WInSAR
Western North America Interferometric Synthetic Aperture Radar Consortium

AGENDA

1. Welcome from the WInSAR Executive Committee: Eric Lindsey
2. Welcome and update from the UNAVCO President: Rebecca Bendick
3. Introduction: Eric Lindsey
4. Report on WInSAR activities at UNAVCO: Christopher Crosby
5. Update from JAXA: Shin-ichi Sobue
6. Update from ESA: Pierre Potin
7. Update from NASA: Gerald Bawden
8. Update on NISAR and ISCE: Paul Rosen
9. Update on GMTSAR: David Sandwell
10. Update from GEO Supersites: Stefano Salvi
11. Update on UAVSAR: Yunling Lou
12. Update from ASF: Franz Meyer
13. Time for questions and feedback

WInSAR
Western North America Interferometric Synthetic Aperture Radar Consortium

Who we are and what we do

WInSAR is a group of InSAR users and researchers that coordinate InSAR activities in North America. Our mission is to:

- advocate for opening access to SAR data
- plan and sponsor training courses for the community
- distribute and maintain software, search tools and data products
- advise on policies and best practices
- maintain an archive of SAR data for North America

The Executive Committee:

Eric Lindsey (Chair), David Bekaert, Katia Tymofyeyeva, Ann Chen, Brent Minchew, Kristy Tiampo (ex-officio)

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Western North America Interferometric Synthetic Aperture Radar Consortium

Training courses, 2021



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Training courses, 2021

InSAR Theory and Processing (GMTSAR)

- Multi-day short course, online, June-July 2021 – over 100 participants

InSAR Theory and Processing (ISCE)

- Multi-day course, online with ASF support, August 2021 – over 150 participants

InSAR Data Interpretation and Analysis for Nonspecialists

- 2-day course held prior to the online SAGE-GAGE meeting this August
- Targeted at ‘end users’, how to use processed InSAR data for their research

Future courses

- Likely continuation of online introductory short courses – very accessible
- Several versions of InSAR for Nonspecialists and/or Time Series Processing
- Looking forward to in-person short courses for smaller groups, advanced topics

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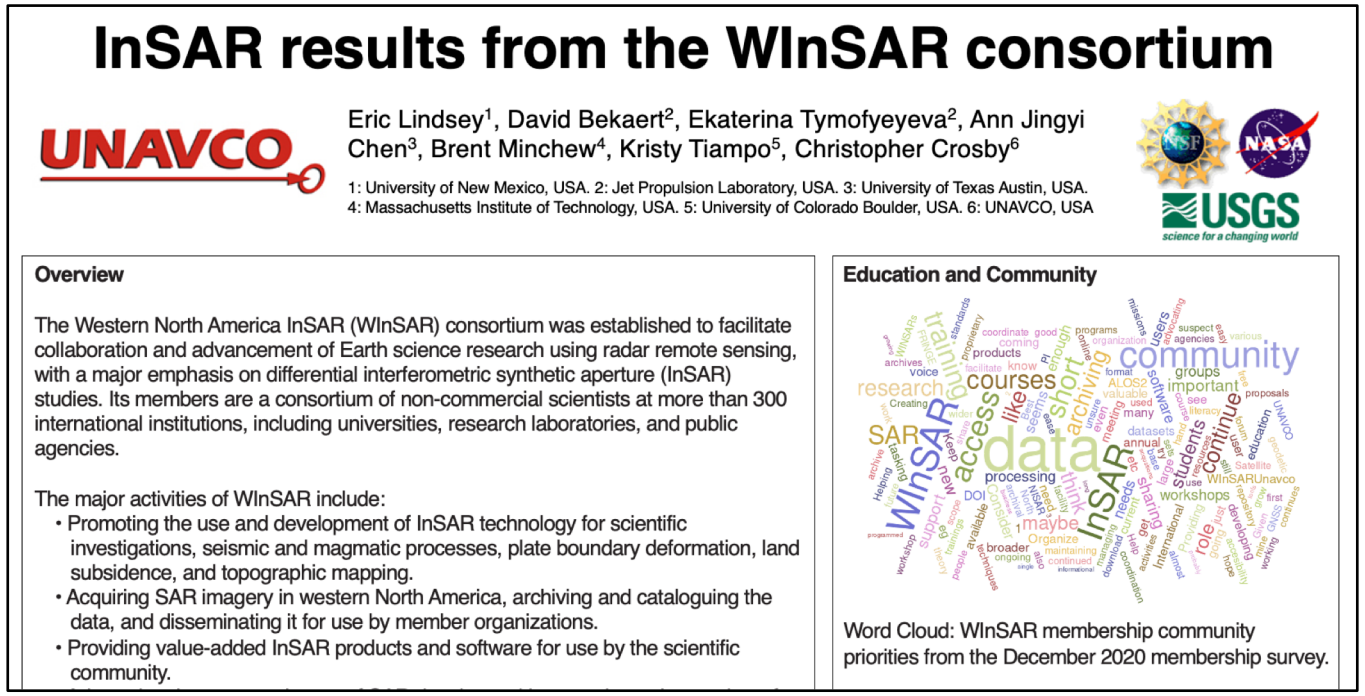
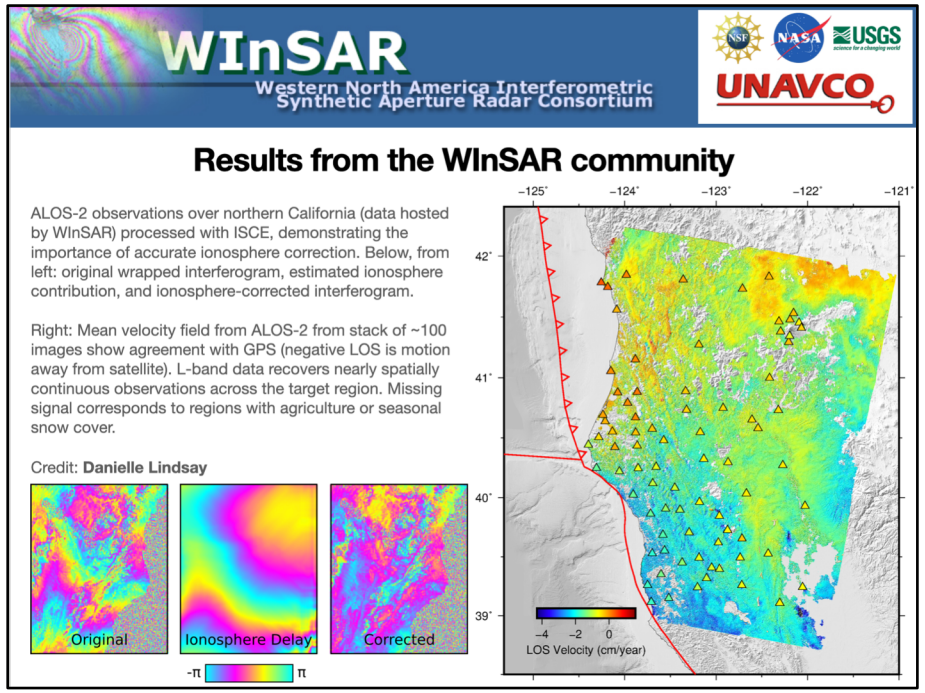
Online meetings – Highlighting WInSAR achievements

JAXA 2021 Earth Observation PI meeting – virtual poster

FRINGE 2021 – virtual “poster” (video)





WInSAR Operations Update

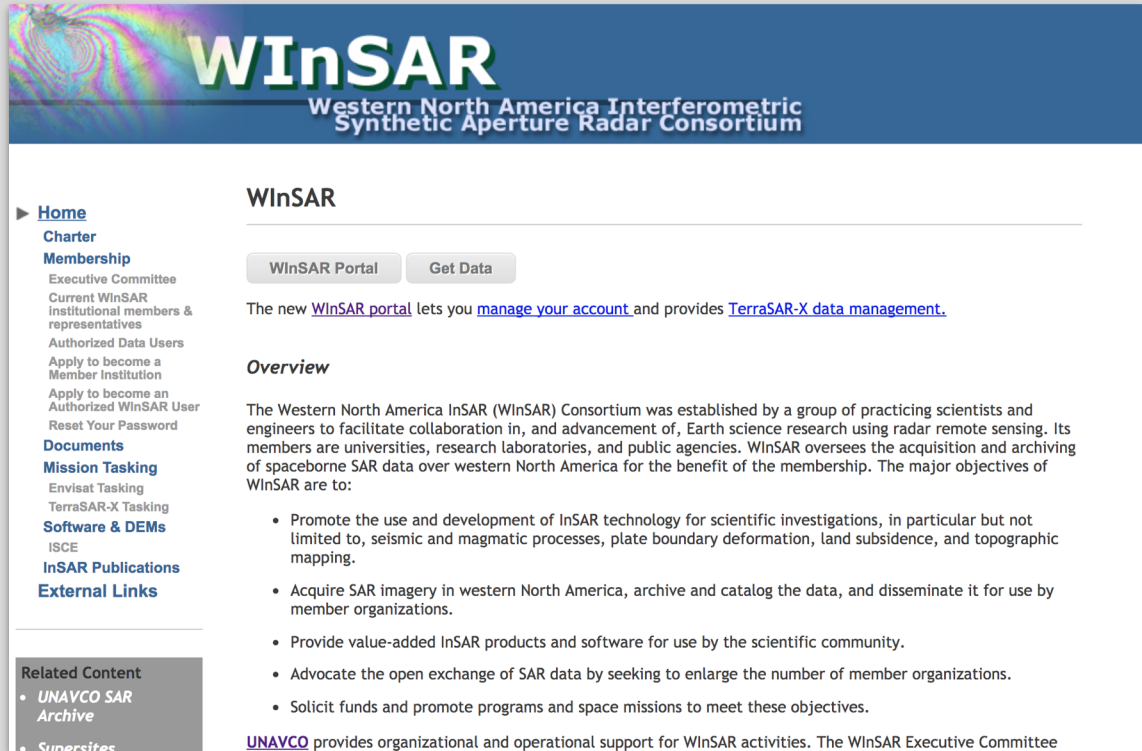
Christopher Crosby

WInSAR Business Meeting - December 2nd, 2021

WInSAR operated by UNAVCO under GAGE (Geodetic Facility for the Advancement of Geoscience (GAGE)) Cooperative Agreement. *Oct. 2018 – Sept. 2025.* WInSAR supported by NSF & NASA

Activities

- Project management and Executive Committee support
- Archive operations & maintenance
- Tasking, data ordering, data ingest
- Website/portal and user community support
- ISCE software access management
- Community short course support



The WInSAR Community

318 WInSAR Institutional Members (5 new member institutions in 2021) = **2016 Registered Users** (+150 in 2021)

Data:

197+ TB of data available for download

(JAXA deprecated the GUI2 interface that WInSAR uses to automate download of ALOS2 in early summer 2020, so no new ALOS2 data has been ingested since then.)

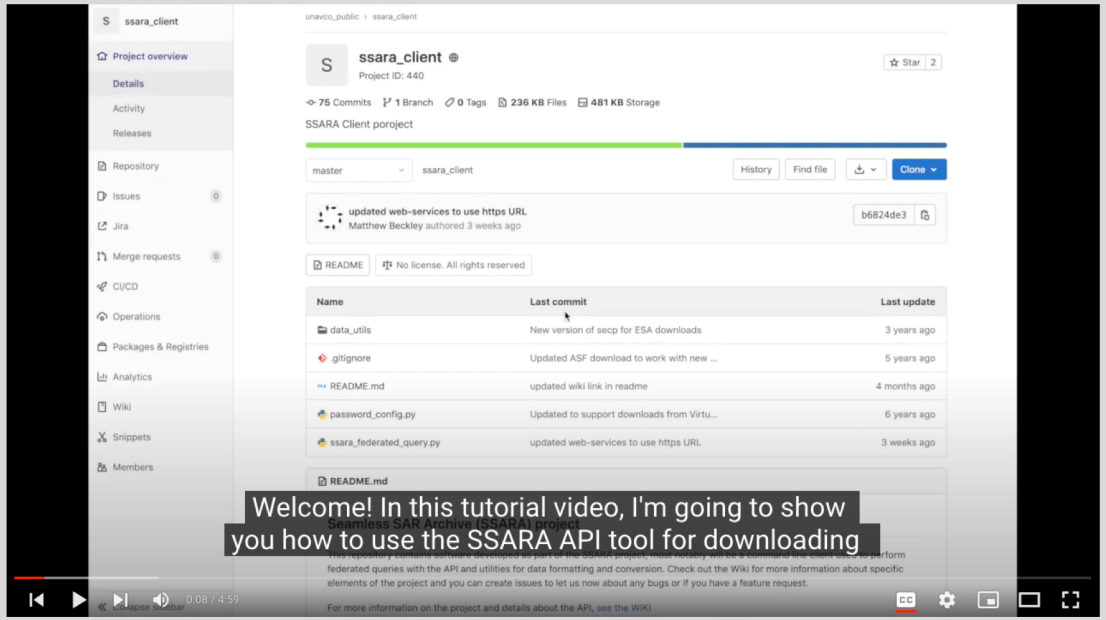
2021 USIP Intern Becca Bussard (PhD candidate at U. Oregon)

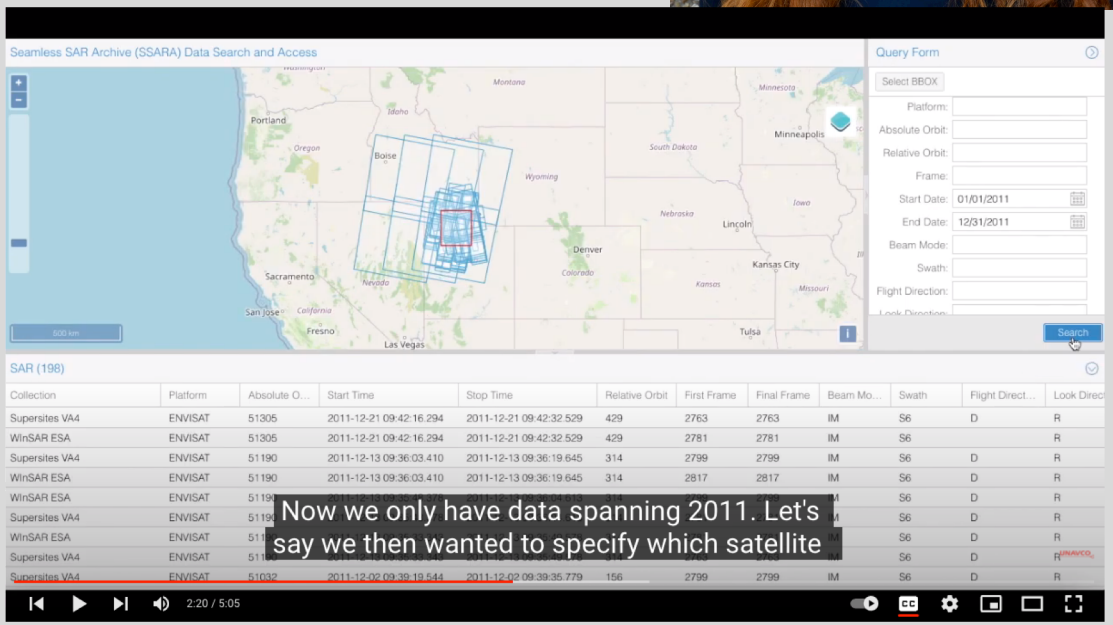


WInSAR focused work during summer 2021:

1. SSARA API & GUI tutorial videos:

https://youtu.be/7ncJ71dCbyY & https://youtu.be/kEcV0x7hyhE



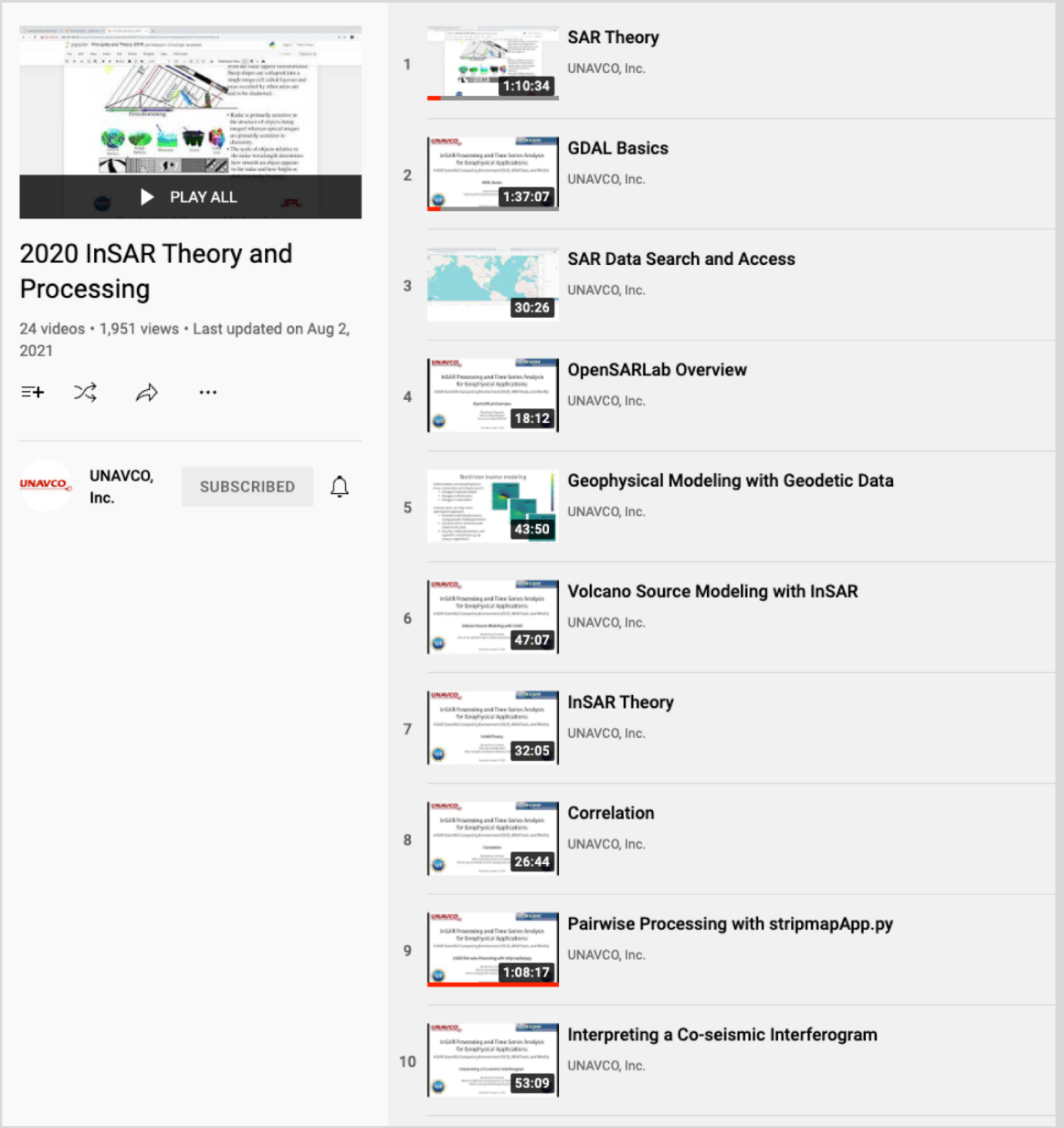


2021 USIP Intern Becca Bussard (PhD candidate at U. Oregon)

WInSAR focused work during summer 2021:

2. Converted the 2020 ISCE short course videos into a modular series of 24 shorter videos:

https://youtube.com/playlist?list=PLzmugeDopIFNxsJFbIhwX3AWy7oFSnG8u

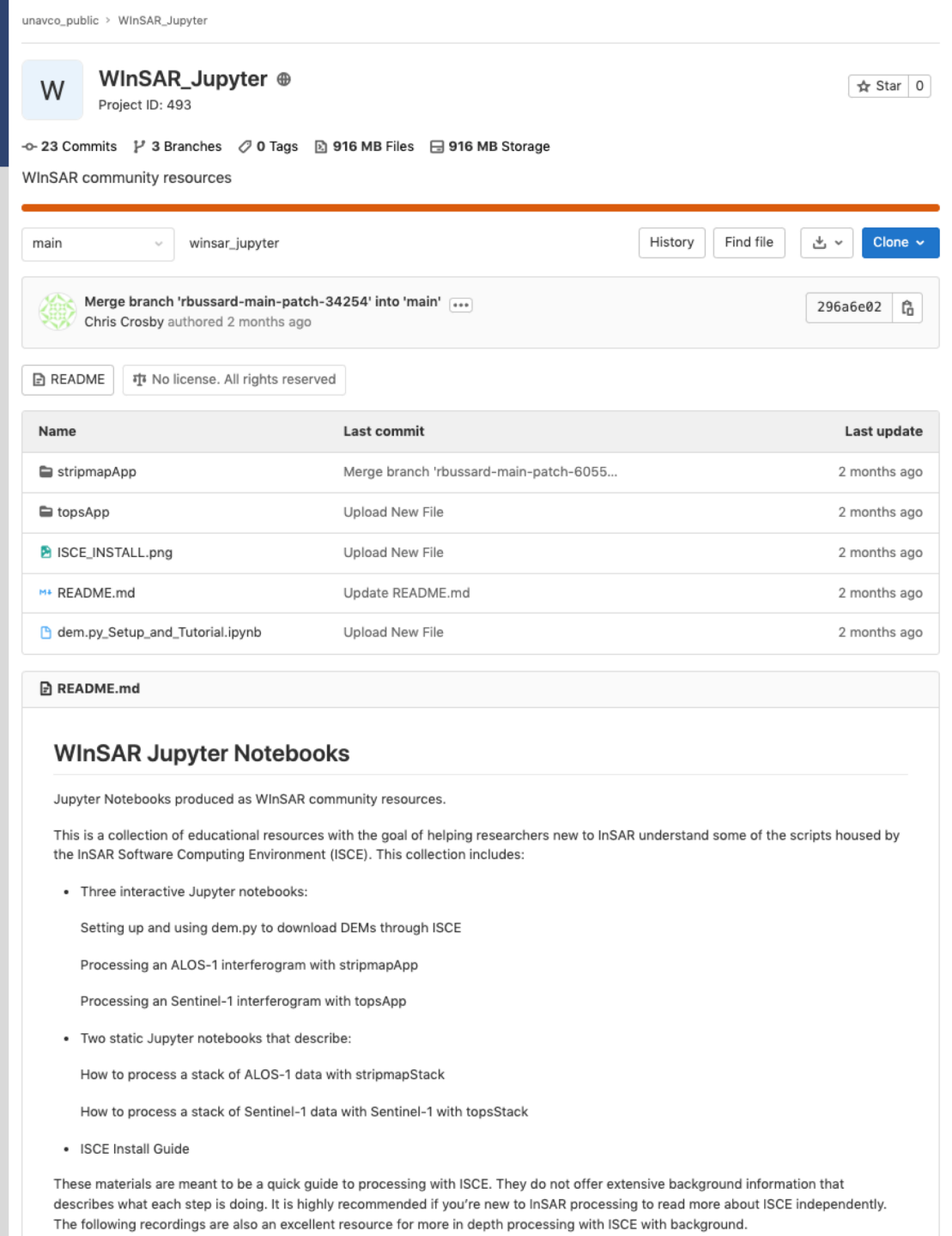


2021 USIP Intern Becca Bussard (PhD candidate at U. Oregon)

WInSAR focused work during summer 2021:

3. Developed a set of five Jupyter Notebooks on ISCE-based InSAR processing:

https://www.unavco.org/gitlab/unavco_public/winsar_jupyter



unavco_public › WInSAR_Jupyter

W **WInSAR_Jupyter**
Project ID: 493

Star 0

23 Commits | 3 Branches | 0 Tags | 916 MB Files | 916 MB Storage

WInSAR community resources

main | winsar_jupyter | History | Find file | Clone

Merge branch 'rbussard-main-patch-34254' into 'main'
Chris Crosby authored 2 months ago — 296a6e02

README | No license. All rights reserved

Name	Last commit	Last update
stripmapApp	Merge branch 'rbussard-main-patch-6055...	2 months ago
topsApp	Upload New File	2 months ago
ISCE_INSTALL.png	Upload New File	2 months ago
README.md	Update README.md	2 months ago
dem.py_Setup_and_Tutorial.ipynb	Upload New File	2 months ago

README.md

WInSAR Jupyter Notebooks

Jupyter Notebooks produced as WInSAR community resources.

This is a collection of educational resources with the goal of helping researchers new to InSAR understand some of the scripts housed by the InSAR Software Computing Environment (ISCE). This collection includes:

- Three interactive Jupyter notebooks:

  Setting up and using dem.py to download DEMs through ISCE

  Processing an ALOS-1 interferogram with stripmapApp

  Processing an Sentinel-1 interferogram with topsApp

- Two static Jupyter notebooks that describe:

  How to process a stack of ALOS-1 data with stripmapStack

  How to process a stack of Sentinel-1 data with Sentinel-1 with topsStack

- ISCE Install Guide

These materials are meant to be a quick guide to processing with ISCE. They do not offer extensive background information that describes what each step is doing. It is highly recommended if you're new to InSAR processing to read more about ISCE independently. The following recordings are also an excellent resource for more in depth processing with ISCE with background.

2021 USIP Intern Becca Bussard (PhD candidate at U. Oregon)

WInSAR focused work during summer 2021:

4. Supported the 2021 ISCE short course instructors in preparation for the course, tested notebooks, acted as lead TA during the course, and grading assistance.



Ongoing:

- Full WInSAR web-content review and updates.
- Updated language and better cross-linkages between WInSAR and UNAVCO content.

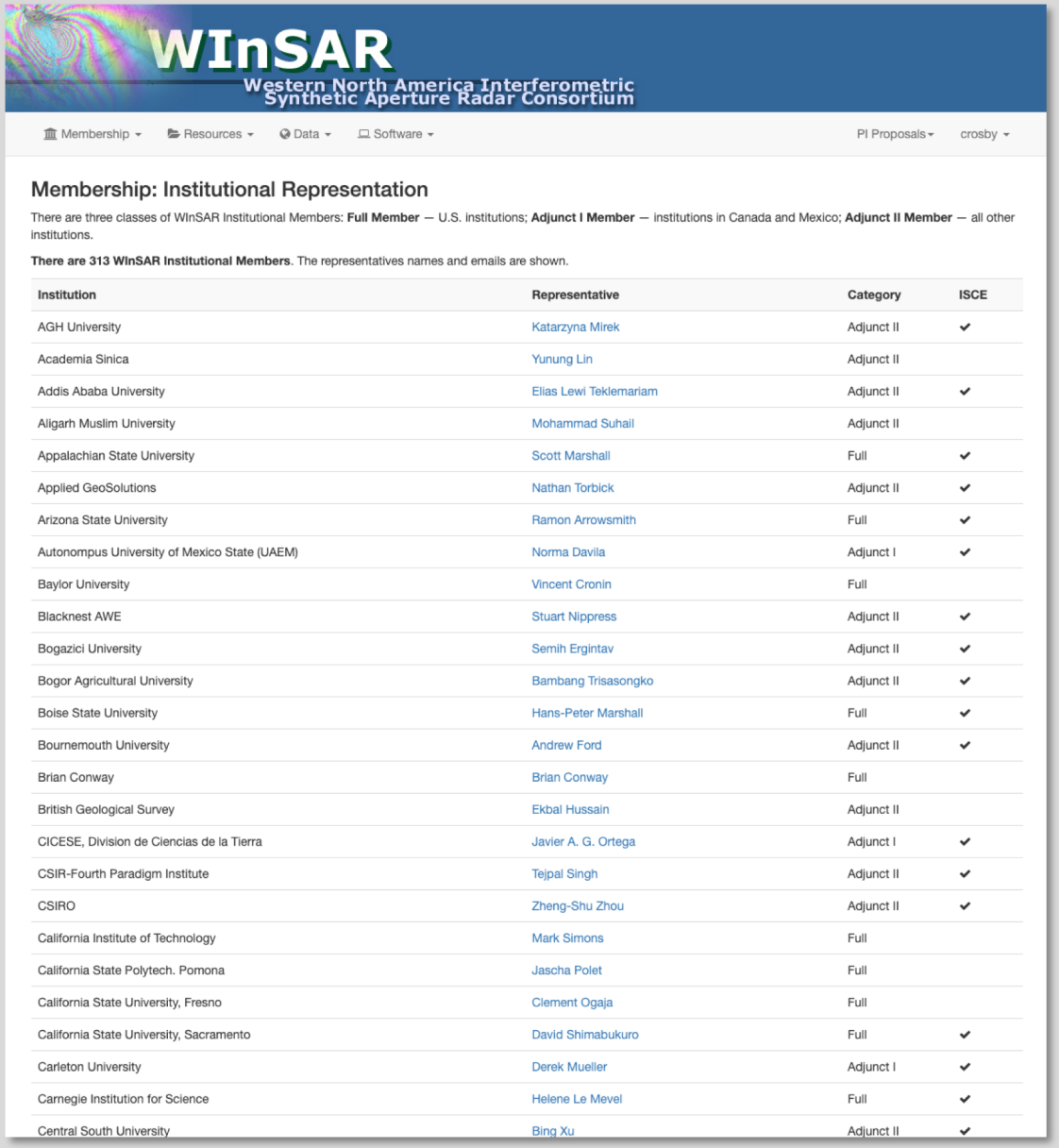
Reminder:

Institutional Representative housekeeping:

In preparation for 2020 EC election, asked Full category reps to verify that their affiliation is correct. 46% response rate.

Please review:
https://winsar.unavco.org/membership/institutions/

Email changes to: winsar@unavco.org



WInSAR
Western North America Interferometric Synthetic Aperture Radar Consortium

Membership ▾ Resources ▾ Data ▾ Software ▾ PI Proposals ▾ crosby ▾

Membership: Institutional Representation

There are three classes of WInSAR Institutional Members: **Full Member** — U.S. institutions; **Adjunct I Member** — institutions in Canada and Mexico; **Adjunct II Member** — all other institutions.

There are 313 WInSAR Institutional Members. The representatives names and emails are shown.

Institution	Representative	Category	ISCE
AGH University	Katarzyna Mirek	Adjunct II	✔
Academia Sinica	Yunung Lin	Adjunct II	
Addis Ababa University	Elias Lewi Teklemariam	Adjunct II	✔
Aligarh Muslim University	Mohammad Suhail	Adjunct II	
Appalachian State University	Scott Marshall	Full	✔
Applied GeoSolutions	Nathan Torbick	Adjunct II	✔
Arizona State University	Ramon Arrowsmith	Full	✔
Autonompus University of Mexico State (UAEM)	Norma Davila	Adjunct I	✔
Baylor University	Vincent Cronin	Full	
Blacknest AWE	Stuart Nippress	Adjunct II	✔
Bogazici University	Semih Ergintav	Adjunct II	✔
Bogor Agricultural University	Bambang Trisasongko	Adjunct II	✔
Boise State University	Hans-Peter Marshall	Full	✔
Bournemouth University	Andrew Ford	Adjunct II	✔
Brian Conway	Brian Conway	Full	
British Geological Survey	Ekbal Hussain	Adjunct II	
CICESE, Division de Ciencias de la Tierra	Javier A. G. Ortega	Adjunct I	✔
CSIR-Fourth Paradigm Institute	Tejpal Singh	Adjunct II	✔
CSIRO	Zheng-Shu Zhou	Adjunct II	✔
California Institute of Technology	Mark Simons	Full	
California State Polytech. Pomona	Jascha Polet	Full	
California State University, Fresno	Clement Ogaja	Full	
California State University, Sacramento	David Shimabukuro	Full	✔
Carleton University	Derek Mueller	Adjunct I	✔
Carnegie Institution for Science	Helene Le Mevel	Full	✔
Central South University	Bing Xu	Adjunct II	✔



ALOS-2 Update

Shinichi Sobue, Yuta Tochigi, Takeo Tadono, Takashi Omote, Hiroshi Kido, Akiko Noda, Fumio Kudoh

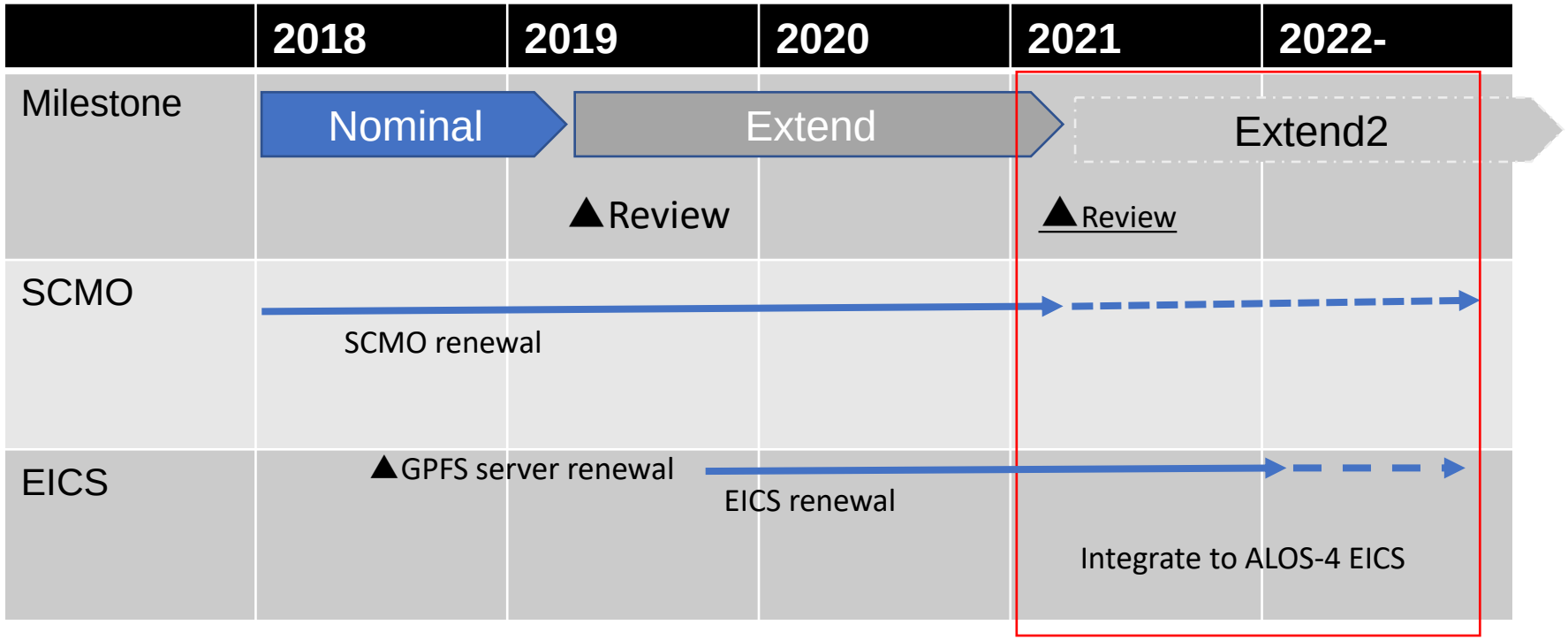
Japan Aerospace Exploration Agency (JAXA)

ALOS-2



Application	Disaster, Land, Agriculture, Natural Resources, Sea Ice & Maritime Safety
L-band SAR (PALSAR-2)	Stripmap: 3 to 10m res., 50 to 70 km swath ScanSAR: 100m res., 350km/490km swath Spotlight: 1×3m res., 25km swath
Orbit	Sun-synchronous orbit Altitude: 628km Local sun time : 12:00 +/- 15min Revisit: 14days Orbit control: ≦+/-500m
Life time	5 years (target: 7 years)
Launch	May 24, 2014; H-IIA launch vehicle
Downlink	X-band: 800Mbps(16QAM) 400/200Mbps(QPSK) Ka-band: 278Mbps (Data Relay)
Experimental Instrument	Compact InfraRed Camera (CIRC) Space-based Automatic Identification System Experiment 2 (SPAISE2)

Extend observation phase



Target of ALOS-2 mission for 2021 operation

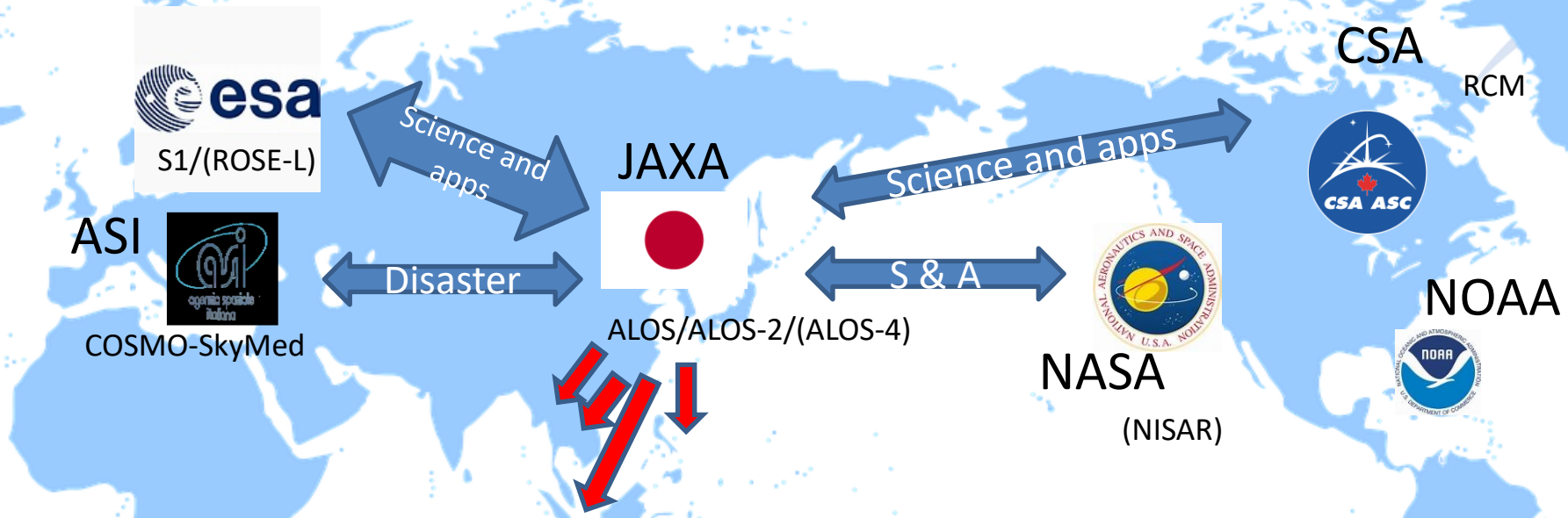
- 7 years continuous observation operation
- Archive global and continuous SM3 and WD1 observation with intensive time series observation in selected area including research and development to prepare ALOS-4 bi-weekly SM3 observation and promoting multi frequency observation in cooperation with ESA, CSA, ASI, NASA and other international partners.
- Project final review in December 2021 and will continue to operate ALOS-2 to overlap with ALOS-4

ALOS－2　system operation status summary

Subsystem	Status	Note
SAP	Green	-
EPS	Green	-
AOCS	Green	ESA operation is suspend
Propulsion	Green	-
CDMS	Green	-
DT	Green	-
DRS	Green	August 5, 2017 DRTS operation was completed
MDPS	Green	System reset because of SEU
THERMAL	Green	-
PALSAR2	Green	System reset because of SEU

Cal/Val status: Green: https://www.eorc.jaxa.jp/ALOS-2/calval/calval_jindex.htm

SAR international cooperation



- Science and apps: Ocean (Sea Ice, ship, oil spill), Land use (agriculture, soil moisture, SWE, crustal deformation - volcano, subsidence, LULCC, forest) with disaster response
- FS for ALOS-4 DT in international partners

Limitation of ALOS-2 operation in extend observation period

Duty cycle (maximum observation time per an orbit) will be reduced in extend observation period to continue to operate ALOS-2 with overlapping with ALOS-4 observation

- Until 2019.10.20 (137 orbit cycle)　Duty50%
- **From 2019.10.21 (138 orbit cycle) Duty30%**

BOS was revised owing to reduce duty cycle with following points

- ✓ SM3 global observation (Two times per a year with high priority –> Once per a year with high priority and once per a year with low priority)
- ✓ Put high priority to un observed area with SM3
- ✓ Put high priority to selected area with intensive observation with SM1, SM2 and SM3 to promote Japanese L-SAR operational and research usage in cooperation with national and international partners

–> Need to revise observe priority and observation coverage

Basic Observation Scenario (BOS) world

8 years (global: SM3 and WD1 for JJ-FAST with intensive high temporal observation of SM1 and/or SM2 to selected area)

次回シミュレーション実施期間

■8年目

回帰	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209
年	2021年												2022年													
回帰開始日	07/26	08/09	08/23	09/06	09/20	10/04	10/18	11/01	11/15	11/29	12/13	12/27	01/10	01/24	02/07	02/21	03/07	03/21	04/04	04/18	05/02	05/16	05/30	06/13	06/27	07/11
ディセンディング	南極域 Super Site	湿地伐採2 南極域 SuperSite	湿地伐採1	地殻1 南極域 Super Site	湿地伐採2 地殻2 南極域Super	湿地伐採1	地殻1 10m Super Site	湿地伐採2 地殻2	湿地伐採1 10m Super	地殻1 10m Super Site	湿地伐採2 地殻2	湿地伐採1	地殻1	湿地伐採2 地殻2	湿地伐採1	地殻1	湿地伐採2 地殻2	湿地伐採1	地殻1	湿地伐採2 地殻2	湿地伐採1	地殻1	湿地伐採2 地殻2	湿地伐採1	湿地伐採2	湿地伐採1
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	F2(6)L	F2(6)L		F2(6)L	F2(6)L		F2(7)R	W2(2)R	F2(5)R	F2(6)R	W2(2)R			W2(2)R			F2(7)R			F2(5)R			F2(6)R			
アセンディング	World E(10m)			地殻	極域	World F(10m)					World A(10m)			北極域	グリーンランド Super Site 南極域	World B(10m)				World C(10m)				World D(10m)		
	F2 (7)R	F2 (5)R	F2 (6)R	W2 (2)R	W2(2)R	F2 (7)R	F2 (5)R	F2 (6)R			F2 (7)R	F2 (5)R	F2 (6)R	W2(2)R	F2(6)R	F2 (6)R	F2 (7)R	F2 (5)R		F2 (7)R	F2 (5)R	F2 (6)R		F2 (7)R	F2 (5)R	F2 (6)R
					W2(2)L										W2(2)L											

SW status

- Latest version: Metadata information correction of L1.1 product(August, 2020) and L2.1 processing with AW3D DSM

- SW update plan for March 2021

Stripes noise reduction for Spotlight and ScanSAR (burst) mode

HIGHLIGHT TOPICS in extend observation period

- Supersite selection to have more time series data for selected application with partner agencies

- Promote international cooperation for ASI, CSA, ESA & NASA and DOST, GISTDA, LAPAN & VNSC

- Ongoing to process all of ScanSAR data using JAXA's supercomputer (JSS3) and open to public in cooperation with NASA and cloud providers (such as TELLUS)

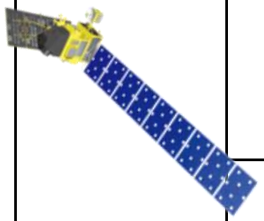
- Operate Gportal-R with other EO data for ALOS-2 data search and order

https://gportal.jaxa.jp

  - ScanSAR L1.1 full aperture mode data delivery (over 100GB zip can not be delivered to aboard because of network connection time out) -> split one zip to multiple files (each beam mode files)

ALOS/ALOS-2 mass processing for O&F

		CY 2020				CY 2021			
		1Q Jan Mar	2Q Apr Jun	3Q Jul Sept	4Q Oct Dec	1Q Jan Mar	2Q Apr Jun	3Q Jul Sept	4Q Oct Dec
ALOS	AVNIR-2 (10 m)	Data Processing			Global	Data Distribution (Open and Free)			
	PALSAR FBS, FBD (10 m)	Data Processing				Japan(L2.2)	Data Distribution	Global (L2.2)	
ALOS-2	PALSAR-2 ScanSAR (25m)			Data Processing		Japan (L1.1, L2.1)			

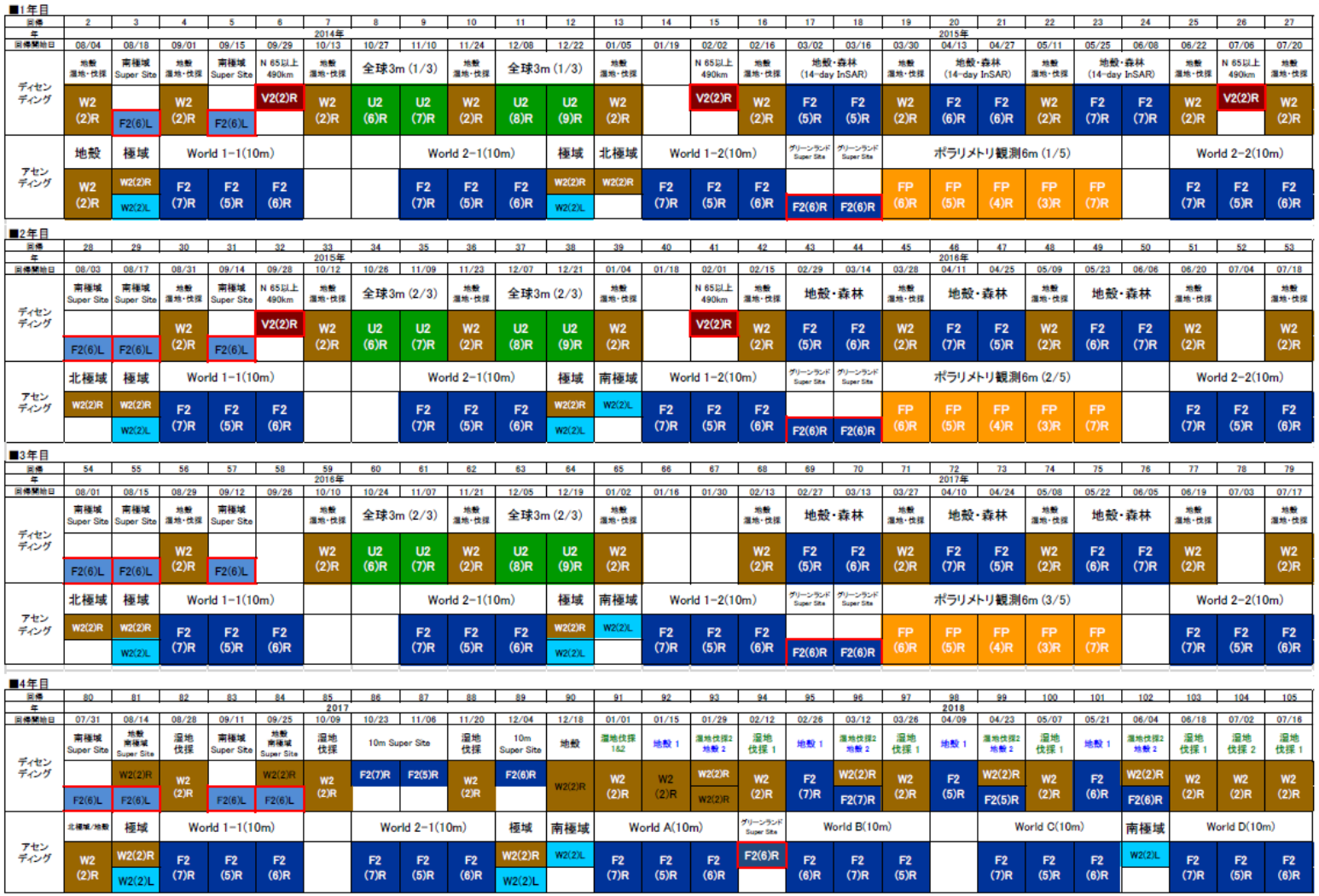




- ALOS/ALOS-2 ScanSAR data mirroring at NASA/ASF
- Plan to start to produce L2.2 for ScanSAR of ALOS-2 as ARD with CARD4L compatible from 2022/1
- ALOS-2 ScanSAR L1.1 full aperture mode and L2.2 will be provided through G-Portal

Basic Observation Scenario (BOS) world

1-3 years (global: SM3 and WD1 for JJ-FAST with one whole SM1 and SM2 observation in the world)



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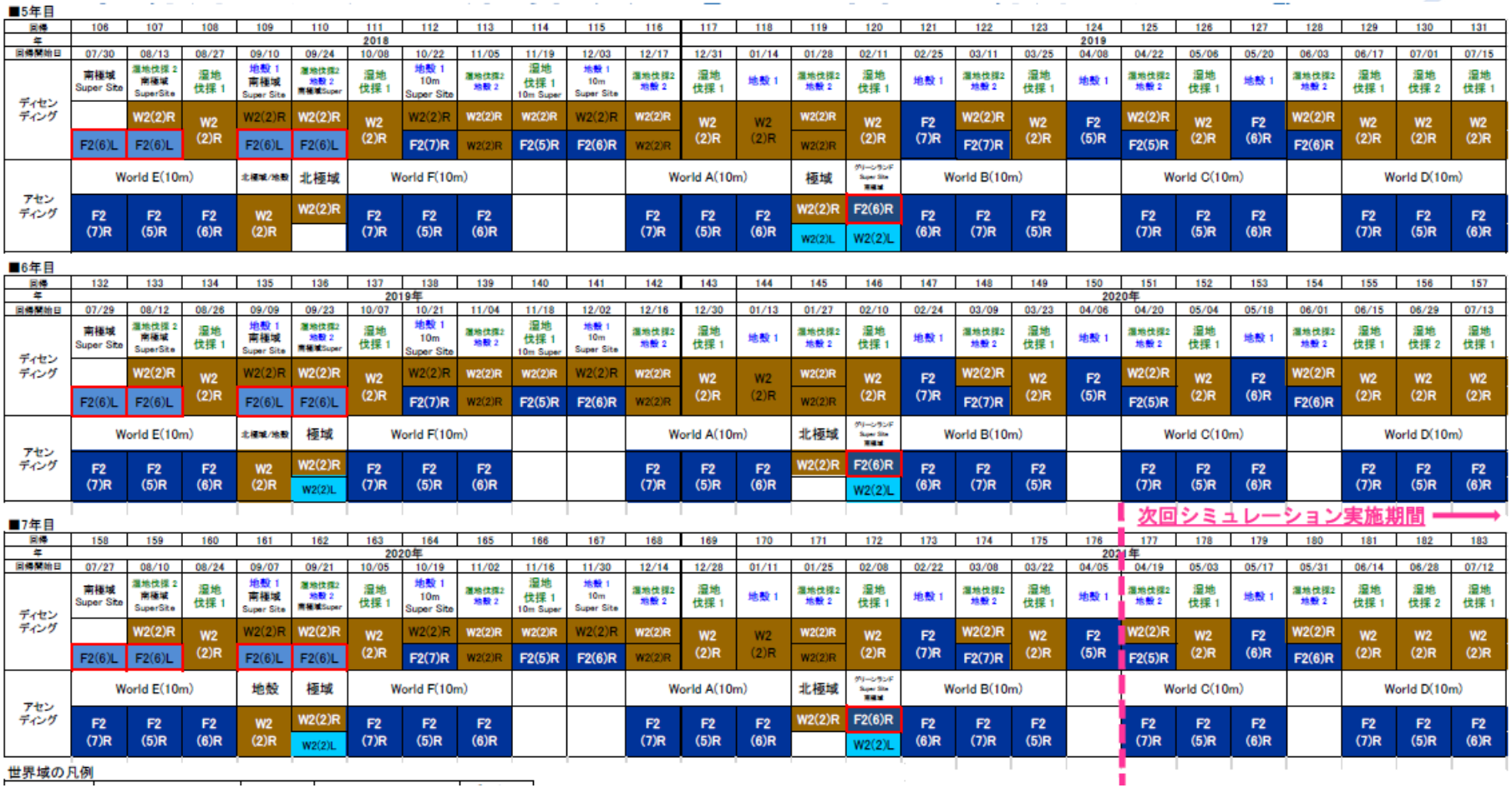
白字 フルポラリメトリ[6m]モード、ビーム番号：No.3-7

Basic Observation Scenario (BOS) world

4-7 years (global: SM3 and WD1 for JJ-FAST with intensive high temporal observation of SM1 and/or SM2 to selected area)



ALOS-4 development and Cal/Val preparation status

Takeshi Motohka (JAXA)

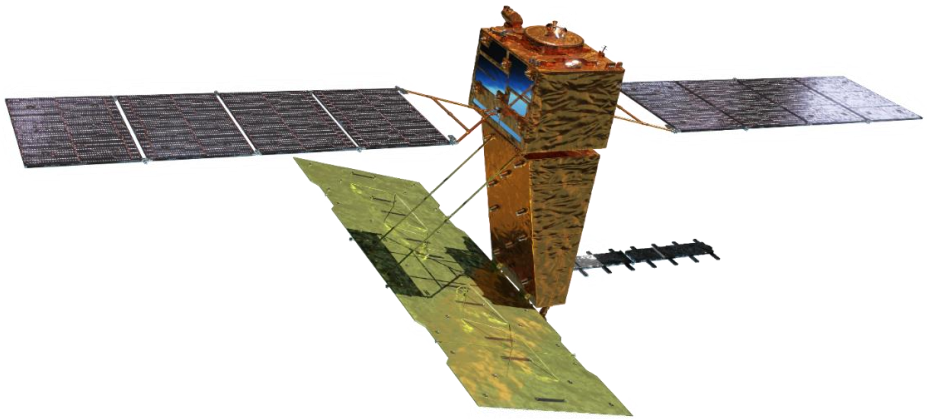
ALOS-4 Project Team and Earth Observation Research Center (EORC) members

JAXA EORA2 PI Workshop

Nov. 2021

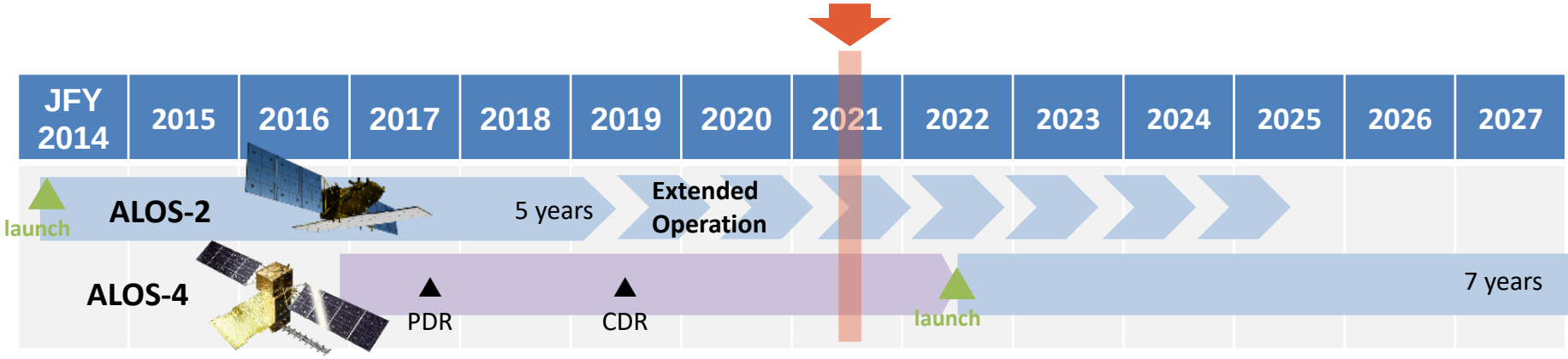
Content

1. ALOS-4 development status
2. Observation concept
3. Cal/Val preparation status



ALOS-4 development status

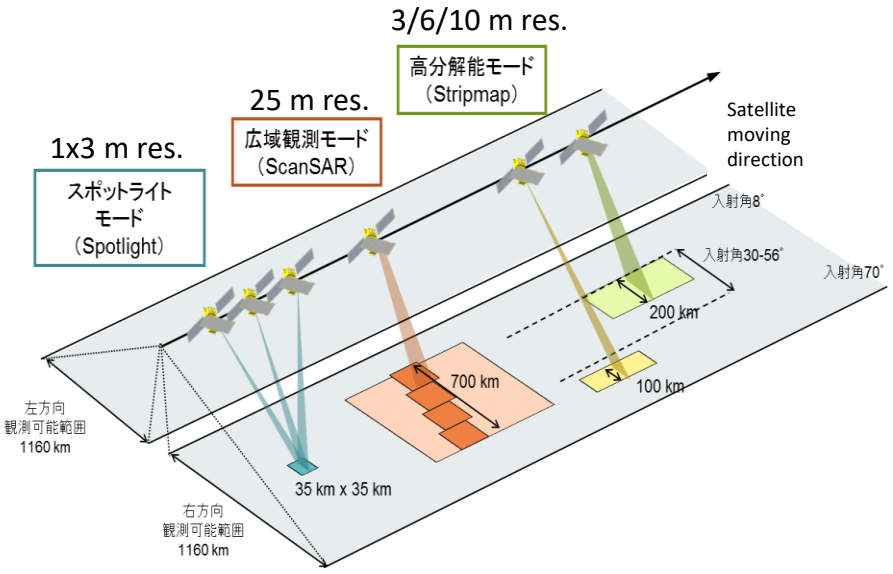
- The ALOS-4 proto-flight model is being tested. The end-to-end point target imaging test of PALSAR-3 sub-system has been completed and good results have been obtained.
- The ground system is also being tested, and a new user interface (AUIG4) that integrates ALOS-2 and ALOS-4 data is being prepared.
- The baseline of Basic Observation Scenario is defined. It will be optimized through simulations and user feedbacks before regular operation.



PALSAR-3 observation modes

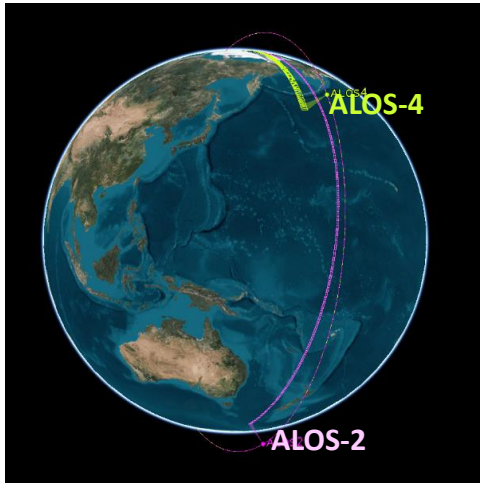
PALSAR-2/PALSAR-3 observation modes
(underlines show the updates in PALSAR-3 specifications)

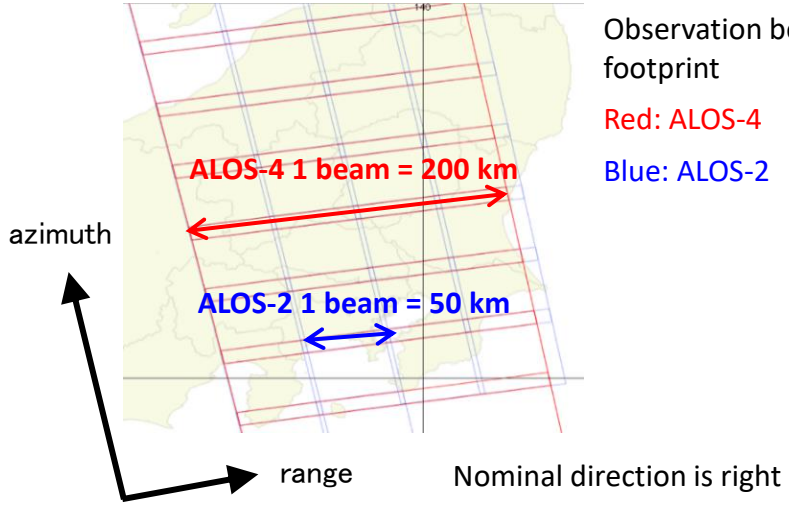
Observation mode	Spotlight	Stripmap		ScanSAR
Polarization*	Single/ **Dual**	Single/ Dual	Full	Single/ Dual
Resolution (m)	1 x 3 (Rg x Az)	3/6/10	**3**/6/10	25 (1 look)
Swath width (km)	25 x 25 **→35 x 35 (Rg x Az)**	50/50/70 **→100-200**	40 **→100**	350/490 **→700**
NESZ (dB)	< -20	< -20	< -20	< -20
Range S/A (dB)	> 15	> 15	> 15	> 15
Azimuth S/A (dB)	> 15	> 15	> 15	> 15
Pol. X-talk (dB)	< -30	< -30	< -30	< -30
Split-band option	-	**28+10 MHz**	-	-



Continuity of ALOS-2 observations

- ALOS-2 and ALOS-4 will be in the same orbital plane, and their beam incidence angles are consistent.
- The synergy of two satellites can realize:
  - reducing emergency observation latency by half
  - frequent repeat-pass or right/left observations (alternating 6 days/8 days repeat) for selected regions (~ALOS-2 50 km swath)





Observation beam footprint

Red: ALOS-4

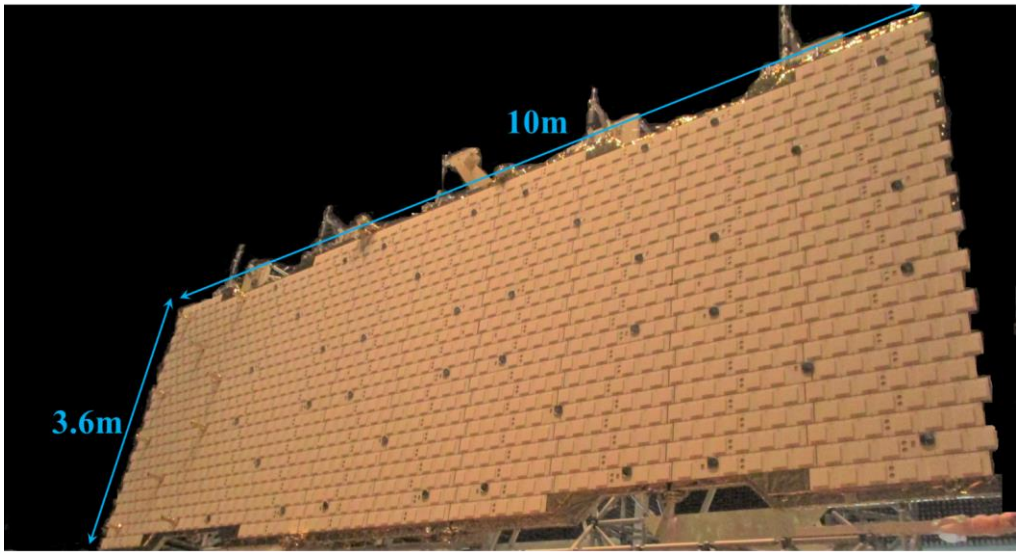
Blue: ALOS-2

PALSAR-3 PFM test

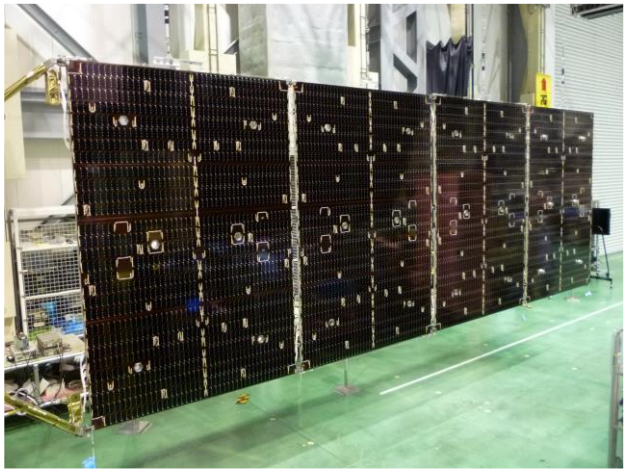
Thermal vacuum test of PALSAR-3 sub-system



Near Field Antenna Measurement of PALSAR-3 full antenna



ALOS-4 system PFM test



ALOS-4 PFM: One of the solar array paddles



ALOS-4 PFM during micro vibration test



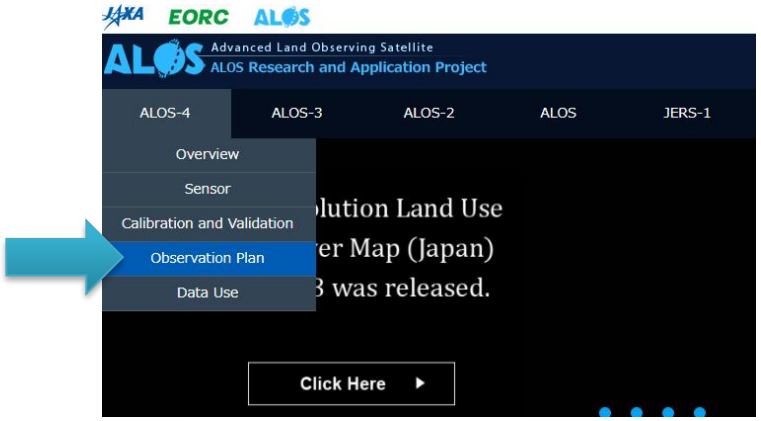
ALOS-4 PFM thermal vacuum test

Movies are on the website:
https://www.satnavi.jaxa.jp/ja/project/alos-4/index.html

Observation concept

- **"Basic Observation Scenario (BOS)"** is defined as a common observation scenario as in ALOS and ALOS-2 for making use of limited observation resources to achieve the ALOS-4 mission objectives.
- The current BOS has been released on the EORC ALOS website. We plan to revise it before launch based on operation simulation results and user feedback.

https://www.eorc.jaxa.jp/ALOS/en/alos-4/a4_observation_e.htm



Observation concept

- ALOS-4 BOS is defined based on the following concept based on user comments at PI workshops and other events,
  - ✓ Minimize the number of observation modes to be operated and increase the number of time series data.
  - ✓ Acquire pre-disaster basemaps with various incidence angles as much as possible to improve quick response to disasters.
  - ✓ Right observation will be used nominally to ensure the continuity from ALOS-2 and effective combination with the other L-SAR satellite (NISAR).
  - ✓ Synergy with ALOS-2 BOS

- Observation requests from PIs not included in the BOS will be discussed as PI supersites.

ALOS-4 BOS URL: https://www.eorc.jaxa.jp/ALOS/en/alos-4/a4_observation_e.htm

Basic Observation Scenario (Japan)

Theme	**Disaster basemap**	**Timeseries observations**
Target areas	All land and coastal areas in Japan	
Observation modes	Stripmap 3 m/200 km swath, ScanSAR	Stripmap 3 m/200 km swath
Orbit direction	Descending and Ascending	
Observation direction	Right and left	Right
Observation incidence angles	30-56 deg. (equivalent to ALOS-2 U2-U3)	30-44 deg. (equivalent to ALOS-2 U2)
Polarization	HH+HV	HH+HV
Observation frequency	1 year (left 30-44 deg. only), 3 years (the others)	About 20 times/year Reduced frequency is allowed during basemap acquisition.

ALOS-4 BOS URL: https://www.eorc.jaxa.jp/ALOS/en/alos-4/a4_observation_e.htm

Basic Observation Scenario (Japan)

Example 1) Start of the non-snow season (July 1)

1 year = 26 cycles x 14 days/cycle

■ 1st year

snow season (Dec. to Apr.)

Cycles	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Month/day	7/1	7/15	7/29	8/12	8/26	9/9	9/23	10/7	10/21	11/4	11/18	12/2	12/16	12/30	1/13	1/27	2/10	2/24	3/10	3/24	4/7	4/21	5/5	5/19	6/2	6/16
Content	Disaster basemap				Open	Disaster basemap				Open cycles		Timeseries		Open	Timeseries			Open	Timeseries			Open	Timeseries			Open
Descending	XB2R	XB2L	UW1R	UW1L	(UW1R)	UW3R	UW3L	UW2R	UW2L	(UW1R)	(UW1R)			(UW1R)				(UW1R)				(UW1R)				(UW1R)
Ascending	XB2R	XB2L	UW1R	UW1L	(UW1R)	UW3R	UW3L	UW2R	UW2L	(UW1R)	(UW1R)			(UW1R)				(UW1R)				(UW1R)				(UW1R)

■ 2nd, 3rd, 5th, 6th year

Autumn (Oct.)

Cycles	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Month/day	7/1	7/15	7/29	8/12	8/26	9/9	9/23	10/7	10/21	11/4	11/18	12/2	12/16	12/30	1/13	1/27	2/10	2/24	3/10	3/24	4/7	4/21	5/5	5/19	6/2	6/16
Content	Timeseries				Open	Timeseries		Disaster	Timeseries	Open		Timeseries		Open	Timeseries			Open	Timeseries			Open	Timeseries			Open
Descending	UW1R				(UW3R)			UW1L		(UW1R)				*1				*1				*1				(UW2R)
Ascending	UW1R				(UW3R)			UW1L		(UW1R)				*1				*1				*1				(UW2R)

■ 4th, 7th year

Cycles	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Month/day	7/1	7/15	7/29	8/12	8/26	9/9	9/23	10/7	10/21	11/4	11/18	12/2	12/16	12/30	1/13	1/27	2/10	2/24	3/10	3/24	4/7	4/21	5/5	5/19	6/2	6/16
Content	Timeseries + Disaster											Timeseries		Open	Timeseries			Open	Timeseries			Open	Timeseries+Disaster			
Descending		XB2R		XB2L		UW3R		UW1L		UW3L				(UW1R)				(UW1R)				(UW1R)		UW2R		UW2L
Ascending		XB2R		XB2L		UW3R		UW1L		UW3L				(UW1R)				(UW1R)				(UW1R)		UW2R		UW2L

UW1-3R: Stripmap 3 m, 200 km swath, beam 1-3, right, HH+HV, UW1-3L: Stripmap 3 m, 200 km swath, beam 1-3, left, HH+HV

XB2R: ScanSAR 700 km swath, beam 2, right, HH+HV, XB2L: ScanSAR 700 km swath, beam 2, left, HH+HV

*1: Assign the right observation for one of the beam UB1/UB3/UB5/UB15/UB17/UB19

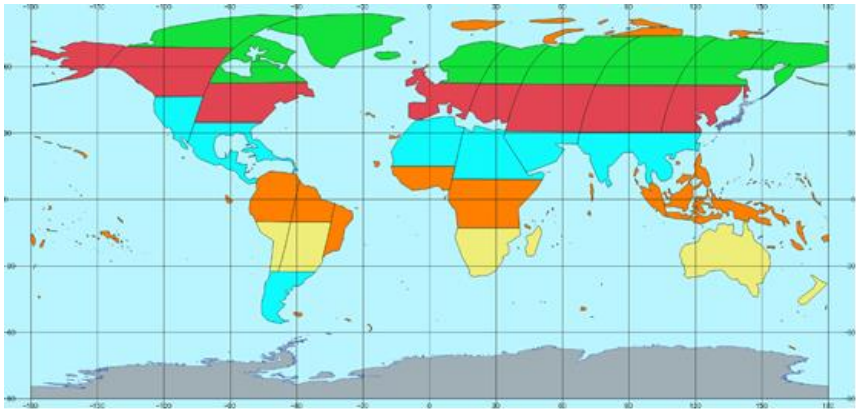
Basic Observation Scenario (Global)

Theme	**Global basemap**	**Disaster basemap**	**Time-series observations**	**Polar observations**
Target areas	All land and coastal areas	About 50% of the global land areas	About 50% of the global land areas	Parts of Antarctica and Greenland
Observation modes	Stripmap 10 m 200 km swath Ionospheric correction mode (on-board split-band) for crustal movement observations.	ScanSAR 700 km swath, Stripmap 10 m 200 km swath (TBD)	Stripmap 10 m 200 km swath Ionospheric correction mode (on-board split-band) for crustal movement observations.	Stripmap 10 m 200 km swath Ionospheric correction mode (on-board split-band) (TBD)
Orbit direction	Ascending and Descending	Ascending and Descending	Ascending	Descending
Observation incidence angles	29-43 deg. (equivalent to ALOS-2 beam F2)	18-60 deg. (beam XB2), 38-55 deg. (equivalent to ALOS-2 beam F3) (TBD)	29-43 deg. (equivalent to ALOS-2 beam F2)	29-43 deg. (equivalent to ALOS-2 beam F2)
Polarization	HH+HV	HH+HV（TBD）	HH+HV	HH+HV (TBD)
Observation frequency	1 year	Once every 3 years	About 9 times/year	3 times/year (TBD)
Observation period	Avoiding the northern hemisphere snow season, October-May	Avoiding the northern hemisphere snow season, October-May	All year	Twice in summer and once in winter in the target area (TBD)

ALOS-4 BOS URL: https://www.eorc.jaxa.jp/ALOS/en/alos-4/a4_observation_e.htm

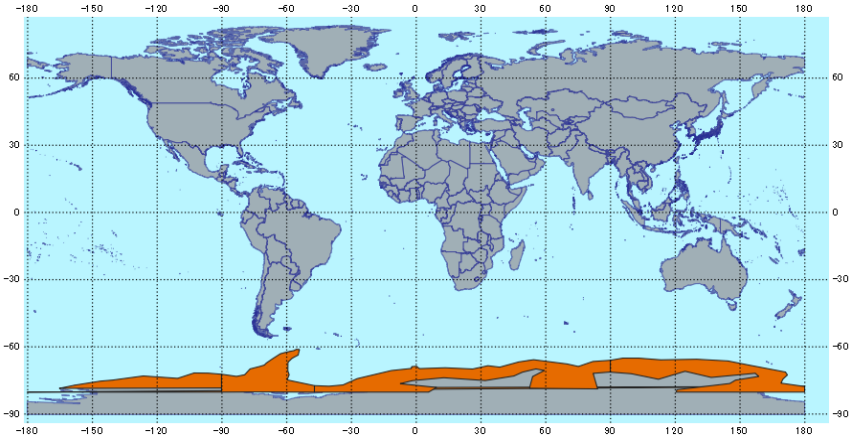
Basic Observation Scenario (Global)

Global basemap



- Stripmap 10 m, 200 km swath, HH+HV
- One coverage/year by using 5 cycles (TBD) due to observation downlink capacity. The different colors in the map mean different cycles to observe.

Polar observations

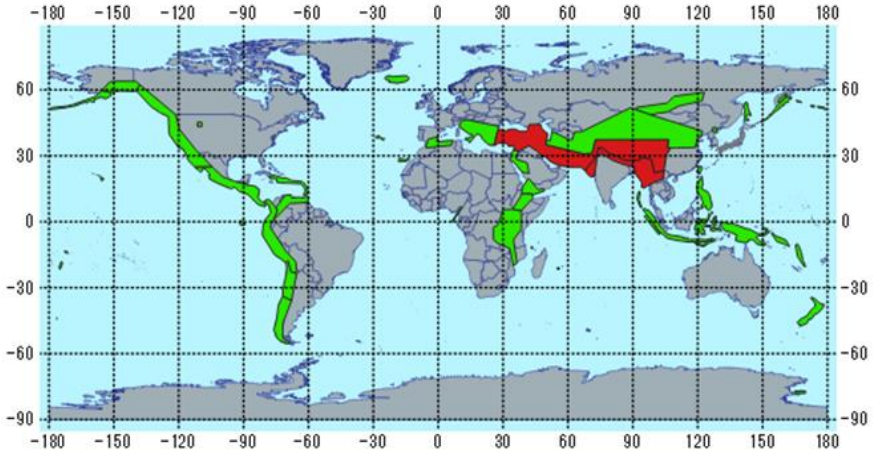


- Stripmap 10 m, 200 km swath, HH+HV (TBD)
- Twice in summer and once in winter for Antarctica.
- Observations of south of the 79° S latitude are not included in the basic observation scenario because it requires a lot of left observations, which conflict with other observations.

ALOS-4 BOS URL: https://www.eorc.jaxa.jp/ALOS/en/alos-4/a4_observation_e.htm

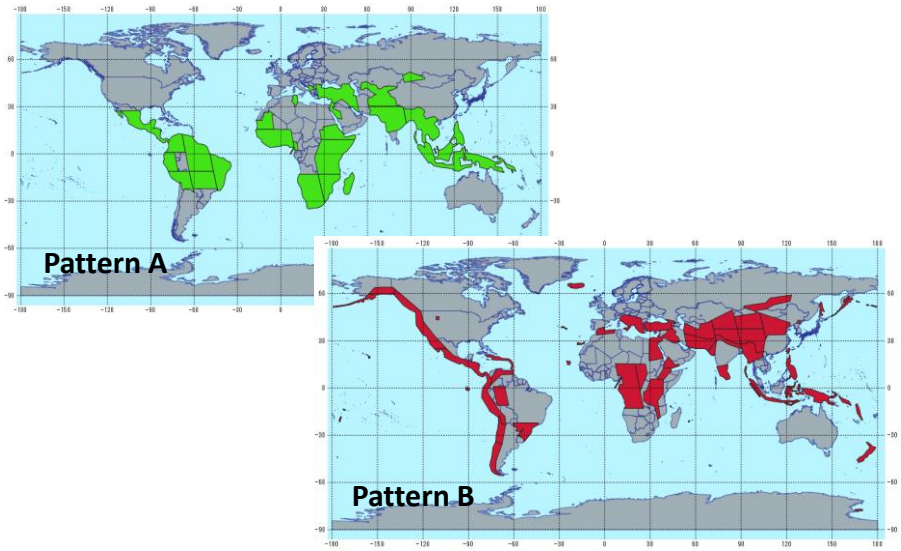
Basic Observation Scenario (Global)

Disaster basemap (ScanSAR 700 km)



- ScanSAR 700 km
- One coverage every 3 years. It will be useful for a pre-disaster basemap for huge earthquakes.

Time-series observations



- Stripmap 10 m, 200 km swath, HH+HV
- About 9 times/year.
- One coverage is divided into 2 cycles.

ALOS-4 BOS URL: https://www.eorc.jaxa.jp/ALOS/en/alos-4/a4_observation_e.htm

Basic Observation Scenario (Global)

Example 1) Start of the non-snow season (July 1)

■ 1st, 4th, 7th year

Cycles	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Month/day	7/1	7/15	7/29	8/12	8/26	9/9	9/23	10/7	10/21	11/4	11/18	12/2	12/16	12/30	1/13	1/27	2/10	2/24	3/10	3/24	4/7	4/21	5/5	5/19	6/2	6/16
Content	Global basemap					Disaster basemap	Disaster + Polar	Open cycles						Open + Polar		Open cycles											
Pattern																										
Descending	FW1R	FW1R	FW1R	FW1R	FW1R	XB2R	XB2R FW1R							FW1R	FW1R											
Content	Global basemap					Disaster basemap		Timeseries (1)		Timeseries (2)		Timeseries (3)		Timeseries (4)		Open	Timeseries (5)		Timeseries (6)		Timeseries (7)		Timeseries (8)		Open cycles	
Patten																										
Ascending	FW1R	FW1R	FW1R	FW1R	FW1R	XB2R	XB2R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R		FW1R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R		

■ 2nd, 5th year

Cycles	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Month/day	7/1	7/15	7/29	8/12	8/26	9/9	9/23	10/7	10/21	11/4	11/18	12/2	12/16	12/30	1/13	1/27	2/10	2/24	3/10	3/24	4/7	4/21	5/5	5/19	6/2	6/16
Content	Global basemap					Disaster basemap	Disaster + Polar	Open cycles						Open + Polar		Open cycles											
Pattern																										
Descending	FW1R	FW1R	FW1R	FW1R	FW1R	FW3R	FW3R FW1R							FW1R	FW1R											
Content	Global basemap					Disaster basemap		Timeseries (1)		Timeseries (2)		Timeseries (3)		Timeseries (4)		Open	Timeseries (5)		Timeseries (6)		Timeseries (7)		Timeseries (8)		Open cycles	
Patten																										
Ascending	FW1R	FW1R	FW1R	FW1R	FW1R	FW3R	FW3R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R		FW1R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R		

■ 3rd, 6th year

Cycles	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Month/day	7/1	7/15	7/29	8/12	8/26	9/9	9/23	10/7	10/21	11/4	11/18	12/2	12/16	12/30	1/13	1/27	2/10	2/24	3/10	3/24	4/7	4/21	5/5	5/19	6/2	6/16
Content	Global basemap					Disaster basemap	Disaster + Polar	Open cycles						Open + Polar		Open cycles											
Pattern																										
Descending	FW1R	FW1R	FW1R	FW1R	FW1R	FW2R	FW2R FW1R							FW1R	FW1R											
Content	Global basemap					Disaster basemap		Timeseries (1)		Timeseries (2)		Timeseries (3)		Timeseries (4)		Open	Timeseries (5)		Timeseries (6)		Timeseries (7)		Timeseries (8)		Open cycles	
Patten																										
Ascending	FW1R	FW1R	FW1R	FW1R	FW1R	FW2R	FW2R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R		FW1R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R	FW1R		

FW1-3R: Stripmap 10 m, 200 km swath, beam 1-3, right, HH+HV, XB2R: ScanSAR 700 km swath, beam 2, right, HH+HV

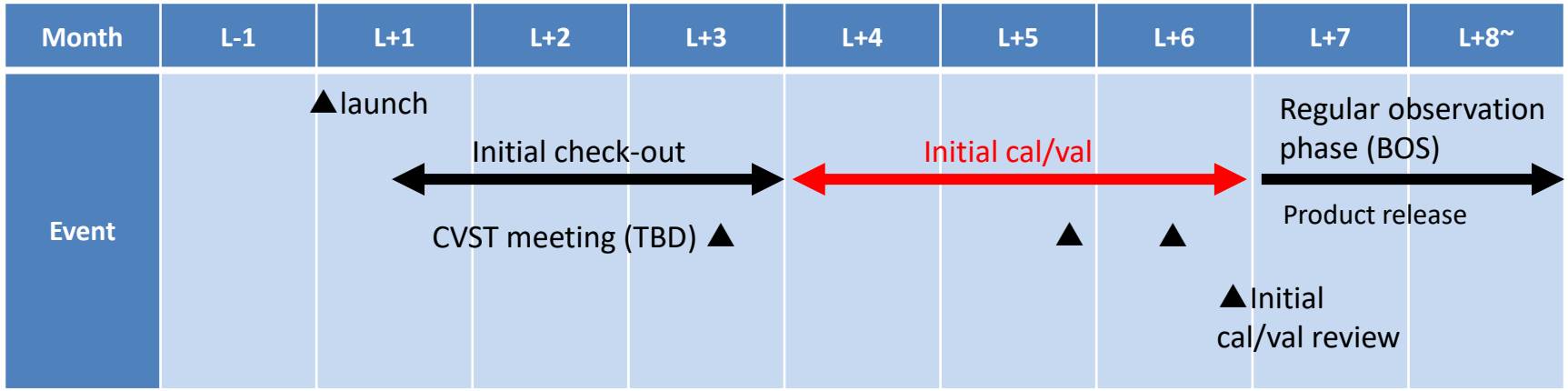
*1 Global basemap: 1 coverage divided into 5 cycles (TBD)

*2 Disaster basemap, Timeseries observations: 1 coverage divided into 2 cycles

Cal/Val preparation status

Initial cal/val phase

- Calibration of observation modes used for regular observations will be prioritized because the initial calibration period is short.
- The products will be provided to the CVST members (Calibration Validation and Science Team) for evaluation.



→ RADAR VISION FOR COPERNICUS



Sentinel-1 Mission Status

Pierre Potin, Sentinel-1 Mission Manager, ESA

WINSAR meeting, 2 December 2021

ESA UNCLASSIFIED – For ESA Official Use Only

Sentinel-1A: 7 years in operations !



Mission Status Highlights

- Sentinel-1A, launched in April 2014, **has reached its design lifetime of 7 years of operations**:

  https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Sentinel-1/First_Copernicus_satellite_exceeds_design_working_life

- Good health of both Sentinel-1A and Sentinel-1B satellites, no significant degradation observed

  => confirmed by the Satellite In-Orbit Performance meeting of 3-4 Nov 2021

- Sentinel-1 contribution to **emergency activations** continues to be very high (more than once a week in average), for flood monitoring in particular

- Sentinel-1 is operated close to its **full mission capacity** (i.e. difficulty to accommodate additional observations)

- With the coming **launch of S1C (Dec 2022-May 2023),** preparation of the concept of "**in-orbit standby**" of a third satellite (2 satellites in operations with a 180deg orbital configuration remains the baseline)

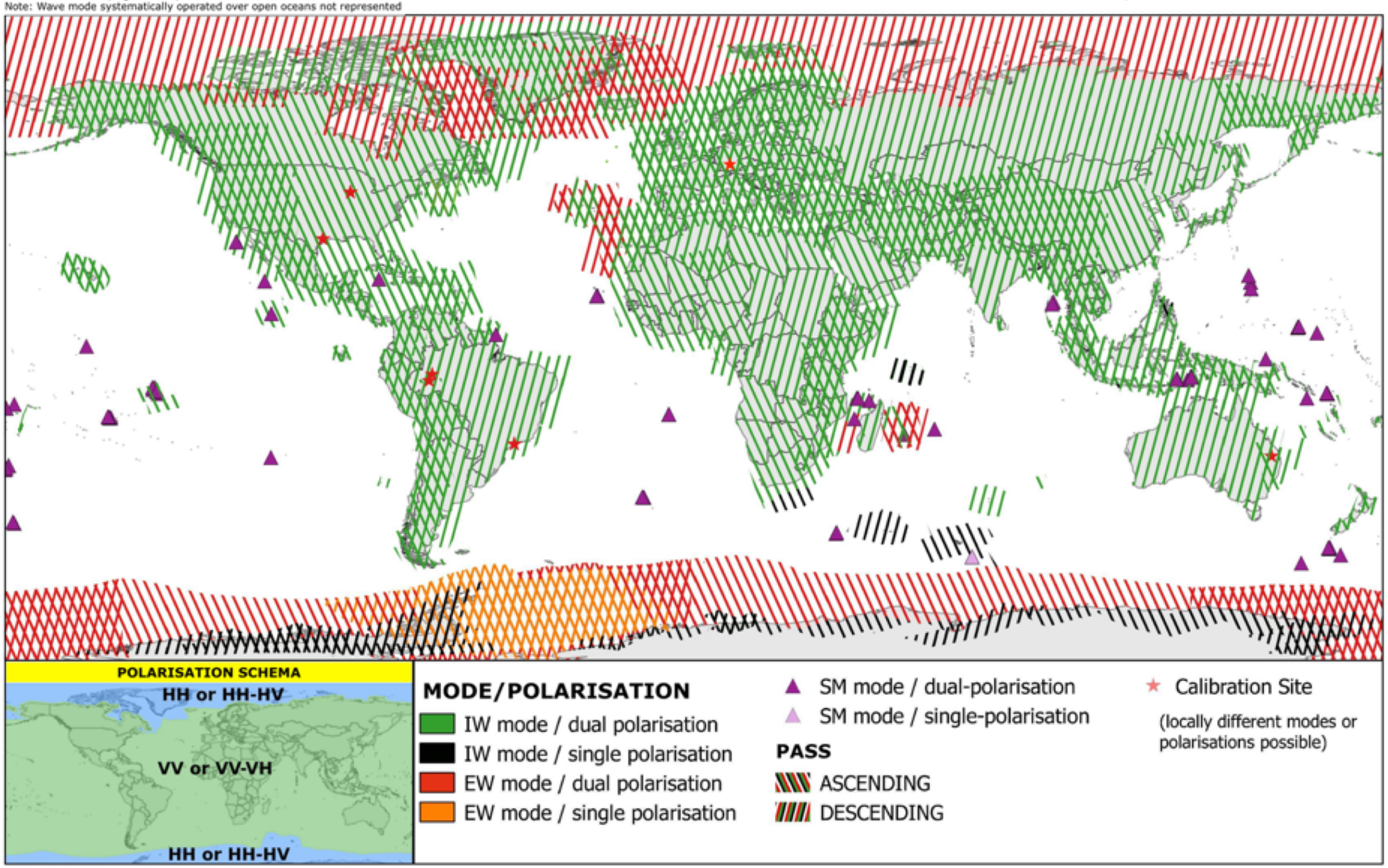
Sentinel-1 Constellation Observation Scenario: Mode - Polarisation - Observation Geometry

sentinel-1

validity start: 11/2021

esa

Note: Seasonal campaigns not represented
Note: Wave mode systematically operated over open oceans not represented



Updated

Starting Nov 2021, no major changes…

This map is related to SAR High Rate modes only. Wave mode operated by default over open oceans (not shown)

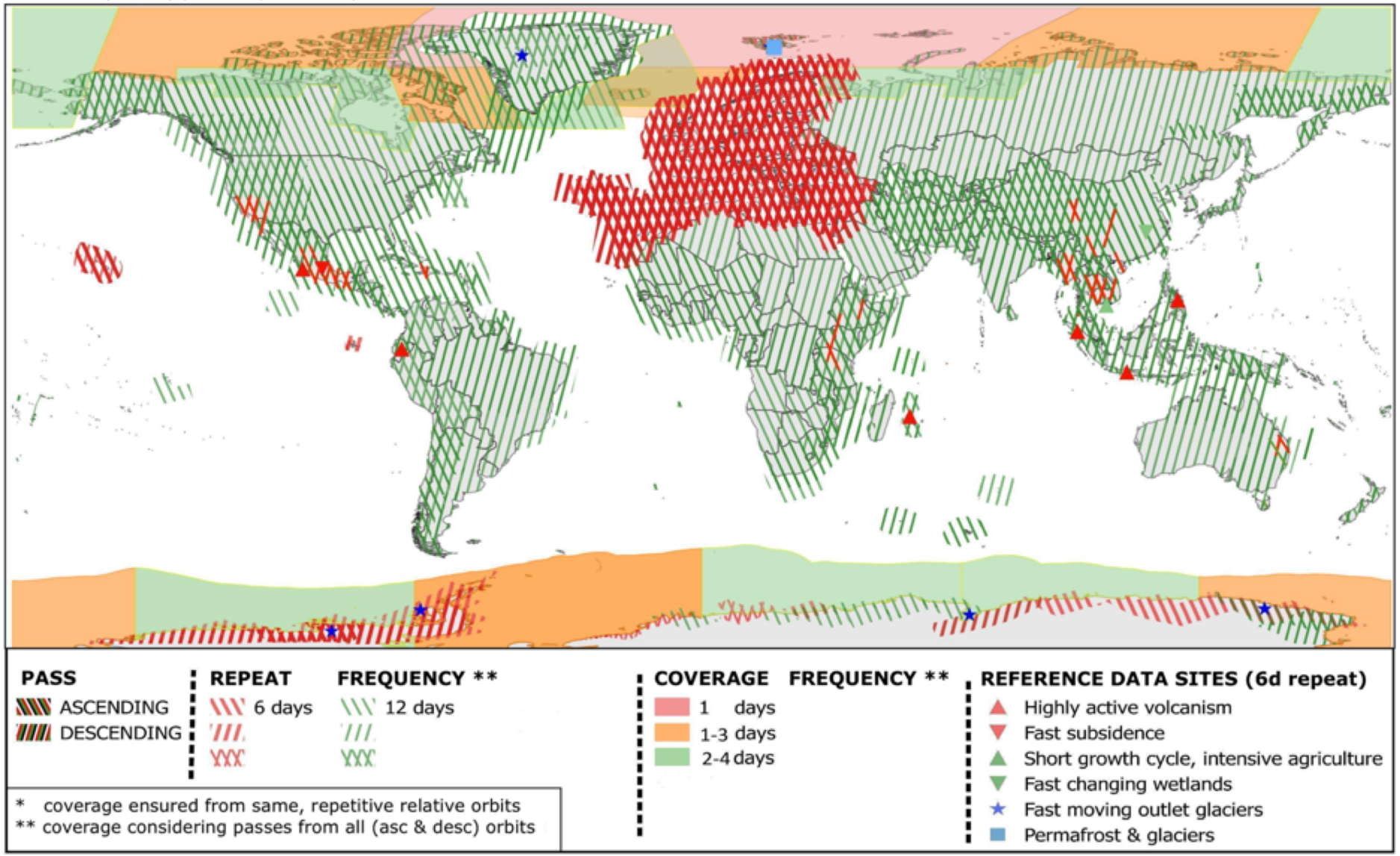
Sentinel-1 Constellation Observation Scenario: Repeat & Coverage Frequency

sentinel-1

validity start: 11/2021

esa

Note: Seasonal campaigns not represented
Note: Wave mode systematically operated over open oceans not represented

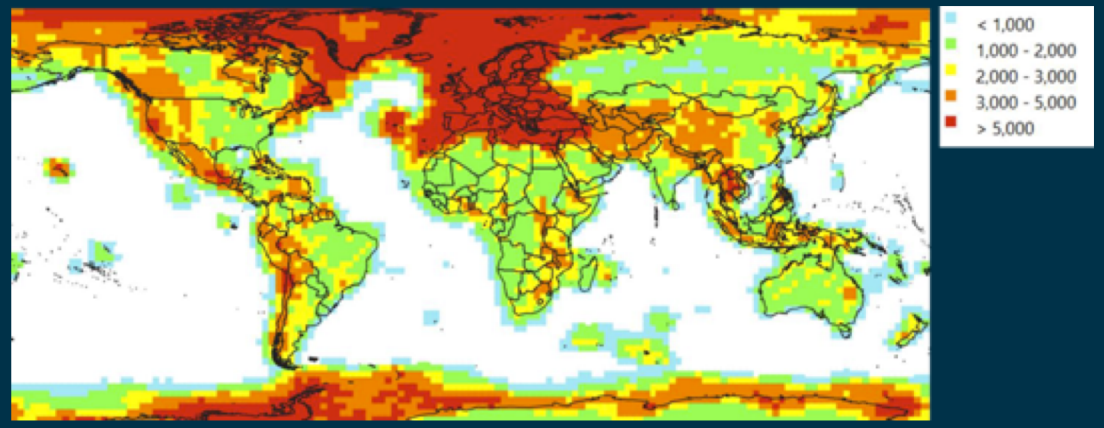


Updated

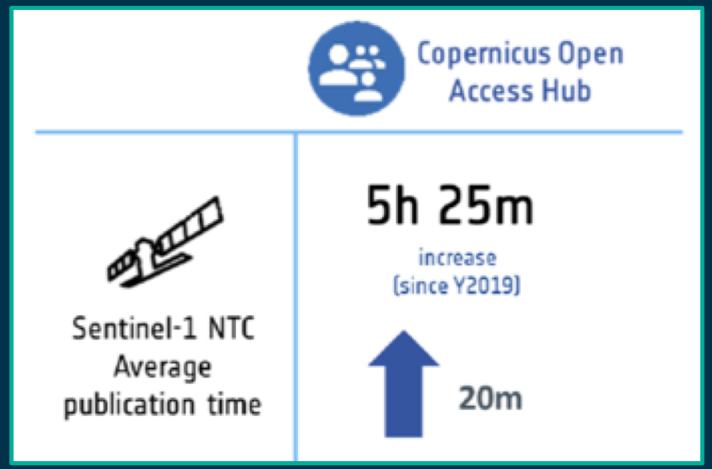
Starting Nov 2021, no major changes…

This map is related to SAR High Rate modes only. Wave mode operated by default over open oceans (not shown)

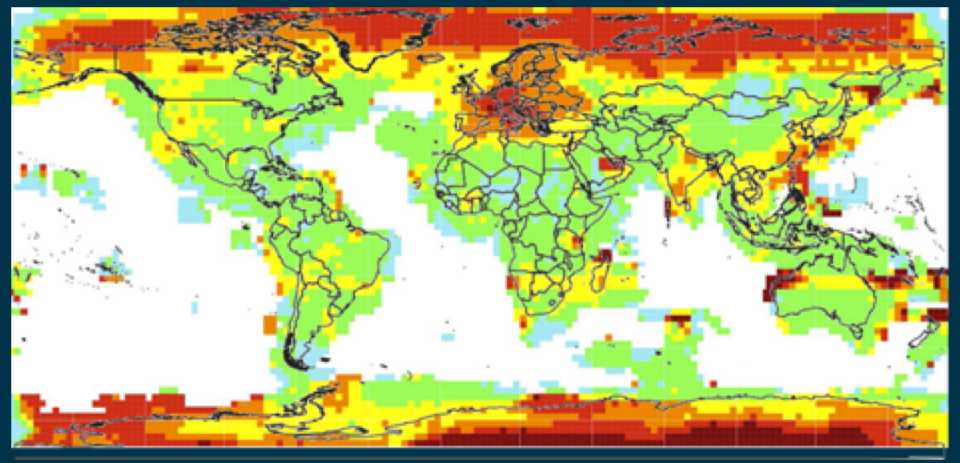
Sentinel Data Access 2020 Report
Examples of Sentinel-1 data product / user statistics



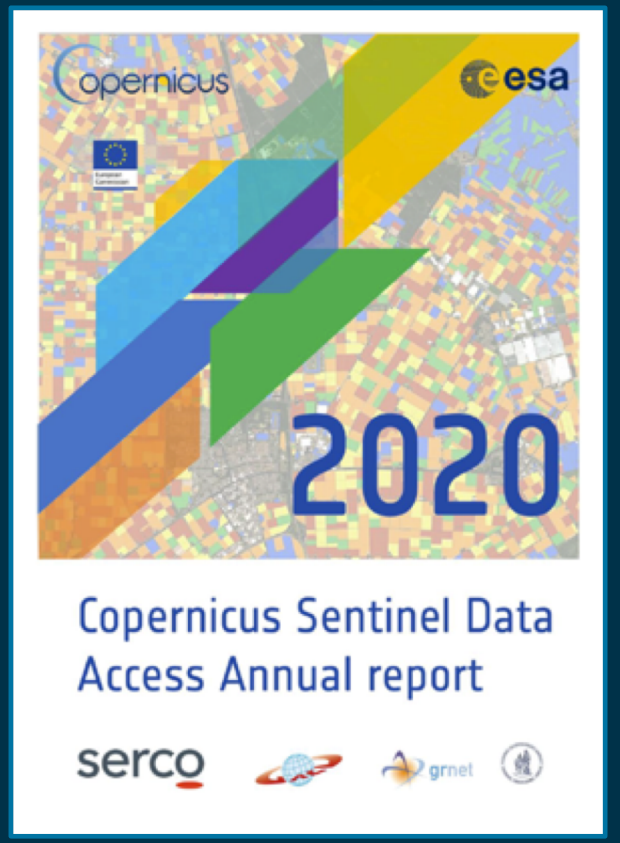
Heatmap of Sentinel-1 products (excluding OCN) published since the start of operations till end 2020



Average publication timeliness on the Open Access Hub during Y2019



Heatmap showing the archive exploitation ratio for Sentinel-1 L0 and L1 NTC products (excluding WV mode) during Y2020

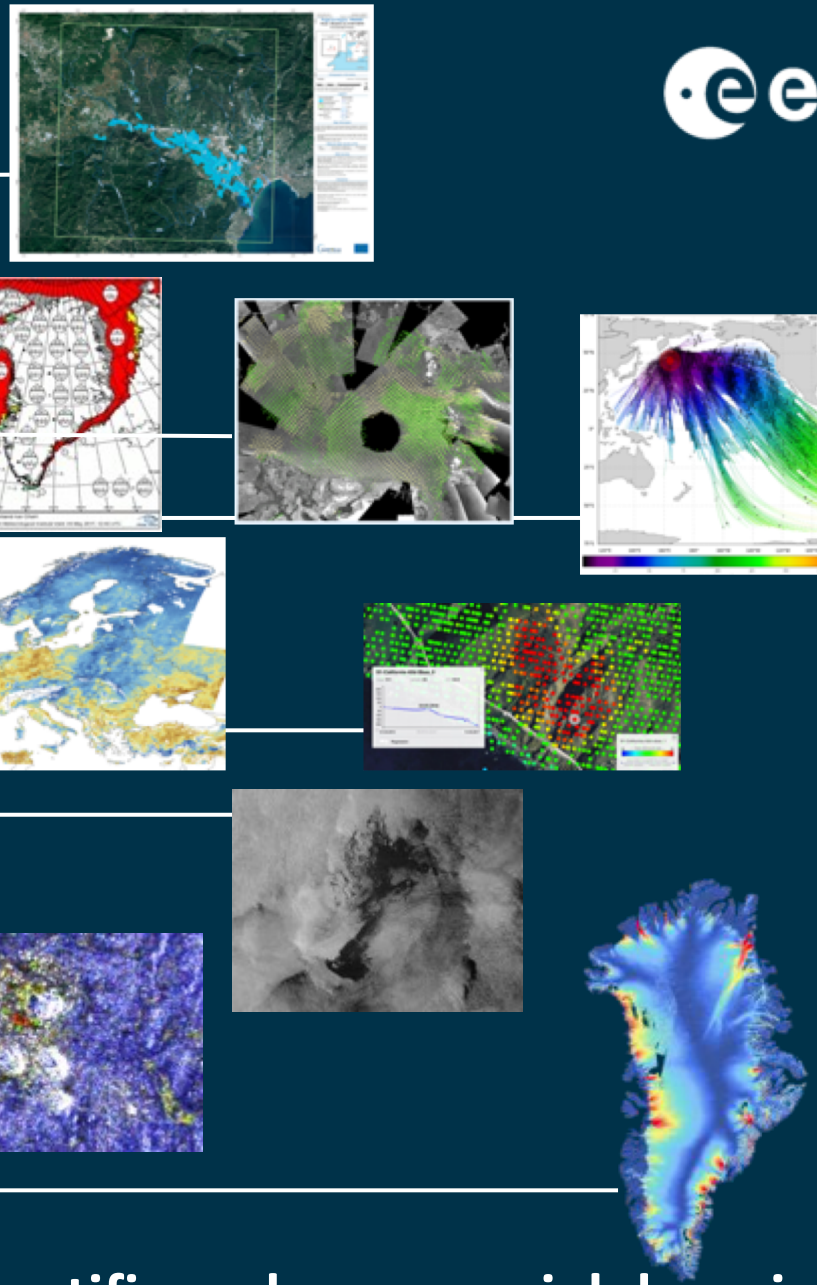


https://scihub.copernicus.eu/reportsandstats/

serco grnet

Sentinel-1 used in most Copernicus services…

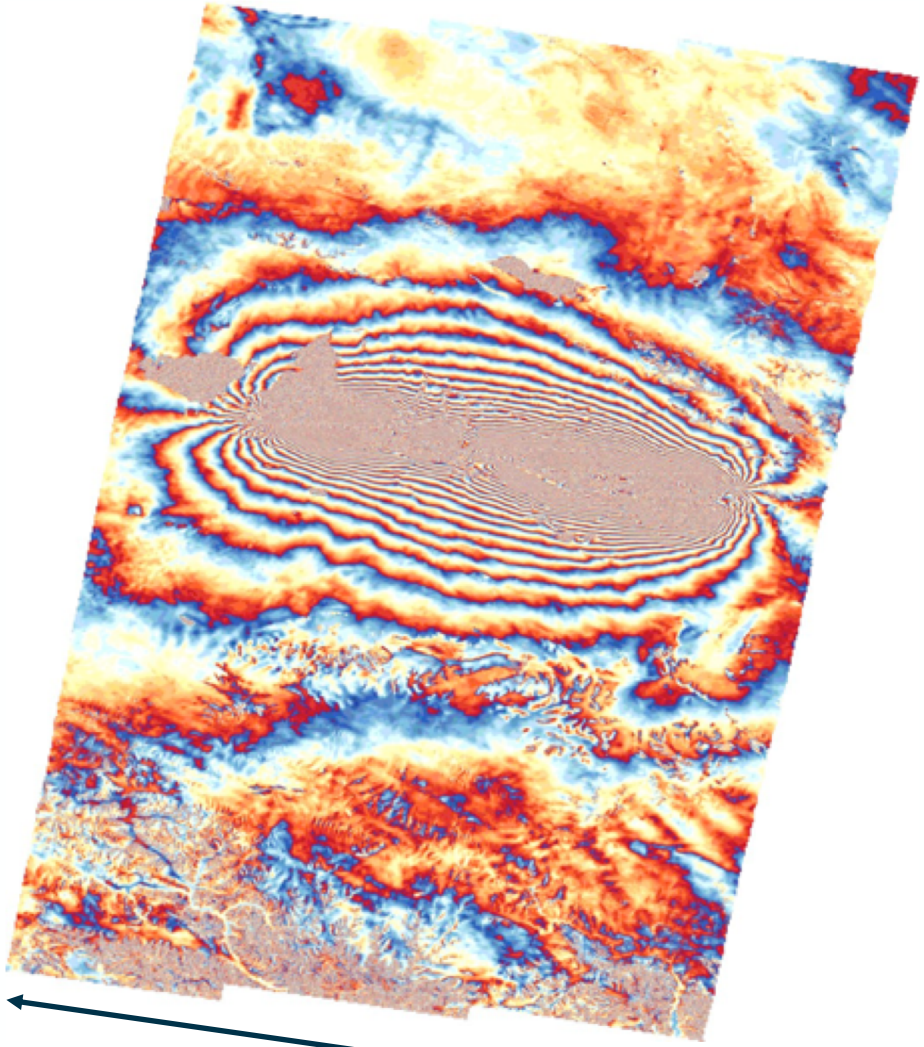
CEMS Copernicus Emergency Management Service	- Emergency response to rapid mapping (flood mainly) - Risk recovery (e.g. ground deformation) - Validation (e.g. floods, landslides) - Automated global flood monitoring (in development)
CMEMS Copernicus Marine Environment Monitoring Service	- Sea-ice (incl. charting, concentration, thickness, drift) - Icebergs concentration - Wave / swell
CLMS – Pan-European & Global Copernicus Land Monitoring Service Global Land Ground Motion Service	- HRLs: Wetness and Water, Imperviousness, Tree cover & Forest, Grassland, Snow, River/Lake ice - Global: Soil moisture - European ground motion service
CSS – CMS Copernicus Security Service Copernicus Maritime Surveillance Service European Maritime Safety Agency / CleanSeaNet	- Oil spill detection and polluter identification (CleanSeaNet) - Maritime surveillance (e.g. ship detection, search and rescue, anti-piracy)
CSS – SEA Copernicus Security Service Support to External Action	- Change detection - Feature identification
C3S Copernicus Climate Change Service	- Ice sheets & ice shelves - Ice velocity - Glaciers



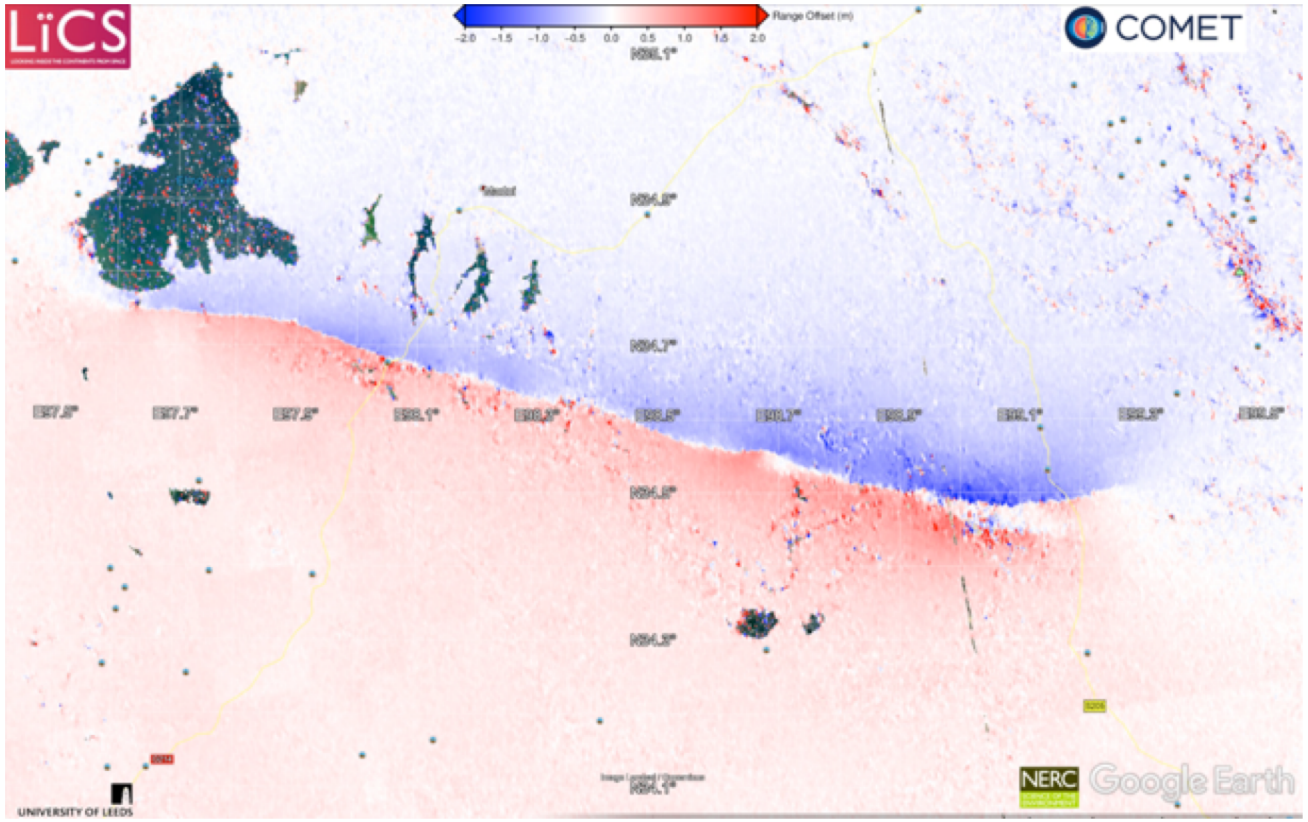
… as well as in national services, and the scientific and commercial domain

Mw7.4 earthquake, Southern Qinghai, China, 21 May 2021

Descending pass interferogram



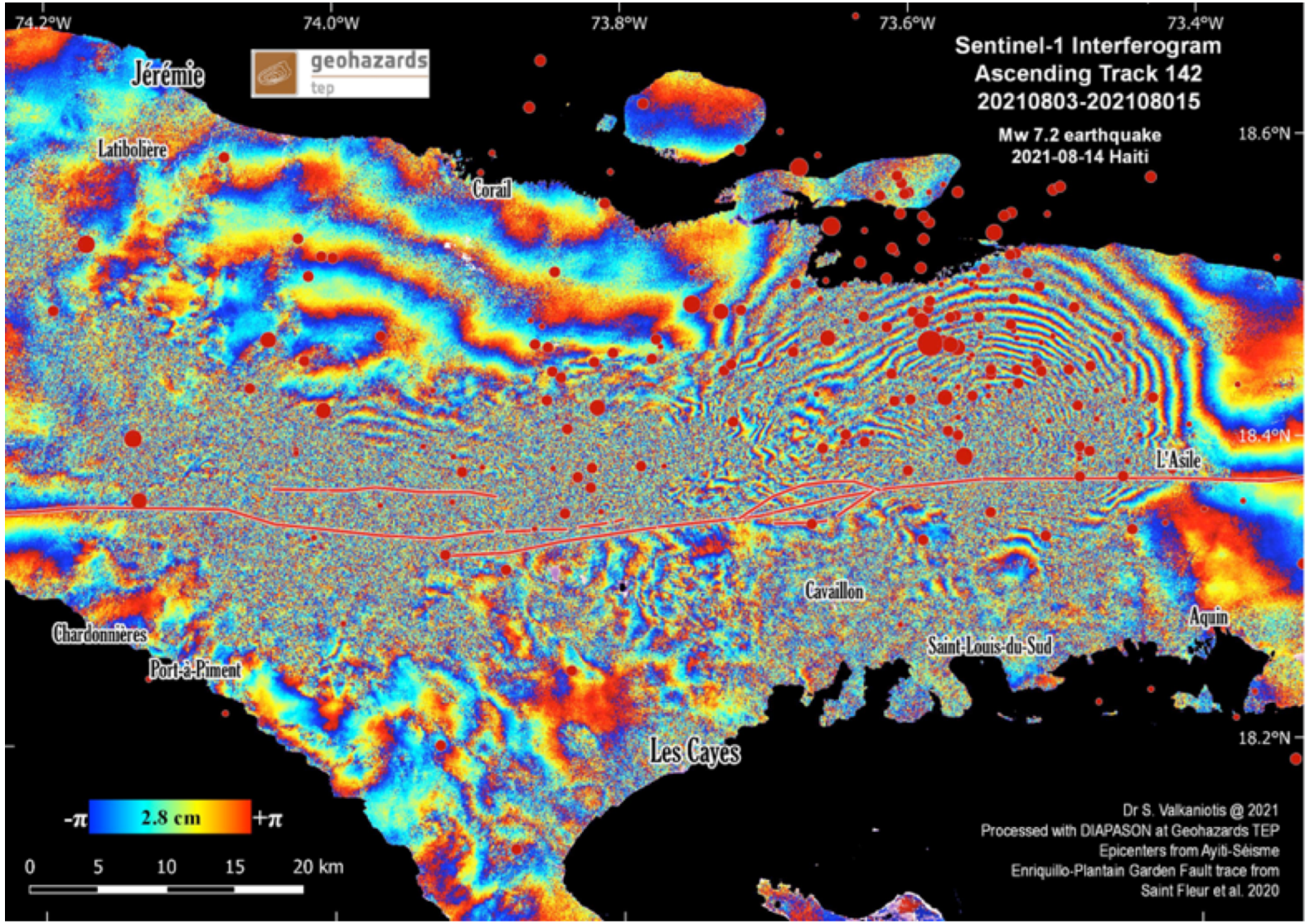
250 km swath



"SAR offsets (in range) indicate 156 km long rupture with single major trace rupture along most of length except in the east with a second splay" –
Courtesy John Elliott, University of Leeds / COMET

© *Contains modified Copernicus Sentinel data (2021) / processed by COMET*

M7.2 earthquake in Haiti
14 August 2021

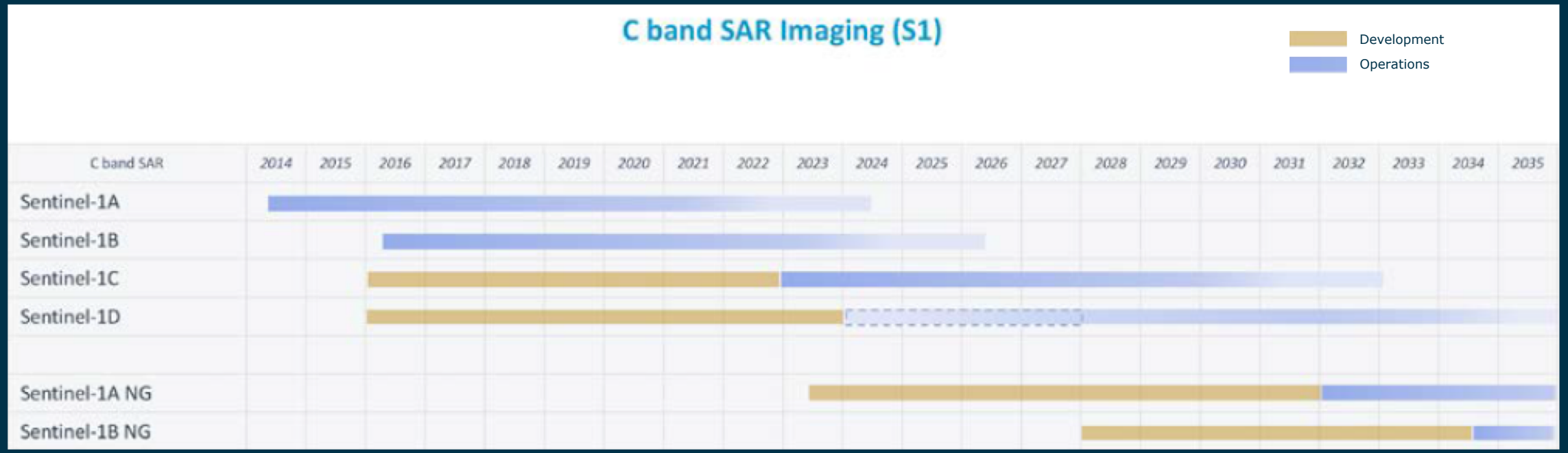


Rupture follows the sinistral Enriquillo-Plantain Garden Fault for ~ 70-80km

geohazards tep

Copyright: Contains modified Copernicus Sentinel data (2021) / processed by S.Valkaniotis with DIAPASON at Geohazards TEP

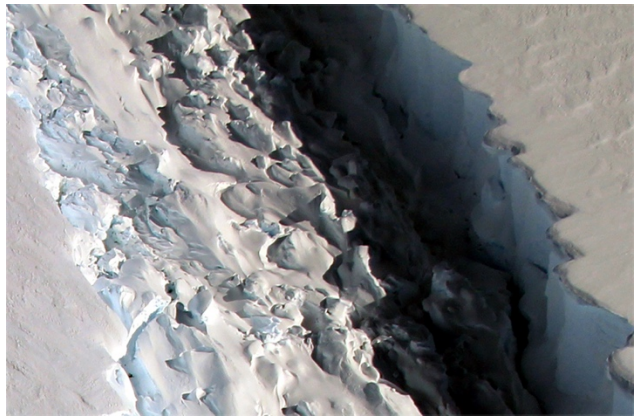
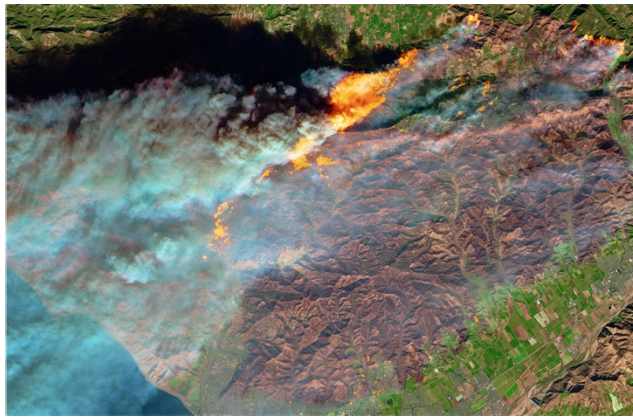
Copernicus Sentinel SAR missions - Plans





SCIENCE



NASA Brief to WInSAR

Western North America Interferometric Synthetic Aperture Radar Consortium

AGU ADVANCING EARTH AND SPACE SCIENCE

Gerald Bawden, Ph.D.

Earth Science Division, NASA HQ

December 02, 2021



Thermal Vacuum First Motion Test on the NISAR DTM

NISAR Update

- Launch date has been delayed…no earlier than Aug/Sept 2023
- First NISAR Science Community Workshop

Save the Date

2022 NISAR Science Community Workshop
April 19-21, 2022
Pasadena, California

See our website for more information: http://nisarscience2022.org/

NISAR
NASA - ISRO SAR Mission

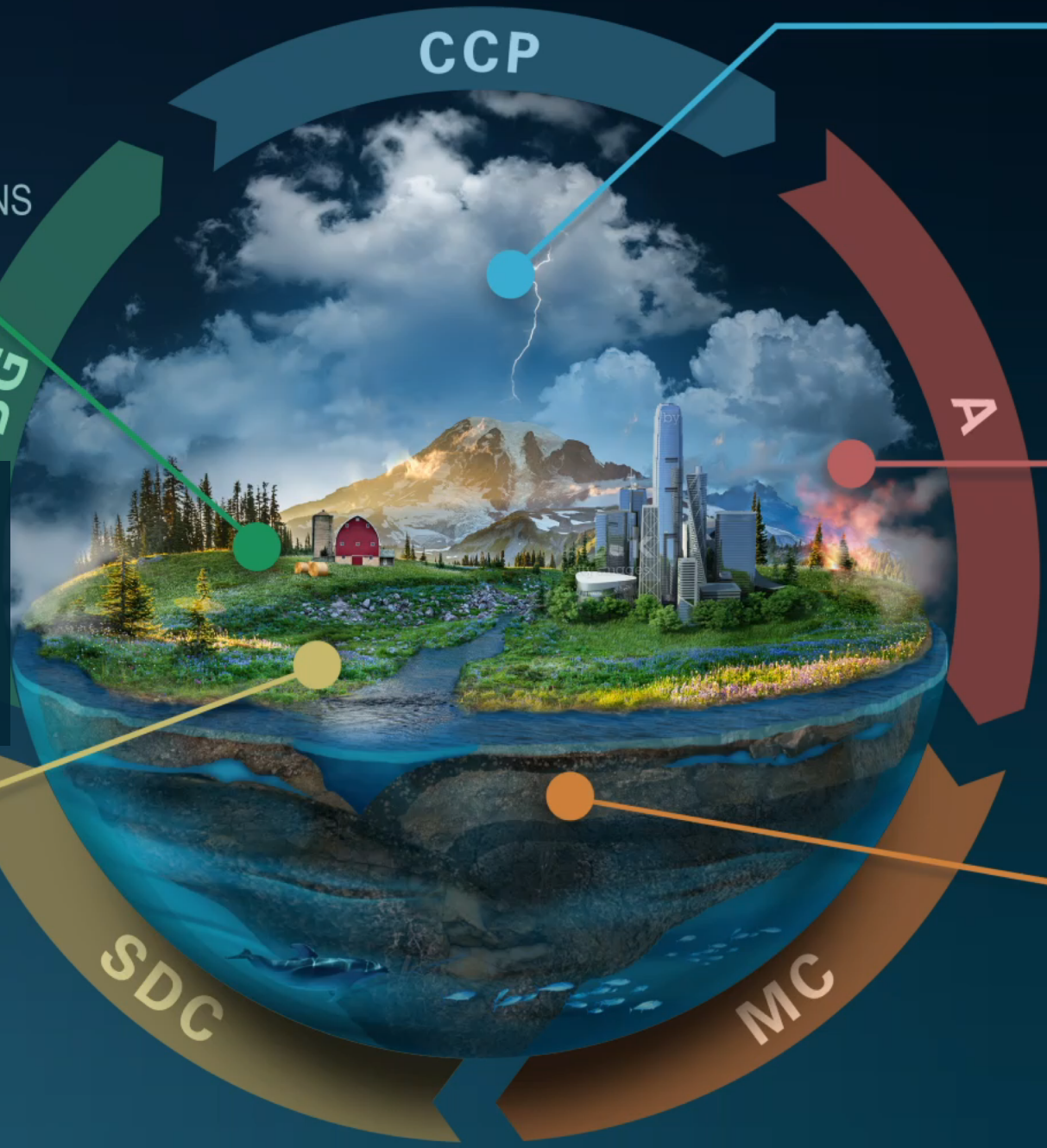




WInSAR
Western North America Interferometric Synthetic Aperture Radar Consortium

EARTH SYSTEM OBSERVATORY

INTERCONNECTED CORE MISSIONS



CLOUDS, CONVECTION AND PRECIPITATION

Water and Energy in the Atmosphere

SURFACE BIOLOGY AND GEOLOGY

Earth Surface and Ecosystems

NISAR serves as a "trailblazer" for ESO and SDC will follow

AEROSOLS

Particles in the Atmosphere

SURFACE DEFORMATION AND CHANGE

Earth Surface Dynamics

MASS CHANGE

Large-scale Mass Redistribution

Decadal Survey Designated Observable Surface Deformation and Change Architecture Study



Instrument

- Interferometric Synthetic Aperture Radar (InSAR) with ionospheric correction
- Estimated cost cap: $500 million – encourages partnership
- SDC's launch window will likely be in the early 2030s

Science and Applications Objectives

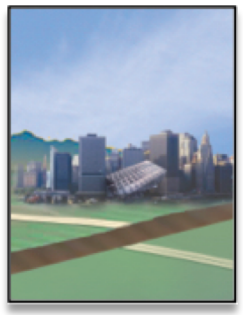
- Measure and track land and ice surface deformation: *geodetic measurements (SAR phase)*
  - Solid Earth surface dynamics from earthquakes, volcanoes, land subsidence and landslides, tectonic plate deformation
  - Cryosphere dynamics associated with ice sheets, glaciers, sea ice and permafrost
- Plus, assess non-geodetic observables not emphasized in the DS: *radiometry/SAR backscatter*
  - Hydrology: soil moisture, surface water extent, aquifers
  - Ecosystems: biomass, disturbance, events
  - Applications: i.e. oil spills, agriculture, infrastructure

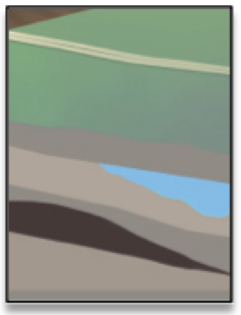
AGU Town Hall TH33K for the latest on SDC

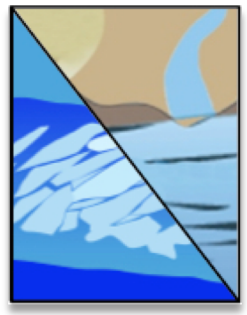
- Wednesday, December 15, 2021 – 12:15 to 1:15 pm
- Convention Center - Room 393-394


Solid Earth


Ecosystems


Geohazards


Hydrology


Cryosphere

Get Involved!

https://science.nasa.gov/earth-science/decadal-sdc

sdc-study@lists.nasa.gov





UAVSAR Suite
P- 68 cm
L- 24 cm
Ka- 8 mm

UAVSAR / P-band Interferometry Landslides Pacific Northwest

PI: Zhong Lu

P-band InSAR
ROSES research

Nov. 12, 2020 to
April 29, 2021
Flights next week

Flight → Look

Camas
Washougal
Corbett
Cascade Locks
Stevenson
14
30

500 m

Phase (radians)
0
π

8.14 km

Flight → Look

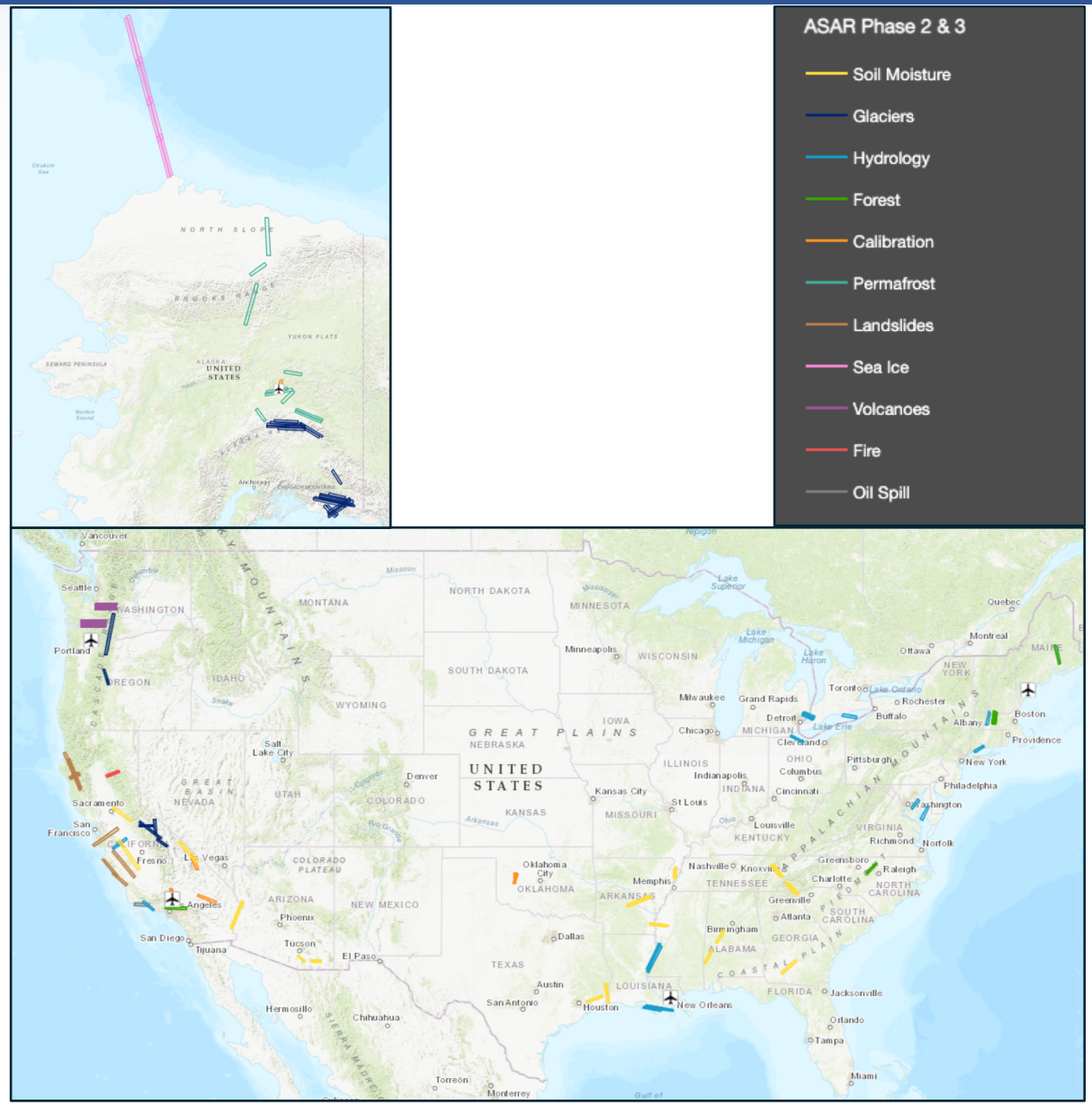
Look → Flight

lat 45.575244° lon -121.78

NASA-ISRO L- and S-band SAR Campaign over North America (June/July 2021)

Motivation and Scope

- The campaign acquired over North America L- and S-band Synthetic Aperture Radar (SAR) data from Space Research Organization (ISRO) Airborne Synthetic Aperture Radar (ASAR) instrument mounted on NASA's Gulfstream III aircraft
- The antenna pod and navigation package for the NASA UAVSAR radar system were utilized, allowing the aircraft to fly over predetermined path with precision
- The imagery is needed by the US to develop and refine algorithms in advance of launch of NASA ISRO Synthetic Aperture Radar Mission (2022)
- The data are relevant and useful to NASA Earth science research and application areas: cryosphere, ecosystems, natural hazards, solid Earth, ocean science, terrestrial hydrology, agriculture, oil spills, and infrastructure.
- Phase 2 and 3 campaigns were in June/July 2021.



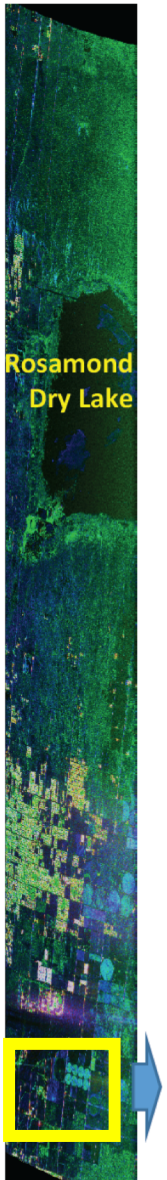
NASA-ISRO campaign flights over Alaska

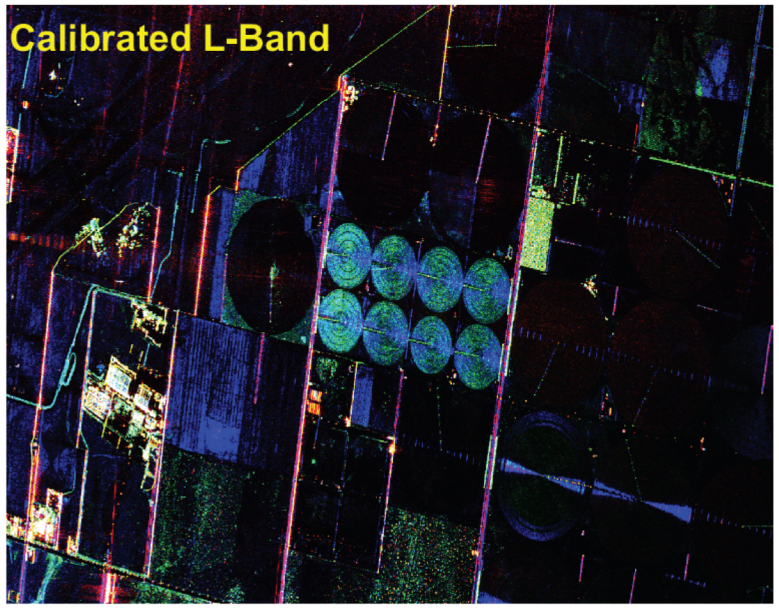
NASA-ISRO campaign flights over western United States

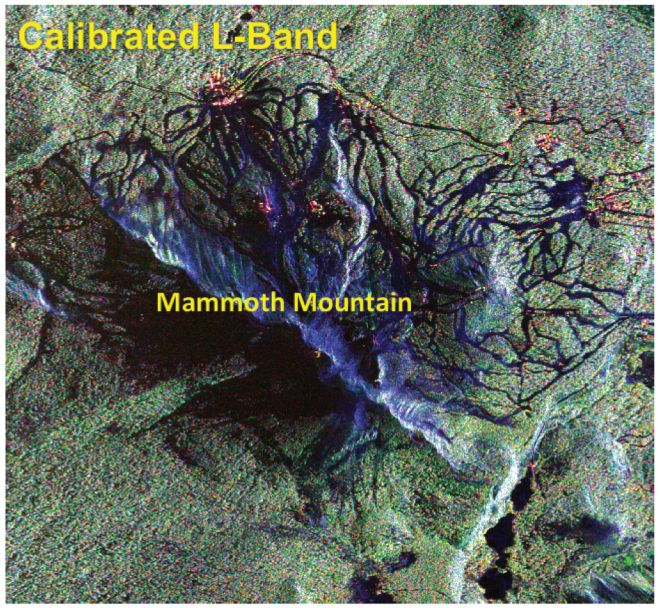
NASA-ISRO L- and S-band SAR Campaign over North America (Dec. 2019)

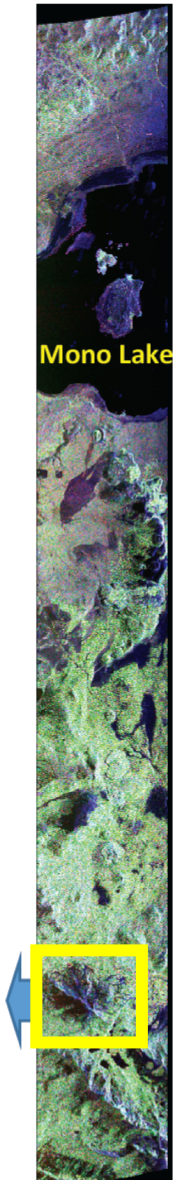
First Calibrated Results of ASAR Campaign

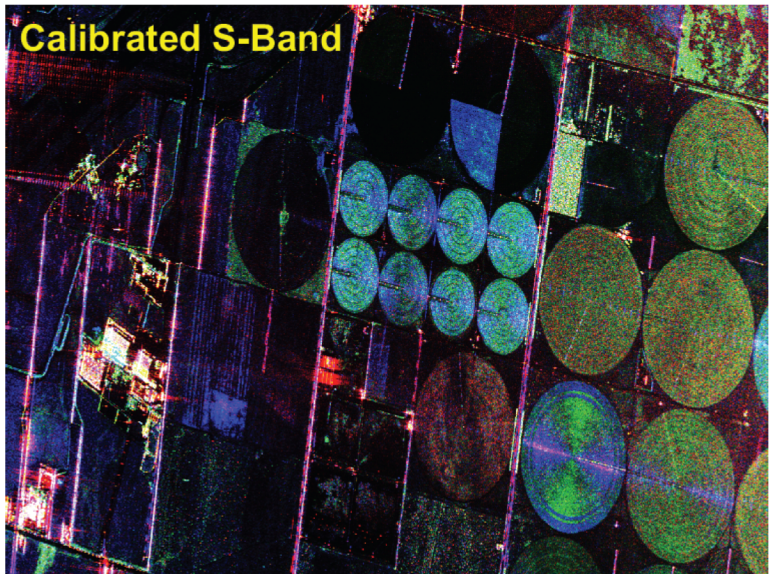
Yamaguchi Decomposed Images : L & S-band (left) Rosamond ; (right) Mammoth Mountain- RGB image: EVEN VOLUME SURFACE

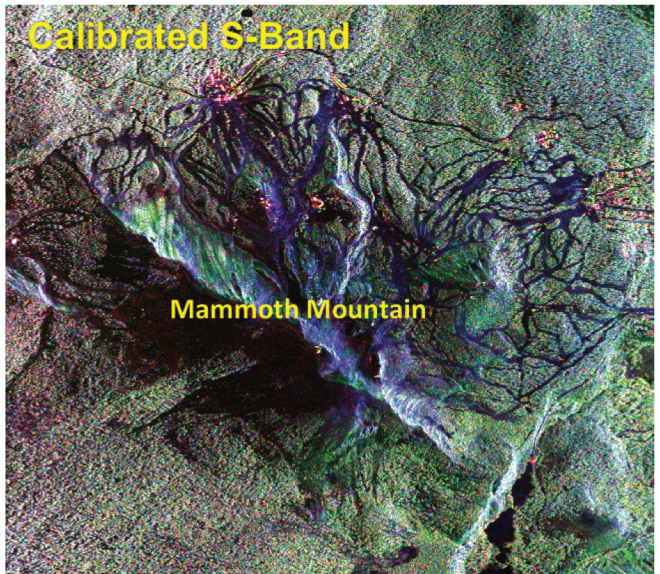




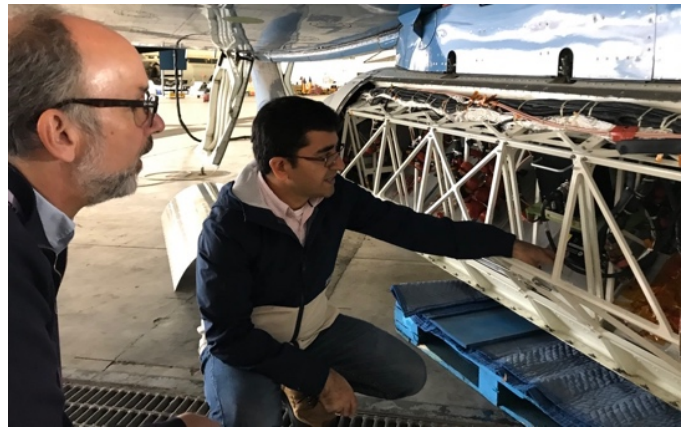












Satellite Needs Working Group Activities Identified in the 2018-19 Cycle

Activities Funded in 2021

ID #	Summary of Proposed Activity
# 1	Global NISAR 200 m soil moisture product – proposed in SNGW17-18 cycle
# 2	Global Surface Water Extent – optical & radar
# 3	Water quality assessment using OLCI
# 4	Land Surface Change Detection - optical & radar
# 5	Land Surface Deformation Detection
#6	Radiation & clouds observations at SatCORPS
#7	Atmospheric composition using GEOS-5
# 8	Low latency freeboard & ice thickness over the Great Lakes from IceSat-2
# 9	Animal Tracking

OPERA* (JPL)

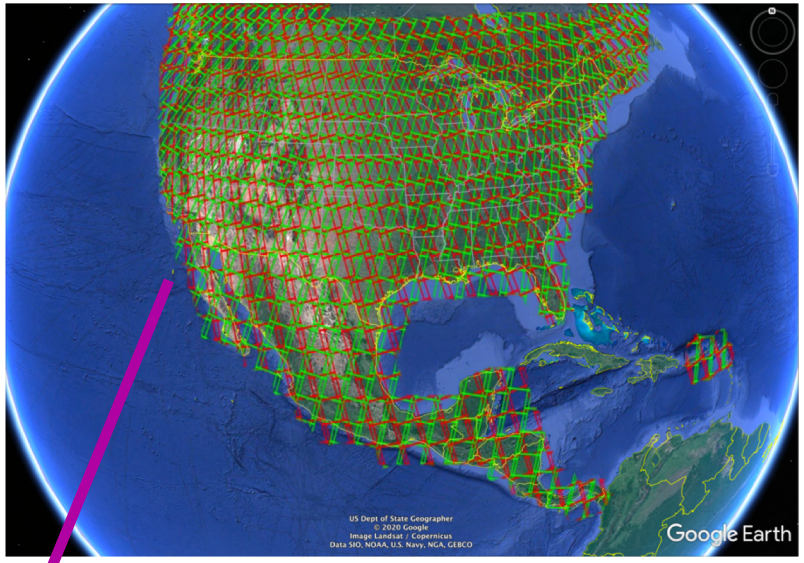
* Operational Products based on ARIA

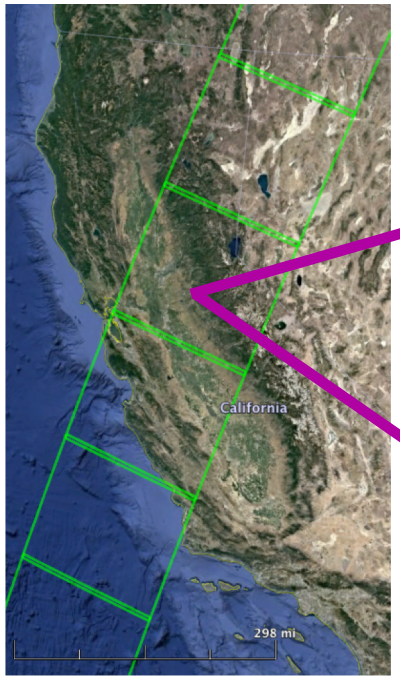
OPERA – A North American Displacement Product

"Surface displacement is the rapid or gradual movement of Earth's surface in response to natural and anthropogenic processes acting on various spatial temporal scales"

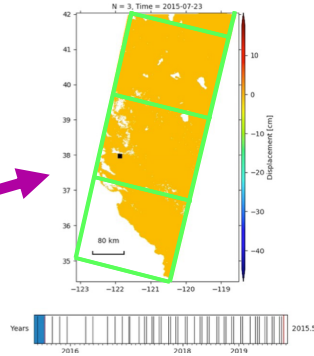
Description:

- ❑ North America (up 200 km into Canada, up to and including Panama) + US territories
- ❑ Products dating back to Mid 2014
- ❑ Frame based (250 x 250 km), i.e. ground swaths of satellite
- ❑ Fine spatial resolution (<30 m) with up to weekly temporal sampling
- ❑ **Satellite derived:**
  - ✓ **SAR (Sentinel-1, NISAR)**
- ❑ A product for Sentinel-1, a product for NISAR
- ❑ Product features:
  - ❑ GIS friendly formatting
  - ❑ Line-of-sight displacement relative to a spatial location and a reference time
  - ✓ Qualitative layers
  - ✓ Meta data information (e.g. algorithm, sensors, etc.)

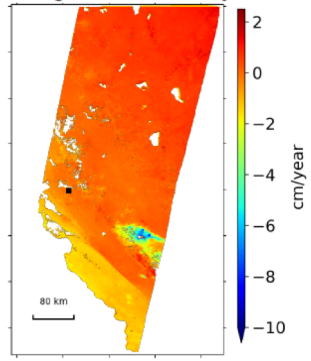




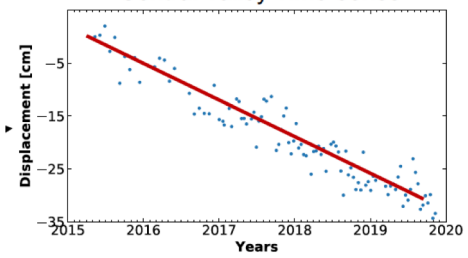
Line-of-sight Displacement



Line-of-sight Long-term velocity



Central Valley Time-series



JAXA-NASA L-SAR Cooperation

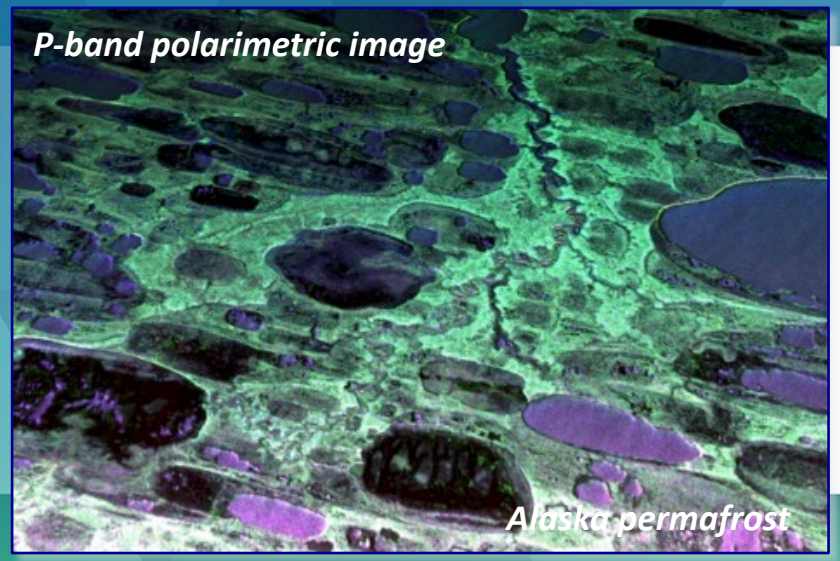
- NASA and JAXA new data agreements
- ASF ALOS-1/PALSAR-1 global mirror
- ASF ALOS-2/PALSAR-2 SCANSAR global data mirror
- JAXA-NASA US Gov. (+USGS, NOAA) ALOS-2 research collaboration
- Exploring ALOS-4 ScanSAR partnership

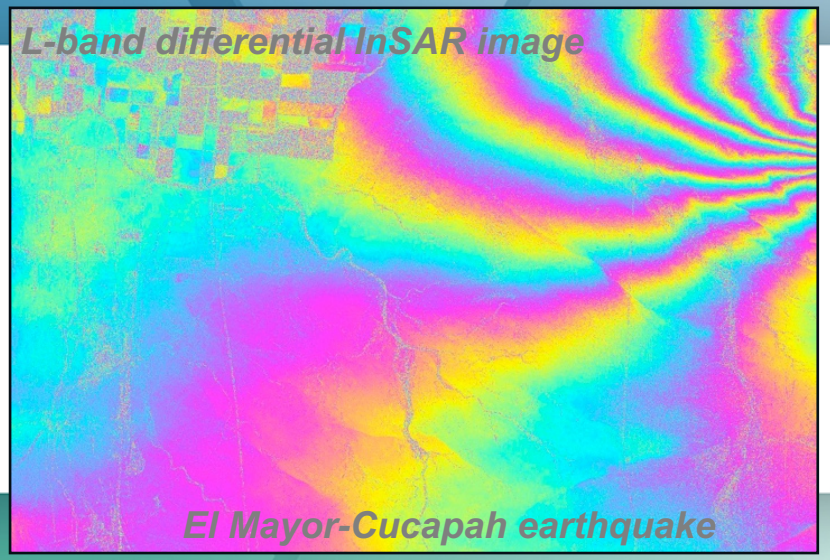
Upcoming NASA Opportunities

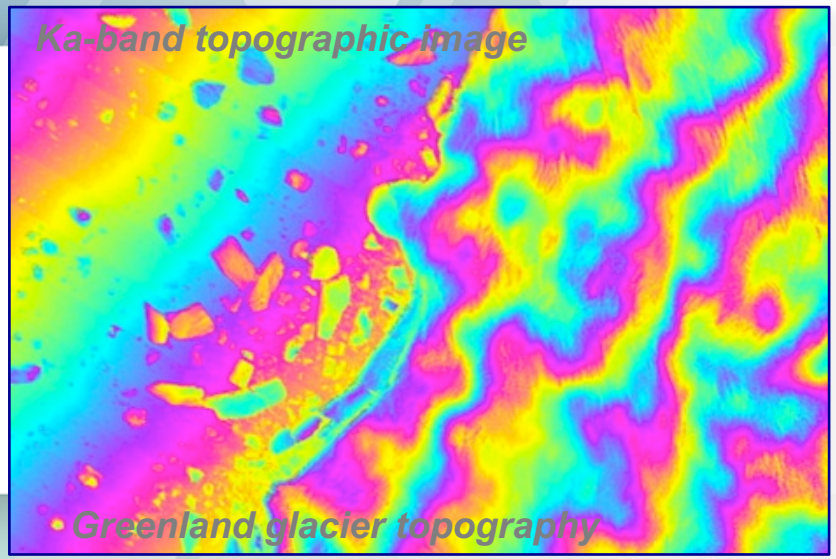
- ROSES-21 Amendment 50: F.5 FINESST Graduate Student Research deadline February 11, 2022
  - F.5 Future Investigators in NASA Earth and Space Science and Technology
  - https://nspires.nasaprs.com/ … Open / FINESST
  - $50k/yr (increase from past years)

- ROSES solicitation – anticipated February 14, 2021

SCIENCE





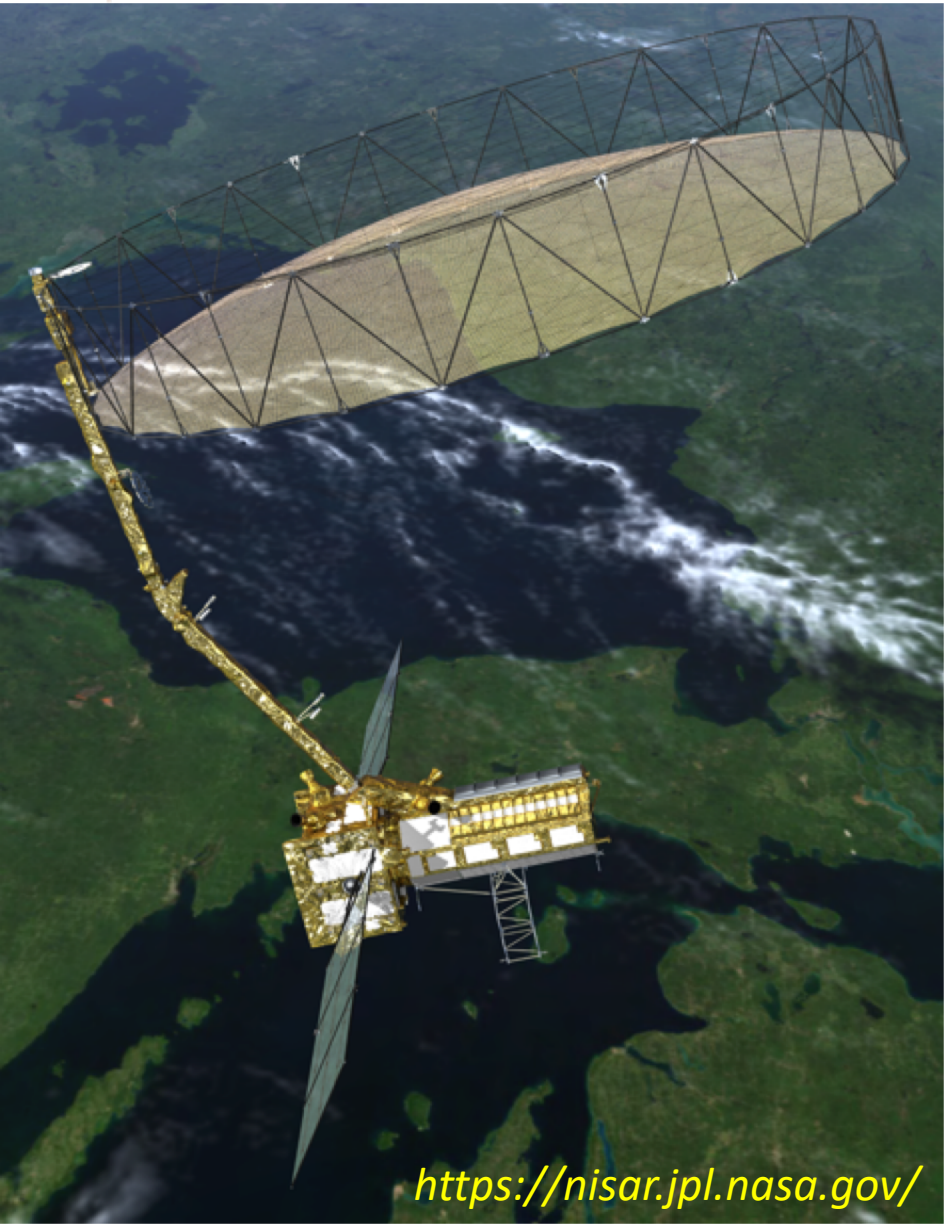


Questions

Gerald.Bawden@NASA.gov

Indian Space
Research Organisation

Jet Propulsion Laboratory
California Institute of Technology



NISAR
NASA - ISRO SAR Mission

Uniquely Capturing the Earth in Motion

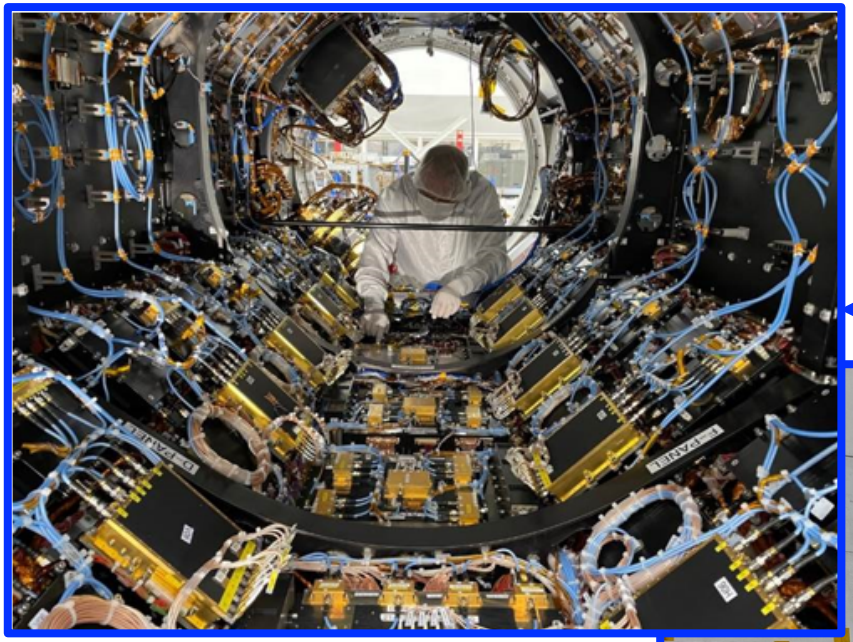
An Update on the NASA-ISRO SAR Mission and ISCE

Paul Rosen, NISAR Project Scientist
Jet Propulsion Laboratory
California Institute of Technology

December 2, 2021
WinSAR Business Meeting 2021

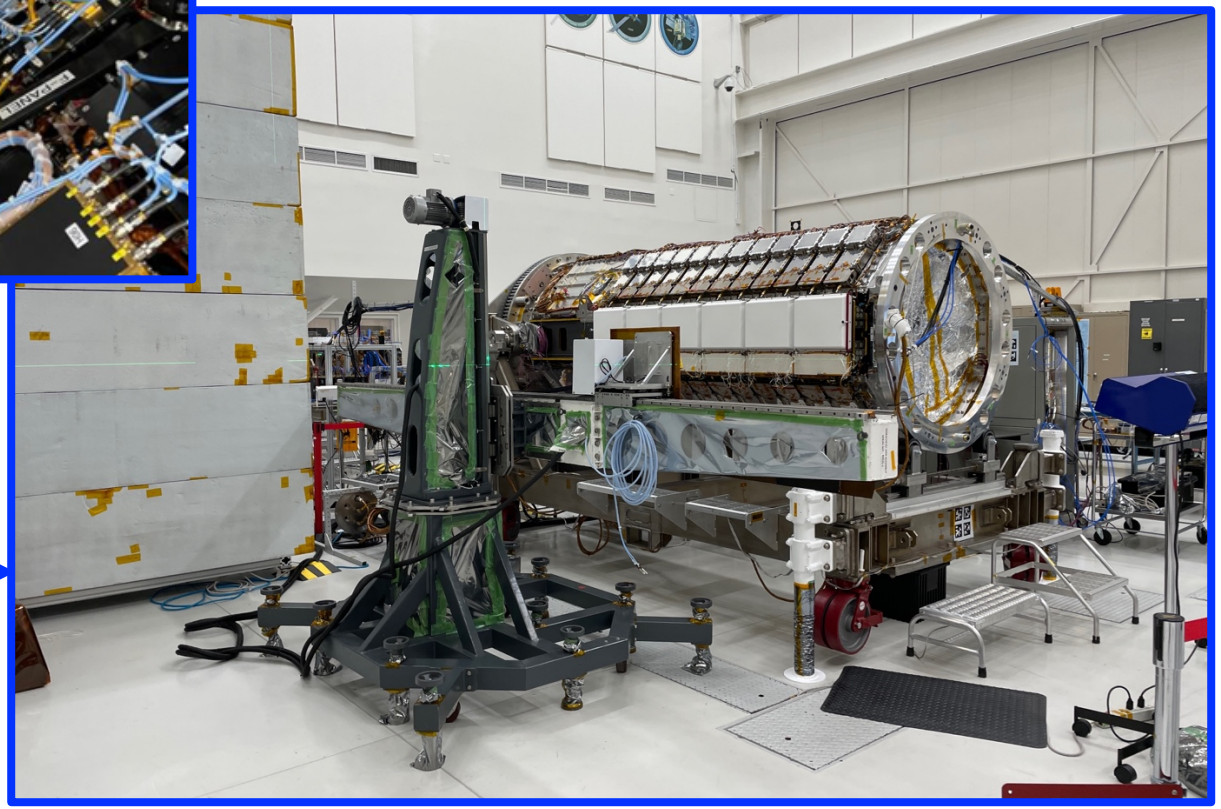
This document has been reviewed and approved for unlimited release

L-SAR/S-SAR Fully Integrated



- Radars have been functionally tested in joint operation and generally work well together
- A mutual interference problem is being resolved

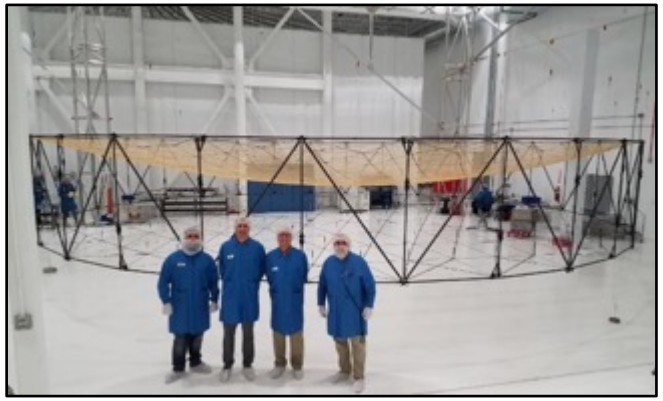
Technician replacing susceptible unit



Fully integrated L- and S-band radar electronics ready for radiating functional test

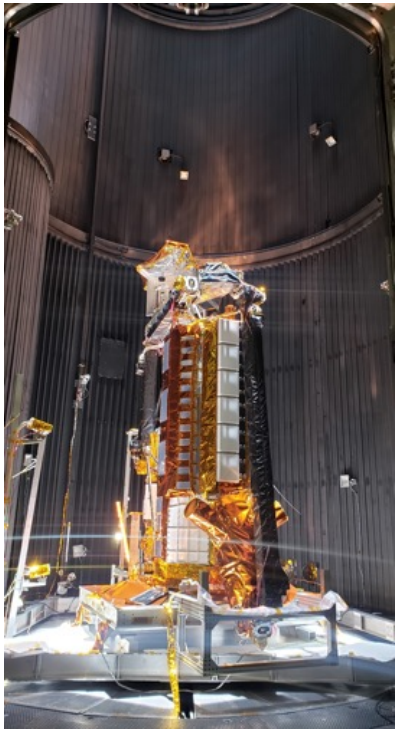
This document has been reviewed and approved for unlimited release

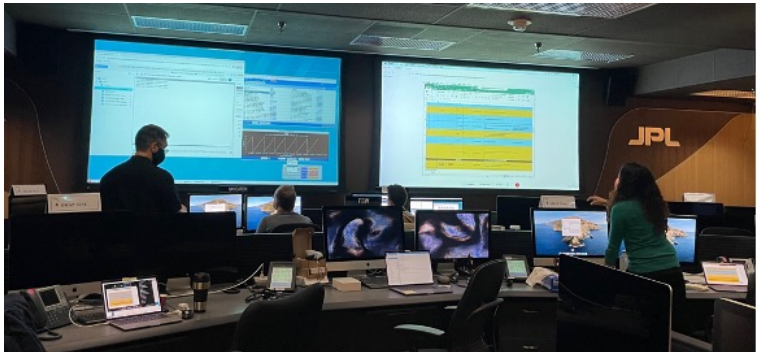
Beginning Electrical/Mechanical Integration of Payload and Practicing Ops



Prior mechanical testing in 2020



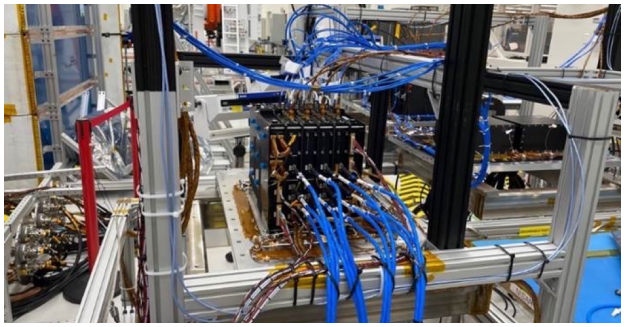






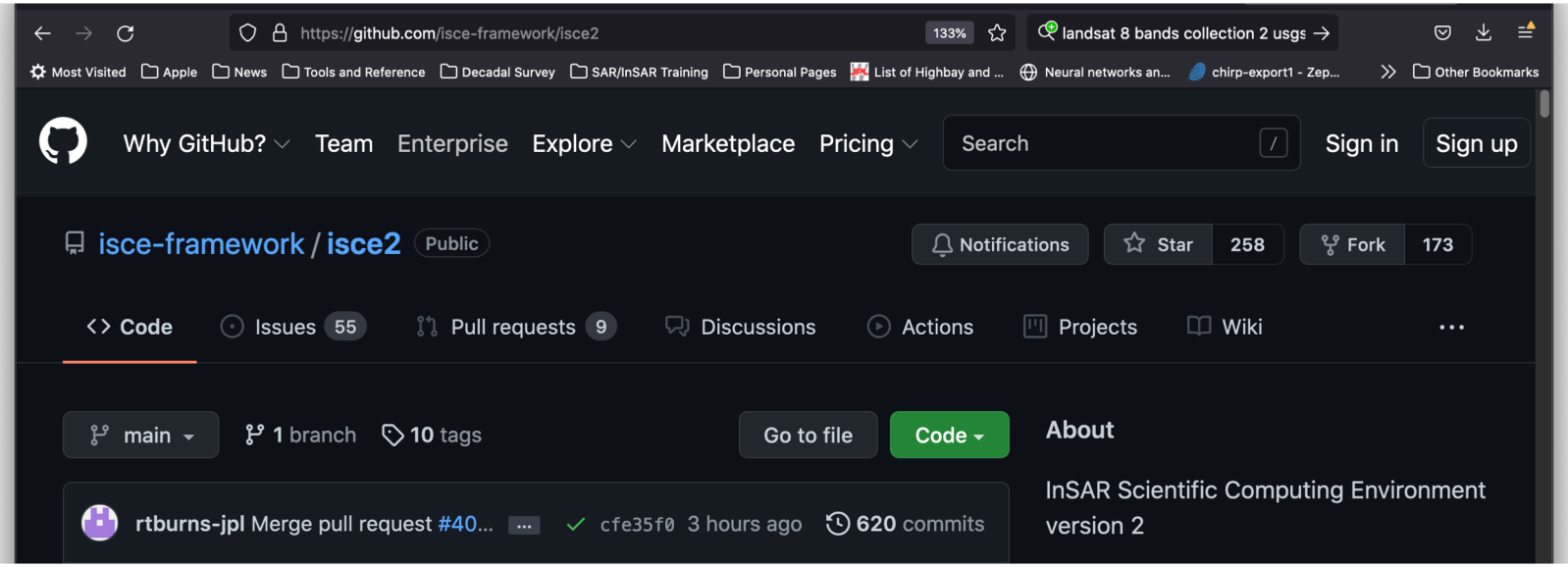
Joint Mission System tests with India

ISRO data handling unit undergoing tests at JPL

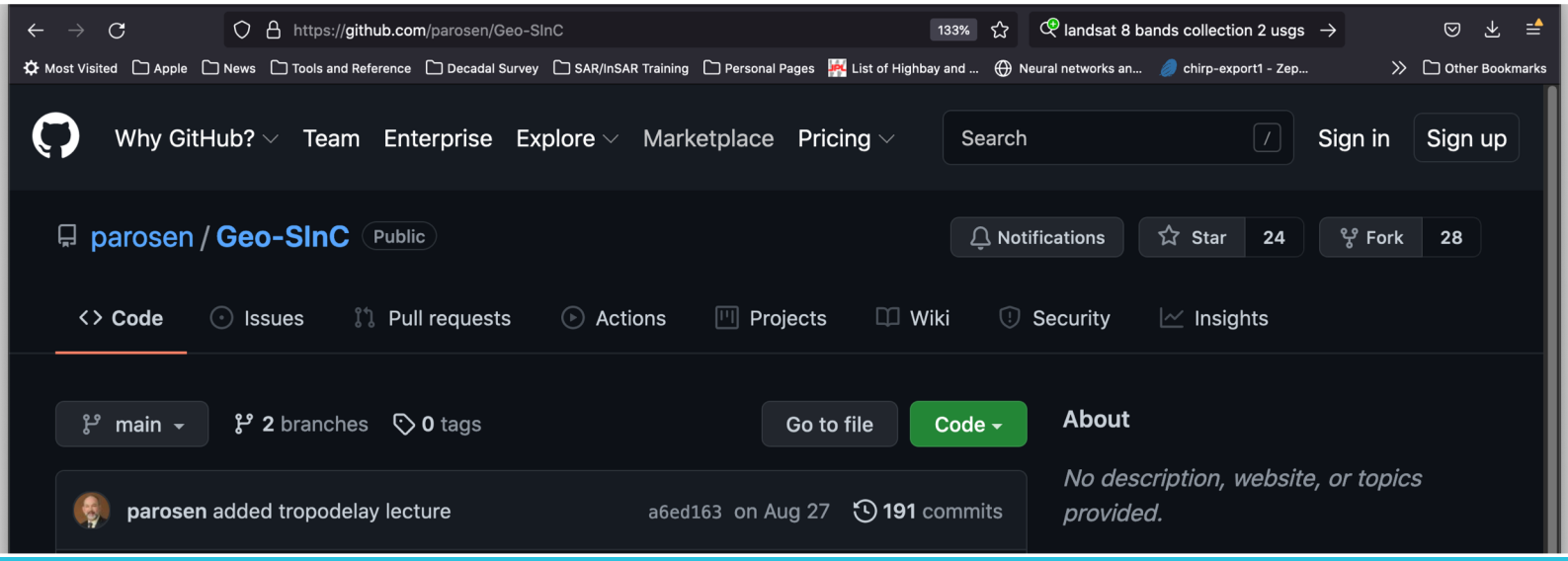


ISCE Update – ISCE2 @https://github.com/

Software

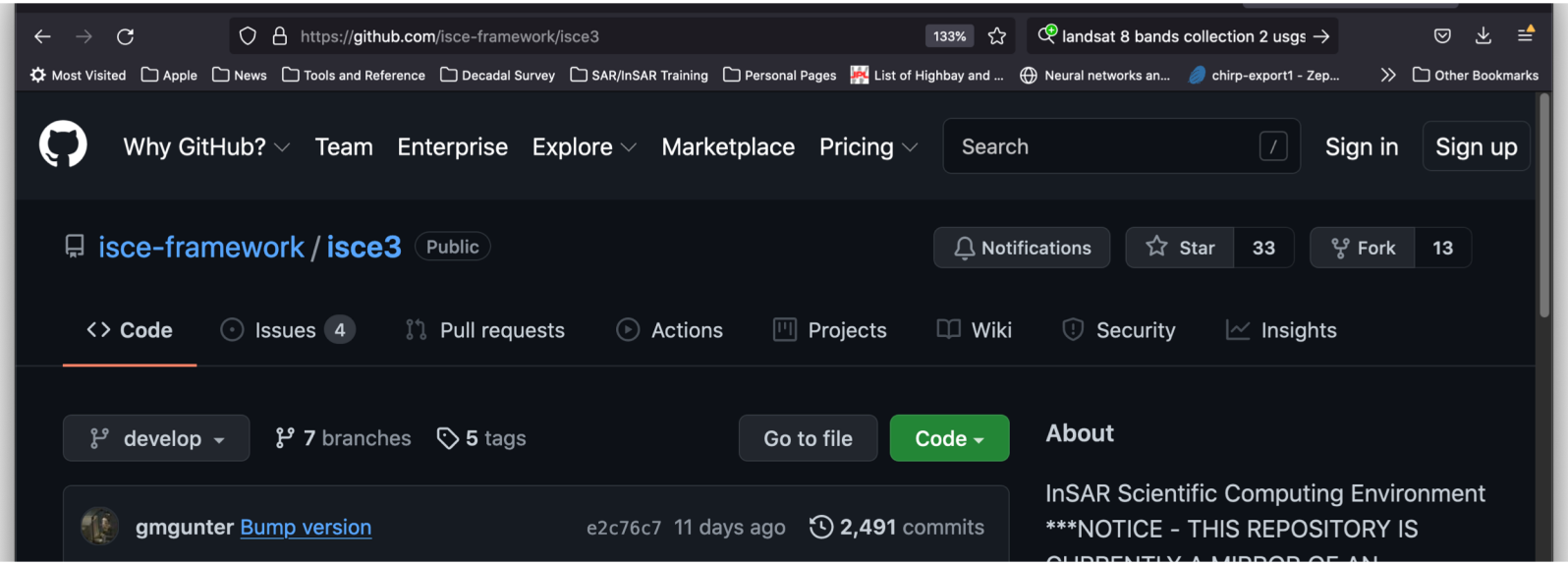


Training

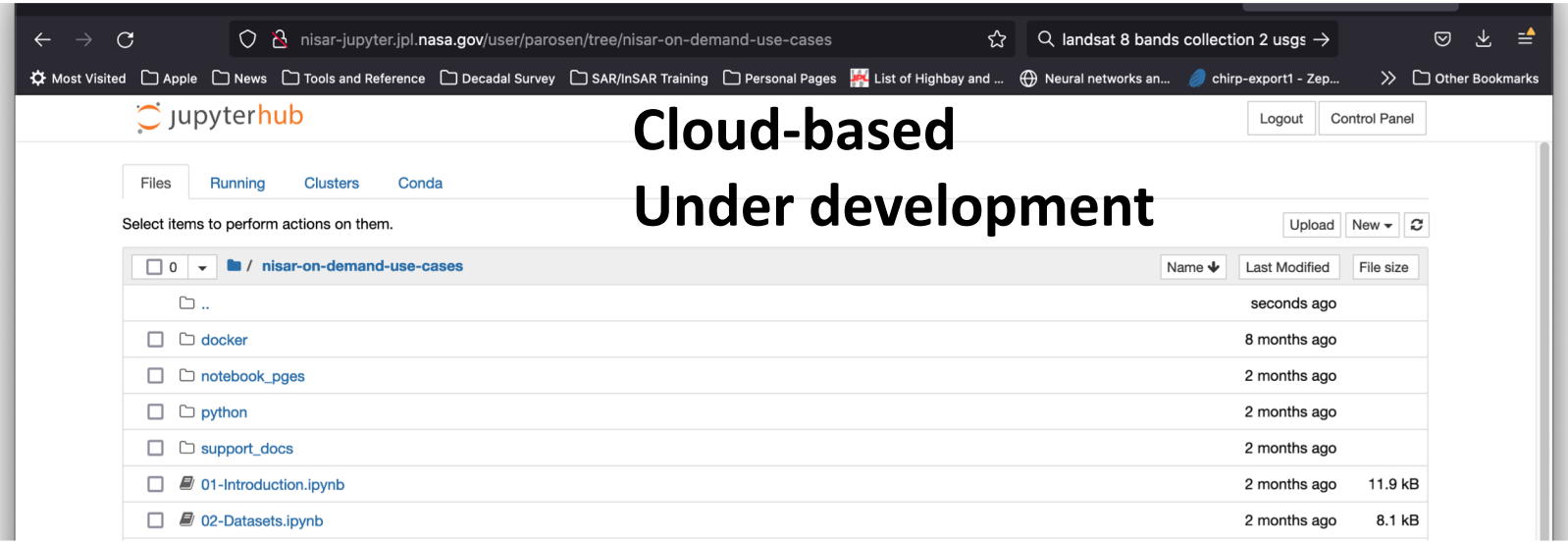


ISCE Update – ISCE3 @https://github.com/

Software

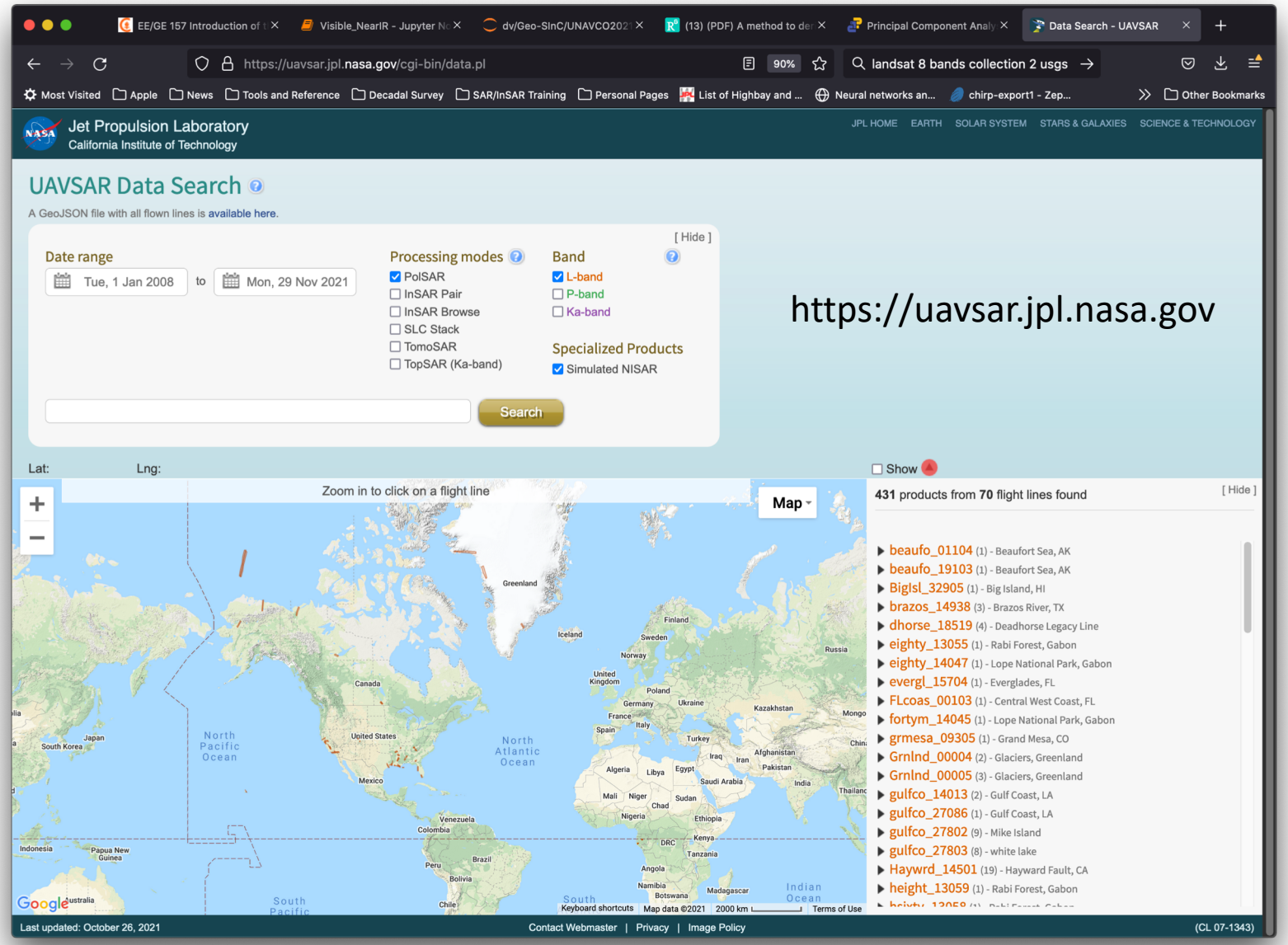


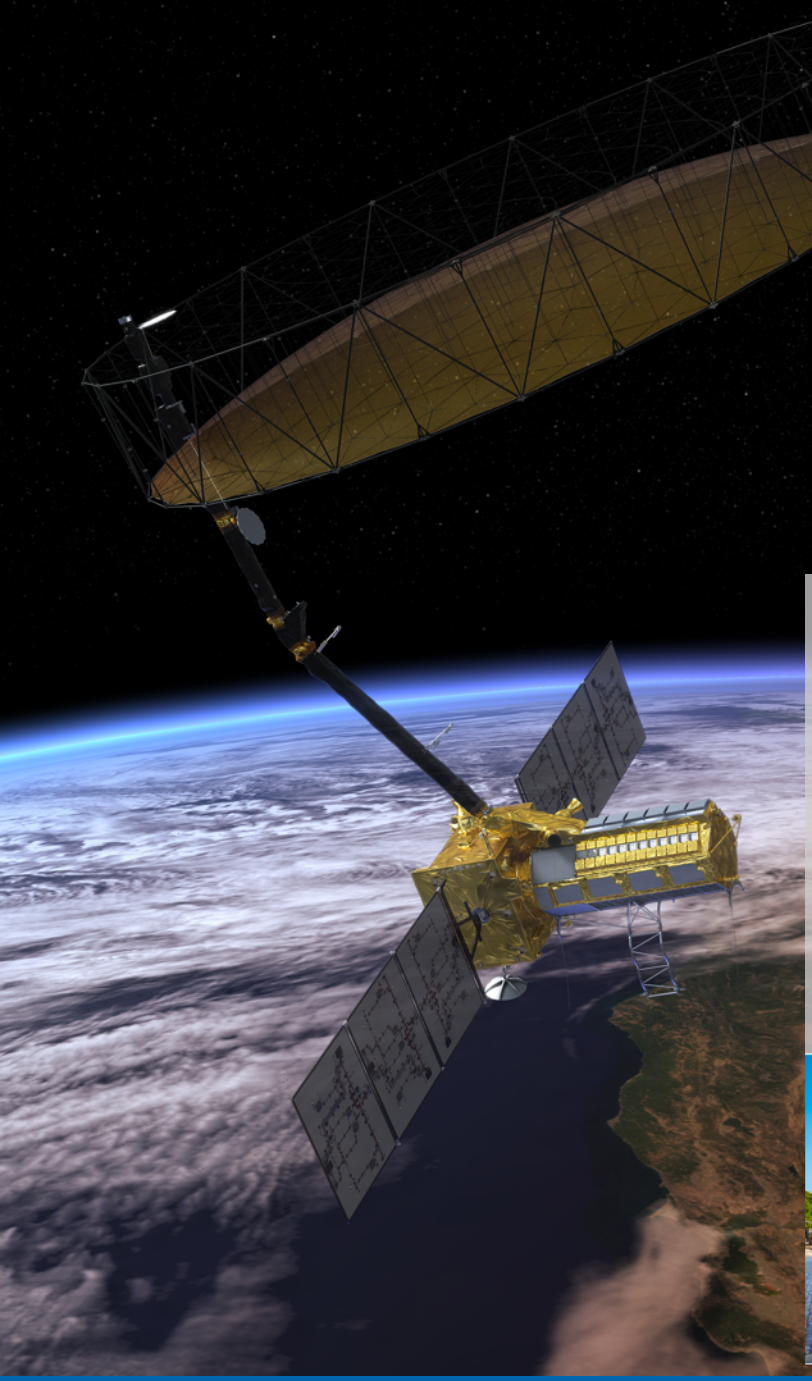
On-Demand



Cloud-based
Under development

ISCE Update – NISAR Simulated Data





NISAR Science Community Workshop

April 19-21, 2022

Pasadena Convention Center, Pasadena, CA

The NASA ISRO Synthetic Aperture Radar (NISAR) Science Workshop will be an in-person event organized by NASA and UNAVCO to bring together the science community in solid earth, ecosystems, cryosphere, hydro-geodesy and other areas of science that will benefit from the NISAR mission.

For more information, and to register for the workshop, go to nisarscience2022.org





GMTSAR Progress https://github.com/gmtsar/gmtsar/wiki/GMTSAR-Wiki-Page

- Developers: Xiaohua (Eric) Xu, David Sandwell,
  Paul Wessel, Leonardo Uieda, Robert Mellors, Eric Lindsey,
  Meng (Matt) Wei, Katherine Guns, and Katherine Materna

- Funding:
  Final year of funding
  NSF Cyberinfrastructure
  New NSF proposal (UT/UCSD)

- Software distribution:
  MacOSX, Ubuntu, CentOS, RH,
  Fedora, Windows 10, > Cloud

- Community Geodetic Model:
  Katia Tymofyeyeva - JPL
  Mike Floyd - MIT
  Zhen Liu - JPL
  Xiaohua Xu - UT
  Katherine Materna - USGS
  Katherine Guns - UCSD
  Kang Wang – UCB
  Eric Fielding - JPL

- UNAVCO short course:
  Virtual, August, 2021

	BKLY	USGS	JPL1	SIOX	UCRV
Coregistered stack	●	●	●	●	●
GMTSAR	●	●		●	●
ISCE			●		
ESD correction			●		
DEM error correction			●	●	
Topo-correlated atm. removed			●	●	
Weather model removed (ERA5)	●				
CANDIS correction	●			●	
Coherence-based SBAS				●	
GPS correction				●	
Spatiotemporal smoothing		●	●	●	
Phase closure masking			●	●	●

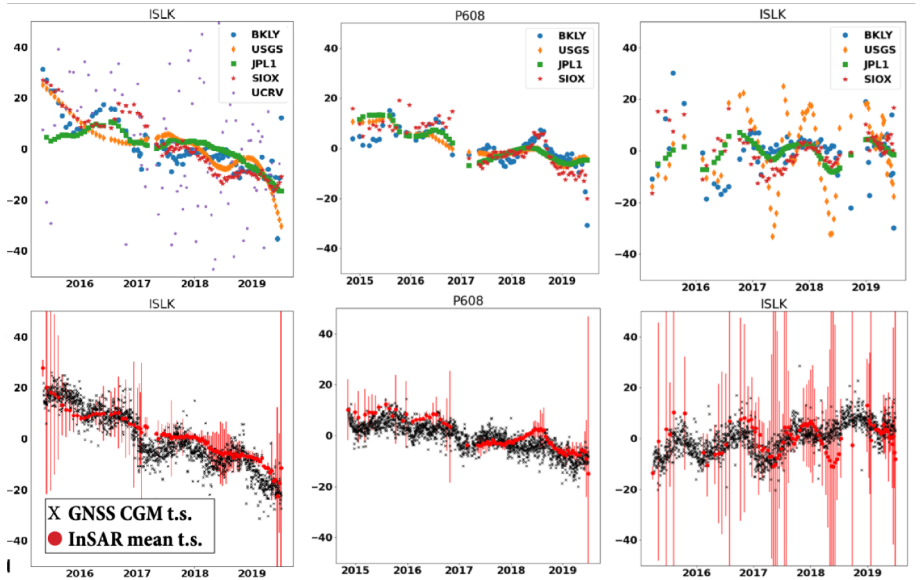


Table 1. Summary of past metrics

metric	year 1	year 2	year 3
committed changes to Github repository	82	54	65
issues posed/resolved on Github repository*	10/10	69/65	172/84
citations calendar year	42	81	140
DEM Generation+ (Figure 3)	7821	5591	4259
short course participants	27	160	140

UNAVCO GMTSAR Instructors/ Staff





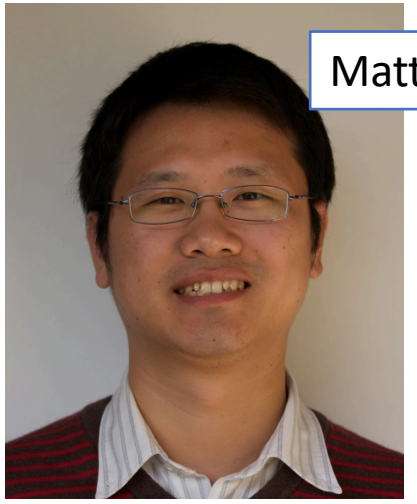






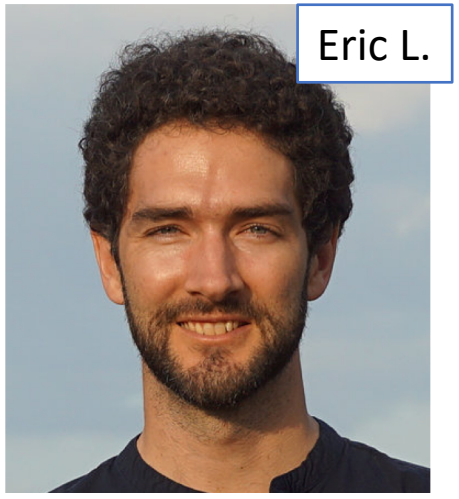














GROUP ON EARTH OBSERVATIONS

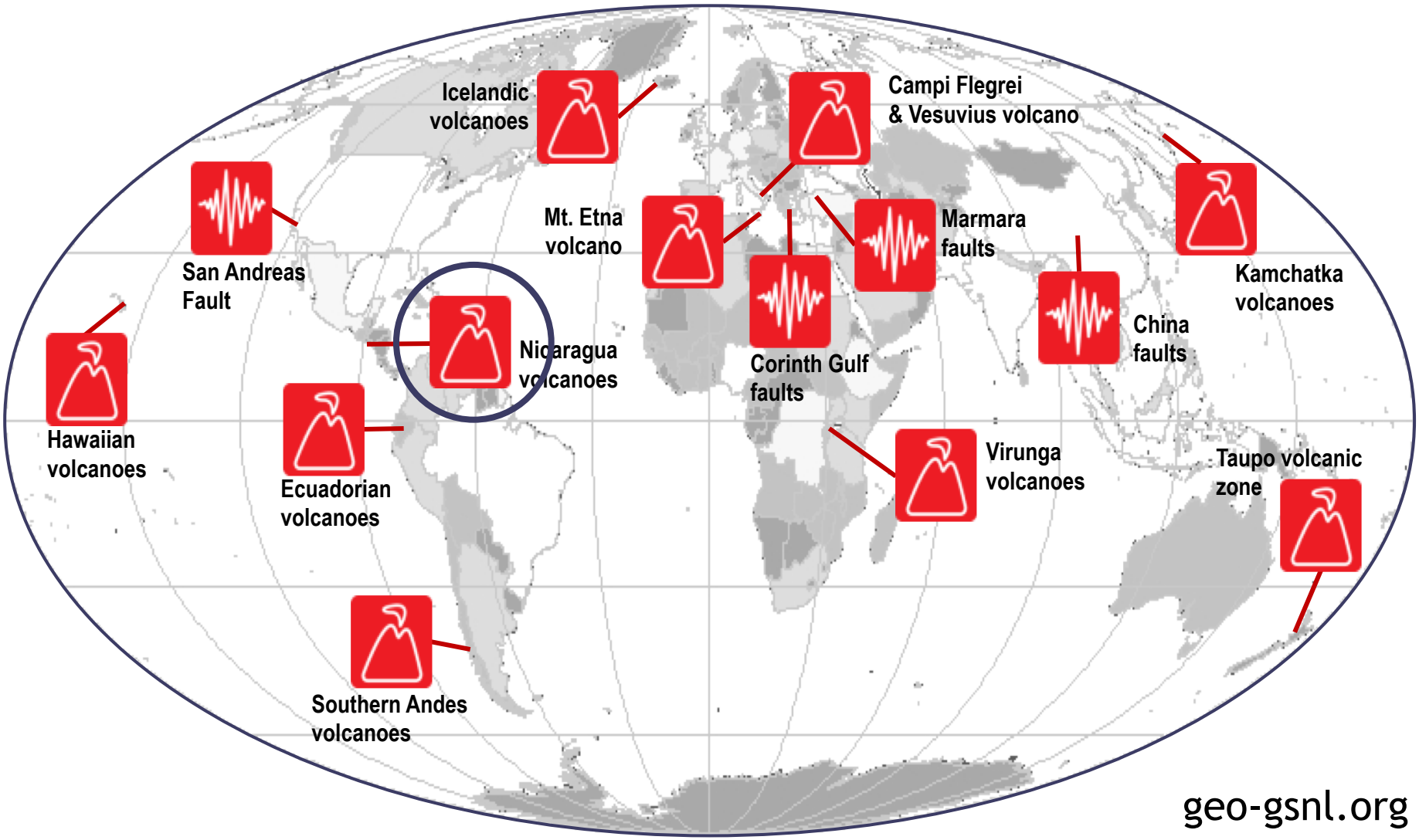
Updates from the GEO Geohazard Supersites initiative

Stefano Salvi

Chair of the GSNL Scientific Advisory Committee

WinSAR meeting @ AGU 2021

The Supersite network in 2021



Progress in 2021

1. Established a Volcano Supersite in Nicaragua
2. Most Supersites continue to use good amounts of CEOS data for research, and for monitoring/response during crises (see Supersite biennial reports on geo-gsnl.org)
3. Information from Supersite data has been crucial for managing volcanic crises: White Island, NZ; Reykjanes peninsula, IS, Etna, IT.
4. For less developed Supersites we maintain cloud computing resources with commercial software for InSAR data processing and geophysical modeling (presently used only by Ecuador S.)
5. The ESA-GEP is our data distribution platform: 10000+ CSK data; TSX data discoverable, Pleiades data to be shared when licensing issues are solved.

Supersite results

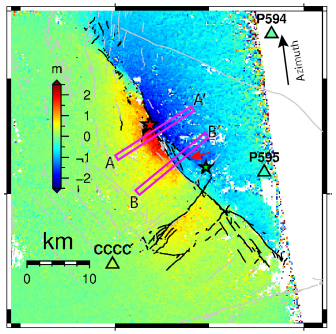
SAF Natural Laboratory:

few CSK data are used from the large quota.

Last data set was for the Ridgecrest earthquake

(Wang & Burgmann, 2020).

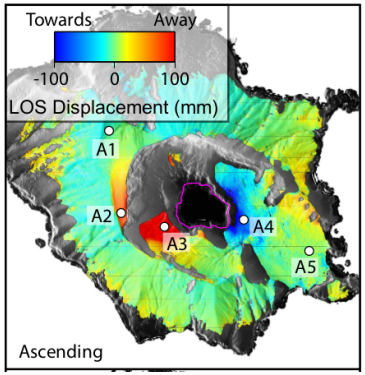
SAF NL Coordinator position is open



Taupo Supersite:

TSX data is used to monitor White Island and provided important information on the deadly Dec. 2019 eruption. This info is now a trial element.

From I. Hamling, GNS-Science.

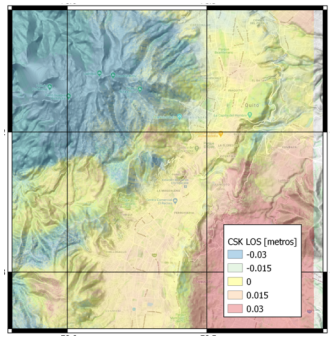


Ecuador Supersite:

CSK and S-1 data are used for volcano monitoring.

IGEPN scientists have acquired capacities in InSAR data processing.

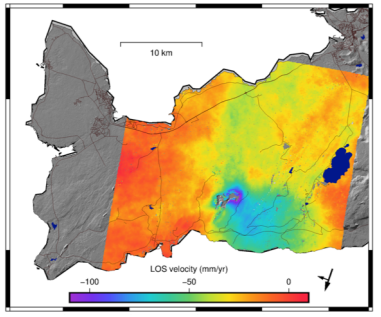
From P. Mothes, IGEPN.



Iceland Supersite:

<u>TSX and CSK</u> data are used to monitor the ongoing Reykyanes peninsula eruption. Same for the ongoing Askja unrest.

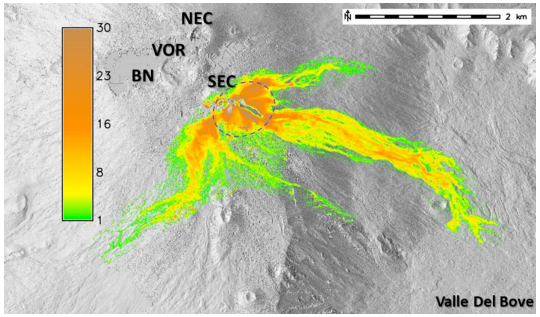
From M. Parks, IMO.



Etna Supersite:

Pleiades VHR optical data are used for accurate DEM extraction and assessment of volume of erupted products.

From G. Ganci, INGV.



GSNL issues

- Free and easy open access to data still lagging behind at some Supersites
- Local data processing and analytic capacities at some Supersites (Nicaragua, Virunga, Ecuador, Chile) should be improved/developed through international collaboration
- GEO has failed so far to provide access to international funding for Supersite development
- The Corinth Supersite was not active in data acquisition/distribution and CEOS support was withdrawn. The SAF NL could be the next.
- While we get full support from ESA, NASA, ASI, DLR, CNES (**Thanks !**), we have still limited or no access to data from JAXA, CSA and other space agencies.



UAVSAR Update



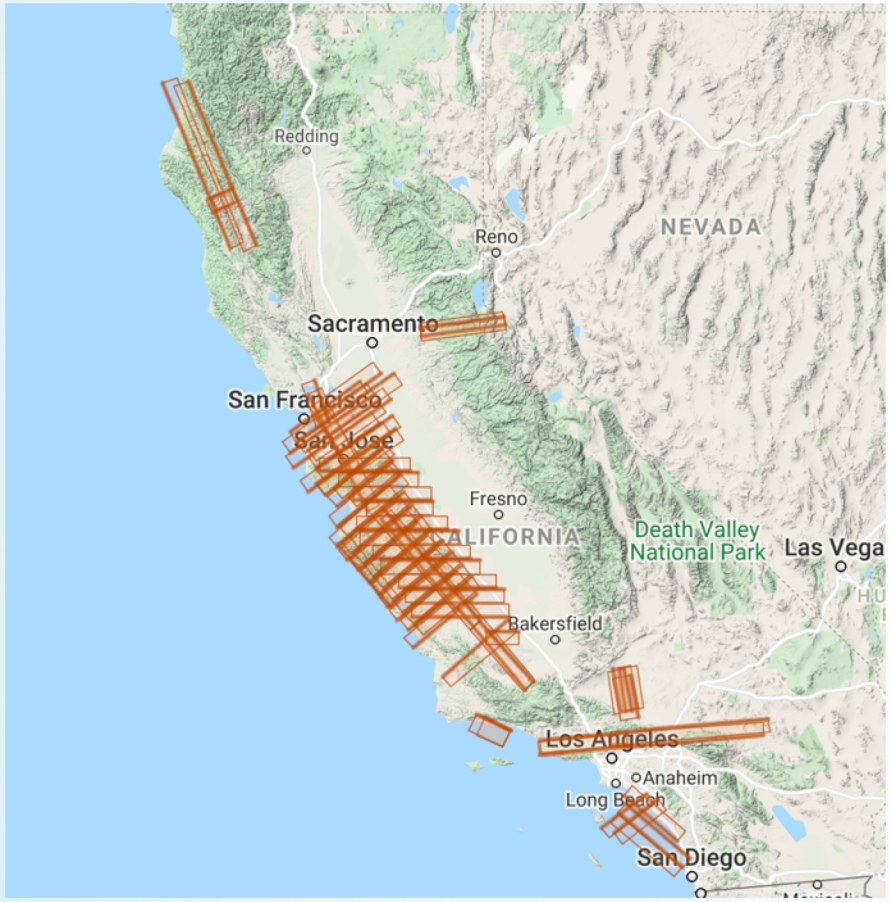
UAVSAR Project Manager: Yunling Lou

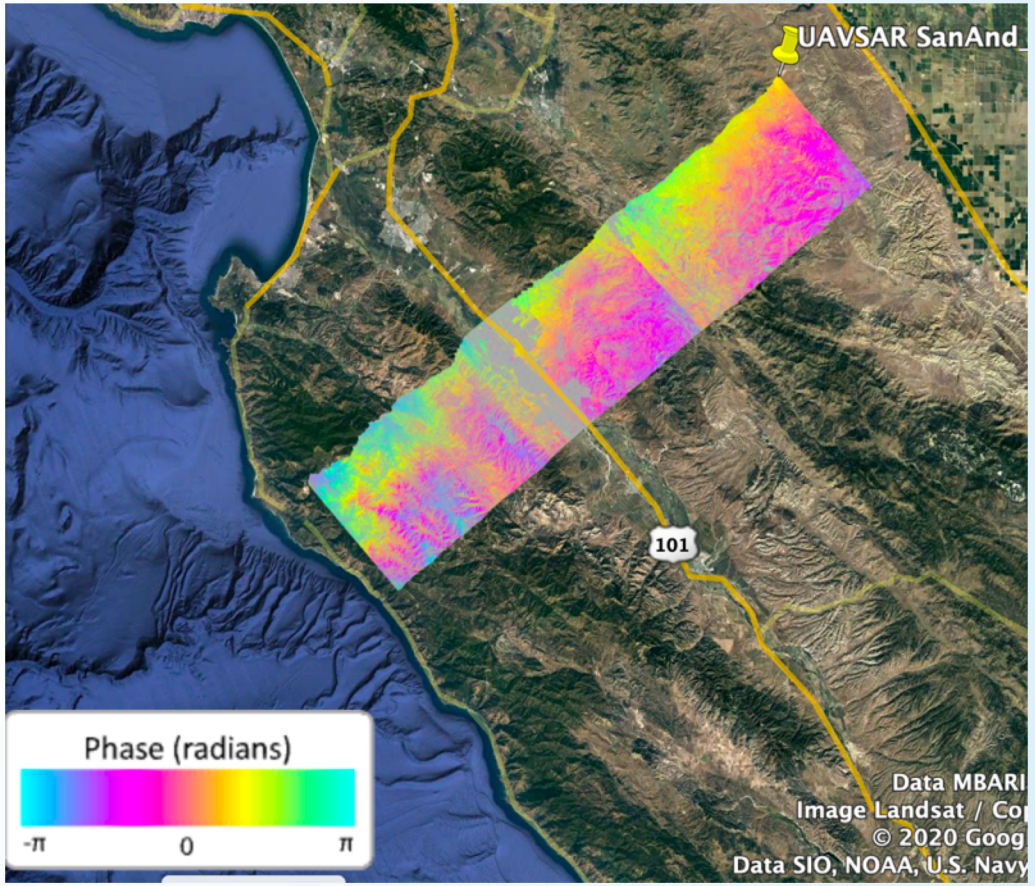
WINSAR Meeting, December 2, 2021

Jet Propulsion Laboratory, California Institute of Technology

San Andreas Fault Monitoring with L-band InSAR

- Imaged Central San Andreas Fault in June 2021
- Also imaged Salton Trough in November 2021 together with the QUAKES imager (PI: A. Donnellan) reconstruct topography with SWIR imager



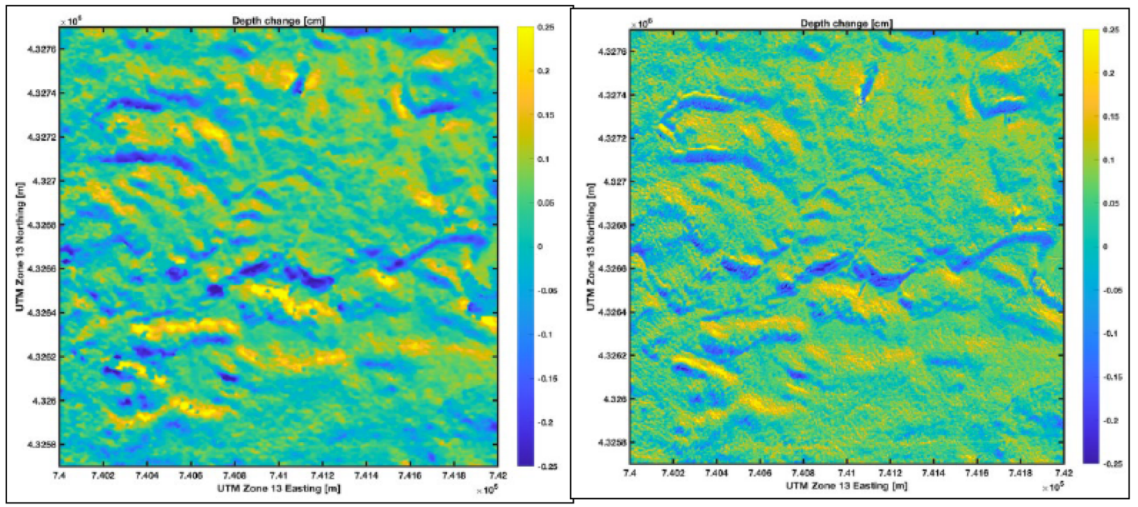


L-band DInSAR for SnowEx and Delta-X Campaigns

SnowEx

- Define the snow conditions where L-band InSAR is likely to work (maintain coherence).
- Quantify the accuracy of L-band InSAR retrievals of snow depth, density, SWE, and wetness.

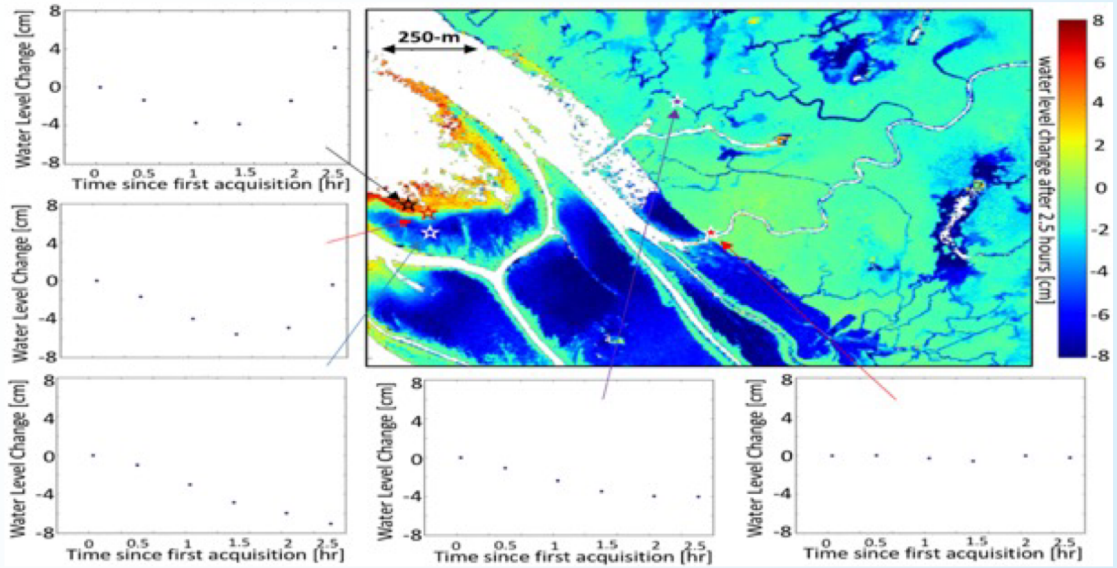
UAVSAR Lidar



2020 UAVSAR InSAR vs Lidar (Quantum) snow depth

DeltaX

- Measure water level changes within marshes and infer water surface velocity
- Estimate Above Ground Biomass
- Assess ability to map shallow bathymetry

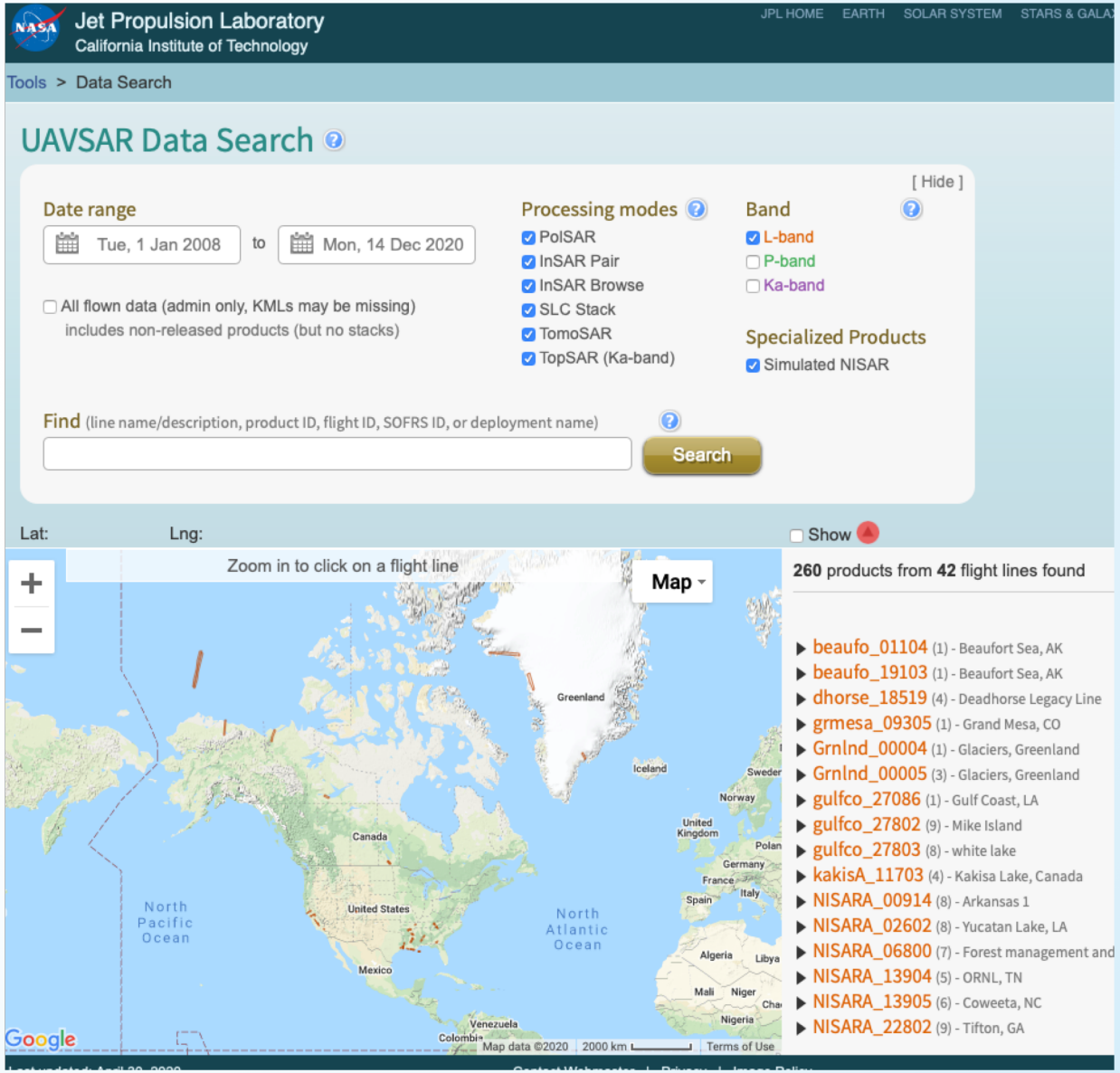


Water level change within wetland from UAVSAR (to 5mm)

Simulated NISAR Products

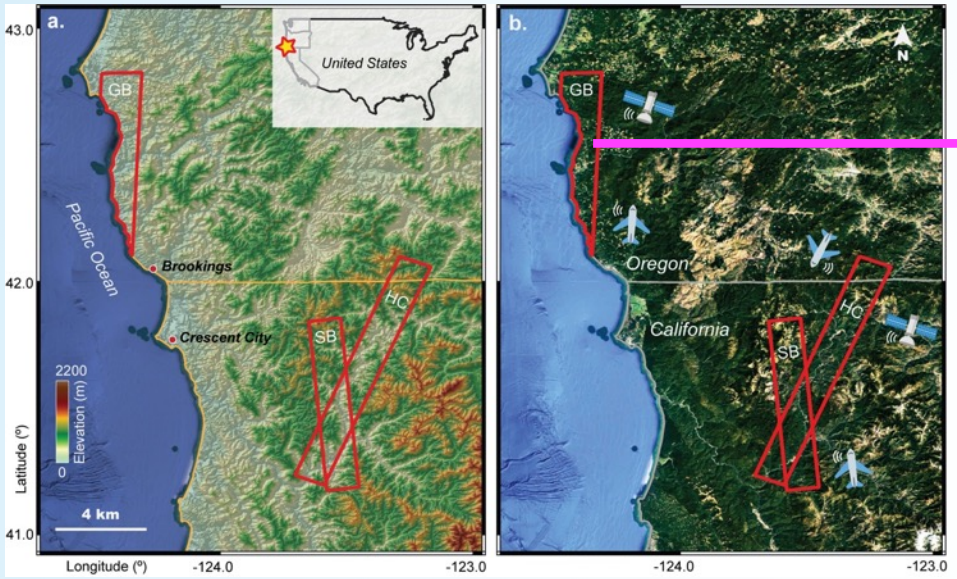
Emulate NISAR data characteristics and deliver products in NISAR data format to facilitate the science community on algorithm testing and tuning in preparation for the NISAR mission data

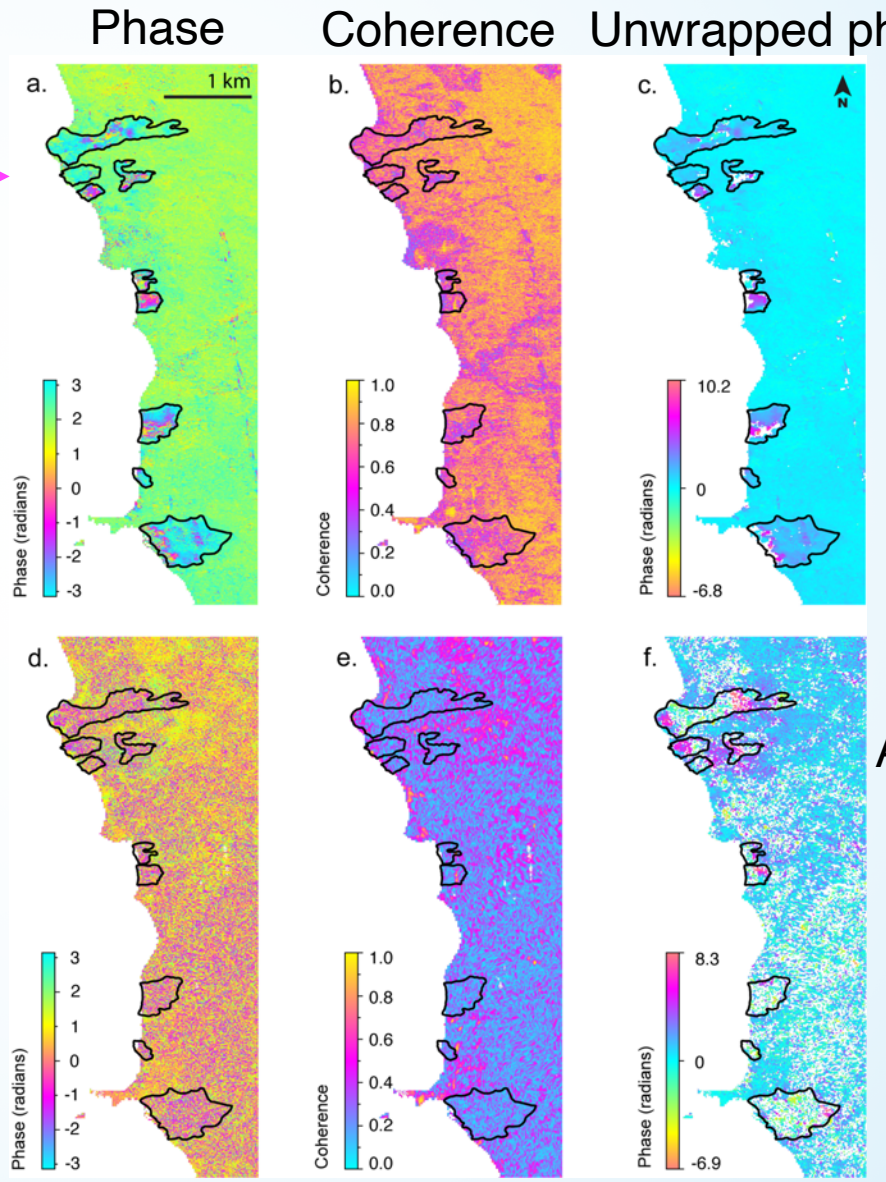
- Add additive noise to convert the UAVSAR NEσ_0 to NISAR ranges
- Sub-band UAVSAR 80 MHz SLC data in range to 20, 40 or 5 MHz sub-bands
- Deliver RSLC products in HDF5 files
- Data can be downloaded from UAVSAR website
- Working with ASF to ingest and host these products at ASF very soon



Landslide Studies with P-Band UAVSAR

UAVSAR P-band InSAR Dec 20/May21





UAVSAR
P Band

ALOS2/PALSAR2
L Band

- Fine pixel size → ability to detect small-sized geohazards;
- Flexible flying path → adjustable to increase sensitivity of deformation detection;
- Excellent vegetation penetration → improved InSAR coherence → reliable InSAR measurements;
- Also observed slightly reduced sensitivity to subtle ground deformation and decorrelation due to thick snow cover

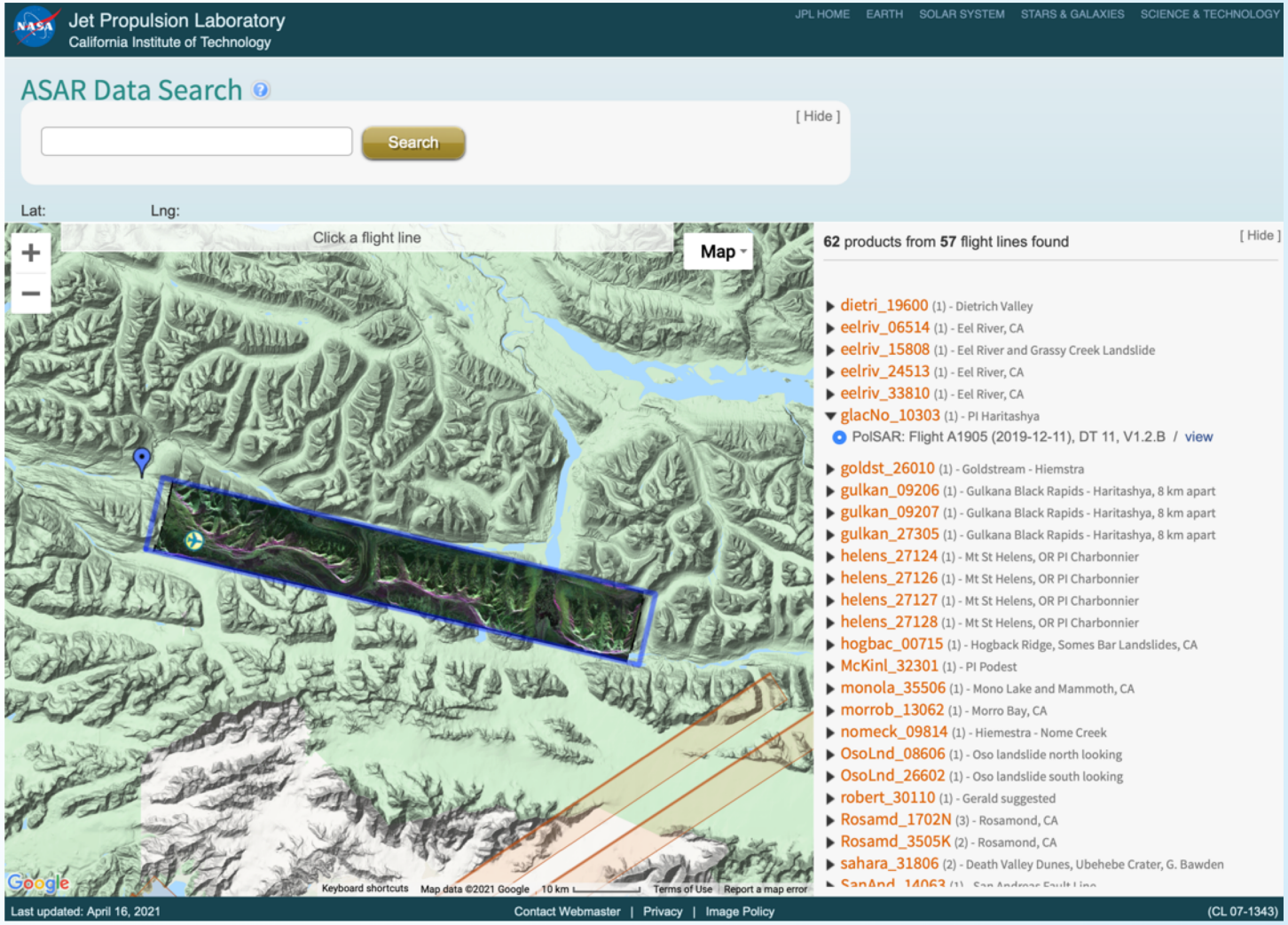
Next observation scheduled for the week of December 6, 2021

Credit:
Z. Lu, Y. Zheng

ISRO Airborne SAR Data Downloading Website

https://uavsar.jpl.nasa.gov/cgi-bin/asar-data.pl

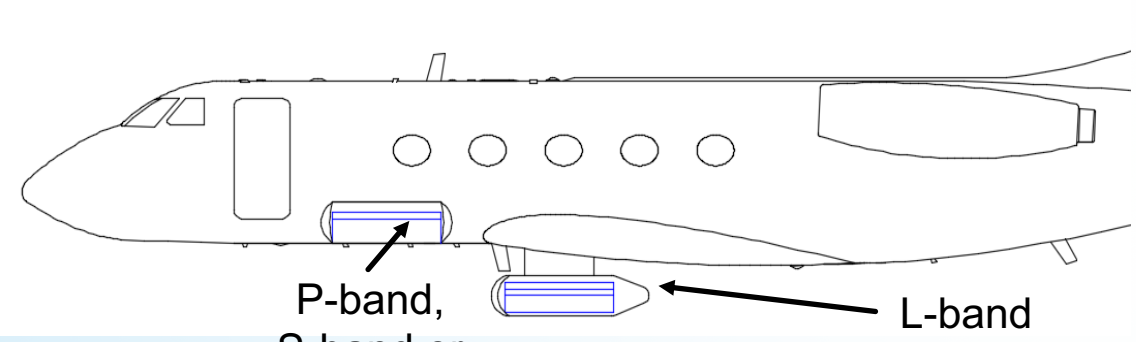
- Hosting L-band and S-band ASAR data acquired in the U.S. in 2019 and 2021
- Quad-pol SLC data in NISAR RSLC format (HDF5), GeoTiff and JPEG
- About 60% of the data acquired in December 2019 were delivered as of April 2021 before data delivery paused while ISRO team worked to improve geolocation accuracy
- Improved data have just arrived on Nov. 30, 2021 and will be available for download in a few days

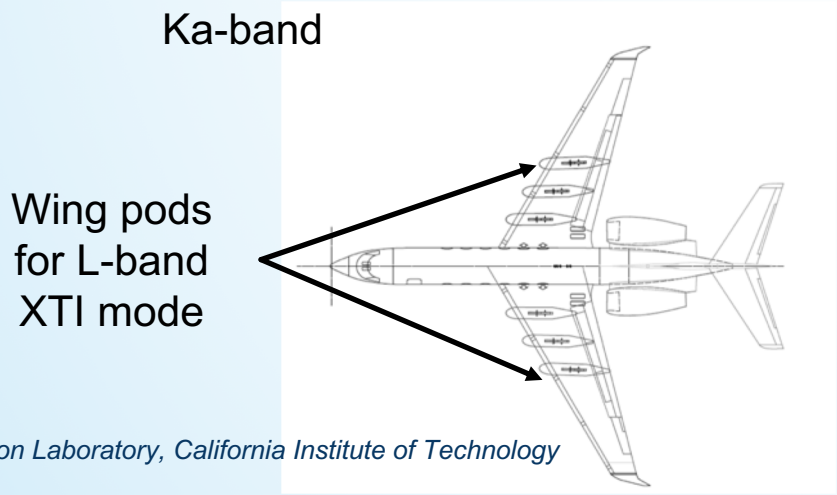


UAVSAR-NextGen Status

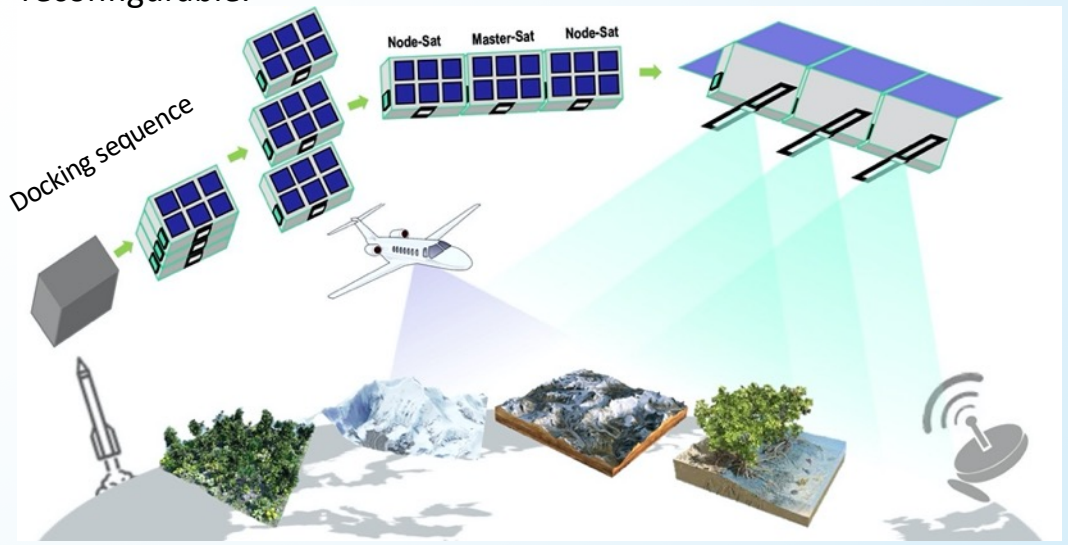
NextGen Objectives

- Ensure robustness of current capabilities
- Modernize UAVSAR capabilities so that it could be a testbed to push the envelope of future technologies that will enable future decadal surveys to make new measurements
- **Leveraging a new IIP to demonstrate flexible digital beamforming synthetic aperture with UAVSAR**

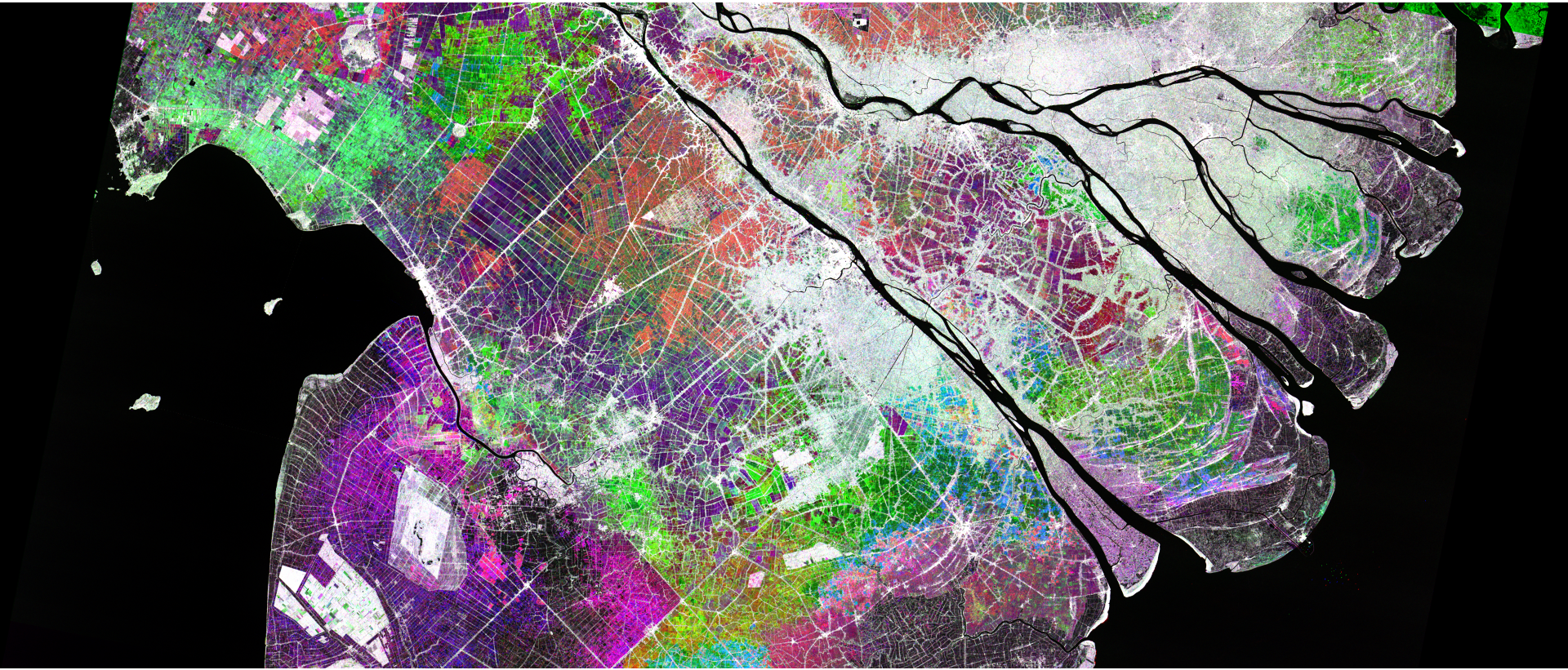




IIP concept with docked CubeSats to form a distributed aperture: Master-Sat performs digital beamforming and data downlinking for the Node-Sats. Flexible SAR aperture is expandable and reconfigurable.



ASF Update 2021



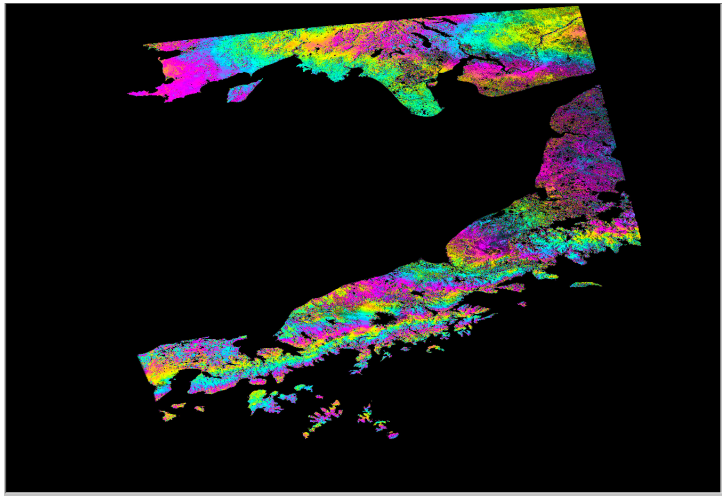
Wade Albright

ASF DAAC Manager

December 2, 2021

JAXA Data

- ALOS-1
  - AVNIR-2
    - all data in NASA EDC and actively distributing
  - PALSAR-1 – Global mirror
    - actively ingesting into NASA EDC (~50% complete)
    - data available for discovery and download as it is ingested
- ALOS-2
  - SCANSAR data mirror
    - Sample products received
    - Ingest pipeline creation underway
  - Restricted access 1500 new scenes/year
    - Received images over Alaska 8.2 quake
    - Received images over Haiti 7.2 quake

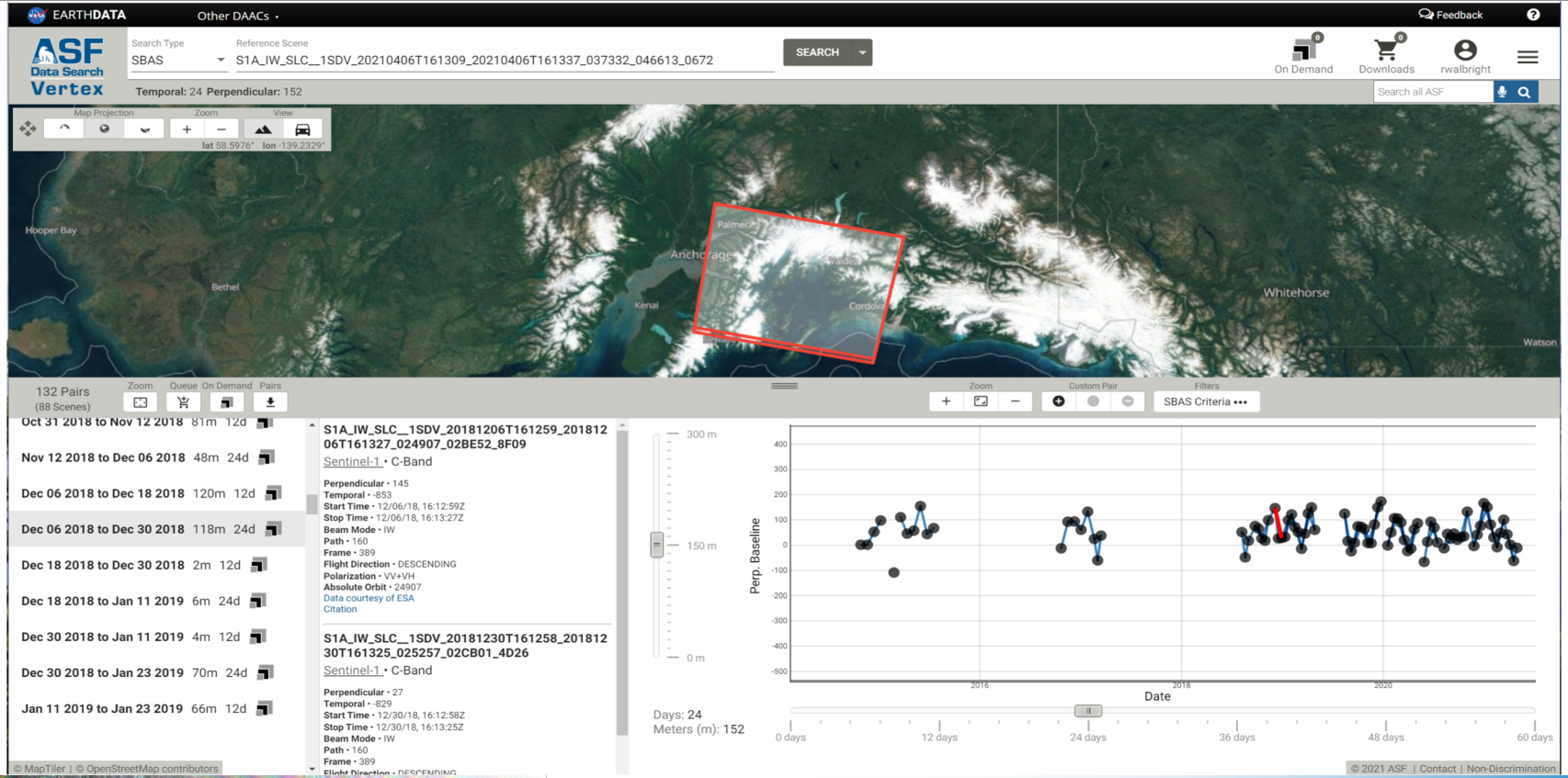


ALOS-2 Interferogram courtesy of Eric Fielding, JPL.

Sentinel-1 Coherence Dataset

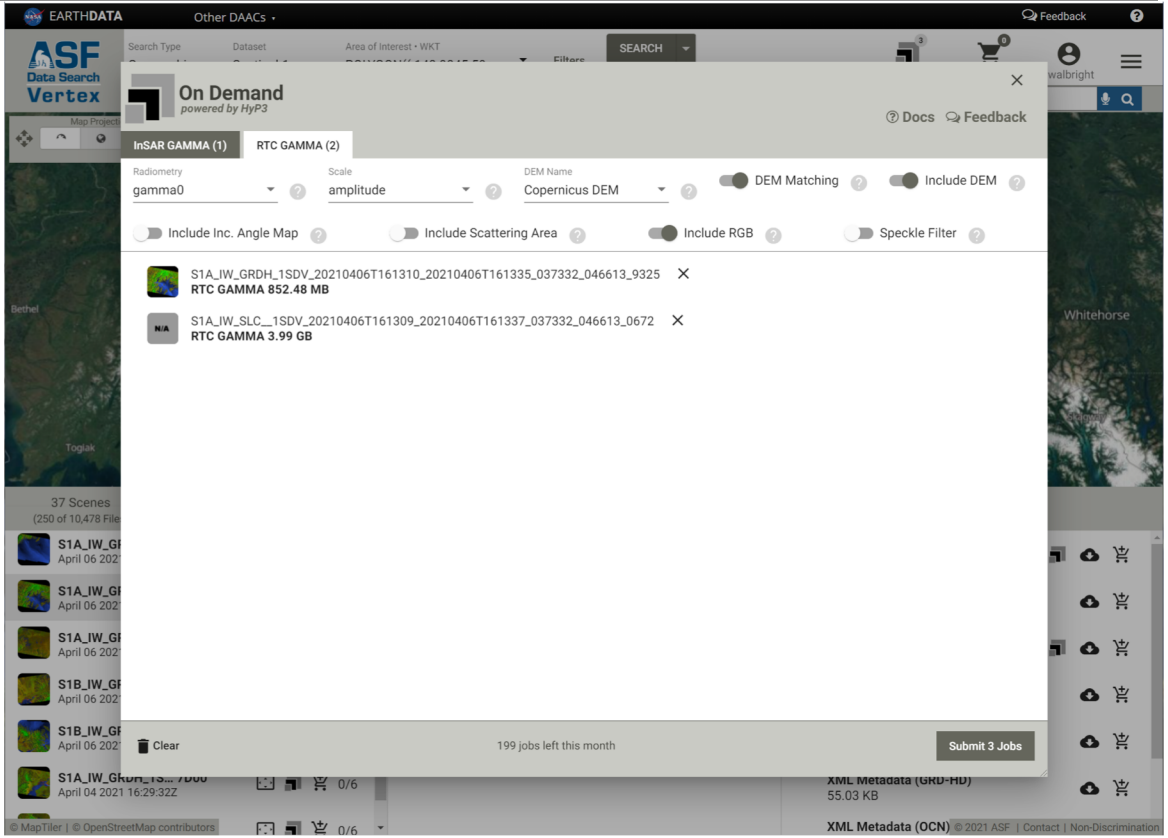
- Global Seasonal Sentinel-1 Interferometric Coherence and Backscatter Data Set
  - Source: Josef Kellndorfer
- Currently available in AWS Open Data Registry
  - https://registry.opendata.aws/ebd-sentinel-1-global-coherence-backscatter/
- Available at ASF DAAC soon
  - Will be hosted in EDC

Visualization & Discovery : SBAS



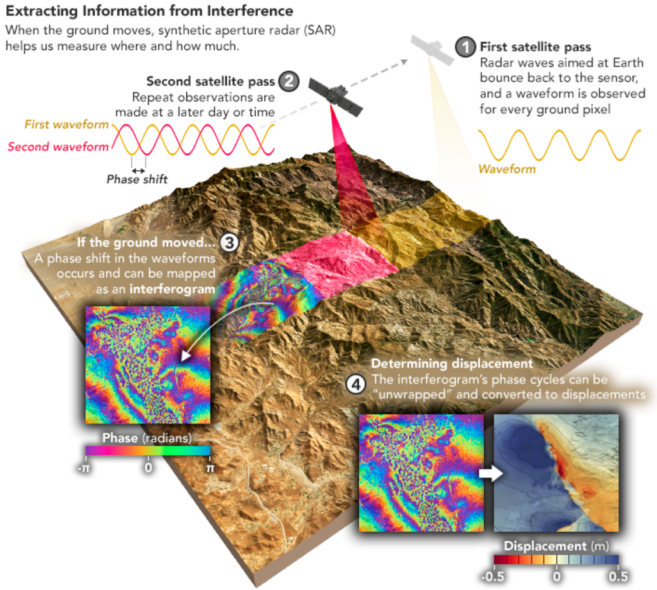
ASF Services : On Demand Product Generation

- InSAR
  - InSAR Story Map (guide)
  - MintPy
- autoRIFT
  - feature tracking
- RTC
  - RTC Story Map (guide)



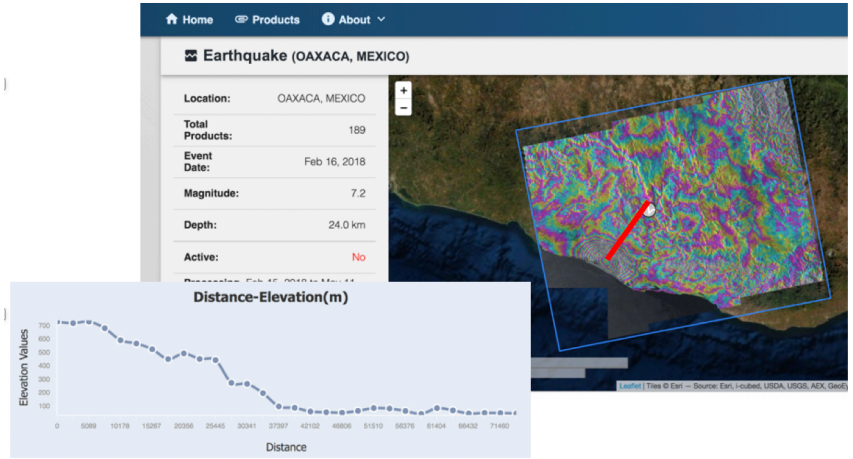
SNWG / OPERA

- ASF assigned Land Surface Displacement products
  - Ingest, Archive, Distribution
  - Burst-based search and discovery
  - Direct S3 Access
- Working closely with JPL OPERA team
- Product creation and validation initiated
  - S1 RTC and co-registered SLC stacks available in 2023
  - S1 Displacement products in 2024
  - NISAR Displacement products in 2025



SNWG/OPERA Tools and Services

- ASF will build tools and services to interact with the products directly
  - Integrated with Vertex and/or standalone
- Interactive exploration of the products
  - Query time series by pixel or small area
    - RTC products
  - Double difference
    - Displacement between two points
  - Transect Lines
    - Displacement along a line





QUESTIONS ?

Join us at AGU

–G34A - Highlights From the SAR Community Supported by ASF's 30-Year Quest for Making SAR Data Accessible I Oral [Wed 12/15/21; 2:30 PM – 3:45 PM EST]

–G35C - Highlights From the SAR Community Supported by ASF's 30-Year Quest for Making SAR Data Accessible II Poster [Wed 12/15/21; 4 PM – 6 PM EST]