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MONTHLY REPORT

for

OCTOBER 1979

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 October 16, 1979 P. Menzel travelled to Greenbelt, MD to confer with H. Montgomery of GSFC about the UW VAS ground processing system configuration, to brief D. Han of NOAA about the latest VAS calibration results, and to attend the Flight Mechanics/Estimation Theory Symposium at GSFC. New developments in navigating geosynchronous spacecraft data were discussed.

II. Data Processing System Development

The physical moving and recabling of the processors in the VAS ground processing system was accomplished in October. All CPU's have the additional disc space in place. Additional software expansion can now be accomplished more readily.

The wideband communications link is now being tested in a DBM-2AP configuration. Hardware debugging was accomplished very quickly. Software to deliver seven services is being installed; (1) remote program initiation, (2) remote file reading, (3) allocating upper core, (4) de-allocating upper core, (5) sending messages, (6) receiving messages, and (7) CPU identification. The first four services are tested, the last three remain to be tested. Installation by mid January is planned.

The ADCCP communications software for buffer transmission and reception has been successfully tested in spite of faulty boards in the test equipment. Progress towards communications with GSFC continues -- linkup tests are now scheduled for February 1980.

The VAS video cassette recorder has been constructed. It features auto selection of mode A, B, AA (depending on what is being sent) and easy transcribing of additional cassette copies. The testing of mode AA is awaiting a signal source.

III. VAS Instrument Support

The calculation of GOES-D VAS calibration coefficients is nearly complete. Calibration of all twelve spectral bands from vacuum test data was accomplished within specs. For the 28 test produced temperature gradients, the absolute error for spectral band 8 is -1.41 ergs/etc and the root mean square error is .28 ergs/etc. Comparable results were achieved for the other spectral bands. For the expected inflight space gradients the uncertainty of the effective external blackbody radiance determination is .2 ergs/etc (winter, equinox) and .4 ergs/etc (summer).

Early analysis of high speed raw data indicates that there is less autocovariance in the signal than expected, hence the spin budget will be lower than the nominal 157 spins for all spectral bands.

Completion of tests for calibration is expected the second week in November.

IV. VAS Data Processing Technique Development

The sounding retrieval software has been further automated: automatic editing is accomplished by rejecting retrievals where the gradient of the brightness temperature is less than a given threshold. Initial tests with this procedure have proven very successful

Work is continuing on the study of severe weather generated by cyclogenesis. The influx of low level moisture into the Great Plains from the Gulf of Mexico, capped by drier air at mid levels, most often causes the mesoscale weather we are trying to study in the VAS program. Determination of both horizontal and vertical mean moisture distributions from RAOB data associated with known cases of cyclogenesis will help indicate what VAS will need to be able to detect and where it will most likely find it.

Results from a comparative severe storm forecast study conducted over the past several months are beginning to emerge. The objective of the study

was to compare lead time severe weather forecasts made using conventional surface and upper air data with forecasts made using McIDAS derived surface parameters and vertical soundings processed from TIROS-N and NOAA-6 satellites. Qualitative categories were assigned to the number of severe storms expected to occur (isolated = 1 to 3, few = 3 to 6, scatter = 6 to 15, numerous = 16 or more). Forecasts were verified by category; any forecast that missed by more than one category was labelled as a "bust". The attached table shows that satellite forecasts verified much better than conventional forecasts (roughly ten percent fewer busts). This work will be continuing.

Table I Summary of Spring to Fall Forecast Sequence

Satellite Forecasts = 77

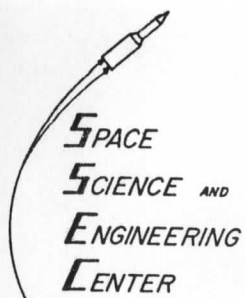
VERIFIED FORECAST	NONE	ISOLATED	FEW	SCATTERED	OUTBREAK	CUMULATIVE BUSTS
NONE	27.3%	2.6%	7.8%			7.8%
ISOLATED	10.4%	9.1%	2.6%			0
FEW	2.6%	3.9%	23.4	6.5%		2.6%
SCATTERED			1.3%	1.3%		0
OUTBREAK					1.3%	0

Forecast Bust % = 10.4%

Conventional Forecasts = 106

VERIFIED FORECAST	NONE	ISOLATED	FEW	SCATTERED	OUTBREAK	CUMULATIVE BUSTS
NONE	21.7%		9.4%	1%	1%	11.3%
ISOLATED	5.7%	16.0%	4.7%	1.9%		1.9%
FEW	8.5%	6.6%	16%	2.8%		9.4%
SCATTERED				2.8%		0
OUTBREAK					1.9%	0

Forecast Bust % = 22.6%



1225 West Dayton Street
Madison, Wisconsin 53706

THE UNIVERSITY OF WISCONSIN

10 November 1979

Vanessa Scott
Code 269, Bldg. 16
Goddard Space Flight Center
Greenbelt, MD 20771

Dear Ms. Scott:

In accordance with Article III of Contract NAS5-21965, I am submitting the required Progress Report for the month of October, 1979.

If you have any questions or desire further information, please contact me at (608) 262-6361.

Sincerely,

Paul Menzel
Program Manager

WPM/klv

Enclosure

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