Lloyd's List Intelligence launches Predictive Fleet Analytics: first 'air-traffic control' for commercial ships powered by SAS analytics

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We are all familiar with navigation tools for road traffic and applications that allow us to track flights in real-time. Now there is also a 'Waze' for the sea. Lloyd's List Intelligence, leading provider of maritime data and insights, partnered with SAS to develop Predictive Fleet Analytics. The solution is a milestone for commercial shipping and will help address global challenges with accurate data on ships' estimated arrival, berth and departure times.

The lack of reliable data for ships puts a lot of pressure on ports, logistics and costs. In this, commercial shipping differs from air travel. While all aircraft must know their exact destination before departure, 63% of ships end up at a different port than originally published (according to Lloyd's List Intelligence 2020). This is often due to the nature of the business. Crude oil, for example, can be sold and resold while still in an oil tanker. This means the ship sometimes has to change course.

Ships are also not required to share this information, making it challenging to know where a vessel is going to, how crowded it will be in a port's anchorage, how long it will take to unload a ship, etc. Fortunately, ships do not sail completely blind. From a minimum size, they are obliged to have a system (AIS) on board that transmits a signal about their location. This is necessary to prevent collisions.

Although raw AIS data is the default go-to for information, it's difficult to plan ahead when about 32% of vessels sail without a destination logged, 36% of vessels' AIS transmissions do not include ETAs (Estimated Time of Arrival). Even when those transmissions do include ETAs, 27% of vessels arrive late. Information inaccuracies lead to wrong judgments and cause significant logistical, competitive, and financial challenges… By using the historical AIS data combined with Lloyd's List Intelligence propriety data, analytics leader SAS helped them to develop a groundbreaking solution that predicts the routes of ships.

Business Issue

Understand complex vessel movements and behaviors by generating the most accurate and detailed analytics and risk ratings.

3,000 data sources

Predictive Fleet Analytics uses real-time data collected from 3,000 sources, resulting in 327 million AIS vessel positions on a monthly basis. The key to the project's successful outcome was the smooth collaboration between interdisciplinary teams who were able to translate the business challenges into analytical tasks. When Lloyd's List Intelligence contacted SAS, the project was first divided into smaller segments. "Predicting where a vessel is traveling to and when it will arrive at this destination are two different things from a data science perspective", says *Joline Jammaers, Senior Data Scientist at SAS*. "There are several models at work and even a smaller segment can consist of two or three models. At one point we were running three parallel streams, but our methodology allowed us to manage the complexity."

As data scientists, *Jammaers* and her colleagues explored the available data to see which predictions the solution could make. They were joined by a handful of data engineers who orchestrated new incoming data in real-time. In the end, Lloyd's List Intelligence and SAS have developed a pioneering new method of calculating, predicting and learning vessel movements and behaviors.

"The solution looks at the trajectory a vessel has taken and then predicts its potential destination, route and arrival time based on historical data. Compare it to a Shazam for commercial shipping where artificial intelligence listens to part of a song and then reveals how it will proceed", explains *Jammaers*. "If a ship regularly communicates about its destination and does not change course that often, a model can assume that the data is probably reliable. If not, it will place less value to that data."

70% accuracy

Once the destination is known, various models begin to predict the arrival time at the anchorage, which is the place where ships gather before they are allowed to enter the port. To predict how long a ship will need to wait, that information can be combined with data from other vessels in or on their way to the port. Data about ship type and cargo can also provide intelligence on how long it will take a ship to unload. "Predictive Fleet Analytics is a perfect example of how different AI models operate together in a complex production environment. This is exactly where SAS' expertise and experience stand out", says *Jammaers*. "The output from one model provides input for the next. All this is happening in real-time, so the models can be combined to make optimal predictions with the snap of a finger."

Currently, Predictive Fleet Analytics is able to predict a vessel's destination with 70% accuracy. The estimated time of berth is accurate within one to two hours; and the estimated time of arrival within a 10-hour window. The latter is 7 times more accurate than what is reported in the AIS transmission data. The entire solution is implemented on commercial cloud using SAS Viya and displays the data on a user-friendly interface. In other words, no knowledge of coding or data science is required to use the insights.

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From port authorities to insurance providers

Many different stakeholders can benefit from the analytics provided by the solution. Think of governments and customs agencies that need to know which ships are planning to enter a port, what cargo they are carrying and when they will arrive. In the past, they only had access to the raw AIS data and custom declarations. Combined with data about other ships in the port, marine traffic control could advise traveling ships to go faster or slower. Even service providers in the port can operate more efficiently thanks to accurate time-of-arrival data. Consider, for example, companies that clean ships or supply food for the crew. Finally, the information can support public agencies that provide technical assistance to improve maritime safety, pollution preparedness and response, and maritime security.

"Predictive Fleet Analytics allows our customers to let decisions on scheduling and routes be driven by the best quality data, so that shipping companies can save on resources and costs", *says Parvin Conners, vice-president of product and data for Lloyd's List Intelligence*. The quality of predictions and analytics relies on the accuracy, completeness en consistency of the data analysed. This is where our solution makes all the difference when compared to other existing tools. Indeed, the solution empowers all actors in the global maritime supply chain with predictive decision-making that impacts overall ship utilization, enabling more favorable operations, freight rates, etc. And eventually also more energy-efficient shipping.

In light of **recent congestion events** in the US and Shanghai last year, as well as the **blockage of the Suez Canal** in 2021, the global supply chain is clearly in need of a solution that predicts "near-term" commercial shipping operations. It must bridge the gap between a customer's proprietary knowledge base (data) and what is or will be happening globally.

"This new level of prediction around destinations and arrivals helps ports to optimize their services and facilities and for maritime servicing businesses to run more smoothly. All of this is possible thanks to the strength of our data and analytics and how we use AI and machine learning", adds *Conners*.

The solution is the second SAS-powered analytics tools for the maritime industry developed by Lloyd's List Intelligence. In 2021, they also released a risk analysis platform, **Seasearcher Advanced Risk and Compliance**, that allows customers to understand complex vessel movements and behaviors in ways that were not possible before. The tool leverages powerful big data and machine learning capabilities from SAS to highlight risk around probable illicit activities in one complete view. It generates the most accurate and detailed analytics and risk ratings.

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Click here for more information about Lloyd's List Intelligence's Predictive Fleet Analytics.

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