

N-CAM Image analysis software (Demodulation_Image_For_Public.exe)

●Software overview

This is software that converts data downlinked from satellites into image in Image data downlink. This software consists of the following three parts.

①Execution software(Demodulation_Image_For_Public.exe)

②Image information file(file_info.txt)

③Input file(Downlink data)

※Put all these files in the same folder.

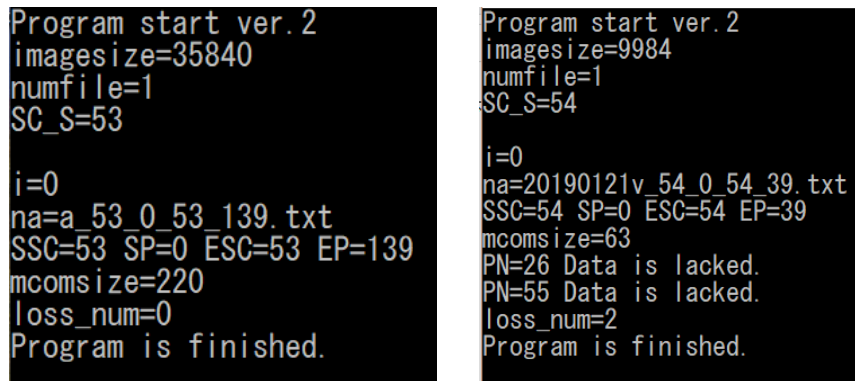
Hereafter, each will be explained.

①Execution software (Demodulation_Image_For_Public.exe)

When the exe file is executed, analysis starts and an image is output as "output.jpg".

Note that "output.jpg" does not become an image if there is a shortage of downlink data or if the input file format is incomplete.

The screen at the time of execution is shown below.



```
Program start ver.2
imagesize=35840
numfile=1
SC_S=53

i=0
na=a_53_0_53_139.txt
SSC=53 SP=0 ESC=53 EP=139
mcomsize=220
loss_num=0
Program is finished.
```

```
Program start ver.2
imagesize=9984
numfile=1
SC_S=54

i=0
na=20190121v_54_0_54_39.txt
SSC=54 SP=0 ESC=54 EP=39
mcomsize=63
PN=26 Data is lacked.
PN=55 Data is lacked.
loss_num=2
Program is finished.
```

Figure 1(Left : Normal, Right : There is a defect in the readout range)

The meanings of the variables shown in Figure 1 are as follows.

- imagesize : Movie size(bytes)
- numfile : Number of input files
- SC_S : Movie reading start sector
- i : Input file number
- na : Read file name

- SSC : Read start sector
- SP : Read start page
- ESC : Read end sector
- EP : Read end page
- mcomsize : Number of downlink packets for one path
- loss_num : Number of loss packets
- PN : Packet number

When the downlink data is insufficient, “PN=x is lacked.” is output. Next, I will explain PN. The ROM image storage area has the following structure:.

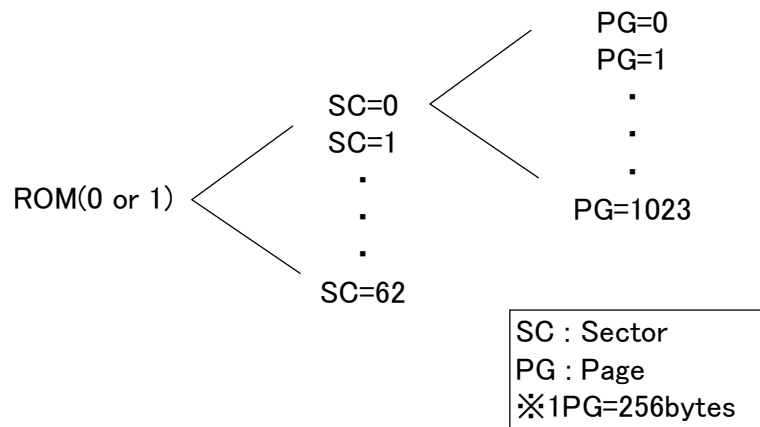


Figure 2 ROM image storage area

The captured images are saved from PG = 0 with SC = 0-62. Based on this, some explanations of the above variables are given below.

- SC_S(Image reading start sector) : Refers to the head sector where the image is stored
- SSC(Read start sector) : The first sector in the input file
- SP(Read start page) : First page included in the input file
- ESC(Read end sector) : Last sector in the input file
- EP(Read end page) : Last page in the input file

Since it is difficult, the following shows an example when the image saved from SC = 3 (data size: 10240 bytes) is downlinked in 3 steps.

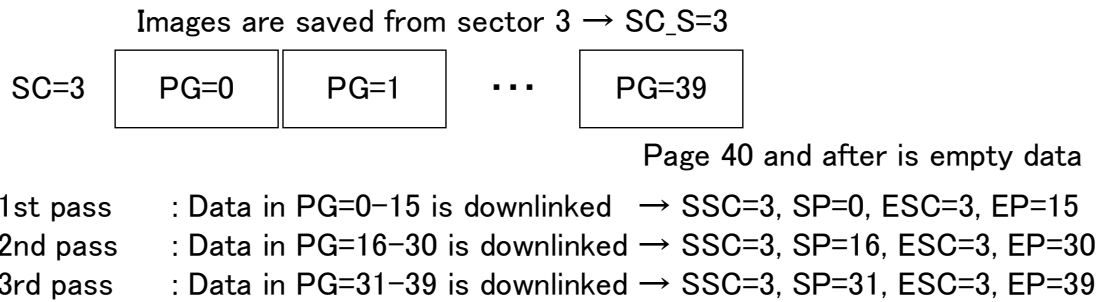


Figure 3 Example 1

See “Operational information page (<http://nexusoperation.seesaa.net/>)” and “Satellite images page (http://sat.aero.cst.nihon-u.ac.jp/nexus/E3_SatImages.html)” for values(SC_S, SSC, SP, ESC, EP). In downlink, image data is stored every 163 bytes per packet. A specific example is as Figure 4.

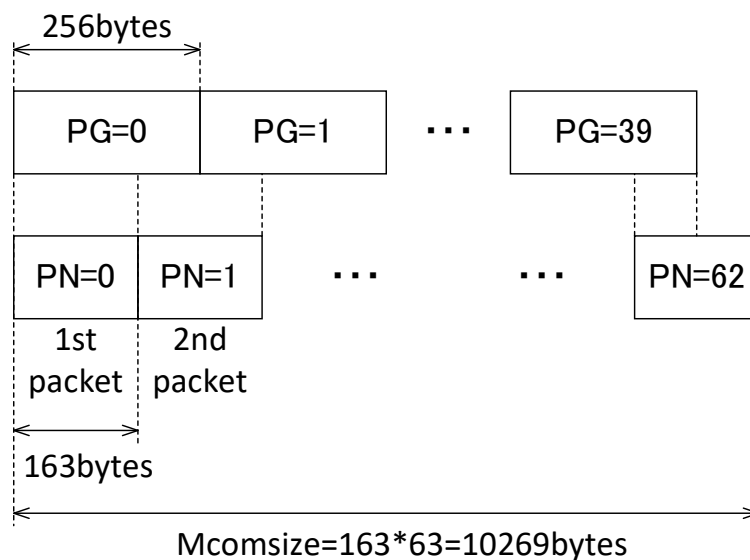


Figure 4 Example 2

In this example, the image is divided into 63 packets. 63 個すべてがダウンリンクできれば、画像になる。

If All packets are downlinked, it becomes an image. If the downlink data is missing and 10 out of 63 are missing, “loss_num=10” is displayed. The location of missing data is x of A “PN=x Data is lacked.”.

②Image information file(file_info.txt)

Enter the information required for “Demodulation_Movie_For_Public1.exe” in “file_info.txt”. The contents of “file_info.txt” are as Figure 5.



```
file_info.txt - Notepad
File Edit Format View Help
※Meaning_of_file_name : (Optional)_(Start sector)_(Start page)_(End sector)_(End page).txt
Image_size 3218176
Total_number_of_files 3
Start_sector 40
20190722c_40_0_40_255.txt
20190722c_40_256_40_511.txt
20190722c_40_512_40_1023.txt
```

Figure 5 Contents of “file_info.txt”

A description of each line of “file_info.txt” is shown below.

- First line : Comment text(Meaningless)
- Second line : Movie size (bytes)

Enter the movie size. Movie size will be released in “Operational information page (<http://nexusoperation.seesaa.net/>)” and “Satellite images page (http://sat.aero.cst.nihon-u.ac.jp/nexus/E3_SatImages.html)”.

- 3rd line : Total number of files

Enter the total number of input files.

- 4th line : Start sector

Enter the first sector number(SC_S) in the read range. See “Operational information page (<http://nexusoperation.seesaa.net/>)” and “Satellite images page (http://sat.aero.cst.nihon-u.ac.jp/nexus/E3_SatImages.html)”for values(SC_S).

- 5th line and after : The name of the input file

Enter the file name of the read file. When reading three files, enter each file with a line feed. The format of the file name is as follows.


“(Optional)_(SSC)_(SP)_(ESC)_(EP).txt(Line feed)”

※Do not put “_” in “Optional”.

For reference, here is an example of using three input files.

③Input file (Downlink data)

This refers to the file where the downlink data is saved. The contents of the input file are based on the following format.



20190722c_40_0_40_255.txt - Notepad

File Edit Format View Help

C1	00	01	84	F0	A0	63	B3	4E	CD	31	05	3A	98	C7	52	D0	21	C3	14	B4	00	EE	F4	B4	00	B4
C1	00	01	A5	F0	83	7B	A8	FB	D7	3F	79	A8	7B	D7	A7	52	5A	1B	D3	81	87	73	79	93	D6	B3
C1	00	01	A8	F0	DD	9C	71	57	39	FB	CD	47	DE	B0	AE	AF	B3	FC	55	35	66	77	53	81	95	35
C1	00	01	AB	F0	1B	AB	EF	7A	C6	9E	EB	24	D7	05	49	1D	F0	89	45	E5	26	AB	33	57	23	37
C1	00	01	AE	F0	A7	50	02	D0	0D	30	1C	29	F9	E6	90	05	3B	8A	00	38	A2	81	0E	CD	14	C6
C1	00	01	B1	F0	53	4D	02	19	4D	A0	62	1C	53	28	01	29	0D	03	1B	49	40	86	D2	50	31	3F
C1	00	01	B9	F0	C6	3F	3C	52	D0	00	3A	53	A9	80	EA	31	48	43	A9	69	8C	75	2E	29	00	77
C1	00	01	BE	F0	5A	0D	00	19	A2	80	12	8A	00	43	8A	4A	00	4A	4C	D0	31	BE	D4	13	CD	20
C1	00	01	BF	F0	A0	02	9D	9A	00	5A	33	40	0B	4B	9A	00	3B	D2	E4	53	10	A0	D1	40	0B	C5
C1	00	01	C2	F0	29	33	40	C4	A6	D0	02	66	90	91	40	09	C5	27	14	08	6F	14	50	31	A4	E2
C1	00	01	C4	F0	00	32	29	7B	D0	21	DD	29	38	CD	03	17	F0	A2	80	16	93	A5	00	3B	34	DA
C1	00	01	D0	F0	53	BB	50	40	DC	D2	7E	14	08	75	21	34	0C	4A	3E	B4	0C	5D	D4	BD	E8	00
C1	00	01	D1	F0	28	18	99	A4	CF	B5	30	13	A5	2D	20	12	9A	69	88	40	C2	92	81	8E	E2	93
C1	00	01	D4	F0	18	B4	EE	3D	29	80	B9	A5	CD	20	0C	FB	51	40	0E	A5	A6	02	F1	D6	8A	00
C1	00	01	D6	F0	20	12	8F	C2	98	09	C5	26	16	90	09	4D	27	DA	98	0B	9A	4F	96	90	09	48
C1	00	01	D8	F0	4A	63	17	34	B4	00	51	4C	03	34	B9	A0	05	CE	69	33	8A	00	5C	D1	40	05
C1	00	01	DA	F0	25	00	27	5A	33	CD	00	37	B5	37	F0	A4	01	4B	F8	50	21	B4	52	18	13	DB
C1	00	01	DC	F0	B0	A3	8F	F6	96	9B	D7	73	2B	1B	16	FF	00	11	61	3F	EB	AD	7F	EF	86	AD
C1	00	01	DD	F0	8C	5F	AD	27	D2	81	0B	9A	33	40	C4	CD	3B	34	C0	37	52	96	A4	02	67	06
C1	00	01	DE	F0	34	6E	A0	04	DC	29	37	50	02	13	C5	1B	F8	A4	02	6E	A3	7D	00	1B	A9	37
C1	00	01	DF	F0	34	06	3D	DF	C3	BD	2A	7F	F5	2F	24	27	F3	AC	4B	BF	86	32	F3	F6	7B	A8
C1	00	01	E0	F0	25	30	16	92	80	13	8A	5C	D3	01	28	CD	20	13	3E	D4	B4	00	9B	85	37	3C
C1	00	01	E2	F0	14	B9	A0	02	96	90	09	45	30	12	8C	D0	30	CD	21	34	00	67	9A	28	01	69
C1	00	01	E5	F0	F7	A9	85	D3	AF	46	A7	71	17	AD	B5	BB	BB	6F	F5	73	B8	C7	A1	AD	BB	4F
C1	00	01	E6	F0	94	0C	4C	51	DE	80	0C	D1	4C	05	A2	90	C3	3C	D2	D0	30	EF	46	45	31	0B
C1	00	01	E8	F0	52	4C	D1	4C	E7	A5	B2	9A	13	86	42	3F	0A	AD	B4	AD	59	42	77	A4	A4	31
C1	00	01	E9	F0	82	97	34	0C	50	69	68	01	D9	A5	CD	48	C3	75	3B	75	31	0B	91	9A	37	50

Figure 6 File format

- One packet of downlink data is stored for each row.

→The specific contents are shown in "FM telemetry format, Figure 6, Image data downlink".

※FM Telemetry Format :

http://sat.aero.cst.nihon-u.ac.jp/nexus/download/NEXUS_FM_telemetry_format_e.pdf