

Digitization and Reformating of Scanner
Data Taken on July 30, 1968

T. L. Phillips
W. R. Simmons

Data was taken by the Michigan^{*} scanner system over two flight lines in Tippecanoe County (\approx 45 miles of flight line) on July 30, 1968. This information note reports on the digitization and reformating of the visible data taken during the mission. A summary is shown in Table 1.

A test analog tape was received at 12:00 noon on July 30, 1968 so that minor modifications in the LARS system could be made to accommodate changes in the format of the analog tape. The major changes in format are: (1) the visible scanner data consisted of 10 instead of the usual 12 channels of data, (2) only one light source was inside the scanner instead of the usual two, (3) the width of the light source was decreased, (4) a narrow sun sensor signal was added to each scan line, and (5) the position of these two calibration sources was not the same as before.

The test tape was digitized using two dummy (0-volts) channels to replace the missing channels. The resultant bulk tape was reformatted and a pictorial printout of the Data Storage Tape was obtained by 2:00 p.m., July 30, 1968. An analysis of the

*The airborne optical/infrared scanning equipments used in this research were made available by the U. S. Army Electronics Command (USAECOM), Fort Monmouth, New Jersey, on a no-cost basis to the University of Michigan (who collected the data) for use on contracts administered by USAECOM.

Data Storage Tape showed: (1) the data samples and "O" calibration samples were an accurate representation of the data on the analog tape and were useful for the data analysis techniques, and (2) the light source and sun sensor ("C1" and "C2" on the tape) were incorrectly located and thus incorrect measurements of these calibration sources appeared on the tape. Changes were made to the reformatting program to correct condition 2 and final checks were performed by 5:00 p.m., July 31, 1968.

At 10:30 p.m., July 31, 1968, the duplicate analog tapes arrived and set-up of the data conversion system began. Digitization of flight line 21 was started at 11:35 p.m. after a short test Bulk Tape was written. During the digitization of flight line 21, the reformatting program was tested using the short test Bulk Tape. The test indicated that there were skew errors on the duplicate analog tapes, and the program was adjusted to give the lowest average variance for "C1" and "C2" in all 12 channels.

The skew errors were illustrated in the computer printouts showing graphs of lines of data from different channels. For the original analog tape, the skew errors do not exist but they appear in the data digitized from the duplicate analog tapes.

The format of the digitization of flight line 21 (runs 26800020 and 26800021) and flight line 25 (runs 26800030 and 26800031) was similar to past digitizations except that the gains for channels 1, 3, and 5 through 12 were set to 7. Channels 2 and 4 had the same input as channel 9 and 11 except that the gains were set to 14.

The digitization and reformatting of flight line 21 was completed at 3:00 a.m., and the digitization of flight line 25

was completed at 3:20 a.m., August 1, 1968. Flight line 35 was digitized at 4:00 a.m. and the reformatting of flight line 25 was finished at 4:30 a.m.; then the pictorial outputs were begun. The pictorial printouts were finished at 5:30 a.m. for flight lines 21 and 25, and graphs of "C1" and "C2" from both flight lines were completed at 6:00 a.m. A selected portion of flight line 21 containing the area C was copied onto another tape at 6:30 a.m., August 1, 1968. This completed the data handling portion of the work.

The resultant Data Storage Tapes are judged to contain the best quality data in all respects (except as noted below) that IARS has had the opportunity to analyze. The exceptions to this are: (1) the overall illumination of the flight lines varied during the data taking, (2) the skew on the duplicate analog tape was as great as 2 samples (.002 inches), and (3) the measurement of "C1" was slightly incorrect and of "C2" was greatly incorrect. The measurement of "C2" does show the variable illumination, however. There is high correlation between the relative brightness of an area and the relative brightness of the sun sensor, averaged over several lines.

Table I Data Handling Summary
for Data Taken July 30, 1968

<u>Date</u>	<u>Time</u>	<u>Comments</u>
7/30/68	Noon	Started checking system using test analog tape.
7/30/68	2:00 p.m.	First printout of test data.
7/31/68	5:00 p.m.	Finished making necessary changes in reformatting program and testing system.
7/31/68	10:30 p.m.	Data tapes arrived, started set-up of data conversion system.
7/31/68	11:35 p.m.	Started digitizing flight line 21.
8/1/68	12:01 a.m.	Found skew errors on duplicate analog tape and adjusted program to "best" compensate for it.
8/1/68	3:00 a.m.	Finished digitizing and reformatting flight line 22.
8/1/68	3:20 a.m.	Finished digitizing flight line 25.
8/1/68	4:00 a.m.	Finished digitizing flight line 35.
8/1/68	4:30 a.m.	Finished reformatting flight line 25.
8/1/68	5:30 a.m.	Finished pictorial printouts for flight lines 21 and 25.
8/1/68	6:00 a.m.	Finished graphing calibration columns.
8/1/68	6:30 a.m.	Copied portion of flight line 21 onto another tape.