

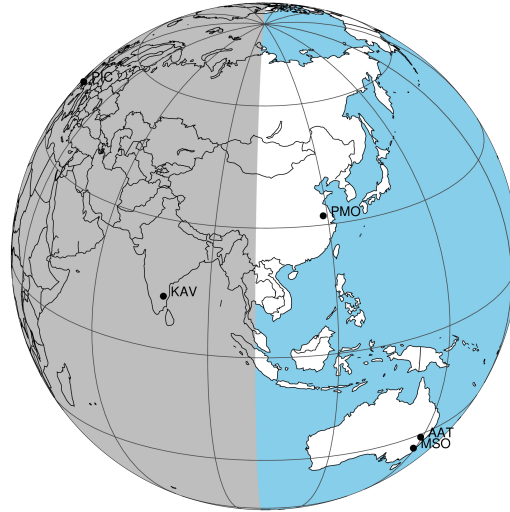
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-09-21T23:09:19.010
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3426133139013534848
 2Mass ID (if available) : 06045075+2337186

Uranus 2032-09-21T23:09:19 K14.73 G17.38 PgtRgt

ICRS Star Coord at Epoch: 06h 04m 50.75098s +23:37:18.34059s

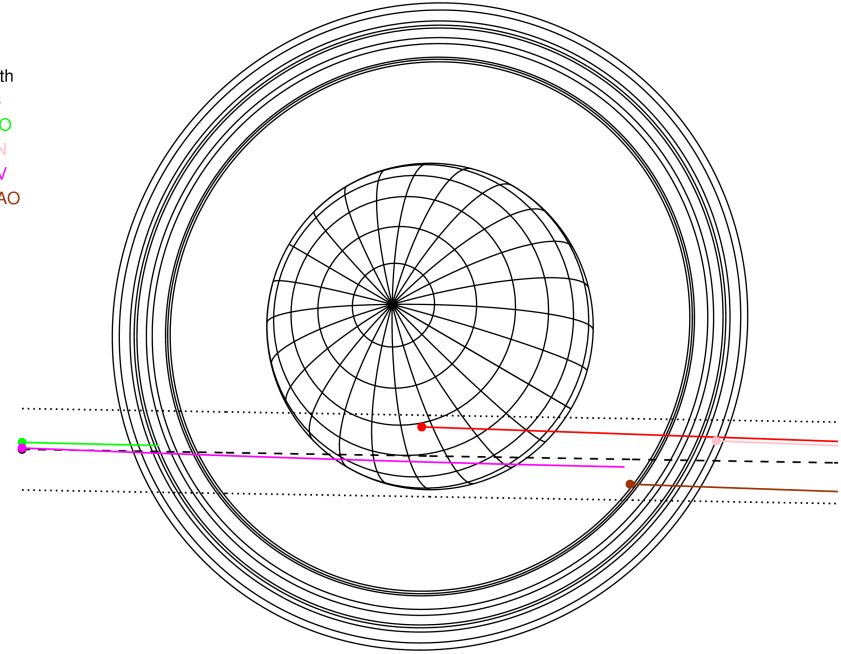
RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.732
 G magnitude : 17.378
 RP magnitude : 16.562
 BP magnitude : 18.117
 DUPflag : 0
 Distance (au) : 19.045
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.44
 Sun-Target sep (deg) : 87.95
 Sun-Moon sep (deg) : 56.63
 B (ring opening deg) : 74.42
 PA of pole (deg) : 59.69

Uranus 2032-09-21T23:09:19 K14.73 G17.38
 PgtRgt



2032-09-21T23:09:19.0100 α: 06 04 50.7510 α: +23 37 18.341 C/A 1.466° PA 359.05 deg v_sky + 7.44 km/s D 19.05 AU
 Credit: Styled after SORA/Lucky Star

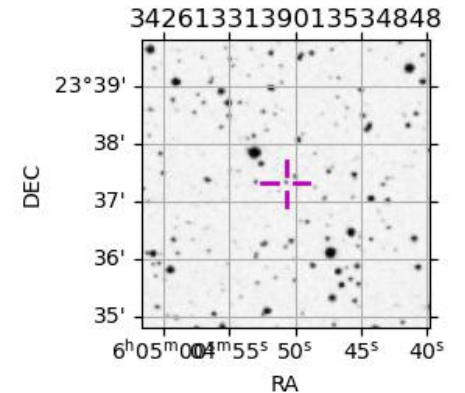
Earth
 PIC
 PMO
 TEN
 KAV
 SAAO



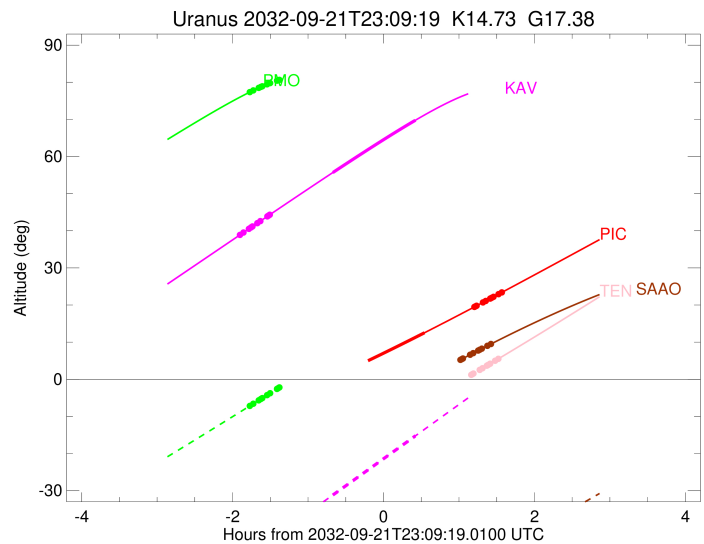
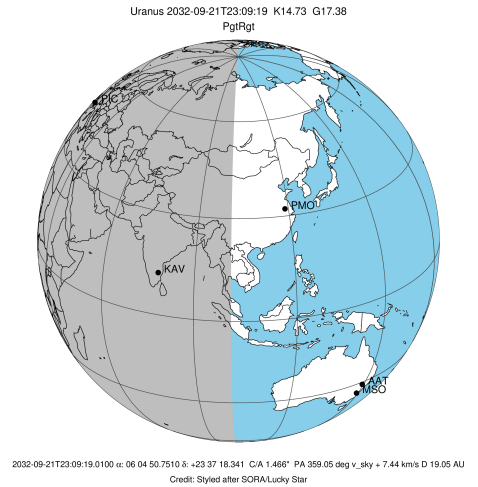
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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		+	+++++	SEP 21 23:41 - SEP 22 00:44	PneRne
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8	+++++			SEP 21 21:23 - SEP 21 21:32	PnnRin
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			+	SEP 22 00:41 - SEP 22 00:41	PnnRne
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8	+++++	+ +		SEP 21 21:15 - SEP 21 23:34	PieRin
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			+++++	SEP 22 00:10 - SEP 22 00:35	PnnRne
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn

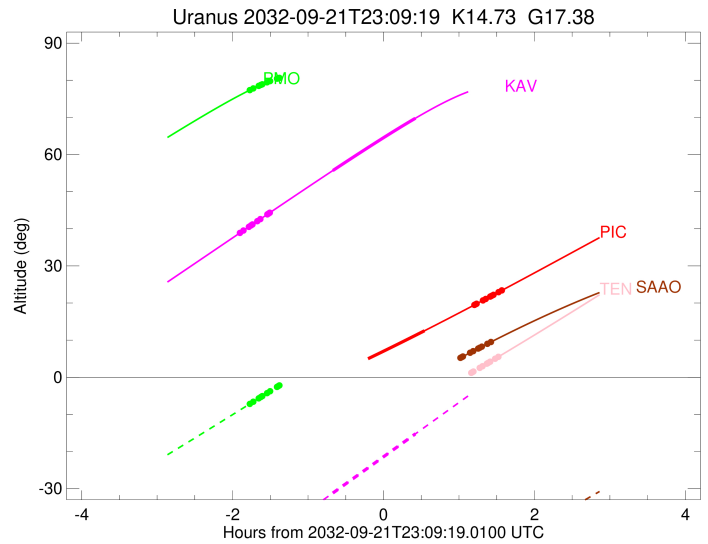
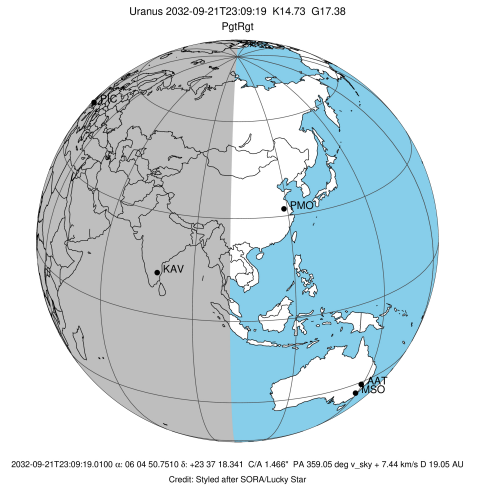


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-09-21T22:58:44.330
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PIC
 Location : Pic du Midi
 Latitude (deg) : 42.93656
 E. Longitude (deg) : 0.14231
 Altitude (km) : 2.890
 Gaia source ID : 3426133139013534848
 2Mass ID (if available) : 06045075+2337186
 ICRS Star Coord at Epoch: 06h 04m 50.75098s +23:37:18.34059s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.732
 G magnitude : 17.378
 RP magnitude : 16.562
 BP magnitude : 18.117
 DUPflag : 0
 Distance (au) : 19.045
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.44
 Sun-Target sep (deg) : 87.95
 Sun-Moon sep (deg) : 56.34
 B (ring opening deg) : 74.42
 PA of pole (deg) : 59.69
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.141
 C/A sky separation (km) : 15765.0
 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_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	2032-09-21T21:15:14.874	-9.99x	-34.49	50842.33	-7.55			
lambda	I	2032-09-21T21:17:03.162	-9.76x	-34.75	50026.71	-7.52			
delta	I	2032-09-21T21:20:53.167	-9.26x	-35.28	48300.35	-7.49			
gamma	I	2032-09-21T21:22:22.596	-9.07x	-35.49	47631.44	-7.47			
eta	I	2032-09-21T21:23:23.575	-8.93x	-35.62	47176.12	-7.46			
beta	I	2032-09-21T21:26:44.476	-8.49x	-36.08	45681.17	-7.42			
alpha	I	2032-09-21T21:28:49.440	-8.21x	-36.36	44752.25	-7.40			
4	I	2032-09-21T21:33:47.336	-7.54x	-37.02	42556.97	-7.33			
5	I	2032-09-21T21:34:21.115	-7.46x	-37.09	42312.63	-7.33			
6	I	2032-09-21T21:35:27.059	-7.31x	-37.23	41836.25	-7.32			
Uranus	I	2032-09-21T22:14:44.753	-1.65x	-41.81	25471.34			6.11	6.40
Uranus	E	2032-09-21T23:41:56.925	12.54	-47.01	25033.85			-15.30	-15.99
6	E	2032-09-22T00:21:35.213	19.49	-46.58	41868.00	7.04			
5	E	2032-09-22T00:22:17.939	19.61	-46.55	42165.55	7.04			
4	E	2032-09-22T00:23:14.861	19.78	-46.52	42551.33	7.05			
alpha	E	2032-09-22T00:28:17.592	20.68	-46.32	44695.81	7.09			
beta	E	2032-09-22T00:30:30.997	21.08	-46.23	45647.11	7.11			
eta	E	2032-09-22T00:34:05.792	21.72	-46.06	47176.12	7.14			
gamma	E	2032-09-22T00:35:08.392	21.91	-46.01	47623.02	7.14			
delta	E	2032-09-22T00:36:43.160	22.20	-45.93	48300.35	7.15			
lambda	E	2032-09-22T00:40:44.155	22.92	-45.72	50026.71	7.17			
epsilon	E	2032-09-22T00:44:16.772	23.56	-45.52	51553.98	7.19			

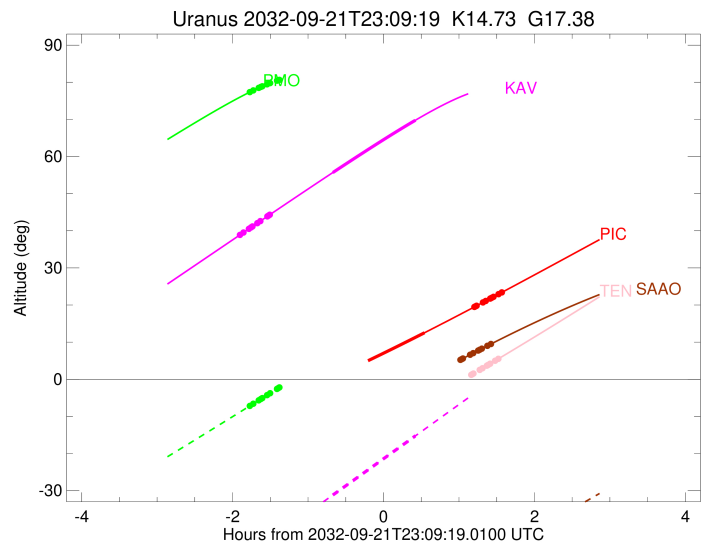
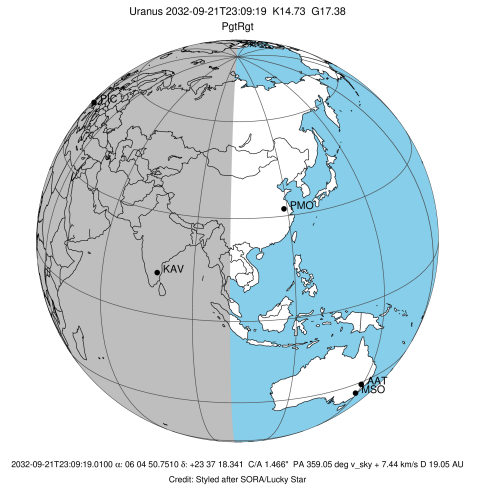
target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-09-21T23:13:05.540
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 3426133139013534848
 2Mass ID (if available) : 06045075+2337186
 ICRS Star Coord at Epoch: 06h 04m 50.75098s +23:37:18.34059s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.732
 G magnitude : 17.378
 RP magnitude : 16.562
 BP magnitude : 18.117
 DUPflag : 0
 Distance (au) : 19.045
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.44
 Sun-Target sep (deg) : 87.95
 Sun-Moon sep (deg) : 57.56
 B (ring opening deg) : 74.42
 PA of pole (deg) : 59.69
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.397
 C/A sky separation (km) : 19295.8
 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_itrfr93_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

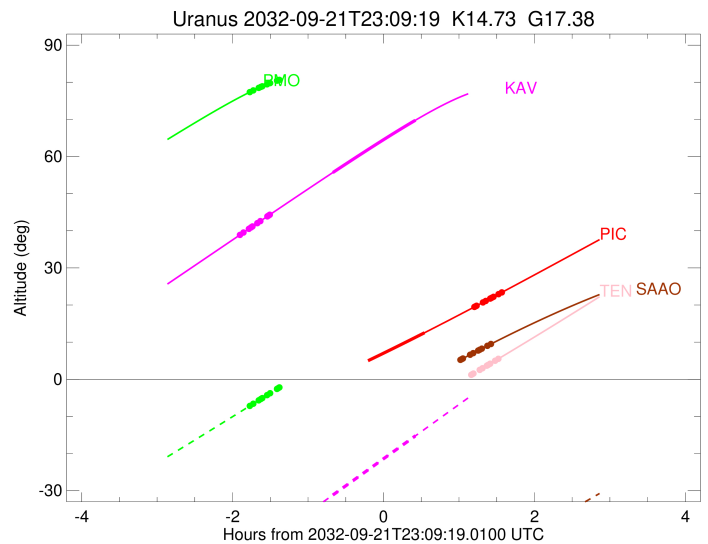
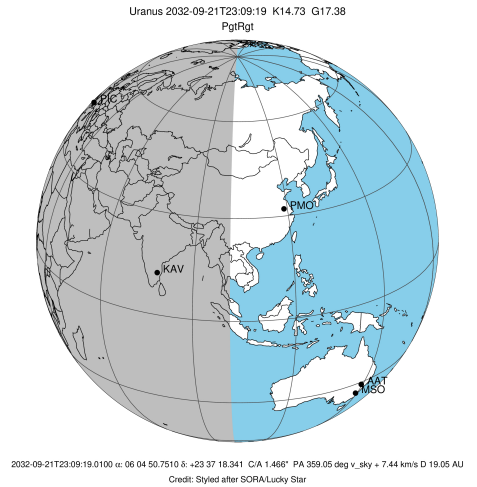
Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-09-21T21:23:45.042	77.48	-7.02	50867.30	-6.74		
lambda	I	2032-09-21T21:25:50.251	77.82	-6.58	50026.71	-6.70		
delta	I	2032-09-21T21:30:08.691	78.50	-5.67	48300.35	-6.66		
gamma	I	2032-09-21T21:31:49.316	78.75	-5.32	47631.53	-6.64		
eta	I	2032-09-21T21:32:58.005	78.92	-5.07	47176.12	-6.62		
beta	I	2032-09-21T21:36:44.562	79.46	-4.27x	45681.23	-6.58		
alpha	I	2032-09-21T21:39:05.817	79.78	-3.78x	44752.43	-6.54		
4	I	2032-09-21T21:44:44.204	80.45	-2.58x	42552.38	-6.45		
5	I	2032-09-21T21:45:22.055	80.52	-2.45x	42309.94	-6.45		
6	I	2032-09-21T21:46:35.795	80.65	-2.19x	41840.96	-6.43		
Uranus	I	2032-09-21T22:33:30.408	79.75	7.76x	25537.35		3.03	3.17
Uranus	E	2032-09-21T23:50:58.549	65.40	23.92x	25080.52		-14.57	-15.23
6	E	2032-09-22T00:36:38.062	55.80	33.04x	41869.92	6.45		
5	E	2032-09-22T00:37:24.681	55.63	33.19x	42168.38	6.46		
4	E	2032-09-22T00:38:25.924	55.42	33.39x	42548.70	6.47		
alpha	E	2032-09-22T00:43:54.947	54.25	34.44x	44697.37	6.56		
beta	E	2032-09-22T00:46:18.917	53.74	34.90x	45647.97	6.59		
eta	E	2032-09-22T00:50:09.976	52.92	35.64x	47176.12	6.64		
gamma	E	2032-09-22T00:51:17.217	52.69	35.85x	47623.25	6.66		
delta	E	2032-09-22T00:52:58.784	52.33	36.17x	48300.35	6.68		
lambda	E	2032-09-22T00:57:16.433	51.41	36.98x	50026.71	6.72		
epsilon	E	2032-09-22T01:01:03.087	50.61	37.69x	51555.06	6.76		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-09-21T22:58:08.530
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : 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 : 3426133139013534848
 2Mass ID (if available) : 06045075+2337186
 ICRS Star Coord at Epoch: 06h 04m 50.75098s +23:37:18.34059s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.732
 G magnitude : 17.378
 RP magnitude : 16.562
 BP magnitude : 18.117
 DUPflag : 0
 Distance (au) : 19.045
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.44
 Sun-Target sep (deg) : 87.95
 Sun-Moon sep (deg) : 56.04
 B (ring opening deg) : 74.42
 PA of pole (deg) : 59.69
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.178
 C/A sky separation (km) : 16267.5
 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



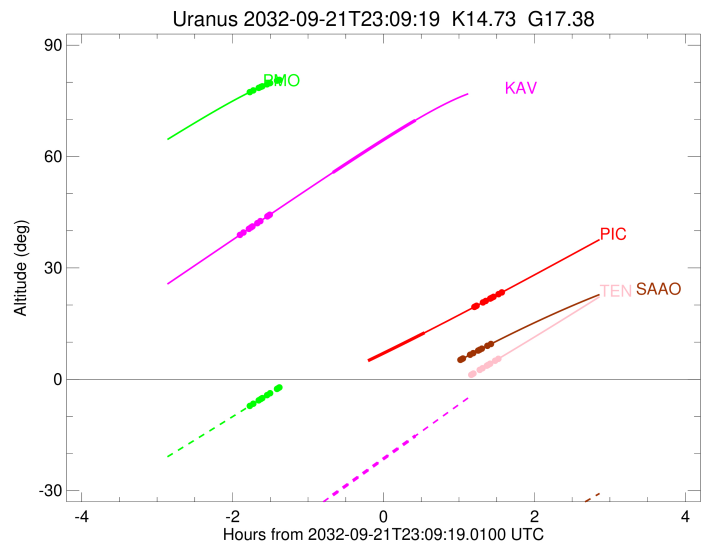
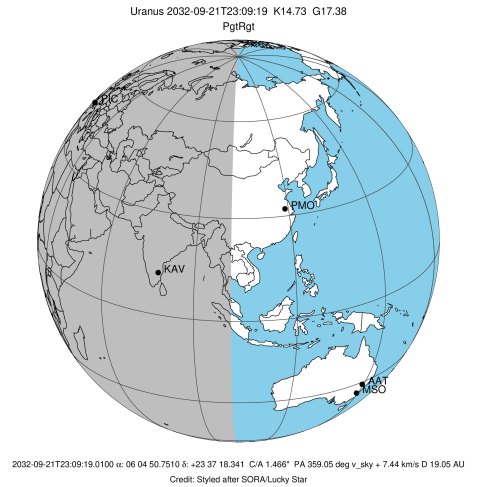
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-09-21T21:16:41.866	-29.62x	-29.85	50845.36	-7.65			
lambda	I	2032-09-21T21:18:29.231	-29.40x	-30.22	50026.71	-7.62			
delta	I	2032-09-21T21:22:16.460	-28.92x	-31.01	48300.35	-7.58			
gamma	I	2032-09-21T21:23:44.821	-28.73x	-31.32	47631.46	-7.56			
eta	I	2032-09-21T21:24:45.080	-28.60x	-31.53	47176.12	-7.55			
beta	I	2032-09-21T21:28:03.626	-28.17x	-32.22	45681.19	-7.51			
alpha	I	2032-09-21T21:30:07.155	-27.89x	-32.64	44752.29	-7.49			
4	I	2032-09-21T21:35:01.806	-27.23x	-33.66	42556.39	-7.41			
5	I	2032-09-21T21:35:35.148	-27.15x	-33.77	42312.35	-7.41			
6	I	2032-09-21T21:36:40.253	-27.00x	-33.99	41836.84	-7.40			
Uranus	I	2032-09-21T22:15:45.053	-21.19x	-41.80	25481.28			5.75	6.02
Uranus	E	2032-09-21T23:39:42.576	-6.44x	-55.95	25039.38			-15.22	-15.90
6	E	2032-09-22T00:19:06.345	1.20x	-60.15	41868.42	7.11			
5	E	2032-09-22T00:19:48.602	1.34x	-60.21	42166.14	7.12			
4	E	2032-09-22T00:20:44.751	1.52x	-60.28	42550.75	7.12			
alpha	E	2032-09-22T00:25:44.179	2.51x	-60.62	44696.16	7.18			
beta	E	2032-09-22T00:27:56.017	2.95x	-60.76	45647.31	7.20			
eta	E	2032-09-22T00:31:28.255	3.66x	-60.96	47176.12	7.22			
gamma	E	2032-09-22T00:32:30.117	3.87x	-61.01	47623.08	7.23			
delta	E	2032-09-22T00:34:03.741	4.18x	-61.09	48300.35	7.24			
lambda	E	2032-09-22T00:38:01.818	4.98x	-61.27	50026.71	7.26			
epsilon	E	2032-09-22T00:41:31.882	5.69	-61.41	51554.34	7.28			

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-09-21T23:02:38.170
 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 : 3426133139013534848
 2Mass ID (if available) : 06045075+2337186
 ICRS Star Coord at Epoch: 06h 04m 50.75098s +23:37:18.34059s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.732
 G magnitude : 17.378
 RP magnitude : 16.562
 BP magnitude : 18.117
 DUPflag : 0
 Distance (au) : 19.045
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.44
 Sun-Target sep (deg) : 87.95
 Sun-Moon sep (deg) : 57.17
 B (ring opening deg) : 74.42
 PA of pole (deg) : 59.69
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.537
 C/A sky separation (km) : 21231.3
 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	2032-09-21T21:15:54.168		39.05	-48.69	50874.64	-6.74		
lambda	I	2032-09-21T21:18:00.661		39.54	-48.19	50026.71	-6.69		
delta	I	2032-09-21T21:22:19.958		40.53	-47.17	48300.35	-6.63		
gamma	I	2032-09-21T21:24:01.093		40.91	-46.77	47631.55	-6.60		
eta	I	2032-09-21T21:25:10.195		41.18	-46.50	47176.12	-6.58		
beta	I	2032-09-21T21:28:58.470		42.05	-45.59	45681.21	-6.52		
alpha	I	2032-09-21T21:31:21.119		42.59	-45.03	44752.41	-6.47		
4	I	2032-09-21T21:37:04.089		43.90	-43.67	42550.93	-6.36		
5	I	2032-09-21T21:37:42.402		44.05	-43.52	42308.86	-6.35		
6	I	2032-09-21T21:38:56.895		44.33	-43.22	41842.50	-6.33		
Uranus	I	2032-09-21T22:28:57.921		55.67	-31.20	25554.34		1.40	1.47
Uranus	E	2032-09-21T23:34:41.810		69.78	-15.24	25139.17		-13.61	-14.23
6	E	2032-09-22T00:24:30.913		77.79	-3.09x	41871.73	6.14		
5	E	2032-09-22T00:25:19.977		77.87	-2.89x	42171.62	6.16		
4	E	2032-09-22T00:26:23.394		77.97	-2.64x	42546.06	6.17		
alpha	E	2032-09-22T00:32:08.976		78.42	-1.23x	44699.14	6.27		
beta	E	2032-09-22T00:34:39.552		78.57	-0.62x	45648.97	6.30		
eta	E	2032-09-22T00:38:40.978		78.75	0.36x	47176.12	6.36		
gamma	E	2032-09-22T00:39:51.275		78.79	0.65x	47623.53	6.37		
delta	E	2032-09-22T00:41:37.310		78.84	1.08x	48300.35	6.39		
lambda	E	2032-09-22T00:46:06.217		78.88	2.18x	50026.71	6.45		
epsilon	E	2032-09-22T00:50:02.608		78.83	3.14x	51555.18	6.49		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2032-09-21T22:56:03.730
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : SAAO
 Location : So. Afr. Astro. Obs. (Sutherland)
 Latitude (deg) : -32.37953
 E. Longitude (deg) : 20.81070
 Altitude (km) : 1.768
 Gaia source ID : 3426133139013534848
 2Mass ID (if available) : 06045075+2337186
 ICRS Star Coord at Epoch: 06h 04m 50.75098s +23:37:18.34059s
 RUWE (>1.4 is poor) : 1.02
 K magnitude : 14.732
 G magnitude : 17.378
 RP magnitude : 16.562
 BP magnitude : 18.117
 DUPflag : 0
 Distance (au) : 19.045
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 7.44
 Sun-Target sep (deg) : 87.95
 Sun-Moon sep (deg) : 56.08
 B (ring opening deg) : 74.42
 PA of pole (deg) : 59.69
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.701
 C/A sky separation (km) : 23500.9
 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	2032-09-21T21:17:35.108	-28.76x	-53.80	50888.65	-6.97		
lambda	I	2032-09-21T21:19:39.570	-28.33x	-54.02	50026.71	-6.91		
delta	I	2032-09-21T21:23:50.979	-27.46x	-54.47	48300.35	-6.83		
gamma	I	2032-09-21T21:25:29.199	-27.12x	-54.63	47631.57	-6.79		
eta	I	2032-09-21T21:26:36.373	-26.89x	-54.74	47176.12	-6.77		
beta	I	2032-09-21T21:30:18.639	-26.12x	-55.10	45681.12	-6.68		
alpha	I	2032-09-21T21:32:37.877	-25.64x	-55.32	44752.30	-6.63		
4	I	2032-09-21T21:38:14.052	-24.48x	-55.80	42548.60	-6.48		
5	I	2032-09-21T21:38:51.527	-24.35x	-55.86	42306.88	-6.46		
6	I	2032-09-21T21:40:03.984	-24.10x	-55.95	41845.01	-6.43		
Uranus	I	2032-09-21T22:33:34.725	-13.24x	-57.98	25554.70		-1.35	-1.41
Uranus	E	2032-09-21T23:16:48.838	-4.76x	-56.09	25240.21		-11.79	-12.34
6	E	2032-09-22T00:10:29.812	5.24	-50.07	41873.54	6.17		
5	E	2032-09-22T00:11:18.852	5.38	-49.95	42175.55	6.19		
4	E	2032-09-22T00:12:20.904	5.57	-49.81	42543.28	6.20		
alpha	E	2032-09-22T00:18:04.571	6.59	-48.98	44701.19	6.33		
beta	E	2032-09-22T00:20:33.486	7.03	-48.61	45650.12	6.37		
eta	E	2032-09-22T00:24:31.858	7.73	-48.01	47176.12	6.44		
gamma	E	2032-09-22T00:25:41.285	7.93	-47.83	47623.84	6.46		
delta	E	2032-09-22T00:27:25.823	8.23	-47.56	48300.35	6.48		
lambda	E	2032-09-22T00:31:50.764	9.00	-46.87	50026.71	6.55		
epsilon	E	2032-09-22T00:35:43.159	9.67	-46.26	51553.76	6.59		