ATS USERS' MANUAL

Space Science and Engineering Center

The University of Wisconsin

June, 1968

USERS' MANUAL TABLE OF CONTENTS

FOREWORD

This ATS Users' Manual and associated Data Catalog were prepared at the University of Wisconsin by the ATS Program of the Space Science and Engineering Center. They provide a variety of information about the ATS satellite meteorology experiments and the data obtained from them.

Some of the information in these documents is also contained in the Users' Manual and Catalog released by NASA. In addition to this, many of the sections discuss procedures, techniques, and types of data that are of special interest to members of the Wisconsin ATS Program and other interested parties.

Requests for copies of these documents should be made through the ATS Program, Space Science and Engineering Center, University of Wisconsin. Additions and corrections to the first issue will be made as required.

Many members of the ATS Program contributed to the preparation of these documents. The efforts of Dr. S. Cox, Mr. E. Smith, Miss S. Svec, and Miss B. Erwin deserve special acknowledgement. Professor V. E. Suomi, principal investigator, and Professor R. J. Parent of the University of Wisconsin are responsible for the overall ATS spin scan camera experiments.

Tom Vonder Haar
ATS Program Manager

PURPOSE

The purpose of the Users' Manual and Catalog is to encourage and facilitate the scientific use of the ATS data.

V. E. Suomi

SECTION I - GENERAL INFORMATION

The ATS spin scan camera is basically a photomultiplier mounted behind a cassegrain telescope. The camera depends on the spin of a spin-stabilized satellite for the lateral sweep across a feature to be photographed (i.e., the earth). The advance in the vertical direction is accomplished by increments. The spin rate of the satellite is approximately 100 revolutions per minute so one, two thousand scan line picture can be taken in 20 minutes.

The Applications Technology Satellites carrying these cameras are at geosynchronous altitude, one over the Pacific at about 151°W longitude and the other viewing the Atlantic from 60°W longitude. Since the satellites are only 19,362 n.m. high, they do not see 180° of longitude but only about 163°. ATS-I, over the Pacific, nominally sees the latitude region between 52°N and 52°S while ATS-III sees the entire earth from pole to pole. Figures I.1 and I.2 show the approximate areas viewed by ATS-I and ATS-III respectively.

At the equator the cameras have a resolution of approximately 2 nautical miles. The scan lines are approximately 2.5 n.m. center to center and the continuous east-west scan is digitized at a rate equivalent to a distance of every 0.7 n.m. near the subpoint.

ATS-I was launched December 1966, and ATS-III was placed into orbit in November 1967. ATS-I, stationed over the Pacific, is a one-color, or black and white, camera. Actually its spectral sensitivity peaks near 5300A and includes very little red light and almost no blue light at all. ATS-III,

ALT 35815KM 19325 N MILES
SUB POINT 0.00N 150.00W

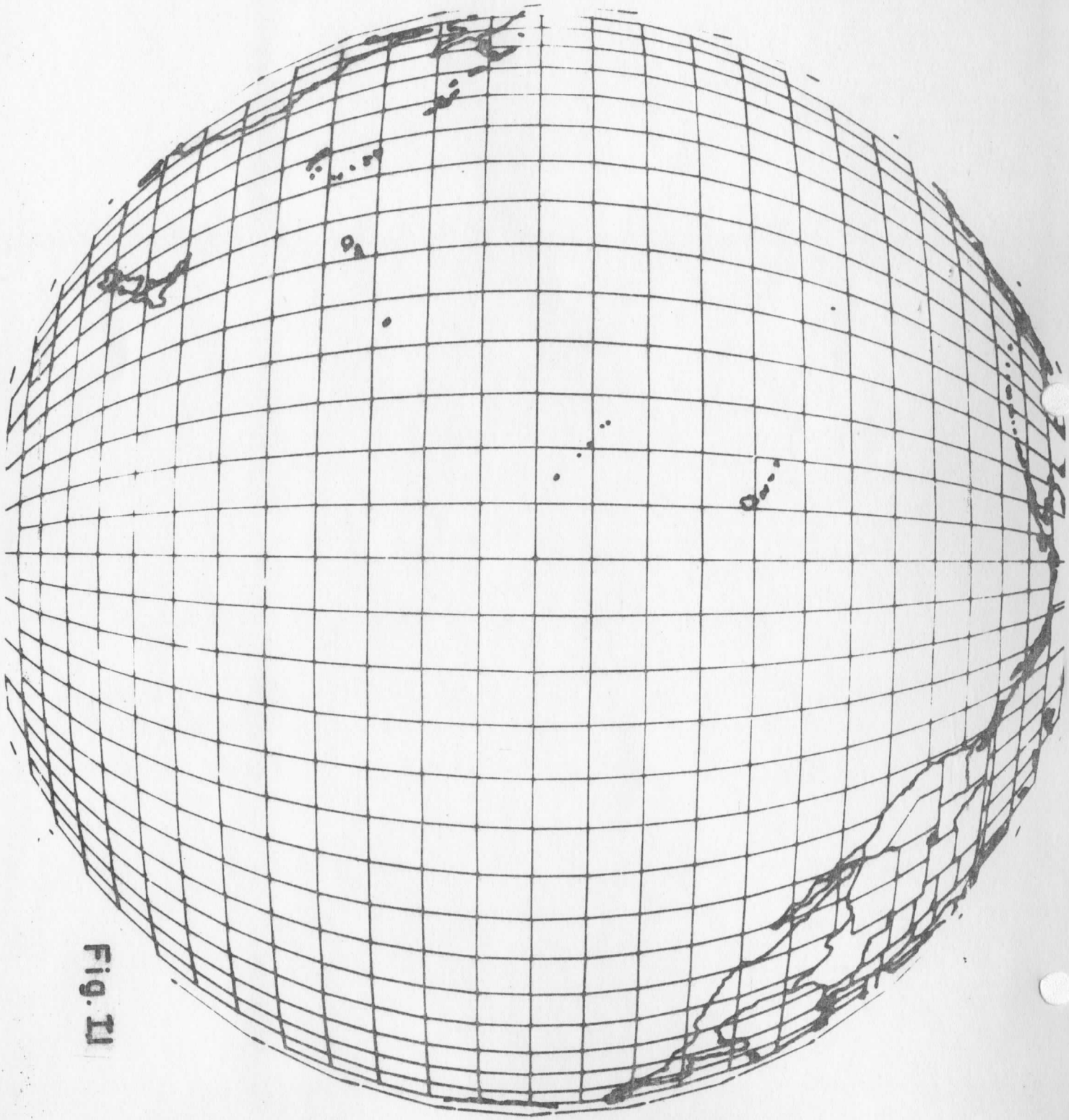
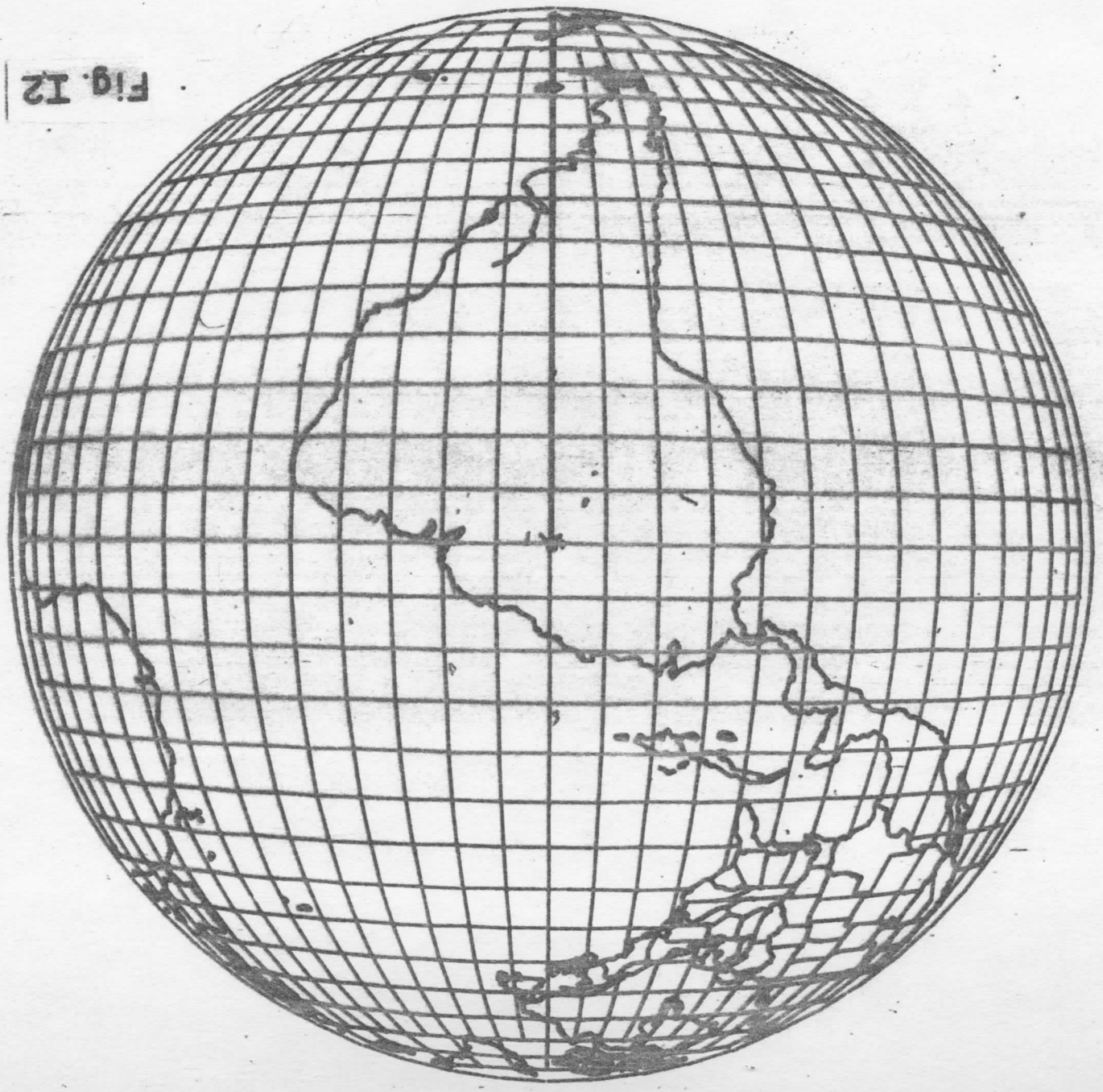


Fig. 11

Fig. 12



ORB / ORB CAN	DATE	TIME-GMT	MIN.AAN	NADIR	PRIN. POINT	SUB. PT	ARROW	PITCH	ROLL	HGT(KM)
2 1 2	111667	162400	204.00	0.00	0.00- 60.00	0.00- 60.00	0.00- 60.00	0.00	0.00	35815.

stationed over the Atlantic, has three separate color channels.* The blue channel sensitivity peaks near 4300A, the green channel near 5300A, and the red channel near 5700A. The voltage outputs of all the channels have a nominal range of 500 millivolts. In 8-bit digital form, the channels are capable of 256 brightness levels.

In the first year of operation of the ATS-I spin scan camera, thousands of pictures were taken. The frequency at which the photographs were taken varied from a few per day to 46 per day. In addition to photographing the earth, a calibration experiment was performed in which the moon was photographed.

Most of the photographs were made of as much of the earth as possible--for a 2000 scan-line photograph at 100 scans/minute, the maximum frequency of photographs is one per twenty minutes. However, one can interrupt the spin scan camera as it scan from north to south and reverse the vertical advance of the scan line. Then the maximum frequency at which you can observe a given area is twice the length of the area in scan lines, divided by the spin rate of 100 revolutions/minute. For example, if one were interested in the development of a cloud feature 25 nautical miles (10 scan lines at the equator) in breadth, one could make two photographs every 12 seconds.

While it is not the objective of this discussion to point out specific research projects, it would be pertinent to note a few projects which have been proposed: cloud heights from geometrical arguments in the terminator zone; cloud heights from brightness and color data; cumulus growth on a short time scale; surface winds from sea surface slope; winds from cloud displacements; detection of submerged islands and reefs; life cycle of a

*In January 1968 the ATS-III red channel became inoperable and data after this date have only the green and blue signals.

hurricane.

The ATS camera affords an extremely wide range of data in both temporal and spatial scales. The spatial scale of one's studies may range from 2 n.m., the camera resolution, to nearly an entire terrestrial hemisphere, the camera field of view. The time scale may vary from a few seconds to over one year, the age of the still-operable ATS-I camera. One may choose from an infinite number of combinations of the temporal and spatial scales.

ATS-III has added another dimension to the scientists' toolbox, that of color. A scientist may deal with colors independently, enhance or subdue a particular color in a combination, or algebraically treat the color digital data. Truly, the immense number of combinations of these three dimensions: space, time, and color available with ATS spin scan data, arms researchers with a powerful tool.

I.A TYPES OF ATS DATA

A general description of the different kinds of ATS data follows. See other sections of this Users' Manual for more details, and refer to the Data Catalog for a list of available data.

EIS Negatives and Hard Copy

A negative is made in real time at the tracking station each time the camera takes a 2000 scan line picture. These negatives are then copied and 8 x 10" hard copy prints are available from NASA. A library of these 8 x 10" prints is maintained at the University of Wisconsin. The EIS negatives and prints represent the fastest route of access to ATS data. See Figure I.3.

Analog Tape and Precision Display Negatives

An analog tape is recorded in real time at the satellite tracking station. This tape contains the video signal received at the ground and documentation containing information on the scan lines. This form of ATS

Fig. I3

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data has the largest information content of any form.

At the University of Wisconsin the analog tapes may be played back through a precision display system which generates a negative of much higher quality than the EIS negative. The video signal generated from the analog tape may also be examined for a scan line cross-section through a picture. This type of depiction would correspond to the highest data density available in any form. See Figure I.4.

Digital Data

Magnetic tapes with ATS digital data represent the most accessible quantitative form of ATS spin scan data. One ATS-I photograph containing 2000 scan lines with 8196 digital elements/scan line can be stored on one 2750' reel of 1½ mil magnetic tape at 800 bpi. An ATS-III photograph takes 3½ reels of 1½ mil magnetic tape. The vast amount of information recorded on these tapes limits their usefulness for studies of large areas, since high costs are encountered for computer time in gaining access to the data. Figure I.5 shows a character display map generated from the digital data.

I.B OTHER AVAILABLE DATA IN THE ATS LIBRARY

The University of Wisconsin ATS Library contains various other kinds of satellite and conventional meteorological data available for scientific use. They are:

1. Image Dissector Camera photographs from another experiment on ATS-III (from Jan. 1968).
2. A small number of ATS-III black-and-white digital blow-ups obtained by NASA during special tornado and hurricane watches.
3. ESSA III and V AVCS Global Mosaic Photographs (Dec. 1966 to present) in the following projections:
   a. Northern/Southern hemisphere polars
   b. Mercator (40°N to 30°S)
4. Monthly and 15-day photographic averages made from the ESSA and ATS pictures during 1967.

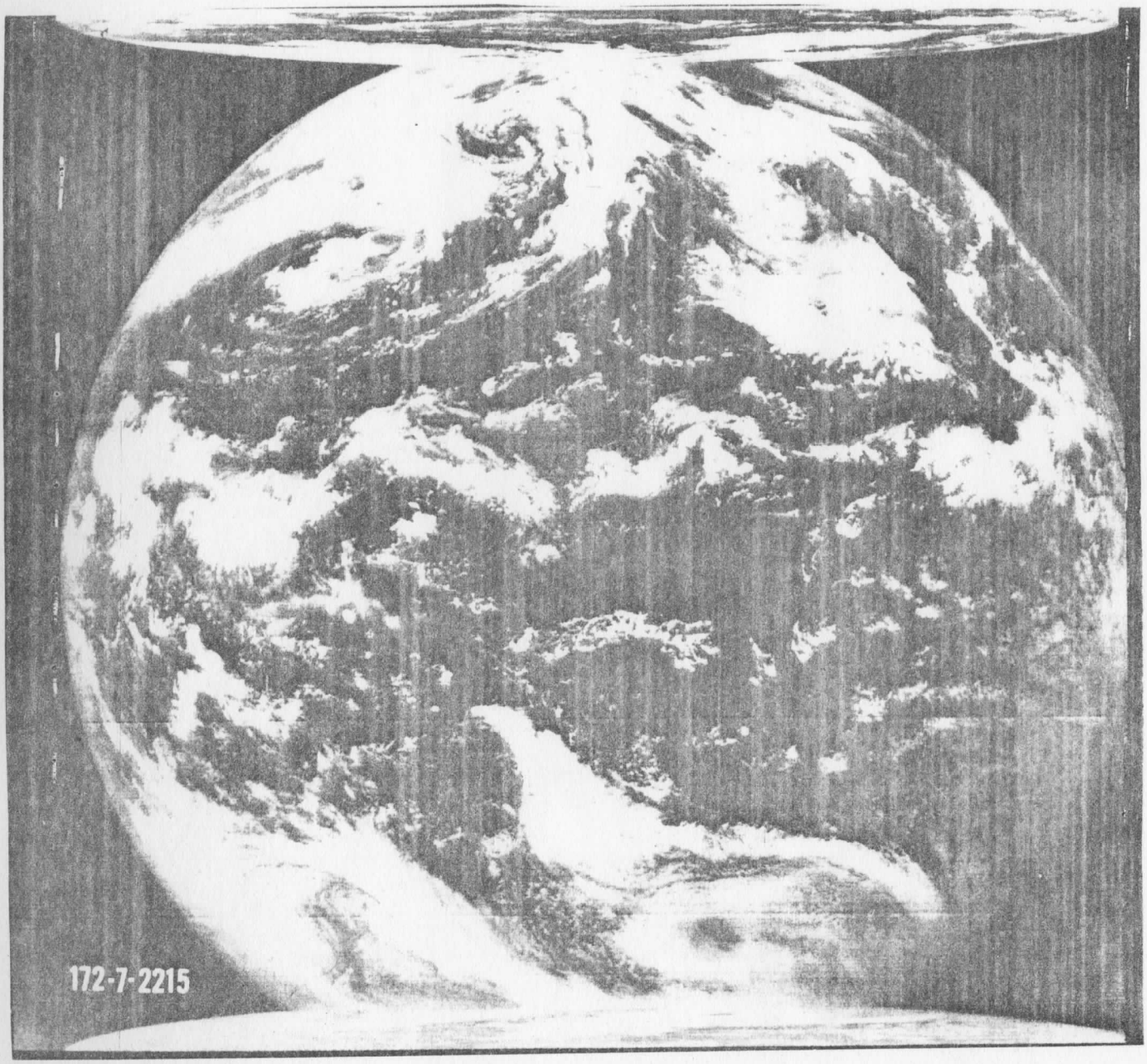

Fig. I.4

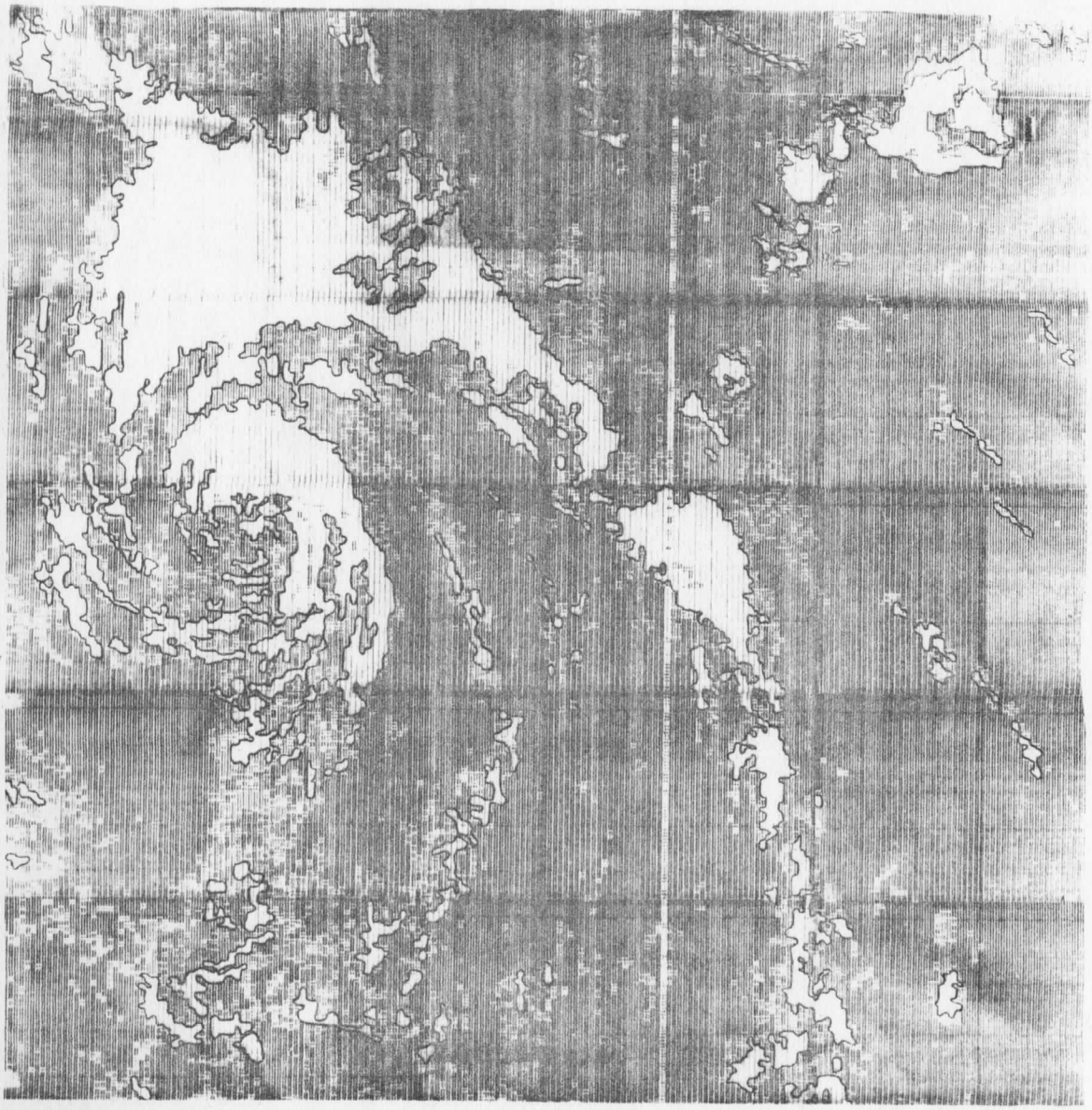

Fig. I5

5. Pacific Sector surface, 700mb, 500mb, and 250mb analyses at 00Z and 12Z (April 1967 to present).

6. U.S. Sector surface, 500mb, and 300mb analyses at 00Z and 12Z (and surface at 06Z and 18Z) (April 1967 to March 1968).

7. Selected data from the Line Islands Experiment (1967) and LIE data catalogs.

I.C REFERENCE MATERIAL IN THE ATS LIBRARY

Many kinds of reference material related to the ATS experiments are filed in the ATS library. They include:

1. (6) ATS Project Volumes, giving technical and engineering details about NASA's entire Applications Technology Satellite program.

2. Scientific papers and reports dealing with the use of ATS data for meteorological purposes, as well as other meteorological and technical papers.

3. Preprints from the book, Weather Motions from Space, Suomi and Hanson, editors. A preliminary list of scientific and technical papers to appear in the book is given on the following pages.

WEATHER MOTIONS FROM SPACE

1.	Suomi, V.	Historical Background of ATS-I
2.	Kornfield, J. and K. Hanson	On the Double Structure of Cloud Distribution in the Equatorial Pacific
3.	Charney, J.	Intertropical Convergence Zone and the Hadley Circulation of the Atmosphere
4.	Lettau, H.	Cromwell Current Heat Transfer
5.	Fujita, T., D. Bradbury, C. Murino, and L. Hull	A Study of Mesoscale Cloud Motions Computed from ATS-I and Terrestrial Photographs
6.	Hanson, K. and T. Vonder Haar	Cloud Motion and Other Parameters from ATS-I Digital Data
7.	Vonder Haar, T., K. Hanson, V. Suomi, and U. Shafrir	Phenomenology of Convective Ring Clouds in the Tropics Derived from Geosynchronous Satellite Observations
8.	Sekera, Z.	Atmospheric Glint
9.	Levanon, N.	Determination of the Sea Surface Slopes Distribution and Wind Velocity from Sun Glitter Viewed from a Synchronous Satellite
10.	Raschke, E. and W. Bandeen	Studies of Reflector Characteristics of the Planet Earth from a Synchronous Satellite--Preliminary Results
11.	Peekna, S., R. Parent, and T. Vonder Haar	Possibilities for Quantitative Radiance Measurements in the 450-650NM Region from the ATS-I Satellite
12.	Fritz, S., L. Hubert, and A. Timchalk	Relation Between Cloud Motions from ATS-I and Wind Direction
13.	Hasler, F., J. Kornfield, and L. Jensen	A Blink Measuring Technique for Quantitative Measurement of Cloud Motion from ATS-I Spin Scan Camera Pictures
14.	Hasler, F. and J. Kornfield	Display and Analysis of ATS-I Spin Scan Camera Pictures through Time-Lapse Movie Technique
15.	Bristor, C., M. Frankel, and E. Kendall	Cloud Motion and Growth from Digitized ATS-I Picture Pairs
16.	Hubert, L. and E. Ramey	Analysis of ATS-I Pictures by Photogrammetric Techniques

17.	Norman, T. and S. Venkateswaran	The Use of ATS Satellites for Ionospheric Studies
18.	Thomsen, R., R. Parent, and V. Suomi	ATS-I Spin Scan Camera
19.	Sunderlin, W. and J. Lahzun	Ground Display and Recording Equipment for the Spin Scan Camera System
20.	Holmes, D.	WEFAX--A Weather Data Communications Experiment
21.	Suomi, V. and R. Parent	Calibration Procedure
22.	Parent, R. and J. Sitzman	Analog Recording System
23.	Hanson, K. and V. Suomi	The Inspace, Absolute Calibration of ATS-I Cloud Camera
24.	Whitney, M., R. Doolittle, and B. Goddard	Processing and Display Experiments Using Digitized ATS-I Spin Scan Camera Data
25.	Lindstrom, J.	Processing, Archival and Documentation of the ATS-I Spin Scan Camera Photographic Data
26.	Hanson, K., T. Vonder Haar, and F. Nicholson	ATS-I Navigation
27.	Nicholson, F.	The Theoretical and Mathematical Justification for Navigation and Analysis from the ATS Satellites
28.	Smith, E. and T. Vonder Haar	Operational Display Techniques for ATS Digital Data Users
29.	Yonker, T.	The Line Islands Experiment and ATS-I Data Guide

I.D ABSOLUTE RADIOMETRIC MEASUREMENTS FROM THE ATS EXPERIMENTS

In addition to the normal photographic products (provided by the imaging capability of the ATS cameras) and the relative "brightness" values stored on analog and digital tape, it is possible to obtain absolute measurements of reflected solar radiance from areas viewed by the cameras. Such data can be used in quantitative radiometric research, in studies of atmospheric energetics, to evaluate the bi-directional reflectance characteristics of reflecting surfaces and for other purposes.

Important factors that must be considered before using absolute values are:

1. Pre-launch and inspace calibration of the spin scan camera experiments.
2. The spectral response characteristics of the various channels.
3. Satellite and ground station gain settings
4. Various other details, including field-of-view effects, atmospheric attenuation of reflected energy, etc.

Information about these questions is given in several papers to be published in Weather Motions from Space (U. of Wisconsin Press). Special reference should be made to:

Peekna, S., R. Parent, and T. Vonder Haar, "Possibilities for Quantitative Radiance Measurements in the 450-650 nm Region from the ATS-I Satellite."

Hanson, K. and V. Suomi, "The Inspace Absolute Calibration of ATS-I Cloud Camera."

I.E "NAVIGATION" OR GRIDDING OF ATS DATA

The "navigation" problem is simply defined as the procedure that allows one to accurately obtain the latitude and longitude of any measurement (or image) obtained from the ATS camera. When access to the ATS data can be referenced by scan line and digital element, the problem involves conversion from these parameters to latitude and longitude and vice versa.

For the nominal case of a perfectly oriented satellite, such a conversion is easily accomplished by a geometrical transformation. Unfortunately, small attitude errors are present in both ATS satellites which cause significant shifts of the viewed features from one picture to the next. There are three ways a data user may overcome these "navigation" problems:

1) Transparent overlay grids provided by NASA are available in the ATS Library. Use of these grids is based on landmark and crude horizon recognition. They suffice for approximate navigation. (See also a description of these grids in NASA's ATS-I Users' Manual.).

2) The user may work with a visual display of ATS data that contains two or more geographical landmarks and thus perform his own superpositioning of separate pictures.

3) Accurate "navigation" can be obtained by using a procedure and related programs that:
   a) derives satellite attitude information from a series of ATS pictures
   b) uses this information to adjust any picture to the nominal view
   c) converts measurements from this nominal case to their proper earth locations.

Information about this procedure, as well as a general description of the "navigation" problem is found in:

Hanson, K., T. Vonder Haar, and F. Nicholson, "ATS-I Navigation", in Weather Motions from Space.

Information about the programs available can be obtained from the programmers attached to the ATS Program.

I.F ORBITAL DATA

A simplified list of orbital parameters for the ATS satellites is included in this section. Additional information on the immediate post-launch parameters abd special attitude maneuvers can be found in NASA's ATS Users' Manuals.

Special ephemeris data provided by NASA on digital tape is also available at Wisconsin (see Figure I.6.). Formats of these tapes and decoding programs can be obtained from the ATS programmers.

ATS-B ORBITAL DATA

1967

Date	Longitude (Degs.)	Latitude (Degs.)
January, 1967		
1	151.10W	00.06N
2	151.05W	00.06N
3	151.00W	00.07N
4	150.94W	00.07N
5	150.88W	00.08N
6	150.82W	00.08N
7	150.76W	00.08N
8	150.69W	00.08N
9	150.62W	00.09N
10	150.55W	00.09N
11	150.48W	00.10N
12	150.41W	00.10N
13	150.34W	00.11N
14	150.26W	00.12N
15	150.19W	00.12N
16	150.11W	00.13N
17	150.03W	00.13N
18	149.95W	00.13N
19	147.87W	00.15N
20	149.79W	00.15N
21	149.71W	00.15N
22	149.62W	00.15N
23	149.53W	00.16N
24	149.43W	00.16N
25	149.34W	00.16N
26	149.24W	00.14N
27	148.95W	00.15N
28	149.04W	00.16N
29	149.15W	00.16N
30	149.27W	00.16N
31	149.38W	00.16N
February, 1967		
1	149.48W	00.16N
2	149.59W	00.16N
3	149.69W	00.16N
4	149.79W	00.16N
5	149.88W	00.16N

Date	Longitude (Degs.)	Latitude (Degs.)
February, 1967		
6	149.98W	00.18N
7	150.08W	00.18N
8	150.17W	00.18N
9	150.26W	00.18N
10	NO DATA AVAILABLE	
11	150.44W	00.18N
12	150.53W	00.16N
13	150.61W	00.16N
14	150.70W	00.17N
15	150.78W	00.16N
16	150.86W	00.16N
17	150.94W	00.16N
18	151.02W	00.16N
19	151.09W	00.16N
20	151.16W	00.15N
21	151.24W	00.15N
22	151.31W	00.15N
23	151.38W	00.15N
24	151.45W	00.15N
25	NO DATA AVAILABLE	
26	151.59W	00.16N
27	151.66W	00.16N
28	151.73W	00.15N
March, 1967		
1	151.79W	00.15N
2	151.85W	00.15N
3	151.90W	00.14N
4	151.95W	00.14N
5	152.00W	00.14N
6	NO DATA AVAILABLE	
7	151.83W	00.14N
8	151.73W	00.13N
9	151.64W	00.13N
10	151.54W	00.13N
11	151.44W	00.13N
12	151.34W	00.13N
13	151.24W	00.13N
14	151.13W	00.13N
15	151.03W	00.12N
16	150.92W	00.12N
17	150.81W	00.12N
18	150.70W	00.11N
19	150.58W	00.11N
20	150.46W	00.10N
21	150.35W	00.10N
22	150.23W	00.09N
23	150.13W	00.09N
24	150.14W	00.09N
25	150.16W	00.09N

Date	Longitude (Degs.)	Latitude (Degs.)
March, 1967		
26	150.17W	00.09N
27	150.18W	00.08N
28	150.18W	00.08N
29	150.18W	00.08N
30	150.18W	00.07N
31	150.18W	00.07N
April, 1967		
1	150.17W	00.06N
2	150.17W	00.06N
3	150.16W	00.05N
4	150.15W	00.05N
5	150.14W	00.05N
6	150.12W	00.05N
7	150.11W	00.04N
8	150.09W	00.04N
9	150.08W	00.04N
10	150.06W	00.04N
11	150.09W	00.04N
12	150.12W	00.03N
13	150.14W	00.03N
14	150.16W	00.03N
15	150.20W	00.29N
16	150.17W	00.28N
17	150.14W	00.28N
18	150.11W	00.27N
19	150.08W	00.26N
20	150.05W	00.25N
21	150.02W	00.25N
22	149.99W	00.24N
23	149.84W	00.23N
24	149.92W	00.25N
25	149.94W	00.25N
26	149.98W	00.22N
27	150.02W	00.27N
28	150.01W	00.28N
29	149.95W	00.31N
30	150.02W	00.29N
May, 1967		
1	150.03W	00.32N
2	150.07W	00.31N
3	150.09W	00.30N
4	150.11W	00.31N
5	150.15W	00.30N
6	150.19W	00.30N
7	150.23W	00.29N
8	150.26W	00.30N
9	150.30W	00.30N
10	150.34W	00.27N

Date	Longitude (Degs.)	Latitude (Degs.)
May, 1967		
11	150.37W	00.27N
12	150.39W	00.26N
13	150.42W	00.25N
14	150.45W	00.34N
15	150.49W	00.33N
16	150.52W	00.32N
17	150.56W	00.31N
18	150.60W	00.31N
19	150.63W	00.30N
20	150.67W	00.30N
21	150.69W	00.27N
22	150.73W	00.27N
23	150.78W	00.27N
24	150.79W	00.26N
25	150.79W	00.26N
26	150.79W	00.25N
27	150.78W	00.24N
28	150.78W	00.25N
29	150.77W	00.24N
30	150.76W	00.23N
31	150.75W	00.23N
June, 1967		
1	NO DATA AVAILABLE	
2	150.72W	00.22N
3	150.71W	00.21N
4	150.69W	00.21N
5	150.67W	00.21N
6	NO DATA AVAILABLE	
7	150.68W	00.19N
8	150.71W	00.19N
9	150.73W	00.18N
10	150.75W	00.18N
11	150.77W	00.17N
12	150.78W	00.16N
13	150.80W	00.16N
14	150.82W	00.15N
15	150.83W	00.15N
16	150.84W	00.14N
17	150.86W	00.14N
18	150.86W	00.14N
19	150.87W	00.13N
20	150.88W	00.13N
21	150.88W	00.13N
22	150.88W	00.12N
23	150.88W	00.12N
24	150.87W	00.11N
25	150.87W	00.11N
26	150.86W	00.10N

Date	Longitude (Degs.)	Latitude (Degs.)
June, 1967		
27	150.84W	00.09N
28	150.83W	00.09N
29	150.82W	00.08N
30	150.80W	00.08N
July, 1967		
1	150.78W	00.08N
2	150.76W	00.08N
3	150.74W	00.07N
4	150.72W	00.07N
5	150.69W	00.07N
6	150.66W	00.07N
7	150.63W	00.06N
8	150.60W	00.06N
9	150.57W	00.05N
10	150.54W	00.05N
11	150.51W	00.04N
12	150.47W	00.04N
13	150.44W	00.04N
14	150.41W	00.03N
15	150.37W	00.03N
16	150.33W	00.03N
17	150.29W	00.03N
18	150.22W	00.03N
19	150.20W	00.03N
20	150.20W	00.03N
21	150.19W	00.03N
22	150.19W	00.02N
23	150.18W	00.02N
24	150.18W	00.01N
25	150.17W	00.01N
26	150.16W	00.00
27	150.14W	00.00
28	150.13W	00.00
29	NO DATA AVAILABLE	
30	150.11W	00.00
31	150.09W	00.00
August, 1967		
1	150.07W	00.00
2	150.05W	00.00
3	150.03W	00.01S
4	150.01W	00.01S
5	150.00W	00.01S
6	149.98W	00.01S
7	149.96W	00.01S
8	149.95W	00.02S
9	149.92W	00.02S
10	149.92W	00.02S

Date	Longitude (Degs.)	Latitude (Degs.)
August, 1967		
11	149.93W	00.02S
12	149.94W	00.02S
13	149.94W	00.02S
14	149.94W	00.02S
15	149.93W	00.02S
16	149.93W	00.02S
17	149.92W	00.02S
18	149.91W	00.02S
19	149.90W	00.02S
20	149.93W	00.02S
21	149.95W	00.02S
22	149.97W	00.02S
23	149.85W	00.03S
24	149.90W	00.03S
25	149.94W	00.03S
26	149.99W	00.03S
27	NO DATA AVAILABLE	
28	NO DATA AVAILABLE	
29	NO DATA AVAILABLE	
30	NO DATA AVAILABLE	
31	150.17W	00.02S
September, 1967		
1	NO DATA AVAILABLE	
2	150.26W	00.02S
3	150.30W	00.02S
4	150.35W	00.02S
5	150.39W	00.02S
6	150.43W	00.02S
7	150.47W	00.02S
8	150.51W	00.02S
9	150.54W	00.02S
10	150.58W	00.02S
11	150.61W	00.01S
12	150.63W	00.01S
13	150.66W	00.01S
14	150.69W	00.01S
15	150.71W	00.01S
16	150.74W	00.01S
17	150.76W	00.01S
18	150.78W	00.01S
19	150.80W	00.01S
20	150.82W	00.01S
21	150.84W	00.01S
22	150.85W	00.01N
23	150.88W	00.01N
24	150.90W	00.01N
25	150.91W	00.01N
26	150.93W	00.01N
27	150.95W	00.01S

Date	Longitude (Degs.)	Latitude (Degs.)
September, 1967		
28	150.97W	00.01S
29	150.99W	00.01S
30	151.01W	00.00
October, 1967		
1	151.03W	00.00
2	151.05W	00.00
3	151.06W	00.00
4	151.08W	00.01S
5	151.04W	00.01N
6	151.00W	00.01N
7	150.96W	00.01N
8	150.91W	00.01N
9	150.87W	00.02N
10	NO DATA AVAILABLE	
11	150.77W	00.02N
12	150.72W	00.02N
13	NO DATA AVAILABLE	
14	150.64W	00.01N
15	150.60W	00.01N
16	150.56W	00.01N
17	150.53W	00.01N
18	150.49W	00.01N
19	150.45W	00.01N
20	150.41W	00.01N
21	150.40W	00.01N
22	150.38W	00.01N
23	150.36W	00.01N
24	150.34W	00.01N
25	150.32W	00.02N
26	150.30W	00.02N
27	NO DATA AVAILABLE	
28	NO DATA AVAILABLE	
29	150.25W	00.02N
30	150.24W	00.02N
31	150.23W	00.02N
November, 1967		
1	NO DATA AVAILABLE	
2	NO DATA AVAILABLE	
3	NO DATA AVAILABLE	
4	NO DATA AVAILABLE	
5	NO DATA AVAILABLE	
6	NO DATA AVAILABLE	
7	NO DATA AVAILABLE	
8	NO DATA AVAILABLE	
9	150.14W	00.01N
10	150.13W	00.01N
11	NO DATA AVAILABLE	

Date	Longitude (Degs.)	Latitude (Degs.)
November, 1967		
12	150.10W	00.01N
13	NO DATA AVAILABLE	
14	150.06W	00.01N
15	150.04W	00.00
16	150.02W	00.00
17	150.00W	00.00
18	149.97W	00.00
19	149.94W	00.01S
20	149.91W	00.01S
21	149.87W	00.01S
22	149.84W	00.01S
23	149.80W	00.01S
24	149.76W	00.01S
25	149.77W	00.01S
26	149.78W	00.01S
27	149.78W	00.01S
28	NO DATA AVAILABLE	
29	149.79W	00.02S
30	149.79W	00.03S
December, 1967		
1	NO DATA AVAILABLE	
2	NO DATA AVAILABLE	
3	149.76W	00.17S
4	NO DATA AVAILABLE	
5	NO DATA AVAILABLE	
6	NO DATA AVAILABLE	
7	149.72W	00.18S
8	149.73W	00.04S
9	149.72W	00.04S
10	149.72W	00.05S
11	149.72W	00.05S
12	149.71W	00.06S
13	149.70W	00.06S
14	149.71W	00.07S
15	NO DATA AVAILABLE	
16	NO DATA AVAILABLE	
17	149.82W	00.08S
18	149.86W	00.08S
19	149.89W	00.08S
20	149.94W	00.08S
21	149.98W	00.09S
22	150.02W	00.09S
23	150.06W	00.09S
24	150.10W	00.09S
25	150.14W	00.10S
26	150.17W	00.10S
27	150.21W	00.11S
28	150.24W	00.12S
29	150.27W	00.12S
30	150.29W	00.13S
31	NO DATA AVAILABLE	

ATS-B, ATS-C EPHEMERIS AND TELEMETRY DISPLAY SYSTEM

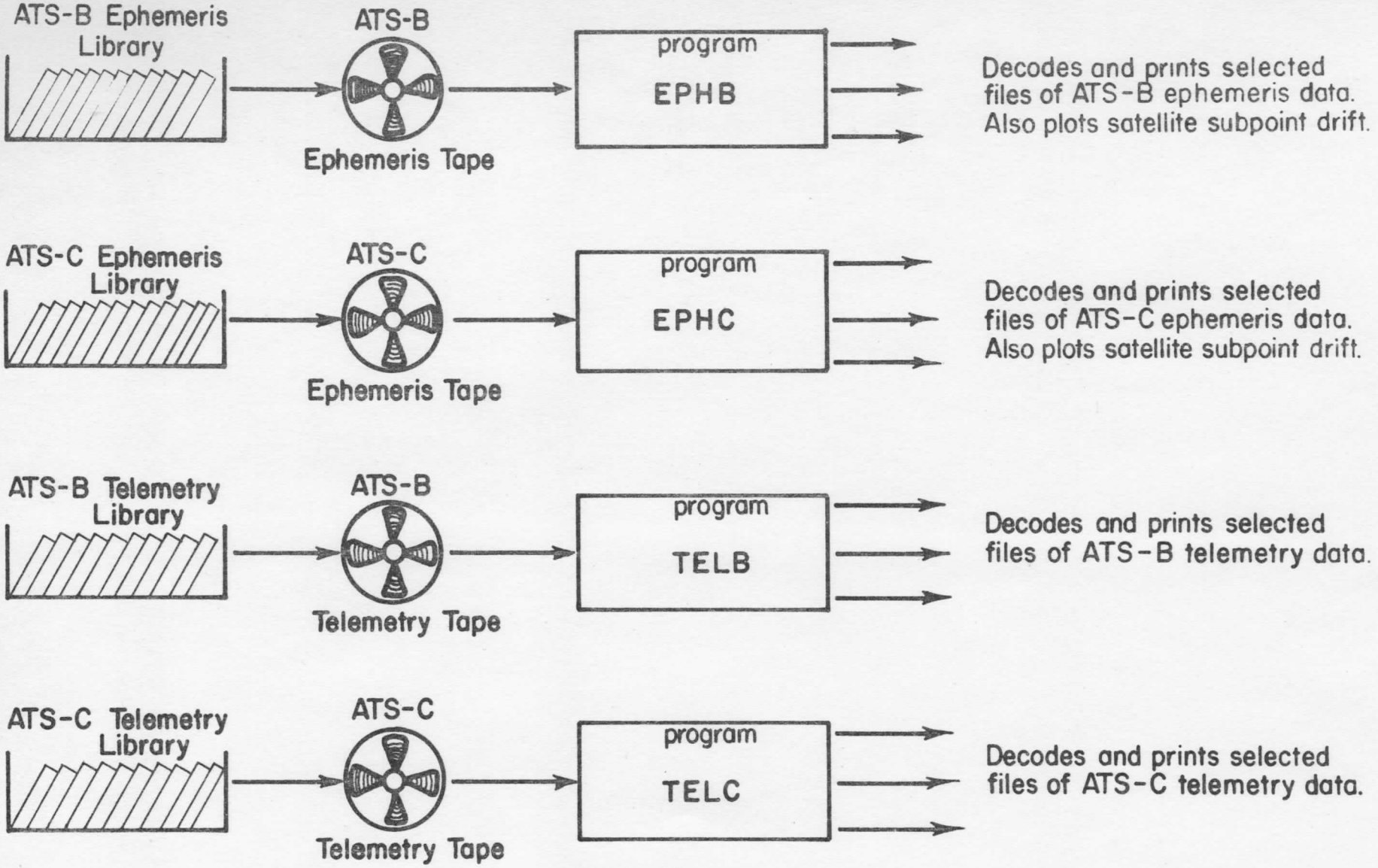

Fig. I.6

I.G TELEMETRY AND ENGINEERING INFORMATION

Several sources of specialized information about the engineering and telemetry aspects of the ATS spin scan camera experiments are available in the following:

1. The six-volume ATS Technical Data Report issued by NASA.
2. Sub-contractor reports to the University of Wisconsin from the Santa Barbara Research Corporation.

Additional information can be obtained from the ATS Project Coordinator, Professor Robert Parent.

SECTION II - PROCEDURES FOR OBTAINING ATS DATA

The Principal Investigator and all other scientists attached to the ATS Program are eager to see the fullest possible utilization of the ATS data for scientific purposes. We welcome inquiries about any aspects of the data. The following pages discuss procedures for obtaining different types of data.

Most requests are for archived data products (pictures, film loops, or tapes) listed in the ATS Catalog. These standard products differ from special requests, which may include photo enlargements, a display of some digital data or an analog record of a scan line. Refer to Table II.1 for a breakdown of the various data options that are available to different types of potential users.

Occasionally, a research group or individual may wish to arrange for special ATS coverage in support of an experiment or to obtain a type or amount of data that requires a departure from the normal operational schedule. Such a request should be made initially to the Principal Investigator through the ATS Program Manager so that the proper arrangements can be made with NASA.

ROSTER OF ATS PROGRAM PERSONNEL
June 1968

ATS Program Manager	Dr. Tom Vonder Haar
ATS Photo Lab Supervisor	Dr. Steve Cox
ATS Analog Data Supervisor	Dr. Steve Cox
ATS Programming Supervisor	Mr. Eric Smith
ATS Data Librarian	Miss Sandra Svec

All of the above can be contacted at:

Space Science and Engineering Center
The University of Wisconsin
1227 W. Dayton Street
Madison, Wisconsin 53715
608-262-1023

TABLE II.1 -REQUEST PROCEDURES FOR ARCHIVED ATS DATA FROM ATS PROGRAM GROUPS

		ATS PROGRAM SCIENTISTS AND STUDENTS	OTHER USERS AT U. OF WISCONSIN	OUTSIDE USERS
EIS AND PRECISION PRINTS	STD. PRODUCTS	Borrow From ATS Data Library	Borrow From ATS Data Library	From NASA
	SPECIAL PRODUCTS	Contact ATS Photo Lab Supervisor	Available At Cost From ATS Photo Lab[1]	From NASA or at Own Facility
FILM LOOPS	STD. PRODUCTS	Borrow From ATS Data Library	Borrow From ATS Data Library	Available At Cost[2] from ATS Photo Lab
	SPECIAL PRODUCTS	Contact ATS Photo Lab Supervisor	Not Available	Not Available
DIGITAL DATA	STD. PRODUCTS	Consult ATS Programming Supervisor	Consult ATS Programming Supervisor	Available At Cost From[3] ATS Program Manager
	SPECIAL PRODUCTS	Contact ATS Program Manager	Contact ATS Program Manager	Not Available
ANALOG DATA	STD. PRODUCTS	Consult ATS Analog Data Supervisor	Consult ATS Analog Data Supervisor	Not Available
	SPECIAL PRODUCTS	Consult ATS Analog Data Supervisor	Not Available	Not Available

[1]See General Price List and Instructions on Page (*18*).

[2]See General Price List and Instructions on Page (19).

[3]Normal charge is $100/tape (less $50 if buyer provides his OWN suitable tape).
Note that there is one ATS-I picture per tape and 1/3 ATS-III picture per tape.

TABLE II.2

ATS PHOTO LAB PRICES

8 x 10 Print	$ 1.00
Copy Negative	.50
16 x 20 Print	10.00

Billing is handled through an interdepartmental requisition.

TABLE II.3

PRICE LIST FOR FILMS

LOOPS:

Loops CD-1, CD-2, CD-3, CD-4	$ 3.00
Other Black & White Loops	4.00
Color Loop	5.00

MOVIES:

Weather in Motion	50.00
Mesoscale Cloud Motions	50.00
Weather in Motion and in Color (200 ft.)	45.00
Weather in Motion and in Color (400 ft.)	75.00

SHORT MOVIES:

12CD-1	9.00
12CD-1 W/CU	15.00
DS-1967	15.00

PLEASE MAKE CHECK PAYABLE TO THE UNIVERSITY OF WISCONSIN

THIS LIST SUBJECT TO CHANGE WITHOUT NOTICE

SECTION III - SPECIAL INFORMATION FOR ATS PHOTOGRAPHIC USERS

PRINTS, NEGATIVES, AND POSITIVE TRANSPARENCIES

Information about the films, processing, etc. regarding the standard photographic products obtained from the ATS spin scan camera experiments is given in NASA's ATS Users' Manual (available in the ATS Library).

Special information about these products and others produced at Wisconsin should be acquired from the photographers of the Space Science and Engineering Center.

FILM LOOPS

Details concerning film loops produced by members of the Wisconsin ATS Program are given in:

Hasler, F. and J. Kornfield, "Display and Analysis of ATS-1 Spin Scan Camera Pictures Through Time-Lapse Movie Techniques", in Weather Motions from Space.

SECTION IV - SPECIAL INFORMATION FOR ATS ANALOG DATA USERS

Playback of analog tapes on the special recorder available at the University of Wisconsin will normally be limited to trained personnel. A user interested in some application of these analog data should contact the ATS Program Manager after referring to:

Parent, R. and J. Sitzman, "The ATS-1 Analog Recording System", in Weather Motions from Space.

SECTION V - SPECIAL INFORMATION FOR ATS DIGITAL DATA USERS

The contents of this section provide detailed information about the formats, data reduction problems and display and analysis techniques for the ATS digital data. In general, all programs have been written, de-bugged, and standardized for use on the CDC3600 and B5500 computers. These programs are available to all scientific users free of charge. After a limited amount of orientation, any scientist or graduate student can easily make use of digital data in his research project. Examples of the use of ATS data in this form are found in several articles in Weather Motions from Space.