

WInSAR Operations Report

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(with considerable contributions from Fran Boler, Susanna Gross, Cassidy Jay)

AGU WInSAR Business Meeting,

December 5, 2012

Contact: winsar@unavco.org or supersites@unavco.org

WInSAR Funding

NSF/NASA WInSAR Grant (*completed as of 5/2012*)

NSF/NASA/USGS funding -Comprehensive EarthScope SAR Archive

\$370,545

2010-2011; startup 8/10

Work Plan, budget were realigned during 2011-12

Currently in no-cost extension period

WInSAR support becomes part of GAGE Facility operations starting fall 2013 – No support for data purchase or significant software development.

UNAVCO SAR Archive Summary

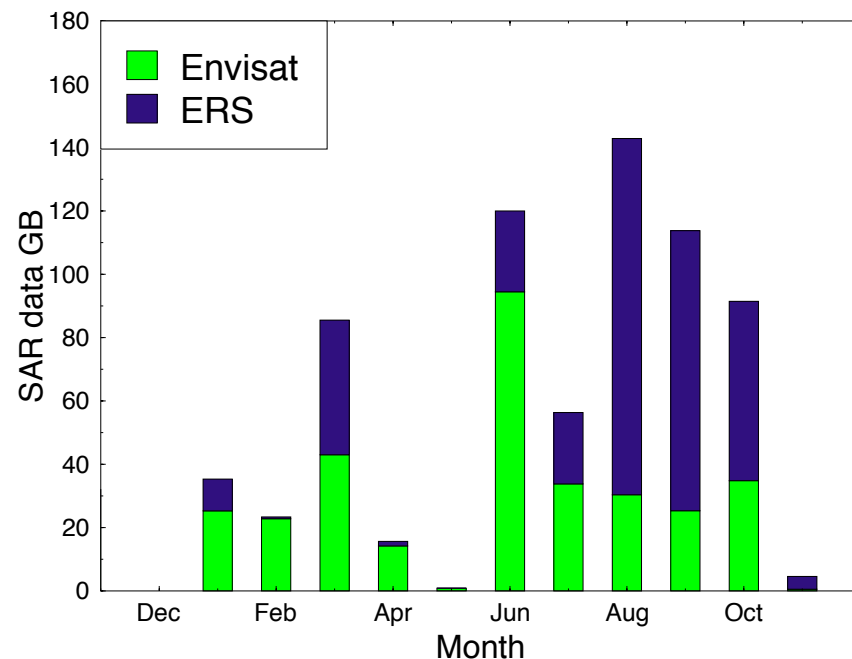
Data accessible via UNAVCO
WInSAR/EarthScope/Supersites
Searchable Catalog

20.4 TB WInSAR + EarthScope

➤ 5% increase over last 12 months

- TerraSAR-X: 321 GB added in 2012
- ERS 10.4 TB
 - increase of 406 GB from Dec. 2011
- Envisat: 3.1 TB
 - increase of 348 GB from Dec. 2011

WInSAR data delivered by ESA in 2012



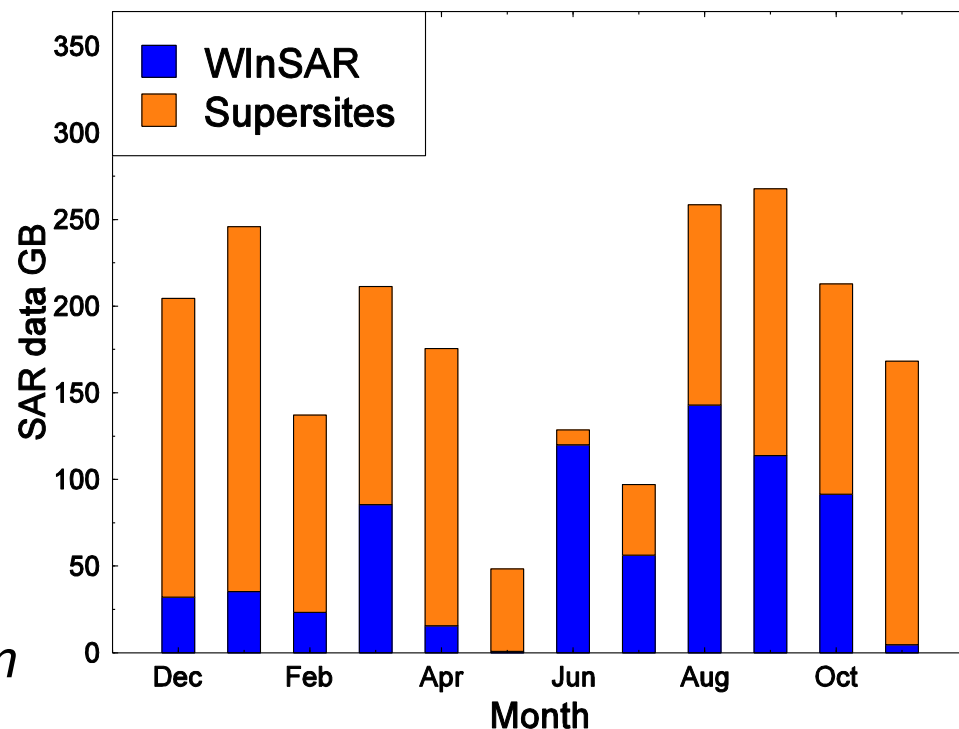
Supersites Archive Summary

Data are “in the cloud” on two ESA-supported systems. Discoverable via UNAVCO Searchable Catalog

- 1.4 TB/9560 scenes added this year
- ERS: 21,295 files
- Envisat: 19,177 files
- Radarsat: 217 GB
- ALOS: 74 GB
- TerraSAR-X: 17 GB

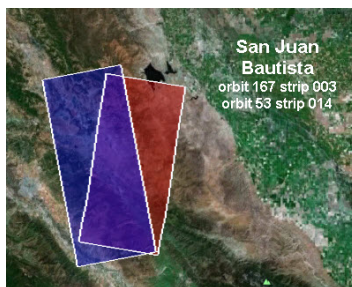
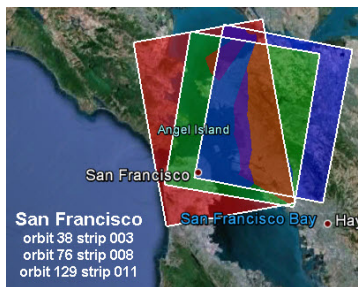
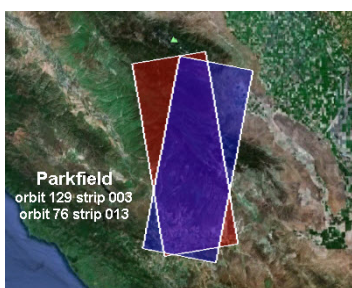
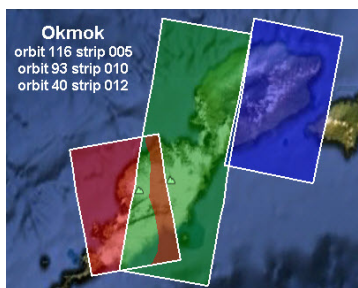
Requires Supersites credentials from ESA to download

SAR data delivered by ESA in 2012



WInSAR TerraSAR-X Tasking

- Tasking orders placed for 28 targets
- 1,208 background acquisitions requested since Dec. 1, 2011
- See summary page: http://winsar.unavco.org/tasking_tsx.html



Okmok	5	17										
	5	116	10/20/2012	10/31/2012	11/11/2012	11/22/2012	12/3/2012	12/14/2012	12/25/2012			
	10	93	10/19/2012 (3)	10/30/2012	11/10/2012	11/21/2012	12/2/2012	12/13/2012	12/24/2012			
	12	40	10/15/2012	10/26/2012	11/6/2012	11/17/2012 (5)	11/28/2012	12/9/2012	12/20/2012			
Parkfield	3	129	10/21/2012 (6)	11/1/2012	11/12/2012	11/23/2012	12/4/2012	12/15/2012	12/26/2012			
	13	76	10/18/2012 (3)	10/29/2012	11/9/2012 (3)	11/20/2012 (3)	12/1/2012	12/12/2012	12/23/2012			
San Francisco	3	38	10/15/2012 (3)	10/26/2012 (3)	11/6/2012	11/17/2012 (3)	11/28/2012 (3)	12/9/2012	12/20/2012			
	8	76	10/18/2012 (3)	10/29/2012 (3)	11/9/2012 (3)	11/20/2012 (3)	12/1/2012	12/12/2012	12/23/2012			
	11	129	10/21/2012 (6)	11/1/2012	11/12/2012 (6)	11/23/2012	12/4/2012	12/15/2012	12/26/2012			
San Juan Bautista	3	167	10/13/2012 (3)	10/24/2012	11/4/2012 (3)	11/15/2012	11/26/2012 (3)	12/7/2012	12/18/2012			
	14	53	10/16/2012	10/27/2012	11/7/2012 (3)	11/18/2012 (5)	11/29/2012 (5)	12/10/2012	12/21/2012			

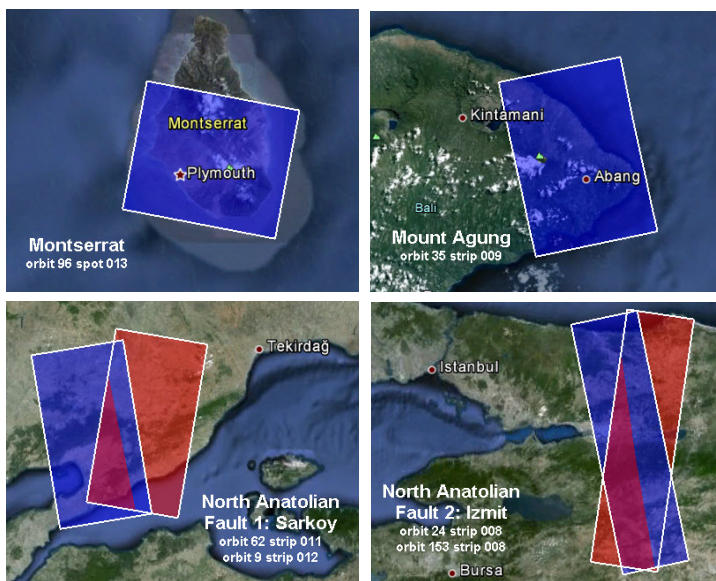
Totals since July 2011:

Count:	BeingCancelled/EXPIRED **	666
	BeingCancelled/FAILED (SCREENING_FAILED)	14
	BeingProcessed/EXPIRED	0
	BeingProcessed/UNPLANNED	70
	BeingProcessed/PLANNED	4
	BeingProcessed/COMPLETE	3
	BeingProcessed/SCREENED	1
	Completed/SCREENED	362
	Completed/DELIVERED	606
	Total:	1726
	Used against quota (1500):	
	Completed/SCREENED	362
	Completed/DELIVERED	606
	Total:	968
	Remaining quota:	532

Updated 11/30/12

Supersites TerraSAR-X Tasking

- Tasking orders placed for 29 targets
- 613 background acquisitions requested since Dec. 1, 2011
- See summary page:
<http://supersites.earthobservations.org/terrasarx.php>



Montserrat	13	96	10/19/2012	10/30/2012	11/10/2012	11/21/2012	12/2/2012	12/13/2012	12/24/2012	1/4/2013
Mt. Agung	6	149	10/15/2012	10/26/2012	11/6/2012 (3)	11/17/2012	11/28/2012	12/9/2012	12/20/2012	12/31/2012
NAF1-Sarkoy	11	62	10/17/2012	10/28/2012	11/8/2012	11/19/2012	11/30/2012	12/11/2012	12/22/2012	1/2/2013
	12	9	10/24/2012 (4)	11/4/2012	11/15/2012	11/26/2012 (3)	12/7/2012	12/18/2012	12/29/2012	1/9/2013
NAF2-Izmit	8	24	10/25/2012 (4)	11/5/2012	11/16/2012	11/27/2012	12/8/2012	12/19/2012	12/30/2012	1/10/2013
	8	153	10/23/2012 (3)	11/3/2012	11/14/2012 (3)	11/25/2012 (3)	12/6/2012	12/17/2012	12/28/2012	1/8/2013
NAF3-Ismetpasa	7	77	10/18/2012	10/29/2012	11/9/2012	11/20/2012	12/1/2012	12/12/2012	12/23/2012	1/3/2013
	9	115	10/20/2012	10/31/2012	11/11/2012	11/22/2012	12/3/2012	12/14/2012	12/25/2012	1/5/2013
NAF4-West Erzincan	10	16	10/25/2012 (2)	11/5/2012	11/16/2012	11/27/2012	12/8/2012	12/19/2012	12/30/2012	1/10/2013
	13	130	10/21/2012	11/1/2012 (4)	11/12/2012	11/23/2012	12/4/2012	12/15/2012	12/26/2012	1/6/2013

Count:	BeingCancelled/EXPIRED **	311
	BeingCancelled/FAILED (SCREENING_FAILED)	3
	BeingProcessed/EXPIRED	0
	BeingProcessed/UNPLANNED	84
	BeingProcessed/PLANNED	3
	BeingProcessed/COMPLETE	1
	BeingProcessed/SCREENED	4
	Completed/SCREENED	79
	Completed/DELIVERED	128
	Total:	613

Updated 11/30/12

Work Plan Changes Infrastructure Upgrade

Due to changed ESA Policy (data and tasking at no charge), a realignment of the budget/work plan was made through planning with the EC and NSF

UNAVCO SAR Archive released July, 2012

Accomplishments:

- Upgrade storage systems at UNAVCO (storage doubled to ~96 Tb)
- Upgrade web server, database server and ingest processing servers
- Database schema redesign
- SAR application programming interface (API)
- Site redesign and migration to new database

The screenshot shows the UNAVCO SAR Archive search interface. The browser address bar displays the URL: `facility.unavco.org/SarArchive/flexweb/SearchSarScene.html`. The page title is "UNAVCO SAR Archive". Below the title, there is a search form with the following fields and options:

- Search Screen** (selected)
- Search** button and **Reset Search Form** button
- Start Date**: (YYYY-MM-DD)
- End Date**: (YYYY-MM-DD)
- Orbit**: (e.g., 30000)
- Track**: 127 (e.g., 10-20)
- Frame**: (e.g., 1-100)
- Beam Swath**: (e.g., F1, S1)
- Max Results per Page**: (1 to 1000)
- Satellite (selected: 2)**:
 - EHV1
 - ERS1
 - ERS2
 - RSAT
 - TSX1
- Collection (selected: 4)**:
 - WinSAR ESA
 - EarthScope ESA
 - EarthScope CSA
 - SuperSites
 - TSX lanelung_RES1513
 - TSX kundgren_GE00192
 - TSX mpoland_GE00875
 - WinSAR Orderable

On the right side of the page, there is a map of the United States with a blue search polygon drawn over the western and central regions. The map includes state names and a "Draw Search Polygon" control.

Ongoing work funded until FY14 (GAGE)

Data Ordering, Tasking, Community Support

- Continue data ordering, tasking and general WInSAR support
- With NASA portion of funds, continue Supersites support

Enhanced support for TSX & ALOS-2 data:

- Builds on existing SAR archive capabilities
- Interface to allow PI to manage Co-Is and authorized users for a given collection (addresses DLR policy)

ISCE licenses and software distribution:

- facilitating distribution, providing help desk support for ISCE users.

New NASA ACCESS funded project: **Seamless SAR Archive (SSARA):**

- Partners: UNAVCO/WInSAR, ASF, JPL, OpenTopography/SDSC
- Design and implement a seamless distributed access system for SAR data and derived interferometric data products.



Seamless Synthetic Aperture Radar (SAR) Archive for Interferometry Analysis

PI: Charles Meertens, UNAVCO

Objective

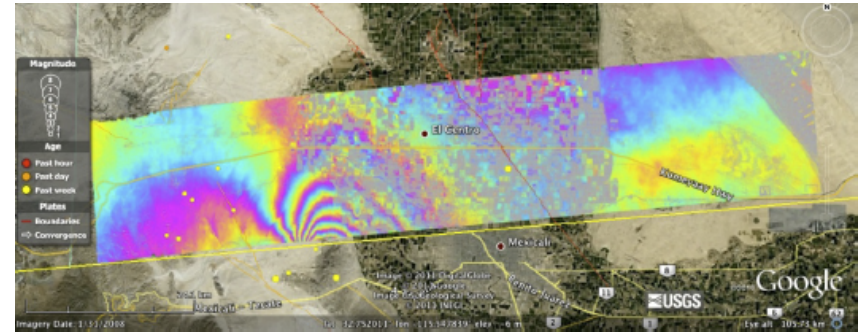
- Develop and implement a federated metadata query and data product download capability from distributed airborne (NASA UAVSAR) and spaceborne SAR archives at ASF and UNAVCO/WInSAR.
- Define and make available new QC parameters and products that will enhance the usability of data and data products from these existing NASA-funded collections.
- Implement a web services enabled terrain correction service for interferometry (InSAR) using NASA SRTM data at SDSC.
- Enhance ASF InSAR processing service to access distributed data collections, utilize terrain correction service, and generate enhanced QC products.
- Establish processed data products archive.

Approach

- Harmonize and enhance ASF and UNAVCO SAR APIs
- Enhance existing web services to provide federated query capability.
- Create terrain correction service from SDSC OpenTopography and integrate JPL tropospheric correction services.

Co-Is/Partners

Jeremy Nicoll, Alaska Satellite Facility; Eric Fielding, JPL, Chaitan Baru, San Diego Supercomputing Center



Enhanced access will be provided to NASA UAVSAR interferogram such as this one showing deformation from the 2010 Mw 7.2 earthquake in Baja California, Mexico.

Key Milestones

- Alignment of ASF and UNAVCO SAR metadata and API definitions 07/12
- Federated search and retrieval of SAR data 12/12
- Implement beta terrain correction service 03/13
- Establish InSAR product archives at ASF and UNAVCO 06/13
- Science evaluation and validation of ASF processing service 09/13
- Final release of UNAVCO and ASF archive web tools and APIs 03/14

TRL_{in} = 5

TRL_{current} = 5

ACCESS

UNAVCO SAR GUI Demo

<http://facility.unavco.org/SarArchive/flexweb/SearchSarScene.html>

The screenshot displays the UNAVCO SAR Archive search interface. On the left is the 'Search Screen' with various filters and search options. On the right is a map of North America with a search polygon drawn over the United States.

Search Screen

Search

Start Date (YYYY-MM-DD)

End Date (YYYY-MM-DD)

Orbit (e.g., 30000, 31000-32000)

Track (e.g., 10-20, 100-110)

Frame (e.g., 1-100)

Beam Swath (e.g., P1, S1, W1, STD)

Max Results per Page (1 to 1000; default 1000)

- Satellite
- Collection
- Archive Status (selected: 1)
- Beam Mode
- Flight Direction
- Scene Size
- Polarization
- Format (selected: 4)
- Processing Type

Draw Search Polygon: On Off

The map shows a search polygon drawn over the United States, covering areas from the Gulf of California to the Gulf of St. Lawrence. The map includes labels for various states and provinces, as well as neighboring countries like Canada, Mexico, and Central/South America. The interface also includes a 'Send Feedback API Docs' link in the top right corner.

Unified Seamless SAR Archive (SSARA) API

The APIs use simple calling conventions, so URLs for searching are built as follows:

[http://facility.unavco.org/SarArchive/SarScene?<QUERYFIELD>=value\(s\)&<QUERYFIELD>=value\(s\)&...](http://facility.unavco.org/SarArchive/SarScene?<QUERYFIELD>=value(s)&<QUERYFIELD>=value(s)&...)

[http://api.daac.asf.alaska.edu/services/search/param?<QUERYFIELD>=value\(s\)&<QUERYFIELD>=value\(s\)&...](http://api.daac.asf.alaska.edu/services/search/param?<QUERYFIELD>=value(s)&<QUERYFIELD>=value(s)&...)

Query Field	Description	Input Values
platform	Name of satellite or airborne mission	Long name of platform (ie. ERS-1,RADARSAT-1,ENVISAT...)
relativeOrbit	List or range of values for the "track" or "path" of the scene	Integer value(s) for the relative orbit
absoluteOrbit	List or range of values for the orbit number	Integer value(s) of the absolute orbit
intersectsWith	Geographic area of interest for the search	Well-known text (WKT) format POINT/LINE/POLYGON
frame	List or range of values for the frame number of the scene	Integer value(s) for the frame
start	Starting date and time of search range	ISO 8601 formatted date (YYYY-MM-DD HH:MM:SS)
end	Ending date and time of search range	ISO 8601 formatted date (YYYY-MM-DD HH:MM:SS)
beamMode	Operating mode(s) of the sensor (comma separated list)	Fine,Standard,Wide Swath
beamSwath	Swath name(s) for scene (comma separated list)	ST1,ST2,...,FN1,FN2,...,S1,S2,...,strip_003,strip_004,...
flightDirection	Specifies the direction the platform is traveling	A or D
lookDirection	Specifies the direction the sensor is looking	R or L
polarization	Polarization mode(s) of the sensor (comma separated list)	HH,VV,HV,VH,HH+HV,VV+VH,HH+VV,HH+VV+HV+VH
collectionName	List of collections to include in search	WInSAR,EarthScope ESA,EarthScope CSA,ASF
processingLevel	List of product levels to include in search	L0,SLC...

API Example

Example call to UNAVCO API:

<http://facility.unavco.org/SarArchive/SarScene?platform=ENVISAT&collectionName=WInSAR%20ESA&relativeOrbit=1>

Example of JSON Output:

```
{ "resultList": [ { "platformName": "ENVISAT", "relativeOrbit": 1, "absoluteOrbit": 13081, "firstFrame": 2547, "finalFrame": 2565, "collectionName": "WInSAR ESA", "stringFootprint": "POLYGON ((178.634326 51.638475, 179.011411 52.58769, 177.443519 52.814771, 177.102191 51.862306, 178.634326 51.638475))", "startTime": "2004-08-30 22:35:17", "stopTime": "2004-08-30 22:35:33", "beamMode": "IM", "beamSwath": "S2", "flightDirection": "D", "lookDirection": "R", "polarization": "VV", "processingLevel": "L0", "downloadUrl": "http://facility.unavco.org/data/sar/lts1/winsar/ENV2/1/2565/ENV1_2_01_2565_13081.baq", "thumbnailUrl": "http://facility.unavco.org/data/sar/lts2/lt/thumbnails/ENVISAT-1/13081/1/2547/20040830T223509570-20040830T223524660_D_T-XI0B.jpg"}, { ... }, ... ], "requestParameters": { "platform": "ENVISAT", "relativeOrbit": "1", "collectionName": "WInSAR ESA" }, "message": "", "status": "SUCCESS", "count": 8 }
```


Command Line Clients

`unavco_api_client.py` and `federated_query.py` (BETA VERSION)

- Written in Python (needs 2.6+, tested on 2.6 and 2.7)
- Similar functionality to `getSAR.pl`
- Implements all the API features
- Option to output a **KML** and/or **download** results

More information:

SSARA Poster
Wednesday Morning
IN31A-1500

API Demo
UNAVCO Booth
Wednesday
2:30-3:30