SAR Archive and Community Support Activities at UNAVCO

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What is UNAVCO?

- UNAVCO, a non-profit university-governed consortium, facilitates geoscience research and education using geodesy.

- Under a 2013 award from the National Science Foundation (NSF), UNAVCO operates the National Earth Science Geodetic Facility, known as the Geodesy Advancing Geosciences and EarthScope (GAGE) Facility. UNAVCO provides supporting services that include:

1. The Plate Boundary Observatory (PBO), an integrated set of geodetic networks (cGPS, real-time GPS, borehole strainmeters, tiltmeters and seismometers, and metpacks) that forms the world-class geodesy component of EarthScope,

2. a facility that provides engineering, instrumentation, and data services to NSF-funded investigators who use terrestrial and satellite geodetic technologies (e.g., TLS, GPS, and InSAR) in Earth science research as well as Geosciences more broadly,

3. network operations to support NSF-funded community GPS networks for Earth, atmospheric, and polar science applications, and the NASA's Global GNSS Network (GGN), and

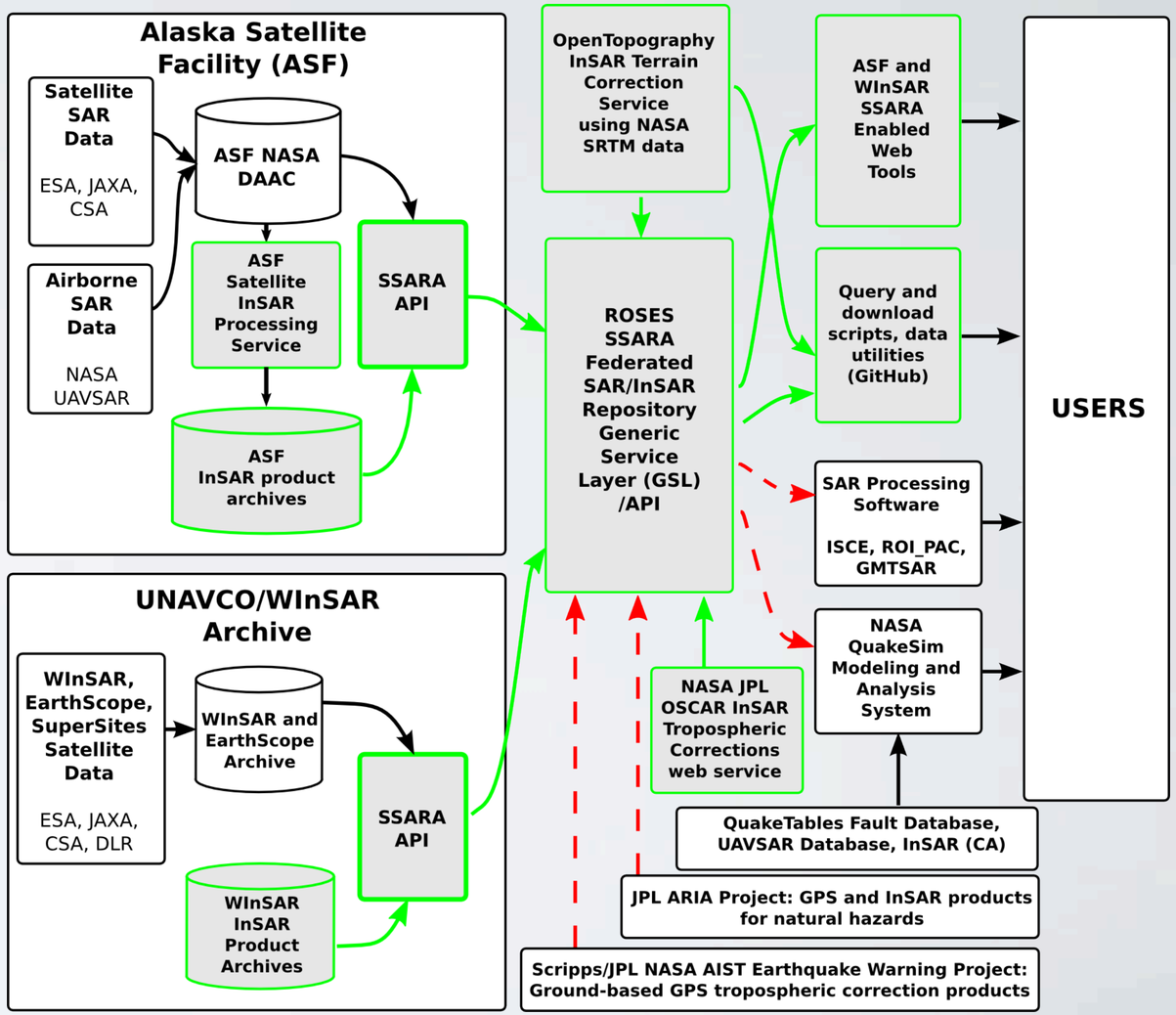
4. PI planning support and core programs to advance geoscience education resources and geodesy community engagement.

Outline

- Seamless SAR Archive (SSARA)
- UNAVCO SAR archive and WInSAR support
- Geohazards Supersites and Natural Laboratories (GSNL) support

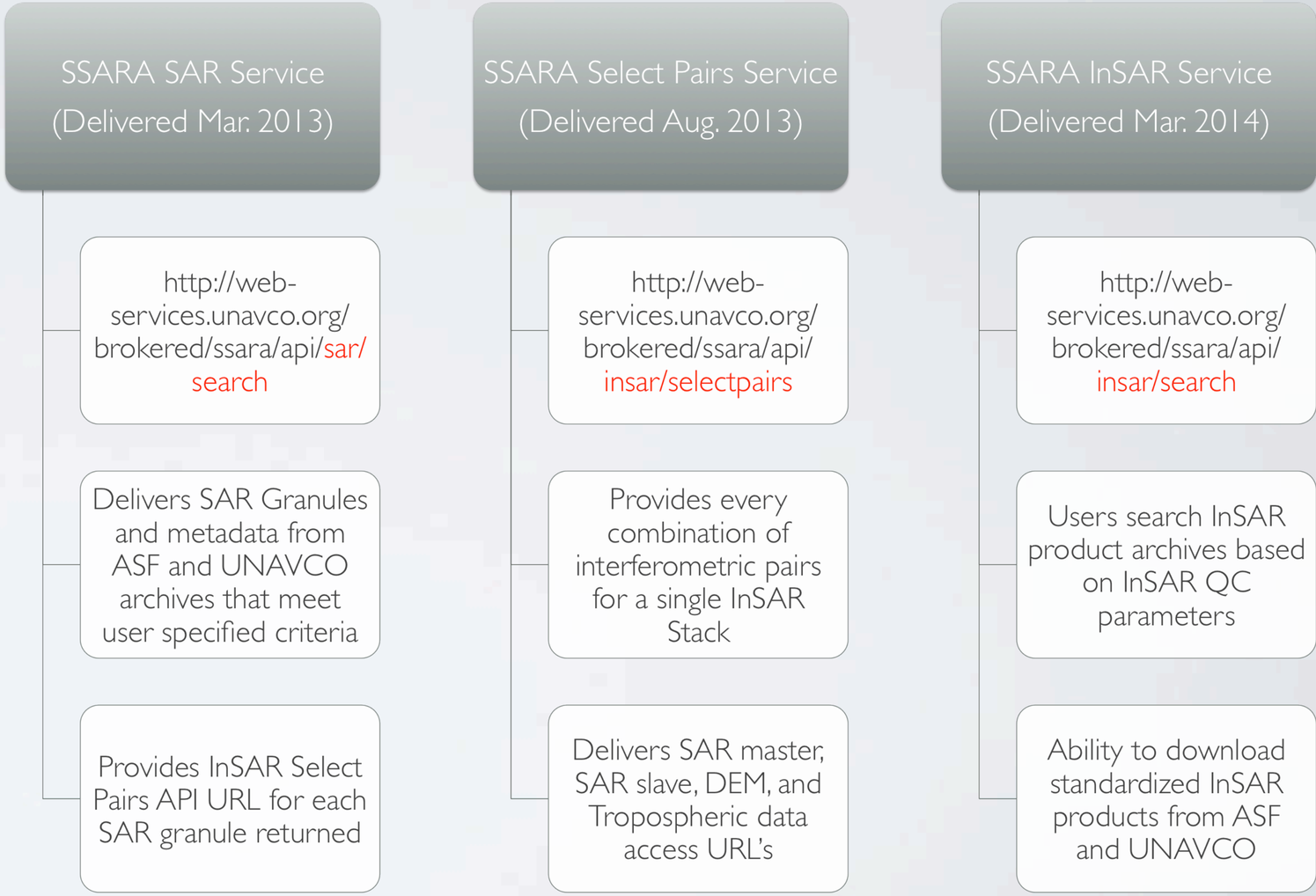
What is SSARA?

- NASA funded project between UNAVCO, ASF, JPL, and SDSC/OpenTopography.
  NASA ROSES ACCESS project NNX12AF62A
- Develop and implement a federated metadata query and data product download capabilities from SAR archives at ASF and UNAVCO/WInSAR
- Define and implement new QC parameters and products to enhance the usability of data from these existing NASA-funded collections
- Develop standard formats for image products such as interferograms, tropospheric measurements, and terrain corrections
- Implement a web services enabled terrain correction service using NASA SRTM data at OpenTopography
- Enhance ASF SAR interferogram processing service to access distributed SSARA data collections, utilize terrain correction service and generate enhanced QC products
- Establish processed data products archive (interferograms and QC products) at ASF and UNAVCO



SSARA API

- Initial development was on searching for SAR data and providing a unified, consistent API between UNAVCO and ASF
- Further API development and enhancements added more InSAR specific keywords and quality control parameters (Doppler centroid, faraday rotation, InSAR stack size, and perpendicular baselines).
- To facilitate InSAR processing, the federated query service incorporated URLs for DEM (from OpenTopography) and tropospheric corrections (from the JPL OSCAR service) in addition to the URLs for SAR data.
- The federated query service provides relevant QC metadata for selecting pairs of SAR data for InSAR processing and all the URLs necessary for interferogram generation.



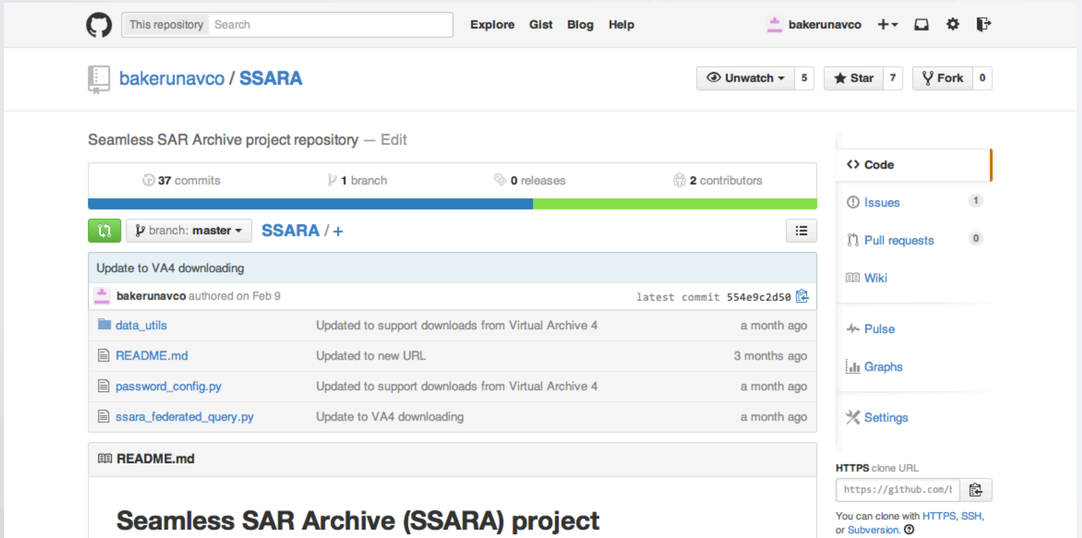
SSARA API

Searching for data

Web Service Root URL:
http://web-services.unavco.org/brokered/ssara/

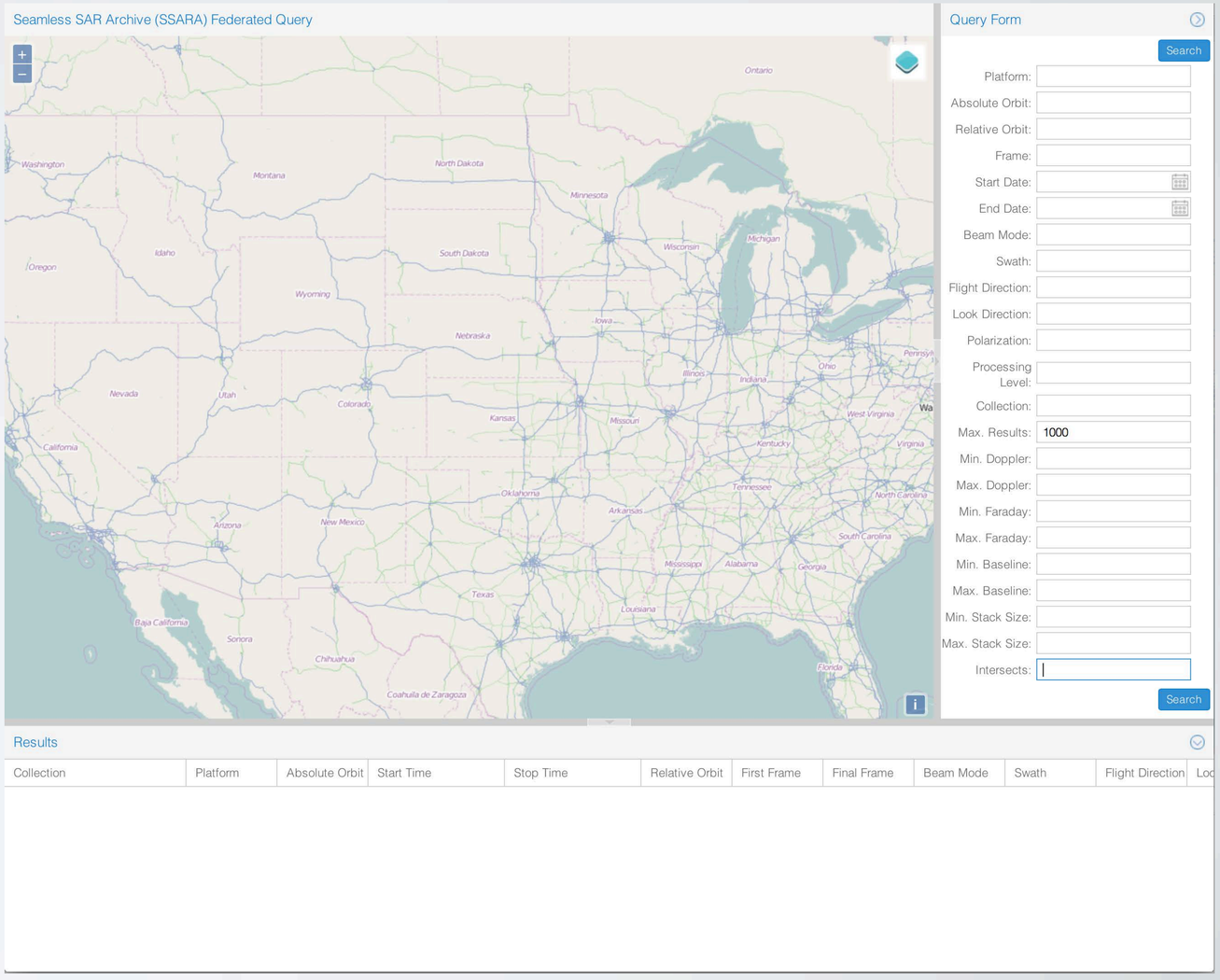
Command Line Client and Utilities:
https://github.com/bakerunavco/SSARA
- Automated downloads from UNAVCO, ASF, and ESA Virtual Archive 4 (via secp)
- HDF5 converter for InSAR product archive
- DEM converted for ROI_PAC and ISCE

git clone https://github.com/bakerunavco/SSARA.git



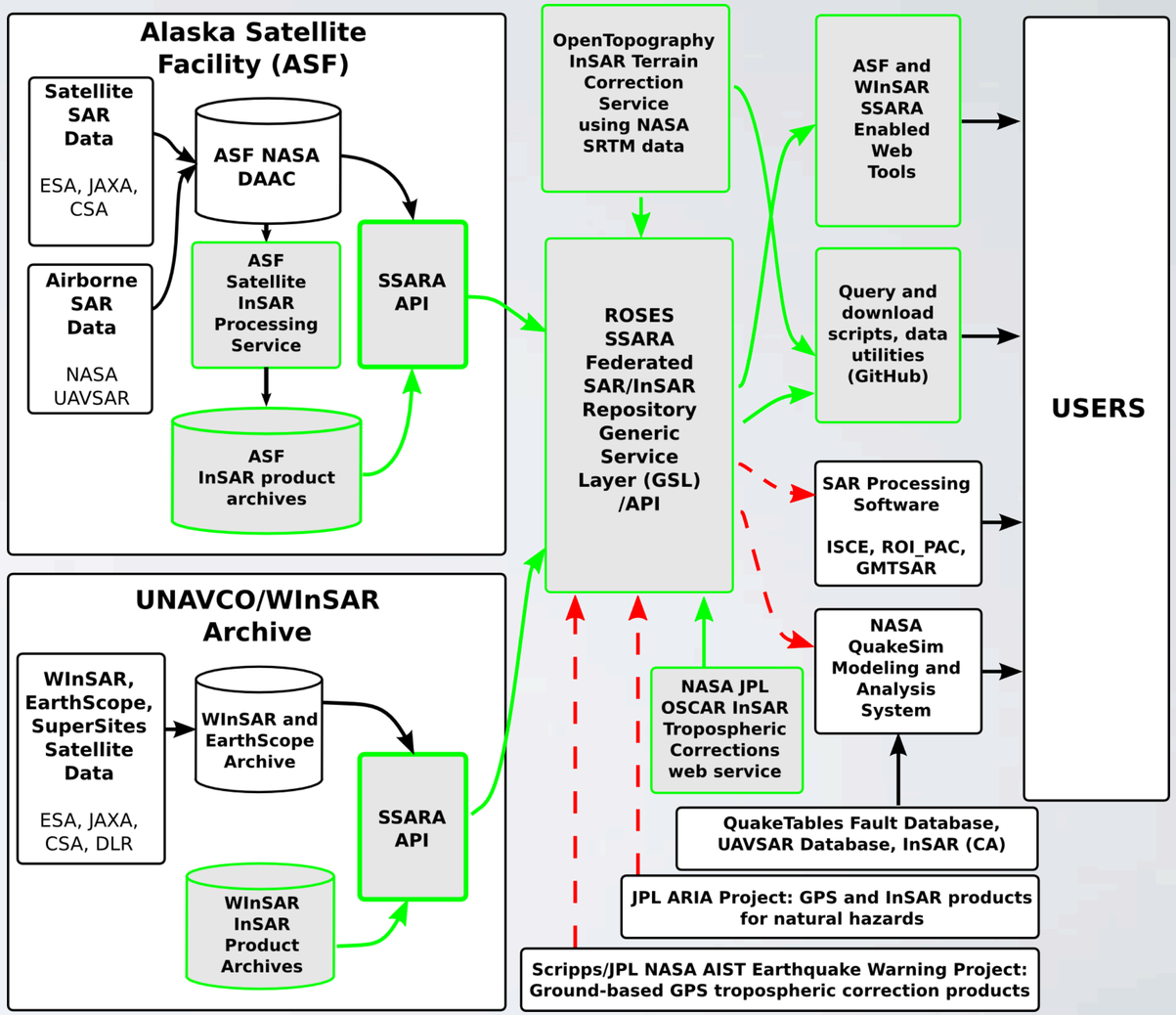
New web GUI for searching

http://web-services.unavco.org/brokered/ssara/gui



Key Benefits of SSARA

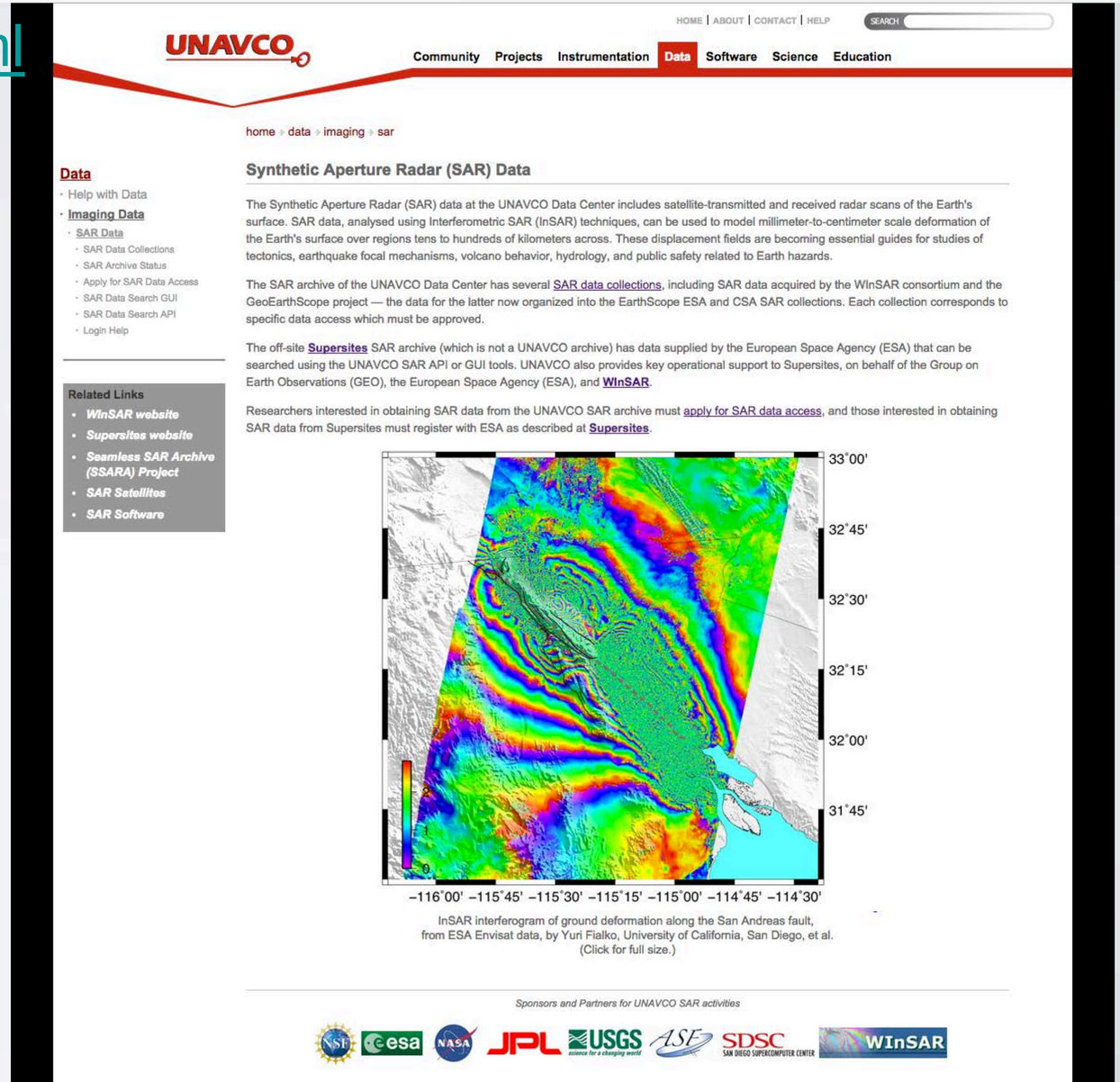
- Provides common search terms and results
- One search location for all SAR data. Researchers/scientists have a single interface to search for SAR data and higher level products.
- Users can easily see what data is “available”, but still need to have credentials to access data at each archive
- More time is spent doing science with the data rather than searching for data



UNAVCO SAR Archive

http://www.unavco.org/data/imaging/sar/sar.html

- The UNAVCO SAR archive has over 140,000 scenes totaling over 25 TB
- Data are organized into collections that allow access control based on user authorization
- ERS-1/2, RADARSAT-1, ENVISAT (Limited to North America). These are the EarthScope and WInSAR data collections
- Organization and distribution of TerraSAR-X for WInSAR PIs. Each proposal has its own collection with limited user access
- Some Supersites data (CSK, RSAT-2 for Hawaii and Sinabung) organized into collections as well



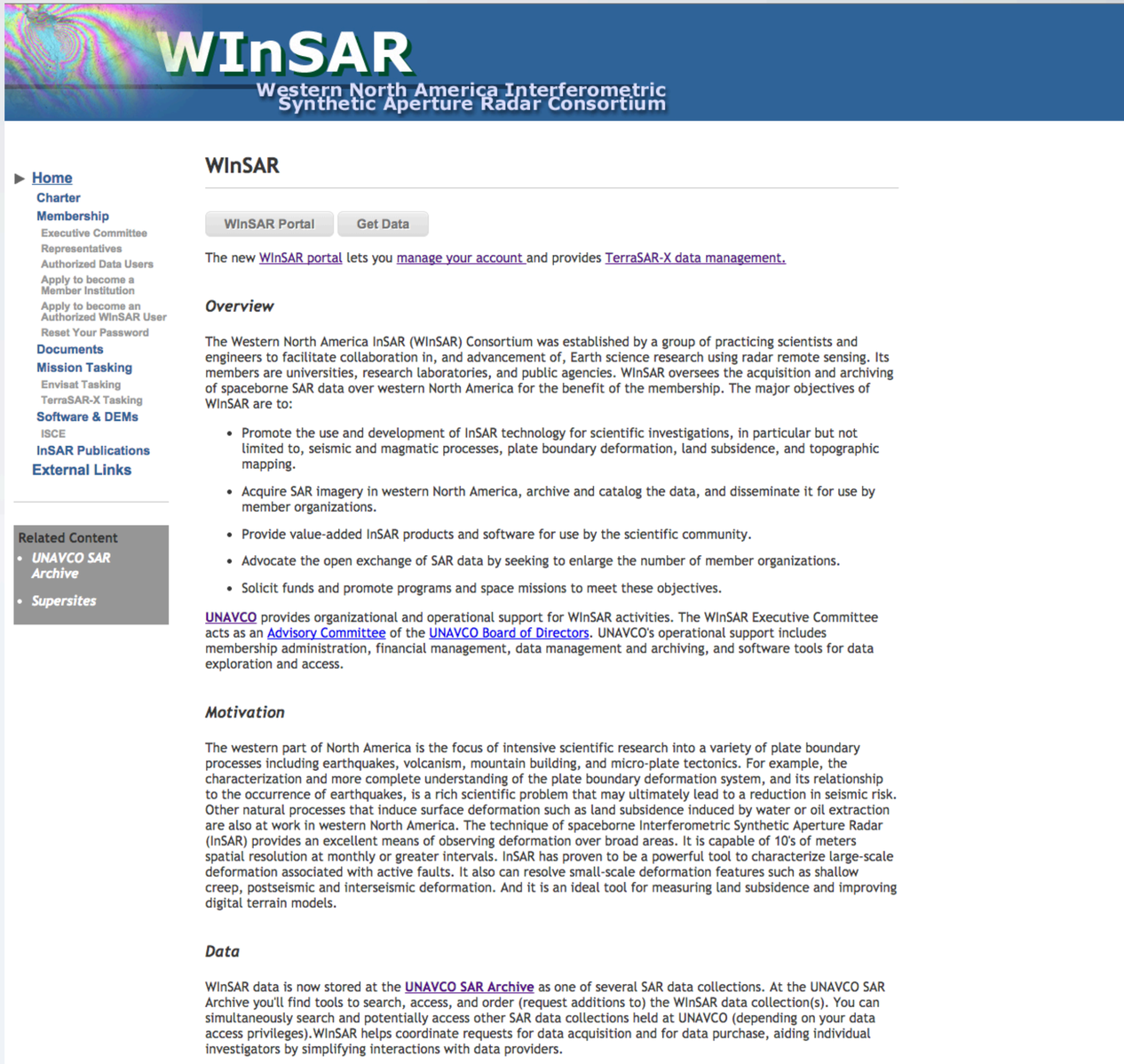
WInSAR Support

- UNAVCO provides data archiving and operational support for WInSAR. Distribution of the ISCE software is provided to WInSAR members.

See https://winsar.unavco.org/ for more information

- Functionality provided by the WInSAR Portal

- https://winsar.unavco.org/portal
- User management (registration, password reset...)
- TSX tasking management (also for Supersites)
- PI proposal management
- InSAR wiki

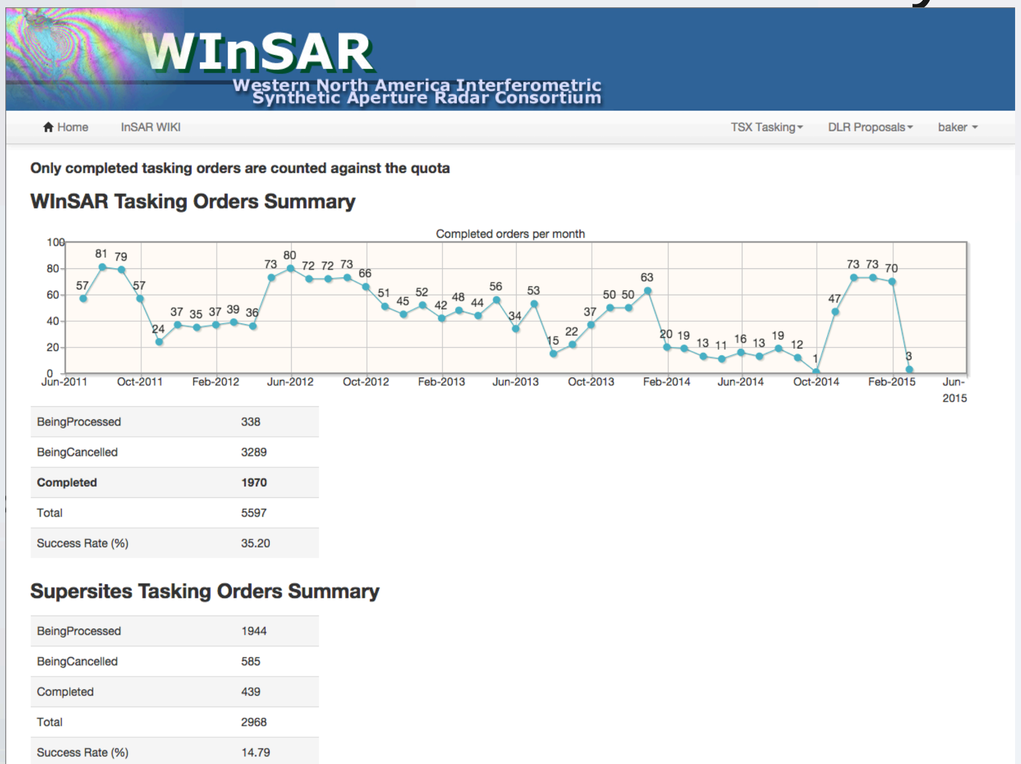


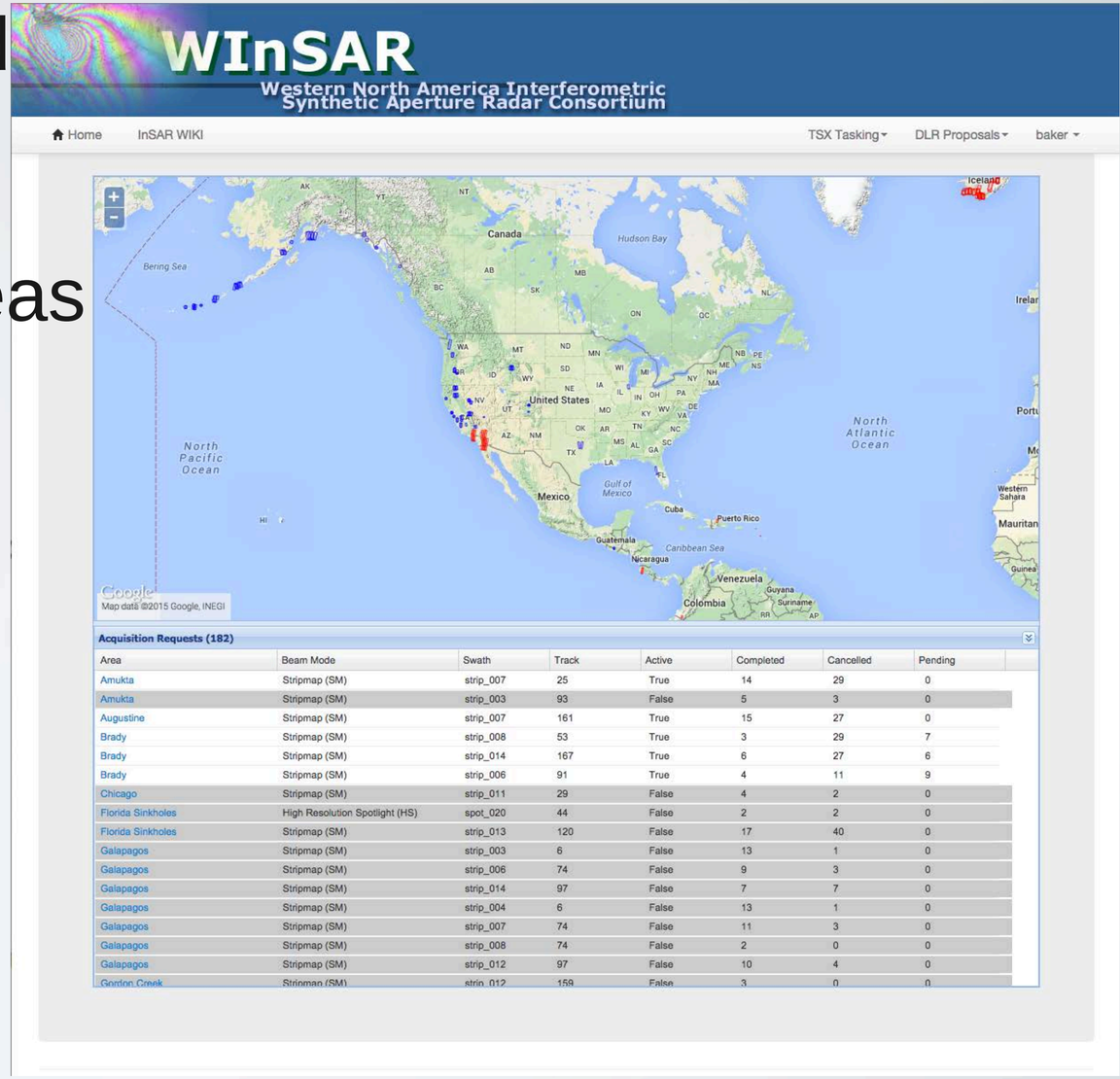
WInSAR Portal - InSAR Wiki

- This new wiki will replace the old roipac.org wiki
- Support pages for ROI_PAC, GMTSAR, ISCE
- Other software, possibly Doris and Sentinel Toolbox
- Advanced techniques: Time series analysis, MAI, pixel tracking
- Improvements and added functionality will be implemented as funding and time allows

WInSAR Portal - TSX tasking

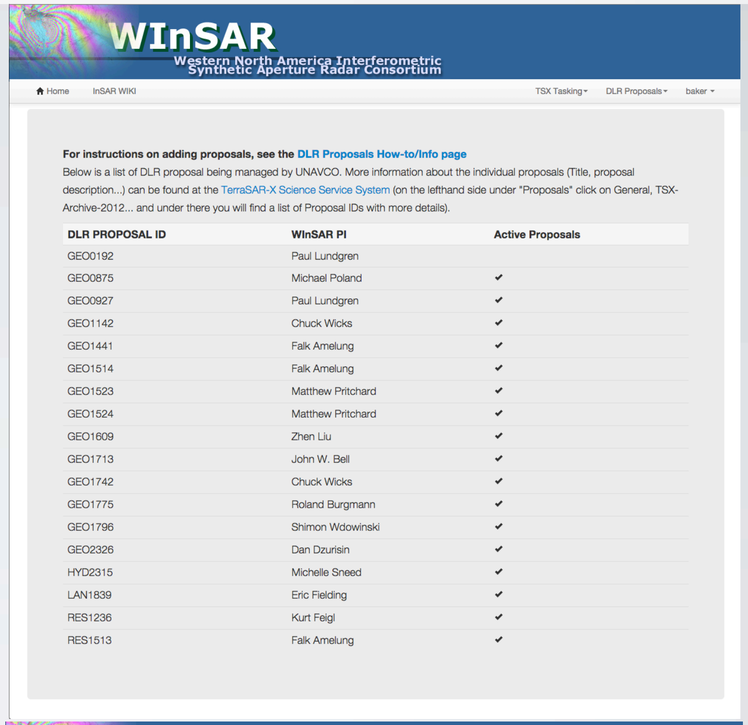
- Coordination of TerraSAR-X background tasking
- Tracks success for individual tasking areas and provides an overall summary

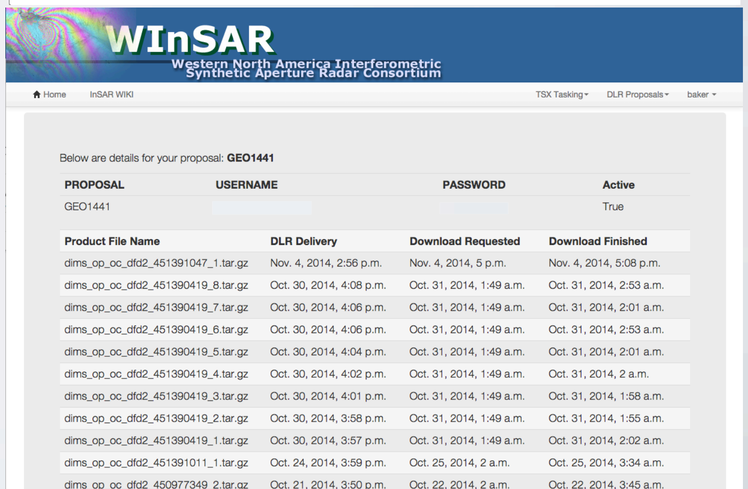




WInSAR Portal - PI proposal management

- Automated data download and distribution for WInSAR PIs and Co-PIs of DLR TSX proposals.
- Access limited to those listed on the license agreement.
- **New sources of data:**
- Similar interface is planned for ALOS-2
- COSMO Sky-Med science proposals could be managed in a similar way. This is already being done for the Hawaii Supersites data.





WInSAR Portal - Interferogram Archive

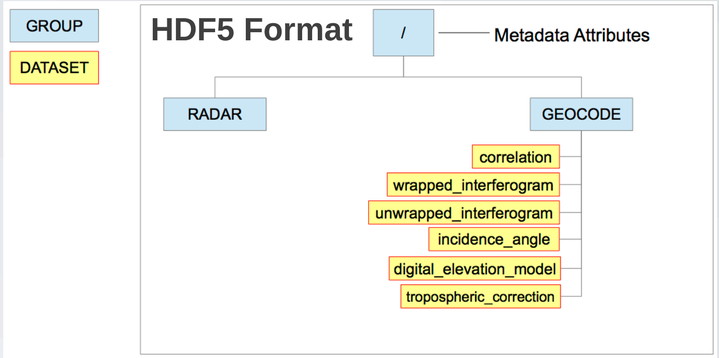
- Developed under the SSARA project to provide a community-contributed InSAR archive for interferograms, time series, and other derived data products.

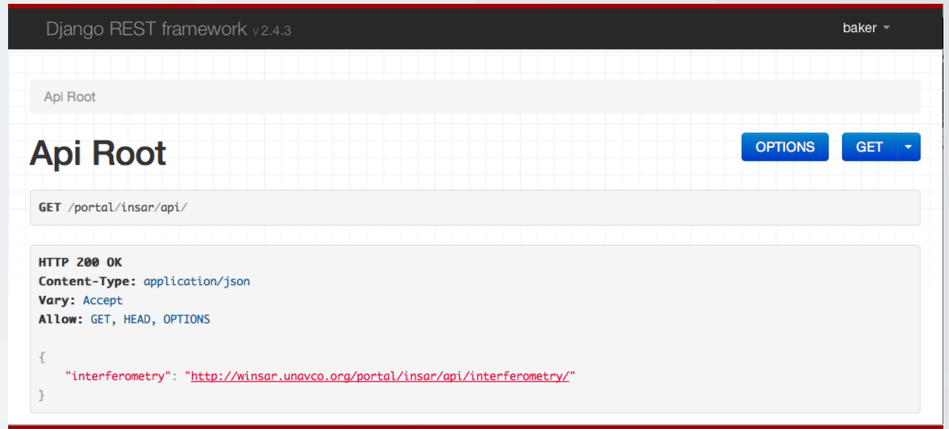
- https://winsar.unavco.org/portal/insar

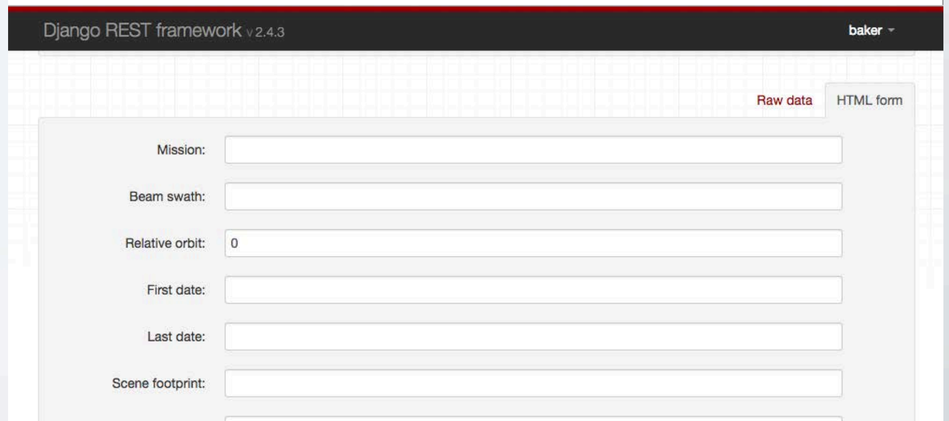
- HDF5 format is used for the data products. Example converters for ROI_PAC and GMTSAR provided on SSARA GitHub repository

- REST interface for uploading interferograms (LOS velocities and LOS time series support in development)
https://winsar.unavco.org/portal/insar/api/

- Data can be uploaded from the command line using cURL:
curl -i -F data_file=@DATA_FILENAME -u USERNAME:PASSWORD
https://winsar.unavco.org/portal/insar/api/interferometry/
Users only need to provide the "data_file" parameter via POST method along with their login credentials since all necessary metadata is read from the HDF5 file directly.







Geohazard Supersites and Natural Laboratories

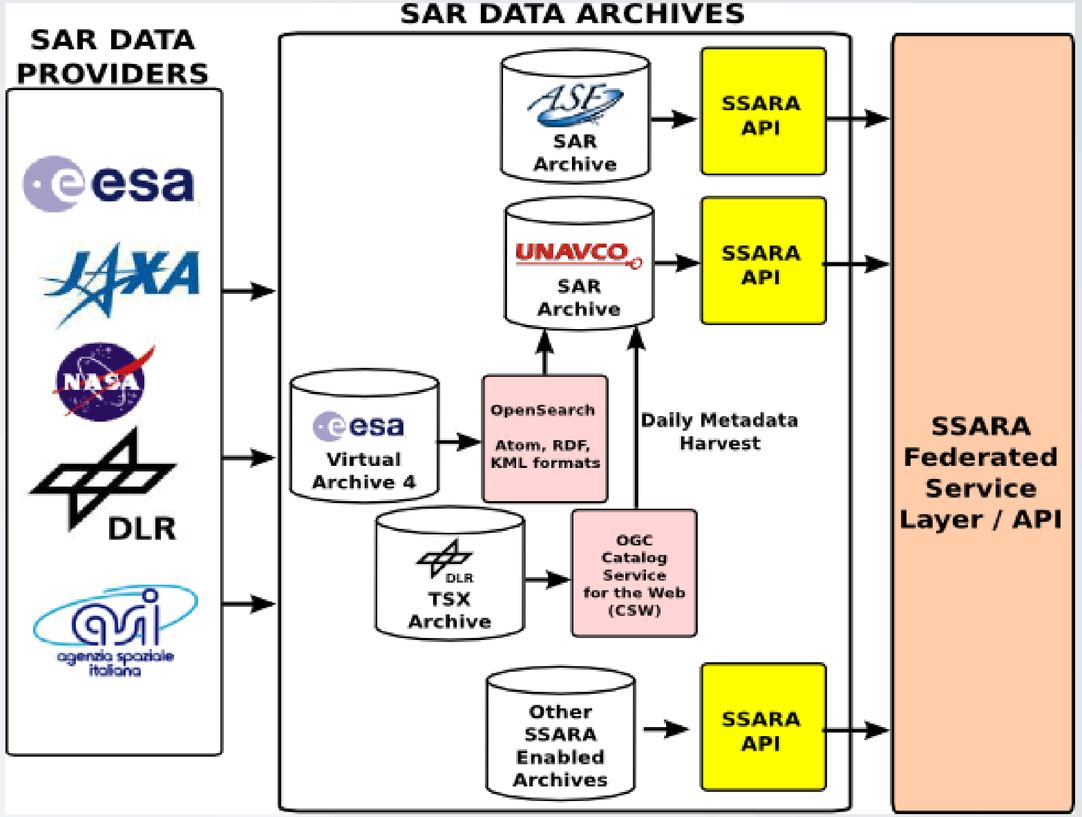
•GSNL SAR Data Integration with SSARA

•Daily harvest of metadata from ESA Virtual Archive 4 and DLR TSX Archive using OpenSearch and OGC CSW protocols.

•Metadata is stored in the UNAVCO SAR database as Supersites VA4 and Geohazard.Supersite.TerraSAR-X_SSC collections and queries are available using the SSARA federated query service

•Integrated the secp download client into SSARA for automated downloads from ESA Virtual Archive 4. Work is in progress to incorporate download from DLR TSX Archive.

•SSARA clients can be utilized directly in the Supersites Exploitation Platform (SSEP) for InSAR data processing



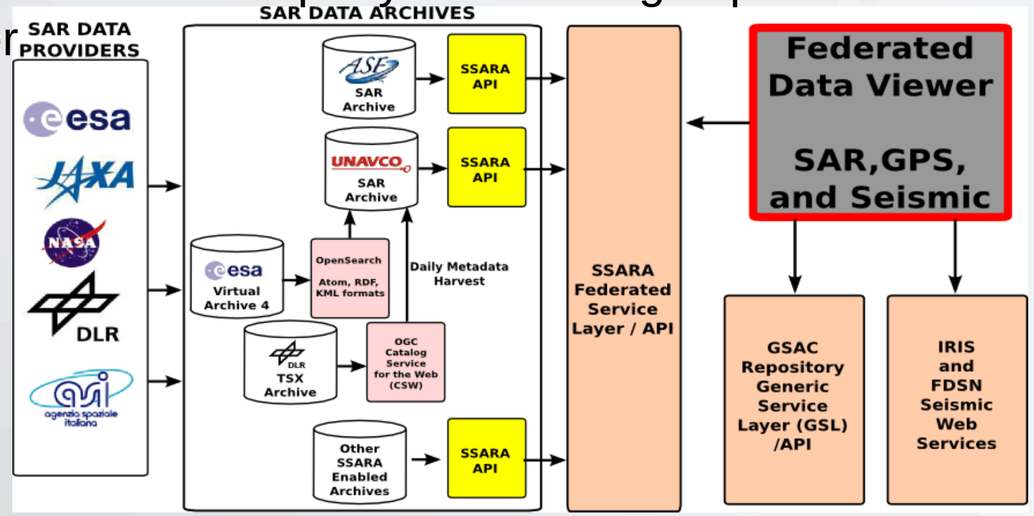
Geohazard Supersites and Natural Laboratories

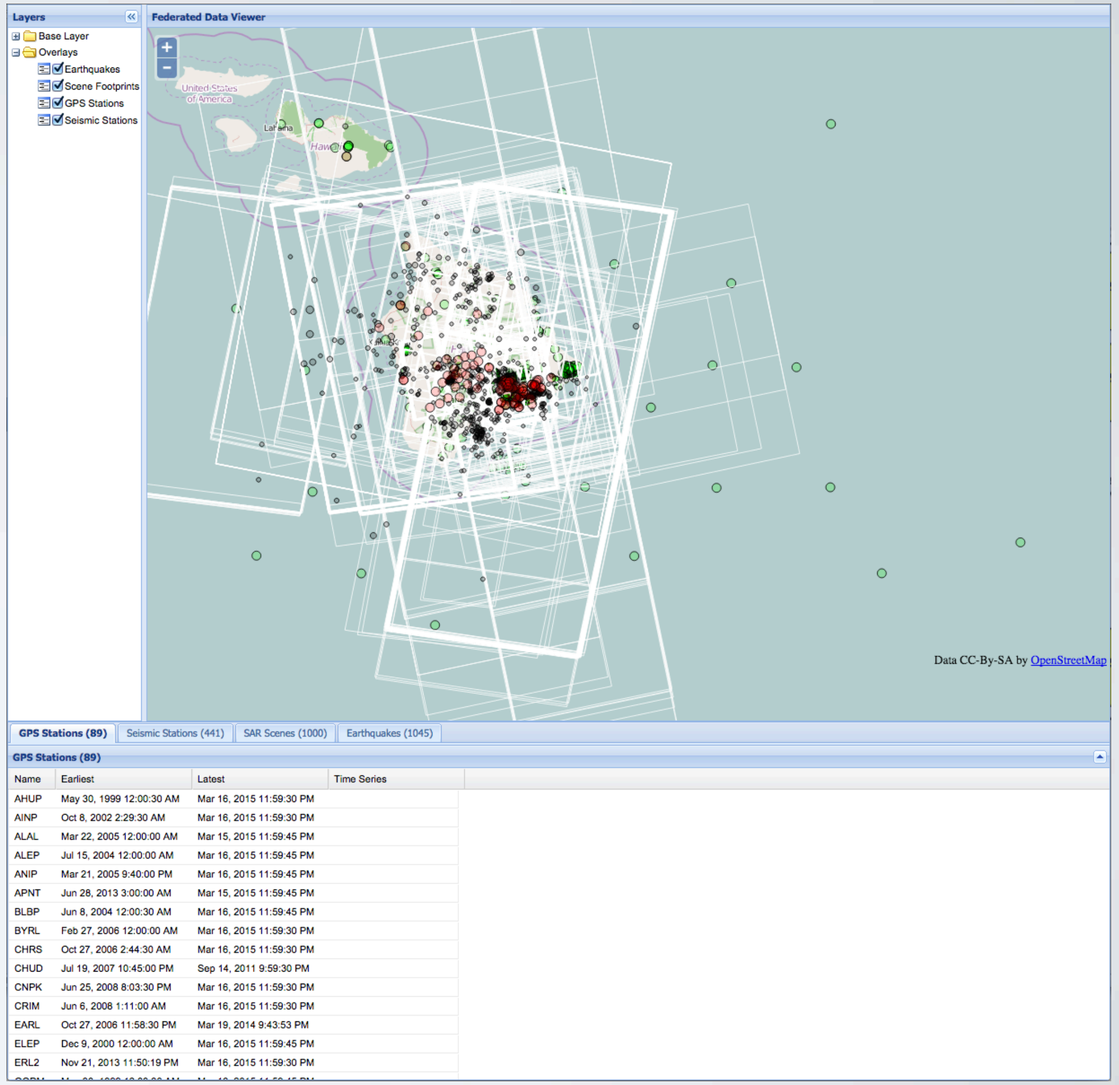
GSNL Federated Data Viewer

- UNAVCO developed a prototype viewer incorporating queries across SAR, GPS, and seismic datasets

- The viewer uses the existing web services (SSARA, GSAC, and COOPEUS) to display available data for the defined Supersites

- Further development will incorporate other data sources (optical and other in situ data) with established web services and provide better query and filtering capabilities within the viewer





Name	Earliest	Latest	Time Series
AHUP	May 30, 1999 12:00:30 AM	Mar 16, 2015 11:59:30 PM	
AINP	Oct 8, 2002 2:29:30 AM	Mar 16, 2015 11:59:30 PM	
ALAL	Mar 22, 2005 12:00:00 AM	Mar 15, 2015 11:59:45 PM	
ALEP	Jul 15, 2004 12:00:00 AM	Mar 16, 2015 11:59:45 PM	
ANIP	Mar 21, 2005 9:40:00 PM	Mar 16, 2015 11:59:45 PM	
APNT	Jun 28, 2013 3:00:00 AM	Mar 15, 2015 11:59:45 PM	
BLBP	Jun 8, 2004 12:00:30 AM	Mar 16, 2015 11:59:45 PM	
BYRL	Feb 27, 2006 12:00:00 AM	Mar 16, 2015 11:59:30 PM	
CHRS	Oct 27, 2006 2:44:30 AM	Mar 16, 2015 11:59:30 PM	
CHUD	Jul 19, 2007 10:45:00 PM	Sep 14, 2011 9:59:30 PM	
CNPK	Jun 25, 2008 8:03:30 PM	Mar 16, 2015 11:59:30 PM	
CRIM	Jun 6, 2008 1:11:00 AM	Mar 16, 2015 11:59:30 PM	
EARL	Oct 27, 2006 11:58:30 PM	Mar 19, 2014 9:43:53 PM	
ELEP	Dec 9, 2000 12:00:00 AM	Mar 16, 2015 11:59:45 PM	
ERL2	Nov 21, 2013 11:50:19 PM	Mar 16, 2015 11:59:30 PM	

Acknowledgements

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