

NAVIGATING SUSTAINABLE MARITIME FRONTIERS: A DEEP DIVE INTO SPIRE'S SPACE-POWERED INNOVATIONS





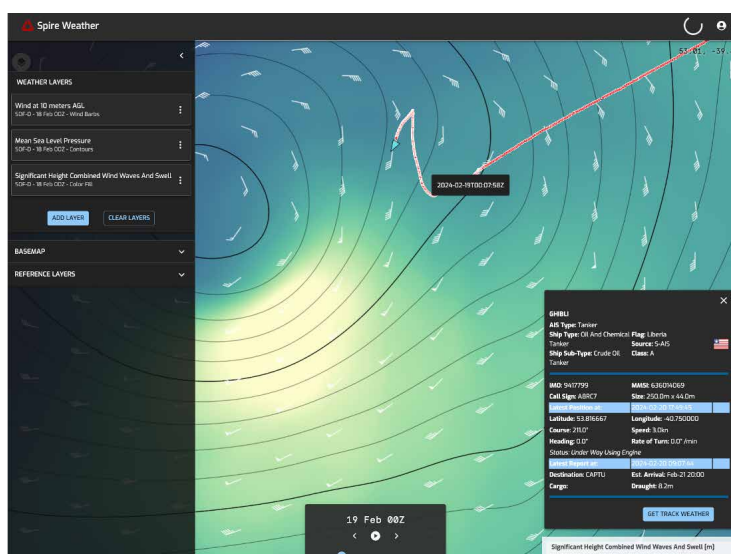
 spire | weather & climate

Carlos Losada, Global Senior Product Manager, Spire

In the vast expanse of maritime operations, where efficiency is king and sustainability reigns supreme, the convergence of cutting-edge technology and industry expertise is reshaping the seascape. Amidst the tumultuous tides of climate change, the maritime sector faces an urgent call to chart a course towards greener, more efficient practices. At the forefront of this transformation stands Spire Global, a pioneering force harnessing space-powered data to revolutionise maritime insights and operations.

In this exploration, we delve into Spire's groundbreaking solutions and unravel the intricate tapestry of technology and innovation woven into the fabric of modern maritime sustainability. From optimising vessel routes to safeguarding against risks and enhancing operational efficiency, Spire's suite of offerings promises to redefine the maritime landscape for port, shipping, and logistics professionals worldwide.

Join us on a voyage through the depths of maritime innovation as we uncover the transformative power of Spire's Deep Navigation Analytics (DNA) platform, Voyage Optimization solution, Risk Insight calculator, and beyond. Together, let us navigate the seas of change, forging a path toward a more sustainable, resilient maritime future.



How does Spire Deep Navigation Analytics contribute to sustainable maritime practices, particularly in reducing carbon emissions and optimising fuel consumption?

In the maritime industry, efficiency hinges on weather and shipping traffic. This becomes increasingly crucial amidst weather extremes fuelled by climate change. Yet, grappling with vast datasets poses a challenge for many maritime stakeholders. Spire's Maritime Deep Navigation Analytics (DNA)

platform offers pre-processed data and integrated technologies, enabling users to prioritise decision making over redundant tech rebuilding.

Could you provide further insight into Spire's Voyage Optimization solution and its capacity to optimise routes for multiple parameters simultaneously? How does Spire's Voyage Optimization, powered by Theyr, distinguish itself from traditional optimisation algorithms?

“AMIDST THE TUMULTUOUS TIDES OF CLIMATE CHANGE, THE MARITIME SECTOR FACES AN URGENT CALL TO CHART A COURSE TOWARDS GREENER, MORE EFFICIENT PRACTICES.”

This represents a prime demonstration of Maritime DNA's value. Rather than requiring users to integrate the optimisation solution with weather and ship models, it seamlessly integrates with our comprehensive data suite. Weather accuracy is pivotal to voyage optimisation, and Spire leverages data from its constellation of over 100 satellites to provide unparalleled insights into weather conditions across under-observed regions, including remote land areas, oceans, and higher altitudes of the atmosphere.

Traditional voyage optimisation algorithms typically focus on avoiding adverse weather conditions or minimising consumption or costs. However, such approaches often fall short in an industry where balancing complex and sometimes conflicting

factors is essential, such as maintaining emissions ratings while adhering to specific arrival time windows.

Spire's Voyage Optimization technology operates on the principle that every possible route must be calculated for a given voyage. By thoroughly exploring the solution space, the system identifies the most suitable route that aligns with the user's combined voyage objectives. This approach empowers users to select routes that effectively address both their commercial and environmental objectives.

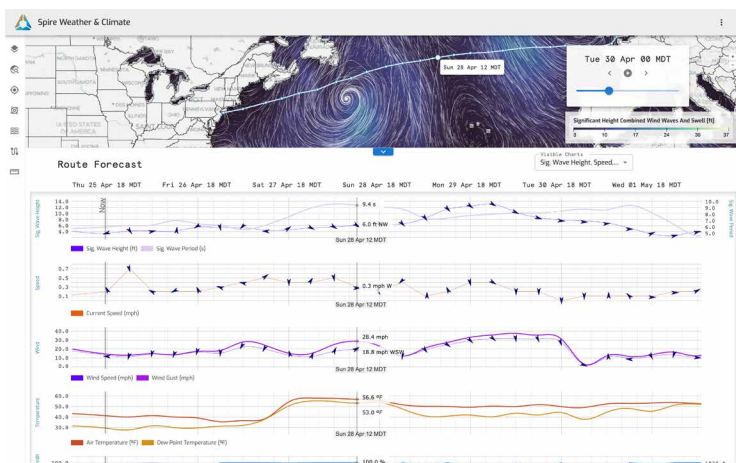
How does Deep Navigation Analytics leverage innovative technologies to bolster the sustainability of maritime operations, and what role does AI play in this process?

Addressing every possible route and schedule between two ports manually would prove time-prohibitive for our users. Spire Voyage Optimization harnesses genetic algorithms, employing evolutionary AI techniques. Essentially, variations of a designated route are systematically explored to navigate each route objective's solution space. Successful variations are iteratively refined, ensuring a highly efficient exploration of all objectives.

Could you discuss the Route Insights product and its role in delivering actionable insights to safeguard vessels, cargo, and crews along customer shipping routes? Additionally, could you elaborate on Spire's proprietary weather data and how it empowers unparalleled insights?

“SPIRE'S ROUTE INSIGHTS ALLOWS USERS TO EFFORTLESSLY ASSESS ROUTE SAFETY AND EFFICIENCY, SHOWCASING HOW OUR MARITIME DNA PLATFORM ENHANCES ACCESSIBILITY TO OUR CUTTING-EDGE WEATHER DATA.”





Spire's Route Insights allows users to effortlessly assess route safety and efficiency, showcasing how our Maritime DNA platform enhances accessibility to our cutting-edge weather data.

Typically, evaluating routes requires significant development effort in processing weather data and developing the relevant algorithms. However, with Spire Route Insights, users simply submit their route alongside vessel type and cargo parameters, receiving an immediate evaluation in return.

Spire's weather data stands out as the sole source built upon our comprehensive dataset of space-based climate insights. Our satellite constellation gathers data on atmospheric properties, precipitation, soil moisture, and ocean winds, facilitating a nuanced understanding of current weather conditions. This detailed dataset minimises forecasting errors by providing precise initial conditions. The weather predictions are then optimised further through satellite-validated comparisons.

What role does digitalisation play in advancing sustainability within maritime operations, and how does Spire contribute to this aspect?

Digitalisation, in our context, signifies the enhancements following the digitisation of information. Spire's contribution lies in providing vessel tracking and weather data to numerous voyage optimisation service providers, enabling real-time decision making amid weather fluctuations. While similar outcomes could be achieved through sensor installation or public weather data utilisation, Spire's datasets and technology enable vessel tracking sans sensors and voyage optimisation with the added benefit of space-based weather forecasts.

This offering stands unparalleled for ports, terminals, and agents, offering real-time visibility and operational forecasting to enhance decision making.

How does Spire's space-powered data revolutionise insights into vessel traffic and weather?

With a comprehensive database covering every vessel and port worldwide, Spire's data presents significant opportunities for the industry's pursuit of just-in-time arrivals and multi-vessel optimisation along trade routes.

This comparison highlights the contrast in coverage between Radio Occultation and Weather Balloons, two methods crucial for assessing atmospheric changes at various altitudes – an essential component for weather prediction models. Radio Occultation, a pioneering technique, offers a holistic view of the atmosphere at every level globally. Leveraging a constellation of over 100 satellites, Spire achieves this breakthrough by analysing signal bending from GPS/GNSS satellites influenced by weather elements.

While Weather Balloons, equipped with meteorological instruments, are confined to launch areas over land, Radio Occultation-derived atmospheric profiles obtained via satellites offer expansive coverage, transcending geographical constraints. Spire's unrivalled weather data coverage extends from the poles to remote oceans, providing indispensable data insights.

ABOUT THE AUTHOR:

Carlos Losada, Spire Global Senior Product Manager responsible for maritime weather solutions, is a Naval Architect and maritime digital solution expert. He graduated from The University of Southampton in the UK, with experience in the field of voyage optimisation, including building, implementing, and selling solutions with companies such as Wartsila.

ABOUT THE COMPANY:

Spire Global, Inc. is a leader in space-based data and analytics offering access to powerful datasets and insights about Earth so organisations can make confident decisions with accuracy and speed. Spire uses one of the world's largest multi-purpose satellite constellations to capture data, enriching the maritime, aviation, and weather industries.

“SPIRE'S UNRIVALLED WEATHER DATA COVERAGE EXTENDS FROM THE POLES TO REMOTE OCEANS, PROVIDING INDISPENSABLE DATA INSIGHTS.”