

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-04-15T21:13:44.900  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3416545711152624128  
 2Mass ID (if available) : 05321861+2326399

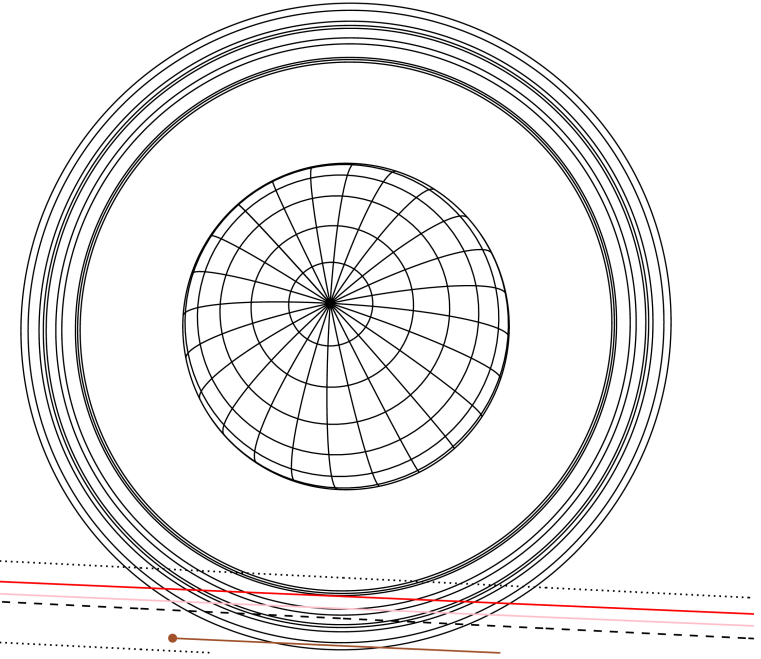
ICRS Star Coord at Epoch: 05h 32m 18.62723s +23:26:39.87592s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.494  
 G magnitude : 17.037  
 RP magnitude : 16.226  
 BP magnitude : 17.734  
 DUPflag : 0  
 Distance (au) : 19.583  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 22.29  
 Sun-Target sep (deg) : 57.64  
 Sun-Moon sep (deg) : 13.63  
 B (ring opening deg) : 80.10  
 PA of pole (deg) : 34.35



2032-04-15T21:13:44.9000 ex: 05 32 18.62723 s +23 26 39.876 C/A 3.212" PA 357.20 deg v\_sky +22.29 km/s D 19.58 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2032-04-15T21:13:44 K14.49 G17.04 XRgt

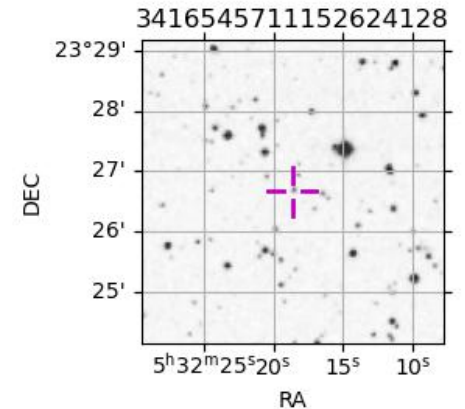
Earth  
 PIC  
 TEN  
 RIO



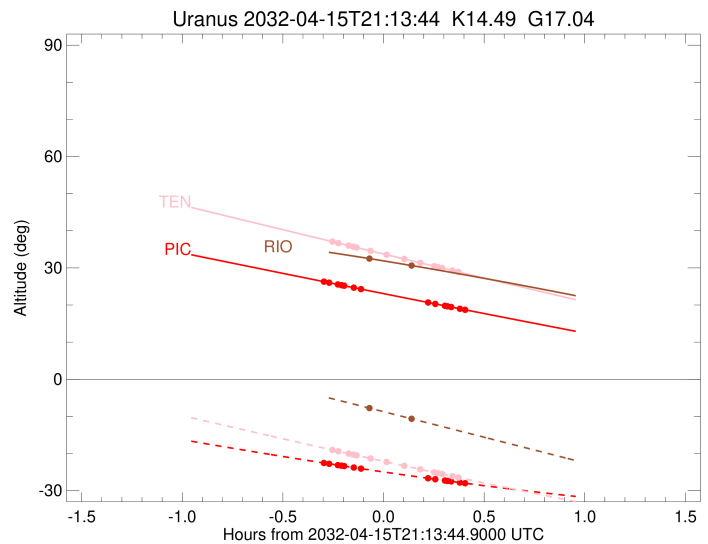
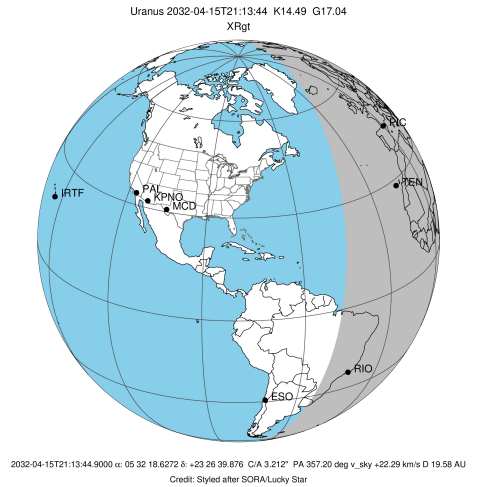
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	++++++		++++++	APR 15 20:56 - APR 15 21:37	PnnRie
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
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	++++++		++++++	APR 15 20:58 - APR 15 21:35	PnnRie
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+		+	APR 15 21:11 - APR 15 21:19	PnnRie
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 : 2032-04-15T21:17:30.350  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 3416545711152624128  
 2Mass ID (if available) : 05321861+2326399  
 ICRS Star Coord at Epoch: 05h 32m 18.62723s +23:26:39.87592s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.494  
 G magnitude : 17.037  
 RP magnitude : 16.226  
 BP magnitude : 17.734  
 DUPflag : 0  
 Distance (au) : 19.583  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 22.29  
 Sun-Target sep (deg) : 57.64  
 Sun-Moon sep (deg) : 13.27  
 B (ring opening deg) : 80.10  
 PA of pole (deg) : 34.35  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 2.975  
 C/A sky separation (km) : 42252.7  
 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

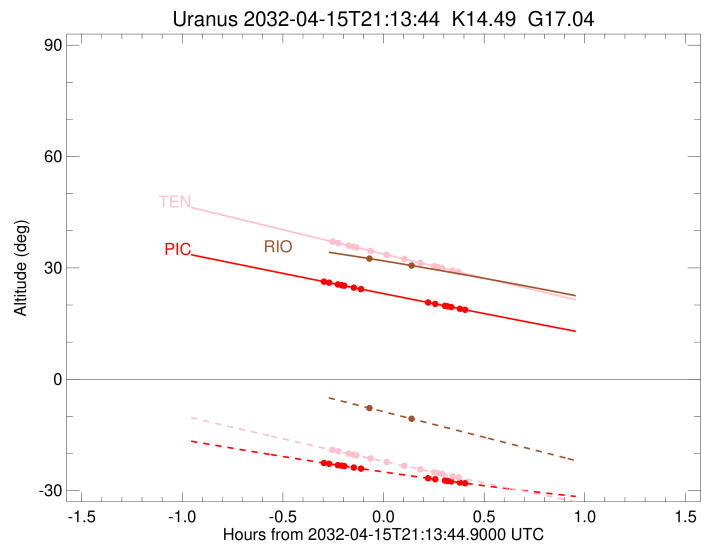
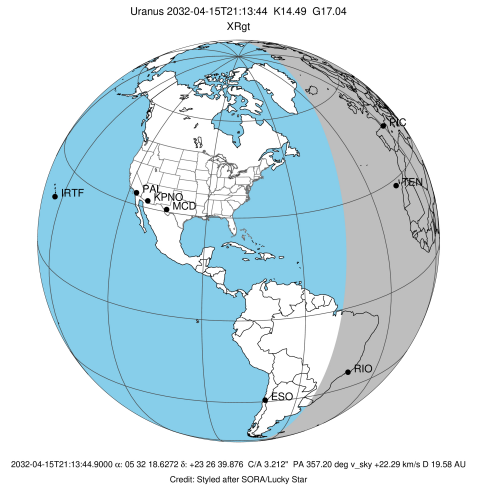


Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-04-15T20:56:16.599		26.24	-22.59	50949.09	-12.06		
lambda	I	2032-04-15T20:57:33.990		26.01	-22.77	50026.71	-11.64		
delta	I	2032-04-15T21:00:10.100		25.53	-23.13	48300.35	-10.45		
gamma	I	2032-04-15T21:01:15.940		25.33	-23.29	47629.84	-9.91		
eta	I	2032-04-15T21:02:02.647		25.19	-23.39	47176.12	-9.51		
beta	I	2032-04-15T21:04:53.529		24.68	-23.78	45680.94	-7.96		
alpha	I	2032-04-15T21:07:00.832		24.29	-24.07	44745.99	-6.70		

No planet occultations

alpha	E	2032-04-15T21:27:02.145		20.68	-26.67	44729.66	6.71		
beta	E	2032-04-15T21:29:10.548		20.30	-26.93	45673.66	7.98		
eta	E	2032-04-15T21:32:02.019		19.79	-27.28	47176.12	9.54		
gamma	E	2032-04-15T21:32:48.785		19.65	-27.38	47631.56	9.94		
delta	E	2032-04-15T21:33:54.280		19.46	-27.51	48300.35	10.48		
lambda	E	2032-04-15T21:36:29.937		18.99	-27.82	50026.71	11.68		
epsilon	E	2032-04-15T21:37:30.315		18.82	-27.94	50745.05	12.10		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-04-15T21:17:47.300  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Observer code : TEN  
 Location : Teide Obs./Tenerife  
 Latitude (deg) : 28.30050  
 E. Longitude (deg) : 343.48909  
 Altitude (km) : 2.395  
 Gaia source ID : 3416545711152624128  
 2Mass ID (if available) : 05321861+2326399  
 ICRS Star Coord at Epoch: 05h 32m 18.62723s +23:26:39.87592s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.494  
 G magnitude : 17.037  
 RP magnitude : 16.226  
 BP magnitude : 17.734  
 DUPflag : 0  
 Distance (au) : 19.583  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 22.29  
 Sun-Target sep (deg) : 57.64  
 Sun-Moon sep (deg) : 13.16  
 B (ring opening deg) : 80.10  
 PA of pole (deg) : 34.35  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.109  
 C/A sky separation (km) : 44156.0  
 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



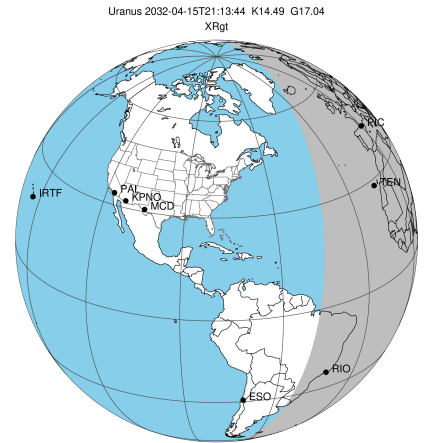
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-04-15T20:58:51.192		36.99	-19.11	50923.52	-10.58		
lambda	I	2032-04-15T21:00:17.553		36.68	-19.40	50026.71	-10.05		
delta	I	2032-04-15T21:03:23.152		36.00	-20.03	48300.35	-8.52		
gamma	I	2032-04-15T21:04:45.265		35.70	-20.30	47630.22	-7.80		
eta	I	2032-04-15T21:05:45.666		35.48	-20.50	47176.12	-7.24		
beta	I	2032-04-15T21:09:53.293		34.59	-21.33	45680.24	-4.80		
alpha	I	2032-04-15T21:14:37.112		33.56	-22.27	44740.85	-1.77		

No planet occultations

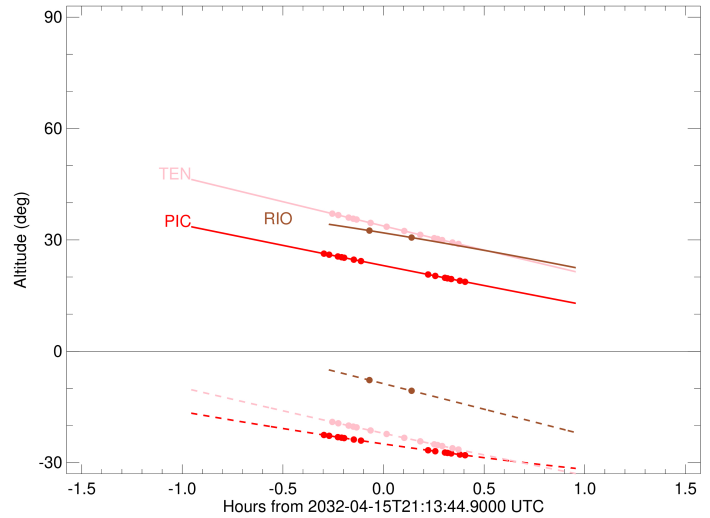
alpha	E	2032-04-15T21:19:57.297		32.40	-23.33	44736.52	1.77		
beta	E	2032-04-15T21:24:42.195		31.37	-24.26	45675.81	4.81		
eta	E	2032-04-15T21:28:50.386		30.48	-25.06	47176.12	7.25		
gamma	E	2032-04-15T21:29:50.835		30.26	-25.26	47631.58	7.81		
delta	E	2032-04-15T21:31:12.587		29.97	-25.52	48300.35	8.54		
lambda	E	2032-04-15T21:34:17.692		29.30	-26.12	50026.71	10.08		
epsilon	E	2032-04-15T21:35:26.938		29.05	-26.34	50743.55	10.62		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-04-15T21:16:23.500  
 Event type : XRgt  
 : No Uranus occs  
 : Ring occs: geocentric, topocentric  
 Observer code : RIO  
 Location : Rio de Janeiro  
 Latitude (deg) : -22.89506  
 E. Longitude (deg) : 316.77708  
 Altitude (km) : 0.033  
 Gaia source ID : 3416545711152624128  
 2Mass ID (if available) : 05321861+2326399  
 ICRS Star Coord at Epoch: 05h 32m 18.62723s +23:26:39.87592s  
 RUWE (>1.4 is poor) : 1.02  
 K magnitude : 14.494  
 G magnitude : 17.037  
 RP magnitude : 16.226  
 BP magnitude : 17.734  
 DUPflag : 0  
 Distance (au) : 19.583  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 22.29  
 Sun-Target sep (deg) : 57.64  
 Sun-Moon sep (deg) : 13.11  
 B (ring opening deg) : 80.10  
 PA of pole (deg) : 34.35  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 3.520  
 C/A sky separation (km) : 49989.6  
 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\_itrf93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



2032-04-15T21:13:44.9000 u: 05 32 18.6272 s: +23 26 39.876 C/A 3.212" PA 357.20 deg v\_sky +22.29 km/s D 19.58 AU  
 Credit: Styled after SORA/Lucky Star

Uranus 2032-04-15T21:13:44 K14.49 G17.04



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-04-15T21:11:28.341		32.23	-8.21	50814.74	-2.42		

No planet occultations

epsilon	E	2032-04-15T21:19:55.534		30.97	-10.14	50773.97	2.42		
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