Disaster Resilient GIS Aids Port Security and Benefits All Stakeholders

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The Port of Oakland at a Glance

- Enterprise agency of the City of Oakland, est. 1927
- Separate Budget and no local tax dollars
- State Lands Trustee responsible for maintaining and managing lands for the benefit of California
Maritime Division

- Only major seaport for Northern California, handling 99% of regional containerized goods
- Ranked 7 in US container traffic (2013)
- Nearly 200 employees, $140M revenues
- 2.39M TEUs (twenty foot equivalent units), totaling more than $40B goods in 2014
- Top Import Commodities (by volume): furniture, glass and glassware, machinery & equipment
- Top Export Commodities (by volume): wood pulp, fruits and nuts, refrigerated meat, beverages and spirits
- Powers nearly 40% of the 73,565 regional jobs generated by the Port
Challenges

- Very small in-house security staff
- Most security performed by tenants and by City, County and USCG
- Needed tools to collaborate and communicate effectively and quickly
- Civic environment known historically for activism
- Physical location prone to natural disasters
Solution: Enterprise GIS on site, replicated to cloud

- Geospatial Security Mapping System (GSMS)
- Started in 2011 and on-going
- Executed by NSG and URS
- Funded by federal and state transportation security grants
- Managed by Port security management personnel
Port started with...

- Siloed non-spatial data
- No in-house GIS staff
- Almost no GIS software nor GIS data
- No system failover in the event of an emergency
Now with GSMS, the Port has...

- Lots of software
- Lots of data
- Lots of users across *all* departments, not just security
Software

- ArcGIS for Desktop
- ArcGIS for Server

- Geocortex Essentials

- NSG Port Solution
Data – nearly 500 available layers

- Live data feeds: CCTV, AIS vessel tracking, weather
- Security: fences, gates, building exits, emergency shut offs
- Environmental: deed restrictions, contaminated areas
- Nautical: depths, buoys, restricted areas
- Aviation: pavement condition, runway zones, airspace surfaces
- Utilities: electric, telecom, gas, storm water, sewer, potable
- Transportation: roads, railroads, evacuation routes
- Property: lease and space assignments, country parcels
- Boundaries: cranes, buildings, berths, terminals, jurisdictions
Security applications

- Situational Awareness viewer
  - Live vessels, weather and CCTV including PTZ
  - Linked photos of critical infrastructure
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- Incident Reporting app
- Asset Inspection app
- Mass Notification app
- Service Request app
- Incident Planning app
Benefits to Security

- Planning for events and emergency incidents
- Awareness on daily basis
- In field inspection of security assets like cameras
- Incident reporting like vandalism, accidents, or emergencies
- Geographically select areas for mass notification
- Service requests for repairs, maintenance
- Management of the security operations center
Prone to disruptions

- Natural disasters
  - 1989 Loma Prieta earthquake
    - relatively light
  - 2012 Hurricane Sandy
    - Port of New York and New York suffered $2 billion in damages (ex. heavy damage)
  - USGS predicts San Francisco Bay Region 63% probability for one or more 6.7+ earthquakes by 2036.

- Civic activism
  - 11/2/2011 General Strike (associated with Occupy Oakland): cost port millions in lost revenues and damages
Resiliency is vital

- GIS plays a critical role in the security of the port
  - Emergency response
  - Resumption of business operations
Solution: replication off-site in the cloud

- Duplicated software and configuration
- Replicated data, updated nightly
- Hosted, secure virtual server 400 miles away
- Return replication for any data collected via apps
Concerns over cybersecurity

• Strike balance between data protection and usability
• Remote access available only from cloud site and via secure means
• No access to internal servers
Looking ahead

- Continue to build staff acceptance and use
- Expand ROI in other departments
  - Environmental and Maintenance inspections
  - Engineering and Maintenance access to data
  - General events planning (ex. construction road closures)
  - Map Quality Feedback and Document Geolinker apps
- More collaboration with terminal tenants
Questions?

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