

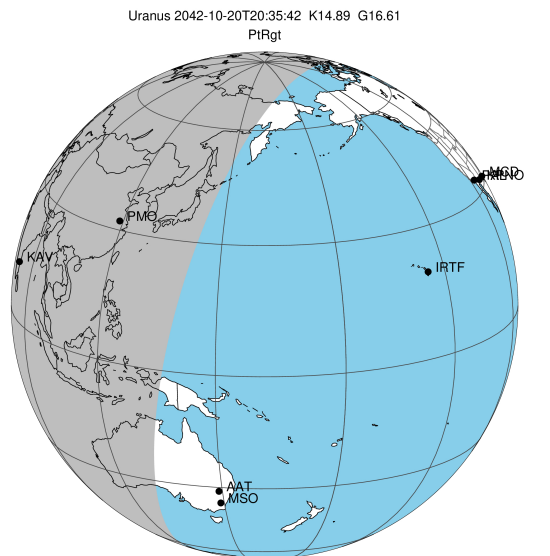
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-10-20T20:35:42.740
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 631754229992083584
 2Mass ID (if available) : 09160540+1633220

Uranus 2042-10-20T20:35:42 K14.89 G16.61 PtRgt

ICRS Star Coord at Epoch: 09h 16m 05.41395s +16:33:21.99303s

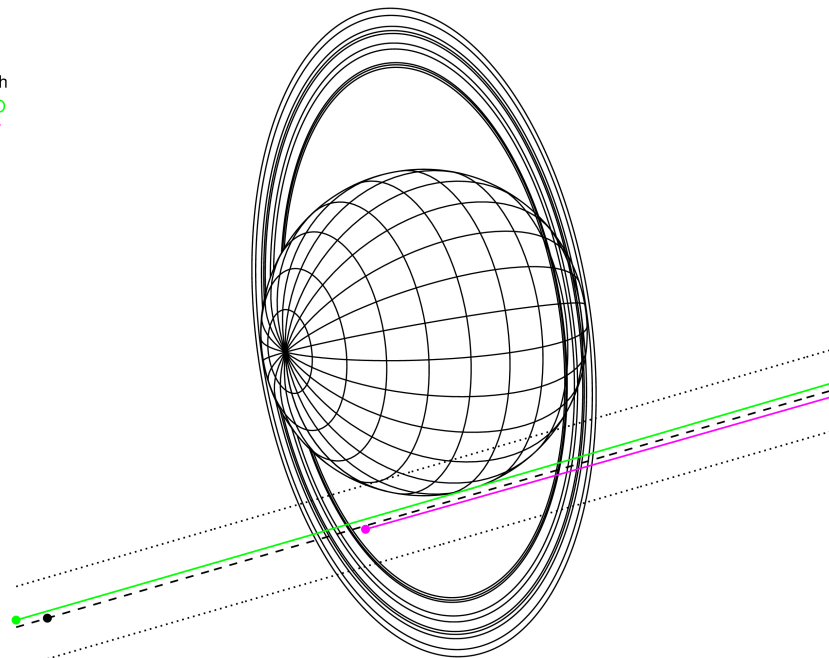
RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.893
 G magnitude : 16.612
 RP magnitude : 16.035
 BP magnitude : 17.026
 DUPflag : 0
 Distance (au) : 18.758
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.52
 Sun-Target sep (deg) : 70.64
 Sun-Moon sep (deg) : 145.33
 B (ring opening deg) : 30.87
 PA of pole (deg) : 98.08

#	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



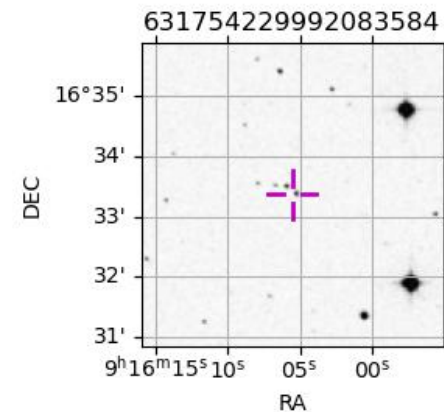
2042-10-20T20:35:42.7400 α: 09 16 05.4140 δ: +16 33 21.993 C/A 1.949° PA 16.19 deg v_sky +16.52 km/s D 18.76 AU
 Credit: Styled after SORA/Lucky Star

Earth
 PMO
 KAV

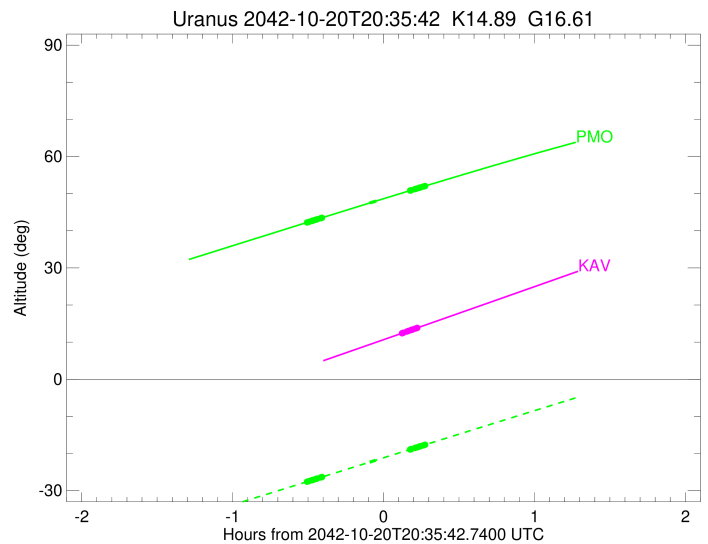
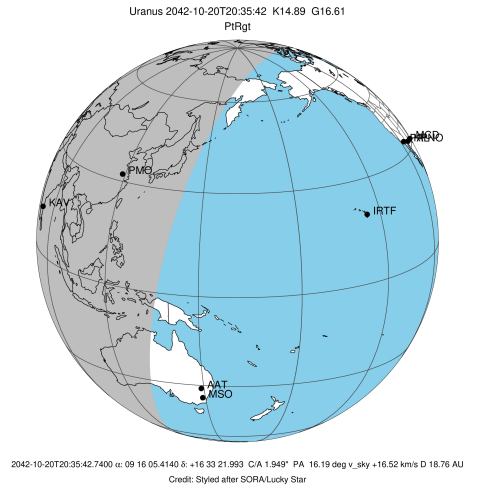


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+ +	+++++	OCT 20 20:05 - OCT 20 20:52	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			+++++	OCT 20 20:43 - OCT 20 20:49	PnnRne
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					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

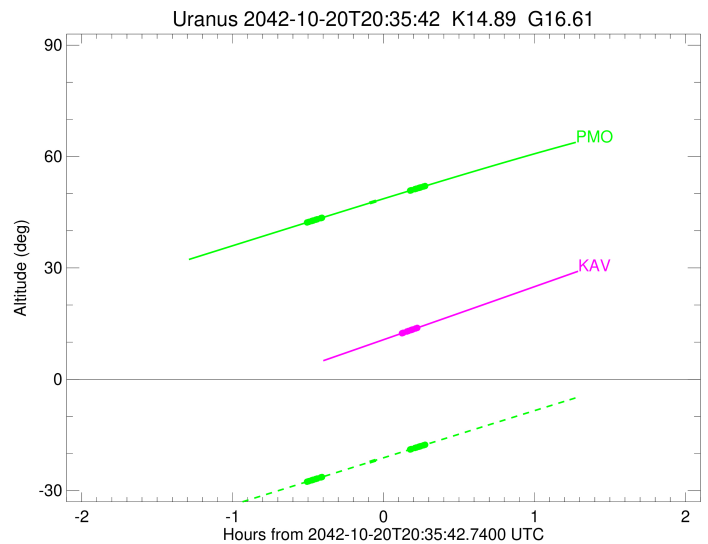
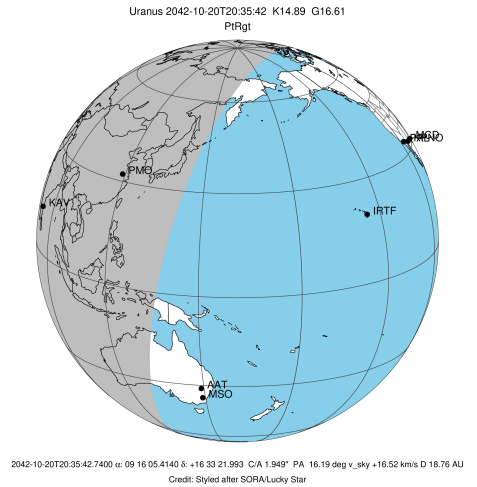


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-10-20T20:31:31.110
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 631754229992083584
 2Mass ID (if available) : 09160540+1633220
 ICRS Star Coord at Epoch: 09h 16m 05.41395s +16:33:21.99303s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.893
 G magnitude : 16.612
 RP magnitude : 16.035
 BP magnitude : 17.026
 DUPflag : 0
 Distance (au) : 18.759
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.52
 Sun-Target sep (deg) : 70.64
 Sun-Moon sep (deg) : 145.23
 B (ring opening deg) : 30.87
 PA of pole (deg) : 98.08
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.876
 C/A sky separation (km) : 25523.8
 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	2042-10-20T20:05:24.316		42.26	-27.58	51045.04	-27.30		
lambda	I	2042-10-20T20:06:01.921		42.40	-27.45	50026.71	-26.98		
delta	I	2042-10-20T20:07:06.323		42.62	-27.22	48300.35	-26.62		
gamma	I	2042-10-20T20:07:31.549		42.71	-27.13	47630.64	-26.47		
eta	I	2042-10-20T20:07:48.752		42.77	-27.07	47176.12	-26.37		
beta	I	2042-10-20T20:08:46.873		42.98	-26.86	45659.31	-25.98		
alpha	I	2042-10-20T20:09:24.039		43.11	-26.73	44704.48	-25.73		
4	I	2042-10-20T20:10:47.558		43.40	-26.44	42580.01	-25.09		
5	I	2042-10-20T20:10:58.693		43.44	-26.40	42245.04	-24.94		
6	I	2042-10-20T20:11:17.924		43.51	-26.33	41796.99	-24.80		
Uranus	I	2042-10-20T20:30:09.945		47.47	-22.33	25557.73		-4.45	-4.66
Uranus	E	2042-10-20T20:32:47.035		48.02	-21.78	25553.49		-9.35	-9.78
6	E	2042-10-20T20:46:15.440		50.82	-18.92	41860.20	24.72		
5	E	2042-10-20T20:46:36.770		50.89	-18.84	42309.27	24.86		
4	E	2042-10-20T20:46:46.430		50.92	-18.81	42611.68	25.01		
alpha	E	2042-10-20T20:48:12.594		51.22	-18.50	44752.31	25.65		
beta	E	2042-10-20T20:48:46.876		51.34	-18.38	45643.17	25.88		
eta	E	2042-10-20T20:49:45.637		51.54	-18.18	47176.12	26.27		
gamma	E	2042-10-20T20:50:02.568		51.60	-18.12	47621.71	26.37		
delta	E	2042-10-20T20:50:28.231		51.69	-18.02	48300.35	26.52		
lambda	E	2042-10-20T20:51:32.894		51.91	-17.80	50026.71	26.87		
epsilon	E	2042-10-20T20:52:28.945		52.10	-17.60	51540.67	27.18		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2042-10-20T20:29:12.750
 Event type : PtRgt
 : Uranus occs: topocentric, not geocentric
 : 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 : 631754229992083584
 2Mass ID (if available) : 09160540+1633220
 ICRS Star Coord at Epoch: 09h 16m 05.41395s +16:33:21.99303s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.893
 G magnitude : 16.612
 RP magnitude : 16.035
 BP magnitude : 17.026
 DUPflag : 0
 Distance (au) : 18.759
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 16.52
 Sun-Target sep (deg) : 70.64
 Sun-Moon sep (deg) : 144.71
 B (ring opening deg) : 30.87
 PA of pole (deg) : 98.08
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.997
 C/A sky separation (km) : 27162.5
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 ural11.bsp
 IAU_URANUS_for_RINGFIT.tpc
 vgr2.ural11.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	2042-10-20T20:03:57.244		3.16x	-66.75	51058.27	-27.10		
lambda	I	2042-10-20T20:04:35.656		3.31x	-66.59	50026.71	-26.74		
delta	I	2042-10-20T20:05:40.724		3.57x	-66.33	48300.35	-26.32		
gamma	I	2042-10-20T20:06:06.262		3.67x	-66.23	47630.52	-26.14		
eta	I	2042-10-20T20:06:23.688		3.74x	-66.15	47176.12	-26.01		
beta	I	2042-10-20T20:07:22.714		3.97x	-65.91	45658.51	-25.55		
alpha	I	2042-10-20T20:08:00.460		4.12x	-65.76	44705.78	-25.26		
4	I	2042-10-20T20:09:25.683		4.45x	-65.41	42582.02	-24.49		
5	I	2042-10-20T20:09:37.203		4.50x	-65.37	42248.70	-24.32		
6	I	2042-10-20T20:09:56.888		4.57x	-65.29	41797.68	-24.15		

No planet occultations

6	E	2042-10-20T20:43:00.974		12.39	-57.22	41858.23	24.04		
5	E	2042-10-20T20:43:22.881		12.48	-57.13	42310.78	24.21		
4	E	2042-10-20T20:43:32.975		12.52	-57.09	42612.70	24.38		
alpha	E	2042-10-20T20:45:01.049		12.86	-56.73	44752.14	25.13		
beta	E	2042-10-20T20:45:35.975		13.00	-56.59	45642.76	25.42		
eta	E	2042-10-20T20:46:35.733		13.24	-56.34	47176.12	25.87		
gamma	E	2042-10-20T20:46:52.923		13.31	-56.27	47621.83	25.99		
delta	E	2042-10-20T20:47:18.943		13.41	-56.17	48300.35	26.16		
lambda	E	2042-10-20T20:48:24.400		13.67	-55.90	50026.71	26.58		
epsilon	E	2042-10-20T20:49:21.170		13.89	-55.67	51544.76	26.93		