

ALOS-4 Update

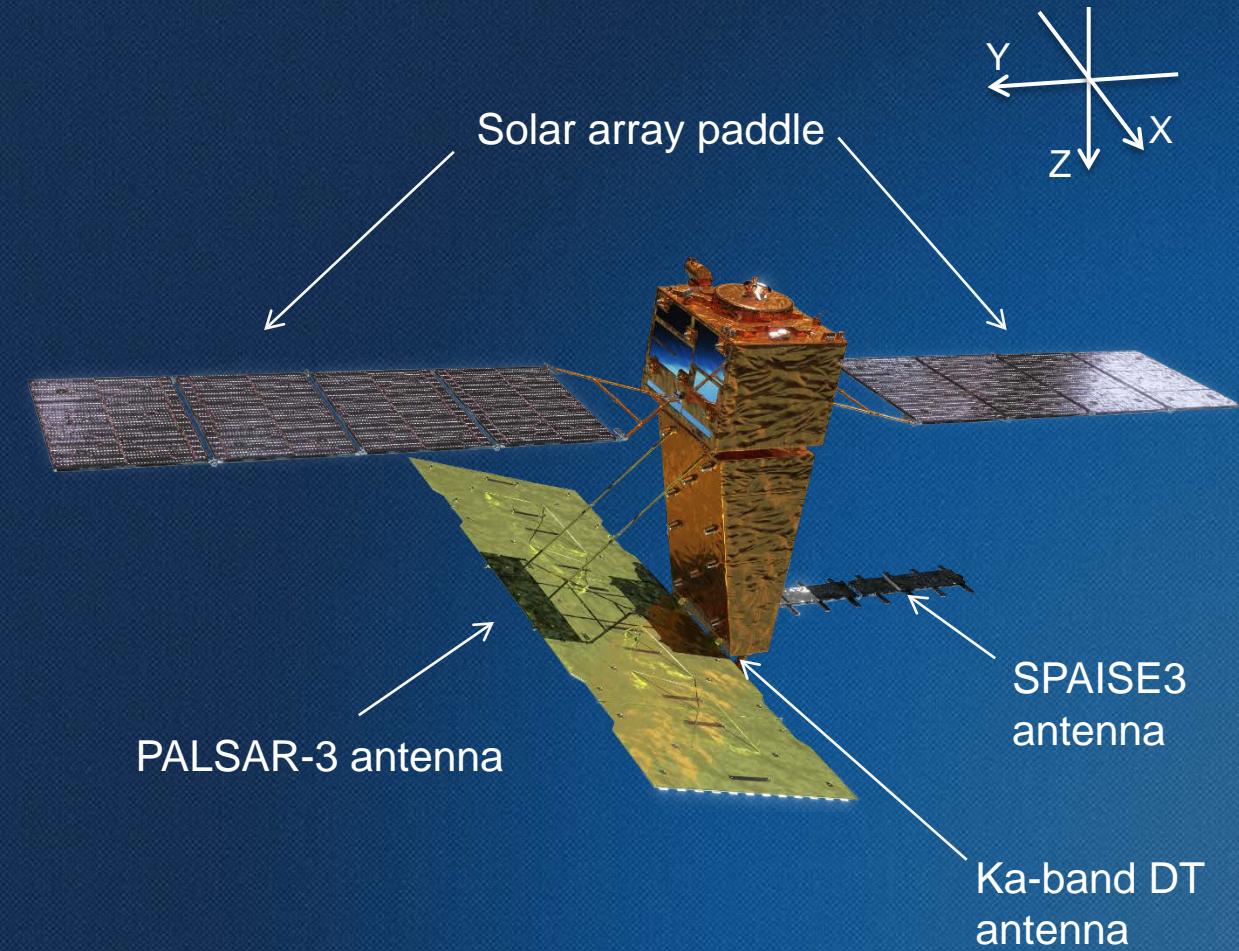
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ALOS-4 project
Space Technology Directorate I
Japan Aerospace Exploration Agency (JAXA)



ALOS-4 Mission Objectives

1. Precise monitoring of land deformation and subsidence using InSAR
2. Continuation and enhancement of ALOS-2 mission (all-weather disaster monitoring and forest monitoring, etc)
3. Exploring new applications such as large infrastructure monitoring using InSAR time series analysis
4. Marine monitoring by SAR and Automatic Identification System for ships (AIS)

ALOS-4 System Overview

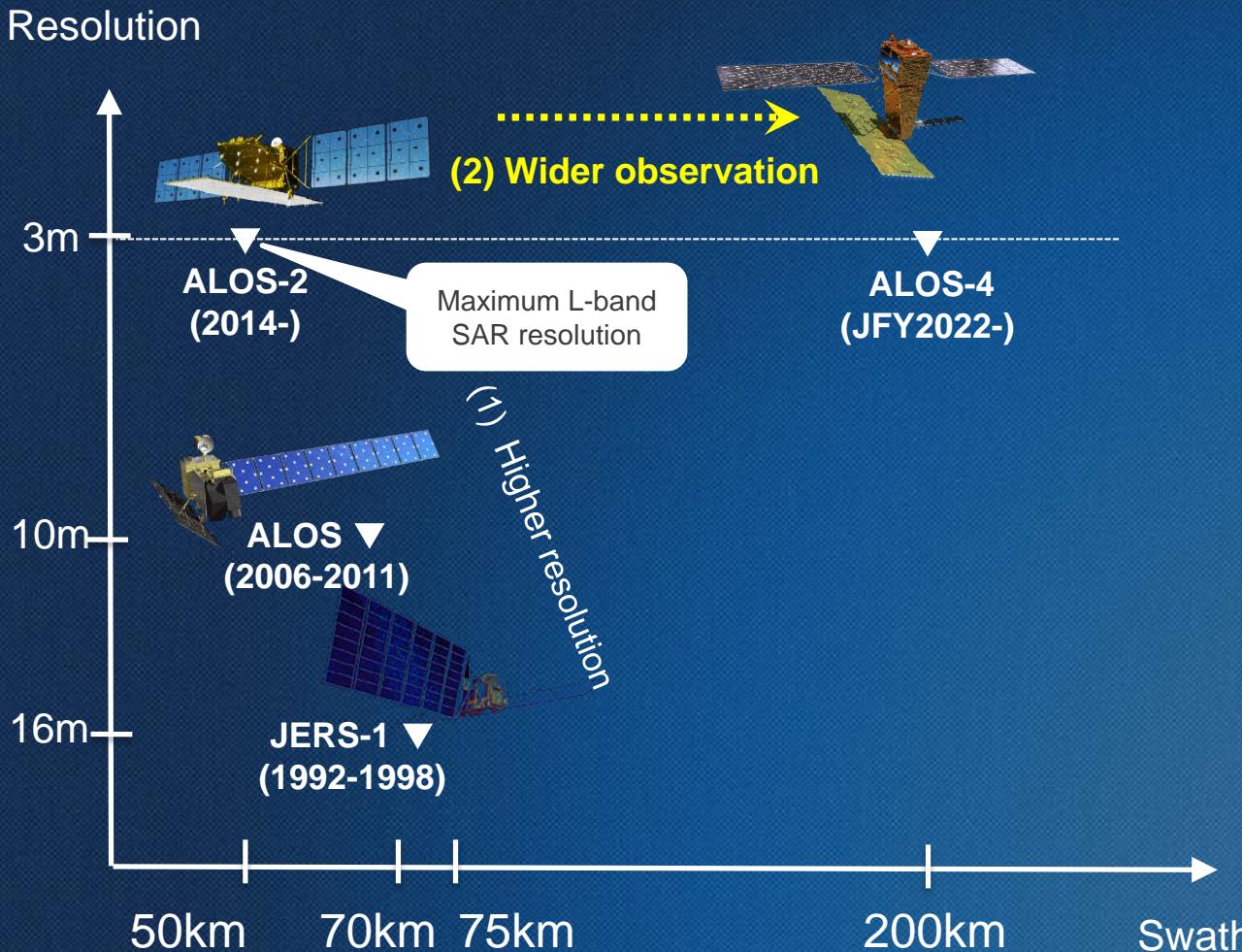


Launch	JFY2022~ by H3 launch vehicle
Orbit	Same orbit as ALOS-2 <ul style="list-style-type: none"> ✓ Sun-synchronous sub-recurrent orbit ✓ Altitude: 628 km ✓ Inclination angle: 97.9 degree ✓ Local sun time at descending: $12:00 \pm 15$ min. ✓ Revisit time: 14 day (15-3/14 rev/day)
Lifetime	7 years
Size	X 10.0 m x Y 20.0 m x Z 6.4 m
Satellite Mass	~2,990 kg
Downlink	1.8/3.6 Gbps (Ka-band)
Mission Instruments	<ul style="list-style-type: none"> - PALSAR-3 (Phased Array type L-band Synthetic Aperture Radar-3) - SPAISE3 (SPace based AIS Experiment 3)
Prime contractor	Mitsubishi Electric Corporation



PALSAR-3

High Resolution & Wide Swath Width



Coverage of 1 repeat cycle (14 days)

ALOS-4/PALSAR-3 (200 km)



ALOS-2/PALSAR-2 (50 km)

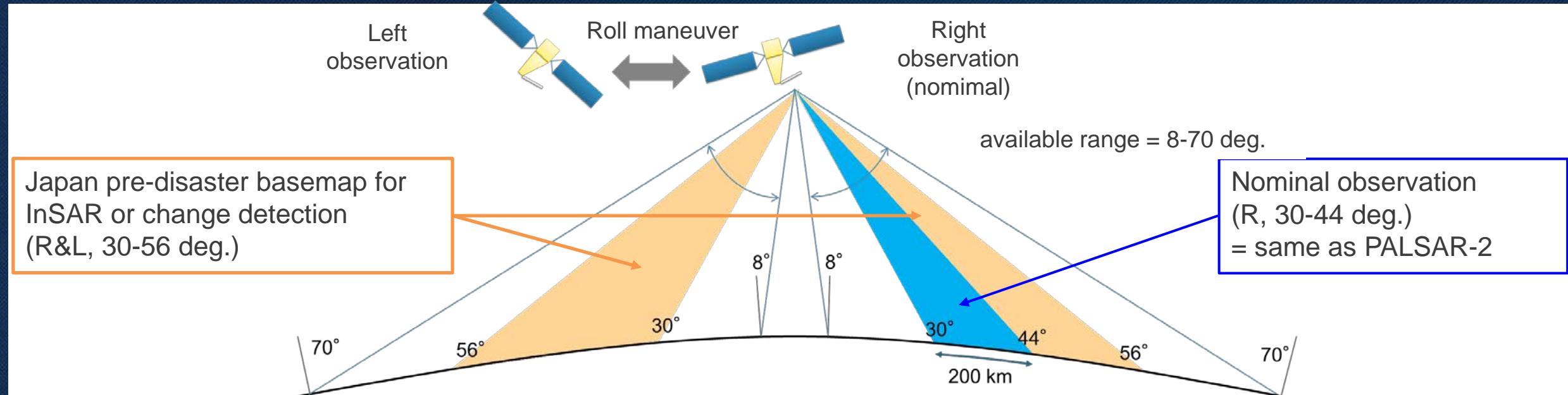


Swath width of PALSAR-3/2

Modes	PALSAR-3	PALSAR-2
Stripmap (res. 3/6/10 m)	<u>100-200 km</u>	30-70 km
ScanSAR (res. 25m*)	<u>700 km</u>	350-490 km
Spotlight (res. 1 x 3 m) *single look	<u>35km×35km</u>	25km×25km



PALSAR-3



InSAR capability between PALSAR-2 and PALSAR-3

InSAR pair	PALSAR-3		PALSAR-2	
	Stripmap100/200 km	ScanSAR700 km	Stripmap50/70 km	ScanSAR350/490 km
PALSAR-3	○	○	○	○
	○	○	○	✗

- ✓ ALOS-4 reference orbit is the same as ALOS-2
- ✓ Controlling accuracy is within +/- 500 m (= small baseline)



PALSAR-3



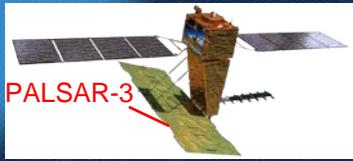
One of the PALSAR-3 antenna 5 panels (center panel, flight model)

2m : azimuth
(10m, as total)



PALSAR-3 antenna (structure model) deployment test





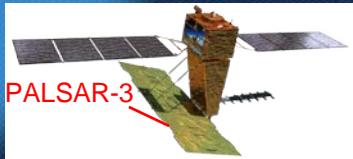
PALSAR-3



Thermal vacuum test



Proto-flight model of PALSAR-3 antenna



PALSAR-3



The following observation plan is currently under consideration.

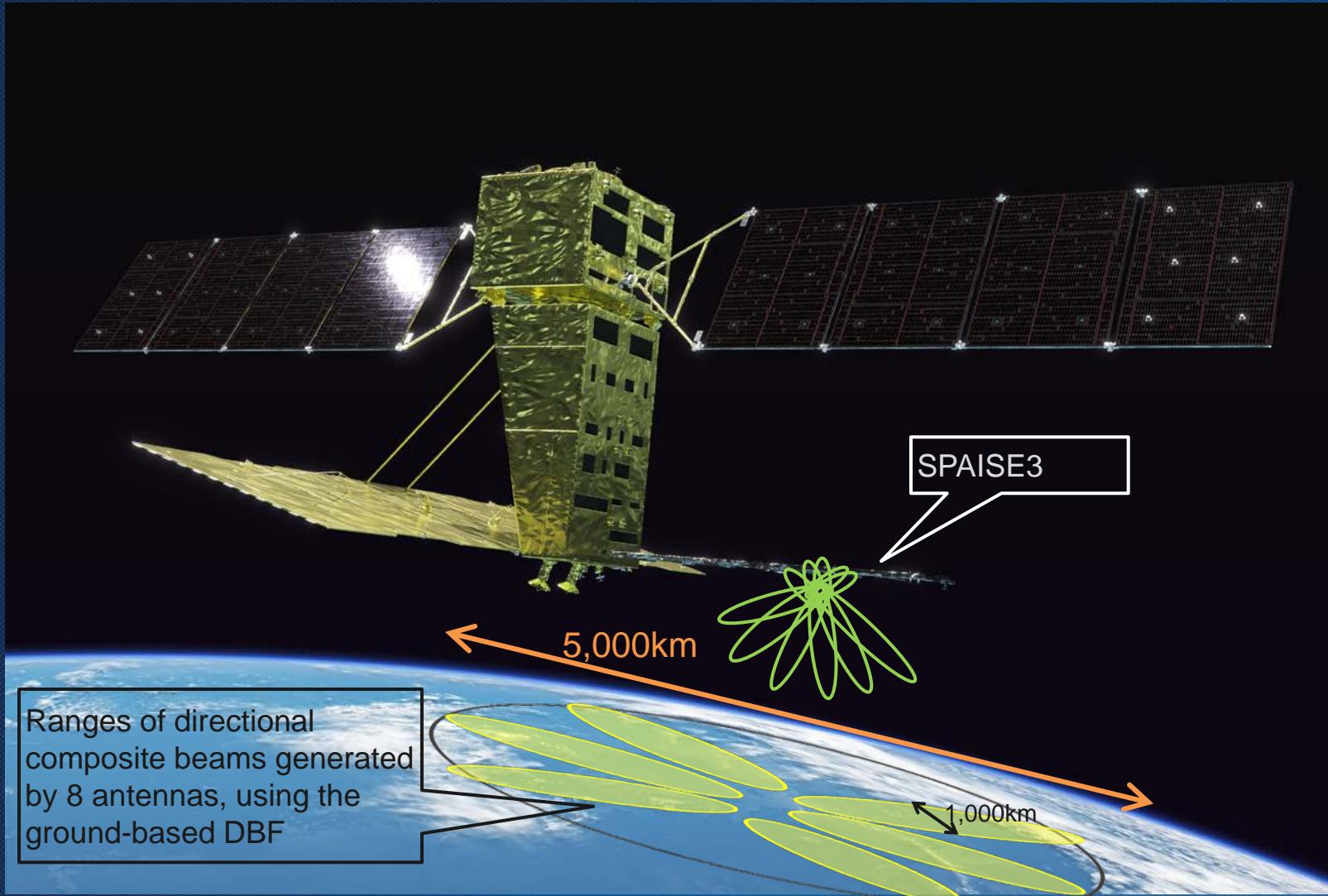
Target area	Title	Resolution	Pol.	Notes
Japan	Base maps	3m (Stripmap)	Dual	
	Time-series observations	3m (Stripmap)	Dual	To be observed ~20 times a year
World	Global base maps	10m (Stripmap)	Dual	To be observed once a year
	Wide-area base maps	25m (ScanSAR)	Dual or Single	To be observed once every 3 years, over specific areas only
	Time-series observations	10m (Stripmap)	Dual	

Details will be prepared one year (TBD) before the launch.

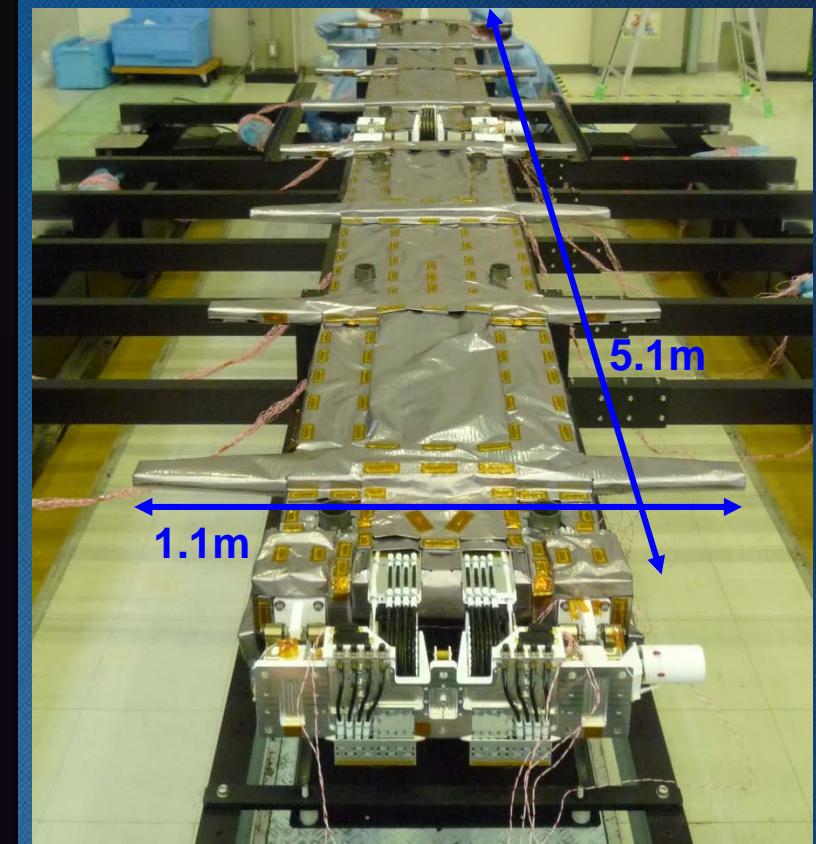


SPAISE3

(The SPace based AIS Experiment 3)



Ranges of directional
composite beams generated
by 8 antennas, using the
ground-based DBF



SPAISE3 antenna (flight model)

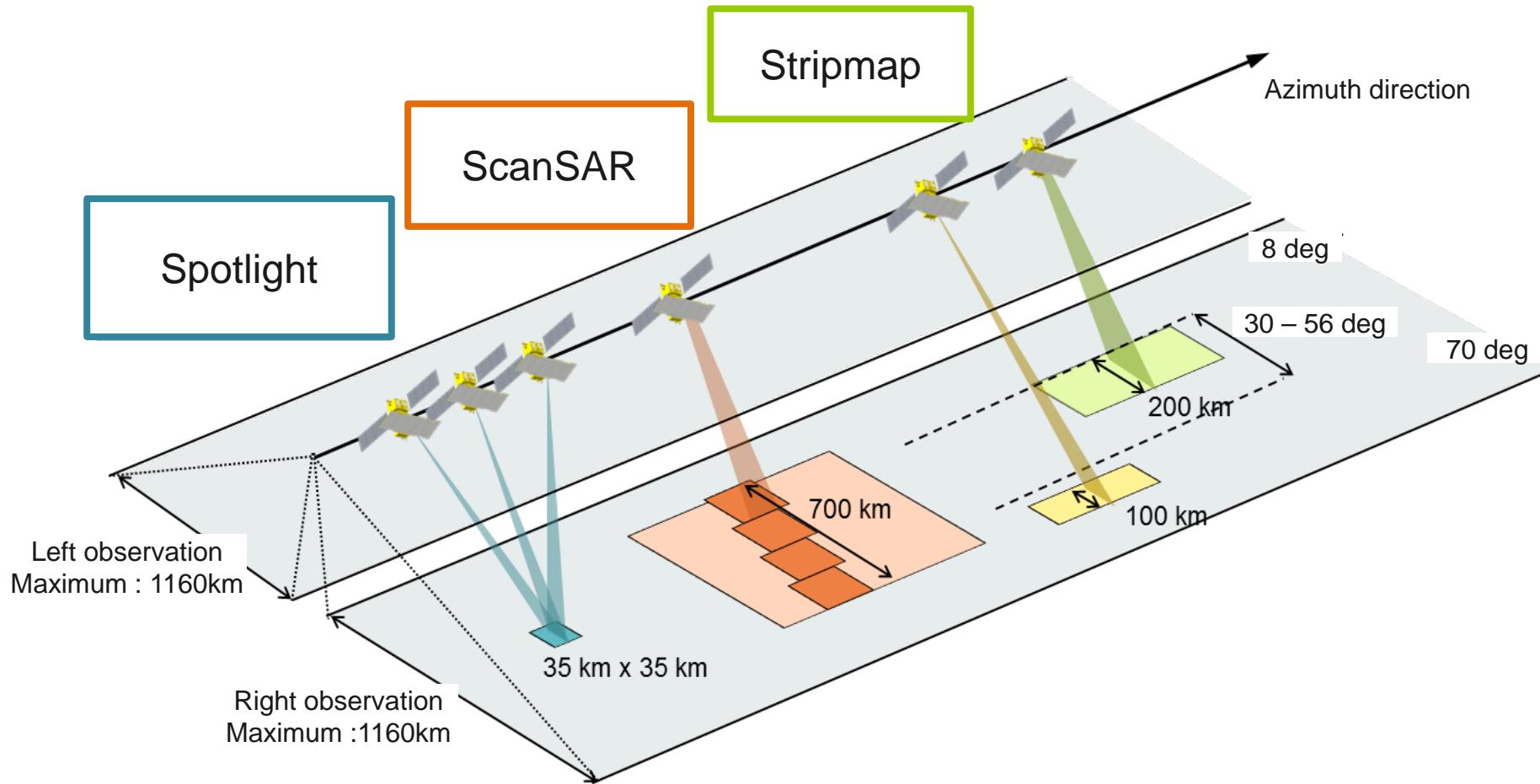
The ALOS-4 project is in Phase D, manufacture and test of proto-flight model (PFM).

Land monitoring SAR satellite roadmap from the basic plan for space development of Japan



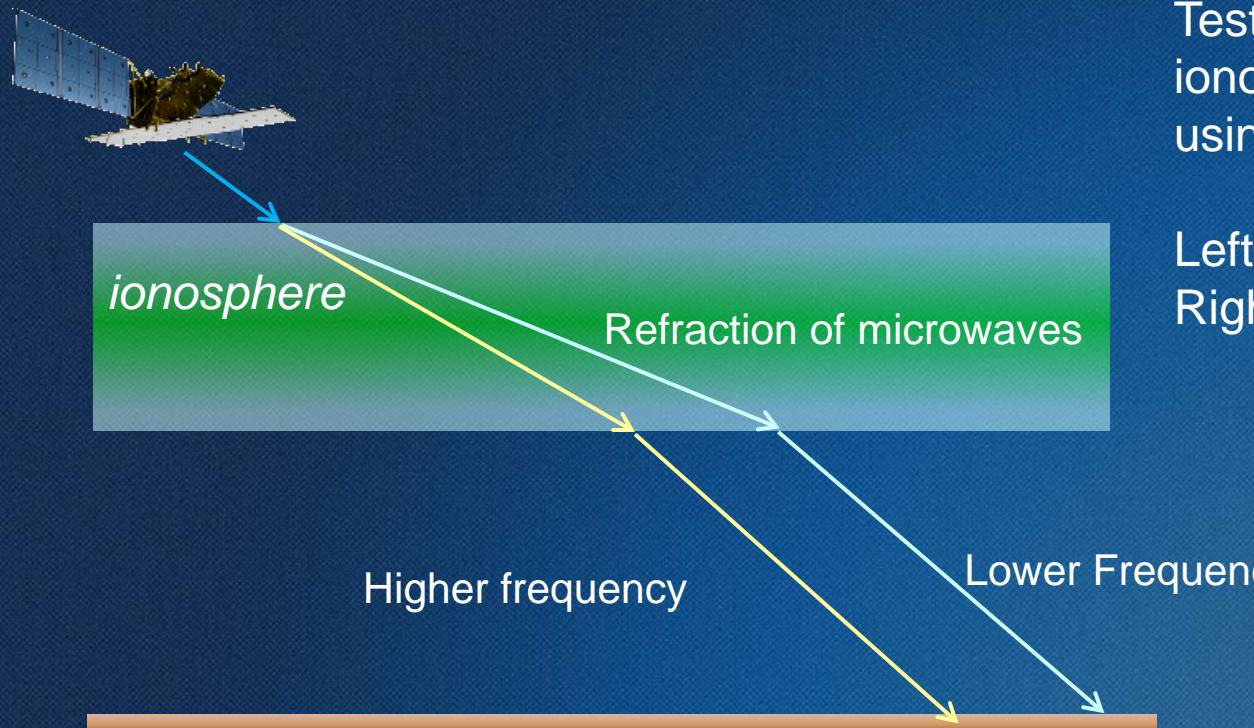
BACK UP

PALSAR-3 Observation Mode



PALSAR-3

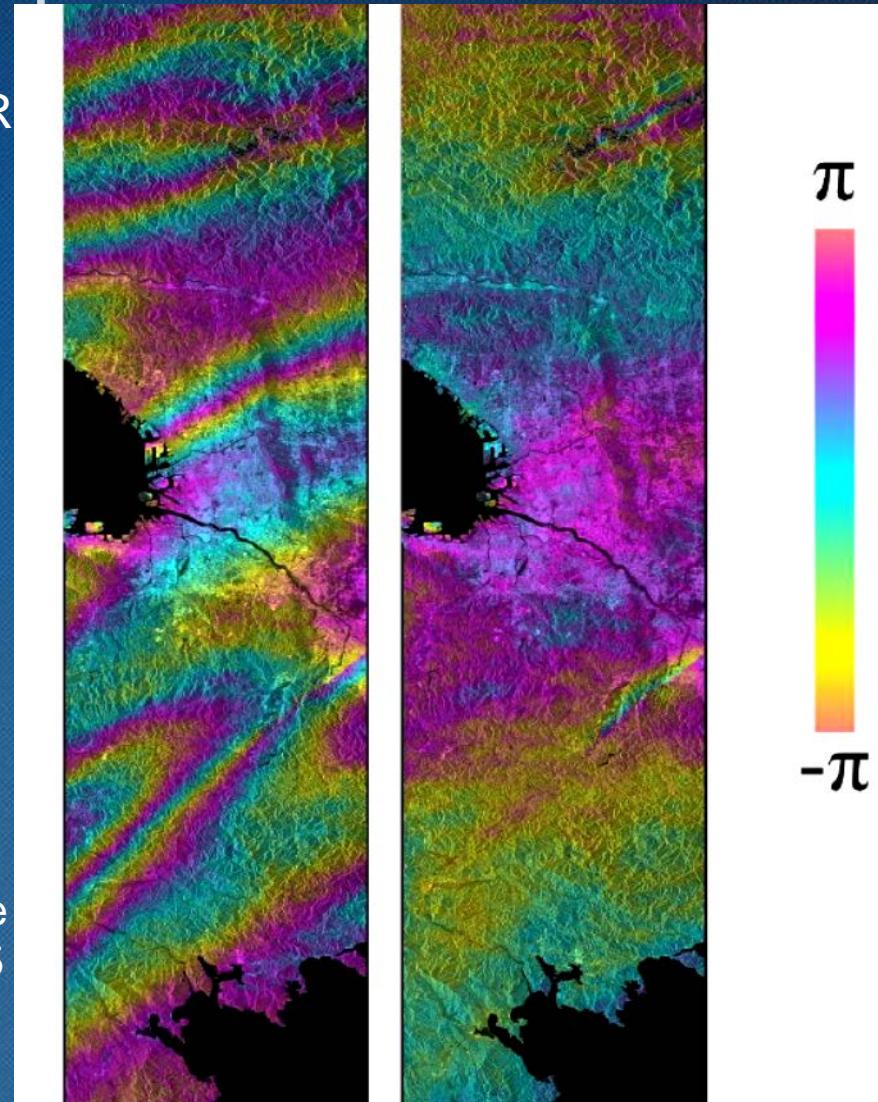
Split-band observation for InSAR ionospheric correction



Test result of the InSAR
ionospheric correction
using PALSAR-2 data

Left: Before correction
Right: After correction

Stripmap 3 m mode
Master = 2015/2/25
Slave = 2016/6/1
Central Japan



User Service : AUIG4

- a. AUIG4 : “One-stop service” for both of PALSAR-3 and PALSAR-2 data
 - i. Data subset based on user requests will be available.
 - ii. Available on multiple OS and browsers

The screenshot shows the AUIG4 ALOS-4 / ALOS-2 User Interface Gateway. At the top, there's a logo of two satellites and the text "AUIG4 ALOS-4 / ALOS-2 User Interface Gateway". Below it is a "ゲストユーザー向けサービス" (Guest User Service) section with a "データ検索" button. A note says: "ゲストユーザー(ユーザ未登録)の方も、カタログの検索を行うことができます。登録ユーザー向けサービスは、JAXA関係者、協定組織・共同研究機関およびJAXAと契約した組織・団体の方を対象としています。" Underneath is a "更新情報" (Update Information) section showing log entries like "xxxxxx を更新しました." and "yyyyyy を実施しました.". On the right is a "登録ユーザー向けサービス" (Registration User Service) form with fields for "ユーザID" and "パスワード" (Password), and a "ログイン" (Login) button. Below the form is a link "パスワードをお忘れの方は[こちら](#)".

The screenshot shows the AUIG4 search interface. At the top, there's a navigation bar with various options like "ホーム", "ユーザ登録情報", "プロジェクト選択", etc. The main area has a "検索方法" (Search Method) section with radio buttons for "プロダクト検索" (ALOS-4/PALSAR-3, ALOS-2/PALSAR-2) and "差分干涉ペア候補検索". Below it is a "検索範囲" (Search Range) section with checkboxes for "矩形指定", "点群指定", "ポリゴン検索", "スレーブ/マスター指定", "XMLファイル指定", and "範囲名指定". There are "検索" (Search) and "リセット" (Reset) buttons. To the right is a map of Japan and surrounding areas with several blue rectangles representing search results. A sidebar on the right shows "シーン詳細" (Scene Details) with information like "撮影機器: PALSAR-2", "撮影日時: 2018/05/18 11:22:33", and a table of search results.

データID	センサ	撮影機器	撮影日時	撮影方角	撮影モード	解像度	出力ファイル名
ALOS-2 ALOS-4 2018/05/18 11:22:33	PALSAR-2	PALSAR-2	2018/05/18 11:22:33	11:22:33	WV1	11	800
ALOS-2 ALOS-4 2018/05/18 11:22:33	PALSAR-2	PALSAR-2	2018/05/18 11:22:33	11:22:33	WV1	17	900
ALOS-2 ALOS-4 2018/05/18 11:22:33	PALSAR-2	PALSAR-2	2018/05/18 11:22:33	11:22:33	WV1	13	1000
ALOS-2 ALOS-4 2018/05/18 11:22:33	PALSAR-2	PALSAR-2	2018/05/18 11:22:33	11:22:33	SM1	34	1100
ALOS-2 ALOS-4 2018/05/18 11:22:33	PALSAR-2	PALSAR-2	2018/05/18 11:22:33	11:22:33	SM1	35	1200
ALOS-2 ALOS-4 2018/05/18 11:22:33	PALSAR-2	PALSAR-2	2018/05/18 11:22:33	11:22:33	SM1	36	1300