

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-01-16T07:47:35.350
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3382599938914075264
 2Mass ID (if available) : 06315630+2334150

ICRS Star Coord at Epoch: 06h 31m 56.31471s +23:34:14.63880s

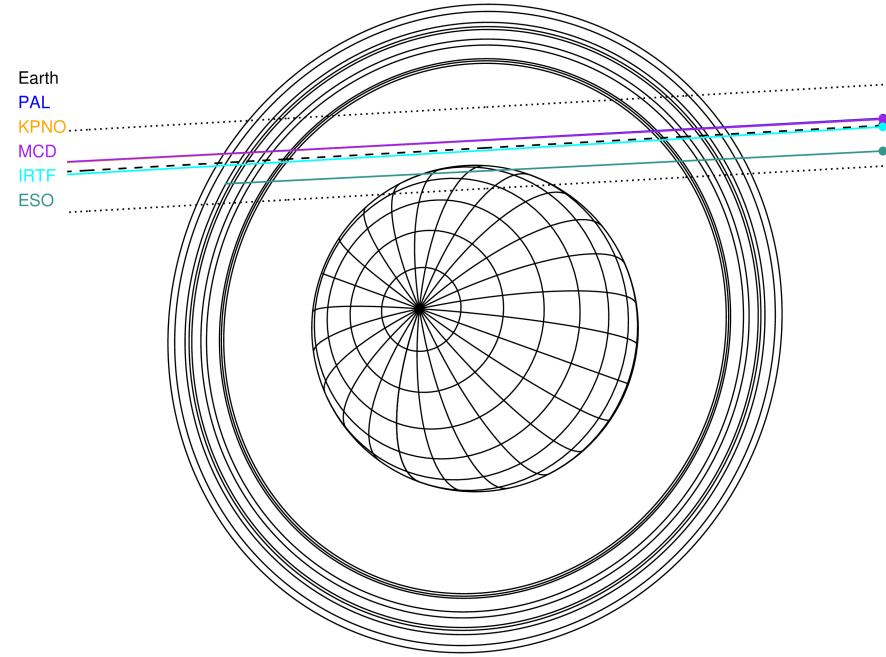
RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.082
 G magnitude : 16.692
 RP magnitude : 15.854
 BP magnitude : 17.461
 DUPflag : 0
 Distance (au) : 17.949
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.89
 Sun-Target sep (deg) : 161.80
 Sun-Moon sep (deg) : 82.91
 B (ring opening deg) : 68.80
 PA of pole (deg) : 70.43

#	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



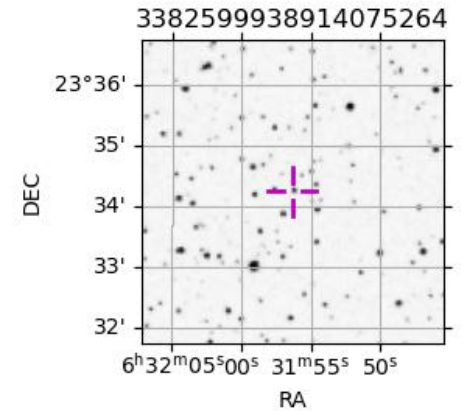
2035-01-16T07:47:35.3500 α: 06 31 56.3147 s: +23 34 14.639 C/A 2.170° PA 183.24 deg v_sky -21.89 km/s D 17.95 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2035-01-16T07:47:35 K14.08 G16.69 PtRgt

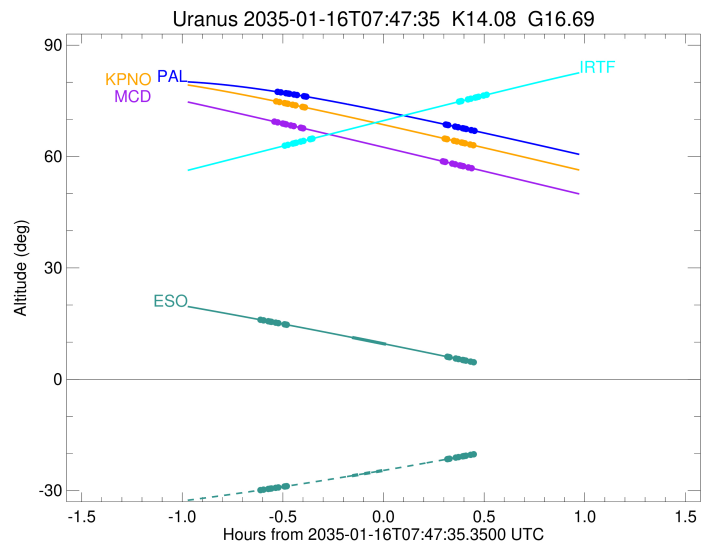
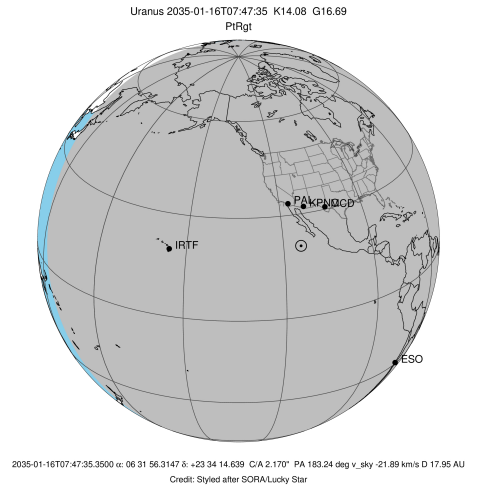


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1				JAN 16 07:15 - JAN 16 08:14	PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++		+++++	JAN 16 07:15 - JAN 16 08:14	PnnRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8				JAN 16 07:15 - JAN 16 08:14	PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	JAN 16 07:15 - JAN 16 08:14	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	JAN 16 07:14 - JAN 16 08:13	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5				JAN 16 07:17 - JAN 16 08:18	PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++		+++++	JAN 16 07:17 - JAN 16 08:18	PnnRie
KAV	Kavalur Observatory	12.6	78.8				JAN 16 07:10 - JAN 16 08:12	PnnRnn
RIO	Rio de Janeiro	-22.9	316.8				JAN 16 07:10 - JAN 16 08:12	PnnRnn
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	JAN 16 07:10 - JAN 16 08:12	PieRie
AAT	Siding Spring (AAT)	-31.3	149.1				JAN 16 07:10 - JAN 16 08:12	PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8				JAN 16 07:10 - JAN 16 08:12	PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0				JAN 16 07:10 - JAN 16 08:12	PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-01-16T07:46:24.100
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3382599938914075264
 2Mass ID (if available) : 06315630+2334150
 ICRS Star Coord at Epoch: 06h 31m 56.31471s +23:34:14.63880s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.082
 G magnitude : 16.692
 RP magnitude : 15.854
 BP magnitude : 17.461
 DUPflag : 0
 Distance (au) : 17.949
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.89
 Sun-Target sep (deg) : 161.80
 Sun-Moon sep (deg) : 83.85
 B (ring opening deg) : 68.80
 PA of pole (deg) : 70.43
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.258
 C/A sky separation (km) : 29394.8
 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



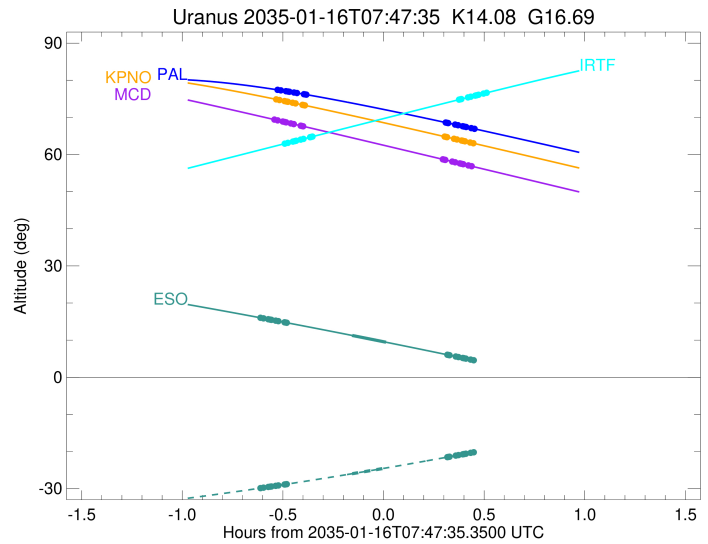
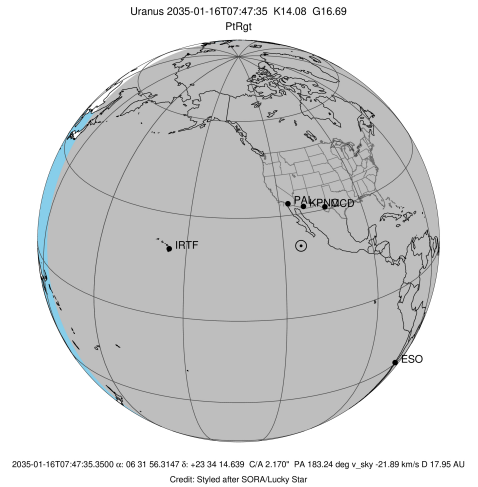
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-16T07:15:40.965		77.47	-74.71	51543.35	-19.36		
lambda	I	2035-01-16T07:16:59.996		77.28	-74.88	50026.71	-19.04		
delta	I	2035-01-16T07:18:31.574		77.06	-75.08	48300.35	-18.66		
gamma	I	2035-01-16T07:19:08.099		76.97	-75.16	47621.87	-18.49		
eta	I	2035-01-16T07:19:32.276		76.91	-75.21	47176.12	-18.38		
beta	I	2035-01-16T07:20:55.485		76.71	-75.38	45664.23	-17.98		
alpha	I	2035-01-16T07:21:50.077		76.57	-75.49	44689.95	-17.67		
4	I	2035-01-16T07:23:52.352		76.25	-75.72	42574.10	-16.96		
5	I	2035-01-16T07:24:14.259		76.19	-75.77	42197.02	-16.77		
6	I	2035-01-16T07:24:34.702		76.14	-75.80	41855.80	-16.68		

No planet occultations

6	E	2035-01-16T08:06:10.571		68.61	-77.59	41875.61	16.66		
5	E	2035-01-16T08:06:27.565		68.56	-77.58	42164.56	16.75		
4	E	2035-01-16T08:06:54.443		68.47	-77.57	42616.38	16.94		
alpha	E	2035-01-16T08:08:54.840		68.07	-77.48	44703.64	17.64		
beta	E	2035-01-16T08:09:49.443		67.90	-77.44	45680.28	17.95		
eta	E	2035-01-16T08:11:11.842		67.62	-77.36	47176.12	18.35		
gamma	E	2035-01-16T08:11:36.188		67.54	-77.34	47624.33	18.46		
delta	E	2035-01-16T08:12:12.635		67.42	-77.30	48300.35	18.63		
lambda	E	2035-01-16T08:13:44.358		67.12	-77.21	50026.71	19.01		
epsilon	E	2035-01-16T08:14:40.929		66.93	-77.15	51108.15	19.33		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2035-01-16T07:46:00.920
Event type           : PtRgt
: Uranus occs: topocentric, not geocentric
: 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       : 3382599938914075264
2Mass ID (if available) : 06315630+2334150
ICRS Star Coord at Epoch: 06h 31m 56.31471s +23:34:14.63880s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 14.082
G magnitude           : 16.692
RP magnitude          : 15.854
BP magnitude          : 17.461
DUPflag              : 0
Distance (au)         : 17.949
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -21.89
Sun-Target sep (deg) : 161.80
Sun-Moon sep (deg)   : 83.84
B (ring opening deg) : 68.80
PA of pole (deg)     : 70.43
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.254
C/A sky separation (km) : 29338.0
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.bsp
earthstns_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```

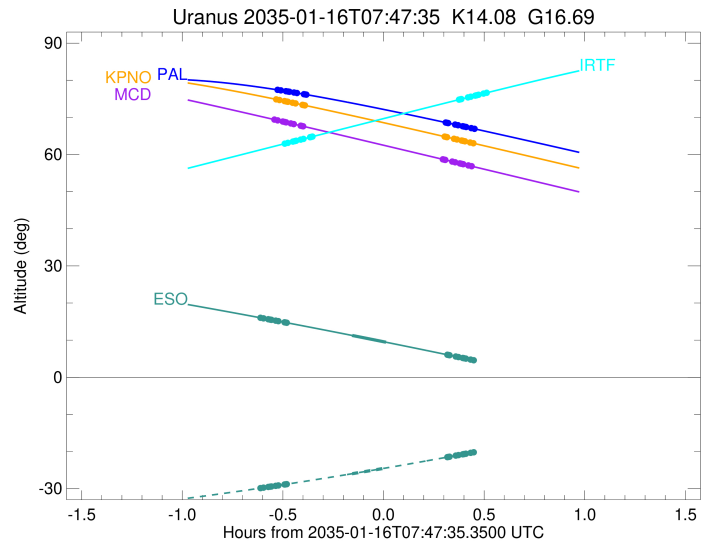
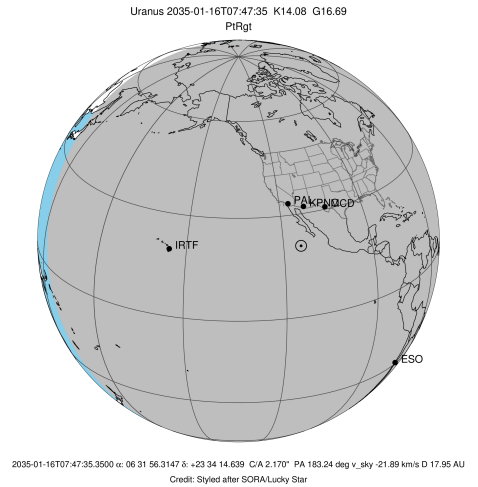


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-16T07:15:15.946		74.93	-78.21	51543.16	-19.38		
lambda	I	2035-01-16T07:16:34.893		74.68	-78.32	50026.71	-19.06		
delta	I	2035-01-16T07:18:06.375		74.40	-78.44	48300.35	-18.68		
gamma	I	2035-01-16T07:18:42.858		74.28	-78.49	47621.88	-18.51		
eta	I	2035-01-16T07:19:07.007		74.21	-78.52	47176.12	-18.40		
beta	I	2035-01-16T07:20:30.113		73.94	-78.62	45664.19	-18.00		
alpha	I	2035-01-16T07:21:24.624		73.77	-78.68	44690.00	-17.69		
4	I	2035-01-16T07:23:26.716		73.38	-78.80	42573.99	-16.99		
5	I	2035-01-16T07:23:48.565		73.31	-78.82	42197.20	-16.80		
6	I	2035-01-16T07:24:08.987		73.25	-78.84	41855.70	-16.71		

No planet occultations

6	E	2035-01-16T08:05:50.487		64.82	-77.26	41875.59	16.68		
5	E	2035-01-16T08:06:07.460		64.76	-77.23	42164.61	16.77		
4	E	2035-01-16T08:06:34.293		64.67	-77.18	42616.38	16.97		
alpha	E	2035-01-16T08:08:34.542		64.25	-76.93	44703.68	17.66		
beta	E	2035-01-16T08:09:29.085		64.06	-76.82	45680.28	17.97		
eta	E	2035-01-16T08:10:51.410		63.78	-76.64	47176.12	18.37		
gamma	E	2035-01-16T08:11:15.737		63.69	-76.59	47624.34	18.48		
delta	E	2035-01-16T08:11:52.156		63.56	-76.51	48300.35	18.64		
lambda	E	2035-01-16T08:13:23.819		63.24	-76.30	50026.71	19.02		
epsilon	E	2035-01-16T08:14:20.341		63.05	-76.17	51107.81	19.34		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-01-16T07:45:29.180
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3382599938914075264
 2Mass ID (if available) : 06315630+2334150
 ICRS Star Coord at Epoch: 06h 31m 56.31471s +23:34:14.63880s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.082
 G magnitude : 16.692
 RP magnitude : 15.854
 BP magnitude : 17.461
 DUPflag : 0
 Distance (au) : 17.949
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.89
 Sun-Target sep (deg) : 161.80
 Sun-Moon sep (deg) : 83.81
 B (ring opening deg) : 68.80
 PA of pole (deg) : 70.43
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.256
 C/A sky separation (km) : 29362.3
 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



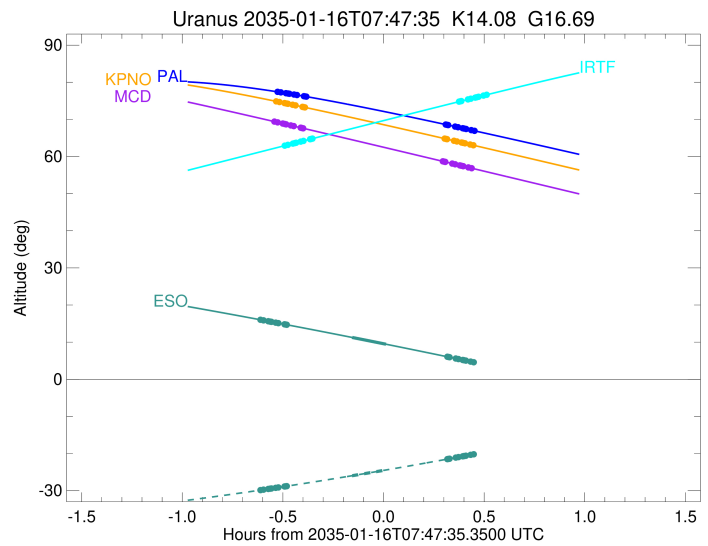
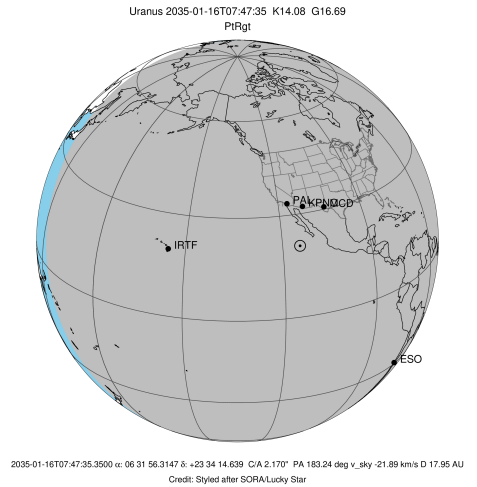
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-16T07:14:43.731		69.48	-80.23	51543.13	-19.36		
lambda	I	2035-01-16T07:16:02.749		69.20	-80.16	50026.71	-19.04		
delta	I	2035-01-16T07:17:34.321		68.88	-80.07	48300.35	-18.66		
gamma	I	2035-01-16T07:18:10.841		68.76	-80.04	47621.88	-18.49		
eta	I	2035-01-16T07:18:35.015		68.67	-80.01	47176.12	-18.38		
beta	I	2035-01-16T07:19:58.214		68.38	-79.92	45664.18	-17.98		
alpha	I	2035-01-16T07:20:52.787		68.19	-79.85	44690.00	-17.67		
4	I	2035-01-16T07:22:55.032		67.76	-79.69	42573.99	-16.97		
5	I	2035-01-16T07:23:16.911		67.68	-79.65	42197.20	-16.78		
6	I	2035-01-16T07:23:37.361		67.61	-79.62	41855.70	-16.68		

No planet occultations

6	E	2035-01-16T08:05:18.883		58.70	-73.54	41875.61	16.65		
5	E	2035-01-16T08:05:35.881		58.64	-73.49	42164.55	16.74		
4	E	2035-01-16T08:06:02.768		58.54	-73.40	42616.38	16.94		
alpha	E	2035-01-16T08:08:03.217		58.11	-73.03	44703.63	17.64		
beta	E	2035-01-16T08:08:57.852		57.91	-72.86	45680.29	17.94		
eta	E	2035-01-16T08:10:20.308		57.62	-72.61	47176.12	18.34		
gamma	E	2035-01-16T08:10:44.672		57.53	-72.53	47624.33	18.45		
delta	E	2035-01-16T08:11:21.148		57.40	-72.42	48300.35	18.61		
lambda	E	2035-01-16T08:12:52.950		57.07	-72.13	50026.71	18.99		
epsilon	E	2035-01-16T08:13:49.584		56.87	-71.95	51108.34	19.31		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2035-01-16T07:49:15.300
Event type           : PtRgt
: Uranus occs: topocentric, not geocentric
: 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       : 3382599938914075264
2Mass ID (if available) : 06315630+2334150
ICRS Star Coord at Epoch: 06h 31m 56.31471s +23:34:14.63880s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 14.082
G magnitude           : 16.692
RP magnitude          : 15.854
BP magnitude          : 17.461
DUPflag              : 0
Distance (au)         : 17.949
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s) : -21.89
Sun-Target sep (deg) : 161.80
Sun-Moon sep (deg)   : 83.78
B (ring opening deg) : 68.80
PA of pole (deg)     : 70.43
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.132
C/A sky separation (km) : 27749.6
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
    
```

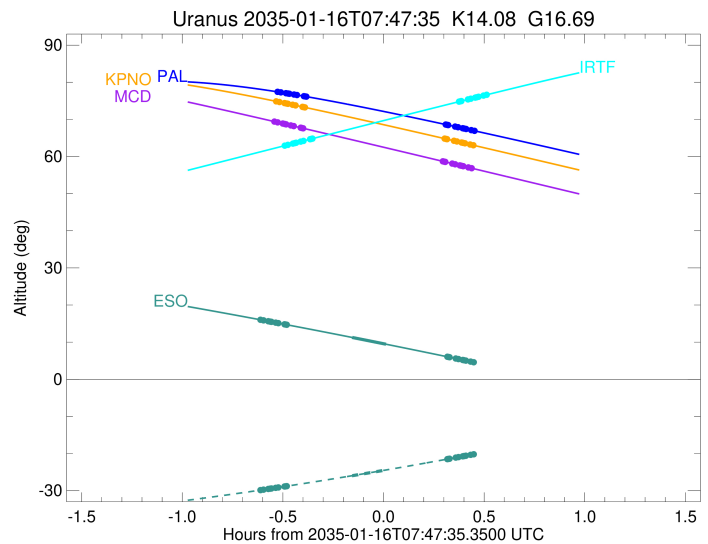
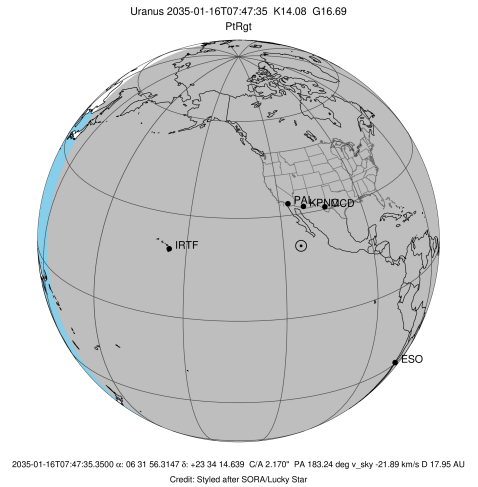


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-16T07:17:49.636		62.86	-44.77	51539.75	-19.88		
lambda	I	2035-01-16T07:19:06.345		63.15	-45.06	50026.71	-19.59		
delta	I	2035-01-16T07:20:35.184		63.49	-45.40	48300.35	-19.27		
gamma	I	2035-01-16T07:21:10.523		63.63	-45.54	47621.99	-19.12		
eta	I	2035-01-16T07:21:33.896		63.72	-45.63	47176.12	-19.03		
beta	I	2035-01-16T07:22:54.170		64.02	-45.94	45663.39	-18.68		
alpha	I	2035-01-16T07:23:46.522		64.22	-46.14	44690.78	-18.42		
4	I	2035-01-16T07:25:43.562		64.67	-46.59	42571.91	-17.82		
5	I	2035-01-16T07:26:04.032		64.75	-46.67	42200.55	-17.65		
6	I	2035-01-16T07:26:23.751		64.82	-46.75	41853.86	-17.57		

No planet occultations

6	E	2035-01-16T08:10:08.513		74.79	-56.91	41874.47	17.59		
5	E	2035-01-16T08:10:24.809		74.86	-56.97	42166.91	17.67		
4	E	2035-01-16T08:10:50.108		74.95	-57.07	42616.08	17.84		
alpha	E	2035-01-16T08:12:45.025		75.38	-57.52	44705.27	18.44		
beta	E	2035-01-16T08:13:37.239		75.58	-57.72	45679.95	18.71		
eta	E	2035-01-16T08:14:56.491		75.87	-58.03	47176.12	19.05		
gamma	E	2035-01-16T08:15:19.968		75.96	-58.12	47624.57	19.15		
delta	E	2035-01-16T08:15:55.125		76.09	-58.26	48300.35	19.29		
lambda	E	2035-01-16T08:17:23.839		76.42	-58.60	50026.71	19.62		
epsilon	E	2035-01-16T08:18:17.805		76.62	-58.81	51090.69	19.91		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-01-16T07:43:32.010
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 3382599938914075264
 2Mass ID (if available) : 06315630+2334150
 ICRS Star Coord at Epoch: 06h 31m 56.31471s +23:34:14.63880s
 RUWE (>1.4 is poor) : 0.98
 K magnitude : 14.082
 G magnitude : 16.692
 RP magnitude : 15.854
 BP magnitude : 17.461
 DUPflag : 0
 Distance (au) : 17.949
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -21.89
 Sun-Target sep (deg) : 161.80
 Sun-Moon sep (deg) : 83.16
 B (ring opening deg) : 68.80
 PA of pole (deg) : 70.43
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.887
 C/A sky separation (km) : 24571.1
 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	2035-01-16T07:10:36.571		16.08	-29.90	51529.36	-20.63		
lambda	I	2035-01-16T07:11:49.874		15.87	-29.74	50026.71	-20.40		
delta	I	2035-01-16T07:13:14.999		15.63	-29.55	48300.35	-20.16		
gamma	I	2035-01-16T07:13:48.728		15.53	-29.47	47622.29	-20.05		
eta	I	2035-01-16T07:14:11.021		15.47	-29.42	47176.12	-19.98		
beta	I	2035-01-16T07:15:27.371		15.25	-29.25	45661.49	-19.72		
alpha	I	2035-01-16T07:16:16.633		15.11	-29.13	44692.82	-19.53		
4	I	2035-01-16T07:18:06.824		14.80	-28.88	42567.17	-19.09		
5	I	2035-01-16T07:18:25.164		14.74	-28.84	42208.44	-18.96		
6	I	2035-01-16T07:18:44.137		14.69	-28.80	41849.56	-18.91		
Uranus	I	2035-01-16T07:38:14.316		11.26	-25.98	25552.32		2.34	2.45
Uranus	E	2035-01-16T07:48:18.716		9.45	-24.44	25372.52		12.53	13.10
6	E	2035-01-16T08:06:39.342		6.06	-21.51	41872.44	18.84		
5	E	2035-01-16T08:06:54.899		6.01	-21.46	42171.00	18.89		
4	E	2035-01-16T08:07:18.259		5.94	-21.40	42615.31	19.02		
alpha	E	2035-01-16T08:09:06.863		5.60	-21.10	44707.86	19.44		
beta	E	2035-01-16T08:09:56.315		5.44	-20.97	45679.34	19.64		
eta	E	2035-01-16T08:11:12.058		5.20	-20.76	47176.12	19.89		
gamma	E	2035-01-16T08:11:34.584		5.13	-20.69	47624.94	19.96		
delta	E	2035-01-16T08:12:08.334		5.03	-20.60	48300.35	20.06		
lambda	E	2035-01-16T08:13:33.860		4.76x	-20.36	50026.71	20.30		
epsilon	E	2035-01-16T08:14:24.809		4.60x	-20.22	51064.56	20.52		