

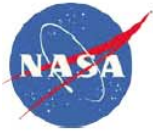
NASA ROSES ACCESS Project Review

# Discovery and Delivery of Space Geodetic Data Products from Distributed Archives

Feb 23, 2011

Fran Boler and Jeff McWhirter

**UNAVCO**



## Discovery and Delivery of Space Geodetic Data Products from Distributed Archives

PI: Frances Boler, UNAVCO

### Objective

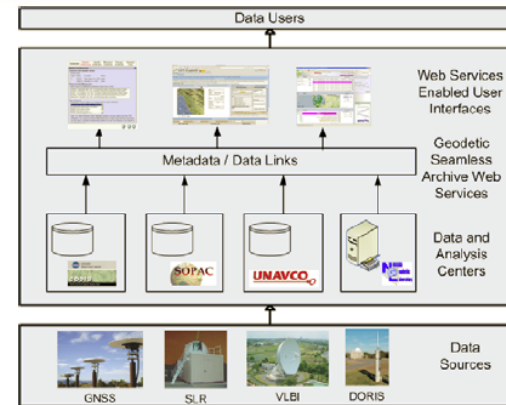
- Modernize mechanisms for exchange of metadata for space geodetic products among established archives
- Improve user discovery and access to a comprehensive catalog of available products through implementation of the modernized GSAC-WS (Geodetic Seamless Archive Centers - Web Services)
- Incorporate new science-based quality control (QC) parameters to enable users to better identify data products applicable for their domain

### Approach

- Collaborate to design comprehensive schema for space geodetic products with input from geodetic community
- Develop web services enabled GSAC-WS
- Science partners utilize new GSAC-WS in development of enhanced- analysis based QC
- Develop a metrics system to track GSAC-WS usage
- Enable GSAC-WS capability within partner Data Centers' existing user interfaces

### Co-Is/Partners

Carey Noll, GSFC CDDIS; Yehuda Bock, UCSD; Geoff Blewitt, UNR; Corne Kreemer, UNR



The modernized GSAC-WS system will provide comprehensive geodetic data search and access across multiple archives

### Key Milestones

- |   |       |
|---|-------|
| • Complete GSAC-WS schema                               | 07/10 |
| • Alpha release of web services                         | 12/10 |
| • Production release of web services                    | 06/11 |
| • Production of QC summary products                     | 10/11 |
| • Production release of user interfaces/metrics systems | 12/11 |
| • Project documentation completed                       | 3/12  |

TRL<sub>in</sub>=5

TRL<sub>current</sub>=5

**ACCESS**

## Presentation Outline

- Project Overview
- Project Schedule
  - Major Accomplishments to Date
  - Partner Accomplishments
- Project Technical Status
  - Software Architecture
  - Demonstration of web services, user interfaces
- Budgets and costing
  - Year 1
  - Planning Year 2
- Participation in ESDSWG
- Q&A

## Project Objectives

- Modernize mechanisms for exchange of metadata for space geodetic products (GNSS, SLR, DORIS, VLBI) among established archives
- Improve user discovery and access to a comprehensive catalog of available products through implementation of the modernized GSAC-WS (Geodetic Seamless Archive Centers - Web Services)
- Incorporate new science-based quality control (QC) parameters to enable users to better identify data products applicable for their domain

## Approach

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## **NASA ACCESS Program Goals Addressed by this Work**

*Improve Earth science user access to Web Services and service registries*

- Expected outcome: simpler, more comprehensive access to a wider class of space geodesy data and metadata

*Improve knowledge of NASA's Earth science data quality and production legacy*

- Expected outcome: New science-based quality control (QC) parameters will be provided based on science partner analyses to enable users to better identify data products applicable for their domain

## **UNAVCO**

PI: Fran Boler

*Project management*

Software Engineer: Jeff McWhirter

*Web services, API, UI development, ESDSWG Rep*

## **SOPAC, University of California, San Diego**

Co-PI: Yehuda Bock

*Project management support*

Software Engineers: Paul Jamason, Mindy Squibb, TBD

*Web services, API, and UI development*

## **CDDIS, NASA**

Co-PI: Carey Noll

*Web services implementation, UI implementation*

## **Nevada Geodetic Lab, University of Nevada, Reno**

Co-PIs: Geoff Blewitt and Corne Kreemer

*Utilize web services, generate QC product*

## **Project Partners**

## Milestones

- ✓ Complete GSAC-WS schema 07/10
- ✓ Alpha release of web services 12/10
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- Project documentation completed 3/12



## Major Accomplishments

- Beta software releases for the GSAC Service Layer and the GSAC Repository are complete
- UNAVCO's beta release GSAC WS Repository, real-time GNSS repository, and web query interface are online for testing purposes
- SOPAC's beta release GSAC WS Repository and web query interface are online for testing purposes
- CDDIS's alpha release GSAC WS Repository and web query interface are online for testing purposes
- Alpha release of the federated web query interface is online for testing purposes
- Public GSAC-WS website at <http://facility.unavco.org/data/gsacws/> includes documentation, project strategies, links to software code, and links to the (alpha, beta) search interfaces that are available for testing

## Accomplishments – Partner Roles

- Schema and vocabulary development – All Partners
- Posters and presentations at IGS meeting and AGU meeting – All Partners
- Repository and GSAC Service Layer design and initial development –UNAVCO
- Repository and GSAC Service Layer design vetting – SOPAC
- Repository implementation - UNAVCO, SOPAC, CDDIS
- Testing and utilization of GSAC search service (clients) - UNR

## Project Schedule Summary

- Software development tasks including web services development and UI development: slightly ahead of schedule
- Implementation of software at partner data centers: on schedule
- Science partner utilization of GSAC services: on schedule
- Publicizing GSAC project: on schedule
- Community feedback: delayed

## Project Schedule

Time frame		Task	Deliverable/Milestone	Completed
<b>Y1Q1</b>				
	1.1.1	Hire UNAVCO Developer	Position filled	10 May 2010
	1.1.2	Establish project Wiki for internal communications	Wiki online	14 May 2010
	1.1.3	Establish project web site for external audience	Project web site online	23-Jul-10
	1.1.4	Research ISO 19115, GCMD, FGDC standards - implementation to GSAC-WS domain	Report on metadata posted to project website	23-Jul-10
	1.1.5	Identify community advisors on metadata scope/definitions and UIs	Advisory group posted on project web site	20 Jun 2010
	1.1.6	Prepare strawman GSAC-WS schema definition	Schema posted	1 Jun 2010
	1.1.7	Discuss via Wiki the strawman GSAC-WS schema definition	Posted GSAC-WS strawman schema modified per discussion	21 Jun 2010
	1.1.8	Inform community about GSAC-WS project at UNAVCO Science Workshop March, 2010	Poster presentation; breakout discussion held	Breakout discussion eliminated due to delayed project start; UNAVCO and SOPAC personnel met 18 Mar 2010

## Project Schedule

Time frame		Task	Deliverable/Milestone	Completed
<b>Y1Q2</b>				
	1.2.1	Establish GSAC-WS schema v 0.1 and plan SW development via meeting in Boulder	Meeting in Boulder	21 Jun 2010
	1.2.2	Produce GSAC-WS schema v 0.1 document	Schema document v 0.1 posted on project web site	28 Sep 2010
	1.2.3	Obtain advisory group input on GSAC WS schema v 0.1	Input posted on project web site bulletin board	Defer input until beta release
	1.2.4	Describe/get feedback: GSAC-WS concept and plans at IGS Infrastructure Meeting June, 2010	Presentation	28 Jun 2010
	1.2.5	Revise GSAC-WS schema to produce v 0.2 document	Schema v 0.2 document posted on project web	14 Oct 2010
	1.2.6	Implement local database modifications to support GSAC WS schema v 0.2		N/A -None needed for v0.2
	1.2.7	Prepare metrics requirements document	Post metrics requirements	15 Sep 2010
	1.2.8	Prepare Semi-annual Report	Semi-Annual report submitted	30 Sep 2010

## Project Schedule

Time frame		Task	Deliverable/Milestone	Completed
<b>Y1Q3</b>				
	1.3.1	Phase 1 development of alpha web services for file-based and real-time GNSS utilizing GSAC-WS schema v 0.2	Completed alpha web services	1 Sep 2010
	1.3.2	Phase 1 development of alpha web services for DORIS/LLR/SLR/VLBI utilizing GSAC-WS schema v 0.2	Completed alpha web services	17 Nov 2010
	1.3.3	Phase 1 development of alpha web services for backward compatibility with GSAC flat file exchange	Completed alpha web services	Implement Yr 2 standalone repository instead
	1.3.4	Review of progress CDDIS webservices development	Progress meeting at CDDIS	scheduled for 24 Feb 2011
	1.3.5	Develop format for Analysis QC product file	Format document posted on project website	delayed to Y1Q4
	1.3.6	Identify and document schema refinements based on development experience	Schema v1.0 document posted on project web site	Software releases encompass schema definitions.

## Project Schedule

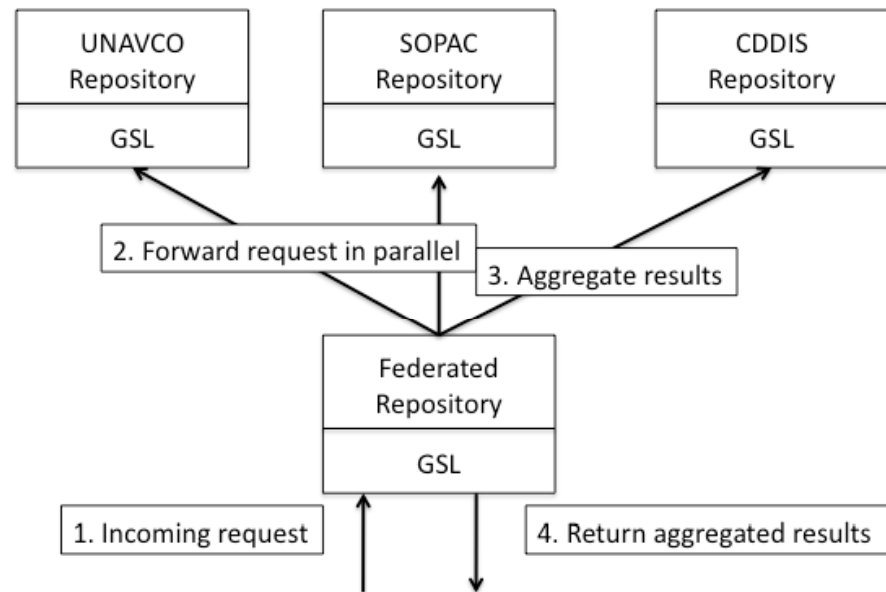
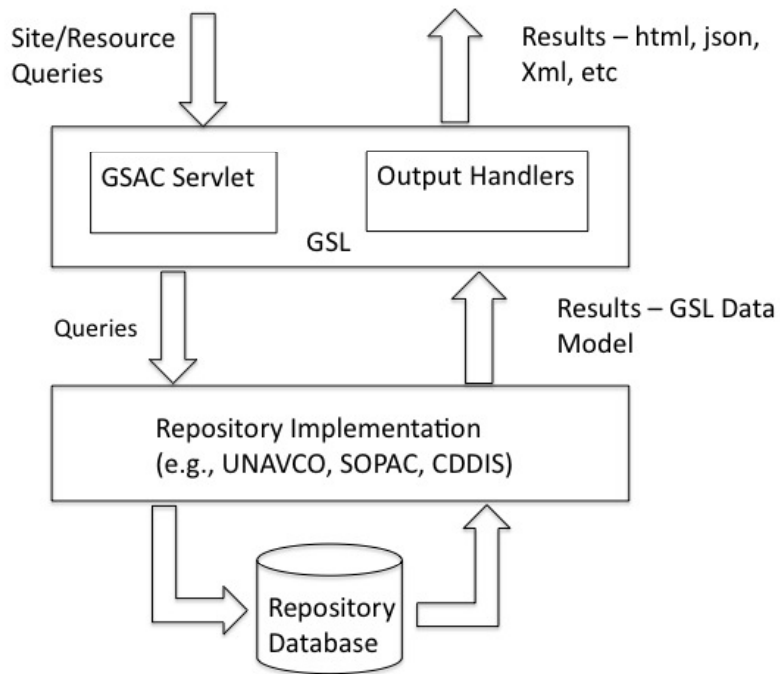
Time frame		Task	Deliverable/Milestone	Completed
<b>Y1Q4</b>				
	1.4.1	Prepare and discuss via Wiki the strawman metrics-system design		Discussed at various meetings/telecons/wiki
	1.4.2	Development team members meet in Boulder to address GSAC-WS issues and to develop implementation plan for metrics system	Metrics system document v 0.1 posted (*Plan must be approved by Steve Berrick)	
	1.4.3	Review of progress SOPAC web services development	Meeting in Boulder	Possibly not needed
	1.4.4	Phase 2 development of beta web services for file-based and real-time GNSS utilizing GSAC-WS schema v 1.0	Completed beta web services	Done 18 Feb 2011
	1.4.5	Phase 2 development of beta web services for DORIS/SLR/VLBI utilizing GSAC-WS schema v 1.0	Completed beta web services	Done 28 Jan 2011
	1.4.6	Phase 2 development of beta web services for backward compatibility with GSAC flat file exchange	Completed beta web services	
	1.4.7	Develop scripts/tools to gather data for daily analyses using GSAC-WS	Completed scripts	
	1.4.8	Participate in ESDSWG Technology Infusion Meeting	Presentation-> attendance	Staff attended the ESDSWG meeting October, 2010
	1.4.9	Report project progress through AGU presentation	Presentation	3 related presentations 13-17 Dec 2010
	1.4.10	Prepare Draft 1-page Sustainability Plan	Plan	
	1.4.11	Prepare Annual Report	Annual Report submitted	Annual report submitted 30 Nov 2010

## Project Schedule Y2 Work Plan Highlights

- Software development of standalone repository for backward compatibility with first generation GSAC
- Incorporation of web services into partner existing User Interfaces
- Implementation of metrics system (following approval of metrics plan)
- Science partner QC product development and regular production



## GSAC-WS Software Architecture

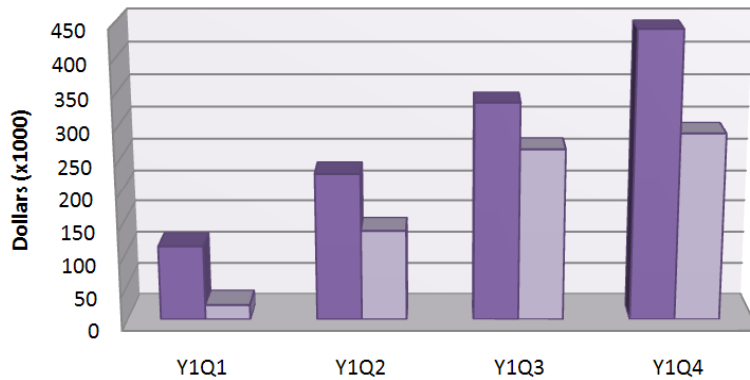




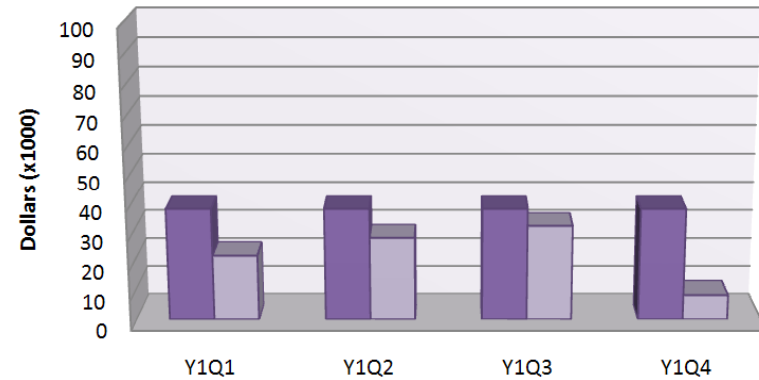
■ budget  
■ spent

## Budgets – Yr 1

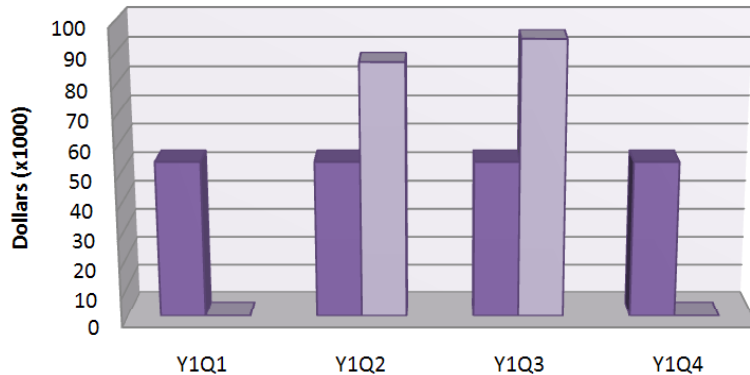
### GSAC Cumulative Spending vs Budget



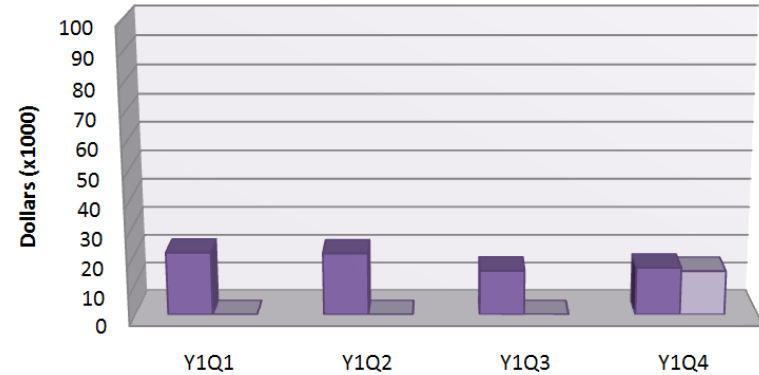
### UNAVCO Spending vs Budget



### SOPAC Spending vs Budget



### UNR Spending vs Budget



\*NOTE: Y1Q4 includes one month of spending so far for the quarter.

## Risks to the Project

- Change of software engineer at SOPAC (mitigation – overlap with Mindy Squibb until replacement for Paul Jamason is hired)
- UNR was unable to work during summer '10 due to contract issues (mitigation – summer '11 work will make up for this)

## Metrics Plan

- GSAC Repository implementation includes web service API logging
- Each repository will assemble web logs
- Web log analysis software will be used to parse and summarize information on service requests
- UNAVCO will aggregate repository statistics and will be responsible for upload to NASA metrics system
- Additional impact metrics and software reuse metrics separate from the web logs are planned

Pages-URL (Top 10) - Full list - Entry - Exit		
20 different pages-url	Viewed	Aver
/gsacws/gscacapi/site/view	10,071	
/gsacws/gscacapi/site/search	4,933	
/gsacws/gscacapi/resource/search	3,192	
/gsacws/gscacapi/site/search/sites.kml	1,882	
/gsacws/gscacapi/resource/view	881	
/gsacws/gscacapi/site/search/sites.atom	623	
/gsacws/gscacapi/site/search/sites.json	503	
/gsacws/gscacapi/resource/search/resources.jnlp	313	
/gsacws/gscacapi/resource/search/resources.json	296	
/gsacws/gscacapi/resource/search/resources.sh	293	
Others	196	

## ESDSWG Participation

Jeff McWhirter is the representative to the ESDSWG

### Highlights:

- Technology Infusion Working Group teleconferences
- New Orleans meeting in October, 2010 (Squibb & Jamason also attended)
- Incorporated OpenSearch concepts into the GSAC system implementation
- Incorporated Atom-based Service Cast output format into the GSAC system implementation

### Feedback planned to ESDSWG:

- Federated distributed search
- OpenSearch
- Service Casting

## Presentations

Blewitt, G. and C. Kreemer, A System to Produce Precise Global GPS Network Solutions for all Geodetic GPS Stations in the World, 2010, Eos Trans. AGU, Fall Meeting Suppl., Abstract G22A-02.

Boler, F., C. Noll, Y. Bock, C Kreemer, and G. Blewitt, Discovery and Delivery of Space Geodetic Data from Distributed Archives, Poster presented at the IGS Infrastructure Meeting, 2010.

Boler, F., G. Blewitt, C. Kreemer, Y. Bock, C. Noll, J. McWhirter, P. Jamason, and M. Squibb, Geodetic Seamless Archive Centers Modernization – Information Technology for Exploiting the Data Explosion, 2010, Eos Trans. AGU, Fall Meeting Suppl., Abstract G23B-827.

McWhirter, J., F. Boler, Y. Bock, P. Jamason, M. Squibb, C. Noll, G. Blewitt, and C. Kreemer, The Geodetic Seamless Archive Centers Service Layer: A System Architecture for Federating Geodesy Data Repositories, 2010, Eos Trans. AGU, Fall Meeting Suppl., Abstract IN11B-1085.