

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2045-01-19T18:28:00.190
 Event type : PgtX
 : Uranus occs: geocentric, topocentric
 : No ring occs
 Gaia source ID : 615924668461420160
 2Mass ID (if available) : 09510470+1349436

Uranus 2045-01-19T18:28:00 K12.65 G14.37 PgtX

ICRS Star Coord at Epoch: 09h 51m 04.66696s +13:49:44.09588s

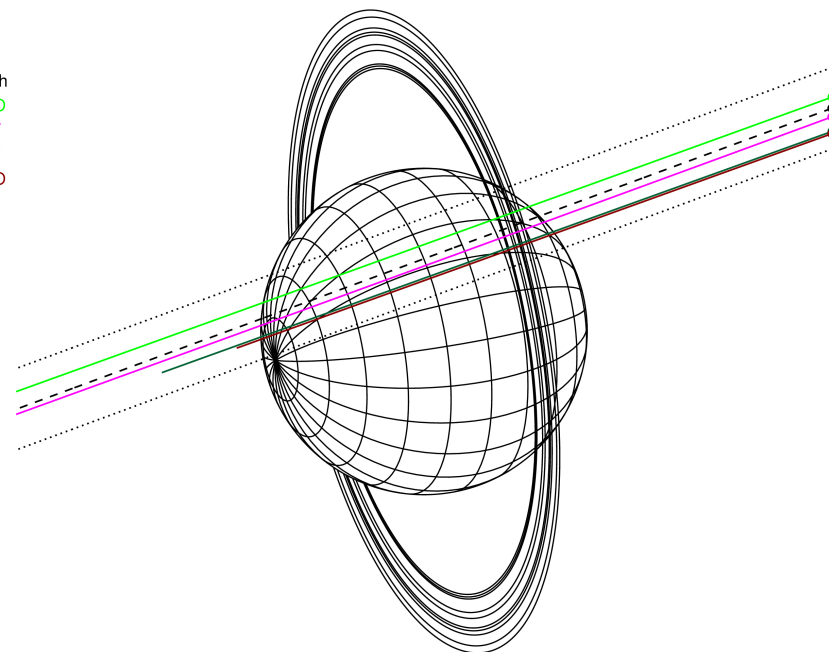
RUWE (>1.4 is poor) : 1.23
 K magnitude : 12.646
 G magnitude : 14.374
 RP magnitude : 13.787
 BP magnitude : 14.775
 DUPflag : 0
 Distance (au) : 17.476
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.12
 Sun-Target sep (deg) : 154.22
 Sun-Moon sep (deg) : 171.33
 B (ring opening deg) : 22.09
 PA of pole (deg) : 101.01

Uranus 2045-01-19T18:28:00 K12.65 G14.37
 PgtX



2045-01-19T18:28:00.1900 ex: 09 51 04.6670 s: +13 49 44.096 C/A 0.853° PA 200.25 deg v_sky -20.12 km/s D 17.48 AU
 Credit: Styled after SORA/Lucky Star

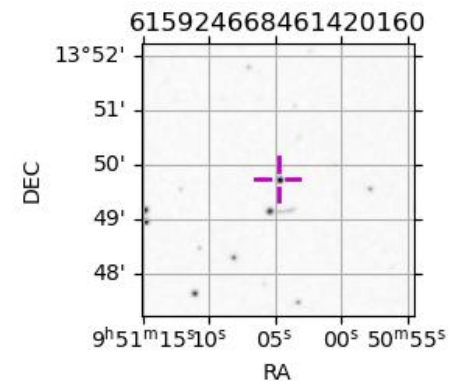
Earth
 PMO
 KAV
 AAT
 MSO



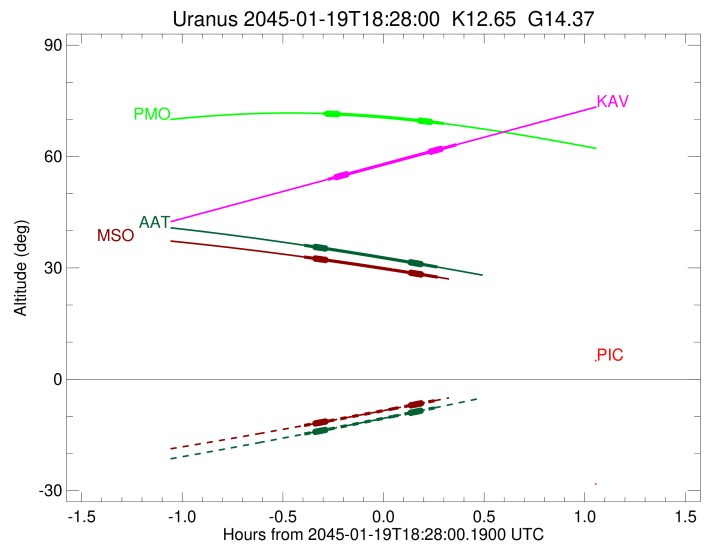
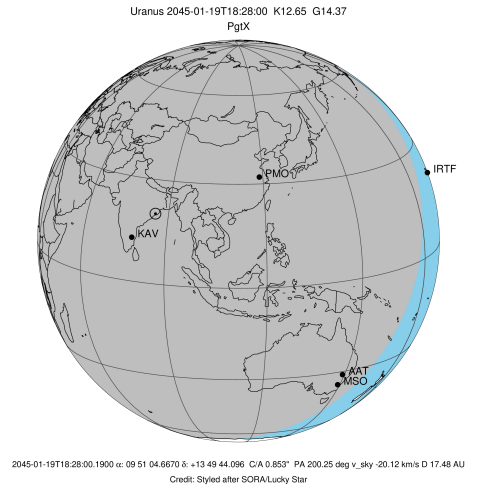
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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					PnnRnn
PAL	Palomar Mt (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8		+	+	JAN 19 18:10 - JAN 19 18:45	PieRnn
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		+	+	JAN 19 18:11 - JAN 19 18:49	PieRnn
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		+	+	JAN 19 18:04 - JAN 19 18:44	PieRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0		+	+	JAN 19 18:04 - JAN 19 18:44	PieRnn

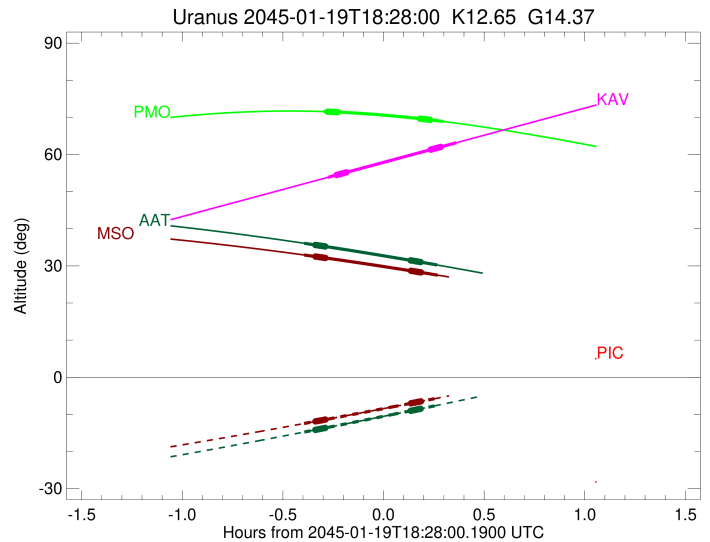
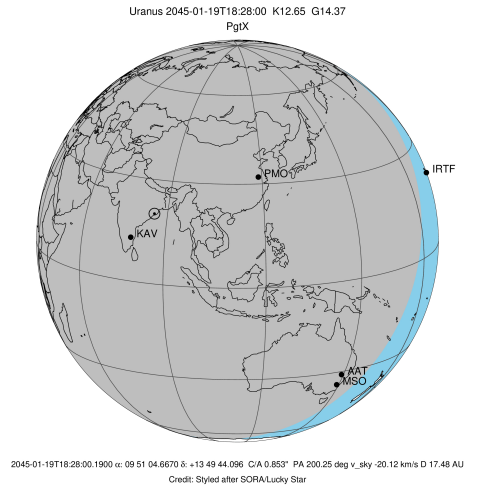


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2045-01-19T18:27:59.600
 Event type : PgtX
 : Uranus occs: geocentric, topocentric
 : No ring occs
 Observer code : PMO
 Location : Purple Mtn Obs. Nanking
 Latitude (deg) : 32.06667
 E. Longitude (deg) : 118.82089
 Altitude (km) : 0.364
 Gaia source ID : 615924668461420160
 2Mass ID (if available) : 09510470+1349436
 ICRS Star Coord at Epoch: 09h 51m 04.66696s +13:49:44.09588s
 RUWE (>1.4 is poor) : 1.23
 K magnitude : 12.646
 G magnitude : 14.374
 RP magnitude : 13.787
 BP magnitude : 14.775
 DUPflag : 0
 Distance (au) : 17.476
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.12
 Sun-Target sep (deg) : 154.22
 Sun-Moon sep (deg) : 171.42
 B (ring opening deg) : 22.09
 PA of pole (deg) : 101.01
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 1.010
 C/A sky separation (km) : 12799.6
 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



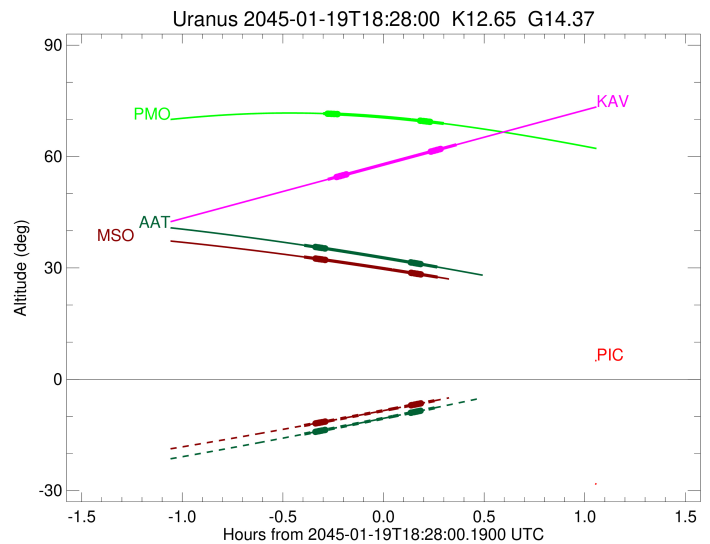
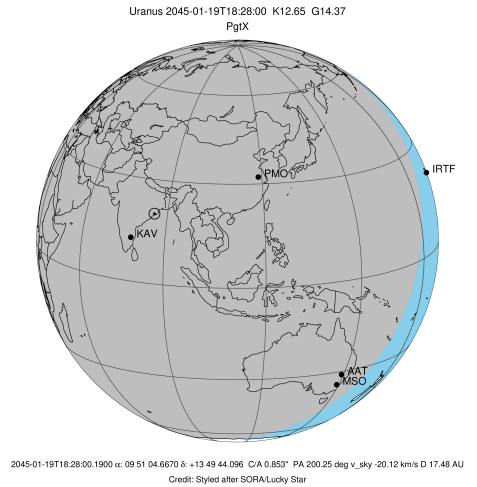
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2045-01-19T18:11:12.667	b	71.54	-61.59	51530.97	-52.13		
lambda	I	2045-01-19T18:11:41.529	b	71.53	-61.49	50026.71	-52.06		
delta	I	2045-01-19T18:12:14.730	b	71.51	-61.38	48300.35	-51.93		
gamma	I	2045-01-19T18:12:27.815	b	71.50	-61.33	47621.24	-51.87		
eta	I	2045-01-19T18:12:36.400	b	71.49	-61.30	47176.12	-51.83		
beta	I	2045-01-19T18:13:05.149	b	71.48	-61.21	45678.75	-51.68		
alpha	I	2045-01-19T18:13:23.684	b	71.46	-61.14	44739.52	-51.59		
4	I	2045-01-19T18:14:06.818	b	71.44	-61.00	42558.04	-51.40		
5	I	2045-01-19T18:14:09.402	b	71.44	-60.99	42294.27	-51.17		
6	I	2045-01-19T18:14:18.322	b	71.43	-60.96	41822.13	-51.14		
Uranus	I	2045-01-19T18:10:02.543		71.58	-61.82	25509.29		-46.10	-47.41
Uranus	E	2045-01-19T18:45:55.621		68.90	-54.43	25487.76		59.67	60.80
6	E	2045-01-19T18:38:55.531	b	69.65	-55.89	41872.84	51.11		
5	E	2045-01-19T18:39:00.959	b	69.64	-55.87	42155.35	51.15		
4	E	2045-01-19T18:39:05.821	b	69.64	-55.85	42556.76	51.38		
alpha	E	2045-01-19T18:39:48.446	b	69.56	-55.70	44686.27	51.56		
beta	E	2045-01-19T18:40:06.955	b	69.53	-55.64	45641.11	51.65		
eta	E	2045-01-19T18:40:36.465	b	69.48	-55.54	47176.12	51.81		
gamma	E	2045-01-19T18:40:45.250	b	69.47	-55.51	47631.45	51.85		
delta	E	2045-01-19T18:40:58.145	b	69.44	-55.46	48300.35	51.90		
lambda	E	2045-01-19T18:41:31.361	b	69.38	-55.35	50026.71	52.04		
epsilon	E	2045-01-19T18:41:45.236	b	69.36	-55.30	50749.09	52.11		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2045-01-19T18:30:35.190
 Event type : PgtX
 : Uranus occs: geocentric, topocentric
 : No ring occs
 Observer code : KAV
 Location : Kavalur Observatory
 Latitude (deg) : 12.57556
 E. Longitude (deg) : 78.83167
 Altitude (km) : 0.722
 Gaia source ID : 615924668461420160
 2Mass ID (if available) : 09510470+1349436
 ICRS Star Coord at Epoch: 09h 51m 04.66696s +13:49:44.09588s
 RUWE (>1.4 is poor) : 1.23
 K magnitude : 12.646
 G magnitude : 14.374
 RP magnitude : 13.787
 BP magnitude : 14.775
 DUPflag : 0
 Distance (au) : 17.476
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.12
 Sun-Target sep (deg) : 154.22
 Sun-Moon sep (deg) : 171.01
 B (ring opening deg) : 22.09
 PA of pole (deg) : 101.01
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.759
 C/A sky separation (km) : 9622.5
 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_itr93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



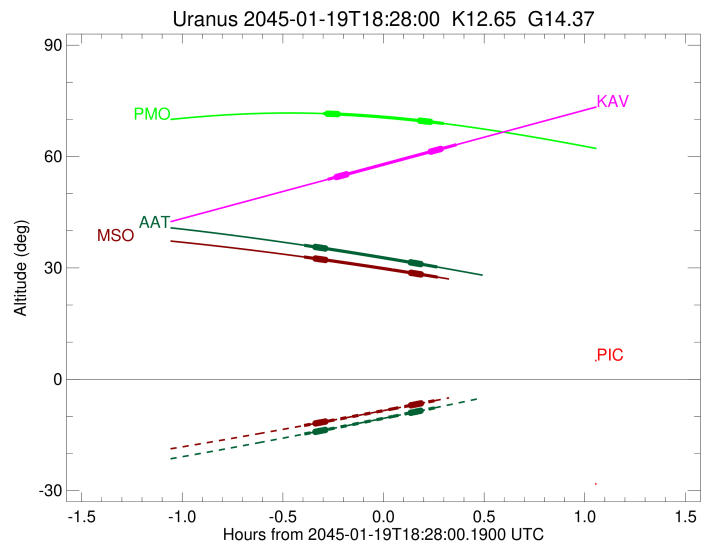
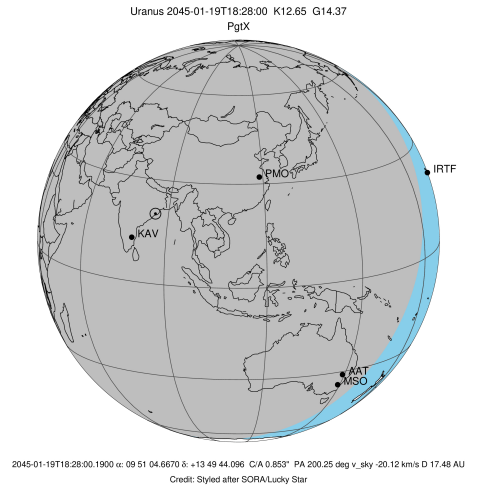
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2045-01-19T18:13:54.011	b	54.46	-77.45	51538.93	-52.86		
lambda	I	2045-01-19T18:14:22.625	b	54.57	-77.54	50026.71	-52.82		
delta	I	2045-01-19T18:14:55.332	b	54.70	-77.64	48300.35	-52.74		
gamma	I	2045-01-19T18:15:08.213	b	54.76	-77.68	47621.13	-52.71		
eta	I	2045-01-19T18:15:16.657	b	54.79	-77.71	47176.12	-52.69		
beta	I	2045-01-19T18:15:44.904	b	54.91	-77.80	45679.39	-52.60		
alpha	I	2045-01-19T18:16:03.053	b	54.98	-77.86	44741.40	-52.55		
4	I	2045-01-19T18:16:45.413	b	55.15	-77.99	42561.41	-52.48		
5	I	2045-01-19T18:16:47.768	b	55.16	-77.99	42298.29	-52.27		
6	I	2045-01-19T18:16:56.648	b	55.20	-78.02	41819.06	-52.25		
Uranus	I	2045-01-19T18:11:22.927		53.84	-76.97	25498.90		-52.42	-53.68
Uranus	E	2045-01-19T18:49:45.418		63.19	-82.25	25481.21		64.44	65.44
6	E	2045-01-19T18:42:06.408	b	61.32	-81.72	41870.85	52.24		
5	E	2045-01-19T18:42:11.737	b	61.35	-81.73	42156.33	52.32		
4	E	2045-01-19T18:42:16.465	b	61.37	-81.74	42560.21	52.53		
alpha	E	2045-01-19T18:42:58.139	b	61.53	-81.80	44687.15	52.61		
beta	E	2045-01-19T18:43:16.319	b	61.61	-81.83	45641.06	52.65		
eta	E	2045-01-19T18:43:45.277	b	61.73	-81.87	47176.11	52.75		
gamma	E	2045-01-19T18:43:53.908	b	61.76	-81.88	47631.51	52.77		
delta	E	2045-01-19T18:44:06.578	b	61.81	-81.90	48300.35	52.81		
lambda	E	2045-01-19T18:44:39.246	b	61.95	-81.94	50026.71	52.88		
epsilon	E	2045-01-19T18:44:52.835	b	62.00	-81.96	50745.56	52.92		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2045-01-19T18:24:13.150
 Event type : PgtX
 : Uranus occs: geocentric, topocentric
 : No ring occs
 Observer code : AAT
 Location : Siding Spring (AAT)
 Latitude (deg) : -31.27703
 E. Longitude (deg) : 149.06608
 Altitude (km) : 1.164
 Gaia source ID : 615924668461420160
 2Mass ID (if available) : 09510470+1349436
 ICRS Star Coord at Epoch: 09h 51m 04.66696s +13:49:44.09588s
 RUWE (>1.4 is poor) : 1.23
 K magnitude : 12.646
 G magnitude : 14.374
 RP magnitude : 13.787
 BP magnitude : 14.775
 DUPflag : 0
 Distance (au) : 17.476
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.12
 Sun-Target sep (deg) : 154.22
 Sun-Moon sep (deg) : 172.05
 B (ring opening deg) : 22.09
 PA of pole (deg) : 101.01
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.619
 C/A sky separation (km) : 7843.1
 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	2045-01-19T18:07:35.852	b	35.66	-14.18	51542.93	-53.04		
lambda	I	2045-01-19T18:08:04.441	b	35.59	-14.10	50026.71	-53.01		
delta	I	2045-01-19T18:08:37.021	b	35.52	-14.00	48300.35	-52.96		
gamma	I	2045-01-19T18:08:49.849	b	35.49	-13.97	47621.08	-52.94		
eta	I	2045-01-19T18:08:58.256	b	35.47	-13.94	47176.12	-52.92		
beta	I	2045-01-19T18:09:26.364	b	35.40	-13.86	45679.73	-52.86		
alpha	I	2045-01-19T18:09:44.389	b	35.36	-13.81	44742.45	-52.83		
4	I	2045-01-19T18:10:26.549	b	35.26	-13.68	42563.40	-52.80		
5	I	2045-01-19T18:10:28.803	b	35.26	-13.67	42300.45	-52.59		
6	I	2045-01-19T18:10:37.713	b	35.24	-13.65	41817.33	-52.57		
Uranus	I	2045-01-19T18:04:24.686		36.09	-14.74	25493.45		-55.88	-57.08
Uranus	E	2045-01-19T18:44:01.934		30.24	-7.56	25479.02		66.18	67.13
6	E	2045-01-19T18:36:08.066	b	31.48	-9.03	41869.70	52.48		
5	E	2045-01-19T18:36:13.394	b	31.47	-9.01	42157.06	52.50		
4	E	2045-01-19T18:36:18.103	b	31.46	-9.00	42562.06	52.71		
alpha	E	2045-01-19T18:36:59.620	b	31.35	-8.87	44687.68	52.73		
beta	E	2045-01-19T18:37:17.774	b	31.30	-8.81	45641.07	52.76		
eta	E	2045-01-19T18:37:46.677	b	31.23	-8.72	47176.12	52.83		
gamma	E	2045-01-19T18:37:55.296	b	31.21	-8.70	47631.54	52.84		
delta	E	2045-01-19T18:38:07.950	b	31.17	-8.66	48300.35	52.87		
lambda	E	2045-01-19T18:38:40.590	b	31.09	-8.56	50026.71	52.92		
epsilon	E	2045-01-19T18:38:54.149	b	31.05	-8.51	50744.40	52.94		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2045-01-19T18:24:14.890
 Event type : PgtX
 : Uranus occs: geocentric, topocentric
 : No ring occs
 Observer code : MSO
 Location : Mt. Stromlo Observatory
 Latitude (deg) : -35.32000
 E. Longitude (deg) : 149.00833
 Altitude (km) : 0.770
 Gaia source ID : 615924668461420160
 2Mass ID (if available) : 09510470+1349436
 ICRS Star Coord at Epoch: 09h 51m 04.66696s +13:49:44.09588s
 RUWE (>1.4 is poor) : 1.23
 K magnitude : 12.646
 G magnitude : 14.374
 RP magnitude : 13.787
 BP magnitude : 14.775
 DUPflag : 0
 Distance (au) : 17.476
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : -20.12
 Sun-Target sep (deg) : 154.22
 Sun-Moon sep (deg) : 172.04
 B (ring opening deg) : 22.09
 PA of pole (deg) : 101.01
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.591
 C/A sky separation (km) : 7493.0
 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	2045-01-19T18:07:38.073	b	32.53	-11.91	51543.61	-53.06		
lambda	I	2045-01-19T18:08:06.664	b	32.47	-11.83	50026.71	-53.03		
delta	I	2045-01-19T18:08:39.231	b	32.40	-11.74	48300.35	-52.99		
gamma	I	2045-01-19T18:08:52.053	b	32.38	-11.70	47621.08	-52.97		
eta	I	2045-01-19T18:09:00.455	b	32.36	-11.68	47176.12	-52.95		
beta	I	2045-01-19T18:09:28.546	b	32.30	-11.60	45679.79	-52.89		
alpha	I	2045-01-19T18:09:46.554	b	32.26	-11.55	44742.64	-52.86		
4	I	2045-01-19T18:10:28.688	b	32.17	-11.43	42563.77	-52.84		
5	I	2045-01-19T18:10:30.926	b	32.17	-11.43	42300.84	-52.64		
6	I	2045-01-19T18:10:39.844	b	32.15	-11.40	41817.01	-52.62		
Uranus	I	2045-01-19T18:04:20.302		32.94	-12.45	25492.54		-56.47	-57.66
Uranus	E	2045-01-19T18:44:09.783		27.51	-5.61	25478.66		66.48	67.42
6	E	2045-01-19T18:36:13.648	b	28.67	-7.01	41869.46	52.53		
5	E	2045-01-19T18:36:18.975	b	28.66	-6.99	42157.22	52.55		
4	E	2045-01-19T18:36:23.680	b	28.65	-6.98	42562.45	52.75		
alpha	E	2045-01-19T18:37:05.156	b	28.55	-6.86	44687.80	52.77		
beta	E	2045-01-19T18:37:23.301	b	28.50	-6.80	45641.08	52.80		
eta	E	2045-01-19T18:37:52.185	b	28.43	-6.72	47176.12	52.86		
gamma	E	2045-01-19T18:38:00.800	b	28.41	-6.69	47631.55	52.87		
delta	E	2045-01-19T18:38:13.446	b	28.38	-6.66	48300.35	52.89		
lambda	E	2045-01-19T18:38:46.070	b	28.30	-6.56	50026.71	52.94		
epsilon	E	2045-01-19T18:38:59.620	b	28.27	-6.52	50744.22	52.96		