A large container ship is shown at sea, viewed from a low angle. The ship is dark-colored with many colorful shipping containers stacked on its deck. The background is a deep blue, suggesting a clear sky or a dark sea.

**“Most ship managers I know mention in their Safety Management Systems that vessels’ passage plans have to be sent to the shore-based team for approval, but now the auditor wants to know ‘How are you approving the plan?’”**

Marine managers are increasingly being asked by external auditors and other key stakeholders to demonstrate the extent of their shore-based capabilities

A new breed of systems is emerging, which enables automation, connectivity, data sharing and a level of monitoring and control that previously marine superintendents, fleet managers and purchasing directors could only dream of.

A free flow of information between ship and shore that gives the shore-based team access to information they need in near real-time so they can access and use it more proactively in a myriad of ways.

## Introduction

In shipping, the last decade has focused heavily on the rollout of ECDIS and the shift from paper based to digital e-navigation has dominated, however, this transformation has also heralded the start of a new era.

**The global security needs** of nations, rising piracy and terrorism, and, more recently, pandemics, and the drive towards cleaner seas are all now driving the agenda for more visible and transparent shipping.

Looking back a decade we are reminded of the incredible pace of technology-driven change that was already underway and the profound impact that change was having on business. Writing in 2010 about future technology trends, Deloitte focused on cloud, cyber security, the Internet of Things, mobile technology and user-centred design. Many of these things that seemed so incredible 10 years ago have now become a part of our everyday lives, taken almost for granted.

At the heart of this change lies the idea of having access to increasingly more accurate information, for navigation and, also, to support other areas of operations which were never possible using paper-based systems. As a result, a new breed of systems is emerging, which enables automation, connectivity, data sharing and a level of data-led analysis, monitoring and control that previously marine superintendents, fleet managers and purchasing directors could only ever have dreamed of.

Most leaders and managers in most industries today would agree that data is no longer a nice-to-have, it's a must-have, and an essential part of an operations plan. Data helps you to build understanding, identify opportunities for greater efficiencies and, ultimately, helps you reduce costs.

This White Paper explores some of the different uses of data available to shipping companies today and how they can help streamline and improve operations and reduce costs.



**Hayley van Leeuwen has worked in digital transformation for much of the past 20 years. As Head of digital products at the UK Hydrographic Office she led the development of the first Admiralty digital publications and the launch of the Admiralty Vector Chart Service (AVCS) which are now in use on board some 90% of merchant vessels worldwide.**

**In her role as a Director of Product and Marketing at Voyager Worldwide, she shares her thoughts on how data is driving a fundamental step change across the industry.**

## Data for better ship management

Few would argue with the idea of the ship's captain having ultimate command and responsibility for the safe and efficient operation of the ship, but across the industry a new requirement is emerging for a more visibility and transparency at least, if not control, ashore.

**Back in 2013** one of the biggest concerns expressed by respondents to Deloitte's Global Supply Chain Risk Survey related to the risks inherent in their extended supply chain (i.e. their supplier's operations) due to lack of visibility.

While a majority of firms are using outsourcing as a business leverage, then, at least, most companies were failing when trying to find a way to have reliable visibility over their entire supply chains while limiting the dependence on a few key stakeholders.

Then, a series of high-profile breaches and frauds, most notably in food and car manufacturing, had served to make making supply chain information more reliable a key focus area for industry.

Similarly, a few high-profile incidents in shipping appear to now be driving charterers, auditors and other key stakeholders to increase the responsibility placed on shore-based teams to demonstrate they have both visibility of and involvement in the safe operations of the vessels they manage, which, in turn is raising a number of questions that today's marine management teams are finding they have to answer.

As one marine superintendent recently said "We are increasingly being asked to demonstrate our shore-based capabilities and how we ensure we are maintaining appropriate oversight of our vessels. Most ship managers I know mention in their Safety Management Systems that vessels' passage plans have to be sent to the shore-based team for approval, but now the auditor wants to know 'How are you approving the passage plan? Do you have sufficient information ashore to do that?' And most times the answer is probably no."

These questions include things like "How do you ensure ship management has sufficient information to approve the route? Do you have access to ENC's and other information to approve the passage plan? If you are advising vessels in relation to navigation decisions, what information you are using to do that?"

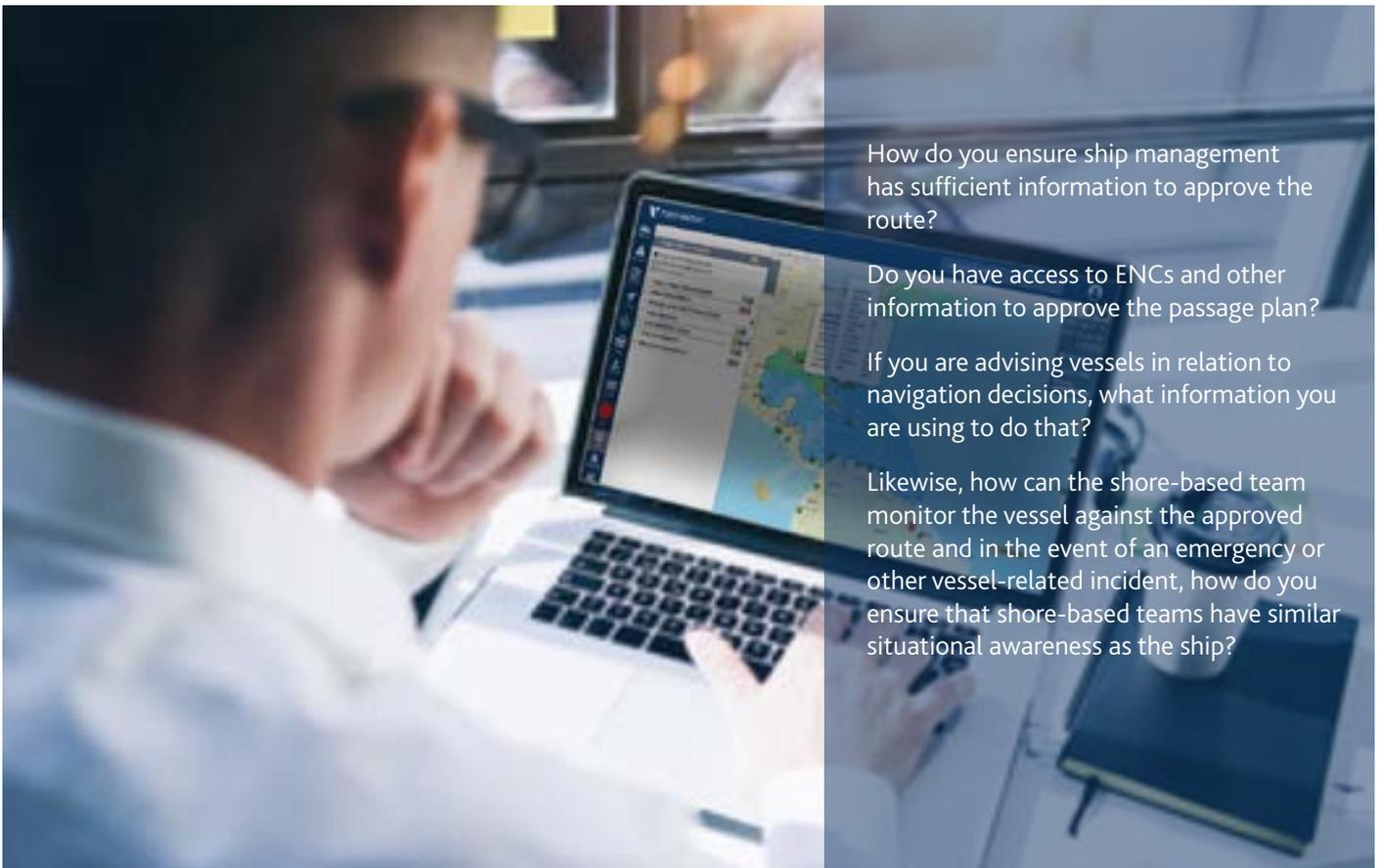
Likewise, how can the shore-based team monitor the vessel against the approved route and in the event of an emergency or other vessel-related incident, how do you ensure that shore-based teams have similar situational awareness as the ship?

This suggests a fundamental shift, from the ship to the shore. What is required to support this shift is a free flow of information between ship and shore that gives the shore-based team access to information they need in near real-time so they can access and use it more proactively in a myriad of ways.

The type and quality of information required ashore is of course dependent on the use case and whether a shipping company (or its auditors) feel that the data used ashore for operational purposes should be of the same standard as onboard the ship – i.e. compliant with SOLAS requirements.

Often, Safety Management procedures are based on using official data that is SOLAS compliant. A route has to be planned and executed by the vessel using official ENC's. If the shore-based team then use unofficial data to check and approve the route, they are using different (less good/accurate/current) information to the vessel which may, arguably, result in errors being made and changes to the route being applied that may then put the vessel

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at increased risk.

This need for better access to official ENCs ashore has been recognised by the international hydrographic community who have worked together to develop an online version of the Admiralty Vector Chart Service (AVCS). The real value, however, comes from the ability of the shore-based manager to layer up information to get a clearer view of the safety of the vessel and identify and better manage any potential risks.

For example, within the Voyager ecosystem, planned routes are automatically shared between the vessel and the office and can be viewed by the shore based team in Voyager FLEET INSIGHT. The route along with the departure time, the forecast weather conditions and additional information relating to maritime security risks, MARPOL restrictions and even territorial boundaries are all displayed overlaid on the ENCS to enable marine superintendents to engage in more meaningful dialogue with the vessel and approve routes with confidence.

Once the voyage is underway, a similar set of data is required, although this time overlaid with the vessel's live position, to enable the

shore-based team to monitor vessel progress and safety during the voyage and keep fully apprised of potential issues that may impact the voyage.

By opening up this rich data resource to shipping companies' shore-based personnel, Voyager Worldwide is making it easier to identify and avoid navigation related issues and create new levels of ongoing value for its customers.

Voyager Worldwide's data, the collection of which has only been made possible by the transition to digital navigation, is now being used in a wide range of ways to support decision making, performance management and safety and compliance improvements across the fleet.

**The real value comes from layering up information to get a clearer view of the safety of the vessel and to better manage any potential risks.**

## Data-Led Cost Reductions

Cost-management is a subject close to the hearts of most shipping companies during these COVID-19 impacted times. And in the digital world, data has the potential to underpin most, if not all, of your cost and budgeting efforts and deliver significant savings.

**When a company decides** to modernise how its fleet navigates and adopt digital navigation, it doesn't just install an ECDIS and link it to a GPS, it actually enables a major shift in how its operations are run and creates significant opportunities to enhance operations and reduce costs.

The shipping industry spends more than \$450 million on navigation every year, but despite this level of spending, a surprisingly high number of the reported PSC defects every year are navigation related.

### Pervasive overspending

In the era of paper navigation, it made sense to buy paper charts and publications "just in case" a vessel may sail in that region. In the digital era just in case purchasing is completely unnecessary.

Despite that, Voyager Worldwide's research has shown that even the best run fleets are still applying a just in case mind set to buying digital charts and digital publications and, as a result, are wasting tens of thousands a year on electronic charts they will never use. Even at a time when earnings are slim, there is still significant wastage on un-used ENC's and digital publications.

Using our data, we can tell you which ENC's and digital publications your vessels have bought, what they have sailed through and where you could be saving.

In the example on the previous page from April 2020, a vessel has purchased \$3015 of ENC's but used less than 60% of them. That's some \$1000 of waste in just one month. On an average navigation budget of \$10,000 per annum, that

is quite some percentage, but most of the time it goes unnoticed because the guys in the office don't have the time or the analytics tools they need to spot it.

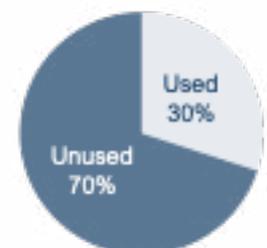
With these new levels of transparency, Voyager Worldwide has also been leading a fundamental change in how navigational information is purchased and used. At Voyager Worldwide, we are not interested in selling high volumes of products that vessels don't need and won't ever use. We don't believe that is the way to build long lasting relationships or to provide value. We believe in using data to provide very tailored services that give customers just what they need, when they need it – nothing more, nothing less.

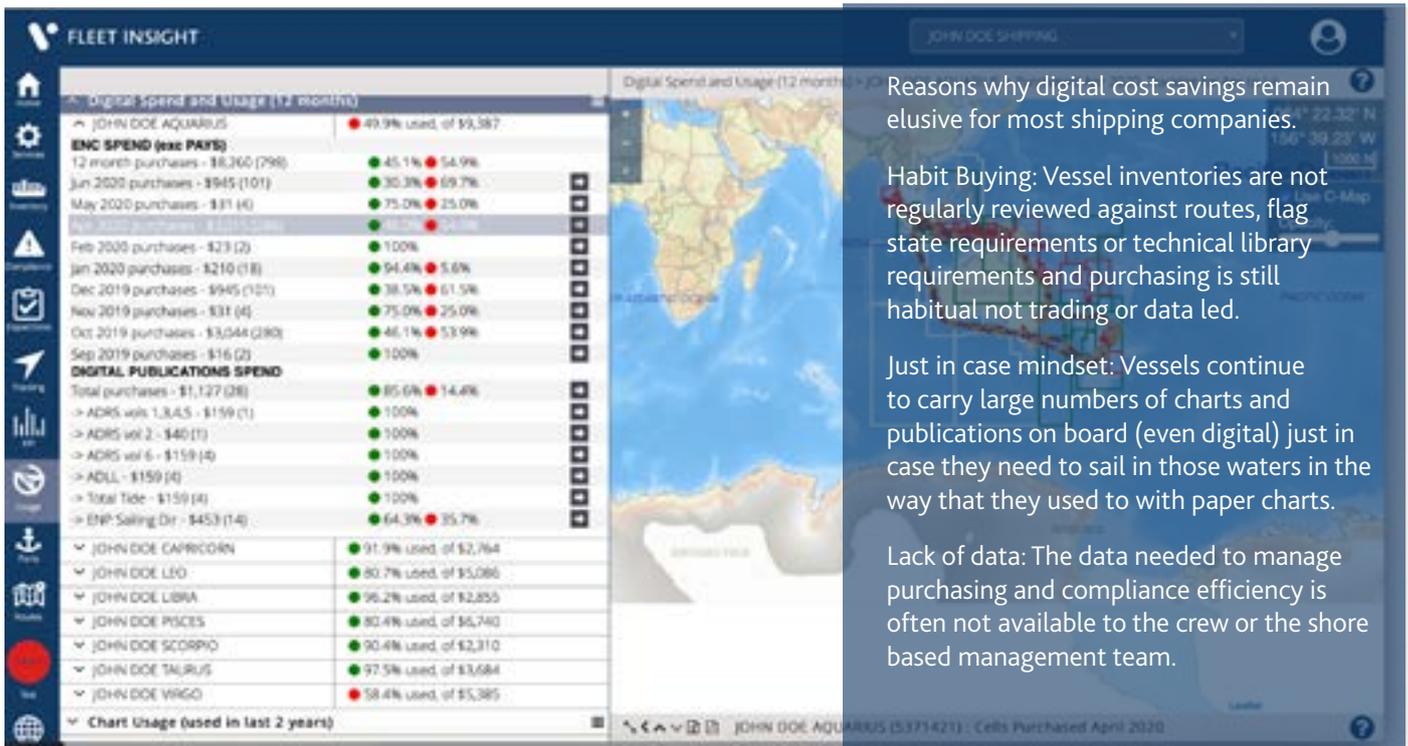
Over the last five years, first using the data to create really tailored pricing for fleets and then running workshops with customers to raise awareness of how they can operate more efficiently, we have built huge amounts of data and knowledge.

Systems that were designed with paper products at the core of their data model do not have the concept of time or purchasing recurrence inherently built into the data model. These metrics are not natively captured, and typically require custom work and custom data algorithms. Voyager Worldwide's data model is designed to capture navigation-related metrics at the most granular level.

For example the Usage module in Voyager FLEET INSIGHT platform is designed to analyse the navigational products each vessel purchases and compare them to what is actually used. This allows customers to view their consumption against trading, for example to identify areas where money is being wasted and their

**In some fleets, a staggering 70% of all ENC's a vessel buys in a year may remain unused - representing significant untapped navigation cost savings**





Reasons why digital cost savings remain elusive for most shipping companies.

Habit Buying: Vessel inventories are not regularly reviewed against routes, flag state requirements or technical library requirements and purchasing is still habitual not trading or data led.

Just in case mindset: Vessels continue to carry large numbers of charts and publications on board (even digital) just in case they need to sail in those waters in the way that they used to with paper charts.

Lack of data: The data needed to manage purchasing and compliance efficiency is often not available to the crew or the shore based management team.

untapped savings are to be found.

Using Voyager FLEET INSIGHT, fleet managers and marine superintendents can now easily identify which vessels are spending too much and work with crews to reduce the amount of wastage. It's not uncommon as a result of the service for fleets to be able to reduce their navigational spend by as much as 25% or 30% per year.

#### 4 ways to use data to help you save on navigation

In summary there are 4 ways every shipping company should be using data to reduce navigational costs:

1. Ensuring every vessel is on the most cost effective navigation service option for its trading patterns and operations
2. Budgeting more accurately so any anomalies can be quickly spotted and addressed
3. Equipping vessels to more accurately purchase what they need
4. Analysing usage and reducing overspending

Image above: ENC usage for a real vessel from April 2020. The vessel has purchased \$3015 of ENCs but used less than 60% of them and wasted \$1000 in just one month.

## Improved compliance management

These cost savings don't have to come at the expense of safety and compliance. In fact, whilst helping you to save money, the same data can, also help you to improve navigation compliance.

**Navigation-related issues** (ENC/ECDIS, charts and technical publications) are routinely one of the most common cause of deficiencies and observations.

In part, the reason for this is very simple. Its just so complicated. In the paper era, a little over 3,000 Admiralty paper charts covered the world's major ports and trading routes. Vessels sailing those routes often purchased and held many hundreds of those charts to

ensure they always had the chart they needed for any eventuality. These paper charts were purchased outright with each chart costing the same amount. Every time there was a New Edition, the chart agent notified the vessel and a replacement was purchased and world.

In today's digital era, there are over 16,000 Electronic Navigational Charts (ENCs) covering the same ports and trading routes at much greater detail at a much wider range of scales - nearly 5 times the volume of data that was available 10 years ago. Each country sets its own price for its ENCs and prices range from less than \$10 to over \$300 for 12 months access. Different prices can apply to a country's ENCs depending on whether it is purchased on a standard or a Pay as you Sail (PAYS) service. Added to that, ENCs are licensed rather than owned with licenced access being bought for periods of 3, 6, 9 or 12 months at a time.

Vessels aren't carrying the navigation products they are required to carry – they are either missing them completely or they are out of date. That makes easy pickings for PSC and SIRE inspectors.

What's interesting though, is that's not because companies aren't spending enough. As our data shows, companies are actually spending too much on navigation products. Its just at too often they are spending their navigation budgets on the wrong things.

Fortunately, as well as telling you where you are overspending, data analysis can now also tell you exactly which products each vessel needs to sail safely and compliantly for its specific Class and Flag and where you have gaps.

It can notify you when a mandatory New

Annual global spend on navigation and number of navigation related PSC deficiencies.

Navigational Defects  
>7000  
Worldwide

Navigational spend  
>\$450  
Million

Edition is published or when a digital publication is due to expire. Importantly, it can also tell you which products a vessel may be missing as well as which products have been bought and are held on board that the vessel doesn't need. You will almost certainly be surprised by the results.

Since 2015, Voyager FLEET INSIGHT has been helping companies streamline their navigational spending while improving their focus on safety and compliance. We track the mandatory requirements for every Flag and vessel worldwide so that our customers only buy a highly curated set of publications to meet their specific compliance needs. With the average New Edition Technical Publication purchase costing more than \$100 this unique approach offers companies an easy way to reduce the overall cost of navigation.

### Bridge inefficiencies

When a navigating officer is dealing with this level of complexity, he or she needs as much of it to be automated as possible. If not, the amount of data becomes unwieldy and on-board systems start to creak. Tools like Voyager Worldwide's PLANNING STATION software are designed to help bridge teams to handle these

new levels of complexity.

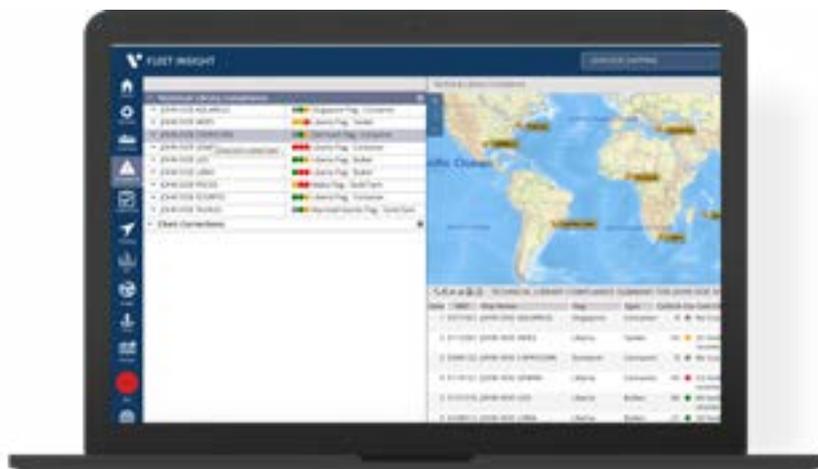
For example, Voyager simplifies route planning and automates the process of identifying the ENC's and publications that are required for a voyage. Online ordering enables vessels to download any products that are not already on-board within minutes of requesting the ENC or digital publication. Updates to ENC's and digital publications are easily downloaded and applied and a full correction log is automatically generated so that compliance can be easily demonstrated to Port State Control and vetting inspectors.

### Preparing for port state control inspections

To assist marine managers and superintendents further with compliance management, data analytics can now also be used to view the inspection histories of ports worldwide. This enables marine superintendents to spot likely focus areas ahead of port arrival and assist the crew to make appropriate preparations.

These sorts of data led tools are saving shipping company's money while also helping to improve overall safety and compliance across fleets.

**Image below: Systematic identification of products each vessel in a fleet needs using Voyager FLEET INSIGHT. Publications missing from vessel holdings and required by regulators or ship cos own requirements are clearly flagged.**



## Data Sharing

Most shipping company today are typically trying to measure vessel performance using data that has been collected in the past and in isolation from other data.

**As shipping embraces** its new digital era, data sharing is becoming second nature. There is already starting to be a free flow of information between ship and shore that gives the shore-based team access to information they need in near real-time so they can access and use it more proactively in a myriad of ways.

Making possible the sharing of navigation and voyage data is an essential component of and the key to understanding where the achievable digital opportunity lies for shipping companies. The challenging part is how to collect, store and manage the large volumes of data involved and, of course, how to make sense of it all.

Unsurprisingly then, when we dig into the detail of what some owners and managers have achieved so far, the digital reality is not as encouraging as the rhetoric. It's very easy for shipping executives to talk a good game – and, for the most part, the story is one they whole heartedly believe in. The issue is whether staff in the field are as well-equipped.

The Voyager Worldwide approach embraces this new demand for visibility and oversight. The company's Voyager FLEET INSIGHT platform combines detailed vessel tracking, official ENCs, weather, maritime risk and other data and the use of algorithms to identify issues and support the marine management team to support their vessels, wherever they are worldwide, enhance safety and make better decision from shore.

Some users will expect to be able to use data to improve the day-to-day management of the vessels they manage from decision support and compliance management to incident management. Others will want to use data more strategically to track and measure key performance indicators, benchmark against the wider commercial fleet and assist with commercial aspects such as budget

management.

For this reason, its important that platforms like Voyager are built in a modular way and designed to be fully scaleable to accommodate an almost unlimited volume of data of different types. For example during the COVID-19 pandemic hit, the team were able to work with S5 Port Agency to make important information about the COVID testing facilities that were available in ports to assist with crew welfare and crew change over decision.

The data collected by Voyager Worldwide that is used to identify overspending and enhance compliance, is also used to help refine navigation budgets, derive and benchmark port turnaround times, analyse yearly operating costs by sea hours, predict annual port fees and costs of major consumables. Knowing how much time a vessel has spent steaming and at anchor is being used to refine maintenance schedules and reduce maintenance costs .

Vessel data can also be leveraged to provide tracking and monitoring to report sailing times and calculate operating costs more accurately, as well as monitoring against charter party terms.

It's not unusual to hear the industry calling for better data sharing for improved safety and efficiency. In fact, the tools are there but in many cases the opportunities that spill out from vessel data – for voyage execution, analysis and benchmarking – are still the preserve of the few, not the many. As the world of shipping becomes more instrumented, interconnected and intelligent, faster and more powerful computers, advanced self-learning algorithms and analytics have the potential to create quantum leaps forward in efficiencies and ship management.

**"Forward thinking leaders around the world are creating tangible outcomes and benefits. They are learning how to make their part of our planet smarter."**  
**Samuel J. Palmisano,**  
**CEO, IBM 2002-2012.**

## About Voyager Worldwide

Voyager Worldwide is a leading maritime solutions company and the world's number one provider of digital navigation solutions.

**Uniquely, we use data intelligence** to help our customers buy the navigational products and solutions they need with precision and accuracy that also helps them to reduce costs and improve efficiency.

We work with the biggest names in shipping worldwide - large and small. We have a powerful Voyager ecosystem that collects data from vessels and enables that data to be shared with shore-based stakeholders. We also collect, store and analyse millions of other data-points ranging from AIS positions to Port State Authority and Flag State data every day.

Since 2015 we have captured over 2 bn data points relating to 120,000 vessels worldwide. This data forms a huge Voyager Worldwide data lake that through the help of our analytics and our Voyager FLEET INSIGHT web service, our customers then use to help them manage navigation (and increasingly) other aspects of their operations more effectively. Our goal is to turn data into information and information into insight.

Our Voyager NAVIGATION as a SERVICE product enables you to buy navigation supplies at cost price – so we have an unambiguous shared objective not to sell you more than you ever need. Since launch in mid 2019, Voyager NaaS has become the preferred way to buy ENC's for thousands of ships worldwide and has delivered an average of 31% savings on navigation spend – by providing the data analytics and software that shipping companies need to identify and buy exactly the products vessels need - at lowest possible prices.

To find out more contact your preferred Voyager worldwide office from the list below or email us at [customerservices@voyagerww.com](mailto:customerservices@voyagerww.com). Alternatively, visit our web site at

[www.voyagerww.com](http://www.voyagerww.com)

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