

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-09-28T16:03:35.180
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3412875816215720320
 2Mass ID (if available) : 04494250+2224544

ICRS Star Coord at Epoch: 04h 49m 42.50155s +22:24:54.24975s

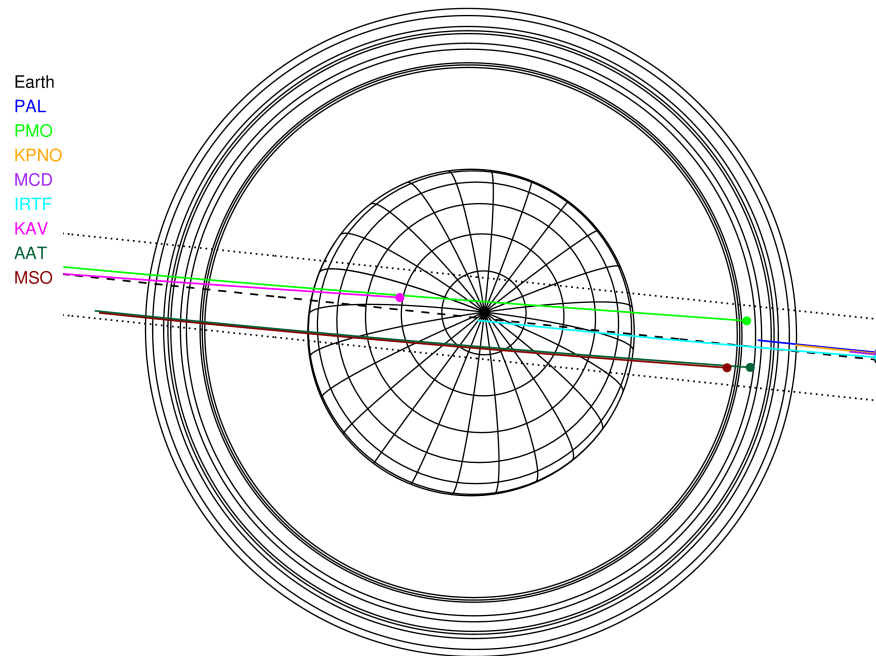
RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.428
 G magnitude : 16.692
 RP magnitude : 15.943
 BP magnitude : 17.320
 DUPflag : 0
 Distance (au) : 18.911
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -4.77
 Sun-Target sep (deg) : 111.86
 Sun-Moon sep (deg) : 122.78
 B (ring opening deg) : 81.41
 PA of pole (deg) : -33.39

#	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



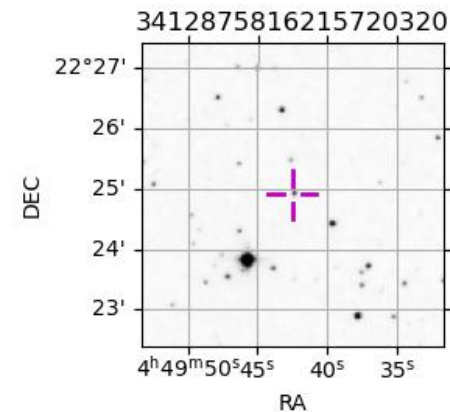
2028-09-28T16:03:35.1800 α: 04 49 42.5015 s δ: +22 24 54.250 C/A 0.180° PA 174.00 deg v_sky - 4.77 km/s D 18.91 AU
 Credit: Styled after SORA/Lucky Star

Uranus 2028-09-28T16:03:35 K14.43 G16.69 PgtRgt

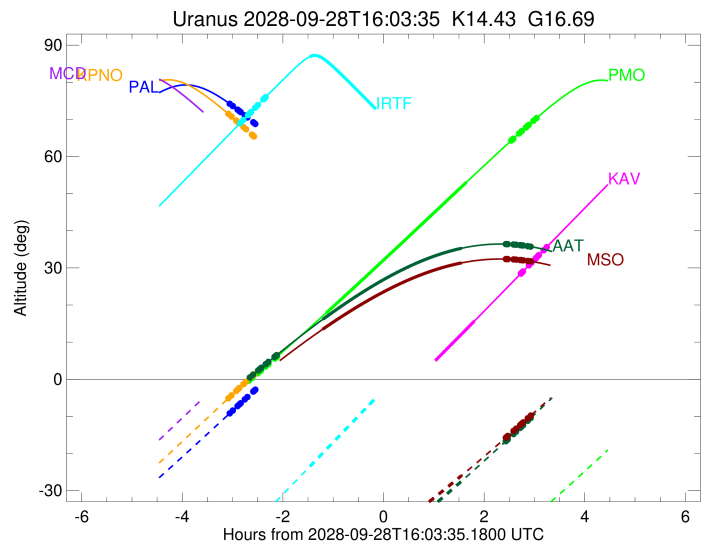
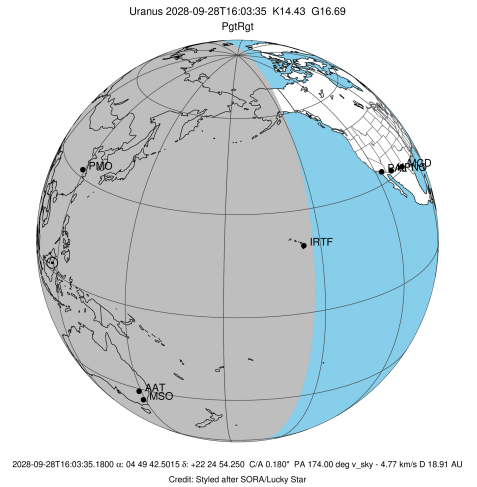


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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 28 13:01 - SEP 28 13:18	PnnRin
PMO	Purple Mtn Obs. Nanki	32.1	118.8		+++ + +	+++++	SEP 28 13:54 - SEP 28 19:07	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	+++++	+		SEP 28 13:13 - SEP 28 14:35	PinRin
KAV	Kavalur Observatory	12.6	78.8		+	+++++	SEP 28 17:52 - SEP 28 19:19	PneRne
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 28 13:53 - SEP 28 19:00	PieRie
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0		++	+++++	SEP 28 14:50 - SEP 28 19:00	PieRne

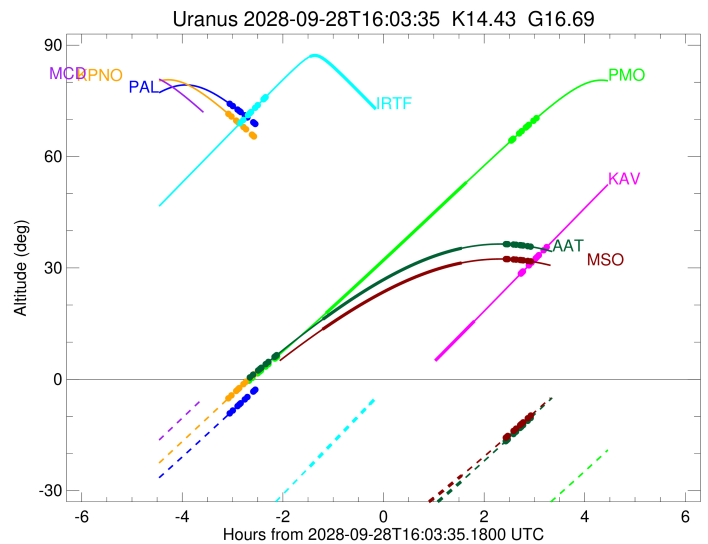
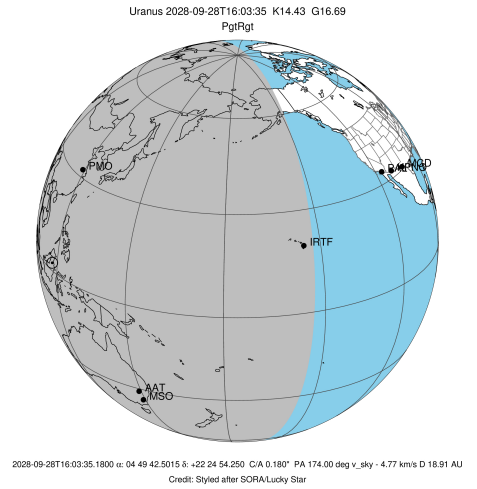


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-09-28T15:47:23.250
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3412875816215720320
 2Mass ID (if available) : 04494250+2224544
 ICRS Star Coord at Epoch: 04h 49m 42.50155s +22:24:54.24975s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.428
 G magnitude : 16.692
 RP magnitude : 15.943
 BP magnitude : 17.320
 DUPflag : 0
 Distance (au) : 18.911
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -4.77
 Sun-Target sep (deg) : 111.86
 Sun-Moon sep (deg) : 122.88
 B (ring opening deg) : 81.41
 PA of pole (deg) : -33.39
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.291
 C/A sky separation (km) : 3989.4
 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	2028-09-28T13:01:22.011		74.02	-8.94	50808.02	-5.10		
lambda	I	2028-09-28T13:03:55.405		73.60	-8.40	50026.71	-5.09		
delta	I	2028-09-28T13:09:34.411		72.63	-7.22	48300.35	-5.09		
gamma	I	2028-09-28T13:11:47.853		72.24	-6.76	47620.96	-5.09		
eta	I	2028-09-28T13:13:15.238		71.99	-6.45	47176.12	-5.09		
beta	I	2028-09-28T13:18:15.048		71.09	-5.41	45649.96	-5.09		
alpha	I	2028-09-28T13:21:19.337		70.53	-4.77x	44713.09	-5.09		
4	I	2028-09-28T13:28:20.635		69.22	-3.30x	42568.94	-5.08		
5	I	2028-09-28T13:29:31.518		68.99	-3.05x	42212.78	-5.08		
6	I	2028-09-28T13:30:49.787		68.75	-2.78x	41809.15	-5.08		
Uranus	I	2028-09-28T14:24:38.365		57.98	8.43x	25360.73		4.98	5.22
Uranus	E	2028-09-28T17:12:02.704		23.10	40.50x	25508.38		-2.51	-2.62
6	E	2028-09-28T18:08:09.448		11.79	48.56x	41857.77	4.82		
5	E	2028-09-28T18:09:28.117		11.53	48.72x	42240.07	4.82		
4	E	2028-09-28T18:10:35.892		11.30	48.85x	42563.84	4.82		
alpha	E	2028-09-28T18:18:03.062		9.83	49.70x	44717.02	4.81		
beta	E	2028-09-28T18:21:22.591		9.18	50.06x	45675.40	4.80		
eta	E	2028-09-28T18:26:35.113		8.16	50.60x	47176.12	4.80		
gamma	E	2028-09-28T18:28:10.035		7.85	50.76x	47631.51	4.80		
delta	E	2028-09-28T18:30:29.512		7.40	50.98x	48300.35	4.79		
lambda	E	2028-09-28T18:36:29.884		6.24	51.54x	50026.71	4.79		
epsilon	E	2028-09-28T18:41:42.768		5.23	51.98x	51523.53	4.78		

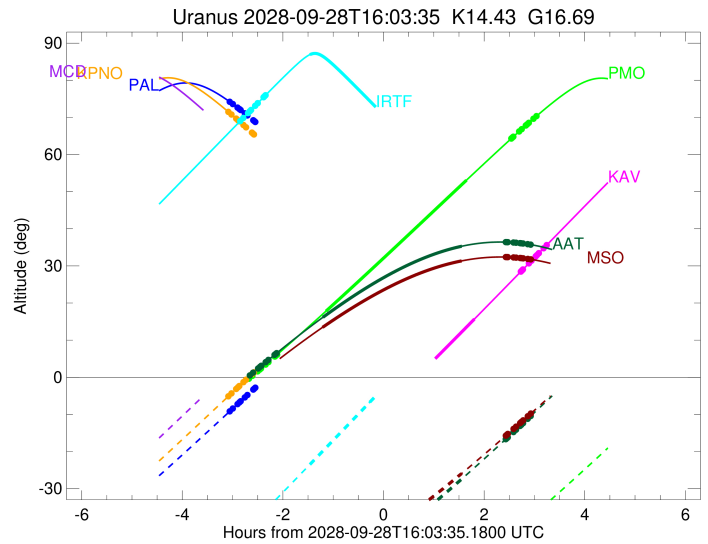
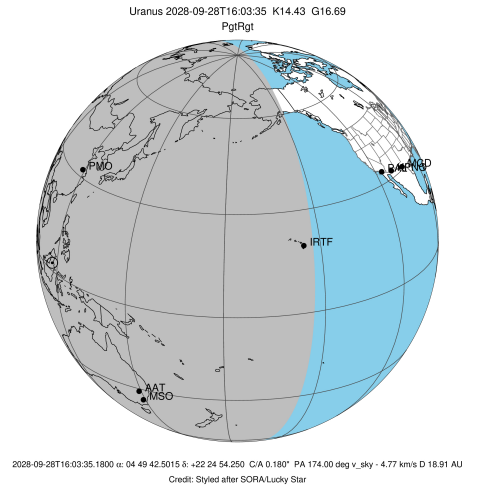
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-09-28T16:19:48.360
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3412875816215720320
 2Mass ID (if available) : 04494250+2224544
 ICRS Star Coord at Epoch: 04h 49m 42.50155s +22:24:54.24975s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.428
 G magnitude : 16.692
 RP magnitude : 15.943
 BP magnitude : 17.320
 DUPflag : 0
 Distance (au) : 18.911
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -4.77
 Sun-Target sep (deg) : 111.86
 Sun-Moon sep (deg) : 123.56
 B (ring opening deg) : 81.41
 PA of pole (deg) : -33.39
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.363
 C/A sky separation (km) : 4973.8
 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	2028-09-28T13:24:21.308	-0.15x	-43.87	50821.84	-4.60			
lambda	I	2028-09-28T13:27:14.255	0.40x	-44.38	50026.71	-4.60			
delta	I	2028-09-28T13:33:29.112	1.60x	-45.49	48300.35	-4.61			
gamma	I	2028-09-28T13:35:56.390	2.07x	-45.92	47620.98	-4.61			
eta	I	2028-09-28T13:37:32.760	2.38x	-46.20	47176.12	-4.62			
beta	I	2028-09-28T13:43:02.631	3.44x	-47.14	45651.05	-4.63			
alpha	I	2028-09-28T13:46:25.862	4.10x	-47.72	44710.94	-4.63			
4	I	2028-09-28T13:54:07.912	5.60	-48.99	42565.96	-4.64			
5	I	2028-09-28T13:55:26.007	5.86	-49.20	42207.73	-4.65			
6	I	2028-09-28T13:56:50.762	6.13	-49.43	41807.10	-4.65			
Uranus	I	2028-09-28T14:54:59.980	17.81	-57.27	25312.39			5.57	5.83
Uranus	E	2028-09-28T17:42:38.201	53.11	-51.18	25504.19			-2.61	-2.73
6	E	2028-09-28T18:36:02.712	64.31	-42.08	41858.78	5.15			
5	E	2028-09-28T18:37:16.515	64.57	-41.85	42242.27	5.15			
4	E	2028-09-28T18:38:19.771	64.78	-41.66	42565.08	5.15			
alpha	E	2028-09-28T18:45:17.074	66.20	-40.36	44718.01	5.16			
beta	E	2028-09-28T18:48:22.523	66.83	-39.78	45674.98	5.17			
eta	E	2028-09-28T18:53:12.859	67.81	-38.86	47176.12	5.17			
gamma	E	2028-09-28T18:54:40.875	68.10	-38.58	47631.54	5.18			
delta	E	2028-09-28T18:56:50.067	68.53	-38.16	48300.35	5.18			
lambda	E	2028-09-28T19:02:23.199	69.63	-37.09	50026.71	5.19			
epsilon	E	2028-09-28T19:07:10.641	70.57	-36.16	51518.27	5.19			

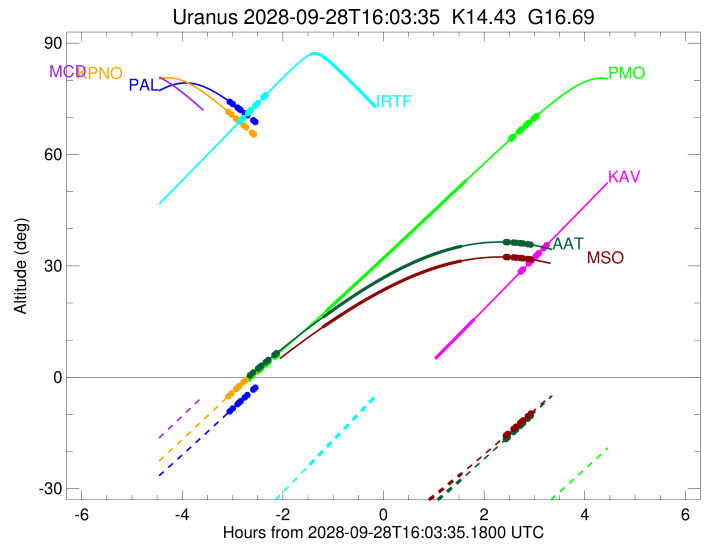
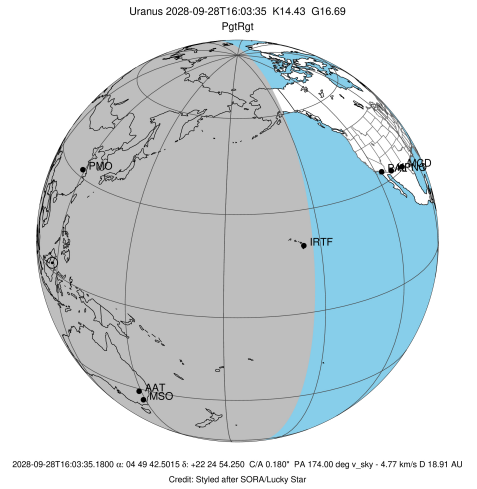
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2028-09-28T15:56:53.880
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       : 3412875816215720320
2Mass ID (if available) : 04494250+2224544
ICRS Star Coord at Epoch: 04h 49m 42.50155s +22:24:54.24975s
RUWE (>1.4 is poor) : 0.99
K magnitude           : 14.428
G magnitude           : 16.692
RP magnitude          : 15.943
BP magnitude          : 17.320
DUPflag              : 0
Distance (au)        : 18.911
f0 (km)              : 0.000
g0 (km)              : 0.000
skyplane vel. (km/s) : -4.77
Sun-Target sep (deg) : 111.86
Sun-Moon sep (deg)   : 123.34
B (ring opening deg) : 81.41
PA of pole (deg)     : -33.39
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.146
C/A sky separation (km) : 2007.2
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
    
```



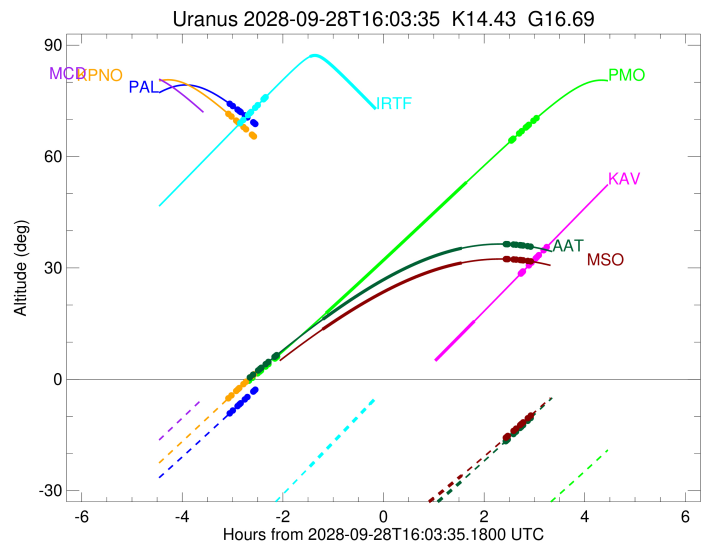
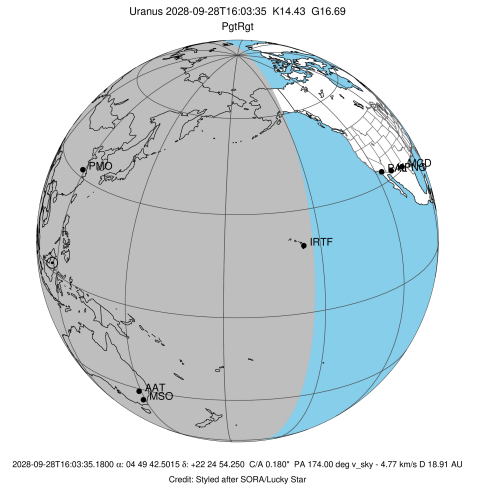
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-09-28T13:13:54.248		69.29	-42.42	50803.63	-5.13		
lambda	I	2028-09-28T13:16:25.728		69.88	-41.84	50026.71	-5.13		
delta	I	2028-09-28T13:22:02.061		71.17	-40.57	48300.35	-5.14		
gamma	I	2028-09-28T13:24:14.324		71.68	-40.07	47620.96	-5.14		
eta	I	2028-09-28T13:25:40.896		72.01	-39.74	47176.12	-5.14		
beta	I	2028-09-28T13:30:37.765		73.15	-38.61	45649.55	-5.14		
alpha	I	2028-09-28T13:33:39.757		73.85	-37.91	44713.96	-5.15		
4	I	2028-09-28T13:40:35.772		75.44	-36.32	42570.22	-5.15		
5	I	2028-09-28T13:41:45.486		75.71	-36.05	42215.01	-5.15		
6	I	2028-09-28T13:43:03.002		76.01	-35.75	41810.10	-5.15		
Uranus	I	2028-09-28T14:35:39.082		86.90	-23.53	25393.04		4.55	4.77
Uranus	E	2028-09-28T17:18:40.537		53.29	14.73x	25473.40		-3.26	-3.42
6	E	2028-09-28T18:11:45.555		41.04	27.00x	41860.04	5.10		
5	E	2028-09-28T18:13:00.242		40.76	27.29x	42244.99	5.10		
4	E	2028-09-28T18:14:03.929		40.51	27.53x	42566.59	5.10		
alpha	E	2028-09-28T18:21:06.108		38.90	29.14x	44719.02	5.09		
beta	E	2028-09-28T18:24:13.994		38.18	29.85x	45674.56	5.09		
eta	E	2028-09-28T18:29:09.259		37.05	30.97x	47176.12	5.08		
gamma	E	2028-09-28T18:30:38.892		36.71	31.30x	47631.55	5.08		
delta	E	2028-09-28T18:32:50.573		36.20	31.80x	48300.35	5.08		
lambda	E	2028-09-28T18:38:30.789		34.90	33.08x	50026.71	5.07		
epsilon	E	2028-09-28T18:43:24.406		33.79	34.18x	51514.74	5.07		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-09-28T16:24:50.590
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 3412875816215720320
 2Mass ID (if available) : 04494250+2224544
 ICRS Star Coord at Epoch: 04h 49m 42.50155s +22:24:54.24975s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.428
 G magnitude : 16.692
 RP magnitude : 15.943
 BP magnitude : 17.320
 DUPflag : 0
 Distance (au) : 18.911
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -4.77
 Sun-Target sep (deg) : 111.86
 Sun-Moon sep (deg) : 123.12
 B (ring opening deg) : 81.41
 PA of pole (deg) : -33.39
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.342
 C/A sky separation (km) : 4687.7
 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



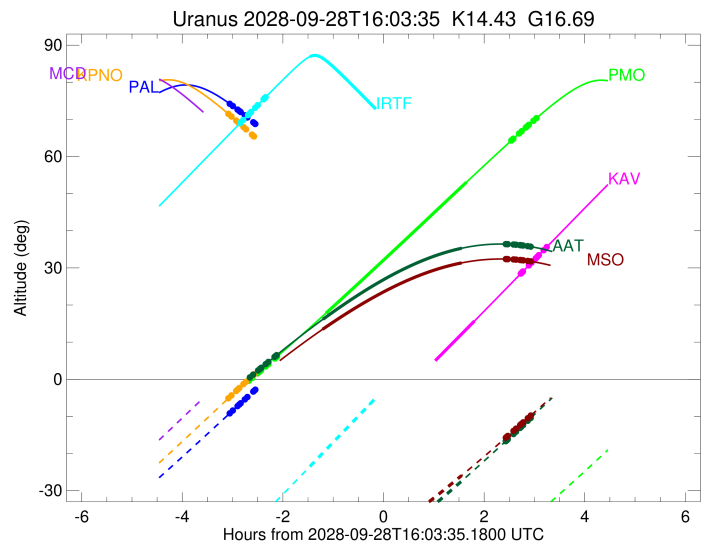
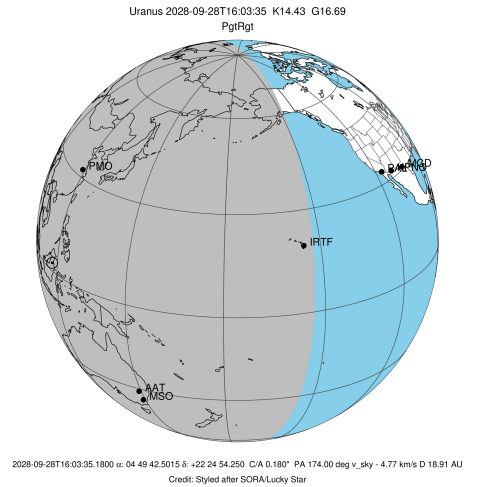
Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2028-09-28T13:17:53.350	-42.19x	-10.95	50819.18	-4.32		
lambda	I	2028-09-28T13:20:56.760	-41.67x	-11.69	50026.71	-4.32		
delta	I	2028-09-28T13:27:35.778	-40.53x	-13.32	48300.35	-4.33		
gamma	I	2028-09-28T13:30:12.600	-40.07x	-13.95	47620.98	-4.33		
eta	I	2028-09-28T13:31:55.227	-39.77x	-14.37	47176.12	-4.34		
beta	I	2028-09-28T13:37:46.644	-38.73x	-15.80	45650.86	-4.34		
alpha	I	2028-09-28T13:41:23.051	-38.08x	-16.68	44711.30	-4.35		
4	I	2028-09-28T13:49:35.442	-36.57x	-18.69	42566.43	-4.36		
5	I	2028-09-28T13:50:58.596	-36.31x	-19.02	42208.53	-4.36		
6	I	2028-09-28T13:52:29.083	-36.03x	-19.39	41807.41	-4.36		
Uranus	I	2028-09-28T14:54:27.235	-23.71x	-34.49	25319.17		5.49	5.75
Uranus	E	2028-09-28T17:52:04.202	15.70	-75.36	25497.39		-2.76	-2.90
6	E	2028-09-28T18:47:24.808	28.47	-79.50	41859.39	4.99		
5	E	2028-09-28T18:48:40.969	28.76	-79.41	42243.60	5.00		
4	E	2028-09-28T18:49:46.050	29.01	-79.32	42565.84	5.00		
alpha	E	2028-09-28T18:56:55.598	30.67	-78.59	44718.57	5.02		
beta	E	2028-09-28T19:00:06.149	31.41	-78.20	45674.74	5.03		
eta	E	2028-09-28T19:05:04.518	32.56	-77.51	47176.12	5.04		
gamma	E	2028-09-28T19:06:34.896	32.91	-77.29	47631.55	5.04		
delta	E	2028-09-28T19:08:47.499	33.42	-76.94	48300.35	5.05		
lambda	E	2028-09-28T19:14:29.149	34.74	-76.00	50026.71	5.06		
epsilon	E	2028-09-28T19:19:23.042	35.87	-75.13	51515.38	5.07		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-09-28T16:15:10.580
 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 : 3412875816215720320
 2Mass ID (if available) : 04494250+2224544
 ICRS Star Coord at Epoch: 04h 49m 42.50155s +22:24:54.24975s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.428
 G magnitude : 16.692
 RP magnitude : 15.943
 BP magnitude : 17.320
 DUPflag : 0
 Distance (au) : 18.911
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -4.77
 Sun-Target sep (deg) : 111.86
 Sun-Moon sep (deg) : 123.40
 B (ring opening deg) : 81.41
 PA of pole (deg) : -33.39
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.153
 C/A sky separation (km) : 2104.1
 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	2028-09-28T13:25:27.136		0.74x	-55.84	50791.11	-4.82		
lambda	I	2028-09-28T13:28:05.559		1.25x	-55.96	50026.71	-4.83		
delta	I	2028-09-28T13:34:02.734		2.38x	-56.19	48300.35	-4.84		
gamma	I	2028-09-28T13:36:23.063		2.82x	-56.26	47620.96	-4.84		
eta	I	2028-09-28T13:37:54.878		3.11x	-56.30	47176.12	-4.85		
beta	I	2028-09-28T13:43:09.725		4.09x	-56.42	45648.41	-4.86		
alpha	I	2028-09-28T13:46:21.656		4.69x	-56.47	44716.42	-4.86		
4	I	2028-09-28T13:53:41.374		6.05	-56.52	42573.73	-4.88		
5	I	2028-09-28T13:54:54.370		6.27	-56.52	42221.14	-4.88		
6	I	2028-09-28T13:56:17.146		6.52	-56.52	41812.76	-4.88		
Uranus	I	2028-09-28T14:51:20.802		16.15	-53.85	25460.50		3.50	3.67
Uranus	E	2028-09-28T17:37:01.640		35.30	-27.38	25383.44		-4.69	-4.91
6	E	2028-09-28T18:29:27.871		36.41	-16.67	41864.35	5.22		
5	E	2028-09-28T18:30:41.583		36.40	-16.41	42254.80	5.22		
4	E	2028-09-28T18:31:43.146		36.39	-16.20	42572.19	5.22		
alpha	E	2028-09-28T18:38:34.645		36.30	-14.76	44723.05	5.22		
beta	E	2028-09-28T18:41:36.552		36.24	-14.13	45672.72	5.23		
eta	E	2028-09-28T18:46:24.173		36.13	-13.12	47176.12	5.23		
gamma	E	2028-09-28T18:47:51.309		36.10	-12.82	47631.58	5.23		
delta	E	2028-09-28T18:49:59.243		36.04	-12.37	48300.35	5.23		
lambda	E	2028-09-28T18:55:29.429		35.86	-11.21	50026.71	5.23		
epsilon	E	2028-09-28T19:00:09.918		35.69	-10.22	51493.54	5.23		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2028-09-28T16:14:50.410
 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 : 3412875816215720320
 2Mass ID (if available) : 04494250+2224544
 ICRS Star Coord at Epoch: 04h 49m 42.50155s +22:24:54.24975s
 RUWE (>1.4 is poor) : 0.99
 K magnitude : 14.428
 G magnitude : 16.692
 RP magnitude : 15.943
 BP magnitude : 17.320
 DUPflag : 0
 Distance (au) : 18.911
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -4.77
 Sun-Target sep (deg) : 111.86
 Sun-Moon sep (deg) : 123.35
 B (ring opening deg) : 81.41
 PA of pole (deg) : -33.39
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.173
 C/A sky separation (km) : 2378.6
 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	2028-09-28T13:24:45.765	-1.26x	-51.86	50789.86	-4.81			
lambda	I	2028-09-28T13:27:24.172	-0.78x	-51.97	50026.71	-4.82			
delta	I	2028-09-28T13:33:21.925	0.31x	-52.17	48300.35	-4.83			
gamma	I	2028-09-28T13:35:42.491	0.73x	-52.24	47620.97	-4.84			
eta	I	2028-09-28T13:37:14.464	1.01x	-52.28	47176.12	-4.84			
beta	I	2028-09-28T13:42:29.896	1.95x	-52.39	45648.30	-4.85			
alpha	I	2028-09-28T13:45:42.107	2.52x	-52.44	44716.67	-4.85			
4	I	2028-09-28T13:53:02.665	3.82x	-52.49	42574.08	-4.87			
5	I	2028-09-28T13:54:15.743	4.03x	-52.49	42221.75	-4.87			
6	I	2028-09-28T13:55:38.778	4.27x	-52.49	41813.03	-4.87			
Uranus	I	2028-09-28T14:50:50.641	13.44	-50.21	25465.63			3.41	3.57
Uranus	E	2028-09-28T17:36:51.822	31.35	-25.91	25378.01			-4.76	-4.98
6	E	2028-09-28T18:29:31.416	32.38	-15.73	41864.55	5.20			
5	E	2028-09-28T18:30:45.447	32.37	-15.48	42255.27	5.20			
4	E	2028-09-28T18:31:47.215	32.36	-15.28	42572.46	5.20			
alpha	E	2028-09-28T18:38:40.263	32.28	-13.91	44723.24	5.20			
beta	E	2028-09-28T18:41:42.803	32.23	-13.30	45672.63	5.21			
eta	E	2028-09-28T18:46:31.521	32.13	-12.34	47176.12	5.21			
gamma	E	2028-09-28T18:47:58.982	32.10	-12.05	47631.58	5.21			
delta	E	2028-09-28T18:50:07.392	32.04	-11.62	48300.35	5.21			
lambda	E	2028-09-28T18:55:38.802	31.88	-10.51	50026.71	5.21			
epsilon	E	2028-09-28T19:00:20.121	31.72	-9.56	51492.49	5.21			