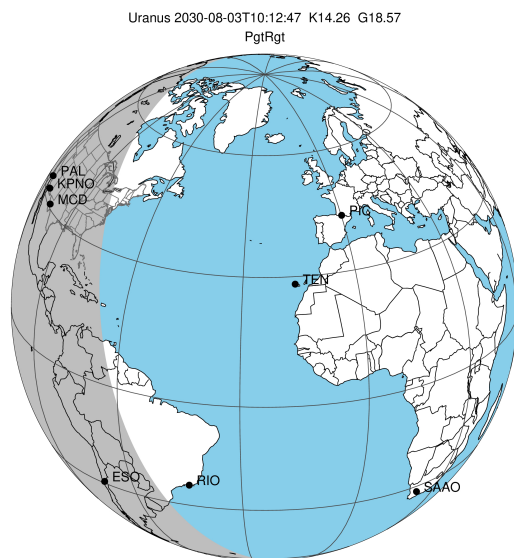


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-08-03T10:12:47.270
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 3416338586353330816
 2Mass ID (if available) : 05213607+2312329

Uranus 2030-08-03T10:12:47 K14.26 G18.57 PgtRgt

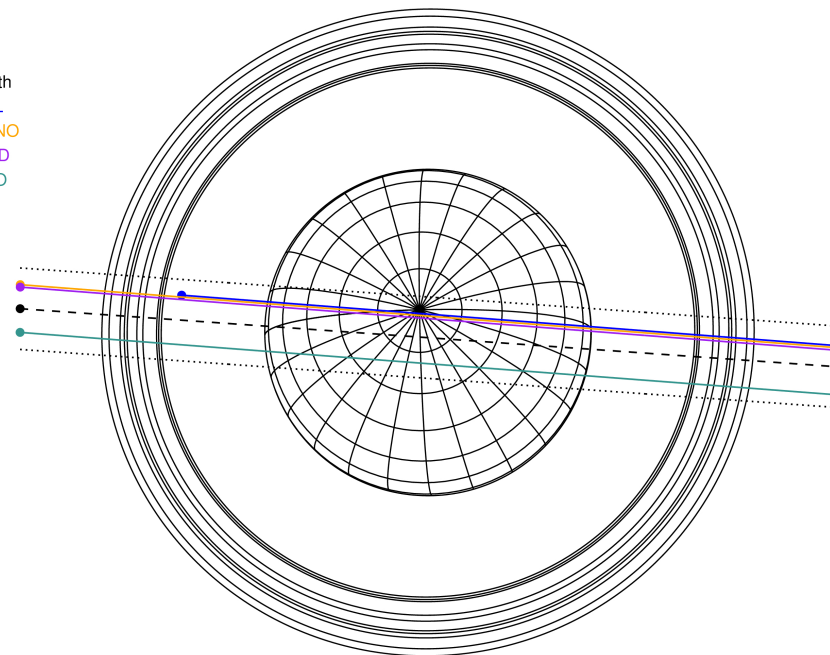
ICRS Star Coord at Epoch: 05h 21m 36.06359s +23:12:32.79093s

RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.257
 G magnitude : 18.571
 RP magnitude : 17.381
 BP magnitude : 20.145
 DUPflag : 0
 Distance (au) : 19.823
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.67
 Sun-Target sep (deg) : 49.54
 Sun-Moon sep (deg) : 97.55
 B (ring opening deg) : 81.45
 PA of pole (deg) : 20.49



2030-08-03T10:12:47.2700 ex: 05 21 36.0636 R: +23 12 32.791 C/A 0.052° PA 355.99 deg v_sky +25.67 km/s D 19.82 AU
 Credit: Styled after SORA/Lucky Star

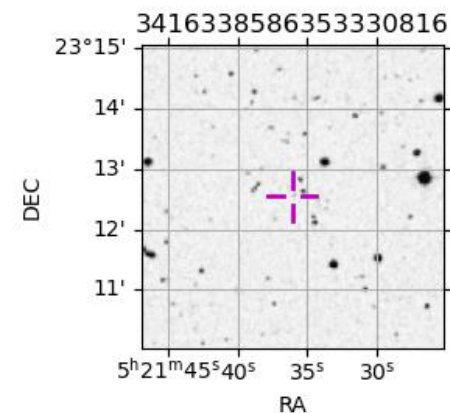
Earth
 PAL
 KPNO
 MCD
 ESO



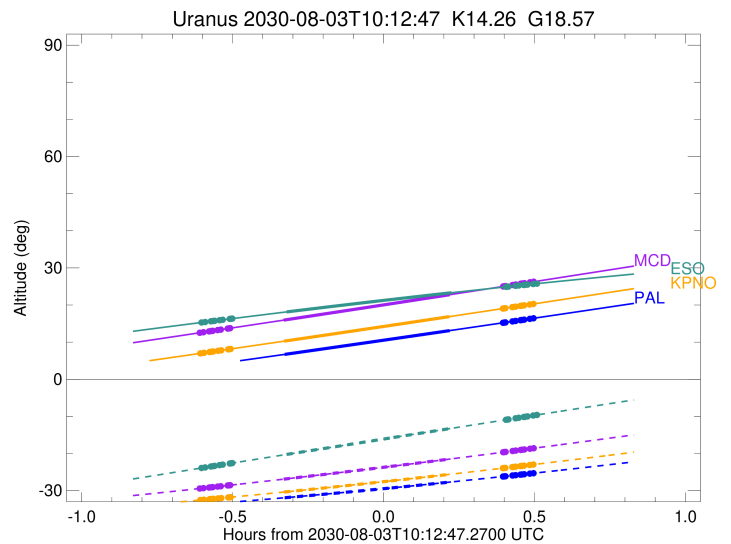
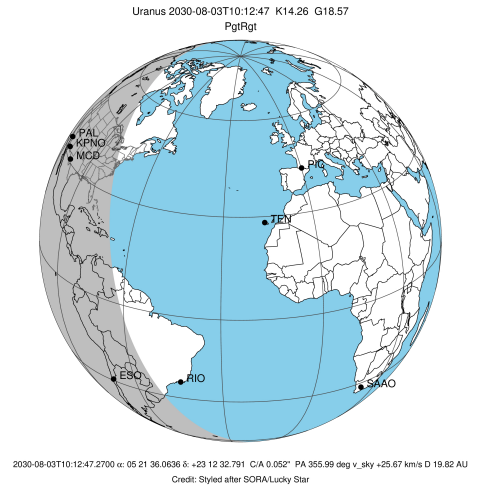
#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

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		+ +	+++++	AUG 03 09:53 - AUG 03 10:42	PieRne
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+ +	+++++	AUG 03 09:36 - AUG 03 10:42	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+ +	+++++	AUG 03 09:36 - AUG 03 10:42	PieRie
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					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3	+++++	+ +	+++++	AUG 03 09:36 - AUG 03 10:43	PieRie
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

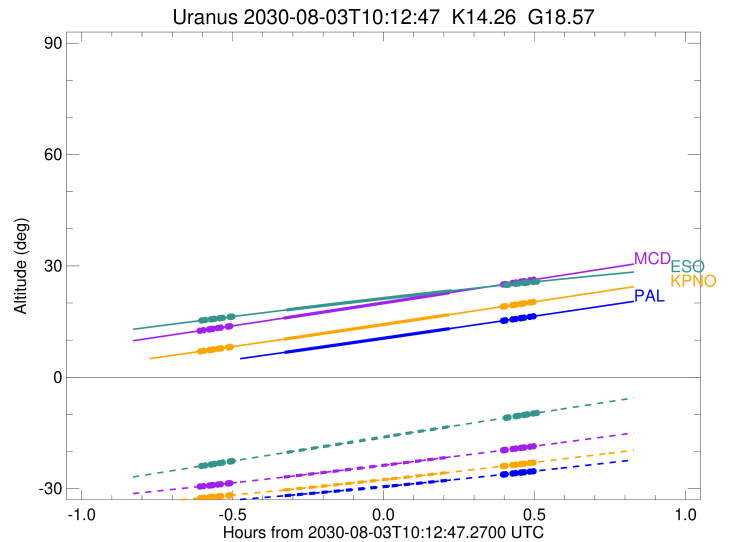
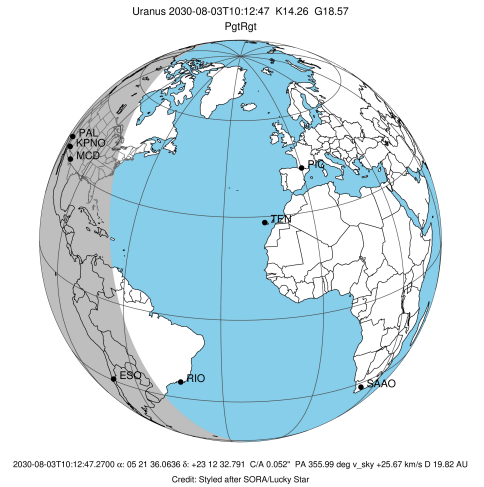


target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-08-03T10:09:29.700
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : PAL
 Location : Palomar Mt (200")
 Latitude (deg) : 33.35622
 E. Longitude (deg) : 243.13601
 Altitude (km) : 1.706
 Gaia source ID : 3416338586353330816
 2Mass ID (if available) : 05213607+2312329
 ICRS Star Coord at Epoch: 05h 21m 36.06359s +23:12:32.79093s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.257
 G magnitude : 18.571
 RP magnitude : 17.381
 BP magnitude : 20.145
 DUPflag : 0
 Distance (au) : 19.823
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.67
 Sun-Target sep (deg) : 49.54
 Sun-Moon sep (deg) : 97.61
 B (ring opening deg) : 81.45
 PA of pole (deg) : 20.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.200
 C/A sky separation (km) : 2869.5
 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



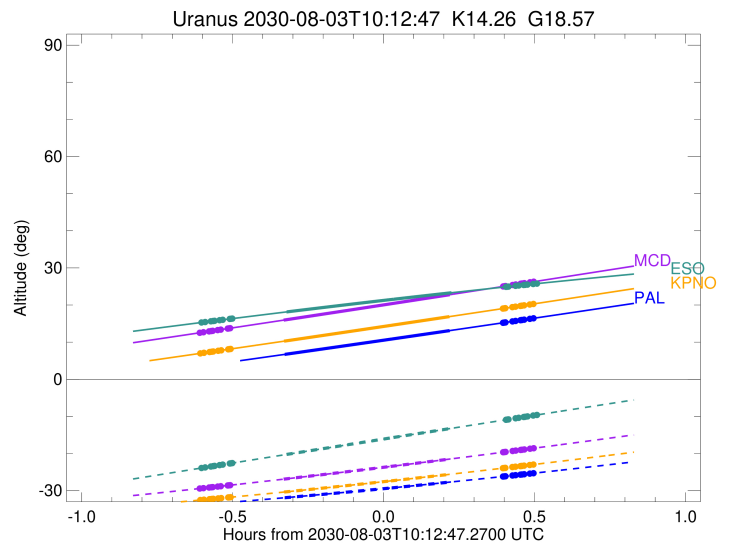
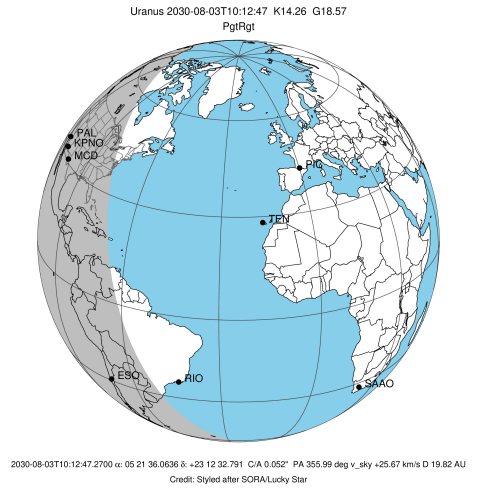
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-08-03T09:36:46.338		3.58x	-33.72	50745.34	-25.76		
lambda	I	2030-08-03T09:37:14.230		3.66x	-33.68	50026.71	-25.76		
delta	I	2030-08-03T09:38:21.247		3.88x	-33.56	48300.35	-25.76		
gamma	I	2030-08-03T09:38:47.480		3.96x	-33.51	47624.69	-25.75		
eta	I	2030-08-03T09:39:04.897		4.01x	-33.48	47176.12	-25.75		
beta	I	2030-08-03T09:40:04.095		4.20x	-33.38	45651.65	-25.75		
alpha	I	2030-08-03T09:40:41.058		4.32x	-33.31	44699.98	-25.74		
4	I	2030-08-03T09:42:02.655		4.58x	-33.16	42601.55	-25.73		
5	I	2030-08-03T09:42:16.451		4.62x	-33.14	42242.65	-25.73		
6	I	2030-08-03T09:42:33.247		4.67x	-33.11	41815.88	-25.73		
Uranus	I	2030-08-03T09:53:08.334		6.70	-31.91	25399.84		4.44	4.65
Uranus	E	2030-08-03T10:25:56.211		13.11	-27.70	25499.95		-2.69	-2.82
6	E	2030-08-03T10:36:32.884		15.21	-26.20	41853.33	25.63		
5	E	2030-08-03T10:36:47.215		15.26	-26.16	42216.43	25.62		
4	E	2030-08-03T10:36:59.590		15.30	-26.13	42536.67	25.63		
alpha	E	2030-08-03T10:38:25.345		15.59	-25.93	44733.25	25.63		
beta	E	2030-08-03T10:39:02.001		15.71	-25.84	45672.77	25.63		
eta	E	2030-08-03T10:40:00.646		15.91	-25.69	47176.12	25.63		
gamma	E	2030-08-03T10:40:18.244		15.96	-25.65	47627.23	25.64		
delta	E	2030-08-03T10:40:44.501		16.05	-25.59	48300.35	25.64		
lambda	E	2030-08-03T10:41:51.841		16.28	-25.42	50026.71	25.64		
epsilon	E	2030-08-03T10:42:51.117		16.47	-25.27	51546.42	25.64		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-08-03T10:09:25.340
 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 : 3416338586353330816
 2Mass ID (if available) : 05213607+2312329
 ICRS Star Coord at Epoch: 05h 21m 36.06359s +23:12:32.79093s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.257
 G magnitude : 18.571
 RP magnitude : 17.381
 BP magnitude : 20.145
 DUPflag : 0
 Distance (au) : 19.823
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.67
 Sun-Target sep (deg) : 49.54
 Sun-Moon sep (deg) : 97.67
 B (ring opening deg) : 81.45
 PA of pole (deg) : 20.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.178
 C/A sky separation (km) : 2563.3
 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_itrf93_040916.bsp
 earth_720101_070426.bpc
 earth_200101_990628_predict.bpc
 pg3f0000r.bsp
 pg490000r.bsp
 naif0012.tls
 earth_flat_IAU.spk



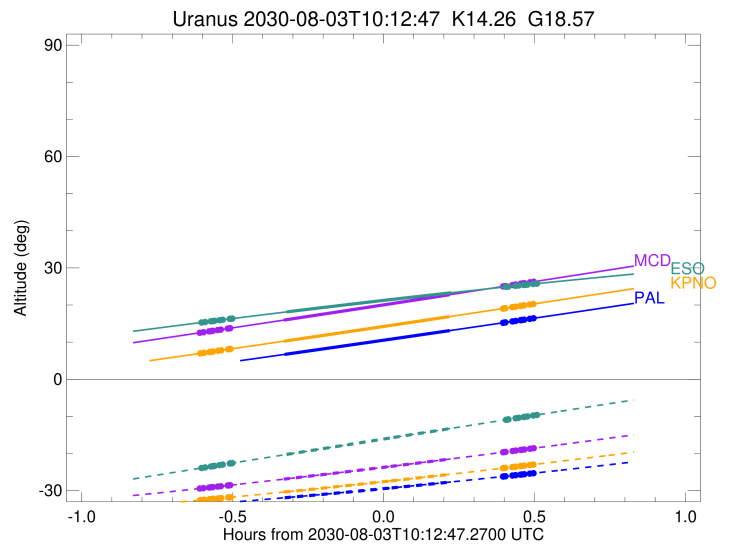
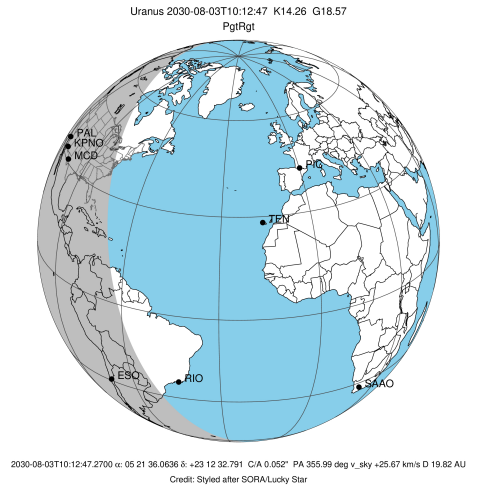
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2030-08-03T09:36:38.572		7.03	-32.50	50745.57	-25.74		
lambda	I	2030-08-03T09:37:06.501		7.12	-32.44	50026.71	-25.74		
delta	I	2030-08-03T09:38:13.582		7.34	-32.30	48300.35	-25.73		
gamma	I	2030-08-03T09:38:39.838		7.42	-32.25	47624.72	-25.73		
eta	I	2030-08-03T09:38:57.273		7.48	-32.21	47176.12	-25.73		
beta	I	2030-08-03T09:39:56.531		7.68	-32.09	45651.53	-25.72		
alpha	I	2030-08-03T09:40:33.516		7.80	-32.01	44700.17	-25.72		
4	I	2030-08-03T09:41:55.181		8.07	-31.84	42601.79	-25.71		
5	I	2030-08-03T09:42:08.977		8.11	-31.81	42243.21	-25.71		
6	I	2030-08-03T09:42:25.797		8.17	-31.77	41816.14	-25.71		
Uranus	I	2030-08-03T09:53:01.113		10.26	-30.38	25405.97		4.35	4.56
Uranus	E	2030-08-03T10:25:54.335		16.88	-25.62	25495.56		-2.79	-2.92
6	E	2030-08-03T10:36:31.491		19.05	-23.95	41853.63	25.60		
5	E	2030-08-03T10:36:45.850		19.10	-23.91	42217.02	25.60		
4	E	2030-08-03T10:36:58.220		19.14	-23.88	42536.89	25.60		
alpha	E	2030-08-03T10:38:24.059		19.43	-23.65	44733.46	25.61		
beta	E	2030-08-03T10:39:00.738		19.56	-23.55	45672.65	25.61		
eta	E	2030-08-03T10:39:59.448		19.76	-23.40	47176.12	25.61		
gamma	E	2030-08-03T10:40:17.065		19.82	-23.35	47627.26	25.61		
delta	E	2030-08-03T10:40:43.348		19.91	-23.28	48300.35	25.61		
lambda	E	2030-08-03T10:41:50.759		20.14	-23.10	50026.71	25.61		
epsilon	E	2030-08-03T10:42:50.120		20.34	-22.94	51546.94	25.61		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-08-03T10:09:24.130
 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 : 3416338586353330816
 2Mass ID (if available) : 05213607+2312329
 ICRS Star Coord at Epoch: 05h 21m 36.06359s +23:12:32.79093s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.257
 G magnitude : 18.571
 RP magnitude : 17.381
 BP magnitude : 20.145
 DUPflag : 0
 Distance (au) : 19.823
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.67
 Sun-Target sep (deg) : 49.54
 Sun-Moon sep (deg) : 97.76
 B (ring opening deg) : 81.45
 PA of pole (deg) : 20.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.151
 C/A sky separation (km) : 2166.1
 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_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	2030-08-03T09:36:32.479		12.58	-29.39	50745.90	-25.70		
lambda	I	2030-08-03T09:37:00.466		12.67	-29.33	50026.71	-25.70		
delta	I	2030-08-03T09:38:07.655		12.90	-29.16	48300.35	-25.69		
gamma	I	2030-08-03T09:38:33.951		12.99	-29.10	47624.76	-25.69		
eta	I	2030-08-03T09:38:51.416		13.05	-29.05	47176.12	-25.69		
beta	I	2030-08-03T09:39:50.772		13.25	-28.91	45651.38	-25.68		
alpha	I	2030-08-03T09:40:27.799		13.38	-28.81	44700.42	-25.68		
4	I	2030-08-03T09:41:49.584		13.66	-28.61	42602.09	-25.67		
5	I	2030-08-03T09:42:03.385		13.70	-28.58	42243.96	-25.67		
6	I	2030-08-03T09:42:20.242		13.76	-28.53	41816.49	-25.67		
Uranus	I	2030-08-03T09:52:56.130		15.93	-26.91	25413.85		4.24	4.44
Uranus	E	2030-08-03T10:25:56.372		22.77	-21.50	25489.71		-2.92	-3.06
6	E	2030-08-03T10:36:34.395		25.00	-19.65	41854.01	25.59		
5	E	2030-08-03T10:36:48.793		25.05	-19.61	42217.77	25.56		
4	E	2030-08-03T10:37:01.161		25.10	-19.58	42537.17	25.56		
alpha	E	2030-08-03T10:38:27.135		25.40	-19.32	44733.74	25.56		
beta	E	2030-08-03T10:39:03.855		25.53	-19.22	45672.50	25.57		
eta	E	2030-08-03T10:40:02.665		25.73	-19.04	47176.12	25.57		
gamma	E	2030-08-03T10:40:20.312		25.80	-18.99	47627.30	25.57		
delta	E	2030-08-03T10:40:46.637		25.89	-18.91	48300.35	25.57		
lambda	E	2030-08-03T10:41:54.159		26.13	-18.71	50026.71	25.57		
epsilon	E	2030-08-03T10:42:53.645		26.33	-18.54	51547.58	25.57		

target : Uranus
 target radius (km) : 25559.00
 C/A epoch : 2030-08-03T10:09:56.250
 Event type : PgtRgt
 : Uranus occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 3416338586353330816
 2Mass ID (if available) : 05213607+2312329
 ICRS Star Coord at Epoch: 05h 21m 36.06359s +23:12:32.79093s
 RUWE (>1.4 is poor) : 1.01
 K magnitude : 14.257
 G magnitude : 18.571
 RP magnitude : 17.381
 BP magnitude : 20.145
 DUPflag : 0
 Distance (au) : 19.823
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 25.67
 Sun-Target sep (deg) : 49.54
 Sun-Moon sep (deg) : 97.81
 B (ring opening deg) : 81.45
 PA of pole (deg) : 20.49
 Pole direction: RA (deg): 257.31100
 Dec (deg): -15.17500
 C/A sky separation (") : 0.339
 C/A sky separation (km) : 4869.9
 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	2030-08-03T09:36:52.339		15.34	-23.85	50755.95	-25.38		
lambda	I	2030-08-03T09:37:21.076		15.42	-23.75	50026.71	-25.37		
delta	I	2030-08-03T09:38:29.130		15.62	-23.50	48300.35	-25.36		
gamma	I	2030-08-03T09:38:55.740		15.69	-23.40	47625.54	-25.36		
eta	I	2030-08-03T09:39:13.465		15.74	-23.34	47176.12	-25.35		
beta	I	2030-08-03T09:40:13.720		15.92	-23.12	45648.76	-25.34		
alpha	I	2030-08-03T09:40:50.960		16.02	-22.99	44705.22	-25.34		
4	I	2030-08-03T09:42:13.848		16.26	-22.69	42607.20	-25.32		
5	I	2030-08-03T09:42:27.564		16.29	-22.64	42257.25	-25.32		
6	I	2030-08-03T09:42:44.861		16.34	-22.58	41823.10	-25.31		
Uranus	I	2030-08-03T09:53:30.262		18.14	-20.25	25525.02		2.04	2.14
Uranus	E	2030-08-03T10:26:16.522		23.30	-13.22	25357.37		-5.00	-5.24
6	E	2030-08-03T10:37:08.551		24.89	-10.91	41860.34	25.23		
5	E	2030-08-03T10:37:23.481		24.93	-10.86	42231.06	25.23		
4	E	2030-08-03T10:37:35.668		24.96	-10.82	42542.58	25.23		
alpha	E	2030-08-03T10:39:02.761		25.17	-10.51	44738.32	25.24		
beta	E	2030-08-03T10:39:39.658		25.25	-10.38	45669.82	25.25		
eta	E	2030-08-03T10:40:39.305		25.39	-10.17	47176.12	25.26		
gamma	E	2030-08-03T10:40:57.199		25.44	-10.11	47628.06	25.26		
delta	E	2030-08-03T10:41:23.814		25.50	-10.01	48300.35	25.26		
lambda	E	2030-08-03T10:42:32.143		25.66	-9.77	50026.71	25.27		
epsilon	E	2030-08-03T10:43:32.601		25.80	-9.56	51554.63	25.28		