

# PORTS THRIVE WITH SMART TECHNOLOGY

Using the power of location intelligence





# INVEST IN THE SMARTEST ENTERPRISE TECHNOLOGY

You are well aware of the profound changes global ports have experienced over the past several decades. With increased global trade and constantly changing international supply chains, the maritime market is in a constant state of transition. To meet these challenges, stakeholders expect you to make smart and strategic capital investments in infrastructure and technology to be sustainable and prosper. To thrive in a competitive environment, ports must implement technology that

- Maximizes operational efficiency and throughput.
- Empowers everyone with the information they need to make better decisions.
- Facilitates collaboration and engagement with stakeholders.
- Helps them play a more productive role in regional economies.

Location intelligence helps you meet those expectations by bringing together information from across your organization and powerfully visualizing your data to help you make the best decisions. It combines sophisticated digital mapping, big data analysis, and the ability to automate many processes that slow throughput and hamper the fiscal growth of ports.







# MANAGE INFORMATION INTELLIGENTLY

Modern ports recognize the value in their information. Even the best ports, however, are characterized by their silos of information and only share data at the departmental level. To thrive, modern ports need to share information and create collaborative environments within the organization and among their stakeholders. Thus, an effective information-sharing platform is the keystone of a modernized port environment.

With location intelligence, all your existing business systems can be converted into information layers that can be visualized and analyzed within a digital map such as the following:


- Leases
- Maritime infrastructure
- Transportation
- Dynamic data feeds (weather, tides, ship locations)
- Utilities
- Environment
- Bathymetry and charts

The power of Esri's ArcGIS® platform is its ability to bring these information layers into a common environment, enabling everyone within the organization to access the information they need to make better decisions daily. Geographic information system (GIS) technology combines both static and dynamic real-time data to give you full situational awareness and thus have greater operational control.

# LEVERAGE EXISTING TECHNOLOGY

Most ports already have a large number of technology investments and management systems that contain critical data and information. The problem is that the data is not shared across their organizations in ways that can be used for more effective decision-making. GIS is perfectly suited to leverage your existing data systems. Because almost all port data has a location component, GIS can serve as the denominator between different datasets, allowing you to maximize the value of your data.

The goal is not to build new, large, complex systems but rather to leverage the data that you already have and to make it much more widely accessible based on user credentials. By creating open APIs that work between existing port management systems, integrating the data—including real-time data—into a common location brings new levels of control into a complex environment.



*“Just as important, however, is that the cloud platform and the generated real-time information, which includes infrastructure, water, and weather condition data, enable us to further improve mission-critical processes in the service to our clients.”*

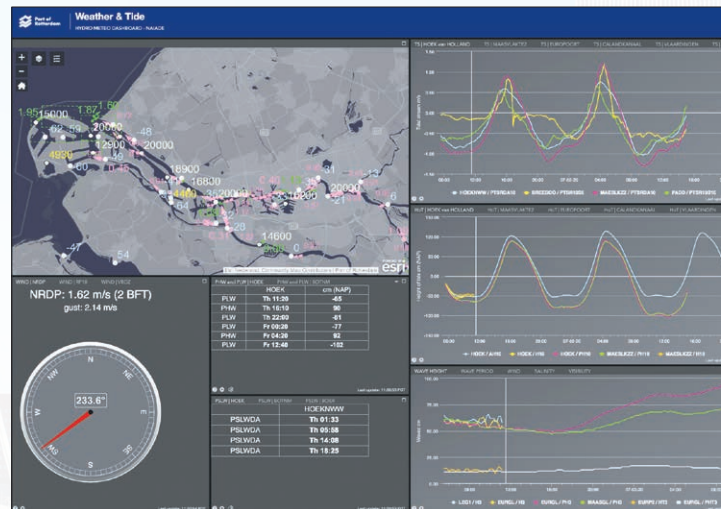
**Ronald Paul**  
Port of Rotterdam's Chief Operating Officer





# PORT OF ROTTERDAM BUILDS A DIGITAL TWIN

The Port of Rotterdam is building a “digital twin”: a precise digital copy of Rotterdam’s infrastructure and activities that reflects the various processes that take place in the port. Ship movements, traffic flows, the weather, geographic data, structures, and water conditions—all these aspects are monitored with absolute precision and in real time. The digital twin is a combination of IBM’s Internet of Things (IoT) platform and Esri’s GIS. Together, these systems provide the users with the right information, presented in the right context, at the right time.



Port of Rotterdam's weather and tide dashboard is monitored by sensors in the port.







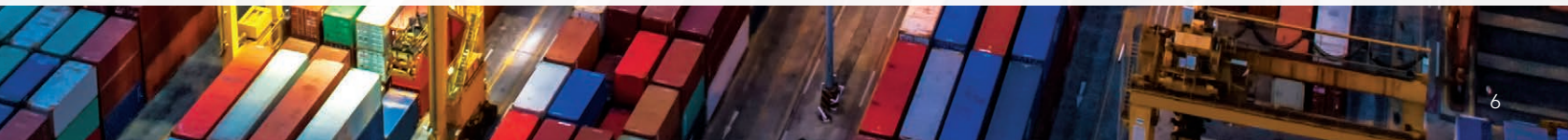
# JUSTIFY SMART CAPITAL INVESTMENT

Trends in global supply chains and trade are leading to larger vessel sizes, which, in turn, require ports to make substantial capital investments to accommodate them. Only a limited number of ports can accommodate 10,000 twenty-foot equivalent unit (TEU) ships and larger, while ships as large as 22,000 TEUs are currently being designed. For ports to keep up, they must make costly improvements to their infrastructure if they want to support these vessels.

At the same time, ports have a limited amount of land and space, and many are constrained by surrounding urban development that prevents further growth. Thus, many ports need to focus

on the best use of their assets and resources. These ports need total, detailed awareness of current asset conditions. They must understand an asset's full life cycle and be able to conduct cost analyses. Together, these behaviors help senior port managers make informed, cost-effective investments.

Location intelligence helps ports overcome these challenges. GIS technology helps you understand your existing assets and supports your strategic planning analyses so you can determine the optimal mix of terminal space and capital investment to meet future demand.



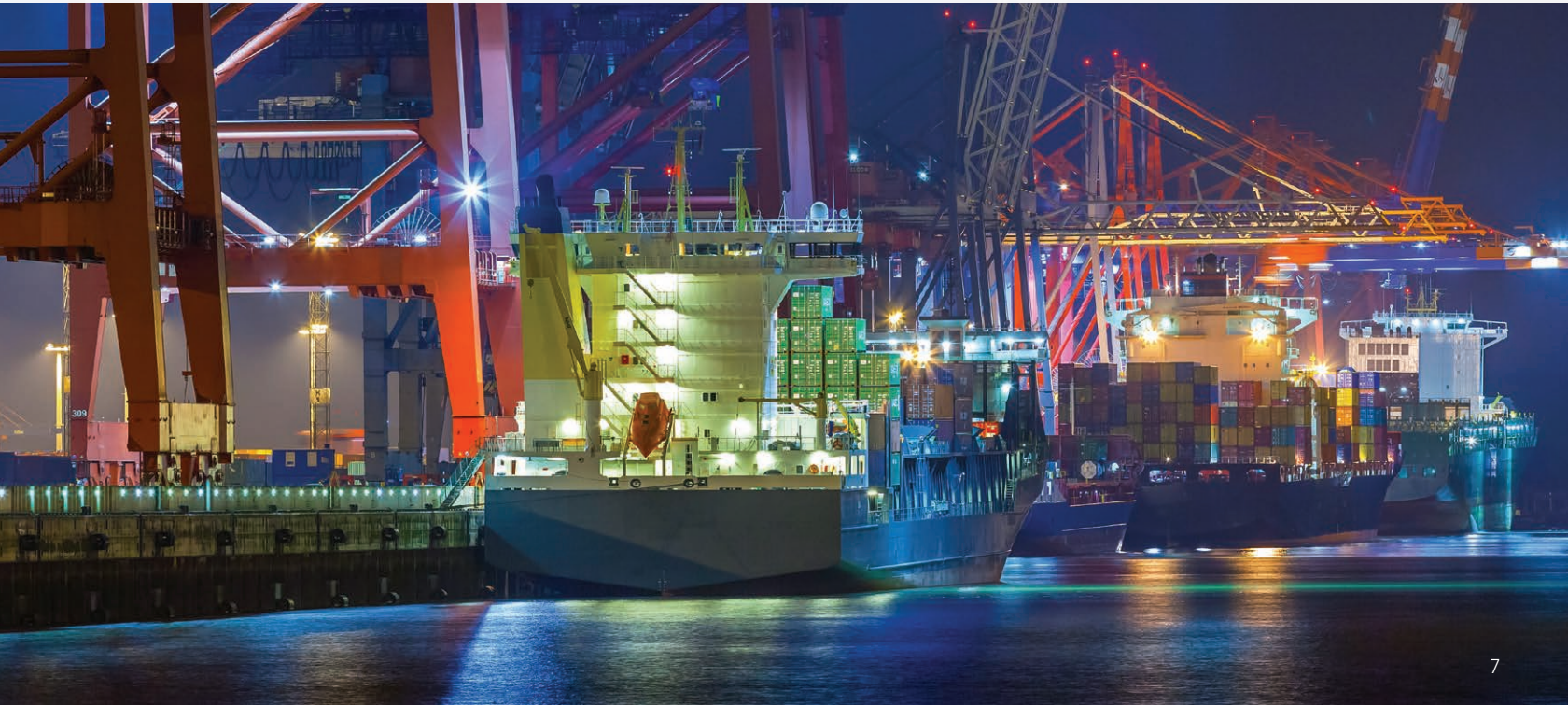


# ENHANCE EXISTING SYSTEMS

Ports rely on expert systems designed to optimize development and asset management. Esri partners with the world's leading providers of port support systems, including Autodesk, Microsoft, IBM, and SAP. So, you can invest with confidence knowing that ArcGIS can integrate with your existing IT systems and enhance their capabilities.

Successful ports around the world use ArcGIS to map and manage their assets to contextualize location, lease terms, capacity

potential, and availability and identify constraints. This streamlines many processes and reduces the time it takes to understand issues so managers and workers can make quicker and better decisions. Many ports map and manage their utility assets to support not only daily operations but also master planning and infrastructure improvements. An increasing number of ports also map maritime infrastructure to better understand the risk to current revenue and opportunity for future revenue increases.







# MAXIMIZE PORT OPERATIONS

Smart ports understand that creating a collaborative environment is critical to improving productivity and increasing competitive advantage. Ports are embracing various concepts of collaboration, whether through single window systems or port community systems to overcome typical port constraints. Each of these systems envisions real-time information sharing among port departments, shipping companies, terminal operators, pilot organizations, drayage teams, and rail companies.

When everyone works together, there are greater operational efficiencies, and throughput is maximized. This effort starts with a common operational picture and greater situational awareness based on shared information.

Esri® technology is used by organizations worldwide to give them this common operational view, thus improving performance. With the ability to integrate real-time vessel movements, weather and tidal changes, land-based transport movements, berth occupancy, and port business systems, ArcGIS provides a location-based platform designed to give port operators a portwide view of all current activity.

Esri technology seamlessly integrates with leading document management and business intelligence systems. It integrates with most port operational systems to give port operators a comprehensive view of operations. Key port actors can drive improved performance, and port staff can view what they need, wherever and whenever. Ports that do this see immediate benefits and return on investment.





# INCREASE PORT SECURITY AND RESILIENCE

With a greater connected world comes greater security concerns. Ports need to prepare for a wide range of scenarios, both natural and man-made. Resilient ports require a strong security network and effective business continuity and emergency management plans. Portwide visibility and control give ports complete awareness, allowing multiple responding agencies to share a common real-time security view of the port.

In the context of an emerging event, it is often difficult to know what is happening and where. Esri's location intelligence gives your security personnel a holistic real-time view of your port's activities, integrating a wide range of cameras, sensors, tracking systems, and other technology inputs, to give you comprehensive situational awareness.

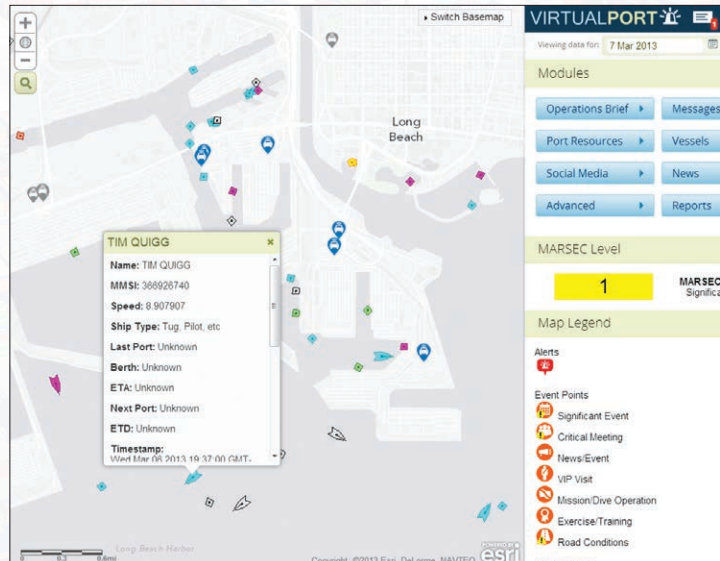
Ensuring the tightest coordination of your security resources in the field is a critical requirement for a successful response. Esri's location-enabled technology lets you see and communicate with all security personnel, ensuring continuous communication from the command center to the field.

Finally, having access to the port's infrastructure data allows responders to quickly identify problems and restore services more quickly. Whether utility disruptions or damaged assets, understanding accurately where assets are located is key to faster restoration of services. Make your port more secure and resilient with Esri technology.



# SECURING THE PORT OF LONG BEACH

The Port of Long Beach has implemented a state-of-the-art security management system based on Esri technology. "Virtual Port is a dynamic, ArcGIS [software]-based system that is fundamental to our security operations," says Randy Parsons, director of Security. "It is the essential technology of our command center and has allowed us to geospatially enable our entire security operation. So, we now have more than 60 geographically referenced databases that are integrated with the existing elements of our physical security system, which increases exponentially our ability to monitor and analyze our daily operations."



All security personnel at the Port of Long Beach, California, have a common operating picture of the enterprise.



# MAKE PORTS GREEN

Ports are under increasing pressure to mitigate their environmental impact and to be good corporate citizens. They must mitigate environmental impact while growing profitability and performance and sustaining positive community relationships. Ports have become beholden to triple bottom-line accounting—the need to balance economic, social, and environmental considerations—to maximize their value to their community and pursue sustainable growth. They must become transparent “port cities” or “green ports.”

Ports become green by minimizing congestion, pollution, emissions, rising sea level impacts, storm disruptions, and more. Green ports restore harbor and coastal ecosystems. Through proactive community involvement and transparency, these ports improve goodwill and increase sustainability.

Spatial technology helps streamline workflows through the visualization and analysis of port environmental information. Whether analyzing water quality, stormwater, emission, or dredging data, GIS technology is an integral part of managing your environmental strategy.







# INTEGRATE PORT BUSINESS

Increasingly, ports are becoming 24-hour, real-time decision-making environments. As a result, many ports are recognizing the need for a comprehensive digital transformation strategy to meet these challenges and to thrive in a highly competitive environment. And that is why smart ports are increasingly turning to the power of information and a location intelligence strategy to inform better decision-making.

ArcGIS visualizes existing business systems, converting them

into actionable intelligence. That means port administrators will be making informed decisions based on data collected from leases; facilities; property, asset, and security management; and real-time tracking systems. Esri's platform gives them the information they need—on any device, at any time. As a result, leading ports worldwide have turned to Esri to help them improve their global competitiveness and their bottom line.





# GET STARTED

You can arrange a preliminary assessment of how ArcGIS can help your port achieve its business objectives. When you contact an Esri representative, our port and maritime experts will help you conduct an official business value assessment to understand where the opportunities for a location-based strategy exist. You will see how bringing spatial information together from your existing port systems can help you meet current challenges. Esri's Jumpstart Packages can help you quickly implement intelligent solutions so you start right away on the path to greater productivity.







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