u36_irtf_320cm_2200nm_predicted_ring_event_times.txt produced Mon Apr 5 07:59:25 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_u36_irtf_320cm

```
Event:                                  u36
Planet:                                 Uranus
Reference:                              J. L. Elliot and 13 colleagues. BAAS 19, 884 (1987)
Title:                                  A four-day occultation by Uranus and its rings
Computations from:                      1987-03-30T11:59:55.8660Z to 1987-04-02T15:21:40.3300Z
Observatory name:                       NASA Infrared Telescope Facility
Observatory code file directory:        /Volumes/dione_raid2/Research/kernels/
Observatory code file:                  ObsCodes_pck00010_20200709_Elon+ocobs_v9BJ.obs
Observatory code:                       568
Observatory abbreviation:               irtf
Entry from observatory code file:
    568 G +204 31 40.08  +19 49 34.0        4212 Mauna Kea                                          pck00010.tpc
Telescope:                              320cm
Instrument:                             Generic InSb High Speed Photometer
Mean wavelength (nm)                    2200nm
Observatory latitude (deg):                19.826111111
Observatory E longitude (deg):             204.527800000
Observatory altitude (km):                   4.212000000
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:             -5464.341062821   -2493.446346975    2151.026113131
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:                        333-124092
Star number:                              114
Star name:                              U36
Star source catalog:                    UCAC4
Star RA (deg):                            266.624681200
Star Dec (deg):                           -23.538897000
Star epoch:                             2000-01-01T00:00:00.0000Z
Star parallax (mas):                        0.000000000
Star pm RA (mas/yr):                       -3.200000000
Star pm Dec (mas/yr):                      -8.100000000
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):               17.783060768      75.423918081
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	1987-03-30T12:02:35.23Z	1987-03-30T09:24:55.06Z	50787.34	-0.612	27.044	-0.97769	206.996	21.876	-56.706
lambda	I	1987-03-30T12:24:01.93Z	1987-03-30T09:46:21.88Z	50026.01	-0.571	77.321	-0.97769	206.867	25.827	-52.786
delta	I	1987-03-30T13:19:12.07Z	1987-03-30T10:41:32.34Z	48300.35	-0.473	290.157	-0.97769	206.487	35.001	-41.521
gamma	I	1987-03-30T13:43:49.09Z	1987-03-30T11:06:09.51Z	47628.84	-0.436	116.245	-0.97769	206.308	38.482	-36.160
eta	I	1987-03-30T14:01:39.01Z	1987-03-30T11:23:59.53Z	47176.17	-0.410	66.644	-0.97769	206.178	40.698	-32.196
beta	I	1987-03-30T15:10:02.05Z	1987-03-30T12:32:22.96Z	45659.21	-0.334	84.209	-0.97770	205.722	46.115	-16.589
alpha	I	1987-03-30T15:58:34.28Z	1987-03-30T13:20:55.47Z	44739.78	-0.302	128.466	-0.97764	205.484	46.336	-5.283
eta	E	1987-04-02T12:30:28.11Z	1987-04-02T09:53:12.67Z	47176.08	1.061	11.560	-0.97769	156.405	29.034	-50.638
gamma	E	1987-04-02T12:37:28.68Z	1987-04-02T10:00:13.28Z	47623.93	1.070	61.301	-0.97769	156.534	30.225	-49.281
delta	E	1987-04-02T12:47:57.45Z	1987-04-02T10:10:42.11Z	48300.61	1.084	235.324	-0.97769	156.732	31.957	-47.203
lambda	E	1987-04-02T13:14:08.30Z	1987-04-02T10:36:53.11Z	50026.01	1.114	23.244	-0.97769	157.242	35.996	-41.803
epsilon	E	1987-04-02T13:25:27.41Z	1987-04-02T10:48:12.27Z	50786.10	1.126	333.357	-0.97769	157.470	37.597	-39.395

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Event geometry at 1987-04-01T03:06:08.0000Z
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    Ring opening angle B (deg):  -77.87531
Position angle of pole P (deg):  311.95670
 Observer-planet distance (km):    2828.379672 x 10^6
       Light travel time (sec):    9434.459061
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