NASA-CR-202508

FINAL PERFORMANCE REPORT

Grant Number:	**NAGW-2166**
Project Title:	***Distribution to the Astronomy Community of the Compressed Digitized Sky Survey***
PI:	**Dr. Marc Postman**
Institution:	**Space Telescope Science Institute**
Project Period:	**07/01/90 - 03/31/96**

Executive Summary:

The Space Telescope Science Institute has compressed an all-sky collection of ground-based images and has printed the data on a two volume, 102 CD-ROM disc set. The first part of the survey (containing images of the southern sky) was published in May 1994. The second volume (containing images of the northern sky) was published in January 1995. Software which manages the image retrieval is included with each volume. The Astronomical Society of the Pacific (ASP) is handling the distribution of the 10x compressed data and has sold 310 sets as of October 1996. ASP is also handling the distribution of the recently published 100x version of the northern sky survey which is publicly available at a low cost. The target markets for the 100x compressed data set are the amateur astronomy community, educational institutions, and the general public. During the next year, we plan to publish the first version of a photometric calibration database which will allow users of the compressed sky survey to determine the brightness of stars in the images.

I. Goals

The Space Telescope Science Institute (STScI) digitized Schmidt survey plates covering the entire sky to obtain the image data needed for construction of the Guide Star Catalog (GSC) and to pursue a number of research programs. The digitized versions of the plates are of great utility in astronomical research, but distribution of the scans has previously been impractical because of the massive volume of data involved (a total of about 600 Gbytes). However, wavelet compression techniques now make such a distribution feasible. With support from NASA Headquarters, compression of 1540 digitized images covering the entire sky began in June 1992.

As a direct result of the support received by NASA headquarters for this program, two versions of the entire sky were produced - one at a compression factor of 10 which is virtually indistinguishable from the original data, and one at a compression factor of about 100 which, while not suitable for professional research activity, provides an invaluable tool for the educational and amateur communities. The surveys that were compressed are the southern hemisphere SRC J band survey (894 plates; epoch 1975-1984) and the northern hemisphere Palomar E band survey (643 plates; epoch 1950-56).

The main project goal was to perform the above data compression and publish the compressed data in a user friendly format.

II. Final Status

All of our project goals were met.

The compression of both the northern POSS-I E survey and southern SRC-J survey was completed. The 10x compressed southern survey was published in May 1994 on 61 CD-ROMs. The data on the southern discs includes 800 deep (1800 - 7200 sec) IIIa-J exposures obtained through a GG 395 filter, 94 short (240 sec) V-band exposures mostly at low galactic latitudes and 2 short (300 sec) V-band exposures, each centered on one of the Magellanic Clouds. The northern survey data includes 643 deep (2400 - 4200 sec) 103a-E exposures obtained from the POSS-I survey with declinations greater than or equal to 0 degrees plus a single short (300 sec) IIIa-J exposure of M31, obtained through a GG 495 filter. We chose the POSS-I E data for northern hemisphere coverage because its limiting magnitude is closer to that of the SRC Southern Sky Survey than other existing northern surveys. The northern data fits on 41 discs, bringing the combined 10x compressed CD set to 102 discs. The northern data were published in January 1995. Astrometric calibrations are published with both data sets. In the south, the astrometric solutions are essentially identical to that derived for the GSC.

In addition, STScI and the Astronomical Society of the Pacific (ASP) recently made available (in Sept. 1996) the highly compressed (100x) version of the northern survey (down to declination -15 deg). This version consists of just 8 CD-ROMs and includes software which runs under MS Windows and Macintosh O/S environments. The specific market for this product are educational institutions and the amateur astronomy community.

ASP is the distributor and is also providing user support. To date, 310 sets of the 10x compressed set have been sold. Over 600 initial orders for the 100x set were received by ASP. Distribution of the 100x is in progress.

In about a year, we will also produce a photometric calibration database which will allow users of the digitized sky survey to compute stellar magnitudes with better than 20% accuracy to the limit of the GSC. This will be followed by an advanced astrometric and photometric calibration database which will allow accurate magnitudes to be computed to V = 18 and will improve the absolute astrometric accuracy of coordinates generated from the digitized sky survey. We also have begun a program to compress current epoch sky surveys (the POSS-II and SES-R). These calibration activities continue to be funded by sales of the 10x and 100x CD sets.

The compression team included the project scientist (Marc Postman), a senior technical assistant (Michael Meakes), a data technician (Flavio Mendez), and a calibration specialist (Jesse Doggett). Mike Shara was the principal investigator. As head of the Catalogs and Surveys Branch, Barry Lasker provided additional scientific and technical management support.

FINAL PATENT/INVENTION REPORT

Grant: NAGW-2166

Principal Investigator: Dr. Marc Postman

Institution: Space Telescope Science Institute

Patents/Inventions Developed: NONE