AUIG4 取扱説明書 用語集

【英語版】

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Contents

1. Glossary

The glossary of the terms is as follows.

Table 1-1 Glossary

No.	Glossary	Description
1	Observation Mode	It refers to the mode of the sensor of satellite. In case of the spotlight mode, the resolution of azimuth direction and range direction are different. In the following, resolution is shown in azimuth x range direction. ALOS-2 has the following three observation modes. Spotlight: Resolution:1m×3m Observation swath width:25km Stripmap: Resolution: 3m Observation swath width:50km Resolution: 6m Observation swath width:50km Resolution: 10m Observation swath width:70km *1 ScanSAR: Resolution:100m Observation swath width:350km Bandwidth:14MHz Resolution:100m Observation swath width:350km Bandwidth:28MHz Resolution: 60m Observation swath width:490m Bandwidth:14MHz *1: In case of Full Polarimetric, 30km ALOS-4 has the following three observation modes. Spotlight: Resolution:1m×3m Observation swath width:25km High Resolution: Resolution: 3m Observation swath width:100km,200km *2 Resolution: 6m Observation swath width:100km,200km *2 Resolution:10m Observation swath width:100km,200km *2 ScanSAR: Resolution:25m Observation swath width:700km *2: In case of Full Polarimetric, 100km ※Refer to 2.1.Observation Mode
2	Beam	It refers to the radio waves emitted from synthetic aperture radar onboard satellite and the range within which these waves can be transmitted and received. In ALOS-2 and ALOS-4, each off-nadir angle is numbered from nearest to the satellite, and the number is called a beam number. However, the beam number corresponds to the off-nadir angle for each observation mode, so the area indicated by the same beam number differs depending on the observation mode.
3	Sub-beam	In case of ALOS-4, the observation width of the beam is about four times wider than that of ALOS-2. To allow ALOS-2 and ALOS-4 to handle the same observation width, the beam is split into multiple beams so that the scene size in the range direction is the same as ALOS-2. The beam from the satellite is not split, it is a unit to be divided for processing on the ground. They are numbered from nearest to the satellite and are called sub beam numbers. However, like the beam number, the sub beam number also corresponds to the off-nadir angle for each observation mode, so the area indicated by the same sub beam number differs depending on the observation mode.

Table 1-1 Glossary

No.	Glossary	Description
4	Reproduct ID	It is an ID that uniquely identifies the observation operation. AAAAAAAAAAAAAAAA-NNNNN AAAAAAAAAAAAAAAA:Sensor Operation Segment ID NNNNN:Observation ID
5	Sensor Operation Segment	It is the unit for starting and ending observations in the observation plan set by ALOS-2/SCMO and ALOS-4/SCMO when they plan their observation plans based on observation requests. A unique ID is assigned to each sensor operation segment for identification, it is called sensor operation segment ID. Sensor Operation Segment ID is unique within each ALOS-2 and ALOS-4 mission period. SAR + 13 alphanumeric digits
6	Observation ID	This is the ID assigned to observations that are continuously imaged. One observation includes multiple scenes. Since the observation ID is a cyclic number, a sensor operation segment ID is assigned to be a unique ID in the observation plan and processing plans. Also, the ID called a reproduct ID is also assigned by concatenating the sensor operation segment ID and the observation ID.
7	Scene ID	A scene is the unit for producing a product in each observation mode, and each scene is assigned a unique scene ID. Scene ID will be decided until SAR image processing. In the case of ALOS-2 AAAAABBBBBCCCC-YYMMDD AAAAA: Satellite/Sensor name (ALOS2) BBBBB: Scene Center total lap number CCCC: Scene center frame number -:separator (hyphen) YYMMDD: Observation date of scene center (YY: lower 2 figures of a year, MM: month, DD: day) In the case of ALOS-4 AAAAABBBCCCCYYMMDDEEEFGHIIJJ AAAAA: Satellite/Sensor name (ALOS4) BBB: Scene center path No CCCC: Scene center frame number EEE: Observation mode F: Extension function G: Observation direction H: Orbit direction II: Beam number JJ: Sub beam number
8	Polarization	Polarization, also called wave polarization, is an expression of the orientation of the lines of electric flux in an electromagnetic field. Polarization is classified according to the direction of oscillation. For example, in case of the direction of oscillation of an electric field is horizontal to the ground, it is called horizontally polarized, and it is vertical, it is called vertically polarized. Also, in case of rotation, it is called circularly polarized. ※Refer to 2.3. Polarization
9	Scene Shift	This is one way to specify a scene for parameter settings. Use this when you want to move the scene back and forth in the direction of satellite travel (azimuth direction) with the selected scene as the base point. Specifies the amount of shift in the scene.

Table 1-1 Glossary

No.	Glossary	Description
10	User Definition	This is one way to specify a scene for parameter settings. Use this when you want to set an arbitrary scene. Specify the scene center (latitude, longitude) and scene size (ground range azimuth range). ※ALOS-4 only
11	Scene Combined	This is one way to specify a scene for parameter settings. Use this when you want to combine different scenes in the range direction with the selected scene as the base point. Specify the sub-beam number of the start point and the sub-beam number of the end point of the specified scene. ※ALOS-4 only
12	Interferometric Pair Candidate	※Refer to Appendix4 About the Interferometry pair candidate search method
13	Observation Path	The ground track of satellite is called a path. For each revisit cycle, the number is assigned to each path based on the ascending node, and the number is called the path number. The path number ranges from 1 to 207, and is increased by 14 for each path through the ascending node. however, the number may not exceed 207.
14	Observation Frame	The observation frame is divided into 7200 segments of one orbit, with the argument of latitude divided evenly. The ascending node is numbered as 0, and its number is called frame number. Frame numbers range from 0 to 7199.
15	Competition for Observation Requests	The observation scene that has an exclusive relationship with an existing scene in an observation plan is called a competition. However, observation scenes that are in an exclusive relationship are those satisfy the following conditions. When the observation direction is same, The range of the observation scene from the observation start date and time to the observation end date and time duplicate, or the interval between observation scenes has a relationship smaller than the minimum shooting interval. When the observation direction is different, The range of the observation scene from the observation start date and time to the observation end date and time duplicate, or observation scene with a relationship where the interval between observation scenes is smaller than the switching time or side-looking.
16	Duplication of Observation Request	The observation scene that has an exclusive relationship with an unobservable period is called a duplication.
17	Processing Level	It is defined according to the processing content specified at the product processing. Processing levels has L0, L1.0, L1.1, L1.2, L1.5, and L2.1, sensor and users cannot be specified. ※Refer to 2.4.Processing Level
18	CEOS format	The format is in accordance with CCT format, created by Committee on Earth Observation satellites (CEOS).
19	GeoTIFF format	The image file format TIFF (Tagged Image File Format) in which geographic information is embedded. The file name extension is “.tiff” or “.tif” same as TIFF Format.
20	WMS	Web Map Service (WMS) is a standard protocol developed by the Open Geospatial Consortium (OGC) for serving georeferenced map images.
21	CSW	Catalog Services for the Web (CSW) is catalog search service for publishing and providing catalog information. ※Refer to Appendix3 About the CSW
22	Ground Station	It is the ground radio station for communication with satellite. ※Refer to 2.2.Ground Station

Table 1-1 Glossary

No.	Glossary	Description
23	Off Nadir Angle	The angle between the vertical nadir of the satellite position and the direction of the SAR beam.
24	Azimuth Direction	The traveling direction of a flying object such as a satellite
25	Range Direction	The range direction corresponds to the direction perpendicular to the flight direction of satellite. It is also called cross-track direction.
26	Argument of latitude	The argument of latitude is an angular parameter that defines the position of satellite moving along a kepler orbit. It is the angle between ascending node ant the satellite. It is sum of the commonly used true anomaly and argument of periapsis.
27	Basic Observation Request	It is an observation requests based on the "basic observation scenario," which is a common observation scenario to effectively utilize limited observation resources to success the mission of crustal and ground deformation monitoring, disaster monitoring, forestry monitoring, sea ice monitoring, vessel movement monitoring, and infrastructure displacement, etc.
28	Individual Observation Request	unlike basic observation request, this is an observation request that users apply for individually.
29	Emergency Observation Requests	Of the individual observation request, this is the most important observation request for the assessing the disaster situation.
30	Calibration Observation Request	It is an operational requirement that does not involve observations, such as irradiating the beam to the ground and receiving the scattered waves.
31	Baseline(Bperp,Bpara)	※Refer to Appendix 4.3.1. Definition of Bperp and Bpara and Overlapping Bandwidth
32	Overlapping Bandwidth	※Refer to Appendix 4.3.1. Definition of Bperp and Bpara and Overlapping Bandwidth

2. Definition of Term

The definition of term is as follows.

2.1. Observation Mode

The observation mode is as follows.

Table 2-1 Observation Mode List

Observation Mode	Satellite	Abbreviation	観測方式概要
Spotlight	ALOS-2 ALOS-4	SPT	Spotlight-SAR is a mode of SAR operation for obtaining high-resolution by steering the radar beam to keep the target within the beam for a longer time and thus form a longer synthetic aperture. Spotlight SAR is capable of extending the high-resolution SAR imaging capability significantly. As more pulses are used, the azimuth resolution increases. This is achieved by keeping a target within the spotlight illumination of the radar beam for a longer time through electronic beam steering, resulting in a longer synthetic aperture. Spotlight SAR mode of operation is usually at the expense of spatial coverage, as other areas within a given accessibility swath of the SAR cannot be illuminated while the radar beam is spotlighting over a particular target area.
Stripmap 3m	ALOS-2 ALOS-4	SM1	The conventional SAR strip mapping mode assumes a fixed pointing direction of the radar antenna broadside to the platform track. A strip map is an image formed in width by the swath of the SAR and follows the length contour of the flight line of the platform itself.
Stripmap 6m	ALOS-2 ALOS-4	SM2	
Stripmap 10m	ALOS-2 ALOS-4	SM3	
ScanSAR 350km	ALOS-2	WD1	A synthetic aperture radar having the capability to illuminate several subswaths by scanning its antenna off-nadir into different positions. This is the SAR-mode “Scan”.
ScanSAR 490km	ALOS-2	WD2	
ScanSAR 700km	ALOS-4	WD3	
Periodical Calibration	ALOS-2 ALOS-4	CAL	This mode is used to check the health of the transmitter and receiver units on the satellite.
self-inspection mode	ALOS-2 ALOS-4	BIT	This mode is used to check the health of RF unit, Control unit, and memory unit on the satellite.

2.2. Ground Station

The ground station is as follows.

Table 2-2 Ground Station List

区分	Ground Station	Abbreviation
JAXA	Central tracking and control center	TACC
	RCC	RCC
	Earth observation center	HEOC
	Tsukuba control station	GNCC
	Tsukuba control station #1	GNC1
	Tsukuba control station #2	GNC2
	Tsukuba test ground station	TCTS
	Inter-satellite communication control station	TICS
JAXA Earth station	Katsuura tracking and communications station	KTU1
	Katsuura S/X band ground station	KTU4
	Masuda tracking and communications station	MSD1
	Ka band receiving ground station #1 (Tsukuba)	KDT1
	Ka band receiving ground station #2 (Hatoyama)	KDT2
	Optical satellite communication ground station (Tsukuba)	OSNT
	Optical satellite communication ground station (Hatoyama)	OSNH
	Okinawa tracking and communications station 1	OKN1
	Okinawa tracking and communications station 2	OKN2
	JAXA transportable station in Kiruna	KRN1
	JAXA transportable station in Santiago	SNT1
	JAXA transportable station in Perth	PRT1
	JAXA transportable station in Maspalomas	MSP1
	Tsukuba #1	PGT
	Tsukuba central ground station DRTS-W / Tracking system	CDW1
	Hatoyama ground station	HGT
	Earth observation center (ADEOS Antenna)	EOCA
	Hatoyama ground station DRTS-W / Tracking system	HDW1
	KSAT Svalbard Satellite Station SG25	SG25
	KSAT Svalbard Satellite Station SG3	SG3
	Svalbard Satellite Station	KSGS
	KSAT Svalbard Satellite Station SG1	SG1
	KSAT Svalbard Satellite Station SG24	SG24
Optical satellite communication	Optical inter-satellite communication control system	OSNC

2.3. Polarization

The polarization list is as follows.

Table 2-3 Polarization List

Polarization	Description
HH	Horizontally polarized wave transmission / Horizontally polarized wave receiving
HV	Horizontally polarized wave transmission / Vertically polarized wave receiving
VH	Vertically polarized wave transmission / Horizontally polarized wave receiving
VV	Vertically polarized wave transmission / Vertically polarized wave receiving
LCH *	left circularly polarized wave transmission / Horizontally polarized wave receiving
LCV *	left circularly polarized wave transmission / Vertically polarized wave receiving
RCH *	right circularly polarized wave transmission / Horizontally polarized wave receiving
RCV *	right circularly polarized wave transmission / Vertically polarized wave receiving
LH *	45 degrees linear polarized wave transmission / Horizontally polarized wave receiving
LV *	45 degrees linear polarized wave transmission / Vertically polarized wave receiving

*:ALOS-2 Only

2.4. Processing Level

The processing level list is as follows.

Table 2-4 Processing Level List

Processing Level	Description
L0	SAR observation data, which is signal data compiled from preprocessed in units of observation ID.
L1.0	Data corresponding to a scene area is extracted from received data. Data type is 8 bit. In the case of multi-polarization mode, the number of SAR Data file is equal to the number of polarizations. In the case of ScanSAR mode, the data file is not divided into each scan. In the case of ATI and compact polarimetry observation, only level 1.0 product is generated.
L1.1	Range and single look azimuth compressed data is represented by complex I and Q channels to preserve the magnitude and phase information.Range coordinate is in slant range. In the case of ScanSAR mode, an image file is generated per each scan.
L1.2(ALOS-4 only)	Signal data converted to observation data equivalent to a single beam by applying various corrections. Image processing must be done by the user themself.
L1.5	Range and multi-look azimuth compressed data is represented by amplitude data. Range coordinate is converted from slant range to ground range, and map projection is performed.
L2.1(ALOS-4)	Level 2.1 data is orthorectified from level 1.5 data by using digital elevation model. Pixel spacing is selectable depending on observation modes. Image coordinate in map projection is geocoded.
L2.1(ALOS-2)	Level 2.1 data is orthorectified from level 1.1 data by using digital elevation model. Pixel spacing is selectable depending on observation modes. Image coordinate in map projection is geocoded.