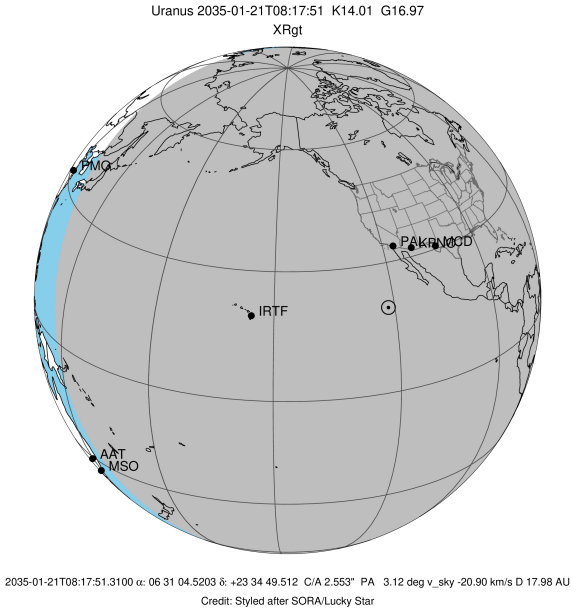


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-01-21T08:17:51.310
 Event type : XRgt
 : No Uranus occs
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3382597976110764544
 2Mass ID (if available) : 06310451+2334499

ICRS Star Coord at Epoch: 06h 31m 04.52032s +23:34:49.51216s

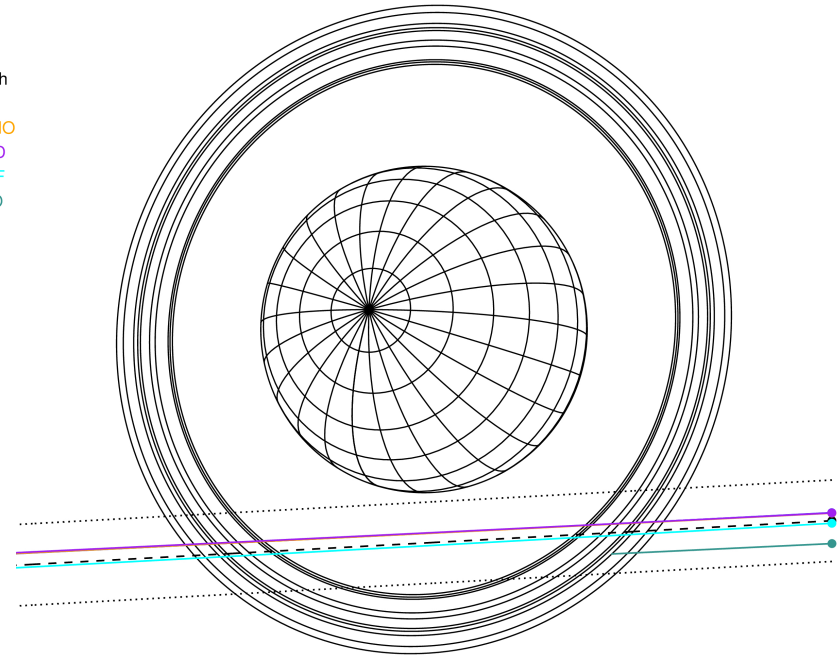
RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.008
 G magnitude : 16.968
 RP magnitude : 15.997
 BP magnitude : 17.922
 DUPflag : 0
 Distance (au) : 17.979
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.90
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 12.13
 B (ring opening deg) : 68.98
 PA of pole (deg) : 70.14

#	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



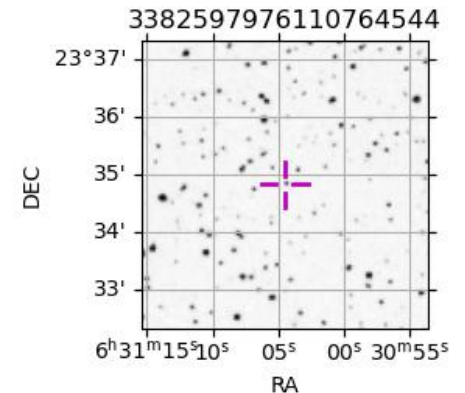
Uranus 2035-01-21T08:17:51 K14.01 G16.97 XRgt

Earth
 PAL
 KPNO
 MCD
 IRTF
 ESO

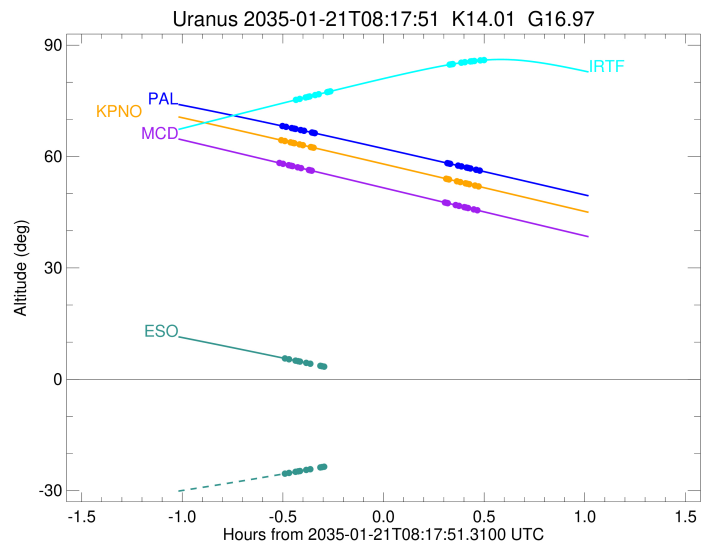
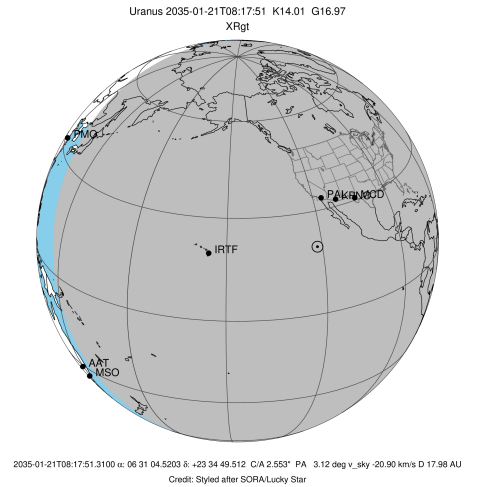


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1				JAN 21 07:47 - JAN 21 08:46	PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++		+++++	JAN 21 07:47 - JAN 21 08:46	PnnRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8				JAN 21 07:47 - JAN 21 08:45	PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++		+++++	JAN 21 07:46 - JAN 21 08:45	PnnRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++		+++++	JAN 21 07:46 - JAN 21 08:45	PnnRie
TEN	Teide Obs./Tenerife	28.3	343.5				JAN 21 07:51 - JAN 21 08:47	PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++		+++++	JAN 21 07:51 - JAN 21 08:47	PnnRie
KAV	Kavalur Observatory	12.6	78.8				JAN 21 07:48 - JAN 21 07:51	PnnRnn
RIO	Rio de Janeiro	-22.9	316.8				JAN 21 07:48 - JAN 21 07:51	PnnRnn
ESO	European Southern Obs	-29.3	289.3	+++			JAN 21 07:48 - JAN 21 07:51	PnnRin
AAT	Siding Spring (AAT)	-31.3	149.1				JAN 21 07:48 - JAN 21 07:51	PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8				JAN 21 07:48 - JAN 21 07:51	PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0				JAN 21 07:48 - JAN 21 07:51	PnnRnn



target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-01-21T08:15:56.950
 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 : 3382597976110764544
 2Mass ID (if available) : 06310451+2334499
 ICRS Star Coord at Epoch: 06h 31m 04.52032s +23:34:49.51216s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.008
 G magnitude : 16.968
 RP magnitude : 15.997
 BP magnitude : 17.922
 DUPflag : 0
 Distance (au) : 17.979
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.90
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 12.78
 B (ring opening deg) : 68.98
 PA of pole (deg) : 70.14
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.446
 C/A sky separation (km) : 31898.9
 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



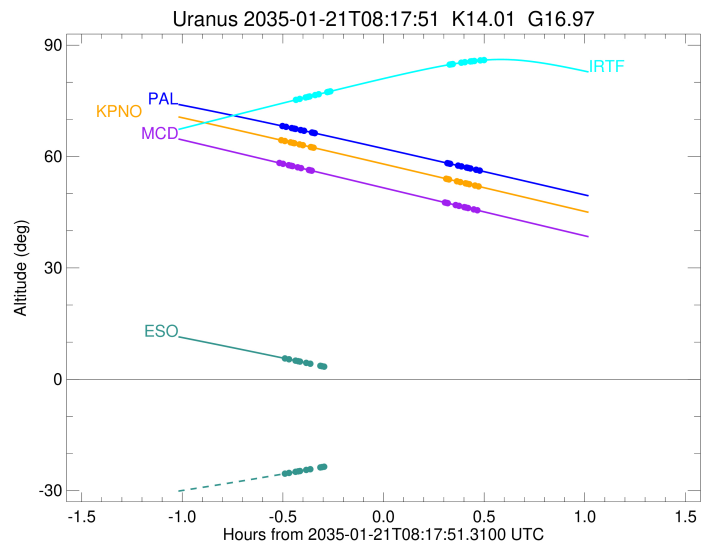
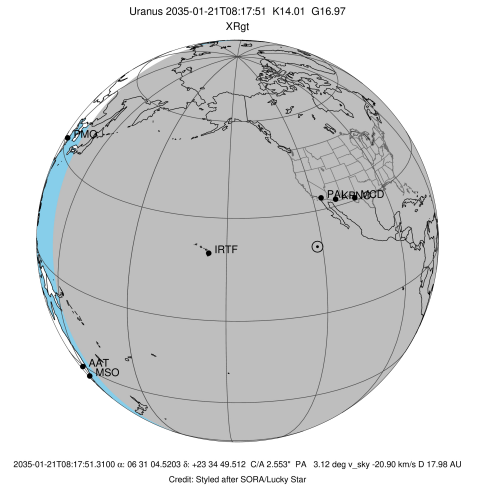
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-21T07:47:46.706		68.20	-76.51	51110.55	-17.38		
lambda	I	2035-01-21T07:48:49.107		68.00	-76.55	50026.71	-17.24		
delta	I	2035-01-21T07:50:30.553		67.66	-76.61	48300.35	-16.79		
gamma	I	2035-01-21T07:51:10.758		67.53	-76.63	47629.25	-16.60		
eta	I	2035-01-21T07:51:38.175		67.44	-76.64	47176.12	-16.46		
beta	I	2035-01-21T07:53:12.872		67.13	-76.68	45641.09	-15.96		
alpha	I	2035-01-21T07:54:09.575		66.94	-76.69	44740.94	-15.64		
4	I	2035-01-21T07:56:35.254		66.46	-76.72	42527.09	-14.71		
5	I	2035-01-21T07:56:49.723		66.41	-76.72	42313.95	-14.60		
6	I	2035-01-21T07:57:25.272		66.29	-76.73	41795.00	-14.34		

No planet occultations

6	E	2035-01-21T08:36:51.734		58.23	-74.22	41824.76	14.31		
5	E	2035-01-21T08:37:22.077		58.12	-74.16	42261.69	14.58		
4	E	2035-01-21T08:37:43.102		58.05	-74.12	42574.87	14.68		
alpha	E	2035-01-21T08:40:06.367		57.55	-73.82	44744.72	15.61		
beta	E	2035-01-21T08:41:04.395		57.35	-73.70	45660.16	15.92		
eta	E	2035-01-21T08:42:38.130		57.03	-73.49	47176.12	16.42		
gamma	E	2035-01-21T08:43:05.679		56.93	-73.43	47630.39	16.56		
delta	E	2035-01-21T08:43:45.911		56.79	-73.34	48300.35	16.75		
lambda	E	2035-01-21T08:45:27.609		56.44	-73.11	50026.71	17.20		
epsilon	E	2035-01-21T08:46:10.054		56.29	-73.02	50760.29	17.34		

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2035-01-21T08:15:35.940
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      : 3382597976110764544
2Mass ID (if available) : 06310451+2334499
ICRS Star Coord at Epoch: 06h 31m 04.52032s +23:34:49.51216s
RUWE (>1.4 is poor) : 0.99
K magnitude          : 14.008
G magnitude          : 16.968
RP magnitude         : 15.997
BP magnitude         : 17.922
DUPflag             : 0
Distance (au)       : 17.979
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -20.90
Sun-Target sep (deg) : 156.49
Sun-Moon sep (deg)  : 12.84
B (ring opening deg) : 68.98
PA of pole (deg)    : 70.14
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 2.448
C/A sky separation (km) : 31917.1
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall11.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall11.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
    
```

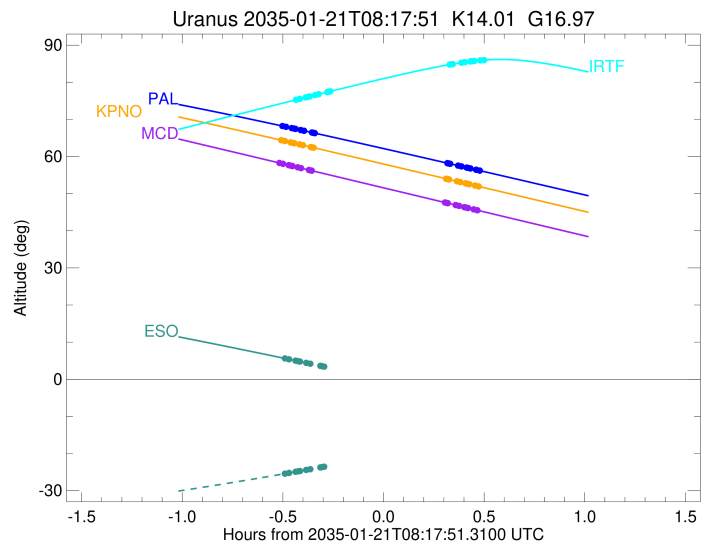
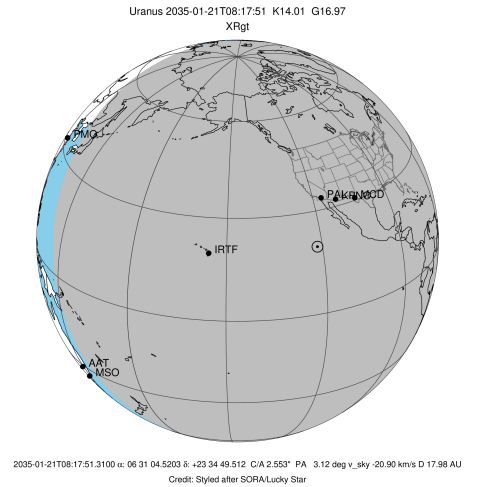


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-21T07:47:25.409		64.39	-77.91	51110.14	-17.37		
lambda	I	2035-01-21T07:48:27.837		64.17	-77.87	50026.71	-17.23		
delta	I	2035-01-21T07:50:09.369		63.82	-77.79	48300.35	-16.77		
gamma	I	2035-01-21T07:50:49.609		63.68	-77.75	47629.26	-16.58		
eta	I	2035-01-21T07:51:17.052		63.58	-77.73	47176.12	-16.44		
beta	I	2035-01-21T07:52:51.841		63.25	-77.63	45641.08	-15.94		
alpha	I	2035-01-21T07:53:48.601		63.06	-77.57	44740.97	-15.62		
4	I	2035-01-21T07:56:14.447		62.55	-77.40	42527.10	-14.69		
5	I	2035-01-21T07:56:28.935		62.50	-77.38	42313.96	-14.58		
6	I	2035-01-21T07:57:04.531		62.37	-77.34	41795.00	-14.32		

No planet occultations

6	E	2035-01-21T08:36:30.608		54.02	-72.22	41824.75	14.29		
5	E	2035-01-21T08:37:00.998		53.91	-72.14	42261.70	14.55		
4	E	2035-01-21T08:37:22.054		53.84	-72.08	42574.87	14.66		
alpha	E	2035-01-21T08:39:45.525		53.33	-71.68	44744.72	15.59		
beta	E	2035-01-21T08:40:43.632		53.12	-71.51	45660.16	15.90		
eta	E	2035-01-21T08:42:17.488		52.79	-71.24	47176.12	16.40		
gamma	E	2035-01-21T08:42:45.073		52.69	-71.16	47630.39	16.54		
delta	E	2035-01-21T08:43:25.355		52.55	-71.04	48300.35	16.73		
lambda	E	2035-01-21T08:45:07.178		52.19	-70.75	50026.71	17.18		
epsilon	E	2035-01-21T08:45:49.674		52.04	-70.62	50760.30	17.32		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-01-21T08:15:08.350
 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 : 3382597976110764544
 2Mass ID (if available) : 06310451+2334499
 ICRS Star Coord at Epoch: 06h 31m 04.52032s +23:34:49.51216s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.008
 G magnitude : 16.968
 RP magnitude : 15.997
 BP magnitude : 17.922
 DUPflag : 0
 Distance (au) : 17.979
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.90
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 12.91
 B (ring opening deg) : 68.98
 PA of pole (deg) : 70.14
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.442
 C/A sky separation (km) : 31842.0
 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

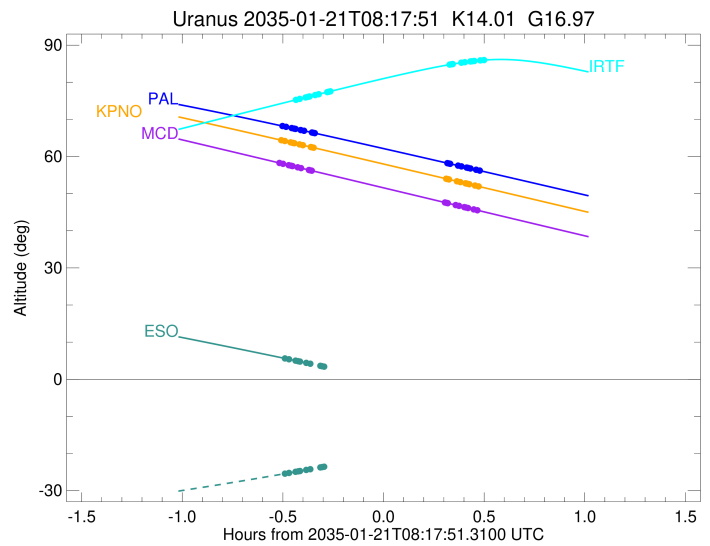
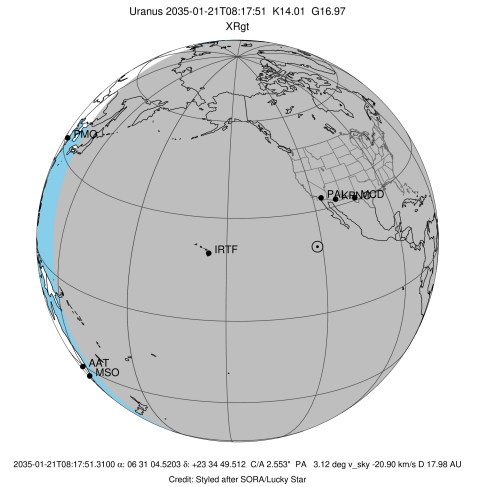


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-21T07:46:52.799		58.26	-76.14	51110.62	-17.38		
lambda	I	2035-01-21T07:47:55.217		58.03	-75.98	50026.71	-17.24		
delta	I	2035-01-21T07:49:36.672		57.67	-75.73	48300.35	-16.79		
gamma	I	2035-01-21T07:50:16.876		57.52	-75.63	47629.25	-16.60		
eta	I	2035-01-21T07:50:44.291		57.43	-75.56	47176.12	-16.46		
beta	I	2035-01-21T07:52:18.970		57.09	-75.31	45641.08	-15.96		
alpha	I	2035-01-21T07:53:15.653		56.88	-75.17	44740.92	-15.65		
4	I	2035-01-21T07:55:41.238		56.36	-74.78	42527.08	-14.72		
5	I	2035-01-21T07:55:55.693		56.31	-74.74	42313.93	-14.61		
6	I	2035-01-21T07:56:31.205		56.18	-74.64	41795.01	-14.35		

No planet occultations

6	E	2035-01-21T08:36:08.633		47.62	-67.33	41824.90	14.32		
5	E	2035-01-21T08:36:38.937		47.51	-67.23	42261.43	14.58		
4	E	2035-01-21T08:36:59.980		47.44	-67.16	42575.02	14.68		
alpha	E	2035-01-21T08:39:23.241		46.92	-66.68	44744.65	15.60		
beta	E	2035-01-21T08:40:21.299		46.71	-66.49	45660.23	15.92		
eta	E	2035-01-21T08:41:55.086		46.38	-66.18	47176.12	16.41		
gamma	E	2035-01-21T08:42:22.656		46.28	-66.08	47630.38	16.54		
delta	E	2035-01-21T08:43:02.921		46.13	-65.95	48300.35	16.72		
lambda	E	2035-01-21T08:44:44.717		45.77	-65.60	50026.71	17.18		
epsilon	E	2035-01-21T08:45:27.226		45.61	-65.46	50760.60	17.32		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-01-21T08:18:32.980
 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 : 3382597976110764544
 2Mass ID (if available) : 06310451+2334499
 ICRS Star Coord at Epoch: 06h 31m 04.52032s +23:34:49.51216s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.008
 G magnitude : 16.968
 RP magnitude : 15.997
 BP magnitude : 17.922
 DUPflag : 0
 Distance (au) : 17.979
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.90
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 12.18
 B (ring opening deg) : 68.98
 PA of pole (deg) : 70.14
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.595
 C/A sky separation (km) : 33841.1
 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

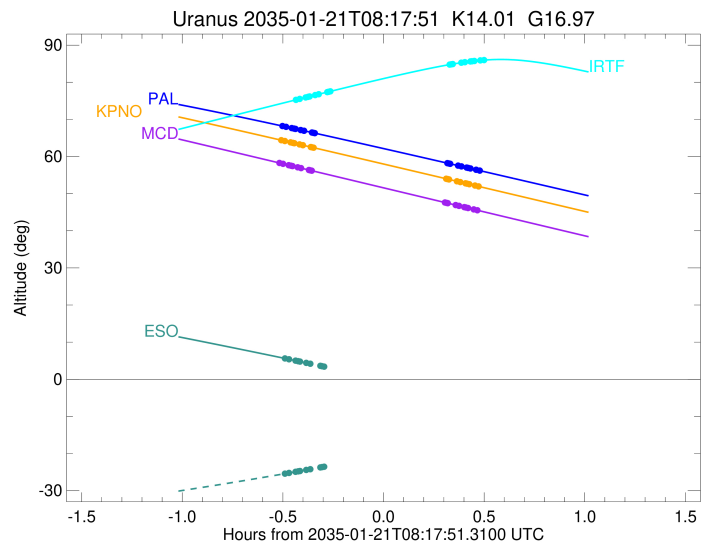
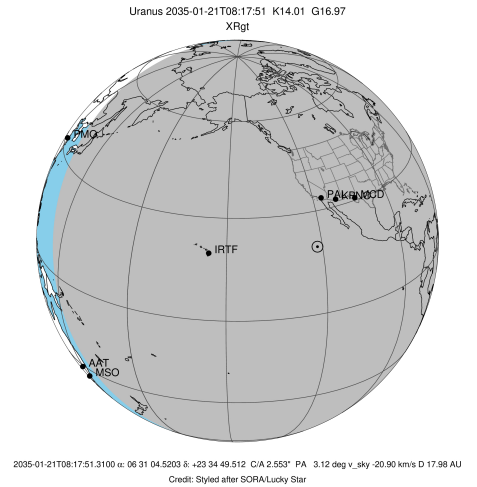


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2035-01-21T07:51:49.266		75.28	-52.18	51091.77	-16.68		
lambda	I	2035-01-21T07:52:53.235		75.52	-52.43	50026.71	-16.50		
delta	I	2035-01-21T07:54:39.556		75.92	-52.84	48300.35	-15.96		
gamma	I	2035-01-21T07:55:21.878		76.08	-53.00	47629.48	-15.74		
eta	I	2035-01-21T07:55:50.838		76.19	-53.12	47176.12	-15.57		
beta	I	2035-01-21T07:57:31.321		76.56	-53.51	45641.05	-14.97		
alpha	I	2035-01-21T07:58:31.840		76.79	-53.74	44742.46	-14.59		
4	I	2035-01-21T08:01:09.536		77.37	-54.36	42527.90	-13.45		
5	I	2035-01-21T08:01:25.465		77.43	-54.42	42314.77	-13.31		
6	I	2035-01-21T08:02:04.653		77.57	-54.57	41794.78	-12.99		

No planet occultations

6	E	2035-01-21T08:37:32.460		84.76	-62.87	41821.48	13.00		
5	E	2035-01-21T08:38:06.458		84.85	-63.00	42267.61	13.32		
4	E	2035-01-21T08:38:28.833		84.91	-63.09	42571.32	13.45		
alpha	E	2035-01-21T08:41:03.841		85.28	-63.69	44746.16	14.59		
beta	E	2035-01-21T08:42:05.539		85.41	-63.93	45658.82	14.98		
eta	E	2035-01-21T08:43:44.830		85.61	-64.32	47176.12	15.58		
gamma	E	2035-01-21T08:44:13.850		85.66	-64.43	47630.58	15.74		
delta	E	2035-01-21T08:44:56.088		85.74	-64.60	48300.35	15.97		
lambda	E	2035-01-21T08:46:42.372		85.90	-65.01	50026.71	16.51		
epsilon	E	2035-01-21T08:47:26.192		85.95	-65.19	50754.51	16.68		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2035-01-21T08:13:38.320
 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 : 3382597976110764544
 2Mass ID (if available) : 06310451+2334499
 ICRS Star Coord at Epoch: 06h 31m 04.52032s +23:34:49.51216s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.008
 G magnitude : 16.968
 RP magnitude : 15.997
 BP magnitude : 17.922
 DUPflag : 0
 Distance (au) : 17.979
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.90
 Sun-Target sep (deg) : 156.49
 Sun-Moon sep (deg) : 12.71
 B (ring opening deg) : 68.98
 PA of pole (deg) : 70.14
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.799
 C/A sky separation (km) : 36492.1
 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	2035-01-21T07:48:34.537		5.59	-25.41	51059.49	-15.32		
lambda	I	2035-01-21T07:49:42.171		5.38	-25.24	50026.71	-15.09		
delta	I	2035-01-21T07:51:39.123		5.01	-24.93	48300.35	-14.42		
gamma	I	2035-01-21T07:52:26.084		4.87x	-24.80	47629.86	-14.13		
eta	I	2035-01-21T07:52:58.426		4.76x	-24.72	47176.12	-13.93		
beta	I	2035-01-21T07:54:51.727		4.41x	-24.42	45641.17	-13.16		
alpha	I	2035-01-21T07:56:00.890		4.19x	-24.23	44744.86	-12.65		
4	I	2035-01-21T07:59:06.674		3.60x	-23.73	42529.83	-11.13		
5	I	2035-01-21T07:59:26.265		3.54x	-23.68	42315.24	-10.95		
6	I	2035-01-21T08:00:14.354		3.38x	-23.55	41794.93	-10.51		

No planet occultations

6	E	2035-01-21T08:29:46.303		-2.35x	-18.56	41817.06	10.48		
5	E	2035-01-21T08:30:29.218		-2.49x	-18.43	42275.45	10.92		
4	E	2035-01-21T08:30:55.438		-2.58x	-18.36	42566.47	11.11		
alpha	E	2035-01-21T08:33:59.084		-3.18x	-17.82	44747.83	12.61		
beta	E	2035-01-21T08:35:09.748		-3.42x	-17.61	45657.11	13.11		
eta	E	2035-01-21T08:37:02.277		-3.79x	-17.28	47176.12	13.87		
gamma	E	2035-01-21T08:37:34.811		-3.90x	-17.18	47630.81	14.08		
delta	E	2035-01-21T08:38:21.892		-4.05x	-17.04	48300.35	14.36		
lambda	E	2035-01-21T08:40:19.337		-4.44x	-16.69	50026.71	15.02		
epsilon	E	2035-01-21T08:41:07.025		-4.60x	-16.55	50749.16	15.25		