Data as the 5th Modality for 21st Century Ports

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Esri
1. **water**  
   **SHIP MOVEMENTS**  
   1,000,000 PER YEAR  
   3,000 PER DAY

2. **road**  
   **PERSONNEL EMPLOYED**  
   30,000 PER YEAR  
   ROAD TRANSPORT

3. **pipeline**  
   **RAW CRUDE OIL**  
   215M BARRELS PER YEAR  
   (BOE) ROTTERDAM TO ANTWERP

4. **rail**  
   **730,000 TRAIN CARS**  
   2,000 PER DAY
Common Returns on Investment

Connect port systems and stakeholders from across the enterprise

- Create Efficient Decisions from Common Data
- Communicate More Effectively
- Attract and Retain Business
- Improve Awareness Across the Enterprise
- Better Manage and Utilize Assets
Establish GIS as a System of Record

Organizing and Managing the Geographic Context of Your Assets and Resources
**Location Strategy**

Map where things are, show how they relate, determine what it all means, and evaluate what actions to take

<table>
<thead>
<tr>
<th>Location Strategy</th>
<th>Map where things are, show how they relate, determine what it all means, and evaluate what actions to take</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location Enablement</strong></td>
<td>Discover, use, make, and share maps at work -- anywhere, anytime</td>
</tr>
<tr>
<td><strong>Constituent Engagement</strong></td>
<td>Facilitate and manage communication with stakeholders</td>
</tr>
<tr>
<td><strong>Decision Support</strong></td>
<td>Inform executives and management with maps and location intelligence</td>
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<tr>
<td><strong>Field Mobility</strong></td>
<td>Get authoritative information into and out of the field</td>
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<tr>
<td><strong>Analytics</strong></td>
<td>Describe, predict, and improve business performance</td>
</tr>
<tr>
<td><strong>Location Data Management</strong></td>
<td>Collect and organize location data about your assets and resources</td>
</tr>
</tbody>
</table>
Port of Rotterdam

Broad Implementation of the ArcGIS Platform

- Asset Management
- Modalities
- Maritime
- Geodesign
- 3D Port
- Harbor Master

Hoeft u vragen? Stuur een bericht naar portmaps@portofrotterdam.com
Information Products - Lease expirations
Quay Wall Modeling System
Rationalize Surveying and Dredging
Automated, Survey-driven Electronic Navigational Charts®
Example
Enter Big Data

Volume
Velocity
Variety
Integrate Remotely Sensed Data
Leveraging Government Open Data

Many Sensors
- POES
- GOES
- DMSP
- Jason-2
- Suomi NPP
- GOES-R

Intelligent Imagery
- Tropical Storms
- Sea Surface Temperature
- SST Anomalies
Integrate Real Time Data
Continuous Processing and Analysis

GeoEvent Processor

Streams

ArcGIS Server

Rules

Messages

JMS
Integrate Many Types of Data
Analyze Communities

- 2013/2016 Demographics
- Access to Care
- Adult Preventive Services Use
- American Community Survey
- Birth Measures
- Building Permits
- U.S. Business Locations
- Business Summary
- Census 1990 Demographics
- Census 2000 Demographics
- Census 2010 Demographics
- Consumer Spending
- Crime indices
- Death Measures
- EPA Enforcement
- Food Access
- Food Consumption
- Food Stamps
### Value Drivers for Data-driven Organizations

<table>
<thead>
<tr>
<th>Driver</th>
<th>Example</th>
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<tbody>
<tr>
<td>New Opportunities</td>
<td>Uncover hidden patterns and generate new business opportunities</td>
</tr>
<tr>
<td>Faster Decisions</td>
<td>More frequent and accurate analysis</td>
</tr>
<tr>
<td>Better Decisions</td>
<td>Quantify impact of decisions</td>
</tr>
<tr>
<td>Proactive Decisions</td>
<td>Gain operational insights</td>
</tr>
<tr>
<td>Improve Capabilities</td>
<td>Data-driven decision making culture</td>
</tr>
<tr>
<td>Increase Automation</td>
<td>Reduce reporting effort</td>
</tr>
<tr>
<td>Eliminate Redundancy</td>
<td>Tools, data stores, processes</td>
</tr>
<tr>
<td>Improve Processes</td>
<td>Continuous improvement</td>
</tr>
<tr>
<td>Reduce Costs</td>
<td>Infrastructure, process, tools</td>
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</table>
Map 3. Domestic Market for Goods Shipping Through the Los Angeles Port Complex, 2010

Source: Brookings analysis of EDR data