

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-30T06:10:20.400  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 3427816766193159168  
 2Mass ID (if available) : 05543603+2338521

Uranus 2032-12-30T06:10:20 K12.55 G14.61 PgtRgt

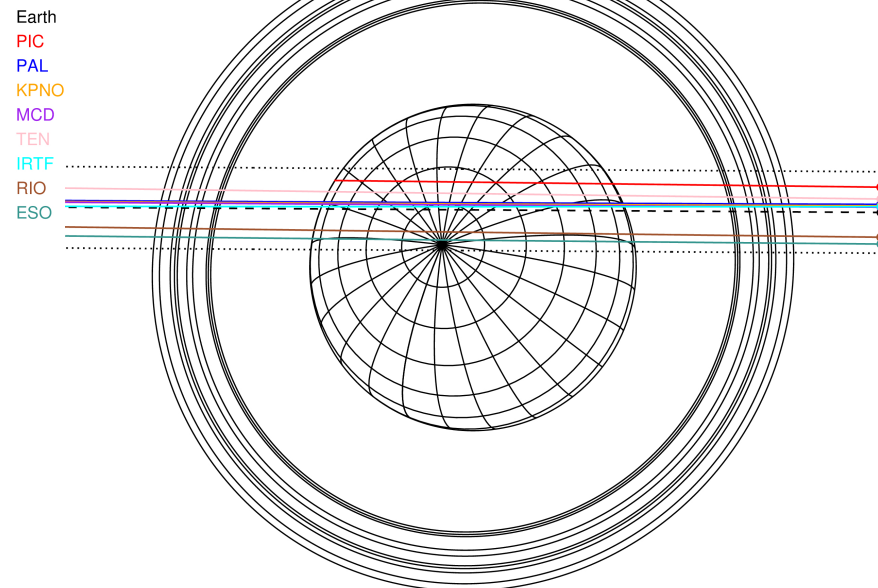
ICRS Star Coord at Epoch: 05h 54m 36.03664s +23:38:52.20251s

RUWE (>1.4 is poor) : 1.06  
 K magnitude : 12.549  
 G magnitude : 14.606  
 RP magnitude : 13.914  
 BP magnitude : 15.123  
 DUPflag : 0  
 Distance (au) : 18.048  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.00  
 Sun-Target sep (deg) : 170.12  
 Sun-Moon sep (deg) : 161.53  
 B (ring opening deg) : 76.37  
 PA of pole (deg) : 53.62

#	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

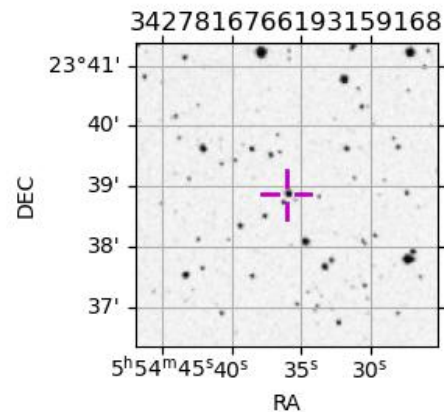


2032-12-30T06:10:20.4000 ra: 05 54 36.03666 cr: +23 38 52.203 C/A 0.696 PA 179.63 deg v\_sky -23.00 km/s D 18.05 AU  
 Credit: Styled after SORA/Lucky Star

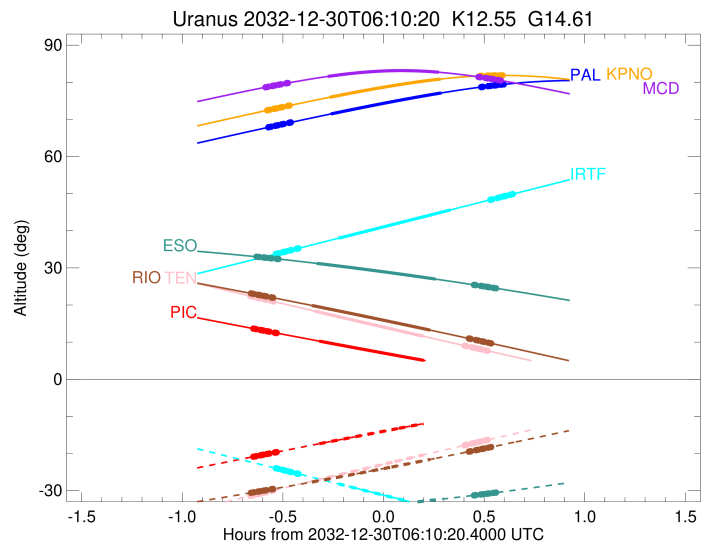
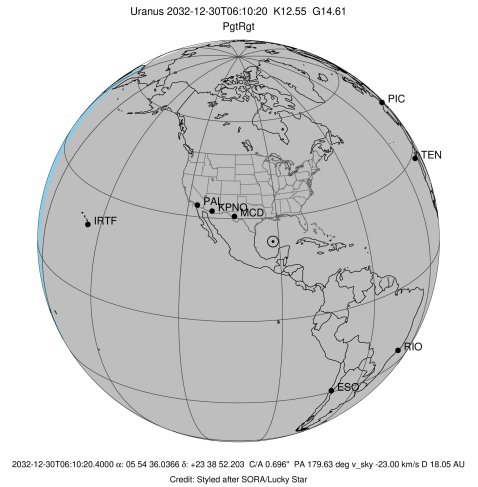


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1	+++++	+	+	DEC 30 05:31 - DEC 30 06:22	PieRin
PAL	Palomar Mt (200")	33.4	243.1	+++++	+	+	DEC 30 05:36 - DEC 30 06:46	PieRie
PNO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4	+++++	+	+	DEC 30 05:35 - DEC 30 06:45	PieRie
MCD	McDonald Obs. 2.7m	30.7	256.0	+++++	+	+	DEC 30 05:35 - DEC 30 06:45	PieRie
TEN	Teide Obs./Tenerife	28.3	343.5	+++++	+	+	DEC 30 05:30 - DEC 30 06:41	PieRie
IRTF	Mauna Kea/IRTF	19.8	204.5	+++++	+	+	DEC 30 05:38 - DEC 30 06:49	PieRie
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+++++	+	+	DEC 30 05:30 - DEC 30 06:42	PieRie
ESO	European Southern Obs	-29.3	289.3	+++++	+	+	DEC 30 05:32 - DEC 30 06:44	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

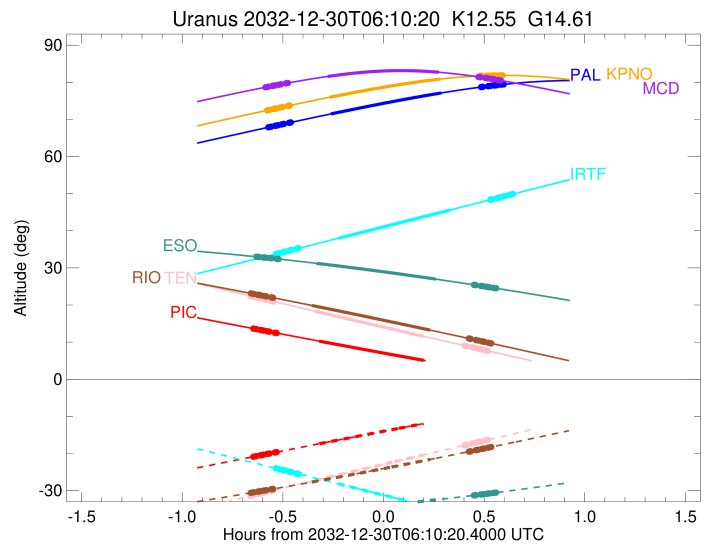
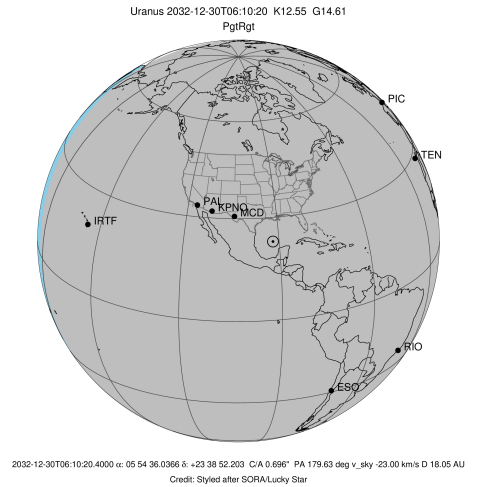


target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-30T06:06:57.430  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : PIC  
 Location : Pic du Midi  
 Latitude (deg) : 42.93656  
 E. Longitude (deg) : 0.14231  
 Altitude (km) : 2.890  
 Gaia source ID : 3427816766193159168  
 2Mass ID (if available) : 05543603+2338521  
 ICRS Star Coord at Epoch: 05h 54m 36.03664s +23:38:52.20251s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 12.549  
 G magnitude : 14.606  
 RP magnitude : 13.914  
 BP magnitude : 15.123  
 DUPflag : 0  
 Distance (au) : 18.048  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.00  
 Sun-Target sep (deg) : 170.12  
 Sun-Moon sep (deg) : 162.33  
 B (ring opening deg) : 76.37  
 PA of pole (deg) : 53.62  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 1.021  
 C/A sky separation (km) : 13361.3  
 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



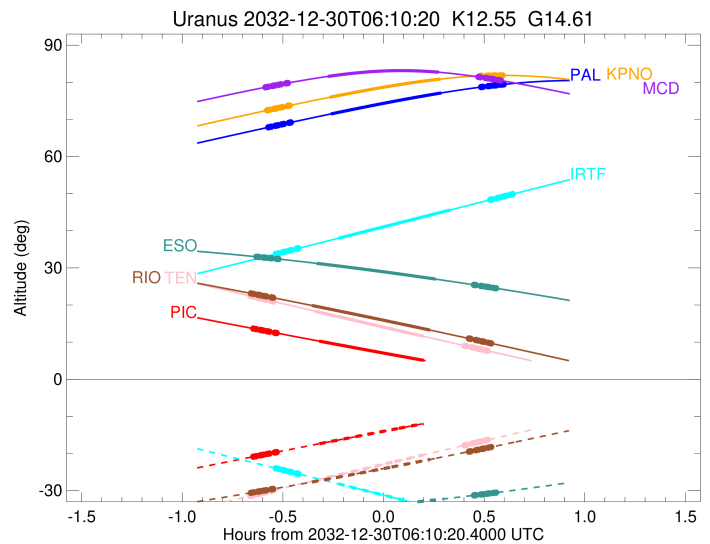
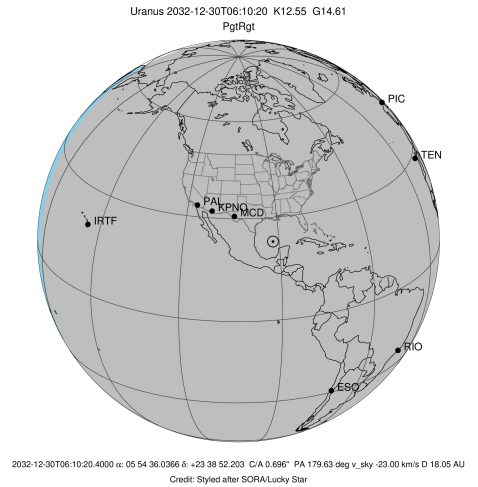
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-30T05:31:35.133		13.64	-20.85	51109.88	-22.63		
lambda	I	2032-12-30T05:32:23.134		13.50	-20.71	50026.71	-22.55		
delta	I	2032-12-30T05:33:39.815		13.28	-20.48	48300.35	-22.48		
gamma	I	2032-12-30T05:34:09.587		13.19	-20.39	47631.53	-22.45		
eta	I	2032-12-30T05:34:29.880		13.13	-20.33	47176.12	-22.43		
beta	I	2032-12-30T05:35:36.716		12.94	-20.13	45678.98	-22.36		
alpha	I	2032-12-30T05:36:18.686		12.82	-20.01	44742.84	-22.32		
4	I	2032-12-30T05:37:54.306		12.55	-19.73	42610.93	-22.19		
5	I	2032-12-30T05:38:10.502		12.50	-19.68	42259.59	-22.19		
6	I	2032-12-30T05:38:31.343		12.44	-19.62	41795.06	-22.15		
Uranus	I	2032-12-30T05:51:11.847		10.27	-17.37	25474.38		-5.22	-5.46
Uranus	E	2032-12-30T06:22:20.000		5.09	-11.94	25007.78		13.61	14.23
6	E	2032-12-30T06:34:58.907	3.05x	-9.78	41867.39	22.06			
5	E	2032-12-30T06:35:16.414	3.00x	-9.73	42261.57	22.11			
4	E	2032-12-30T06:35:28.691	2.97x	-9.69	42526.39	22.11			
alpha	E	2032-12-30T06:37:07.156	2.71x	-9.41	44712.23	22.23			
beta	E	2032-12-30T06:37:49.540	2.60x	-9.30	45651.65	22.27			
eta	E	2032-12-30T06:38:57.864	2.42x	-9.10	47176.12	22.34			
gamma	E	2032-12-30T06:39:17.830	2.36x	-9.05	47622.25	22.35			
delta	E	2032-12-30T06:39:48.148	2.28x	-8.96	48300.35	22.38			
lambda	E	2032-12-30T06:41:05.177	2.08x	-8.75	50026.71	22.44			
epsilon	E	2032-12-30T06:42:05.605	1.92x	-8.58	51384.26	22.53			

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-30T06:11:16.910  
 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 : 3427816766193159168  
 2Mass ID (if available) : 05543603+2338521  
 ICRS Star Coord at Epoch: 05h 54m 36.03664s +23:38:52.20251s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 12.549  
 G magnitude : 14.606  
 RP magnitude : 13.914  
 BP magnitude : 15.123  
 DUPflag : 0  
 Distance (au) : 18.048  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.00  
 Sun-Target sep (deg) : 170.12  
 Sun-Moon sep (deg) : 161.67  
 B (ring opening deg) : 76.37  
 PA of pole (deg) : 53.62  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.775  
 C/A sky separation (km) : 10145.4  
 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



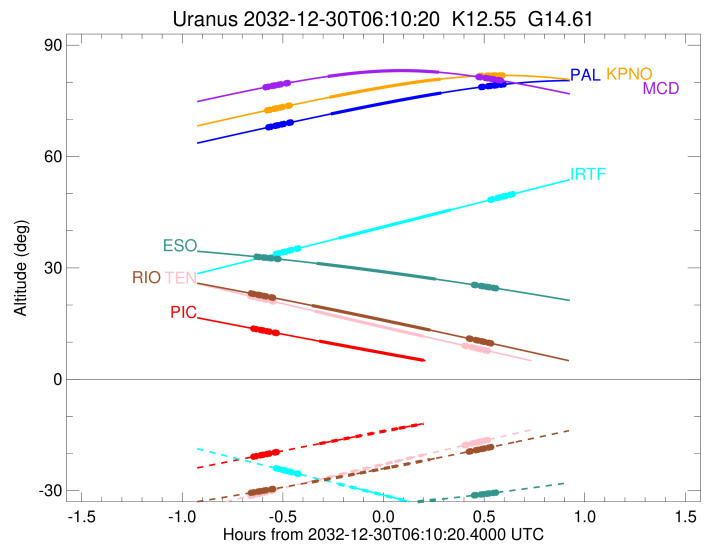
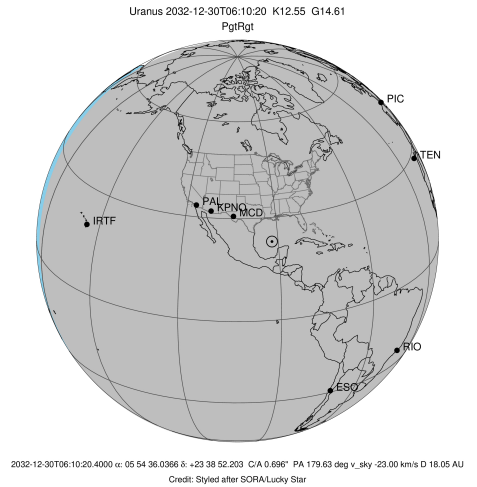
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-30T05:36:03.925		67.88	-58.96	51086.84	-23.35		
lambda	I	2032-12-30T05:36:49.421		68.03	-59.12	50026.71	-23.29		
delta	I	2032-12-30T05:38:03.599		68.28	-59.37	48300.35	-23.25		
gamma	I	2032-12-30T05:38:32.372		68.37	-59.47	47631.47	-23.24		
eta	I	2032-12-30T05:38:51.971		68.44	-59.54	47176.12	-23.23		
beta	I	2032-12-30T05:39:56.497		68.65	-59.76	45678.33	-23.19		
alpha	I	2032-12-30T05:40:37.005		68.78	-59.90	44741.19	-23.17		
4	I	2032-12-30T05:42:08.873		69.08	-60.21	42612.39	-23.09		
5	I	2032-12-30T05:42:24.757		69.13	-60.26	42254.01	-23.10		
6	I	2032-12-30T05:42:44.484		69.19	-60.33	41795.56	-23.07		
Uranus	I	2032-12-30T05:54:39.927		71.48	-62.76	25414.30		-6.84	-7.16
Uranus	E	2032-12-30T06:27:35.676		77.13	-69.28	25029.78		13.32	13.93
6	E	2032-12-30T06:39:28.516		78.72	-71.51	41869.90	23.09		
5	E	2032-12-30T06:39:44.876		78.75	-71.56	42254.90	23.12		
4	E	2032-12-30T06:39:56.924		78.77	-71.60	42526.00	23.11		
alpha	E	2032-12-30T06:41:31.090		78.95	-71.89	44709.52	23.19		
beta	E	2032-12-30T06:42:11.784		79.03	-72.01	45650.26	23.21		
eta	E	2032-12-30T06:43:17.437		79.14	-72.21	47176.12	23.25		
gamma	E	2032-12-30T06:43:36.609		79.18	-72.27	47622.00	23.26		
delta	E	2032-12-30T06:44:05.760		79.23	-72.35	48300.35	23.28		
lambda	E	2032-12-30T06:45:19.861		79.35	-72.58	50026.71	23.32		
epsilon	E	2032-12-30T06:46:17.006		79.44	-72.75	51359.87	23.37		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-30T06:10:56.670  
 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 : 3427816766193159168  
 2Mass ID (if available) : 05543603+2338521  
 ICRS Star Coord at Epoch: 05h 54m 36.03664s +23:38:52.20251s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 12.549  
 G magnitude : 14.606  
 RP magnitude : 13.914  
 BP magnitude : 15.123  
 DUPflag : 0  
 Distance (au) : 18.048  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.00  
 Sun-Target sep (deg) : 170.12  
 Sun-Moon sep (deg) : 161.74  
 B (ring opening deg) : 76.37  
 PA of pole (deg) : 53.62  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.760  
 C/A sky separation (km) : 9953.9  
 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\_itrff93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



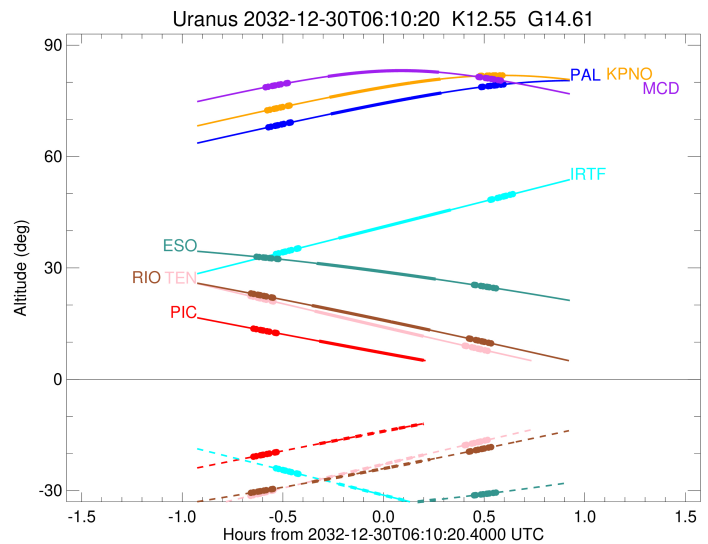
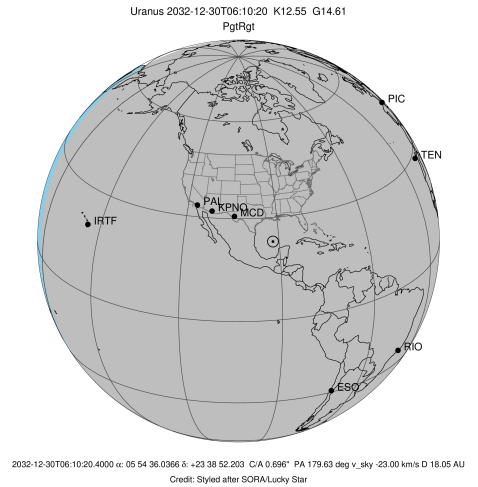
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-30T05:35:43.781		72.46	-63.52	51085.07	-23.39		
lambda	I	2032-12-30T05:36:29.129		72.61	-63.67	50026.71	-23.33		
delta	I	2032-12-30T05:37:43.187		72.85	-63.93	48300.35	-23.29		
gamma	I	2032-12-30T05:38:11.912		72.94	-64.03	47631.47	-23.28		
eta	I	2032-12-30T05:38:31.478		73.00	-64.09	47176.12	-23.27		
beta	I	2032-12-30T05:39:35.894		73.21	-64.32	45678.28	-23.23		
alpha	I	2032-12-30T05:40:16.334		73.34	-64.46	44741.06	-23.21		
4	I	2032-12-30T05:41:48.023		73.63	-64.77	42612.49	-23.14		
5	I	2032-12-30T05:42:03.900		73.69	-64.83	42253.60	-23.14		
6	I	2032-12-30T05:42:23.567		73.75	-64.90	41795.61	-23.11		
Uranus	I	2032-12-30T05:54:16.970		75.96	-67.33	25410.02		-6.94	-7.27
Uranus	E	2032-12-30T06:27:18.616		80.87	-73.82	25031.54		13.30	13.90
6	E	2032-12-30T06:39:09.720		81.72	-75.97	41870.02	23.13		
5	E	2032-12-30T06:39:26.037		81.73	-76.01	42254.58	23.16		
4	E	2032-12-30T06:39:38.082		81.74	-76.05	42525.99	23.15		
alpha	E	2032-12-30T06:41:12.103		81.79	-76.32	44709.40	23.22		
beta	E	2032-12-30T06:41:52.742		81.81	-76.43	45650.20	23.24		
eta	E	2032-12-30T06:42:58.311		81.83	-76.62	47176.12	23.28		
gamma	E	2032-12-30T06:43:17.458		81.84	-76.67	47621.98	23.29		
delta	E	2032-12-30T06:43:46.573		81.84	-76.75	48300.35	23.31		
lambda	E	2032-12-30T06:45:00.585		81.86	-76.96	50026.71	23.34		
epsilon	E	2032-12-30T06:45:57.615		81.86	-77.11	51358.73	23.40		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-30T06:10:25.890  
 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 : 3427816766193159168  
 2Mass ID (if available) : 05543603+2338521  
 ICRS Star Coord at Epoch: 05h 54m 36.03664s +23:38:52.20251s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 12.549  
 G magnitude : 14.606  
 RP magnitude : 13.914  
 BP magnitude : 15.123  
 DUPflag : 0  
 Distance (au) : 18.048  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.00  
 Sun-Target sep (deg) : 170.12  
 Sun-Moon sep (deg) : 161.84  
 B (ring opening deg) : 76.37  
 PA of pole (deg) : 53.62  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.748  
 C/A sky separation (km) : 9785.1  
 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



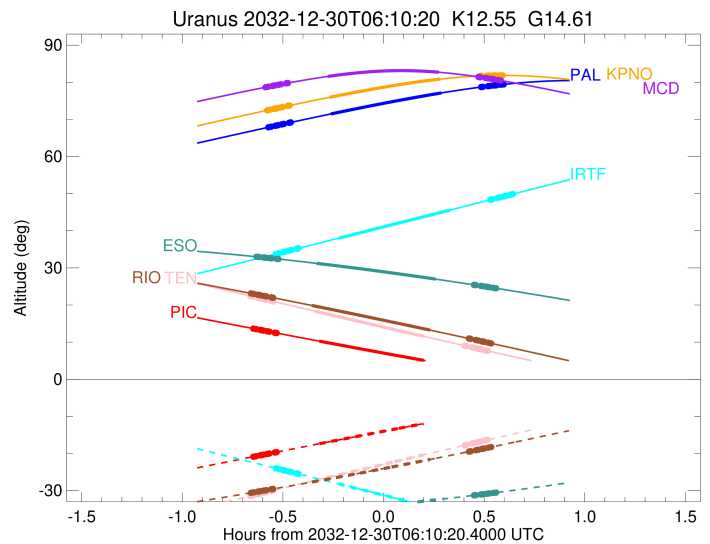
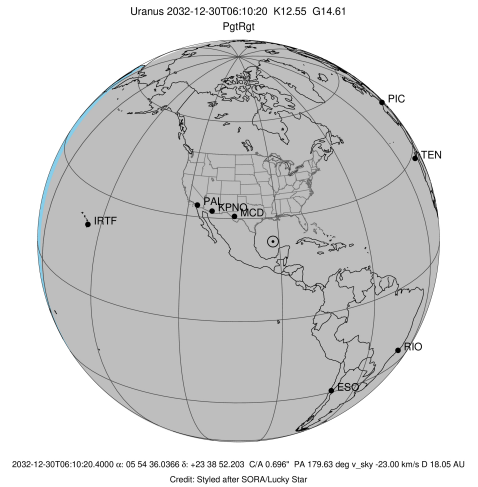
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-30T05:35:13.156		78.67	-70.01	51083.38	-23.42		
lambda	I	2032-12-30T05:35:58.365		78.80	-70.17	50026.71	-23.36		
delta	I	2032-12-30T05:37:12.312		79.02	-70.42	48300.35	-23.33		
gamma	I	2032-12-30T05:37:40.993		79.10	-70.52	47631.46	-23.31		
eta	I	2032-12-30T05:38:00.529		79.16	-70.58	47176.12	-23.30		
beta	I	2032-12-30T05:39:04.845		79.34	-70.80	45678.23	-23.27		
alpha	I	2032-12-30T05:39:45.224		79.46	-70.94	44740.94	-23.25		
4	I	2032-12-30T05:41:16.749		79.71	-71.25	42612.58	-23.18		
5	I	2032-12-30T05:41:32.621		79.76	-71.31	42253.20	-23.18		
6	I	2032-12-30T05:41:52.233		79.81	-71.38	41795.65	-23.16		
Uranus	I	2032-12-30T05:53:43.842		81.58	-73.76	25406.05		-7.03	-7.37
Uranus	E	2032-12-30T06:26:50.657		82.71	-79.76	25033.04		13.28	13.88
6	E	2032-12-30T06:38:40.362		81.44	-81.37	41870.11	23.15		
5	E	2032-12-30T06:38:56.645		81.40	-81.40	42254.32	23.18		
4	E	2032-12-30T06:39:08.688		81.38	-81.43	42525.99	23.18		
alpha	E	2032-12-30T06:40:42.600		81.16	-81.60	44709.30	23.25		
beta	E	2032-12-30T06:41:23.199		81.07	-81.67	45650.15	23.27		
eta	E	2032-12-30T06:42:28.706		80.91	-81.78	47176.12	23.30		
gamma	E	2032-12-30T06:42:47.835		80.86	-81.81	47621.97	23.31		
delta	E	2032-12-30T06:43:16.923		80.79	-81.86	48300.35	23.33		
lambda	E	2032-12-30T06:44:30.871		80.60	-81.97	50026.71	23.36		
epsilon	E	2032-12-30T06:45:27.818		80.46	-82.05	51357.85	23.42		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-30T06:06:12.880  
 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 : 3427816766193159168  
 2Mass ID (if available) : 05543603+2338521  
 ICRS Star Coord at Epoch: 05h 54m 36.03664s +23:38:52.20251s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 12.549  
 G magnitude : 14.606  
 RP magnitude : 13.914  
 BP magnitude : 15.123  
 DUPflag : 0  
 Distance (au) : 18.048  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.00  
 Sun-Target sep (deg) : 170.12  
 Sun-Moon sep (deg) : 162.47  
 B (ring opening deg) : 76.37  
 PA of pole (deg) : 53.62  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.884  
 C/A sky separation (km) : 11570.9  
 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



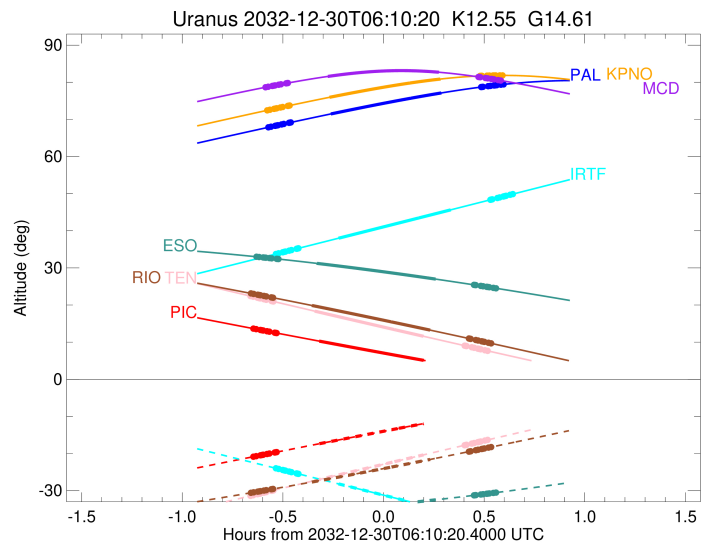
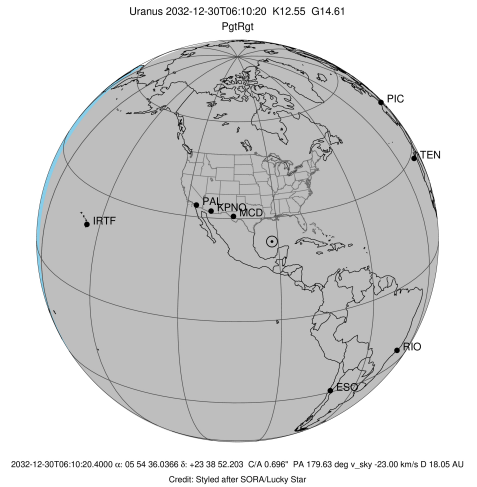
Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2032-12-30T05:30:44.200		22.40	-31.40	51094.77	-22.95		
lambda	I	2032-12-30T05:31:30.845		22.23	-31.23	50026.71	-22.88		
delta	I	2032-12-30T05:32:46.372		21.97	-30.96	48300.35	-22.83		
gamma	I	2032-12-30T05:33:15.680		21.86	-30.85	47631.49	-22.81		
eta	I	2032-12-30T05:33:35.650		21.79	-30.78	47176.12	-22.80		
beta	I	2032-12-30T05:34:41.410		21.56	-30.55	45678.57	-22.74		
alpha	I	2032-12-30T05:35:22.701		21.41	-30.40	44741.80	-22.71		
4	I	2032-12-30T05:36:56.513		21.08	-30.06	42611.88	-22.62		
5	I	2032-12-30T05:37:12.616		21.02	-30.00	42256.05	-22.62		
6	I	2032-12-30T05:37:32.875		20.95	-29.93	41795.35	-22.58		
Uranus	I	2032-12-30T05:49:49.866		18.35	-27.29	25439.30		-6.21	-6.51
Uranus	E	2032-12-30T06:22:16.507		11.58	-20.36	25016.42		13.49	14.11
6	E	2032-12-30T06:34:33.344		9.05	-17.77	41868.68	22.48		
5	E	2032-12-30T06:34:50.339		8.99	-17.71	42258.25	22.51		
4	E	2032-12-30T06:35:02.552		8.95	-17.67	42526.16	22.51		
alpha	E	2032-12-30T06:36:39.272		8.62	-17.33	44710.88	22.60		
beta	E	2032-12-30T06:37:20.996		8.48	-17.18	45650.96	22.63		
eta	E	2032-12-30T06:38:28.294		8.25	-16.95	47176.12	22.68		
gamma	E	2032-12-30T06:38:47.956		8.18	-16.88	47622.12	22.69		
delta	E	2032-12-30T06:39:17.834		8.08	-16.77	48300.35	22.71		
lambda	E	2032-12-30T06:40:33.773		7.82	-16.51	50026.71	22.76		
epsilon	E	2032-12-30T06:41:32.872		7.62	-16.30	51372.52	22.82		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-30T06:13:48.420  
 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 : 3427816766193159168  
 2Mass ID (if available) : 05543603+2338521  
 ICRS Star Coord at Epoch: 05h 54m 36.03664s +23:38:52.20251s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 12.549  
 G magnitude : 14.606  
 RP magnitude : 13.914  
 BP magnitude : 15.123  
 DUPflag : 0  
 Distance (au) : 18.048  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.00  
 Sun-Target sep (deg) : 170.12  
 Sun-Moon sep (deg) : 161.09  
 B (ring opening deg) : 76.37  
 PA of pole (deg) : 53.62  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.727  
 C/A sky separation (km) : 9521.4  
 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	2032-12-30T05:38:19.200		33.76	-23.99	51083.46	-23.26		
lambda	I	2032-12-30T05:39:04.724		33.93	-24.16	50026.71	-23.20		
delta	I	2032-12-30T05:40:19.171		34.22	-24.44	48300.35	-23.17		
gamma	I	2032-12-30T05:40:48.044		34.32	-24.55	47631.46	-23.16		
eta	I	2032-12-30T05:41:07.708		34.40	-24.62	47176.12	-23.15		
beta	I	2032-12-30T05:42:12.444		34.64	-24.86	45678.23	-23.12		
alpha	I	2032-12-30T05:42:53.081		34.80	-25.02	44740.93	-23.10		
4	I	2032-12-30T05:44:25.175		35.15	-25.36	42612.60	-23.04		
5	I	2032-12-30T05:44:41.147		35.21	-25.42	42253.13	-23.04		
6	I	2032-12-30T05:45:00.873		35.28	-25.50	41795.65	-23.02		
Uranus	I	2032-12-30T05:56:55.657		37.99	-28.18	25403.30		-7.10	-7.43
Uranus	E	2032-12-30T06:30:23.157		45.64	-35.76	25037.27		13.22	13.82
6	E	2032-12-30T06:42:14.121		48.35	-38.46	41870.44	23.10		
5	E	2032-12-30T06:42:30.391		48.41	-38.52	42253.37	23.13		
4	E	2032-12-30T06:42:42.508		48.46	-38.57	42525.96	23.12		
alpha	E	2032-12-30T06:44:16.632		48.82	-38.93	44708.91	23.19		
beta	E	2032-12-30T06:44:57.338		48.98	-39.08	45649.95	23.21		
eta	E	2032-12-30T06:46:03.018		49.23	-39.33	47176.12	23.25		
gamma	E	2032-12-30T06:46:22.193		49.30	-39.40	47621.94	23.26		
delta	E	2032-12-30T06:46:51.356		49.41	-39.52	48300.35	23.27		
lambda	E	2032-12-30T06:48:05.489		49.69	-39.80	50026.71	23.30		
epsilon	E	2032-12-30T06:49:02.412		49.91	-40.01	51353.98	23.36		

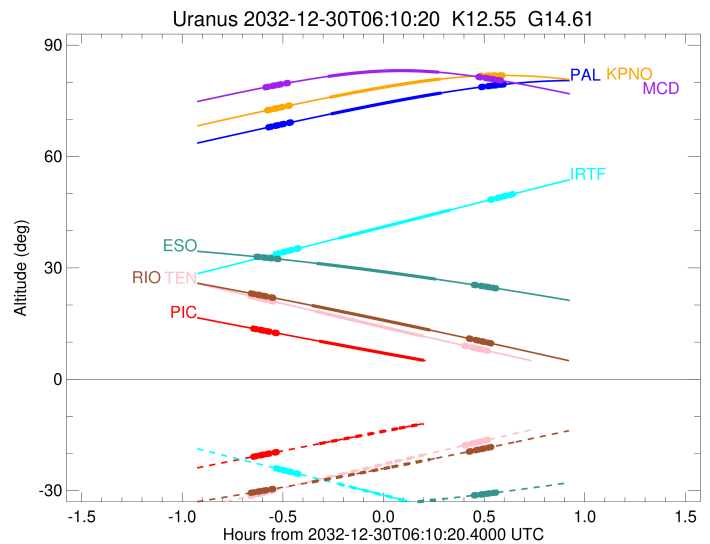
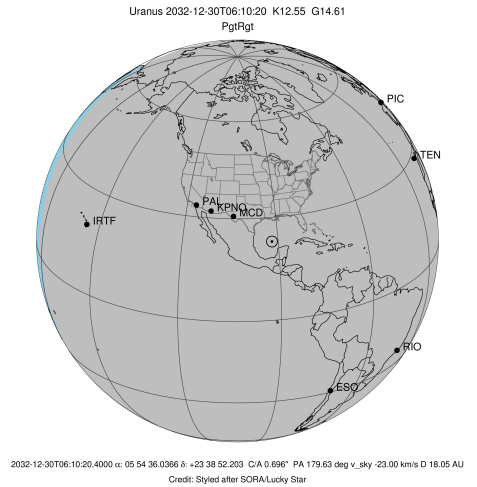
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-30T06:06:41.250  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Observer code : RIO  
 Location : Rio de Janeiro  
 Latitude (deg) : -22.89506  
 E. Longitude (deg) : 316.77708  
 Altitude (km) : 0.033  
 Gaia source ID : 3427816766193159168  
 2Mass ID (if available) : 05543603+2338521  
 ICRS Star Coord at Epoch: 05h 54m 36.03664s +23:38:52.20251s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 12.549  
 G magnitude : 14.606  
 RP magnitude : 13.914  
 BP magnitude : 15.123  
 DUPflag : 0  
 Distance (au) : 18.048  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.00  
 Sun-Target sep (deg) : 170.12  
 Sun-Moon sep (deg) : 162.21  
 B (ring opening deg) : 76.37  
 PA of pole (deg) : 53.62  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.422  
 C/A sky separation (km) : 5519.9  
 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	2032-12-30T05:30:54.190		23.12	-30.57	51046.99	-23.60		
lambda	I	2032-12-30T05:31:37.472		22.99	-30.46	50026.71	-23.57		
delta	I	2032-12-30T05:32:50.738		22.78	-30.27	48300.35	-23.56		
gamma	I	2032-12-30T05:33:19.142		22.69	-30.19	47631.33	-23.55		
eta	I	2032-12-30T05:33:38.473		22.64	-30.14	47176.12	-23.55		
beta	I	2032-12-30T05:34:42.140		22.45	-29.98	45677.07	-23.53		
alpha	I	2032-12-30T05:35:22.134		22.33	-29.87	44738.17	-23.53		
4	I	2032-12-30T05:36:52.287		22.06	-29.64	42614.37	-23.50		
5	I	2032-12-30T05:37:08.400		22.02	-29.59	42244.50	-23.51		
6	I	2032-12-30T05:37:27.271		21.96	-29.54	41796.87	-23.49		
Uranus	I	2032-12-30T05:48:58.222		19.88	-27.69	25309.36		-9.03	-9.45
Uranus	E	2032-12-30T06:24:15.828		13.24	-21.60	25087.58		12.54	13.11
6	E	2032-12-30T06:35:49.415		10.98	-19.49	41872.61	23.40		
5	E	2032-12-30T06:36:05.128		10.93	-19.44	42246.64	23.41		
4	E	2032-12-30T06:36:17.414		10.89	-19.40	42525.98	23.40		
alpha	E	2032-12-30T06:37:50.383		10.58	-19.12	44706.35	23.42		
beta	E	2032-12-30T06:38:30.741		10.45	-18.99	45648.69	23.43		
eta	E	2032-12-30T06:39:35.904		10.23	-18.79	47176.12	23.44		
gamma	E	2032-12-30T06:39:54.916		10.17	-18.73	47621.72	23.44		
delta	E	2032-12-30T06:40:23.865		10.08	-18.64	48300.35	23.44		
lambda	E	2032-12-30T06:41:37.490		9.83	-18.41	50026.71	23.45		
epsilon	E	2032-12-30T06:42:33.042		9.65	-18.24	51329.72	23.48		



target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2032-12-30T06:08:14.020  
 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 : 3427816766193159168  
 2Mass ID (if available) : 05543603+2338521  
 ICRS Star Coord at Epoch: 05h 54m 36.03664s +23:38:52.20251s  
 RUWE (>1.4 is poor) : 1.06  
 K magnitude : 12.549  
 G magnitude : 14.606  
 RP magnitude : 13.914  
 BP magnitude : 15.123  
 DUPflag : 0  
 Distance (au) : 18.048  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : -23.00  
 Sun-Target sep (deg) : 170.12  
 Sun-Moon sep (deg) : 161.93  
 B (ring opening deg) : 76.37  
 PA of pole (deg) : 53.62  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.326  
 C/A sky separation (km) : 4268.4  
 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	2032-12-30T05:32:33.529		32.99	-36.57	51038.36	-23.75		
lambda	I	2032-12-30T05:33:16.165		32.93	-36.53	50026.71	-23.73		
delta	I	2032-12-30T05:34:28.940		32.82	-36.47	48300.35	-23.72		
gamma	I	2032-12-30T05:34:57.151		32.77	-36.45	47631.29	-23.71		
eta	I	2032-12-30T05:35:16.345		32.74	-36.43	47176.12	-23.71		
beta	I	2032-12-30T05:36:19.573		32.64	-36.37	45676.75	-23.70		
alpha	I	2032-12-30T05:36:59.297		32.58	-36.33	44737.46	-23.70		
4	I	2032-12-30T05:38:28.725		32.44	-36.25	42614.73	-23.68		
5	I	2032-12-30T05:38:44.822		32.41	-36.24	42242.32	-23.69		
6	I	2032-12-30T05:39:03.427		32.38	-36.22	41797.26	-23.68		
Uranus	I	2032-12-30T05:50:26.866		31.22	-35.50	25283.13		-9.50	-9.94
Uranus	E	2032-12-30T06:25:54.425		26.98	-32.47	25109.46		12.23	12.79
6	E	2032-12-30T06:37:20.180		25.43	-31.26	41873.36	23.62		
5	E	2032-12-30T06:37:35.611		25.40	-31.24	42244.05	23.63		
4	E	2032-12-30T06:37:47.902		25.37	-31.21	42526.08	23.63		
alpha	E	2032-12-30T06:39:19.956		25.15	-31.04	44705.37	23.64		
beta	E	2032-12-30T06:39:59.963		25.06	-30.97	45648.21	23.64		
eta	E	2032-12-30T06:41:04.561		24.91	-30.85	47176.12	23.65		
gamma	E	2032-12-30T06:41:23.400		24.86	-30.81	47621.64	23.65		
delta	E	2032-12-30T06:41:52.097		24.80	-30.76	48300.35	23.65		
lambda	E	2032-12-30T06:43:05.080		24.62	-30.62	50026.71	23.66		
epsilon	E	2032-12-30T06:43:59.732		24.49	-30.51	51319.73	23.68		