



Crowd Cartography:

Mobile crowdsourcing of university facilities mapping

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Washington State University





- Founded 1890
- Land Grant Institution
- Over 26,000 undergraduate, graduate,
- and professional students
- PAC 12





WSU Locations



-  4 Campuses (Pullman, Spokane, Tri-Cities, Vancouver)
-  5 Research and Extension Centers
-  4 Research and Extension Units
-  1 Research Station

WSU Infrastructure Stats



Real Estate

- 21,550 acres owned & leased worldwide

Facilities

- 1,000 owned facilities
- 1,400 floorplans
- 12 million square feet of interior space

Utilities (Pullman)

- 70 miles of streets and sidewalks
- 2700 outdoor lighting fixtures
- 42+ miles of electrical lines
- 22 miles of steam lines
- 30 miles of fresh water lines
- 6 miles of chilled water lines



Previous Mapping Technology

- Primarily CAD based utility maps
 - Printed 80 and 40 scale maps
- ArcGIS Server 9.3
 - Initially created to store real estate data
- Google API facility locator
- Google API tree inventory viewer
- Basic real estate viewer using ESRI Silverlight API v2.4

Problem

Maps for land, facilities, and utilities were not properly maintained over the last 40 years of expansion:

- Organization structure
 - Two different departments geographically separated
- As-built drawings not incorporated into working maps at project closeout
- Redlines never transferred into record
- Department wide limited access to maps



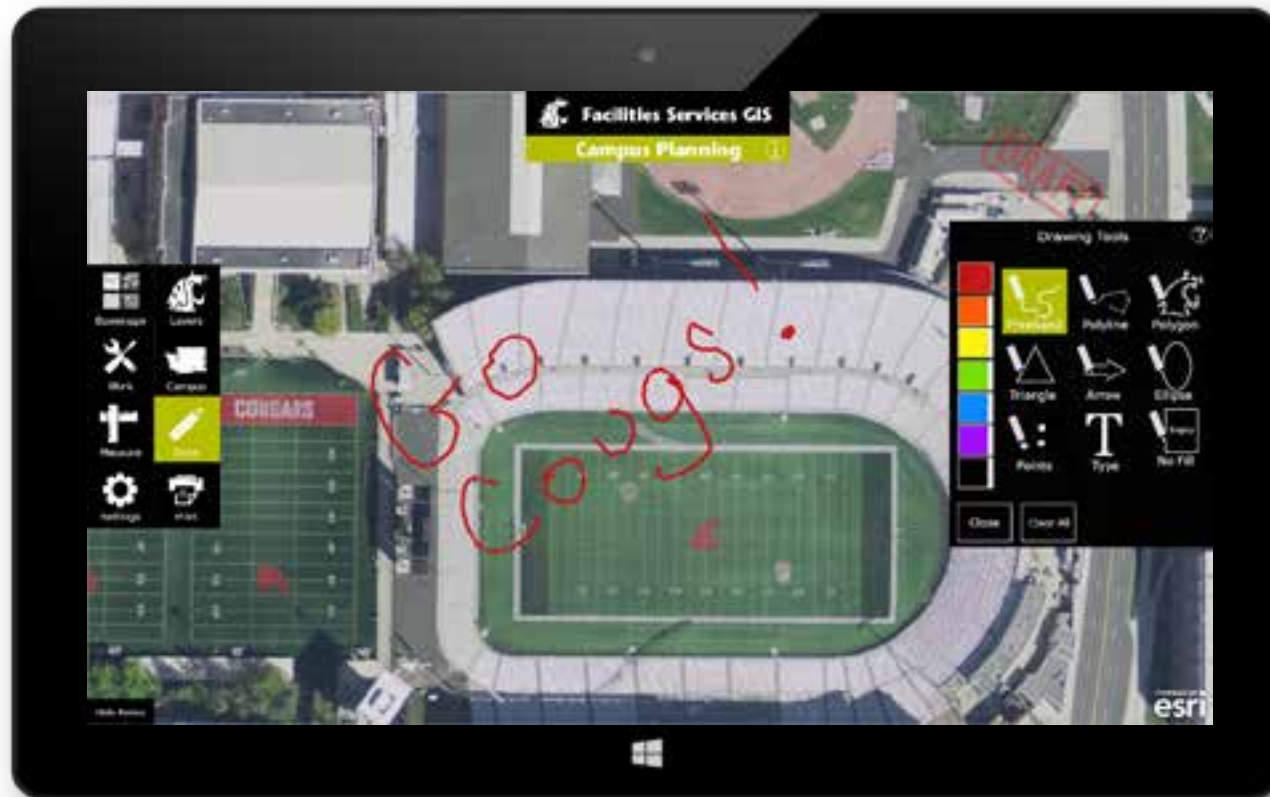


Solution: Mobile Crowd Cartography App

Goal: Create an easy-to-use mobile application so that all staff can view and query the same geospatial data as well as contribute information back into the university's GIS.

App Requirements

- Developed and maintained in-house
- Easy and intuitive to use
- Be able to view and query all available geospatial data
- Allow users to submit corrections or additions to existing data
- Touch-enabled device friendly



App Users

- Must support current users of the GIS
 - Real Estate
 - Planning
 - Capital Projects
- Support expanded department workflows and users
 - Future expansion may include WSU Police and WSU Parking Services



App Design



Menu Layout

- Easy to interact with while holding a tablet

Menu Card Stacks

- Allows for expansion of content and/or app functionality

App Highlight Color

- Makes it easy to distinguish apps from each other

| | |
|-----------------|---|
| Campus Mapping | i |
| Operations | i |
| Heavy Equipment | i |
| Urban Campuses | i |
| Campus Planning | i |
| Utilities | i |
| Real Estate | i |

App Development



GIS Environment

- ArcGIS for Server 10.2
- ArcSDE 10.1 – SQL Server
- ESRI Silverlight API 3.1



Dev Software

- Microsoft Blend for Visual Studio 2012
- Microsoft Visual Studio 2012
- Adobe Photoshop CS6



Redline Data Processing

- AutoCAD Map 3D 2014
- ArcDesktop 10.2.1
- Trimble R10 & TSC3 Collector
- Trimble Geo 7 Centimeter Kit
 - GPS units used for field verification as needed





Application Demo



Field Deployment

The background of the slide is a detailed line-art map of the Washington State University (WSU) campus. The map shows various buildings, roads, and green spaces. Overlaid on this map are several colored markers: red dots are scattered across the upper and middle sections of the map, while green dots are clustered in the lower-left and lower-right areas. These markers likely represent the locations where the field deployment was implemented.

- Deployed 5 months (early February to end June)
- 200 users trained February to March
- 100 active users by end June
- Used by all four main WSU campuses

Results

- Departments now updating their own map layers
 - E.g., 118 redlines collected in 4 days for the storm water system
- Raised awareness of the importance of good data
- The GIS is now the single source for digital mapping data
- Created discussions on workflows of project information
- Used during all planning meetings
- Expanding into other departments and campuses
- Will provide outside consultants easy access to our data



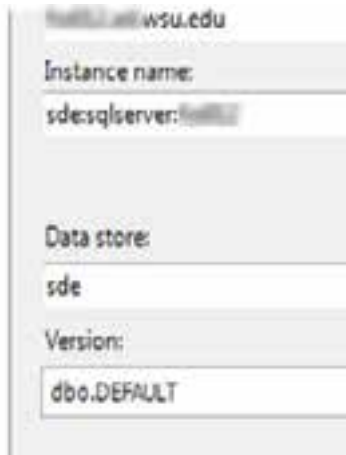
Lessons Learned: User Experience



- Encourage Training!
- Get users excited, make it fun
- Add elements to make the transition easier, i.e. old scanned maps
- Add visual elements to indicate data saves
- Spend the extra time on your UI/UX
- IT Support J

Lessons Learned: Technical

AutoCAD Map 3D 2014 needs a little tweaking to make it work with ArcSDE



The screenshot shows a dialog box for configuring a connection. The fields are as follows:

| | |
|----------------|---------------|
| Instance name: | sdesqlserver: |
| Data store: | sde |
| Version: | dbo.DEFAULT |

- Work with IT to confirm firewall settings
- If connecting to ArcSDE instance, 64 bit workstations require seven AutoCAD dll's to be overwritten with ESRI dll's
- Instance name syntax
 - sde:sqlserver:(servername)
- Manually type the data store name, "sde"
- Connection parameters aren't saved
- sde FeatureDataSets not recognized
- sde domain tables not recognized. No drop downs, manual entry

If your connection crashes

- Check the SDE_states table for a null closing_time

Application Fair



We have a display at the app fair featuring our public facing app. Stop by and give it a try!

cougGIS.wsu.edu

We will also be heading to the booth right after this session to show off the crowdsourcing app to those who are interested.

Feel free to ask questions and try it out for yourself!



Questions?

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