SENSOR/INSTRUMENT: LIMS

TAPE SPEC. NO. T564111, REVISION C DATED ~~5/24/78~~ 07/15/81

SPEC. TITLE LIMS PROFILE R TAPE
78-0989-01F

REVIEWED BY: Paul Bailey DATE 7/17/80

APPROVED BY: _____ DATE _____
Gary Wolford
NOPS Manager

B 5-24-78

C 07-15-81 BJG

NIMBUS G

NIMBUS OBSERVATION PROCESSING SYSTEM (NOPS)

REQUIREMENTS DOCUMENT #NG-67

TAPE SPECIFICATION T564111

LIMS PROFILE R TAPE

PREPARED BY: Richard Stephenson DATE: 5/24/78

Rev. A includes new Standard Header and the removal of the parameter and radiance profiles. Creation of LIMS Profile R Tape.

[illegible] Revised old Tape II [illegible] with new Tape III [illegible]

07-15-81 added new standard header

ABSTRACT

The LIMS Profiles R Tape will be a 9 track 1600 BPI Tape generated at NCAR. The first file will contain two identical STANDARD HEADER records written in EBCDIC. Each subsequent file will contain daily data. This tape may contain up to 62 days of profiles.

However, the number of days of data put on the tape will ultimately be determined by the record count. Only complete files will be written and the tape will be terminated with a double end of file.

I. REQUIREMENT IDENTIFICATION

LIMS Profiles R Tape Specification Number T564111.

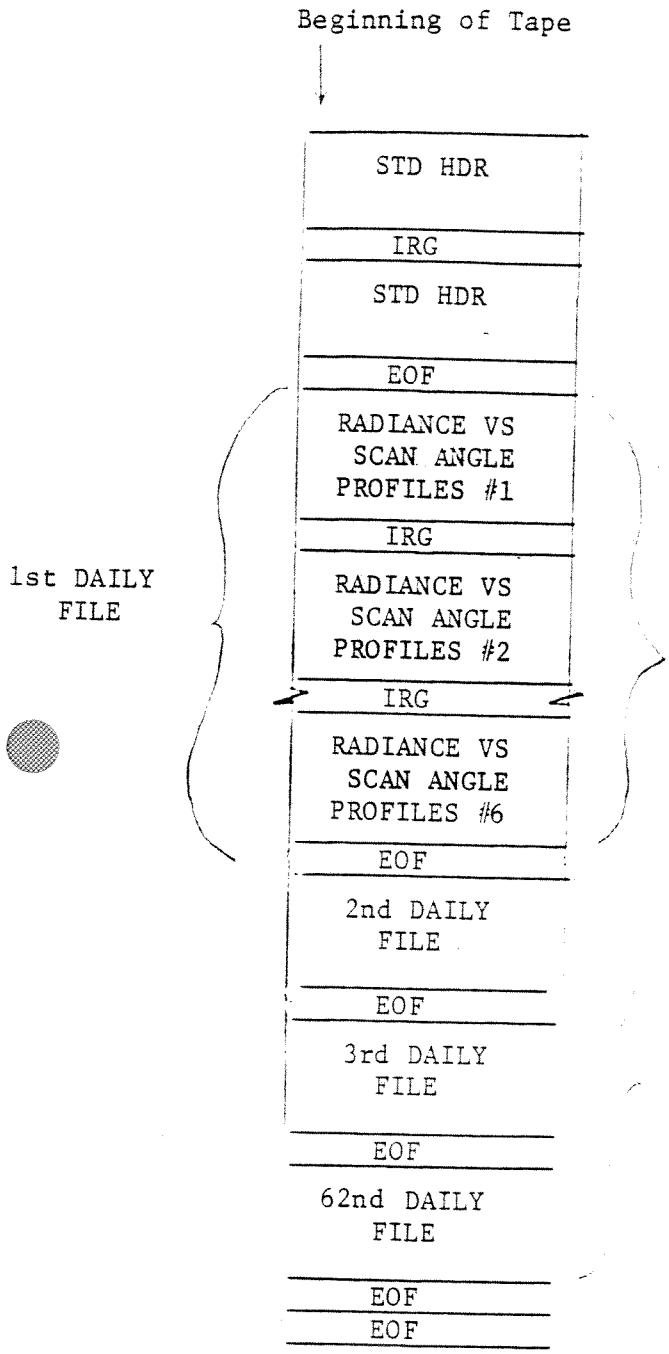
II. INPUT DATA SOURCE

LIMS, ILT, Tape Specification Number T526031.

III. OPERATING MODE

Daily profile data will be output in consecutive day number order. Only complete files will be output, which will be up to 62 per tape. Missing data, if it covers an entire one day file period, will cause the reduction of files by one for each one day file period that data is missing. The tape will be terminated with a double end of file, when the data span on the tape has reached two months or the record count in the last completed file has reached or exceeded a total record count of 3300 physical records. Optionally, shorter spans, could be input. See appendix A for tape length calculations. The above termination system assumes that a maximum of 230 profile frames will be in the last file.

IV. GROSS FORMAT



1 DAILY SET OF "RADIANCE VS SCAN ANGLE PROFILES" PLACED IN ASCENDING ORBIT NO. ORDER AND TIME ORDER.

TAPE MAY CONTAIN UP TO 62 DAY FILES DEPENDING UPON MISSING FILES (NO DATA) AND TOTAL NUMBER OF PHYSICAL RECORDS WRITTEN ON TAPE.

LAST FILE WILL NOT EXCEED 230 PHYSICAL RECORDS.

effective date ____

STANDARD HEADER SPECIFICATION AND TAPE DOCUMENTATION

V.1 GENERAL

All computer compatible tapes (CCT's) that are used as interfaces within NOPS require some form of identification. This applies to all CCT's that are currently defined by a NOPS tape specification, and that are also used for distribution or archiving purposes.

In addition to defining a "latest" product, data relating to previous products that went into the making of the "latest" product provides useful information when system problems occur.

The purpose of this revision to existing NOPS tape specifications is to define a scheme that allows the recording of the genealogy of a "latest" product, and in general adheres to existing tape documentation standards.

In brief the system is as follows:

1. A documentation file that consists of a string of physical records <u>follows</u> the data on any tape defined by a current NOPS tape specification. This will be referred to as a Trailing Documentation File (TDF), and be the last file on a tape when it exists.

2. The standard NOPS header file remains as defined, with minor modifications to the standard header record that reflect both the existence of a TDF and adherence to the IPD standard for sequence numbers.

The following sections define the NOPS standard header records and file, and the TDF. Data files as currently defined in NOPS tape specification remain unchanged.

V.2 STANDARD HEADER RECORD (SHR)

The SHR will consist of one physical record that consists of 5 logical records of 126 EBCIDIC characters. The first 126 characters will remain as previously defined with the exception of CHARACTER 1, and those characters that define the sequence number (40-45). CHARACTER 1 will contain an asterisk (*) and serve to notify all systems that a TDF is likely to follow the main data files and that the next logical record contains information relevant to complete identification. As of the implementation date of this specification, all sequence numbers will have the following form that is an IPD standard:[1]

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[1]This does not apply to CZCS Data. For CZCS data, CHARACTERS 40 to 45 represent a 6-digit sequence number.

CHARACTER 40 = The last digit of the year in which the data were acquired.

CHARACTER 41-43 = Julian day of the year in which the data were acquired.

CHARACTER 44 = Sequence number for this particular product (usually a 1) (e.g., CLDT's will have a 1 and 2, as there are 2 products per day).

CHARACTER 45 = The existing hyphen remains unless there is a remake of the tape for any reason. In this case, an ascending alpha character will replace the hyphen, and the most recent reasons for remake will be recorded in logical record 4 of the header.

CHARACTER 47 = This will remain as a blank unless it is needed to remove ambiguities in CHARACTER 40. This may occur if data are being acquired on October 24, 1988.

This scheme will uniquely identify any tape when used in conjunction with the tape specification number, the PDFC code, and the subsystem identification.

The second logical record consisting of 126 characters will contain information that is required to complete the history of the product.

CHARACTER 1-12 = Software program name and version number.

CHARACTER 13-18 = Program documentation reference number, if it exists.

CHARACTER 20-126 = User defined comments that may be more relevant to the user than the preceding ones.

The NOPS standard header file will continue to consist of 2 records, the second being a duplicate of the first. Logical records 3 and 4 may be used for anything desired if no remake information is required.[2]

V.3 TRAILING DOCUMENTATION FILE (TDF)

The TDF will consist of all NOPS standard header records (non-duplicated) that relate to products that have gone into the making of the current product. Documentation records will be

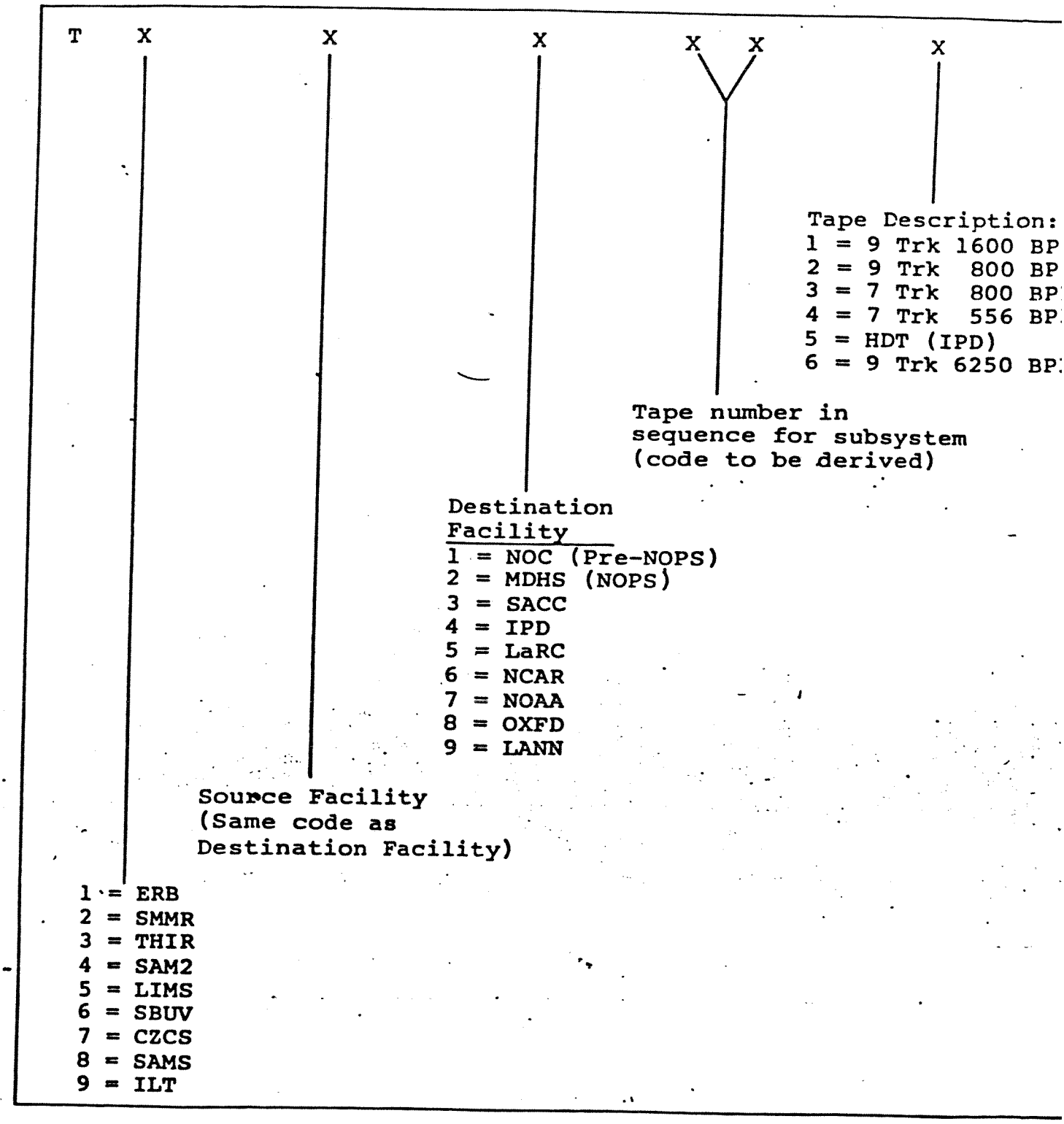
[2]In the case of CZCS these logical records are used to define the genealogy of the image rather than the method of V.3.

sequenced in accordance with their access; that is, first in is the first recorded. Every TDF is 630 bytes in length.

The first record of this file will serve to identify the file as a TDF. This will be accomplished by placing asterisks in CHARACTERS 1 to 10 followed by NOPS TRAILER DOCUMENTATION FILE FOR TAPE PRODUCT T [SPEC NO (6 digits)] GENERATED ON DDD HH MM. The exact spacing of this comment is noncritical as long as it is less than 116 characters. The second physical record will be a repeat of the header file NOPS standard header record for this type with the proviso that data referring to the end-time are correct for the data set. Following physical records will be an accumulation of TDF's of all input tapes. For those products that require more than one tape, the TDF will appear on the last tape only as well as the warning asterisk.

Table V-1

NOPS Specification Numbering Code



TAPES: A six digit number prefixed with a T to denote TAPE will be used.

Rev. D adds 6250 bpi tapes as a possible product

Total 24 bit Words	MSB 24 22 20 18 16 14 12 10 8 6 4 2 LSB 1	Total Bits
1	• Nimbus - 7 $_b$NOPS$_b$SPEC$_b$ NO$_b$T └If TDF exists (24 Characters)	
8		192
9	SPEC NO. (6 Digits)	
10	$_b$SQ$_b$NO$_b$ (7 Characters)	
13	PDFC CODE (2 Char.)	
14	5 Digit Sequence No. (5 Characters) YJJJN *For CZCS these characters (40-45) are a	
15	six digit sequence # (includes Redo) REDO CHARACTER	408
16	1 Char..Tape Copy No Blank Character	
17	(4 Characters) SUBSYSTEM I.D.	
18	Blank Character SOURCE FACILITY	
19	(4 Characters) Blank Character	
20	(T) Character (Ø) Character Blank Character	
21	(4 Characters) DESTINATION FACILITY I.D.	
22	(23 Characters)	
29	START YEAR, DAY, HOURS, MINUTES, SECONDS $_b$START$_b$19XX$_b$DDD$_b$HHMMSS$_b$	696
36	END DATE AND TIME OF DATA (19 Characters) TO$_b$19XX$_b$DDD$_b$HHMMSS$_b$ * Some Facilities may not include end time in header (20 Characters)	
42	DATE AND TIME TAPE WAS GENERATED GEN$_b$19XX$_b$DDD$_b$HHMMSS$_b$	1008
84	BLANK (126 Characters) SW Program Name (1-12) Documentation (13-18) Comments (19-126)	2016
126	BLANK (126 Characters)	3024
168	BLANK (126 Characters)	4032
210	BLANK (126 Characters)	5040

EBCDIC TAPE FORMAT

Figure V -1. Standard Header (Physical Record Format)
(1 Character = 8 bits)

The STD HDR will contain the following:

Two identical records (physical) of 630 characters (eight bits each followed by an end-of-file.

The first 126 characters of the first record will consist of:

*NIMBUS-7$_b$NOPS$_b$SPEC$_b$NO$_b$T └ optional	(1 - 24 Character Count)
XXXXXX (96 digit spec number)	(25 - 30 Character Count)
$_b$SQ$_b$NO$_b$	(31 - 37 Character Count)
AA XXXXX (5 digit sequence No.)	(38 - 44 Character Count)

NOTE: If sequence number is zero, tape is not a finished product (i.e., definitive ephemeris not used, artificial VIP data, etc.) *

┌ redo character -X (copy number 1 or 2)	(45, 46 Character Count)
$_b$YYYY$_b$ (4 character subsystem ID)	(47 - 52 Character Count)
YYYY (Generation Facility ID)	(53 - 56 Character Count)
$_b$TO$_b$YYYY (4 Char. Des. Fac. ID)	(57 - 64 Character Count)
$_b$START$_b$19XX$_b$DDD$_b$HHMMSS$_b$ (Start year, day of year, hours, minutes, seconds)	(65 - 87 Character Count)

*For CZCS, characters 40 to 45 are a 6-digit sequence number.

$_bTO_b19XX_bDDD_bHHMMSS_b$ (88 - 106 Character Count)

(End data and time of data)

$GEN_b19XX_bDDD_bHHMMSS_b$ (107 - 126 Character Count)

(Date and time tape was generated)

The second group of 126 characters will contain continuation documentation of the original 126 characters when required.

The third, fourth, and fifth groups of 126 characters each are intended for the use of the subsystem analysts for further identifications of their data. They may contain blanks, EBCDIC, BDC, or binary characters or zeros.

The second record in the file is a duplicate of the first record for redundancy.

The PDFC codes are as defined in Table V-2.

EXAMPLE: An ERB matrix tape covering the month of February 1979 is generated by SACC and sent to IPD for production of contour maps on 16 mm microfilm. The NOPS STD HDR file on the tape that IPD receives would contain two of the following records.

$*NIMBUS-7NOPS_bSPEC_bNO_bT134031_bSO_bNO_b$

1st day of time period

AA90321-2$_b$ERB$_{bb}$SACC$_b$TO$_b$IPD$_{bb}$START$_b$1979$_b$

032$_b$000432$_b$TO$_b$1979$_b$059$_b$235742$_b$GEN$_b$

1979$_b$104$_b$094500$_b$followed by 504 blanks

First day of time period may not be first data day in the event of multiday-stacked products that are based in an ILT week.

V.4 TAPE DUPLICATION

It has been determined that the duplication of master tapes is neither time nor cost effective, thus the requirement of duplication implied in the preceding specification is rescinded. However, some tapes that require a great deal of effort to produce in terms of manpower and computer time should be duplicated.

If a redo is required due to tape errors or algorithm changes, this will be noted both on the CCT (HEADER C-45) and on the canister.

V.5 SHIPPING LETTERS

IPD will include a shipping letter with every tape distributed. The shipping letter will be printed directly from the first 126 (or 138)

characters of the first physical record of SHF. In the event of copies made from CCT's that are not generated in IPD, a new physical record reflecting IPD as the source and the Nimbus experimenter to whom the tape is being sent as the destination, will be added as the second record of the TDF. All existing records in the TDF will be pushed down, but none will be lost. This record should also replace those in the SHF.

NIMBUS-G PROJECT DATA FORMAT CODES (MAY 5, 1980) REV. FROM MARCH 3, 1980

SENSOR	TAPE ID	ORIG.	COPIES	PDF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
ERB	MATRIX	12	72	AA	MAAA	D RED	/ L RED
	TABLES	12	-	AB	TAAB	D RED	/ D PINK
	MAT*	365	2555	AC	MTAC	D RED	/ D RED
	SEFOT*	12	84	AD	SEAD	D RED	/ YELLOW
	ZMT*	2	14	AE	ZMAE	L RED	/ L PINK
	STAGS	1	-	AG	STAG	D RED	/ D ORANGE
TOTALS		*379	2653				
	OTHER	25	72				

SENSOR	TAPE ID	ORIG.	COPIES	PDF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
LIMS	MATRIX-M	14	28	EA	MAEA	YELLOW	/ BLUE
	MATRIX-C	14	28	EB	MAEB	YELLOW	/ L GREEN
	PROFILE-R	7	14	EC	PREC	YELLOW	/ L PINK
	PROFILE-I	21	42	ED	PRED	YELLOW	/ M TAN
	RAT*	210	945	EE	RAEE	YELLOW	/ D PINK
	IPAT*	105	347	EF	IPEF	YELLOW	/ D ORANGE
	MAT*	70	294	EG	MTEG	YELLOW	/ YELLOW
	CAT*	70	210	EH	CTEH	YELLOW	/ GREY
	SMAT*	7	28	EI	SMEI	YELLOW	/ L BROWN
	SCAT*	7	21	EM	SCEM	YELLOW	/ D GREEN
	NMCT@	52	-	EK	NMEK	YELLOW	EXP LABEL
	UFO@	295	-	UE	UFUE	YELLOW	EXP LABEL
	ILT@	30	-	LE	ILLE	YELLOW	EXP LABEL
TOTALS		*469	1845				
		@377	-				
	OTHER (R)	56	112				

SENSOR	TAPE ID	ORIG.	COPIES	PDF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
SMMR	MATRIX-30	12	-	BA	MABA	L TAN	/ YELLOW
	MATRIX-LO	12	-	BB	LOBB	L BRWN	/ L GRN
	MATRIX-SS	12	-	BC	SSBC	L BRWN	/ L ORAN
	MAP-30*	12	60	BD	MPBD	L BRWN	/ L PINK
	MAP-LO*	12	60	BE	LOBE	L BRWN	/ BLUE
	MAP-SS*	12	60	BF	SSBF	M TAN	/ M TAN
	PARM-30*	60	360	BG	PABG	M TAN	/ YELLOW
	PARM-LO*	30	150	BH	LOBH	M BRWN	/ YELLOW
	PARM-SS*	30	120	BI	SSBI	M BRWN	/ M BRWN
	TAT*	183	732	BJ	TABJ	D BRWN	/ YELLOW
	CELL-ALL*	61	427	BK	DEBK	D BRWN	/ L GRN
TOTALS		*400	1969				
	OTHER	36	-				

SENSOR	TAPE ID	ORIG.	COPIES	PDF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
SBUV/ TOMS	MATRIX	24	216	FA	MAFA	D GRN	/ D ORAN
	TABLES	12	-	FB	TAFB	L GRN	/ L PINK
	MONTAGE	52	-	FC	MOFC	D GRN	/ D PINK
	RUT-S*	26	26	FD	SRFD	GREY	/ D GRN
(R)	OZONE-S*	12	100	FE	OSFE	L GRN	/ L BRWN
(R)	OZONE-T*	180	1440	FF	OTFF	D GRN	/ D GRN
	ZMT*	2	16	FH	ZMFH	L GRN	/ L PINK
	RUT-T*	120	120	FJ	TRFJ	D GRN	/ YELLOW
TOTALS (R)		*340	1702				
	OTHER	88	216				

SENSOR	TAPE ID	ORIG.	COPIES	PDF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
THIR	SOURCE	5110	-	IA	SOIA	D ORAN	/ D ORAN
	STT	1095	-	IB	STIB	D ORAN	/ YELLOW
	BSHT	365	-	IC	BSIC	D RED	EXP LABEL
	CLDT	730	1460	ID	CLID	D ORAN	/ D GRN
	CLE	219	1095	IE	CLIE	D ORAN	/ D PINK
	CLT	365	1825	IF	CLIF	M ORAN	/ GREY
	ILT-T	52	-	LI	ILLI	L ORAN	/ L PINK
	ILT-C	52	-	LC	ILLC	L ORAN	/ L BRWN
TOTALS (R)		7988	4380				

SENSOR	TAPE ID	ORIG.	COPIES	PDF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
CZCS (R)	CRT360*	100	400	ZI	CRZI	BLUE	/ BLUE
	SOURCE	4500	-	ZA	SOZA	STANDARD STA LAB	
(R)	CRCST*	250	1000	ZB	CRZB	BLUE	/ D GRN
	CAT	12	96	ZC	CAZC	BLUE	/ D ORAN
	CRT-L	900	1800	ZD	CRZD	BLUE	/ YELLOW
	ILT	52	-	LZ	ILLZ	BLUE	/ M TAN
(R)	CRT	2750	5500	ZE	CRZE	BLUE	/ D GRN
	ILT-L@	52	-	LL	ILLL	BLACK	EXP LABE
(R)	CCT-F	225	-	ZH	CCZH	BLUE	/ PINK
(R)	LOIT#	250	-	ZF	LOZF	L GRN	/ GREY
(R)	DPIT#	250	-	ZG	DPZG	GRN	/ BLUE
TOTALS (R)		*350	1400				
		@ 52	-				
(R)		#500	-				
(R)		8439	7446				

SENSOR	TAPE ID	ORIG.	COPIES	PDF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
SAM II	MATRIX	4	24	DA	MADA	D PURP	/ D PURP
	PROFILE	12	72	DB	PRDB	D PURP	/ D ORAN
	RDAT*	12	72	DC	RDDC	M PURP	/ D GRN
	BANAT*	12	72	DD	BADD	M PURP	/ YELLOW
	NMCT@	52	-	DE	NMDE	D ORAN	EXP LABEL
	ILT@	52	-	LD	ILLD	D ORAN	EXP LABEL
TOTALS		* 24	144				
		@104	-				
	OTHER	16	96				

SENSOR	TAPE ID	ORIG.	COPIES	PDF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
SAMS	MATRIX	24	24	HA	MAHA	YEL-OR	/ L PINK
	RAT*	180	198	HC	RAHC	YEL-OR	/ YELLOW
	ILT@	183	-	LH	ILLH	GREY	EXP LABEL
	NMCT@	52	-	HD	NMHD	GREY	EXP LABEL
TOTALS		@ 235	-				
		* 180	198				
	OTHER	24	24				

		ORIGINALS	COPIES	PDF
(R)	* TOTALS	2,142	9,911	27
	@ TOTALS	768	-	3
(R)	# TOTALS	500	-	2
(R)	OTHER TOTALS	16,672	12,346	30
(R)	GRAND TOTALS	20,082	22,257	67

* REQUESTED BY METOPS AND COPIES BY [illegible]
@ REQUESTED BY METOPS AND [illegible]
# REQUESTED BY METOPS AND COPIES TO FILM BY [illegible]

(R) - SENSORS WHERE REQUESTS ARE MADE [illegible] CHANGES TO LATER [illegible] ON AVAILABILITY AND [illegible]

NIMBUS G PROJECT DATA FORMAT CODES (Cont'd.)

SENSOR	TAPE ID	PDFC CODE
LOCATION	ILT/ERB	LA
	ILT/SMMR	LB
	ILT/THIR	LI
	ILT/SAM II	LD
	ILT/LIMS	LE
	ILT/SBUV	LF
	ILT/CZCS	LZ
	ILT/SAMS	LH
USER	UFO/ERB	UA
	UFO/SMMR	UB
	UFO/LIMS	UE
	UFO/SBUV	UF
	UFO/ILT	UL

1st CHARACTER	SOURCE/SENSOR	2nd CHARACTER	USER/SENSOR OR TAPE NUMBER
ERB	A		
SMMR	B		
THIR	I		
SAM II	D		
LIMS	E		
SBUV/TOMS	F		
CZCS	Z		
SAMS	H		
ILT	L		
UFO	U		

VI. LIMS PROFILES DATA RECORD

Figure VI-1 defines the format. The tape format will be identical for all profiles. It was designed to accommodate the largest profile and a maximum of 24 profiles. Each film product will have 4 sets of 6 profiles each. The film specification number will be used to define the type of annotation required for each product. A parameter number will be assigned to each radiance channel output. The parameters are fixed in position both on the film product and in the tape format. The Radiances vs. Scan Angle profiles film product is made up of from 1 to 4 groups of 6 profiles. At least 1 group (top quarter of film product) is required for a film frame. Film Specification number F565051 defines the film product output, See Figure VI-2.

The following items define each piece of data in the LIMS Profile Format.

(1) PHYSICAL RECORD NO. (12 BITS) - This is the number of a record within a file. It starts at 1 at the beginning of a file and increments by 1 for each physical record. It is followed by 4 zeroed spare bits.

(2) FILE CONTROL AND RECORD IDENTIFICATION (8 BITS) - Identifies record type and the last record written in a file and records in the last file on the tape. The MSB will be set to "1" if that record is the last one written in a file. The second most MSB will be set on all records in the last file on the tape. The record type will use the 6 LSB of that byte to identify the type of record being read. Record I.D. will be set to $"5"_8$.

(3) RECORD PER FRAME (12 BITS) - Identifies the number of records needed for one film product. This number will be 1 for all LIMS Profile Products.

FIGURE VI-1. LIMS PROFILES FORMAT (UNIVERSAL)

Word Pos.	MSB 24 22 20 18 16 14 12 10 8 6 4 2 1 LSB	Bits
1	PHYSICAL RECORD NO. (12 BITS) / 4 SPARES / FILE CONT. / RECORD I.D. (6)	24
2	SPARE (12 BITS) / RECORDS PER FRAME = 1	48
3	RECORD NO. IN FRAME = 1 (12 BITS) / ALGORITHM NO. (ANNOTATION 12	72
4	FRAME NO. 24 BITS	96
5	FILM SPECIFICATION NO. 24 BITS	120
6	FRAMES' ORBIT NO. FOR ANNOTATION 24 BITS	144
7	ANNOTATION YEAR NUMBER (12 BITS) / ANNOTATION GMT DAY NO. 12 BITS	168
8	PROFILE GENERATION YEAR NO. (12) / PROFILE GENERATION DAY NO. 12 BITS	192
9	PROFILE GROUP NO. (1 to 4) (12) / LEFT SCALE CODE 12 BITS	216
24	30, 12 BIT WORDS. THICKNESS IN .1 KM ORDERED FROM TOP-DOWN. THE FIRST SET IS THE HIGHEST PRESSURE VALUE AND ORDERED BOTTOM PRESSURE LEVEL, TOP PRESSURE LEVEL AND THICKNESS IN .1 KM, (3, 12 BIT WORD GROUPS)	576
5-26	SCALING COEFFICIENTS FOR VERTICAL SCALE 48 BITS	624
27	DAY/NIGHT CODE (12) / UP/DOWN SCAN CODE (12)	648
28	PROFILE TIME IN INTEGER SECONDS (24)	672
29	TANGENT POINT LAT. (12) / TANGENT POINT LONG. (12)	696
30	30 KM REFERENCE POSITION (12) / NO. OF VERTICAL DATA VALUES (12)	720
155	250 DATA VALUES (EITHER PRESSURE OR SCAN ANGLE) USING SCALING COEFFICIENTS ABOVE 250 x 12 BITS EACH = (3000)	3720
156	PROFILE NO. (1 to 6) (12) / PARAMETER NO. (12)	3744
157	ABSCISSA SCALE (Left Side) (12) / ABSCISSA SCALE (Right Side) (12)	3768
158	UNITS CODE (12) / UNITS SCALE (12)	3792
9-160	SCALING COEFFICIENTS FOR DATA IN PROFILE N (48)	3840
285	250 DATA VALUES FOR 1 PARAMETER USING SCALING COEFFICIENTS DIRECTLY ABOVE. 250, 12 BITS WORDS = 3000	6840
935	REPEAT WORDS 156 THROUGH 285 FOR 5 ADDITIONAL PROFILES FOR A TOTAL OF 6 PROFILES. 3120 BITS x 5 = (15,600)	22,440
3716	REPEAT WORDS 9 THROUGH 935 FOR 3 ADDITIONAL GROUPS FOR A TOTAL OF 4 GROUPS OF 6 PROFILES 22,248 x 3 = (66,744)	89.184
3720	84 ZEROED SPARE BITS / 12 BIT 1's COMPLEMENT ADD CHECKSUM	89,280

2480, 36 BIT WORDS — 3720, 24 BIT WORDS
2790, 32 BIT WORDS — 11,160 8 BIT BYTES

NOTE: FIELDS WITH SHADED CORNERS ARE FILM OUTPUT VARIABLES

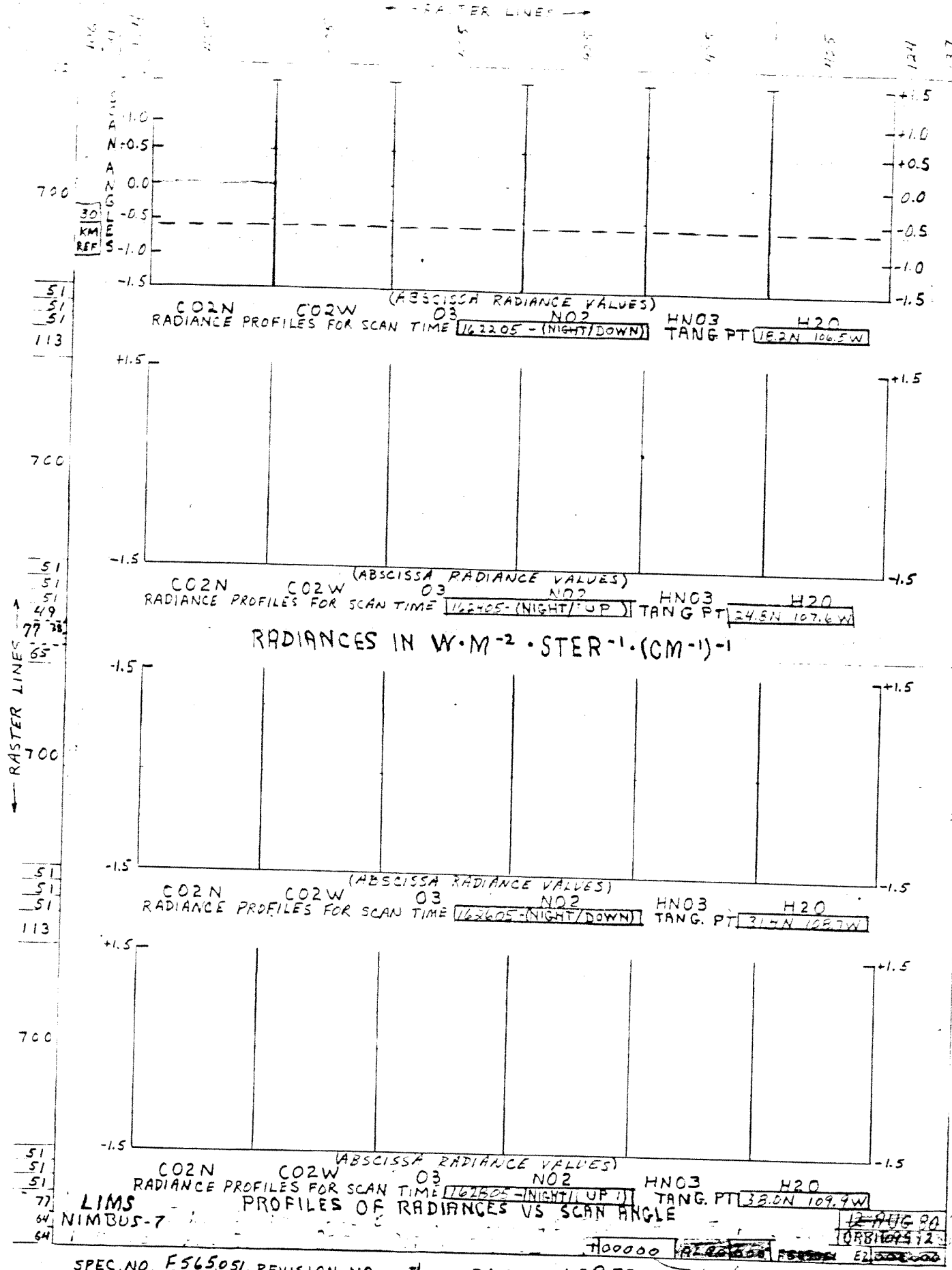


FIGURE VI-2. RADIANCE VS SCAN ANGLE PROFILE FRAME

SPEC. NO. F565051 REVISION NO. #1 DATE 1-28-72

PRODUCED PERIODICALLY ≈ 9/6 DAYS ON 16 MM MICROFILM

THIS DISPLAY IS A 12 TIMES ENLARGEMENT OF THE MICROFILM DISPLAY (12X = 6.61" x 8.82")

(14) THICKNESS IN .1 KM (10 sets of 3, 12 BIT WORDS) - These 10 groups of 2 pressure levels and 1 thickness in .1 KM are ordered starting at the highest pressure level at the top of the 30, 12 bit word field. The thickness is the difference in .1 Kilometers between 2 pressure levels. The 10, 3 word groups will be set up with the bottom of the pressure level (highest millibar reading) coming first, followed by the top of the pressure level (lower millibar reading) which provides the range of pressure levels for which the thickness is computed and it is placed in the last word. This method assumed that the thickness measurements may not necessarily be contiguous. The thickness is on the tape in 100 meters/count resolution. The pressure levels are in 1×10^{-4} bars (.1 mb), (i.e., 300 mb = 3000 counts).

(15) SCALING COEFFICIENTS FOR VERTICAL SCALE (48 BITS) There will be up to 250 scan angles which require scaling to make them fit into a 12 bit integer field. The following scaling coefficients are tentative values, the first value is the 0 count value followed by an exponent to the base 10, the 2nd pair of 12 bit words are slope values and its exponent.

$$\text{Scan Angle Scan} = 0 \text{ counts} = -1500 \times 10^{-3} \text{ degrees}$$
$$1 \text{ count} = 1 \times 10^{-3} \text{ degrees}$$

$$(\text{i.e., } 3000 \text{ counts} = 3000 \times 1 \times 10^{-3} = 3.0 + (-1.5^{\circ}) = +1.5^{\circ})$$

NOTE: A negative offset, slope or exponent value will be in the 2's complement form on the tape.

(16) DAY/NIGHT CODE (12 BITS) - If the profile group was taken during Earth night, the code word will be set to 63. If in Earth day, set this word to 4032.

(17) UP/DOWN CODE (12 BITS) - Each scan is 12 seconds and can be either a scan up from earth to space or down from space to earth direction. Down scan code will be a 63 and an up scan code will be 4032.

(18) PROFILE TIME IN INTEGER SECONDS (24 BITS) - The profile GMT in integer seconds which corresponds to the center of the profile in time.

(4) RECORD NO. WITHIN FRAME (12 BITS) - Identifies which part of the frame this record contains. This number will be set to 1 for all LIMS Profile Products.

(5) ALGORITHM I.D. (12 BITS) - Identification of algorithm for the profile matrix.

(6) FRAME NO. (24 BITS) - Identifies a complete profile set. All records with the same frame number apply to the set of profiles used to generate one frame of microfilm output. This number is assigned by NCAR/LIMS and is used by IPD for film accounting.

(7) FILM SPEC. NO. (24 BITS) - Film specifications defines the output format for the data frame. See Film Specification No . F565051.

(8) FRAMES' ORBIT NO. FOR ANNOTATION (24 BITS) - The "NASA" orbit number which applies to all of the profiles data on the entire film frame.

(9) ANNOTATION YEAR NUMBER (12) - The entire 4 digit year number which is applicable to all of the profiles on the film frame.

(10) ANNOTATION GMT DAY NO. (12) - The day number which is applicable to all data on the film product. It will start at 1 on January 1 and increment by 1's for each GMT day of the year.

(11) PROFILE GENERATION YEAR NO. (12)
PROFILE GENERATION DAY NO. (12)

These fields are structured identically to those described in items 9 & 10 above, but are used to date the generation of the profile data.

(12) PROFILE GROUP NO. (12 BITS) - The film specifications require up to 4 groups of 6 profiles each. The group at the top of the film product is group 1, the next group down is 2 and the last group is no. 4. If a profile group no. is zero, this group of 6 profiles will not be output. If a group number exceeds number 4, these will not be output either. If a profile group number is other than 1 thru 4, it will be assumed that no other groups are to be plotted.

(13) LEFT SCALE CODE (12) - This coded number only identifies the ordinate scale used. It is not used as a variable for the film processor. It is only used by someone who might use the data from the tape.

Code	Scales
* 1	300 mb to 0.1 mb and 0 to 65 KM
2	-1.5 to +1.5° Scan Angle with 30 KM REF.

* Used on Profile I Tape.

(19) TANGENT POINT LATITUDES (12 BITS) - The latitude on the earth corresponding to a point 30 KM above the earth, through which the profile data goes. A latitude of zero degrees represents the South Pole and 180 degrees, the North Pole. The latitude will be stored as a latitude position x 20, (i.e., NORTH POLE = 180° x 20 = 3600.

(20) TANGENT POINT LONGITUDE (12 BITS) - The longitude corresponding to the same point on earth as described above. The longitudinal value will start at the 0° Greenwich meridian and go westward 360° but using a scalar of 10. For example, 105°W will be 1050 when stored and written to tape.

(21) 30 KM REFERENCE POSITION (12 BITS) - This item is used only on film specification no. F565051. It will be an angular position which is scaled using the scaling coefficients used for scaling the Vertical scale (see item 15). It will be used to draw a horizontal line across all 6 profiles at the specified position which represents a 30 KM height.

(22) NO. OF VERTICAL DATA VALUES (12 BITS) - These data values will be scaled using the scaling coefficients described in item 15 above. This number will represent the number of "Y" values placed in this field, from 1 to 250, that provides ½ of an (X, Y) location of a data value. These "Y" values will apply to all 6 profiles. Where there is no available data, delete characters will be used, (4095 counts).

(23) 250 DATA VALUES (VERTICAL SCALE) 250, 12 BIT WORDS - See item 22 above. Approximately 250 "Y" values are expected for the film product which requires the scan angle "Y" scale.

(24) PROFILE NO. (1 to 6) (12 BITS) - The information given in items 12 thru 23 inclusive will be given for each of the 4 profile groups. Within each group there will be 6 profiles and they are fixed from 1 to 6 on the film and tape in ascending numerical order. If data is not available for a particular profile (Parameter), the data values will all be set to 4095, the delete code.

(25) PARAMETER NO. (12 BITS) - The parameter numbers used on the tape have been assigned as shown below;

PARAMETER NO.	PROFILE NO.	PARAMETER DESCRIPTION
0		No Profiles
1	1	CO2N Radiance
2	2	CO2W Radiance
3	3	03 Radiance
4	4	NO2 Radiance
5	5	HN03 Radiance
6	6	H20 Radiance
7	1	TEMP (K)
8	2	03 (PPM)
9	3	03 (UMB)
10	4	NO2 (PPB)
11	5	HN03 (PPB)
12	6	H20 (PPM)
13		No Profiles

An invalid Parameter number can be interpreted as a not data flag. However, the data values in such a profile still must contain all delete characters (4095).

(26) ABSCISSA SCALE (Left Side), (12 BITS)
ABSCISSA SCALE (Right Side), (12 BITS)

These two values will be scaled using the same scaling coefficients that are used to scale the "X" data values in item 29 below. The intention is to provide a means to vary the film product scales as are required. The film specification would be used to imply which profiles have linear or log scales. Presently, however, the scales are fixed at unknown values.

(27) UNITS CODE AND UNITS SCALE (2, 12 BIT WORDS) - The units code will be used to describe the units of the "X" axis and will use the codes as shown in Table VI-1. The units scale is just an exponent using the base 10. Negative exponents will be written using a 2's complement. For example, using units of watts/CM^2 and a 10^{-3} units scale factor to get milliwatts/CM^2.

(28) SCALING COEFFICIENTS FOR DATA IN PROFILE N (48 BITS) 4, 12 BIT WORDS

The first word is a signed integer value and the second word is the base ten exponent for word 1 using the 2's complement system. Words 3 & 4 are identical to words 1 & 2. The first pair describe the base or 0 count value. The second pair of numbers describe the slope or increment per 1 count.

Replaces [illegible]
on 5-24-78

TABLE III-1

UNITS CODE Numbers in the Tape Record and their Corresponding Word Variable for Film Display

UNITS CODE	DISPLAY	UNITS CODE	DISPLAY
0	W/M^2	32	
1	POINTS/TARGET	33	
2	PERCENT	34	
3	NONE	35	
4	DOBSON UNITS	36	
5	PPM	37	
6	PPB	38	
7	GM/MICROGM	39	
8	GM/NANOGM	40	
9	DEGREES K	41	
10	W/M^2 STER	42	
11	W/M^2 STER/CM	43	
12	KILOMETERS	44	
13	GM/LITER	45	
14	KM^{-1}	46	
15	NUMBER PER CM^3	47	
16	METERS	48	
17	KM	49	
18	K	50	
19	M-ATM-CM	51	
20		52	
21		53	
22		54	
23		55	
24		56	
25		57	
26		58	
27		59	
28		60	
29		61	
30		62	
31		63	

(29) 250 DATA VALUES (X Scale) 250, 12 BIT WORDS - Up to 250 data values can be used. Unused data words will be filled with delete characters which is defined as 4095 counts. These words provide the X value that corresponds to the Y value located in item (23) above in the same table position (1 to 250). See example below:

Word Position From Top of Field	Y Value	Profile #1	#2	#3	#4	#5	#6
1	10	220	4095	10	4095	30	1900
2	11	220	30	15	4095	31	2000
3	12	220	32	20	4095	32	2025
4	14	220	33	25	4095	38	2050
5	15	220	34	30	4095	45	2100
6	17	220	35	4095	4095	60	2050
7	30	221	20	4095	1	80	2000
9	40	221	10	4095	2	90	4095
↓	↓	↓	↓	↓	↓	↓	↓
248	60	223	0	4095	30	100	4095
249	4095	4095	4095	4095	4095	4095	4095
250	4095	4095	4095	4095	4095	4095	4095

4095 = Delete character.

(30) REPEAT ITEMS 24 through 29 for 5 additional profiles to complete 1 group.

(31) REPEAT ITEMS 12 through 30 for 3 additional groups of 6 profiles each for 1 complete film product frame which contains;

One to 4 groups of 6 profiles/radiance parameters starting on the top quarter of the film and working down the frame by quarters. See film specification No. F565051, "Profiles of Radiances vs. Scan Angle".

(32) SPARES (84) - Zeroed Out

(33) <u>12 BIT 1's COMPLEMENT ADD CHECKSUM</u> (12 BITS) - These 12 bits are the last 12 bits of the physical record. Each 24 bit word output to tape is divided into 2, 12 bit words and added with any overflow over 12 bits added into the LSB side of the summation word. The final summation word is placed as the last word of the record as the checksum. A quality control program can check this number by recomputing what it has read in addition to other quality checks to insure a quality product.

APPENDIX A

TAPE LENGTH CALCULATIONS (9 TRACK, 1600 BPI)

- O STD HEADER FILE 2'
- O 1 PHYSICAL RECORD = 1 FILM FRAME = 11,160 BYTES/1600 BPI = 6.975"/Rec.
- O 6.975" PER RECORD PLUS 0.65" for IRG = 7.625"/Rec.
- O ASSUMING 2200' of TAPE :· 3462 FRAMES COULD BE WRITTEN PER TAPE.
- O UP TO 55 FRAMES PER DAY COULD BE WRITTEN IN 62 DAILY FILES TO FILL 1 TAPE. AT 6 FRAMES PER DAY THE TAPE COULD CONTAIN 1.5 YEARS OF DATA. THE TAPE WILL BE TERMINATED AT 2 MONTHS OR LESS.

5. APPENDIX - continued

Temperature blick (386 16 bit integers)

Word	Function
-1	7203 identifier
0	lat ref no (1 is 50s, 48 is 67.5n). Range 1-48
1,2	time secs
3	day
4	year
5	sat. lat. deg *100
6	sat. long. deg *100
7	tang. pt. lat. deg *100
8	tang. pt. long. deg *100
9	major frame in cal file corresponding to this frame.
10-	noe words; eigen function coeffs *10000
10+noe -	noe words; std dev. in above *10000
10+2*noe	nr words; temp (k) at each spcial level; *10
10+2*noe+nr -	nr words; relative error at each special level; *10000
10+2*noe+2*nr -	nr words; temperature std dev (deg k*10) (note differs from .1t1 item)
10+2*noe+3*nr -	72 words; absolute temperature at intervals of 0.2 in log (p) from 1.4 upwards. k *10
10+2*noe+3*nr+72 - 127	zero (spare space)
127-383	2 further blocks as above (0-126)
384	checksum

currently nr = 10 and noe = 8 (check words 52,53 of header block)

5. APPENDIX - continued

NOTES - continued

(5) Radiances (these are the present locations in the block)

45	a1 pmr
53	a1 wb
61	a234 pmr
69	a234 wb
77	b1 pmr
85	b1 wb
93	b2 pmr
101	b2 wb
109	c1 pmr
117	c1 wb
125	c23 pmr
133	c23 wb

Scaling of radiances determined by format number (high byte of word 0 of data).

If format number 8 then alp, sieve 0 and 1; b2p, sieve 0 and 1;
a234p, all sieves - % 290 k blackbody x 10.

otherwise

a234p, all sieves - a% 290 k blackbody x 10
all other channels - % 290 K blackbody x 100

(6) Position in block of specific cell temperatures, etc.:

Modulator	Period	Amplitude	Cell Temp	Pressure
a12	215	223	160	153
a3	216	224	161	154
a4	217	225	162	155
b12	218	226	163	156
c1	219	227	164	157
c2	220	228	165	158
c3	221	229	166	159
chopper	222	230	15	n/a
blackbody	n/a	na/	14	n/a

(7) Tangent scale heights are set to 9999 before 25: Feb: 82
Tangent scale hights are set to -32768 after 25: Feb: 82