AVIRIS GROUND DATA PROCESSING SYSTEM

Earl G. Hansen, Steve Larson, H. Ian Novack, Robert Bennett

Jet Propulsion Laboratory, California Institute of Technology
4800 Oak Grove Drive, Pasadena, California 91109

1. INTRODUCTION

During the last year and a half, February, 1991 to June, 1992, a major upgrade of the AVIRIS ground data processing system has taken place. Both the hardware and software components have been changed significantly to improve the processing capacity and performance and to structure a data facility capable of handling the projected work load into the near future.

This paper will provide a summary report of these changes and some projections for the future.

2. OBJECTIVES

The objectives of the AVIRIS data facility are to decommutate and archive AVIRIS data and to provide raw or radiometrically calibrated data products to the science investigator. These primary objectives have not changed from the initial concepts (Reimer et al. 1987). The upgrade effort has greatly improved the processing system. These objectives can now be accomplished in a more timely fashion at a reasonable cost and there is sufficient capacity to manage the current processing load and provide for future growth. The method of implementation has added the flexibility to provide better service to the investigator and allow for future changes.

3. HARDWARE DESCRIPTION

The data facility hardware system has been changed significantly. The original system was a VAX 11/780 processor with 2.4 GB of disk, two 1/2 inch tape drives, a 35mm camera for quicklook production and an AMPEX HBR3000 high density tape drive for playback of the instrument tape. This system became too slow to handle the processing load in a timely manner.

The new system consists of two UNIX based server platforms and two UNIX based workstations. The archiving process runs on a SUN 4/490 server with 32 MB of memory, 8 GB of disk, two 4mm DAT tape drives, one 8 mm tape drive, a Kodak XL7700 image printer, and a Metrum VLDS tape subsystem to provide playback of the instrument tape. The 4mm DAT tape drives are used as the archive media and the Kodak image printer replaces 35mm photography prints as the quicklook production method.

The hardware system for retrieval processing is a Solbourne 5E/900 server with two SPARC processors running in a symmetric multiprocessing mode. This system has 128 MB of memory, 8 GB of disk, two 1/2 inch tape drives, three 4mm DAT tape drives, two 8mm tape drives, and two IVAS image processing subsystems. The 1/2 inch, 4mm DAT, and 8mm tape drives provide the means to deliver data

products to the investigators. The IVAS processors are used as analysis display devices providing 24-bit color capability. This system also serves as the host for the RDBMS which stores the archive catalog, the retrieval audit trail and quality control tables and the instrument performance statistical tables.

Two SUN SPARC 1 workstations provide the software maintenance and testing capabilities. In addition these workstations support the calibration process, data analysis and scientific visualization.

4. OPERATION

The major impacts the upgrade has made on operations are in the areas of performance and capacity. The archival process has been improved to perform the archiving of one scene in twenty minutes with the production of quicklooks on the same day as archiving using the image printer. The use of a dedicated server allows the archiving of AVIRIS data in quantities of runs, as it is acquired. Each run can be archived in one to two hours depending on the run size. This makes possible the archiving of four to eight runs per day. The quicklooks for these runs are available for mailing the next day. The system as implemented has a capacity to archive 3600 scenes per year allowing for system maintenance and down time. It will also provide for a one week time span from data acquisition to delivery of quicklooks.

Retrieval processing performance has also been improved. The system as implemented permits processing of each scene in thirty to forty minutes depending upon the processing options. This new system will allow two retrievals to be run concurrently. The capacity of the new system is then comparable to the archiving system, capable of producing 3600 retrieval data products annually. In addition, the new system will permit the creation of data products on additional media and in UNIX format. Retrieval products will be available on 1/2 inch, 8mm, or 4mm DAT tapes and in both VAX and UNIX formats.

5. FUTURE PLANS

With the implementation of the new data processing system a major improvement in the data handling capabilities for AVIRIS has been accomplished. This system should provide a stable, flexible and maintainable facility for processing AVIRIS data today and into the near future.

Additional improvements are being explored and will be implemented as they are approved. Next to be explored is the possible use of CD-ROM as a delivery media for retrievals. In the near future the means to master CD-ROM disks in the data facility will become available at reasonable cost and performance. This media would be added to the choices for data product delivery.

We look forward to supporting the science community in delivering high quality data in a timely fashion and ask that any suggestions on how we can improve our service to you, the investigator, be forwarded to the AVIRIS support team.

6. REFERENCES

W. M. Porter, T. G. Chrien, E. G. Hansen, C. M. Sarture, "Evolution of the Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) Flight and Ground Data Processing System," *Imaging Spectroscopy of the Terrestrial Environment, Proceedings of SPIE,*

Volume 1298, pp. 11-17, 1990.

J. H. Reimer, J. R. Heyada, S. C. Carpenter, W. T. S. Deich, M. Lee, "AVIRIS Ground Data Processing System," *Imaging Spectroscopy II, Proceedings of SPIE,* Volume 834, pp. 79-90, 1987.