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for
MONTHLY REPORT

Contract No.: NAS5-21965

VISSR Atmospheric Sounder (VAS)
Development and Performance Evaluation

Prepared by

National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, MD
Space Science and Engineering Center
The University of Wisconsin
Madison, WI
for

I. General

The proposal of the Space Science and Engineering Center's participation to the conclusion of the VAS Demonstration was completed in March. The major subsections of the proposal presented the performance requirements and the design of the proposed processing system. The estimated cost of the UW program is \$1,954,446.

Documentation submitted to NASA during the month consisted of the above mentioned UW/SSEC VAS proposal.

II. Data Processing System Design and Development

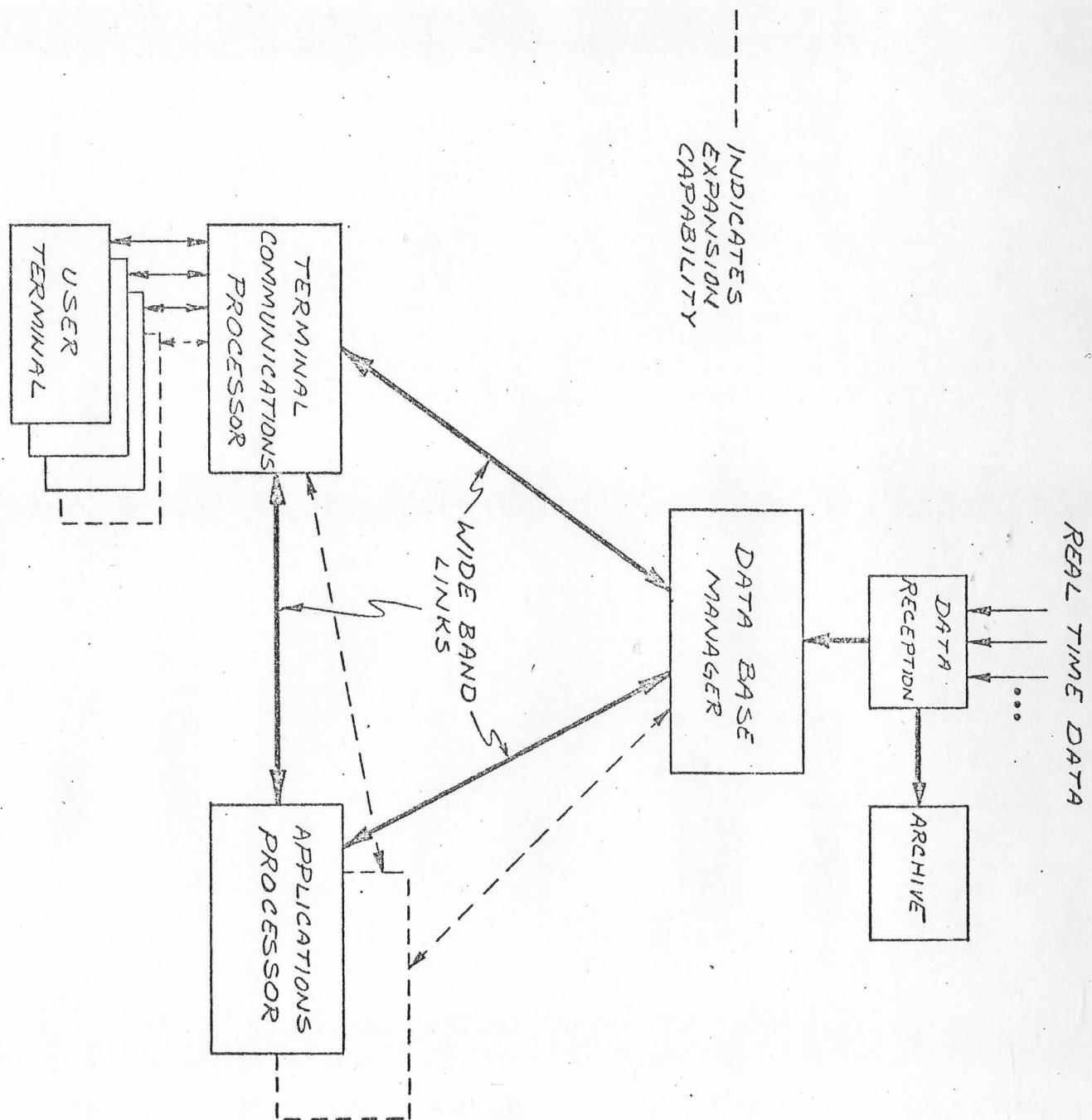
The VAS processing system design presented in the proposal is summarized briefly here. The system architecture selected for VAS is a distributed processor system which uses similar processors throughout. Each processor in the network will be responsible for only one class of activity, hence in this architecture. The design is based on the separation of activities into three classes; (1) data handling, (2) user communications, and (3) applications processing. Each time critical activity is handled by its own processor. The structure consists of a data base manager (DBM), a terminal communications processor (TCP), and applications processors (AP) which are all tied together by high speed I/O channels.

Figure 1 shows the VAS system architecture we propose to use. The dashed elements of the system illustrate the capability for expansion inherent in this architecture. The design is based on the separation of activities into three classes; (1) data handling, (2) user communications, and (3) applications processing. Each time critical activity is handled by its own processor. The design is based on the separation of activities into three classes; (1) data handling, (2) user communications, and (3) applications processing. Each time critical activity is handled by its own processor. The design is based on the separation of activities into three classes; (1) data handling, (2) user communications, and (3) applications processing. Each time critical activity is handled by its own processor.

The data base manager acts like a librarian taking in data from VAS, VISSR, TIROS-N, DMSP, conventional weather, and digital radar, preprocessing the data, filling it away for future reference, and meeting requests for data from the applications processor and terminal processor. The DBM is responsible for data, conventional weather, and digital radar, preprocessor (TCP), and applications processor (AP) which are all tied together by high speed I/O channels.

FIGURE 1

VAS PROCESSING SYSTEM ARCHITECTURE



for only one time critical task, data input. This processor has the bulk of the on-line data storage in the system including disks and magnetic tapes. It also controls the data archive and peripherals such as a line printer and a card reader.

The terminal communications processor handles all of the user and programmer requests and passes them on in either a modified or unmodified form to the applications processors or the DBM. Although initially only three user terminals are envisioned (UM, NESS, and GSFC), this design is upgradeable to handling a considerable number more (roughly 50). The TCP is responsible for only one time critical task, terminal message input. The applications processors perform the bulk data processing jobs. They can be tailored to specific tasks with external arithmetic units such as array or vector processors. These processors contain a small amount of high speed mass storage for the data sets requested from the DBM and a large amount of core memory to minimize the I/O requests for data and wait times.

The user terminals connected to the terminal communications processor can be anything from a simple CRT terminal to a more complex terminal with its own small processor and TV image video processing capability. The interface to the terminals will be byte oriented, bit serial, synchronous packet transmission, where packet content and band rates could vary.

The major advantages of this structure are that the processors can be optimized both in hardware and software to perform a single class of time critical tasks and that the system can grow in a linear fashion as more terminals and applications processors are added.

In a telephone conversation with H. Montgomerie the question was raised; if determination of the central frequency of any filter is off, how does this affect the calibration for that band? Using the last thermal vacuum test data for band 8, we found that the absolute and rms error varied in a nearly linear fashion as the assumed central frequency moved away from 895 cm^{-1} as much as 20 cm^{-1} . The slope of the errors with respect to frequency was only $\sim 0.005^\circ\text{C}/\text{cm}^{-1}$. Thus initial indications are that central frequency variations pose no serious problems as long as they are nominally constant.

III. VAS Instrument Support

cc: H. Montgomery, Code 942 (10 copies)

Enclosure

WPM/rmk

Program Manager
Paul Menzel

Sincerely,

Paul Menzel

If you have any questions or desire further information, please contact me at (608) 262-0118.

In accordance with Article III of Contract NAS5-21965, I am submitting the required Progress Report for the month of March, 1977.

Dear Mr. Connor:

Mr. J. B. Connor
Contracting Officer, Code 289
NASA-Goddard Space Flight Center
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10 April 1977

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THE UNIVERSITY OF WISCONSIN

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