

u12\_ctio\_400cm\_2200nm\_predicted\_ring\_event\_times.txt produced Mon Apr 12 17:56:42 2021 using  
rfrench@Achilles.local:/Volumes/PromisePegasus28TB\_backup/dione\_raid2/Research/uranus/PDART2014/programs/pro\_occinfo2geom\_plots\_pds4\_v7.pro

Bundle ID: uranus\_occ\_u12\_ctio\_400cm

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Event: u12
Planet: Uranus
Reference: French et al. 1986 Icarus 67, 134-163
Title: Structure of the Uranian rings II. Ring orbits and widths.
Computations from: 1980-08-15T21:40:00.0100Z to 1980-08-16T01:20:00.0100Z
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
Telescope: 2380 CTIO 4m - tweaked 2020 Apr 01 to match JPL Horizons pck00010.tpc
Instrument: 400cm
Mean wavelength (nm): Generic InSb High Speed Photometer
Observatory latitude (deg): 2200nm
Observatory E longitude (deg): -30.169138889
Observatory altitude (km): 289.194111111
Ellipsoid source: 2.380000000
Observatory reference frame: /Volumes/dione_raid2/Research/kernels/pck00010.tpc
Earth equatorial radius (km): ITRF93
Earth 1/flattening: 6378.136600000
Topocentric position vector: 298.257006177
Leapsecond kernel file: 1815.108950819 -5214.008358653 -3187.793456948
Star catalog directory: /Volumes/dione_raid2/Research/kernels/naif0012.tls
Star catalog file: /Volumes/dione_raid2/Research/RINGFIT/stars/data/
Star catalog ID: ustarsALLd.v3.merged.sortedA.csv
Star number: 25096598
Star name: 39
Star source catalog: U12
Star RA (deg): UCAC2
Star Dec (deg): 229.541725300
Star epoch: -17.994799500
Star parallax (mas): 2000-01-01T00:00:00.0000Z
Star pm RA (mas/yr): 0.000000000
Star pm Dec (mas/yr): -12.700000000
Star catalog positions in frame: 10.000000000
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): -197.025441657 125.568807336
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

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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	1980-08-15T21:52:54.99Z	1980-08-15T19:16:50.98Z	50881.81	-8.297	49.078	-0.89307	173.218	76.028	4.499
lambda	I	1980-08-15T21:54:38.20Z	1980-08-15T19:18:34.18Z	50026.01	-8.288	6.081	-0.89307	172.969	76.213	4.147
delta	I	1980-08-15T21:58:06.65Z	1980-08-15T19:22:02.60Z	48300.36	-8.268	71.878	-0.89307	172.440	76.558	3.434
gamma	I	1980-08-15T21:59:28.82Z	1980-08-15T19:23:24.77Z	47621.16	-8.260	1.318	-0.89307	172.221	76.684	3.153
eta	I	1980-08-15T22:00:22.69Z	1980-08-15T19:24:18.63Z	47176.23	-8.254	90.284	-0.89307	172.074	76.763	2.968
beta	I	1980-08-15T22:03:26.72Z	1980-08-15T19:27:22.64Z	45657.70	-8.233	280.130	-0.89310	171.551	77.013	2.337
alpha	I	1980-08-15T22:05:24.46Z	1980-08-15T19:29:20.36Z	44687.17	-8.219	338.018	-0.89314	171.198	77.155	1.932
four	I	1980-08-15T22:09:49.32Z	1980-08-15T19:33:45.19Z	42530.37	-8.186	25.410	-0.89282	170.344	77.422	1.019
five	I	1980-08-15T22:10:20.13Z	1980-08-15T19:34:16.00Z	42261.93	-8.179	250.358	-0.89316	170.240	77.448	0.913
six	I	1980-08-15T22:11:15.58Z	1980-08-15T19:35:11.45Z	41818.98	-8.173	64.511	-0.89294	170.048	77.493	0.722
Atmosphere	I	1980-08-15T22:37:20.62Z							77.288	-4.723
Atmosphere	E	1980-08-16T00:16:53.49Z							61.177	-26.030
six	E	1980-08-16T00:46:00.26Z	1980-08-15T22:09:55.10Z	41831.18	8.289	278.232	-0.89294	24.064	55.099	-32.313
five	E	1980-08-16T00:46:52.20Z	1980-08-15T22:10:47.03Z	42253.99	8.296	103.715	-0.89316	23.888	54.915	-32.500
four	E	1980-08-16T00:47:33.08Z	1980-08-15T22:11:27.91Z	42594.92	8.305	238.527	-0.89282	23.746	54.771	-32.647
alpha	E	1980-08-16T00:51:53.26Z	1980-08-15T22:15:48.06Z	44752.17	8.345	189.471	-0.89314	22.903	53.850	-33.583
beta	E	1980-08-16T00:53:43.80Z	1980-08-15T22:17:38.59Z	45674.44	8.361	130.901	-0.89310	22.567	53.458	-33.980
eta	E	1980-08-16T00:56:42.97Z	1980-08-15T22:20:37.74Z	47176.15	8.386	300.042	-0.89307	22.047	52.821	-34.624
gamma	E	1980-08-16T00:57:37.18Z	1980-08-15T22:21:31.94Z	47631.07	8.394	210.776	-0.89307	21.897	52.629	-34.819
delta	E	1980-08-16T00:58:56.88Z	1980-08-15T22:22:51.63Z	48300.39	8.404	280.905	-0.89307	21.680	52.345	-35.105
lambda	E	1980-08-16T01:02:21.89Z	1980-08-15T22:26:16.63Z	50026.01	8.429	214.067	-0.89307	21.149	51.615	-35.841
epsilon	E	1980-08-16T01:04:45.94Z	1980-08-15T22:28:40.65Z	51241.30	8.445	256.478	-0.89307	20.797	51.101	-36.358

Event geometry at 1980-08-15T23:27:14.0000Z

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Ring opening angle B (deg): -63.26138
Position angle of pole P (deg): 88.10158
Observer-planet distance (km): 2807.648769 x 10^6
Light travel time (sec): 9365.308213

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