

THE ASTRONOMICAL DATA SYSTEMS GROUP IN JAPAN

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1. INTRODUCTION

In spite of the relatively large size of the astronomical community in Japan, there have been rather few efforts to organize an astronomical data system(s) and to take advantage of such systems. As a matter of fact, it has been realized that astronomical data, as the volume grows, are in many cases easier to handle in computer readable form than in printed form, and there is a growing trend of recording observational data or large tables on magnetic tapes and the likes, and of acquiring such data from other investigators (notably from investigators in other lands). However, it has not always been realized that machine-readable data bring about various kinds of problems when they are to be used by a number of astronomers whose fields of interest are different from each other or who works at geometrically scattered insitutions.

Concerned about such problems associated with the use of astronomical data in computer-readable form, a small group, including the author, held informal colloquia first in 1973 and again in 1974. Through these colloquia it was found that not small a number of astronomers are concerned about an organized approach for the computer-readable astronomical data. The major reasons for the difficulties arising from the use of such data on a common basis were summerized as follows.

- (a) Schemes for representing data on, say, magnetic tapes are not as apparent as in the case of data in printed form.

- (b) In order to process the data, one must have an access to a computer system offering the capabilities of flexible tape/disk operations. However, such is not always the case at universities in Japan.
- (c) The fact that computers of various kinds are used at different institutions causes a compatibility problem.
- (d) There is no library service available for astronomical data tapes. An alternative would be for every investigator to own his copies covering a wide range of research fields, but it is of course not practical.

In 1975 the Ministry of Education, Science and Culture announced the plan for sponsoring a three-year research project on the organization of scientific information. Our proposal concerning astronomical data systems was approved, and the whole project started in the spring of this year. The project is one of the so-called 'special research projects', in which the emphasis is placed on coordinated research activities among their member groups. This particular project is entitled 'Formation Process of Information Systems and Organization of Scientific Information', and consists of fifty seven research groups. About two thirds of these groups are engaged in the developments of data processing methodologies, such as input technologies, pattern recognition, language analysis, and data base management. The remaining groups are mostly engaged in the application of such methodologies to specific fields of science, including, beside astronomy, many branches of chemistry and related fields, nuclear physics, mathematics, geology, etc.. A few group from humanities are also participating. It should be noted that many of the 'applications groups' are concerned with technical documents. In the case of astronomy, however, we feel it is more important and urgent to establish an information system for observational data than do the same for astronomical documents, at least for the time being.

2. GROUP ORGANIZATION

The astronomy group within the above mentioned project consists of six colleagues. They are,

Dr. Kiichiro Furukawa and Dr. Shiro Nishimura
of the Tokyo Astronomical Observatory,
Dr. Akira Uesugi
of the Department of Astronomy, University of Kyoto,
Dr. Yoichi Terashita, Mr. Ichiro Fukuda and
Dr. Takashi Kusaka
of the Computer Center, Kanazawa Institute of
Technology.

The research fields of the members include position astronomy, stellar atmospheres, stellar evolution, and computer science. Participations of colleagues in other fields such as galaxies and radio astronomy are highly desired.

3. FACILITIES

Data processing facilities available to the members of the group are an IBM 370/158-II system (Kanazawa Institute of Technology), a FACOM 230/58 system (Tokyo Astronomical Observatory), and a FACOM M-190 system (University of Kyoto). Under present circumstances, the Kanazawa system is thought to be most fitted for computer-related operations involving extensive file processing. It is also equipped with an interactive terminal system and a key-punch service.

As for the data processing facilities at large, large-scale computer systems are available at major universities, and they can be used by scientists at other institutions at relatively low rates. Users can bring (or mail) their input decks or use time-sharing (or remote job entry) terminals where such things are available. Although these systems are large and fast, they are primarily designed to handle large volumes of numerical computation jobs, and present some inconveniences to jobs requiring extensive file operations. A long-term project of connecting the major systems is in progress. When the project is completed, the resulting computer network is expected to have an enormous impact on scientific information systems.

4. ACTIVITIES

After having several meetings within the group it has been agreed upon that a proto-type astronomical data system should be established and be evaluated within the group, allowing for an extended service for colleagues who might be interested in using such a system. By an astronomical data system, we mean a system for producing, acquiring, maintaining, distributing, and evaluating the astronomical data in computer-readable form. Although most of the computer-related operations will be done with the computing facilities available to the group, it has been emphasized that the resulting system should be machine-independent as much as possible, thus the compatibility being one of the most important goals in our work. Works currently under way are as follows.

- (a) Collection and validation of magnetic tapes containing astronomical data (mostly star catalogs).

- (b) Production of the magnetic tape version for the catalog of stellar rotational velocities (Uesugi's revised catalog): In order to keep the input errors as few as possible, several validation schemes are being tried, including the use of interactive display terminals.
- (c) Construction of an interactive data retrieval system: As the inter-university computer network is developed, automated data processing such as searching, sorting and extraction of data is expected to be a desirable procedure for the would-be users of the astronomical data system.
- (d) Survey of the compatibilities and incompatibilities among the computer systems used by various institutions.
- (e) Definitions of standards: We feel that the standards should be subject to an international agreement, and one is badly needed. However, if such an agreement is not expected to be reached soon, we must proceed with local standards which would be flexible enough for future changes. Currently, we are concerned about two types of standards. One is for the specification of the contents of the tape being distributed (whether the specification should be recorded within the tape itself or be written on a separate form). The other is for coding non-numerical informations such as the star name, the spectral type, etc..

5. ACKNOWLEDGEMENT

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