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FIFTEENTH PROGRESS REPORT

on

CALIBRATION AND EVALUATION OF SKYLAB ALTIMETRY FOR  
GEODETIC DETERMINATION OF THE GEOID (Contract NAS9-13276,  
EPN 440) May 1 to May 31, 1974

to

NASA Johnson Space Center  
Principal Investigation Management Office  
Houston, Texas 77058

from

BATTELLE

Columbus Laboratories

June 17, 1974

Prepared by: D. M. J. Fubara (CO-Investigator)  
and M. B. Kuhner

A. G. Mourad (Principal Investigator)  
Z. H. Byrns, Code TF6 - NASA/JSC Technical Monitor

(E74-10612) CALIBRATION AND EVALUATION  
OF SKYLAB ALTIMETRY FOR GEODETIC  
DETERMINATION OF THE GEOID  
Report, 1-31 MAY 1974 (Battelle Columbus  
Labs., Ohio.) 5 p HC \$4.00  
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PROGRESS

The main effort during this reporting period was aimed at matching altimetry data from CCT S071-1 tapes with ephemeris data from SKYBET tapes. Needed data were read from three CCT S071-1 tapes. A computer program was written to read SKYBET tapes and convert the data to a form compatible with Battelle's computer system. Also a computer program is being written to plot graphs of altimeter-derived geoid heights directly from the analytical processing. Reading the data tapes consumed much more time than expected due to various problems described below.

Documents and data received and reviewed during this period are listed in Appendix A.

### DATA PROCESSING RESULTS

There are no significant results to be reported at this time.

### PROBLEMS

The labels on the CCT S071-1 tapes did not specify the density at which the data were written. It was therefore assumed that the density was 556 bpi. A large number of parity errors were encountered. Various attempts to eliminate these errors involved trying different tape transports and cleaning the tapes. When it was finally decided to try reading the tapes at 800 bpi all the parity errors disappeared.

Problems were also encountered in reading the SKYBET tapes. The density was again not specified and it had to be learned by experiment that it was 556 bpi. The data were written in FORTRAN E-fields with 1346 characters per block using the 029 character set. Neither of the FORTRAN compilers currently on Battelle's operating system permit the reading of records over 150 characters long. Therefore, unusual measures were required to convert the data to a form which is readily useable on our computer.

A more fundamental problem is that ephemeris data is required at one-eighth or at least one second intervals but the SKYBET tapes supplied give the data only about every 15 seconds.

### RECOMMENDATIONS

(a) A low effort will be placed on this project until the expected contract extension with additional funding has materialized.

(2) We would appreciate a speedy decision on whether NASA/JSC can furnish us SKYBET ECT X, Y, Z AND  $\dot{X}$ ,  $\dot{Y}$ ,  $\dot{Z}$  data by interpolation at one-eighth second or at least one second time intervals.

(3) Since altimeter data were collected in various parts of the world other than our specific test sites and because future NASA satellite altimetry missions such as GEOS-C and SEASAT would derive significant benefits if our current investigation were extended to include analysis of the Skylab worldwide altimeter data, we recommend that the necessary steps be taken for the contractual arrangement to give us these data for analysis and evaluation.

(4) The sensor performance review meeting on May 13, 1974, at NASA/Wallops brought to our attention the existence of a more recent "Sensor Performance Report on S193 Altimeter" (MSC-05528) which is to be released at some future date. The concensus of opinion is that it will not be of very much use to us and the other PI's by that projected time frame. We therefore request the preliminary version of that report which is currently available but has not been released.

#### NEXT PERIOD AND SUMMARY OUTLOOK

In view of the current contract situation, we plan a low effort work to develop a computer program for direct graphical plotting of the output of our numerical analysis.

#### TRAVEL

On May 13, 1974, a meeting to discuss "Status Review on S-193 Sensor Performance" was held at NASA/Wallops. Mr. George T. Ruck and Dr. D. M. Fubara represented Mr. A. G. Mourad, the Principal Investigator, at that meeting.

APPENDIX A

REPORTS AND DATA RECEIVED

<u>Title</u>		<u>Identification Number</u>	<u>No. of Copies</u>
(1) PRELIMINARY SKYLAB EREP INVESTIGATION DATA ACCOMPLISHMENT SUMMARY REPORT	March, 1974		1
(2) SKYLAB IV/EREP DATA BOOKS EPN#440			1
<u>DDC Accession No.</u>	<u>Processed from Microfilm Roll No.</u>	<u>DPAR No.</u>	
34-25119	34-17318	S193B-71-1-97-72-2	
(3) SKYLAB IV/EREP DIGITAL MAGNETIC TAPES			4
34-02533	700425	S193-69-11-85-Skybet	
34-02534	700424	S193-071-02-97-Skybet	
SKYLAB II/EREP DIGITAL MAGNETIC TAPES			
32-12240	700428	S193-070-09-9-Skybet	
32-12241	700430	S193-069-09-7-Skybet	
(4) SKYLAB II/EREP DIGITAL MAGNETIC TAPE			2
32-12242	700431	S193B-069-08-6-Skybet	
34-02537	700429	S193B-069-10-54-Skybet	
(5) SKYLAB II/EREP DIGITAL MAGNETIC TAPE			1
32-12243	700429	S193B-70-08-4-Skybet R1	
(6) SKYLAB IV/EREP STRIPCHARTS (One copy each)			
34-04650	1	S193B-069-07-85-74-1	
34-04651	2	S193B-069-07-85-74-1	
34-04652	3	S193B-069-07-85-74-1	