SAILDRONE

CARBON IMPACT REPORT 2023

EXECUTIVE SUMMARY

In 2023, Saildrone's uncrewed surface vehicles (USVs) avoided 99.9% of comparable ocean data GHG emissions and 223% of our total company GHG emissions—a 56% year-over-year improvement in carbon impact while dramatically scaling operations.

The oceans cover 72% of the Earth's surface and serve as a critical corridor for global trade, national defense, and economic development. Yet, vast areas of the oceans remain unexplored and unmonitored, leaving blind spots that threaten national security and limit strategic advantage.

Saildrone uncrewed surface vehicles (USVs) use primarily wind and solar power to deliver persistent, autonomous presence across the world's oceans—with zero to minimal operational emissions depending on mission requirements. Saildrone USVs provide the maritime intelligence needed to close information gaps on missions ranging from illegal activity detection to seafloor mapping and resource assessment. By enabling real-time, actionable insights at sea, Saildrone strengthens national security, supports sovereign maritime operations, and helps unlock the full potential of the blue economy while preserving the ecological integrity of the planet.

This second edition of Saildrone's Carbon Impact Report demonstrates our commitment to environmental stewardship. To assess our carbon impact, Saildrone analyzes the emissions resulting from business activities, as well as the emissions avoided through our low-carbon solutions compared to traditional alternatives. This methodology helps us focus on both "doing less harm" by continuously reducing our operational emissions and "doing more good" by expanding the adoption of our technology to avoid emissions generated by traditional ocean monitoring solutions. This year's results prove that sustainable ocean operations aren't just possible—they're highly effective and demonstrate that we can scale maritime operations while dramatically reducing carbon impact.

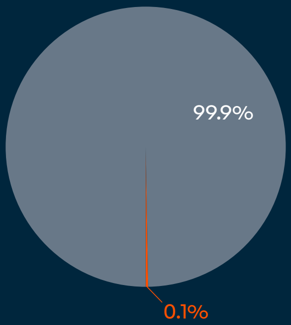
Three breakthrough results defined our 2023 carbon performance:

99.9% emissions avoided: Saildrone's avoided emissions grew from 8,289 tonnes of CO_2e in 2022 to 25,708 tonnes of CO_2e in 2023—a 210% increase. While traditional vessels would have generated 26,111 tonnes of CO_2e to complete our 2023 missions, Saildrone USVs produced only 24 tonnes of CO_2e—avoiding 99.9% of comparable traditional vessel emissions.

Avoided ~2.25x company footprint: Saildrone's avoided emissions of 25,708 tonnes exceeded the entire company's GHG footprint by 223%, meaning we avoided more than twice the carbon we produced across all business operations.

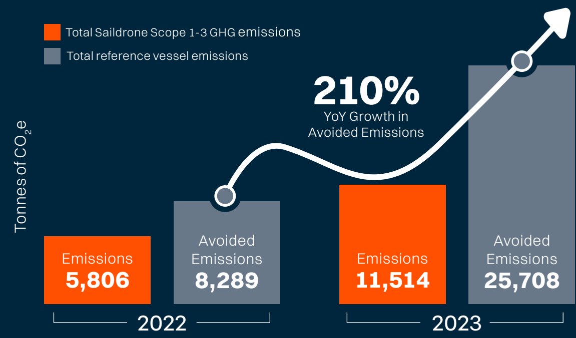
Sustainable scaling: More significantly, we achieved a 56% year-over-year improvement in our carbon impact ratio—avoiding 2.23 tonnes of CO_2e for every 1 tonne produced, up from 1.43 in 2022—despite a 98% increase in total emissions and a 21% rise in emissions intensity due to the deployment of new USV classes. We accomplished this while expanding operational scale by 63%, sailing a distance equivalent to circumnavigating the Earth 14 times.

These results represent more than efficiency gains—they demonstrate that the future of maritime operations lies in renewable energy, autonomous systems, and technologies that simultaneously strengthen national security and environmental protection.



AVOIDED EMISSIONS
Saildrone avoided emissions during 2023: **99.9% (25,708 tCO_2e)**

USV EMISSIONS
Saildrone emissions during missions in 2023: **0.1% (24 tCO_2e)**



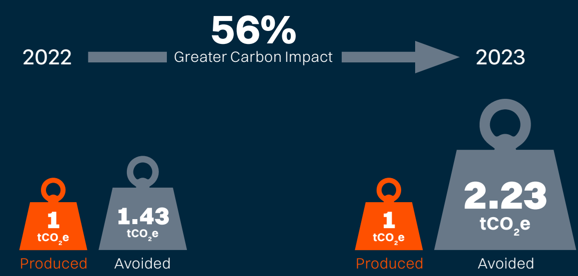


FIGURE 1
COMPARISON OF OCEAN DATA COLLECTION EMISSIONS BETWEEN SAILDRONE USVS AND TRADITIONAL VESSELS

FIGURE 2
YEAR-OVER-YEAR COMPARISON OF SAILDRONE'S TOTAL SCOPE 1-3 EMISSIONS AND AVOIDED EMISSIONS

FIGURE 3
YEAR-OVER-YEAR CARBON AVOIDANCE GROWTH

CARBON ACCOUNTING CONTEXT

Saildrone is committed to measuring, monitoring, and managing its carbon impact to support a more sustainable future. Employing a dual approach, Saildrone accounts for both the emissions generated by its business and the emissions avoided by using its innovative zero- and low-carbon solutions. The quantification of emissions across both measurements is expressed in terms of CO_2e, the universal unit of measure for translating the varying global warming potentials (GWP) of different greenhouse gases (GHGs) into the GWP of carbon dioxide.

In measuring the emissions generated by its business, Saildrone has followed the Greenhouse Gas Protocol, a corporate accounting and reporting standard widely considered to be the best practice in such quantification efforts. This framework separates a company's emissions into three areas:

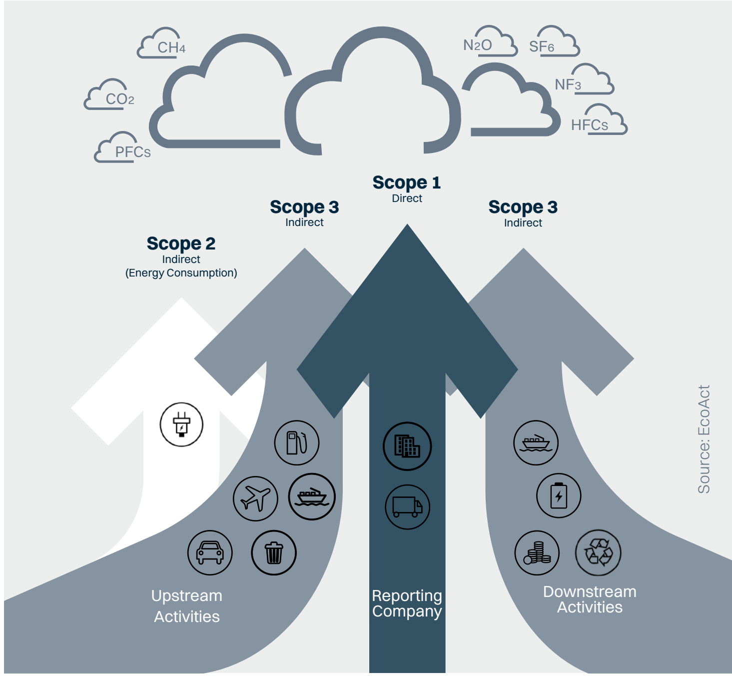
1) **Scope 1: Direct Operational Emissions**
   Direct emissions from owned or operated assets

2) **Scope 2: Indirect Operational Emissions**
   Indirect emissions from the generation of purchased electricity, steam, heat, or cooling

3) **Scope 3: Indirect Value Chain Emissions**
   Indirect emissions emitted by other entities (upstream and downstream) as a result of the company's activities.

Within the GHG Protocol framework, Scope 1 and 2 emissions reflect a company's operational emissions within its direct control—for example, the electricity consumed in Saildrone buildings and the diesel usage of its larger USV classes. In contrast, Scope 3 emissions are typically outside a company's direct control, accounting for the emissions of a company's entire value chain. This includes upstream sources of emissions, such as the emissions from producing materials purchased by Saildrone to manufacture its USVs.[1]

In measuring the emissions that its solutions avoid, Saildrone has used the guidance established in 2023 by the World Business Council on Sustainable Development (WBCSD) for quantifying avoided emissions.[2] This entails comparing the GHG impact of Saildrone's solutions during customer missions to the GHG impact of the most likely alternative technology that would have been used had Saildrone's solutions not been available. Given the versatile applications of Saildrone USVs, multiple use cases were developed to define the most likely alternative scenarios for the various customer missions completed in 2023.



Source: EcoAct

1 Downstream sources of emissions, such as use phase emissions or end-of-life treatment of sold products, are not applicable to Saildrone, as it does not sell its USVs.

2 Saildrone recognizes the importance of the WBCSD guidance and acknowledges that its current avoided emissions calculations are not fully aligned with this framework. For example, the WBCSD's guidance requires the full lifecycle emissions of a solution to be evaluated. However, Saildrone's current avoided emissions calculations only consider the operational emissions resulting from specific missions—as it would be impractical to calculate the lifecycle emissions of its solutions vs. those of existing alternative solutions (e.g., emissions associated with manufacturing USVs vs. manufacturing of every type of reference vessel).

SAILDRONE'S GHG EMISSIONS

Saildrone partnered with EcoAct, part of Schneider Electric, an international climate and sustainability consultancy with over 20 years of experience in corporate GHG accounting and comprehensive decarbonization strategies, to calculate its Scope 1 – 3 GHG inventory for calendar year 2023. Our inventory followed the operational control approach within the Greenhouse Gas Protocol, resulting in a total Scope 1 – 3 footprint of 11,514 tCO_2e. As Figure 4 shows, Scope 3 emissions account for over 95% of total emissions for the year.

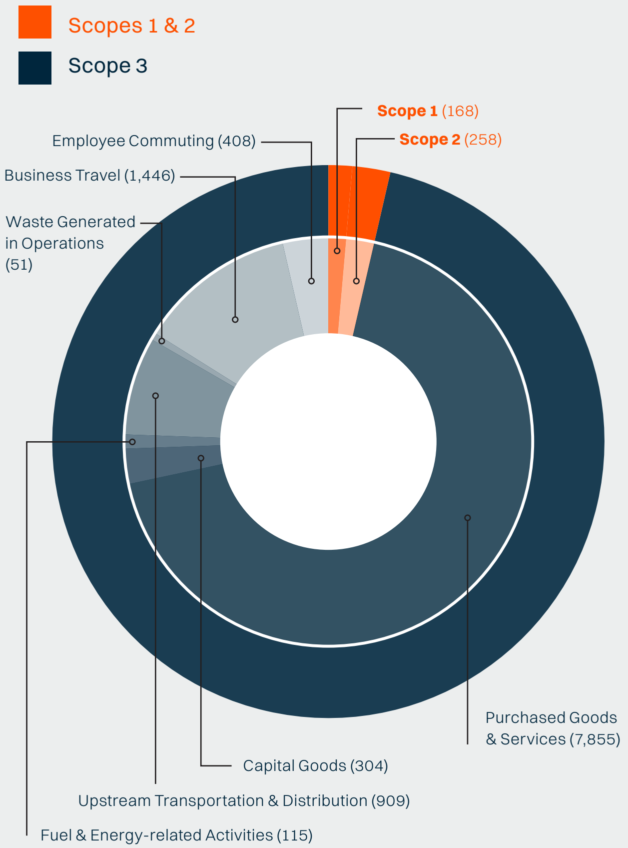
Scope 1 and 2 emissions for 2023 totaled 426 tCO_2e, including the operation of real estate assets (288 tCO_2e) and supporting vehicles, such as forklifts, telehandlers, support boats, and larger, diesel-assisted USVs (137 tCO_2e). The primary source of Scope 1 and 2 emissions is facility electricity consumption, representing 2% of total Scope 1 – 3 emissions. The greater amount of emissions resulting from USV-related diesel consumption is driven by the operational needs of one Surveyor-class and 20 Voyager-class USVs in 2023. Saildrone's remaining 2023 customer missions were completed with Explorer-class vehicles, which are entirely renewably powered and thus produce zero emissions when operating. Further details on our Scope 1 and 2 emissions can be found in Table 2 in the Appendix.

Scope 3 emissions for 2023 totaled 11,088 tCO_2e, more than 25x Saildrone's combined Scope 1 and 2 emissions. These emissions were generated by the operations of non-Saildrone entities, such as the suppliers who manufacture the materials used to build Saildrone USVs and the third-party logistics and air travel providers who transport Saildrone vehicles and staff to and from deployment and recovery sites. Saildrone offers its USVs to customers using a "mission-as-a-service" model rather than selling the vehicles to customers. As a result, only upstream Scope 3 categories (specifically, the first 7 categories in Table 3 in the Appendix) are relevant to the analysis, since the emissions from deploying, operating, and servicing Saildrone vehicles are captured in these categories. Please refer to Table 3 for further details on the results of Saildrone's screening to determine the relevancy of each Scope 3 emissions category, the calculation methodology and emission factor sources used for each category, and the resulting 2023 emissions.

Saildrone's Scope 3 emissions are primarily concentrated in two areas of the business: how the company manufactures its USVs and how the company moves and deploys them after they enter Saildrone's active fleet.

Manufacturing emissions:
Scope 3 emissions related to USV manufacturing fall under Category 1 (Purchased Goods and Services) and Category 2 (Capital Goods). These two categories collectively account for 71% of total Scope 1 – 3 emissions and have increased

FIGURE 4
SAILDRONE'S TOTAL GHG EMISSIONS BY SCOPE
(Tonnes of CO_2e, in 2023)



by 100% compared to our 2022 operations. Since Saildrone is a fast-growing company and made a large investment in expanding the Voyager fleet in 2023 to 20 active Voyagers, along with an additional 16 Voyagers in the production phase that had not yet entered service at year-end, raw materials and fixed assets used to manufacture the vehicles represent the dominant sources of emissions. This includes key elements such as mechanical and electrical materials, large USV components such as hulls, machinery and equipment, composite materials, and sensors.

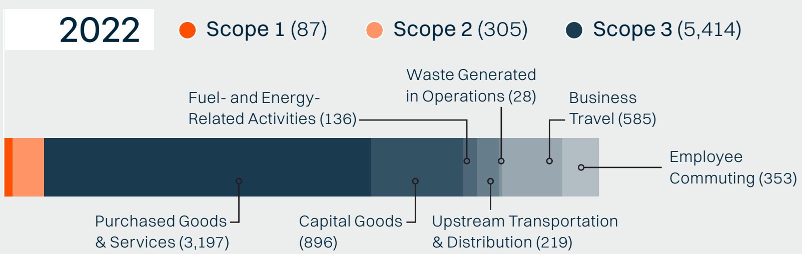
Transportation and deployment emissions:
Scope 3 emissions associated with the transportation and deployment of Saildrone USVs fall under Category 4 (Upstream Transportation and Logistics) and Category 6 (Business Travel). Category 4 captures emissions linked to transporting Saildrone USVs and other equipment to and from mission deployment and recovery sites, while Category 6 encompasses emissions tied to the movement of Saildrone employees to and from these same deployment and recovery sites. Combined, these categories constitute 20% of total Scope 1 – 3 emissions, which have increased by 293% compared to our 2022 operations.

Emissions intensity:
Overall, Saildrone's total Scope 1 – 3 emissions doubled year-over-year from 2022 to 2023. However, for rapidly scaling operations, emissions intensity provides a more insightful metric for year-on-year comparisons. In Saildrone's case, emissions intensity is defined as the Scope 1 – 3 emissions per nautical mile (nm) sailed. This metric increased from 30.6 kg CO_2e/nm in 2022 to 37.2 kg CO_2e/nm in 2023—a 21.5% increase.

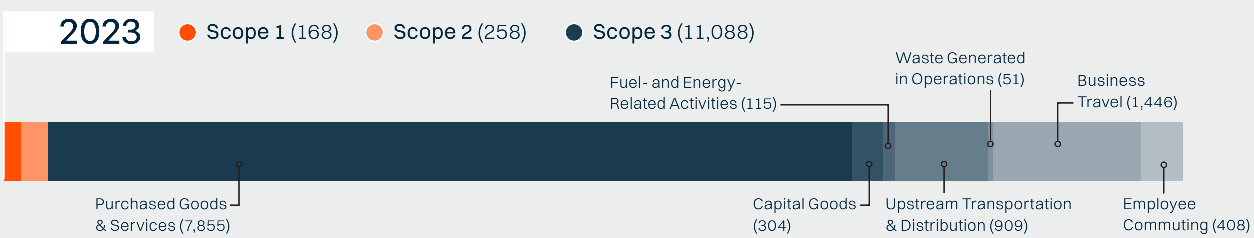
This increase primarily reflects the operational reality of launching Voyager-class USVs in 2023. As standard with new product classes, initial deployments typically require increased maintenance, upgrades, and troubleshooting during the first year of operations. This drives emissions intensity up through increased service team travel, shipping of spare parts, and increased nautical mile service transits. We expect this intensity metric to decrease in future years as operations mature. Importantly, despite increased intensity, our avoided emissions and positive environmental impact grew significantly, reflecting both the scale and effectiveness of Saildrone's expanding missions.

FIGURE 5

YEAR-OVER-YEAR COMPARISON OF SAILDRONE'S EMISSIONS



	2022	2023
Total Emissions (tCO2e)	5,806	11,514 (▲198%)
Nautical Miles Sailed	189,855	309,786 (▲163%)
Emissions Intensity (kg CO2e/nautical mile)	30.6	37.2 (▲21.5%)



SAILDRONE'S AVOIDED EMISSIONS

Saildrone partnered with Rightship, the world's leading environmental, social, and governance (ESG)-focused digital maritime platform, to calculate our avoided emissions. The first step in this process was to separate our various customer missions into similar "use cases", against which we could make comparisons. For each use case, the WBCSD guidance requires us to define the most likely alternative technology scenario that would have occurred in the absence of our USV solutions (each one is called a "reference scenario" in the WBCSD guidance).

Reference scenarios can sometimes be straightforward (e.g., an ocean mapping USV being compared to a traditional ocean mapping vessel), but sometimes they require more analysis, especially when Saildrone USVs are not operating in place of a traditional vessel. For instance, when a Saildrone USV is used in place of a data collection buoy, it avoids emissions associated with the fossil fuel consumption from vessels otherwise required to service the buoy. Another methodology-challenging example is when a Saildrone USV performs a mission that traditional vessels could not undertake due to considerations of crew safety (e.g., studying storm intensification by sailing into hurricanes).

As these examples illustrate, the diversity and novelty of Saildrone's solutions make it difficult, if not impossible, to consider like-for-like comparisons and take a full lifecycle view in quantifying the avoided emissions. Therefore, this report compares Saildrone USVs to their respective reference scenarios beginning with transit from the start and end points of the mission, including all mission activity in between. However, we exclude comparisons of emissions activities outside of mission-related activities, such as manufacturing and transporting the USVs or alternative existing technology solutions to and from mission start and end points. Through this approach, we can calculate the difference in reference vessel emissions and Saildrone USV emissions for each mission and quantify the aggregate net avoided emissions.

While each reference case is, by definition, different from other use cases, certain core parameters are consistent across all reference case calculations. In all cases, Saildrone adhered to the European Standard Methodology for Calculation and Declaration of Energy Consumption and GHG Emissions of Transport Services (EN 16258:2012) and calculated the avoided emissions on a well-to-prop basis for all reference cases. This accounting methodology captures the full life cycle emissions of fuel consumption, including upstream fuel extraction, refinement, transportation, and, ultimately, the final combustion of the fuel.

Reference use case methodologies are grouped into three solution areas: Defense & Security, Ocean Mapping, and Ocean Research. Table 1 (see p.9) presents the total avoided emissions for each solution area and use case, resulting in a grand total of 25,708 tCO_2e net avoided emissions in 2023, a 210% increase compared to net avoided emissions in 2022. For additional information on the methodologies, use cases, and individual missions, refer to Tables 4 and 5 in the Appendix.

TABLE 1: SUMMARY OF SAILDRONE'S 2023 AVOIDED EMISSIONS BY SOLUTION AREA AND USE CASE

Solution Area	Use Case	Total Avoided Emissions (tCO_2e)
Defense & Security	Naval ISR Patrol	**10,561**
	Coastal MDA Patrol	**4,133**
	Subtotal Defense & Security	**14,694**
Ocean Mapping	Nearshore Multibeam Bathymetry	**264**
	Deepwater Multibeam Bathymetry	**231**
	Single-beam Bathymetry	**4,604**
	Subtotal Ocean Mapping	**5,099**
Ocean Research	Fisheries Acoustics	**401**
	Storm Mitigation	**1,541**
	Buoy Mitigation	**956**
	Scientific Observations	**2,030**
	Float Deployment	**987**
	Subtotal Ocean Research	**5,915**
	Total	**25,708**

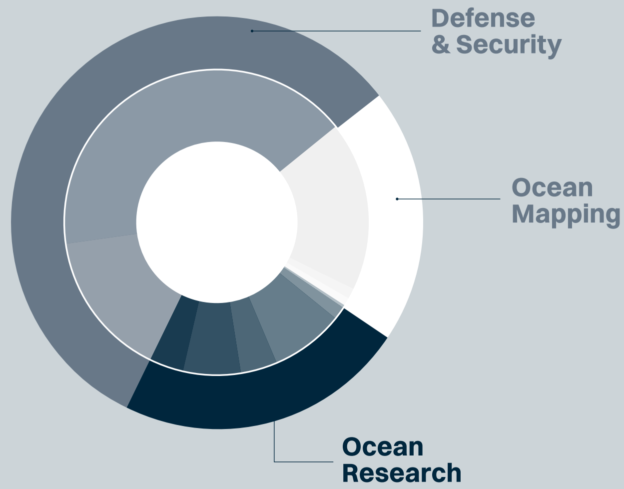
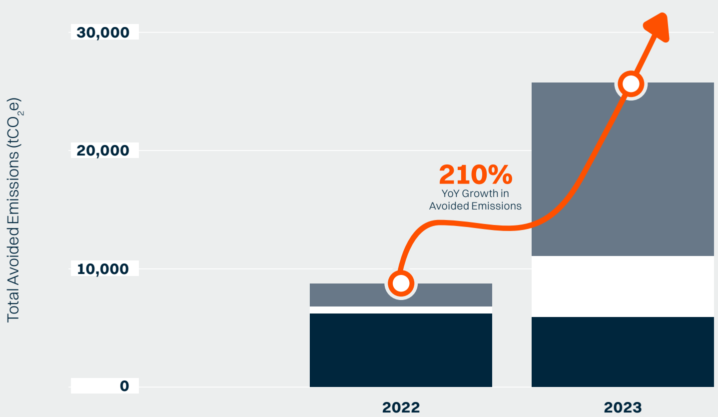


FIGURE 6

YEAR-OVER-YEAR COMPARISON OF SAILDRONE'S AVOIDED EMISSIONS



	2022	2023
Defense & Security	**1,636**	**14,694**
Ocean Mapping	**460**	**5,099**
Ocean Research	**6,193**	**5,915**
Total	**8,289 tCO2e**	**25,708 tCO2e**

DEFENSE & SECURITY

Saildrone's 2023 Defense & Security customer missions resulted in total avoided emissions of

14,694 tCO_2e

Saildrone is revolutionizing how navies, defense, and law enforcement agencies (LEAs) monitor and protect our oceans, enabling accurate, dynamic, and confident decision-making and response for the full spectrum of maritime threats and challenges.

Saildrone's 2023 Defense & Security customer missions resulted in total avoided emissions of 14,694 tCO_2e. This represents a significant increase from the 1,636 tCO_2e avoided in 2022, reflecting the continued success and growth of this solution area. In line with the WBCSD guidance, each customer mission was classified under a specific use case to accurately reflect mission activities and calculate the resulting emissions that would have been generated by the traditional alternative solution had Saildrone USVs not been utilized. The Defense & Security use cases for 2023 are defined below.

NAVAL ISR PATROL

This reference use case is used to calculate avoided emissions for missions that focus on conducting intelligence, surveillance, and reconnaissance (ISR) patrols over large maritime areas, typically further than 12 nautical miles from shore. This ISR patrol would traditionally be conducted by a crewed, fossil-fuel-powered patrol vessel. We calculate avoided emissions for the patrol work by using a coverage area comparison, assuming the reference vessels patrol the same total area patrolled using Saildrone's detection capabilities. Patrol vessels not only perform reconnaissance work but also intervene as needed if any contacts of interest are detected during patrols. The intervention component, by nature, requires a crewed vessel for physical response. Saildrone does not perform this critical portion of patrol ships and, therefore, operates as part of an integrated fleet of manned and unmanned vehicles. Based on Saildrone's experience, our methodology assumes a 2.4% intervention rate by crewed patrol vessels. We deduct the crewed-vessel intervention emissions from the total emissions avoided by using our USVs for the surveillance and detection portion of the patrol function.

COASTAL MDA PATROL

This reference use case is used to calculate avoided emissions for missions that focus on conducting maritime domain awareness (MDA) patrols over a large coastal area, typically within 1 to 12 nautical miles from shore. This surveillance would traditionally be conducted by a crewed, fossil-fuel-powered patrol vessel. We calculate avoided emissions for the patrol work by using a coverage area comparison, assuming the reference vessels patrol the same total area patrolled using Saildrone's detection capabilities. Patrol vessels not only perform reconnaissance work but also intervene as needed if any contacts of interest are detected during patrols. The intervention component, by nature, requires a crewed vessel for physical response. Saildrone does not perform this critical portion of patrol ships and, therefore, operates as part of an integrated fleet of manned and unmanned vehicles. Based on Saildrone's experience, our methodology assumes a 2.8% intervention rate by manned patrol vessels. We deduct the crewed-vessel intervention emissions from the total emissions avoided by using our USVs for the surveillance and detection portion of the patrol function.

10 Saildrone Voyagers in Key West, FL, ready to deploy for the US Navy.

CASE STUDY
US NAVY 4TH FLEET

The US Naval Forces Southern Command (USNAVSO) and US 4th Fleet launched Operation Windward Stack to enhance maritime domain awareness and counter illicit activity across the Caribbean Sea and surrounding waters. This vast area of responsibility includes key shipping lanes and strategic maritime choke points.

Saildrone was selected for deployment as part of Operation Windward Stack. A fleet of Saildrone Voyager-class USVs equipped with advanced sensors demonstrated Saildrone's ability to provide persistent maritime surveillance and real-time vessel detection, operating continuously for extended periods without refueling or maintenance. Saildrone USVs serve as a force multiplier, enhancing situational awareness and enabling rapid, effective responses from manned naval and Coast Guard assets.

Saildrone covered an area of 12,500 square nautical miles, delivering critical intelligence across the US 4th Fleet area of operations. Over the course of the mission, the 10 Voyager USVs sailed more than 130,000 nautical miles over 2,700 cumulative mission days. They detected 116,000 unique contacts, an average of 43 contacts per USV per day. Of the total contacts, 98,000 were not broadcasting AIS.

The Naval ISR Patrol use case was used to calculate the carbon avoided by using Saildrone Voyager USVs for the detection portion of this mission in place of traditional manned patrol vessels. The first step was to compile a set of reference patrol vessels that could have been used in place of the Voyagers to conduct this surveillance and average them together to create a hypothetical patrol vessel. This set of reference vessels comprised a wide range of sizes (359 – 4,600 metric tonnes deadweight), service speeds (20 – 40 knots), and engine fuel burn rates.

The avoided emissions for this reference case were calculated using an integrated approach that accounted for the detection range of the sensors installed on the Voyager USVs and the distance traveled during the patrol period to calculate the coverage area for the area patrolled by the USVs. This coverage area was then used to calculate the amount of time that would have been required for a manned patrol vessel to patrol the same area. Combining this with the average fuel consumption rate of the reference patrol vessels yielded an emissions total of 9,427 tCO_2e. In contrast, the Voyager USVs utilized in this mission only produced 9 tCO_2e. However, we also considered the emissions associated with manned-vessel interventions during the mission. We assumed an intervention rate of 2.4% for this use case, yielding 226 tCO_2e emitted from intervention activities. As a result, the net avoided emissions, when subtracting the USV and manned vessel intervention emissions, totaled 9,192 tCO_2e.

Equipped with radar and cameras, the Saildrone Voyager is a 10-meter USV designed to support monitor critical maritime areas for illicit activity.

OCEAN MAPPING

Saildrone's 2023 customer missions for Ocean Mapping resulted in an avoided emissions total of

5,099 tCO_2e

To date, only about 26% of the ocean has been mapped using modern technology. This lack of exploration is largely due to the high cost of access, which has traditionally been undertaken by large survey ships that are expensive to build and operate, as well as limited in number. Saildrone USVs are equipped with industry-leading sonars for near-shore and open-ocean bathymetry, delivering high-quality data sets that meet the most stringent industry standards. While not designed as a replacement for a survey ship, Saildrone USVs provide an economical, low-carbon solution to rapidly increase global knowledge of the seafloor and focus traditional vessels on areas that require crewed exploration.

Saildrone's 2023 customer missions for Ocean Mapping resulted in an avoided emissions total of 5,099 tCO_2e. This represents a significant increase from the 460 tCO_2e avoided in 2022, reflecting the deployment of additional Voyager-class USVs and the execution of multiple Ocean Mapping missions of varying types. The Ocean Mapping use cases for 2023 are defined below.

NEARSHORE MULTIBEAM BATHYMETRY

This reference case is used to calculate avoided emissions for missions focused on mapping the seafloor in nearshore environments, typically in waters shallower than 300 meters, using a multibeam sonar array on Saildrone USVs. This research data would traditionally be collected by a fossil-fuel-powered survey vessel that would need to travel to the mission location and map the same survey area that the Saildrone USV mapped over the course of the mission. While the area surveyed is assumed to be identical for Saildrone USVs and the traditional vessel, we calculate avoided emissions taking into account Saildrone's hybrid propulsion system. The USVs used for this reference case (Voyagers and Surveyors) primarily use wind for propulsion and solar for power generation, but are also equipped with a high-efficiency diesel generator to meet the power demands of the multibeam sonar and a propeller for maneuvering and maintaining course in challenging conditions. This combination means the USVs can follow more direct transects than a purely wind-powered vessel, while still achieving significant emissions reductions compared to fully motor-powered survey vessels. However, the USV transects are not as direct as those performed by the fully motor-powered vessels. Therefore, avoided emissions were calculated assuming the reference vessel conducts the survey using a more structured survey plan as compared with that used by Saildrone USVs.

DEEPWATER MULTIBEAM BATHYMETRY

This reference case is used to calculate avoided emissions for missions that focus on mapping the seafloor in deepwater environments, typically in waters greater than 300 meters, using a multibeam sonar array on Saildrone USVs. This research data would traditionally be collected by a fossil-fuel-powered survey vessel that would need to travel to the mission location and map the same survey area that the Saildrone USV mapped over the course of the mission. While the area surveyed is assumed to be identical for Saildrone USVs and the traditional vessel, we calculate avoided emissions taking into account the Surveyor's advanced hybrid propulsion system. The USV is equipped with both wind and diesel-electric propulsion, allowing it to conduct precise, straight-line surveys similar to traditional vessels but with substantially lower fuel consumption and emissions. However, the USV transects are not as direct as those performed by the fully motor-powered vessels. Therefore, avoided emissions were calculated assuming the reference vessel conducts the survey using a more structured survey plan as compared with that used by Saildrone USVs.

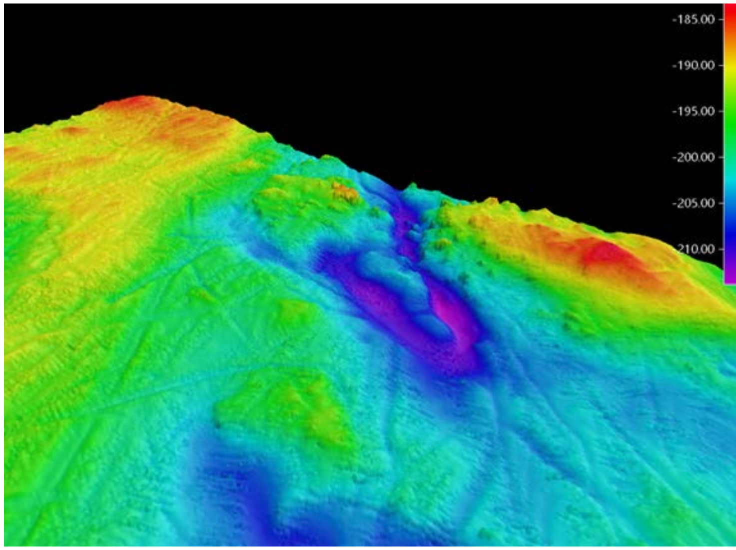


Image of data collected by Saildrone showing the varied topography in the Gulf of Maine.

SINGLE-BEAM BATHYMETRY

This reference case is used to calculate avoided emissions for missions that involve mapping the seafloor using a single-beam sonar system on Saildrone's Explorer-class USVs. This methodology is not sufficient for hydrographic mapping and is used as a means of evaluating distant parts of the ocean for areas of interest and prioritizing a future multibeam survey. This research data would traditionally be collected by a fossil-fuel-powered survey vessel that would need to travel to the mission location and map the same survey area that the Saildrone Explorer USV mapped over the course of the mission. Using company estimates of survey capacity by comparable vessels, the avoided emissions were calculated assuming the reference vessel travels the same transit distance to and from the mission start and end points, but a significantly shorter span of time for the actual mission duration.

The Saildrone Voyager is the only survey USV that can deliver long-duration International Hydrographic Organization (IHO)-compliant multibeam mapping surveys and ocean data collection at depths up to 300 m (984 ft). Saildrone USVs are primarily wind and solar-powered, but the Voyager also carries a high-efficiency electric motor for speed and maneuverability in light winds.

CASE STUDY
NOAA GULF OF MAINE SURVEY

The Gulf of Maine is a biologically rich and ecologically significant region and home to diverse marine life that plays a crucial role in maintaining marine biodiversity. It is one of the highest mapping priorities due to its significant commercial fisheries supported by diverse habitats, including deep-sea corals, and the potential to support wind energy. Saildrone worked with the National Oceanic and Atmospheric Administration (NOAA)'s Northeast Fisheries Science Center, National Centers for Coastal Ocean Science, and the Office of Habitat Conservation's Deep-sea Coral Program to gather high-resolution seafloor mapping data to inform fisheries management and responsible offshore wind development in the region.

Two Saildrone Voyager-class USVs surveyed 1,122 square nautical miles in an area of the north-central Gulf of Maine that had never been mapped in high resolution. The multibeam data revealed a complex and varied underwater landscape, reflecting the region's glacial history and dynamic oceanographic processes. This data will be used to inform new species distribution models, update nautical charts, and aid navigation, filling important gaps in bathymetric coverage.

In addition to bathymetric data, Saildrone also collected backscatter, temperature, salinity, and depth profiles, which are essential for understanding the habitat preferences of these corals. The use of autonomous technology not only enhanced the efficiency and scope of the survey but also minimized the environmental impact and risk to personnel typically associated with manned missions.

The Nearshore Multibeam Bathymetry use case was used to calculate the carbon avoided by using Saildrone Voyager USVs for this mission in place of traditional crewed research vessels. The first step was to compile a set of reference vessels that could have been used in place of the Saildrone Voyagers to collect this data and average them together to create the hypothetical survey vessel. This set of five vessels comprised a wide range of sizes (104 – 857 metric tonnes deadweight) and main engine powers (1,368 – 2,056 kW), though all had the same average transit and mission speeds of 12 and 8 knots, respectively. These specifications were used to calculate the range of fuel consumption rates (6.32 – 12.84 kg/km), yielding an average burn rate of 8.24 kg/km during transit and 9.89 kg/km during the mission for the reference vessels.

The distance traveled by the Voyagers was broken down into mission distance and transit distance. Mission distance was measured as the distance sailed by the Voyagers from the starting point of data collection to the end of the survey route, totaling 3,335 nm. Transit distance was measured as the distance sailed from the Voyagers' deployment location to mission start, and from the end of data collection back to the USV recovery site, totaling 1,100 nm.

Combining this information with the average fuel consumption rate of the reference vessels, the average reference vessel would have traveled a total distance of 4,435 nm, burning 78 tonnes of fuel and generating 266 tCO_2e. While Saildrone Voyagers are not fully renewably powered, they rely much less on fossil fuels. During this mission, the two Voyagers were operational for a total of 107 days, burning an estimated 93 gallons of fuel and resulting in 1 tCO_2e emitted. By using the Saildrone solution, the net avoided emissions for this mission amounted to 265 tCO_2e.

OCEAN RESEARCH

Saildrone's 2023 customer missions for Ocean Research resulted in an avoided emissions total of

5,915 tCO_2e

Saildrone collects real-time in situ meteorological and oceanographic data at, above, and below the sea surface. Ocean Research missions are typically performed with Saildrone Explorer USVs, powered entirely by renewable wind and solar energy, which allows them to remain deployed at sea continuously for up to a year. Saildrone USVs are not designed as a replacement for traditional data collection vessels but rather are intended to augment existing research assets by providing data on a broad temporal and spatial scale without impacting the environment they are monitoring. Collecting a similar set of metocean data to that of weather buoys, robotic floats, or research vessels, Saildrone USVs transit autonomously to and from the area of operation and do not require a mooring to remain stationed in one location.

Ocean Research missions in 2023 resulted in a total avoided emissions total of 5,915 tCO_2e. This represents a slight decrease from the 6,193 tCO_2e avoided in 2022, reflecting a reduction in the number of Ocean Research mission days conducted in 2023. Ocean Research use cases for 2023 are defined below.

FISHERIES ACOUSTICS

This reference case is used to calculate avoided emissions for missions that collect measurements for fisheries management, quota setting, and research. Fisheries missions require both a trawling component as well as acoustic measurements. The trawling component, by its nature, will always require a crewed vessel that would allow for physical specimen observation, classification, and measurement. Saildrone USVs would not impact this portion of fisheries surveys, and thus, the trawling component is not considered in this reference case. For Saildrone's carbon avoidance analysis, this reference case only considers emissions that would be avoided by using Saildrone USVs in place of traditional crewed vessels for the acoustic component of the fisheries mission. This research data is traditionally collected by a fossil-fuel-powered research vessel. We calculate avoided emissions assuming the reference vessel travels the same distance as Saildrone USVs.

STORM MITIGATION

This reference case is used to calculate avoided emissions for missions that collect data during storm events, such as hurricanes. Traditional crewed vessels could not collect in situ data during these storm events due to safety considerations; therefore, this research data would typically be collected through a buoy observation array that requires regular servicing. For purposes of this calculation, Saildrone conservatively assumes that such a buoy network would already be in existence and therefore does not account for avoiding any of the emissions associated with the initial setup of the hypothetical buoy network. Instead, we only calculate the emissions that would be avoided by the annual servicing required for such buoy networks, which would be accomplished by a fossil-fuel-powered vessel. Considering buoy observation radius and Saildrone USV coverage distances, we estimate that each Saildrone USV can cover the same area as three buoys. We calculate avoided emissions by combining the distance traveled to and from mission points as the distance that would have been traveled to reach the hypothetical buoy network, an assumed fixed distance traveled to service buoys during the mission, and additional time spent idling during repairs for such annual service trips.

BUOY MITIGATION

This reference case is used to calculate avoided emissions for missions that repeatedly collect ocean measurements in a specific maritime area over several years. Such research data is traditionally collected through the creation of a buoy observation array that requires regular servicing. For purposes of carbon avoidance calculation, Saildrone conservatively assumes that the buoy network is already in existence and does not account for avoiding the emissions associated with the initial setup of the buoy network. Instead, we only calculate the emissions avoided by the annual servicing required for such buoy networks, which would be accomplished by a fossil-fuel-powered vessel. We calculate avoided emissions by combining the reference vessel's distance traveled to and from the buoys and time spent idling during repairs for such annual service trips.

SCIENTIFIC OBSERVATIONS

This reference case is used to calculate avoided emissions for missions that collect scientific data for a specified period of time in areas of the ocean where a buoy network would not be likely to be created (i.e., in areas where repeated missions do not occur on a year-by-year basis). Such research data would traditionally be collected by a fossil-fuel-powered research vessel that would need to travel to the mission location and spend a fixed amount of time collecting the data. We calculate avoided emissions assuming that the reference vessel travels the same distance to and from the mission site as a saildrone, and then idles in a fixed position for the duration of the mission.

FLOAT DEPLOYMENT

This reference case is used to calculate avoided emissions for missions that collect scientific data over an extended distance in areas of the ocean where a buoy network would not be likely to be created (i.e., in areas where repeated missions do not occur on a year-by-year basis). Such research data would traditionally be collected by robotic floats deployed by a fossil-fuel-powered vessel that would need to travel to the mission start location and then travel along the mission route. We calculate avoided emissions assuming the reference vessel travels the same distance covered by Saildrone USVs.

CASE STUDY

2023 NOAA ATLANTIC HURRICANE MONITORING

While NOAA has made steady progress in forecasting a hurricane's track, forecasting hurricane rapid intensification—wind speeds increasing 30 knots in 24 hours or less—remain a significant challenge. To improve understanding of hurricane rapid intensification, scientists need to understand the ocean processes occurring as intensity increases, which means collecting data immediately before and during a storm. In 2023, the third year of a multi-year mission, Saildrone deployed a fleet of twelve Explorer-class USVs across the Atlantic, Caribbean, and Gulf of Mexico.

The saildrones were strategically positioned in operational areas in the Tropical Atlantic and Gulf of Mexico that have a high likelihood of encountering a hurricane, based on historical track data. NOAA and Saildrone Mission Control worked together to task the vehicles into as many storms as possible.

During the 2023 mission, the Saildrone fleet intercepted storms 19 times in six hurricanes and spent 141 hours in tropical storm conditions battling 65+ knot winds and 15-meter waves. Sailing more than 37,000 nautical miles (nm), Saildrone delivered real-time, high-resolution data on ocean and weather conditions at a scale not previously possible. The mission was initially designed as purely a research mission, but over time, constituents in other NOAA departments, including the National Hurricane Center (NHC) and National Weather Service (NWS), have integrated the real-time Saildrone data into forecasting and advisories; NHC cited Saildrone data in forecast discussions 20 times throughout the season.

The Storm Mitigation use case was used to calculate the carbon avoided by using Saildrone USVs in place of a traditional crewed research vessel. The first step was to compile a set of reference vessels that could have been used in place of Saildrone USVs, assuming risks to the vessel and crew were ignored. This set of four vessels comprised a wide range of sizes (350 - 1,080 metric tonnes deadweight), service speeds (8.5 - 15 knots), and engine powers (1,324 – 4,530 kW). These specifications were used to calculate the range of fuel consumption rates (6.39 – 12.09 kg/km), yielding an average burn rate of 9.83 kg/km for the reference vessels.

The distance traveled by Saildrone USVs was divided into mission distance and transit distance. Since scientific measurements for this mission began immediately after the USVs were deployed, the mission distance was measured as the distance sailed from the deployment point to end point of data collection, totaling 1,000 nm. The transit distance sailed from the end point of the data collection back to the recovery site was calculated at 11,882 nm (calculated as the average of the transit distance of the twelve USVs deployed across 20 different buoy locations).

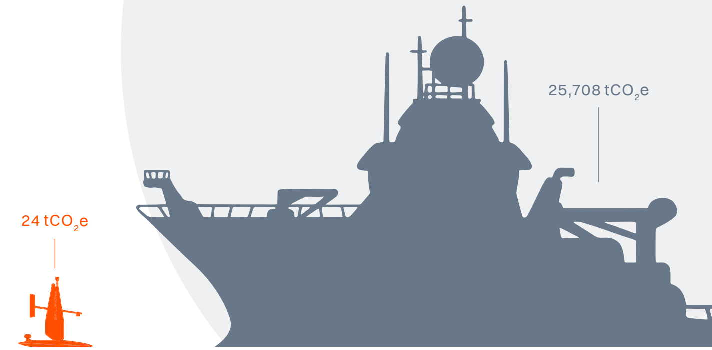
Combining this information with the average fuel consumption rate of the reference vessels, the average reference vessel would have traveled a total distance of 12,882 nm, burning 456 tonnes of fuel and generating 1,541 tCO_2e. Since the Saildrone USVs used in this mission were Explorers with zero carbon emissions during operation, Saildrone's emissions to perform the mission were 0 tCO2e, resulting in net avoided emissions of 1,541 tCO_2e.

SAILDRONE'S OVERALL CARBON IMPACT

As shown in Table 5 of the Appendix, our USV fleet generated only 24 tCO_2e while collecting data during missions in 2023, while the total emissions that would have been generated by the reference vessels amounted to 26,111 tCO_2e. Operationally, this means that Saildrone produced only 0.1% of the emissions that would have been emitted by existing vessels—and that we therefore avoided 99.9% of the carbon that would have been produced by traditional maritime solutions to perform the same missions.

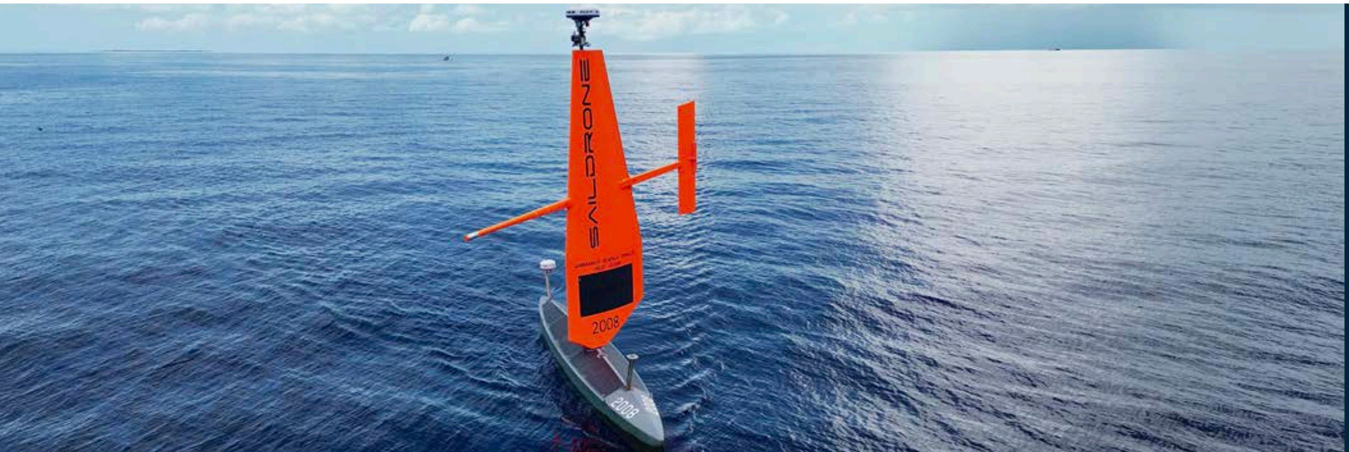
In particular, Saildrone's national security missions achieved extraordinary growth, with avoided emissions increasing nearly 800% from 1,636 to 14,694 tonnes of CO_2e, demonstrating how revolutionizing maritime defense solutions can drastically reduce environmental impact, and how such a transformation contributes more significantly than any other factor to increasing the company's overall carbon impact.

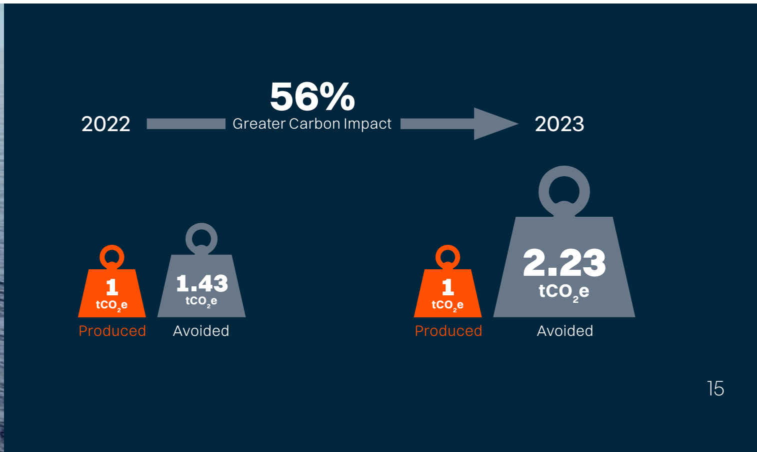
Expanding the analysis to compare our total Scope 1 – 3 emissions footprint (11,514 tCO_2e) vs. the total net avoided emissions (25,708 tCO_2e) yields an "emissions avoidance" ratio of 223%. In other words, for every tonne of CO_2e produced in our 2023 operations, Saildrone avoided 2.23 tonnes of CO_2e that would have been produced had USVs not been utilized. This represents a 56% increase over our 2022 emissions avoidance ratio, in which Saildrone avoided 1.43 tonnes of CO_2e that would have otherwise been produced. We are proud of our significant, and growing, emissions avoidance ratio, as it demonstrates the role Saildrone's solutions play in progressing to a low-carbon maritime future.



SAILDRONE'S FLEET **AVOIDED 99.9% OF OPERATIONAL EMISSIONS** FOR MARITIME DATA GATHERING.

FOR EVERY TONNE OF CO_2e PRODUCED IN OUR 2023 OPERATIONS, **WE AVOIDED 2.23 TONNES OF CO_2e**, THAT WOULD HAVE BEEN PRODUCED HAD SAILDRONE USVS NOT BEEN UTILIZED.





THE ROAD AHEAD

As we look ahead, we recognize the impact Saildrone's rapid growth trajectory will have on its carbon footprint. Our 2023 emissions reflect a more diverse fleet composition than the previous year, resulting in more varied and unique reference cases reflecting the expanded capabilities of our Voyager and Surveyor classes.

In 2024, we expect our fleet composition to continue to shift towards a greater proportion of our Voyager- and Surveyor-class USVs. As a result, it is expected that Saildrone's Scope 1 emissions from mobile combustion will continue to increase as operations expand using these larger USV classes that burn small amounts of diesel fuel. We expect our Scope 3 emissions to stabilize and increase more modestly, as we aim to manufacture fewer USVs and focus on increased utilization of our existing fleet, yielding greater carbon avoidance per nautical mile sailed. The deployment of new generations of USVs (specifically, our second-generation Surveyor-class USV and our third-generation Voyager-class USV) will further improve the efficiency and reliability of our missions, improving our carbon intensity metric for every nautical mile sailed.

In parallel, Saildrone's avoided emissions are expected to grow as well, and given our 2023 carbon avoidance results, we believe the carbon avoided metric will grow at a faster rate than our carbon emissions. For 2024, we expect mission composition to continue to shift towards a greater mix of Defense & Security operations. As our analysis shows, Defense & Security missions result in the largest avoided emissions totals. This sizable impact is logical, given that the reference vessels used by navies and LEAs to complete these missions in the absence of Saildrone USVs are larger and have a much greater fuel consumption rate than the reference survey and research vessels used in the Ocean Mapping and Ocean Research use case categories. Defense & Security missions also typically last longer and are more persistent in nature compared to Ocean Mapping and Ocean Research missions. As Saildrone continues to partner with navies and LEAs, we expect significant increases in avoided emissions in 2024 and beyond.

Saildrone is excited to release its second Carbon Impact Report, and we are committed to continuing this journey by measuring and reporting annual impact metrics and striving to improve data quality and accuracy of our calculations. We are proud to have avoided almost 100% of the emissions that would have been produced by reference vessels while conducting 2023 missions, and we aim to continue avoiding >95% of carbon emissions resulting from missions in future years. Equally as important, we recognize the significance of avoiding 220% of our total emissions footprint in 2023 and remain committed to actively managing our carbon impact so that we continue to increase our avoidance ratio into 2024. By meeting both targets, we ensure that Saildrone not only delivers low-emission maritime solutions but also contributes meaningfully to global decarbonization efforts.

GLOSSARY

Avoided Emissions: Avoided emissions are defined as the positive impact on society when comparing the GHG impact of a solution to an alternative reference scenario where a solution would not be used.

CO_2 equivalent (CO_2e): The universal unit of measurement to indicate the global warming potential (GWP) of each of the greenhouse gases, expressed in terms of the GWP of one unit of carbon dioxide. It is used to evaluate releasing (or avoiding releasing) different greenhouse gases against a common basis.

Emission Factor: A factor allowing GHG emissions to be estimated from a unit of available activity data (e.g., gallons of fuel consumed, amount spent on raw materials).

Emission Intensity: Emissions intensity is Scope 1 - 3 emissions per nautical mile sailed, which provides a more insightful metric for year-on-year comparisons in rapidly scaling operations..

Saildrone Explorer USV: Saildrone's 7m (23 ft) USV. Powered exclusively by renewable wind and solar energy, the Saildrone Explorer offers a long-term solution for meteorological and oceanographic research with a zero operational carbon footprint. The Explorer carries a payload of sensors for metocean data collection, carbon monitoring, fisheries surveys, single-beam mapping, and more.

Global Warming Potential (GWP): A factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO_2.

Greenhouse Gases (GHG): GHGs are the seven gases listed in the Kyoto Protocol: carbon dioxide (CO_2); methane (CH_4); nitrous oxide (N_2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulfur hexafluoride (SF_6).

Greenhouse Gas Protocol (GHGP): The comprehensive global standard to measure and manage greenhouse gas (GHG) emissions from private and public sector operations, value chains, and mitigation actions.

Reference Vessel: Alternative traditional vessels that could have been used in place of Saildrone USVs to conduct its missions.

Reference Vessel Emissions: The emissions that would have been produced had Saildrone's missions been conducted with reference vessels instead of Saildrone USVs.

Scope 1: The category of greenhouse gas emissions resulting from all owned or operated assets.

Scope 2: : The category of greenhouse gas emissions resulting from the generation of electricity, heating/cooling, or steam purchased for consumption.

Scope 3: The category of greenhouse gas emissions derived from all activities within an entity's value chain not captured by Scope 1 and 2. This is split into a further 15 subcategories representing different sources of emissions within an entity's value chain.

Saildrone Surveyor USV: Saildrone's 20m (65 ft) USV. Powered by a combination of renewable wind, solar energy, and a high-efficiency diesel engine, the Saildrone Surveyor is equipped with industry-leading sonars for near-shore and open-ocean bathymetry and produces data sets that conform to the most stringent industry standards. For MDA/ISR applications, the Saildrone Surveyor fuses radar, cameras, and advanced machine learning for IUU fishing, counter-smuggling, and migrant interdiction mission applications. The Surveyor detects vessels near-shore and in deep ocean, even those not transmitting their position, and can carry passive acoustic sensors to further discriminate threat contacts.

Uncrewed/Unmanned Surface Vehicle (USV): A vehicle that is capable of operating on water surfaces without a crew on board.

Saildrone Voyager USV: Saildrone's 10m (33 ft) USV. Powered by a combination of renewable wind, solar energy, and a small auxiliary motor, the Saildrone Voyager uses radar, cameras, and advanced machine learning to deliver comprehensive situational awareness remotely for MDA and ISR customers from anywhere in the world. For bathymetry applications, the Saildrone Voyager carries an impressive payload for near-shore and lakebed survey operations, including high-resolution MBES and Innomar SBP systems. The Voyager is the only survey USV that can deliver long-duration multibeam mapping surveys and ocean data collection at depths to 300 m.

Well to Tank (WTT): Boundary of fuel-based emissions accounting that only includes the upstream extraction, production, and transportation of fuels consumed.

Tank to Prop (TPP): Boundary of fuel-based emissions accounting that only includes the downstream combustion of fuels consumed.

Well to Prop (WTP): The full life cycle emissions of fuel consumption, including both the Well to Tank (WTT) and Tank to Prop (TPP) components.

APPENDIX

Table 2 presents detailed data inputs and results from Saildrone's Scope 1 and 2 emissions inventory. Facility emissions were calculated using direct electricity and diesel consumption measurements, except for two locations where this data was unavailable. For one of these locations, electricity consumption was estimated using a square footage allocation of the entire building's consumption, while the other location provided total utility spend, which was converted to electricity consumption using the average local electricity price. Mobile combustion emissions were calculated using direct diesel consumption for Saildrone USVs. For the vehicles operated by Saildrone, fuel consumption was estimated using the average annual fuel prices from the US Energy Information Administration. All emissions were calculated using emission factors from US EPA's emission factor databases.

Table 3 presents detailed calculation methodologies and results from Saildrone's Scope 3 emissions inventory. Saildrone determined that Categories 1 – 7 were the only relevant sources of Scope 3 emissions due to the nature of Saildrone's business. Emissions were calculated using various sources of data such as spend, raw material weight, fuel and electricity consumption, and logistics activity data. Spend-based calculations used emission factors from the VitalMetrics CEDA 6.0 database. Activity-based calculations used emission factors from the US EPA's 2023 database, the EcoInvent 2023 (v3.10) database, and the UK Government Emission Factors 2023 database (formerly known as the Department for Environment, Food, and Rural Affairs - DEFRA - database).

Table 4 presents definitions and assumptions used to design the avoided emissions use cases. For each use case, Saildrone defined a calculation methodology based on the most likely scenario that would have occurred without its technology. This also necessitated defining the most likely vessels that would have completed the missions in lieu of Saildrone USVs. Saildrone evaluated a wide range of alternative vessels to ensure a robust approach to the avoided emissions calculations. With these unique vessel specifications, including deadweight and engine power, each reference vessel was simulated according to the use case parameters to calculate the fuel consumption rates. This process allowed a representative "average" reference vessel to be created. However, it is worth noting that these vessels could travel at different speeds due to circumstances such as weather and wind patterns, and thus, this simulation methodology and resulting fuel consumption rates remain a point of uncertainty.

Table 5 presents the detailed avoided emissions results for each mission completed in 2023, which are calculated by taking the average of the vehicle fuel consumption rates for the set of reference vessels defined for each use case in Table 4. The inclusion of missions completed in 2023 is an important distinction. This 2023 Carbon Impact Report includes missions initiated in 2022 and concluded in 2023 but excludes missions that began in 2023 and were still ongoing in 2024. Since Saildrone is a rapidly growing company whose number of missions has been increasing year-over-year, we believe this methodology design will likely result in a more conservative estimation of avoided emissions. As Saildrone's business grows and incorporates more programmatic work, rather than shorter missions with defined end points, there may be a need to cut off avoided emissions calculations on a calendar year basis in certain cases.

TABLE 2: SAILDRONE'S SCOPE 1 AND 2 EMISSIONS

Scope	Emissions Source	Activity Data	Activity Data Unit	Emissions (tCO_2e)
Scope 1	Stationary Diesel	2,331	gallons	13
	Mobile Diesel – Surveyor	342	gallons	4
	Mobile Diesel – Voyager	2,741	gallons	28
	Mobile Diesel – Support Vehicles	4,061	gallons	42
	Mobile Propane – Support Vehicles	792	gallons	21
	Mobile Gasoline - Support Vehicles	4,867	gallons	43
	Refrigerants	13	kg	17
Scope 2	Electricity	1,004	MWh	258
			Total Scope 1 & 2 Emissions	**426**

TABLE 3: SAILDRONE'S SCOPE 3 EMISSIONS

Scope 3 Category	Relevance	Calculation Methodology	Emission Factor Source	Emissions (tCO_2e)
Purchased Goods & Services	Relevant, emissions calculated	Hybrid Spend- and Activity-based	CEDA and EcoInvent	7,855
Capital Goods	Relevant, emissions calculated	Spend-based	CEDA	304
Fuel- and Energy-Related Activities	Relevant, emissions calculated	Activity-based	UK Government Emission Factors (DEFRA) and IEA	115
Upstream Transportation & Distribution	Relevant, emissions calculated	Hybrid Spend- and Activity-based	CEDA and UK Government Emission Factors (DEFRA)	909
Waste Generated in Operations	Relevant, emissions calculated	Activity-based	US EPA and EcoInvent	51
Business Travel	Relevant, emissions calculated	Hybrid Spend- and Activity-based	CEDA and UK Government Emission Factors (DEFRA)	1,446
Employee Commuting	Relevant, emissions calculated	Activity-based	EPA and UK Government Emission Factors (DEFRA)	408
Upstream leased assets	Not relevant, Saildrone does not lease upstream assets	N/A	N/A	N/A
Downstream Transportation & Distribution	Not relevant, Saildrone does not sell any products	N/A	N/A	N/A
Processing of Sold Products	Not relevant, Saildrone does not sell any products	N/A	N/A	N/A
Use of Sold Products	Not relevant, Saildrone does not sell any products	N/A	N/A	N/A
End-of-Life Treatment of Sold Products	Not relevant, Saildrone does not sell any products	N/A	N/A	N/A
Downstream Leased Assets	Not relevant, Saildrone does not lease any assets to other parties	N/A	N/A	N/A
Franchises	Not relevant, Saildrone does not have any franchises	N/A	N/A	N/A
Investments	Not relevant, Saildrone does not have any investments	N/A	N/A	N/A
			Total	**11,088**

TABLE 4: SUMMARY OF USE CASE METHODOLOGIES AND ASSUMPTIONS

Saildrone Solution Area	Avoided Emissions Use Case	Avoided Emissions Calculation Methodology	Reference Vessels	Deadweight (metric tonnes)	Main Engine Power (kW)	Moving Fuel Consumption Rate (kg diesel / km)
Defense & Security	Naval ISR Patrol	Coverage area comparison, assuming reference vessels cover the same total area that was captured in the cameras on Saildrone USVs.	National Security Cutter (WMSL)	Confidential	Confidential	Confidential
			Medium Endurance Cutter (WMEC)	Confidential	Confidential	Confidential
			Fast Response Cutter (WPC-154)	Confidential	Confidential	Confidential
			Freedom class littoral combat ship (LCS)	Confidential	Confidential	Confidential
			Arleigh Burke-class guided missile destroyer (DDG)	Confidential	Confidential	Confidential
			Average	**Confidential**	**Confidential**	**Confidential**
	Coastal MDA Patrol	Coverage area comparison, assuming reference vessels cover the same total area that was captured in the cameras on Saildrone USVs.	USCG 87' Marine Protector Class Patrol Boat	Confidential	Confidential	Confidential
			USCG RB-M Response Boat Medium 45'	Confidential	Confidential	Confidential
			USCG RB-S Response Boat Small 29'	Confidential	Confidential	Confidential
			USCBP Interceptor 41'	Confidential	Confidential	Confidential
			Average	**Confidential**	**Confidential**	**Confidential**
Ocean Mapping	Single-beam Bathymetry	Miles-to-miles comparison, assuming the reference vessels travel the same transit distance to and from mission points, and a reduced mission distance.	Pathfinder	2,145	10,592	51.5

	Nearshore Multibeam Bathymetry	Miles-to-miles comparison, assuming the reference vessels travel the same total distance as Saildrone USVs.	Fairweather	695	1,810	10.2
			Rainier	528	1,810	10.2
			NOAAS Ferdinand R. Hassler	104	2,056	10.9
			R/V Atlantic Explorer	527	1,368	5.3
			NOAA Thomas Jefferson	857	1,876	12.8
			Average	**542**	**1,784**	**9.9**
	Multibeam Bathymetry	Miles-to-miles comparison, assuming the reference vessels travel the same total distance as Saildrone USVs.	Fairweather	695	1,810	13.2
			Rainier	528	1,810	13.2
			Okeanos Explorer	731	1,176	5.9
			NOAAS Ferdinand R. Hassler	104	2,056	14.5
			Average	**515**	**1,713**	**11.7**
Ocean Research	Float Deployment	Miles-to-miles comparison, assuming the reference vessels travel the same total distance as Saildrone USVs.	Atlantis	1,332	4,413	11.8
			Nancy Foster	370	932	8.1
			Go America	864	1,250	4.2
			Ronald H. Brown	1,332	6,645	22.2
			Knorr	1,597	2,908	11.1
			Average	**1,099**	**3,230**	**11.5**
	Storm Mitigation	Combined methodology using miles-to-miles comparison for average transit distance to and from the mission points, and a hypothetical distance traveled (50 nm) and time spent idling (48 hours) during the mission to setup or service buoys. Saildrone USVs are assumed to service the same area as three buoys.	Bluefin	1,080	1,324	6.4
			Ka'imimoana (Ocean Titan)	742	2,400	8.7
			Oak	350	4,530	12.1
			Maple	350	4,530	12.1
			Average	**631**	**3,196**	**9.8**

	Buoy Mitigation	Combined methodology using miles-to-miles comparison for average transit distance to and from the mission points, and a hypothetical distance traveled (50 nm) and time spent idling (48 hours) during the mission to setup or service buoys.	Bluefin	1,080	1,324	6.4
			Ka'imimoana (Ocean Titan)	742	2,400	8.7
			Oak	350	4,530	12.1
			Maple	350	4,530	12.1
			Average	**631**	**3,196**	**9.8**
	Scientific Observations	Combined methodology using miles-to-miles comparison for transit distance to and from mission points, and time-based comparison for mission duration.	Atlantis	1,332	4,413	11.8
			Nancy Foster	370	932	8.1
			Go America	864	1,250	4.2
			Ronald H. Brown	1,332	6,645	22.2
			Knorr	1,597	2,908	11.1
			Average	**1,099**	**3,230**	**11.5**
	Fisheries – Great Lakes	Miles-to-miles comparison, assuming the reference vessels travel the same total distance as Saildrone USVs.	Sturgeon	180	1,104	5.5
			Kiyi	132	954	4.8
			Muskie	67	719	2.4
			Stanford H. Smith	28	372	0.9
			Average	**102**	**787**	**3.4**
	Fisheries – Marine Coastal	Miles-to-miles comparison, assuming the reference vessels travel the same total distance as Saildrone USVs.	Reuben Lasker	718	2,220	8.7
			Lisa Marie	135	1,119	4.5
			Oscar Dyson	796	2,300	7.8
			Average	**550**	**1,880**	**7.0**

TABLE 5: SUMMARY OF SAILDRONE'S 2023 MISSIONS AND AVOIDED EMISSIONS CALCULATIONS

Saildrone Solution Area	Avoided Emissions Use Case	Mission Name	Saildrone USVs Employed	Average Reference Vessel Emissions (tCO_2e)	Saildrone Emissions (tCO_2e)	Crewed Vessel Emissions (tCO_2e)	Net Avoided Emissions (tCO_2e)
Defense & Security	Naval ISR Patrol	2023 Project 41	Explorers & Voyagers	1,403	1	34	1,369
		2023 USN 4th Fleet	Voyagers	9,427	9	226	9,192
	Coastal MDA Patrol	2023 USCG-CBP Mission	Voyagers	1,461	5	41	1,415
		2023 USCG Safety of Life at Sea (SOLAS) Mission	Voyagers	1,605	6	45	1,555
		2023 Task Force 59 Mission	Explorers & Voyagers	1,198	2	34	1,163
			Subtotal	**15,095**	**22**	**379**	**14,694**
Ocean Mapping	Multibeam Bathymetry	2023 BOEM CA Coast Mapping	Surveyors	232	1	0	231
	Nearshore Multibeam Bathymetry	2023 NOAA Gulf of Maine Mapping	Voyagers	266	1	0	264
	Single-beam Bathymetry	2022 NGA Red Dot Mission (performed in 2023)	Explorers	4,604	0	0	4,604
			Subtotal	**5,101**	**2**	**0**	**5,099**
Ocean Research	Float Deployment	2023 HI Ocean Chemistry	Explorers	987	0	0	987
	Storm Mitigation	2023 NOAA Atlantic Hurricane	Explorers	1,541	0	0	1,541
	Buoy Mitigation	2023 NDBC Buoy Mitigation	Explorers	42	0	0	42
		2023 TPOS Mission	Explorers	915	0	0	915

	Scientific Observations	2023 BATCON Mission	Explorers	577	0	0	577
		2023 NOWRDC Marine Mammal Acoustics Mission	Explorers	1,452	0	0	1,452
	Fisheries – Marine Coastal	2023 NOAA SWFSC Survey	Explorers	312	0	0	312
	Fisheries – Great Lakes	2023 USGS Great Lakes Mission	Explorers	89	0	0	89
			Subtotal	**5,915**	**0**	**0**	**5,915**
All			**Grand Total**	**26,111**	**24**	**379**	**25,708**

SAILDRONE