

N-CAM Movie analysis software (Demodulation_Movie_For_Public)

● Software overview

This is software that converts data downlinked from satellites into video in Movie data downlink. This software consists of the following four parts.

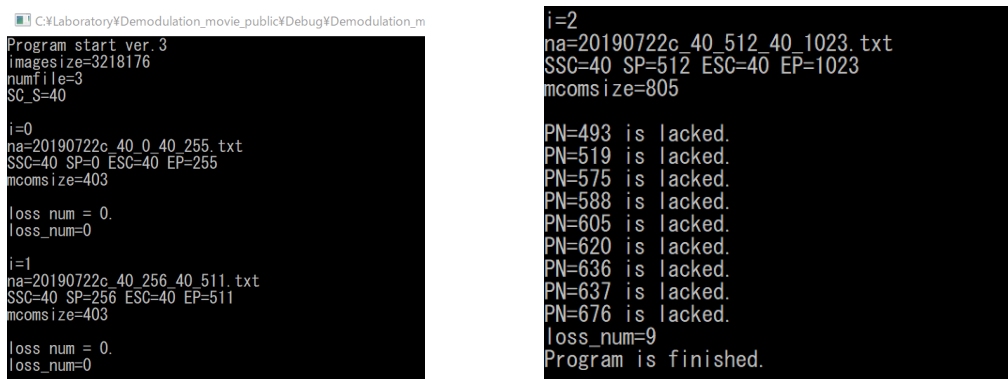
- ① Execution software 1 (Demodulation_Movie_For_Public1.exe)
- ② Movie information file (file_info.txt)
- ③ Input file(Downlink data)
- ✖Put all these files in the same folder.
- ④ Execution software 2 (Demodulation_Movie_For_Public2.exe)

Hereafter, each will be explained

① Execution software 1 (Demodulation_Movie_For_Public1.exe)

This software extracts moving image data from downlink data and confirms that there is no shortage of downlink data. When the exe file is executed, analysis starts, and a file called “output.bin” is output.

The screen at the time of execution is shown below.



```

C:\Laboratory\Demodulation_movie_public\Debug\Demodulation_m
Program start ver. 3
imagesize=3218176
numfile=3
SC_S=40

i=0
na=20190722c_40_0_40_255.txt
SSC=40 SP=0 ESC=40 EP=255
mcomsize=403

loss_num = 0.
loss_num=0

i=1
na=20190722c_40_256_40_511.txt
SSC=40 SP=256 ESC=40 EP=511
mcomsize=403

loss_num = 0.
loss_num=0

i=2
na=20190722c_40_512_40_1023.txt
SSC=40 SP=512 ESC=40 EP=1023
mcomsize=805

PN=493 is lacked.
PN=519 is lacked.
PN=575 is lacked.
PN=588 is lacked.
PN=605 is lacked.
PN=620 is lacked.
PN=636 is lacked.
PN=637 is lacked.
PN=676 is lacked.
loss_num=9
Program is finished.

```

Figure 1 Execution screen (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

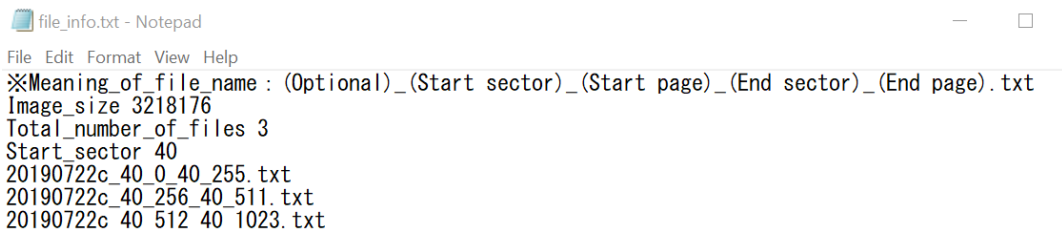
When the downlink data is insufficient, “PN=x is lacked.” is output. For the explanation of the packet number, please refer to the explanation of the image analysis software shown at the following URL.

● Image analysis software

(http://sat.aero.cst.nihon-u.ac.jp/nexus/download/InstructionManual_ImageAnalysisSoftware_20190125.pdf)

② Movie 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 2.



```

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 2 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).

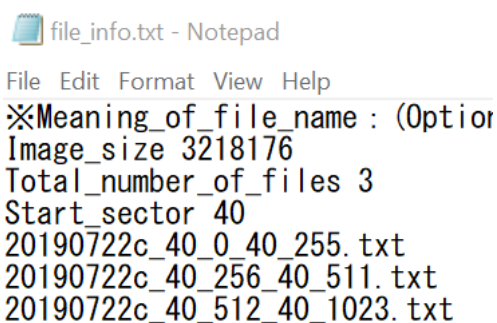
- 5th line and after : The name of the input file

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”.

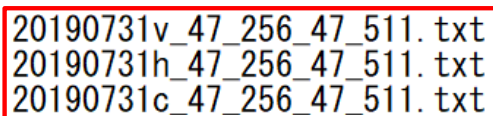
For reference, here is an example of using three input files.



```
file_info.txt - Notepad
File Edit Format View Help
※Meaning_of_file_name : (Option
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 3 Three input files

In addition, when there are multiple antennas like Nihon University, there may be multiple data that read the same range. In this case, as shown in Fig. 4, if the files with the same read range are placed together, the missing of the read range can be confirmed with the sum of multiple files as shown in Fig. 5.



```
20190731v_47_256_47_511. txt
20190731h_47_256_47_511. txt
20190731c_47_256_47_511. txt
```

Figure 4 The files with the same read range are placed together

```

i=78
na=20190731v_47_256_47_511.txt
SSC=47 SP=256 ESC=47 EP=511
mcomsize=403

PN=232 is lacked.
PN=382 is lacked.
loss_num=2

i=79
na=20190731h_47_256_47_511.txt
SSC=47 SP=256 ESC=47 EP=511
mcomsize=403

loss num = 0.
loss_num=0

i=80
na=20190731c_47_256_47_511.txt
SSC=47 SP=256 ESC=47 EP=511
mcomsize=403

loss num = 0.
loss_num=0

```

Figure 5 Output result

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

④ Execution software 2 (Demodulation_Movie_For_Public2.exe)

This software converts “output.bin”, which is the output of execution software 1, into an image. When "output.bin" is put in the same file as the execution software 2 and the exe file is executed, the following screen appears..

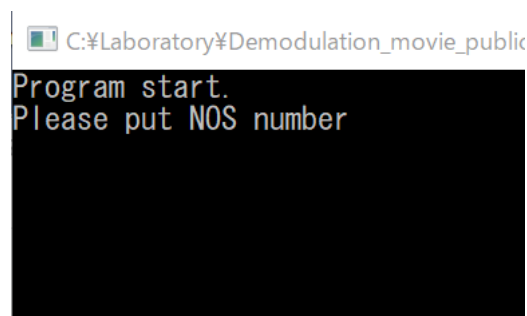


Figure 7 Screen after execution

N-CAM videos are created by taking a large number of images and stitching them together. First, specify the number of shots.

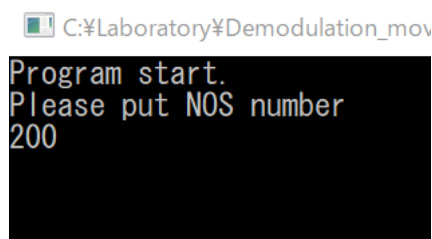


Figure 8 Step1

When you press Enter, you will be prompted for the next file name. Type “output” and press Enter.

```
C:\Laboratory\Demodulation_  
Program start.  
Please put NOS number  
200  
NOS=200  
put file name  
output  
file=output  
OK(1) NO(0)
```

Figure 9 Step 2

If the information you entered is correct, type “1”. The analysis is then performed. The image included in the downlink data is output.

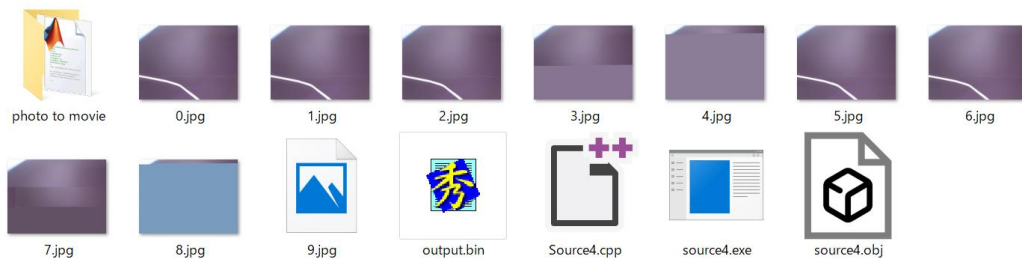


Figure 10 Step3

If the data is missing, the missing image is output as shown in 3.jpg above. A movie is created by stitching together the output images..