



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

Broad Jurisdiction



Commercial Real Estate



Parks, Open Space, Utility



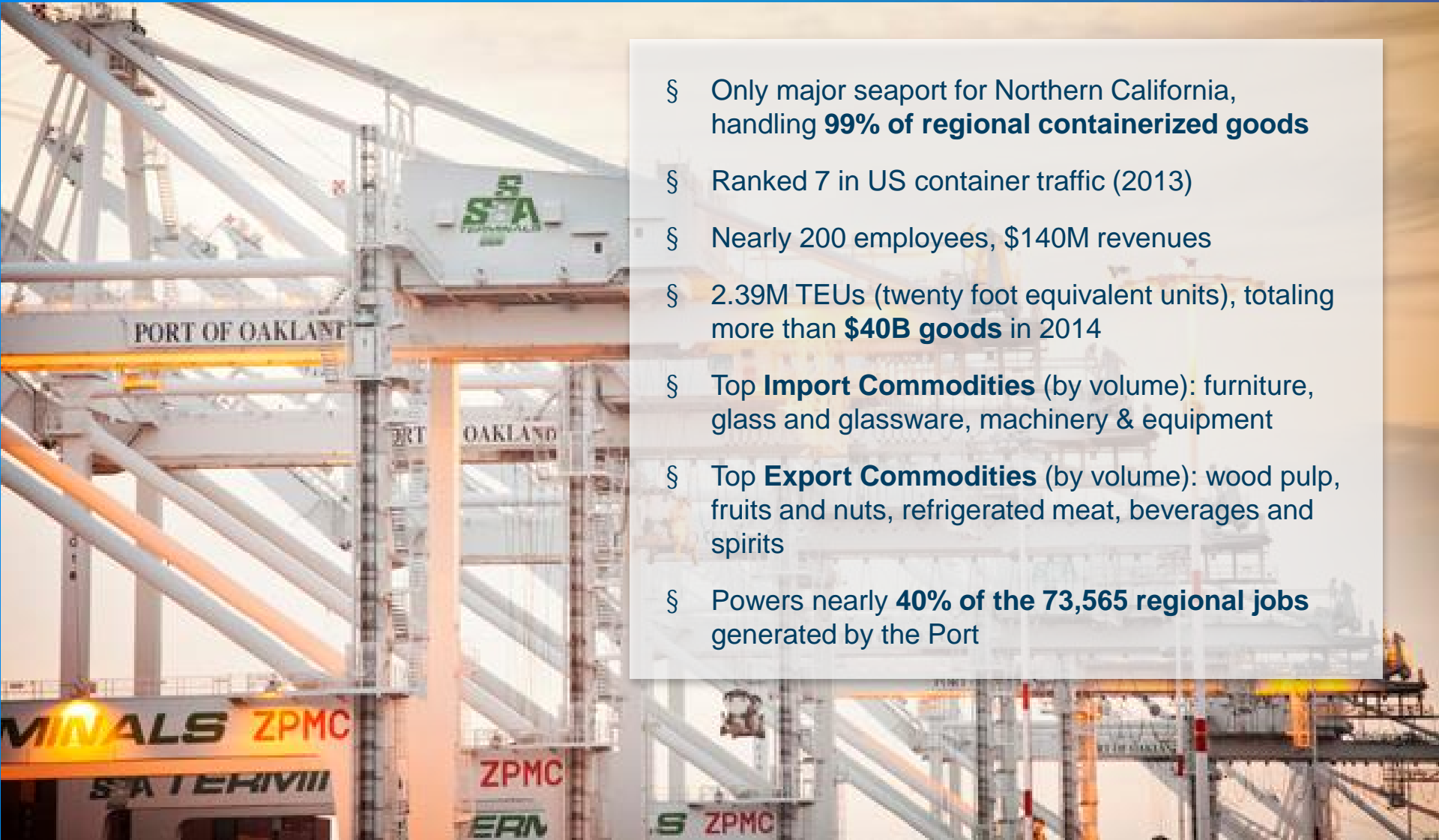
Maritime Area



Aviation (including OAK)

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



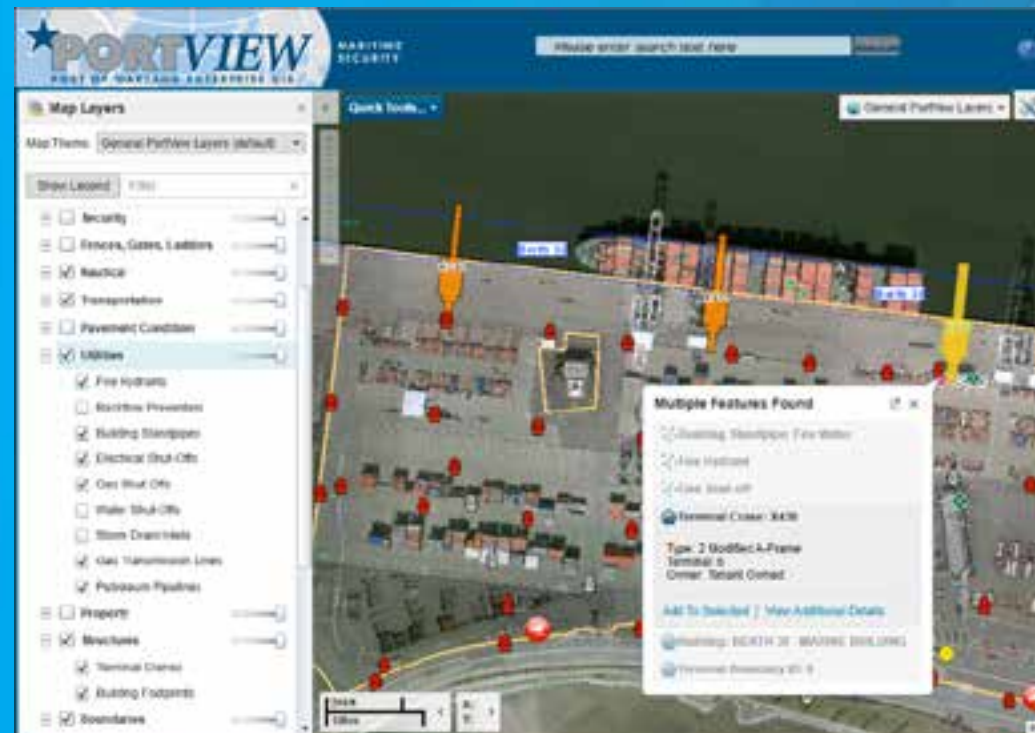
Challenges

- **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

-  **esri**
 - ArcGIS for Desktop
 - ArcGIS for Server
-  Latitude Geographics®
 - Geocortex Essentials
-  **NSG**
NORTHSOUTH GIS
 - 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



Alameda

Station ID: 9414750
 Publish Date: 5/23/2012 2:50:00 AM +00:00
 NOAA Tides & Currents: NOAA Tides & Currents
 Water Level: -0.65 ft
 Water Level Trend: Rising
 Air Temperature: 55.69° F
 Wind Speed: 2.13 m/s
 Water Temperature: 65.21° F
 Wind Direction: 290.63 (°N)
 Wind Gust: 3.18 m/s
 Air Pressure: 1,019.71 mb
 Air Pressure Trend: Rising

MATSONIA 293 8

Vessel Information AIS Supplementary Data

Vessel ID: 366265000
 Publish Date: 3/21/2013 7:28:00 AM -08:00
 Marine Traffic Report: Marine Traffic Report
 Vessel: MATSONIA
 Heading: 293.00 (°NW)
 Latitude: 37.7948
 Longitude: -122.286
 Speed: 3.00 kts
 Destination: OAK 58
 E.T.A.: 3/4/2013 9:00:00 AM
 Navigation Status: Manned
 Ship Type: Cargo
 Call Sign: W48C
 Dimension to Port: 58.07 ft
 Dimension to Starboard: 26.25 ft
 Dimension to Bow: 456.64 ft
 Dimension to Stern: 299.19 ft
 Draft: 29.53 ft

Security applications

- Situational Awareness viewer
 - Live vessels, weather and CCTV
 - Linked photos
- Port Security Management System



PORTVIEW Port Security Management System Incidents Period Report
4/27/2015 12:00:00 AM - 4/27/2015 11:59:00 PM

Summary of Incidents
Reporting Period: 4/27/2015 12:00:00 AM - 4/27/2015 11:59:00 PM

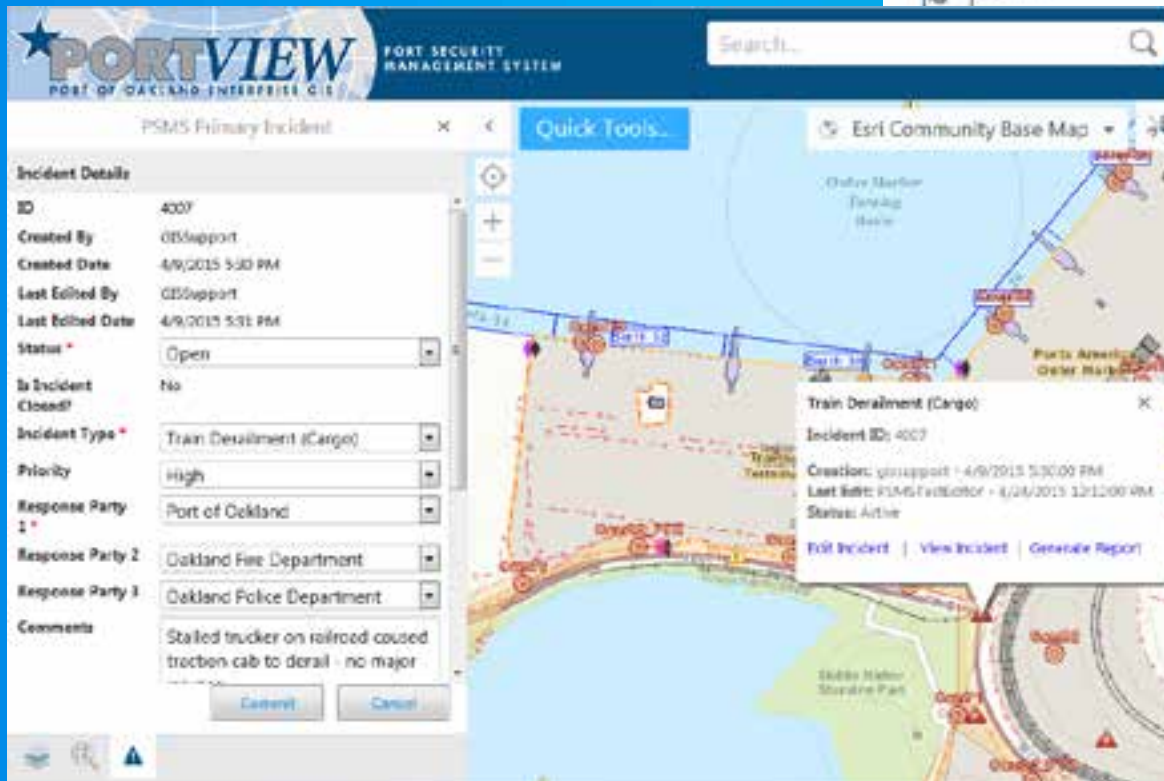
Opened In Period:	3
Edited In Period:	4
Closed In Period:	3

Opened Incidents

ID #	Priority	Incident Type	Created	Last Edit	Current Status	Response Parties
4007	High	Train Derailment (Cargo)	4/9/2015 5:30:00 PM	4/27/2015 12:00:00 PM	Complete	Oakland Fire Department

Edited Incidents

ID #	Priority	Incident Type	Created	Last Edit	Current Status	Response Parties	FBI Count
4007	High	Reclassification	4/27/2015 12:00:00 PM	4/27/2015 12:00:00 PM	Active	Oakland Fire Department	1
4007	High	Reclassification	4/27/2015 12:00:00 PM	4/27/2015 12:00:00 PM	Active	Port of Oakland	1
4007	High	Reclassification	4/27/2015 12:00:00 PM	4/27/2015 12:00:00 PM	Active	Oakland Police Department	1



PORTVIEW PORT SECURITY MANAGEMENT SYSTEM

PSMS Primary Incident

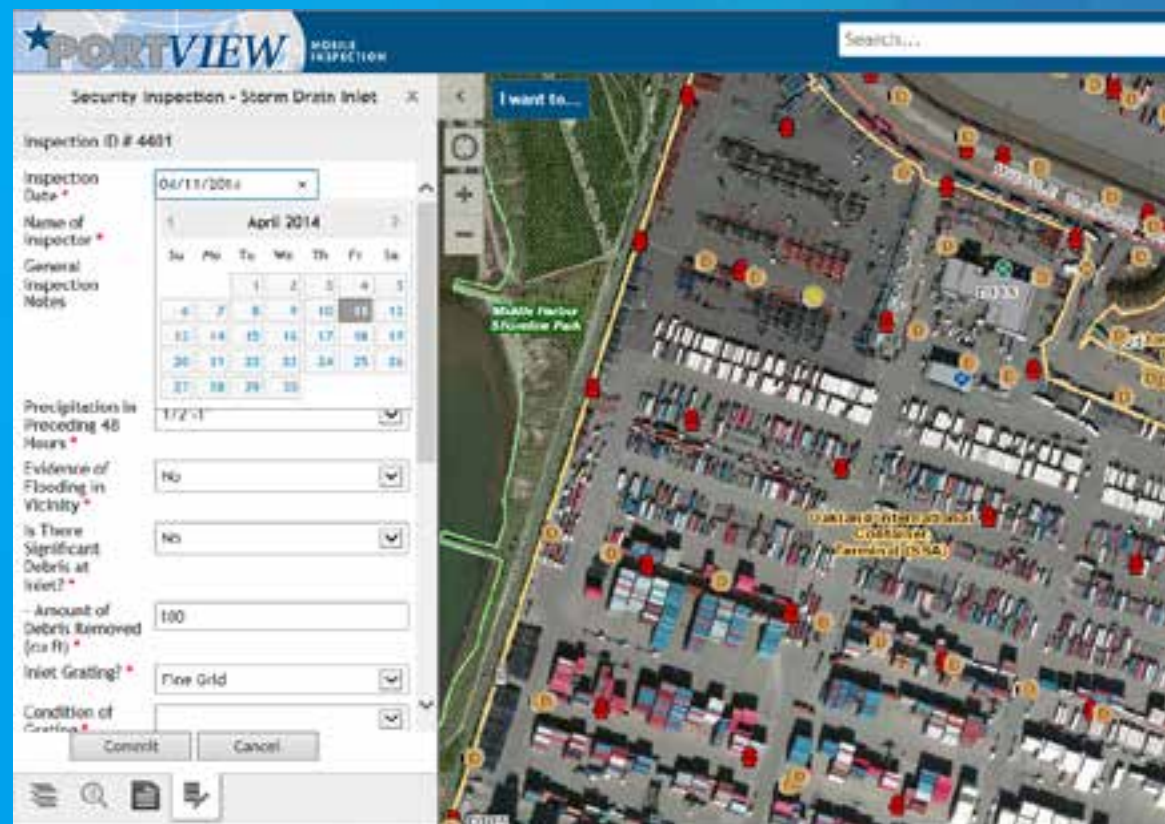
Incident Details

ID: 4007
 Created By: GISsupport
 Created Date: 4/9/2015 5:30 PM
 Last Edited By: GISsupport
 Last Edited Date: 4/9/2015 5:31 PM
 Status: Open
 Is Incident Closed?: No
 Incident Type: Train Derailment (Cargo)
 Priority: High
 Response Party 1: Port of Oakland
 Response Party 2: Oakland Fire Department
 Response Party 3: Oakland Police Department
 Comments: Stalled trucker on railroad caused trolley cab to derail - no major

Train Derailment (Cargo)
 Incident ID: 4007
 Creation: GISsupport - 4/9/2015 5:30:00 PM
 Last Edit: P1M6Fvd866tor - 4/26/2015 12:12:00 AM
 Status: Active

Security applications

- Situational Awareness viewer
 - Live vessels, weather and CCTV including PTZ
 - Linked photos of critical infrastructure
- Port Security Management System
- 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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