Asteroidal Occultation Predictions by IOTA/ES

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http://astro1.physik.uni-siegen.de/uastro/occult/

History of the prediction package ASTOCC

- Work started 1995 after ESOP XIV (Plzen) by the author

- First version was finished end of that year. Predictions for 1996 were made with this program. Databases: All numbered asteroids ($\approx$ 6000) and the PPM star catalog

- In 1996 and 1997 some new features were added and bug fixes were made

- In 1998 there was no time to continue the work on the program :-(

- In 1999 some major changes: New databases (astorb.dat and Goffin's combined

star catalog). Porting the software to the GNU g77 Fortran compiler (DOS and Linux) and many minor (internal) modifications.

Parts of the package

The package consists of several programs:

- `OCCEPH`: Computes the ephemeris file

- `FINDOCC`: Searches for occultations

- `MAKEMAP`: Generates the ground track maps

- `MAKESUM`: Utility for making summary tables of all accepted occultations

Some other tools for generating the unformatted, direct access star catalog etc.
The programs were written in FORTRAN 77, `MAKEMAP` was written in C. Supported compilers are MS-F77 (V5.1)*, GNU g77 and GNU gcc. The software runs on DOS and Linux.

*will not be longer supported

Computational details

- `OCCEPH` uses a PECE integrator with variable step size and variable order (which is also used by the JPL). Only the asteroid will be integrated, positions and velocities of the main planets were read from the JPL file, as well as masses and fundamental constants

- The NOVAS library provides routines for the computation of apparent places

- `MAKEMAP` uses the DISLIN graphics library by Helmut Michels (MPAE Lindau)

Predictions for 1999 and 2000

The latest predictions were made using the following data and filters:

- JPL DE403 ephemeris and planetary masses

- Orbital elements database ASTORB.DAT from Lowell Observatory. About 52 000 numbered and unnumbered asteroids

- Edwin Goffin's combined star catalog: 1300364 stars from HIP, TYC, TAC, CMC, PPM

Occultations were searched for:

- All asteroids with $D > 10\,\text{km}$, $CEU < 60''$

- Occultations with at least $1\,\text{s}$ duration, $0.8\,\text{mag}$ drop and $30°$ elongation to the Sun.

Availability

The predictions for 1999 and 2000 could be downloaded from

`http://astro1.physik.uni-siegen.de/uastro/occult/`

The whole package (99R1) including the source code (for the GNU g77 compiler) will be available within the next couple of months from the same web site. The software will be released under the GNU General Public License (GPL).

Work still to do

Before releasing the software to the community, some tasks have to be done:

- Translating the source comments into English

- Fixing at least some of the known bugs

- Maybe adding some missing features (e.g. creating star charts)

- Performance

- Documentation