Integrated Maritime Operational Planning System

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The Panama Canal Authority (ACP) is an autonomous legal entity of the Republic of Panama, established under public law, Title XIV of the National Constitution with exclusive charge of the operation, administration, management, preservation, maintenance, and modernization of the Canal, as well as its activities and related services, pursuant to legal and constitutional regulations in force, so that the Canal may operate in a safe, continuous, efficient, and profitable manner.

The Panama Canal is approximately 80 kilometers long between the Atlantic and Pacific Oceans. This waterway was cut through one of narrowest saddles of the isthmus that joins North and South America.

The Canal uses a system of locks -compartments with entrance and exit gates. The locks function as water lifts: they raise vessels from sea level (the Pacific or the Atlantic) to the level of Gatun Lake (26 meters above sea level); vessels then sail the channel through the Continental Divide.

Vessels from all parts of the world transit daily through the Panama Canal. Some 13 to 14 thousand transits are served by the Canal every year. The Panama Canal serves more than 144 maritime routes connecting 160 countries and reaching some 1,700 ports in the world.

Today, the Canal is presented with new challenges and opportunities, defined by a sustained increase in international trade which translates into a greater demand for the Panama transit route. With the inauguration of the third-set of locks, we tended to the demand for larger ships to transit the Canal. The information, electronics and telecommunications systems (IT) play an important role in maintaining the service and efficiency levels offered with this increased demand.

To achieve business agility while reliably supporting its current operation, the ACP is renovating its business processes with a design supported by Enterprise Architecture practices. The new information and technology systems landscape the ACP will be able to obtain the agility and flexibility required for maximizing the return on investment on the recently expanded Canal.

This business transformation is geared towards the Canal’s core maritime business. The ACP’s maritime business is supported by:

1. Systems that enable vessel scheduling, traffic control, resource management among other maritime core capabilities;
2. Customer-facing and Business-to-Business (B2B) applications for maritime service requests, booking, billing and customer service;
3. Back-office systems that include finance, human resources and asset management;
4. Smaller departmental applications;
5. Specialized electronic control systems, positioning systems, network and telecommunications infrastructure.

All the customer-facing, B2B, booking and billing functional components have been renovated to accommodate new business requirements and enable the flexibility and agility to evolve accordingly. The next phase covers the renovation of systems and functional components that support the scheduling of vessels for transit and harbor services, marine traffic control and resource management.

After a comprehensive market research, it was determined that there was at least one Commercial-off-the-Shelf software platform that provides the functionality to satisfy ACP’s planning and scheduling requirements with no need for extensive customization or additional coding. The use of a mature software platform with several similar scale implementations in the maritime and other similarly complex industries such as mining and manufacturing significantly reduces the risks associated with the development of brand new or repurposed in-house business applications.

ACP acquired the Quintiq’s Planning and Optimization Software Platform to serve the operational planning requirements for the core maritime business of the Canal.

The full scope of the Integrated Maritime Operational Planning System will cover the scheduling of the Maritime Core Services offered by the Canal:

* Transit
* Harbor Movement
* Anchorage Usage

The Transit Service is the most important among the three and generates most of the business revenue.

The services listed above are provided 24 hours a day, every day of the year. To deliver these services the Canal provides four internal services directly to the vessels, and some indirect internal services, that need to be included as part of the Maritime Core Services Delivery Plan:

|  |  |
| --- | --- |
| **Direct Internal Services** | **Indirect Internal Services** |
| * Lockage
* Pilotage
* Tugboat Assistance
* Deckhands Assistance
 | * Ground Transportation
* Water Transportation
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To provide this internal services various resources are involved. These resources are distributed along the 80 kilometers of the waterway.

The effectiveness and reliability in the provision of these services is highly dependent on the experience and information available to service planners, maritime resource dispatchers, traffic controllers, port captains, boarding officers (inspectors), pilots, tug masters, locks masters, launch operators, vehicle drivers and other operating personnel.

The Maritime Core Services Operational Delivery Plan focuses on delivering value to the Panama Canal Customers and generating value to the Panama Canal through the achievement of the following business objectives:

*Increase Service Delivery:*

1. Increase throughput
2. Reduce vessel backlog, waiting times and delays
3. Compliance with maritime services times (transit times, canal water times)
4. Balance customer demands and capacity availability

*Increase Resource Utilization and reduce cost*

1. Maximizes the usage of locks, channels and reduce bottle necks and idleness
2. Maximizes the usage of tugboats, pilots and deckhands, avoiding idleness, and minimizing overtimes and penalty payments

*Improve the visibility and quality of the information for better decision making and risk mitigation*

1. Optimize the scheduling capabilities of core maritime services
2. Planning of resources
3. Operational visibility and situational awareness

Finally, a more the detail scope of this project includes:

* Generation of the candidate vessels list sorted by priority for transit, harbor movement and anchorage service.
* Creation of the vessel schedule and itineraries based on:
	+ Limited locks and tugboat resources.
	+ Unlimited locks and tugboat resources.
* Creation of jobs, for the following internal services:
	+ Tugboat
	+ Pilots
	+ Deckhand crews
	+ Locks
* Rostering and assignment for the following internal resources supporting the internal services:
	+ Tugboat Crews
	+ Pilots
	+ Deckhand crews
	+ Lock crews
	+ Launch Operators
	+ Motor vehicle operators
* Calculation of tugboat resources needs for a given plan.
* For a given plan the suggested locks operating mode and its time range.
* Use of locks and tugs availability data.
* Locks and tugs assignment.
* Transportation needs for:
	+ Pilots
	+ Deckhand crews
* Plan KPIs calculation