

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2031-04-02T13:30:03.600  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3415726746788735488  
 2Mass ID (if available) : 05115864+2304564

Uranus 2031-04-02T13:30:03 K14.46 G16.38 PgtRgt

ICRS Star Coord at Epoch: 05h 11m 58.65396s +23:04:56.61617s

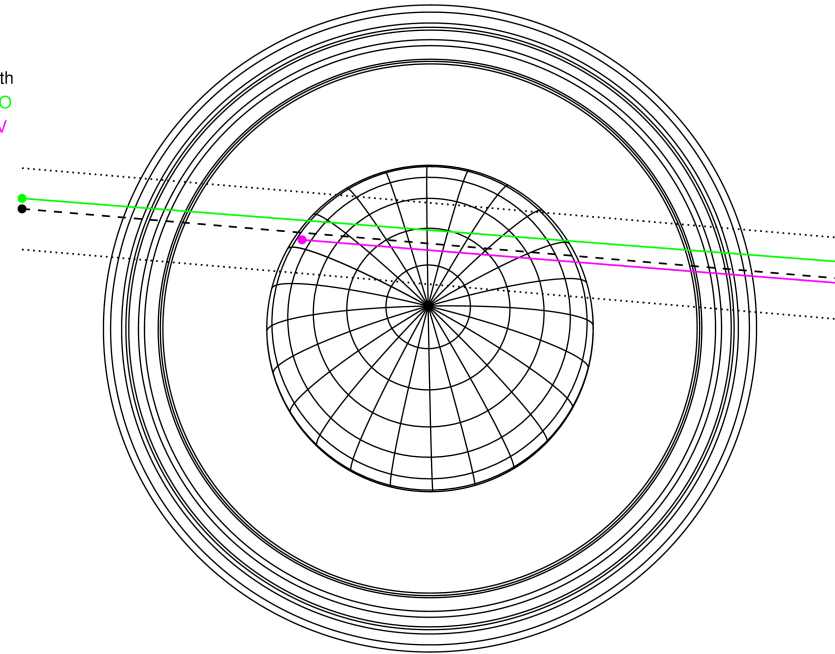
RUWE (>1.4 is poor) : 0.96  
 K magnitude : 14.457  
 G magnitude : 16.383  
 RP magnitude : 15.768  
 BP magnitude : 16.817  
 DUPflag : 0  
 Distance (au) : 19.507  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 18.08  
 Sun-Target sep (deg) : 66.78  
 Sun-Moon sep (deg) : 51.32  
 B (ring opening deg) : 82.07  
 PA of pole (deg) : 4.78

#	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



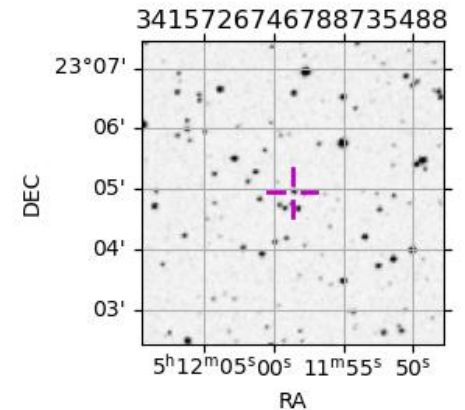
2031-04-02T13:30:03.6000 cc: 05 11 58.6540 s: +23 04 56.616 C/A 0.941" PA 175.13 deg v\_sky +18.08 km/s D 19.51 AU  
 Credit: Styled after SORA/Lucky Star

Earth  
 PMO  
 KAV

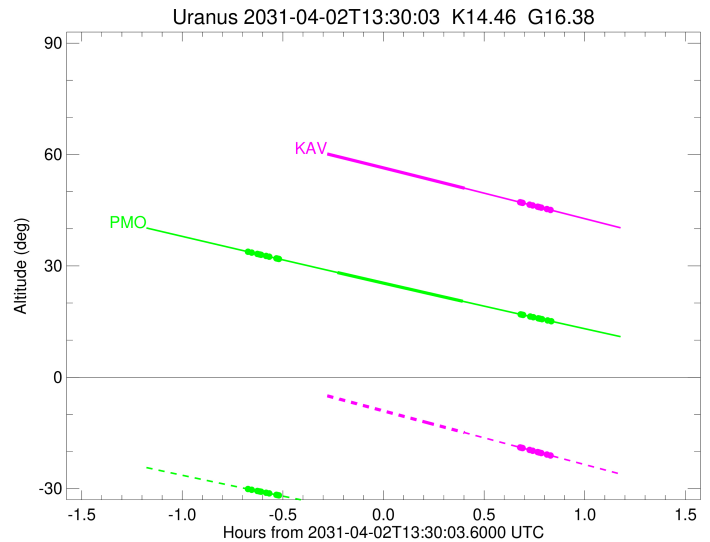
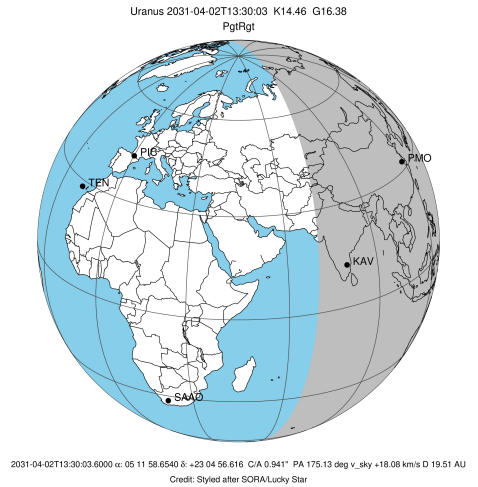


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+++++	+ +	+++++	APR 02 12:50 - APR 02 14:20	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		+	+++++	APR 02 13:54 - APR 02 14:20	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					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

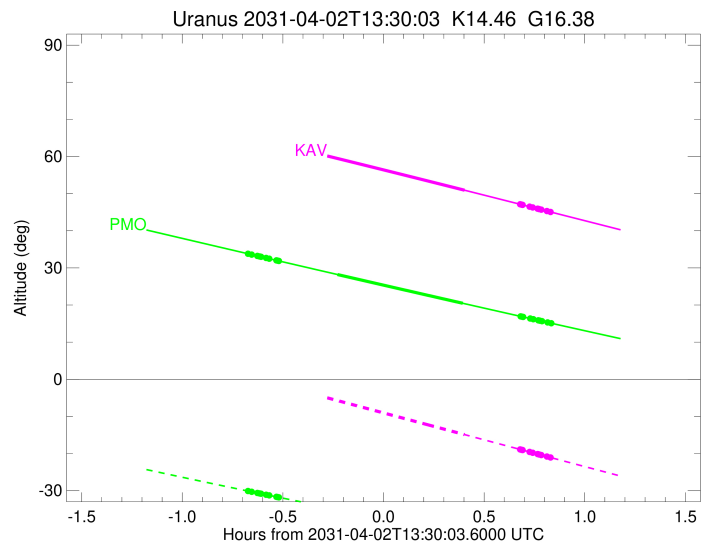
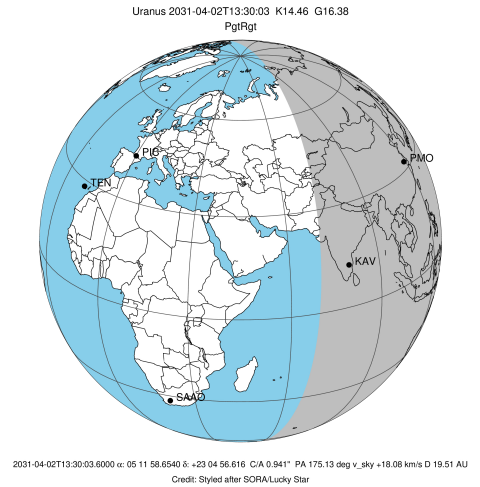


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2031-04-02T13:34:56.300  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PMO  
 Location : Purple Mtn Obs. Nanking  
 Latitude (deg) : 32.06667  
 E. Longitude (deg) : 118.82089  
 Altitude (km) : 0.364  
 Gaia source ID : 3415726746788735488  
 2Mass ID (if available) : 05115864+2304564  
 ICRS Star Coord at Epoch: 05h 11m 58.65396s +23:04:56.61617s  
 RUWE (>1.4 is poor) : 0.96  
 K magnitude : 14.457  
 G magnitude : 16.383  
 RP magnitude : 15.768  
 BP magnitude : 16.817  
 DUPflag : 0  
 Distance (au) : 19.507  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 18.08  
 Sun-Target sep (deg) : 66.78  
 Sun-Moon sep (deg) : 51.17  
 B (ring opening deg) : 82.07  
 PA of pole (deg) : 4.78  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.085  
 C/A sky separation (km) : 15350.7  
 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	2031-04-02T12:50:02.589		33.73	-30.18	50771.96	-17.01		
lambda	I	2031-04-02T12:50:46.395		33.58	-30.32	50026.71	-17.00		
delta	I	2031-04-02T12:52:28.134		33.22	-30.63	48300.35	-16.94		
gamma	I	2031-04-02T12:53:08.278		33.08	-30.75	47620.98	-16.91		
eta	I	2031-04-02T12:53:34.601		32.99	-30.83	47176.12	-16.89		
beta	I	2031-04-02T12:55:03.437		32.68	-31.11	45678.74	-16.82		
alpha	I	2031-04-02T12:55:59.358		32.48	-31.28	44739.34	-16.78		
4	I	2031-04-02T12:58:06.489		32.03	-31.67	42611.84	-16.67		
5	I	2031-04-02T12:58:25.035		31.97	-31.73	42305.82	-16.64		
6	I	2031-04-02T12:58:53.002		31.87	-31.81	41840.33	-16.61		
Uranus	I	2031-04-02T13:16:19.187		28.22	-34.94	25250.14		5.76	6.03
Uranus	E	2031-04-02T13:53:43.671		20.47	-41.16	25429.51		3.71	3.88
6	E	2031-04-02T14:10:54.481		16.95	-43.73	41805.83	16.74		
5	E	2031-04-02T14:11:15.391		16.88	-43.78	42157.53	16.77		
4	E	2031-04-02T14:11:39.079		16.80	-43.83	42554.95	16.80		
alpha	E	2031-04-02T14:13:47.485		16.37	-44.14	44720.02	16.93		
beta	E	2031-04-02T14:14:41.864		16.18	-44.26	45641.41	16.97		
eta	E	2031-04-02T14:16:12.100		15.88	-44.47	47176.12	17.04		
gamma	E	2031-04-02T14:16:38.760		15.79	-44.54	47630.77	17.06		
delta	E	2031-04-02T14:17:17.966		15.65	-44.63	48300.35	17.09		
lambda	E	2031-04-02T14:18:58.753		15.31	-44.86	50026.71	17.16		
epsilon	E	2031-04-02T14:20:16.784		15.05	-45.03	51367.94	17.18		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2031-04-02T13:33:11.370  
 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 : 3415726746788735488  
 2Mass ID (if available) : 05115864+2304564  
 ICRS Star Coord at Epoch: 05h 11m 58.65396s +23:04:56.61617s  
 RUWE (>1.4 is poor) : 0.96  
 K magnitude : 14.457  
 G magnitude : 16.383  
 RP magnitude : 15.768  
 BP magnitude : 16.817  
 DUPflag : 0  
 Distance (au) : 19.507  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 18.08  
 Sun-Target sep (deg) : 66.78  
 Sun-Moon sep (deg) : 51.61  
 B (ring opening deg) : 82.07  
 PA of pole (deg) : 4.78  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.863  
 C/A sky separation (km) : 12212.2  
 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\_itrf93\_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	2031-04-02T12:46:47.155		65.93	1.44x	50781.61	-17.10		
lambda	I	2031-04-02T12:47:31.284		65.78	1.26x	50026.71	-17.10		
delta	I	2031-04-02T12:49:12.362		65.42	0.85x	48300.35	-17.06		
gamma	I	2031-04-02T12:49:52.205		65.27	0.69x	47620.96	-17.04		
eta	I	2031-04-02T12:50:18.315		65.18	0.58x	47176.12	-17.03		
beta	I	2031-04-02T12:51:46.312		64.86	0.23x	45679.36	-16.99		
alpha	I	2031-04-02T12:52:41.803		64.67	0.00x	44737.41	-16.97		
4	I	2031-04-02T12:54:47.391		64.21	-0.51x	42610.22	-16.90		
5	I	2031-04-02T12:55:05.395		64.15	-0.58x	42308.46	-16.88		
6	I	2031-04-02T12:55:32.949		64.05	-0.69x	41843.55	-16.86		
Uranus	I	2031-04-02T13:12:16.299		60.38	-4.75x	25333.82		4.90	5.14
Uranus	E	2031-04-02T13:54:14.735		50.93	-14.91	25494.84		2.60	2.73
6	E	2031-04-02T14:10:45.548		47.15	-18.89	41808.34	16.96		
5	E	2031-04-02T14:11:05.998		47.07	-18.97	42156.09	16.98		
4	E	2031-04-02T14:11:29.279		46.99	-19.06	42551.53	17.00		
alpha	E	2031-04-02T14:13:36.437		46.50	-19.57	44717.37	17.07		
beta	E	2031-04-02T14:14:30.510		46.29	-19.79	45641.18	17.10		
eta	E	2031-04-02T14:16:00.147		45.95	-20.15	47176.12	17.15		
gamma	E	2031-04-02T14:16:26.665		45.85	-20.26	47630.97	17.16		
delta	E	2031-04-02T14:17:05.656		45.70	-20.41	48300.35	17.18		
lambda	E	2031-04-02T14:18:46.031		45.32	-20.81	50026.71	17.22		
epsilon	E	2031-04-02T14:20:05.159		45.01	-21.13	51390.61	17.23		