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Monitor. Report. Optimize.

IMO Panel 4: GHG Reduction Strategies

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Agenda

1. **Decarbonization challenges affecting ship operators today**
2. **What is direct measurement and how can it benefit climate policy?**
3. **What is SailPlan?**
4. **Case study: how are ship operators using SailPlan today?**
5. **Discussion**

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A sea change of regulatory and business pressures are demanding that ship operators change

Macro Pressures

Carbon Intensity Indicator - a carbon report card for ships used to reach emissions regulation targets

EU ETS - Direct carbon taxation of ship emissions beginning October 1st - causing panic

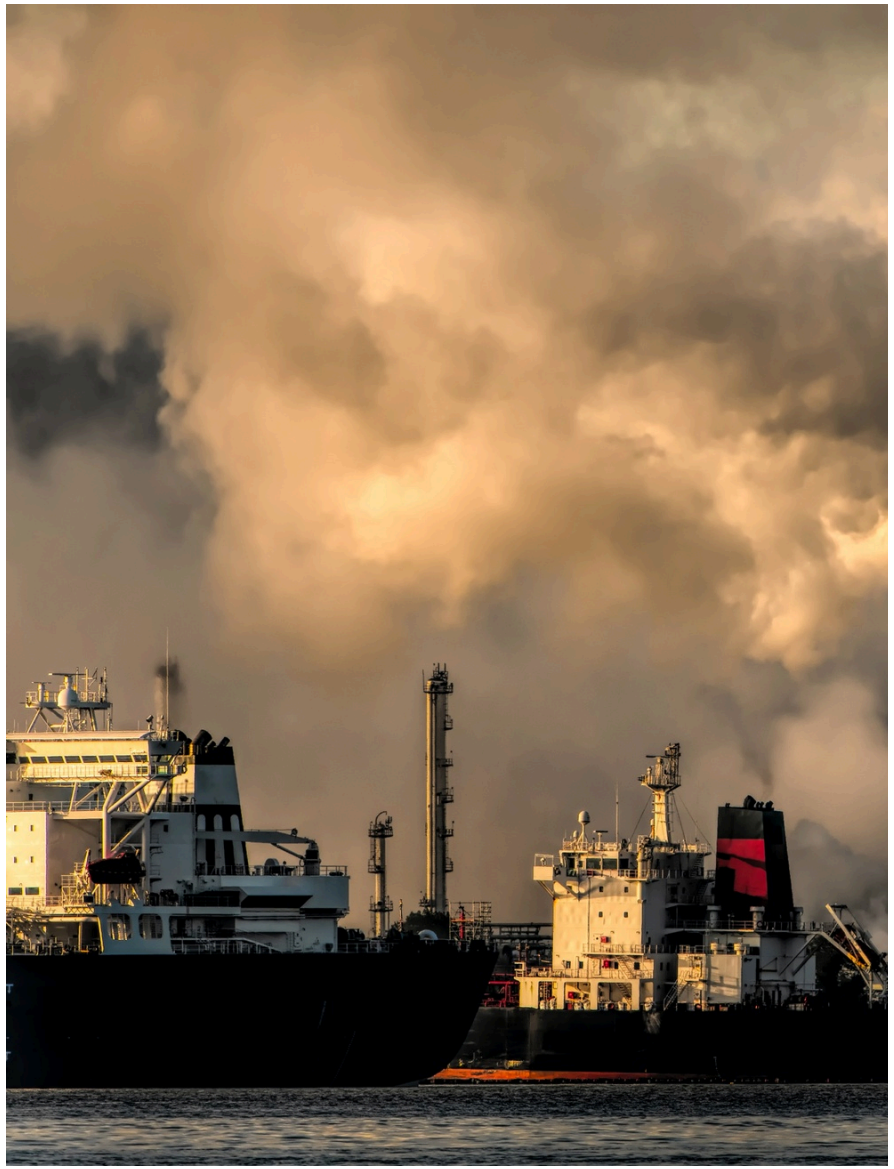
SEC ESG Rule - Anticipated this year, requires public companies to track Scope 1 and 2 emissions

FuelEU - Yet another reporting system alongside IMO DCS and EU MRV

Customers and charterers - Demanding cleaner transportation.

Digitalization and decarbonization present the greatest challenge to the maritime industry since World War II.

Why will direct measurement benefit climate policy?



Directly Measuring Emissions is a Decarbonization Strategy that Provides:

Accuracy, certainty, and auditability

Actionable insight to lower fuel use, saving money and reduce emissions (win-win climate strategy)

Simple data-reporting management from sensor to verifier

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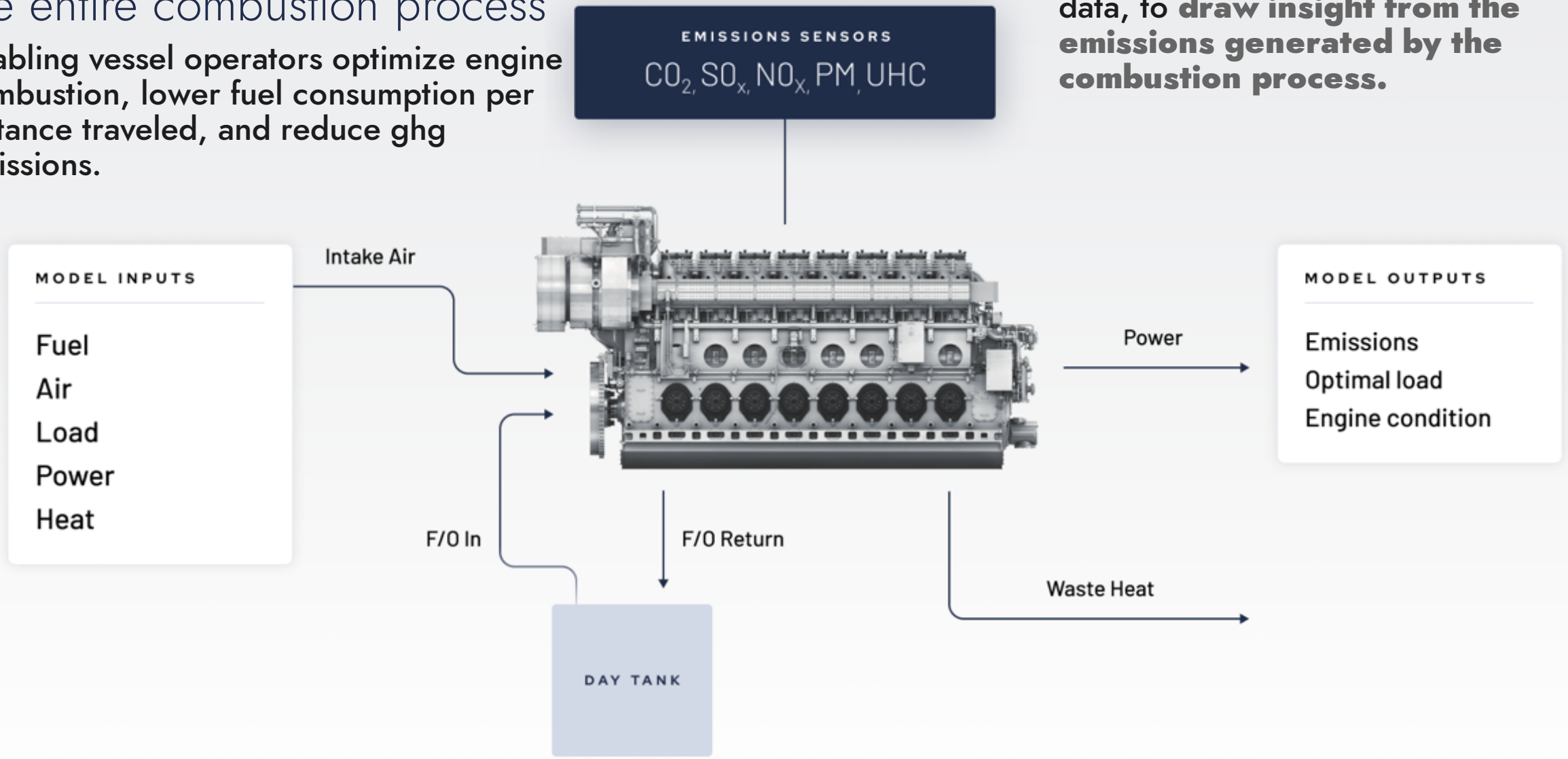
SailPlan measures and models the entire combustion process

Enabling vessel operators optimize engine combustion, lower fuel consumption per distance traveled, and reduce ghg emissions.

SailPlan's platform fuses true emissions data with fuel and engine data, to draw insight from the emissions generated by the combustion process.



Emissions measurements offer insights ghg reduction opportunities and engine health

Alternative fuels, electrification, and other decarbonization efforts are not ready today - but we can always optimize and make vessels more efficient

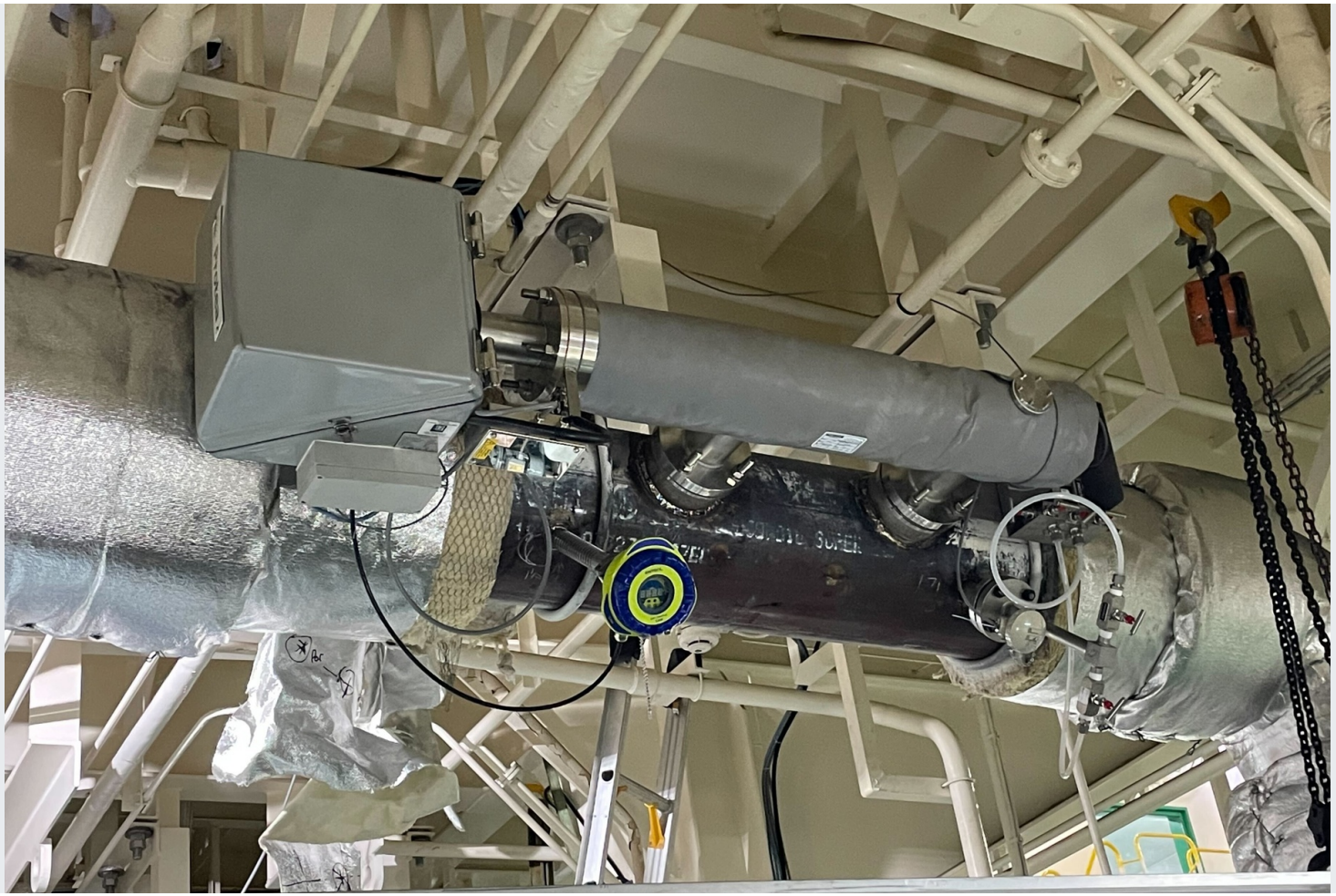
Combustion efficiency: Are you burning your fuel effectively?

If not, what steps can you take to continuously improve your operation to reduce fuel and save money?

What green initiatives will have the greatest ROI on my decarbonization efforts?

What's the impact of these initiatives (hull cleaning, using biofuels, etc.)?

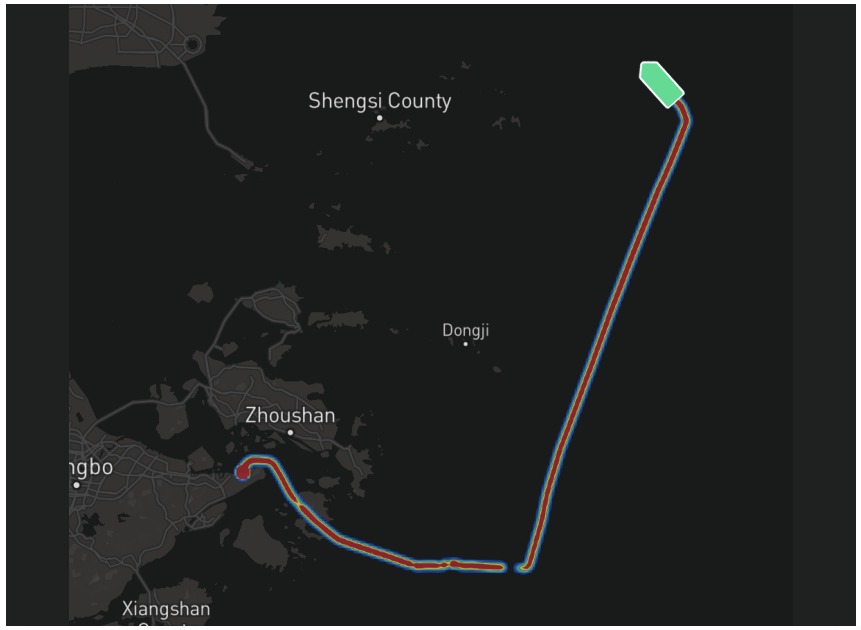
Direct measurement is an easier and more accurate way than calculating emissions via fuel consumption.

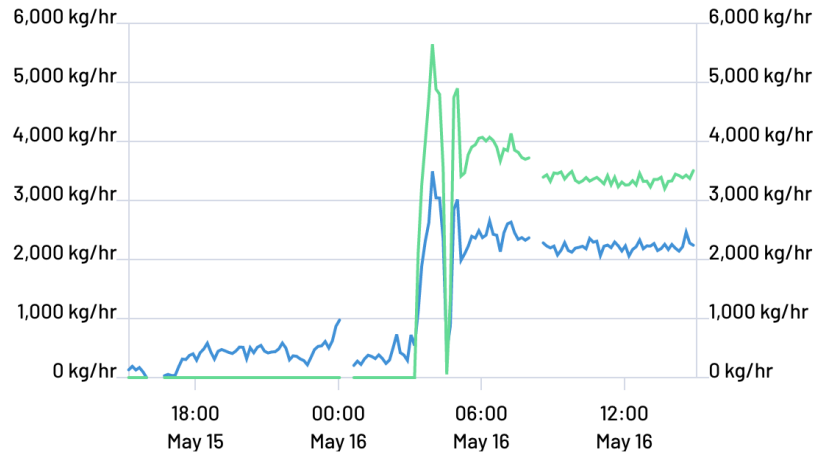


- **CEMS can measure CH4, NOX, SOX, H20 and other GHGs**
- **Allows you to understand inefficiences**
- **Measuring is more accurate than calculating emissions**
- **Removes the need to figure out how to determine emissions accurately**
- **Allows you to report true emissions - enables creating climate goals**

Use case: Maritime Emissions Tracking

A commercial ship operator in the world uses SailPlan's data ingestion, storage, and the SailPlan application to manage GHG emissions dataset reporting with internal and external stakeholders.





Engine 1 | Engine 2

CO	CO2	CH4
101.1 ppm	**2,204.6** kg/hr	**0** kg/hr
NOX	**SO2**	**H2O**
36.8 kg/hr	**3.5** kg/hr	**4.6** ppm

EXHAUST FLOW RATE

23,659.9 m3/hr

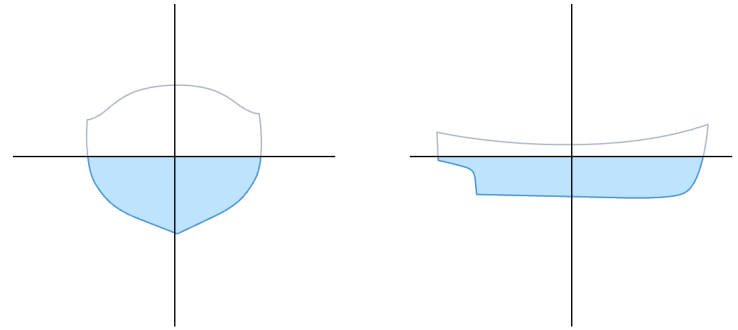
WEATHER

TRUE WIND SPEED	TRUE WIND DIRECTION	AIR TEMPERATURE
26.5 kts	**143.5** °	**20.2** °C

STABILITY

Roll **-2** °

Pitch **2** °



Baseline Run

312 GPH
9-10 kts
3,292 kVA (~2.6MW)

Engine 2 Data

Power	1,791 kVA
Load	52 %
CO_2	4.2 %
CH_4	1,394 ppm
SO_2	32 ppm
NO_x	332 ppm
H_2O	340 ppm

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Engine 3 Data

Power	1,501 kVA
Load	43 %
CO_2	5 %
CH_4	1,397 ppm
SO_2	45 ppm
NO_x	179 ppm
H_2O	298 ppm

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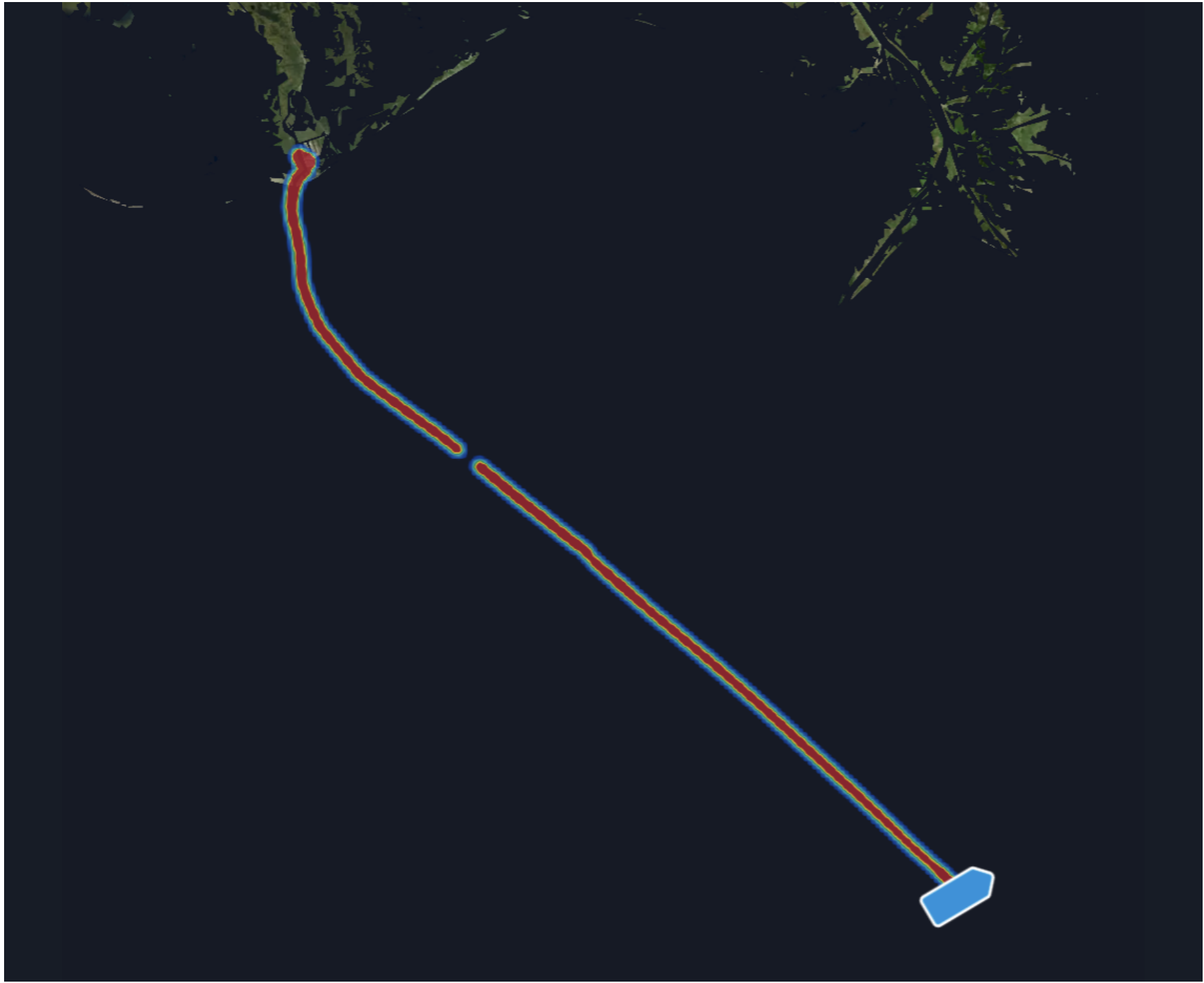

Optimized Load and Power Run

156 GPH
8.5-10 kts
1,571 kVA (~1.2MW)

Engine 1 Data

Power	1,571 kVA
Load	45 %
CO_2	6.8 %
CH_4	1,279 ppm
SO_2	66 ppm
NO_x	96 ppm
H_2O	331 ppm

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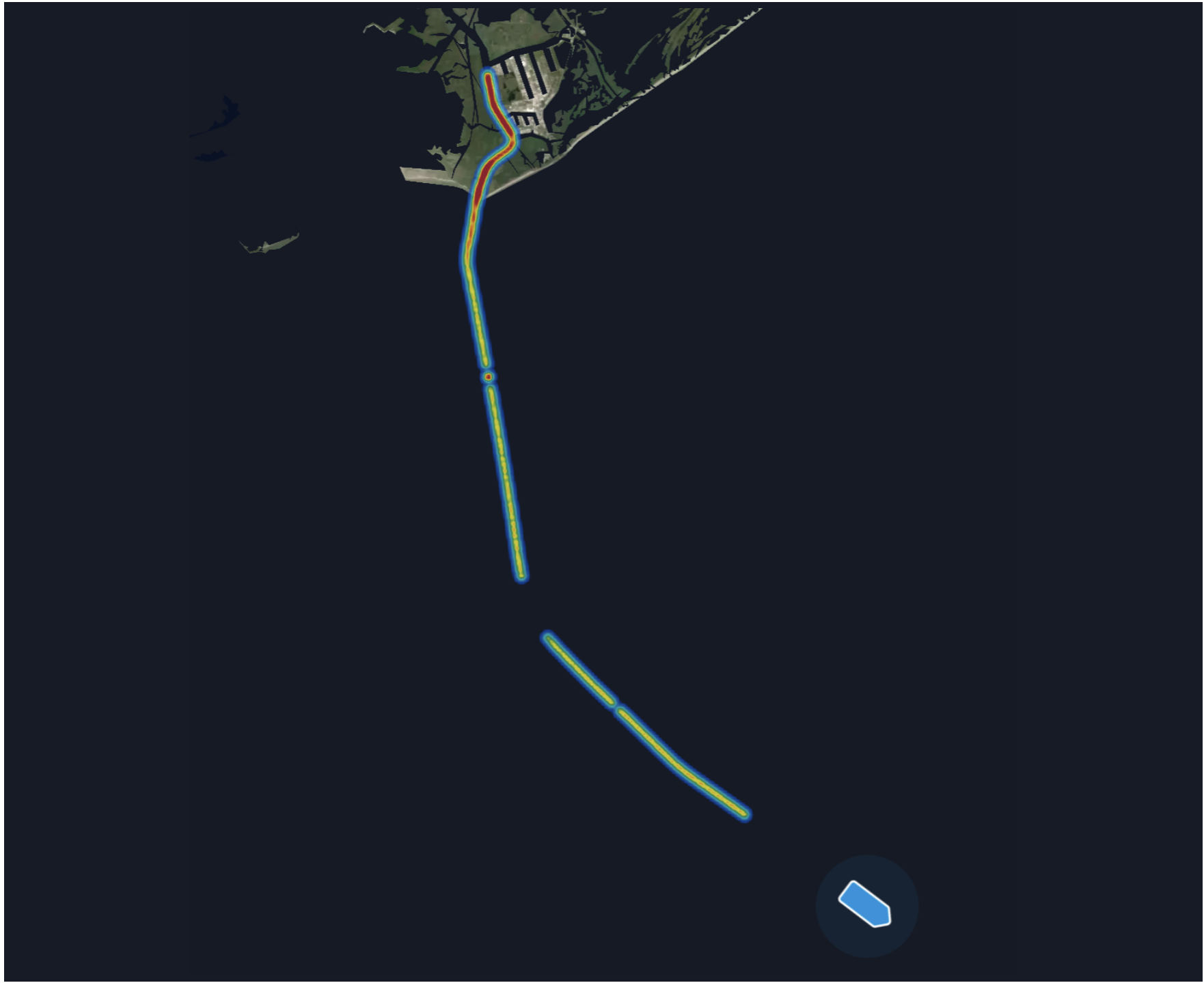

Real-Time Emissions Monitoring and Noise Reduction

There is an opportunity to optimize around emissions and noise reduction

Some noise reduction strategies may not be optimal for ghg reductions

Finding the right noise reductions that also reduce ghg is possible via sensors and software

This would be possible by connecting noise and emissions sensors to software and looking at the data in real-time

Software would offer optimization suggestions based on the sweet spot between ghg and noise reduction

Discussion

questions? charlotte@sailplan.com

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