

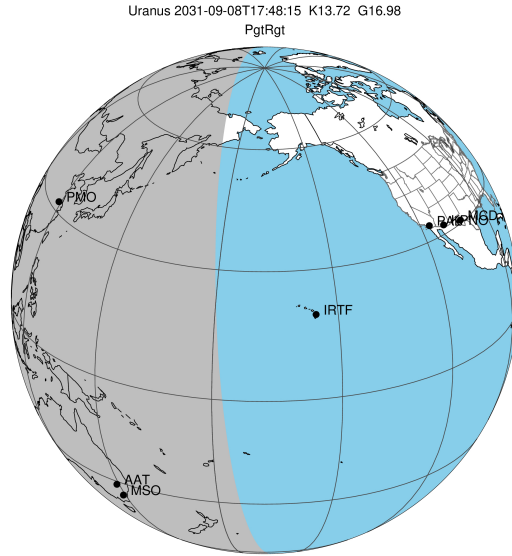
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-09-08T17:48:15.950
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427621568518704128
 2Mass ID (if available) : 05445998+2331181

Uranus 2031-09-08T17:48:15 K13.72 G16.98 PgtRgt

ICRS Star Coord at Epoch: 05h 44m 59.98557s +23:31:18.03960s

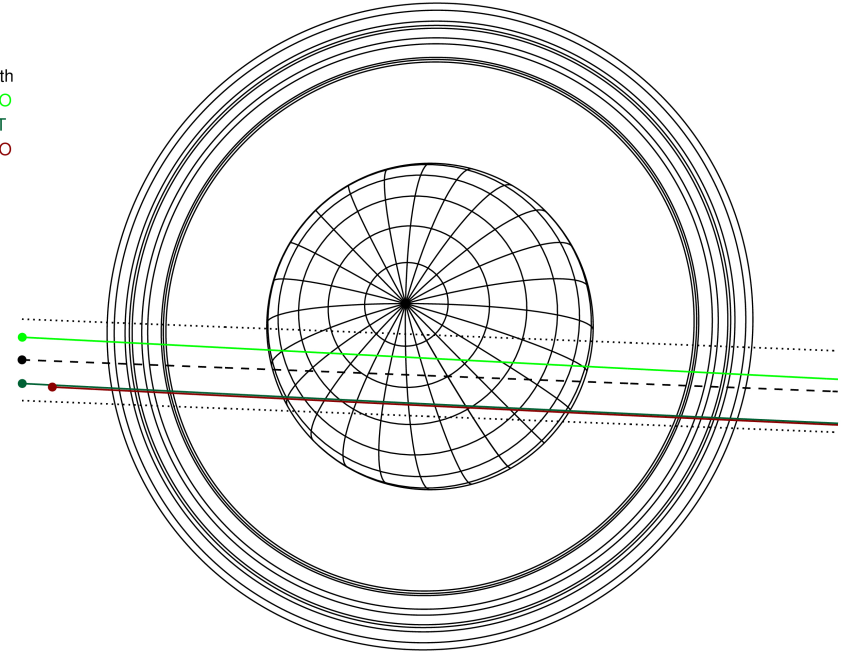
RUWE (>1.4 is poor) : 1.23
 K magnitude : 13.720
 G magnitude : 16.978
 RP magnitude : 16.038
 BP magnitude : 17.907
 DUPflag : 0
 Distance (au) : 19.274
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.10
 Sun-Target sep (deg) : 78.89
 Sun-Moon sep (deg) : 10.65
 B (ring opening deg) : 78.14
 PA of pole (deg) : 46.87

#	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



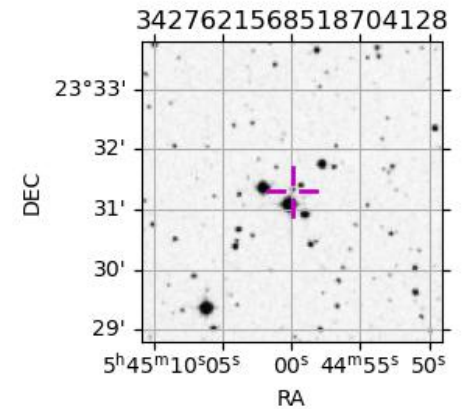
2031-09-08T17:48:15.9500 ex: 05 44 59.9856 s: +23 31 18.040 C/A 0.5477 PA 357.77 deg v_sky +12.10 km/s D 19.27 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PMO
 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					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	SEP 08 16:31 - SEP 08 18:50	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4					PnnRnn
MCD	McDonald Obs. 2.7m	30.7	256.0					PnnRnn
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					PnnRnn
AAT	Siding Spring (AAT)	-31.3	149.1	+++++	+ +	+++++	SEP 08 16:32 - SEP 08 18:51	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++	+ +	+++++	SEP 08 16:33 - SEP 08 18:51	PieRie

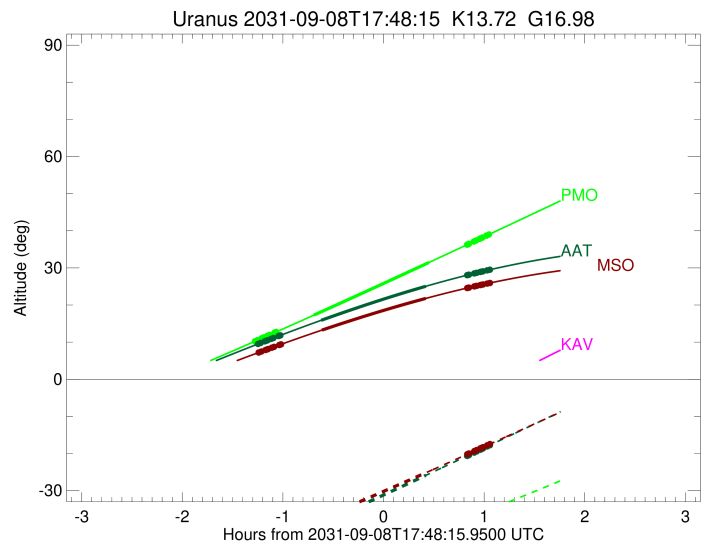
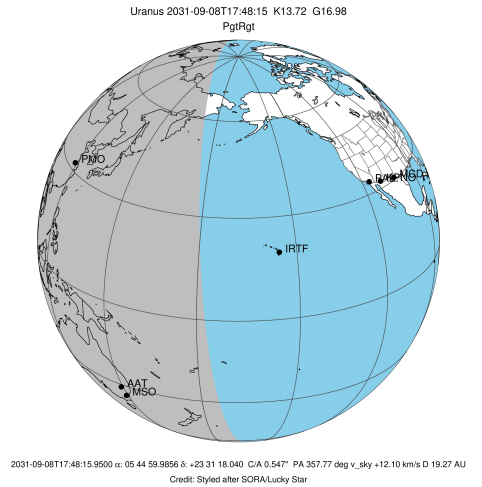


3427621568518704128

23°33'
 32'
 31'
 30'
 29'
 5h45m10s05s 00s 44m55s 50s
 RA

```

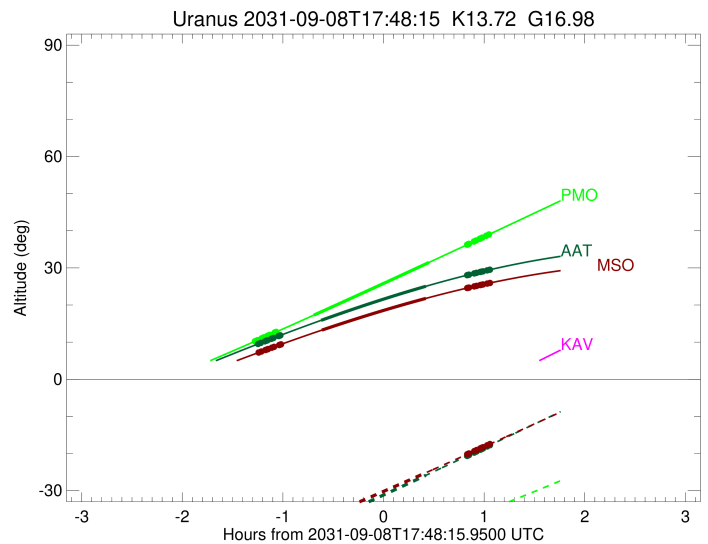
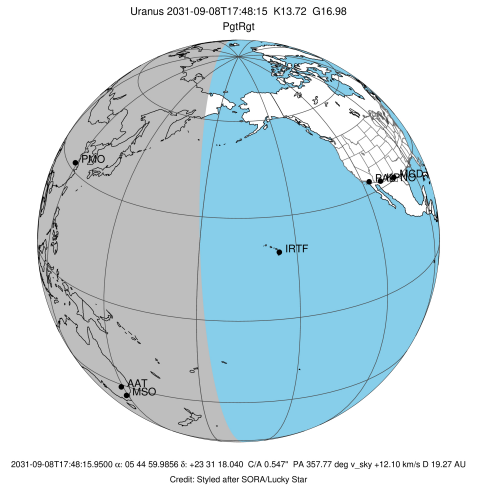
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2031-09-08T17:41:06.330
Event type           : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code        : PMO
Location              : Purple Mtn Obs. Nanking
Latitude (deg)       : 32.06667
E. Longitude (deg)   : 118.82089
Altitude (km)        : 0.364
Gaia source ID       : 3427621568518704128
2Mass ID (if available) : 05445998+2331181
ICRS Star Coord at Epoch: 05h 44m 59.98557s +23:31:18.03960s
RUWE (>1.4 is poor) : 1.23
K magnitude           : 13.720
G magnitude           : 16.978
RP magnitude          : 16.038
BP magnitude          : 17.907
DUPflag              : 0
Distance (au)        : 19.274
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : 12.10
Sun-Target sep (deg) : 78.89
Sun-Moon sep (deg)   : 10.11
B (ring opening deg) : 78.14
PA of pole (deg)     : 46.87
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.357
C/A sky separation (km) : 4987.9
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	2031-09-08T16:31:04.625		10.12	-51.91	51552.78	-12.24		
lambda	I	2031-09-08T16:33:09.305		10.53	-51.82	50026.71	-12.24		
delta	I	2031-09-08T16:35:30.453		11.00	-51.70	48300.35	-12.23		
gamma	I	2031-09-08T16:36:25.533		11.18	-51.66	47627.06	-12.22		
eta	I	2031-09-08T16:37:02.432		11.30	-51.63	47176.12	-12.22		
beta	I	2031-09-08T16:39:05.118		11.71	-51.52	45678.12	-12.21		
alpha	I	2031-09-08T16:40:23.703		11.97	-51.45	44718.95	-12.20		
4	I	2031-09-08T16:43:16.222		12.55	-51.28	42616.56	-12.19		
5	I	2031-09-08T16:43:44.364		12.64	-51.25	42266.68	-12.19		
6	I	2031-09-08T16:44:22.944		12.77	-51.22	41805.39	-12.19		
Uranus	I	2031-09-08T17:06:43.340		17.27	-49.52	25337.26		7.35	7.69
Uranus	E	2031-09-08T18:15:23.136		31.47	-40.96	25124.28		-10.38	-10.86
6	E	2031-09-08T18:38:10.322		36.26	-37.31	41874.94	11.96		
5	E	2031-09-08T18:38:40.225		36.37	-37.22	42221.71	11.96		
4	E	2031-09-08T18:39:05.261		36.46	-37.15	42527.39	11.96		
alpha	E	2031-09-08T18:42:07.922		37.10	-36.64	44710.37	11.96		
beta	E	2031-09-08T18:43:25.894		37.37	-36.42	45642.21	11.96		
eta	E	2031-09-08T18:45:34.208		37.83	-36.06	47176.12	11.96		
gamma	E	2031-09-08T18:46:11.875		37.96	-35.95	47626.61	11.96		
delta	E	2031-09-08T18:47:08.206		38.16	-35.79	48300.35	11.96		
lambda	E	2031-09-08T18:49:32.544		38.67	-35.38	50026.71	11.96		
epsilon	E	2031-09-08T18:50:32.604		38.88	-35.20	50745.07	11.96		

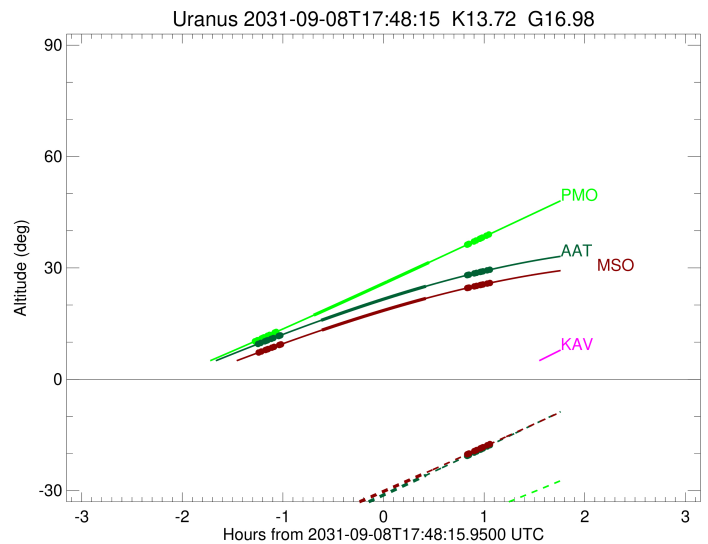
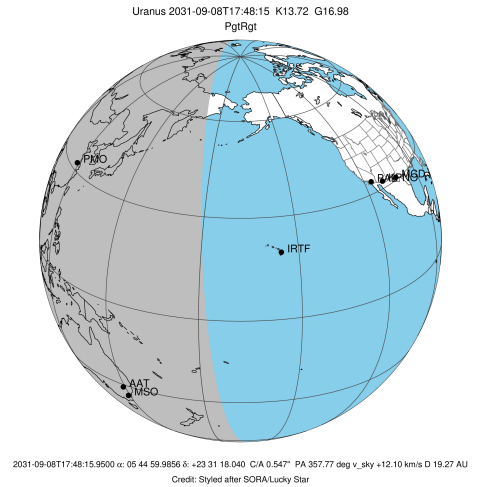
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target                : Uranus
target radius (km)    : 25559.00
C/A epoch              : 2031-09-08T17:42:36.830
Event type             : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code         : AAT
Location               : Siding Spring (AAT)
Latitude (deg)        : -31.27703
E. Longitude (deg)    : 149.06608
Altitude (km)         : 1.164
Gaia source ID        : 3427621568518704128
2Mass ID (if available) : 05445998+2331181
ICRS Star Coord at Epoch: 05h 44m 59.98557s +23:31:18.03960s
RUWE (>1.4 is poor)  : 1.23
K magnitude           : 13.720
G magnitude           : 16.978
RP magnitude          : 16.038
BP magnitude          : 17.907
DUPflag              : 0
Distance (au)         : 19.274
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : 12.10
Sun-Target sep (deg)  : 78.89
Sun-Moon sep (deg)   : 10.06
B (ring opening deg) : 78.14
PA of pole (deg)     : 46.87
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.868
C/A sky separation (km) : 12138.1
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	2031-09-08T16:32:54.517		9.42	-46.29	51542.03	-11.74		
lambda	I	2031-09-08T16:35:03.685		9.80	-45.88	50026.71	-11.72		
delta	I	2031-09-08T16:37:31.207		10.23	-45.42	48300.35	-11.69		
gamma	I	2031-09-08T16:38:28.786		10.39	-45.23	47627.86	-11.67		
eta	I	2031-09-08T16:39:07.502		10.50	-45.11	47176.12	-11.66		
beta	I	2031-09-08T16:41:16.322		10.88	-44.69	45676.15	-11.63		
alpha	I	2031-09-08T16:42:39.169		11.12	-44.43	44713.33	-11.61		
4	I	2031-09-08T16:45:40.416		11.64	-43.84	42615.98	-11.56		
5	I	2031-09-08T16:46:09.032		11.72	-43.75	42279.14	-11.55		
6	I	2031-09-08T16:46:50.201		11.84	-43.62	41810.89	-11.54		
Uranus	I	2031-09-08T17:11:05.085		15.88	-38.81	25483.02		4.27	4.48
Uranus	E	2031-09-08T18:13:31.702		25.05	-25.88	25018.99		-11.62	-12.16
6	E	2031-09-08T18:38:10.425		28.05	-20.65	41877.76	11.36		
5	E	2031-09-08T18:38:42.880		28.11	-20.53	42235.39	11.38		
4	E	2031-09-08T18:39:08.326		28.16	-20.44	42529.95	11.38		
alpha	E	2031-09-08T18:42:19.142		28.51	-19.76	44705.20	11.42		
beta	E	2031-09-08T18:43:41.122		28.66	-19.47	45641.39	11.44		
eta	E	2031-09-08T18:45:55.179		28.90	-18.99	47176.12	11.47		
gamma	E	2031-09-08T18:46:34.524		28.97	-18.85	47627.40	11.47		
delta	E	2031-09-08T18:47:33.151		29.08	-18.65	48300.35	11.48		
lambda	E	2031-09-08T18:50:03.325		29.34	-18.11	50026.71	11.51		
epsilon	E	2031-09-08T18:51:06.497		29.45	-17.89	50753.96	11.52		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2031-09-08T17:42:50.520
 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 : 3427621568518704128
 2Mass ID (if available) : 05445998+2331181
 ICRS Star Coord at Epoch: 05h 44m 59.98557s +23:31:18.03960s
 RUWE (>1.4 is poor) : 1.23
 K magnitude : 13.720
 G magnitude : 16.978
 RP magnitude : 16.038
 BP magnitude : 17.907
 DUPflag : 0
 Distance (au) : 19.274
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 12.10
 Sun-Target sep (deg) : 78.89
 Sun-Moon sep (deg) : 10.06
 B (ring opening deg) : 78.14
 PA of pole (deg) : 46.87
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.888
 C/A sky separation (km) : 12417.1
 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	2031-09-08T16:33:17.142		7.12	-44.27	51541.38	-11.73		
lambda	I	2031-09-08T16:35:26.358		7.48	-43.90	50026.71	-11.71		
delta	I	2031-09-08T16:37:54.009		7.88	-43.46	48300.35	-11.68		
gamma	I	2031-09-08T16:38:51.639		8.04	-43.29	47627.90	-11.66		
eta	I	2031-09-08T16:39:30.396		8.15	-43.18	47176.12	-11.65		
beta	I	2031-09-08T16:41:39.359		8.50	-42.80	45676.06	-11.62		
alpha	I	2031-09-08T16:43:02.314		8.73	-42.55	44713.09	-11.59		
4	I	2031-09-08T16:46:03.777		9.22	-42.01	42615.93	-11.54		
5	I	2031-09-08T16:46:32.389		9.30	-41.92	42279.64	-11.53		
6	I	2031-09-08T16:47:13.630		9.41	-41.79	41811.14	-11.52		
Uranus	I	2031-09-08T17:11:33.072		13.25	-37.30	25487.96		4.13	4.33
Uranus	E	2031-09-08T18:13:29.700		21.78	-25.19	25016.47		-11.65	-12.19
6	E	2031-09-08T18:38:12.329		24.58	-20.20	41877.84	11.35		
5	E	2031-09-08T18:38:44.850		24.64	-20.09	42235.92	11.37		
4	E	2031-09-08T18:39:10.287		24.68	-20.01	42530.07	11.37		
alpha	E	2031-09-08T18:42:21.199		25.01	-19.36	44705.01	11.41		
beta	E	2031-09-08T18:43:43.238		25.15	-19.08	45641.37	11.43		
eta	E	2031-09-08T18:45:57.351		25.37	-18.63	47176.12	11.46		
gamma	E	2031-09-08T18:46:36.711		25.44	-18.50	47627.43	11.47		
delta	E	2031-09-08T18:47:35.352		25.53	-18.30	48300.35	11.48		
lambda	E	2031-09-08T18:50:05.554		25.78	-17.79	50026.71	11.51		
epsilon	E	2031-09-08T18:51:08.774		25.88	-17.57	50754.45	11.52		