

FORMAT OF VISSR ARCHIVE DATA (GMS-5 AND GVAR-VISSR)

1. VISSR IR DATA

(1) File specifications

Items	Specifications	Comments
Block length	3664bytes	Fixed length

Byte order : Big endian

Data type : I*2(2-bytes Integer), I*4(4-bytes Integer), R*4(4-bytes Real),
R*8(8-bytes Real)

(2) File composition

(A) CONTROL BLOCK

Block	3664bytes
1 - 2	Control block

(B) IMAGE PARAMETER BLOCK

Block	2688bytes	976bytes
3	① Mode block	Not used
4	② Information of S/DB operation	Not used
5	③ Coordinate transformation parameters	Not used
6	④ Attitude prediction data	Not used
7	⑤ Orbit prediction data(1)	Not used
8	⑤ Orbit prediction data(2)	Not used
9	⑥ DCD Communication	Not used
10	⑦ VIS calibration	Not used
11	⑧ IR1 calibration	Not used
12	⑧ IR2 calibration	Not used
13	⑧ WV calibration	Not used
14	⑨ Split window calibration	Not used
15	Reserved	Not used
16	Reserved	Not used
17	⑩ Simple coordinate transformation	Not used
18	⑪ β -angle	Not used

(C) IMAGE DATA BLOCK

Block	64bytes	256bytes	3344bytes
19-final	LCW	DOC	Image data

(3) File contents

(A) CONTROL BLOCK

Position (bytes)	Items	Contents	Type
1-2	Control block size	Block size of IR image file =2	I*2
3-4	Head block number of parameter block	Parameter block number of IR image data file =3	I*2
5-6	Parameter block Number of image data	Parameter block size of IR image data file =16	I*2

7-8	Head block number of image data	Parameter block number of IR image data file =19	I*2
9-10	Total block size of image data	Total block size of image data	I*2
11-12	Available block size of image data	Available block size of image data	I*2
13-14	Head valid line number	Head valid line number of image data	I*2
15-16	Final valid line number	Line number of final input valid data	I*2
17-18	Final data block number	Block number of final input data	I*2
19-32	Reserved		I*2
33-	Address table	Block number of available data (Not available = -1)	I*2

(B) IMAGE PARAMETER BLOCK

See Table-1 Contents of image parameter block

(C) IMAGE DATA BLOCK

LCW (Line Control Word)

Position (bytes)	Items	Contents	Type
1-4	Data ID	Higher 16 bits = Image segment, Lower 16bits = Data segment Image segment 0000 = standard (part) observation 0008 = test observation Data segment 0001 = IR 1ch 0002 = IR 2ch 0004 = IR 3ch 0008 = VIS 1ch 0010 = VIS 2ch 0020 = VIS 3ch 0040 = VIS 4ch 0000 = others	-
5-8	Line number	Added by VISSR collection signal	I*4
9-12	Line name	Contents of VISSR data 01 = VISSR image data 08 = test 10 = annotation data 20 = gray scale data	I*4
13-16	Error line flag	Normal/Error line 0000 = normal line	I*4
17-20	Error message	Message number of S/DB mode error 0 = normal	I*4
21-24	Mode error flag	Bit data of S/DB mode error 0 = normal	I*4
25-32	Scan time	MJD of VISSR scan time	R*8
33-36	β angle	Sun-Earth angle in radian	R*4

37-40	West side earth edge	Pixel position of west side earth edge	I*4
41-44	East side earth edge	Pixel position of east side earth edge	I*4
45-52	Received time (1)	Received time of host side	I*4
53-56	Received time (2)	Received time of host side in millisecond	I*4
57-64	Reserved		-

DOC (Document)

Position (bytes)	Items	Contents	Type
65-320	DOC	Omitted	-

Image data

Position (bytes)	Items	Contents	Type
321-	Image data	Brightness value of each pixel (one byte/pixel)	Binary

2. VISSR VIS DATA

(1) File specification

Items	Specification	Comments
Block length	13504bytes	Fixed length

Byte order : Big endian

Data type : I*2(2-bytes Integer), I*4(4-bytes Integer), R*4(4-bytes Real),
R*8(8-bytes Real)

(2) File composition

(A) CONTROL BLOCK

Block	13504bytes
1 - 2	Control block

(B) IMAGE PARAMETER BLOCK

Block	2688bytes	2688bytes	2688bytes	2688bytes	2752byte
3	①Mode block	②Information of S/DB operation	③Coordinate transformation parameters	④Attitude prediction data	Not used
4	⑤Orbit prediction data	⑤Orbit prediction data	⑥Information of DCD communication	⑦VIS calibration	Not used
5	⑧IR1 calibration	⑧IR2 calibration	⑧WV calibration	⑨Split window calibration	Not used
6	Reserved	Reserved	⑩Simple coordinate transformation table	⑪ β -angle sampling	Not used

(C) IMAGE DATA BLOCK

Block	64bytes	64bytes	13376bytes
7-final	LCW	DOC	Image Data

(3) File contents

(A) Control Block

Position (bytes)	Items	Contents	Type
1-2	Control block size	Number of control block =2	I*2
3-4	Head block number of parameter block	Head block-number of parameter block =3	I*2
5-6	Parameter block size	Number of parameter block =4	I*2
7-8	Head block number of image data	Head block-number of image data block =7	I*2
9-10	Total block line size of image data	Number of total block of image data	I*2
11-12	Available block	Number of normal line of image data	I*2

	size of image data		
13-14	Head valid line-number	Head line-number of image data	I*2
15-16	Final valid line-number	Line-number of final input available data	I*2
17-18	Final data block number	Block-number of final input data	I*2
19-32	Reserved		I*2
33-	Address table	Block-number of available data (Not available = -1)	I*2

- (B) Image parameter block
See Table-1 Contents of image parameter block

- (C) Image data block
LCW (Line Control Word)

Position (bytes)	Items	Contents	Type
1-4	Data ID	Higher 16 bits = Image segment, Lower 16bits = Data segment Image segment 0000 = standard (part) observation 0008 = test observation Data segment 0001 = IR 1ch 0002 = IR 2ch 0004 = IR 3ch 0008 = VIS 1ch 0010 = VIS 2ch 0020 = VIS 3ch 0040 = VIS 4ch 0000 = others	-
5-8	Line number	Added by VISSR collection signal	I*4
9-12	Line name	Contents of VISSR data 01 = VISSR image data 08 = test 10 = annotation data 20 = gray scale data	I*4
13-16	Error line flag	Normal/Error line 0000 = normal line	I*4
17-20	Error message	Message number of S/DB mode error 0 = normal	I*4
21-24	Mode error flag	Bit data of S/DB mode error 0 = normal	I*4
25-32	Scan time	MJD of VISSR scan time	R*8
33-36	Beta angle	Sun-Earth angle in radian	R*4
37-40	West side earth edge	Pixel position of west side earth edge	I*4
41-44	East side earth edge	Pixel position of east side earth edge	I*4
45-52	Received time (1)	Received time of host side	I*4

53-56	Received time (2)	Received time of host side in millisecond	I*4
57-64	Reserved		-

DOC (Document)

Position (bytes)	Items	Contents	Type
65-128	DOC	Omitted	-

Image data

Position (bytes)	Items	Contents	Type
129-	Image data	Brightness value of each pixel (one byte/pixel)	Binary

Table-1: Contents of Image parameter block

① Mode block(The position is a relative address. 1word=4bytes)

Position (word)	Items	Contents	Type							
1	Satellite number	Serial number of satellite	I*4							
2-4	Satellite name	Satellite name (within 8 characters)	ASCII							
5-8	Observation time	AD[UTC]	ASCII							
9-10	Observation time	MJD	R*8							
11	GMS operation mode	1 = S1 6 = S6 7 = S7 0 = Not specified	I*4							
12	DPC operation mode	1 = Automatic 2 = Manual	I*4							
13	VISSR observation mode	1 = Scheduled 2 = Wind vectors 3 = Unscheduled 4 = Special	I*4							
14	Scanner selection	1 = Primary-1 2 = Redundant-1 11= Primary-2 12= Redundant-2 0 = Not specified	I*4							
15	Sensor selection	Used sensor (7 decimal digits) 位 10^6 10^5 10^4 10^3 10^2 10^1 10^0 <table border="1" style="margin-left: 40px;"> <tr> <td>IR1</td> <td>IR2</td> <td>WV1</td> <td>VIS1</td> <td>VIS2</td> <td>VIS3</td> <td>VIS4</td> </tr> </table> 1 = Primary 2 = Redundant 0 = Not specified	IR1	IR2	WV1	VIS1	VIS2	VIS3	VIS4	I*4
IR1	IR2	WV1	VIS1	VIS2	VIS3	VIS4				
16	Sensor mode	Selection of VIS/IR(IR1, IR2, WV) <table border="1" style="margin-left: 40px;"> <tr> <td style="text-align: center;">MSB31</td> <td style="text-align: center;">1</td> <td style="text-align: center;">LSB0</td> </tr> <tr> <td style="text-align: center;">-----</td> <td style="text-align: center;">IR</td> <td style="text-align: center;">VIS</td> </tr> </table> 0 = Not used 1 = Used	MSB31	1	LSB0	-----	IR	VIS	I*4	
MSB31	1	LSB0								
-----	IR	VIS								
17	Scan frame mode	1 = Normal frame (2500 steps) 2 = Expanded frame (2756 steps) 0 = Not specified	I*4							
18	Scan mode	1 = Normal scan 2 = Partial scan 3 = Single scan 0 = Not specified	I*4							
19	Upper limit of scan number	Scan line-number of upper limit	I*4							
20	Lower limit of scan number	Scan line-number of lower limit	I*4							
21	Equatorial scan line number	Line-number of equatorial scan	I*4							
22	Spin rate	Rotational rate [spins/minute]	R*4							
23-30	VIS frame parameters	23 Bit length 24 Number of lines 25 Number of pixels	I*4 I*4 I*4							

		26 Stepping angle 27 Sampling angle 28 LCW-pixel size 29 DOC-pixel size 30 reserved	I*4 R*4 R*4 I*4 -							
31-38	IR frame parameters	23 Bit length 24 Number of lines 25 Number of pixels 26 Stepping angle 27 Sampling angle 28 LCW-pixel size 29 DOC-pixel size 30 reserved	I*4 I*4 I*4 R*4 R*4 I*4 I*4 -							
39	Satellite height	Nominal height of satellite = 3.59×10^7 m	R*4							
40	Earth radius	Earth radius = 6.3702895×10^6 m	R*4							
41	SSP-longitude	Nominal SSP-longitude	R*4							
42-50	Reserved		-							
51-64	Table of sensor trouble	51 VIS primary 1ch 52 VIS primary 2ch 53 VIS primary 3ch 54 VIS primary 4ch 55 VIS redundant 1ch 56 VIS redundant 2ch 57 VIS redundant 3ch 58 VIS redundant 4ch 59 IR1 primary 60 IR1 redundant 61 IR2 primary 62 IR2 redundant 63 WV primary 64 WV redundant (1 = VISSR sensor is available)	I*4							
65-100	Reserved		-							
101-160	Status tables of data relative address segment	Relative address <table border="1" style="margin-left: 20px;"> <tr> <td>0</td> <td>Data segment</td> </tr> <tr> <td>1</td> <td>Data presence</td> </tr> <tr> <td>2</td> <td rowspan="2">Generated day & time</td> </tr> <tr> <td>3</td> </tr> </table> Data segment 1=Information of S/DB operation 2=Parameters for coordinate transformation 3=Attitude prediction data 5=Orbit prediction data(1), (2) 6=DCD Communication data 7=VIS calibration 8=IR1 calibration 9=IR2 calibration 10=WV calibration 11=Split window calibration (reserved) 12-14=Reserved 15= β -angle sampling (reserved)	0	Data segment	1	Data presence	2	Generated day & time	3	I*4
0	Data segment									
1	Data presence									
2	Generated day & time									
3										

		Data presence 1=Exist 2=Not exist Data generation time <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>YYMMDD</td> <td>Date</td> </tr> <tr> <td>hhmmss</td> <td>Time</td> </tr> </table>	YYMMDD	Date	hhmmss	Time	
YYMMDD	Date						
hhmmss	Time						
161-672	Reserved		-				

② Information of S/DB operation

Omitted

③ Coordinate conversion parameters segment

(The position is a relative address. 1word=4bytes)

Position (word)	Items	Contents	Type						
1	Data segment	2 = Coordinate transformation parameters	I*4						
2	Data validity	1 = available 2 = not available	I*4						
3-4	Data generation time	Generation time of this block parameters <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>3</td> <td>YYMMDD</td> <td>Date</td> </tr> <tr> <td>4</td> <td>hhmmss</td> <td>Time</td> </tr> </table>	3	YYMMDD	Date	4	hhmmss	Time	I*4
3	YYMMDD	Date							
4	hhmmss	Time							
5-6	Scheduled	Scheduled observation time [MJD]	R*8						
7-10	Stepping angle along line	7 VIS channel 8 IR1 channel 9 IR2 channel 10 WV channel	R*4						
11-14	Sampling angle along pixel	11 VIS channel 12 IR1 channel 13 IR2 channel 14 WV channel	R*4						
15-18	Central line number of VISSR frame	15 VIS channel 16 IR1 channel 17 IR2 channel 18 WV channel	R*4						
19-22	Center pixel number of VISSR frame	19 VIS channel 20 IR1 channel 21 IR2 channel 22 WV channel	R*4						
23-26	Pixel difference of VISSR center from the normal position	23 VIS channel 24 IR1 channel 25 IR2 channel 26 WV channel	R*4						
27-30	Number of sensor elements	27 VIS channel 28 IR1 channel 29 IR2 channel 30 WV channel	R*4						
31-34	Total number of VISSR frame lines	31 VIS channel 32 IR1 channel 33 IR2 channel 34 WV channel	R*4						

35-38	Total number of VISSR frame pixels	35 VIS channel 36 IR1 channel 37 IR2 channel 38 WV channel	R*4
39-41	VISSR misalignment	39 x-component : δa 40 y-component : δb 41 z-component : δc	R*4
42-50	Matrix of misalignment	$ELMIS = \begin{pmatrix} \cos \delta c & \sin \delta c & 0 \\ -\sin \delta c & \cos \delta c & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} \cos \delta b & 0 & -\sin \delta b \\ 0 & 1 & 0 \\ \sin \delta b & 0 & \cos \delta b \end{pmatrix}$ $\times \begin{pmatrix} 1 & 0 & 0 \\ 0 & \cos \delta a & \sin \delta a \\ 0 & -\sin \delta a & \cos \delta a \end{pmatrix}$ <p> ELMIS (1, 1) = CC × CB ELMIS (2, 1) = -SC × CB ELMIS (3, 1) = SB ELMIS (1, 2) = CC × SB × SA + SC × CA ELMIS (2, 2) = -SC × SB × SA + CC × CA ELMIS (3, 2) = -CB × SA ELMIS (1, 3) = -CC × SB × CA + SC × SA ELMIS (2, 3) = SC × SB × CA + CC × SA ELMIS (3, 3) = CB × CA where, SA= $\sin \delta a$, CA= $\cos \delta a$ SB= $\sin \delta b$, CB= $\cos \delta b$ SC= $\sin \delta c$, CC= $\cos \delta c$ </p>	R*4
51-65	Parameters	51 Judgement of observation convergence time 52 Judgement of line convergence 53 E-W angle of Sun-light condense prism 54 N-S angle of Sun-light condense prism 55 π 56 $\pi/180$ 57 $180/\pi$ 58 Equatorial radius 59 Oblateness of earth 60 Eccentricity of the earth orbit 61 First angle of VISSR observation in S/DB 62 Upper limited line of the 2nd prism for VIS solar observation 63 Lower limited line of the 1st prism for VIS solar observation 64 Upper limited line of the 3rd prism for VIS solar observation 65 Lower limited line of the 2nd prism for VIS solar observation	R*4
66-67	Stepping angle along line	66 VIS solar observation 67 IR solar observation	R*4
68-69	Sampling angle along pixel	68 VIS solar observation 69 IR solar observation	R*4

70-71	Center line of VISSR frame	70 VIS solar observation 71 IR solar observation	R*4
72-73	Center pixel of VISSR frame	72 VIS solar observation 73 IR solar observation	R*4
74-75	Pixel difference of VISSR center from the normal position	74 VIS solar observation 75 IR solar observation	R*4
76-77	Sensor elements number	76 VIS solar observation 77 IR solar observation	R*4
78-79	Total number of VISSR frame lines	78 VIS solar observation 79 IR solar observation	R*4
80-81	Total number of Pixels/lines VISSR frame	80 VIS solar observation 81 IR solar observation	R*4
82-100	Reserved		-
101-118	Orbital parameters	101-102 Epoch time 103-104 Semi-major axis 105-106 Eccentricity 107-108 Orbital inclination 109-110 Longitude of the ascending node 111-112 Argument of perigee 113-114 Mean anomaly 115-116 Longitude of SSP 117-118 Latitude of SSP	R*8
119-120	Reserved		-
121-132	Attitude parameters	121-122 Epoch time 123-124 Angle between Z-axis and satellite spin axis at the epoch time 125-126 Angle change rate between spin axis and Z-axis 127-128 Angle between spin axis and ZY-axis 129-130 Angle change rate between spin axis and ZT-axis 131-132 Daily mean of spin rate	R*8
133-661	Reserved		-
662-672	Correction of Image distortion	662 Stepping angle along line of IR1[rad] 663 Stepping angle along line of IR2[rad] 664 Stepping angle along line of WV[rad] 665 Stepping angle along line of VIS[rad] 666 Sampling angle along pixel of IR1[rad] 667 Sampling angle along pixel of IR2[rad] 668 Sampling angle along pixel of WV[rad] 669 Sampling angle along pixel of VIS[rad] 670 X component VISSR misalignment[rad] 671 Y component VISSR misalignment[rad] 672 Z component VISSR misalignment[rad]	R*4

④ Attitude prediction (The position is a relative address. 1word=4bytes)

Position (word)	Items	Contents	Type
1	Data segment	3 = Attitude prediction data	I*4

2	Data validity	1 = available 2 = not available	I*4		
3-4	Data generation time	3 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>YYMMDD</td></tr></table> Date 4 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>hhmmss</td></tr></table> Time	YYMMDD	hhmmss	I*4
YYMMDD					
hhmmss					
5-6	Start time	Start time of attitude prediction[MJD]	R*8		
7-8	End time	End time of attitude prediction[MJD]	R*8		
9-10	Prediction interval time	Interval time of attitude prediction[MJD]	R*8		
11	Number of prediction	Number of attitude prediction	I*4		
12	Data size	Number of attitude prediction data set	I*4		
13-672	Attitude prediction data	Attitude prediction data 1-33 (See ④-1)	-		

④-1 Contents of attitude prediction data (The position is a relative address. 1word=4bytes)

Position (word)	Items	Contents	Type		
0-1	Prediction time	Prediction time[MJD]	R*8		
2-3	Prediction time	Prediction time[UTC] 3 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>YYMMDD</td></tr></table> Date 4 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>hhmmss</td></tr></table> Time	YYMMDD	hhmmss	I*4
YYMMDD					
hhmmss					
4-5	Right ascension of attitude	Predicted right ascension of attitude	R*8		
6-7	Declination of attitude	Predicted declination of attitude	R*8		
8-9	Sun-earth angle	Sun-earth angle at prediction time	R*8		
10-11	Spin rate	Satellite spin rate at prediction time	R*8		
12-13	Right ascension of orbital plane	Right ascension of orbital plane at prediction time	R*8		
14-15	Declination of orbital plane	Declination of orbital plane at prediction time	R*8		
16-17	Reserved		-		
18	Eclipse flag	0 = Out of eclipse period 1 = In eclipse period	I*4		
19	Spin axis flag	0 = within 0.5degree 1 = beyond 0.5degree	I*4		

⑤ Orbit prediction (The position is a relative address. 1word=4bytes)

Position (word)	Items	Contents	Type		
1	Data segment	5 = Orbit prediction data	I*4		
2	Data validity	1 = available 2 = not available	I*4		
3-4	Data generation time	3 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>YYMMDD</td></tr></table> Date 4 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>hhmmss</td></tr></table> Time	YYMMDD	hhmmss	I*4
YYMMDD					
hhmmss					
5-6	Start time	Start time of orbit prediction[MJD]	R*8		

7-8	End time	End time of orbit prediction[MJD]	R*8
9-10	Prediction interval time	Interval time of orbit prediction[MJD]	R*8
11	Number of prediction	Number of orbit prediction	I*4
12	Data size	Number of orbit prediction data set	I*4
13-642	Orbit prediction data	Orbit prediction data 1-9 (See ⑤-1)	-
643-672	Reserved		-

⑤-1 Contents of orbit prediction data (The position is a relative address. 1word=4bytes)

Position (word)	Items	Contents	Type
0-1	Prediction time	Prediction time[MJD]	R*8
2-3	Prediction time	Prediction time[UTC] <div style="display: flex; align-items: center; margin-left: 20px;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">2</div> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">YYMMDD</div> <div style="margin-right: 5px;">Date</div> </div> <div style="display: flex; align-items: center; margin-left: 20px;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">3</div> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">hhmmss</div> <div>Time</div> </div>	I*4
4-15	Satellite position and velocity in the 1950.0 yearly mean inertial coordinate system	4-5 X-component of position 6-7 Y-component of position 8-9 Z-component of position 10-11 X-component of velocity 12-13 Y-component of velocity 14-15 Z-component of velocity	R*8
16-27	Satellite position and velocity in the earth-fixed coordinate system	16-17 X-component of position 18-19 Y-component of position 20-21 Z-component of position 22-23 X-component of velocity 24-25 Y-component of velocity 26-27 Z-component of velocity	R*8
28-29	Greenwich sidereal time	Greenwich sidereal time	R*8
30-33	Sun-directional vector	Vector from Satellite to Sun in 1950.0 yearly mean inertial coordinate system 30-31 Azimuth 32-33 Elevation	R*8
34-37	Sun-directional Vector	Vector from Satellite to Sun in the earth-fixed coordinate system 34-35 Azimuth 36-37 Elevation	R*8
38-55	Conversion matrix A_1-A_9	Matrix to convert from 1950.0 yearly mean inertial coordinate system(X, Y, Z) to the earth-fixed coordinate system(x, y, z) $\begin{pmatrix} X \\ y \\ z \end{pmatrix}^T = \begin{pmatrix} A_1 & A_4 & A_7 \\ A_2 & A_5 & A_8 \\ A_3 & A_6 & A_9 \end{pmatrix} \begin{pmatrix} X \\ Y \\ Z \end{pmatrix}^M$	R*8
56-61	Moon Directional vector	Vector from Satellite to Moon in 1950.0 yearly mean inertial coordinate system 56-57 X-component of vector 58-59 Y-component of vector 60-61 Z-component of vector	R*8

62-67	Satellite position	62-63 Latitude of SSP 64-65 Longitude of SSP 66-67 Satellite height	R*8
68	Eclipse period flag	0 = out of eclipse period 1 = in eclipse period	I*4
69	Reserved		-

⑥ DCD Communication
Omitted

⑦ VIS Calibration data (The position is a relative address. 1word=4bytes)

Position (word)	Items	Contents	Type								
1	Data segment	7 = VIS calibration	I*4								
2	Data validity	1 = available 2 = not available	I*4								
3-4	Data generation Time[UTC]	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">YYMMDD</td> <td style="text-align: center;">Date</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">hhmmss</td> <td style="text-align: center;">time</td> </tr> </table>	3	YYMMDD	Date	4	hhmmss	time	I*4		
3	YYMMDD	Date									
4	hhmmss	time									
5	Sensor group	Sensor group calibration table of primary or redundant <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;">3 (MSB)</td> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0 (LSB)</td> </tr> <tr> <td style="text-align: center;">VIS ch. 1</td> <td style="text-align: center;">VIS ch. 2</td> <td style="text-align: center;">VIS ch. 3</td> <td style="text-align: center;">VIS ch. 4</td> </tr> </table> 1 = primary 2 = redundant	3 (MSB)	2	1	0 (LSB)	VIS ch. 1	VIS ch. 2	VIS ch. 3	VIS ch. 4	I*4
3 (MSB)	2	1	0 (LSB)								
VIS ch. 1	VIS ch. 2	VIS ch. 3	VIS ch. 4								
6-105	VIS1 calibration table	See Table⑦-1	-								
106-205	VIS2 calibration table	See Table⑦-1	-								
206-305	VIS3 calibration table	See Table⑦-1	-								
306-405	VIS4 calibration table	See Table⑦-1	-								
406-672	Reserved		-								

⑦-1 Contents of VIS channel calibration table
(The position is a relative address. 1word=4bytes)

Position (word)	Items	Contents	Type						
1	Channel number	Channel number =1~4	I*4						
2	Data validity	1 = available 2 = not available	I*4						
2-3	Updated time	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">YYMMDD</td> <td style="text-align: center;">Date</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">hhmmss</td> <td style="text-align: center;">Time</td> </tr> </table>	2	YYMMDD	Date	3	hhmmss	Time	I*4
2	YYMMDD	Date							
3	hhmmss	Time							
4	Table ID	Increment when the table is updated.	I*4						

5-68	Brightness-albedo conversion table	<table border="1"> <tr> <td>0</td> <td>Albedo</td> <td rowspan="4">Albedo = 0~1</td> </tr> <tr> <td>1</td> <td>Albedo</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>63</td> <td>Albedo</td> </tr> </table>	0	Albedo	Albedo = 0~1	1	Albedo			63	Albedo	R*4
0	Albedo	Albedo = 0~1										
1	Albedo											
63	Albedo											
69-74	VIS channel staircase brightness data	Brightness and voltage used to calculate the electric calibration regression curve	R*4									
75-84	Coefficients table of VIS staircase regression curve	Coefficients of VIS staircase regression curve	R*4									
85-86	Brightness table for calibration	<table border="1"> <tr> <td>85</td> <td>Universal space brightness</td> </tr> <tr> <td>86</td> <td>Solar brightness</td> </tr> </table>	85	Universal space brightness	86	Solar brightness	R*4					
85	Universal space brightness											
86	Solar brightness											
87-88	Calibration uses brightness correspondence voltage chart	<table border="1"> <tr> <td>87</td> <td>Universal space voltage</td> </tr> <tr> <td>88</td> <td>Solar voltage</td> </tr> </table>	87	Universal space voltage	88	Solar voltage	R*4					
87	Universal space voltage											
88	Solar voltage											
89-90	Calibration coefficients of radiation observation	<p>Equation of calibration of radiation observation is</p> $V = G * E + V_0$ <table border="1"> <tr> <td>89</td> <td>G</td> </tr> <tr> <td>90</td> <td>V₀</td> </tr> </table>	89	G	90	V ₀	R*4					
89	G											
90	V ₀											
91-99	Reserved		-									

⑧ IR1,IR2,WV calibration table (The position is a relative address. 1word=4bytes)

Position (word)	Items	Contents	Type								
1	Data segment	8 = IR1 calibration record 9 = IR2 calibration record 10= WV calibration record	I*4								
2	Data validity	1 = available 2 = not available	I*4								
3-4	Updated time	<table border="1"> <tr> <td>3</td> <td>YYMMDD</td> <td>Date</td> </tr> <tr> <td>4</td> <td>hhmmss</td> <td>Time</td> </tr> </table>	3	YYMMDD	Date	4	hhmmss	Time	I*4		
3	YYMMDD	Date									
4	hhmmss	Time									
5	Sensor group	1 = primary 2 = redundant	I*4								
6	Table ID	Increment when the table is updated.	I*4								
7-8	Reserved		-								
9-264	Conversion table of equivalent black body radiation	<p>Radiation [W/cm²*sr] to brightness</p> <table border="1"> <tr> <td>Brightness= 0</td> <td>Radiation</td> </tr> <tr> <td>1</td> <td>Radiation</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>255</td> <td>Radiation</td> </tr> </table>	Brightness= 0	Radiation	1	Radiation			255	Radiation	R*4
Brightness= 0	Radiation										
1	Radiation										
255	Radiation										

265-520	Conversion table of equivalent black body temperature	Temperature[K] to brightness Brightness= 0 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>Temperature</td></tr><tr><td>Temperature</td></tr><tr><td> </td></tr><tr><td>Temperature</td></tr></table> 1 255	Temperature	Temperature		Temperature	R*4																				
Temperature																											
Temperature																											
Temperature																											
521-526	Staircase brightness data	Brightness and voltage used to calculate regression curve for electric correction	R*4																								
527-536	Coefficients table of staircase regression curve	Coefficients table of staircase regression curve	R*4																								
537-539	Brightness data for calibration	537 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>Brightness of space</td></tr><tr><td>Brightness of black body shutter</td></tr><tr><td>Reserved</td></tr></table> 538 539	Brightness of space	Brightness of black body shutter	Reserved	R*4																					
Brightness of space																											
Brightness of black body shutter																											
Reserved																											
540-542	Voltage table for brightness of calibration	540 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>Voltage of space</td></tr><tr><td>Voltage of black body shutter</td></tr><tr><td>Reserved</td></tr></table> 541 542	Voltage of space	Voltage of black body shutter	Reserved	R*4																					
Voltage of space																											
Voltage of black body shutter																											
Reserved																											
543-544	Calibration coefficients of radiation observation	Equation of calibration of radiation Observation is $V = G * E + V_0$ 543 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>G</td></tr><tr><td>V₀</td></tr></table> 544	G	V ₀	R*4																						
G																											
V ₀																											
545	Valid shutter temperature	Valid shutter temperature [K]	R*4																								
546	Valid shutter radiation	Valid shutter radiation [W/cm ² *sr]	R*4																								
547-562	Telemetry data table	Telemetry data of calibration and VISSR temperature. <table border="1" style="margin-left: auto; margin-right: auto;"><thead><tr><th>Position (word)</th><th>Flag=2 GMS-5</th></tr></thead><tbody><tr><td>547</td><td>Shutter temp. 1 [°C]</td></tr><tr><td>548</td><td>Redundant mirror temp. [°C]</td></tr><tr><td>549</td><td>Primary mirror temp. [°C]</td></tr><tr><td>550</td><td>Baffle FW temp. [°C]</td></tr><tr><td>551</td><td>Baffle AF temp. [°C]</td></tr><tr><td>552</td><td>+15 volt auxiliary power supply [V]</td></tr><tr><td>553</td><td>Radiative cooler temp.1 [K]</td></tr><tr><td>554</td><td>Radiative cooler temp.2 [K]</td></tr><tr><td>555</td><td>Electronics module temp. [°C]</td></tr><tr><td>556</td><td>Scan mirror temp. [°C]</td></tr><tr><td>557</td><td>Shutter cavity temp. [°C]</td></tr></tbody></table>	Position (word)	Flag=2 GMS-5	547	Shutter temp. 1 [°C]	548	Redundant mirror temp. [°C]	549	Primary mirror temp. [°C]	550	Baffle FW temp. [°C]	551	Baffle AF temp. [°C]	552	+15 volt auxiliary power supply [V]	553	Radiative cooler temp.1 [K]	554	Radiative cooler temp.2 [K]	555	Electronics module temp. [°C]	556	Scan mirror temp. [°C]	557	Shutter cavity temp. [°C]	R*4
Position (word)	Flag=2 GMS-5																										
547	Shutter temp. 1 [°C]																										
548	Redundant mirror temp. [°C]																										
549	Primary mirror temp. [°C]																										
550	Baffle FW temp. [°C]																										
551	Baffle AF temp. [°C]																										
552	+15 volt auxiliary power supply [V]																										
553	Radiative cooler temp.1 [K]																										
554	Radiative cooler temp.2 [K]																										
555	Electronics module temp. [°C]																										
556	Scan mirror temp. [°C]																										
557	Shutter cavity temp. [°C]																										

		558	Primary mirror sealed temp. [°C]	
		559	Redundant mirror sealed temp. [°C]	
		560	Shutter temp.2 [°C]	
		561	Reserved	
		562	Reserved	
563	Flag of valid shutter temperature calculation	2 = GMS-5		I*4
564-672	Reserved			-

⑨ Split window calibration record is wholly set by 0.

⑩ Simple coordinate conversion table

(The position is a relative address. 1half word=2bytes)

Position (half word)	Items	Contents	Type
1	60° N, 80° E IR1 line number	IR1 line number of 60° N, 80° E	I*2
2	60° N, 80° E IR1 pixel number	IR1 pixel number of 60° N, 80° E	I*2
3	60° N, 85° E IR1 line number	IR1 line number of 60° N, 85° E	I*2
4	60° N, 85° E IR1 pixel number	IR1 pixel number of 60° N, 85° E	I*2
51	55° N, 80° E IR1 line number	IR1 line number of 55° N, 80° E	I*2
52	55° N, 80° E IR1 pixel number	IR1 pixel number of 55° N, 80° E	I*2
53	55° N, 85° E IR1 line number	IR1 line number of 55° N, 85° E	I*2
54	55° N, 85° E IR1 pixel number	IR1 pixel number of 55° N, 85° E	I*2
1249	60° S, 160° E IR1 line number	IR1 line number of 60° S, 160° E	I*2
1250	60° S, 160° E IR1 pixel number	IR1 pixel number of 60° S, 160° E	I*2

Continued from ⑩ (The position is a relative address. 1word=4bytes)

Position (word)	Items	Contents	Type
626	Earth equator Radius [m]	Retrieved from coordinate conversion block	R*4 (IBM)
627	Satellite height [m]	Retrieved from coordinate conversion block	R*4 (IBM)
628	Stepping angle [rad]	Retrieved from coordinate conversion block	R*4 (IBM)
629	Sampling angle	Retrieved from coordinate conversion block	R*4

	[rad]		(IBM)
630	SSP latitude [deg]	Latitude of SSP	R*4 (IBM)
631	SSP longitude [deg]	Longitude of SSP	R*4 (IBM)
632	SSP line number	Line number of SSP	R*4 (IBM)
633	SSP pixel number	Pixel number of SSP	R*4 (IBM)
634	π	Retrieved from coordinate conversion block	R*4 (IBM)
635	Line correction (X) IR1-VIS	Calculated by conversion of coordinates of SSP $X = L_{vis} - (L_{ir1} - 1) * 4 - 2.5$ L_{vis} = VIS sensor line number L_{ir1} = IR1 sensor line number	R*4 (IBM)
636	Pixel correction (Y) IR1-VIS	Calculated by conversion of coordinates of SSP $Y = P_{vis} - (P_{ir1} - 1) * 4 - 2.5$ L_{vis} = VIS sensor pixel number L_{ir1} = IR1 sensor pixel number	R*4 (IBM)
637	Line correction (X) IR1-IR2	Calculated by conversion of coordinates of SSP $X = L_{ir2} - L_{ir1}$ L_{ir2} = IR2 sensor line number L_{ir1} = IR1 sensor line number	R*4 (IBM)
638	Pixel correction (Y) IR1-IR2	Calculated by conversion of coordinates of SSP $Y = P_{ir2} - P_{ir1}$ P_{ir2} = IR2 sensor pixel number P_{ir1} = IR1 sensor pixel number	R*4 (IBM)
639	Line correction (X) IR1-WV	Calculated by conversion of coordinates of SSP $X = L_{wv} - L_{ir1}$ L_{wv} = WV sensor line number L_{ir1} = IR1 sensor line number	R*4 (IBM)
640	Pixel correction (Y) IR1-WV	Calculated by conversion of coordinates of SSP $Y = P_{wv} - P_{ir1}$ P_{wv} = WV sensor pixel number P_{ir1} = IR1 sensor pixel number	R*4 (IBM)
641-672	Reserved		-

⑩ β -angle sampling
Omitted

(September 21 2016)