

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-09-26T12:11:25.830
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 56066301219417472
 2Mass ID (if available) : 03202202+1803390

Uranus 2023-09-26T12:11:25 K13.02 G14.51 PgtRgt

ICRS Star Coord at Epoch: 03h 20m 22.03071s +18:03:38.94823s

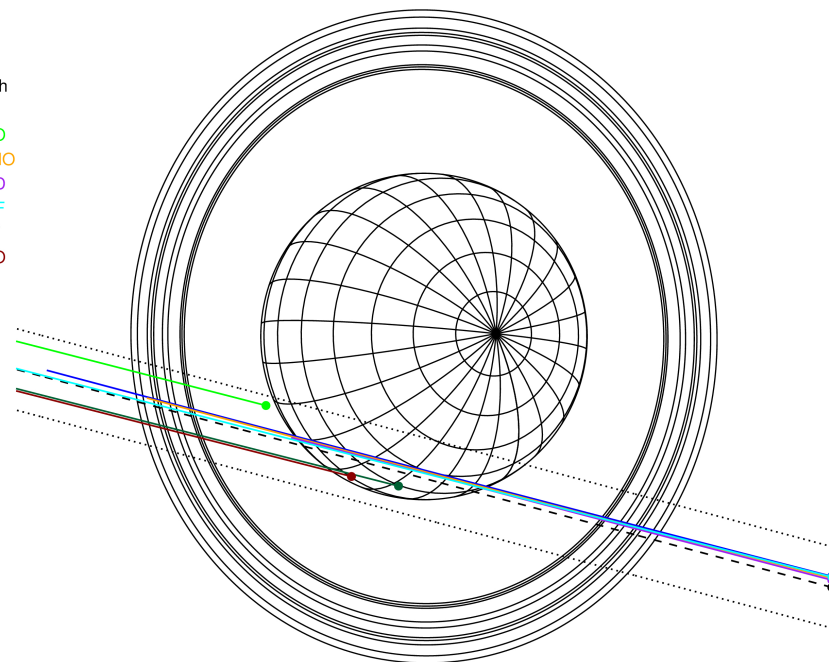
RUWE (>1.4 is poor) : 1.02
 K magnitude : 13.015
 G magnitude : 14.512
 RP magnitude : 14.003
 BP magnitude : 14.851
 DUPflag : 0
 Distance (au) : 18.964
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.96
 Sun-Target sep (deg) : 130.42
 Sun-Moon sep (deg) : 90.25
 B (ring opening deg) : 63.78
 PA of pole (deg) : -87.77

#	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



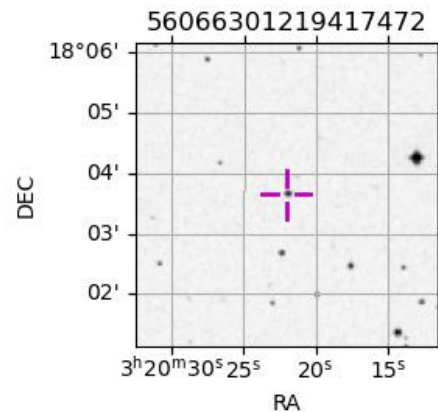
2023-09-26T12:11:25.8300 ex: 03 20 22.0307 s: +18 03 38.948 C/A 1.559° PA 345.04 deg v_sky -12.96 km/s D 18.96 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 AAT
 MSO

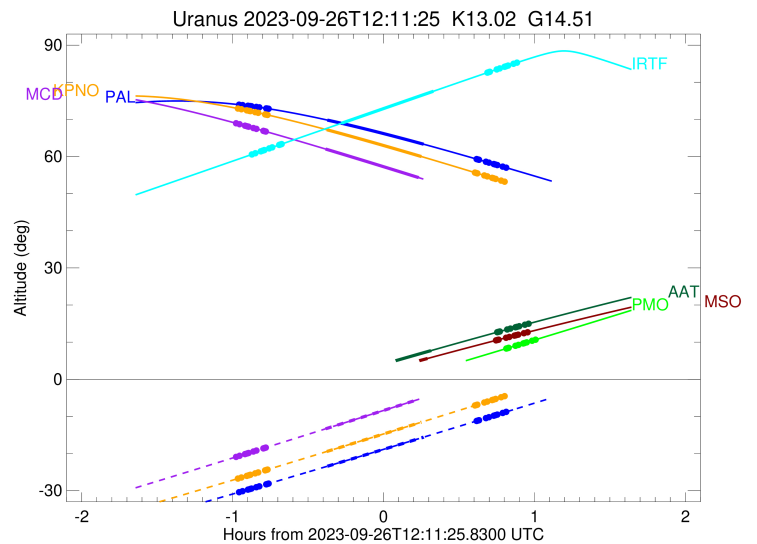
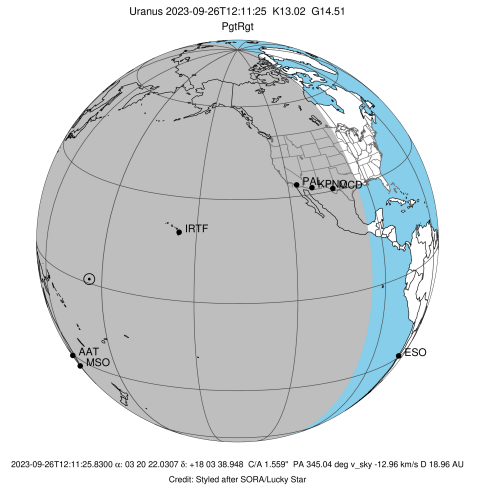


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+ +	+++++	SEP 26 11:14 - SEP 26 13:00	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8			+++++	SEP 26 13:00 - SEP 26 13:12	PnnRne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	SEP 26 11:14 - SEP 26 12:56	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +		SEP 26 11:13 - SEP 26 12:25	PieRin
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	SEP 26 11:19 - SEP 26 13:04	PieRie
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					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1		+	+++++	SEP 26 12:30 - SEP 26 13:09	PneRne
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0		+	+++++	SEP 26 12:28 - SEP 26 13:09	PneRne

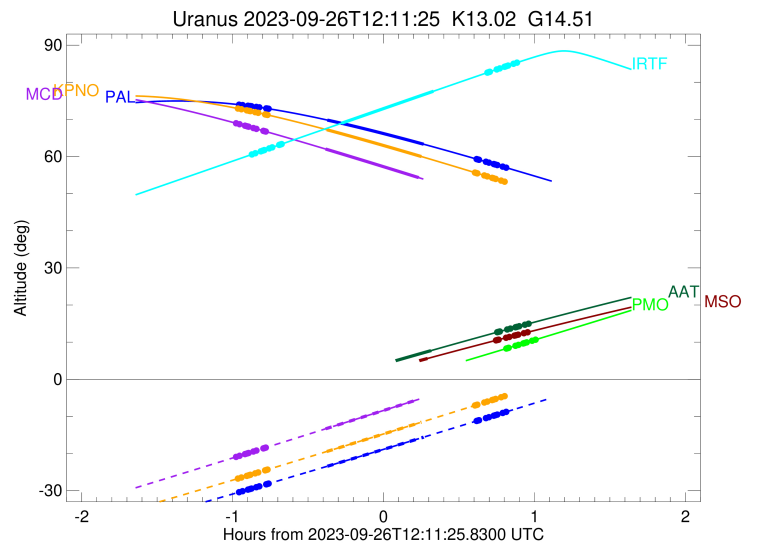
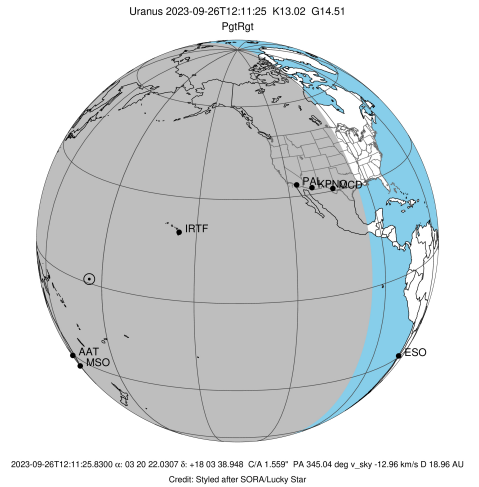


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-09-26T12:08:29.660
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 56066301219417472
 2Mass ID (if available) : 03202202+1803390
 ICRS Star Coord at Epoch: 03h 20m 22.03071s +18:03:38.94823s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 13.015
 G magnitude : 14.512
 RP magnitude : 14.003
 BP magnitude : 14.851
 DUPflag : 0
 Distance (au) : 18.964
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.96
 Sun-Target sep (deg) : 130.42
 Sun-Moon sep (deg) : 91.17
 B (ring opening deg) : 63.78
 PA of pole (deg) : -87.77
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.471
 C/A sky separation (km) : 20235.1
 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	2023-09-26T11:14:29.926		73.93	-30.33	50772.13	-13.50		
lambda	I	2023-09-26T11:15:25.305		73.85	-30.15	50026.71	-13.44		
delta	I	2023-09-26T11:17:34.211		73.67	-29.72	48300.35	-13.34		
gamma	I	2023-09-26T11:18:24.979		73.60	-29.56	47624.03	-13.30		
eta	I	2023-09-26T11:18:58.690		73.55	-29.45	47176.12	-13.27		
beta	I	2023-09-26T11:20:52.235		73.37	-29.07	45676.25	-13.17		
alpha	I	2023-09-26T11:22:05.992		73.25	-28.83	44710.51	-13.10		
4	I	2023-09-26T11:24:51.938		72.96	-28.29	42541.72	-12.92		
5	I	2023-09-26T11:25:15.105		72.92	-28.21	42245.92	-12.87		
6	I	2023-09-26T11:25:47.739		72.87	-28.10	41823.89	-12.85		
Uranus	I	2023-09-26T11:49:04.845		69.83	-23.44	25499.63		8.92	9.33
Uranus	E	2023-09-26T12:27:23.728		63.32	-15.60	25250.18		-20.87	-21.76
6	E	2023-09-26T12:48:30.125		59.30	-11.22	41878.55	12.83		
5	E	2023-09-26T12:48:51.978		59.23	-11.15	42162.02	12.86		
4	E	2023-09-26T12:49:26.681		59.12	-11.02	42616.16	12.90		
alpha	E	2023-09-26T12:52:09.734		58.59	-10.46	44749.89	13.09		
beta	E	2023-09-26T12:53:17.922		58.37	-10.22	45641.47	13.15		
eta	E	2023-09-26T12:55:14.226		57.98	-9.82	47176.12	13.25		
gamma	E	2023-09-26T12:55:48.543		57.87	-9.70	47631.41	13.28		
delta	E	2023-09-26T12:56:38.832		57.71	-9.52	48300.35	13.32		
lambda	E	2023-09-26T12:58:47.937		57.28	-9.08	50026.71	13.42		
epsilon	E	2023-09-26T13:00:38.651		56.91	-8.69	51516.67	13.48		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-09-26T12:16:39.930
 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 : 56066301219417472
 2Mass ID (if available) : 03202202+1803390
 ICRS Star Coord at Epoch: 03h 20m 22.03071s +18:03:38.94823s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 13.015
 G magnitude : 14.512
 RP magnitude : 14.003
 BP magnitude : 14.851
 DUPflag : 0
 Distance (au) : 18.964
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.96
 Sun-Target sep (deg) : 130.42
 Sun-Moon sep (deg) : 90.23
 B (ring opening deg) : 63.78
 PA of pole (deg) : -87.77
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.212
 C/A sky separation (km) : 16666.8
 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

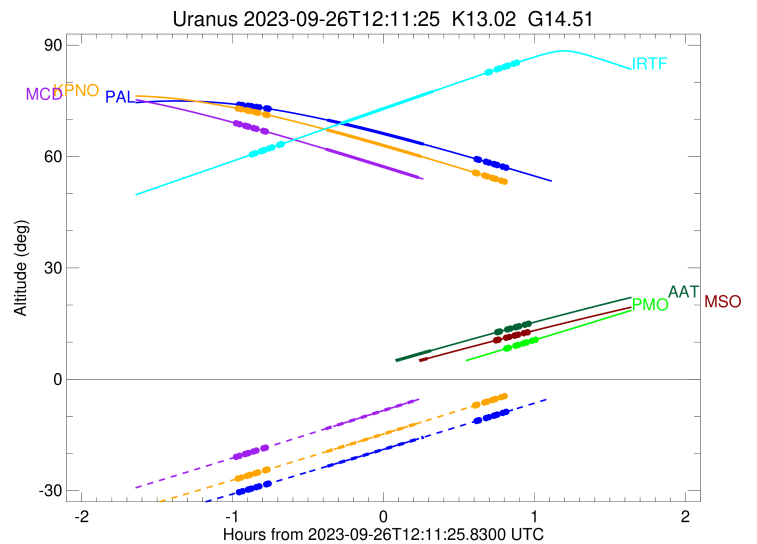
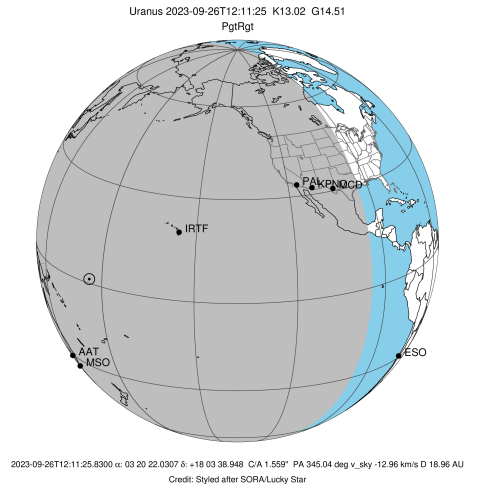


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2023-09-26T11:19:06.414		-11.51x	-18.18	50761.82	-13.31		
lambda	I	2023-09-26T11:20:01.730		-11.34x	-18.38	50026.71	-13.28		
delta	I	2023-09-26T11:22:12.026		-10.94x	-18.83	48300.35	-13.22		
gamma	I	2023-09-26T11:23:03.262		-10.78x	-19.01	47623.64	-13.20		
eta	I	2023-09-26T11:23:37.198		-10.67x	-19.13	47176.12	-13.18		
beta	I	2023-09-26T11:25:31.301		-10.32x	-19.52	45677.35	-13.12		
alpha	I	2023-09-26T11:26:45.599		-10.09x	-19.78	44707.60	-13.08		
4	I	2023-09-26T11:29:31.299		-9.57x	-20.35	42538.59	-12.97		
5	I	2023-09-26T11:29:53.495		-9.50x	-20.43	42253.50	-12.94		
6	I	2023-09-26T11:30:26.817		-9.40x	-20.55	41820.04	-12.93		
Uranus	I	2023-09-26T11:51:44.424		-5.36x	-24.95	25422.48		13.63	14.25
Uranus	E	2023-09-26T12:41:03.946		4.38x	-34.83	25168.86		-23.66	-24.65
6	E	2023-09-26T13:00:18.586		8.29	-38.52	41877.46	13.10		
5	E	2023-09-26T13:00:40.333		8.36	-38.59	42165.34	13.11		
4	E	2023-09-26T13:01:14.221		8.48	-38.69	42616.52	13.14		
alpha	E	2023-09-26T13:03:54.536		9.02	-39.19	44748.69	13.27		
beta	E	2023-09-26T13:05:01.951		9.25	-39.41	45641.20	13.31		
eta	E	2023-09-26T13:06:57.059		9.65	-39.76	47176.12	13.38		
gamma	E	2023-09-26T13:07:31.059		9.76	-39.87	47631.29	13.40		
delta	E	2023-09-26T13:08:20.948		9.93	-40.02	48300.35	13.43		
lambda	E	2023-09-26T13:10:29.213		10.37	-40.42	50026.71	13.49		
epsilon	E	2023-09-26T13:12:20.258		10.75	-40.76	51527.97	13.53		

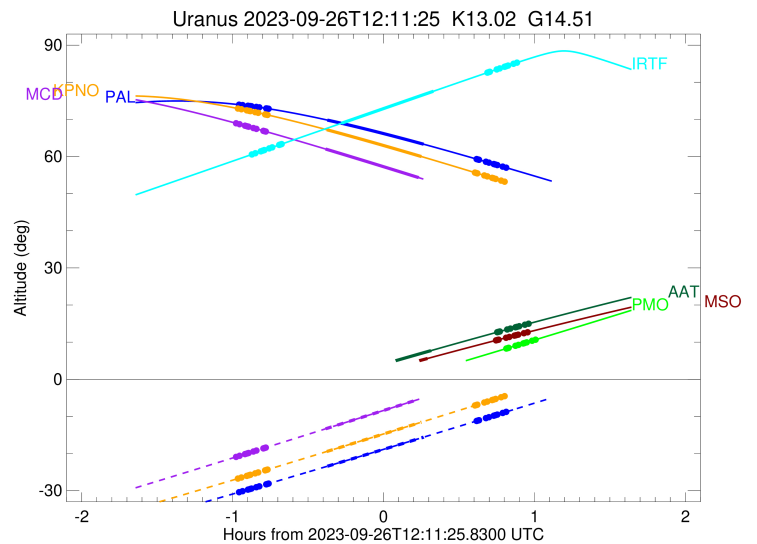
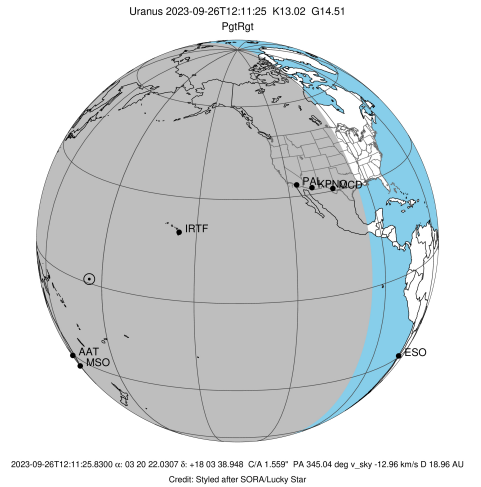
```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch              : 2023-09-26T12:07:57.320
Event type             : PgtRgt
: Uranus occs: geocentric, topocentric
: 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        : 56066301219417472
2Mass ID (if available) : 03202202+1803390
ICRS Star Coord at Epoch: 03h 20m 22.03071s +18:03:38.94823s
RUWE (>1.4 is poor)  : 1.02
K magnitude           : 13.015
G magnitude           : 14.512
RP magnitude          : 14.003
BP magnitude          : 14.851
DUPflag              : 0
Distance (au)         : 18.964
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -12.96
Sun-Target sep (deg)  : 130.42
Sun-Moon sep (deg)    : 91.14
B (ring opening deg)  : 63.78
PA of pole (deg)      : -87.77
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.486
C/A sky separation (km) : 20444.5
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	2023-09-26T11:14:02.312		72.86	-26.65	50772.93	-13.47		
lambda	I	2023-09-26T11:14:57.856		72.74	-26.46	50026.71	-13.41		
delta	I	2023-09-26T11:17:07.026		72.43	-26.02	48300.35	-13.31		
gamma	I	2023-09-26T11:17:57.903		72.31	-25.85	47624.05	-13.27		
eta	I	2023-09-26T11:18:31.693		72.23	-25.73	47176.12	-13.24		
beta	I	2023-09-26T11:20:25.518		71.95	-25.34	45676.17	-13.14		
alpha	I	2023-09-26T11:21:39.444		71.77	-25.09	44710.71	-13.07		
4	I	2023-09-26T11:24:25.874		71.35	-24.52	42541.94	-12.88		
5	I	2023-09-26T11:24:49.174		71.29	-24.44	42245.40	-12.83		
6	I	2023-09-26T11:25:21.853		71.20	-24.33	41824.16	-12.81		
Uranus	I	2023-09-26T11:48:52.397		67.22	-19.46	25504.06		8.57	8.98
Uranus	E	2023-09-26T12:26:31.294		59.99	-11.55	25255.88		-20.66	-21.55
6	E	2023-09-26T12:47:50.169		55.66	-7.04	41878.60	12.78		
5	E	2023-09-26T12:48:12.097		55.58	-6.96	42161.86	12.80		
4	E	2023-09-26T12:48:46.948		55.46	-6.84	42616.13	12.85		
alpha	E	2023-09-26T12:51:30.639		54.90	-6.26	44749.94	13.04		
beta	E	2023-09-26T12:52:39.070		54.67	-6.02	45641.49	13.10		
eta	E	2023-09-26T12:54:35.775		54.26	-5.61	47176.12	13.21		
gamma	E	2023-09-26T12:55:10.207		54.14	-5.48	47631.41	13.24		
delta	E	2023-09-26T12:56:00.661		53.97	-5.31	48300.35	13.28		
lambda	E	2023-09-26T12:58:10.176		53.52	-4.85x	50026.71	13.38		
epsilon	E	2023-09-26T13:00:01.178		53.14	-4.45x	51516.04	13.43		

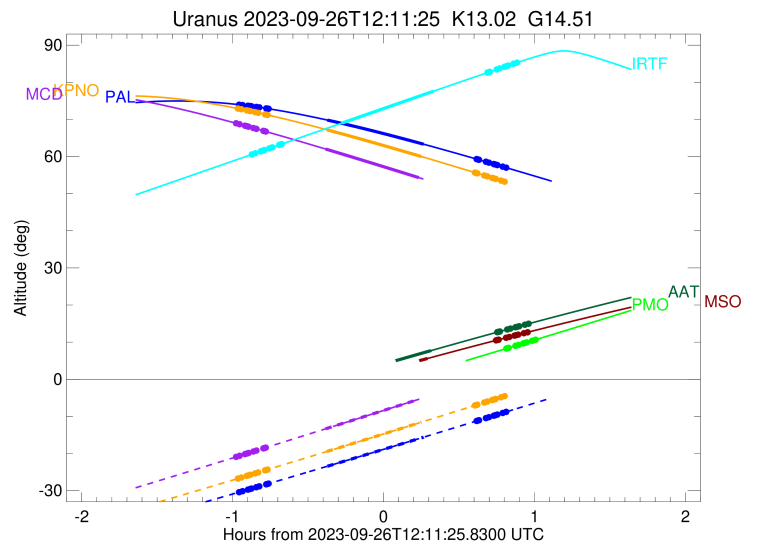
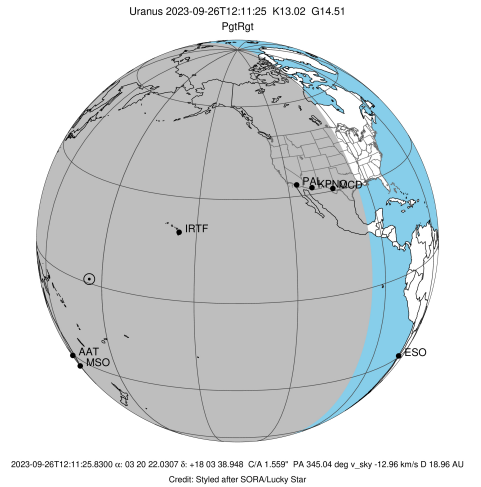
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-09-26T12:07:11.590
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 56066301219417472
 2Mass ID (if available) : 03202202+1803390
 ICRS Star Coord at Epoch: 03h 20m 22.03071s +18:03:38.94823s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 13.015
 G magnitude : 14.512
 RP magnitude : 14.003
 BP magnitude : 14.851
 DUPflag : 0
 Distance (au) : 18.964
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.96
 Sun-Target sep (deg) : 130.42
 Sun-Moon sep (deg) : 91.09
 B (ring opening deg) : 63.78
 PA of pole (deg) : -87.77
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.501
 C/A sky separation (km) : 20642.2
 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	2023-09-26T11:13:18.640		68.87	-20.81	50773.78	-13.44		
lambda	I	2023-09-26T11:14:14.381		68.70	-20.61	50026.71	-13.38		
delta	I	2023-09-26T11:16:23.880		68.30	-20.16	48300.35	-13.28		
gamma	I	2023-09-26T11:17:14.893		68.14	-19.98	47624.08	-13.24		
eta	I	2023-09-26T11:17:48.779		68.03	-19.86	47176.12	-13.20		
beta	I	2023-09-26T11:19:42.944		67.68	-19.46	45676.09	-13.10		
alpha	I	2023-09-26T11:20:57.076		67.44	-19.19	44710.92	-13.03		
4	I	2023-09-26T11:23:44.080		66.91	-18.60	42542.17	-12.83		
5	I	2023-09-26T11:24:07.527		66.84	-18.52	42244.87	-12.78		
6	I	2023-09-26T11:24:40.266		66.73	-18.41	41824.43	-12.76		
Uranus	I	2023-09-26T11:48:25.083		62.02	-13.35	25508.36		8.23	8.61
Uranus	E	2023-09-26T12:25:26.953		54.32	-5.39	25261.14		-20.47	-21.35
6	E	2023-09-26T12:46:59.234		49.73	-0.76x	41878.64	12.72		
5	E	2023-09-26T12:47:21.260		49.65	-0.68x	42161.72	12.74		
4	E	2023-09-26T12:47:56.290		49.53	-0.55x	42616.11	12.79		
alpha	E	2023-09-26T12:50:40.765		48.94	0.04x	44749.99	12.98		
beta	E	2023-09-26T12:51:49.503		48.69	0.28x	45641.50	13.04		
eta	E	2023-09-26T12:53:46.719		48.28	0.70x	47176.12	13.15		
gamma	E	2023-09-26T12:54:21.299		48.15	0.83x	47631.42	13.18		
delta	E	2023-09-26T12:55:11.966		47.97	1.01x	48300.35	13.22		
lambda	E	2023-09-26T12:57:22.014		47.51	1.48x	50026.71	13.32		
epsilon	E	2023-09-26T12:59:13.421		47.11	1.88x	51515.53	13.38		

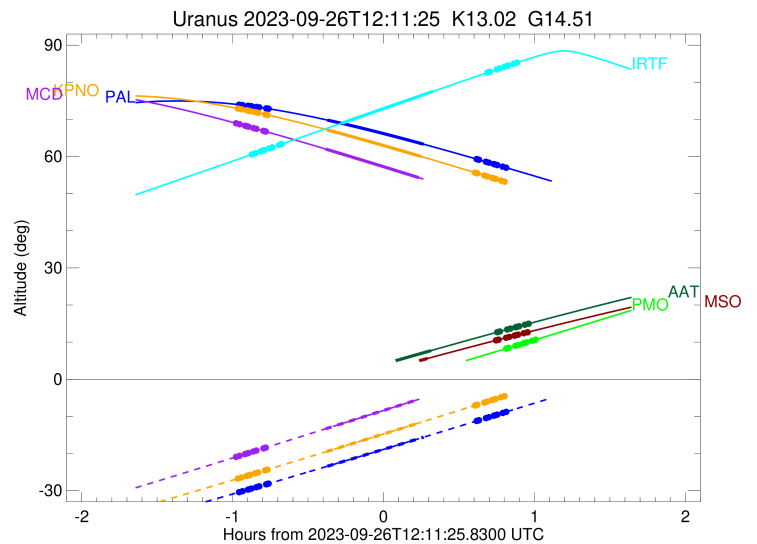
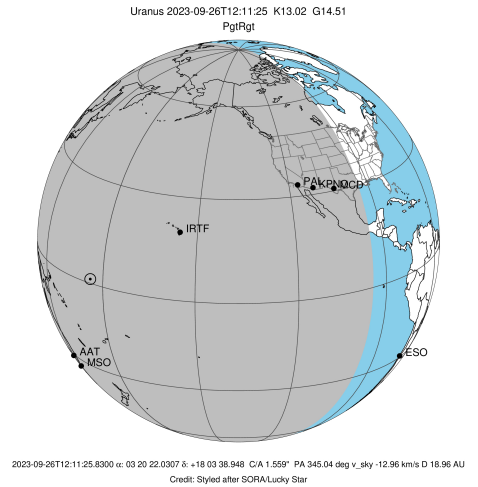
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2023-09-26T12:13:17.980
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: 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       : 56066301219417472
2Mass ID (if available) : 03202202+1803390
ICRS Star Coord at Epoch: 03h 20m 22.03071s +18:03:38.94823s
RUWE (>1.4 is poor) : 1.02
K magnitude          : 13.015
G magnitude          : 14.512
RP magnitude         : 14.003
BP magnitude         : 14.851
DUPflag             : 0
Distance (au)        : 18.964
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -12.96
Sun-Target sep (deg) : 130.42
Sun-Moon sep (deg)   : 91.23
B (ring opening deg) : 63.78
PA of pole (deg)     : -87.77
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.509
C/A sky separation (km) : 20749.2
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
    
```



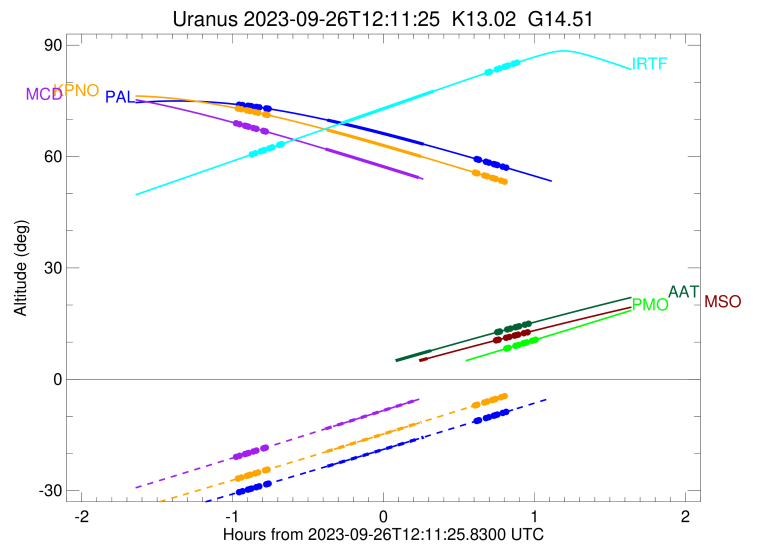
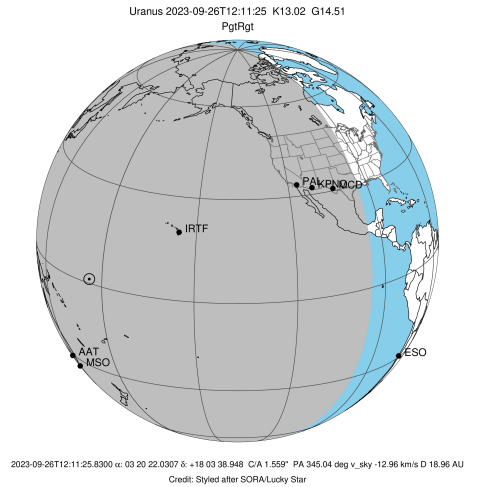
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2023-09-26T11:19:35.169		60.68	-65.44	50772.91	-13.41		
lambda	I	2023-09-26T11:20:30.979		60.90	-65.28	50026.71	-13.35		
delta	I	2023-09-26T11:22:40.773		61.41	-64.93	48300.35	-13.25		
gamma	I	2023-09-26T11:23:31.898		61.61	-64.79	47624.06	-13.21		
eta	I	2023-09-26T11:24:05.854		61.74	-64.69	47176.12	-13.18		
beta	I	2023-09-26T11:26:00.246		62.19	-64.37	45676.16	-13.07		
alpha	I	2023-09-26T11:27:14.544		62.48	-64.16	44710.74	-13.00		
4	I	2023-09-26T11:30:01.848		63.14	-63.68	42541.99	-12.81		
5	I	2023-09-26T11:30:25.288		63.24	-63.61	42245.28	-12.76		
6	I	2023-09-26T11:30:58.132		63.36	-63.52	41824.22	-12.74		
Uranus	I	2023-09-26T11:54:46.179		68.98	-59.08	25507.79		8.28	8.66
Uranus	E	2023-09-26T12:31:17.282		77.59	-51.55	25268.62		-20.19	-21.07
6	E	2023-09-26T12:52:47.715		82.62	-46.87	41878.75	12.81		
5	E	2023-09-26T12:53:09.543		82.70	-46.79	42161.36	12.83		
4	E	2023-09-26T12:53:44.326		82.84	-46.67	42616.03	12.88		
alpha	E	2023-09-26T12:56:27.547		83.47	-46.06	44750.13	13.08		
beta	E	2023-09-26T12:57:35.718		83.73	-45.81	45641.55	13.15		
eta	E	2023-09-26T12:59:31.951		84.17	-45.38	47176.12	13.26		
gamma	E	2023-09-26T13:00:06.237		84.30	-45.26	47631.43	13.30		
delta	E	2023-09-26T13:00:56.464		84.49	-45.07	48300.35	13.34		
lambda	E	2023-09-26T13:03:05.360		84.98	-44.59	50026.71	13.45		
epsilon	E	2023-09-26T13:04:55.604		85.39	-44.18	51513.58	13.51		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-09-26T12:18:44.010
 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 : 56066301219417472
 2Mass ID (if available) : 03202202+1803390
 ICRS Star Coord at Epoch: 03h 20m 22.03071s +18:03:38.94823s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 13.015
 G magnitude : 14.512
 RP magnitude : 14.003
 BP magnitude : 14.851
 DUPflag : 0
 Distance (au) : 18.964
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.96
 Sun-Target sep (deg) : 130.42
 Sun-Moon sep (deg) : 90.33
 B (ring opening deg) : 63.78
 PA of pole (deg) : -87.77
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.722
 C/A sky separation (km) : 23679.0
 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	2023-09-26T11:25:10.870	-5.21x	-41.91	50783.63	-12.67			
lambda	I	2023-09-26T11:26:10.867	-5.00x	-42.08	50026.71	-12.59			
delta	I	2023-09-26T11:28:28.703	-4.54x	-42.48	48300.35	-12.46			
gamma	I	2023-09-26T11:29:23.084	-4.35x	-42.64	47624.41	-12.40			
eta	I	2023-09-26T11:29:59.289	-4.23x	-42.74	47176.12	-12.36			
beta	I	2023-09-26T11:32:01.490	-3.81x	-43.09	45675.11	-12.22			
alpha	I	2023-09-26T11:33:20.714	-3.55x	-43.32	44713.32	-12.13			
4	I	2023-09-26T11:36:20.658	-2.94x	-43.83	42544.95	-11.88			
5	I	2023-09-26T11:36:46.795	-2.85x	-43.90	42238.60	-11.82			
6	I	2023-09-26T11:37:21.443	-2.73x	-44.00	41827.69	-11.79			
Uranus	I	2023-09-26T12:06:27.679	3.08x	-48.61	25554.52			2.44	2.55
Uranus	E	2023-09-26T12:30:22.864	7.73	-51.88	25380.37			-15.66	-16.36
6	E	2023-09-26T12:56:42.134	12.69	-54.77	41879.37	11.92			
5	E	2023-09-26T12:57:05.348	12.76	-54.81	42158.97	11.95			
4	E	2023-09-26T12:57:42.757	12.88	-54.87	42615.30	12.02			
alpha	E	2023-09-26T13:00:37.330	13.41	-55.13	44750.98	12.29			
beta	E	2023-09-26T13:01:49.777	13.63	-55.23	45641.94	12.38			
eta	E	2023-09-26T13:03:52.987	14.01	-55.41	47176.12	12.53			
gamma	E	2023-09-26T13:04:29.267	14.12	-55.46	47631.51	12.57			
delta	E	2023-09-26T13:05:22.335	14.28	-55.53	48300.35	12.63			
lambda	E	2023-09-26T13:07:38.215	14.69	-55.71	50026.71	12.78			
epsilon	E	2023-09-26T13:09:33.125	15.04	-55.86	51501.07	12.86			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2023-09-26T12:18:33.910
 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 : 56066301219417472
 2Mass ID (if available) : 03202202+1803390
 ICRS Star Coord at Epoch: 03h 20m 22.03071s +18:03:38.94823s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 13.015
 G magnitude : 14.512
 RP magnitude : 14.003
 BP magnitude : 14.851
 DUPflag : 0
 Distance (au) : 18.964
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -12.96
 Sun-Target sep (deg) : 130.42
 Sun-Moon sep (deg) : 90.30
 B (ring opening deg) : 63.78
 PA of pole (deg) : -87.77
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.749
 C/A sky separation (km) : 24056.2
 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	2023-09-26T11:25:12.401	-6.49x	-39.47	50785.21	-12.61			
lambda	I	2023-09-26T11:26:12.808	-6.29x	-39.63	50026.71	-12.53			
delta	I	2023-09-26T11:28:31.345	-5.84x	-40.00	48300.35	-12.39			
gamma	I	2023-09-26T11:29:26.018	-5.66x	-40.15	47624.46	-12.33			
eta	I	2023-09-26T11:30:02.429	-5.54x	-40.24	47176.12	-12.29			
beta	I	2023-09-26T11:32:05.367	-5.15x	-40.57	45674.97	-12.15			
alpha	I	2023-09-26T11:33:25.053	-4.89x	-40.78	44713.67	-12.05			
4	I	2023-09-26T11:36:26.278	-4.30x	-41.25	42545.37	-11.79			
5	I	2023-09-26T11:36:52.733	-4.22x	-41.32	42237.68	-11.73			
6	I	2023-09-26T11:37:27.538	-4.10x	-41.40	41828.17	-11.69			
Uranus	I	2023-09-26T12:07:32.397	1.63x	-45.73	25557.55			1.39	1.45
Uranus	E	2023-09-26T12:28:57.580	5.60	-48.37	25398.99			-14.79	-15.46
6	E	2023-09-26T12:56:13.055	10.49	-51.05	41879.43	11.82			
5	E	2023-09-26T12:56:36.440	10.56	-51.09	42158.71	11.86			
4	E	2023-09-26T12:57:14.164	10.67	-51.14	42615.19	11.92			
alpha	E	2023-09-26T13:00:10.091	11.18	-51.37	44751.08	12.20			
beta	E	2023-09-26T13:01:23.036	11.39	-51.46	45641.99	12.30			
eta	E	2023-09-26T13:03:27.044	11.75	-51.62	47176.12	12.45			
gamma	E	2023-09-26T13:04:03.549	11.86	-51.66	47631.51	12.50			
delta	E	2023-09-26T13:04:56.937	12.01	-51.73	48300.35	12.56			
lambda	E	2023-09-26T13:07:13.590	12.40	-51.89	50026.71	12.71			
epsilon	E	2023-09-26T13:09:08.984	12.73	-52.02	51499.44	12.79			