u13_sso_390cm_2200nm_predicted_ring_event_times.txt produced Mon Apr 19 18:55:48 2021 using
rfrench@Achilles.local:/Volumes/PromisePegasus28TB_backup/dione_raid2/Research/uranus/PDART2014/programs/pro_occinfo2geom_plots_pds4_v7.pro

Bundle ID: uranus_occ_u13_sso_390cm

```
Event:                                  u13
Planet:                                 Uranus
Reference:                              French et al. 1986 Icarus 67, 134-163
Title:                                  Structure of the Uranian rings II. Ring orbits and widths.
Computations from:                      1981-04-26T19:00:34.4340Z to 1981-04-26T20:27:56.3420Z
Observatory name:                       Siding Spring Observatory
Observatory code file directory:        /Volumes/dione_raid2/Research/kernels/
Observatory code file:                  ObsCodes_pck00010_20200319_Elon+ocobs_v9BJ.obs
Observatory code:                       413
Observatory abbreviation:               sso
Entry from observatory code file:
    413 G +149 03 57.89  -31 16 37.4        1164 Siding Spring Observatory                          pck00010.tpc
Telescope:                              390cm
Instrument:                             Generic InSb High Speed Photometer
Mean wavelength (nm)                    2200nm
Observatory latitude (deg):                 -31.277055556
Observatory E longitude (deg):              149.066080556
Observatory altitude (km):                    1.164000000
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:             -4680.887217216    2805.218233092   -3292.789439636
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:                        77434
Star number:                               43
Star name:                              U13
Star source catalog:                    Hipparcos
Star RA (deg):                              237.106435600
Star Dec (deg):                             -19.774024460
Star epoch:                             1991-04-02T13:30:00.0000Z
Star parallax (mas):                         -0.370000000
Star pm RA (mas/yr):                         -8.050000000
Star pm Dec (mas/yr):                         2.950000000
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):                -3.158232885      22.470337537
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	1981-04-26T19:11:10.04Z	1981-04-26T16:42:29.83Z	51111.68	-20.250	274.897	-0.94089	25.150	39.782	-17.674
lambda	I	1981-04-26T19:12:03.73Z	1981-04-26T16:43:23.53Z	50026.01	-20.190	204.580	-0.94089	25.603	39.590	-17.484
delta	I	1981-04-26T19:13:29.39Z	1981-04-26T16:44:49.19Z	48300.69	-20.086	211.497	-0.94089	26.368	39.284	-17.181
gamma	I	1981-04-26T19:14:02.83Z	1981-04-26T16:45:22.63Z	47629.96	-20.043	130.606	-0.94089	26.681	39.165	-17.062
eta	I	1981-04-26T19:14:25.47Z	1981-04-26T16:45:45.28Z	47176.37	-20.012	205.394	-0.94089	26.899	39.084	-16.982
beta	I	1981-04-26T19:15:42.38Z	1981-04-26T16:47:02.19Z	45642.24	-19.902	340.633	-0.94088	27.668	38.810	-16.710
alpha	I	1981-04-26T19:16:30.50Z	1981-04-26T16:47:50.32Z	44684.70	-19.827	0.151	-0.94084	28.179	38.638	-16.539
four	I	1981-04-26T19:18:19.23Z	1981-04-26T16:49:39.05Z	42545.35	-19.641	304.897	-0.94081	29.404	38.250	-16.155
five	I	1981-04-26T19:18:31.02Z	1981-04-26T16:49:50.84Z	42305.54	-19.612	151.407	-0.94118	29.557	38.207	-16.113
six	I	1981-04-26T19:18:56.57Z	1981-04-26T16:50:16.40Z	41814.05	-19.568	303.117	-0.94096	29.856	38.116	-16.023
Atmosphere	I	1981-04-26T19:32:53.28Z							35.134	-13.072
Atmosphere	E	1981-04-26T20:05:01.64Z							28.271	-6.314
six	E	1981-04-26T20:17:50.43Z	1981-04-26T17:49:10.46Z	41825.36	19.496	73.740	-0.94095	160.594	25.552	-3.648
five	E	1981-04-26T20:18:11.01Z	1981-04-26T17:49:31.05Z	42217.47	19.526	282.582	-0.94118	160.843	25.479	-3.577
four	E	1981-04-26T20:18:27.72Z	1981-04-26T17:49:47.76Z	42560.62	19.565	76.425	-0.94081	161.044	25.420	-3.520
alpha	E	1981-04-26T20:20:18.77Z	1981-04-26T17:51:38.81Z	44742.32	19.748	134.173	-0.94084	162.297	25.028	-3.136
beta	E	1981-04-26T20:21:05.74Z	1981-04-26T17:52:25.79Z	45669.97	19.819	115.668	-0.94088	162.791	24.862	-2.974
eta	E	1981-04-26T20:22:21.56Z	1981-04-26T17:53:41.61Z	47176.08	19.923	341.954	-0.94089	163.546	24.595	-2.712
gamma	E	1981-04-26T20:22:44.17Z	1981-04-26T17:54:04.22Z	47626.71	19.953	267.610	-0.94089	163.762	24.515	-2.634
delta	E	1981-04-26T20:23:17.89Z	1981-04-26T17:54:37.95Z	48300.16	19.994	349.120	-0.94089	164.077	24.396	-2.518
lambda	E	1981-04-26T20:24:43.99Z	1981-04-26T17:56:04.05Z	50026.01	20.094	343.743	-0.94089	164.842	24.092	-2.222
epsilon	E	1981-04-26T20:25:28.12Z	1981-04-26T17:56:48.18Z	50913.87	20.141	54.887	-0.94089	165.215	23.937	-2.070

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Event geometry at 1981-04-26T19:48:57.0000Z
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    Ring opening angle B (deg):  -70.20122
Position angle of pole P (deg):   79.77306
 Observer-planet distance (km):    2674.146234 x 10^6
       Light travel time (sec):    8919.991691
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