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CASPAN
Engineers and Constructors
Houston, Texas



Final Report
to
Johnson Spacecraft Center

NAS 9-14702

CASPAN CORPORATION
Engineers and Constructors
Houston, Texas

TABLE OF CONTENTS

| <u>Section</u> | Title | Page |
|----------------|---------------------------------|------|
| 1.0 | Background | 1-1 |
| 2.0 | Accomplishments | 2-1 |
| 3.0 | Problems | 3-1 |
| 4.0 | Recommendations and Conclusions | 4-1 |

LIST OF FIGURES

| Figure No. | Title | Page |
|------------|--|------|
| 2.1 | Mission Statistical Data | 2-2 |
| 2.2 | Status of Cataloging and Indexing of Ames Aircraft Flight | 2-6 |
| 2.2 | Status of Cataloging and Indexing Aircraft Missions | 2-6 |
| 2.3 | Status of Cataloging and Indexing of Ames Aircraft Flights Map. | 2-7 |
| 2.4 | Status of Cataloging and Indexing of Aircraft Missions Map | 2-8 |
| 2.5 | Earth Observation Helicopter Flight Reports Data | 2-10 |
| 2.6 | Apollo 9 High Altitude Under- flights Status | 2-11 |

BACKGROUND

1.0

Caspan Corporation was awarded a contract to convert pertinent information contained in LACIE reference documents into computer load sheets for key-punch. NASA was to assume responsibility for training Caspan personnel to perform the task.

The statement of work also called for Caspan to index imagery selected from Earth Resources Survey Program sources. The remote sensor imagery data provided by NASA was to be screened, indexed and evaluated to determine specific area coverage. All coverage plots were prepared and submitted in final draft form for approval by the JSC Technical Monitor, who utilize the JSC reproduction facilities to accomplish the final printing report.

Caspan continued the task of preparing LACIE documents for Data Base Entry with the awarding of NASA NAS 9-14702. Altogether six different tasks were assigned by NASA throughout the duration of the contract.

They were the preparation of:

1. LACIE documents for Data Base Entry.
2. Earth Observations Aircraft Flight Summary Reports for publication.
3. Updating the Index Coverage Map of Ames Aircraft Flights and the Aircraft Mission Coverage Map.
4. Earth Observations Helicopter Flight Reports for publication.
5. Flight Summary Reports for Apollo 9 High Altitude Underflights for publication.
6. Indexing of LANDSAT Imagery.

The primary task was preparation of LACIE documents for Data Base Entry. The task was to continue until the backlog of documents were completed. The prepared documents and key-punch transmittal sheets were to be delivered on a weekly basis. Specific procedures set by NASA during the contract were to be used in the continued preparation of the LACIE documents.

The second task assigned was the preparation of Earth Observations Aircraft Flight Summary Reports for publication. The reports were to be prepared as the data was released by NASA. The procedures for preparing these reports was initiated by Caspan utilizing basic methods used in Cataloging and Indexing of previous Earth Observation Aircraft Missions. The major change was the use of computer printouts to plot the areas flown rather than the actual film.

The third task was the Updating the Index Coverage Map of Ames Aircraft Flights and the Aircraft Mission Coverage Map. The updating was to be done as the Flight Summary Reports were completed and as the Ames data was supplied. The existing procedures were to be used in the updating with little or no variation.

The fourth task assigned to Caspan was to prepare twenty Earth Observations Helicopter Flight Reports for publications. The data necessary for the publication of the reports was to be furnished by NASA and delivered to Caspan as soon as it was available. Upon delivery of the data the reports were to be prepared and returned to NASA. The format and procedures were originated by Caspan using the data made available by NASA.

The fifth task assigned was the preparation of seven Flight Summary Reports

for Apollo 9 High Altitude Underflights for publication. The data and film was to be furnished by NASA and was to be completed within one month. The procedures used were similiar to the ones used in preparing preceding flight summaries. The only variation was the use of film for the plotting of the areas flown.

The sixth and last task assigned was the Indexing of LANDSAT Imagery. The images and necessary materials were to be furnished by NASA. Caspan was to prepare and deliver the images and index cards to NASA weekly. The existing NASA procedures were to be used with minor variations. The major change from previous procedures was to be the modification of the Ground Track Number System. This modification was to come at a future date. In connection with the same task a listing of segment numbers of the U.S. with their corresponding ground track numbers was to be prepared.

ACCOMPLISHMENTS

2.0

Caspan prepared a total of one thousand five hundred and twenty-six LACIE documents for Data Base Entry between July 1, 1975 and March 2, 1976. Each document required an average of 1.3 manhours averaging an output of 169 documents per month. This activity consisted of deriving key word from the abstracts and inputting the author, co-author, title, contract number and subject.

Caspan prepared for publication thirty Earth Observations Aircraft Flight Summary Reports between October 29, 1975 and February 18, 1976. These thirty missions averaged 70.16 manhours per report. The smallest being mission 294 with 14 manhours. All manhours are reflected in Figure 2.1. The Flight Summary Report consists of 5 sections: (1) General Statement, (2) Index Map, (3) Sensor Data Listing, (4) Flight Line Maps, and (5) a listing of Rolls not Catalogued and Indexed.

Preparation of the Status of Cataloging and Indexing of Ames Aircraft Flight was continued through out the contract. A total of 730.3 manhours were spent in preparation of these maps. Prepared were maps covering flights 72-123 through 75-201. These flights were placed on three maps due to the numerous amount of flights that were to be represented. The placement and manhours of the flights are indicated on figure 2.2. An example is shown in figure 2.3.

Prepared in a similiar fashion to the previous Index Map was the Status of Cataloging and Indexing of Aircraft Mission Maps. A total 550.9 manhours were spent in preparation of these maps. The maps covered missions 276 through 330. Manhour breakout per index is shown in figure 2.2. An example is shown in figure 2.4.

MISSION STATISTICAL DATA

| | Mission Number | Rec'd by CASPAN | Manhours Per Mission | Date Forwarded To NASA | Current Status |
|----|----------------|-------------------|----------------------|------------------------|----------------|
| 1 | 279 | October 29, 1975 | 57.75 | November 26, 1975 | Published |
| 2 | 280 | October 31, 1975 | 175.50 | December 9, 1975 | Published |
| 3 | 282 | - | - | - | Canceled |
| 4 | 283 | November 6, 1975 | 274.65 | November 20, 1975 | Published |
| 5 | 284 | November 12, 1975 | 80.13 | December 12, 1975 | Published |
| 6 | 285 | October 30, 1975 | | December 4, 1975 | Published |
| 7 | 286 | - | - | - | Canceled |
| 8 | 287 | December 2, 1975 | 72 | December 18, 1975 | Published |
| 9 | 288 | December 1, 1975 | 24.5 | December 10, 1975 | Published |
| 10 | 289 | December 2, 1975 | 20 | December 4, 1975 | Published |
| 11 | 290 | December 17, 1975 | 67.25 | December 18, 1975 | Published |
| 12 | 291 | December 8, 1975 | 19 | December 12, 1975 | Published |
| 13 | 292 | - | - | - | |
| 14 | 293 | December 19, 1975 | 22 | December 24, 1975 | Published |
| 15 | 294 | December 16, 1975 | 14 | December 24, 1975 | Published |
| 16 | 295 | December 9, 1975 | 115.75 | December 24, 1975 | Published |

Figure 2.1

MISSION STATISTICAL DATA

| | Mission Number | Rec'd by CASPAN | Manhours Per Mission | Date Forwarded To NASA | Current Status |
|----|----------------|-------------------|----------------------|------------------------|----------------|
| 17 | 296 | - | - | - | Canceled |
| 18 | 297 | - | - | - | Canceled |
| 19 | 298 | - | - | - | Canceled |
| 20 | 299 | - | - | - | Canceled |
| 21 | 300 | December 9, 1975 | 51 | December 24, 1975 | Published |
| 22 | 301 | - | - | - | Canceled |
| 23 | 302 | - | - | - | Canceled |
| 24 | 303 | December 22, 1975 | 22 | January 5, 1976 | Published |
| 25 | 304 | - | - | - | Canceled |
| 26 | 305 | December 23, 1975 | 110 | January 15, 1976 | Published |
| 27 | 306 | January 2, 1976 | 115.8 | January 9, 1976 | Published |
| 28 | 307 | - | - | - | Canceled |
| 29 | 308 | January 12, 1976 | 135.5 | February 18, 1976 | Published |
| 30 | 309 | January 13, 1976 | 45 | January 22, 1976 | Published |
| 31 | 310 | November 3, 1975 | 57 | January 29, 1976 | Published |

Figure 2-1 continued

MISSION STATISTICAL DATA

| | Mission Number | Rec'd by CASPAN | Manhours Per Mission | Date Forwarded To NASA | Current Status |
|----|----------------|-------------------|----------------------|------------------------|-------------------|
| 32 | 311 | January 5, 1976 | 109.9 | January 22, 1976 | Published |
| 33 | 312 | November 14, 1975 | 72 | February 10, 1976 | Published |
| 34 | 313 | - | - | - | Canceled |
| 35 | 314 | - | - | - | Canceled |
| 36 | 315 | January 19, 1976 | 29 | January 29, 1976 | Published |
| 37 | 316 | January 19, 1976 | 55 | January 29, 1976 | Published |
| 38 | 317 | January 21, 1976 | 75 | January 29, 1976 | Published |
| 39 | 318 | January 21, 1976 | 71 | February 5, 1976 | Published |
| 40 | 319 | - | - | - | Mission Not Flown |
| 41 | 320 | - | - | - | Mission Not Flown |
| 42 | 321 | - | - | - | Mission Not Flown |
| 43 | 322 | - | - | - | Mission Not Flown |
| 44 | 323 | - | - | - | Mission Not Flown |
| 45 | 324 | January 29, 1976 | 19 | February 5, 1976 | Published |
| 46 | 325 | February 6, 1976 | 72 | February 18, 1976 | Published |
| 47 | 326 | - | - | - | Mission Not Flown |

Figure 2.1 continued

MISSION STATISTICAL DATA

| | Mission Number | Rec'd by CASPAN | Manhours Per Mission | Date Forwarded TO NASA | Current Status |
|----|----------------|------------------|----------------------|------------------------|-------------------|
| 48 | 327 | - | - | - | Mission Not Flown |
| 49 | 328 | - | - | - | Mission Not Flown |
| 50 | 329 | - | - | - | Mission Not Flown |
| 51 | 330 | January 30, 1976 | 54 | February 5, 1976 | Published |

STATUS OF CATALOGING AND INDEXING OF AMES AIRCRAFT FLIGHT

| <u>Map</u> | <u>Starting Date</u> | <u>Completion Date</u> | <u>Manhours</u> | <u>Current Status</u> |
|--|----------------------|------------------------|-----------------|-----------------------|
| 1. 72-123 thru 207 | July 7, 1975 | July 25, 1975 | 232.3 | Published |
| *2. 72-0001 thru 74-197 & 75-0002 thru 75-101 | August 1, 1975 | August 31, 1975 | 176.5 | Published |
| 3. 75-102 thru 75-201 | January 19, 1976 | March 1, 1976 | 322.5 | Published |

* Combined on one index.

STATUS OF CATALOGING AND INDEXING OF AIRCRAFT MISSIONS

| <u>Map</u> | <u>Starting Date</u> | <u>Completion Date</u> | <u>Manhours</u> | <u>Current Status</u> |
|-----------------|----------------------|------------------------|-----------------|-----------------------|
| 1. 276 thru 300 | - | July 8, 1975 | 389.9 | Published |
| 2. 301 thru 330 | August 25, 1975 | March 1, 1976 | 161 | Published |

Figure 2-2

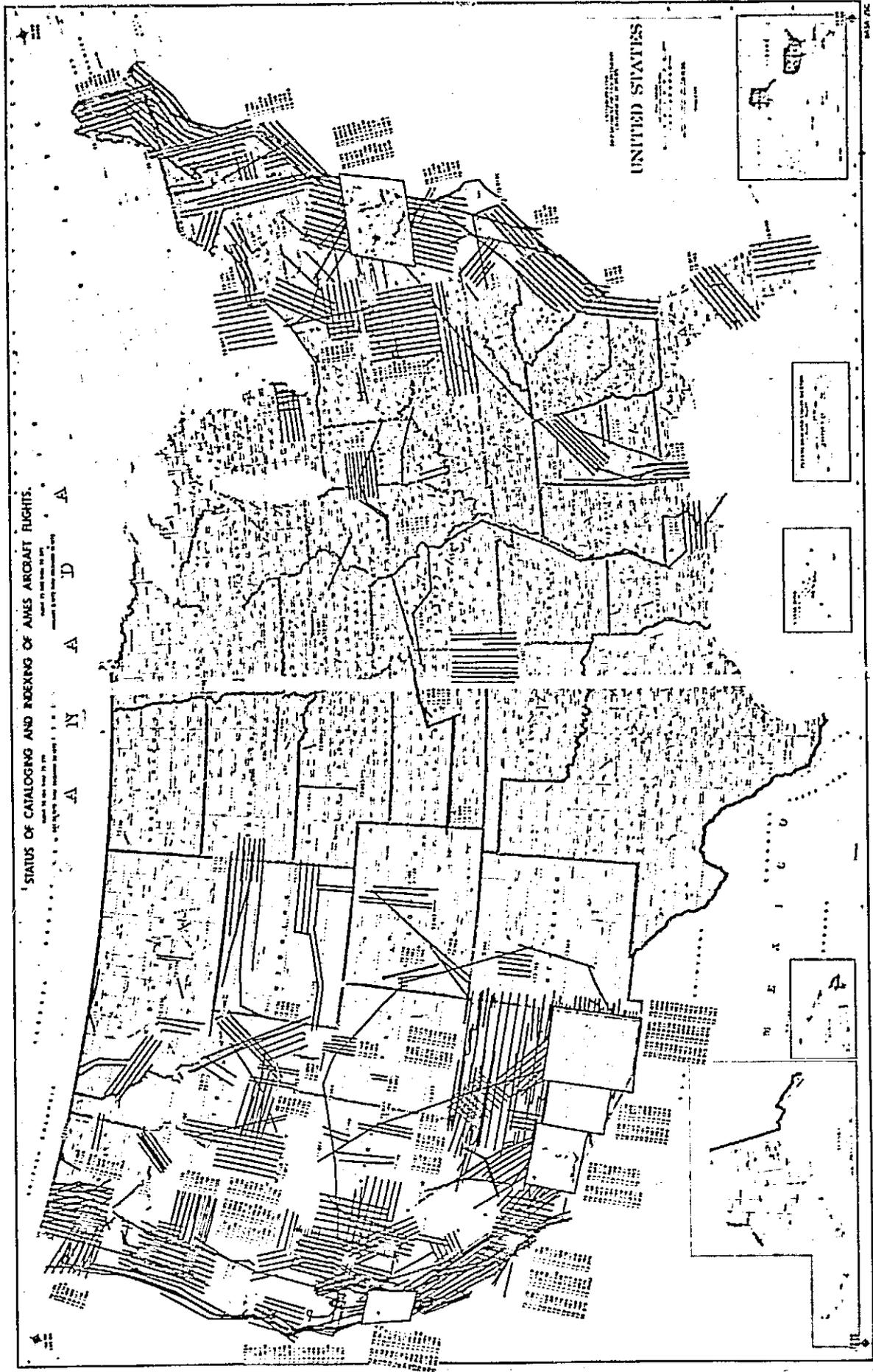


Figure 2-3

Caspan prepared for publication eleven Earth Observation Helicopter Flight Reports between September 26, 1975 and June 30, 1976. A total of 839 manhours were spent in preparation of these flights. The task had originally called for preparation of twenty flight reports, but due to the delay in receiving the data from NASA, insufficient time was allow for preparation of all flights before the end of the contract. The status of each report up to the ending date of the contract are listed in figure 2.5. The Flight Reports consisted of (1) Project description, (2) General Statement, (3) Instrument Logs, (4) Flight Maps, (5) Process data, (6) Sight Location Map, (7) Flight Line Map and (8) Map Legend.

Seven Apollo 9 High Altitude Flight Summary Underflight Reports were prepared between March 3, 1976 and March 25, 1976. A total of 693 manhours were spent in preparation of the reports. Vinten film was used to plot the areas flown. A listing of the reports prepared is shown on figure 2.6. They consist of: (1) General Statement, (2) Index Coverage Map, (3) Mission Sensor Data and (4) Flight Line Map Site.

Eight thousand and eighty-six LANDSAT images were indexed between March 15, 1976 and June 30, 1976 by Caspan, a total of 839.9 manhours were spent in preparation of these images. This activity consisted of preparing an index card for each image to be indexed, a master index card for each ground track number, placing a lable in the upper left hand conner of each image containing the pertinent information from the index card and cutting the LANDSAT images to size. Approximately three weeks after the begining of the task, a new Ground Track Number System was put into use. One thousand three hundred and twenty-one of the previously prepared cards were covered to the new System.

EARTH OBSERVATION HELICOPTER FLIGHT REPORTS DATA

| | <u>Report</u> | <u>Starting Date</u> | <u>Completion Date</u> | <u>Current Status</u> |
|----|----------------|----------------------|------------------------|--|
| 1 | Mission 294-1 | October 22, 1975 | October 31, 1975 | Published |
| 2 | Mission 294-2 | October 16, 1975 | October 24, 1975 | Published |
| 3 | Mission 294-3 | October 2, 1975 | October 8, 1975 | Published |
| 4 | Mission 294-4 | - | - | Bad flight/cloud cover. Not Published |
| 5 | Mission 294-5 | September 26, 1975 | October 1, 1975 | Published |
| 6 | Mission 294-6 | October 2, 1975 | October 8, 1975 | Published |
| 7 | Mission 294-7 | October 9, 1975 | October 14, 1975 | Published |
| 8 | Mission 294-8 | June 28, 1976 | June 30, 1976 | Published |
| 9 | Mission 294-9 | October 2, 1975 | October 8, 1975 | Published |
| 10 | Mission 294-10 | October 8, 1975 | October 14, 1975 | Published |
| 11 | Mission 294-11 | June 28, 1976 | June 30, 1976 | Published |
| 12 | Mission 294-12 | October 12, 1975 | October 21, 1975 | Published |

APOLLO 9 HIGH ALTITUDE UNDERFLIGHTS STATUS

| <u>Mission</u> | <u>Starting Date</u> | <u>Date Forward To Nasa</u> | <u>Current Status</u> |
|----------------|----------------------|-----------------------------|--|
| 1 | March 3, 1976 | March 25, 1976 | Prepared with the exception of flight 1. Film not available. |
| 2 | March 12, 1976 | March 19, 1976 | Published |
| 3 | March 16, 1976 | March 19, 1976 | Published |
| 4 | March 17, 1976 | March 25, 1976 | Published |
| 5 | March 18, 1976 | March 25, 1976 | Published |
| 6 | - | - | No data taken |
| 7 | March 3, 1976 | March 12, 1976 | Published |
| 8 | March 11, 1976 | March 19, 1976 | Published |

Figure 2-6

PROBLEMS

3.0

Problems that arose during the performance of the tasks were of a delaying nature. Delays in receiving data during most tasks from NASA did not allow for a smooth work flow.

The delays in preparing the Flight Summary Report were caused by problems in locating and obtaining complete Flight Parameter Logs, Photographic Logs and computer print out sheets. This added several days of production time, to the Earth Observations Aircraft Flight Summary Reports.

The delay in the processing of Helicopter flight data for the Earth Observations Helicopter Flight Reports by NASA caused a completed stop in production from October 24, 1976 to June 22, 1976. As a result only eleven of the assigned twenty were completed before the end of contract.

The delays in preparation of Apollo 9 High Altitude Underflight Flight Summary Reports were caused by having Caspan pull all Apollo 9 High Altitude Underflight film, the unavailability of film, and the absence of labels on cans of film this caused several days of additional research and delay in production of the flight summary reports.

CONCLUSIONS AND RECOMMENDATIONS

4.0

Methods and procedures used on all six assigned tasks were satisfactory and continued use of these methods is recommended for future preparation of these types of tasks.

We do recommend that in order to maintain a smooth flow of work that all data and material necessary for the preparation of a task be assembled and be readily available at the beginning of a task.

Addendum
to
Final Report
NAS 9-14702

CASPAN CORPORATION
Engineers and Constructors
Houston, Texas

BACKGROUND

A 1.0

This addendum covers extension of NAS 9-14702 during the period of July 1, 1976 thru August 31, 1976.

ACCOMPLISHMENTS

A 2.0

Eight hundred and eighty four LANDSAT images were indexed between July, 7 1976 and August 31, 1976 by Caspan, a total of 227.4 manhours were spent in preparation of these images. This activity consisted of preparing an index card for each image to be indexed, a master index card for each ground track number, placing a label in the upper left hand corner of each image containing the pertinent information from the index card and cutting the LANDSAT images to size. In connection with this task a cross indexing list of segment numbers versus the corresponding foot print numbers and a listing of foot print numbers versus the corresponding segment numbers of Canada was prepared.

Caspan prepared for publication six Earth Observation Helicopter Flight Reports between July 7, 1976 and July 22, 1976. This completed Mission 294 (flights 1 thru 20). The status of each report is listed in figure A 2-1. The Flight Reports consisted of (1) Project description, (2) General Statement, (3) Instrument Logs, (4) Flight Maps, (5) Process Data, (6) Sight Location Map, (7) Flight Line Map and (8) Map Legend

Caspan prepared for publication two Earth Observations Aircraft Flight Summary Reports (MX 334 and 338). Mission 334 was begun on July 27, 1976 and was completed and forwarded to NASA on July 31, 1976. This mission totaled 96 manhours. Mission 338 was begun on August 18, 1976 and was completed

EARTH OBSERVATION HELICOPTER FLIGHT REPORT DATA

| Report | Starting Date | Completion Date | Current Status |
|-------------------|---------------|-----------------|----------------|
| 1. Mission 294-15 | July 7, 1976 | July 13, 1976 | Published |
| 2. Mission 294-16 | July 12, 1976 | July 13, 1976 | Published |
| 3. Mission 294-17 | July 13, 1976 | July 15, 1976 | Published |
| 4. Mission 294-18 | July 18, 1976 | July 20, 1976 | Published |
| 5. Mission 294-19 | July 18, 1976 | July 20, 1976 | Published |
| 6. Mission 294-20 | July 20, 1976 | July 22, 1976 | Published |

and forwarded to NASA on August 24, 1976. The mission totaled 90 manhours. The two missions averaged 93 manhours per report. The Flight Summary Report consists of 5 sections; (1) General Statement, (2) Index Map, (3) Sensor Data Listing, (4) Flight Line Maps, and (5) a listing of Rolls not Catalogued and Indexed.

Preparation of the Status of Cataloging and Indexing of Ames Aircraft Flight Map covering (flights 75-202 thru current) and the Earth Resources Map (MX 331 thru current) were begun on August 11, 1976 and continued through August 31, 1976. Twenty-one manhours were spent in preparation of the Ames Index Map and 10 manhours on the Earth Resources Map during this time.

The preparation for key punch transmittal sheets for Plotting and Indexing of Computer Tape Data for Full Frame Imagery began on August 5, 1976. The key punch transmittal sheets format consisted of: (1) Scene Identification, (2) Foot Print, (3) Coordinates, (4) Accession Date, (5) Tape, (6) Data Received, (7) GSFC Number, and (8) Project. The format was conceived by Caspan using data provided by NASA.

PROBLEMS

A 3.0

No major problems occurred during this period.

CONCLUSION AND RECOMENDATION

A 4.0

Conclusions and Recommendations stated on page 4-1 of the Final Report to Johnson Spacecraft Center apply to this addendum.