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# Data Archive System for Kiso Observatory and Okayama Astrophysical Observatory

S. Ichikawa

*National Astronomical Observatory of Japan, Mitaka, Tokyo 181, Japan*

S. Yoshida

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

M. Yoshida

*Okayama Astrophysical Observatory, NAOJ, Kamogata, Asakuchi, Okayama 719-02, Japan*

T. Horaguchi

*National Science Museum, Shinjuku, Tokyo 169, Japan*

M. Hamabe

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

**Abstract.** A data archive system for optical CCD data produced at Kiso Observatory and Okayama Astrophysical Observatory is discussed. This system, named MOKA, allows users to search data with some constraints, preview data, and view FITS headers. This paper outlines the MOKA system in some detail.

## 1. Introduction

Japanese optical astronomers have not made much effort to archive the data produced with telescopes in Japan because of their low quality. The construction of Japanese 8m telescope, SUBARU, is now in progress. SUBARU will be in operation by the end of this century and is expected to produce a large amount of high quality data which deserves to be archived. This motivated us to develop a data archive system for SUBARU, although we have little experience in developing or maintaining such a system. To overcome this, we decided to develop an archive system for the CCD data available now at the Kiso Observatory (Kiso) and the Okayama Astrophysical Observatory (OAO). This system, named MOKA (Mitaka Okayama Kiso data Archive system), is designed to be a prototype of the SUBARU data archive system, as well as a practical facility for effective archiving of the data produced at Kiso and OAO.

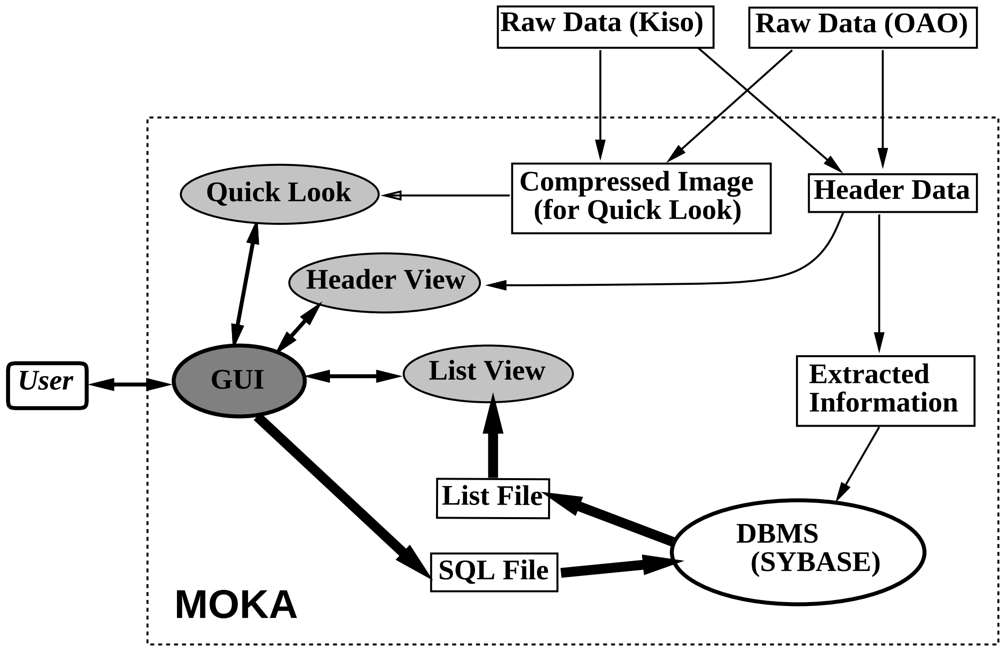


Figure 1. Structure of MOKA and data flow.

## 2. Outline of MOKA

At present, MOKA deals with raw observational data, not calibrated data. The data are produced from Kiso 105 cm Schmidt telescope prime focus camera CCD and OAO 188 cm telescope Cassegrain focus spectrograph CCD. MOKA offers data search, data preview (quick look), and FITS header view. MOKA does not handle the raw data directly, and the raw data itself is stored in each observatory on tapes or CD-ROMs. MOKA handles header information, and compressed images for previews extracted from the raw data. The structure of MOKA and the data flow are shown in Figure 1.

Unfortunately, we have a severe bandwidth restriction: 9.6 kbps to Kiso and 19.2 kbps to OAO. Users of MOKA must access NAOJ Mitaka, or visit Kiso or OAO. We anticipate most users accessing MOKA through Mitaka, although MOKA is installed in Mitaka, Kiso, and OAO.

FITS header data and compressed images are created from the raw data at each observatory, and sent to Mitaka, Kiso, and OAO. Information for a search is then extracted from the header data and input to a database management system (DBMS; in this case Sybase). A GUI has been written for MOKA that creates a SQL file according to search constraints set by the user. At present, possible constraints are instruments (observatories), a range of acquisition dates, types of frames, and a position (ranges of R.A. and Dec.). The SQL file is submitted, and the results of a search are stored in a file. The user can see the list of the frames found in the search, preview these images, and view the header data of the selected frame. MOKA sends requests for raw data to each observatory. The raw data are then sent by tape because of the network restriction.

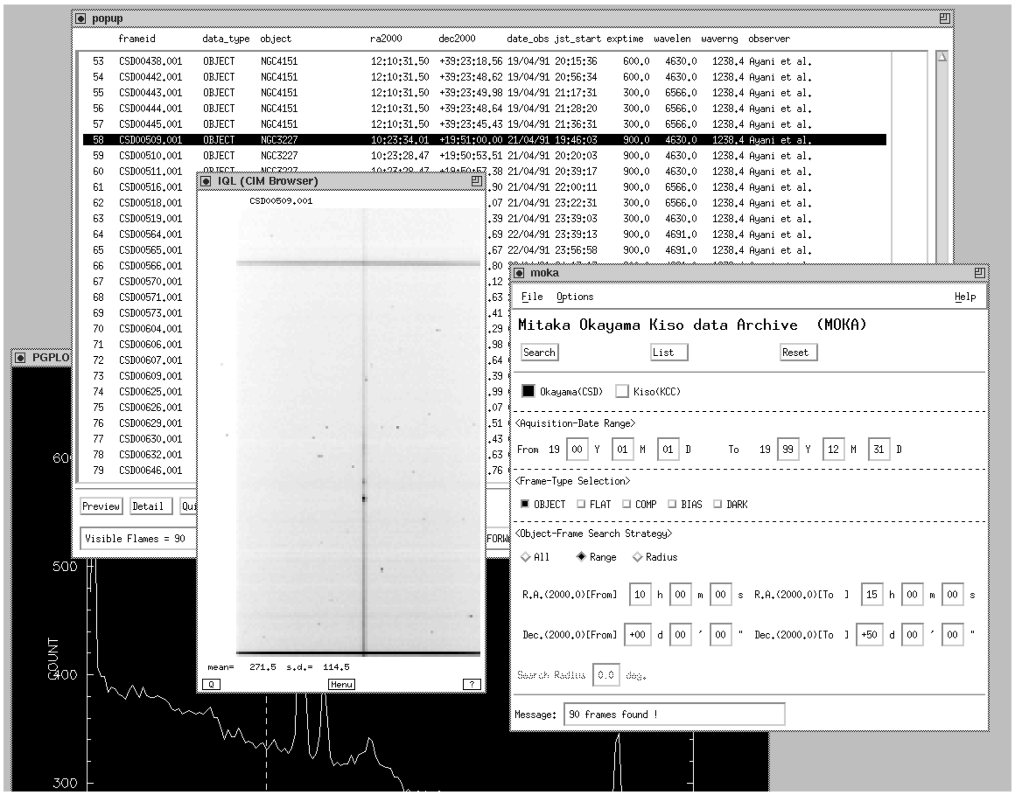


Figure 2. Sample screen of MOKA.

We use highly compressed images for the previewing, to save both disk space and a CPU overhead. The compression methods used are binning or discrete sampling, 8 bit-scaling, and gzip. A $500 \times 500$ OAO frame (about 500 kB) is compressed to about 10 kB, and a $1000 \times 1000$ Kiso frame (about 2000 kB) is compressed to about 6 kB. MOKA displays the compressed images for preview, and shows either a horizontal or vertical profile at the requested position.

## 3. Next Step of MOKA

We will soon be able to display many images at the same time in the preview mode, and to set more search constraints (wavelength, etc.). As MOKA is a prototype of the SUBARU archive system, we must address several tasks. For example; the handling of raw and calibrated data directly, dealing with data from other instruments or observatories, connecting with other astronomical databases, and so on. We expect our efforts will lead the better design of the SUBARU archive system.

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