The
Final Report
for
Contract NAS8-38499

Investigation in Support of the Development of the NASA Geoplatform Program

October 1996

I. Introduction

The work on this contract spanned the period 1 January 1990 through 30 September 1995. The major activities were Data Management study, GOES-N Interconnect, Geoplatform Sounder Data Instrument Study, Marshall Space Flight Center (MSFC) Science support, Wide Word Workstation, Wetnet support, and the GOES/GARS study.

II. Contract Activities

A. Data Management Study

The results of this study were presented orally by Francis Bretherton to MSFC staff at a review in May of 1992.

B. GOES-N Interconnect

A study was made to compare NOAA's GOES-N instrument design with that of the Geoplatform instruments. The report on this study titled: "Study of Geoplat Complementarity with the NOAA GOES Instruments: GEOPLATFORM INSTRUMENT STUDIES FINAL REPORT" was submitted on 15 July 1990.

C. Geoplatform Sounder Data Instrument Study

A study (Phase A) was made to develop a conceptual design for of a Geostationary Atmospheric Profiler (GAP) Instrument. The first report on this study was submitted June 1990 and a revised version adopting the design to MSFC Geoplatform concept titled: "GEOSTATIONARY ATMOSPHERIC PROFILER (GAP) PHASE A STUDY FINAL REPORT" was submitted on January 31, 1992.

D. MSFC Science support

This effort provided both real-time and archived meteorological data to MSFC staff in support of MSFC research and development activities. This task cover support for a number of field programs.

E. WWWorkstation

A McIDAS workstation package called the Wide Word Workstation was developed and delivered to MSFC in August 1991.

F. WetNet support

The MSFC WetNet project was an effort to find out how well scientists, working at their home facilities, could work collegially on a scientific investigation. The WetNet system was implemented using the UW's McIDAS-OS2 software. This effort included a variety of activities in support of the WetNet project. Specifically, we worked on modifications to the WetNet software package, participation in the WetNet group meetings, GCOS network database development, a new UI for WetNet, and support for the magneto-optical (MO) device driver.

1. WetNet software package modifications

Through feedback from the WetNet community, the McIDAS was enhanced with a large number of new functions. Most significant among these was a program to better support algorithm development for multispectral image analysis. Modifications were required to improve the navigation accuracy for the DMSP satellites particularly in the polar regions of each orbit.

2. WetNet group meetings participation

At the WetNet group meeting held in September 1993 at Utah State in Logan, UT, we demonstrated the McIDAS-X package for WetNet users. The McIDAS-X for WetNet was in high demand as most WetNet scientists were implementing their processing on Unix systems and needed WetNet functionality in those systems. Unfortunately we were unable to move the MO drives to Unix, so it was necessary to maintain the old McIDAS-OS2 WetNet systems.

We also participated in the WetNet group meeting in February 1995 at the University of New Hampshire in Dunham NH. We presented plans for new features that were scheduled for McIDAS and demonstrated the new graphical user interface (GUI) for McIDAS-X. We also assisted the MSFC WetNet team to develop an implementation plan in a post-meeting conference.

3. GCOS network database development

The Global Change Observing System (GCOS) network database was developed independent of McIDAS as a simple data display package and supporting database that would work in a variety of personal computers to provide MSFC staff with global and local climate oriented data. After considerable market analysis, we chose GRASP™ as the software package for this implementation. The first use of the system was in September, 1992. The system never achieved wide acceptance and was discontinued because the database maintenance costs were excessive.

4. Development of a new User Interface (UI) for WetNet

Following the distribution of McIDAS-X for WetNet, the users asked for a GUI to facilitate its use. A market analysis identified a freeware package called Tcl/Tk was the most appropriate GUI

building tool kit for the project. The interface was developed in collaboration with the WetNet staff at MSFC, and eventually distributed to the WetNet users.

5. Magneto-optical (MO) device driver support

The magneto-optical device driver was originally developed under NASA MSFC contract NAS8-37587. SSEC subcontracted to Software Technology, Inc. (STI) to develop this driver for IBM's OS/2 operating system. Under this contract, STI upgraded the device driver to maintain compatibility with changes to the IBM OS/2 operating system, and to provide ongoing support for the device driver. In general, this device was a continuing source of problems for the WetNet support staff, the SSEC support staff, and the WetNet scientists. Unfortunately, it was the only solution available at the time that the WetNet system was implemented.

G. GOES/GARS study

Global Change Research requires long time periods of scientifically validated data sets be cataloged and readily available to the research community. The GOES archive, at UW, is one such data set. Various climate oriented products could be generated which might be of great interest to the global change research community. Some of the products considered were: Global hourly cloudiness, 3 hourly precipitation, cloud cleared radiance, cloud classification and cloud cleared water vapor. The prototype McIDAS-X system was well suited to produce these products since it can operate on the archive with modular units functioning as ingestors and processors.

We proposed and implemented a processing chain within McIDAS-X which monitored the ingested GOES data from the Pathfinder data period (May, 1987 through November, 1988), and supervised the various steps in the processing chain resulting in climate products. We prototyped several product generation algorithms to demonstrate the viability of this approach. The products from the effort have been made available to the global change science community under other NASA grants.

III. Conclusion

A diverse set of studies were funded by this program. All were focused on extending or demonstrating the usefulness of meteorological satellite data, with emphasis on geostationary satellite data. To that end this effort was highly successful and of significant benefit to Marshall Space Flight Center and the University of Wisconsin - Madison.