The Palomar – ST ScI Digitized Sky Survey (POSS–II): Preliminary Data Availability

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Abstract. A preliminary version of *The Palomar – ST ScI Digitized Sky Survey,* now becoming available on the ST ScI WWW server, is described.

1. The POSS-II Survey and its Digitization

The 48-inch Oschin Schmidt telescope on Palomar Mountain, commissioned in the late 1940s, continues to be the dominant source of northern hemisphere optical sky survey data. Following the success, dissemination, and widespread community application of the first survey *The National Geographic Society – Palomar Observatory Sky Survey* (hereafter POSS–I; Minkowski and Abell 1963), the technical advances introduced at the UK Schmidt in the 1970s, and the completion of several intermediate-epoch surveys (Luyten 1963, Hoessel, *et al.,* 1979; and Lasker *et al.,* 1990), the concept of a new survey was a logical and timely advance. Briefly, this new program, *The Second Palomar Sky Survey* (hereafter POSS–II), covers all of the northern sky in 894 fields on a 5°-grid, using modern fine-grain emulsions in the photographic blue, red, and IR passbands. Some summary information is given in Table 1, and full details may be found in Reid, *et al.* (1991).

While photography was the only conceivable distribution method for the POSS–I, the advances in microdensitometry and in the digitization of the older surveys (for a review of the major modern systems and their programs, see Lasker 1995a,b), as well as in the technology for archiving and data distribution (*eg.,* Pirenne 1994), made it clear that a digitized version of the POSS–II had to be an integral part of the project plan. This approach (compared to the photographic) offers far more convenience of access and use, the ready manipulability of numerical data, the opportunity to make a direct association of astrometric and photometric calibrations with the images, and a relatively modest cost of replication.

Accordingly, in 1991 Caltech and the ST ScI completed a Memorandum of Understanding which defined *The Palomar – ST ScI Digitized Sky Survey.* Major features of this program are digitization based on scans of the original plates, processing of all fields in the three passbands (2682 plates total), the use of a $1''$ sampling interval, and distribution of the full-plate pixel data to the community.

In support of this, the microdensitometers used for the original scanning for the Guide Star Catalog (Lasker, *et al.* 1990) were rebuilt as laser-illuminated 5-channel systems capable of scanning rates well in excess of 1000 plates per year. The metrology is stable to 0.5 μm, and the densitometry extends three density units above the sky (note that typical sky values on the original plates are in the range $1.5 - 2.5$). The scans are of dimension 23040^2, which corresponds to 1.1 Gbyte per plate (for a 2.8 Tbyte survey total).

Table 1. POSS–II Data Summary[a]

Band	B_J	R	I
Plate	IIIa-J	IIIa-F	IV-N
Filter	GG385	RG610	RG9
$\lambda(\mathring{A})$	4800	6500	8500
Limiting mag	22.5	20.8	19.5
Plate status	82%	83%	55%
Scan status	39%	36%	12%
CD ROM status	-	7%	-

[a]Status information as of 1995 November. Photometric data is from Reid, *et al.* (1991).

2. Archiving and Distribution

At the ST ScI, the raw scans are archived on 6 Gbyte WORMs (six scans per disc), and a second copy on Exabyte tape (one scan per volume) is located at Caltech. However, with existing technology, this data set is too large for simple community distribution; and some data compression is essential. A very similar problem with earlier ST ScI scans of the POSS–I (E) and the SERC J surveys led to the development of the *Digitized Sky Survey – I,* based on 10X compression with loss, using the H-transform (White, *et al.,* 1992), and occupying 102 printed CD ROMs. The same approach and the same compression factor were adopted for the POSS–II.

A basic difference, however, is that the POSS–II is still in progress. Thus the data must be regarded as preliminary in that certain plates may be retaken or rescanned as resources permit near the end of the project. This alone precludes the initial investment required for a massive printing on CD ROMs. However, the general community interest in the data, as well as the schedule anticipated in the MOU, makes it appropriate that we create a preliminary distribution mechanism for immediate use, even while still maintaining our committment to make a printed CD ROM version after the completion of the observing and scanning.

The technology adopted for the preliminary distribution is write-once CD ROMs. With 10X compression, six plates fit on a single volume (but fewer where severely crowded fields make 10X too large a compression factor). As a preliminary distribution of the POSS-II survey, such discs are now being prepared and mounted in a jukebox accessible the ST ScI WWW server. The new scans may be accessed at

`http://stdata.stsci.edu/dss/dss_form.html`

Because of the limited throughput of write-once technology, only a few copies of each volume are being made. One is located at ESO; the disposition of the others remains to be negotiated in consideration for help in relieving resource-based risks to the project.

3. Discussion

Associated with each image is descriptive header information, *eg.,* plate data furnished by the observatory, information about the scanning process, calibrations, and the pertinent copyright statement. For normal (*ie.,* FITS) extractions through the WWW server, this information is copied to the FITS header, with the astrometric keywords modified to pertain to the image subset specified. For image formats that do not contain header provisions, *eg.,* GIF, the plan is to superpose the copyright statement on the edge of the image and to furnish the supporting information in a separate file.

The highest priority for the continued development of this community data server (and including an analogous effort in the south) is to complete coverage in the R-band; then, as resources permit, the blue and IR will be added. As of this writing, the northern sky coverage is about 7% and increasing by about 6% per month.

An ongoing maintenance effort for both the DSS-I and the DSS–II is to provide photometric information. This is to be based on new CCD calibration sequences (Ferrari, et al. 1994) and the calibration system described elsewhere in this volume by Doggett.

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