#305

Earth Sc

NIMBUS 5

SURFACE COMPOSITION MAPPING RADIOMETER

72-097A-05A ESAD-00128

.pes

Table of Contents

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1. INTRODUCTION:

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

When printing, special settings may be required to make the text box appear on the printed output.

Version	Date	Person	Page	Description of Change
01				
02				

3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC INFORMATION SYSTEM:

http://nssdc.gsfc.nasa.gov/nmc/

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There you will be able to perform searches to find additional information]

4. CATALOG MATERIALS:

a. Associated Documents To find associated documents you will need to know the document ID number and then click here. http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/

b. Core Catalog Materials

NIMBUS-5

SFC COMPOSITION MAPPING RAD TAPES

72-097A-05A ESAD-00128

THIS DATA SET HAS BEEN RESTORED. THERE WERE ORIGINALLY 39 9-TRACK, 1600 BPI TAPES, WRITTEN IN BINARY. THERE ARE EIGHT RESTORED TAPES. THE DR TAPES ARE 3480 CARTRIDGES AND THE DS TAPES ARE 9-TRACK, 6250 BPI. THE TAPES WERE CREATED ON AN IBM 360 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	DD#	FILES	TIME SPAN
DR03684	DS03684	D18436	1	12/11/72 - 12/11/72
		D18433	2	12/16/72 - 12/16/72
		D21985	3	12/17/72 - 12/17/72
		D21990	4	12/18/72 - 12/18/72
		D18443	5	12/20/72 - 12/20/72
DR03685	DS03685	D18449	1	12/20/72 - 12/20/72
		D18452	2	12/20/72 - 12/20/72
		D18453	3	12/20/72 - 12/20/72
		D18427	4	12/21/72 - 12/21/72
		D18428	5	12/21/72 - 12/21/72
DR03686	DS03686	D18429	1	12/21/72 - 12/21/72
		D18454	2	12/21/72 - 12/21/72
		D18455	3	12/21/72 - 12/21/72
		D18424	4	12/22/72 - 12/22/72
DR03687	DS03687	D18444	1	12/22/72 - 12/22/72
		D18450	2	12/22/72 - 12/22/72
		D18456	3	12/22/72 - 12/22/72
		D18457	4	12/22/72 - 12/22/72
		D21993	5	12/22/72 - 12/22/72
DR03688	DS03688	D18425	1	12/23/72 - 12/23/72
		D18435	2	12/23/72 - 12/23/72
		D18437	3	12/23/72 - 12/23/72
		D18442	4	12/23/72 - 12/23/72
		D18451	5	12/23/72 - 12/23/72

DR#	DS#	DD#	FILES	TIME SPAN
DR03689	DS03689	D18458	1	12/23/72 - 12/23/72
		D21991	2	12/23/72 - 12/23/72
		D21988	3	12/24/72 - 12/24/72
		D21989	4	12/24/72 - 12/24/72
		D18426	5	12/24/72 - 12/24/72
		D18439	6	12/24/72 - 12/24/72
		D18441	7	12/24/72 - 12/24/72
DR03690	DS03690	D18431	1	12/25/72 - 12/25/72
		D18440	2	12/25/72 - 12/25/72
		D18445	3	12/25/72 - 12/25/72
		D18432	4	12/26/72 - 12/26/72
		D18448	5	12/26/72 - 12/26/72
DR03691	DS03691	D18434	1	12/28/72 - 12/28/72 (a)
		D21987	2	12/28/72 - 12/28/72
		D21994	3	12/30/72 - 12/30/72

(a) I/O ERROR ON RECORD 4, FILE 1.

REQ. AGENT	RAND NO.	ACQ. AGENT
DLB	RC3416	JCL

NIMBUS 5 SCMR

SURFACE COMPOSITION MAPPING RADIOMETER

72-097A-05A

This data set consists of 39 Nimbus 5 Surface Composition Mapping Radiometer tapes. The tapes are single file 1600 BPI 9-track tapes prepared on S360 and have data in BCD/EBCDIC format. Records are blocked 4 logical records to 1 physical record. The tapes have a header record followed by data records containing approximate ly seven minutes of satellite data.

The time spans for the tapes are:

D#	C#	TIME SPAN		
D-18436	C-15569	346	18-07	18-11
D-18433	C-15566	351	08-49	08-55
D-18452	C-15582	355	02-00	02-07
D-18453	C-15583	355	11-13	11-20
D-18449	C-15579	355	11-16	11-23
D-18443	C-15575	355	22-31	22-39
D-18454	C-15584	356	12-03	12-08
D-18455	C-15585	356	12-16	12-23
D-18427	C-15561	356	17-35	17-43
D-18428	C-15562	356	18-14	18-20
D-18429	C-15563	356	20-03	20-11
D-18457	C-15587	357	02-11	02-20
D-18444	C-15576	357	04-52	05-01
D-18424	C-15558	357	06-42	06-47
D-18450	C-15580	357	11-29	11-36

D#	C#	TIME SPAN		
D-18456	C-15586	357	16-40	16-48
D-18435	C-15568	358	01-30	01-35
D-18442	C-15574	358	08-51	08-57
D-18451	C-15581	358	10-45	10-50
D-18437	C-15570	358	12-20	12-27
D-18425	C-15559	358	17-53	17-56
D-18458	C-15588	358	19-42	19-45
D-18439	C-15571	359	05-09	05-17
D-18441	C-15573	359	06-55	06-58
D-18426	C-15560	359	17-06	17-16
D-18440	C-15572	360	04-26	04-33
D-18431	C-15564	360	06-13	06-19
D-18445	C-15577	360	07-59	08-05
D-18432	C-15565	361	05-28	05-35
D-18448	C-15578	361	07-16	07-22
D-18434	C-15567	363	16-32	16-38
D-21985	C-16963	352	18-21	18-23
D-21990	C-16968	353	08-41	08-47
D-21993	C-16971	357	14-52	14-59
D-21991	C-16969	358	10-33	10-41
D-21989	C-16967	359	09-41	09-49
D-21988	C-16966	359	16-54	16-58
D-21987	C-16965	363	18-18	18-24
D-21994	C-16972	365	20-22	20-28

B R I E F D E S C R I P T I O N
SFC Composition Mapping Rad Tapes
72-097A-05A

This data set of earth surface radiances was generated on an IBM 360 computer and put on EBCDIC magnetic tapes. It contains calibrated and located IR radiances and brightness temperatures at 660 x 660 m ground resolution. Data are grouped in 7-min observations in the Mercator projection, covering globally from 80 deg S. to 80 deg N. For each day of observation, there is a varying number of archival magnetic tapes.

M A T E R I A L S F O R D I S T R I B U T I O N
72-097A-05A
SFC Composition Mapping Rad Tapes

"Nimbus 5 User's Guide," pp 49-58, B14758-000A.

The following was found in the Data Set Catalog:

Surface Composition Mapping Radiometer (SCMR) Data Processing System by CSC under Contract No. NAS 5-11790; 9101-14700-01TM (B29184-000A).

(Rev. by CYN, 9/97)

SECTION 3

THE SURFACE COMPOSITION MAPPING RADIOMETER (SCMR) EXPERIMENT

by
W. A. Hovis, Jr.
National Aeronautics and Space Administration
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3.1 Introduction

The Surface Composition Mapping Radiometer (SCMR) for Nimbus 5 is a three channel instrument with two channels sensing terrestrially emitted radiation in the 8.3 to 9.3 (8.8) and 10.2 to 11.2 (10.7) micrometer (μm) range and one channel sensing reflected solar energy in the 0.8 to 1.1 (0.95) μm interval. Because of telemetry limitations, only two channels can be utilized at one time—either the 8.8 and the 10.7 μm channels or the 0.95 and the 10.7 μm channels. The selection of channels is by real-time or stored command and will be determined on a case by case basis by the experimenter. For nighttime operation, only the 8.8 and 10.7 μm channels will be used.

The instrument scans across the direction of the spacecraft track with a rotating mirror. The instantaneous field of view of each channel is 0.6 x 0.6 milliradians resulting in a field of view of 660 x 660 meters, in the nadir, from the projected 1100 km orbital altitude. The scan mirror rotates at 10 rps to provide contiguous scan lines with a useful scan width limited to about 800 km because of distortion and atmospheric interference.

The detectors for the two long wavelength channels are cooled by a radiative cooler to approximately 100°K. The cooler will be allowed to outgas for approximately two weeks after launch before cooling and collection of long wavelength data is begun. The 0.95 μm channel will begin operation soon after launch.

3.2 Optical Configuration

The optical configuration of the instrument is shown schematically in Figure 3-1. The large rotating scan mirror fills the 20 cm diameter primary lens of a Cassegrain telescope. The secondary lens collimates the energy to a dichroic splitter that transmits the short wavelength range. The transmitted energy is focused onto a silicon diode detector and filtered to produce the desired bandpass. The short wavelength detector and filter are matched to those used in the ERTS 1 Multi-Spectral Scanner, Band 4 (Figure 3-2).

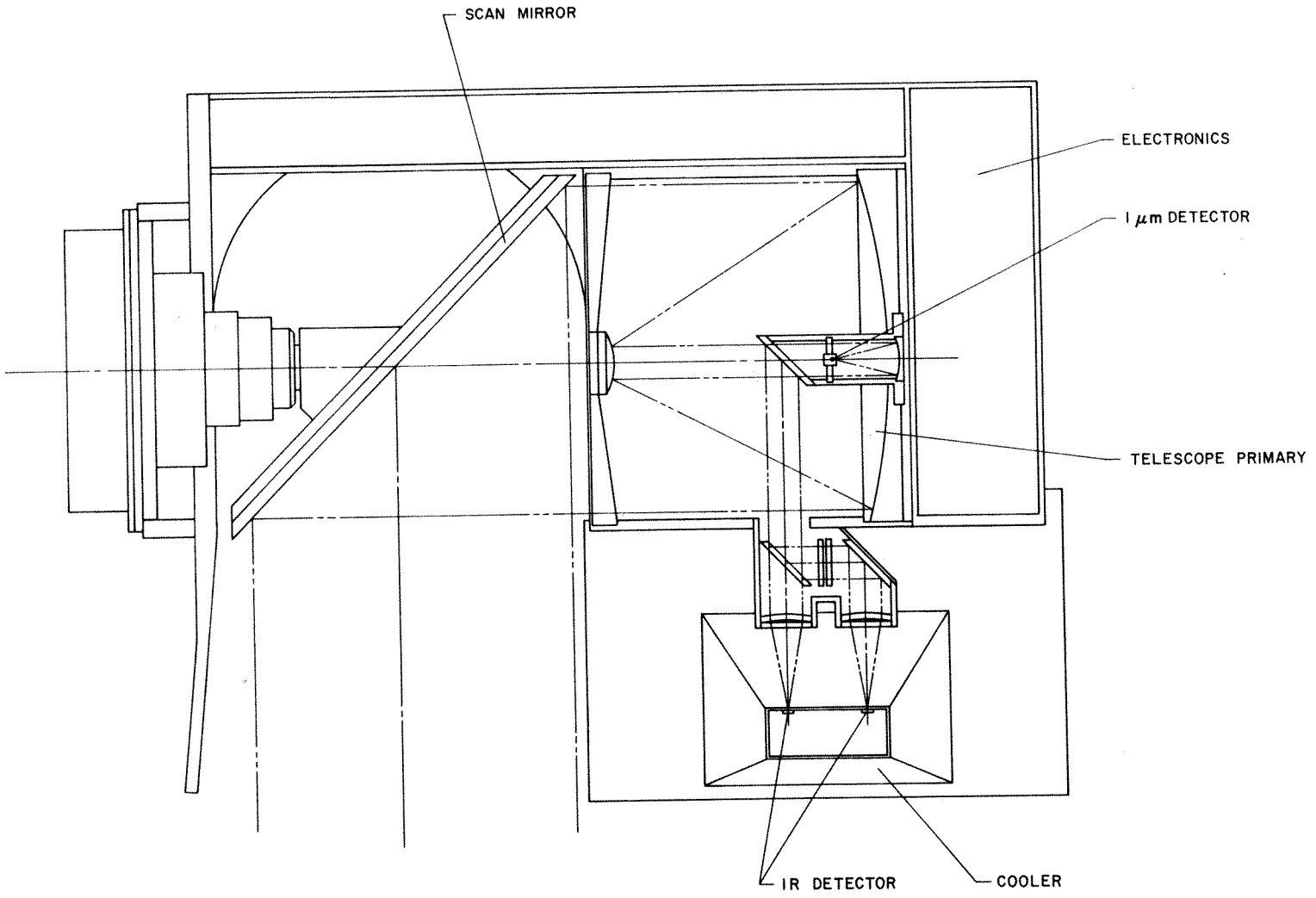

Figure 3-1. SCMR Optical Configuration

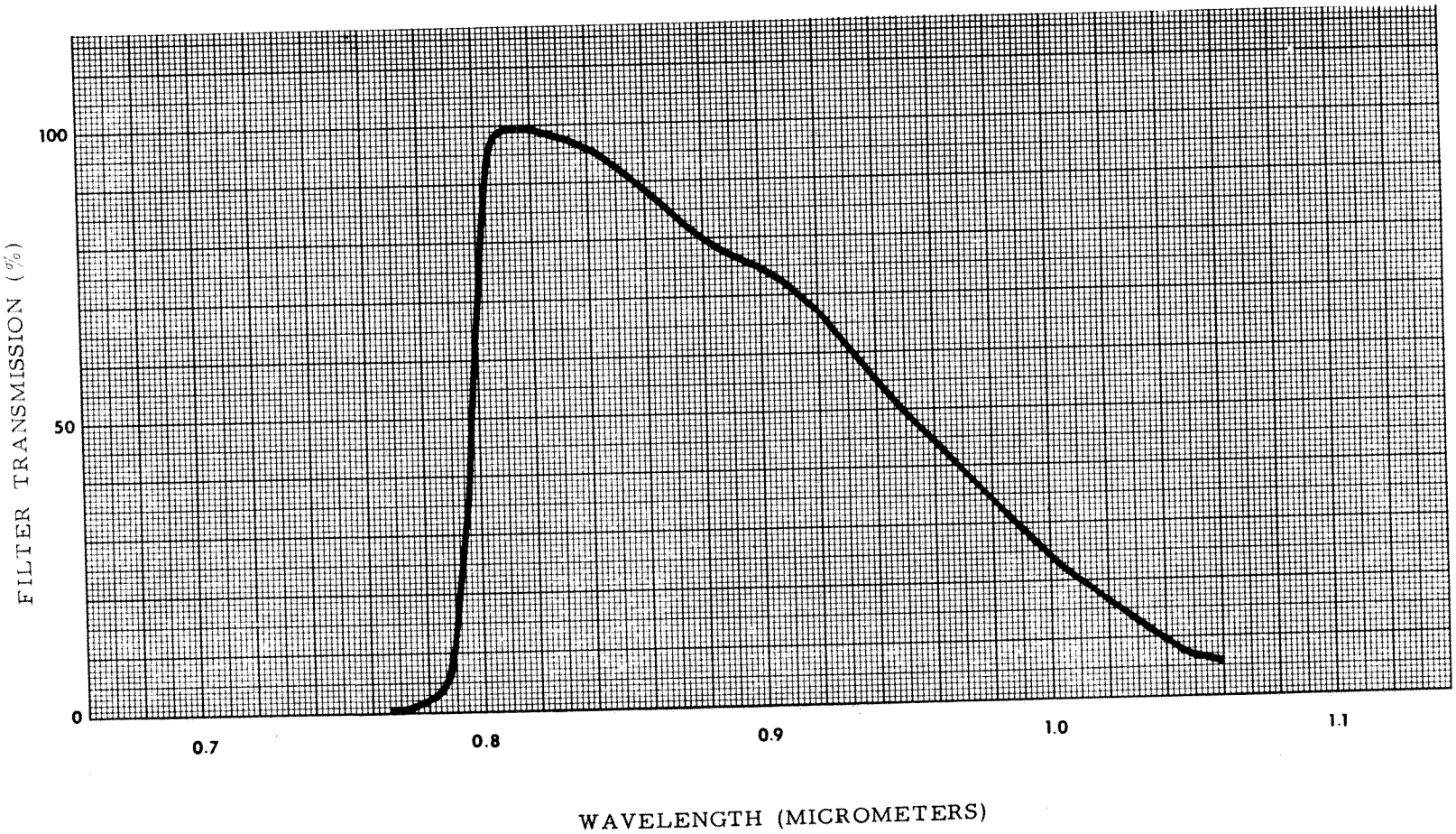

Figure 3-2. Spectral Response of 0.8-1.1 μm Channel

The reflected long wavelength energy is split again by a dichroic splitter that transmits the longer wavelength interval (10.7 μm) and reflects the shorter (8.8 μm). The longer wavelength radiation is then focused, through a filter that defines the 10.2 to 11.2 micrometer interval, onto a mercury-cadmium-telluride detector. The shorter wavelength radiation is reflected off a plane mirror and then focused, through a 9.3 to 10.3 μm filter, onto another mercury-cadmium-telluride detector. Both detectors are mounted on the patch of the radiative cooler.

3.3 Channel Selection

The 8.8 and 10.7 μm channels were selected to coincide with the reststrahlen features of acidic (high silica content) and basic (low silica content) rocks, soils, and consolidated sediments. The object is to sense the radiation in both channels, convert them to equivalent blackbody temperatures and determine if a temperature difference occurs. Since reststrahlen manifests itself as a decrease in emissivity, variable in wavelength with silica content, the polarity of the temperature difference should indicate if the surface material is acidic or basic. Figure 3-3 illustrates the effects of reststrahlen on radiated energy from a granite, representing the acidic case, and from a dunite, representing the basic case, where both are at a true temperature of 290°K. It can be seen that the minimum for granite occurs near 8.8 μm and for dunite near 10.7 μm. The 9.6 μm ozone band is shown to illustrate why the reststrahlen for intermediate materials cannot be observed.

A breadboard instrument, with the same long wavelength channels as the SCMR, was built and flown on an aircraft. Figure 3-4 shows the location of the two long wavelength channels and the laboratory measured emissivity of a sample of serpentine from Rockville, Maryland. Figure 3-5 shows the equivalent blackbody temperature, measured in the nadir, when flying over the serpentine quarry. Over trees and fields on either side of the quarry the two temperatures agree very well, while over the quarry the shorter wavelength channel produces a warmer equivalent blackbody temperature than the long wavelength channel. Since both measurements were made simultaneously, the difference is due only to the emissivity variation with wavelength.

The reststrahlen band of intermediate materials is obscured by ozone absorption, but much of the intermediate surface material is basaltic and a poor reflector of incident solar energy. The 0.95 μm channel offers the opportunity to observe surface material reflectance and detect basaltic areas.

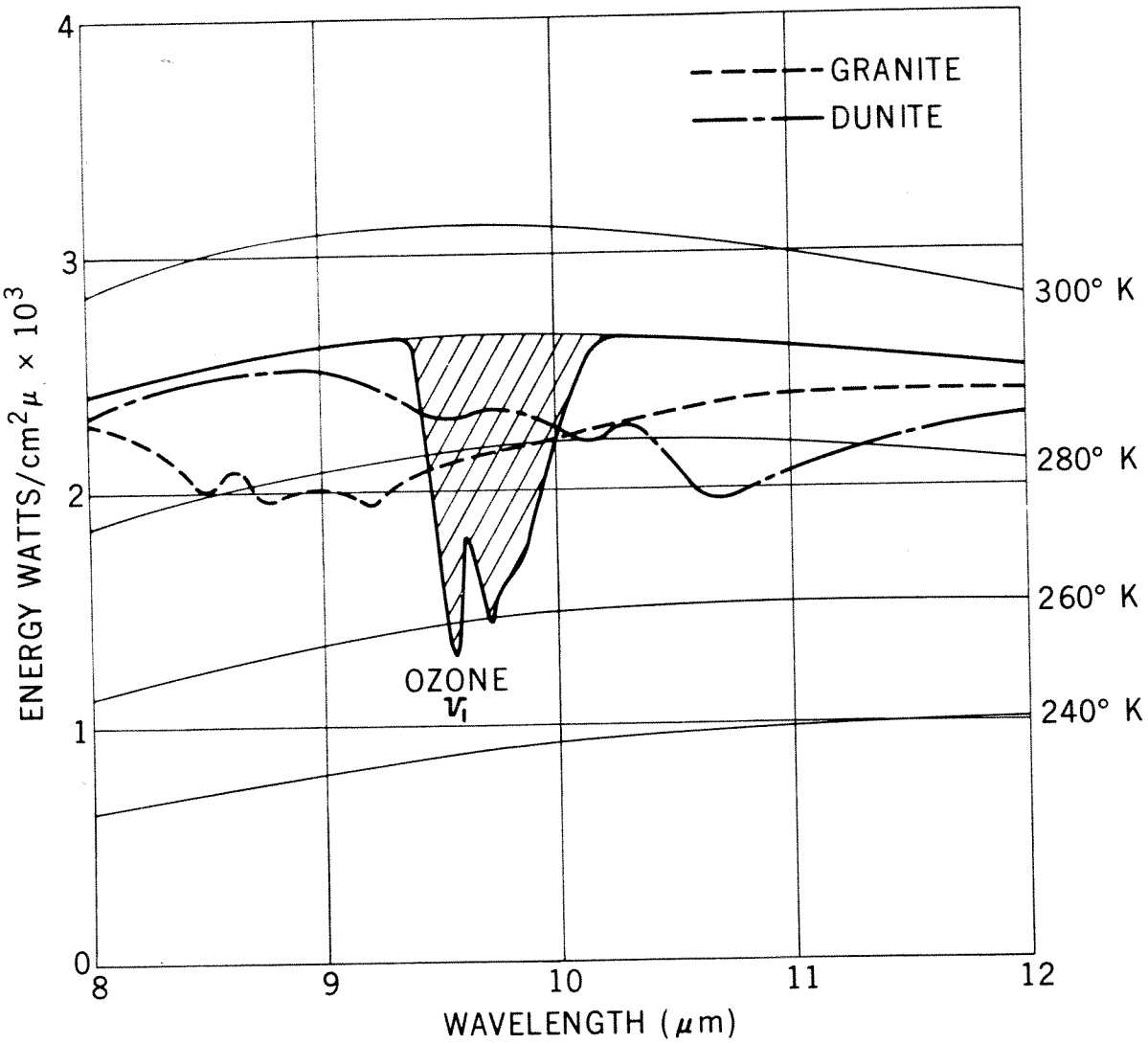

Figure 3-3. Reststrahlen Effects on Radiated Energy From a Granite and a Dunite

3.4 Operation Constraints

The SCMR data is transmitted in an analog format by an S-band transmitter on Nimbus 5. At present only five stations are equipped to receive such data. They are at Rosman, North Carolina; Goldstone, California; Fairbanks, Alaska; Honeysuckle Creek, Australia and Madrid, Spain. The acquisition circles for real time data acquired by these stations are shown in Figure 3-6.

The SCMR tape recorder will provide a maximum of 8 minutes of recording time between readouts, programmable in 1 minute intervals by stored command.

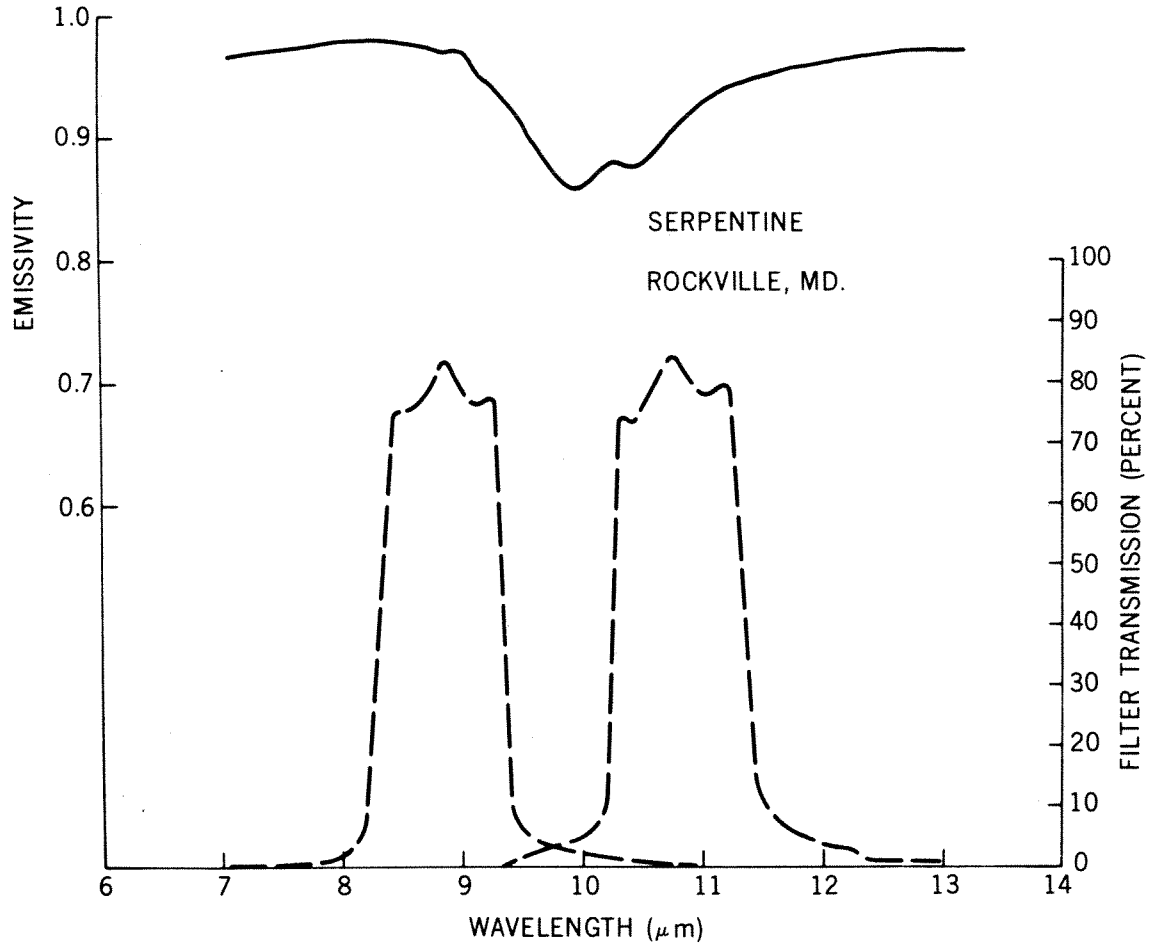

Figure 3-4. Laboratory Measured Emissivity of Serpentine Sample

Since there is only one transmitter, any time spent acquiring data stored on the tape recorder is lost for real-time data acquisition. Only data collected at Rosman can be transmitted by a wideband data link to GSFC for immediate processing. Because of data link noise, this data will not be of archival quality. Therefore, all data will be taped and sent to GSFC for archival processing.

Every attempt will be made to acquire data concerning phenomena with diurnal variations.

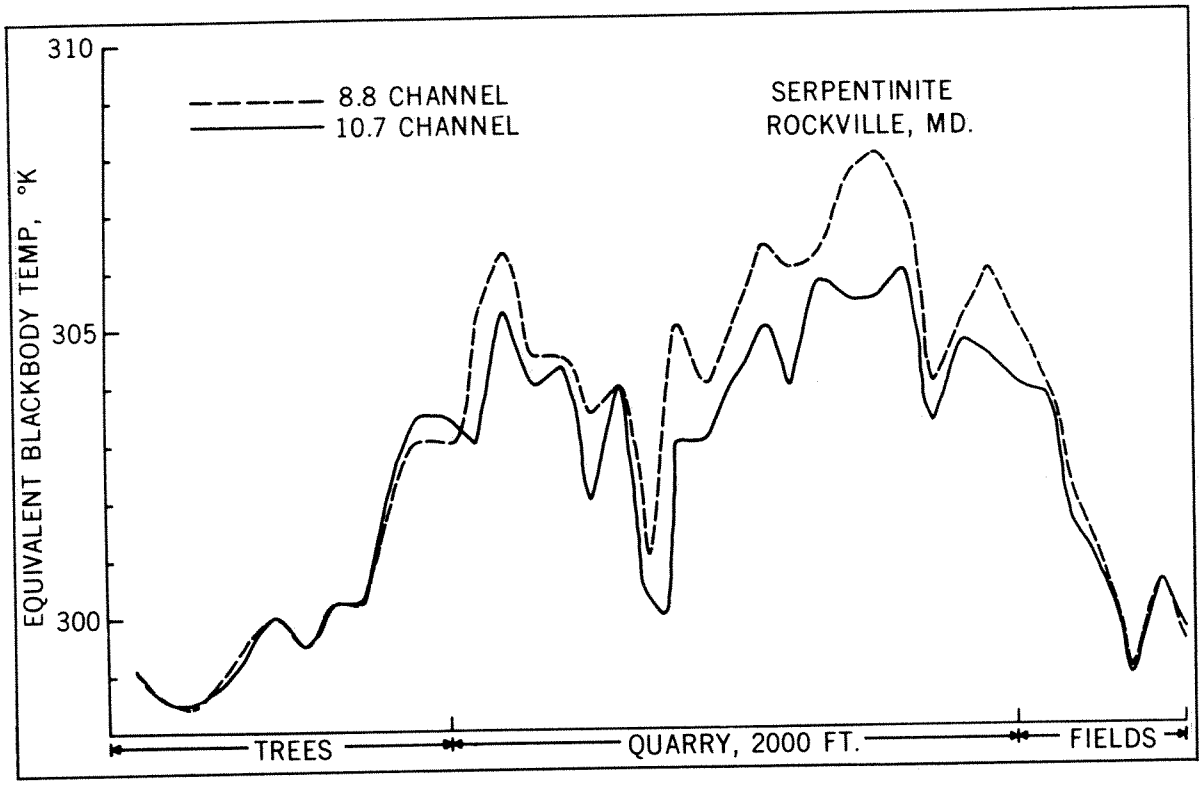

Figure 3-5. SCMR 8.8 μm and 10.7 μm Equivalent Blackbody Temperatures Over a Serpentine Quarry

3.5 Data Processing

3.5.1 Analog Data

The first product from the SCMR data will be a quick look black and white picture with 13 gray levels. This will be produced as a 4 x 5 inch picture in the MDHS. With nominal spacecraft attitude, gridding at this stage of processing will be accurate to ±0.1° in latitude and longitude near the subsatellite track. This picture can cover either horizon-to-horizon or ±37° from nadir. The gray scale is such that equal incremental excitation temperatures correspond to equal density increments from 0.3 to 1.3, representing a temperature range of from 265°K to 325°K.

For the long wavelength channels, either a simple voltage to density display or an analog voltage to temperature display will be utilized. Since in the 0.95 μm channel the output voltage is linear with respect to incident energy, only a voltage to density display will be utilized.

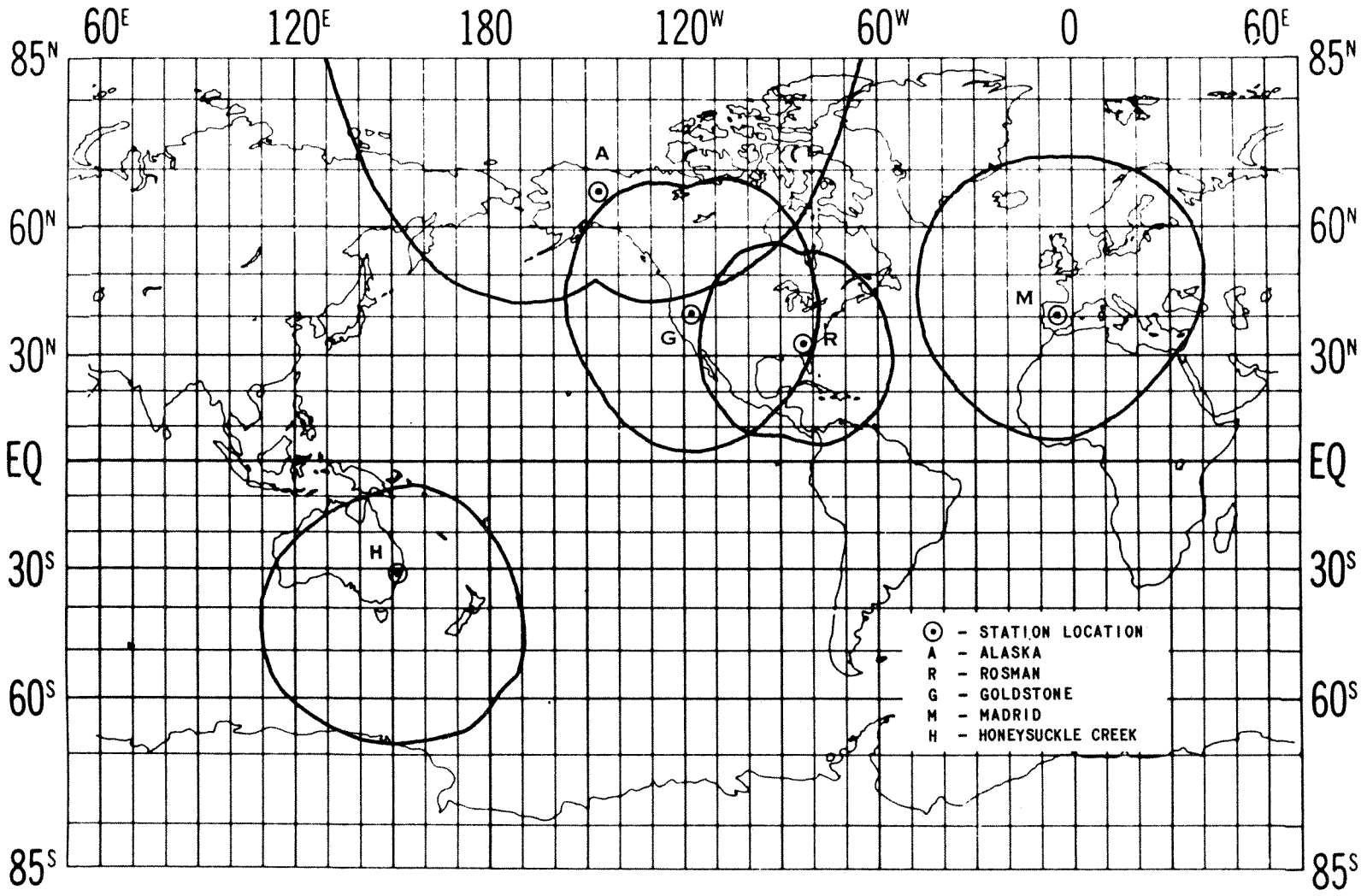

Figure 3-6. Station Data Acquisition Areas

A pictorial product showing the temperature difference between the two long wavelength channels can also be produced. In this mode, channel-to-channel temperature differences up to ±6°K are represented in the 13 step gray scale in 1° increments. More accurate differences are possible in digital processing when the inflight calibration is included.

All data received will be processed to 4" x 5" black and white pictures, and an optically reduced 70 mm roll format copy.

3.5.2 Digital Processing

The SCMR pictures will be examined and a decision made as to whether to digitize the data. The primary basis for this decision will be amount of cloud cover.

Analog data will be digitized to 8 bits and output on a 9 track 1600 BPI tape. Each record will consist of the following:

- 60 bytes of Header
- 31 bytes of Synch
- 62 bytes of Deep Space
- 93 bytes of Voltage Calibration (with instrument in the calibration loop)
- 3475 bytes of Earth Data
- 187 bytes of Voltage Calibration (with instrument out of the calibration loop)
- 137 bytes of reference blackbody
- 31 bytes of reference blackbody temperature thermistor

for each data channel exclusive of the header for a total of 8100 bytes/scan/record.

These data will then be processed by the Laboratory for Meteorology and Earth Sciences (LMES)/GSFC and a final tape consisting of temperature (for the longwave channels) or energy (for the 0.95 μm channel) and orbital information, etc. will be produced. Data will be in units of degrees Kelvin or milliwatts/cm^2 μm depending on the data channels used. The tape will be FORTRAN compatible and will contain all pertinent information. The format of this archival tape will be defined in a future Nimbus catalog.

3.5.3 Digital Display Products

A variety of computer programs are under development at the LMES which will yield the following products:

- Contoured maps
- Black and White pictures
- Color pictures

With accurate satellite ephemeris and nominal attitude data as input, the SCMR data points near the subsatellite track will be correctly gridded to within one half a resolution element. However, the data-to-grid location differences may be as much as ±11 km (6 n. m.).

3.5.4 Availability of SCMR Data

All SCMR data, photographic or digital, will be archived, initially, by the experimenter. Any requests for SCMR data and all queries on availability of SCMR data should be directed to:

Dr. Warren Hovis, Code 652
Goddard Space Flight Center
Greenbelt, Maryland 20771
Telephone: 301-982-6465

B29184-000A

9101-14700-01TM

SURFACE COMPOSITION MAPPING RADIOMETER (SCMR) DATA PROCESSING SYSTEM

Prepared by

COMPUTER SCIENCES CORPORATION

For

GODDARD SPACE FLIGHT CENTER

Under

Contract No. NAS 5-11790
Task Assignment No. 147

Prepared by:

S. K. Tak — 5/11/73
S. K. Tak — Date

Approved by:

F. D. Eastham — 5/11/73
F. D. Eastham — Date
Section Manager

Dr. F. M. Calabria — 5/11/1973
Dr. F. M. Calabria — Date
Department Manager

ABSTRACT

This document describes a system of computer programs for the processing and display of data obtained from the Surface Composition Mapping Radiometer (SCMR) flown aboard the NIMBUS E satellite. The SCMR instrument provides measurements of thermal energy radiating from the earth's surface. The SCMR data processing system provides for the calibration, geographic referencing and display of data observed by the SCMR instrumentation.

TABLE OF CONTENTS

SECTION 1 - INTRODUCTION

The Surface Composition Mapping Radiometer (SCMR) is a scanning radiometer flown on the NIMBUS E satellite and is similar in operation to other infrared radiometers such as the High Resolution Infrared Radiometer (HRIR) and the Temperature Humidity Infrared Radiometer (THIR) which have been previously flown.

The SCMR has two main data channels, one centered at 8.8 microns and the other at 10.9 microns. Each channel has a 1.0 micron bandwidth and the spatial resolution, assuming a normal NIMBUS noon orbit, is 600 meters. Upon ground command a third data channel (1.2 micron) maybe substituted for the 8.8 micron channel. The 8.8 and 10.9 micron channels provide measurements of thermally radiated energy from the earth's surface and the 1.2 micron channel gives a measure of reflected energy.

The SCMR instrument is designed such that a zero volt output for the 8.8 and 10.9 micron channels corresponds to a temperature of 259^{o}K and 265.4^{o}K respectively. Any viewed surface temperature below these values will also yield a zero volt output. The upper temperature limit of both channels is approximately 335^{o}K and corresponds to a six volt output.

The SCMR instrument is operated approximately 10 minutes out of each orbit and is programmable in one minute increments.

For each rotation of the scanning mirror, rotating at 10 rps, the following information is obtained from the telemetry:

a. instrument view of space,

b. stairstep voltage calibration (0-6v) through the instrument,

c. instrument view of earth,

d. stairstep voltage calibration (0-6v) bypassing the instrument,

e. instrument view of the reference black body,

f. an analog voltage representing the temperature of the reference black body.

When the 8.8 and 10.9 micron data channels are in operation, the objective is to calculate the surface temperature of the earth and also the temperature difference ($T_{10.9} - T_{8.8}$) for each data point. When the 1.2 micron channel is substituted for the 8.8 micron channel, temperature differences are not computed, and the 1.2 micron channel data are converted to radiance values by application of pre-set calibration values.

This document describes a system of computer programs designed for the processing and display of data received from the SCMR instrument package. This system has been implemented for use on the IBM 360/91 computer and has been designed to simplify operational procedures by automating many of the recording and maintenance functions which are normally required to be performed manually.

SECTION 2 - SCMR SYSTEM DESCRIPTION

The Surface Composition Mapping Radiometer (SCMR) data processing system includes calibration, geographic referencing, catalog maintenance and selective display capabilities for the processing and display of data obtained from the SCMR sensors aboard the NIMBUS E satellite. The general data flow through this system is depicted in Figure 2-1.

The individual programs comprising this system are fully described in subsequent sections. However, the general functions performed by each are summarized below:

- The calibration program performs the initial processing of the telemetry data received. Equipment calibration data is accumulated. calibration curves are established and the sensed earth data is converted from telemetry counts to indices to master conversion tables. A calibrated data tape is output by this program for subsequent processing steps.

- The geographic referencing program accepts as input, the calibrated data tape, obtains the corresponding sub-satellite points from an ephemeris data tape and outputs an archival tape containing final sensed data related to its geographic position.

- A selective display program provides a variety of capabilities for the graphic representation of data processed through this system in the form of contour plots.

- The catalog maintenance program provides automatic record keeping of the SCMR data as it is processed through the various programs of the processing system, and provides ready access for sorting and summarization of information for reporting purposes.

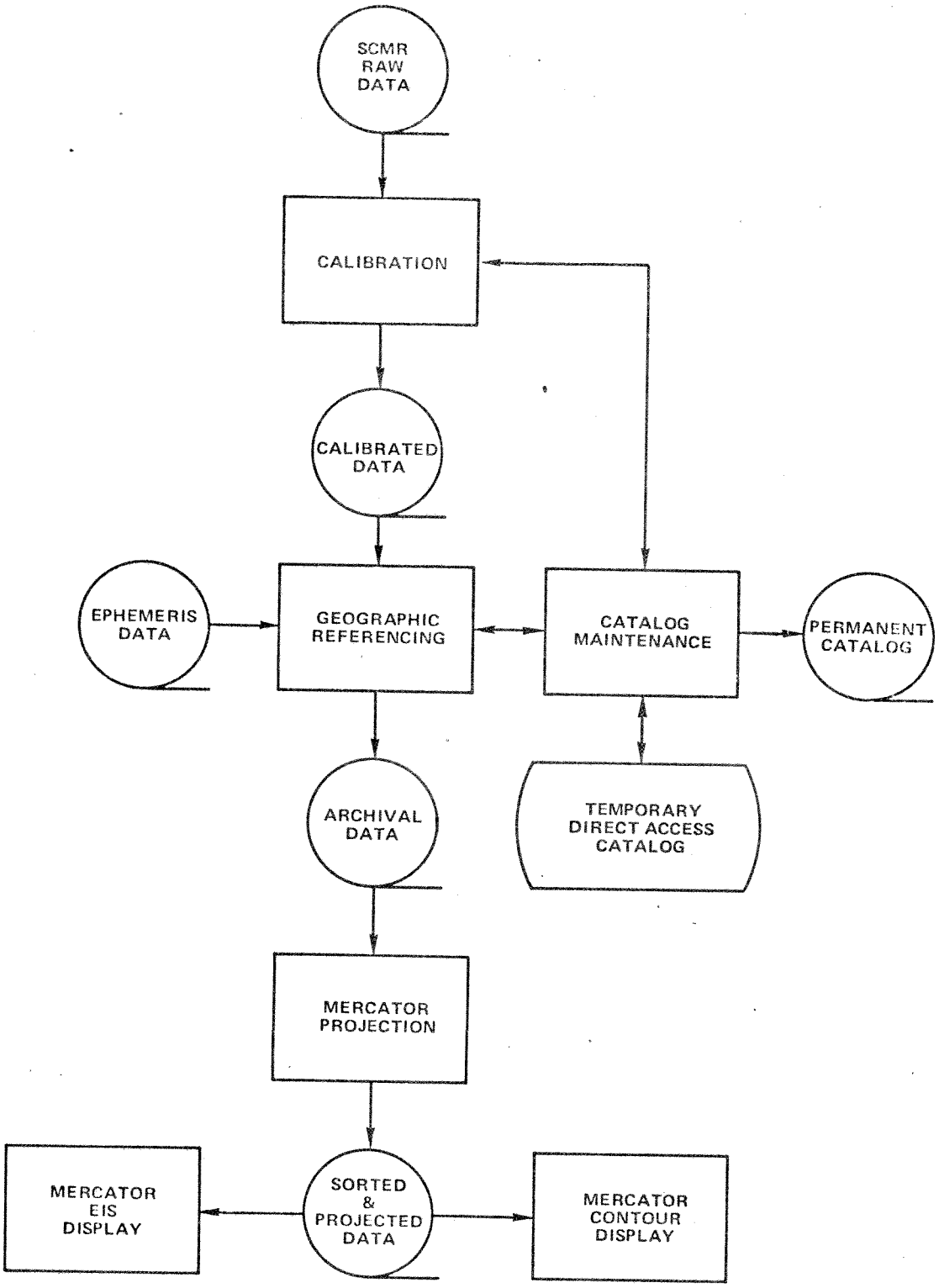

Figure 2-1. SCMR Data Processing System

SECTION 3 - CALIBRATION PROGRAM

3.1 PROGRAM DESCRIPTION

The primary purpose of the SCMR Calibration Program (SCMCAL) is to provide accurate conversion of the raw earth data, as seen by the SCMR sensors, from telemetry counts to its corresponding value of absolute temperature. This conversion is accomplished in the following manner:

1. For each input record, an average value is determined for each of the calibration and reference data segments, separate values being computed corresponding to each operating data channel.

2. The individual averages determined for each record are accumulated to maintain a running average of each data segment covering 11 records (1.1 sec of sampled data).

3. The running averages are used to construct conversion tables to be used for the conversion of the sensed earth data (telemetry counts) to corresponding values of voltage, radiance and temperature.

Program operation is such that the conversion tables are constructed from the previous 1.1 seconds of calibration data (11 input records).

For optimization in handling the large volumes of data received from the SCMR equipment, the conversion of earth data is accomplished by using the telemetry count of each data point as an index to an appropriate table to retrieve its

corresponding calibrated value of voltage, radiance or temperature.

The following mathematical operations are utilized in construction of the conversion tables. Output voltage (telemetry counts) is assumed to be linear with respect to energy input (radiance sensed by the SCMR instrument).

1. Using the calibration levels (instrument bypassed) on either side of the measured black body temperature (V_T, given in telemetry counts), the corresponding analog voltage (V_i) is obtained by linear interpolation.

2. The analog voltage representing black body temperature is then converted to absolute temperature from a table of analog voltage vs. temperature (Table 1). The black body temperature used in subsequent construction of conversion tables is an average of the black body temperatures as measured by the 10.9μ and 8.8μ channels. When the 1.2μ channel is substituted for the 8.8μ channel, only the 10.9μ channel black body temperature is used in construction of the 10.9μ conversion tables. Conversion of the 1.2μ channel data is made by direct linear interpolation from the values of Table 3-2.

3. Using the computed black body temperature and the computed 0 v level, temperature and corresponding radiance values are determined for each operating channel.

$$\omega(\lambda, T) = \frac{C_1}{\lambda^5} \times \frac{\Delta_\lambda}{\exp\left[C_2/\lambda T \right] - 1}$$

where; $\omega(\lambda, T)$ = Radiance (ω/cm^2)

λ = Channel mid-point (μ)

Δ_λ = Bandwidth $(= 1\mu)$

T = Temperature (^oK)

$C_1 = 37413$

$C_2 = 14388$

4. Using the instrument calibration values, a table of voltages is constructed by linear interpolation to obtain a voltage corresponding to each possible telemetry count configuration (0-255).

5. From the values of 3. and the tables of 4. the following values can now be determined for each operating channel;

   a. Nominal Radiance Slope

   $$NRS = \frac{\text{Black Body Radiance - 0 volt Radiance}}{\text{Black Body Reference (Housing) voltage}} \qquad (W.cm^{-2}.V^{-1})$$

   b. Radiance for each of 256 possible voltages $(W.cm^{-2})$

   $\omega_i = \text{Voltage}_i \times NRS + 0 \text{ volt Radiance}$

c. Temperature for each of 256 possible voltages

$$T_i = \frac{C_2}{\lambda \ \mathrm{Ln}\left(\frac{C_1}{\lambda^5 \times \omega_i} + 1\right)}$$

Using the calibration and conversion tables established in the preceeding steps, each earth data point viewed by the SCMR sensors (8-bit telemetry count) is used as an index to the appropriate table to retrieve a corresponding value of temperature (voltage for the 1.2μ channel). This retrieved table value of temperature or voltage is now converted to an 8-bit integer value for use as an index to a master conversion table contained on the output tape, and is placed in the array to be output. When all viewed points for the current record have been thus treated, an output record is written on the Calibrated Data Tape. Appendix C describes the format of this tape.

The above process is repeated until the end of the selected interval is reached (maximum of 7 minutes of data) at which time this interval is recorded in the SCMR catalog and the run terminates.

Table 3-1. Black Body Volt/Temp. Conversion Table

Voltage	0.00V	0.25V	0.50V	0.75V
0.00(V)	323.87 (^{o}K)	323.87 (^{o}K)	323.87 (^{o}K)	323.87 (^{o}K)
1.00	320.83	317.78	314.99	312.46
2.00	309.92	307.39	305.11	302.82
3.00	299.78	289.26	295.98	293.96
4.00	291.67	298.40	287.11	284.83
5.00	282.56	280.53	277.99	275.72
6.00	273.44			

Table 3-2. 1.2μ Channel Volt/Radiance Conversion Table

Analog Voltage (V)	Corresponding Radiance (mW)
0.00	0.0
1.62	15.5
2.93	31.3
4.16	46.9
5.38	62.8

3.2 USER'S GUIDE

The SCMR calibration program is invoked by a small FORTRAN driver which reads two data cards containing selection criteria for the given run. Parameters not input are given the indicated default values.

Input Card No. 1

Cols.	Description	Format	Default
12-20	Calibration start time (HH MM SS)	3I3	00 00 00
33-41	Calibration stop time (HH MM SS)	3I3	24 00 00
53-57	Output calibration tape no.	I5	0
66-73	Area covered by data	2A4	blank

Input Card No. 2

Cols.	Description	Format	Default
12-15	8.8μ black body temp. increment	F4.1	1.7
30-33	10.9μ black body temp. increment	F4.1	0.5
56-59	Calibration printout interval	I4	600
75-79	10.9μ channel wavelength	F5.2	10.55

Required DD cards: 1, 2, 3, 4

SECTION 4 - GEOGRAPHIC REFERENCING PROGRAM

4.1 PROGRAM DESCRIPTION

The SCMR location program provides geographic referencing of the SCMR calibrated data. Appropriate calls are made to the GEOCTR[1] program to establish 101 pairs of latitude and longitude which are then placed with the calibrated data and output to an SCMR archive tape. Initializing values of roll, pitch, and yaw are determined by the ATTADJ subroutine and the SCMR catalog is appropriately updated.

4.2 USER'S GUIDE

The SCMR location program is invoked by:

CALL SCMRLC

A single input card is required as follows:

Cols.	Description	Format
11-13	SCMR catalog data set reference no.	I3
31-34	SCMR archive tape no. being written	I4

Required DD cards: 1, 2, 4, 10, 11, 12, 13, 14

[1] CSC, 3000-093-01TN, Sub-Satellite Locator Program - GEOCTR, October 1973.

SECTION 5 - DISPLAY PROGRAMS

5.1 PROGRAM DESCRIPTION

Two programs are available to obtain Mercator projected displays of selected areas of SCMR data. One program utilizes the Wolf Plotting and Contouring Package (GSFC Library #A00227) to produce a display in the form of temperature contours. This program provides the capability of producing selected areas for display by printer plot, SC-4020 microfilm and/or CalComp 12- or 30-inch plots. Contour plots may be produced for any combination of selected data channels (10.5-, 8.8/1.2-, and/or 10.5-8.8-micron data). A second program provides selection of a single area and single channel for production of an EIS color picture.

Both of the above display programs require as input a prepared tape containing latitude, longitude (I, J) positions of each data point, sorted in descending order. An I, J computation program extracts, from the SCMR archive tape, an overall area selected for display. A latitude and longitude position is computed for each data point within the selected area. This position is then converted to an I, J grid position within an imaginary world map Mercator coordinate system by

$$J = (360 - LON) \times 160 \qquad LON = 0^{o} \text{ to } 360^{o} \text{ W}$$

$$I = \frac{\ell n \left[\tan\left(45 + \frac{LAT}{2}\right)\right]}{160} \qquad LAT = -80^{o} \text{ to } +80^{o}$$

Channel data and the associated I, J positions are then output to tape for descending sort by the IBM sort/merge program.

5.2 USER'S GUIDE

5.2.1 Area Selection Program for Mercator Display Programs

The area selection and I, J computation program requires a single input card as follows:

Cols.			
8-10	Deg	South latitude limit	-80^{o} to $+80^{o}$
12, 13	Min		
19-21	Deg	North latitude limit	
23, 24	Min		
34-36	Deg	East longitude limit	0^{o} to 360^{o} W
38, 39	Min		
46-48	Deg	West longitude limit	
50, 51	Min		
61, 62	Deg	Nadir angle limit	

Approximate time requirements for a selected area 10^{o} latitude by 10^{o} longitude are as follows:

	CPU	I/O
selection	3.0	1.0
sorting	5.0	20.0

Run deck setup for a combined selection and sorting run is as follows:

```
//     EXEC  [illegible],PARM=XREF
//SOURCE.SYSIN DD *
        CALL COMPIL
        STOP
        END
//CIJ  EXEC [illegible] ,GO=220K
//[illegible].SYSLIB  DD DSN=[illegible].DISP=SHR
//GO.ARCHIVE    DD UNIT=(9TRACK,,DEFER),DISP=(OLD,KEEP),LABEL=(1,BLP),
//                VOL=SER=L34[illegible]          INPUT SCAR ARCHIVE TAPE
//GO.SORTAPE    DD UNIT=(9TRACK,,DEFER),DISP=(NEW,PASS),LABEL=(1,BLP),
//  VOL=SER=L3457,DSN=&&SORTOUT           FINAL SORTED OUTPUT TAPE
//GO.SORTAPE    DD UNIT=(9TRACK,,DEFER),DISP=(NEW,PASS),LABEL=(1,BLP),
//  VOL=SER=L3438,DSN=&&TOPSRT            INT. TAPE TO BE SORTED
//GO.DATAS DD *
 LAT=/ 32 00/ - / 40 00/: LON=/ 114 00/ - / 124 00/:NADIR=/35/:
//SORT EXEC PGM=SORT,PARM='CORE=700000',REGION=700K
//SORTLIB DD DSN=SYS1.SORTLIB,DISP=SHR
//SYSOUT DD SYSOUT=A
//SORTIN DD DISP=(OLD,DELETE),LABEL=(1,NL),DSN=&&TOPSRT,
// DCB=(RECFM=FB,LRECL=20,BLKSIZE=32000),VOL=REF=*.CIJ.GO.SORTAPE
//SORTWK01 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK02 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK03 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK04 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK05 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK06 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK07 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK08 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK09 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK10 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK11 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK12 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK13 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK14 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTWK15 DD UNIT=2314,SPACE=(TRK,(500),,CONTIG)
//SORTOUT [illegible]=([illegible]).[illegible]=(2,[illegible]),[illegible]=*.SORTIN.
//   [illegible].CIJ.[illegible] ([illegible])
//SYSIN [illegible]
 [illegible] (1, [illegible]). [illegible]
//  [illegible]
```

5.2.2 Contour Program (Mercator Projection)

Control parameters for the contour program are provided by the input of two NAMELIST strings, defined as follows:

NAMELIST/PLOTS/

Name	Type	Description
PRINTR	I*4	$\neq 0$; printer plot
CALCMP	I*4	>0; 30-inch CalComp plot 0; 12-inch CalComp plot
SC4020	I*4	$\neq 0$; SC-4020 microfilm
CTRLVL	R*4	Increment (^{o}K) for contour levels
NCHNL	I*4	Channel selection for display 0 10.5 micron 1 8.8 2 (10.5 - 8.8) 3 1.2 4 10.5 and 8.8 5 10.5 and (10.5 - 8.8) 6 8.8 and (10.5 - 8.8) 7 10.5 and 1.2 8 10.5 and 8.8 and (10.5 - 8.8)
LONAVG	I*4	Number of points to be averaged in longitude
LATAVG	I*4	Number of points to be averaged in latitude
LONSEG	I*4	Number of longitude segments to be output
LATSEG	I*4	Number of latitude segments to be output
SUPRES	R*4	Minimum value to be contoured

NAMELIST/POSNS/

Name	Type	Description
TOPLAT	R*4	Northern plot limit (-80° to +80°)
BOTLAT	R*4	Southern plot limit
WESTLN	R*4	Western plot limit (0 - 360°W)
EASTLN	R*4	Eastern plot limit

Following these NAMELIST inputs, an 80-character identification field is required for plot labeling.

A sample run deck setup is as follows:

```
//    EXEC FORTRANH,PARM='XREF
//SOURCE.SYSIN DD *
      DIMENSION PLARY(35000)
      DATA PLDIM/35000./
      COMMON/BUF/BUF(97632)
C       PLDIM MUST BE DIMENSIONED > IX * IY
C          WHERE: IX = 120*(WESTLN - EASTLN)/LONAVG
C                 IY = 200*(TOPLAT - BOTLAT)/LATAVG
C         BUF MUST BE DIMENSIONED > PLDIM/16 + 2002
      CALL SCNRPL (PLARY,PLDIM)
      STOP
      END
//   EXEC LINKGO,REGION.GO=400K
//LINK.SYSLIB DD DSN=SYS2.SCOMV.SLOCLIB1,DISP=SHR
//            DD DSN=SYS2.MOLEPLOT,DISP=SHR
//GO.FT22F001 DD DCB=(RECFM=FB,BLKSIZE=7200,LRECL=400),DSN=&&SFL2,
//            UNIT=2314,SPACE=(CYL,(2,1))
//GO.FT23F001 DD DCB=(RECFM=FB,BLKSIZE=7200,LRECL=400),DSN=&&SFL3,
//            UNIT=2314,SPACE=(CYL,(2,1))
//GO.SORTAPE DD UNIT=(7TRACK,,DEFER),DISP=(OLD,KEEP),LABEL=(1,SL),
//            VOL=SER=L73457
//GO.PLOTAPE  DD DCB=(,RECFM=1),LABEL=(,SL,,OUT),UNIT=(7TRACK,,DEFER),
//            VOL=SER=L73456
//GO.MOLEPLOT DD DCB=(,RECFM=1),LABEL=(,SL,,OUT),UNIT=(7TRACK,,DEFER),
//            VOL=SER=L73455
//GO.SYSIN DD *
 $PLOTS PRINT=1, CALCMP=-1, SC4020=1, STRLVL=2.00, HOMPL=0,
        LONAVG=2,  LATAVG=2,  LONSEC=1,  LATSEC=1,  SUBSEC=200.0,  SEND
 &POSNS TOPLAT=55.0,  BOTLAT=33.0,  WESTLN=121.5,  EASTLN=116.0,  $END
                          POSTHUE CALIFORNIA SEGMENT
```

5.2.3 EIS Color Program (Mercator Projection)

Control parameters for the color program are provided by the input of two NAMELIST strings, defined as follows:

NAMELIST/POSNS/

Name	Type	Description
TOPLAT	R*4	Northern plot limit (-80^{o} to $+80^{o}$)
BOTLAT	R*4	Southern plot limit
WESTLN	R*4	Western plot limit ($0-360^{o}$W)
EASTLN	R*4	Eastern plot limit
CHANEL	I*4	Channel selection for display 1. 1.2 2. 10.5 3. 8.8 4. 10.5 - 8.8

NAMELIST/COLORS/

Name	Type	Description
NCOLOR	I*4	Number of color levels to be used
BOTTOM	I*4	Count value to be assigned color (NCOLOR)
DELTA	I*4	Incremental count for assignment of subsequent levels

A sample run deck setup is as follows:

```
//    EXEC FORTRAGH
//SOURCE.SYSIN DD *
       CALL PGMERC
       STOP
       END
//    EXEC LINKGO,REGION.GO=175K
//LINK.SYSLIB DD DSN=KB.SPGNU.SLOCLIB1,DISP=SHR
//GO.SORTAPE DD UNIT=(9TRACK,,DEFER),DISP=(OLD,KEEP),LABEL=(1,BLP),
//              VOL=SER=13437
//GO.PICTUR    DD DCB=(,DEN=1),LABEL=(,BLP,,OUT),UNIT=(7TRACK,,DEFER),
//              VOL=SER=13436
//GO.SYSUDUMP DD SYSOUT=A
 &POSNS TOPLAT=40.0, BOTLAT=32.0, WESTLN=124., EASTLN=114., CHANEL=3, &END
 &COLORS  HCOLOR=10,  BOTTOM=25,  DELTA=10,  &END
```

SCMR SORTED I, J TAPE FORMAT

File 1 - Header Date BLKSIZE=232, LRECL=232, RECFM=F, DEN=3

Word	Format	Description
1-40	EBCDIC	ID data from raw data tape
42	R*4	Minimum latitude ($+90^{o}$)
43	R*4	Minimum longitude (0^{o} - 360^{o}W)
44	R*4	Maximum latitude ($+90^{o}$)
45	R*4	Maximum longitude (0^{o} - 360^{o}W)
46	I*4	Minimum I
47	I*4	Minimum J (J = 0 to 57600 for longitude = 360^{o}W to 0^{o}W)
48	I*4	Maximum I
49	I*4	Maximum J (I = -22333 to +22333 for latitude = -80^{o} to $+80^{o}$)
50	I*4	Orbit number
51	I*4	Archive start time (HHMMSS)
52	I*4	Archive stop time (HHMMSS)
53	I*4	Buffer number

Word	Format	Description
54	I*4	Channel flag 0 = 8.8 1 = 1.2
55	R*4	Number of J's/Degree longitude = 160
56	I*4	Year } Date of data
57	I*4	Month } Date of data
58	I*4	Day } Date of data

File 2 - Data records BLKSIZE=32000, LRECL=20, RECFM=FB, DEN=3

Bytes	Format	Description
1, 2	I*2	I latitude coordinate position
3, 4	I*2	J longitude coordinate position
5-8	R*4	Channel 1 (8.8) temperature
9-12	R*4	Channel 2 (10.5) temperature
13-16	R*4	Difference (10.5 - 8.8) temperature
17	L*1	Channel 1 (8.8) index
18	L*1	Channel 2 (10.5) index
19, 20	I*2	Difference (10.5 - 8.8) index

SECTION 6 - CATALOG MAINTENANCE PROGRAM

6.1 PROGRAM DESCRIPTION

The purpose of the Catalog Maintenance Program (CMP) is to provide automatic record keeping of NIMBUS SCMR data as it is processed through the various programs of the processing system. This program performs automatically most of the recording functions required to maintain up to date information as to the SCMR data available, the various stages through which it has been processed and the intermediate and terminal locations of this data. In addition, since this information is contained both on resident disk storage and magnetic tape, it is readily accessible for computer sorting and summarization.

The CMP will be called, by each program in the SCMR data processing system, at the beginning and ending of each data interval requested for processing. The first call will establish the catalog entry to be accessed and provide locator information. The last call will complete the entry with information describing the interval. For an interval not previously processed (calibration) a unique Data Set Reference Number (DSRN) will be established for use in identifying this interval by subsequent processing requests (geographic referencing, display) and summary reporting.

The SCMR catalog may be accessed and updated from several processing programs concurrently, obviating the necessity of single run submissions. The one exception to this, is when the request is made for transfer of catalog

data from disk to tape. At this time, all subsequent catalog modifications (updating and replacement) are inhibited to allow verification of transfer prior to overwriting by new data. Release of the catalog is then accomplished by an appropriate call and normal processing may then be continued.

Appropriate messages are issued by the maintenance program relating to the content of the catalog, previous catalog actions and when transfer to tape should be accomplished.

6.2 USER'S GUIDE

The CMP, in addition to the functions performed through calls by the various processing programs, is called upon directly to provide listing or other manipulation of data which it contains. The following describes the options available and the required calling sequence parameters, including those normally used by the processing system. See Appendix A for content of the catalog and Appendix E for the job control cards required for its utilization.

CALL CATLG (IN, IS, LIST)

* IN - Indicates function to be performed

* IS - Identifies source of call (if from a processing program)

LIST - Input data array

IN = 1: Initialize record with requested interval

2: Complete record with interval data

3: Return catalog data for given DSRN (no catalog entry made)

4: Transfer catalog to tape

5: Re-set catalog after successful tape transfer

6: List entire catalog

7: List current run additions to catalog

8: Clear and initialize catalog

9: Replace provided catalog entries

10: Compress the catalog

Delete those entries for which No. of scans [LIST(3)] = 0

IS = 1; Calibration

2; Geographic referencing

3; Display program

* IN and IS must be defined INTEGER*2

Input Data Array

LIST ( )	Description	Format	Source
1	0	I	CAL
	DSRN		All others
2	Orbit no.	I	CAL
3	No. of scans in interval	I	CAL
4	1.2μ flag (= 1 when operational)	I	CAL
5	8.8μ Black body temperature (avg)	F	CAL
6	8.8μ Space voltage (avg)	F	CAL

LIST ( )	Description	Format	Source
7	Calibrated data tape no.	I	CAL
8	Archive data tape no.	I	LOC
9	Interval start time	I	CAL
10	Interval stop time	I	CAL
11	Sub-satellite latitude (start)	F	LOC
12	Sub-satellite longitude (start)	F	LOC
13	Satellite altitude	F	LOC
14	Sub-satellite latitude (stop)	F	LOC
15	8.8μ temperature at 0v (avg)	F	CAL
16	10.9μ temperature at 0v (avg)	F	CAL
17	8.8μ Space temperature (avg)	F	CAL
18	8.8μ Housing temperature (avg)	F	CAL
19	Time jumps	I	CAL
20	10.9μ Black body temperature (avg)	F	CAL
21	10.9μ Space voltage (avg)	F	CAL
22	Microfilm log number	I	DIS
23	Calcomp log number	I	DIS
24	Printer plot log number	I	DIS
25	Sun right ascension	F	LOC
26	Sun declination	F	LOC
27	Sub-satellite longitude (stop)		LOC
28	10.9μ space temperature (avg)	F	CAL

LIST ( )	Description	Format	Source
29	10.9μ housing temperature (avg)	F	CAL
30	Raw data buffer no.	I	CAL
31,32	8-character area	A	CAL
33-40	Not used		

Usage Requirements:

For IN = 4; LIST (1) should contain the tape number to receive the catalog data.

For IN = 5, 8, 9; IS must = 605, to prevent inadvertent modification of catalog data.

For IS ≠ 1; LIST (1) should contain the previously established DSRN in order to provide proper update of the corresponding catalog entry for this interval.

For IN = 9;

LIST (2) = Catalog request no. to be modified
(= 605 to correct maintenance data)

LIST (3) = number of values to be replaced

LIST (I) = catalog word number to be replaced

LIST (I + 1) = replacement value

I = 4, 2*J + 2, 2

Required DD cards: 1, 2, 10 (for IN = 4)

APPENDICES

APPENDIX A - SCMR CATALOG FORMAT

A.1 DIRECT ACCESS CATALOG FILE

The SCMR direct access catalog file is contained on a permanently resident disk storage device within the IBM 360/91 system and is therefore directly accessible by all programs within the SCMR processing system. This file contains 270 data records of 40 words each and provides summary data pertaining to each interval of processed data. Two additional records follow these data records and contain information used by the catalog maintenance program.

A.1.1 Data Record Content

Same as input list described in Section 6.2

A.1.2 Maintenance Record Content

Word No.	Description	Format
1	D. A. record no. of last entry	I
2, 3	Date of last entry	A
4	Source code making last entry	I
5, 6	Date of last initialization	A
7, 8	Date of last tape transfer	A
9	First DSRN in this file	I
10	Last DSRN established	I
11	If $\neq 0$, file being held for transfer validation	I
12	Tape no. of last catalog transfer	I

APPENDIX B - RAW DATA TAPE FORMAT

The SCMR raw data is provided on a single file 9-track 1600 BPI tape containing no more than seven minutes of satellite data. Each digitized data point is represented by a unipolar 8-bit binary code. Data from each channel is interleaved such that odd bytes refer to one data set and even bytes to the other. A header record of 60 bytes provides identification and time information. All data records are of the same length and correspond to one full data scan. As the scanning mirror rotates at 10 rps, this provides a maximum of 4200 records/tape. The content of each record is as follows.

No. of Bytes	
(1) 60	header information
(2) 62	synch pulse N 5 volts
(3) 127	instrument view of space
(4) 186	(0-6v) stairstep calibration through the instrument
(5) 6950	viewed earth data
(6) 374	(0-6v) stairstep calibration (instrument bypassed)
(7) 274	instrument view of the reference black body (V_c)
(8) 62	analog voltage representing temperature of the black body (V_T)

All of these except (1) contain interleaved data from two channels as described above.

When channel 1 substitution takes place (the 1.2μ channel instead of the 8.8μ channel) internal calibration values are used for conversion of 1.2μ channel data to radiance. In this instance, the channel 1 calibration data contained within the record data is only for reference monitoring and not for data conversion.

A complete discussion of the digitization process, associated quality checks performed and the digital tape content may be found in the GSFC document "NIMBUS-E SCMR DATA PROCESSING SYSTEM", I-564-72-404, dated October 1972.

APPENDIX C - CALIBRATED/ARCHIVAL DATA TAPE FORMAT

The end product of the SCMR Data Processing System is the SCMR archive tape containing temperature, radiance and precise geographical locations of the earth scanned points. The SCMR calibration tape is the output of calibration programs and is prepared in identical format to the archive tape. The two tapes are described as a single tape, the only difference being that those data locations in the archive tape containing position data provided by the locator program are set to zeros in the CAL tape.

This tape is a single file 9-track 1600 BPI tape prepared on S360 and has data in BCD/EBCDIC format. The tape has a header record followed by data records containing no more than seven minutes of satellite data. The 8000 byte header record identifies the interval and is followed by up to 4200 records containing the data for each rotation of the scanning mirror. All data records are 8000 bytes long and each earth data point is represented by an 8-bit (0-255) index to the master conversion tables. Data from each channel is interleaved such that odd bytes refer to the 8.8 μ channel (1.2 μ channel when operational). Each data record contains locator information applicable to the beginning of the maximum 7 minute interval followed by geographical reference scans for scanner rotation. The locator information is organized in 32-bit floating points words.

Each scan of geographical reference data contains 101 latitudes plus 101 longitudes of earth viewed points, each point corresponding to a specified nadir angle of the scanning mirror. The first point of the scan corresponds to -50 degrees of nadir angle while successive scan points correspond to nadir angles at 1 degree increments, thus the last scan point belong to +50 degrees of nadir angle. There is one scan for each rotation of the sensor to the maximum of 4200 scans. The contents of header record and data records are described on the following page.

Header Record

Bytes	Word	Format	Description
1-160	1-40	EBCDIC	Data identification from raw data tape
160 -6308	41-1577		Master conversion tables
160 -1188	41-297	R*4	8.8μ temperature
1189-2112	298-553	R*4	Radiance
2113-3236	554-809	R*4	10.9μ temperature
3237-4280	810-1065	R*4	Radiance
4261-5280	1066-1320	R*4	1.2μ voltage
5281-6308	1322-1577	R*4	Radiance
6309-6316	1578-1579	EBCDIC	Calibration processing date (YR/MO/DY)
6317-6328	1780-1782	EBCDIC	Calibration processing time (HR:MN:SS. sss)
6329-6332	1783	R*4	Number of samples per degree nadir angle
6333-6336	1784	R*4	Sample corresponding to 0 degree nadir angle

Data Record

Bytes	Word	Format	Description
1-4	1	I*4	Day of Data
5-8	2	I*4	Record Time (milliseconds of day)
9-10	3	I*2	Channel indicator (0 = 8.8μ; 1 = 1.2μ)
11-12	3-1/2	I*2	Data Flag from raw data record
13-6960	4-1740 1/2	I*1	8-bit indices to master conversion tables e.g. 13 = 8.8 or 1.2; 14 = 10.9; 15 = 8.8 or 1.2; 16= 10.9

Bytes	Word	Format	Description
6961-6964	1741	R*4	Greenwich hour angle of Aries (degrees)
6965-6968	1742	R*4	SSP Latitude (degrees, + 90^{o})
6969-6972	1743	R*4	SSP Longitude (degrees West Longitude)
6973-6976	1744		Spares
6977-6980	1745	R*4	Satellite height (km)
6981-6984	1746	I*4	Day/night/twilight indicator: 0 = day; 1 = twilight; 2 = night
6985-7000	1747-1750		Spares
7000-7404	1751-1851	R*4	Latitude positions (degrees + 90) corresponding to each of the 101 nadir angles
7405-7808	1852-1952	R*4	Longitude positions (degrees W) corresponding to each of the 101 nadir angles

Each scan contains up to 3475 data samples and 101 latitude-longitude points corresponding to specified nadir angles as mentioned above. Given the 101 points, the intermediate latitude-longitude points corresponding to each data sample could be obtained using quadratic interpolation. To maintain the accuracy of computed points within the instrument resolution, the following formula may be used to interpolate intermediate points.

Let (ϕ_1, λ_1), (ϕ_2, λ_2) and (ϕ_3, λ_3) are latitudes-longitudes at intervals t_1, t_2 and t_3 respectively such that $\Delta t = t_3 - t_2 - t_1$. Then, the latitude-longitude (ϕ, λ) at a given point t, where $t_1 < t < t_2$ is given by

$$\phi = \phi_1 + \frac{(t - t_1)}{\Delta t} \cdot (\phi_2 - \phi_1) + \frac{(t - t_1)(t - t_2)}{2(\Delta t)^2} \cdot (\phi_3 - 2\phi_2 + \phi_1)$$

and

$$\lambda = \lambda_1 + \frac{(t - t_1)}{\Delta t} \cdot \left[(\lambda_2 - \lambda_1) + \frac{t - t_2}{2\,\Delta t} \cdot (\lambda_3 - 2\lambda_2 + \lambda_1)\right]$$

APPENDIX D - UTILITY SUBROUTINE DESCRIPTIONS

Name: DATTIM

Calling Sequence: DATTIM (K, ID, IT, ICD, ICT)

Input:

K = 1 to convert data
= 2 to convert time
= 3 to convert both
= 9 to return ID = YYDDD

ID Binary date

IT Binary time

Output:

K = 0 valid data returned
= >0 illegal data, same values as input
= <0 illegal input code (K)

ICD 8 character date (MM/DD/YY)

ICT 12 character time (HH:MN:SS.SSS)

ID Integer date for input K=9 (YYDDD)

Description: This subroutine converts binary time and date to character format for printing and is called primarily by the subroutine SYSDT which accesses the S360 internal time and date.

Name: FILTER

Calling Sequence: FILTER (ARY)

Input:

ARY (1)	Return Code 0=OK, 1=EOF
First Call;	initializes core and gets header data
ARY (11)	orbit number
(12)	buffer
(13)	day
(14)	start time
(15)	stop time
(16)	year

The 40 word header record is transferred to the first 40 words of COMMON/ OUTREC/

Subsequent calls;

ARY (2)	day of data
(3)	record time (ms of day)
(4)	record time (sec of day)
(6)	record date-time (YDDDHHMM)

The data record returned for calibration is transferred to the area of COMMON/ INREC/

Description: This routine initially calls the subroutine RDFLTR to determine whether or not input SCMR data is to be filtered prior to calibration. Appropriate switches are set and for a filter run the necessary additional core storage is obtained. This routine also performs the delay by one scan of the 10.5μ channel data for both filter and non-filter runs. Record time is that associated with the 8.8μ data channel.

Required DD cards: 1,3

Name: PLTRAW

Calling Sequence: PLTRAW

Input: One data card as follows:

COL	
15 - 18	First record to be plotted
33 - 36	Last record to be plotted
47	Channel selection (1=8.8μ, 2=10.5μ 3=both)

Description: This routine produces an output tape for submission to the Calcomp plotter. Each selected record is displayed by a single line plot of approximately 40 inches in length. A maximum of 12 records (6 records if both channels are selected) are displayed on a 30 inch picture at which time the plot is advanced for another set of 12. The plot is identified by orbit and record number.

Required DD cards: 1, 3, 6

Name: PRTRAW

Calling Sequence: PRTRAW (IR1, IR2)

Input:

IR1 First record to be listed

IR2 Last record to be listed

Description: This routine provides a printout of selected records from the SCMR raw data tape. Tape header identification data is unpacked and labeled appropriately. The data for each channel is listed separately and is identified by time and category (sync, space, earth, etc).

Required DD cards: 1, 3

Name: RDFLTR

Calling Sequence: RDFLTR (LIST)

Input: None

Output:

LIST (1)	summation of input matrix of 10.5 data
LIST (2)	summation of input matrix for 8.8 data
LIST (3)	0 = values input for filter run 1 = values not input, no filtering required

Description: This routine is called initially by the subroutine FILTER to read from cards the filtering constants to be used for the filtering of SCMR raw data prior to calibration. If no cards are input, the returned value indicates to the program that an unfiltered calibration is to be run.

Required DD cards: 1

Optional input cards containing 5x5 matrix constants for each channel. Five cards of five values each are required for first the 10.5μ channel and then five cards for the 8.8μ channel. FORMAT (10F5.0)

Name: SCRAW

Calling Sequence: SCRAW (ARRAY, TIME, IER)

Input: None

Output:

IER	Return Code	0 = read OK 1 = end of file

First Call

TIME	N/A	
ARRAY (1-40)	40 words header data	(EBCDIC)
(41)	orbit number	(I)
(42)	buffer number	(I)
(43)	day of data	(I)
(44)	start time	(I, HHMMSS)
(45)	stop time	(I, HHMMSS)

Subsequent calls

TIME	ms of day
ARRAY	8320 words of alternating channel data; channel 1 (8.8μ or 1.2μ) in odd locations and channel 2 (10.5μ) in even locations in the following order:

Word No.	Category	No. of each Channel
1- 62	Sync	62
63- 186	Space	124
187- 560	Int. Cal	374
561-7510	Earth	6950
7511-7884	Ext. Cal	374
7885-8258	Housing	374
8258-8320	Black Body	62

Required DD cards: 1,3

Name: PRTDTA

Calling Sequence: PRTDTA (IR1, IR2, ID1, ID2, NCH)

Input

IR1 First record

IR2 Last record

ID1 First data position in record

ID2 Last data position in record

NCH Channel data to be listed

1 = 8.8μ or 1.2μ channel

2 = 10.9μ channel

3 = Both channels

Description: This routine provides a printout of selected data areas from the calibrated or archive data tape. All tape header identification data is output (including the master conversion tables) followed by the data (index values) from the selected area.

Required DD cards: 1, 4

APPENDIX E - DD CARD REQUIREMENTS

This section lists all DD cards that are required by the various areas of the SCMR Data Processing System. Where applicable, cards are listed twice and are marked as follows:

* Required for initial allocation and initialization.

** Required during normal production operation.

The DD cards required by the various processing programs are listed by number following the User's Guide for that program. Those numbers correspond to the card numbers given here.

1. SCMR Program Library

```
* //DDNAME DD DSNAME=K3.SOGNW.SCMROLIB,DISP=(,CATLG),
//  UNIT=2314,VOL=SER=M2USR2,SPACE=(TRK,(20,,7))
**//LINK.SYSLIB DD DSNAME=K3.SOGNW.SCMROLIB,
    DISP=SHR
```

2. Direct Access Catalog

```
*//GO.FT25F001 DD DSNAME=K3.SOGNW.SCMRCTLG,
    DISP=(,CATLG),
//  UNIT=2314,VOL=SER=M2USR5,SPACE=(100,500),
//  DCB=(,DSORG=DA,RECFM=F,BLKSIZE=100)
**//GO.FT25F001 DD DSNAME=K3.SOGNW.SCMRCTLG,
    DISP=SHR
```

3. Raw Digital Data Tape

```
//GO.SCMRTP DD UNIT=(9TRACK,,DEFER),DISP=(OLD,KEEP),
//  LABEL=(1,BLP),DCB=(RECFM=F,BLKSIZE=8328,
    LRECL=8328),VOL=SER=LXXXX
```

4. CAL/Archive Tape

```
//GO.FT30F001 DD UNIT=(9TRACK,,DEFER),DISP=(OLD,KEEP),
//  LABEL=(1,BLP),DCB=(RECFM=FB,BLKSIZE=32000,
    LRECL=8000),
//  VOL=SER=LXXXX
```

5. Microfilm Plot Tape

```
//GO.WOLF4020 DD DCB=(,DEN=1),LABEL=(,BLP,,OUT),
//  UNIT=(7TRACK,,DEFER),VOL=SER=LXXXX
```

6. CalComp Plot Tape

```
//GO.PLOTAPE DD DCB=(,DEN=1),LABEL=(,BLP,,OUT),
  UNIT=(7TRACK,,DEFER),
//  DSN=RUNID,VOL=SER=LXXXX
```

7. Area Selection Temporary Storage

```
//GO.FT35F001 DD DSN=&TMP3,DCB=DSORG=DA,UNIT=2314,
//  SPACE=(200,25)
```

8. Temporary Storage for Second Channel Data

```
//GO.FT22F001 DD DCB=(RECFM=VBS,BLKSIZE=3508,LRECL=354),
//  DSN=&TMP1,UNIT=2314,SPACE=(CYL,(2,1))
```

9. Temporary Storage for Third Channel Data

```
//GO.FT23F001 DD DCB=(RECFM=VBS,BLKSIZE=3508,LRECL=354),
//  DSN=&TMP2,UNIT=2314,SPACE=(CYL,(2,1))
```

10. SCMR Location Library

```
//LINK.SYSLIB DD DSN=K3.SOGNW.SLOCLIB1,DISP=SHR
```

11. NIMBUS-5 Right Ascension/Declination Tables

```
//GO.FT40F001 DD DSN=K3.SOGNW.LOCTABL,DISP=SHR
```

12. GEOCTR Message Data Set

```
//GO.FT30F001 DD SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,
// BLKSIZE=141)
```

13. Output Archive Tape

```
//GO.FT35F001 DD UNIT=(9TRACK,,DEFER),DISP=(OLD,KEEP),
//  LABEL=(1,BLP),DCB=(RECFM=FB,FLKSIZE=32000,LRECL=8000),
//  VOL=SER=LXXXX
```

14. Input Ephemeris Tape

```
//GO.EPHEM1 DD DISP=SHR,UNIT=(9TRACK,,DEFER),
// LABEL=(1,BLP),VOL=SER=LXXXX
```

```
IEF237I 331    ALLOCATED TO SYSPRINT
IEF237I 231    ALLOCATED TO SYSPRINT
IEF237I 232    ALLOCATED TO SYSPRINT
IEF237I 004    ALLOCATED TO FT08F001
```

D-18436
DAY 346 18:07-18:11
1972

RECORD 1 OF FILE 1
LENGTH = 32000 BYTES

```
CECEC9C9 CDCDC2C2 00C700C4 00D300B0 00B000B0 00B100A0 00B000B1 00B300B4 00B800C4 00B000B0
00B000B0 00B600B7 00B200B1 00B200B1 00B100A0 E2C1D3E3 D3D260C6 A0A0A0A0 A0A000C2 00B000B1
00B800B0 00B700B4 00B000B1 00B800B1 00B100B2 00B000B0 00B000B0 00B100B0 00B100B7 00B200B1
00B200B1 00B300A0 00A000A0 00A000A0 00A000A0 00A000A0 00A000A0 00A000A0 00A000A0 00A000A0
43109000 43109555 43109AAA 43109FFF 4310A555 4310AAAA 4310AFFF 4310B555 4310BAAA 4310BFFF
4310C555 4310CAAA 4310CFFF 4310D555 4310DAAA 4310DFFF 4310E555 4310EAAA 4310EFFF 4310F555
4310FAAA 4310FFFF 43110555 43110AAA 43110FFF 43111555 43111AAA 43111FFF 43112555 43112AAA
43112FFF 43113555 43113AAA 43113FFF 43114555 43114AAA 43114FFF 43115555 43115AAA 43115FFF
43116555 43116AAA 43116FFF 43117555 43117AAA 43117FFF 43118555 43118AAA 43118FFF 43119555
43119AAA 43119FFF 4311A555 4311AAAA 4311AFFF 4311B555 4311BAAA 4311BFFF 4311C555 4311CAAA
4311CFFF 4311D555 4311DAAA 4311DFFF 4311E555 4311EAAA 4311EFFF 4311F555 4311FAAA 4311FFFF
43120555 43120AAA 43120FFF 43121555 43121AAA 43121FFF 43122555 43122AAA 43122FFF 43123555
43123AAA 43123FFF 43124555 43124AAA 43124FFF 43125555 43125AAA 43125FFF 43126555 43126AAA
43126FFF 43127555 43127AAA 43127FFF 43128555 43128AAA 43128FFF 43129555 43129AAA 43129FFF
4312A555 4312AAAA 4312AFFF 4312B555 4312BAAA 4312BFFF 4312C555 4312CAAA 4312CFFF 4312D555
4312DAAA 4312DFFF 4312E555 4312EAAA 4312EFFF 4312F555 4312FAAA 4312FFFF 43130555 43130AAA
43130FFF 43131555 43131AAA 43131FFF 43132555 43132AAA 43132FFF 43133555 43133AAA 43133FFF
43134555 43134AAA 43134FFF 43135555 43135AAA 43135FFF 43136555 43136AAA 43136FFF 43137555
43137AAA 43137FFF 43138555 43138AAA 43138FFF 43139555 43139AAA 43139FFF 4313A555 4313AAAA
4313AFFF 4313B555 4313BAAA 4313BFFF 4313C555 4313CAAA 4313CFFF 4313D555 4313DAAA 4313DFFF
4313E555 4313EAAA 4313EFFF 4313F555 4313FAAA 4313FFFF 43140555 43140AAA 43140FFF 43141555
43141AAA 43141FFF 43142555 43142AAA 43142FFF 43143555 43143AAA 43143FFF 43144555 43144AAA
43144FFF 43145555 43145AAA 43145FFF 43146555 43146AAA 43146FFF 43147555 43147AAA 43147FFF
43148555 43148AAA 43148FFF 43149555 43149AAA 43149FFF 4314A555 4314AAAA 4314AFFF 43148555
43148AAA 4314BFFF 4314C555 4314CAAA 4314CFFF 4314D555 4314DAAA 4314DFFF 4314E555 4314EAAA
4314EFFF 4314F555 4314FAAA 4314FFFF 43150555 43150AAA 43150FFF 43151555 43151AAA 43151FFF
43152555 43152AAA 43152FFF 43153555 43153AAA 43153FFF 43154555 43154AAA 43154FFF 43155555
43155AAA 43155FFF 43156555 43156AAA 43156FFF 43157555 43157AAA 43157FFF 43158555 43158AAA
43158FFF 43159555 43159AAA 43159FFF 4315A555 4315AAAA 4315AFFF 4315B555 4315BAAA 4315BFFF
4315C555 4315CAAA 4315CFFF 4315D555 4315DAAA 4315DFFF 3E616210 3E62246F 3E62E7CD 3E63AC34
3E6471CA 3E65383C 3E65FFB7 3E66C862 3E6791FA 3E685C92 3E692866 3E69F513 3E6AC2CF 3E6B91C7
3E6C619B 3E6D3286 3E6E04A6 3E6ED7A9 3E6FABBB 3E708107 3E71573D 3E722E86 3E7306FE 3E73E061
3E74BADD 3E75969A 3E76733A 3E7750EC 3E782FE2 3E790FC5 3E79F0BA 3E7AD2EF 3E7BB617 3E7C9A52
3E7D7FD0 3E7E6634 3E7F4DBA 3E803679 3E81202C 3E820B05 3E82F71C 3E83E421 3E84D248 3E85C1B3
3E86B206 3E87A381 3E889645 3E8989FD 3E8A7ECB 3E8B74F1 3E8C6C07 3E8D6439 3E8E5DB4 3E8F5823
3E9053B5 3E9150A2 3E924E76 3E934D70 3E944DC0 3E954F05 3E965167 3E975524 3E9859DA 3E995FB1
3E9A66E3 3E9B6F01 3E9C784D 3E9D82E4 3E9E8E84 3E9F9B40 3EA0A961 3EA18876 3EA2C8B0 3EA3DA46
3EA4ECD8 3EA6008C 3EA715A8 3EA82BB4 3EA942F6 3EAA5B90 3EAB752D 3EAC8FEB 3EADAC0F 3EAEC92B
3EAFE774 3EB10727 3EB227D3 3EB349AF 3EB46CED 3EB59130 3EB6B68F 3EB7DD66 3EB90533 3EBA2E2E
3EBB589E 3EBC8402 3EBDB094 3EBEDE8E 3EC00D87 3EC13DB8 3EC26F60 3EC3A1F8 3EC4D5C9 3EC60B03
3EC74137 3EC878B1 3EC9B187 3ECAEB62 3ECC2682 3ECD6300 3ECEA080 3ECFDF45 3ED11F66 3ED26096
3ED3A2FC 3ED4E6DA 3ED62BB8 3ED771C9 3ED8B954 3EDA01CE 3EDB4B98 3EDC96DB 3EDDE30B 3EDF3089
3EE07F72 3EE1CF63 3EE32086 3EE47330 3EE5C6D1 3EE71BB0 3EE87219 3EE9C975 3EEB2211 3EEC7C32
3EEDD756 3EEF33A9 3EF09193 3EF1F06D 3EF35082 3EF4B221 3EF614BC 3EF778A2 3EF8DE00 3EFA445A
3EFBABFE 3EFD1528 3EFE7F4E 3EFFEABA 3F10157A 3F102C59 3F10434C 3F105A59 3F107174 3F1088A4
3F109FED 3F10B745 3F10CEB3 3F10E638 3F10FDCD 3F111578 3F112D3A 3F11450D 3F115CF3 3F1174F4
3F118D03 3F11A528 3F11BD65 3F11D5B2 3F11EE15 3F12068F 3F121F19 3F1237B9 3F125071 3F126939
3F128216 3F129B0D 3F12B412 3F12CD2D 3F12E661 3F12FFA5 3F1318FE 3F13326F 3F1348F1 3F136587
3F137F38 3F1398F7 3F13B2CC 3F13CCB9 3F13E6B7 3F1400CA 3F141AF6 3F143532 3F144F83 3F1469EE
3F148468 3F149EF8 3F14B9A1 3F14D45A 3F14EF28 3F150A0F 3F152506 3F154013 3F155B38 3F15766E
3F1591BA 3F15AD1F 3F15C893 3F15E41C 3F15FFC1 3F161B74 3F16373D 3F165320 3F166F11 3F153B18
3F16A73B 3F16C36B 3F16DFB1 3F16FC11 3F171882 3F173507 3F1751A7 3F176E56 3F178B19 3F17A7F9
3F17C4E7 3F17E1EA 3F17FF08 3F181C36 3F183978 3F1856D5 3F187442 3F1891C4 3F18AE60 3F18CD0D
3F18EACE 3F1908AA 3F192695 3F194496 3F1962B1 3F1980DC 3F199F1A 3F19BD77 3F19DBE1 3F19FA60
3F1A18FA 3F1A37A4 3F1A5662 3F1A753C 3F1A9425 3F1AB323 3F1AD23D 3F1AF165 3F1B10A5 3F1B2FFD
3F1B4F66 3F1B6EE3 43109000 43109555 43109AAA 43109FFF 4310A555 4310AAAA 4310AFFF 4310B555
4310BAAA 4310BFFF 4310C555 4310CAAA 4310CFFF 4310D555 4310DAAA 4310DFFF 4310E555 4310EAAA
4310EFFF 4310F555 4310FAAA 4310FFFF 43110555 43110AAA 43110FFF 43111555 43111AAA 43111FFF
43112555 43112AAA 43112FFF 43113555 43113AAA 43113FFF 43114555 43114AAA 43114FFF 43115555
43115AAA 43115FFF 43116555 43116AAA 43116FFF 43117555 43117AAA 43117FFF 43118555 43118AAA
43118FFF 43119555 43119AAA 43119FFF 4311A555 4311AAAA 4311AFFF 4311B555 4311BAAA 4311BFFF
4311C555 4311CAAA 4311CFFF 4311D555 4311DAAA 4311DFFF 4311E555 4311EAAA 4311EFFF 4311F555
4311FAAA 4311FFFF 43120555 43120AAA 43120FFF 43121555 43121AAA 43121FFF 43122555 43122AAA
43122FFF 43123555 43123AAA 43123FFF 43124555 43124AAA 43124FFF 43125555 43125AAA 43125FFF
43126555 43126AAA 43126FFF 43127555 43127AAA 43127FFF 43128555 43128AAA 43128FFF 43129555
```

43129AAA	4312 9FFF	4312A555	4312AAAA	4312AFFF	4312B555	4312BAAA	4312BFFF	4312C555	4312CAAA
4312CFFF	4312D555	4312DAAA	4312DFFF	4312E555	4312EAAA	4312EFFF	4312F555	4312FAAA	4312FFFF
43130555	43130AAA	43130FFF	43131555	43131AAA	43131FFF	43132555	43132AAA	43132FFF	43133555
43133AAA	43133FFF	43134555	43134AAA	43134FFF	43135555	43135AAA	43135FFF	43136555	43136AAA
43136FFF	43137555	43137AAA	43137FFF	43138555	43138AAA	43138FFF	43139555	43139AAA	43139FFF
4313A555	4313AAAA	4313AFFF	4313B555	4313BAAA	4313BFFF	4313C555	4313CAAA	4313CFFF	4313D555
4313DAAA	4313DFFF	4313E555	4313EAAA	4313EFFF	4313F555	4313FAAA	4313FFFF	43140555	43140AAA
43140FFF	43141555	43141AAA	43141FFF	43142555	43142AAA	43142FFF	43143555	43143AAA	43143FFF
43144555	43144AAA	43144FFF	43145555	43145AAA	43145FFF	43146555	43146AAA	43146FFF	43147555
43147AAA	43147FFF	43148555	43148AAA	43148FFF	43149555	43149AAA	43149FFF	4314A555	4314AAAA
4314AFFF	4314B555	4314BAAA	4314BFFF	4314C555	4314CAAA	4314CFFF	4314D555	4314DAAA	4314DFFF
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43154FFF	43155555	43155AAA	43155FFF	43156555	43156AAA	43156FFF	43157555	43157AAA	43157FFF
43158555	43158AAA	43158FFF	43159555	43159AAA	43159FFF	4315A555	4315AAAA	4315AFFF	4315B555
4315BAAA	4315BFFF	4315C555	4315CAAA	4315CFFF	4315D555	4315DAAA	4315DFFF	3E6DD512	3E6E8C79
3E6F44A1	3E6FFD86	3E708743	3E71719D	3E722CBC	3E72E8B2	3E73A54D	3E7462A5	3E7520D8	3E75DFAD
3E769F3D	3E775FB3	3E7820BC	3E78E28A	3E79A539	3E7A6884	3E7B2C93	3E7BF184	3E7CB715	3E7D7D5D
3E7E4487	3E7F0C57	3E7FD4DD	3E809E4D	3E816863	3E82332F	3E82FEE7	3E83CB2F	3E84983C	3E856638
3E8634CB	3E87041D	3E87D459	3E88A52C	3E8976C9	3E8A494C	3E8B1C67	3E8BF03D	3E8CC50E	3E8D9A68
3E8E7089	3E8F4799	3E901F45	3E90F784	3E91D105	3E92AAF5	3E9385AC	3E946146	3E953D7F	3E961A7D
3E96F866	3E97D6EF	3E98B631	3E999666	3E9A7739	3E9B58C5	3E9C3B44	3E9D1E5D	3E9E0239	3E9EE6FD
3E9FCC65	3EA0B288	3EA199A5	3EA28156	3EA369D0	3EA45331	3EA53D28	3EA627E5	3EA713A1	3EA7FFE2
3EA8ECF7	3EA9DAFC	3EAAC98F	3EABB8EA	3EACA937	3EAD9A1B	3EAE8BCE	3EAF7E66	3EB07196	3EB16593
3EB25A80	3EB35001	3EB44650	3EB53D8B	3EB6355C	3EB72DF6	3EB82780	3EB921A5	3EBA1C8A	3EBB1865
3EBC14DB	3EBD1210	3EBE103C	3EBF0F00	3EC00E8C	3EC10F02	3EC2101C	3EC311EE	3EC414C5	3EC51823
3EC61C52	3EC72178	3EC82721	3EC92D9B	3ECA350D	3ECB3D17	3ECC45E6	3ECD4FA8	3ECE5A03	3ECF6521
3ED0712F	3ED17DD7	3ED28B3E	3ED399B4	3ED4A8A3	3ED5B85C	3ED6C917	3ED7DA62	3ED8EC7A	3ED9FF82
3EDB1319	3EDC277A	3EDD3CD9	3EDE52C5	3EDF6978	3EE0811C	3EE19968	3EE2B25B	3EE3CC68	3EE4E6F2
3EE6023F	3EE71E94	3EE83B73	3EE95912	3EEA77BB	3EEB96EA	3EECB6DB	3EEDD7D2	3EEEF94D	3EF01B93
3EF13ED4	3EF262A2	3EF3873F	3EF4ACD5	3EF5D2E7	3EF6F9D0	3EF82186	3EF94A23	3EFA7358	3EF39D86
3EFCC84A	3EFDF3D4	3EFF2058	3F1004D6	3F101783	3F102A9F	3F103D96	3F105097	3F1063AA	3F1076C4
3F1089EC	3F109D22	3F10B062	3F10C3AE	3F10D709	3F10EA6E	3F10FDDF	3F11115F	3F1124E9	3F11387E
3F114C24	3F115FD2	3F11738B	3F118756	3F119B29	3F11AF08	3F11C2F6	3F11D6EE	3F11EAF2	3F11FF06
3F121322	3F12274A	3F123B83	3F124FC3	3F126411	3F12786D	3F128CD4	3F12A145	3F12B5C6	3F12CA50
3F12DEE7	3F12E38D	3F13083C	3F131CF6	3F1331C1	3F134695	3F135B73	3F137064	3F13855B	3F139A5F
3F13AF73	3F13C48F	3F13D9B6	3F13EEEF	3F14042F	3F14197B	3F142ED8	3F14443D	3F1459AE	3F146F2E
3F148488	3F149A4D	3F14AFF2	3F14C59F	3F14DB59	3F14F122	3F1506F4	3F151CD0	3F1532BF	3F1548B4
3F155EB6	3F1574C8	3F158AE0	3F15A107	3F15B73C	3F15CD7B	3F15E3C4	3F15FA1E	3F16107F	3F1626ED
3F163D6B	3F1653F2	3F166A82	3F168124	3F1697CE	3F16AE83	3F16C548	3F16DC17	3F16F2F0	3F1709D8
3F1720CA	3F1737C8	3F174ED4	3F1765EA	3F177D09	3F17943A	3F17AB73	3F17C2B8	3F17DA0C	3F17F169
3F1808D0	3F182048	3F1837C7	3F184F54	00000000	3F666666	3FCCCCCC	40133333	40199999	401FFFFF
40266666	402CCCCC	40333333	40399999	403FFFFF	40466666	404CCCCC	40533332	40599999	405FFFFF
40666666	406CCCCC	40733332	40799999	407FFFFF	40866665	408CCCCC	40933332	40999999	409FFFFF
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2F812F81	2F812E81	2E812E81	2E812E81	2F812F81	30813181	32813281	33813581	36813981	3D813F81
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3E813B81	3A813981	38813881	37813781	37813781	37813781	36813681	35813581	33813381	33813281
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00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000
00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

                                    550 RECORDS IN FILE   1 OF TAPE

IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS75104.T142007.RV000.YZJRJDN2.LODMOD          PASSED
IEF285I   VOL SER NOS= K3SCR3.
IEF285I   SYS75104.T142007.RV000.YZJRJDN2.S0000514        SYSIN
IEF285I   VOL SER NOS= K3SCR4.
IEF285I   SYS75104.T142007.RV000.YZJRJDN2.S0000514        DELETED
IEF285I   VOL SER NOS= K3SCR4.
IEF285I   SYS75104.T142007.SV000.YZJRJDN2.R0000510        SYSOUT
IEF285I   VOL SER NOS= K3SCR4.
IEF285I   SYS75104.T142007.SV000.YZJRJDN2.R0000511        DELETED
IEF285I   VOL SER NOS= K3SCR3.
IEF285I   SYS75104.T142007.SV000.YZJRJDN2.R0000512        DELETED
IEF285I   VOL SER NOS= K3SCR4.
IEF285I   SYS75104.T142007.RV000.YZJRJDN2.R0000513        KEPT
IEF285I   VOL SER NOS= Z0996 .
IEF280E K 0D4,Z0996 ,YZJRJDN2,GO
IEF373I STEP /GO       / START 75104.1827
IEF374I STEP /GO       / STOP  75104.1834 CPU    0MIN 22.15SEC MAIN 186K LCS    0K
- STEP 03 -     RETURN CODE = 0000                                  STEP TIME =      .67 MINS=(CPU=      .36,IO=      .31)
                                        IO IN SECS. DISK=     7.20,DRUM=      .38,TAPE=    11.09,CEL_=      .00,OTHR=      .14
IEF285I   SYS75104.T142007.RV000.YZJRJDN2.LODMOD          DELETED
IEF285I   VOL SER NOS= K3SCR3.
IEF375I  JOB /YZJRJDN2/ START 75104.1817
IEF376I  JOB /YZJRJDN2/ STOP  75104.1834 CPU    0MIN 31.69SEC
-   SYSTEM=MVT-21 (11-21-73)   K3                                                  TIME=18.34.43.85 DATE=04-14-75
- JOB 0369-                                                  TOTAL TIME =     1.20 MINS=(CPU=      .52,IO=      .68)
                                        IO IN SECS. DISK=    18.02,DRUM=     1.10,TAPE=    22.20,CEL_=      .00,OTHR=      .38
 THERE WERE 03 TAPES MOUNTED FOR THIS JOB. TAPE MOUNT CHARGE WAS 00.0 MINUTES.
```

```
//XXGO       EXEC PGM=*.LINK,SYSLMOD,COND=(4,LT),REGION=70K                    00000230
//XXFT05F001 DD   DDNAME=DATA5                                                 00000240
//XXFT06F001 DD  SYSOUT=&OUT,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=&BLKSIZE)       00000250
IEF653I SUBSTITUTION JCL - SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265)
//XXFT07F001 DD  SYSOUT=B,DCB=(RECFM=FB,BLKSIZE=7280,LRECL=80)                00000260
//XXSYSPRINT DD  SYSOUT=&OUT,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=&BLKSIZE),      00000270
IEF653I SUBSTITUTION JCL - SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265),
//XX             SPACE=(CYL,(0,1)),UNIT=(DISK,3)                             00000280
//GO.FT08F001 DD UNIT=9TRACK,DISP=(OLD,KEEP),LABEL=(01,BLP,,IN),
//         DCB=(BLKSIZE=32000,RECFM=U,DEN=3),
//            VOL=SER=JJ0012
//GO.DATA5 DD *
//
IEF236I ALLOC. FOR YZJRJCA2 GO
IEF237I 231   ALLOCATED TO PGM=*.DD
IEF237I 232   ALLOCATED TO FT05F001
IEF237I 231   ALLOCATED TO FT06F001
IEF237I 231   ALLOCATED TO FT07F001
IEF237I 232   ALLOCATED TO SYSPRINT
IEF237I 231   ALLOCATED TO SYSPRINT
IEF237I 331   ALLOCATED TO SYSPRINT
IEF237I 0D3   ALLOCATED TO FT08F001
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<

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                                   RECORD     1  OF FILE    1
                                   LENGTH =  32000  BYTES
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D-21985
12/17/72
Day 352 18:21 - 18:23

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00B200B2  00B500A0  00CA00A0  00A000A0  00A000A0  00A000A0  00A000A0  00A0C0A0  00A000A0  00A000A0
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3F121322	3F12274A	3F123B83	3F124FC3	3F126411	3F127860	3F128CD4	3F12A145	3F12B5C6	3F12CA50
3F12DEE7	3F12F38D	3F13083C	3F131CF6	3F1331C1	3F134695	3F135B73	3F137064	3F13855B	3F139A5F
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3F148488	3F149A4D	3F14AFF2	3F14C59F	3F14DB59	3F14F122	3F1506F4	3F151CD0	3F1532BF	3F1548B4
3F155EB6	3F1574C8	3F158AE0	3F159F07	3F15B73C	3F15CD78	3F15E3C4	3F15FA1E	3F16107F	3F1626ED
3F163D6B	3F1653F2	3F166A82	3F168124	3F1697CE	3F16AE83	3F16C548	3F16DC17	3F16F2F0	3F1709D8
3F1720CA	3F1737C8	3F174ED4	3F1765EA	3F177D09	3F17943A	3F17AB73	3F17C2B8	3F17DA0C	3F17F169
3F1808D0	3F182048	3F1837C7	3F184F54	00000000	3F666666	3FCCCCCC	40133333	40199999	401FFFFF
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40E66665	40ECCCCB	40F33332	40F99998	40FFFFFF	41106666	4110CCCC	41113333	41119999	4111FFFF
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