NDAC/LO/096
1987 June 9

20th NDAC Report from Lund Observatory

WP6000: Step 2/3 (Lindegren)

A completely new program is being developed for simulating the input to Step 2/3 (Sphere Reconstitution and Determination of Astrometric Parameters) Some of the new features are:

- the preliminary INCA star list IC1 (February 1987) will be used as *a priori* catalogue and as basis for generating a 'true' catalogue from which the observations are simulated;
- complete abscissa files will be simulated for all the 114,488 entrie of IC1 and a period of 2.5 years. The actual format for input to Step 2/3 (Petersen, 1987 March 18) will be used;
- abscissa errors will be simulated in a more realistic fashion, including cyclic correlation within each set, variation of the s.d. with the number of frames per star, effects of earth and moon occultations, and a significant proportion of corrupt observations (double stars, veiling glare).

Most of the algorithms have been developed and will be implemented during June/July. The first test runs of the full-scale Step 2/3 solution are planned for September/October.

WP8000: Double Stars (Söderhjelm)

The simulation of double-star observations and their reduction have been modified according to the principles described in NDAC/LO/090, using some more realistic assumptions on the attitude motion and including stellar aberration. The simulation process now includes the formation of 'Case History Files' by phase calibration and averaging over each FOV crossing.

In most cases the new double-star solutions, based on the compressed data in the Case History Files, give results which are very similar to the old ones. The rms astrometric errors are rather consistently increased by some 20%, mostly attributable to the OGAR error in the spin phase (σ_Ω = = 3 mas is now assumed; this error was previously neglected). However, a rather unexpected problem emerged for systems with nearly equal components (Δm < 0.5 mag) and separations close to $(n+\frac{1}{2})s$, where s = 1.2 arcsec and n = 0, 1, 2, ... For these objects, the first harmonic becomes very weak in some observations, and the phase averaging used in forming the CHF becomes meaningless. Even worse, the data for the second harmonic (β_4, β_5) also become useless because they refer to the (undetermined) phase of the first harmonic. A remedy would be to use the second harmonic phase as the main datum for such systems. The simulations show that this would save practically all the difficult cases (estimated number ~700 systems). This will however require some 25% increased storage for the IFOV crossing data. (Discussion needed.)

Working paper

C Söderhjelm 1987 June 04: HIPPARCOS reductions for multiple stars, V. (NDAC/LO/095)