PROGRESS REPORT

THROUGH

February 1980

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. Data Processing System Development

We are still unsuccessfully trying to collect VAS data which can be used for case studies into the scientific potential of VAS. During January the SDB had problems and Westinghouse spent a lot of time attempting to fix them. During February the satellite was moved to 135°W. While the satellite was moving we attempted to collect VAS data. However, problems at Wallops and interference with other satellites prevented collection of good data. During January and February, we attempted to collect data on 40 days. Of these days, there is only one day where all the scheduled PDLs were successfully received. During January there were 55 dwell sounding sequences scheduled. Only 26 were actually sent, and of these, only 8 contained usable data. Hence only 14.5% of the attempted dwell soundings were usable. For the MSI, 229 were scheduled, 130 were transmitted, and 94 were usable (41% of attempted were usable). February was only slightly better. There were 61 dwell soundings scheuled, 30 transmitted, and 17 were usable (28% usable). The MSI had 200 scheduled, 89 transmitted, and 83 usable (42% usable). We had attempted a two week test with NMC where we would make soundings in the northeastern Pacific which could be used in the LFM to investigate the potential impact of remote soundings in the LFM forecast. Because of problems in obtaining dwell soundings, we were able to deliver only one data set to NMC.

II. VAS Instrument Support

Further investigations into the VAS-D inflight radiometric performance continued to verify good instrument performance. Mean temperature measurements of 500 samples for N spins (where N is the nominal spin budget for a given band) were found to be repeatable to within .5°C from one measurement to the next for all bands; in fact all but bands 2, 3, 5 and 9 were repeatable to within .2°C.

The VAS-D spin budget was reevaluated on February 3, 1981 and was found to be stabilized to its winter value of approximately 93 spins. A 20% reduction is anticipated as winter turns to summer.

The VAS-E SDB parameters for calibration and detector geometry are almost all calculated. They should be ready for the SDB in time for the launch of GOES-E.

III. Algorithm Development

Research during this period concentrated on improving the data sampling techniques to deal with varying meteorological conditions. Cloud contamination is a serious obstacle to uniform data average. Unlike the polar orbiting sounder the VAS does not have microwave measurements to quality control the processed infrared radiances. In addition, the VAS suffers from registration

problems caused by misalignment of short and long wavelength detectors and by changing meteorological conditions during the "spin budget". In consequence sampling of the radiances varies according to cloud condition.

For each retrieval the minimal sample is a 5 x 5 FOV array. For cloudless samples, the radiances are filtered independently to exclude noisy values. The filter is essentially of the "buddy-checking" variety where a modal value is sought. For overcast conditions a similar filter is used but registration is enforced. That is, if any channel of an individual FOV is rejected, all channels are rejected. Finally, for partly cloudy conditions the traditional NSTAR method is used. The current filtering procedure is to accept paired fields of view if the calculated clear column radiances of the 750 and 2210 μm agree within a specified tolerance with an operator-selected nearby clear FOV. All accepted pairs are further subjected to a regression check to ensure short/longwave consistency. Finally, "slopes" and "intercepts" associated with each pair are averaged to produce the final clear column estimate.

Results to date suggest that "clear" retrievals are quite successful. "Overcast" are limited by the accuracy of the initial guess temperature profile and are generally unacceptable if any cirrus is present. "Partly cloudy" solutions require considerably more development work.

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March 30, 1981

Ms. Vanessa Scott
Code 269, Bldg. 16
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Dear Ms. Scott:

In accordance with Article III of Contract NAS5-21965, I am submitting the required Progress Report for activities through February 1981.

If you have any questions or desire further information, please contact me at (608) 262-3755.

Sincerely,

Frederick R. Mosher

Frederick R. Mosher
Program Manager

FRM/sf

Enclosure

cc: H. Montgomery, (10 copies)