

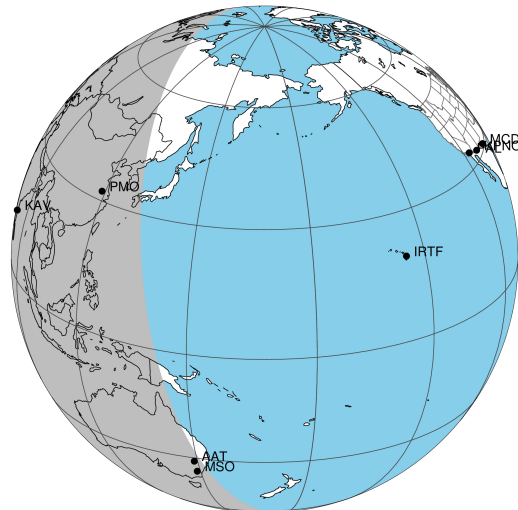
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-08-15T20:36:17.790
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3416295567960945536
 2Mass ID (if available) : 05234246+2314334

Uranus 2030-08-15T20:36:17 K14.66 G18.17 PgtRgt

ICRS Star Coord at Epoch: 05h 23m 42.49074s +23:14:33.25322s

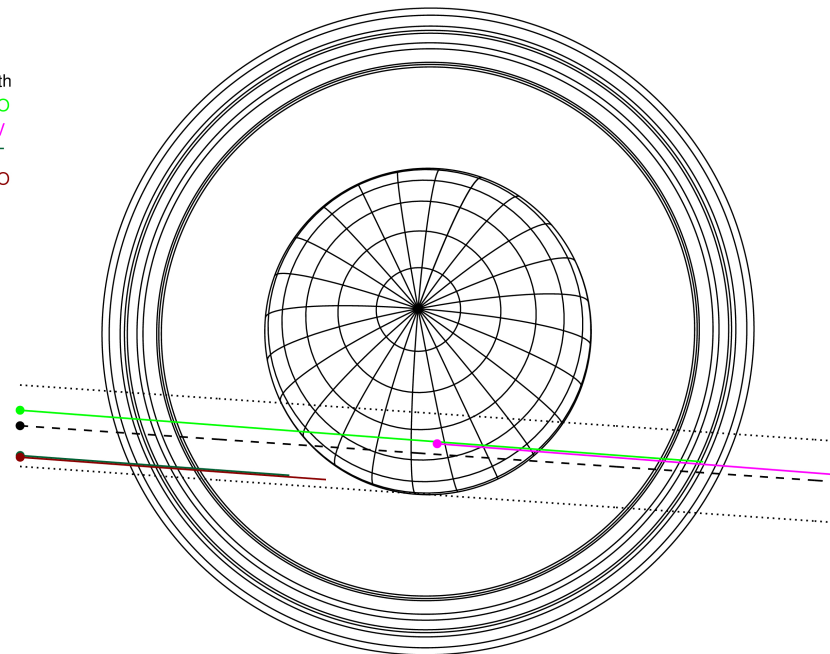
RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.662
 G magnitude : 18.170
 RP magnitude : 17.155
 BP magnitude : 19.277
 DUPflag : 0
 Distance (au) : 19.648
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.79
 Sun-Target sep (deg) : 60.97
 Sun-Moon sep (deg) : 88.42
 B (ring opening deg) : 81.24
 PA of pole (deg) : 23.56

Uranus 2030-08-15T20:36:17 K14.66 G18.17
 PgtRgt



2030-08-15T20:36:17.7900 ex: 05 23 42.4907 s: +23 14 33.253 C/A 1.336° PA 356.07 deg v_sky +20.79 km/s D 19.65 AU
 Credit: Styled after SORA/Lucky Star

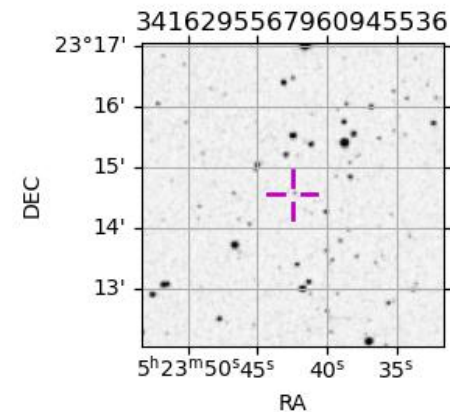
Earth
 PMO
 KAV
 AAT
 MSO



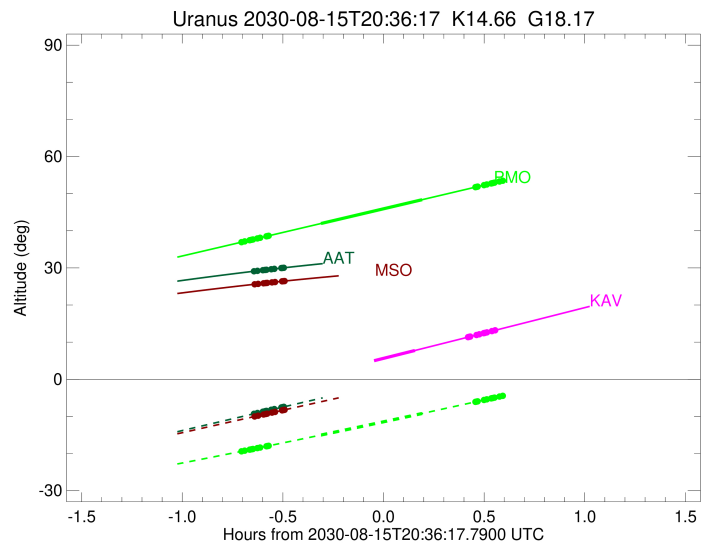
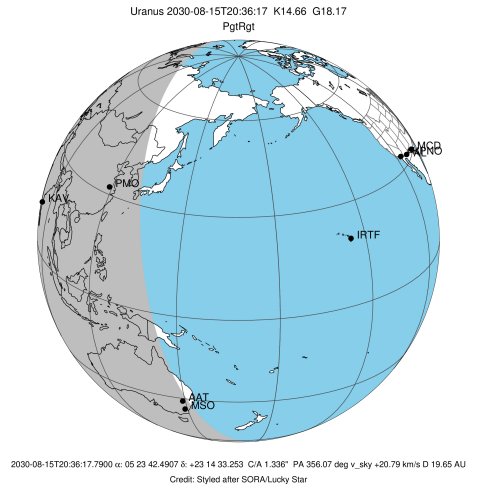
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+ +	+++++	AUG 15 19:54 - AUG 15 21:08	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
IRTTF	Mauna Kea/IRTTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8		+	+++++	AUG 15 20:45 - AUG 15 21:09	PneRne
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	+++++			AUG 15 19:58 - AUG 15 20:06	PnnRin
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++			AUG 15 19:58 - AUG 15 20:06	PnnRin

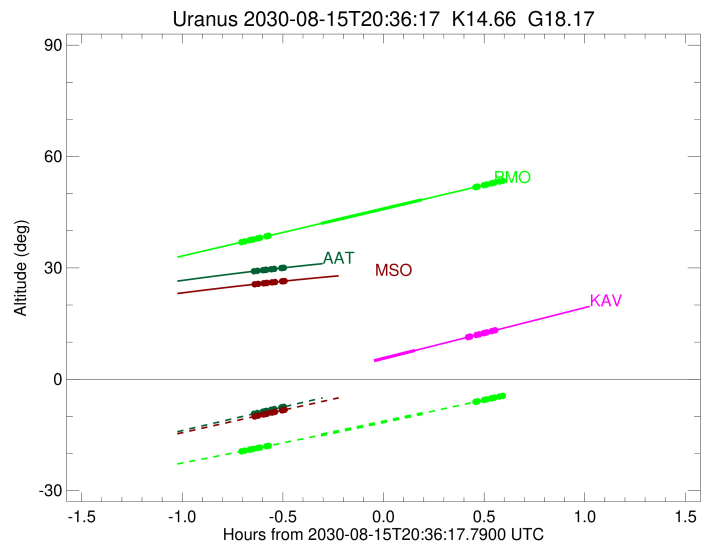
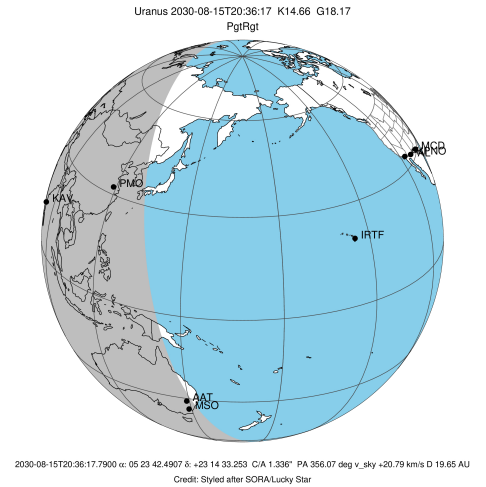


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-08-15T20:32:58.740
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3416295567960945536
 2Mass ID (if available) : 05234246+2314334
 ICRS Star Coord at Epoch: 05h 23m 42.49074s +23:14:33.25322s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.662
 G magnitude : 18.170
 RP magnitude : 17.155
 BP magnitude : 19.277
 DUPflag : 0
 Distance (au) : 19.649
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.79
 Sun-Target sep (deg) : 60.97
 Sun-Moon sep (deg) : 89.10
 B (ring opening deg) : 81.24
 PA of pole (deg) : 23.56
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.201
 C/A sky separation (km) : 17117.9
 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



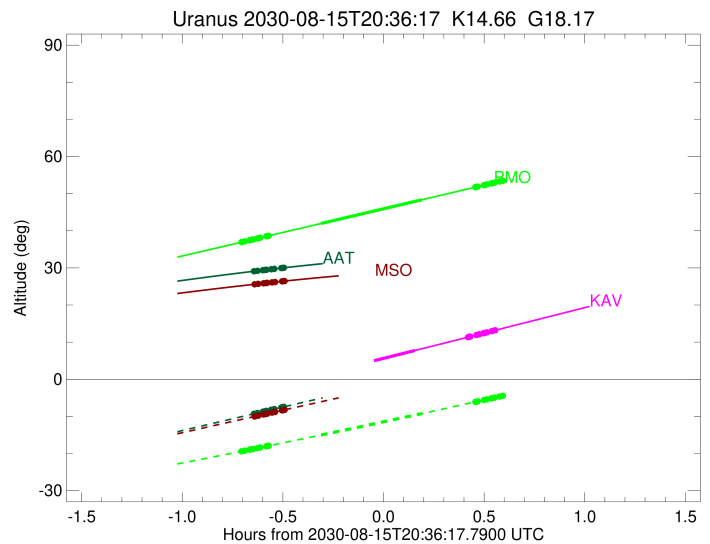
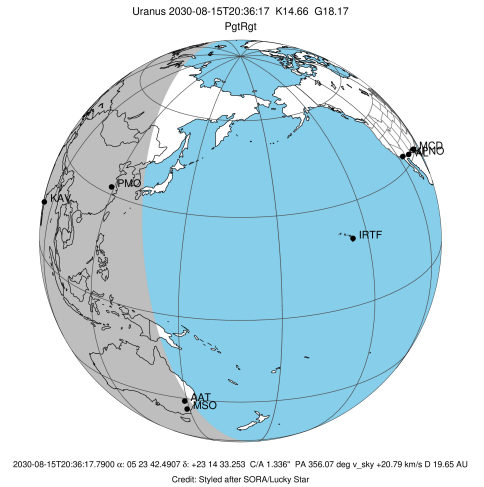
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-08-15T19:54:18.330		37.01	-19.34	50751.64	-19.44		
lambda	I	2030-08-15T19:54:55.686		37.14	-19.23	50026.71	-19.39		
delta	I	2030-08-15T19:56:24.959		37.46	-18.96	48300.35	-19.29		
gamma	I	2030-08-15T19:57:00.013		37.58	-18.85	47624.94	-19.25		
eta	I	2030-08-15T19:57:23.351		37.66	-18.78	47176.12	-19.22		
beta	I	2030-08-15T19:58:42.900		37.94	-18.54	45651.49	-19.11		
alpha	I	2030-08-15T19:59:32.801		38.12	-18.39	44699.57	-19.05		
4	I	2030-08-15T20:01:23.620		38.51	-18.05	42598.75	-18.88		
5	I	2030-08-15T20:01:42.867		38.58	-17.99	42235.30	-18.85		
6	I	2030-08-15T20:02:05.385		38.66	-17.92	41812.11	-18.80		
Uranus	I	2030-08-15T20:17:37.815		41.95	-15.03	25523.25		-2.15	-2.25
Uranus	E	2030-08-15T20:47:49.186		48.37	-9.22	25045.71		-8.28	-8.66
6	E	2030-08-15T21:03:43.769		51.76	-6.08	41879.59	18.71		
5	E	2030-08-15T21:04:06.431		51.84	-6.01	42294.64	18.76		
4	E	2030-08-15T21:04:21.233		51.89	-5.96	42579.51	18.78		
alpha	E	2030-08-15T21:06:16.571		52.30	-5.58	44751.86	18.95		
beta	E	2030-08-15T21:07:04.203		52.47	-5.42	45655.64	19.00		
eta	E	2030-08-15T21:08:23.978		52.75	-5.15	47176.12	19.11		
gamma	E	2030-08-15T21:08:47.753		52.84	-5.07	47630.72	19.14		
delta	E	2030-08-15T21:09:22.712		52.96	-4.96x	48300.35	19.17		
lambda	E	2030-08-15T21:10:52.525		53.28	-4.66x	50026.71	19.27		
epsilon	E	2030-08-15T21:12:09.215		53.55	-4.40x	51507.18	19.31		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-08-15T20:31:15.790
 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 : 3416295567960945536
 2Mass ID (if available) : 05234246+2314334
 ICRS Star Coord at Epoch: 05h 23m 42.49074s +23:14:33.25322s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.662
 G magnitude : 18.170
 RP magnitude : 17.155
 BP magnitude : 19.277
 DUPflag : 0
 Distance (au) : 19.649
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.79
 Sun-Target sep (deg) : 60.97
 Sun-Moon sep (deg) : 88.49
 B (ring opening deg) : 81.24
 PA of pole (deg) : 23.56
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.222
 C/A sky separation (km) : 17414.5
 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



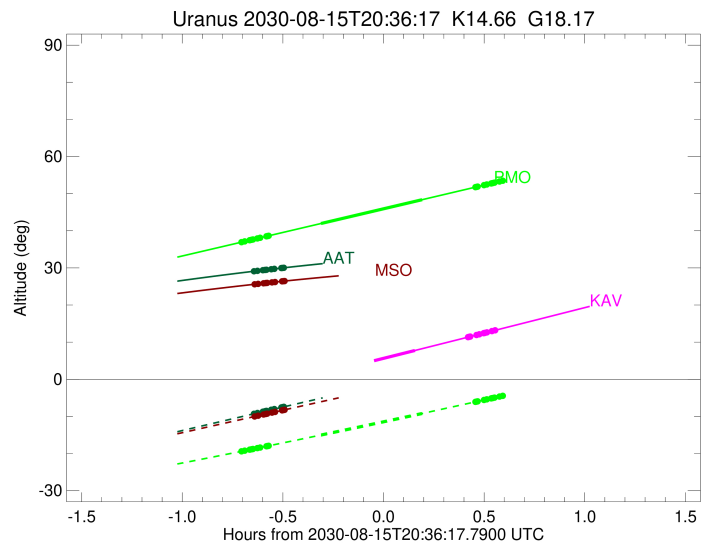
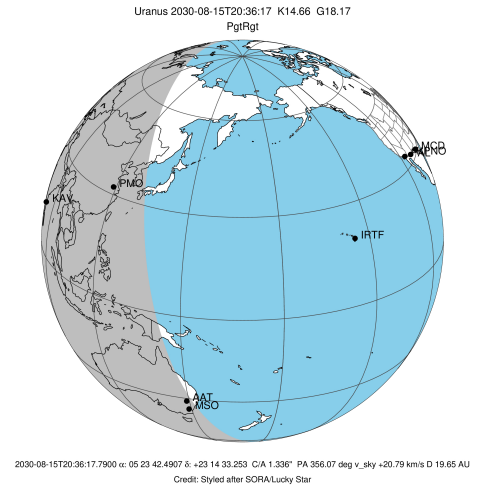
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-08-15T19:53:11.068	-4.03x	-59.26	50752.03	-19.66			
lambda	I	2030-08-15T19:53:48.022	-3.89x	-59.18	50026.71	-19.61			
delta	I	2030-08-15T19:55:16.301	-3.56x	-58.99	48300.35	-19.50			
gamma	I	2030-08-15T19:55:50.969	-3.43x	-58.91	47624.97	-19.46			
eta	I	2030-08-15T19:56:14.054	-3.35x	-58.86	47176.12	-19.43			
beta	I	2030-08-15T19:57:32.753	-3.06x	-58.69	45651.40	-19.32			
alpha	I	2030-08-15T19:58:22.114	-2.87x	-58.57	44699.73	-19.25			
4	I	2030-08-15T20:00:11.792	-2.47x	-58.33	42598.97	-19.07			
5	I	2030-08-15T20:00:30.834	-2.40x	-58.28	42235.79	-19.04			
6	I	2030-08-15T20:00:53.141	-2.31x	-58.23	41812.33	-18.99			
Uranus	I	2030-08-15T20:16:20.108	1.14x	-55.94	25519.17	-2.27		-2.37	
Uranus	E	2030-08-15T20:45:41.098	7.76	-50.93	25039.44	-8.33		-8.72	
6	E	2030-08-15T21:01:31.423	11.35	-47.94	41879.62	18.87			
5	E	2030-08-15T21:01:53.928	11.44	-47.87	42295.18	18.91			
4	E	2030-08-15T21:02:08.599	11.50	-47.82	42579.96	18.94			
alpha	E	2030-08-15T21:04:02.937	11.93	-47.45	44751.92	19.11			
beta	E	2030-08-15T21:04:50.141	12.11	-47.30	45655.46	19.17			
eta	E	2030-08-15T21:06:09.218	12.41	-47.04	47176.12	19.28			
gamma	E	2030-08-15T21:06:32.782	12.50	-46.97	47630.75	19.31			
delta	E	2030-08-15T21:07:07.424	12.63	-46.85	48300.35	19.35			
lambda	E	2030-08-15T21:08:36.418	12.97	-46.56	50026.71	19.45			
epsilon	E	2030-08-15T21:09:52.313	13.26	-46.31	51505.51	19.49			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-08-15T20:34:30.540
 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 : 3416295567960945536
 2Mass ID (if available) : 05234246+2314334
 ICRS Star Coord at Epoch: 05h 23m 42.49074s +23:14:33.25322s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.662
 G magnitude : 18.170
 RP magnitude : 17.155
 BP magnitude : 19.277
 DUPflag : 0
 Distance (au) : 19.649
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.79
 Sun-Target sep (deg) : 60.97
 Sun-Moon sep (deg) : 88.93
 B (ring opening deg) : 81.24
 PA of pole (deg) : 23.56
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.687
 C/A sky separation (km) : 24034.1
 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_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	2030-08-15T19:58:02.764		29.14	-9.22	50768.50	-18.03		
lambda	I	2030-08-15T19:58:44.051		29.21	-9.08	50026.71	-17.93		
delta	I	2030-08-15T20:00:20.897		29.38	-8.74	48300.35	-17.72		
gamma	I	2030-08-15T20:00:59.051		29.45	-8.60	47625.81	-17.64		
eta	I	2030-08-15T20:01:24.593		29.49	-8.51	47176.12	-17.58		
beta	I	2030-08-15T20:02:52.036		29.65	-8.21	45648.58	-17.35		
alpha	I	2030-08-15T20:03:46.629		29.74	-8.02	44704.88	-17.22		
4	I	2030-08-15T20:05:49.928		29.95	-7.59	42605.08	-16.85		
5	I	2030-08-15T20:06:11.071		29.99	-7.51	42250.66	-16.79		
6	I	2030-08-15T20:06:36.815		30.03	-7.42	41819.25	-16.70		
Uranus	I	2030-08-15T20:28:07.345		32.02	-2.93x	25275.46		-6.10	-6.39
Uranus	E	2030-08-15T20:40:09.363		32.96	-0.45x	25009.34		-8.58	-8.98
6	E	2030-08-15T21:02:06.717		34.32	4.04x	41879.52	16.65		
5	E	2030-08-15T21:02:32.735		34.35	4.13x	42303.59	16.75		
4	E	2030-08-15T21:02:49.229		34.36	4.19x	42587.58	16.80		
alpha	E	2030-08-15T21:04:56.888		34.47	4.62x	44752.43	17.17		
beta	E	2030-08-15T21:05:49.093		34.51	4.79x	45652.47	17.30		
eta	E	2030-08-15T21:07:16.562		34.58	5.09x	47176.12	17.52		
gamma	E	2030-08-15T21:07:42.484		34.60	5.17x	47631.13	17.58		
delta	E	2030-08-15T21:08:20.455		34.63	5.30x	48300.35	17.67		
lambda	E	2030-08-15T21:09:57.611		34.70	5.63x	50026.71	17.87		
epsilon	E	2030-08-15T21:11:18.342		34.76	5.90x	51475.35	17.97		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-08-15T20:34:33.640
 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 : 3416295567960945536
 2Mass ID (if available) : 05234246+2314334
 ICRS Star Coord at Epoch: 05h 23m 42.49074s +23:14:33.25322s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.662
 G magnitude : 18.170
 RP magnitude : 17.155
 BP magnitude : 19.277
 DUPflag : 0
 Distance (au) : 19.648
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 20.79
 Sun-Target sep (deg) : 60.97
 Sun-Moon sep (deg) : 88.88
 B (ring opening deg) : 81.24
 PA of pole (deg) : 23.56
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.705
 C/A sky separation (km) : 24290.3
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.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	2030-08-15T19:58:14.366		25.63	-9.95	50769.34	-17.99		
lambda	I	2030-08-15T19:58:55.802		25.70	-9.81	50026.71	-17.88		
delta	I	2030-08-15T20:00:32.909		25.86	-9.49	48300.35	-17.67		
gamma	I	2030-08-15T20:01:11.174		25.92	-9.36	47625.85	-17.58		
eta	I	2030-08-15T20:01:36.796		25.96	-9.27	47176.12	-17.52		
beta	I	2030-08-15T20:03:04.532		26.10	-8.98	45648.47	-17.29		
alpha	I	2030-08-15T20:03:59.302		26.19	-8.80	44705.10	-17.15		
4	I	2030-08-15T20:06:03.100		26.39	-8.38	42605.31	-16.77		
5	I	2030-08-15T20:06:24.318		26.42	-8.31	42251.26	-16.72		
6	I	2030-08-15T20:06:50.197		26.46	-8.22	41819.55	-16.62		
Uranus	I	2030-08-15T20:28:55.519		28.34	-3.82x	25253.86		-6.33	-6.63
Uranus	E	2030-08-15T20:39:26.946		29.09	-1.74x	25018.46		-8.50	-8.90
6	E	2030-08-15T21:01:59.227		30.39	2.67x	41879.48	16.58		
5	E	2030-08-15T21:02:25.384		30.41	2.75x	42303.90	16.67		
4	E	2030-08-15T21:02:41.950		30.42	2.80x	42587.88	16.73		
alpha	E	2030-08-15T21:04:50.096		30.52	3.22x	44752.43	17.11		
beta	E	2030-08-15T21:05:42.476		30.56	3.38x	45652.35	17.25		
eta	E	2030-08-15T21:07:10.230		30.62	3.67x	47176.12	17.47		
gamma	E	2030-08-15T21:07:36.230		30.64	3.75x	47631.14	17.53		
delta	E	2030-08-15T21:08:14.307		30.67	3.87x	48300.35	17.62		
lambda	E	2030-08-15T21:09:51.716		30.73	4.18x	50026.71	17.82		
epsilon	E	2030-08-15T21:11:12.557		30.79	4.44x	51473.98	17.93		