

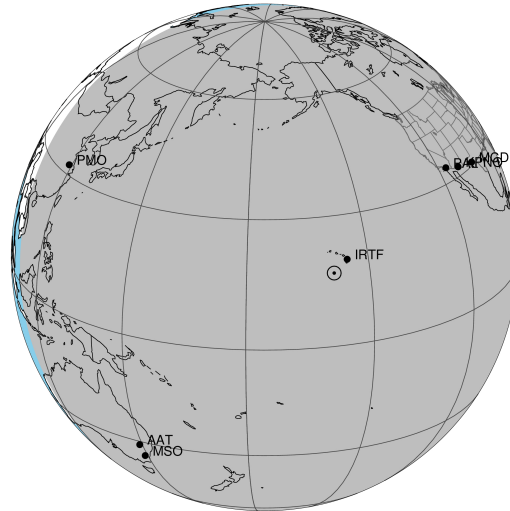
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-02-01T10:49:35.680
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 674563719516174208
 2Mass ID (if available) : 07502877+2134177

Uranus 2039-02-01T10:49:35 K12.06 G16.03 PgtRgt

ICRS Star Coord at Epoch: 07h 50m 28.73689s +21:34:18.14912s

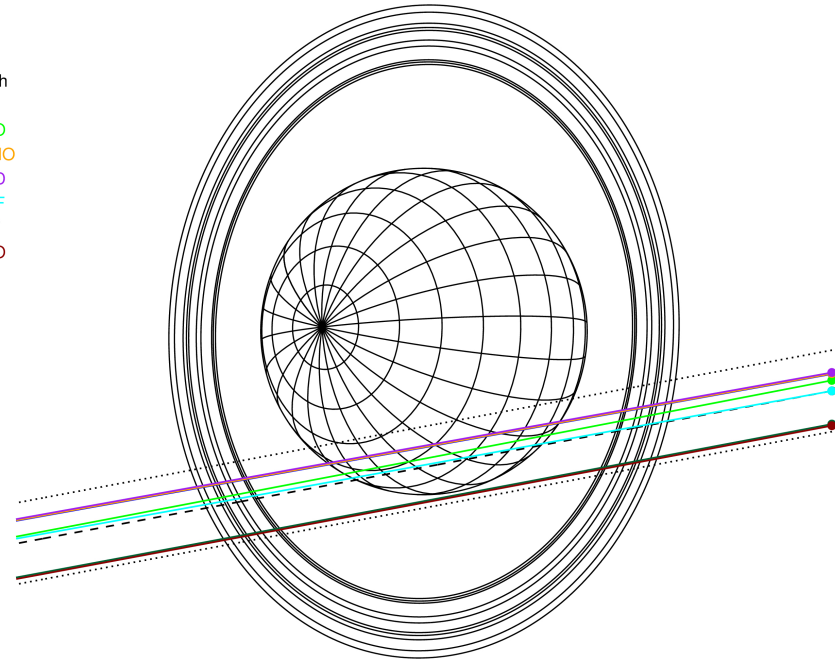
RUWE (>1.4 is poor) : 1.09
 K magnitude : 12.061
 G magnitude : 16.029
 RP magnitude : 0.000
 BP magnitude : 0.000
 DUPflag : 0
 Distance (au) : 17.695
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.06
 Sun-Target sep (deg) : 163.65
 Sun-Moon sep (deg) : 71.00
 B (ring opening deg) : 51.32
 PA of pole (deg) : 87.51

Uranus 2039-02-01T10:49:35 K12.06 G16.03
 PgtRgt



2039-02-01T10:49:35.6800 α: 07 50 28.7369 δ: +21 34 18.149 C/A 1.621° PA 10.60 deg v_sky -22.06 km/s D 17.69 AU
 Credit: Styled after SORA/Lucky Star

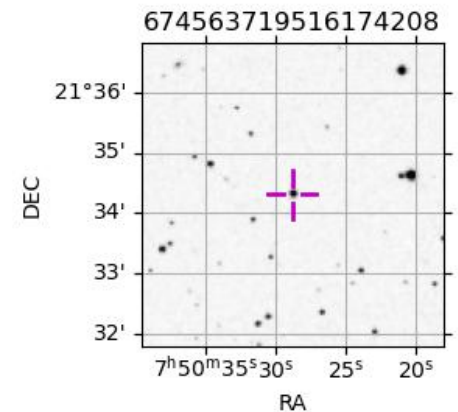
Earth
 PAL
 PMO
 KPNO
 MCD
 IRTF
 AAT
 MSO



#	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

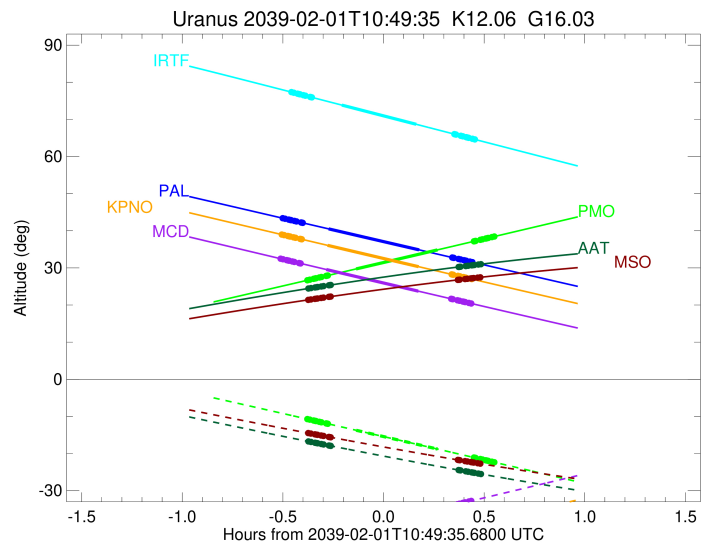
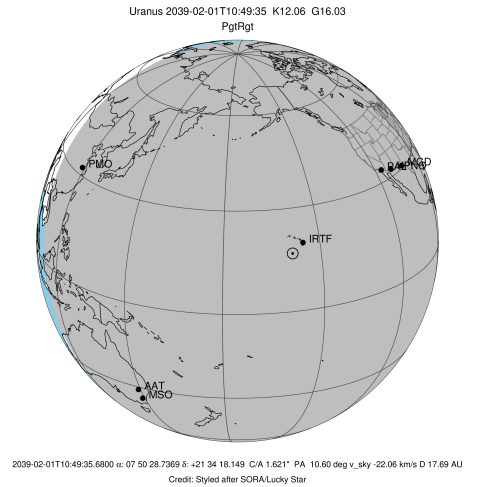
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+ +	+++++	FEB 01 10:19 - FEB 01 11:16	PieRie
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++	+ +	+++++	FEB 01 10:26 - FEB 01 11:22	PieRie
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	FEB 01 10:19 - FEB 01 11:16	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	FEB 01 10:18 - FEB 01 11:15	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	FEB 01 10:22 - FEB 01 11:16	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	+++++		+++++	FEB 01 10:27 - FEB 01 11:18	PnnRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0	+++++		+++++	FEB 01 10:27 - FEB 01 11:18	PnnRie



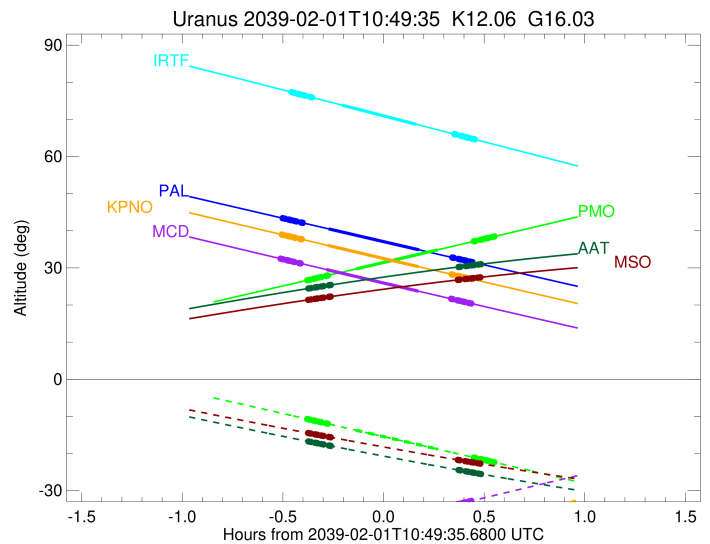
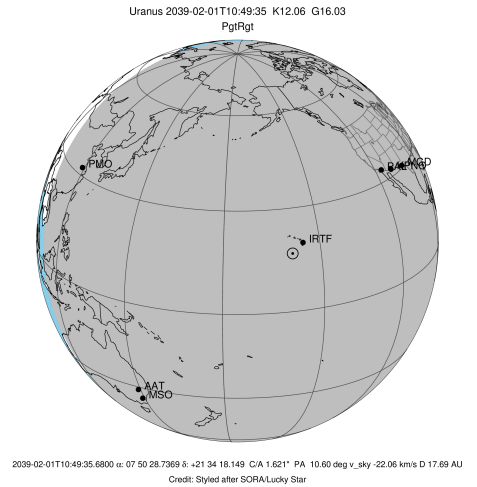
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2039-02-01T10:46:38.550
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      : 674563719516174208
2Mass ID (if available) : 07502877+2134177
ICRS Star Coord at Epoch: 07h 50m 28.73689s +21:34:18.14912s
RUWE (>1.4 is poor) : 1.09
K magnitude          : 12.061
G magnitude          : 16.029
RP magnitude         : 0.000
BP magnitude         : 0.000
DUPflag             : 0
Distance (au)       : 17.695
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : -22.06
Sun-Target sep (deg) : 163.65
Sun-Moon sep (deg)  : 71.71
B (ring opening deg) : 51.32
PA of pole (deg)    : 87.51
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.393
C/A sky separation (km) : 17875.2
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_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	2039-02-01T10:19:29.909		43.40	-54.97	51245.11	-26.53		
lambda	I	2039-02-01T10:20:16.054		43.24	-54.82	50026.71	-26.36		
delta	I	2039-02-01T10:21:21.735		43.01	-54.60	48300.35	-26.21		
gamma	I	2039-02-01T10:21:47.290		42.92	-54.52	47631.33	-26.15		
eta	I	2039-02-01T10:22:04.714		42.86	-54.46	47176.12	-26.10		
beta	I	2039-02-01T10:23:03.067		42.65	-54.27	45659.47	-25.96		
alpha	I	2039-02-01T10:23:39.032		42.53	-54.15	44716.43	-25.85		
4	I	2039-02-01T10:25:01.280		42.24	-53.87	42608.88	-25.57		
5	I	2039-02-01T10:25:13.978		42.19	-53.83	42273.30	-25.55		
6	I	2039-02-01T10:25:31.878		42.13	-53.77	41826.32	-25.50		
Uranus	I	2039-02-01T10:33:13.715		40.52	-52.23	25303.23		-31.90	-33.10
Uranus	E	2039-02-01T11:00:13.691		34.86	-46.72	25453.68		19.73	20.59
6	E	2039-02-01T11:10:05.613		32.80	-44.69	41876.02	25.42		
5	E	2039-02-01T11:10:22.743		32.74	-44.63	42264.84	25.47		
4	E	2039-02-01T11:10:32.545		32.70	-44.60	42527.74	25.49		
alpha	E	2039-02-01T11:11:58.780		32.40	-44.30	44744.87	25.76		
beta	E	2039-02-01T11:12:34.646		32.28	-44.17	45676.81	25.87		
eta	E	2039-02-01T11:13:32.443		32.08	-43.98	47176.12	26.01		
gamma	E	2039-02-01T11:13:49.638		32.02	-43.92	47623.77	26.06		
delta	E	2039-02-01T11:14:15.576		31.93	-43.83	48300.35	26.11		
lambda	E	2039-02-01T11:15:21.502		31.70	-43.60	50026.71	26.26		
epsilon	E	2039-02-01T11:16:11.108		31.52	-43.43	51331.63	26.42		

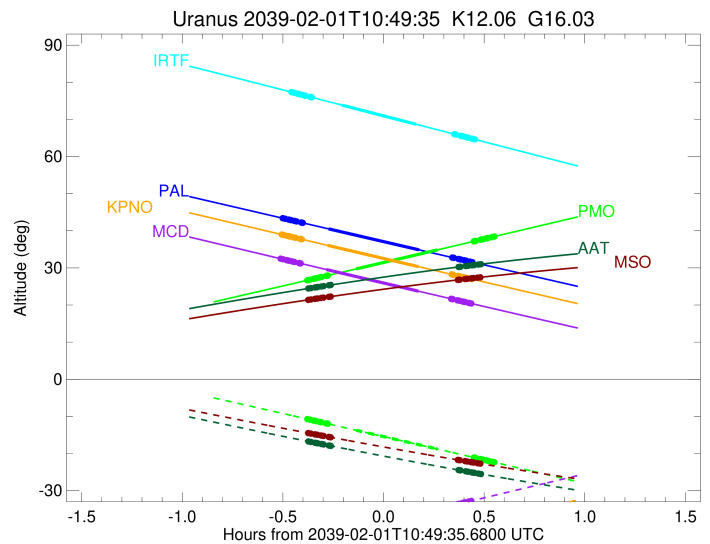
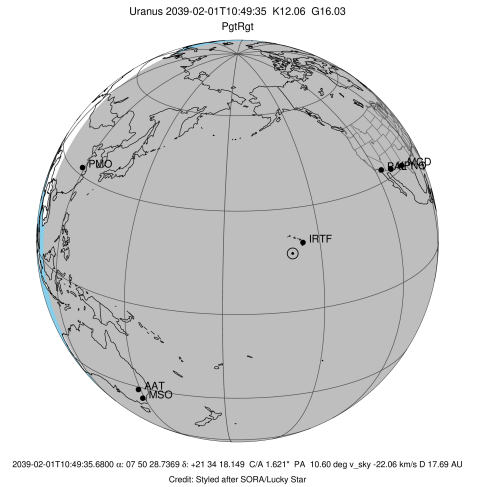
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-02-01T10:53:28.610
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 674563719516174208
 2Mass ID (if available) : 07502877+2134177
 ICRS Star Coord at Epoch: 07h 50m 28.73689s +21:34:18.14912s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 12.061
 G magnitude : 16.029
 RP magnitude : 0.000
 BP magnitude : 0.000
 DUPflag : 0
 Distance (au) : 17.695
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.06
 Sun-Target sep (deg) : 163.65
 Sun-Moon sep (deg) : 71.21
 B (ring opening deg) : 51.32
 PA of pole (deg) : 87.51
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.525
 C/A sky separation (km) : 19576.3
 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	2039-02-01T10:26:50.349		26.66	-10.72	51255.84	-26.05		
lambda	I	2039-02-01T10:27:37.794		26.82	-10.88	50026.71	-25.85		
delta	I	2039-02-01T10:28:44.801		27.06	-11.11	48300.35	-25.68		
gamma	I	2039-02-01T10:29:10.893		27.15	-11.20	47631.38	-25.60		
eta	I	2039-02-01T10:29:28.693		27.21	-11.26	47176.12	-25.55		
beta	I	2039-02-01T10:30:28.325		27.42	-11.47	45660.12	-25.37		
alpha	I	2039-02-01T10:31:05.118		27.55	-11.59	44717.58	-25.25		
4	I	2039-02-01T10:32:29.536		27.84	-11.88	42607.93	-24.92		
5	I	2039-02-01T10:32:42.450		27.89	-11.93	42275.88	-24.88		
6	I	2039-02-01T10:33:00.779		27.95	-11.99	41827.87	-24.82		
Uranus	I	2039-02-01T10:41:25.728		29.73	-13.73	25332.03		-29.83	-30.98
Uranus	E	2039-02-01T11:05:41.882		34.86	-18.80	25487.11		16.18	16.91
6	E	2039-02-01T11:16:33.347		37.16	-21.08	41876.92	24.89		
5	E	2039-02-01T11:16:50.941		37.22	-21.14	42268.86	24.96		
4	E	2039-02-01T11:17:00.837		37.26	-21.18	42528.50	24.99		
alpha	E	2039-02-01T11:18:28.684		37.57	-21.48	44745.94	25.33		
beta	E	2039-02-01T11:19:05.159		37.70	-21.61	45677.43	25.45		
eta	E	2039-02-01T11:20:03.822		37.90	-21.82	47176.12	25.64		
gamma	E	2039-02-01T11:20:21.275		37.97	-21.88	47624.00	25.69		
delta	E	2039-02-01T11:20:47.566		38.06	-21.97	48300.35	25.76		
lambda	E	2039-02-01T11:21:54.341		38.30	-22.21	50026.71	25.94		
epsilon	E	2039-02-01T11:22:45.145		38.48	-22.38	51347.80	26.14		

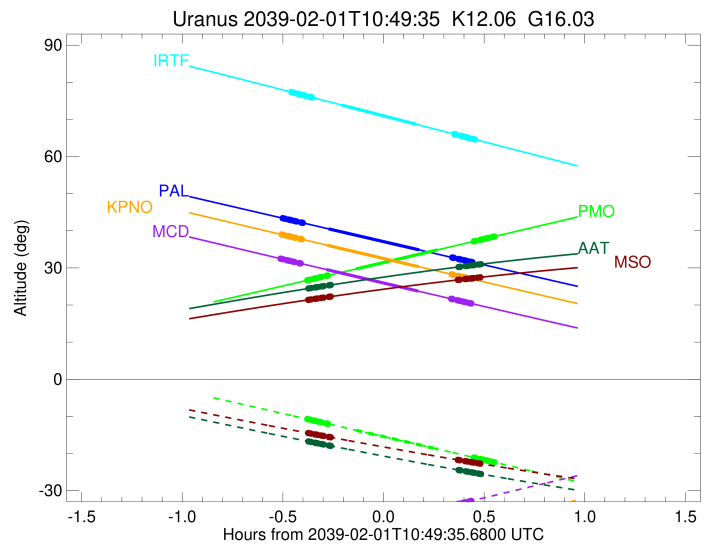
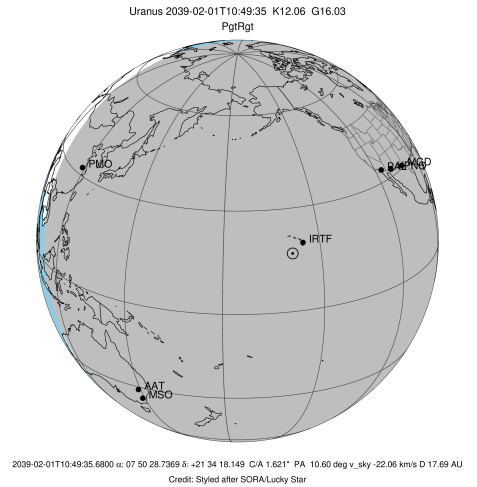
```

target                : Uranus
target radius (km)    : 25559.00
C/A epoch              : 2039-02-01T10:46:24.930
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        : 674563719516174208
2Mass ID (if available) : 07502877+2134177
ICRS Star Coord at Epoch: 07h 50m 28.73689s +21:34:18.14912s
RUWE (>1.4 is poor)  : 1.09
K magnitude           : 12.061
G magnitude           : 16.029
RP magnitude          : 0.000
BP magnitude          : 0.000
DUPflag              : 0
Distance (au)         : 17.695
f0 (km)               : 0.000
g0 (km)               : 0.000
skyplane vel. (km/s)  : -22.06
Sun-Target sep (deg)  : 163.65
Sun-Moon sep (deg)    : 71.67
B (ring opening deg)  : 51.32
PA of pole (deg)      : 87.51
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.387
C/A sky separation (km) : 17796.9
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	2039-02-01T10:19:12.924		38.99	-51.13	51244.51	-26.51		
lambda	I	2039-02-01T10:19:59.070		38.83	-50.97	50026.71	-26.34		
delta	I	2039-02-01T10:21:04.783		38.60	-50.74	48300.35	-26.20		
gamma	I	2039-02-01T10:21:30.350		38.50	-50.65	47631.33	-26.14		
eta	I	2039-02-01T10:21:47.781		38.44	-50.59	47176.12	-26.09		
beta	I	2039-02-01T10:22:46.158		38.24	-50.39	45659.43	-25.95		
alpha	I	2039-02-01T10:23:22.136		38.11	-50.27	44716.37	-25.84		
4	I	2039-02-01T10:24:44.402		37.82	-49.98	42608.92	-25.57		
5	I	2039-02-01T10:24:57.108		37.77	-49.94	42273.16	-25.54		
6	I	2039-02-01T10:25:15.015		37.71	-49.87	41826.23	-25.49		
Uranus	I	2039-02-01T10:32:55.665		36.08	-48.27	25301.91		-32.00	-33.20
Uranus	E	2039-02-01T11:00:04.518		30.33	-42.56	25452.25		19.87	20.74
6	E	2039-02-01T11:09:54.870		28.25	-40.47	41875.99	25.41		
5	E	2039-02-01T11:10:12.003		28.19	-40.41	42264.68	25.46		
4	E	2039-02-01T11:10:21.813		28.16	-40.38	42527.72	25.48		
alpha	E	2039-02-01T11:11:48.089		27.86	-40.07	44744.83	25.75		
beta	E	2039-02-01T11:12:23.976		27.73	-39.95	45676.79	25.85		
eta	E	2039-02-01T11:13:21.809		27.53	-39.74	47176.12	26.00		
gamma	E	2039-02-01T11:13:39.016		27.47	-39.68	47623.77	26.04		
delta	E	2039-02-01T11:14:04.971		27.38	-39.59	48300.35	26.10		
lambda	E	2039-02-01T11:15:10.945		27.14	-39.36	50026.71	26.24		
epsilon	E	2039-02-01T11:16:00.566		26.97	-39.18	51331.00	26.40		

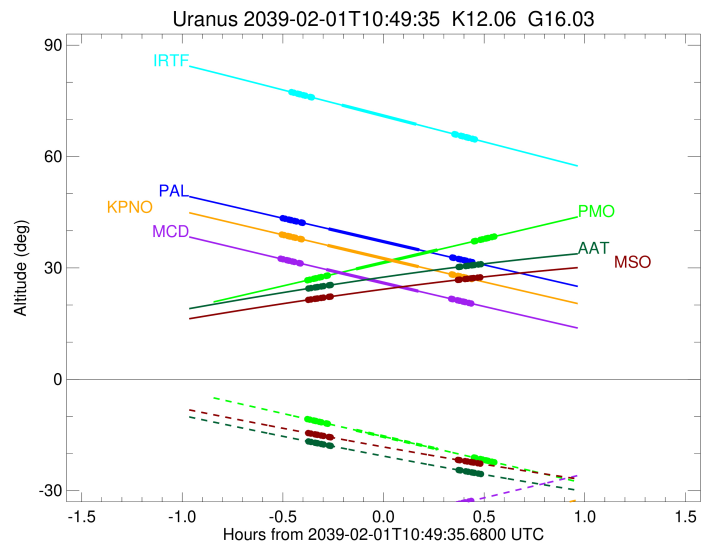
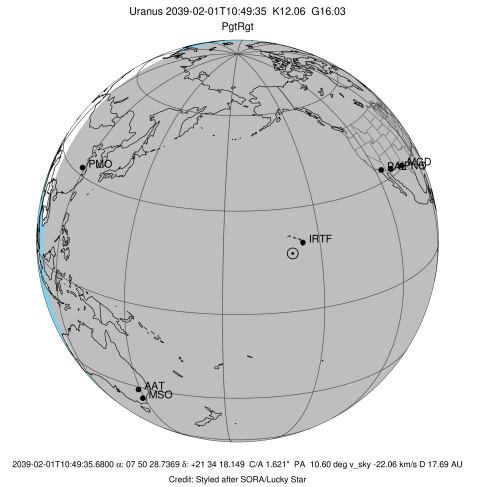
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-02-01T10:46:10.450
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 674563719516174208
 2Mass ID (if available) : 07502877+2134177
 ICRS Star Coord at Epoch: 07h 50m 28.73689s +21:34:18.14912s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 12.061
 G magnitude : 16.029
 RP magnitude : 0.000
 BP magnitude : 0.000
 DUPflag : 0
 Distance (au) : 17.695
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.06
 Sun-Target sep (deg) : 163.65
 Sun-Moon sep (deg) : 71.60
 B (ring opening deg) : 51.32
 PA of pole (deg) : 87.51
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.373
 C/A sky separation (km) : 17617.3
 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	2039-02-01T10:18:52.108		32.49	-45.01	51243.05	-26.50		
lambda	I	2039-02-01T10:19:38.222		32.33	-44.85	50026.71	-26.33		
delta	I	2039-02-01T10:20:43.960		32.09	-44.61	48300.35	-26.19		
gamma	I	2039-02-01T10:21:09.535		32.00	-44.52	47631.32	-26.13		
eta	I	2039-02-01T10:21:26.971		31.94	-44.46	47176.12	-26.09		
beta	I	2039-02-01T10:22:25.361		31.73	-44.25	45659.34	-25.94		
alpha	I	2039-02-01T10:23:01.344		31.60	-44.12	44716.22	-25.84		
4	I	2039-02-01T10:24:23.591		31.31	-43.83	42609.04	-25.57		
5	I	2039-02-01T10:24:36.309		31.26	-43.78	42272.83	-25.55		
6	I	2039-02-01T10:24:54.218		31.20	-43.72	41826.04	-25.50		
Uranus	I	2039-02-01T10:32:31.786		29.57	-42.08	25298.84		-32.21	-33.42
Uranus	E	2039-02-01T10:59:59.431		23.74	-36.17	25449.06		20.18	21.06
6	E	2039-02-01T11:09:45.764		21.67	-34.06	41875.90	25.41		
5	E	2039-02-01T11:10:02.887		21.61	-34.00	42264.33	25.46		
4	E	2039-02-01T11:10:12.707		21.58	-33.97	42527.66	25.48		
alpha	E	2039-02-01T11:11:38.997		21.28	-33.66	44744.73	25.74		
beta	E	2039-02-01T11:12:14.895		21.15	-33.53	45676.73	25.84		
eta	E	2039-02-01T11:13:12.757		20.95	-33.32	47176.12	25.98		
gamma	E	2039-02-01T11:13:29.971		20.89	-33.26	47623.75	26.02		
delta	E	2039-02-01T11:13:55.943		20.80	-33.17	48300.35	26.08		
lambda	E	2039-02-01T11:15:01.961		20.57	-32.93	50026.71	26.22		
epsilon	E	2039-02-01T11:15:51.569		20.39	-32.75	51329.64	26.38		

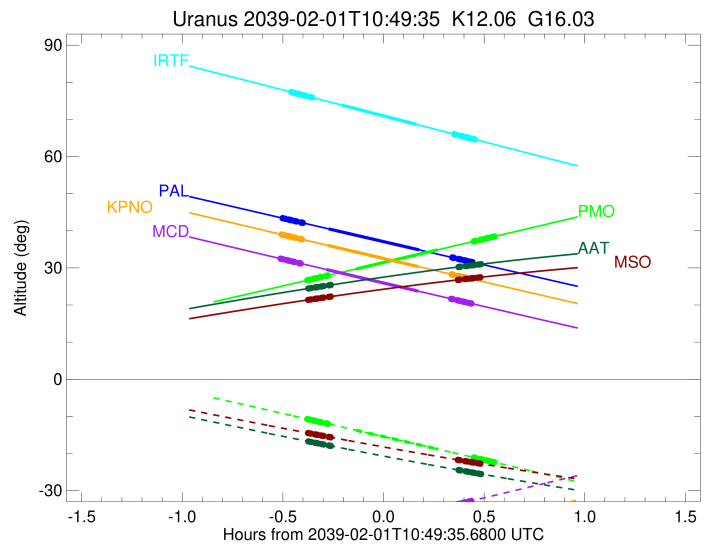
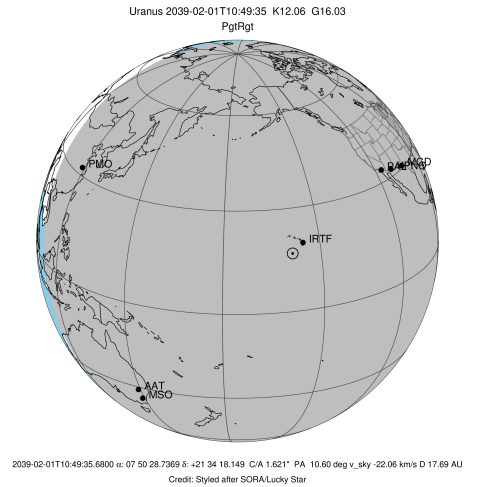

```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2039-02-01T10:48:09.540
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       : 674563719516174208
2Mass ID (if available) : 07502877+2134177
ICRS Star Coord at Epoch: 07h 50m 28.73689s +21:34:18.14912s
RUWE (>1.4 is poor) : 1.09
K magnitude           : 12.061
G magnitude           : 16.029
RP magnitude         : 0.000
BP magnitude         : 0.000
DUPflag              : 0
Distance (au)        : 17.695
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -22.06
Sun-Target sep (deg) : 163.65
Sun-Moon sep (deg)   : 71.91
B (ring opening deg) : 51.32
PA of pole (deg)     : 87.51
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 1.604
C/A sky separation (km) : 20581.1
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	2039-02-01T10:22:04.477		77.37	-85.90	51267.22	-26.14		
lambda	I	2039-02-01T10:22:52.210		77.19	-86.05	50026.71	-25.92		
delta	I	2039-02-01T10:23:59.059		76.93	-86.24	48300.35	-25.72		
gamma	I	2039-02-01T10:24:25.105		76.83	-86.31	47631.42	-25.64		
eta	I	2039-02-01T10:24:42.883		76.76	-86.36	47176.12	-25.58		
beta	I	2039-02-01T10:25:42.452		76.53	-86.52	45660.77	-25.38		
alpha	I	2039-02-01T10:26:19.236		76.38	-86.61	44718.70	-25.23		
4	I	2039-02-01T10:27:43.878		76.06	-86.81	42606.99	-24.86		
5	I	2039-02-01T10:27:56.711		76.01	-86.84	42278.26	-24.82		
6	I	2039-02-01T10:28:15.038		75.94	-86.88	41829.33	-24.75		
Uranus	I	2039-02-01T10:37:09.918		73.86	-87.33	25357.67		-27.91	-29.02
Uranus	E	2039-02-01T10:59:20.363		68.69	-83.73	25501.76		14.39	15.05
6	E	2039-02-01T11:10:43.301		66.03	-81.20	41877.21	24.71		
5	E	2039-02-01T11:11:01.056		65.97	-81.14	42270.24	24.78		
4	E	2039-02-01T11:11:10.986		65.93	-81.10	42528.79	24.82		
alpha	E	2039-02-01T11:12:39.359		65.58	-80.76	44746.27	25.19		
beta	E	2039-02-01T11:13:16.018		65.44	-80.62	45677.62	25.34		
eta	E	2039-02-01T11:14:14.921		65.21	-80.40	47176.12	25.54		
gamma	E	2039-02-01T11:14:32.442		65.14	-80.33	47624.08	25.60		
delta	E	2039-02-01T11:14:58.821		65.04	-80.23	48300.35	25.68		
lambda	E	2039-02-01T11:16:05.791		64.78	-79.98	50026.71	25.87		
epsilon	E	2039-02-01T11:16:56.892		64.58	-79.78	51352.46	26.09		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-02-01T10:51:13.260
 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 : 674563719516174208
 2Mass ID (if available) : 07502877+2134177
 ICRS Star Coord at Epoch: 07h 50m 28.73689s +21:34:18.14912s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 12.061
 G magnitude : 16.029
 RP magnitude : 0.000
 BP magnitude : 0.000
 DUPflag : 0
 Distance (au) : 17.695
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.06
 Sun-Target sep (deg) : 163.65
 Sun-Moon sep (deg) : 71.28
 B (ring opening deg) : 51.32
 PA of pole (deg) : 87.51
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.034
 C/A sky separation (km) : 26105.1
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl1.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

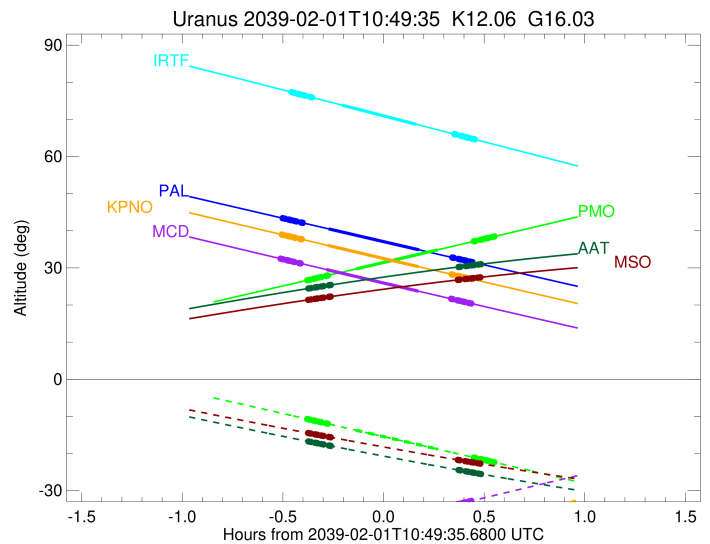
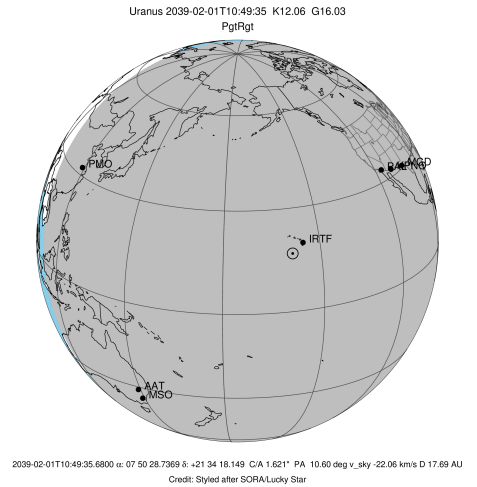


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2039-02-01T10:27:06.193		24.44	-16.73	51311.95	-24.43		
lambda	I	2039-02-01T10:27:59.280		24.56	-16.89	50026.71	-24.09		
delta	I	2039-02-01T10:29:11.429		24.74	-17.11	48300.35	-23.75		
gamma	I	2039-02-01T10:29:39.667		24.80	-17.19	47631.54	-23.61		
eta	I	2039-02-01T10:29:58.996		24.85	-17.25	47176.12	-23.51		
beta	I	2039-02-01T10:31:03.929		25.00	-17.44	45663.54	-23.16		
alpha	I	2039-02-01T10:31:44.288		25.10	-17.56	44723.50	-22.91		
4	I	2039-02-01T10:33:18.645		25.32	-17.84	42602.32	-22.25		
5	I	2039-02-01T10:33:32.448		25.35	-17.88	42288.15	-22.18		
6	I	2039-02-01T10:33:52.718		25.40	-17.94	41835.96	-22.04		

No planet occultations

6	E	2039-02-01T11:11:59.644		30.25	-24.45	41879.06	22.07		
5	E	2039-02-01T11:12:19.727		30.29	-24.51	42281.61	22.21		
4	E	2039-02-01T11:12:30.531		30.31	-24.54	42531.93	22.28		
alpha	E	2039-02-01T11:14:08.190		30.49	-24.80	44748.92	22.95		
beta	E	2039-02-01T11:14:48.361		30.57	-24.91	45679.14	23.20		
eta	E	2039-02-01T11:15:52.380		30.69	-25.08	47176.12	23.55		
gamma	E	2039-02-01T11:16:11.389		30.72	-25.13	47624.78	23.66		
delta	E	2039-02-01T11:16:39.862		30.78	-25.21	48300.35	23.80		
lambda	E	2039-02-01T11:17:51.875		30.91	-25.40	50026.71	24.14		
epsilon	E	2039-02-01T11:18:48.294		31.01	-25.55	51395.68	24.48		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2039-02-01T10:51:05.010
 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 : 674563719516174208
 2Mass ID (if available) : 07502877+2134177
 ICRS Star Coord at Epoch: 07h 50m 28.73689s +21:34:18.14912s
 RUWE (>1.4 is poor) : 1.09
 K magnitude : 12.061
 G magnitude : 16.029
 RP magnitude : 0.000
 BP magnitude : 0.000
 DUPflag : 0
 Distance (au) : 17.695
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -22.06
 Sun-Target sep (deg) : 163.65
 Sun-Moon sep (deg) : 71.25
 B (ring opening deg) : 51.32
 PA of pole (deg) : 87.51
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 2.053
 C/A sky separation (km) : 26347.9
 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	2039-02-01T10:27:03.064		21.37	-14.48	51314.04	-24.33		
lambda	I	2039-02-01T10:27:56.456		21.49	-14.63	50026.71	-23.99		
delta	I	2039-02-01T10:29:08.925		21.65	-14.84	48300.35	-23.65		
gamma	I	2039-02-01T10:29:37.296		21.72	-14.92	47631.55	-23.50		
eta	I	2039-02-01T10:29:56.719		21.76	-14.97	47176.12	-23.40		
beta	I	2039-02-01T10:31:01.979		21.90	-15.15	45663.67	-23.03		
alpha	I	2039-02-01T10:31:42.558		21.99	-15.27	44723.73	-22.78		
4	I	2039-02-01T10:33:17.512		22.20	-15.54	42602.07	-22.10		
5	I	2039-02-01T10:33:31.380		22.23	-15.57	42288.60	-22.03		
6	I	2039-02-01T10:33:51.773		22.27	-15.63	41836.28	-21.89		

No planet occultations

6	E	2039-02-01T11:11:46.156		26.77	-21.72	41879.12	21.92		
5	E	2039-02-01T11:12:06.382		26.80	-21.77	42282.10	22.06		
4	E	2039-02-01T11:12:17.249		26.82	-21.80	42532.10	22.14		
alpha	E	2039-02-01T11:13:55.506		26.99	-22.05	44749.02	22.82		
beta	E	2039-02-01T11:14:35.903		27.06	-22.15	45679.20	23.07		
eta	E	2039-02-01T11:15:40.253		27.17	-22.31	47176.12	23.44		
gamma	E	2039-02-01T11:15:59.357		27.21	-22.36	47624.81	23.54		
delta	E	2039-02-01T11:16:27.965		27.26	-22.43	48300.35	23.69		
lambda	E	2039-02-01T11:17:40.305		27.38	-22.61	50026.71	24.04		
epsilon	E	2039-02-01T11:18:37.035		27.48	-22.76	51397.48	24.38		