An Archival System for Observational Data Obtained at the Okayama and Kiso Observatories. III

Eiji Nishihara and Michitoshi Yoshida

Okayama Astrophysical Observatory, National Astronomical Observatory of Japan, Kamogata, Okayama 719-02, Japan

Shin-ichi Ichikawa, Kentaro Aoki and Masaru Watanabe

Astronomical Data Analysis Center, National Astronomical Observatory of Japan, Mitaka, Tokyo 181, Japan

Toshihiro Horaguchi

National Science Museum, Shinjuku, Tokyo 169, Japan

Shigeomi Yoshida

Kiso Observatory, University of Tokyo, Mitake, Nagano 397-01, Japan

Masaru Hamabe

Institute of Astronomy, University of Tokyo, Mitaka, Tokyo 181, Japan

Abstract. We present the newly developed version of the Mitaka-Okayama-Kiso data Archival system (MOKA3). MOKA3 consists of three parts: 1) a distributed database system which manages the observational data archive of Okayama and Kiso observatories, 2) a Web-based data search and request system, and 3) a delivery system for requested data. The client system of MOKA3 is implemented as a Java Applet so that many functions, e.g., GUI arrangement, display of preview images, and conversion of coordinates, can be processed locally on the client side without accessing the server system. Moreover, environmental data, such as meteorological data and all-sky images, are also archived in the database system of MOKA3 in order to increase the utility of its archival observational data.

1. Introduction

Observational data is one of the most important fundamentals in astronomy, and so the importance of archiving and reusing observational data is widely recognized. The original version of MOKA (Mitaka-Okayama-Kiso data Archival system; Horaguchi et al. 1994; Takata et al. 1995; & Ichikawa et al. 1995) is the first fully-fledged observational data archival system in Japan. It was developed for the observational data taken with the Spectro-NebulaGraph (SNG; Kosugi et

425

al. 1995) of the 188cm telescope at the Okayama Astrophysical Observatory, and those taken with the prime focus CCD camera of the 105cm Schmidt telescope at the Kiso Observatory.

Basically, the original MOKA was not a client-server system. Therefore, the sites where users can operate MOKA were considerably restricted. In order to solve this problem, we developed the second version of MOKA (MOKA2[1]; Yoshida 1997) which is based on the World Wide Web (WWW). MOKA2 has been in operation since September 1996. Through the operation of MOKA2, several points to be improved were clarified. These were with respect to displaying preview images, managing database systems, and integrating environmental data. Then we started to develop the third version of MOKA (MOKA3), which will be in operation late in 1997. In this paper, we present a technical overview of MOKA3.

2. System Overview

MOKA3 consists of three parts: 1) a distributed database system which manages the observational data archive of Okayama and Kiso observatories, 2) a Web-based data search and request system, and 3) a delivery system of requested data. The data flow of MOKA3 is shown in Figure 1.

2.1. Distributed Database System

The following three kinds of data files are managed in the MOKA3 distributed database system. 1) Header information database: Requisite header items are extracted from header sections of original CCD frames and stored in database tables. These tables are managed by an ORACLE DBMS (DataBase Management System) and used for a search of CCD frames. 2) Header files: In addition to the header database above mentioned, we stored header files, which are duplicate copies of header sections of original CCD frames. These files are plain text files and used to show detailed information about CCD frames. 3) Preview image files: By binning and resampling, reduced-size preview images are generated from original CCD frames. They are stored as gzipped FITS files.

These data files are stored in the server machines at Mitaka, Okayama, and Kiso respectively. Newly produced data from night-by-night observations are processed into these three kinds of data at their source observatory. These new processed data are sent to Mitaka, then other observatories copy them from Mitaka. In MOKA3, this data transfer is achieved by distributed database mechanism in ORACLE for database files and by ftp-mirroring for header and preview image files. This mechanism efficiently copies only new data and keeps the database at each site consistent.

2.2. Data Search & Request System

The data search and request system of MOKA3 is implemented as a Java applet. Hence, users can operate MOKA3 with a Java-enabled WWW browser on any computer connected to the Internet. Searching constraints input in this
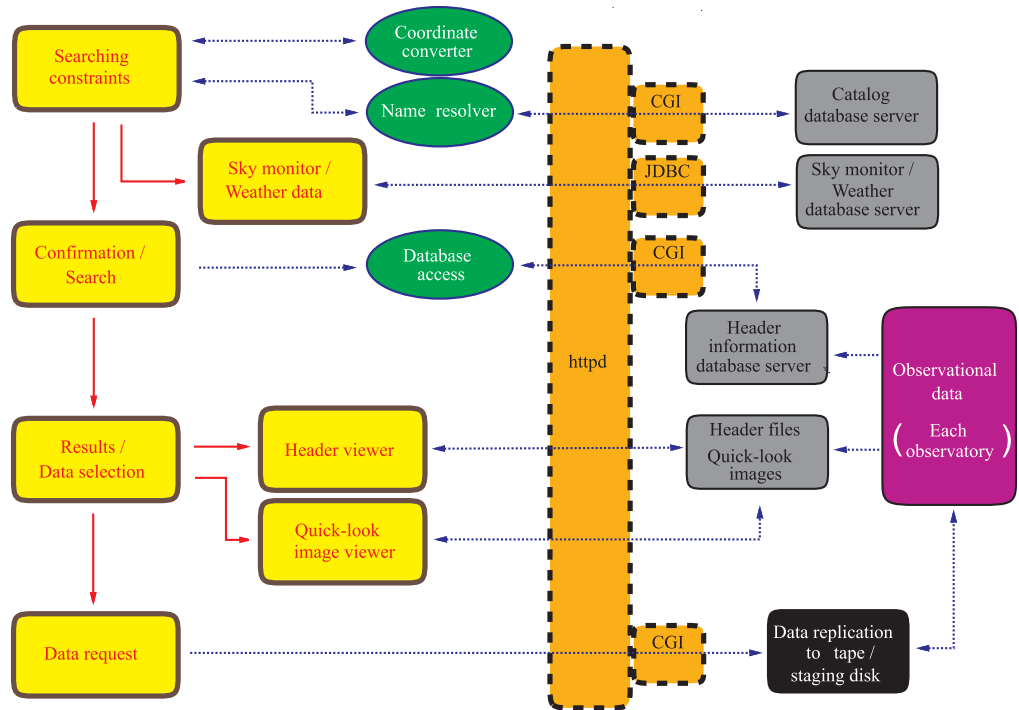
---

[1]http://moka.nao.ac.jp/

Figure 1.   Data flow of MOKA3.

applet are passed to the DBMS server computer through CGI. SQL statements corresponding to these constraints are created, and a search is performed by ORACLE. The results of the search are displayed on the client computer as a list of frames appropriate to the constraints specified. Users can also display the detailed header information and/or preview images of selected frames on the client computer to examine whether these frames are appropriate for their purpose.

In the above procedure, many functions are processed locally on the client computer without accessing the server computer. For example, GUI components are dynamically switched over in compliance with the user's selection of searching strategies (e.g., by name or by coordinate). This local processing by the Java applet reduces load the server computer and the network. Moreover, as a part of the applet, the viewer of preview FITS images is also implemented in Java. Therefore, users can flexibly display the preprocessed images with their favorite display levels, and plot them at any position. In the earlier MOKA2, such a viewer was prepared as an external viewer of the WWW browser. Hence, available platforms are restricted. In addition, users must first install the viewer on their client machine.

The original CCD frames are stored in the observatory where they were produced. Registered users can utilize these data. MOKA3 has a window to request for these original data. From this window, the request for selected frames is automatically generated and sent to the MOKA3 administrator at the source

observatory as an e-mail. Registration for MOKA3 data request is also available from this window.

2.3.   Data Delivery System

The administrator who receives the e-mail for a data request checks the proprietry period of the data, and sends a distribution tape to the user if no proprietry problem is found. A mechanism to make a distribution tape corresponding to the data request e-mail is prepared. This decreases the load on the administrators at the observatory and makes the distribution of the data quicker.

2.4.   Weather Database & Sky Monitor

In addition to the above three main body of MOKA3, access to the weather database and the all-sky images at Okayama is available from the home page of MOKA3. They are implemented as independent applets for the present. Because meteorological conditions severely affect the quality of data from ground-based observations, these environmental data are also archived in the database system of MOKA3 in order to help users to sift out adequate data from the archive.

References

Horaguchi, T., et al. 1994, Publ. Natl. Astron. Obs. Japan, 4, 1

Ichikawa, S., et al. 1995, in ASP Conf. Ser., Vol. 77, Astronomical Data Analysis Software and Systems IV, ed. R. A. Shaw, H. E. Payne & J. J. E. Hayes (San Francisco: ASP), 173

Kosugi, G., et al. 1995, PASP, 107, 474

Takata, T., et al. 1995, Publ. Natl. Astron. Obs. Japan, 4, 9

Yoshida, M. 1997, in ASP Conf. Ser., Vol. 125, Astronomical Data Analysis Software and Systems VI, ed. Gareth Hunt & H. E. Payne (San Francisco: ASP), 302