LESLIE BELL-FRIEDEL

Caterpillar Marine Asset Intelligence Global Business Manager

"When it comes to all the businesses and individuals Caterpillar touches, my passion lies most with our customers, just trying to find ways for our technology and services to help them do their business better, smarter and more efficiently."

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WHAT IS CATERPILLAR MARINE ASSET INTELLIGENCE?

Caterpillar Marine Asset Intelligence is the Caterpillar Marine organization that is bringing Cat Connect technology, services and solutions to the marine industry. For its analytics and prognostics solutions, Marine Asset Intelligence leverages proprietary technology that is customizable to specific applications and customer situations, as well as providing both onboard and shore interfaces for stakeholders throughout a customer organization. Marine Asset Intelligence is focused on providing technology enabled services and solutions to prevent problems before they can manifest themselves on the ship and cause breakdowns, reduced efficiency or unsafe conditions, and to operate more safely and sustainably.

HOW EXACTLY DOES THIS TECHNOLOGY WORK?

The technology allows us to automatically collect data from existing onboard sources such as sensors, the ship's control system or from the equipment itself. Automated analytics then qualify, validate and analyze the data, removing noise to focus efforts on what is important. The analytics are used to identify potential issues and provide potential solutions.

The onboard analytics and user interface provide the onboard crew with real-time information: what is the condition of their equipment and what they should do about any potential issues that have been identified.

Qualified data is also sent ashore, where additional automated analytics are used to further analyze the data—both from an individual vessel as well as from a fleet perspective—and where subject matter experts are on hand to review the analytic output and apply their experience to it. Fleet advisors then take this information and help vessel owners and operators use it effectively by ensuring the right people get the right information at the right time and the appropriate prioritization is applied.

WHAT VESSEL SYSTEMS CAN IT MONITOR?

Marine Asset Intelligence's technology and services can essentially monitor any equipment that has electronic sensors. This can range from diesel engines and generator sets to turbines, pumps, compressors, refrigeration – essentially any critical system onboard the vessel.

HOW DOES A VESSEL OWNER DETERMINE WHAT TO MONITOR?

The very first thing the Marine Asset Intelligence team does is sit down with the vessel owner and/or operator to understand their specific business objectives and how data analytics could help them to increase performance against their goals. Out of this discussion, there is a focus on what is important to the customer: what systems can cause unplanned downtime, which systems drive maintenance costs, what systems consume fuel and energy, and where can we reduce risk. Just because every system can be monitored doesn't mean it should be. Efforts should be focused on what is critical to that specific application and that specific customer. Is it the refrigeration, HVAC, propulsion systems, engines? Where is it they would have headaches or high costs? Those are the areas where we focus our efforts.

We have significant expertise within Marine Asset Intelligence on most of these major systems and an extensive analytical library on over 75 OEMs. However, for any unique equipment that Marine Asset Intelligence is not already monitoring, external experts, such as from the equipment manufacturer or academia, can be engaged to ensure the right analytics are configured for that particular piece of equipment in that application.

CAN A VESSEL OWNER CHANGE WHAT IS MONITORED?

The technology platform is very flexible. If the vessel owner says, "I only want to do three systems today," and a year down the road he says, "I want to add this system," the additional scope can be quickly reviewed and added.

HOW DOES A VESSEL OWNER ACCESS THE DATA?

The crew has access to the information onboard the vessel via any computer connected to the ship's network.

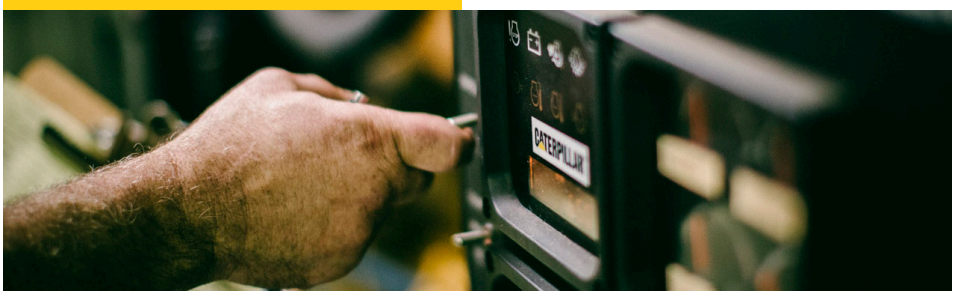
For shore users, access is available through any Internet connected device – typically laptops, tablets, etc. The web-based user interface can be customized for specific users or user groups. Some users might be focused on individual ships with a high level of detail whereas others might want to have a higher level view across the fleet. The interfaces are flexible to enable different stakeholders to focus on the information that is most important (and appropriate) for them.

IS THERE AN APP FOR THIS DATA?

There's not an app yet for this, but we are looking at the key dashboards vessel owners would like to have, and if that would make sense in an app.

WHAT FORMAT IS DATA PRESENTED IN?

Different formats are available for different user profiles based on their needs. At the highest level, there are high level dashboards and reports which can provide a variety of graphs and data visualizations, including vessel performance curves, efficiency comparisons, custom metrics, geophysical location, etc. At a detailed engineering level, there are simple red-yellow-green indicators for each piece of equipment that summarize the current and projected condition, as well as the ability to drill deep to understand the health and performance of a piece of equipment. Lastly, comprehensive reports with both the automated recommendations based on the current status of that equipment and the output of the subject matter expert and fleet advisors analysis, are provided on an agreed-upon frequency.



WHAT'S THE DIFFERENCE BETWEEN ONBOARD AND ONSHORE DATA?

The onboard technology is called Vessel Edition and the shore-based interface is called Shore Edition. These are very similar, with similar views and options to facilitate communication between the onboard crew and the shore based team. Vessel Edition is focused on a specific vessel, so it does not have data from the entire fleet, and it provides real-time data analysis for the onboard crew. Shore Edition (which is of course available to the crew if they have access to the web) is slightly time-delayed (due to data transfer), enables a view across the fleet, provides access to custom analytics and provides the central storage warehouse for the comprehensive equipment health and advisory reports.

CAN YOU BRIEFLY EXPLAIN THE VALUE OF MARINE ASSET INTELLIGENCE?

Marine Asset Intelligence helps vessel owners and operators improve their operations and their equipment by helping them optimize maintenance, avoid failures and associated downtime, increase fuel and energy efficiency, and ensure safety and compliance.

There are four main value drivers: equipment management, productivity, sustainability and safety. The number one priority is protecting equipment. Equipment management covers this through predicting and avoiding failures, as well as assisting crews with remote expert troubleshooting when there is a problem to resolve as fast as possible. It's also about increasing fuel efficiency, improving vessel performance, reducing fuel burn, and improving operations and maintenance.

Safety is about whether it's actually the equipment condition that is the problem, or a failed sensor, or how that equipment is being operated and creating transparency to solve those issues. Another value is ensuring compliance with many of the regulations, including ballast water treatment, emissions and waste discharges.

THERE ARE MANY DIFFERENT MONITORING SYSTEMS ON THE MARKET. WHAT MAKES CAT MARINE ASSET INTELLIGENCE DIFFERENT?

There are several areas where Marine Asset Intelligence's technology and services are differentiated versus others in the marketplace.

First, Marine Asset Intelligence is about more than remote monitoring. Just having data is often not very valuable and, in fact, many owners and operators complain of data overload. Unlike typical "remote monitoring" systems, Marine Asset Intelligence is focused on using automated analytics to turn the raw data into actionable information that can be used by owners and operators to make better decisions and improve their maintenance and operations.

Second, Marine Asset Intelligence brings together data from a wide range of sources into a single platform that is comprehensive from an owner and operator perspective. It is able to provide monitoring and analytics across a very wide range of equipment, including Caterpillar and non-Cat® equipment, diesel engines and non-diesel engine systems – compared against most others in the marketplace who are focused on a specific manufacturer's equipment or a specific type of equipment. This is critical for customers with mixed fleets and customers who have critical equipment that covers a wide range of equipment types. These customers spend a lot of money and create a lot of complexity when they have multiple systems, advisors and interfaces they have to balance.

Third, Marine Asset Intelligence's technology and services can help owners and operators across multiple dimensions, including equipment health (part of the equipment management value proposition) and fuel and energy efficiency (part of the productivity value proposition). Many others in the market are only focused on one or a small set of the value propositions such as a maintenance-only solution or a fuel/energy-only solution.

In addition to a wide, flexible scope, Marine Asset Intelligence's technology and services are provided both onboard and onshore. Some others in the market are only focused on the onboard user or only focused on the shore user—our view is that both groups are critical to maximize performance.

We have built both our technology platform and our team of experts on over 40 million hours of machine monitoring experience. This provides us not only with the expertise to analyze individual equipment, but also with the experience in how to configure new analytical models and continuously improve our analytics in a cost-effective manner.

Finally, our Marine Asset Intelligence comes with expertise: analysts, experts and fleet advisors, helping vessel owners turn information into action, and that's something that's also unique.

HOW LONG MIGHT IT TAKE FOR THIS TECHNOLOGY TO ESSENTIALLY PAY FOR ITSELF?

It really depends on the owner and operator, their current level of maintenance, and how efficient they already are in their operations and maintenance. For a typical application with a typical culture for maintenance and operation, vessel owners could expect to have a return on investment within three months to a year.

WOULD IT BE MORE COST-EFFECTIVE TO HAVE MARINE ASSET INTELLIGENCE INCORPORATED IN THE VESSEL DESIGN OR INSTALLED IN AN EXISTING VESSEL?

We can do both quite easily, although it can be more cost effective for customers to design data generation and capture into a new build. Marine Asset Intelligence can work upfront with vessel owners to work through what data they want and from which systems, based on their business needs. The benefit is the avoidance of any later retrofitting of sensors, or any recabling.

However, the Marine Asset Intelligence services and technology are also very applicable to existing fleets. Vessels built in the last 10 to 15 years typically have a high degree of sensoring already installed and likely some degree of automation as well, both of which reduce the added investment required to take advantage of Marine Asset Intelligence's technology and services. The older the vessel or the less technologically sophisticated, the more potential cost upfront for the vessel owner because data may not be available for us to retrieve.

CAN YOU GIVE US A LITTLE BACKGROUND ON THIS TECHNOLOGY?

Marine Asset Intelligence services are based on a technology that has been developed over the last 15 years; built on our approximately 40 million hours of equipment monitoring experience. Today, Marine Asset Intelligence monitors thousands of assets, across 100+ vessels, covering 75+ different OEMs, with hundreds of users across multiple organizations.

WHAT VESSEL TYPES CAN USE THIS?

There isn't really a restriction on vessel type – the Marine Asset Intelligence service and technology are valuable to any vessel owner who has an interest in reducing operation or maintenance costs, reducing risks, increasing uptime, maximizing equipment reliability, improving the safety of their crew or operation, or decreasing overall cost of ownership, and who believes technology can help him/her achieve that.

WHERE CAN VESSEL OWNERS PURCHASE CAT MARINE ASSET INTELLIGENCE?

If they're interested in finding out more about Cat Connect services, marine customers can contact their local Cat dealer and/or contact Caterpillar Marine Asset Intelligence directly.

IS THIS TECHNOLOGY SUPPORTED BY THE CAT DEALER NETWORK?

Absolutely. The Cat dealers are very interested in helping all marine owners and operators, and they work closely with Caterpillar to find innovative ways to meet their customers' business needs in the technology space.

WILL VESSEL OWNERS AND CREW MEMBERS RECEIVE TRAINING ON THIS TECHNOLOGY?

Yes, customers can rely on the Marine Asset Intelligence fleet advisor and their dealers to help them in all aspects of the technology and service, whether that be with the user interface, customizing reports and dashboards, or executing on the operational and maintenance recommendations.

BUILT FOR IT.