Scanning Activities at the STScI

One of the two STScI PDS microdensitometers is now dedicated to second-generation plate scanning. Descriptions of the collaboration between Caltech and the STScI to digitize and distribute the POSS-II survey appear elsewhere in this newsletter as well as in abstracts by Djorgovski et al. and by Lasker et al. The program additionally includes the digitization of all plates in the AAO-R Survey (Morgan et al., 1992).

The second generation scans use 15μm pixels and a 23040^2 raster (occupying 1.2 Gbytes uncompressed). The initial scanning efforts are proceeding slowly (3 plates per week), pending the completion of the upgrades described below and in the previous Newsletter.

During this phase, considerable attention has been directed to quality control of the production scanning process. Apart from the usual considerations of bit and pixel statistics, procedures for the impersonal control of the two major PDS scanning defects, shearing and chopping, have been developed. Shearing, which occurs when right- and left-going scan lines are incorrectly aligned, is detected (typically to a precision of 0.03 pixels) with an interline correlation function. Chopping, which occurs when the servo response is inadequate to keep the Y-position (axis orthogonal to the fast scan motion) at the value defined by the metrology system, is detected with a relatively simple operation involving the interline correlation function. This procedure was developed in collaboration with Nick Weir (Caltech), and is currently being calibrated; the sensitivity is believed to be better than 0.05 pixels.

In addition to these tests, based on scans of astronomical data, two new sets of test plates have been acquired. One is a Ronchi ruling oriented at 30° to the scan axis, such that scans at zero Y-increment are very sensitive to chopping. The other is a 140 x 140 line grid on a 14-inch plate, to be used for long term metrology control. Discussion regarding the measurement of the second grid at other institutions would be welcomed.

The compression of the GSC-I scans ($\approx$ 10x, using the algorithm described by White et al. [1992]) is now in progress, and community distribution of these on CD ROMs will begin in about one year. Some compression experiments have also been done on the POSS-II scans. It appears that compressions of 20 – 30 may be feasible for community distribution for the POSS-II.

The second PDS has been removed from service to support the installation of an upgraded control system. This modification is based primarily on a Hewlett Packard (HP) 5527A control system for the metrology laser. This unit includes a servo controller which takes its feedback information directly from the metrology laser, a new 'divide-by-N' unit custom built by HP and integrated with the servo controller, and a programmable DVM for overall system monitoring. At the same time, all functions of the original Perkin-Elmer microprocessor are being replaced by a VAXstation 4000, interfaced by IEEE and by CAMAC. Full details of this project will be published after the integration is completed.

References

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