

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-10-15T09:37:55.970  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 144669380594264064  
 2Mass ID (if available) : 04300273+2143551

ICRS Star Coord at Epoch: 04h 30m 02.71928s +21:43:55.32391s

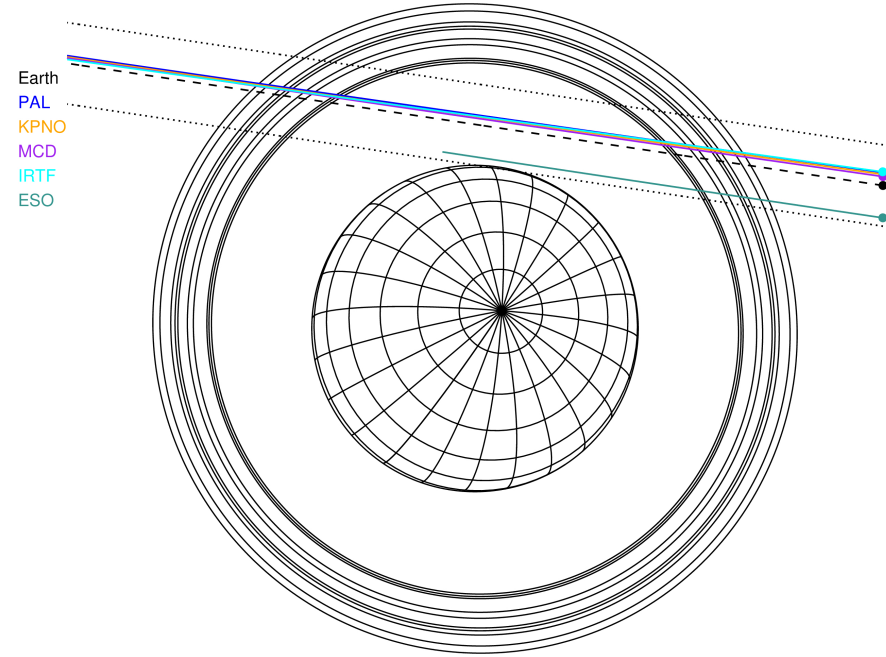
RUWE (>1.4 is poor) : 1.05  
 K magnitude : 13.354  
 G magnitude : 16.187  
 RP magnitude : 15.314  
 BP magnitude : 16.956  
 DUPflag : 0  
 Distance (au) : 18.687  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -13.69  
 Sun-Target sep (deg) : 132.24  
 Sun-Moon sep (deg) : 50.01  
 B (ring opening deg) : 78.63  
 PA of pole (deg) : -56.44

#	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



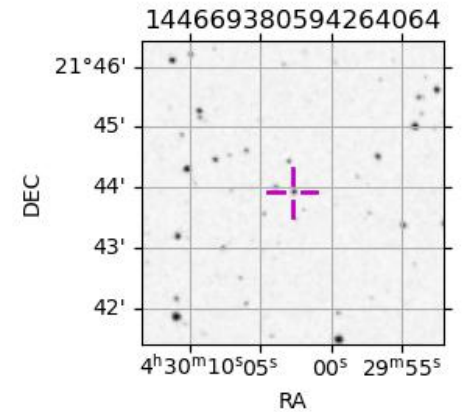
2027-10-15T09:37:55.9700 ra: 04 30 02.7193 s: +21 43 55.324 C/A 2.337'' PA 171.48 deg v\_sky -13.69 km/s D 18.69 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2027-10-15T09:37:55 K13.35 G16.19 XRgt

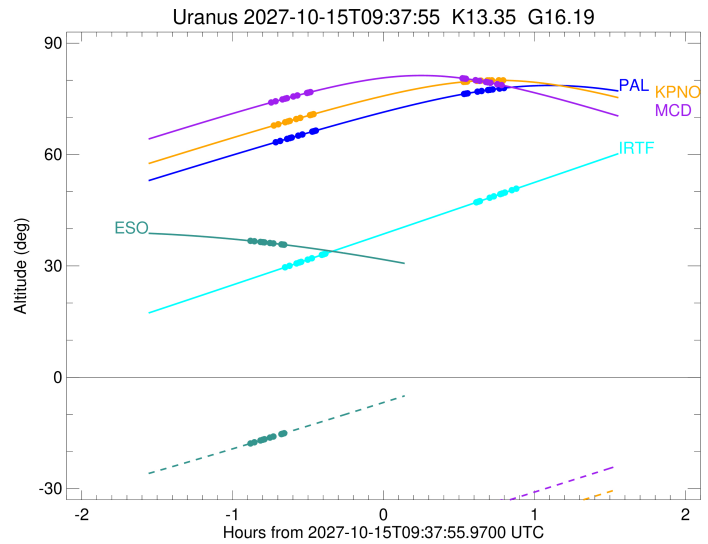
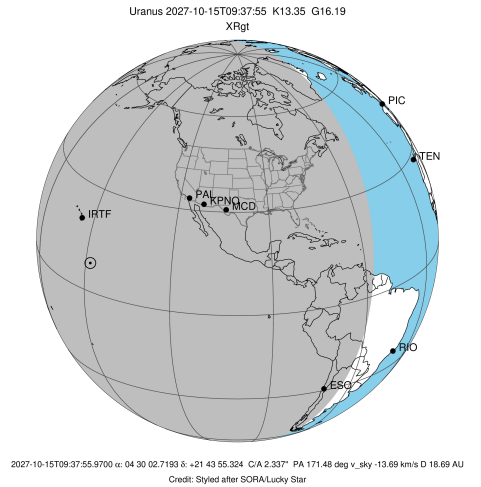


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++		+++++	OCT 15 08:54 - OCT 15 10:25	PnnRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	OCT 15 08:53 - OCT 15 10:25	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	OCT 15 08:52 - OCT 15 10:24	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++		+++++	OCT 15 08:58 - OCT 15 10:30	PnnRie
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	+++++			OCT 15 08:44 - OCT 15 08:58	PnnRin
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



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-10-15T09:39:45.240  
 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 : 144669380594264064  
 2Mass ID (if available) : 04300273+2143551  
 ICRS Star Coord at Epoch: 04h 30m 02.71928s +21:43:55.32391s  
 RUWE (>1.4 is poor) : 1.05  
 K magnitude : 13.354  
 G magnitude : 16.187  
 RP magnitude : 15.314  
 BP magnitude : 16.956  
 DUPflag : 0  
 Distance (au) : 18.687  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -13.69  
 Sun-Target sep (deg) : 132.24  
 Sun-Moon sep (deg) : 50.55  
 B (ring opening deg) : 78.63  
 PA of pole (deg) : -56.44  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.446  
 C/A sky separation (km) : 33149.8  
 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



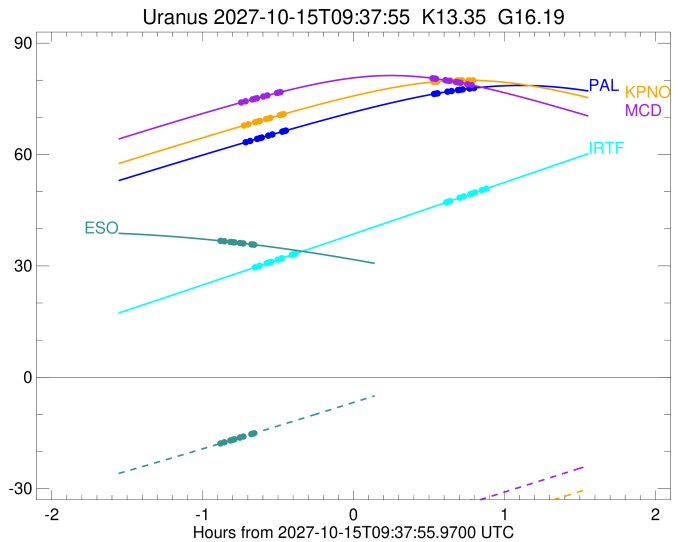
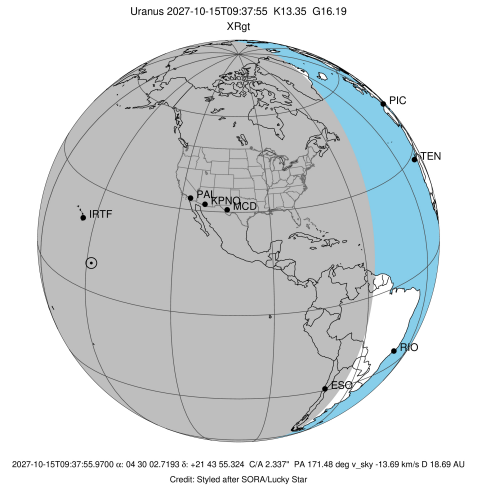
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-10-15T08:54:29.395		63.19	-59.00	51553.55	-10.78		
lambda	I	2027-10-15T08:56:52.580		63.67	-58.67	50026.71	-10.54		
delta	I	2027-10-15T08:59:38.802		64.22	-58.27	48300.35	-10.23		
gamma	I	2027-10-15T09:00:45.361		64.44	-58.11	47624.13	-10.09		
eta	I	2027-10-15T09:01:29.962		64.58	-58.00	47176.12	-10.00		
beta	I	2027-10-15T09:04:04.121		65.09	-57.62	45660.33	-9.66		
alpha	I	2027-10-15T09:05:46.683		65.42	-57.37	44684.79	-9.40		
4	I	2027-10-15T09:09:34.604		66.16	-56.79	42609.14	-8.79		
5	I	2027-10-15T09:10:07.390		66.27	-56.71	42314.81	-8.69		
6	I	2027-10-15T09:11:02.247		66.45	-56.56	41856.03	-8.51		

No planet occultations

6	E	2027-10-15T10:09:52.478		76.31	-46.30	41805.99	8.54		
5	E	2027-10-15T10:10:43.769		76.41	-46.14	42247.09	8.72		
4	E	2027-10-15T10:11:24.565		76.49	-46.01	42604.31	8.83		
alpha	E	2027-10-15T10:15:15.741		76.93	-45.28	44717.81	9.44		
beta	E	2027-10-15T10:16:56.339		77.11	-44.96	45681.10	9.70		
eta	E	2027-10-15T10:19:27.747		77.36	-44.47	47176.12	10.04		
gamma	E	2027-10-15T10:20:11.875		77.43	-44.33	47621.43	10.14		
delta	E	2027-10-15T10:21:18.387		77.54	-44.12	48300.35	10.28		
lambda	E	2027-10-15T10:24:03.789		77.77	-43.59	50026.71	10.59		
epsilon	E	2027-10-15T10:25:39.631		77.90	-43.28	51050.21	10.83		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2027-10-15T09:39:13.040
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      : 144669380594264064
2Mass ID (if available) : 04300273+2143551
ICRS Star Coord at Epoch: 04h 30m 02.71928s +21:43:55.32391s
RUWE (>1.4 is poor) : 1.05
K magnitude         : 13.354
G magnitude         : 16.187
RP magnitude        : 15.314
BP magnitude        : 16.956
DUPflag            : 0
Distance (au)       : 18.687
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -13.69
Sun-Target sep (deg) : 132.24
Sun-Moon sep (deg)  : 50.61
B (ring opening deg) : 78.63
PA of pole (deg)    : -56.44
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.427
C/A sky separation (km) : 32893.8
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall11.bsp
ural161.bsp
vgr2.ural161.bsp
peph.ural160.bsp
earthstns_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```

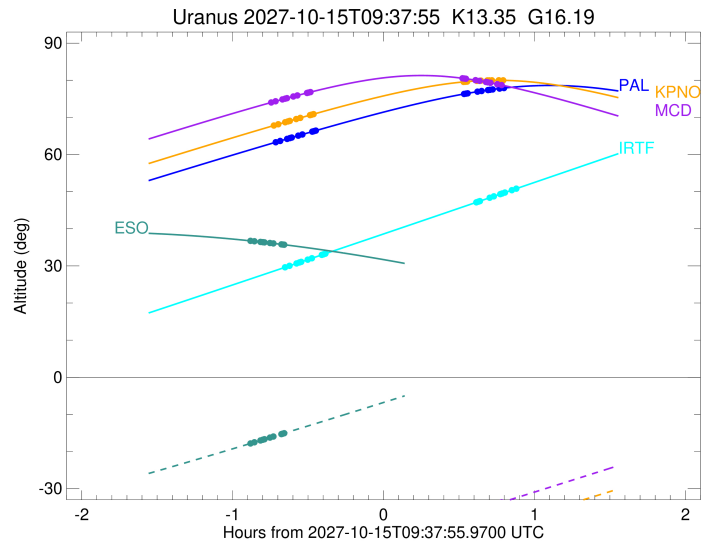
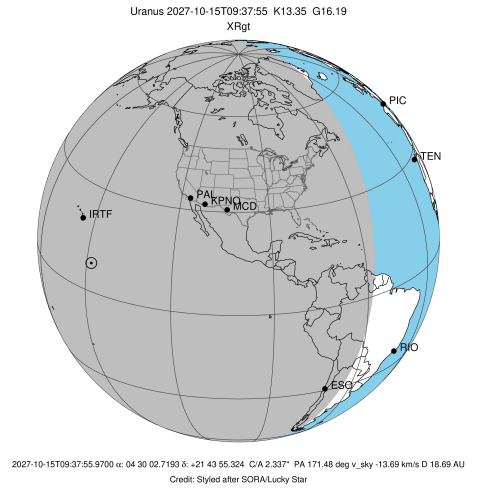


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-10-15T08:53:45.176		67.69	-56.86	51553.81	-10.85		
lambda	I	2027-10-15T08:56:07.329		68.16	-56.47	50026.71	-10.62		
delta	I	2027-10-15T08:58:52.208		68.71	-56.01	48300.35	-10.31		
gamma	I	2027-10-15T08:59:58.185		68.92	-55.82	47624.17	-10.18		
eta	I	2027-10-15T09:00:42.387		69.07	-55.70	47176.12	-10.09		
beta	I	2027-10-15T09:03:15.072		69.56	-55.27	45660.15	-9.76		
alpha	I	2027-10-15T09:04:56.529		69.89	-54.97	44684.76	-9.51		
4	I	2027-10-15T09:08:41.691		70.61	-54.32	42608.88	-8.91		
5	I	2027-10-15T09:09:13.984		70.71	-54.23	42314.90	-8.81		
6	I	2027-10-15T09:10:08.010		70.88	-54.07	41856.44	-8.64		

No planet occultations

6	E	2027-10-15T10:09:42.012		79.56	-42.76	41805.72	8.67		
5	E	2027-10-15T10:10:32.528		79.61	-42.59	42246.36	8.84		
4	E	2027-10-15T10:11:12.835		79.65	-42.46	42604.03	8.94		
alpha	E	2027-10-15T10:15:01.395		79.84	-41.69	44718.07	9.54		
beta	E	2027-10-15T10:16:40.968		79.90	-41.36	45681.11	9.79		
eta	E	2027-10-15T10:19:11.019		79.96	-40.85	47176.12	10.13		
gamma	E	2027-10-15T10:19:54.785		79.97	-40.71	47621.44	10.22		
delta	E	2027-10-15T10:21:00.769		79.99	-40.48	48300.35	10.36		
lambda	E	2027-10-15T10:23:44.970		80.00	-39.93	50026.71	10.67		
epsilon	E	2027-10-15T10:25:19.966		79.99	-39.61	51047.92	10.90		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-10-15T09:38:22.400  
 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 : 144669380594264064  
 2Mass ID (if available) : 04300273+2143551  
 ICRS Star Coord at Epoch: 04h 30m 02.71928s +21:43:55.32391s  
 RUWE (>1.4 is poor) : 1.05  
 K magnitude : 13.354  
 G magnitude : 16.187  
 RP magnitude : 15.314  
 BP magnitude : 16.956  
 DUPflag : 0  
 Distance (au) : 18.687  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -13.69  
 Sun-Target sep (deg) : 132.24  
 Sun-Moon sep (deg) : 50.69  
 B (ring opening deg) : 78.63  
 PA of pole (deg) : -56.44  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.407  
 C/A sky separation (km) : 32621.5  
 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

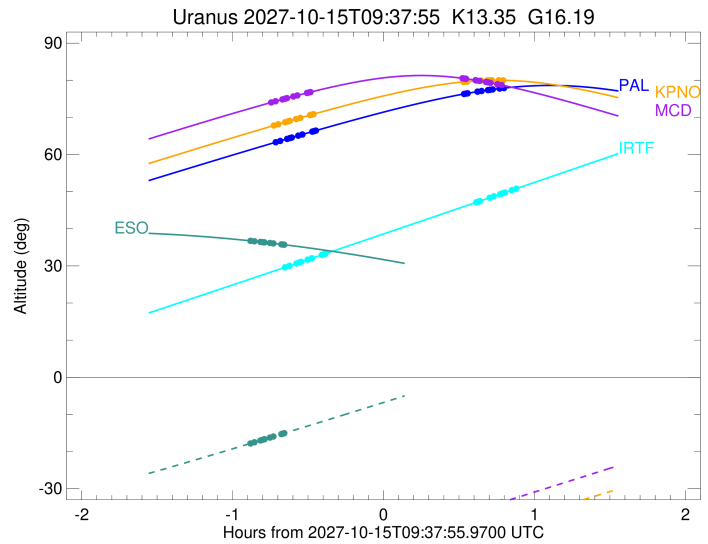
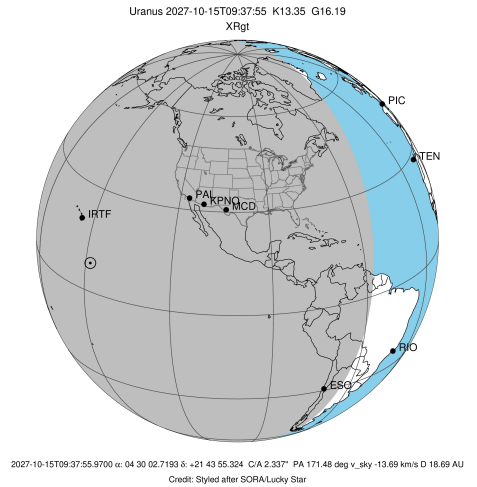


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-10-15T08:52:41.815		73.91	-52.39	51554.08	-10.94		
lambda	I	2027-10-15T08:55:02.889		74.35	-51.94	50026.71	-10.71		
delta	I	2027-10-15T08:57:46.371		74.86	-51.43	48300.35	-10.41		
gamma	I	2027-10-15T08:58:51.744		75.05	-51.22	47624.21	-10.28		
eta	I	2027-10-15T08:59:35.534		75.19	-51.08	47176.12	-10.19		
beta	I	2027-10-15T09:02:06.699		75.64	-50.59	45659.96	-9.86		
alpha	I	2027-10-15T09:03:47.020		75.94	-50.27	44684.73	-9.62		
4	I	2027-10-15T09:07:29.367		76.58	-49.55	42608.59	-9.04		
5	I	2027-10-15T09:08:01.157		76.67	-49.45	42314.98	-8.94		
6	I	2027-10-15T09:08:54.338		76.82	-49.28	41856.89	-8.77		

No planet occultations

6	E	2027-10-15T10:09:14.308		80.55	-37.00	41805.45	8.79		
5	E	2027-10-15T10:10:04.056		80.48	-36.82	42245.63	8.96		
4	E	2027-10-15T10:10:43.879		80.42	-36.69	42603.74	9.06		
alpha	E	2027-10-15T10:14:29.840		80.03	-35.89	44718.34	9.64		
beta	E	2027-10-15T10:16:08.397		79.85	-35.55	45681.13	9.89		
eta	E	2027-10-15T10:18:37.108		79.55	-35.03	47176.12	10.21		
gamma	E	2027-10-15T10:19:20.515		79.46	-34.87	47621.46	10.30		
delta	E	2027-10-15T10:20:25.978		79.32	-34.64	48300.35	10.44		
lambda	E	2027-10-15T10:23:09.000		78.96	-34.07	50026.71	10.74		
epsilon	E	2027-10-15T10:24:43.172		78.74	-33.74	51045.66	10.97		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-10-15T09:44:07.450  
 Event type : XRgt  
 : No Uranus occs  
 : 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 : 144669380594264064  
 2Mass ID (if available) : 04300273+2143551  
 ICRS Star Coord at Epoch: 04h 30m 02.71928s +21:43:55.32391s  
 RUWE (>1.4 is poor) : 1.05  
 K magnitude : 13.354  
 G magnitude : 16.187  
 RP magnitude : 15.314  
 BP magnitude : 16.956  
 DUPflag : 0  
 Distance (au) : 18.687  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -13.69  
 Sun-Target sep (deg) : 132.24  
 Sun-Moon sep (deg) : 49.99  
 B (ring opening deg) : 78.63  
 PA of pole (deg) : -56.44  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.434  
 C/A sky separation (km) : 32985.8  
 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

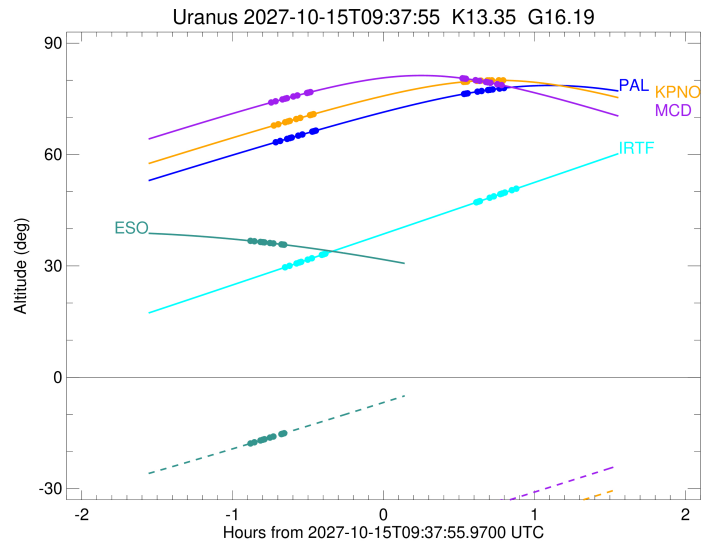
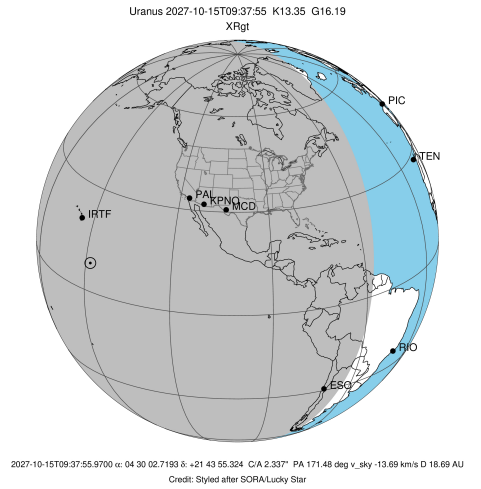


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-10-15T08:58:11.251		29.48	-69.78	51553.53	-10.68		
lambda	I	2027-10-15T09:00:35.682		30.03	-70.26	50026.71	-10.45		
delta	I	2027-10-15T09:03:23.242		30.67	-70.81	48300.35	-10.15		
gamma	I	2027-10-15T09:04:30.299		30.93	-71.03	47624.13	-10.02		
eta	I	2027-10-15T09:05:15.220		31.10	-71.18	47176.12	-9.93		
beta	I	2027-10-15T09:07:50.402		31.69	-71.68	45660.32	-9.60		
alpha	I	2027-10-15T09:09:33.558		32.08	-72.00	44684.79	-9.35		
4	I	2027-10-15T09:13:22.515		32.96	-72.72	42609.10	-8.76		
5	I	2027-10-15T09:13:55.405		33.08	-72.82	42314.82	-8.66		
6	I	2027-10-15T09:14:50.414		33.29	-72.98	41856.10	-8.49		

No planet occultations

6	E	2027-10-15T10:14:44.784		47.10	-78.68	41805.64	8.56		
5	E	2027-10-15T10:15:35.892		47.30	-78.65	42246.14	8.73		
4	E	2027-10-15T10:16:16.693		47.46	-78.62	42603.93	8.84		
alpha	E	2027-10-15T10:20:07.810		48.35	-78.41	44718.19	9.44		
beta	E	2027-10-15T10:21:48.395		48.74	-78.30	45681.12	9.69		
eta	E	2027-10-15T10:24:19.907		49.32	-78.11	47176.12	10.03		
gamma	E	2027-10-15T10:25:04.083		49.50	-78.05	47621.45	10.13		
delta	E	2027-10-15T10:26:10.670		49.75	-77.95	48300.35	10.26		
lambda	E	2027-10-15T10:28:56.308		50.39	-77.69	50026.71	10.58		
epsilon	E	2027-10-15T10:30:31.944		50.76	-77.52	51046.28	10.81		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-10-15T09:35:28.300  
 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 : 144669380594264064  
 2Mass ID (if available) : 04300273+2143551  
 ICRS Star Coord at Epoch: 04h 30m 02.71928s +21:43:55.32391s  
 RUWE (>1.4 is poor) : 1.05  
 K magnitude : 13.354  
 G magnitude : 16.187  
 RP magnitude : 15.314  
 BP magnitude : 16.956  
 DUPflag : 0  
 Distance (au) : 18.687  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -13.69  
 Sun-Target sep (deg) : 132.24  
 Sun-Moon sep (deg) : 50.63  
 B (ring opening deg) : 78.63  
 PA of pole (deg) : -56.44  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.961  
 C/A sky separation (km) : 26580.0  
 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	2027-10-15T08:44:31.433		36.79	-17.94	51554.16	-12.16		
lambda	I	2027-10-15T08:46:37.862		36.64	-17.51	50026.71	-12.01		
delta	I	2027-10-15T08:49:02.664		36.46	-17.02	48300.35	-11.83		
gamma	I	2027-10-15T08:49:59.921		36.39	-16.82	47625.08	-11.75		
eta	I	2027-10-15T08:50:38.197		36.34	-16.69	47176.12	-11.70		
beta	I	2027-10-15T08:52:49.048		36.17	-16.24	45656.33	-11.51		
alpha	I	2027-10-15T08:54:14.134		36.06	-15.95	44684.81	-11.38		
4	I	2027-10-15T08:57:19.730		35.80	-15.31	42602.50	-11.06		
5	I	2027-10-15T08:57:45.077		35.77	-15.22	42314.60	-11.00		
6	I	2027-10-15T08:58:27.172		35.71	-15.08	41864.49	-10.91		

No planet occultations

6	E	2027-10-15T10:13:41.568		27.03	0.86x	41800.41	10.88		
5	E	2027-10-15T10:14:20.771		26.94	1.00x	42229.75	10.97		
4	E	2027-10-15T10:14:54.159		26.86	1.13x	42596.99	11.03		
alpha	E	2027-10-15T10:18:04.356		26.40	1.81x	44724.33	11.34		
beta	E	2027-10-15T10:19:28.239		26.20	2.11x	45681.18	11.48		
eta	E	2027-10-15T10:21:37.408		25.89	2.58x	47176.12	11.66		
gamma	E	2027-10-15T10:22:15.540		25.79	2.71x	47621.87	11.72		
delta	E	2027-10-15T10:23:13.265		25.65	2.92x	48300.35	11.79		
lambda	E	2027-10-15T10:25:38.581		25.29	3.45x	50026.71	11.97		
epsilon	E	2027-10-15T10:26:58.936		25.09	3.74x	50991.90	12.11		