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MONTHLY REPORT

for

DECEMBER 1976

VISSR Atmospheric Sounder (VAS)
Development and Performance Evaluation

Contract No.: NAS5-21965

Prepared by

Space Science and Engineering Center
The University of Wisconsin
Madison, WI

for

National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, MD

I. General

On December 16, 1976, D. Small of NOAA and P. Menzel of SSEC jointly gave an informational presentation on the VAS program to NOAA and the National Weather Service. The unique capabilities of the VAS instrument were identified and concepts of the VAS data processing system for producing a detailed and consistent four dimensional description of mesoscale phenomena were explained. The need for close coordination with the scientists responsible for short term weather forecasting was stressed.

II. VAS Instrument Support

Further investigations were conducted to assess the impact of the suggested 75 cm^{-1} half band width in the 4μ window. It was concluded that a half band width of 140 cm^{-1} for the 4μ window would allow a significantly better imaging capability. For imaging applications of the 4μ window where large area coverage or rapid time sequence data is required, the spin budget for the window should be kept below 5 spins.

III. Development of VAS Data Processing Techniques

During the week of December 19, 1976, H. Woolf of NOAA/NESS visited UW/SSEC to implement some of the NESS Nimbus 6 Sounding Retrieval Software on McIDAS. Thru our joint efforts, we were able to (a) compile a clear column radiance retrieval program on McIDAS, (b) execute this program with HIRS and SCAMS data producing results in agreement with benchmark output processed at Suitland, Md., (c) compile and execute a statistical temperature profile retrieval program on McIDAS yielding a reasonable comparison with available conventional weather data, and (d) implement the capability on

McIDAS to produce images of any channel radiance (or temperature), the differences of any two channels, or any channel compared to guessed surface temperatures.

It was determined that much of the NESS sounding retrieval software was adaptable to McIDAS and that execution was accurate but slow (implementation of floating point hardware would greatly speed up the processing).

IV. Data Processing System Development

Reception of VHF TIROS-N beacon data at the University of Wisconsin was investigated. A Vaisala search antenna located nearby was inspected and found to be in good condition. A downlink calculation determined that a good signal to noise ratio was obtainable from satellite locations higher than 15° with respect to the horizon. Efforts are being made to size the task of building a PSK demodulater, a bit synchronizer, and a frame synchronizer.

V. System Design Analysis

Much effort has been focussed on preparing a ground processing system specification notebook that will serve as a reference document for development of a system design. A section on data collection has been nearly completed: data rates, schedules, formats, volumes, calibration algorithms, ... have been identified. Initial contributions to a section on data analysis include a sizing of the computational requirements to perform clear column radiance retrievals and minimum information temperature inversions. We are also attempting to put together a VAS scanning scenerio. Continued work on this notebook is planned.

SPACE
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THE UNIVERSITY OF WISCONSIN

10 January 1977

Mr. J. B. Connor
Contracting Officer, Code 289
NASA--Goddard Space Flight Center
Greenbelt, MD 20771

Dear Mr. Connor:

In accordance with Article III of Contract NAS5-21965, I am submitting the required Progress Report for the month of December, 1976.

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

Sincerely,

Paul Menzel

Paul Menzel
Program Manager

WPM/rmk

Enclosure

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