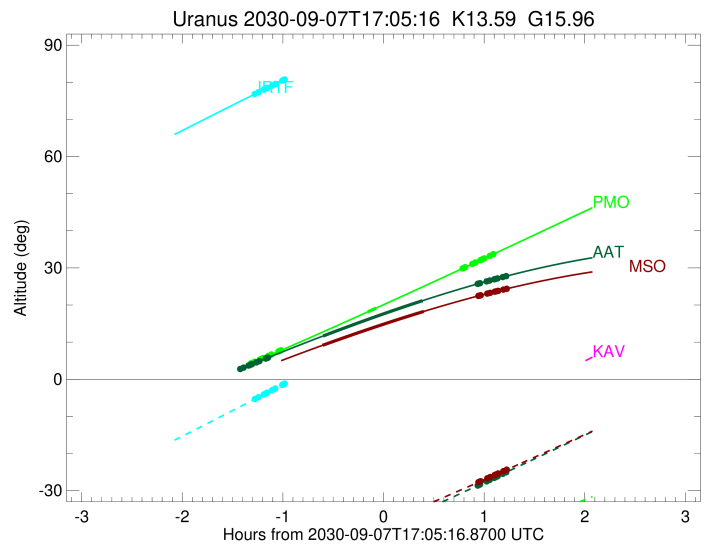
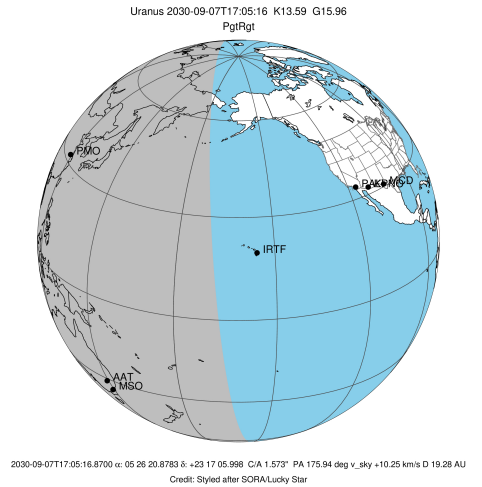
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	++++++	+ +	++++++	SEP 07 15:51 - SEP 07 18:11	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	+			SEP 07 15:48 - SEP 07 15:48	PnnRin
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
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	+++	+ +	++++++	SEP 07 15:55 - SEP 07 18:19	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0		+ +	++++++	SEP 07 16:29 - SEP 07 18:19	PieRne

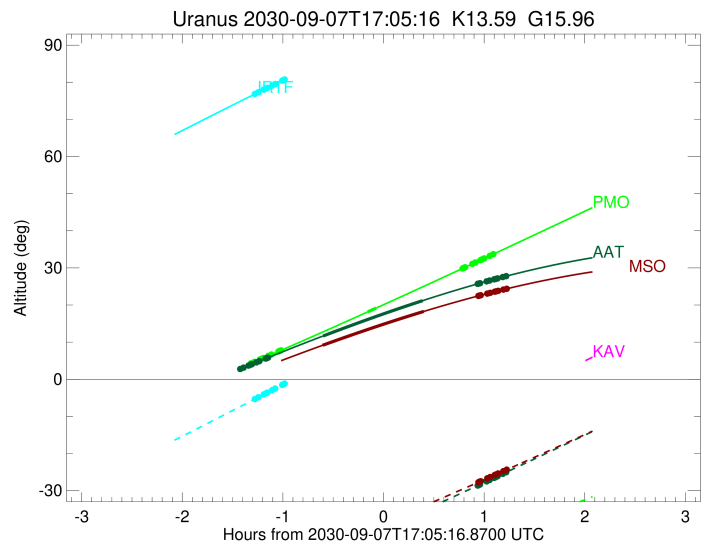
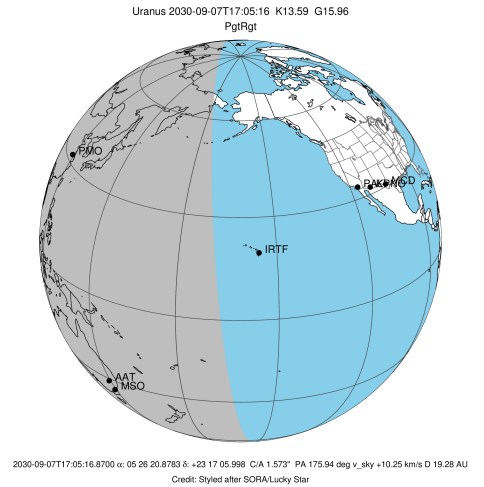


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-07T16:57:31.760
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3416120749908253184
 2Mass ID (if available) : 05262087+2317060
 ICRS Star Coord at Epoch: 05h 26m 20.87832s +23:17:05.99780s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.587
 G magnitude : 15.957
 RP magnitude : 15.161
 BP magnitude : 16.614
 DUPflag : 0
 Distance (au) : 19.280
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 10.25
 Sun-Target sep (deg) : 82.43
 Sun-Moon sep (deg) : 151.62
 B (ring opening deg) : 80.94
 PA of pole (deg) : 27.20
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.795
 C/A sky separation (km) : 25107.0
 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



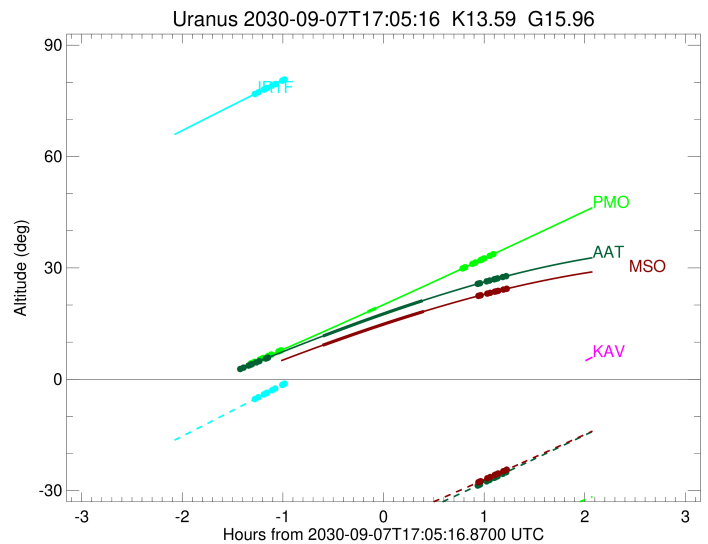
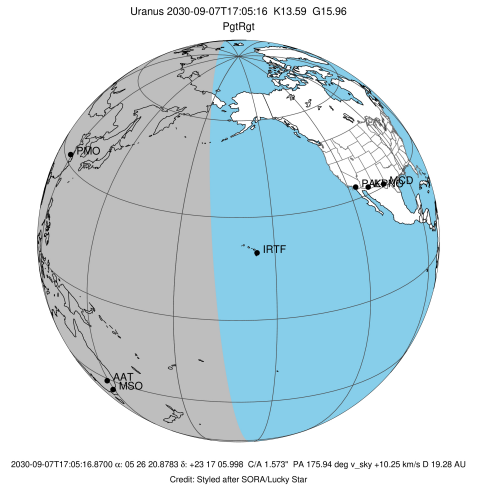
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-09-07T15:46:30.742		4.35x	-52.04	51008.43	-9.05		
lambda	I	2030-09-07T15:48:20.011		4.70x	-52.08	50026.71	-8.95		
delta	I	2030-09-07T15:51:34.102		5.33	-52.14	48300.35	-8.83		
gamma	I	2030-09-07T15:52:51.194		5.58	-52.16	47621.24	-8.78		
eta	I	2030-09-07T15:53:41.970		5.75	-52.17	47176.12	-8.75		
beta	I	2030-09-07T15:56:34.141		6.30	-52.21	45680.50	-8.63		
alpha	I	2030-09-07T15:58:28.781		6.68	-52.22	44697.63	-8.54		
4	I	2030-09-07T16:02:46.604		7.52	-52.24	42526.24	-8.31		
5	I	2030-09-07T16:03:28.860		7.66	-52.24	42167.48	-8.28		
6	I	2030-09-07T16:04:11.405		7.80	-52.23	41823.98	-8.24		
Uranus	I	2030-09-07T16:55:55.617		18.16	-50.17	25126.17		7.84	8.21
Uranus	E	2030-09-07T17:00:49.142		19.16	-49.79	25187.69		7.25	7.59
6	E	2030-09-07T17:52:29.667		29.86	-44.08	41879.71	8.07		
5	E	2030-09-07T17:53:21.151		30.04	-43.96	42295.66	8.10		
4	E	2030-09-07T17:53:56.050		30.17	-43.88	42579.40	8.13		
alpha	E	2030-09-07T17:58:19.460		31.09	-43.28	44750.98	8.34		
beta	E	2030-09-07T18:00:07.749		31.47	-43.02	45658.59	8.42		
eta	E	2030-09-07T18:03:06.798		32.09	-42.60	47176.12	8.53		
gamma	E	2030-09-07T18:03:59.903		32.28	-42.47	47630.00	8.56		
delta	E	2030-09-07T18:05:17.988		32.55	-42.28	48300.35	8.61		
lambda	E	2030-09-07T18:08:37.327		33.25	-41.79	50026.71	8.71		
epsilon	E	2030-09-07T18:11:31.076		33.86	-41.36	51547.68	8.80		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-07T17:06:16.580
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 3416120749908253184
 2Mass ID (if available) : 05262087+2317060
 ICRS Star Coord at Epoch: 05h 26m 20.87832s +23:17:05.99780s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.587
 G magnitude : 15.957
 RP magnitude : 15.161
 BP magnitude : 16.614
 DUPflag : 0
 Distance (au) : 19.280
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 10.25
 Sun-Target sep (deg) : 82.43
 Sun-Moon sep (deg) : 151.10
 B (ring opening deg) : 80.94
 PA of pole (deg) : 27.20
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.539
 C/A sky separation (km) : 21523.6
 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



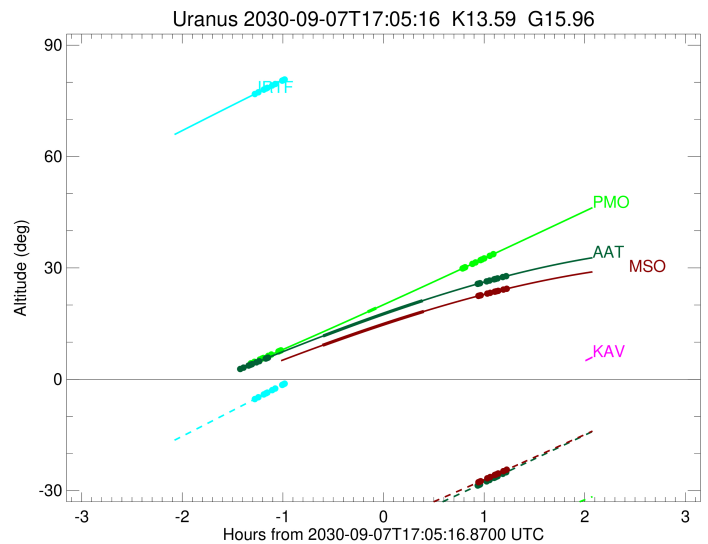
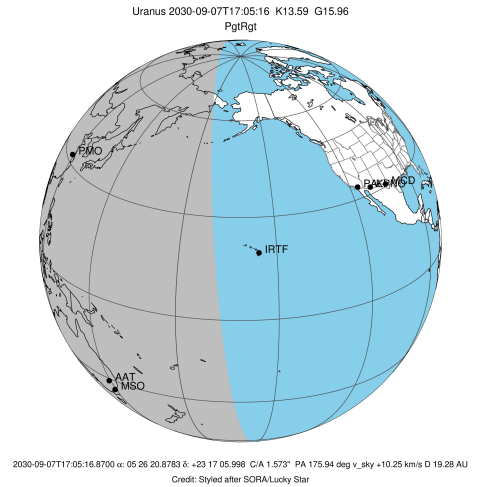
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-09-07T15:48:54.969		76.92	-5.25	50974.71	-8.99		
lambda	I	2030-09-07T15:50:41.043		77.31	-4.84x	50026.71	-8.92		
delta	I	2030-09-07T15:53:55.484		78.04	-4.08x	48300.35	-8.84		
gamma	I	2030-09-07T15:55:12.477		78.32	-3.78x	47621.09	-8.81		
eta	I	2030-09-07T15:56:03.076		78.51	-3.59x	47176.12	-8.78		
beta	I	2030-09-07T15:58:54.248		79.14	-2.92x	45679.84	-8.70		
alpha	I	2030-09-07T16:00:47.918		79.55	-2.48x	44694.91	-8.65		
4	I	2030-09-07T16:05:00.894		80.47	-1.50x	42527.13	-8.50		
5	I	2030-09-07T16:05:42.940		80.62	-1.33x	42162.97	-8.48		
6	I	2030-09-07T16:06:24.302		80.77	-1.17x	41819.39	-8.45		
Uranus	I	2030-09-07T16:44:45.562		86.37	7.82x	24987.81		9.06	9.48
Uranus	E	2030-09-07T17:29:16.952		78.60	18.29x	25442.18		4.03	4.22
6	E	2030-09-07T18:07:09.766		70.03	27.20x	41879.70	8.43		
5	E	2030-09-07T18:07:59.529		69.84	27.39x	42299.98	8.46		
4	E	2030-09-07T18:08:32.961		69.71	27.53x	42583.18	8.48		
alpha	E	2030-09-07T18:12:46.454		68.75	28.52x	44751.65	8.62		
beta	E	2030-09-07T18:14:31.140		68.35	28.93x	45657.09	8.68		
eta	E	2030-09-07T18:17:25.403		67.68	29.61x	47176.12	8.76		
gamma	E	2030-09-07T18:18:17.195		67.48	29.81x	47630.25	8.78		
delta	E	2030-09-07T18:19:33.378		67.19	30.11x	48300.35	8.81		
lambda	E	2030-09-07T18:22:48.423		66.45	30.87x	50026.71	8.89		
epsilon	E	2030-09-07T18:25:38.310		65.79	31.53x	51542.06	8.96		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-07T16:58:16.270
 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 : 3416120749908253184
 2Mass ID (if available) : 05262087+2317060
 ICRS Star Coord at Epoch: 05h 26m 20.87832s +23:17:05.99780s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.587
 G magnitude : 15.957
 RP magnitude : 15.161
 BP magnitude : 16.614
 DUPflag : 0
 Distance (au) : 19.280
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 10.25
 Sun-Target sep (deg) : 82.43
 Sun-Moon sep (deg) : 151.37
 B (ring opening deg) : 80.94
 PA of pole (deg) : 27.20
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.279
 C/A sky separation (km) : 17888.4
 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	2030-09-07T15:40:13.765		2.84x	-55.80	50950.50	-9.56		
lambda	I	2030-09-07T15:41:50.761		3.14x	-55.55	50026.71	-9.51		
delta	I	2030-09-07T15:44:52.847		3.70x	-55.06	48300.35	-9.45		
gamma	I	2030-09-07T15:46:04.812		3.92x	-54.86	47621.02	-9.43		
eta	I	2030-09-07T15:46:52.046		4.07x	-54.74	47176.12	-9.41		
beta	I	2030-09-07T15:49:31.631		4.56x	-54.30	45679.21	-9.35		
alpha	I	2030-09-07T15:51:17.418		4.89x	-54.00	44693.02	-9.31		
4	I	2030-09-07T15:55:11.275		5.60	-53.35	42528.19	-9.21		
5	I	2030-09-07T15:55:50.575		5.72	-53.24	42160.16	-9.19		
6	I	2030-09-07T15:56:28.639		5.84	-53.13	41816.03	-9.17		
Uranus	I	2030-09-07T16:29:16.176		11.66	-47.22	25012.61		8.85	9.26
Uranus	E	2030-09-07T17:28:38.704		21.18	-35.45	25531.61		1.94	2.04
6	E	2030-09-07T18:01:31.425		25.71	-28.62	41879.21	8.98		
5	E	2030-09-07T18:02:18.714		25.81	-28.45	42304.86	9.00		
4	E	2030-09-07T18:02:50.146		25.88	-28.34	42587.98	9.01		
alpha	E	2030-09-07T18:06:49.009		26.38	-27.50	44752.23	9.10		
beta	E	2030-09-07T18:08:28.046		26.58	-27.15	45655.08	9.14		
eta	E	2030-09-07T18:11:14.106		26.92	-26.57	47176.12	9.18		
gamma	E	2030-09-07T18:12:03.548		27.02	-26.40	47630.58	9.20		
delta	E	2030-09-07T18:13:16.279		27.16	-26.14	48300.35	9.22		
lambda	E	2030-09-07T18:16:23.060		27.53	-25.48	50026.71	9.27		
epsilon	E	2030-09-07T18:19:05.074		27.85	-24.91	51530.93	9.31		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-09-07T16:58:31.730
 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 : 3416120749908253184
 2Mass ID (if available) : 05262087+2317060
 ICRS Star Coord at Epoch: 05h 26m 20.87832s +23:17:05.99780s
 RUWE (>1.4 is poor) : 0.97
 K magnitude : 13.587
 G magnitude : 15.957
 RP magnitude : 15.161
 BP magnitude : 16.614
 DUPflag : 0
 Distance (au) : 19.280
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 10.25
 Sun-Target sep (deg) : 82.43
 Sun-Moon sep (deg) : 151.32
 B (ring opening deg) : 80.94
 PA of pole (deg) : 27.20
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.258
 C/A sky separation (km) : 17592.2
 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	2030-09-07T15:40:21.653	0.83x	-52.99	50948.06	-9.59			
lambda	I	2030-09-07T15:41:58.113	1.11x	-52.76	50026.71	-9.54			
delta	I	2030-09-07T15:44:59.638	1.65x	-52.33	48300.35	-9.48			
gamma	I	2030-09-07T15:46:11.370	1.86x	-52.15	47621.01	-9.46			
eta	I	2030-09-07T15:46:58.446	2.00x	-52.04	47176.12	-9.44			
beta	I	2030-09-07T15:49:37.484	2.47x	-51.65	45679.14	-9.39			
alpha	I	2030-09-07T15:51:22.892	2.78x	-51.39	44692.85	-9.35			
4	I	2030-09-07T15:55:15.781	3.45x	-50.80	42528.31	-9.24			
5	I	2030-09-07T15:55:54.962	3.57x	-50.70	42159.92	-9.23			
6	I	2030-09-07T15:56:32.859	3.68x	-50.60	41815.72	-9.21			
Uranus	I	2030-09-07T16:29:03.097	9.16	-45.26	25016.82			8.81	9.22
Uranus	E	2030-09-07T17:29:21.304	18.28	-34.13	25535.35			1.81	1.89
6	E	2030-09-07T18:01:56.112	22.47	-27.73	41879.16	9.03			
5	E	2030-09-07T18:02:43.198	22.56	-27.57	42305.14	9.04			
4	E	2030-09-07T18:03:14.475	22.62	-27.46	42588.28	9.05			
alpha	E	2030-09-07T18:07:12.174	23.08	-26.67	44752.25	9.14			
beta	E	2030-09-07T18:08:50.751	23.27	-26.35	45654.96	9.18			
eta	E	2030-09-07T18:11:36.110	23.59	-25.79	47176.12	9.22			
gamma	E	2030-09-07T18:12:25.347	23.68	-25.63	47630.60	9.24			
delta	E	2030-09-07T18:13:37.777	23.81	-25.39	48300.35	9.26			
lambda	E	2030-09-07T18:16:43.816	24.16	-24.76	50026.71	9.30			
epsilon	E	2030-09-07T18:19:25.130	24.45	-24.22	51530.14	9.35			