

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-01-21T10:28:42.510  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 51296310542057088  
 2Mass ID (if available) : 03572444+2018473

Uranus 2027-01-21T10:28:42 K12.42 G14.56 PgtRgt

ICRS Star Coord at Epoch: 03h 57m 24.43809s +20:18:46.64687s

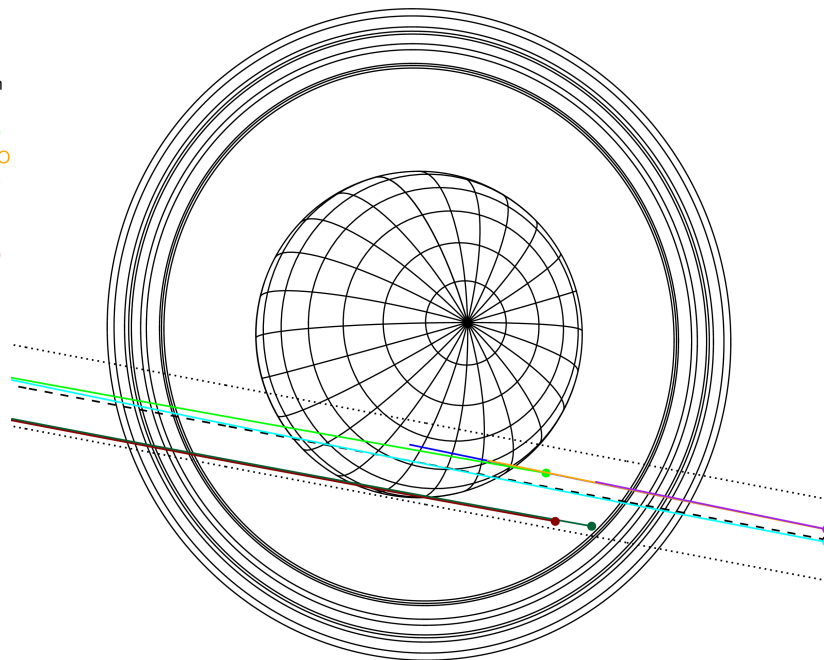
RUWE (>1.4 is poor) : 0.98  
 K magnitude : 12.423  
 G magnitude : 14.563  
 RP magnitude : 13.865  
 BP magnitude : 15.099  
 DUPflag : 0  
 Distance (au) : 18.900  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -8.86  
 Sun-Target sep (deg) : 120.67  
 Sun-Moon sep (deg) : 44.13  
 B (ring opening deg) : 72.15  
 PA of pole (deg) : -76.18

#	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



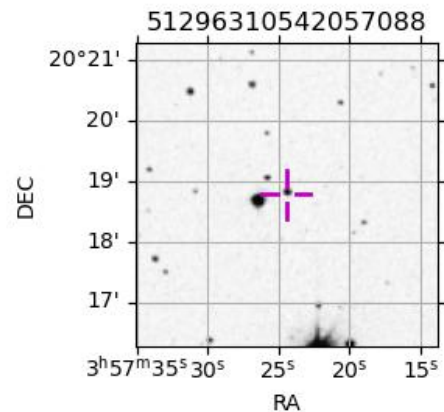
2027-01-21T10:28:42.5100 α: 03 57 24.4381 δ: +20 18 46.647 C/A 1.432° PA 349.27 deg v\_sky - 8.86 km/s D 18.90 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PAL  
 PMO  
 KPNO  
 MCD  
 IRTF  
 AAT  
 MSO

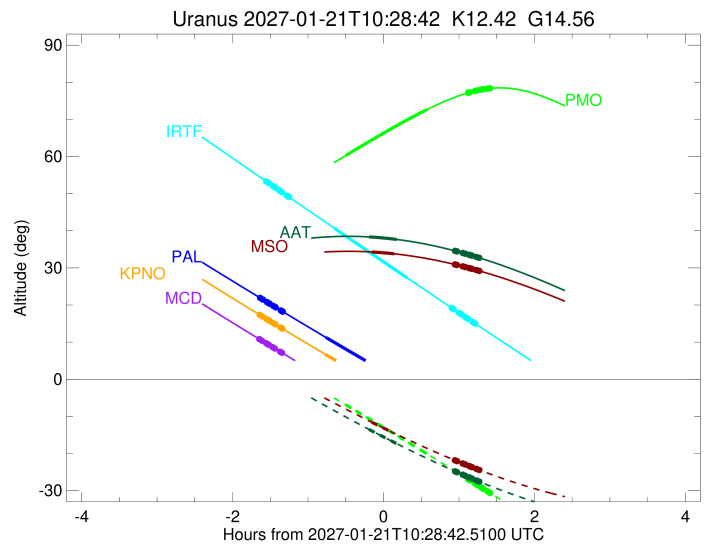
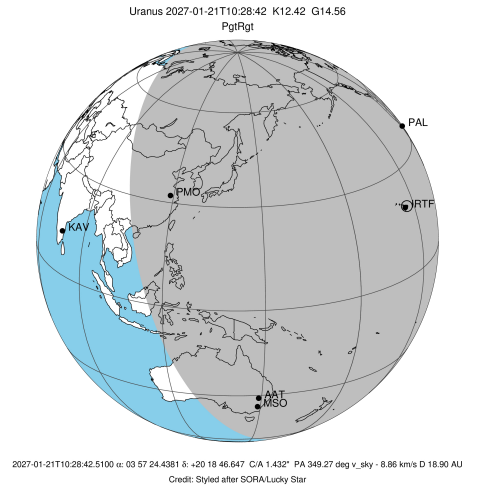


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEncode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1	+++++	+		JAN 21 08:50 - JAN 21 09:42	PinRin
PMO	Purple Mtn Obs. Nanki	32.1	118.8		+	+++++	JAN 21 09:58 - JAN 21 11:52	PieRne
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+		JAN 21 08:49 - JAN 21 09:42	PinRin
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++			JAN 21 08:49 - JAN 21 09:07	PnnRin
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+	+++++	JAN 21 08:55 - JAN 21 11:40	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		+	+++++	JAN 21 10:17 - JAN 21 11:44	PieRne
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0		+	+++++	JAN 21 10:19 - JAN 21 11:44	PieRne

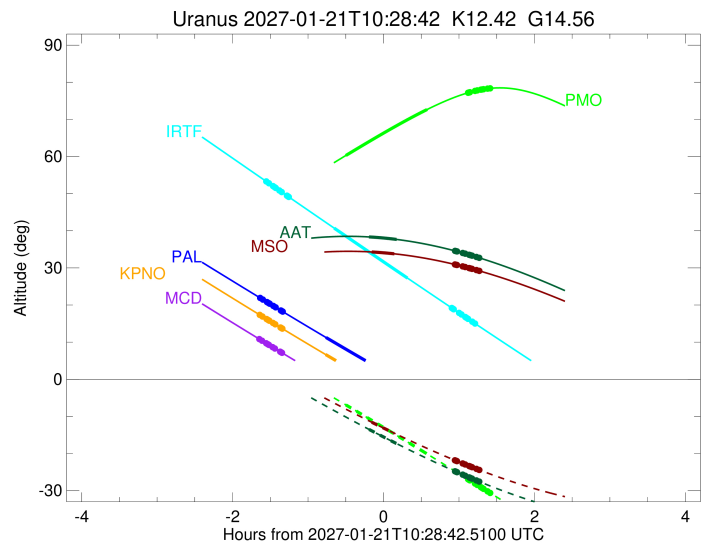
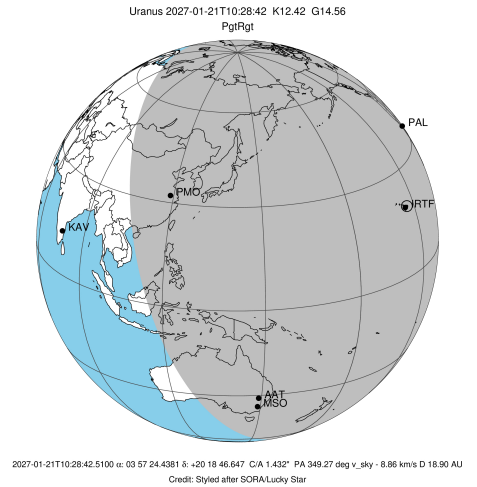


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-01-21T10:18:15.020  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PAL  
 Location : Palomar Mt (200")  
 Latitude (deg) : 33.35622  
 E. Longitude (deg) : 243.13601  
 Altitude (km) : 1.706  
 Gaia source ID : 51296310542057088  
 2Mass ID (if available) : 03572444+2018473  
 ICRS Star Coord at Epoch: 03h 57m 24.43809s +20:18:46.64687s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 12.423  
 G magnitude : 14.563  
 RP magnitude : 13.865  
 BP magnitude : 15.099  
 DUPflag : 0  
 Distance (au) : 18.900  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -8.86  
 Sun-Target sep (deg) : 120.67  
 Sun-Moon sep (deg) : 43.46  
 B (ring opening deg) : 72.15  
 PA of pole (deg) : -76.18  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.254  
 C/A sky separation (km) : 17190.8  
 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\_itrff93\_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	2027-01-21T08:50:12.777		22.00	-72.46	51400.57	-8.80		
lambda	I	2027-01-21T08:52:48.865		21.46	-72.08	50026.71	-8.78		
delta	I	2027-01-21T08:56:05.970		20.79	-71.58	48300.35	-8.73		
gamma	I	2027-01-21T08:57:23.800		20.52	-71.37	47621.46	-8.71		
eta	I	2027-01-21T08:58:14.960		20.35	-71.24	47176.12	-8.70		
beta	I	2027-01-21T09:01:07.542		19.76	-70.78	45680.03	-8.65		
alpha	I	2027-01-21T09:02:55.055		19.39	-70.49	44749.85	-8.61		
4	I	2027-01-21T09:07:13.738		18.50	-69.78	42538.68	-8.52		
5	I	2027-01-21T09:07:46.812		18.39	-69.69	42251.97	-8.50		
6	I	2027-01-21T09:08:29.840		18.24	-69.57	41879.68	-8.49		
Uranus	I	2027-01-21T09:42:52.582		11.28	-63.30	25481.72		6.63	6.94
Uranus	E	2027-01-21T10:52:51.083		-2.36x	-49.18	25076.63		-16.97	-17.72
6	E	2027-01-21T11:26:29.612		-8.54x	-42.17	41810.88	8.24		
5	E	2027-01-21T11:27:13.757		-8.67x	-42.01	42165.21	8.25		
4	E	2027-01-21T11:28:01.411		-8.82x	-41.85	42569.73	8.26		
alpha	E	2027-01-21T11:32:17.011		-9.58x	-40.96	44687.27	8.33		
beta	E	2027-01-21T11:34:12.020		-9.92x	-40.56	45652.42	8.36		
eta	E	2027-01-21T11:37:13.980		-10.45x	-39.92	47176.12	8.40		
gamma	E	2027-01-21T11:38:08.136		-10.61x	-39.73	47631.34	8.41		
delta	E	2027-01-21T11:39:27.599		-10.84x	-39.46	48300.35	8.43		
lambda	E	2027-01-21T11:42:52.015		-11.44x	-38.74	50026.71	8.46		
epsilon	E	2027-01-21T11:44:17.673		-11.69x	-38.44	50752.25	8.47		

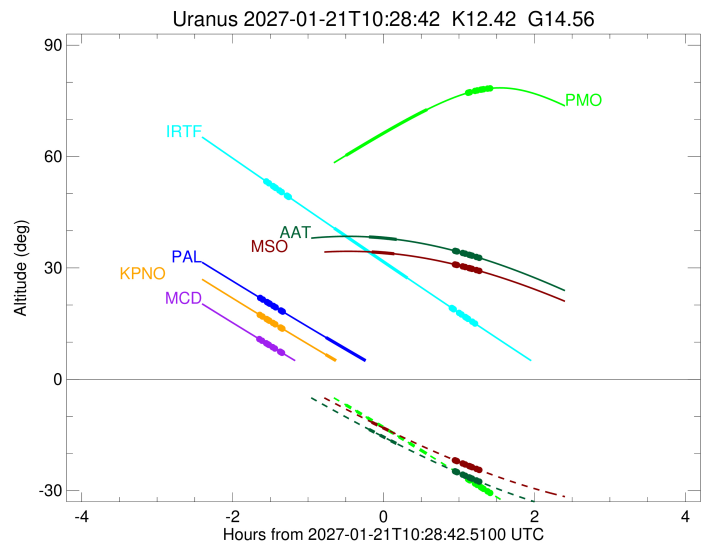
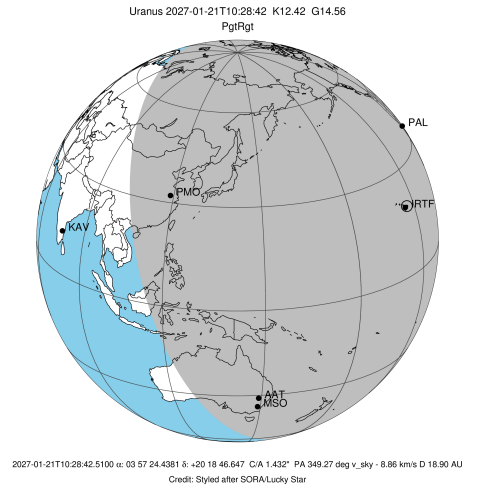
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-01-21T10:31:36.400  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 51296310542057088  
 2Mass ID (if available) : 03572444+2018473  
 ICRS Star Coord at Epoch: 03h 57m 24.43809s +20:18:46.64687s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 12.423  
 G magnitude : 14.563  
 RP magnitude : 13.865  
 BP magnitude : 15.099  
 DUPflag : 0  
 Distance (au) : 18.900  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -8.86  
 Sun-Target sep (deg) : 120.67  
 Sun-Moon sep (deg) : 44.98  
 B (ring opening deg) : 72.15  
 PA of pole (deg) : -76.18  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.308  
 C/A sky separation (km) : 17934.6  
 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	2027-01-21T09:06:38.904		49.37	3.30x	51404.62	-8.90		
lambda	I	2027-01-21T09:09:13.624		49.92	2.81x	50026.71	-8.89		
delta	I	2027-01-21T09:12:28.334		50.60	2.19x	48300.35	-8.84		
gamma	I	2027-01-21T09:13:45.195		50.87	1.94x	47621.44	-8.82		
eta	I	2027-01-21T09:14:35.705		51.05	1.78x	47176.12	-8.81		
beta	I	2027-01-21T09:17:26.076		51.65	1.23x	45679.95	-8.76		
alpha	I	2027-01-21T09:19:12.148		52.03	0.89x	44749.98	-8.73		
4	I	2027-01-21T09:23:27.355		52.92	0.07x	42538.96	-8.64		
5	I	2027-01-21T09:23:59.923		53.04	-0.04x	42252.65	-8.62		
6	I	2027-01-21T09:24:42.455		53.19	-0.17x	41879.66	-8.61		
Uranus	I	2027-01-21T09:58:46.703		60.28	-6.91	25485.82		6.45	6.75
Uranus	E	2027-01-21T11:03:23.749		72.67	-20.12	25099.44		-16.54	-17.28
6	E	2027-01-21T11:35:53.023		77.17	-26.91	41812.44	8.66		
5	E	2027-01-21T11:36:34.758		77.24	-27.06	42163.47	8.67		
4	E	2027-01-21T11:37:20.052		77.31	-27.22	42567.66	8.69		
alpha	E	2027-01-21T11:41:23.171		77.67	-28.07	44687.89	8.78		
beta	E	2027-01-21T11:43:12.324		77.81	-28.45	45653.23	8.82		
eta	E	2027-01-21T11:46:04.731		78.01	-29.06	47176.12	8.87		
gamma	E	2027-01-21T11:46:56.025		78.06	-29.24	47631.27	8.88		
delta	E	2027-01-21T11:48:11.281		78.13	-29.50	48300.35	8.90		
lambda	E	2027-01-21T11:51:24.693		78.29	-30.18	50026.71	8.95		
epsilon	E	2027-01-21T11:52:45.324		78.34	-30.47	50749.10	8.96		

```

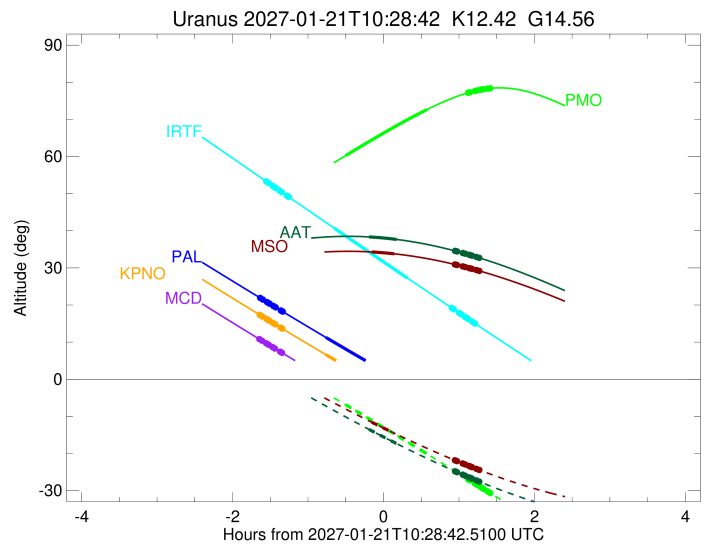
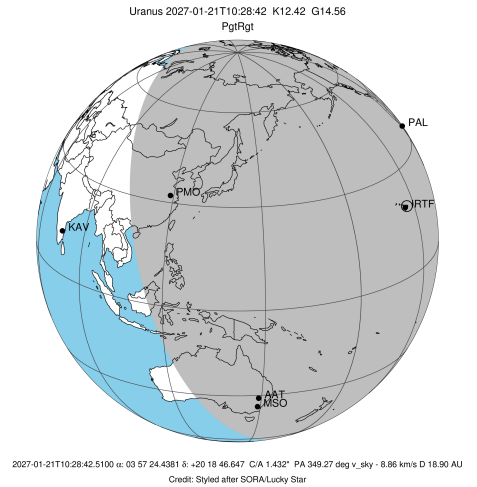
target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2027-01-21T10:18:16.860
Event type          : PgtRgt
: Uranus occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code       : KPNO
Location            : Kitt Peak Natl Obs
Latitude (deg)      : 31.96333
E. Longitude (deg)  : 248.40000
Altitude (km)       : 2.120
Gaia source ID      : 51296310542057088
2Mass ID (if available) : 03572444+2018473
ICRS Star Coord at Epoch: 03h 57m 24.43809s +20:18:46.64687s
RUWE (>1.4 is poor) : 0.98
K magnitude         : 12.423
G magnitude         : 14.563
RP magnitude        : 13.865
BP magnitude        : 15.099
DUPflag            : 0
Distance (au)       : 18.900
f0 (km)            : 0.000
g0 (km)            : 0.000
skyplane vel. (km/s) : -8.86
Sun-Target sep (deg) : 120.67
Sun-Moon sep (deg)  : 43.41
B (ring opening deg) : 72.15
PA of pole (deg)   : -76.18
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.250
C/A sky separation (km) : 17136.5
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	2027-01-21T08:49:52.442		17.44	-69.92	51400.61	-8.77		
lambda	I	2027-01-21T08:52:29.024		16.90	-69.44	50026.71	-8.76		
delta	I	2027-01-21T08:55:46.746		16.22	-68.84	48300.35	-8.71		
gamma	I	2027-01-21T08:57:04.819		15.95	-68.60	47621.46	-8.69		
eta	I	2027-01-21T08:57:56.137		15.77	-68.44	47176.12	-8.67		
beta	I	2027-01-21T09:00:49.255		15.18	-67.90	45680.02	-8.62		
alpha	I	2027-01-21T09:02:37.100		14.81	-67.56	44749.86	-8.58		
4	I	2027-01-21T09:06:56.575		13.92	-66.73	42538.70	-8.49		
5	I	2027-01-21T09:07:29.747		13.80	-66.62	42252.01	-8.48		
6	I	2027-01-21T09:08:12.910		13.66	-66.48	41879.68	-8.47		
Uranus	I	2027-01-21T09:42:40.610		6.67	-59.60	25480.98		6.66	6.97
Uranus	E	2027-01-21T10:53:06.913		-6.98x	-44.83	25075.55		-16.99	-17.74
6	E	2027-01-21T11:26:50.827		-13.09x	-37.66	41810.81	8.21		
5	E	2027-01-21T11:27:35.132		-13.22x	-37.51	42165.29	8.22		
4	E	2027-01-21T11:28:22.947		-13.36x	-37.34	42569.82	8.23		
alpha	E	2027-01-21T11:32:39.400		-14.10x	-36.43	44687.25	8.31		
beta	E	2027-01-21T11:34:34.802		-14.44x	-36.02	45652.39	8.33		
eta	E	2027-01-21T11:37:37.393		-14.96x	-35.38	47176.12	8.37		
gamma	E	2027-01-21T11:38:31.736		-15.12x	-35.18	47631.34	8.38		
delta	E	2027-01-21T11:39:51.474		-15.35x	-34.90	48300.35	8.40		
lambda	E	2027-01-21T11:43:16.602		-15.93x	-34.18	50026.71	8.43		
epsilon	E	2027-01-21T11:44:42.575		-16.17x	-33.87	50752.39	8.44		

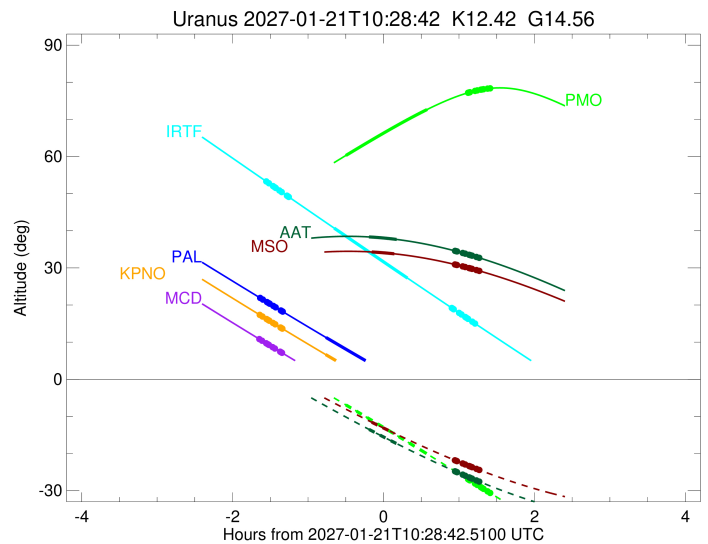
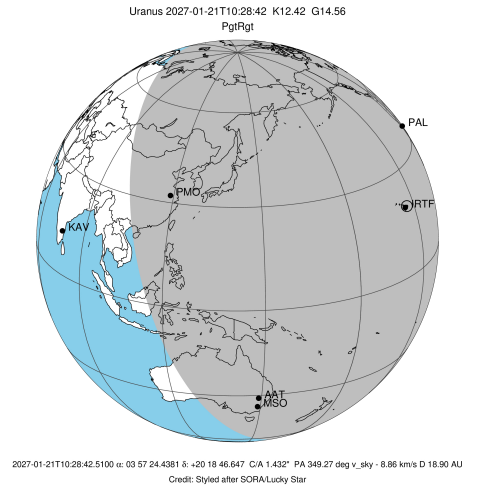
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2027-01-21T10:18:31.770
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       : 51296310542057088
2Mass ID (if available) : 03572444+2018473
ICRS Star Coord at Epoch: 03h 57m 24.43809s +20:18:46.64687s
RUWE (>1.4 is poor) : 0.98
K magnitude           : 12.423
G magnitude           : 14.563
RP magnitude         : 13.865
BP magnitude         : 15.099
DUPflag              : 0
Distance (au)        : 18.900
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -8.86
Sun-Target sep (deg) : 120.67
Sun-Moon sep (deg)   : 43.34
B (ring opening deg) : 72.15
PA of pole (deg)     : -76.18
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.238
C/A sky separation (km) : 16977.0
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_itrff93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
  
```



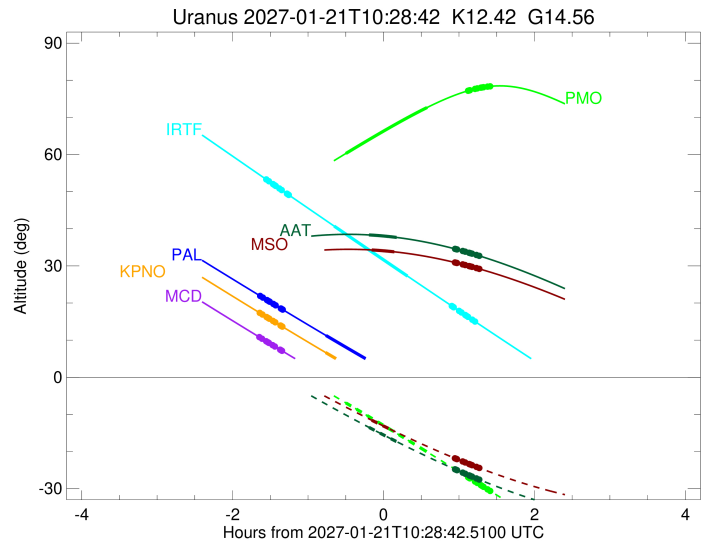
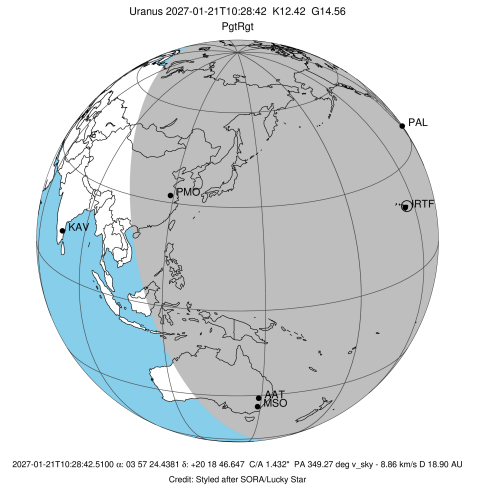
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-01-21T08:49:31.299		10.92	-64.65	51401.31	-8.74		
lambda	I	2027-01-21T08:52:08.631		10.38	-64.12	50026.71	-8.72		
delta	I	2027-01-21T08:55:27.185		9.70	-63.44	48300.35	-8.67		
gamma	I	2027-01-21T08:56:45.583		9.43	-63.17	47621.45	-8.65		
eta	I	2027-01-21T08:57:37.113		9.25	-62.99	47176.12	-8.64		
beta	I	2027-01-21T09:00:30.937		8.66	-62.39	45680.00	-8.59		
alpha	I	2027-01-21T09:02:19.204		8.29	-62.02	44749.90	-8.55		
4	I	2027-01-21T09:06:39.677		7.40	-61.11	42538.79	-8.46		
5	I	2027-01-21T09:07:12.952		7.29	-61.00	42252.25	-8.44		
6	I	2027-01-21T09:07:56.308		7.14	-60.85	41879.68	-8.44		
Uranus	I	2027-01-21T09:42:27.313	0.21x	-53.54	25478.15			6.78	7.10
Uranus	E	2027-01-21T10:53:50.450	-13.32x	-38.20	25072.86			-17.04	-17.80
6	E	2027-01-21T11:27:37.760	-19.18x	-30.94	41810.65		8.18		
5	E	2027-01-21T11:28:22.252	-19.31x	-30.78	42165.47		8.19		
4	E	2027-01-21T11:29:10.242	-19.44x	-30.61	42570.03		8.20		
alpha	E	2027-01-21T11:33:27.617	-20.15x	-29.69	44687.19		8.27		
beta	E	2027-01-21T11:35:23.455	-20.47x	-29.28	45652.31		8.30		
eta	E	2027-01-21T11:38:26.762	-20.97x	-28.63	47176.12		8.34		
gamma	E	2027-01-21T11:39:21.320	-21.12x	-28.43	47631.35		8.35		
delta	E	2027-01-21T11:40:41.372	-21.33x	-28.15	48300.35		8.36		
lambda	E	2027-01-21T11:44:07.320	-21.88x	-27.42	50026.71		8.40		
epsilon	E	2027-01-21T11:45:33.677	-22.11x	-27.11	50752.70		8.41		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-01-21T10:19:06.580  
 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 : 51296310542057088  
 2Mass ID (if available) : 03572444+2018473  
 ICRS Star Coord at Epoch: 03h 57m 24.43809s +20:18:46.64687s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 12.423  
 G magnitude : 14.563  
 RP magnitude : 13.865  
 BP magnitude : 15.099  
 DUPflag : 0  
 Distance (au) : 18.900  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -8.86  
 Sun-Target sep (deg) : 120.67  
 Sun-Moon sep (deg) : 43.88  
 B (ring opening deg) : 72.15  
 PA of pole (deg) : -76.18  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.437  
 C/A sky separation (km) : 19704.1  
 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\_itrff93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



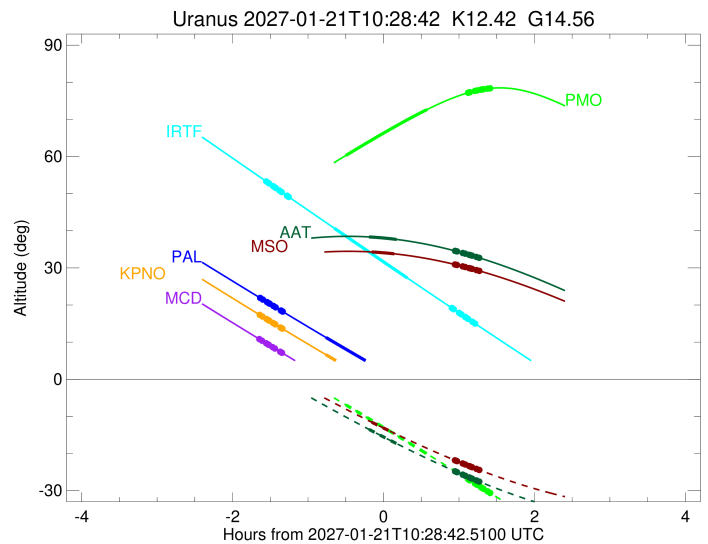
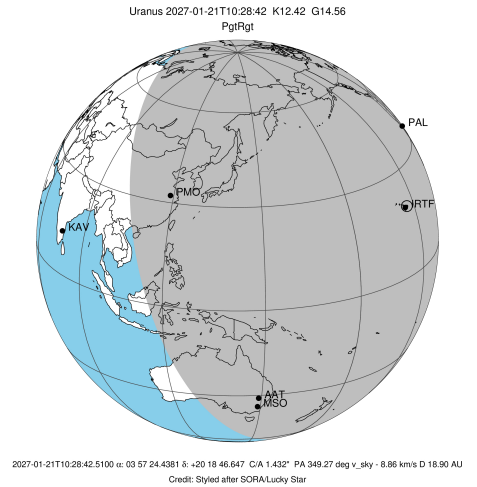
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-01-21T08:55:04.724		53.39	-66.97	51385.73	-8.84		
lambda	I	2027-01-21T08:57:38.445		52.80	-67.57	50026.71	-8.82		
delta	I	2027-01-21T09:00:54.955		52.03	-68.34	48300.35	-8.75		
gamma	I	2027-01-21T09:02:12.631		51.73	-68.64	47621.58	-8.72		
eta	I	2027-01-21T09:03:03.745		51.53	-68.84	47176.12	-8.71		
beta	I	2027-01-21T09:05:56.277		50.86	-69.51	45680.36	-8.64		
alpha	I	2027-01-21T09:07:44.120		50.44	-69.94	44749.09	-8.59		
4	I	2027-01-21T09:12:03.915		49.43	-70.95	42536.88	-8.47		
5	I	2027-01-21T09:12:37.610		49.30	-71.08	42247.26	-8.45		
6	I	2027-01-21T09:13:20.324		49.13	-71.25	41879.74	-8.43		
Uranus	I	2027-01-21T09:49:26.774		40.73	-79.73	25525.19		4.37	4.58
Uranus	E	2027-01-21T10:47:47.840		27.25	-86.54	25131.23		-15.93	-16.64
6	E	2027-01-21T11:22:56.389		19.22	-78.28	41813.35	8.21		
5	E	2027-01-21T11:23:40.226		19.05	-78.11	42162.57	8.22		
4	E	2027-01-21T11:24:27.934		18.87	-77.92	42566.53	8.24		
alpha	E	2027-01-21T11:28:44.012		17.90	-76.92	44688.22	8.35		
beta	E	2027-01-21T11:30:38.791		17.47	-76.47	45653.62	8.39		
eta	E	2027-01-21T11:33:39.893		16.78	-75.76	47176.12	8.44		
gamma	E	2027-01-21T11:34:33.757		16.58	-75.55	47631.23	8.46		
delta	E	2027-01-21T11:35:52.772		16.28	-75.24	48300.35	8.48		
lambda	E	2027-01-21T11:39:15.743		15.51	-74.45	50026.71	8.53		
epsilon	E	2027-01-21T11:40:40.205		15.20	-74.12	50748.09	8.55		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-01-21T10:28:53.980  
 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 : 51296310542057088  
 2Mass ID (if available) : 03572444+2018473  
 ICRS Star Coord at Epoch: 03h 57m 24.43809s +20:18:46.64687s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 12.423  
 G magnitude : 14.563  
 RP magnitude : 13.865  
 BP magnitude : 15.099  
 DUPflag : 0  
 Distance (au) : 18.900  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -8.86  
 Sun-Target sep (deg) : 120.67  
 Sun-Moon sep (deg) : 44.67  
 B (ring opening deg) : 72.15  
 PA of pole (deg) : -76.18  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.803  
 C/A sky separation (km) : 24715.8  
 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	2027-01-21T09:09:41.152		37.07	-0.83x	51353.26	-8.40		
lambda	I	2027-01-21T09:12:19.205		37.21	-1.35x	50026.71	-8.36		
delta	I	2027-01-21T09:15:47.000		37.39	-2.02x	48300.35	-8.26		
gamma	I	2027-01-21T09:17:09.387		37.45	-2.29x	47621.87	-8.21		
eta	I	2027-01-21T09:18:03.755		37.50	-2.46x	47176.12	-8.18		
beta	I	2027-01-21T09:21:07.681		37.64	-3.06x	45680.90	-8.08		
alpha	I	2027-01-21T09:23:03.599		37.72	-3.43x	44747.19	-8.00		
4	I	2027-01-21T09:27:44.011		37.90	-4.33x	42533.46	-7.81		
5	I	2027-01-21T09:28:21.625		37.92	-4.45x	42237.14	-7.77		
6	I	2027-01-21T09:29:06.822		37.95	-4.59x	41879.36	-7.74		
Uranus	I	2027-01-21T10:17:15.678		38.34	-13.51	25543.90		-2.92	-3.06
Uranus	E	2027-01-21T10:39:09.708		37.67	-17.34	25361.34		-10.68	-11.17
6	E	2027-01-21T11:25:30.599		34.59	-24.78	41819.20	7.70		
5	E	2027-01-21T11:26:16.329		34.52	-24.89	42158.09	7.73		
4	E	2027-01-21T11:27:06.805		34.45	-25.02	42559.62	7.76		
alpha	E	2027-01-21T11:31:38.146		34.03	-25.68	44690.76	7.95		
beta	E	2027-01-21T11:33:38.392		33.84	-25.98	45656.34	8.03		
eta	E	2027-01-21T11:36:46.689		33.53	-26.43	47176.12	8.13		
gamma	E	2027-01-21T11:37:42.536		33.44	-26.56	47630.93	8.16		
delta	E	2027-01-21T11:39:04.380		33.30	-26.76	48300.35	8.20		
lambda	E	2027-01-21T11:42:33.655		32.95	-27.25	50026.71	8.30		
epsilon	E	2027-01-21T11:43:59.868		32.80	-27.45	50743.64	8.33		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-01-21T10:29:03.590  
 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 : 51296310542057088  
 2Mass ID (if available) : 03572444+2018473  
 ICRS Star Coord at Epoch: 03h 57m 24.43809s +20:18:46.64687s  
 RUWE (>1.4 is poor) : 0.98  
 K magnitude : 12.423  
 G magnitude : 14.563  
 RP magnitude : 13.865  
 BP magnitude : 15.099  
 DUPflag : 0  
 Distance (au) : 18.900  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -8.86  
 Sun-Target sep (deg) : 120.67  
 Sun-Moon sep (deg) : 44.64  
 B (ring opening deg) : 72.15  
 PA of pole (deg) : -76.18  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.822  
 C/A sky separation (km) : 24971.2  
 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	2027-01-21T09:09:56.068		33.17	0.80x	51351.09	-8.35		
lambda	I	2027-01-21T09:12:34.681		33.30	0.31x	50026.71	-8.31		
delta	I	2027-01-21T09:16:03.610		33.46	-0.34x	48300.35	-8.21		
gamma	I	2027-01-21T09:17:26.465		33.52	-0.59x	47621.89	-8.17		
eta	I	2027-01-21T09:18:21.153		33.56	-0.76x	47176.12	-8.14		
beta	I	2027-01-21T09:21:26.195		33.69	-1.33x	45680.92	-8.03		
alpha	I	2027-01-21T09:23:22.882		33.76	-1.69x	44747.06	-7.95		
4	I	2027-01-21T09:28:05.244		33.93	-2.55x	42533.26	-7.75		
5	I	2027-01-21T09:28:43.204		33.95	-2.67x	42236.50	-7.71		
6	I	2027-01-21T09:29:28.668		33.97	-2.81x	41879.31	-7.68		
Uranus	I	2027-01-21T10:19:25.035		34.29	-11.58	25534.78		-3.70	-3.87
Uranus	E	2027-01-21T10:37:18.443		33.79	-14.53	25384.36		-10.02	-10.49
6	E	2027-01-21T11:25:25.358		30.93	-21.82	41819.49	7.64		
5	E	2027-01-21T11:26:11.386		30.87	-21.92	42157.92	7.67		
4	E	2027-01-21T11:27:02.217		30.80	-22.04	42559.30	7.71		
alpha	E	2027-01-21T11:31:35.469		30.41	-22.67	44690.89	7.90		
beta	E	2027-01-21T11:33:36.479		30.24	-22.94	45656.46	7.98		
eta	E	2027-01-21T11:36:45.888		29.96	-23.37	47176.12	8.08		
gamma	E	2027-01-21T11:37:42.054		29.87	-23.49	47630.92	8.11		
delta	E	2027-01-21T11:39:04.359		29.74	-23.68	48300.35	8.15		
lambda	E	2027-01-21T11:42:34.755		29.42	-24.14	50026.71	8.25		
epsilon	E	2027-01-21T11:44:01.403		29.28	-24.32	50743.59	8.29		