704

DE-1

Spin-Scan Auroral Imagers Digital Data (SAI)
81-070A-03A

Due to the size, a directory listing of each platter is not included in this catalog

DE-1

Spin-Scan Auroral Imagers (SAI) Digital Data

81-070A-03A

This data set catalog consists of one Optimum optical disk and four tapes. This data set is self documenting and contains the software needed to utilize the dataset. The data were written in binary, the documentation files were written in ASCII. The disks were created on the VAX 8650 in Files 11 format using the SOAR Software package. The data has been copied onto 8 millimeter tapes in VMS Backup format. The volume numbers, label names and time spans follow:

add density

D/KV No.	Tape#	Label Name	Time Span
KV00009	D-87904	DEA3_0001A	09/23/81 - 05/31/82
8MM TAPES :			
D-87905		DEA3_0001B	07/16/82 - 08/07/82
D-87906		DEA3_0002A	09/25/83 - 08/05/84
D-87907		DEA3_0002B	10/22/84 - 01/31/86
D-87908		DEA3_0003A	02/20/86 - 02/05/87

9-2-10 ad

also on DLT

[DEA3_0001A]SAIDOC.SFD

CCSDYDNM000200NSSD0028SMARK111

TYPE_OF_FILE_NAME: SAI MISSION ANALYSIS FILE

FILE_ATTRIBUTES: Variable length unformatted sequential file

RECORD_TYPE_NAMES: Header record, scan line record

RECORD_LENGTH:
A. HEADER_RECORD: 404 bytes
B. SCAN_LINE_RECORD: variable, to a maximum of 1600 bytes

TYPE_OF_FILE_DESCRIPTION:
An SAI mission analysis file (MAF) contains the pixels of one image from one photometer. An image is made up of all consecutive scans of the photometer without changes in mirror stepping direction. For the next image the stepping mirror advances in the opposite direction. The MAF is organized with a header record which describes the file, the spacecraft position during the image, and the number, N, of scan lines in the file. This is followed by N individual scan line records, each containing the mirror position and the pixel data collected during that scan.

Most MAFs have been reduced to a thirty-five degree region centered on the nadir direction (center of Earth) rather than including all pixels within the nominal 120 or 360 degree scan line. The number of pixels deleted at the start of the scan and the number of pixels included are given in each scan line record.

FILE_STRUCTURE: unformatted sequential file with segmented records of variable length

DATA_TYPES:
All numbers stored in single byte fields have integer values 0 to 255. Numbers stored in longer fields are represented as two's complement integers.

FORMAT_OF_THE_HEADER_RECORD:

BYTE#	FIELD NAME	DEC TYPE	DESCRIPTION
1-2	RECORD LENGTH (WORDS)	I*2	total header record length in units of 16-bit words
3-4	FILE TYPE, BLOCKING FACTOR	I*2	4*256 + 1
5-6	RECORD LENGTH (BYTES-4)	I*2	header record length in units of bytes less 4
7-8	ZEROS	I*2	0000
9-12	FILE TYPE	I*4	4
13-16	YEAR MOD 1000	I*4 \	UT of last TM minor frame
17-20	DAY OF YEAR	I*4 }	#0 mod 16 before
21-24	MILLISECONDS OF DAY	I*4 /	start of image
25-28	PHOTOMETER ID	I*4	1 = A, 2 = B, 3 = C
29-32	FILTER WHEEL VOLTAGE	I*4	units of 0.02V; unconverted position count may be used to

			identify filter properties as in Table 1 below
33-36	FILTER WHEEL CODE	I*4	four ASCII characters; see Table 1 below
37-40	FILTER WHEEL TEMPERATURE	I*4	conversion given below in Table 2
41-44	FIRST MIRROR LOCATION COUNTER	I*4	\ mirror ranges given
45-48	LAST MIRROR LOCATION COUNTER	I*4	/ below in Table 3
49-52	NUMBER OF SCAN LINE RECORDS	I*4	number of records following the header record
53-56	NUMBER OF PIXELS IN IMAGE	I*4	total number of pixels in this image
57-60	MAXIMUM PIXELS IN SCAN	I*4	maximum number of pixels contained in any scan line in this image
61-64	MINIMUM COMPRESSED COUNT	I*4\	pixel count statistics
65-68	6% COMPRESSED COUNT	I*4 \	for color scaling; 6%
69-72	50% COMPRESSED COUNT	I*4)	to 94% levels are
73-76	94% COMPRESSED COUNT	I*4 /	recommended for
77-80	MAXIMUM COMPRESSED COUNT	I*4/	color scale range
81-84	GREY SCALE MIN (6% COUNT)	I*4	recommended grey scale
85-88	GREY SCALE MAX (94% COUNT)	I*4	range
89-92	PHOTOMETER DIGITAL HOUSEKEEPING	I*4	first 32 bits, see Table 4 below
93-96	HOUSEKEEPING, RELAY STATUS	I*4	final 24 bits of photometer digital housekeeping plus 8 bits for relay status; see Table 4 below
97-100	DATA CONTROL UNIT (DCU) MINOR-MODE-COMMAND BYTES	I*4	see Table 5 below
101-116	ANALOG SUBCOM	I*4	one value per byte as shown in Table 6 below
117-120	ORBIT NUMBER	I*4	orbit number
121-124	X(SCPOS) GEI	I*4 \	
125-128	Y(SCPOS) GEI	I*4)	GEI coordinates in meters
129-132	Z(SCPOS) GEI	I*4 /	for spacecraft position
133-136	X(SPIN) GEI	I*4 \	
137-140	Y(SPIN) GEI	I*4)	GEI angular momentum
141-144	Z(SPIN) GEI	I*4 /	vector; unit vector * 1.E
145-148	X(NORMAL TO ORBIT) GEI	I*4 \	
149-152	Y(NORMAL TO ORBIT) GEI	I*4)	GEI vector normal to orbit
153-156	Z(NORMAL TO ORBIT) GEI	I*4 /	plane; unit vector * 1.E6
157-160	UI IMAGE PRODUCTION DATE	I*4	YDDD(BCD), seconds(binary)
161-164	X(VEL) GEI	I*4 \	
165-168	Y(VEL) GEI	I*4)	GEI spacecraft velocity
169-172	Z(VEL) GEI	I*4 /	vector; millimeters/sec.
173-176	X(SUN) GEI	I*4 \	
177-180	Y(SUN) GEI	I*4)	GEI vector toward sun,
181-184	Z(SUN) GEI	I*4 /	unit vector * 1.E6
185-188	S/C SPIN RATE	I*4	S/C spin rate with respect to nadir, in microradians/sec. (not always present)
189-192	MILLISECONDS OF DAY FOR O/A	I*4	UT as msec. of day for orbit/attitude data above (if start UT is near end of day, O/A UT may be on next day)
193-196	AVERAGE SPIN PERIOD, NADIR	I*4 \	three samples of

BYTE#	FIELD NAME	TYPE	DESCRIPTION
197-200	AVERAGE SPIN PERIOD, MINIMUM	I*4)	average spin period in
201-204	AVERAGE SPIN PERIOD, MAXIMUM	I*4 /	msec. during image tim
205-206	SCAN LINE NADIR CORRECTION FLAG	I*2	LSB = 1 if corrections have been done, 0 if not
207-372	SPARE	BYTE	
373-380	RESERVED	BYTE	reserved
381-388	ASCII FILE NAME	BYTE	original sequence name
389-390	IMSYNC VERSION, LEVEL	I*2	production software version number*64 + level
391-394	SPARE	BYTE	
395-396	SCAN LINE OFFSET	I*2	pixel offset to start of scan lines; a negative offset indicates a reconstructed advanced-nadir-reference image
397-404	SPARE	BYTE	

FORMAT_OF_THE_SCAN_LINE_RECORD:

BYTE#	FIELD NAME	DEC TYPE	DESCRIPTION
1-2	RECORD LENGTH (WORDS)	I*2	total scan line record length in units of 16-bit words
3-4	RECORD LENGTH (BYTES-2)	I*2	scan line record length in units of bytes less 2
5-8	MILLISECONDS OF DAY	I*4	UT at last minor frame #0 mod 16
9	DIGITAL MIRROR LOCATION COUNTER	BYTE	see table 3 for MLC range
10	ANALOG MIRROR LOCATION	BYTE	units of 0.02V; for conversion to digital MLC, see table 7
11	ANALOG FILTER WHEEL POSITION	BYTE	units of 0.02V; unconverted position count may be used to identify filter properties as in Table 1 below
12	S/C CLOCK SUBCOM COUNTER	BYTE	subcom count at half-second start minor frame (0,8,16,...,112,120)
13-14	DCU COUNT (FULL 16 BITS)	I*2	elapsed time on 8192 Hz clock from nadir pulse to next half-second sync
15-16	PIXEL OFFSET TO START OF SCAN	I*2	offset from nadir pulse to start of scan line in pixels; a negative offset indicates a reconstructed advanced-nadir-reference image
17-18	BODY MOUNTED HORIZON SENSOR (BMHS) NADIR CORRECTION	I*2 \	units of 8ths of pixels;
19-20	SUN SENSOR NADIR CORRECTION	I*2)	sum of the three field
21-22	MANUAL NADIR CORRECTION	I*2 /	gives total correction; - sign moves scan up (earlier), + sign moves scan down (later)
23-24	ORDER OF NADIR CORRECTIONS	I*2	last four correction methods, BCD; most recent shifted into

			least significant position; 1=BMHS, 2=Sun, 3=Manual; if pixel offset is negative, see Note 2 below
25	PIXEL 1 IMAGE DATA	BYTE	units of compressed counts; for count decompression and conversion to luminosity, see Note 1 below
26	PIXEL 2 IMAGE DATA	BYTE	
.	.	.	
.	.	.	
.	.	.	
n+24	PIXEL n IMAGE DATA	BYTE	

Note 1. Pixel decompression and conversion to luminosity

The compressed telemetry count is r = 16y + x where x and y are the decimal equivalents of the four low-order and four high-order bits, respectively. The true number of counts per image pixel is R, where

$$R = \begin{cases} x & y=0 \\ (x+16)2^{y-1} & y>0 \end{cases}$$

If $r > 127$ the protective circuit has been activated and the data are to be ignored.

True counts can be converted to line-of-sight intensities in kilorayleighs by dividing by the sensitivities given in the Table 1 below [see Frank et al., Space Science Instrumentation, vol. 5, pp. 369-395 (1981)].

The conversion factors provided here are based upon pre-launch laboratory calibrations. No corrections are made here for long term changes in sensitivity at VUV wavelengths, which are known to have occurred in flight [see Rairden et al., Journal of Geophysical Research, vol. 91, pp. 13,613-13,630 (1986)]. Initial work in the first two years after launch has revealed no obvious degradations at visible wavelengths. No additional work has been done on inflight calibrations.

Note 2. Additional scan line adjustment for reconstructed advanced-nadir-reference images

For reconstructed images from advanced-nadir-reference operations, the order-of-pixel-corrections field (scan line record bytes 23-24) is replaced by a correction to be applied to the first 75 pixels in that scan line. This offset is in units of 1/100ths of pixels. The standard pixel corrections should be applied as usual to the entire scan line, then the first 75 pixels should be adjusted by this correction. As with the standard correction, a positive correction indicates the pixels are to be moved down in the display, and a negative correction indicates they should be moved up. The size of this correction will be half of a pixel or less. (See IMAGE_DISPLAY_ALGORITHM below for more information on pixel alignment.)

IMAGE_DISPLAY_ALGORITHM:

The header record specifies the number of scan line records in bytes 49-52 and a maximum number of pixels per scan line in bytes 57-60.

The maximum number of pixels plus 24 is the maximum size of a scan line. The actual number of pixels in a scan line is specified by the number given in bytes 3-4 of the scan line record minus 22. Each pixel requires one byte. The header record is usually retained while reading each scan line consecutively into another array.

Successive pixels within a scan line are conventionally displayed from top to bottom on the display screen. The mirror location counter (MLC) gives the scan line's relative position left to right, as shown in Table 3.

Three adjustments described below may be applied to position pixels correctly in the scan direction. The first (#1) must be applied to all scan lines. The second (#2) is needed for certain lines in images with early production dates. The third (#3) is only appropriate for reconstructed advanced-nadir-reference images. This special type of image file can be identified by the presence of a negative scan line offset in bytes 395-396 of the header record. The three adjustments are as follows:

#1. The sum of the nadir correction fields, bytes 17-18, 19-20, and 21-22, should be applied to each scan line. Added together, these three fields give a correction in eighths of pixels for irregularities in S/C nadir determination. A negative total correction indicates the scan line should be shifted up on the screen by that amount, and a positive value indicates a shift down.

#2. An additional correction should be made for an early processing problem if the UI image production software version and level number, as it appears in header record bytes 389-390, is less than 195. If the DCU count (scan line record bytes 13-14) taken mod 32 is 0, then the scan line should be shifted up one pixel, as in the following algorithm:

```
IF ( (version#*64+level).LT.195 .AND. MOD(DCU,32).EQ.0 )
                shift scan line up one pixel.
```

#3. If the scan line offset in header record bytes 395-396 is negative, an additional adjustment may be applied to the first 75 pixels in the scan line. The size of this adjustment will be at most half a pixel, and therefore may not be significant for all applications. The correction is found in scan line record bytes 23-24 and is in units of 1/100ths of a pixel. The sign convention is the same as for #1 above: a positive correction means the pixels should be shifted down by that amount, a negative correction means an upward shift, assuming the scan is oriented from top to bottom. This adjustment is to be applied only to the first half of the scan line, not to the second half.

The pixel histogram values given in header record bytes 61-88 may be helpful for establishing the color table settings. Operation of the photometer electronic guardian (which protects the sensor in the presence of excessive light levels) is indicated by setting the most significant bit of the 8-bit pixel word. In this case, pixel values are greater than 127 and are usually shown as saturated or blacked out. Pixel values of 255 indicate fill data.

The [SSC] directory on this volume includes source code for image display software. All the necessary corrections and adjustments for scan line alignment are included in that software source code.

TABLES:

Table 1. Filter codes, positions, and sensitivities

PHOTOMETER A

filter number	filter code	analog filter wheel position range (counts)	sensitivity in counts/(kilorayleigh-pixel)
1	360Z	100-108	2.3×10^{-4}
2	317Z	118-126	5.7×10^{-4}
3	630W	136-144	0.88
4	557W	154-162	2.40
5	391W	172-180	3.31
6	394B	190-198	1.96
7	626B	208-216	1.08
8	630W	226-234	0.78
9	557N	244-246	1.30
10	391N	46-54	2.33
11	630N	63-71	0.66
12	557N	81-89	1.60

PHOTOMETER B

filter number	filter code	analog filter wheel position range (counts)	sensitivity in counts/(kilorayleigh-pixel)
1	629C	61-69	3.2×10^{-4}
2	630N	81-89	1.31
3	557N	101-110	2.40
4	391N	121-131	4.49
5	630N	142-151	1.19
6	317Z	163-172	4.5×10^{-4}
7	482M	184-192	7.40
8	554B	203-212	3.85
9	557W	223-232	4.85
10	390W	1-10	5.84
11	630W	21-30	2.00
12	557W	41-49	4.64

PHOTOMETER C

filter number	filter code	analog filter wheel position range (counts)	sensitivity in counts/(kilorayleigh-pixel)
1	136W	90-98	1.65
2	123W	109-117	3.08
3	120W	128-136	3.10
4	140N	147-155	1.27
5	136W	166-174	2.05
6	125N	185-194	1.71
7	123W	204-212	3.08
8	117N	223-231	0.84
9	140N	241-246	1.26
10	125N	36-43	1.80
11	117N	53-61	0.91
12	117A	72-80	10.5

Table 2. Temperature conversion table (note: temperature measurements

were not obtained after day 175 of 1984 due to a malfunction in the spacecraft data system)

TM#	deg C	TM#	deg C	TM#	deg C	TM#	deg C	TM#	deg C
0-6	150	34	51	77-78	23	153-154	- 5	223-224	-34
7	144	35	50	79-80	22	155-157	- 6	225	-35
8	138	36	49	81-82	21	158-160	- 7	226	-36
9	96	37	48	83-84	20	161-163	- 8	227	-37
10	93	38	47	85-87	19	164-166	- 9	228-229	-38
11	89	39	46	88-90	18	167-169	-10	230-231	-39
12	86	40-41	45	91-92	17	170-172	-11	232	-40
13	83	42	44	93-95	16	173-174	-12	233-234	-41
14	80	43	43	96-98	15	175-177	-13	235	-42
15	78	44	42	99-100	14	178-180	-14	236	-43
16	76	45	41	101-102	13	181-183	-15	237	-44
17	74	46-47	40	103-105	12	184-185	-16	238	-45
18	72	48-49	39	106-108	11	186-188	-17	239	-46
19	70	50	38	109-111	10	189-190	-18	240	-47
20	68	51-52	37	112-113	9	191-193	-19	241	-49
21	66	53	36	114-116	8	194-195	-20	242	-50
22	65	54-55	35	117-119	7	196-198	-21	243	-51
23	63	56	34	120-122	6	199-200	-22	244	-52
24	62	57-58	33	123-125	5	201-203	-23	245	-54
25	61	59-60	32	126-128	4	204-205	-24	246	-55
26	59	61-62	31	129-131	3	206-207	-25	247	-57
27	58	63-64	30	132-134	2	208-209	-26	248	-59
28	57	65-66	29	135-137	1	210-211	-27	249	-61
29	56	67-68	28	138-140	0	212-213	-28	250	-63
30	55	69-70	27	141-143	-1	214-215	-29	251	-66
31	54	71-72	26	144-146	-2	216-217	-30	252	-69
32	53	73-74	25	147-149	-3	218-219	-31	253	-73
33	52	75-76	24	150-152	-4	220-221	-32	254	-79
						222	-33	255	-85

Table 3. Mirror location counter (MLC) ranges, assuming vertical orientation of scan lines

	leftmost MLC	center MLC	rightmost MLC
photometer A	141	80	21
photometer B	133	73	13
photometer C	28	90	148

When the spacecraft is aligned with its rotation axis normal to the orbit plane, (1) the center scan line is coplanar with the orbit plane, and (2) the angular momentum vector is directed to the left, opposite to the direction of the orbital angular momentum vector.

Table 4. Photometer digital housekeeping and relay status

Bit extraction and bit testing functions such as the VAX FORTRAN intrinsic functions IBITS and BTEST are useful for decoding the bit fields.

First 32 bits (MSB=bit 31)

bit 31: filter wheel moved since last sample, 1 = moved.
bit 30: filter wheel at the position switch, 0 = at position switch.
bit 29: mirror stepping enable, 1 = enabled.
bit 28: origin search in progress, 1 = in progress.
bit 27: mirror limit switch activated since last sample, 1 = activated.
bit 26: bit no.27 indication, upper(CW) or lower(CCW), 1 = upper limit(CW).
bit 25: PM tube gain level, 0 = low gain.
bit 24: mirror search for restricted range, 1 = in progress.
bit 23: lower limit switch, backup, 1 = activated.
bit 22: lower limit switch, primary, 1 = activated.
bit 21: upper limit switch, backup, 1 = activated.
bit 20: upper limit switch, primary, 1 = activated.
bit 19: nadir bypass status, 0 = normal, 1 = bypassed.
bit 18: filter heater element, 1 = power applied.
bits 17-16: spare - zeroes.
bits 15-8: 8-bit mirror position code, high limit if in restricted range.
bits 7-0: 8-bit mirror position code, low limit if in restricted range.

Second 32 bits (MSB=bit 31)

bit 31: move mirror position one step on 0 to 1 transition only.
bit 30: move mirror to origin on 0 to 1 transition only.
bit 29: move direction for bits 1-2, up(CW) or down(CCW), 1 = down(CCW).
bit 28: mirror range, full or restricted, 1 = restricted.
bit 27: alternate filter cycles, 1 = no.
bit 26: filter wheel direction, up(CW) or down(CCW), 1 = down(CCW).
bit 25: filter wheel to position switch on 0 to 1 transition only.
bits 24-22: 3-bit filter wheel code (see Note 3).
bits 21-19: 3-bit photo-transistor sensitivity code, 000=most sensitive.
bit 18: photo-transistor no. 2 on/off, 1 = off.
bit 17: photo-transistor no. 1 on/off, 1 = off.
bit 16: guardian on/off, 1 = off.
bits 15-8: 8-bit photometer identification, photometer A: 00000000
photometer B: 00001111
photometer C: 11110000.
bit 7: spare.
bit 6: collimator cover heater connector no. 1 on/off, 1 = on.
bit 5: PM protection enabled, 0 = enabled.
bit 4: collimator-cover switch no. 1 on/off, 1 = on.
bit 3: collimator-cover switch no. 2 on/off, 1 = on.
bit 2: collimator-cover heater connector no. 2 on/off, 1 = on.
bits 1-0: spare.

Note 3:
000 = 5 deg.
001 = 30 deg.
010 = 60 deg.
011 = 90 deg.
100 = 120 deg.
101 = 150 deg.
110 = 180 deg.
111 = alternate mode selection (30 deg.)

Table 5. DCU minor mode command (MSB=bit 31)

The VAX FORTRAN intrinsic functions IBITS and BTEST are recommended for decoding the bit fields.

bits 31-16: 16-bit internal nadir generator code (INGC), generated spin period is (INGC+1)*3./16384.
bits 15-11: spare.
bits 10-9: 2-bit sector code, nadir pulse C (see Note 4).
bit 8: spare.
bits 7-6: 2-bit sector code, nadir pulse B (see Note 4).
bit 5: spare.
bits 4-3: 2-bit sector code, nadir pulse A (see Note 4).
bit 2: spare.
bits 1-0: 2-bit nadir pulse source code,
00,11 = normal nadir pulses,
10 = advanced nadir pulses,
01 = internal nadir generator.

Note 4.

sector code	at nadir pulse A	B	C	the sector is
	the photometer selected is			
00,11	A	B	C	1
01	B	C	A	3
10	C	A	B	2

Table 6. Photometer analog housekeeping subcom (not available after day 175 of 1984 due to a malfunction in the spacecraft data system)

The VAX FORTRAN intrinsic function IBITS is recommended for decoding the bit fields.

First 32 bits (MSB=bit 31)

bits 31-24: thermistor no. 5 temperature.
bits 23-16: thermistor no. 6 temperature. (For temperature conversion, see table 2.)
bits 15-8: thermistor no. 7 temperature.
bits 7-0: thermistor no. 8 temperature.

Second 32 bits (MSB=bit 31)

bits 31-24: +5V to logic (6.667/256.*count).
bits 23-16: +5V to PM tube, 1st relay (6.667/256.*count).
bits 15-8: -10V (-15./256.*count).
bits 7-0: thermistor no. 9 temperature.

Third 32 bits (MSB=bit 31)

bits 31-24: regulated bus current (500./256.*count).
bits 23-16: +5V to PM tube, 2nd relay (6.667/256.*count).
bits 15-8: +10V (15./256.*count).
bits 7-0: +200V blocking supply (247./256.*count).

Fourth 32 bits (MSB=bit 31)

bits 31-24: +5V to logic (6.667/256.*count).
bits 23-16: thermistor no. 6 temperature.
bits 15-8: +5V line current (100./256.*count).
bits 7-0: pulse load bus peak current (1000./256.*count).

Table 7. Conversion of analog mirror position count to approximate digital mirror location counter (MLC)

Photometer A: MLC = (count-44.000)*.769 + 14.0
Photometer B: MLC = (count-47.286)*.721 + 17.0
Photometer C: MLC = (count-58.286)*.772 + 29.0

These equations are based on pre-launch testing. Comparisons with post-launch data show errors as large as six counts. However, these data were provided in the telemetry only for a coarse backup to the digital counters. They have never been used to accurately determine mirror positions.

[DEA3_00014]FILELIST.SFD

CCSDYDNM000200NSSD0027SMARK115

TYPE_OF_FILE_NAME: PRIMARY DATA FILE LIST

FILE_ATTRIBUTES: Formatted ASCII file

RECORD_LENGTH: 28 bytes

TYPE_OF_FILE_DESCRIPTION:
The file list file contains a complete list of primary data file names in chronological order for this volume. The directory is not included with the file name but can be readily deduced from it (please see DIRECTORY_NAMING_CONVENTION and FILE_NAMING_CONVENTION in VOLDESC.SFD). The original six-character production sequence name is included for each file. A string locating utility such as the VAX VMS SEARCH command is recommended for locating a particular sequence name.

FORMAT_OF_THE_RECORD:
bytes 1-21: primary data file name
byte 22: TAB
bytes 23-28: production sequence name

CCSDYDNM000200NSSD0027EMARK115

CCSDXZLM0001SMARK001CCSDXVNM0002SMARK002

LOG_VOL_IDENT: USANASANSSDDEA3_0001A
LOG_VOL_INITIATION_DATE: 1991-06-05
LOG_VOL_CLOSING_DATE: 1991-06-10
LOG_VOL_CAPACITY: 1 GB/LOG_VOL
LOG_VOL_FILE_STRUCTURE: FILES-11

VOLUME_DIAMETER: 12 INCHES
VOLUME_DRIVE_MFGR_AND_MODEL: OPTIMEM 1000
COMPUTER_MFGR: DIGITAL EQUIPMENT CORPORATION
OPERATING_SYSTEM: VMS 5.3-1
COMPUTER_SYSTEM: MicroVAX II-GPX
TRANSFER_SOFTWARE: SOAR V4.1

TECHNICAL_CONTACT: M. RAE DVORSKY
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PREV_LOG_VOLS: NONE

CCSDXVNM0002EMARK002CCSDXSNM0002SMARK003

DATA_SET_NAME: DE SAI AURORAL IMAGING DIGITAL DATA

DATA_SOURCES: SPIN-SCAN AURORAL IMAGERS (SAI) ON DYNAMICS EXPLORER 1 (DE 1)

SCIENTIFIC_CONTACT: LOUIS A. FRANK
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319/335-1695
IOWASP::FRANK

SOURCE_CHARACTERISTICS:

A. DESCRIPTION_OF_SPACECRAFT:

Dynamics Explorer 1 (DE 1) is one of two spacecraft launched for the Dynamics Explorer program on 3 August 1981. The two spacecraft were launched into coplanar polar orbits at different altitudes for the purpose of studying interactive processes within the atmosphere-ionosphere-magnetosphere system. Dynamics Explorer 2 re-entered the atmosphere on 19 February 1983. Re-entry time of DE 1 cannot yet be determined.

Instruments on board DE 1 in addition to the spin-scan auroral imager are: energetic ion composition spectrometer, high altitude plasma instrument, magnetometer, plasma wave instrument, and retarding ion mass spectrometer.

B. ORBIT_INFORMATION:

Initial orbital parameters of DE 1 were an inclination of 89.9 degrees, orbital period of 410 minutes, right ascension of the ascending node at 161 degrees, radial distance at perigee of 6950 km (1.09 RE), and radial distance at apogee of 29650 km (4.65 RE). The initial latitude of apogee at 78.2 degrees North provided excellent viewing of the northern auroral oval during the winter of 1981-82, and the precession rate of 0.328 degrees per day allowed similar viewing of the southern polar region in 1983. Apogee returns to the northern polar region every three years (e.g., the autumns of 1984, 1987, etc.)

C. PERFORMANCE:

Initial spacecraft duty cycle was about 90%. With spacecraft age and decreasing priority in the NASA tracking system, the duty cycle decreased slowly after the first year of operation. By 1989 the duty cycle varied from 16-55%. Data acquisition in individual orbits is designed to maximize the science return. The 1984 failure of circuitry in the spacecraft data system has prevented the monitoring of instrument voltages, currents, and temperatures, but has had no effect on the acquisition of images.

INVESTIGATION_OBJECTIVES:

The general objective of the Dynamics Explorer program is to investigate magnetosphere-ionosphere-atmosphere coupling processes. Specific objectives fall into five categories: (1) electric field induced convection; (2) magnetosphere-ionosphere electric currents; (3) direct energy coupling; (4) mass coupling; and (5) wave, particle, and plasma interactions.

Several of the broad scientific objectives of global auroral imaging are (1) to establish and clarify the association of diverse auroral and magnetospheric plasmas, (2) to determine the relationship between vacuum-ultraviolet and visible auroral emissions, (3) to determine the evolution of the auroral oval during magnetic substorms by taking advantage of the temporal resolutions of the imaging photometers and the extended viewing times with the high-altitude orbit, and (4) to develop global models for field-aligned currents, ionospheric convection, and charged-particle precipitation during all conditions of magnetic activity. Indeed such imaging will provide a natural coordinate system, and a monitor of magnetospheric and ionospheric activity, to reference in situ point measurements with both spacecraft.

INSTRUMENT_ATTRIBUTES:

A. DESCRIPTION_OF_INSTRUMENT:

The spin-scan auroral imagers (SAI) comprise three photometers which provide images of Earth at various wavelengths via interference filters mounted on a wheel and selected by ground command. Two of the photometers provide visible wavelength images, and the third provides images at vacuum-ultraviolet wavelengths.

The three photometers are mounted on the spacecraft such that their fields of view are separated by about 120 degrees in a plane oriented perpendicular to the spin axis. Each photometer in operation collects one scan line during each spacecraft rotation, with an internal mirror stepping once per rotation to start a new scan line.

The visible photometers are designed to suppress light scattering from the sunlit atmosphere by a sufficiently large factor to image the relatively weak emissions from the visible aurora in the dark hemisphere of Earth.

B. OPERATIONAL_MODE:

An auroral image is a nadir-centered two-dimensional pixel array provided by the spacecraft rotation and the photometer's stepping mirror which advances the field of view 0.25 degrees once per rotation in a direction perpendicular to the plane of rotation. A change in mirror-stepping direction signals the start of a new image. One, two, or three photometers may be in operation at one time. The images from all operating photometers are telemetered simultaneously with image repetition rates that typically vary from about 3 to 12 minutes.

C. MEASURED_PARAMETERS:

Auroral images are obtained at 391.4, 557.7 and 630.0 nm. Several background filters are also provided. The third imaging photometer is equipped with filters and a photocathode for observations at vacuum-ultraviolet wavelengths, in particular emissions of the Lyman-Birge-Hopfield band of molecular nitrogen at about 140 to 170 nm. Imaging at these wavelengths allows coverage of the auroral oval in both the dark and sunlit ionospheres. The filter array for the vacuum-ultraviolet imaging photometer also includes filters for atomic hydrogen Lyman alpha at 121.6 nm and oxygen lines at 130.4 and 135.6 nm.

Filters included in this dataset for observations of the aurora and geocorona are the shown in the following tables.

In this section 'L' in Lp, dL, and Lnnn.n represents the Greek letter lambda, 'd' in dL represents the Greek letter delta, and 'a' in Lya represents the Greek letter alpha.

VISIBLE IMAGING PHOTOMETER A

Filter#	Lp,nm	dL,nm	Tp	Sp	Name	Function
3	630.03	1.06	0.45	0.88	630W	[OI]21 line
4	557.80	0.90	0.48	2.40	557W	[OI]32 line
5	390.85	2.36	0.27	3.31	391W	N2+(0-0) band
6	394.96	1.20	0.16	1.96	394B	Background for L391.4
7	626.57	1.10	0.55	1.08	626B	Background for L630.0
8	630.07	1.08	0.40	0.78	630W	[OI]21 line
9	557.87	0.29	0.26	1.30	557N	[OI]32 line (narrow dL)
10	391.30	0.85	0.19	2.33	391N	N2+(0-0) (narrow dL)
11	630.06	0.26	0.34	0.66	630N	[OI]21 line (narrow dL)

12	557.77	0.26	0.32	1.60	557N	[OI]32 line (narrow dL)

VISIBLE IMAGING PHOTOMETER B

Filter#	Lp,nm	dL,nm	Tp	Sp	Name	Function
2	630.05	0.27	0.31	1.31	630N	[OI]21 line (narrow dL)
3	557.82	0.23	0.23	2.40	557N	[OI]32 line (narrow dL)
4	391.24	0.80	0.20	4.49	391N	N2+(0-0) (narrow dL), centered on band head
5	630.04	0.26	0.28	1.19	630N	[OI]21 line (narrow dL)
8	554.63	0.85	0.39	3.85	554B	Background for L557.7
9	557.82	0.85	0.47	4.85	557W	[OI]32 line
10	390.80	2.40	0.26	5.84	390W	N2+(0-0) band
11	629.97	1.01	0.44	2.00	630W	[OI]21 line
12	557.78	0.90	0.47	4.64	557W	[OI]32 line

VACUUM-ULTRAVIOLET IMAGING PHOTOMETER C

Filter#	Lp,nm	dL,nm	Tp	Sp	S(Lya)	Name	Principal function
1	150	43	0.21	1.65		136W	N2(LBH) band
2	131	32	0.30	3.08		123W	OI lines
3	125	30	0.36	3.10	2.18	120W	H Lya line
4	156	34	0.18	1.27		140N	N2(LBH) band (narrow dL)
5	150	41	0.25	2.05		136W	N2(LBH) band
6	135	18	0.17	1.71		125N	OI lines (narrow dL)
7	128	30	0.30	3.08		123W	OI lines
8	120	11	0.13	0.84	0.79	117N	H Lya line (narrow dL)
9	154	43	0.17	1.26		140N	N2(LBH) band (narrow dL)
10	129	14	0.18	1.80		125N	OI lines (narrow dL)
11	120	11	0.14	0.91	0.79	117N	H Lya line (narrow dL)
12	130	47	1.00	10.5	7.0	117A	H Lya line

Lp is wavelength of peak transmission for filter.
dL is passband FWHM.
Tp is transmission at Lp and +15 deg C.
Sp is sensitivity at Lp in units of counts/(kilorayleigh-pixel).
S(Lya) is sensitivity at L121.6 in units of counts/(kilorayleigh-pixel).

D. PERFORMANCE_OF_THE_INSTRUMENT:

The auroral imaging instrumentation aboard the spacecraft Dynamics Explorer 1 continues to function normally in 1989 with no degradation to electronics, sensors, or electromechanical devices. Extended exposure of optical elements to intense energetic charged-particle radiation in the inner magnetosphere has decreased instrument sensitivity at vacuum-ultraviolet (VUV) wavelengths. This effect was anticipated. Principal loss is a large decrease in sensitivity to Lyman-alpha radiation (121.6 nm) at the short-wavelength limit of the photometer for VUV wavelengths. The long-term survey of emissions from the geocorona effectively ended by mid 1986. Auroral imaging at VUV wavelengths greater than 123 nm continues without difficulties, but the sensitivities have decreased, particularly at the short-wavelength limit of the individual pass bands. Several spacecraft malfunctions in the nearly eight years of operations have resulted in no loss of scientific information from the imaging instrumentation. A brief return in January 1987 of spacecraft telemetry which includes the imaging housekeeping data has allowed us to determine that the instument voltages, currents, and temperatures remain within proper operating limits, with no indication of instrument degradation.

E. RESOLUTION:

The full width of the fields of view of the photometers corresponding to a single pixel is 0.29 degrees. An image frame consists of all scan lines obtained by mirror steps in one direction which deflect the field of view by 0.25 degrees per rotation. The angular separation of two consecutive pixels in the direction of spacecraft rotation is about 0.23 degrees. A full frame has 120 scan lines or 30 degrees of width. For routine processing the angular width along a scan line is 150 pixels, or about 34.5 degrees of length. The frame width is occasionally adjusted to less than 120 scan lines.

F. REFERENCE:

Frank, L. A., J. D. Craven, K. L. Ackerson, M. R. English, R. H. Eather, and R. L. Carovillano, Global auroral imaging instrumentation for the Dynamics Explorer mission, Space Sci. Inst., 5, 369-393, 1981.

PARAMETERS:

Each primary data file contains one image from one photometer, instrument parameters for that image, and orbit/attitude data for one central time in the image. Each image data file contains a header record giving universal time, instrument parameters, orbital position, and the number of scan line records, N, to follow. The N scan line records each provide the UT and mirror position for the scan line and all image pixels for that scan. Each scan line record contains pixels collected by one photometer during one six-second spacecraft spin. Each image file contains all scans by one photometer between changes of mirror stepping direction, up to 120 scans or 12 minutes per file. The same filter will normally be in use for the entire image, but for some operations the filter change will not take place at the first scan line.

DATA_SET_QUALITY:

Data processing anomalies have mostly been corrected during the archiving procedure to produce a data set of overall high quality. Problems that may yet be encountered include scan lines that are not aligned correctly with respect to nadir, scan lines that contain an incorrect mirror position, and header records containing an incorrect filter wheel position or incorrect orbit/attitude data. Personal observation indicates that these problems occur in less than three percent of the images. Pre-archival screening should reduce the frequency of occurrence of such problems to less than one percent. Displaying the image with a simple coordinate overlay such as limb and terminator is usually adequate for determining the existence of an unusable file. Graphic coordinate overlay techniques are described in the software source code documentation.

DATA_PROCESSING_OVERVIEW:

A. DATA_PROCESSING_CYCLE:

Spacecraft tape recorder data are transmitted to Goddard Space Flight Center (GSFC) and there edited and time-smoothed by the input processing software. SAI instrument parameters and image data are then decommutated from the telemetry on the DE Sigma-9 computer and shipped on magnetic tape to The University of Iowa for image file production.

A second phase of processing on the Sigma-9 generates adjustments for each scan line to correct for jitter in the spacecraft nadir reference system. These are copied to magnetic tape with the corresponding telemetry, and at Iowa are merged into the newly produced image files.

Orbit/attitude data are generated on the Sigma-9 for specific image times, and are sent to Iowa on magnetic tape where they are merged into the header records of newly produced image files.

Although one photometer will collect pixel data for 360 or 120 degrees of each rotation, depending on the operational mode, routine production images are reduced to the 35 degree area of interest centered on Earth. For special purposes the telemetry files can be reprocessed to show the full length of the scan lines or to be centered differently.

B. HISTORY:

Image production at Iowa was originally done on a Univac 418-III. That computer was replaced in 1986 by a VAX 11-780. In 1987 a MicroVAX II was added, which was later clustered with the VAX 11-780 and several other computers.

Scan line adjustments and orbit/attitude data were originally merged into the image files on the Sigma-9 after the files had been sent to GSFC on magnetic tape. Since 1983 these adjustments and orbit/attitude data have been sent from GSFC to Iowa, and the merges are done immediately after image production.

DATA_ORGANIZATION:

The logical volumes will progress chronologically beginning with day 266 of 1981. About 30,000 image files will reside on each logical volume. The images files will be grouped in several time-ordered directories and subdirectories to facilitate rapid data access. Each year or part of year of data will be in a unique directory named 'Y' followed by the four-digit year number. These directories will be further subdivided into several subdirectories for ranges of days in each year, and named 'D' followed by a concatenation of the first day number and the last day number. Each range-of-days subdirectory will have three subdirectories named 'A', 'B', and 'C' for the three photometer designations. If a pass (the set of all images from one period of continuous operation) spans the boundary between two range-of-days directories, the entire pass will be included in both directories.

The following diagram illustrates a sample primary data directory structure:

```
                    [DEA3_0001A]                          top level data
                          |                                    directory
    ______________________|______________________
    |                           |                      |
```

```
 [Y1981]                  [Y1982]                  [Y1983]      directory for each
    |                        |                        |         year on volume
    |          ______________|______________          |
    |          |             |             |          |
[D266365]  [D001110]    [D111270]    [D271365]    [D001103]     directory for each
 ___|___    ___|___      ___|___      ___|___      ___|___      range of days
 |  |  |    |  |  |      |  |  |      |  |  |      |  |  |
[A][B][C]  [A][B][C]    [A][B][C]    [A][B][C]    [A][B][C]     directory for
                                                          each photometer
```

There is a supplementary data file in the top level data directory that has the complete list of primary data files on this volume.

TYPE_OF_FILE_RELATIONSHIPS:
The auroral imaging data set contains three types of image files: (1) standard production output image files, as described above, and designated SAI00; (2) specially reconstructed images designated SAI20; and (3) advanced mode images designated SAI30. The modes of operation which produced type SAI20 and type SAI30 images were required for data acquired in the last half of 1982 during a spacecraft malfunction. For these operations the 'advanced' nadir reference was used, with an offset of 60 degrees from the nadir direction. Type SAI20 and type SAI30 files, which will not appear in every volume, are designed to resemble type SAI00 files, and, although they are listed as a separate file type, they may be used exactly like type SAI00 files for most purposes. The spacecraft malfunction "disappeared" in late 1982.

The supplementary file list data file ([DEA3_*]FILELIST.DAT) has the complete time and attribute list of the primary data files as given in the file names and includes a six-character production sequence name for each file.

Software source code shows how to properly align the image data, how to convert compressed pixel counts to uncompressed counts, how to convert uncompressed counts to luminosities, in kilorayleighs, using calibration data obtained prior to launch, and how to correlate geographic and geocentric equatorial inertial (GEI) coordinates with individual pixels. Source code is also included for displaying an image and plotting the limb of the Earth and the terminator on it.

CCSDXSNM0002EMARK003CCSDXKNM0002SMARK005

LOG_VOL_TIME_COVERAGE: 1981-09-23 TO 1982-05-31

TYPE_OF_FILE_TIME_COVERAGE:
SAI00 1981-09-23T19:02:16 1982-05-31T23:17:12

DIRECTORY_NAMING_CONVENTION:
The top level data directory name echoes the last ten characters of the logical volume identifier, as in [DEA3_0001A]. The second level data directories are named 'Y' followed by the year of the data they contain, as in [DEA3_0001A.Y1982]. The third level data directories are named 'D' followed by two three-digit day-of-year numbers giving the range of days of the data they contain, as in [DEA3_0001A.Y1982.D001110]. Each third level data directory has three fourth level directories named 'A', 'B', and 'C' for the three SAI photometer designations. For example, [DEA3_0001A.Y1982.D001110.C] would contain image data files from the C photometer for the time period of day 1 through day 110 of the year 1982. If a pass (the set of all images from one period of continuous operation) spans the boundary between two range-of-

days directories, the entire pass will be included in both directories.
The top level data directory also includes a subdirectory named [.SSC] which contains software source code and related files.

DIRECTORY_TIME_COVERAGE:

[DEA3_0001A.Y1981.D266280]
[DEA3_0001A.Y1981.D281293]
[DEA3_0001A.Y1981.D294306]
[DEA3_0001A.Y1981.D307320]
[DEA3_0001A.Y1981.D321337]
[DEA3_0001A.Y1981.D338356]
[DEA3_0001A.Y1981.D357365]
[DEA3_0001A.Y1982.D001016]
[DEA3_0001A.Y1982.D017034]
[DEA3_0001A.Y1982.D035040]
[DEA3_0001A.Y1982.D046071]
[DEA3_0001A.Y1982.D079092]
[DEA3_0001A.Y1982.D093111]
[DEA3_0001A.Y1982.D112129]
[DEA3_0001A.Y1982.D130151]

FILE_NAMING_CONVENTION:

The naming convention describes the contents of the image files, as follows:

```
                       yrdayhhmmss_pfm
sample file name:      81270120000_C1F

where characters 1-2  = year
                 3-5  = day of year
                 6-11 = UT as hhmmss
                 12   = '_'
                 13   = photometer ID (A,B,C)
                 14   = filter number (1-9,A,B,C)
                 15   = mirror range (F:full,R:restricted,O:stepping off).
```

The file names are extended with the following file types:

.SAI00 standard image production output with all scan line records having a pixel offset of 188 and length of 150; minimal post-production processing; no manipulation of pixel values

.SAI20 reconstructed Earth-centered images from a mode of operation requiring use of a nadir reference direction offset from nadir by 60 degrees; the pixel offset is negative and the scan line length is 150 pixels; minimal post-production processing; no manipulation of pixel values

.SAI30 images from a mode of operation requiring use of a nadir reference direction offset from nadir by 60 degrees; the pixel offset is a positive value and varies with the photometer and the selection of imaging sector; if the photometer is selected in two of the three possible imaging sectors, the boundary between the selected sectors may be visible in the image; scan line length is 150 pixels; minimal post-production processing; no manipulation of pixel values

Each image file also has a six-character production sequence name with the photometer identifier (A, B, or C) as the second character. When image production was transferred from the UNIVAC 418 to the VAX 11-780, longer file names became possible, and the naming convention described above was proposed. For the convenience of users who may wish to locate image files by their original six-character identifiers, the production sequence name is included in the file list data file (FILELIST.DAT) located in the top data directory on each volume.

FILE_TIME_AND_ATTRIBUTE_COVERAGE:
The user should refer to the file list data file ([DEA3_*]FILELIST.DAT) for this volume. It is described in the type-of-file information.

PREV_LOG_VOL_TIME_COVERAGE: None.

CCSDXKNM0002EMARK005CCSDXRNM0003SMARK006

NESTING=L
REF=[DEA3_*]FILELIST.SFD

CCSDXRNM0003EMARK006CCSDXRLM0003SMARK007

ADI=NSSD0027
CLASS=R
NESTING=N
SCOPE=EACH
REF=[DEA3_*]FILELIST.DAT

CCSDXRLM0003EMARK007CCSDXRNM0003SMARK008

NESTING=L
REF=[DEA3_*]SAIDOC.SFD

CCSDXRNM0003EMARK008CCSDXRLM0003SMARK009

ADI=NSSD0028
CLASS=I
NESTING=N
SCOPE=EACH
REF=[DEA3_*.SSC]*.SAI00
REF=[DEA3_*.Y*.D*.*]*.SAI00
REF=[DEA3_*.Y*.D*.*]*.SAI20
REF=[DEA3_*.Y*.D*.*]*.SAI30

CCSDXRLM0003EMARK009CCSDXRNM0003SMARK00E

NESTING=L
REF=[DEA3_*]SSCDOC.SFD

CCSDXRNM0003EMARK00ECCSDXRLM0003SMARK00F

ADI=NSSD0029
CLASS=J
NESTING=N
SCOPE=EACH
REF=[DEA3_*.SSC]*.FOR

REF=[DEA3_*.SSC]*.XMP

CCSDXRLM0003EMARK00FCCSDXZLM0001EMARK001

Dump of file 1DUB4:[DEA3_0001A.Y1981.D266280.AJ81266193831_AAF.SAI00;1 on 5-FEB-1992 09:25:39.04
File ID (97,1,0) End of file block 35 / Allocated 48

Virtual block number 2 (00000002), 512 (0200) bytes


```
 605C615B 524E524F 4D4F5051 51525153 4C4E4B4E 4C505250 4E555550 504C5052 RPLPPUUNPRPLNKNLSQRQQPOMORNR[a\' 000000
 5A575A5D 5C5A5B5F 605E595C 59524D49 514D5253 51515250 5153504D 51535961 aYSQMPSQPRQQSRMQIMRY\Y^'_[Z\]ZWZ 000020
 FFF400BC 0A6C6864 D08B0437 0F3E00AC 00570003 00B06363 6257545E 62585457 WTXb^TWbcc°...W.?.>.7..?dhl.¼.ð. 000040
 5151534B 50504E50 4C505050 504A4F50 535B5F57 55514F52 53550001 00000000 ......USRDQUW_[SPOJPPPPLPNPPKSQQ 000060
 524C4F4C 4E4B4F4F 4F4F504F 4D49494F 50504C4C 4C514F4E 4F50514E 5150514F OQPQNQPONOQLLLPPOIIMOPOOOOKNLOLR 000080
 4B4D4E4E 504F4F51 55524E50 4F515150 524D514E 504E4C4D 504E4C4A 4E4E4F4E NONNJLNPMLNPNQMRPQQOPNRUQOOPNNMK 0000A0
 4E51504E 4B4F4F4F 4D4D514C 51515258 575B5855 51504E4F 4E504F51 5253524F ORSRQOPNONPQUX[WXRQQLQMMOOOKNPQN 0000C0
 000300B0 57616260 5C595D63 615A5856 5554595B 5F616262 5F5C5C5A 5854514F OQTXZ\\_bba_[YTUVXZac]Y\'baW°... 0000E0
 5B565551 514F5154 00010000 0000FFF2 00BC0893 4864CD8A 043726AE 00AC0057 W.?.?&7..‡dH..¼.ð.......TQOQQUV[ 000100
 4F4E4C4E 504D4A50 4C4D4B4B 4F514951 4E51504D 4F4E4F53 52504E50 51515254 TRQQPNPRSONOMPQNQIQOKKMLPJMPNLNO 000120
 5151504E 4F4D504F 53504D50 4E4C4E4D 4E505252 4C514C4D 504F504F 4E4E5050 PPNNOPOPMLQLRRPNMNLNPMPSOPMONPQQ 000140
 60595354 51525352 52525351 50534E50 514E4C4D 4E515358 554F5051 51515150 PQQQQPOUXSQNMLNQPNSPQSRRRSRQTSY' 000160
 54526060 5E5C5C56 585F5B58 5552504B 51504F4E 4D534D50 4F4D4C4C 4E504F55 UOPNLLMOPMSMNOPQKPRUX[_XV\\^''RT 000180
 06B02864 CC890437 3E1E00AC 00570003 00B0565B 5D5B5F5C 605F6161 57565757 WWVWaa_'\_[][V°...W.?..>7..‡d(°. 0001A0
 504E4E4F 4F4D5751 524F4D52 4F545655 5B555252 53550001 00000000 FFF300BC ¼.ð.......USRRU[UVTORMORQWMOONNP 0001C0
 4F50524F 53514D51 51505150 5150494D 4C4E4D4D 4D4F4D4E 4B4F4C4D 4B4F4D4E NMOKMLOKNMOMMMNLMIPQPQPQQMQSORPO 0001E0
```

Dump of file 1DUB4:[DEA3_0001A.Y1981.D266280.A]81266193831_AAF.SAI00;1 on 5-FEB-1992 09:25:39.04
File ID (97,1,0) End of file block 35 / Allocated 48

Virtual block number 1 (00000001), 512 (0200) bytes


```
00000001 0436F7CE 0000010A 00000051 00000004 00000190 040100CA 00030196 ....é...........Q.......ÎÆ6..... 000000
00000096 000038D6 00000061 0000002C 0000008C 00000066 5A303633 00000064 d...360Zf.......,...a...Ö8...... 000020
20B00000 00000059 0000004C 0000005F 00000059 00000050 0000004C 00000000 ....L...P...Y..._...L...Y.....° 000040
FF51F1DA 000000B5 BB66229B 0D08A600 BBBBA56A 00006364 00000000 66280082 ..(f....dc..j¥»».ς..."f»µ...ÚñQ. 000060
00000669 000E6C86 0004FA5F 00000B85 FFF18C3A FFFB1ADF 000489BC 003C0FFA ú.<.¼...ß.û.:.ñ....._ú...l..i... 000080
000FD2B5 FFFFED99 FFFFD58E FFF0BE07 005602EC 001178A2 FFCCF19C 503608EF ï.6P.ñì.¢x..ì.V..ςς..Õ...í..µÒ.. 0000A0
00000000 00000000 00000000 00000001 000017AB 000017AA 000017AA 043B7D41 A};.ª...ª...«................... 0000C0
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 ................................ 0000E0
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 ................................ 000100
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 ................................ 000120
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 ................................ 000140
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 ................................ 000160
00AC0057 000300B0 B0CB7535 524962C4 00BC0037 003600C3 20203830 38534155 UAS808  Ã.6.7.¼.ÄbIR5uË°°...W.¬. 000180
4F525359 5C595251 52525352 00010000 0000FFF4 00BC0C4F 0864D18C 0436F7CE ÎÆ6..Ñd.O.¼.ô.......RSRRQRY\YSRO 0001A0
52504E50 4E4B4E51 4E514E4E 4D4A4F4C 514C4E4F 4C4C4F50 51515152 534E5150 PQNSRQQQPOLLONLQLOJMNNQNQNKNPNPR 0001C0
4E51504E 514D4D4B 4C4D4E4D 4F4E4B4B 4E4C5150 51515051 4E4E5151 4D4C4F4F OOLMQQNNQPQQPQLNKKNOMNMLKMMQNPQN 0001E0
```

```
Directory QSA2:[DEA3_0001A]

FILELIST.DAT;1          FILELIST.SFD;1          SAIDOC.SFD;1            SSC.DIR;1               SSCDOC.SFD;1
VOLDESC.SFD;1           Y1981.DIR;1             Y1982.DIR;1

Total of 8 files.

Directory QSA2:[DEA3_0001A.SSC]

81312013926_A4F.SAI00;1 81312013928_B9F.SAI00;1 81312014101_C2F.SAI00;1 CRDPIX.FOR;1            CRDPIX.XMP;1
CURRENT_IMAGE.FOR;1     DELIB.FOR;1             DEVIEW.FOR;1            DISPLAY.FOR;1           DSPMAP.XMP;1
IMAGEIN.FOR;1           IMDSP.FOR;1             MAP.FOR;1               PIXCRD.FOR;1            PIXCRD.XMP;1
PLOT.FOR;1              SETCRD.FOR;1            TESTPLOT.FOR;1          TESTPLOT.XMP;1

Total of 19 files.

Directory QSA2:[DEA3_0001A.Y1981]

D266280.DIR;1           D281293.DIR;1           D294306.DIR;1           D307320.DIR;1           D321337.DIR;1
D338356.DIR;1           D357365.DIR;1

Total of 7 files.

Directory QSA2:[DEA3_0001A.Y1981.D266280]

A.DIR;1                 B.DIR;1                 C.DIR;1

Total of 3 files.

Directory QSA2:[DEA3_0001A.Y1981.D266280.A]

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