

STELLAR DATA AND COMPUTING FACILITIES AT THE PULKOVO OBSERVATORY

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The Pulkovo Observatory computing laboratory began its activities in 1956. Originally it was equipped with card-punched machines. An essential work of processing astronomical data was carried out with the help of these machines ([1] and other).

With the development of the computing techniques in the USSR, the laboratory has been equipped with more modern computing devices. At present the Laboratory disposes of the third generation computer ES-1020 of the Ryad type, as well as the second generation computers Minsk-22 and Nairi-K.

The main data on the computers are given in the table below.

TABLE

Parameter	Computer Type		
	ES-1020	Minsk-22	Nairi-K
High-speed memory (op/sec)	20 000	15 000	2 000
Capacity of the memory (K)	64	32	16
Disk memory (N of devices)	2	-	-
Magnetic tape memory	4	8	-

The computer ES-1020 is compatible with IBM computers at the level of the algorithmic languages, punch-cards and magnetic tape data. The computer Minsk-22 is compatible with other computers at the level of the languages ALGOL and FORTRAN and the punch-card data.

The Laboratory's staff consists of experienced astronomers who compile programs, skilled engineers and operators. Data is kept on punch-cards and magnetic tapes. Apart from original catalogues and other data obtained from observations at Pulkovo and other observatories, the fundamental and general catalogues (FK4, N30, GC, PFKSZ, SAO, Yale, AGK3R etc) are available at the Laboratory.

Direct data transmission in real time from the telescope to the computer is realized.

Astronomical ephemerides are necessary as a rule for reduction of astronomical data (e.g. observations). That is why basic parts of the "Annuaire Astronomique de l'URSS" were algorithmized and stored in the computers as a file of programs. The ephemeris time was chosen as the fundamental argument. While preparing for the work some formulas determining certain quantities were revised. For example, Besselian quantities C and D used to compute apparent places of stars were transformed to expressions of trigonometric series using fundamental arguments of the Lunar theory [2]. Wide application of modern computers in astronomy in our opinion requires a new form of the astronomical ephemerides. All the section of the astronomical ephemerides that are easily algorithmized and can be kept in the computer's memory might be significantly shortened.

The astronomical ephemerides being the main source of most precise astronomical data must avoid detailed tables for hand calculations. The astronomical ephemerides are to be compiled taking into consideration the fact that the astronomer must be supplied with algorithms and corresponding test points.

The system of data centers which permits data to be stored in a machine-readable form is to be welcomed. In the USSR the Pulkovo Observatory practically performs the function of the center for data on meridian astronomy and solar activity. Hence, great expenditure is saved for preparing data at every observatory.

The computing laboratory regularly exchanges data with the Astronomisches Rechen-Institut (Heidelberg) and the U.S. Naval Observatory and has contacts with the Stellar Data Center in Strasbourg.

The future development of the centers for astronomical data we see in cooperation in the field of data exchange and in centralization of data-keeping in certain national and world centers.

REFERENCES

1. M.S. Zverev, D.D. Polozhentsev. *Trudy Glavn. Astr. Obser.* v. 72, 1958.
2. V.S. Gubanov. *Astron. J. USSR*, v. 49, no. 5, 1972.