

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-04-04T07:16:31.590
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3427675551966744960
 2Mass ID (if available) : 05490979+2337495

Uranus 2033-04-04T07:16:31 K14.97 G18.69 PgtRgt

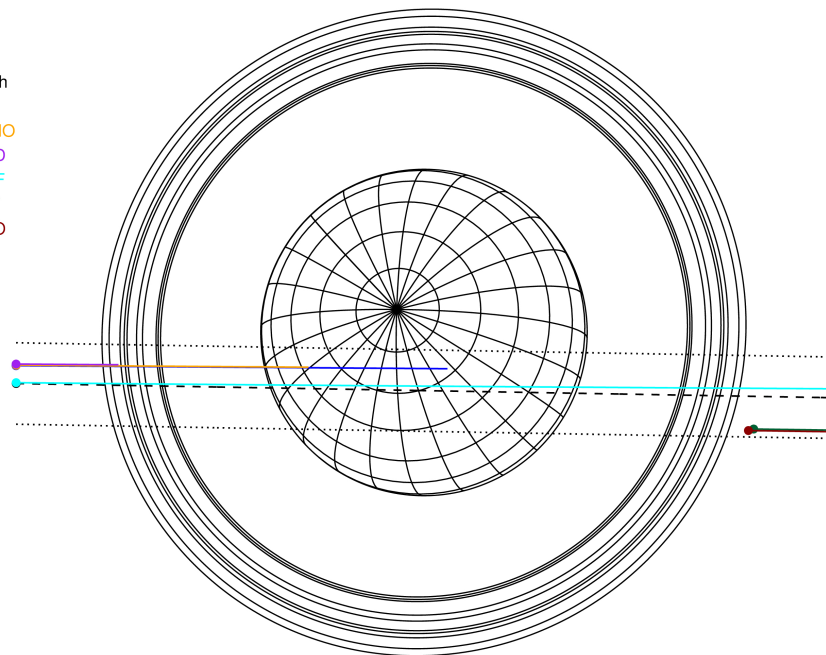
ICRS Star Coord at Epoch: 05h 49m 09.79976s +23:37:49.35275s

RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.967
 G magnitude : 18.693
 RP magnitude : 17.659
 BP magnitude : 19.902
 DUPflag : 0
 Distance (au) : 19.267
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.01
 Sun-Target sep (deg) : 73.14
 Sun-Moon sep (deg) : 12.29
 B (ring opening deg) : 77.36
 PA of pole (deg) : 49.83



2033-04-04T07:16:31.5900 ex: 05 49 09.7998 s: +23 37 49.353 C/A 0.645° PA 359.00 deg v_sky +15.01 km/s D 19.27 AU
 Credit: Styled after SORA/Lucky Star

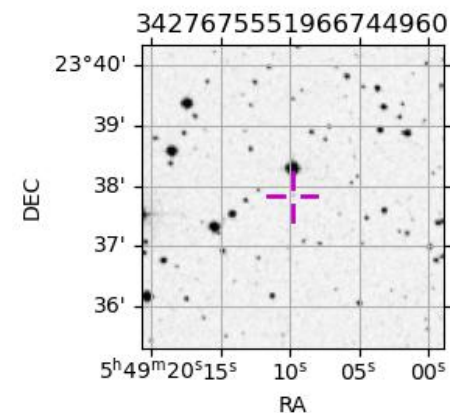
Earth
 PAL
 KPNO
 MCD
 IRTF
 AAT
 MSO



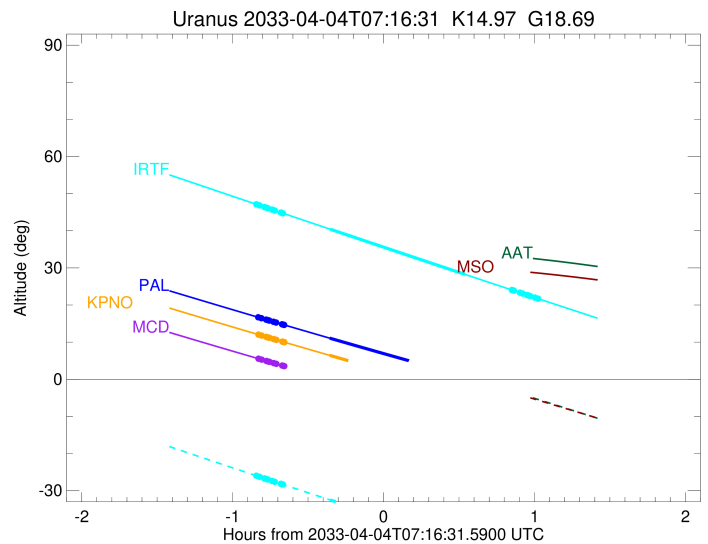
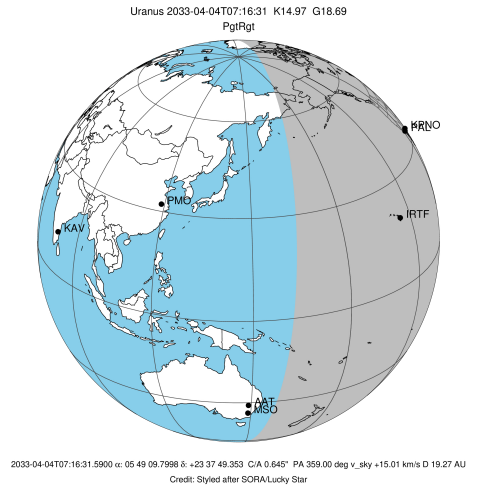
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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	+++++	+		APR 04 06:26 - APR 04 06:55	PinRin
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+		APR 04 06:26 - APR 04 06:55	PinRin
MCD	McDonald Obs. 2.7m	30.7	256.0	++			APR 04 06:26 - APR 04 06:28	PnnRin
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+ +	+++++	APR 04 06:25 - APR 04 08:17	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
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

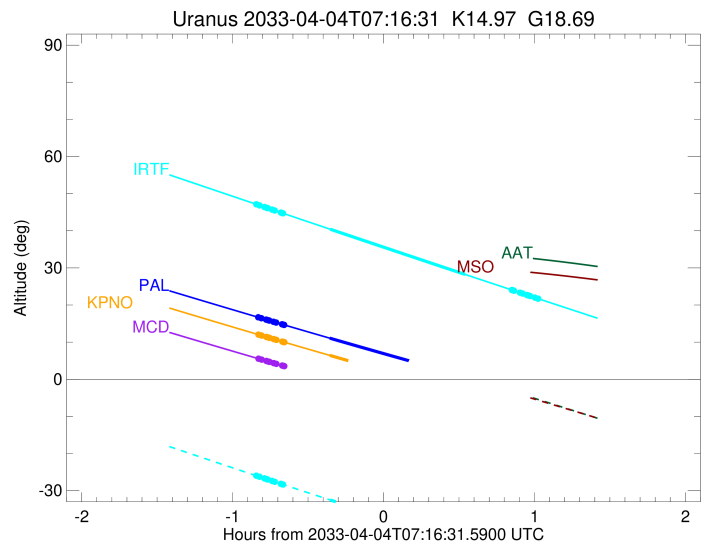
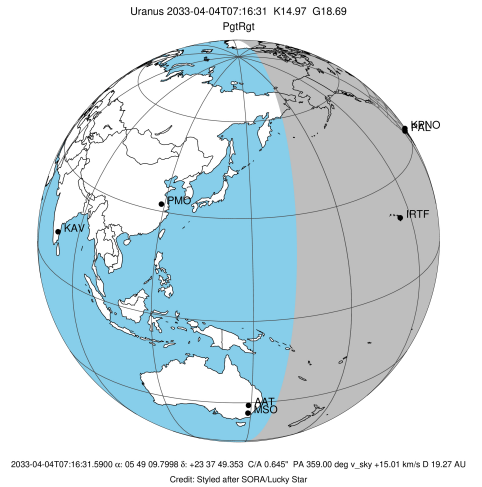


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-04-04T07:22:29.880
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3427675551966744960
 2Mass ID (if available) : 05490979+2337495
 ICRS Star Coord at Epoch: 05h 49m 09.79976s +23:37:49.35275s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.967
 G magnitude : 18.693
 RP magnitude : 17.659
 BP magnitude : 19.902
 DUPflag : 0
 Distance (au) : 19.267
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.01
 Sun-Target sep (deg) : 73.14
 Sun-Moon sep (deg) : 13.24
 B (ring opening deg) : 77.36
 PA of pole (deg) : 49.83
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.404
 C/A sky separation (km) : 5647.4
 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



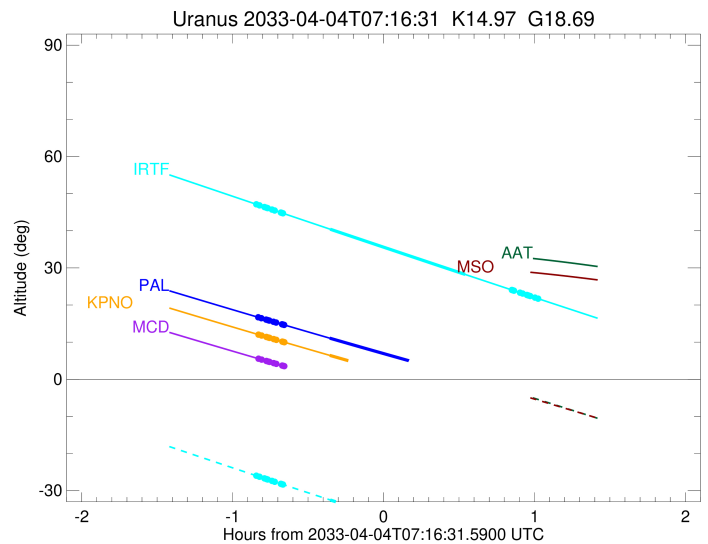
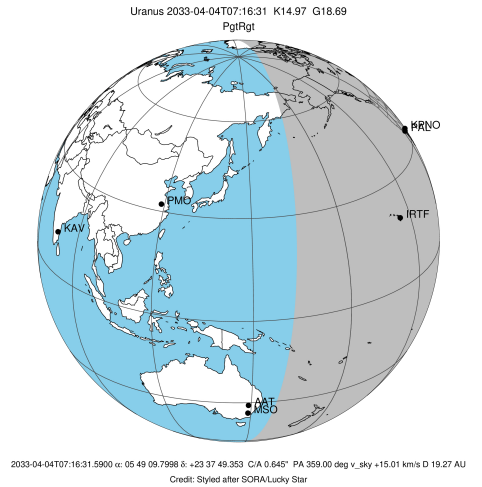
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-04-04T06:26:28.422		16.75	-46.20	51392.76	-15.09		
lambda	I	2033-04-04T06:27:59.047		16.45	-46.36	50026.71	-15.07		
delta	I	2033-04-04T06:29:53.599		16.06	-46.56	48300.35	-15.07		
gamma	I	2033-04-04T06:30:37.983		15.92	-46.64	47631.57	-15.07		
eta	I	2033-04-04T06:31:08.213		15.82	-46.69	47176.12	-15.07		
beta	I	2033-04-04T06:32:47.926		15.49	-46.86	45674.18	-15.06		
alpha	I	2033-04-04T06:33:50.973		15.28	-46.97	44723.68	-15.06		
4	I	2033-04-04T06:36:12.237		14.81	-47.20	42601.56	-15.05		
5	I	2033-04-04T06:36:40.958		14.71	-47.24	42161.76	-15.05		
6	I	2033-04-04T06:37:01.873		14.64	-47.28	41844.34	-15.04		
Uranus	I	2033-04-04T06:55:06.628		11.08	-48.83	25349.31		7.63	7.99
Uranus	E	2033-04-04T07:49:30.950		0.70x	-50.96	25111.45		-11.27	-11.79
6	E	2033-04-04T08:07:21.828		-2.56x	-50.75	41818.89	15.22		
5	E	2033-04-04T08:07:54.222		-2.66x	-50.74	42314.40	15.23		
4	E	2033-04-04T08:08:09.040		-2.70x	-50.73	42551.04	15.24		
alpha	E	2033-04-04T08:10:31.842		-3.13x	-50.67	44722.06	15.26		
beta	E	2033-04-04T08:11:32.686		-3.31x	-50.64	45652.35	15.26		
eta	E	2033-04-04T08:13:12.511		-3.61x	-50.58	47176.12	15.27		
gamma	E	2033-04-04T08:13:41.649		-3.70x	-50.57	47621.19	15.28		
delta	E	2033-04-04T08:14:26.101		-3.83x	-50.54	48300.35	15.28		
lambda	E	2033-04-04T08:16:19.033		-4.17x	-50.48	50026.71	15.29		
epsilon	E	2033-04-04T08:17:21.350		-4.35x	-50.44	50979.87	15.31		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-04-04T07:22:28.780
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : KPNO
 Location : Kitt Peak Natl Obs
 Latitude (deg) : 31.96333
 E. Longitude (deg) : 248.40000
 Altitude (km) : 2.120
 Gaia source ID : 3427675551966744960
 2Mass ID (if available) : 05490979+2337495
 ICRS Star Coord at Epoch: 05h 49m 09.79976s +23:37:49.35275s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.967
 G magnitude : 18.693
 RP magnitude : 17.659
 BP magnitude : 19.902
 DUPflag : 0
 Distance (au) : 19.267
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.01
 Sun-Target sep (deg) : 73.14
 Sun-Moon sep (deg) : 13.23
 B (ring opening deg) : 77.36
 PA of pole (deg) : 49.83
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.398
 C/A sky separation (km) : 5565.7
 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



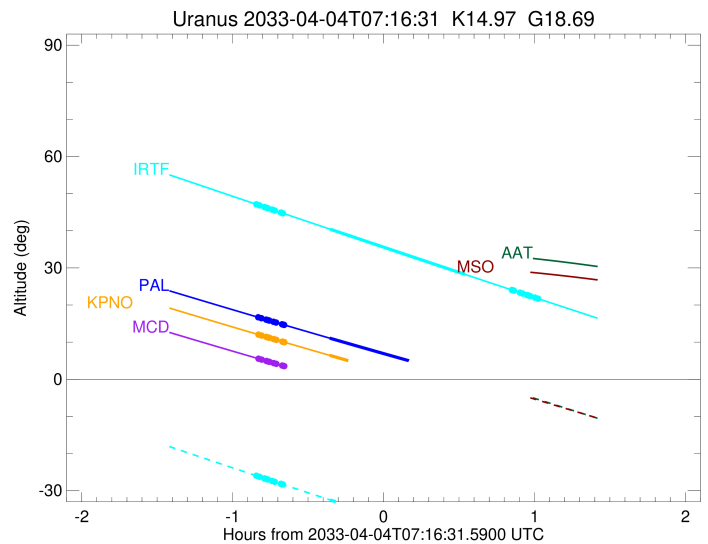
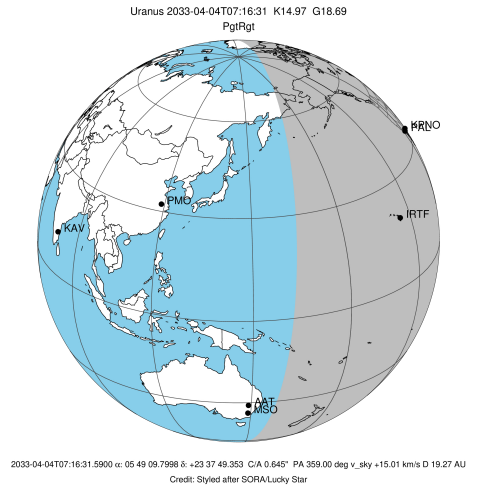
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2033-04-04T06:26:35.049		12.08	-49.51	51392.26	-15.12		
lambda	I	2033-04-04T06:28:05.407		11.78	-49.64	50026.71	-15.11		
delta	I	2033-04-04T06:29:59.661		11.40	-49.80	48300.35	-15.11		
gamma	I	2033-04-04T06:30:43.929		11.25	-49.86	47631.57	-15.11		
eta	I	2033-04-04T06:31:14.079		11.15	-49.90	47176.12	-15.11		
beta	I	2033-04-04T06:32:53.532		10.82	-50.04	45674.15	-15.10		
alpha	I	2033-04-04T06:33:56.413		10.61	-50.12	44723.62	-15.10		
4	I	2033-04-04T06:36:17.302		10.15	-50.30	42601.49	-15.09		
5	I	2033-04-04T06:36:45.944		10.05	-50.34	42161.69	-15.09		
6	I	2033-04-04T06:37:06.794		9.98	-50.37	41844.42	-15.08		
Uranus	I	2033-04-04T06:55:08.420		6.44	-51.49	25347.54		7.67	8.03
Uranus	E	2033-04-04T07:49:27.282		-3.83x	-52.05	25112.89		-11.25	-11.77
6	E	2033-04-04T08:07:15.157		-7.04x	-51.28	41818.96	15.26		
5	E	2033-04-04T08:07:47.460		-7.14x	-51.25	42314.38	15.27		
4	E	2033-04-04T08:08:02.236		-7.18x	-51.23	42550.96	15.28		
alpha	E	2033-04-04T08:10:24.669		-7.60x	-51.10	44722.00	15.29		
beta	E	2033-04-04T08:11:25.360		-7.78x	-51.03	45652.32	15.30		
eta	E	2033-04-04T08:13:04.932		-8.07x	-50.93	47176.12	15.31		
gamma	E	2033-04-04T08:13:33.996		-8.16x	-50.90	47621.19	15.32		
delta	E	2033-04-04T08:14:18.335		-8.29x	-50.85	48300.35	15.32		
lambda	E	2033-04-04T08:16:10.983		-8.61x	-50.72	50026.71	15.33		
epsilon	E	2033-04-04T08:17:13.109		-8.80x	-50.65	50979.32	15.35		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-04-04T07:22:18.720
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 3427675551966744960
 2Mass ID (if available) : 05490979+2337495
 ICRS Star Coord at Epoch: 05h 49m 09.79976s +23:37:49.35275s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.967
 G magnitude : 18.693
 RP magnitude : 17.659
 BP magnitude : 19.902
 DUPflag : 0
 Distance (au) : 19.267
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.01
 Sun-Target sep (deg) : 73.14
 Sun-Moon sep (deg) : 13.19
 B (ring opening deg) : 77.36
 PA of pole (deg) : 49.83
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.386
 C/A sky separation (km) : 5393.0
 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	2033-04-04T06:26:35.811		5.59	-52.84	51391.11	-15.18		
lambda	I	2033-04-04T06:28:05.739		5.29	-52.91	50026.71	-15.17		
delta	I	2033-04-04T06:29:59.544		4.92x	-53.00	48300.35	-15.17		
gamma	I	2033-04-04T06:30:43.637		4.77x	-53.04	47631.57	-15.17		
eta	I	2033-04-04T06:31:13.668		4.68x	-53.06	47176.12	-15.17		
beta	I	2033-04-04T06:32:52.729		4.35x	-53.13	45674.09	-15.16		
alpha	I	2033-04-04T06:33:55.363		4.15x	-53.17	44723.48	-15.16		
4	I	2033-04-04T06:36:15.685		3.69x	-53.25	42601.35	-15.15		
5	I	2033-04-04T06:36:44.207		3.60x	-53.27	42161.55	-15.15		
6	I	2033-04-04T06:37:04.950		3.53x	-53.28	41844.60	-15.14		
Uranus	I	2033-04-04T06:55:01.762		0.06x	-53.64	25343.66		7.74	8.10
Uranus	E	2033-04-04T07:49:14.552		-9.93x	-51.70	25115.87		-11.21	-11.73
6	E	2033-04-04T08:06:58.009		-13.01x	-50.16	41819.11	15.32		
5	E	2033-04-04T08:07:30.178		-13.10x	-50.11	42314.34	15.33		
4	E	2033-04-04T08:07:44.895		-13.14x	-50.09	42550.81	15.34		
alpha	E	2033-04-04T08:10:06.805		-13.54x	-49.85	44721.88	15.35		
beta	E	2033-04-04T08:11:07.279		-13.71x	-49.75	45652.25	15.36		
eta	E	2033-04-04T08:12:46.497		-13.99x	-49.58	47176.12	15.37		
gamma	E	2033-04-04T08:13:15.456		-14.07x	-49.52	47621.18	15.37		
delta	E	2033-04-04T08:13:59.638		-14.20x	-49.45	48300.35	15.37		
lambda	E	2033-04-04T08:15:51.889		-14.51x	-49.25	50026.71	15.38		
epsilon	E	2033-04-04T08:16:53.724		-14.68x	-49.13	50978.21	15.40		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2033-04-04T07:22:25.500
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : IRTF
 Location : Mauna Kea/IRTF
 Latitude (deg) : 19.82622
 E. Longitude (deg) : 204.52800
 Altitude (km) : 4.168
 Gaia source ID : 3427675551966744960
 2Mass ID (if available) : 05490979+2337495
 ICRS Star Coord at Epoch: 05h 49m 09.79976s +23:37:49.35275s
 RUWE (>1.4 is poor) : 1.00
 K magnitude : 14.967
 G magnitude : 18.693
 RP magnitude : 17.659
 BP magnitude : 19.902
 DUPflag : 0
 Distance (au) : 19.267
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 15.01
 Sun-Target sep (deg) : 73.14
 Sun-Moon sep (deg) : 13.16
 B (ring opening deg) : 77.36
 PA of pole (deg) : 49.83
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.601
 C/A sky separation (km) : 8396.2
 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_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	2033-04-04T06:25:41.196	47.20	-25.91	51409.84	-14.70		
lambda	I	2033-04-04T06:27:15.381	46.84	-26.27	50026.71	-14.68		
delta	I	2033-04-04T06:29:13.026	46.39	-26.71	48300.35	-14.67		
gamma	I	2033-04-04T06:29:58.629	46.22	-26.88	47631.58	-14.66		
eta	I	2033-04-04T06:30:29.696	46.10	-26.99	47176.12	-14.66		
beta	I	2033-04-04T06:32:12.149	45.71	-27.38	45675.08	-14.65		
alpha	I	2033-04-04T06:33:16.938	45.46	-27.62	44725.74	-14.64		
4	I	2033-04-04T06:35:42.328	44.91	-28.16	42603.69	-14.61		
5	I	2033-04-04T06:36:11.964	44.79	-28.27	42164.06	-14.61		
6	I	2033-04-04T06:36:33.863	44.71	-28.35	41841.54	-14.60		
Uranus	I	2033-04-04T06:55:20.857	40.42	-32.51	25407.67		6.47	6.77
Uranus	E	2033-04-04T07:48:59.767	28.24	-43.94	25065.94		-11.85	-12.40
6	E	2033-04-04T08:07:31.533	24.06	-47.65	41816.37	14.77		
5	E	2033-04-04T08:08:05.136	23.94	-47.76	42315.00	14.79		
4	E	2033-04-04T08:08:20.496	23.88	-47.81	42553.74	14.80		
alpha	E	2033-04-04T08:10:47.463	23.33	-48.29	44724.15	14.83		
beta	E	2033-04-04T08:11:49.962	23.10	-48.49	45653.46	14.84		
eta	E	2033-04-04T08:13:32.506	22.71	-48.82	47176.12	14.86		
gamma	E	2033-04-04T08:14:02.452	22.60	-48.91	47621.29	14.87		
delta	E	2033-04-04T08:14:48.110	22.43	-49.06	48300.35	14.88		
lambda	E	2033-04-04T08:16:44.070	22.00	-49.43	50026.71	14.90		
epsilon	E	2033-04-04T08:17:49.380	21.75	-49.64	51000.05	14.93		