ALOS Data Service and Mission Operations

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Contents

1. ALOS User Service Concept

- Global Service

  Global Map, Basin Map, Rainforest Map
- Regional Service

  Disaster Monitoring, Regional Area Observation

1. ALOS User Service Concept

- Resource allocation priority

  Application > Research/Science > General
- Pricing policy

  Marginal price for all users (excluding value added service)
- Timely service

  - Urgent service
  - Near real-time service
  - Normal service

2. ALOS Data User / Distributor

User Type	Who
Institutional user	ERSDAC, GSI, MAFF, MOE, JCG, etc.
NASDA internal user	EORC, selected PIs
General user	General user including research use

ERSDAC Earth Remote Sensing Data Analysis Center
MAFF: Ministry of Agriculture, Forest and Fishery
JCG: Japan Coast Guard
GSI: Geographical Survey Institute
MOE: Ministry of the Environment
EORC: Earth Observation Research Center (NASDA)

Distributor Type	Who
Data node	CNES/ESA, NOAA, AUSLIG
Data distributor in Japan	Data distributor appointed by NASDA

3. ALOS Data Products - Mission data -

Processing Level	Definition	
Level 0 only for ERSDAC GSI EORC Data nodes	AVNIR-2 Level 0 data for distribution (including TT&C, AOCS, PCD telemetry)	
	PRISM Level 0 data for distribution (including TT&C, AOCS, PRISM mission telemetry)	
	PALSAR Level 0 data for distribution (including TT&C, AOCS, PALSAR mission telemetry)	
Level 1 (Processed data)	AVNIR-2, PRISM	
	1A	Uncorrected image, Scene unit
	1B1	Radiometrically calibrated image
	1B2	Geometrically corrected image
	PALSAR	
	1.0	Uncorrected image, Scene Unit
	1.1	Single look complex data on slant range
	1.5	Multi look processed image

3. ALOS Data Products - Catalog data -

Data type	Definition
Directory	ALOS data directory in DIF* * Directory Interchange Format
Inventory	Text-base catalog information of PRISM, AVNIR-2, PALSAR images
Image catalog (with thumbnail)	PRISM, AVNIR-2, PALSAR JPEG images with scene unit

3. ALOS Data Products
- On-line distribution dataset -

On-line distribution dataset	Definition
PALSAR Level 1.5	- Japan's land area (latest data) - Cloud free (<10%) - Good Q/A - Geo-reference - Geotiff format - On-line distribution (internet)
AVNIR-2 Level 1B2	
PRISM Level 1B2	

4. ALOS Data Service
- For Users -

Time service	Definition	User
Urgent service	Mainly for disaster monitoring - First priority (from observation to delivery) - Request file will be accepted by 72 hours before observation - Urgent request later than 72 hours before obs needs operator call - Level 1 data will be ready for distribution within 3 hours after data reception - Image catalog will be open to public within 1 hour (3 hours for PALSAR) - Data will be provided by either CD-R or on-line	Institutional user (ERSDAC, GSI) NASDA internal user
Near real-time service	Such as Sea Ice monitoring - Request must be submitted as Standing Request - Near real-time Level 1 data delivery within 3 hours after observation via on-line	Institutional User (JCG)
Normal service	- Request must be submitted by one week before observation - Three types of request method a. Standing request b. On-demand file request c. On-demand WWW request	Institutional user NASDA internal user General user

4. ALOS Data Service
- For Users -

Normal service

a. Standing Request
- User has to define the area and time of interest (submitted by dedicated form)
- Level 0 user: ERSDAC, GSI(PALSAR), EORC, Data Nodes(all)
- Level 1 user: GSI(Optical), MAFF, MOE, JGC, EORC(all)
- Status can be retrieved by WWW interface (AUIG)
- Level 0 data delivery by DTF-2
- Level 1 data delivery by CD-R or on-line

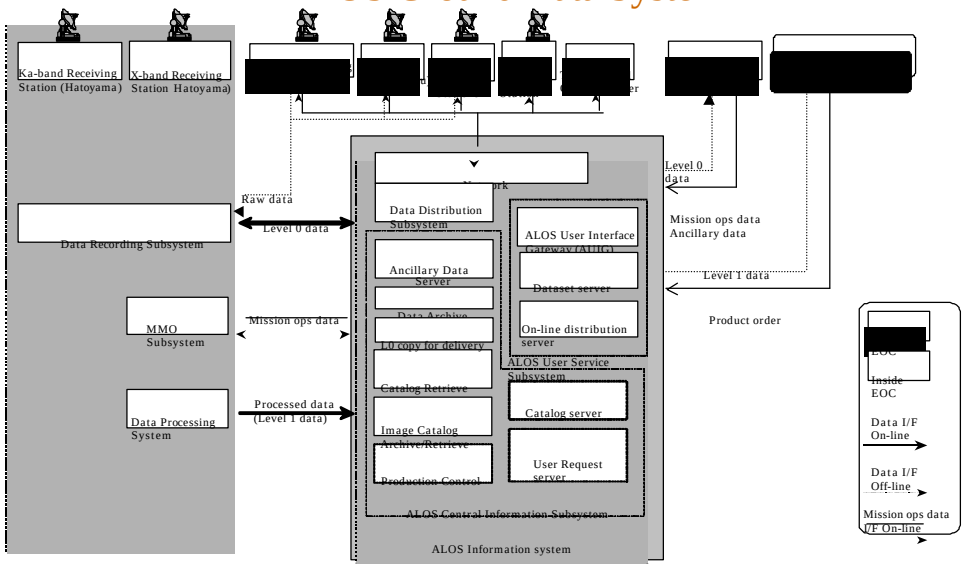
b. On-demand File Request
- Observation request by on-line file transfer
- User has to define path, start latitude and time length
- Observation Request: ERSDAC(PALSAR), GSI(TBD)
- Status can be retrieved by WWW interface (AUIG)
- Level 0 data delivery by DTF-2
- No Level 1 data service

4. ALOS Data Service
- For Users -

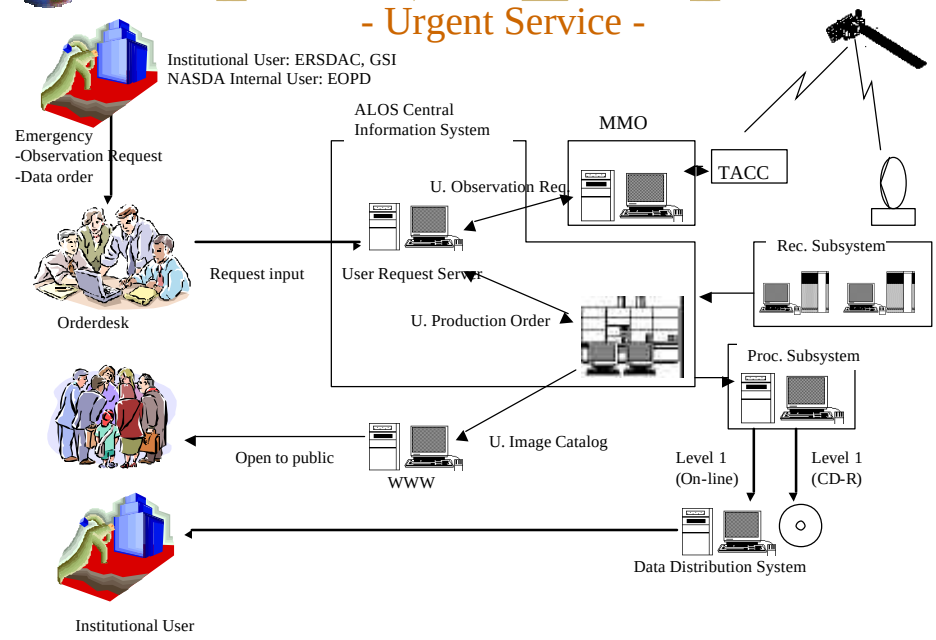
c. On-demand WWW Request

- WWW interface via internet (AUIG)
- User registration/authentication, Observation plan/scheduling status, ALOS satellite orbit/ instrument FOV, Observation request and product order, data search and order, On-line dataset distribution, Urgent observation image access, Utility information (Toolkit, Documentation, etc), Interoperability with other data sources (Landsat, JERS, etc)
- User: Japanese governmental users, NASDA internal users, General users
- Level 1 data delivery by CD-R or on-line

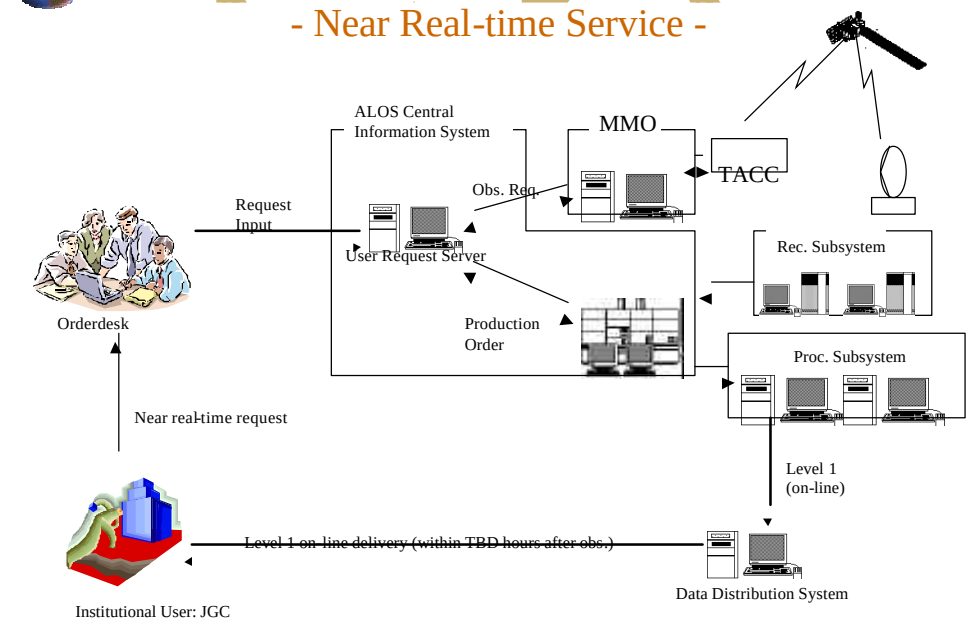
5. ALOS Data Service Flow
- ALOS Ground Data System -



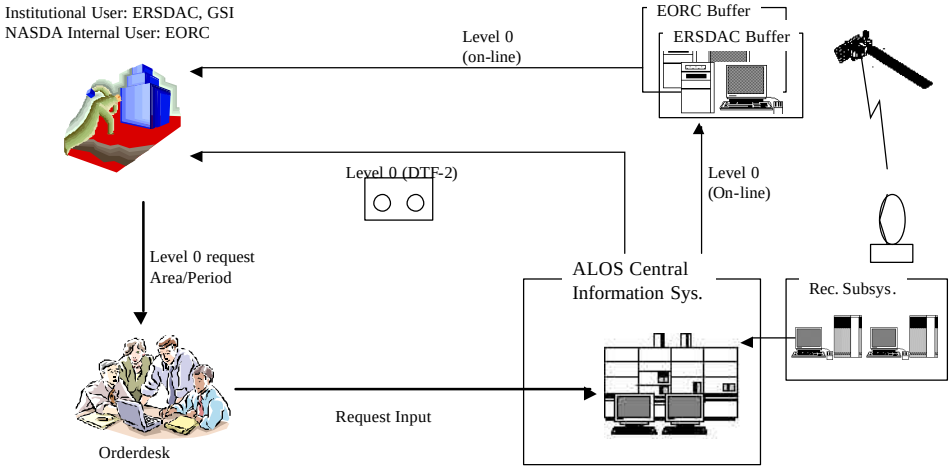
5. ALOS Data Service Flow
- Urgent Service -



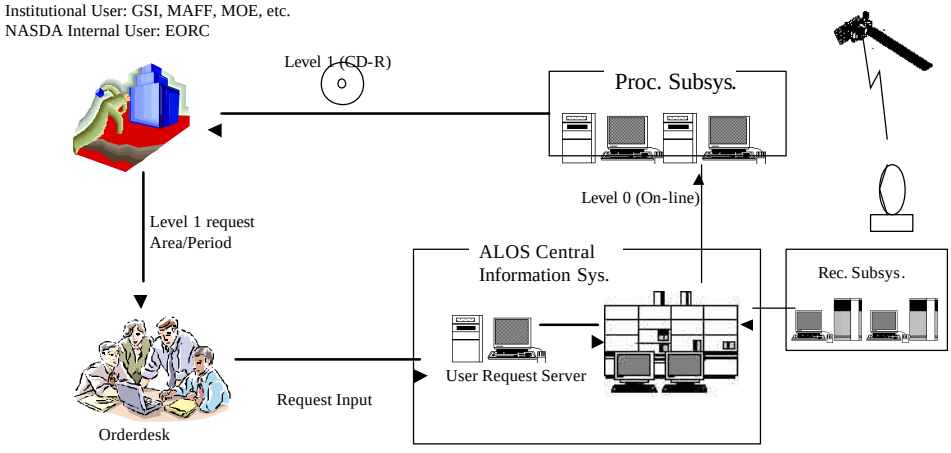
5. ALOS Data Service Flow
- Near Real-time Service -



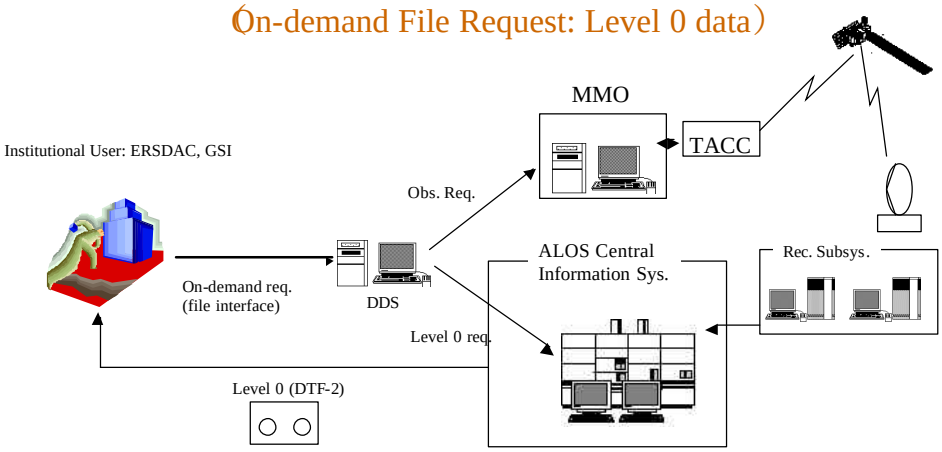
5. ALOS Data Service Flow
- Normal Service -
(Standing Request: Level 0 data)



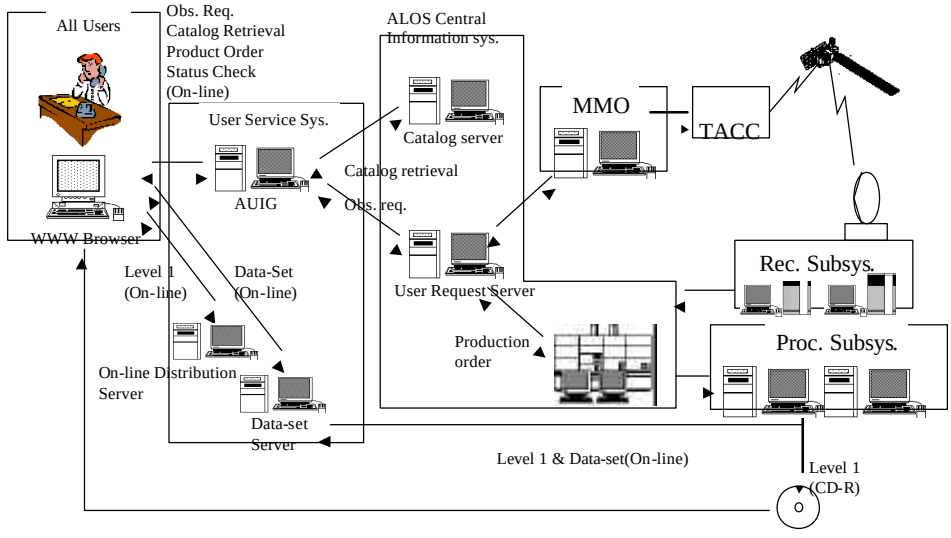
5. ALOS Data Service Flow
- Normal Service -
(Standing Request: Level 1 data)



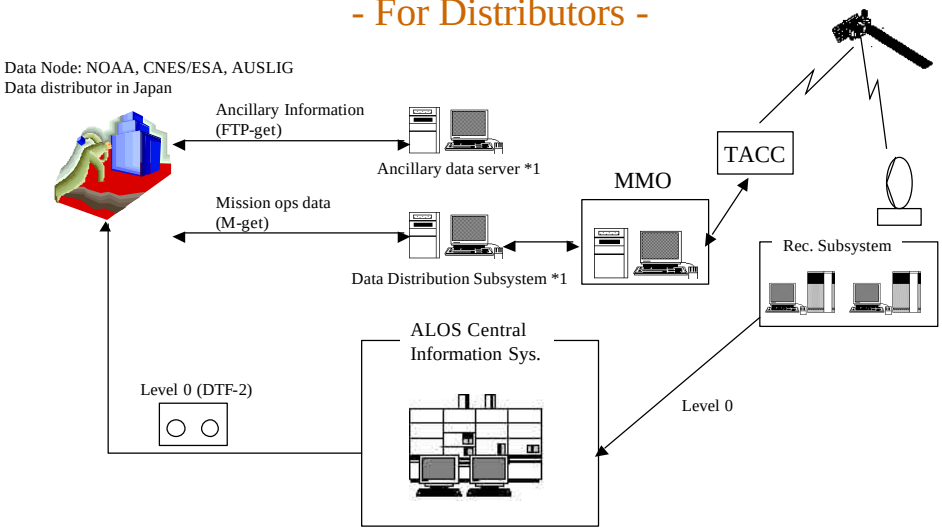
5. ALOS Data Service Flow
- Normal Service -
(On-demand File Request: Level 0 data)



5. ALOS Data Service Flow
- Normal Service -
(On-demand WWW Request: Level 1 data)



5. ALOS Data Service Flow
- For Distributors -



*1: Not allowed to access via internet (dedicated link only)

6. ALOS Data Release Schedule

	Initial Check Out (L to L+3mo)	Initial CAL/VAL (L+3mo to L+8mo)	Routine Ops (L+8mo to EOL)
Level 0 data	CAL/VAL only (limited amount)	Test delivery (limited amount)	Routine delivery
Level 1 data for NASDA internal user	CAL/VAL only (limited amount)	uncalibrated data (limited amount)	calibrated data
Level 1 data for general user	No delivery	No delivery	calibrated data

7. ALOS Instrument Operations Baseline

PALSAR

ERSDAC: Basin Mapping
GSI: Volcanic Area Monitoring
EORC: Global Rain Forest Mapping
Rest resources: Observation Requests

PRISM

Most resources allocated for systematic land covering

AVNIR-2

MAFF: Agricultural Monitoring
MOE: Environmental Monitoring
GSI: World Map
Rest resources: Observation Requests

8. ALOS Mission Operations Scheduling

Three kinds of Observation Requests

1) STANDING REQUEST
- Timing: Provided before launch
  Modified every 4 * 46 days (TBD)
- How : Dedicated form
  Sensor, Mode, Area (lat/lon polygon), Time period
- Who: NASDA internal (including PIs), ERSDAC,
  Japanese governmental users (GSI,MAFF,MOE,etc.),
  Data Node

2) ON-DEMAND FILE REQUEST (directly sent to MMO)
- Timing: Weekly request provided one week before
  (except for urgent request: 72 hours before)
- How: File transfer via dedicated line
  Sensor, Mode, Date, Area (path, start lat, time length)
  Requestor must be conscious with the satellite orbit
- Who: ERSDAC, Data Node, Ground Station

8. ALOS Mission Operations Scheduling

3) ON-DEMAND WWW REQUEST (via ALOS User Interface Gateway)

Timing:	Weekly request provided one week before
	(except for urgent request: 72 hours before)
How:	WWW interface via internet (AUIG)
	Sensor, Mode, Time Period, Scene
Who:	NASDA internal (including PIs), General users

Priority

"STANDING REQUESTs" are prior to "ON-DEMAND REQUESTs"

Not assign all resources with "STANDING REQUESTs" to keep rooms for "ON-DEMAND REQUESTs"

"Observation Purpose" must be designated in the Observation Request

8. ALOS Mission Operations Scheduling

Simulation

Necessary to define allocation for "STANDING REQUESTs" of each user

Simulation #1 done in 1999
- Japanese institutional users request only
- The results are described in MOIS

Simulation #2 running now
- not received detail observation requests from nodes
- provide very rough estimation of satisfactory ratio

Simulation #3 planned in 2002
- use actual application
- final allocation before launch

Appendix: ALOS Data Product Format

PRISM, AVNIR-2: CEOS Superstructure

PALSAR: CEOS SAR

Media: CD-R

on-line (tar file)

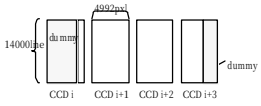
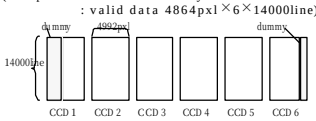
Format Documentation

July 2001 Draft in Japanese

July 2002 Version 1

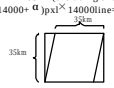
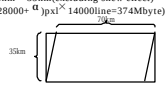
PRISM Product Format

- Scene Size (1/2) -

Level	Obs Mode	Scene Size
1A, 1B1	Triplet	35km×35km (4992pxl×14000line×4=267Mbyte : valid data 4864pxl×3×14000line) 
	Nadir 70km width	75km×35km (4992pxl×14000line×6=400Mbyte : valid data 4864pxl×6×14000line) 

PRISM Product Format

- Scene Size (2/2) -

Level	Obs Mode	Scene Size
1B2R (Geo-reference)	Triplet	35km × 35km(excluding skew effect) ((14000+ α)pxl × 14000line=187Mbyte) 
	Nadir 70km width	70km × 35km(excluding skew effect) ((28000+ α)pxl × 14000line=374Mbyte) 
1B2G (Geo-coded)	Triplet	Variable Size (Rotated image of Geo-reference) 

PRISM Product Format

- File Structure -

Volume Directory	
CCD i	Leader
	Image
	Trailer
CCD i+1	Leader
	Image
	Trailer
CCD i+2	Leader
	Image
	Trailer
CCD i+3	Leader
	Image
	Trailer
Supplemental	

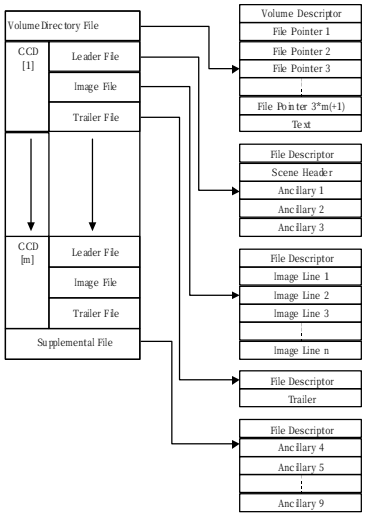
PRISM Level1A,1B1
(CCD 1-6 for 70km mode)

Volume Directory	
	Leader
	Image
	Trailer

PRISM Level 1B2

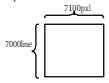
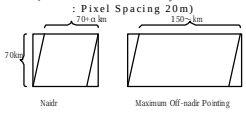
PRISM Product Format

- Record Structure -



AVNIR-2 Product Format

- Scene Size (1/2) -

Level	Scene Size
1A, 1B1	70km×70km(Nadir) (7100pxl×7000line×4band=190Mbyte) 
1B2R (Geo-reference)	70km×70km(Nadir)(Cross track size increases with off-nadir pointing angle) ((7100+α)×7000line×4band=190Mbyte : Pixel Spacing 10m) ((4730+α)×4667line×4band=84Mbyte : Pixel Spacing 15m) ((3550+α)×3500line×4band=47Mbyte : Pixel Spacing 20m) 

AVNIR-2 Product Format

- Scene Size (2/2) -

Level	Scene Size
1B2G (Geo-coded)	Variable Size (Rotated Image of Geo-reference) 

AVNIR-2 Product Format

- File Structure -

Volume Directory	
Band 1	Leader
	Image
	Trailer
Band 2	Leader
	Image
	Trailer
Band 3	Leader
	Image
	Trailer
Band 4	Leader
	Image
	Trailer
Supplemental	

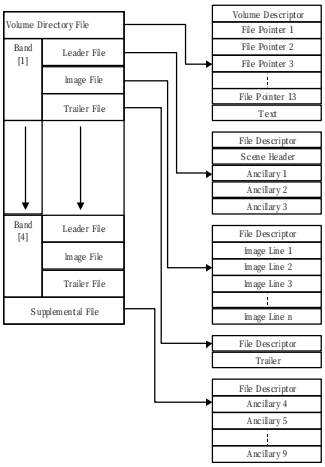
AVNIR-2 Level 1A, 1B1

Volume Directory	
Band 1	Leader
	Image
	Trailer
Band 2	Leader
	Image
	Trailer
Band 3	Leader
	Image
	Trailer
Band 4	Leader
	Image
	Trailer

AVNIR-2 Level 1B2

AVNIR-2 Product Format

- Record Structure -



PALSAR Product Format

- Types of Products -

Observation Mode		Process Level			
		1.0	1.1	1.5	
High Resolution	Single Polarization	○	○	○	18 beams
	Dual Polarization	○	○	○	18 beams
Scan	Burst 1 (short cycle)	○	—	○	3/4/5 scan
	Burst 2 (long cycle)	○	—	○	3/4/5 scan
Direct Downlink		○	○	○	18 beams
Polarimetry		○	○	—	12 beams

PALSAR Product Format

- Level 1.5 Scene Size -

Observation Mode		Range Size	Azimuth Size
High Resolution Direct Downlink	Off-nadir 9.9-43.4deg.	70km	70km
	Off-nadir 45.2-50.0deg	50km	
	Off-nadir 50.8deg	40km	
Scan	5scan	350km	350km
	4scan	300km	
	3scan	250km	

PALSAR Product Format

- Level 1.5 File Size(1/2) -

High Res & Direct Downlink Mode (Geo-reference)

Image Size Range×Azimuth	Frame Size & File Size					
	Pixel Spacing 6.25m			Pixel Spacing 12.5m		
	Range Pix	Azimuth Pix	MB	Range Pix	Azimuth Pix	MB
70×52～78km	11,200	8,900 ～ 13,100	280	5,600	4,500 ～ 6,600	71
50×64～79km	8,000	10,300 ～ 13,100	200	4,000	5,200 ～ 6,600	50
40×75～79km	6,400	12,000 ～ 13,100	160	3,200	6,000 ～ 6,600	40

High Res & Direct Downlink Mode (Geo-coded)

Pixel Spacing	Image Size Range×Azimuth	Frame Size & File Size		
		East-West	South-North	MB
6.25m	70×52～78km	8,300 ～ 17,200	11,200 ～ 17,200	558
	50×64～79km	10,300 ～ 15,300	8,000 ～ 15,300	400
	40×75～79km	12,000 ～ 14,600	6,400 ～ 14,600	320
12.5m	70×52～78km	4,200 ～ 8,600	5,600 ～ 8,600	140
	50×64～79km	5,200 ～ 7,700	4,000 ～ 7,700	101
	40×75～79km	6,000 ～ 7,300	3,200 ～ 7,300	81

PALSAR Product Format

- Level 1.5 File Size(2/2) -

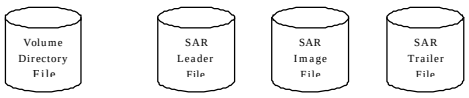
Scan Mode

Image Size Range×Azimuth	Frame Size & File Size					
	Geo-reference			Geo-coded		
	Range Pix	Azimuth Pix	MB	East-West	South-Nort	MB
250km×350km	2,500	3,500	17	4,300	4,300	36
300km×350km	3,000	3,500	21	4,600	4,600	41
350km×350km	3,500	3,500	24	5,000	5,000	48

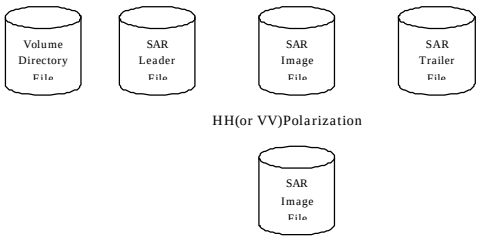
PALSAR Product Format

- Level 1.0 File Structure (1/3) -

High Resolution (Single Polarization) Mode



High Resolution (Dual Polarization) Mode

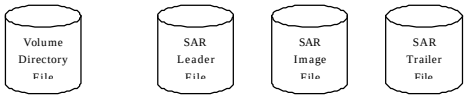


PALSAR Product Format

- Level 1.0 File Structure (2/3) -

Direct Downlink Mode

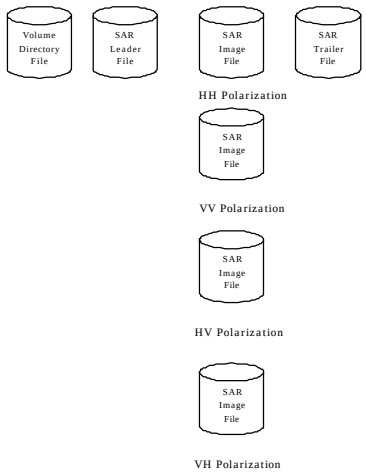
Scan Mode



PALSAR Product Format

- Level 1.0 File Structure (3/3)-

Polarimetry Mode



PALSAR Product Format

- Level 1.5 File Structure -