

u9539_ctio_400cm_2200nm_predicted_ring_event_times.txt produced Mon Apr 5 13:40:24 2021 using
rfrench@Achilles.fios-router.home:/Volumes/PromisePegasus28TB_backup/dione RAID2/Research/uranus/PDART2014/programs/pro_occinfo2geom_plots_pds4_v7
.pro

Bundle ID: uranus_occ_u9539_ctio_400cm

```

Event: u9539
Planet: Uranus
Reference: French et al. 1993 BAAS 25, 111
Title: Stellar Occultations by the Uranian Rings and Atmosphere of U111 on 14 April 1993 and of u9539 on 30 June
1993
Computations from: 1993-06-30T06:44:59.8200Z to 1993-06-30T08:48:49.8200Z
Observatory name: Cerro Tololo Inter-American Observatory
Observatory code file directory: /Volumes/dione RAID2/Research/kernels/
Observatory code file: ObsCodes_pck00010_20200709_Elon+ocobs_v9BJ. obs
Observatory code: 807
Observatory abbreviation: ctio
Entry from observatory code file:
807 G +289 11 38.80 -30 10 08.9
2380 CTIO 4m - tweaked 2020 Apr 01 to match JPL Horizons pck00010.tpc
Telescope: 400cm
Instrument: Generic InSb High Speed Photometer
Mean wavelength (nm): 2200nm
Observatory latitude (deg): -30.169138889
Observatory E longitude (deg): 289.194111111
Observatory altitude (km): 2.380000000
Ellipsoid source: /Volumes/dione RAID2/Research/kernels/pck00010.tpc
Observatory reference frame: ITRF93
Earth equatorial radius (km): 6378.136600000
Earth 1/flattening: 298.257006177
Topocentric position vector: 1815.108950819 -5214.008358653 -3187.793456948
Leapsecond kernel file: /Volumes/dione RAID2/Research/kernels/naif0012.tls
Star catalog directory: /Volumes/dione RAID2/Research/RINGFIT/stars/data/
Star catalog file: ustarsALLd.v3.merged.sortedA.csv
Star catalog ID: 23016546
Star number: 111
Star name: U9539
Star source catalog: UCAC2
Star RA (deg): 292.545155000
Star Dec (deg): -22.307723400
Star epoch: 2000-01-01T00:00:00.0000Z
Star parallax (mas): 0.000000000
Star pm RA (mas/yr): 5.000000000
Star pm Dec (mas/yr): 4.200000000
Star catalog positions in frame: J2000
Star frame for calculations: J2000
Heliocentric frame for calculations: J2000
Ringfit savefile directory: /Volumes/dione RAID2/Research/RINGFIT/tests/Uranus/Ur017L/savefiles/
Ringfit savefile for star/time offsets: ringfit_v1.8.Ur017L-RF-V0204.sav
Ringfit output file directory: /Volumes/dione RAID2/Research/RINGFIT/tests/Uranus/Ur017L/outfiles/
Ringfit output file: ringfit_v1.8.Ur017L-RF-V0204.out
Star offsets dRA,dDec (mas): 51.478702922 68.841237067
Time offset for this obstr./event (sec): 0.000000000
Kernel directory: /Volumes/dione RAID2/Research/kernels/
../../../../kernels/ura111.bsp
../../../../kernels/vgr2.ura111.bsp
../../../../kernels/earthstns_itrf93_040916.bsp
../../../../kernels/earth_720101_031229.bpc
../../../../kernels/pg3f0000r.bsp
../../../../kernels/pg490000r.bsp
../../../../kernels/naif0012.tls
/Volumes/dione RAID2/Research/RINGFIT/tests/Uranus/Ur017L/savefiles/../../../../kernels/RAJobs_U111+rgf9.spk
/Volumes/dione RAID2/Research/RINGFIT/tests/Uranus/Ur017L/savefiles/../../../../kernels/URKALLv1.spk
/Volumes/dione RAID2/Research/kernels/uranus_ringframes_rfrench20201201_v1.tf
/Volumes/dione RAID2/Research/kernels/pck00010.tpc

```

Predicted Ring/Atmosphere Occultation Events

	Ring	I/E	UTC (Earth)	UTC (@ring)	R (model)	R-dot	Anomaly	Sin B	Ulon	Alt (deg)	Sun (deg)
	epsilon	I	1993-06-30T07:29:53.43Z	1993-06-30T04:55:08.23Z	50948.68	-25.994	299.250	-0.82867	352.652	64.114	-53.106
	lambda	I	1993-06-30T07:30:28.94Z	1993-06-30T04:55:43.74Z	50026.01	-25.969	97.384	-0.82868	352.414	63.988	-52.978
	delta	I	1993-06-30T07:31:35.44Z	1993-06-30T04:56:50.24Z	48300.63	-25.918	128.868	-0.82868	351.944	63.752	-52.739
	gamma	I	1993-06-30T07:32:01.30Z	1993-06-30T04:57:16.10Z	47630.73	-25.896	217.323	-0.82867	351.752	63.660	-52.646
	eta	I	1993-06-30T07:32:18.85Z	1993-06-30T04:57:33.65Z	47176.10	-25.880	36.850	-0.82868	351.618	63.598	-52.582
	beta	I	1993-06-30T07:33:17.40Z	1993-06-30T04:58:32.20Z	45660.63	-25.826	271.744	-0.82872	351.153	63.390	-52.371
	alpha	I	1993-06-30T07:33:54.83Z	1993-06-30T04:59:09.63Z	44691.52	-25.788	323.026	-0.82872	350.838	63.257	-52.237
	four	I	1993-06-30T07:35:15.88Z	1993-06-30T05:00:30.68Z	42599.66	-25.692	231.187	-0.82897	350.107	62.968	-51.945
	five	I	1993-06-30T07:35:30.33Z	1993-06-30T05:00:45.13Z	42262.33	-25.700	109.934	-0.82826	349.994	62.917	-51.893
	six	I	1993-06-30T07:35:44.41Z	1993-06-30T05:00:59.20Z	41870.24	-25.657	219.256	-0.82907	349.836	62.867	-51.842
Atmosphere		I	1993-06-30T07:43:52.75Z							61.127	-50.085
Atmosphere		E	1993-06-30T08:19:22.61Z							53.465	-42.420
	six	E	1993-06-30T08:26:13.06Z	1993-06-30T05:51:27.76Z	41822.88	25.597	70.204	-0.82907	200.885	51.986	-40.951
	five	E	1993-06-30T08:26:25.11Z	1993-06-30T05:51:39.82Z	42172.99	25.637	320.601	-0.82826	200.765	51.942	-40.907
	four	E	1993-06-30T08:26:41.78Z	1993-06-30T05:51:56.48Z	42564.64	25.631	81.600	-0.82897	200.610	51.882	-40.848
	alpha	E	1993-06-30T08:28:06.42Z	1993-06-30T05:53:21.12Z	44752.30	25.727	171.954	-0.82872	199.851	51.576	-40.544
	beta	E	1993-06-30T08:28:42.14Z	1993-06-30T05:53:56.84Z	45671.34	25.762	120.065	-0.82872	199.553	51.447	-40.416
	eta	E	1993-06-30T08:29:40.40Z	1993-06-30T05:54:55.10Z	47176.30	25.814	244.258	-0.82868	199.092	51.237	-40.208
	gamma	E	1993-06-30T08:29:57.74Z	1993-06-30T05:55:12.44Z	47624.19	25.829	64.461	-0.82867	198.961	51.174	-40.146
	delta	E	1993-06-30T08:30:23.91Z	1993-06-30T05:55:38.61Z	48300.18	25.849	335.621	-0.82868	198.767	51.080	-40.052
	lambda	E	1993-06-30T08:31:30.61Z	1993-06-30T05:56:45.31Z	50026.01	25.898	303.210	-0.82868	198.297	50.839	-39.813
	epsilon	E	1993-06-30T08:32:26.66Z	1993-06-30T05:57:41.35Z	51478.66	25.935	144.466	-0.82867	197.926	50.637	-39.612

Event geometry at 1993-06-30T08:01:37.0000Z

```

-----
Ring opening angle B (deg): -55.96298
Position angle of pole P (deg): 275.85538
Observer-planet distance (km): 2783.631046 x 10^6
Light travel time (sec): 9285.193713

```