

Computer-aided Control Systems in Astrophysical Techniques – Development in the Second Half of the Past Century

REINHARD E. SCHIELICKE

Astrophysical Institute and University Observatory of Jena, Schillergäßchen 2, D-07745 Jena, Germany
schie@astro.uni-jena.de

50 years ago the use of on-line digital computing techniques in science was pioneered by nuclear chemists. As a first step in astronomical techniques hard-wired digital control units were installed to carry out special tasks.

In the 1960s small computers could be programmed to control parts of the data-taking experiments as well as to process the data. A decade later, observational astronomy benefited from the explosive growth of the computer technology. Programmable minicomputers typically with 16 K words internal memory (usually ferrite magnetic cores), punched tape and teletype periphery as in- and output and working with a special programme, usually in assembly language, were used in astronomical techniques (Robinson, L.B. 1975, ARA&A 13, 165–185).

In the last half of the 1970s the first micro computers based on high-integrated circuits were parts of astronomical devices. With its 4- or 8-bit processors the efficiency was not high and so the step to multi-processor control systems – up to 16 CPUs – went without saying. Hard and floppy disks, graphic CRT-displays and plotters became usual, the interface to the telescope or to the data acquisition commonly was CAMAC. At this time, computer languages were FORTRAN and ALGOL (compiler languages), BASIC and FOCAL (interpretive languages) as well as special languages like FORTH. For the use in astronomy e. g. ASTROL or ASCOL were developed.

Up to now, very efficient computer-based control systems – connected by the World Wide Web – have been integrated in astronomical observing techniques on a large scale.