

From Precision Scheduling to Peak Performance: Spinerergie's Tug Fleet Solution

WHITE PAPER



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Foreword

The tugboat sector is at a turning point. Operators face growing operational demands, increasing costs, and stricter regulations – all while managing fleets that often span a mix of vessel ages, systems, and technologies. Digitalization has the power to unlock efficiency and resilience, but too often solutions are fragmented: tied to specific hardware, built for a single function, or limited to one part of the operation.

At Spinergie, we take a different approach. Our Smart Fleet Management (SFM) platform is designed to work with your complexities and evolve with your fleet. A single solution that unites the many moving parts of your fleet into one coherent view. Whether scheduling, reporting, monitoring performance, or optimizing fuel consumption, SFM centralizes data across vessels, ports, and teams, powering more intelligent workflows. By remaining hardware agnostic, it avoids costly retrofits and ensures operators can adopt modern practices without disrupting their existing fleet.

This is our key differentiator. Instead of working within silos created by standalone hardware or

software providers, we deliver a holistic, fleet-wide perspective. With SFM, tugboat operators gain real-time visibility, actionable insights, and a single source of truth to guide both day to day decisions and long term strategy.

By bridging the gap between operations at sea and management on shore, Spinergie enables tugboat operators to modernize their fleets with confidence – improving safety, efficiency, and competitiveness in the ever-evolving maritime industry.



Patrick Sanguily
General Manager, Americas

Introduction

Tugboats are essential for the smooth functioning of ports and harbors around the world. In performing some of the most critical tasks—from guiding vessels to and from port, to assisting with docking, towing cargo, and responding to maritime emergencies—the fleet is in consistently high demand. However, these operations are highly sensitive with low margins for error. They require pinpoint precision and effective coordination.

Alongside daily work demands, tugboat operators are working in a maritime environment that is becoming increasingly complex. Competitive pressures, rising operational costs, and stricter regulatory requirements are intensifying the pressure placed on fleets. At the same time, global trade expansion is increasing the volume of marine traffic.

Technological advancement is rising in tandem with increased maritime activity, and brings with it both opportunities and challenges. While upgrades offer greater efficiency, they also come with significant barriers to adoption. Steep upfront capital investments can be prohibitive and an older fleet that might not readily support in-built modern technologies.

This creates a paradox. Despite the maritime industry's growth and technological innovation, many operators continue to face financial and technical limitations. As a result, achieving operational efficiency with existing fleets becomes a strategic priority.

The Case for Digitalization

The challenge for the tugboat sector is clear: how to improve and modernize operations safely and efficiently with minimal disruption or extra training for crews?

Digitalization provides a practical and scalable answer. By using a digital management solution, operators can achieve immediate gains by modernizing the way tugboat operations are planned, executed, and monitored. By streamlining workflows, centralizing core information, and unlocking accurate, real-time data, digital solutions empower tugboat operators to increase efficiency and enhance their fleet resilience without disruption.

Smart Fleet Management (SFM) addresses the tugboat sector's most pressing challenges—from scheduling and dispatch through to proactive vessel monitoring. As a hardware agnostic system it removes the cost-prohibitive move of retrofitting the fleet, and instead, the software will work on any platform, including mobile, while integrating with existing systems. Furthermore, the system is intuitive and easy to use, minimizing the learning curve for crews and reducing the need for technical expertise. Ongoing support from our dedicated team ensures operators and crews are equipped to fully leverage the solution.

Perhaps most importantly, efficiency gains begin on board. Digitizing reporting processes means crews spend less time on administrative tasks and more time on core operations. Communication between vessels, onshore teams, and external stakeholders becomes faster and more reliable with a centralized “single source of truth”.

With accurate, high-quality data as a foundation, tugboat operators have what they need to make better decisions, optimize performance, and build a lasting competitive advantage.

Smart Fleet Management for the tugboat sector

SFM consolidates scheduling, reporting, and performance management into a single, centralized platform customized to fit your tugboat operations. By delivering actionable insights across all aspects of fleet and vessel management, it helps tugboat operators transition from reactive problem solving to proactive decision making.

At the map level, it is possible to see which facilities are active and which are planned, which is useful for tugboat owners looking for future opportunities or keen to understand possible future demand spots.

Smart Fleet Management...

1. Removes data silos
2. Automates previously manual work
3. Delivers critical business performance metrics
4. Guarantees data quality.



Vessel Scheduling

Move from Reactive to Proactive Scheduling

Demand Planning

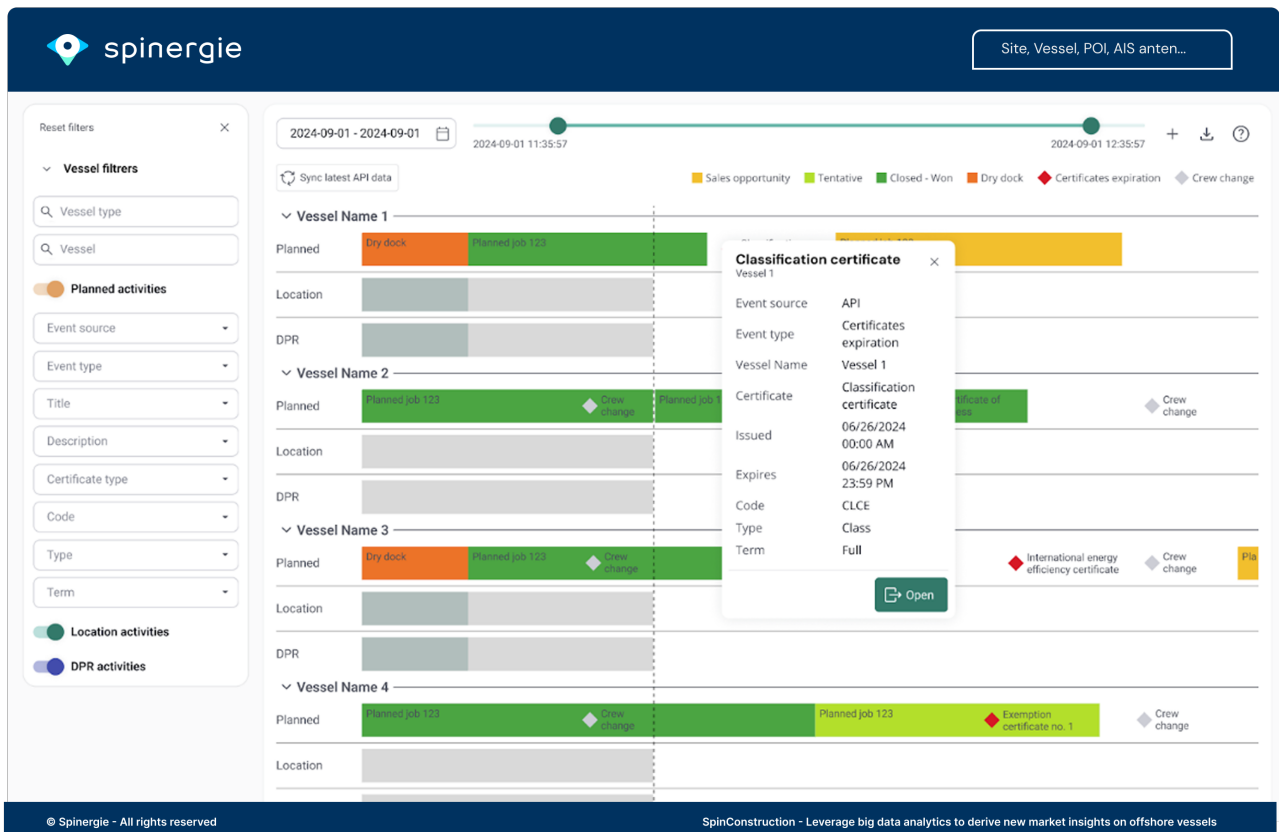
Capture demand and manage opportunities through their entire lifecycle to win more work and create accurate forecasts for capacity planning.

Capacity Planning

Meet demand with minimum expenditure by tracking planned downtime and fleet availability to optimize asset allocation.

Fleet Scheduling

Support dispatching from a centralized schedule of upcoming jobs, ETA changes, and tug and crew assignment.



An illustrated example of the vessel schedule within Smart Fleet Management.

Coordinating a tugboat fleet is a complex balancing act. You must juggle unpredictable ship schedules, uncertain job durations, and changing environmental conditions. At the same time you need to coordinate with onshore staff, vessel crews, harbor facilities and other stakeholders.

To complicate matters further, critical information is often scattered across disconnected CRMs, PMS systems, and crewing software. This fragmentation can lead to missed opportunities and costly double bookings.

SFM centralizes your vessel planning, aligning every team with a single source of truth. With this synchronization you are primed to maximize your commercial and operational performance.

Features

Vessel Planning data can be viewed in three different ways: an easy-to-read timeline for quick access to key information; high-level data within KPI dashboards and granular data within utilization analysis.

Timeline View

- Add planned events directly into the application with user-friendly forms.
- Sync API data and add further activities manually where required.
- Identify availability and plan the most efficient dates for yard stays and maintenance periods.
- Integrated, toggleable viewing for an actual activities vs planned activities comparison.
- Easy sharing with clients for increased collaboration.

High-level KPIs

- At-a-glance view of high-level company-specific KPIs like booked or available days.
- Filtered KPI viewing shows insights for your entire fleet or by vessel/vessel type.
- Compare each KPI to key business objectives and targets.

Utilization Analysis

- Immediate visibility of the next year, quarter or month.
- Analyze work scopes by customer, job type or regions
- Use data visualization tools to get insights per vessel, customer or job type.
- Generate recurring utilization reports to be sent directly to your inbox.

Vessel Reporting

Better Data for Better Decisions

Streamlined Vessel Reporting

Digitize towing vessel reports, personnel tracking, incident tracking, sitreps, and noon reports for instant data access and a streamlined workflow.

Improved and Assured Data Quality

Maximize data quality and reduce the administrative burden on crews by leveraging AIS algorithms, native weather data feeds, and onboard hardware to prefill data.

A Single Source of Truth for Your Maritime Operations

Streamline fleet performance analysis and regulatory reporting with accessible, centralized data.

The screenshot shows the Spinerie vessel reporting dashboard. At the top left is the Spinerie logo. A search bar at the top right contains the text "Site, Vessel, POI, AIS anten...". Below the header, there is a sidebar on the left with a "New simultaneous activity" dropdown and a list of "Simultaneous activities" including "May 15 - 18:30 Port of Discharging (POD)". The main area is a form for reporting a "Port of Discharging (POD)". The form includes fields for "Start*" (2025-05-15 18:30), "End*" (2025-05-15 23:40), "Time arrival POD*" (2025-05-15 18:30), "Alongside POD*" (2025-05-15 18:35), "Comm. Disch.*" (2025-05-15 20:18), "Compl. Disch.*" (2025-05-15 21:18), "Cast off POD*", "Departure POD*" (2025-05-15 23:40), "Shipped cargo", "Floating Crane/Gear", "Return cargo", "To (POL/POD)" (POL), "Next POL", "Arrival next POL*", and "Comment". There are also "Loading duration (h)" (1) and buttons for "Next activity" and "Delete activity".

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Smart Fleet Management - Optimize your maritime activities with operational & environmental insights

An illustrated example of a vessel reporting dashboard in Smart Fleet Management.

Saving time and simplifying processes are the ethos behind SFM reporting. The Daily Report (or custom-report structure, see case study, page xx), translates operations into data via a reporting structure built to match client operations. Tugboat operators can set up their criteria and KPIs to be analyzed through data feeds, sensor information (fuel, engine hours, etc.), and automated reporting.

Populating reports using aggregated data saves crew time onboard and ensures data is accessible from a reliable, single source. Stringent QC procedures ensure all DRs are accurate and fleet updates are automatically sent to shorebase.

Features

- Reduce crew time spent on operational reporting tasks by up to 90%
- Customize to fit your data entry preferences, including tables, drop-down menus, and entry fields.
- Guided entry streamlines manual input with impossible readings and errors blocked before they cascade.
- Automated calculations, sensor data and AIS tracking populate pre-selected fields.
- An unlimited number of custom reports are automatically generated from the single-entry system.
- Each vessel has its own distribution list to which reports will be automatically sent once validated.
- Robust integration ensures seamless data flow to avoid double reporting and provide a single source of truth for each data set.
- The fully secure reporting environment protects sensitive information.
- Direct data and report submission to verification services when required.



Operations Performance

Improve Operational Efficiency at Sea and at Port

Advanced Remote Vessel Monitoring Centre

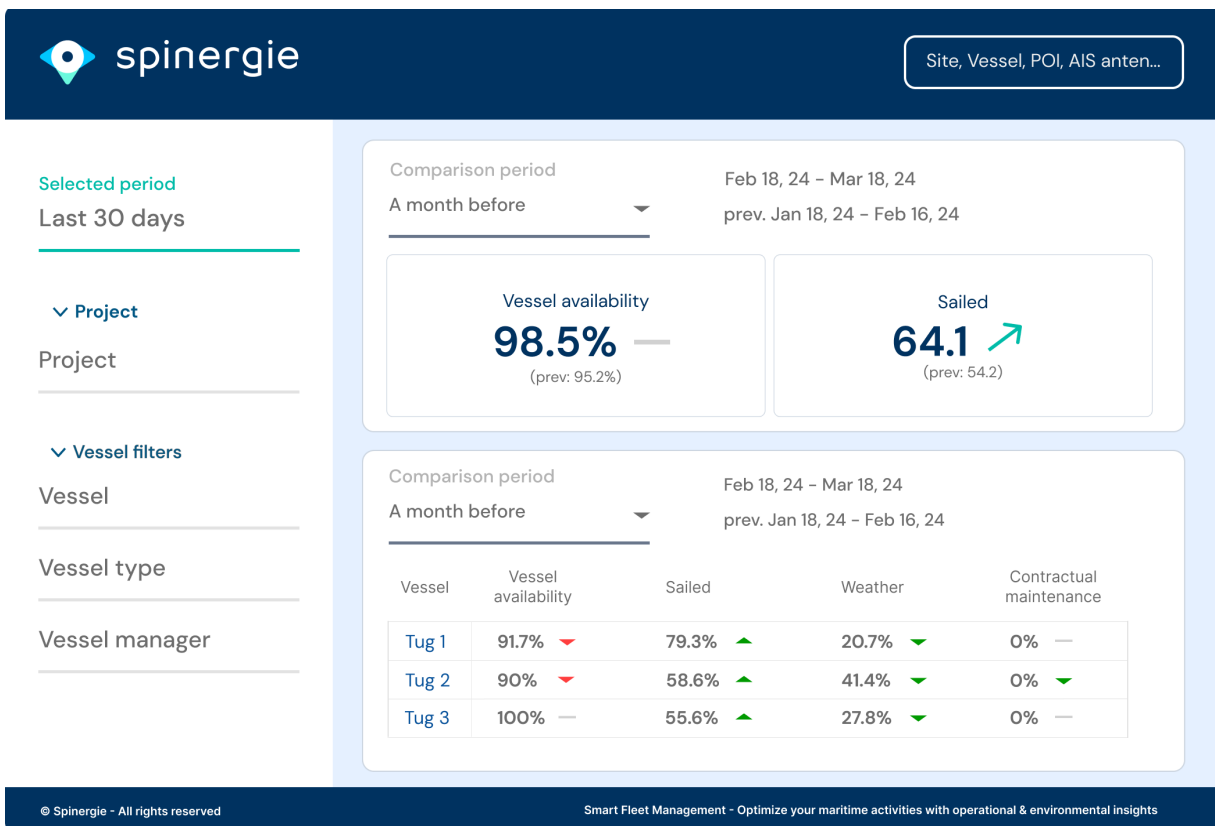
Gain real-time insights into operations at sea and at port, with dynamic marine charts and consolidated data feeds.

Job Execution Analysis

Ensure you meet customer expectations by replaying vessel movements during each job, or referring to calculated performance metrics.

Customized KPI Tracking and Analysis

Improve and benchmark performance, or undertake direct root-cause analysis, by comparing vessels and jobs with KPIs tailored to your unique operations.



An illustrated example of 'at a glance' performance data available within Smart Fleet Management.

Operations Performance includes a number of features geared towards improving operational efficiency and, in turn, reducing operating costs. This can be achieved through detailed real-time fleet monitoring, job execution analysis and customized KPI tracking and analysis.

SFM benefits from a powerful, live (vessel positions are updated every two seconds), customizable map interface populated by your tugboat fleet. This means you no longer have to rely on third-party AIS providers that may only update a vessel location once every few hours. This immediacy reduces waiting times and allows for prompt decision making when required.

Real-time tracking also means your onshore and offshore crews are equipped with the historical activity context that can influence future voyage plans, support QHSE investigations, and enhance coordination with charterers.

Crucially, the data compiled within real-time tracking and on-board reporting, provides the backbone for the analysis that will help your team make impactful operational decisions.

Features

- Follow voyage progress and monitor operations in real-time to maintain an ongoing account of consumption levels and ensure voyages remain on time and within budget.
- Live tracking capabilities that give a real-time account of consumption levels are reinforced with sensor data and activity tracking.
- Historical positioning documentation with weather and wave context that can be utilized when solving potential disputes.
- Analytics generated from reported data can be used as a benchmarking tool to identify inefficiencies on a vessel or fleet-wide basis.
- Benchmarking is undertaken within a single dashboard, making identifying problem areas easier and leaving less room for error.
- Undertake root cause analysis to identify and address the underlying issues impacting over-consumption or underperformance.
- Better contextualize voyage performance with weather data and vessel parameters.
- Transparent performance analytics and detailed reports increase accountability among stakeholders.
- Access realistic performance figures to inform future contracts.



Operations Performance: two key use cases

Asset Allocation

SFM algorithms help tugboat operators better understand whether jobs are being over-assetted (using more tug horsepower and bollard pull than necessary) or under-assetted. With vessels potentially making many thousands of maneuvers each year, these individual maneuver data points, alongside contextual analysis, are combined to create actionable insight that will ultimately reduce operating costs.

Fuel Consumption

Fuel consumption is another important consideration for tugboat operators and is one of the main drivers of ever-increasing operating costs. SFM provides consumption data points that help you understand where and how to reduce fuel consumption—primarily through fleet benchmarking and activity analysis.



Vessel Performance

Manage Vessel Performance and Reduce Fuel Consumption

Proactive Reliability Monitoring

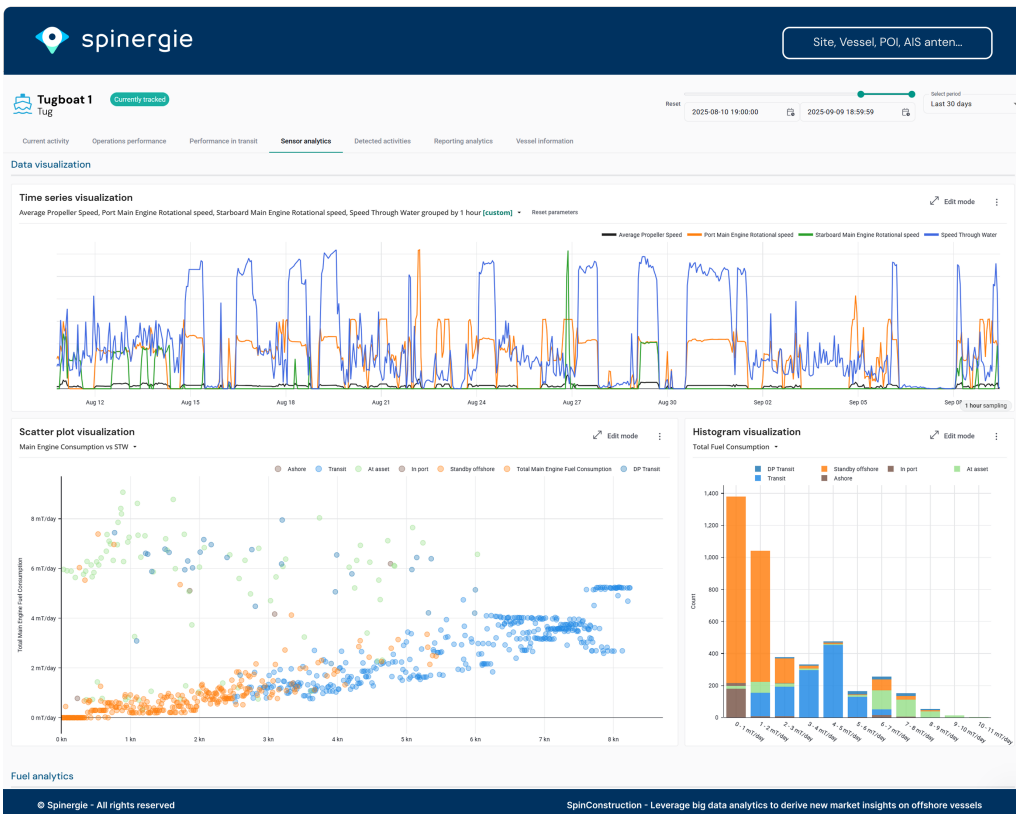
Monitor engine performance to identify issues before a breakdown occurs and coordinate preventative measures.

Secure Fuel Consumption Modeling and Analytics

Establish predictive fuel models for each vessel that adjust for external factors – like weather – to provide a more accurate performance baseline.

Maintain Cost Effective Practices

Reduce costs and keep efficiency high by optimizing maintenance schedules and understanding the true ROI for maintenance and upgrades.



An illustrative example of data analysis and visualization within Smart Fleet Management.

It can be a struggle to quantify the actual impact of vessel maintenance and performance-enhancing technology. Variations in speed, weather conditions, and operational factors make it difficult to measure performance gains after an upgrade or determine when efficiency has diminished enough to warrant further maintenance.

Vessel Performance Over Time gives a clear, numerical measure of performance gains after an event. It also shows how performance drops over time due to fouling. This helps tugboat operators understand the true ROI for maintenance and technology while helping optimize maintenance schedules. This reduces costs while keeping efficiency high.

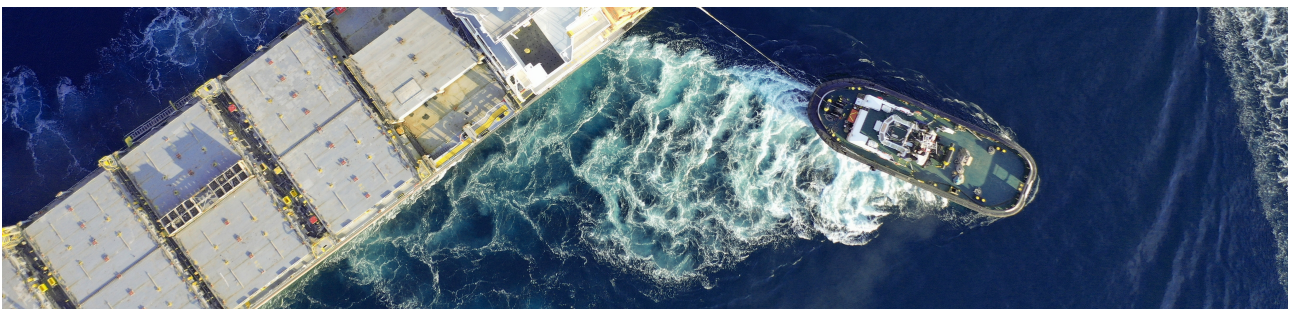
Features

- Quantify the performance improvements caused by maintenance events.
- Pinpoint vessels displaying reduced performance and evaluate the severity of their decline.
- Evaluate the impact of your fuel reduction efforts and adapt your maintenance plans accordingly to meet regulatory requirements and your own targets.
- Plan maintenance tasks effectively around longer idle periods.
- Recognize when performance has deteriorated to a point that recommends maintenance.



The Strategic Benefits of Using Smart Fleet Management

- **Operational Efficiency:** centralizing information increases transparency and ensures all stakeholders are “on the same page” thus helping effective fleet deployment. Automating key workflows reduces the administrative burden on all teams and streamlines communication.
- **Enhanced safety:** alerts can be set up for remote monitoring purposes (for bilge, fire, etc.) while the tugboat is inshore and not in use. This ensures the vessel is safe and secure, and selected stakeholders will be immediately alerted to concerns such as overheating.
- **Historical tracking:** real-time vessel tracking provides historical activity context that can influence future voyage plans and aid incident investigation.
- **Data-Driven Decision Making:** accurate, real-time data creates a single source of truth that aligns teams in making impactful decisions for day-to-day operations and in strategic planning.
- **Cost Optimization:** proactive maintenance and effective scheduling helps reduce unnecessary costs while protecting fleet readiness and reliability.
- **Scalability and Flexibility:** a hardware agnostic platform that integrates with existing systems allows tugboat operators to adopt digitalization without disruptive infrastructure changes, and ensures it will grow and adapt with the company and requirements of the maritime industry.
- **Regulatory Compliance and Transparency:** digitized, verifiable data helps you stay ahead of evolving global and regional regulatory requirements.



Case Study

When a fleet manager needed clearer visibility and better productivity across a large tugboat fleet, they turned to Spinergie to help them reduce the reporting burden for their captains and provide the performance insights they needed to improve.

Operating across two regions, the client has a managed fleet of 150 vessels including just over 100 owned or chartered tugboats. This tugboat fleet has two primary tasks: pushing barges and assisting with harbor maneuvers.

Challenge

The client already had SFM in place for their bulk cargo operations, however, their tugboat operations remained largely invisible to onshore teams. They wanted to include tugboats in their existing solution to improve fleet visibility. But—it had to adapt to their unique operations.

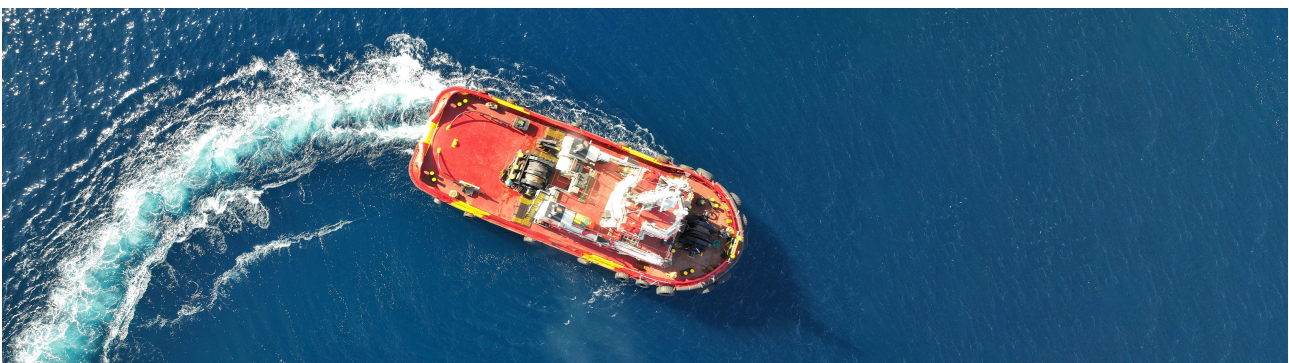
Prior to incorporating tug operations into SFM, the client had a complicated on-board reporting process. Critical information was being exchanged via Whatsapp messages before being manually consolidated into Word documents and Excel spreadsheets. This process was time-consuming and complicated for the onshore team, but also prone to data loss and inconsistencies. Furthermore, it made it impossible to generate any valuable insight or analytics.

Pain Points

- A high workload for crew and onshore teams to report, compile and cross-check fragmented data.
- No structured visibility on multi-day tug activities across ports and off-shore sites.
- A need for vessel-specific reporting that could adapt to different tug operations.
- Crews use mobile phones to report, so the interface must be easy to use on a handheld device.

Customizing SFM for the client's tugboat operations

We built a customized towing vessel reporting solution designed to fit the client's operations. It also provides them with advanced performance insights without any manual data consolidation, complicated spreadsheets or guesswork.



Building the solution

Non-daily activity-based reports

Rather than the typical daily activity logs that are standard to most maritime operations, the client's reports are structured around shipment activities (e.g. loading, discharging and transit). Spinergie designed their SFM reporting process to allow them to track the full cycle of loading or unloading at different sites and over several days if needed. By structuring the reports in this way, the client can see all activities relating to one shipment within the same report. This makes them significantly easier to read and track.

Reports customised to operations

Since the client has two different types of tugboat operations, their reports are designed to support harbor maneuvering operations and barge towing operations alike. Each type of operation has its own activity types and input fields to ensure relevance and usability.

A mobile-first user interface

It was important that the transfer to SFM was as easy as possible for the crew. We designed a mobile-first interface which replicates the reporting flow of the previously used Whatsapp messages. Using minimal buttons and intuitive fields, data entry is a simple process even on a mobile device. Many fields are automatically updated, such as speed and distance, through synchronisation with the client's other sources.

In-built quality control

Onshore teams were previously tasked with quality checks alongside their daily data compilation exercises. Spinergie alleviated this burden with robust in-built quality check procedures. Data cannot be entered if it exceeds set limits or with a wrong date or time stamp.

Automated data integration

Tugboat reporting is now seamlessly integrated into the client's centralized SFM dashboard so stakeholders can access all operational data (for bulk and tugboats) in one place. They no longer need to search through multiple databases.

Customisation and collaboration

We worked together with the client to make a solution that fit their operational needs exactly. With ongoing feedback throughout the process, SFM adapted to the lessons learned as they started fleet implementation. It will continue to scale with the company as their operations, and the sector, evolves.

Result

With SFM, the client now has the visibility they needed to optimize their tugboat operations. Crucially, onshore teams now have the clarity they need to take prompt or proactive action when required. The learning curve for the crews was minimal and they can continue to use the mobile-based reporting that works for them. Now manual reporting is backed by automated data entry and processing. This lets onboard crews focus on core tasks and lets onshore teams focus on analysis and strategy without painful data consolidation.

Conclusion

The tugboat sector faces many challenges in striving to meet the escalating demands of the maritime industry with an aging fleet. But it is also a time of opportunity to embrace innovation and discover new tools to adapt to these challenges.

SFM provides intuitive, easily-adaptable tools that tugboat operators leverage to better understand market dynamics and optimize operations.

As the maritime landscape evolves to accept new markets and pressures, digitalization will be essential in surviving and thriving in an increasingly complex and competitive market. But tugboat operators can ensure their continued success by harnessing the power of data-driven insights and operational efficiency.



About Spinergie

Through our varied experiences and knowledge, we have become experts in applying data science to the maritime sector. We are based in the US, France, the UK and Asia. Our solutions are used by charterers, shipowners, and engineering companies all over the world.

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