Examples of Geotechnical Data & Document Management Systems in the United States

The COSMOS/PEER-LL *Geotechnical Virtual Data Center*, Caltrans *GeoDOG*, and other systems

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Senior Transportation Engineer
California Department of Transportation

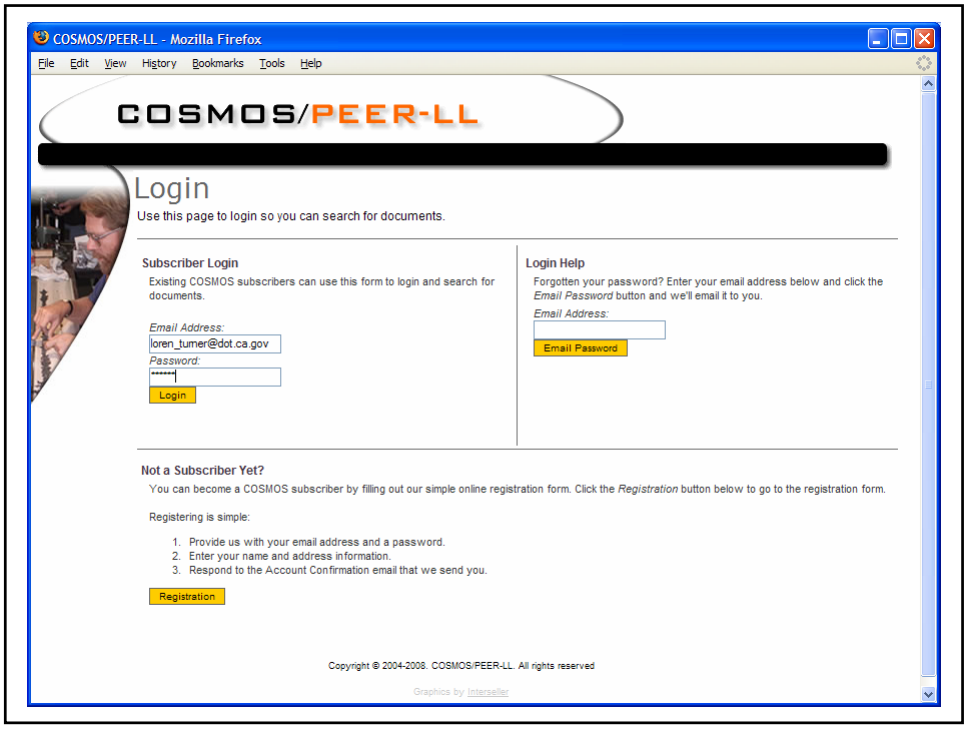
AGS/ICE, Electronic Transmission and Storage of Data
Birmingham, UK
June 18, 2008

Overview

- COSMOS/PEER-LL Geotechnical Virtual Data Center
- Caltrans GeoDOG
- Systems developed by other State Transportation Agencies

Geotechnical Virtual Data Center

- Project Team:
  - **Carl Stepp (PI),** Consortium of Organizations for Strong-Motion Observation Systems
  - **Jean Benoit**, University of New Hampshire
  - **John Bobbit**, Petrotechnical Open Standards Consortium
  - **Sean Devlin**
  - **Dan Ponti**, U.S. Geological Survey
  - **Charles Real**, California Geological Survey
  - **Toru Saito**, Saito Statistics
  - **Jennifer Swift**, University of Southern California
  - **Loren Turner**, Caltrans
  - **Yang Zhu**, Caltrans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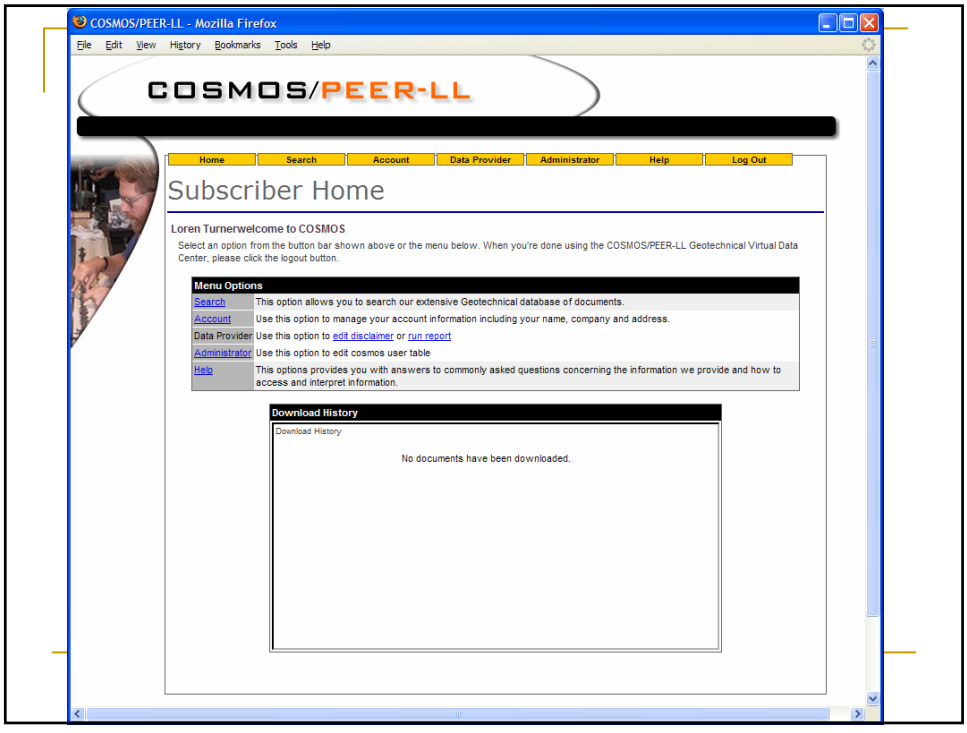
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Loren Turnerwelcome to COSMOS
Select an option from the button bar shown above or the menu below. When you're done using the COSMOS/PEER-LL Geotechnical Virtual Data Center, please click the logout button.
Menu Options
Search This option allows you to search our extensive Geotechnical database of documents.
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Data Provider Use this option to edit disclaimer or run report
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Latitude: -116.90826416015625 Longitude: 33.911454454267606
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Project Date(mm/dd/yyyy)
Asset Name
Project Name
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Boundaries (decimal degrees)
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VDC_754
VDC_12
VDC_753
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VDC_755
and 912 more
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Latitude: -117.59078975492188 Longitude: 33.831638461142866
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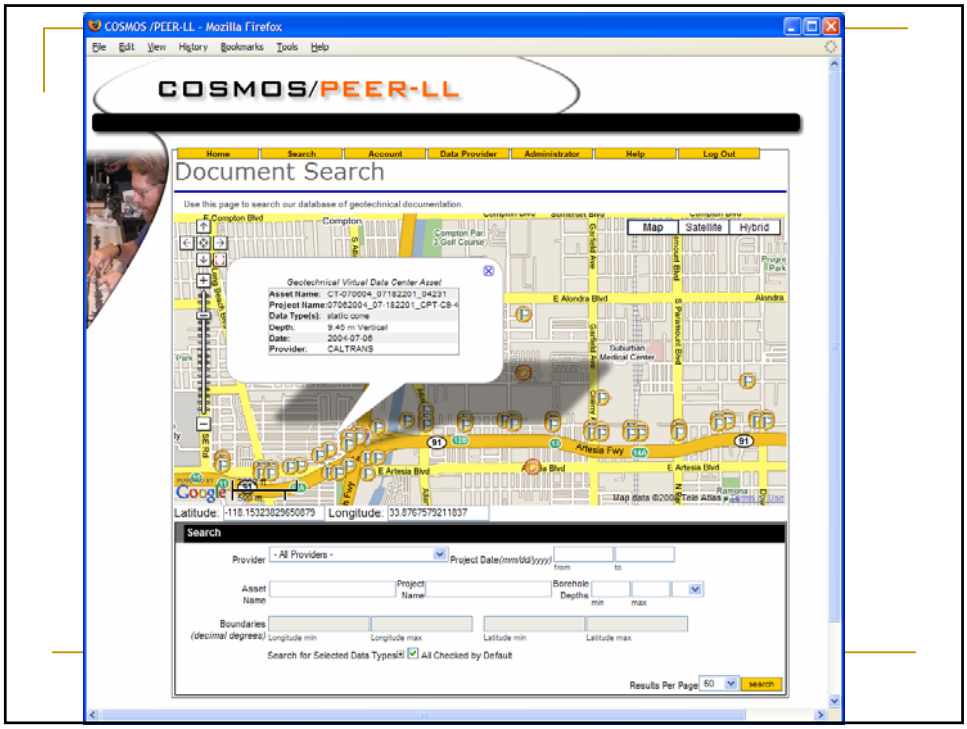
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Geotechnical Virtual Data Center Asset
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Project Name:07062004_07 182201_CPT CB-4
Data Type(s): static cone
Depth: 9.45 m Vertical
Date: 2004-07-06
Provider: CALTRANS
Latitude: -118.15323829650879 Longitude: 33.8767579211837
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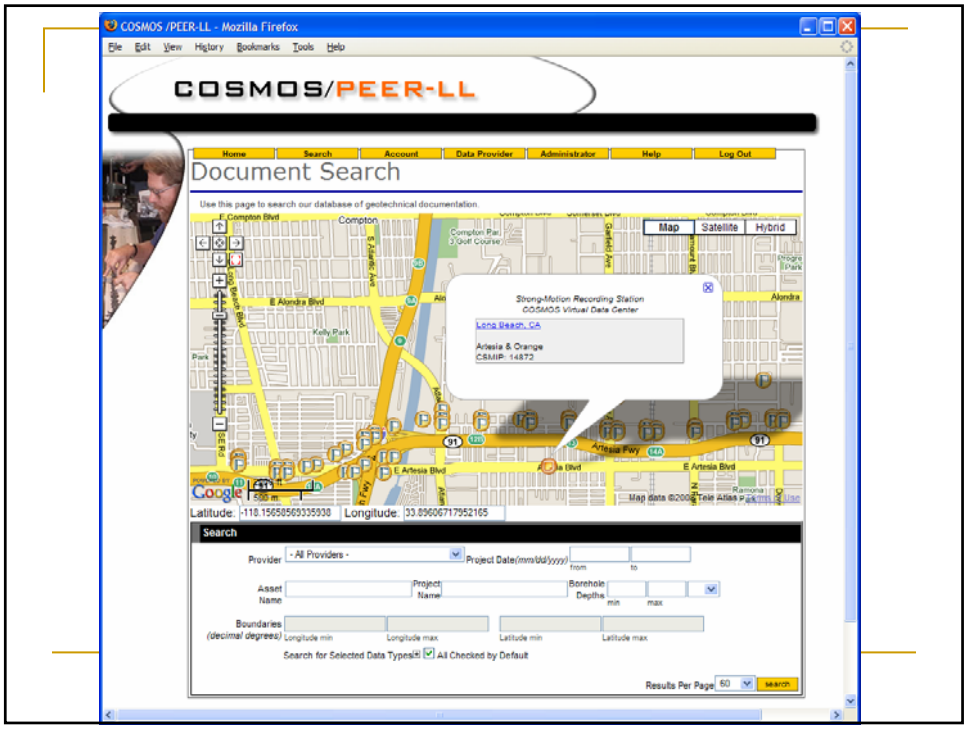
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COSMOS Virtual Data Center
Long Beach, CA
Artesia & Orange
CSMIP: 14872
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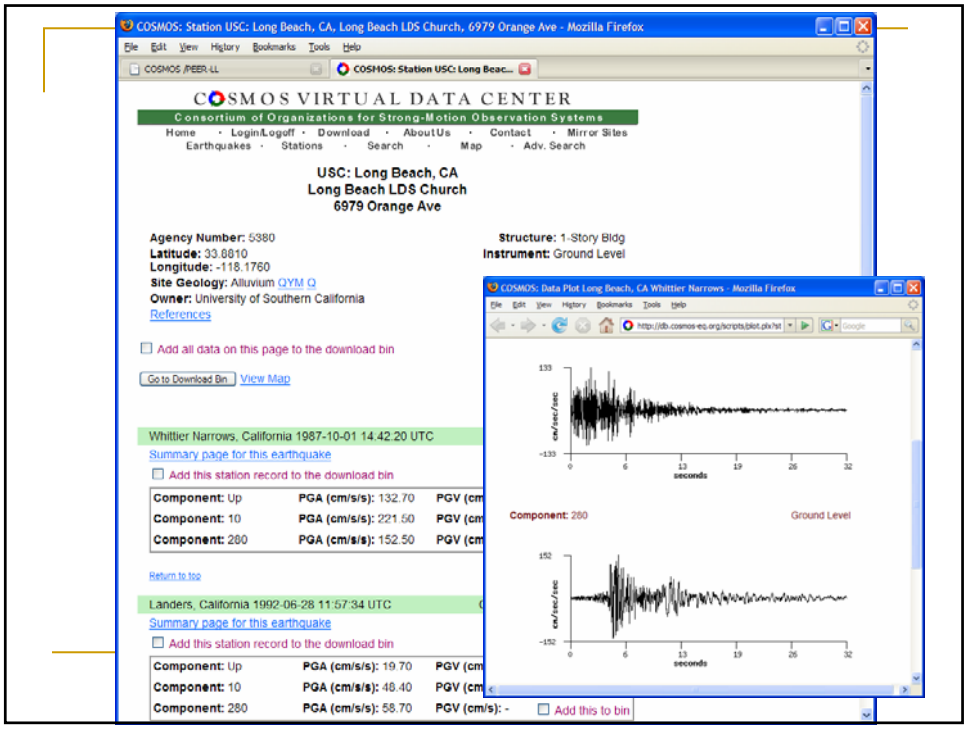
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Earthquakes · Stations · Search · Map · Adv. Search
USC: Long Beach, CA
Long Beach LDS Church
6979 Orange Ave
Agency Number: 5380
Latitude: 33.8810
Longitude: -118.1760
Site Geology: Alluvium QYM Q
Owner: University of Southern California
References
Structure: 1-Story Bldg
Instrument: Ground Level
Add all data on this page to the download bin
Go to Download Bin
View Map
Whittier Narrows, California 1987-10-01 14:42:20 UTC
Summary page for this earthquake
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Component: Up PGA (cm/s/s): 132.70
Component: 10 PGA (cm/s/s): 221.50
Component: 280 PGA (cm/s/s): 152.50
Return to top
Landers, California 1992-06-28 11:57:34 UTC
Summary page for this earthquake
Add this station record to the download bin
Component: Up PGA (cm/s/s): 19.70
Component: 10 PGA (cm/s/s): 48.40
Component: 280 PGA (cm/s/s): 58.70 PGV (cm/s): -
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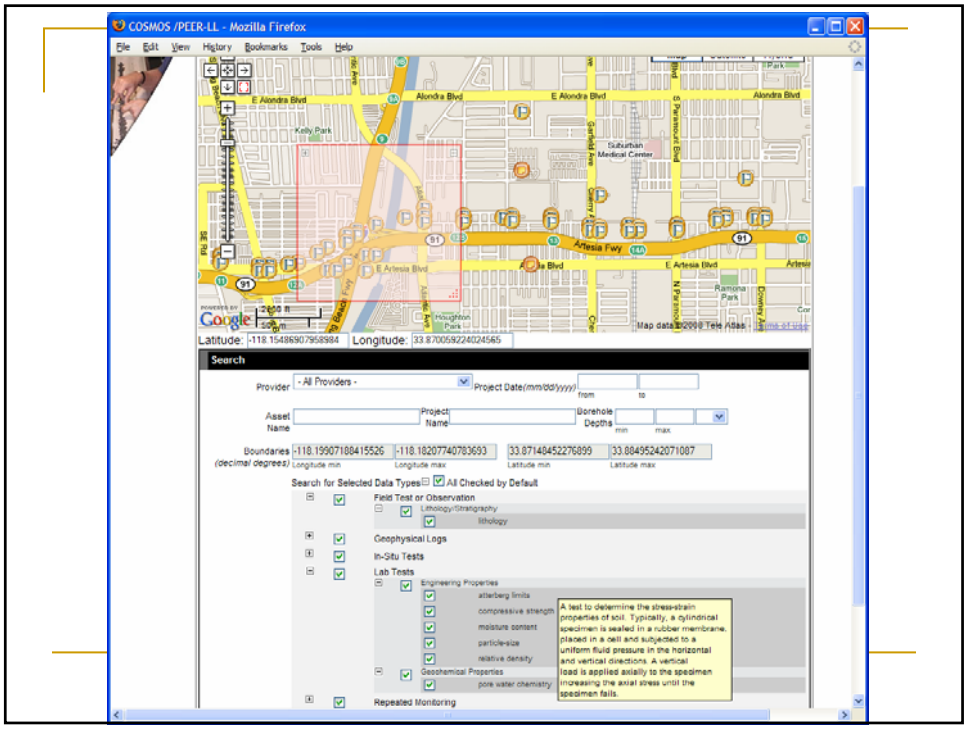
cm/sec/sec
seconds
Component: 280
Ground Level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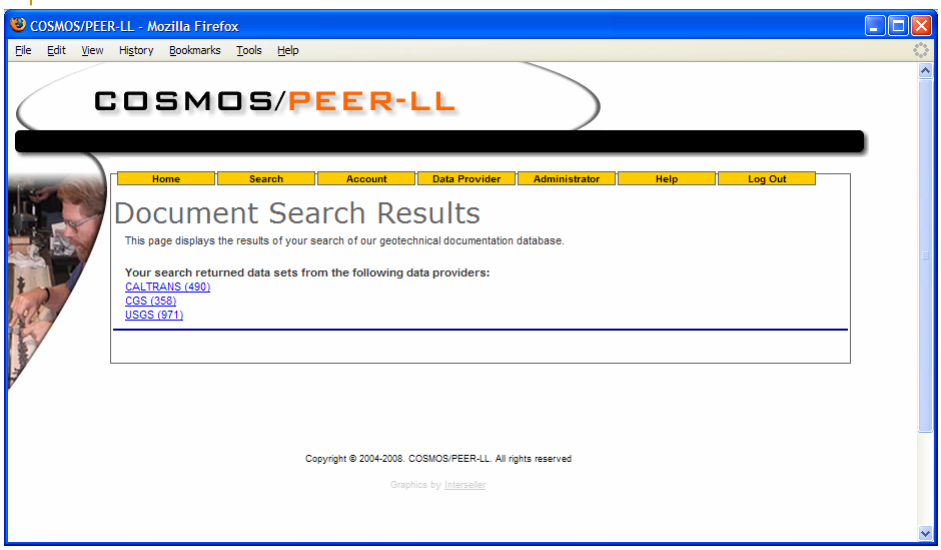
Geophysical Logs
In-Situ Tests
Lab Tests
Geochemical Properties
Repeated Monitoring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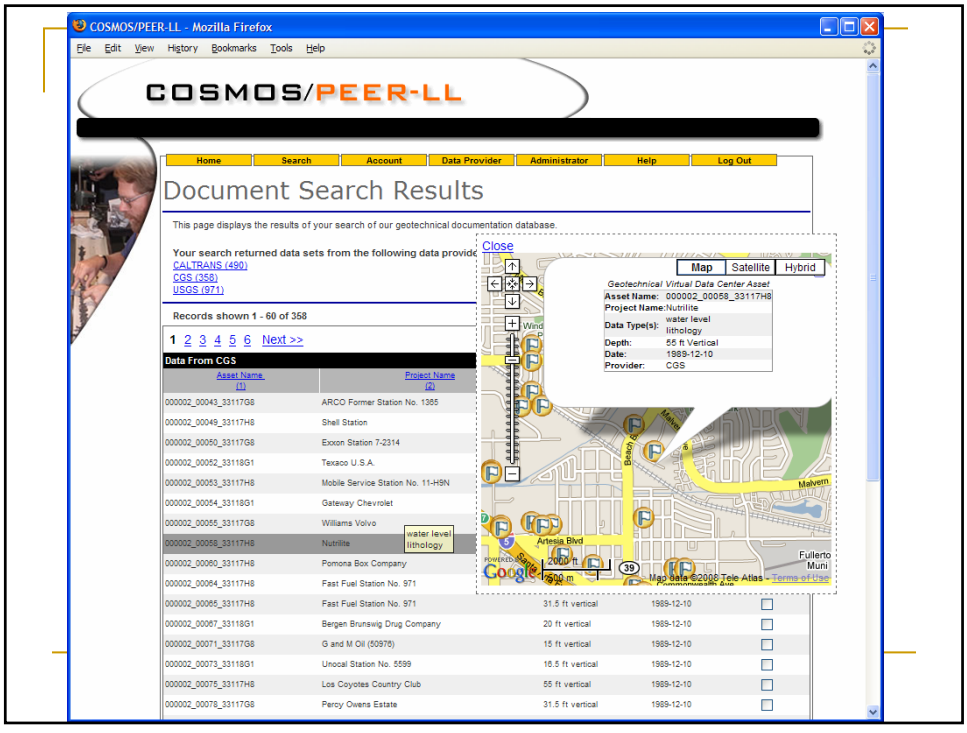
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Data From CGS
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Project Name (2)
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000002_00053_33117H8 Mobile Service Station No. 11-H9N
000002_00054_33118G1 Gateway Chevrolet
000002_00055_33117G8 Williams Volvo
000002_00058_33117H8 Nutrilite
000002_00060_33117H8 Pomona Box Company
000002_00064_33117H8 Fast Fuel Station No. 971
000002_00065_33117H8 Fast Fuel Station No. 971 31.5 ft vertical 1989-12-10
000002_00067_33118G1 Bergen Brunswig Drug Company 20 ft vertical 1989-12-10
000002_00071_33117G8 G and M Oil (50976) 15 ft vertical 1989-12-10
000002_00073_33118G1 Unocal Station No. 5599 16.5 ft vertical 1989-12-10
000002_00075_33117H8 Los Coyotes Country Club 55 ft vertical 1989-12-10
000002_00078_33117G8 Percy Owens Estate 31.5 ft vertical 1989-12-10
water level
lithology
Close
Map Satellite Hybrid
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Provider: CGS
Artesia Blvd
Malvern
Fullerton Muni
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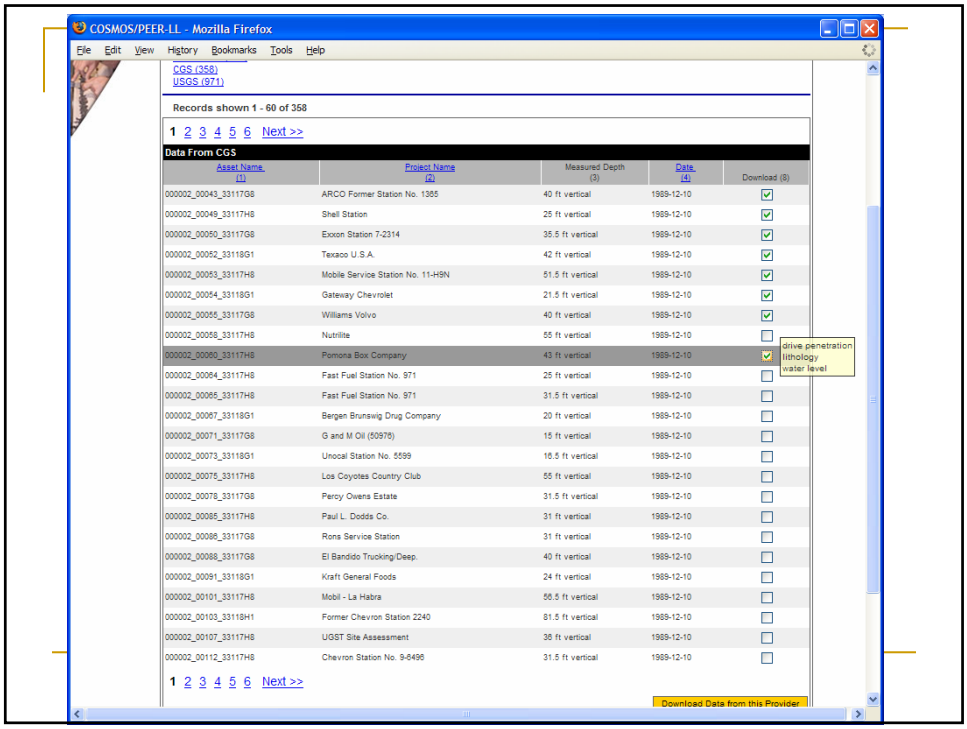
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000002_00055_33117G8 Williams Volvo 40 ft vertical 1989-12-10
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000002_00091_33118G1 Kraft General Foods 24 ft vertical 1989-12-10
000002_00101_33117H8 Mobil - La Habra 56.5 ft vertical 1989-12-10
000002_00103_33118H1 Former Chevron Station 2240 81.5 ft vertical 1989-12-10
000002_00107_33117H8 UGST Site Assessment 36 ft vertical 1989-12-10
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water level
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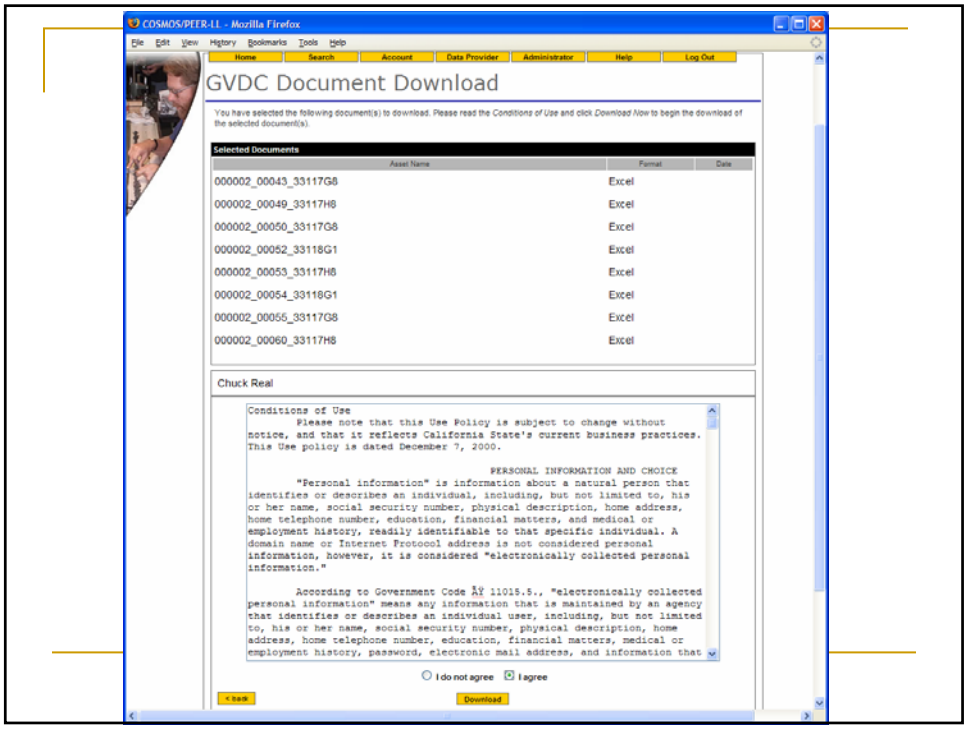
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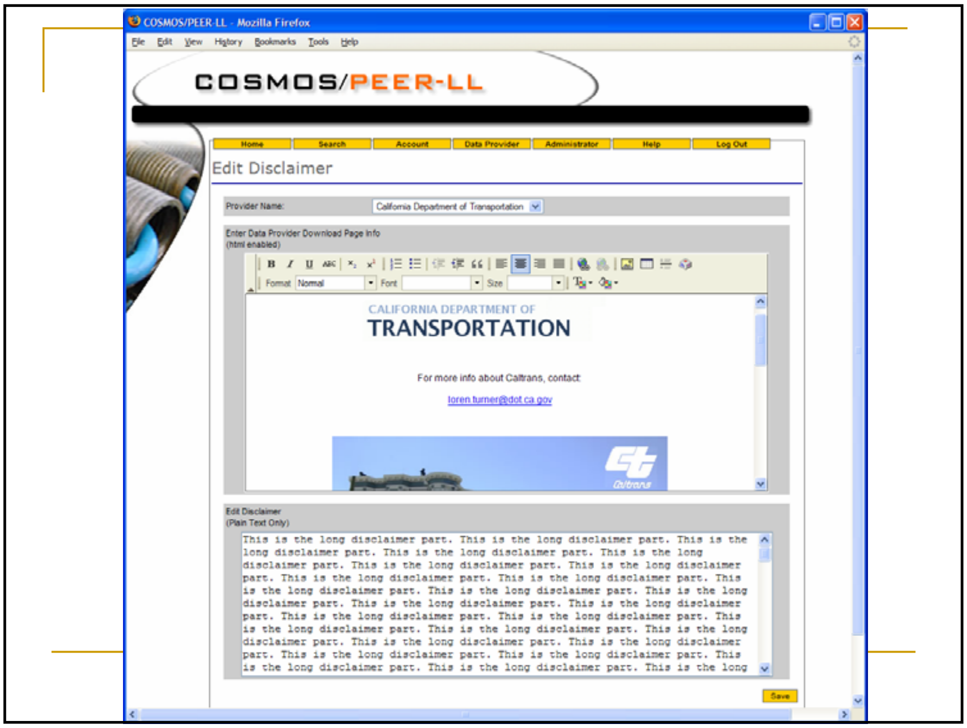
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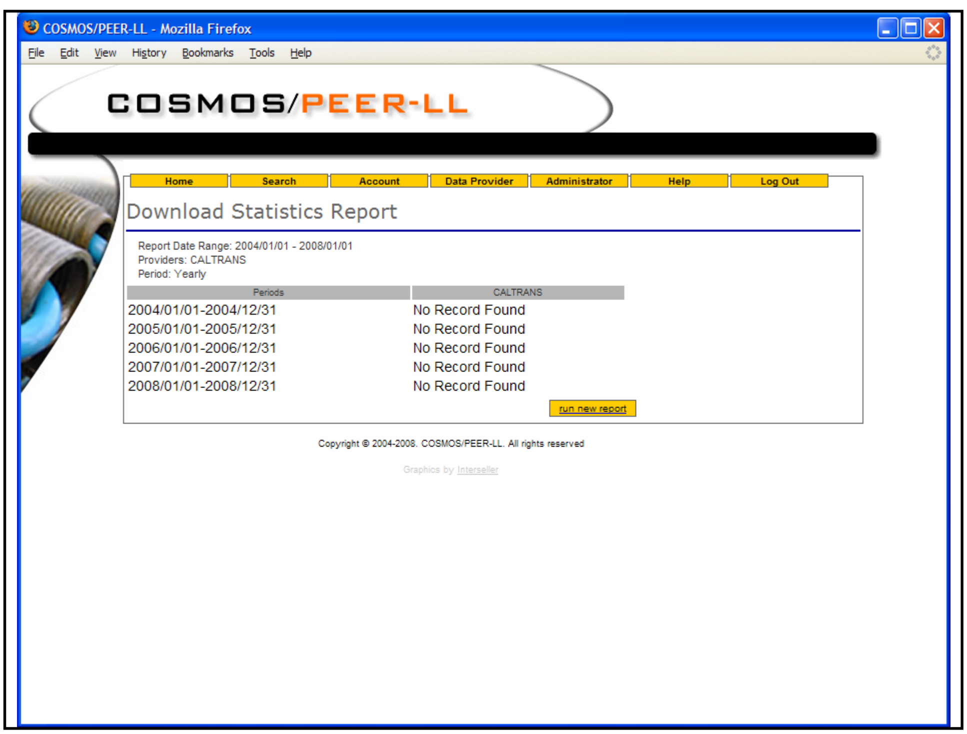
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Period: Yearly
Periods
CALTRANS
2004/01/01-2004/12/31 No Record Found
2005/01/01-2005/12/31 No Record Found
2006/01/01-2006/12/31 No Record Found
2007/01/01-2007/12/31 No Record Found
2008/01/01-2008/12/31 No Record Found
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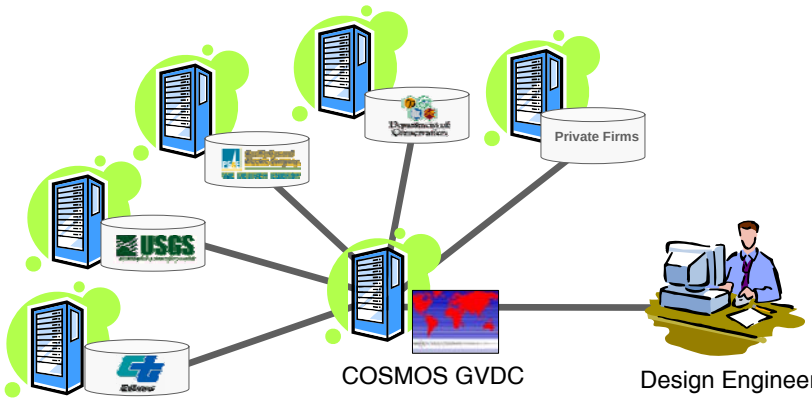
GVDC – How Does It Work?

- The GVDC is a data "broker," not a data repository.
- Translation-based system using DIGGS.



GVDC – How Does It Work?

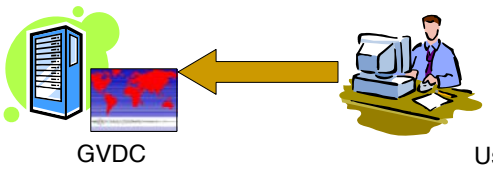
- First, the data provider needs to have a digital repository of their data.
- The data repository can take on many forms, however, the simplest implementation is to have a collection of DIGGS files on a web server.

GVDC – How Does It Work?

- The Data Provider generates a MetaDIGGS XML file to reflect their available data sets.
- The GVDC "harvests" the MetaDIGGS file and stores this information in it's database.

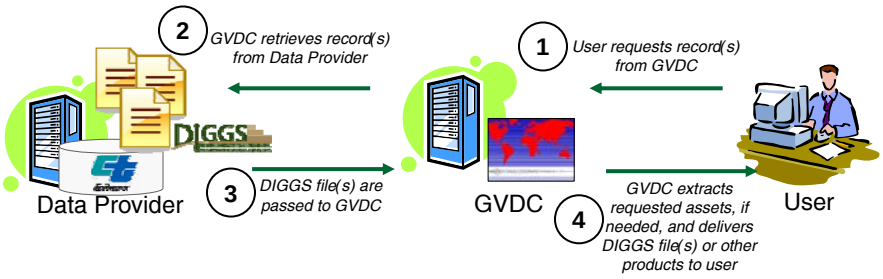
GVDC – How Does It Work?

- A user goes the GVDC to search for data.

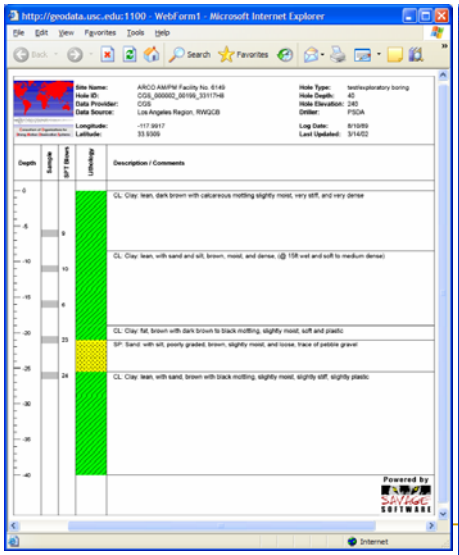


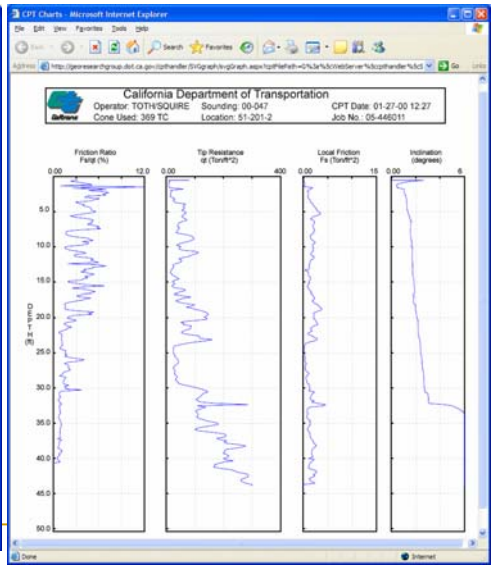
GVDC – How Does It Work?

- The user requests to download and/or preview the record(s) returned by the search process.

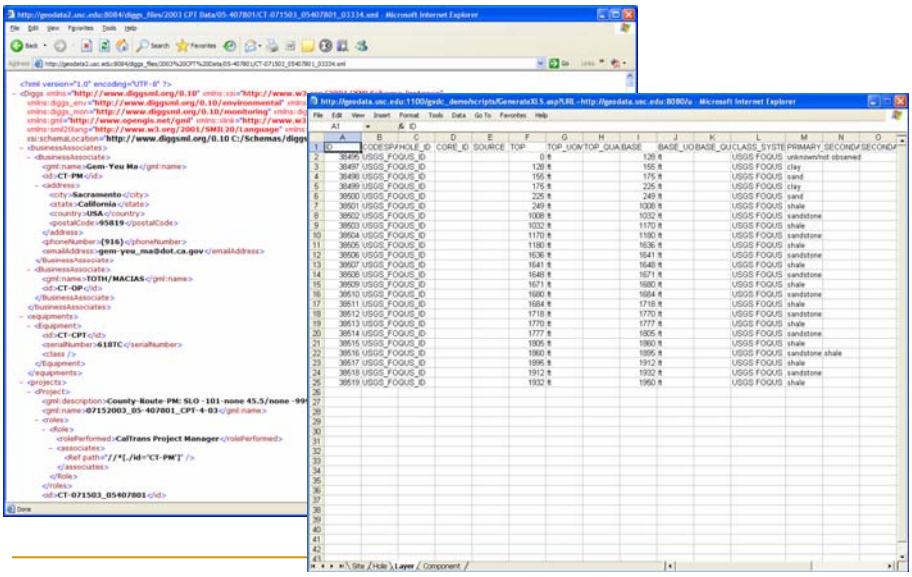


GVDC – How Does It Work?





GVDC – How Does It Work?



Caltrans GeoDOG

Digital Repository
Of
Geotechnical Services

- Central data repository on the web that houses geotechnical documents as well as data generated through gINT, including borehole logs and laboratory test data.
- Search for and download data on the repository using web-based map interface.
- Pass data digitally between the soils lab, engineers/geologists, drafting services, and the data repository.
- Integration with the Department's document management system.

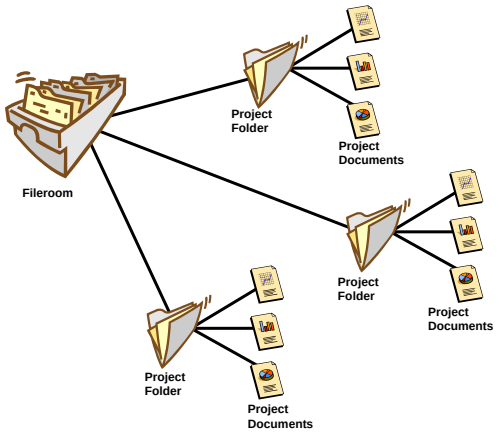
Caltrans GeoDOG

- **Development Team:**
  - Xing Liu
  - Janki Patel
  - Loren Turner
- **Advisory Panel:**
  - Yung Chung
  - Gem-Yeu Ma
  - Bill Owen
  - Mark Willian

Motivation for Caltrans GeoDOG

- 30,000+ project files
- 2million+ documents
  - Memos
  - Boring logs
  - Reports
  - Test results
  - Photos
- 300 projects/year
- 80+ years of data

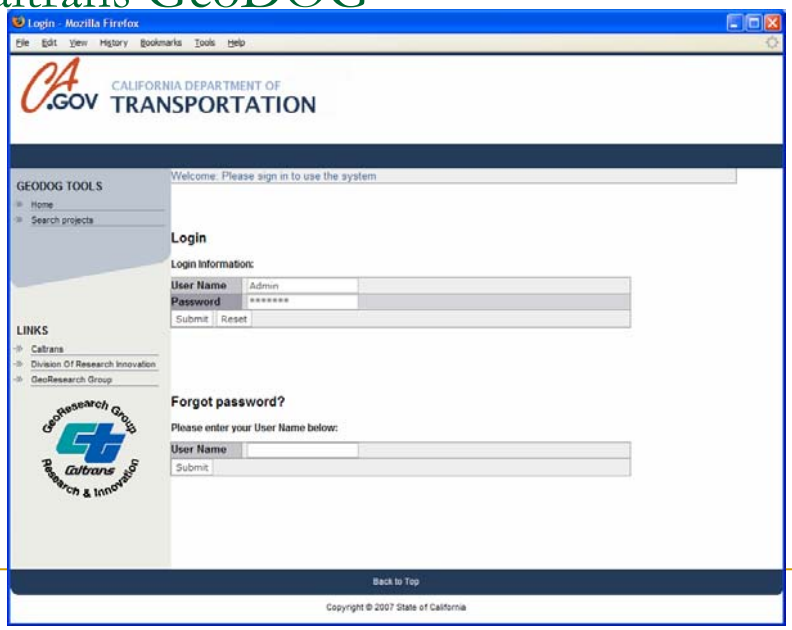
Caltrans GeoDOG Design Approach

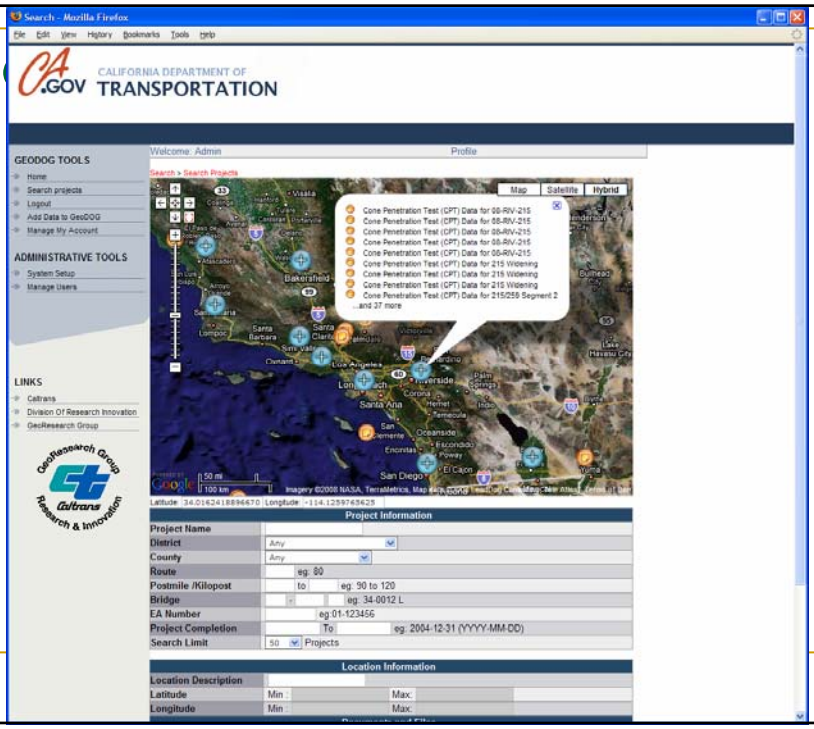


- Database structure:
  - The system's database is organized by *Projects*.
  - *Projects* can have multiple *files* and *locations*.
  - *Locations* can be used to define anything the user wants.
  - The user can upload any file type.
  - *Files* are not directly linked to *locations.*
- Searching
  - Users search by *project*, *file* or *location* info.
  - Map interface can be used to define *location* max/min boundaries.
  - All *Location* points are displayed on the map.
  - Search results are displayed by *Projects* that match search criteria.

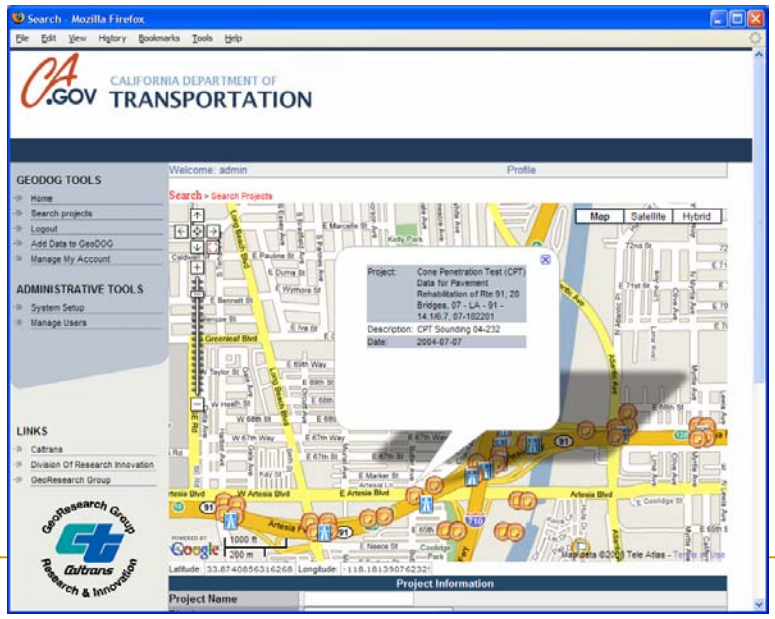
Caltrans GeoDOG

Caltrans GeoDOG

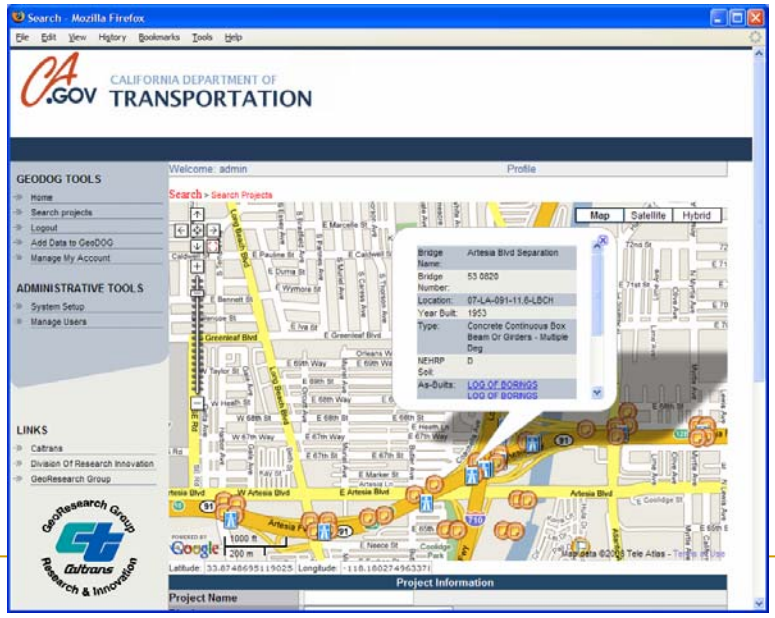




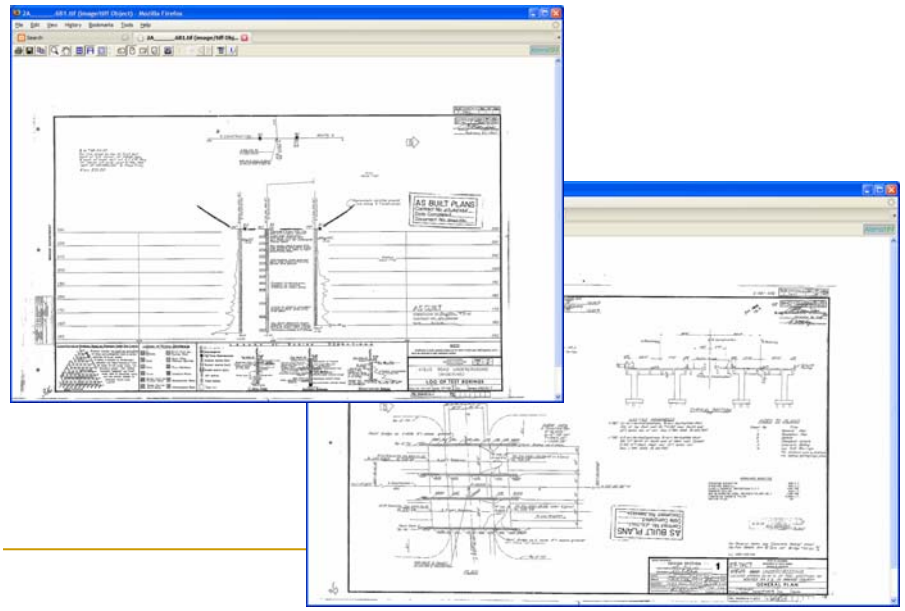
Caltrans GeoDOG



Caltrans GeoDOG



Caltrans GeoDOG



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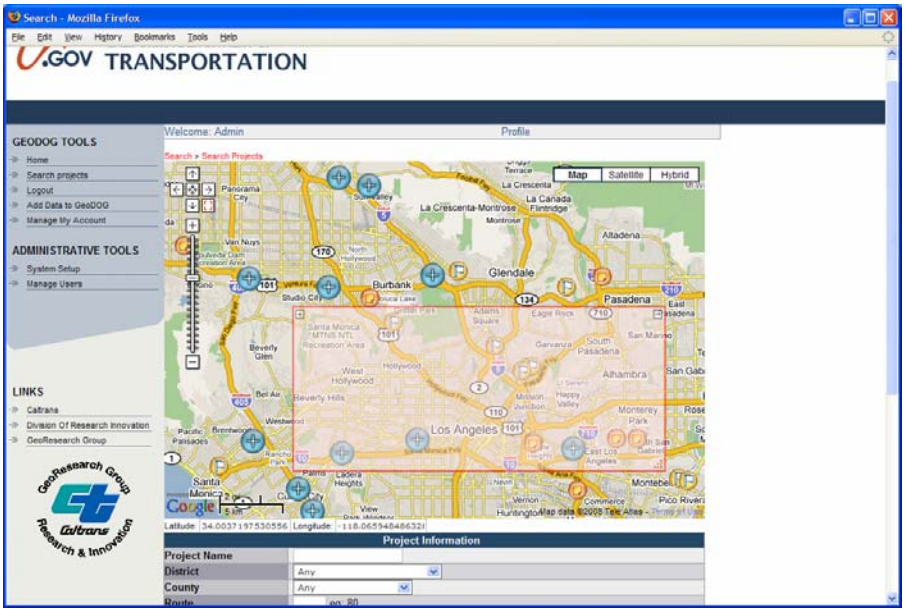

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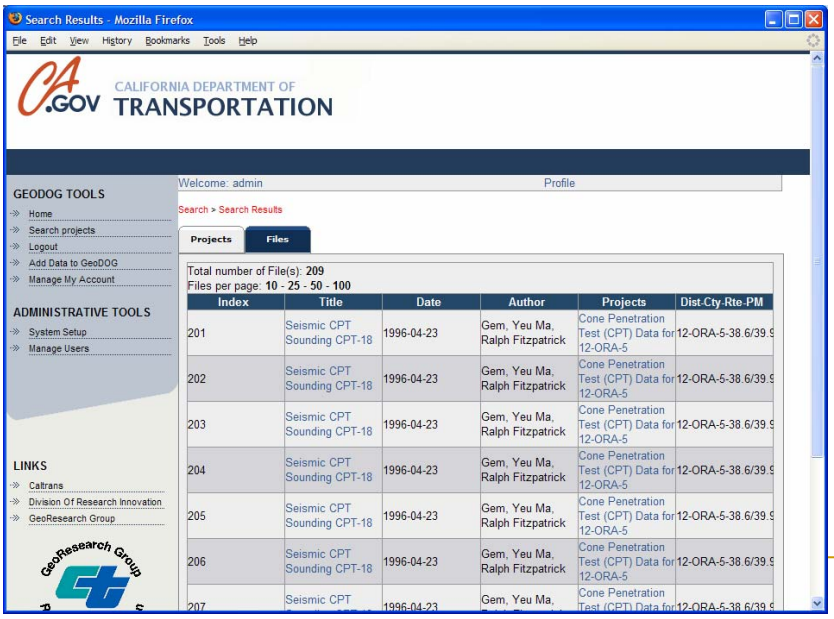

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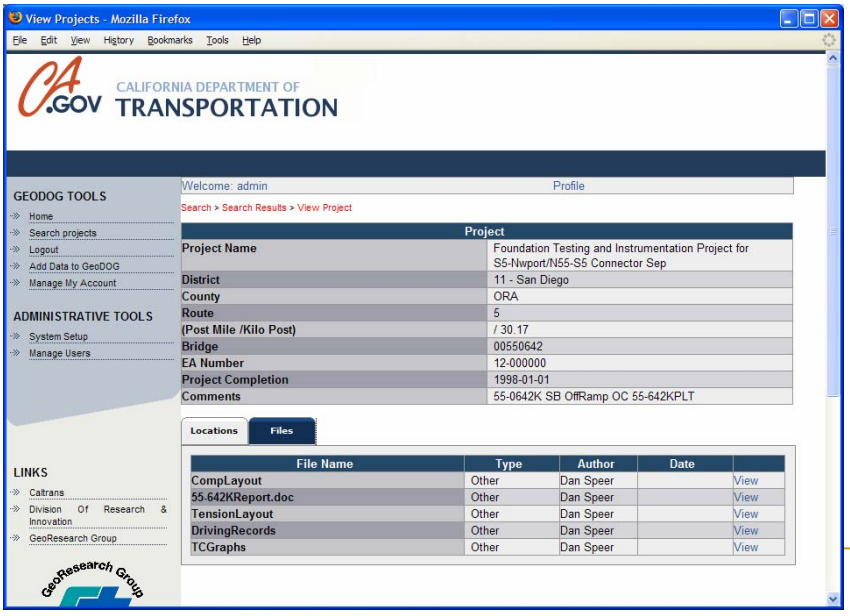

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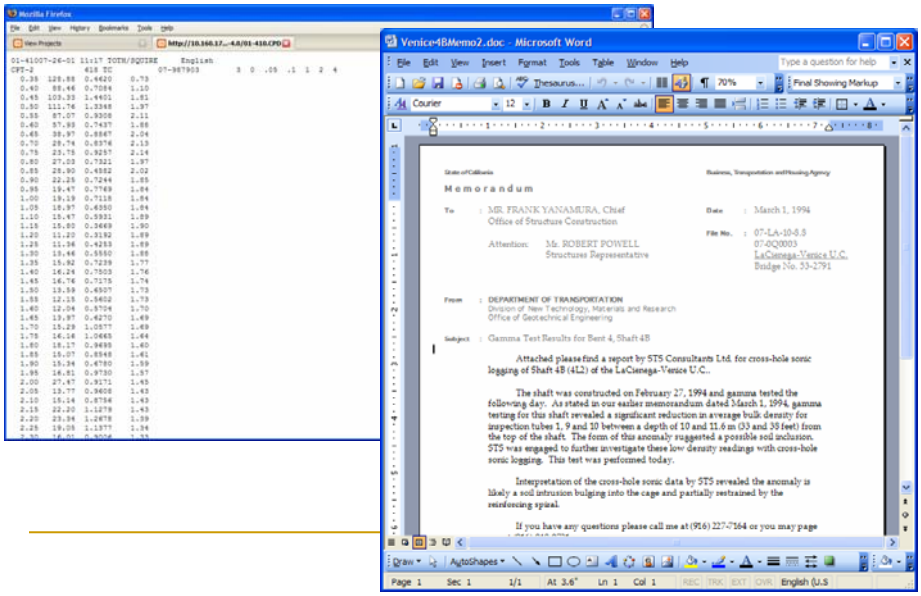

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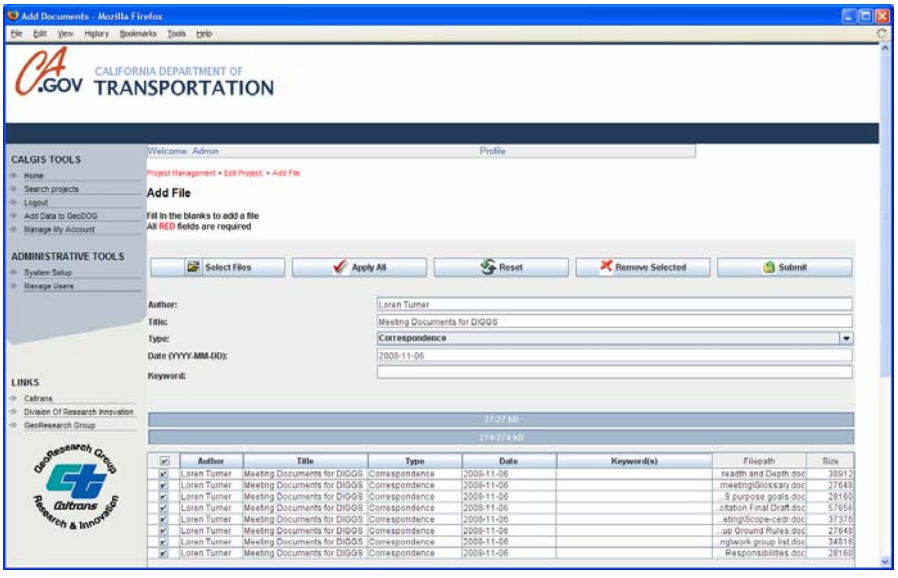

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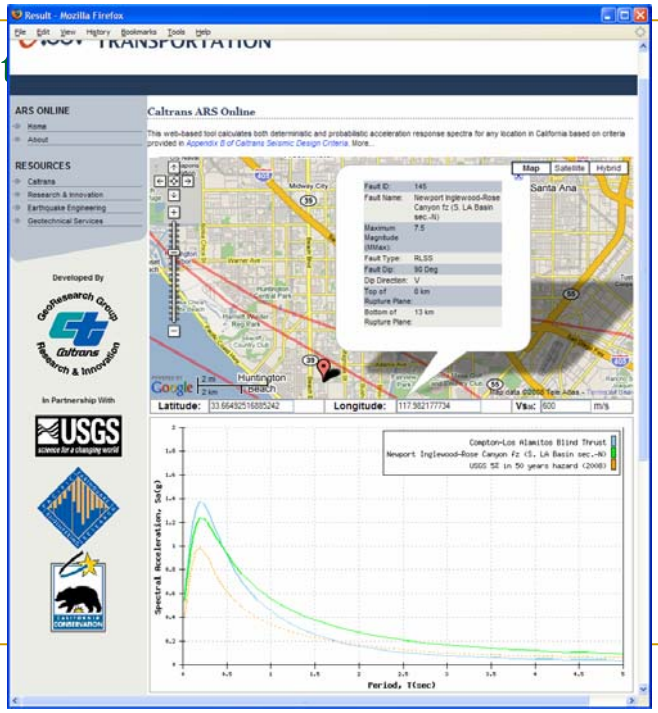

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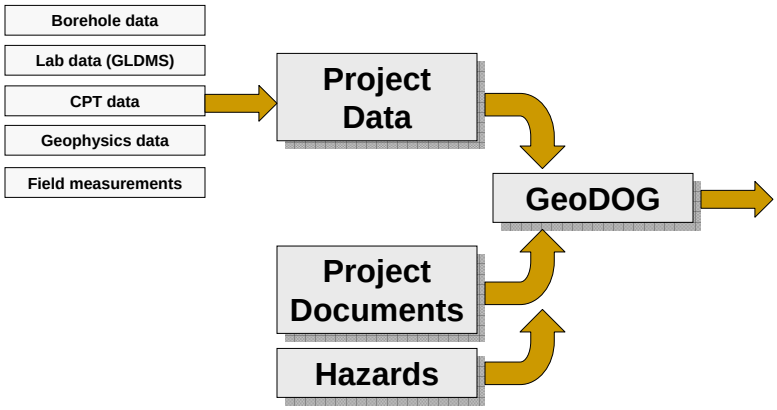
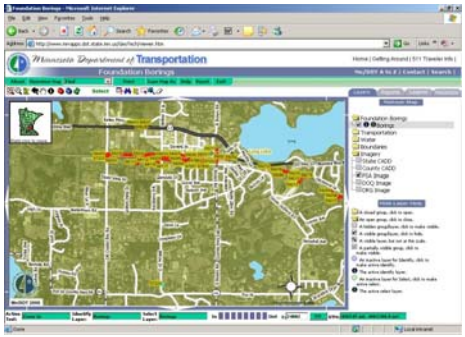


GVDC & GeoDOG Technologies

- WAMP
  - **W**indows (Server 2003)
  - **A**pache
  - **M**ySQL (PostgreSQL/PostGIS for GVDC)
  - **P**HP
- GoogleMaps
  - Clustering
  - Selection box tool
  - Map overlays
- Other Technologies
  - Java Applets
  - Javascript & AJAX

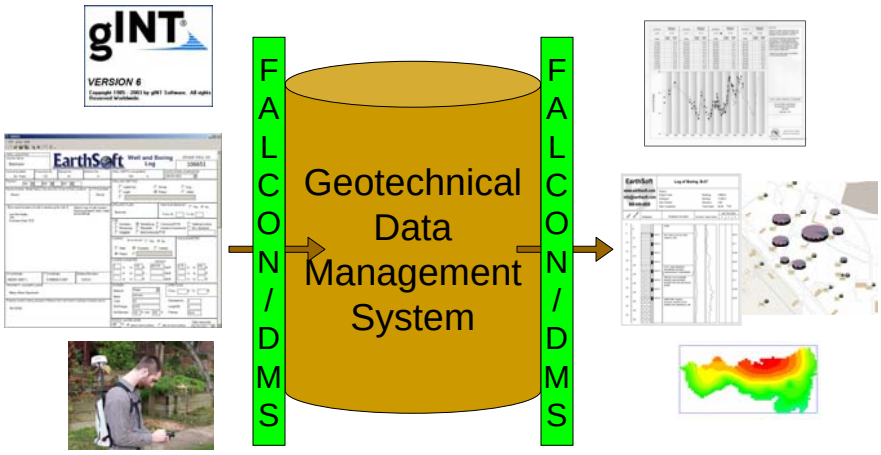
Minnesota DOT - Geotechnical Investigation Information Interchange Internet Interface (GI^5)

- ArcIMS web application
- Makes over 25,000 borings and soundings available on-line
- Graphic interface allows search by zoom, pan, and by data queries
- Users can download static PDF logs, eventually DIGGS data files
- Updated quarterly



http://www.mrr.dot.state.mn.us/geotechnical/foundations/Gis/gi5_splash.html

Ohio DOT - Geotechnical Data Management System



Manages versions of all INCOMING DATA

Manages versions of all OUTGOING DATA

http://www.dot.state.oh.us/

Examples of Geotechnical Data & Document Management Systems in the United States

The COSMOS/PEER-LL *Geotechnical Virtual Data Center*, Caltrans *GeoDOG*, and other systems

Loren Turner, P.E.
Senior Transportation Engineer
California Department of Transportation

AGS/ICE, Electronic Transmission and Storage of Data
Birmingham, UK
June 18, 2008