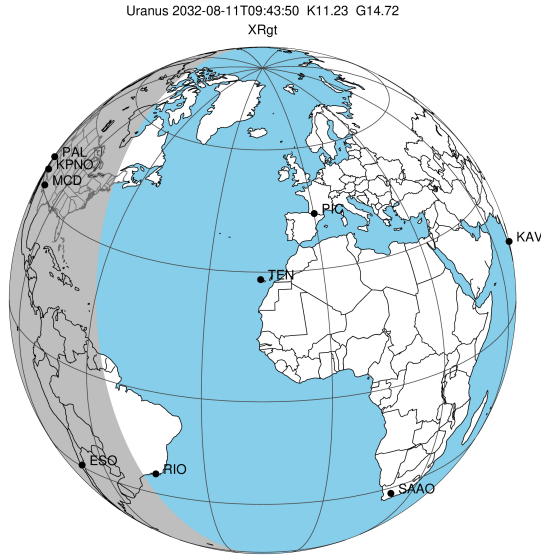


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-08-11T09:43:50.330  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3424866952591895552  
 2Mass ID (if available) : 05593242+2336540

ICRS Star Coord at Epoch: 05h 59m 32.43459s +23:36:54.09230s

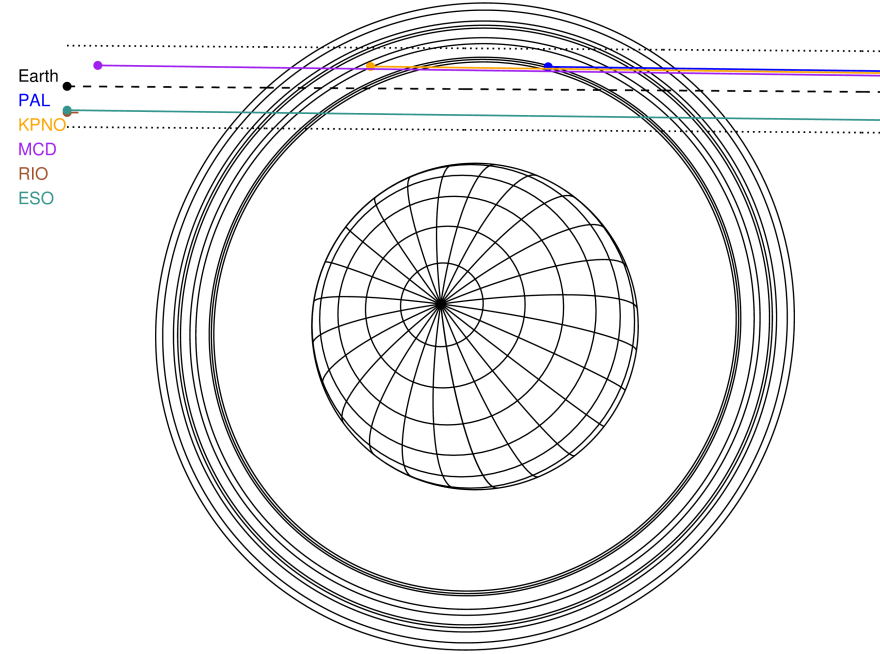
RUWE (>1.4 is poor) : 1.04  
 K magnitude : 11.233  
 G magnitude : 14.722  
 RP magnitude : 13.728  
 BP magnitude : 15.729  
 DUPflag : 0  
 Distance (au) : 19.694  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 25.93  
 Sun-Target sep (deg) : 48.94  
 Sun-Moon sep (deg) : 105.59  
 B (ring opening deg) : 75.46  
 PA of pole (deg) : 56.80

#	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



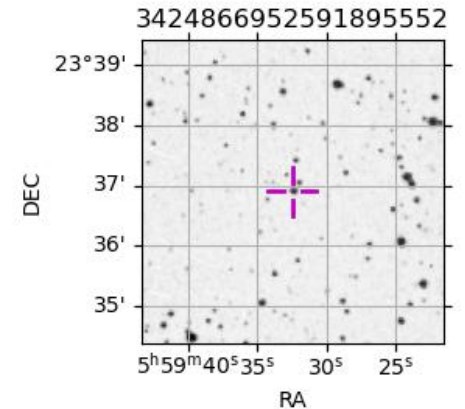
2032-08-11T09:43:50.3300 ex: 05 59 32.4346 R: +23 36 54.092 C/A 2.607" PA 179.60 deg v\_sky +25.93 km/s D 19.69 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2032-08-11T09:43:50 K11.23 G14.72 XRgt



Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

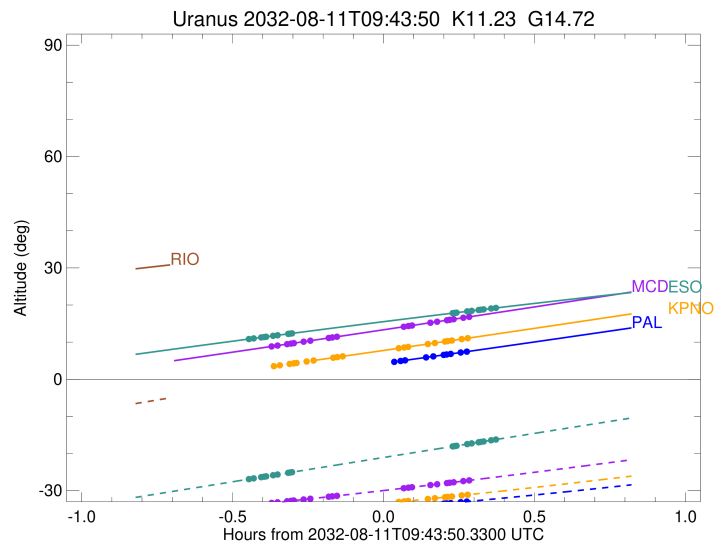
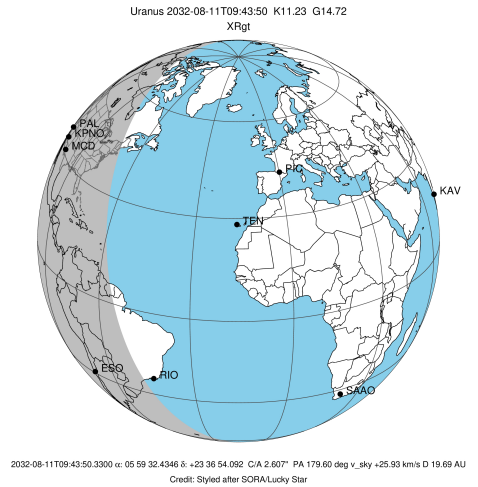
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1			+++++	AUG 11 09:48 - AUG 11 10:00	PnnRne
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	++++		+++++	AUG 11 09:29 - AUG 11 10:00	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	AUG 11 09:21 - AUG 11 10:00	PnnRie
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					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3	+++++		+++++	AUG 11 09:17 - AUG 11 10:05	PnnRie
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



3424866952591895552

23°39'  
 38'  
 37'  
 36'  
 35'  
 5h59m40s35s 30s 25s  
 RA

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-08-11T09:40:38.560  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 3424866952591895552  
 2Mass ID (if available) : 05593242+2336540  
 ICRS Star Coord at Epoch: 05h 59m 32.43459s +23:36:54.09230s  
 RUWE (>1.4 is poor) : 1.04  
 K magnitude : 11.233  
 G magnitude : 14.722  
 RP magnitude : 13.728  
 BP magnitude : 15.729  
 DUPflag : 0  
 Distance (au) : 19.694  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 25.93  
 Sun-Target sep (deg) : 48.94  
 Sun-Moon sep (deg) : 105.45  
 B (ring opening deg) : 75.46  
 PA of pole (deg) : 56.80  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.858  
 C/A sky separation (km) : 40817.9  
 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\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



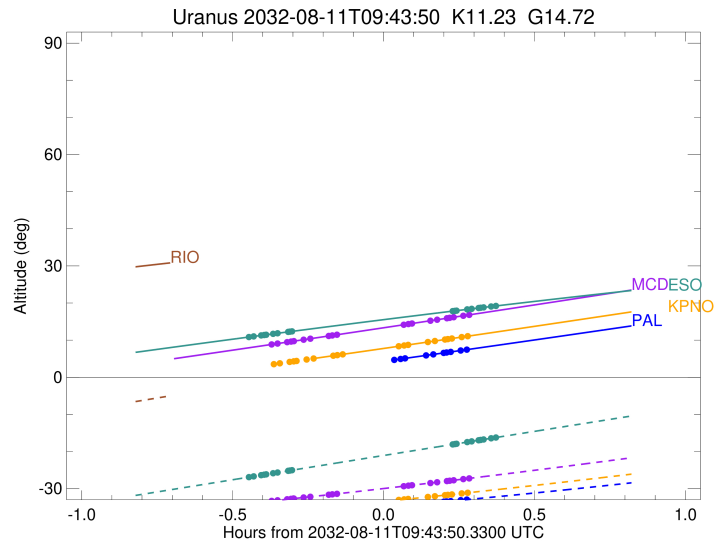
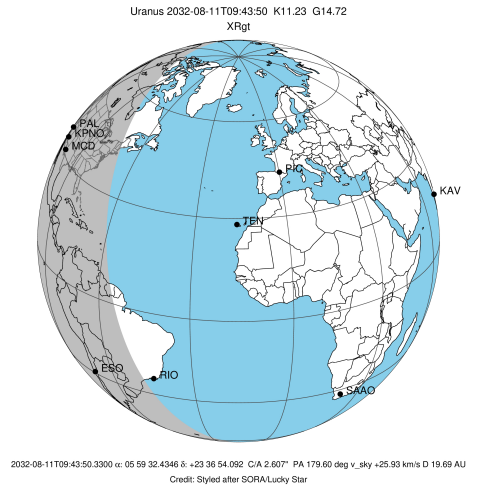
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-08-11T09:22:50.147	0.35x	-37.19	50786.64	-15.50			
lambda	I	2032-08-11T09:23:39.669	0.50x	-37.11	50026.71	-15.11			
delta	I	2032-08-11T09:25:38.609	0.87x	-36.92	48300.35	-13.90			
gamma	I	2032-08-11T09:26:27.690	1.02x	-36.83	47631.32	-13.36			
eta	I	2032-08-11T09:27:02.264	1.13x	-36.78	47176.12	-12.97			
beta	I	2032-08-11T09:29:04.341	1.51x	-36.57	45681.20	-11.49			
alpha	I	2032-08-11T09:30:29.471	1.77x	-36.42	44752.42	-10.38			
4	I	2032-08-11T09:34:47.564	2.58x	-35.97	42548.42	-6.64			
5	I	2032-08-11T09:35:24.695	2.69x	-35.90	42305.73	-6.05			
6	I	2032-08-11T09:36:50.071	2.96x	-35.75	41846.52	-4.61			

No planet occultations

6	E	2032-08-11T09:45:54.497	4.67x	-34.72	41831.80	4.61			
5	E	2032-08-11T09:47:25.319	4.96x	-34.54	42315.21	6.05			
4	E	2032-08-11T09:48:04.707	5.08	-34.47	42570.18	6.63			
alpha	E	2032-08-11T09:52:18.697	5.89	-33.96	44741.47	10.37			
beta	E	2032-08-11T09:53:44.067	6.16	-33.79	45672.77	11.47			
eta	E	2032-08-11T09:55:47.132	6.56	-33.53	47176.12	12.94			
gamma	E	2032-08-11T09:56:21.482	6.67	-33.46	47627.34	13.33			
delta	E	2032-08-11T09:57:10.968	6.82	-33.36	48300.35	13.87			
lambda	E	2032-08-11T09:59:10.196	7.20	-33.11	50026.71	15.07			
epsilon	E	2032-08-11T10:00:04.565	7.38	-33.00	50860.01	15.46			

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2032-08-11T09:40:32.580
Event type          : XRgt
: No Uranus occs
: Ring occs: geocentric, topocentric
Observer code       : KPNO
Location            : Kitt Peak Natl Obs
Latitude (deg)      : 31.96333
E. Longitude (deg)  : 248.40000
Altitude (km)       : 2.120
Gaia source ID      : 3424866952591895552
2Mass ID (if available) : 05593242+2336540
ICRS Star Coord at Epoch: 05h 59m 32.43459s +23:36:54.09230s
RUWE (>1.4 is poor) : 1.04
K magnitude          : 11.233
G magnitude          : 14.722
RP magnitude         : 13.728
BP magnitude         : 15.729
DUPflag             : 0
Distance (au)       : 19.694
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 25.93
Sun-Target sep (deg) : 48.94
Sun-Moon sep (deg)  : 105.50
B (ring opening deg) : 75.46
PA of pole (deg)    : 56.80
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.836
C/A sky separation (km) : 40510.4
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_itrf93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```

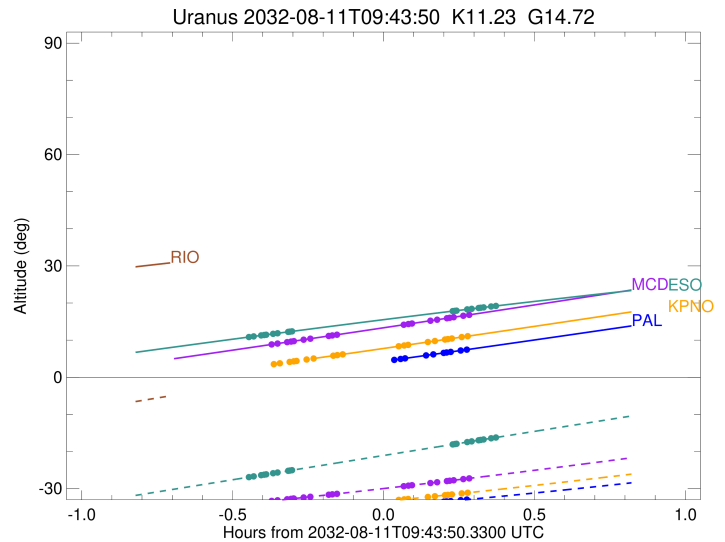
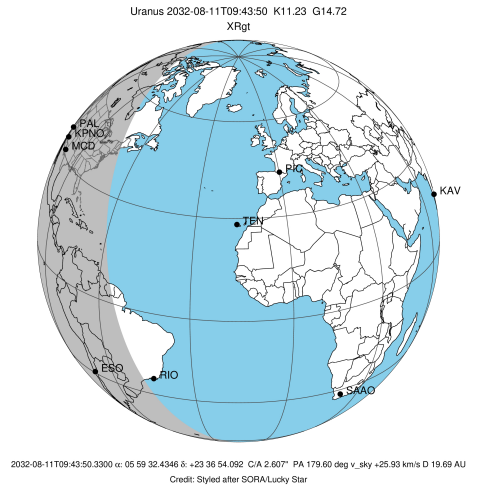


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-08-11T09:22:26.329		3.60x	-36.16	50788.51	-15.70		
lambda	I	2032-08-11T09:23:15.296		3.76x	-36.06	50026.71	-15.33		
delta	I	2032-08-11T09:25:12.313		4.14x	-35.83	48300.35	-14.16		
gamma	I	2032-08-11T09:26:00.443		4.29x	-35.73	47631.34	-13.64		
eta	I	2032-08-11T09:26:34.284		4.40x	-35.66	47176.12	-13.26		
beta	I	2032-08-11T09:28:33.207		4.78x	-35.42	45681.21	-11.85		
alpha	I	2032-08-11T09:29:55.449		5.05	-35.25	44752.43	-10.80		
4	I	2032-08-11T09:33:57.906		5.83	-34.74	42547.35	-7.34		
5	I	2032-08-11T09:34:31.164		5.94	-34.67	42304.55	-6.83		
6	I	2032-08-11T09:35:43.855		6.17	-34.52	41848.11	-5.61		

No planet occultations

6	E	2032-08-11T09:46:48.216		8.34	-33.05	41830.17	5.61		
5	E	2032-08-11T09:48:06.357		8.60	-32.87	42315.25	6.82		
4	E	2032-08-11T09:48:41.873		8.71	-32.79	42571.45	7.34		
alpha	E	2032-08-11T09:52:40.232		9.50	-32.24	44741.03	10.78		
beta	E	2032-08-11T09:54:02.720		9.77	-32.05	45672.51	11.83		
eta	E	2032-08-11T09:56:02.640		10.16	-31.77	47176.12	13.23		
gamma	E	2032-08-11T09:56:36.258		10.27	-31.69	47627.28	13.61		
delta	E	2032-08-11T09:57:24.798		10.43	-31.57	48300.35	14.12		
lambda	E	2032-08-11T09:59:22.112		10.82	-31.29	50026.71	15.29		
epsilon	E	2032-08-11T10:00:15.942		11.00	-31.16	50863.03	15.66		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-08-11T09:40:28.500  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Observer code : MCD  
 Location : McDonald Obs. 2.7m  
 Latitude (deg) : 30.67158  
 E. Longitude (deg) : 255.97844  
 Altitude (km) : 2.075  
 Gaia source ID : 3424866952591895552  
 2Mass ID (if available) : 05593242+2336540  
 ICRS Star Coord at Epoch: 05h 59m 32.43459s +23:36:54.09230s  
 RUWE (>1.4 is poor) : 1.04  
 K magnitude : 11.233  
 G magnitude : 14.722  
 RP magnitude : 13.728  
 BP magnitude : 15.729  
 DUPflag : 0  
 Distance (au) : 19.694  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 25.93  
 Sun-Target sep (deg) : 48.94  
 Sun-Moon sep (deg) : 105.58  
 B (ring opening deg) : 75.46  
 PA of pole (deg) : 56.80  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.808  
 C/A sky separation (km) : 40112.1  
 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\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk

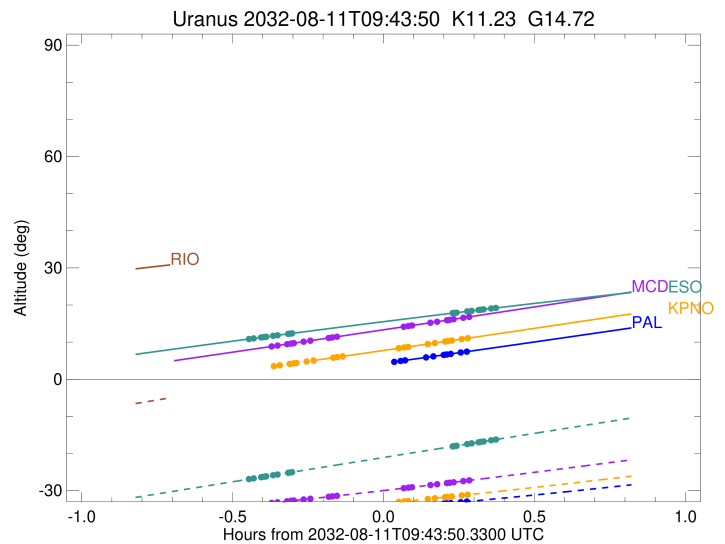
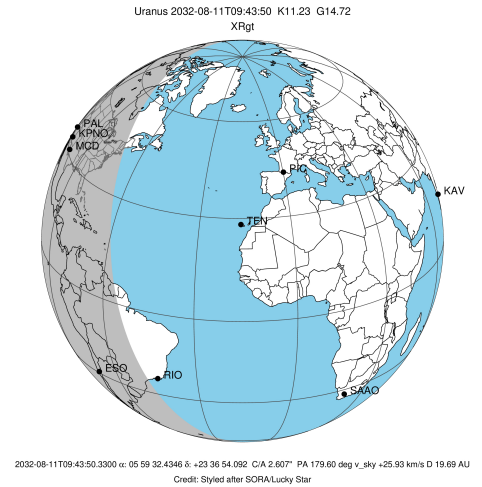


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-08-11T09:21:59.274		8.92	-33.25	50790.96	-15.96		
lambda	I	2032-08-11T09:22:47.587		9.08	-33.14	50026.71	-15.60		
delta	I	2032-08-11T09:24:42.318		9.47	-32.86	48300.35	-14.48		
gamma	I	2032-08-11T09:25:29.326		9.62	-32.75	47631.36	-13.98		
eta	I	2032-08-11T09:26:02.306		9.73	-32.67	47176.12	-13.62		
beta	I	2032-08-11T09:27:57.579		10.12	-32.39	45681.23	-12.29		
alpha	I	2032-08-11T09:29:16.557		10.38	-32.19	44752.43	-11.30		
4	I	2032-08-11T09:33:02.936		11.14	-31.63	42546.12	-8.15		
5	I	2032-08-11T09:33:32.685		11.24	-31.56	42303.12	-7.70		
6	I	2032-08-11T09:34:35.104		11.45	-31.40	41849.81	-6.67		

No planet occultations

6	E	2032-08-11T09:47:48.151		14.13	-29.35	41828.43	6.67		
5	E	2032-08-11T09:48:56.025		14.37	-29.18	42315.21	7.70		
4	E	2032-08-11T09:49:28.034		14.47	-29.09	42572.93	8.14		
alpha	E	2032-08-11T09:53:10.315		15.23	-28.50	44740.47	11.28		
beta	E	2032-08-11T09:54:29.546		15.50	-28.28	45672.18	12.26		
eta	E	2032-08-11T09:56:25.823		15.90	-27.97	47176.12	13.59		
gamma	E	2032-08-11T09:56:58.581		16.01	-27.88	47627.19	13.95		
delta	E	2032-08-11T09:57:46.003		16.17	-27.75	48300.35	14.44		
lambda	E	2032-08-11T09:59:41.038		16.57	-27.44	50026.71	15.55		
epsilon	E	2032-08-11T10:00:34.232		16.75	-27.29	50866.88	15.91		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-08-11T09:40:59.510  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Observer code : ESO  
 Location : European Southern Obs. (3.6m)  
 Latitude (deg) : -29.26097  
 E. Longitude (deg) : 289.26831  
 Altitude (km) : 2.400  
 Gaia source ID : 3424866952591895552  
 2Mass ID (if available) : 05593242+2336540  
 ICRS Star Coord at Epoch: 05h 59m 32.43459s +23:36:54.09230s  
 RUWE (>1.4 is poor) : 1.04  
 K magnitude : 11.233  
 G magnitude : 14.722  
 RP magnitude : 13.728  
 BP magnitude : 15.729  
 DUPflag : 0  
 Distance (au) : 19.694  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 25.93  
 Sun-Target sep (deg) : 48.94  
 Sun-Moon sep (deg) : 105.65  
 B (ring opening deg) : 75.46  
 PA of pole (deg) : 56.80  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.316  
 C/A sky separation (km) : 33081.1  
 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	2032-08-11T09:17:21.830		10.89	-26.84	50837.36	-19.78		
lambda	I	2032-08-11T09:18:02.896		11.01	-26.69	50026.71	-19.61		
delta	I	2032-08-11T09:19:32.220		11.27	-26.37	48300.35	-19.03		
gamma	I	2032-08-11T09:20:07.595		11.38	-26.24	47631.57	-18.78		
eta	I	2032-08-11T09:20:31.962		11.45	-26.15	47176.12	-18.60		
beta	I	2032-08-11T09:21:53.725		11.69	-25.85	45680.64	-17.97		
alpha	I	2032-08-11T09:22:46.261		11.85	-25.66	44750.89	-17.53		
4	I	2032-08-11T09:24:57.229		12.24	-25.19	42534.52	-16.31		
5	I	2032-08-11T09:25:12.407		12.28	-25.13	42283.28	-16.18		
6	I	2032-08-11T09:25:38.035		12.36	-25.04	41864.41	-15.86		

No planet occultations

6	E	2032-08-11T09:57:33.067		17.81	-18.10	41813.23	15.83		
5	E	2032-08-11T09:58:04.083		17.89	-17.99	42308.96	16.15		
4	E	2032-08-11T09:58:21.442		17.94	-17.92	42588.57	16.28		
alpha	E	2032-08-11T10:00:28.254		18.29	-17.47	44732.22	17.49		
beta	E	2032-08-11T10:01:21.065		18.43	-17.28	45667.33	17.92		
eta	E	2032-08-11T10:02:43.806		18.66	-16.98	47176.12	18.55		
gamma	E	2032-08-11T10:03:07.940		18.72	-16.89	47625.93	18.73		
delta	E	2032-08-11T10:03:43.718		18.82	-16.76	48300.35	18.97		
lambda	E	2032-08-11T10:05:13.312		19.06	-16.44	50026.71	19.55		
epsilon	E	2032-08-11T10:05:59.267		19.18	-16.27	50931.64	19.71		