



ACRUXSOFT

# Optimizing Trawl Performance: A Trawl Vision Case Study

Analysis of the Norwegian  
Trawler 'NOKASA'



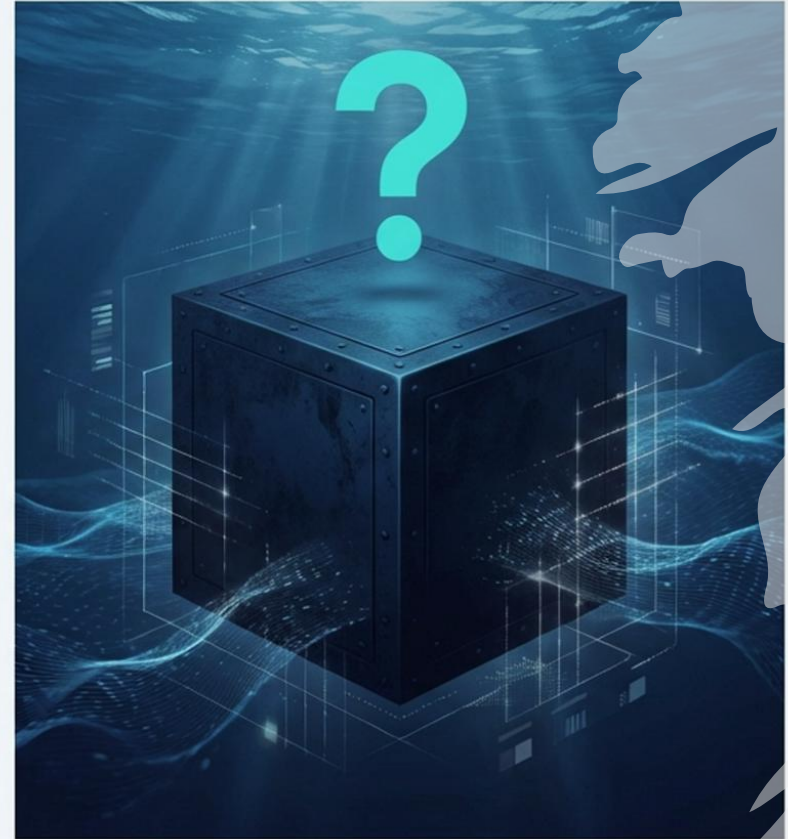
# The Underwater 'Black Box' of Trawling

The performance of trawl gear is a complex interplay of hydrodynamics, engineering, and operational parameters. Hidden inefficiencies in this "black box" can lead to:

- Increased fuel consumption
- Sub-optimal catch rates
- Excessive stress on gear and vessel

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**How can you truly understand and optimize what's happening hundreds of meters below the surface?**

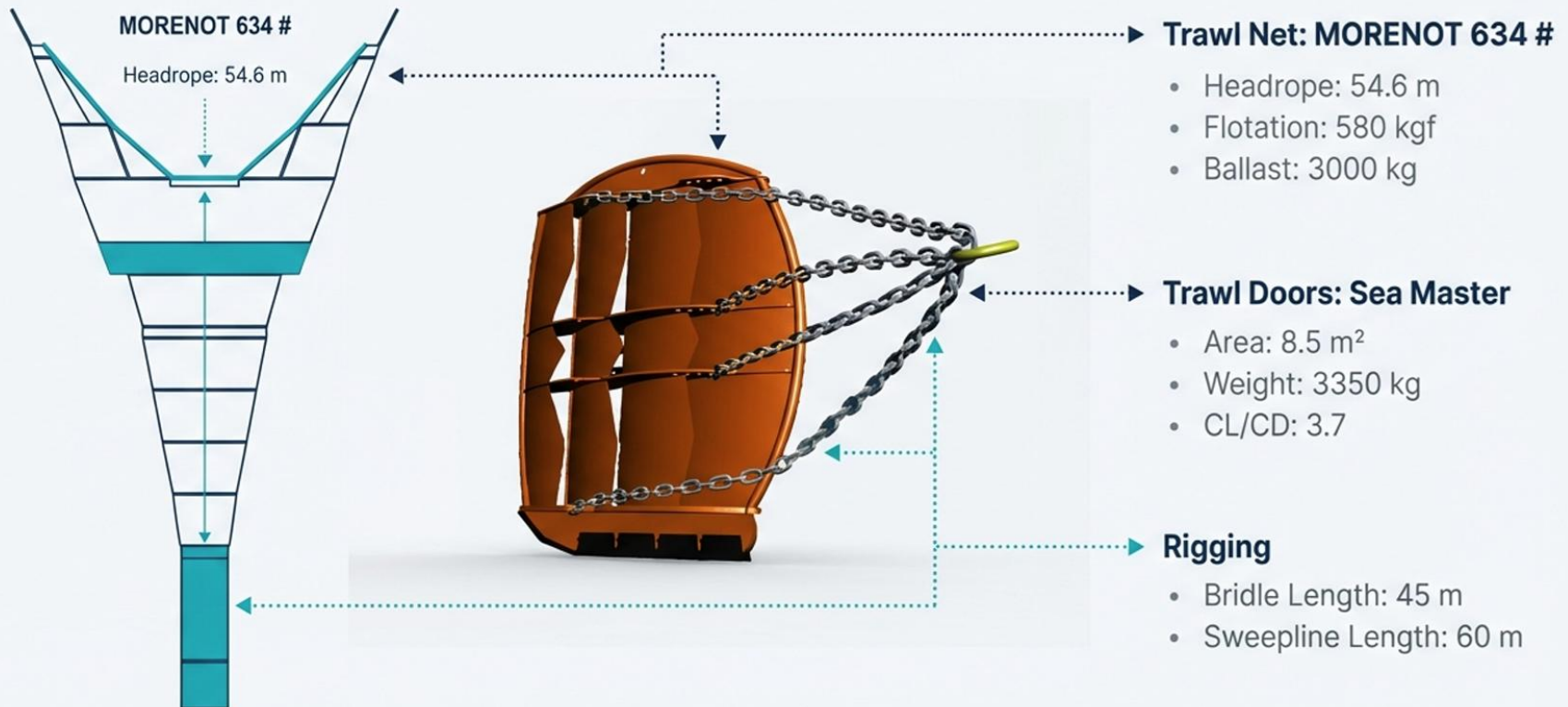


# The Subject: Norwegian Trawler NOKASA



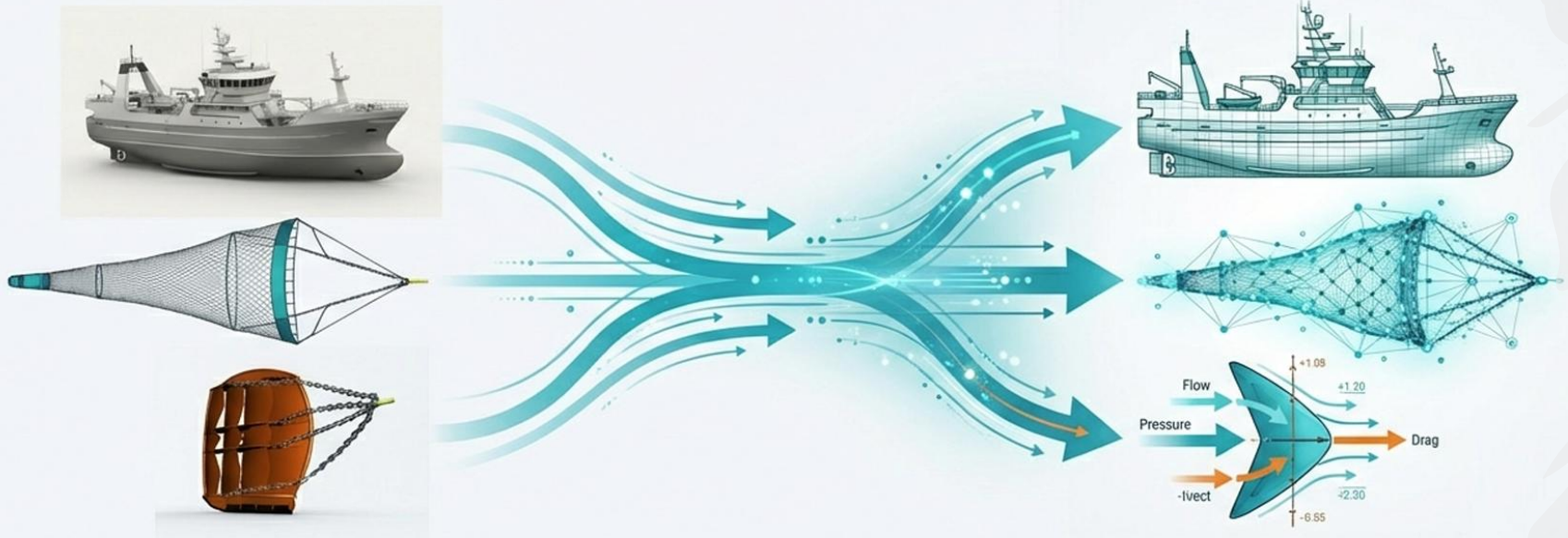
Name	<b>NOKASA</b>
IMO	<b>8811247</b>
Flag	<b>Norway</b>
Power	<b>3,000 HP</b>
Capacity	<b>445 tons DWT</b>
Length (LOA)	<b>45 m</b>

# The Trawling System Configuration



# From Physical Gear to a Precise Digital Twin

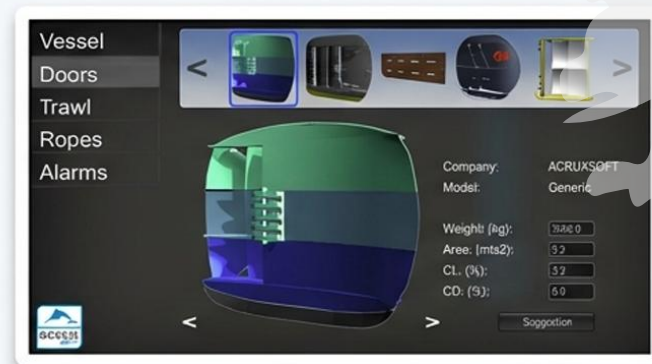
Trawl Vision software allows us to create a dynamic, virtual replica of the entire trawling system. By inputting the exact specifications of the vessel and its gear, we build a 'Digital Twin' to simulate performance under a wide range of operational conditions, revealing insights impossible to see with physical sensors alone.



# Step 1: Modeling Every Component in Trawl Vision



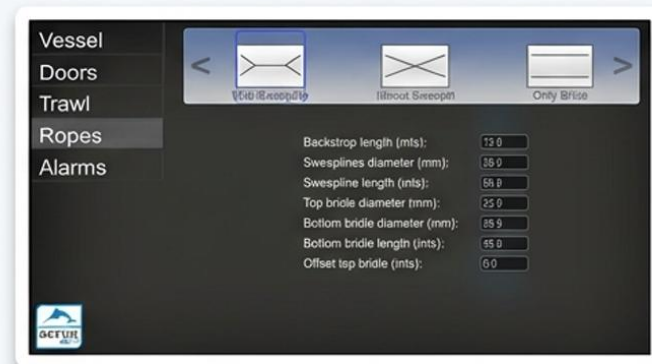
Vessel Selection



Door Configuration



Trawl Parameters



Rope & Rigging Setup

Every critical parameter of the Nokasa's system is precisely modeled to ensure the simulation mirrors real-world physics.



# Initial Simulation: System Performance at 3.2 Knots

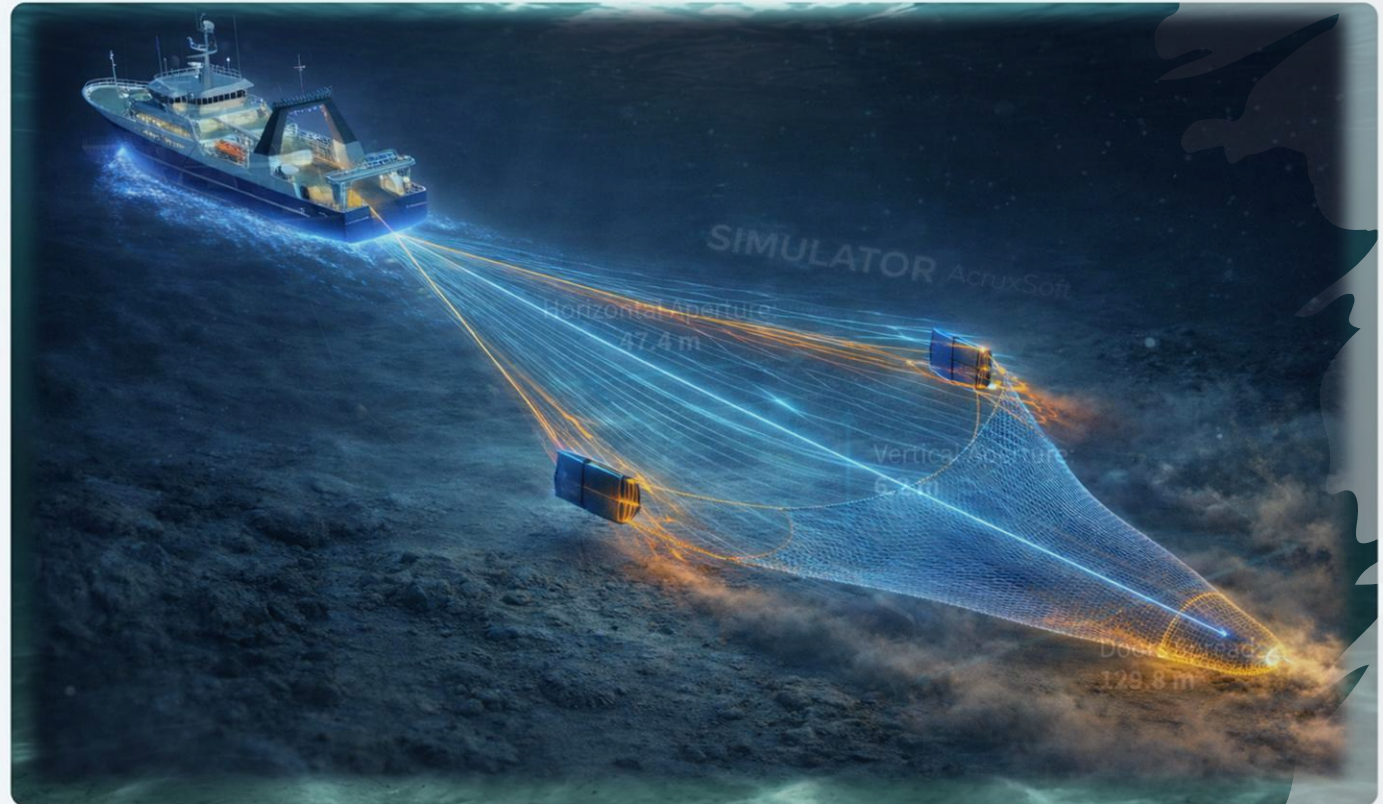
Horizontal Aperture:  
**47.4 m**

Vertical Aperture:  
**6.2 m**

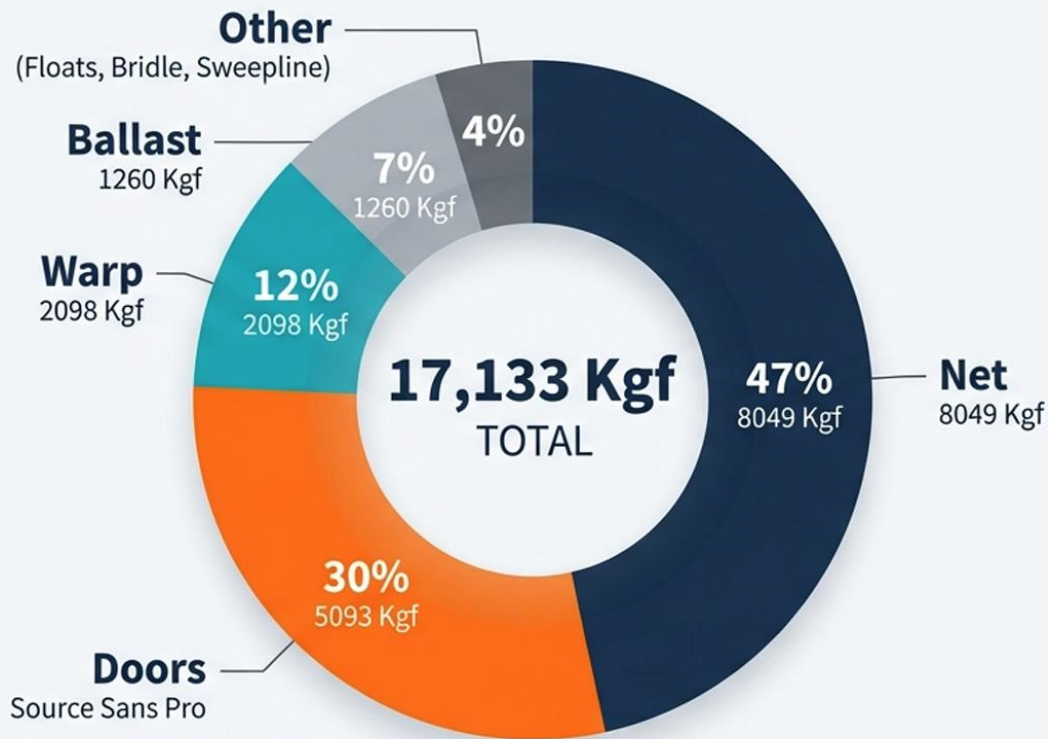
Doors Spread:  
**129.8 m**

Filtered Water Volume:  
**361.6 m<sup>3</sup>/s**

Total System  
Resistance:  
**17,133 Kgf**



# Deconstructing Total Resistance at 3.2 Knots



## Key Insight

The trawl net and doors together account for over 75% of the total system drag. The high resistance from the doors (30%) is a key area for investigation.

# Beyond a Snapshot: Performance is Dynamic

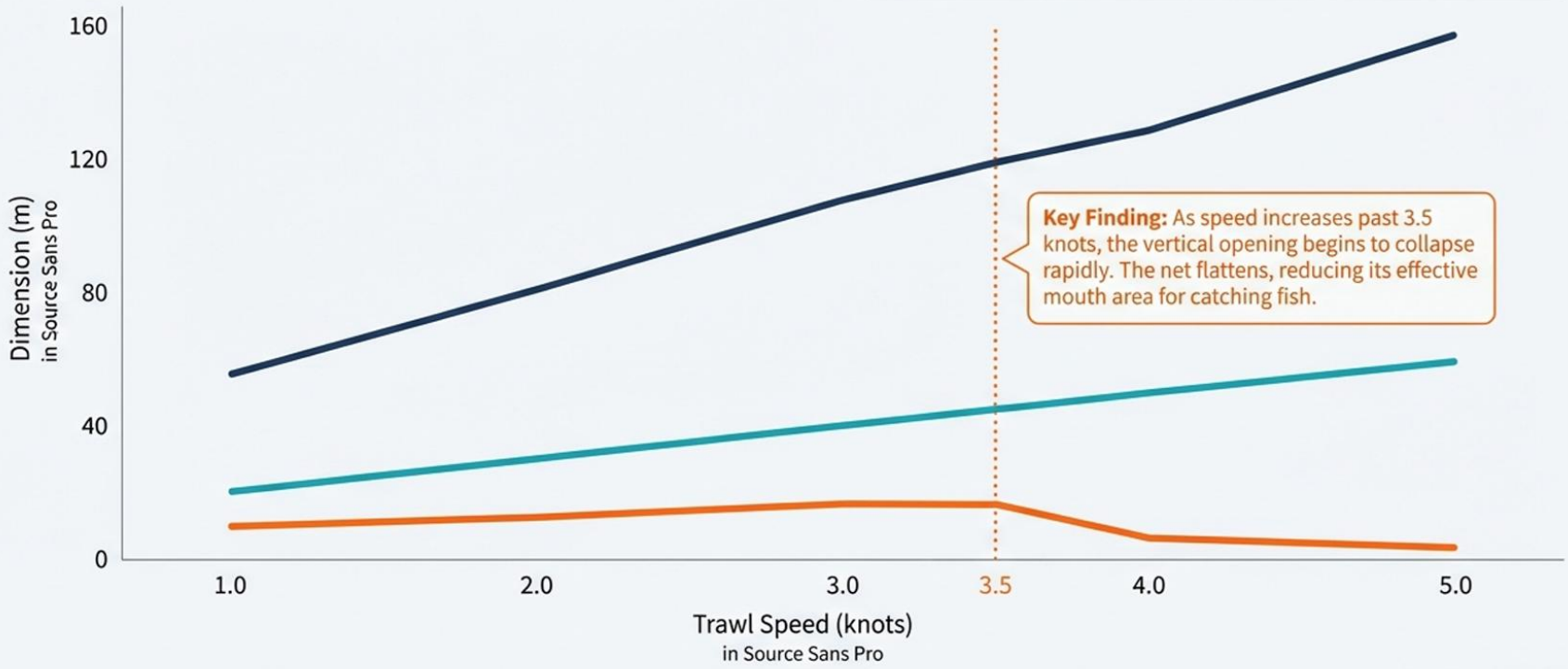
A single speed tells only part of the story. Trawl geometry, efficiency, and resistance change dramatically with every tenth of a knot. To find the true optimal performance, we simulated the Nokasa's system across a full operational range of 1.0 to 5.0 knots.



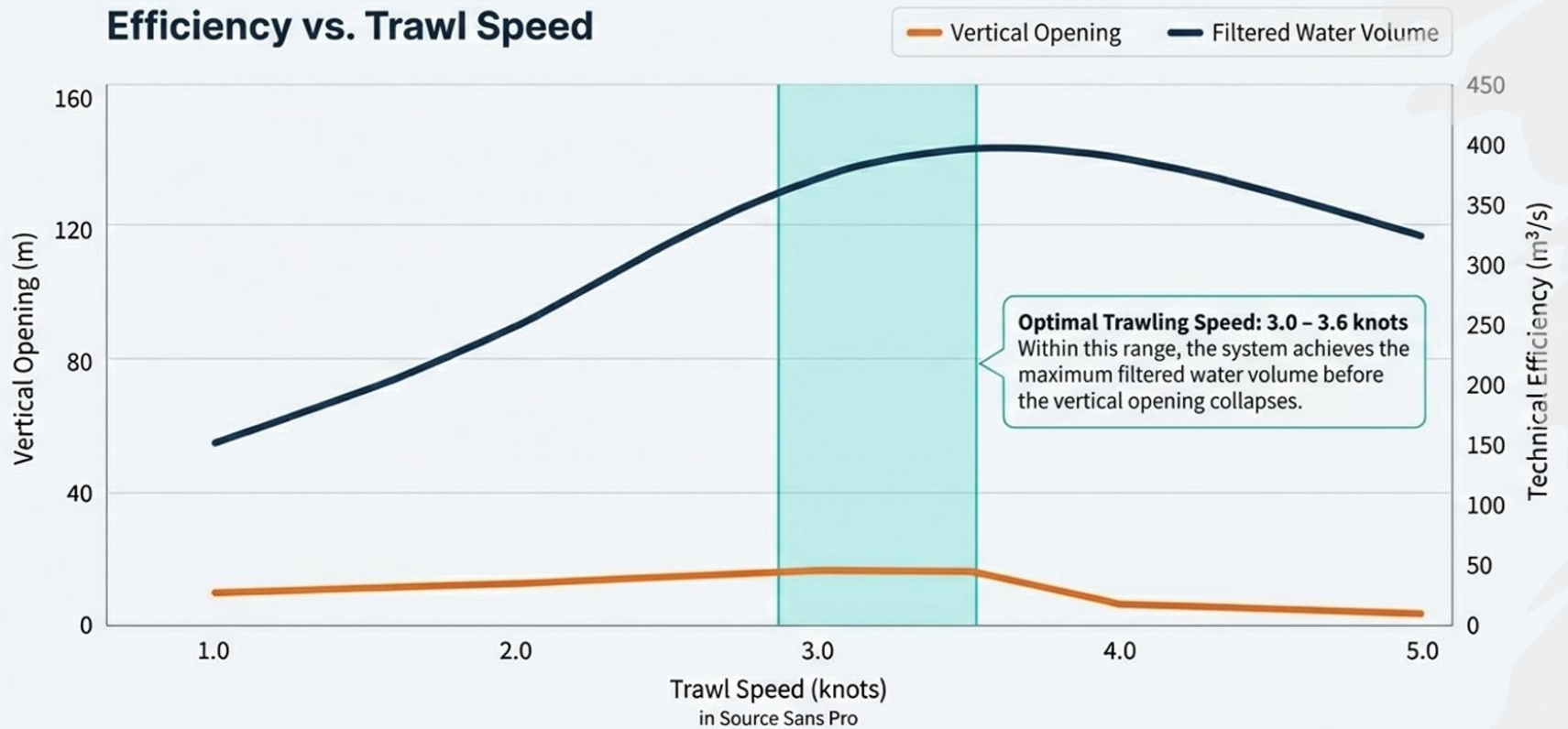
# How Trawling Speed Affects Net Geometry

## Net Geometry vs. Trawl Speed

Vertical Opening in Source Sans Pro    Horizontal Opening in Source Sans Pro    Door Spread in Source Sans Pro

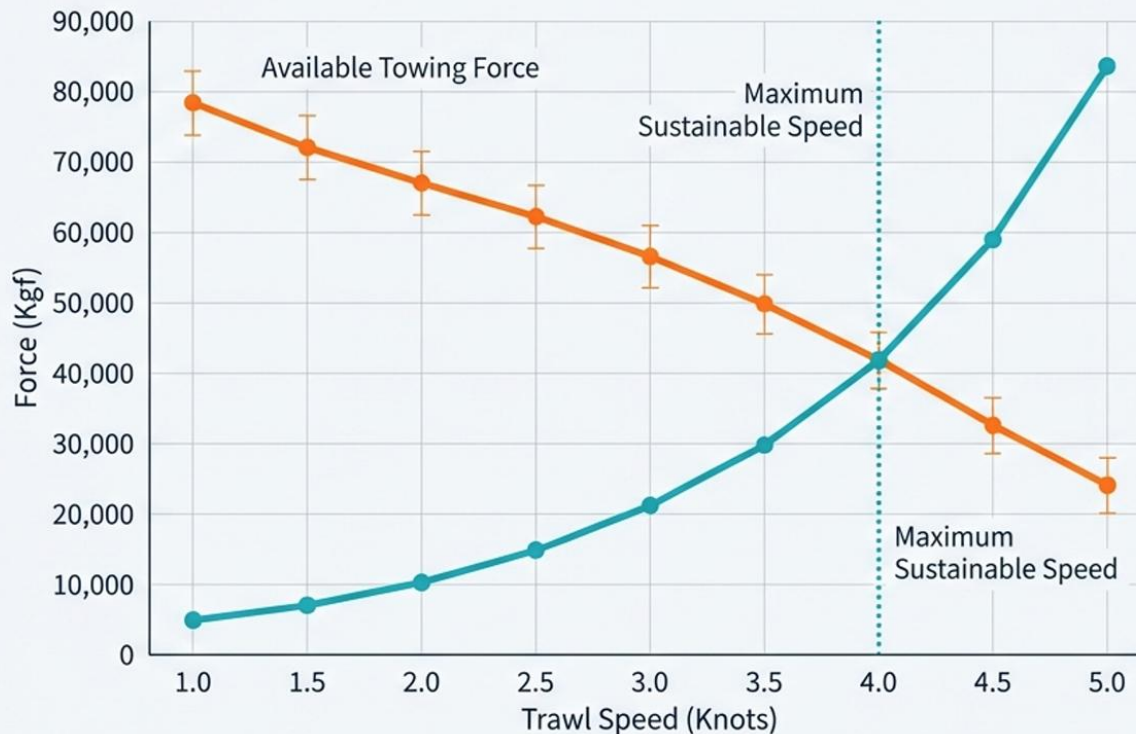


# Pinpointing Peak Technical Efficiency



# Balancing Efficiency with the Vessel's Power Limit

## System Resistance vs. Available Towing Force



### Key Insight

The simulation shows the trawling system's resistance intersects the vessel's available towing force at approximately 4.0 knots. Trawling above this speed is physically unsustainable and highly inefficient.

# Expert Analysis: Summary of Findings



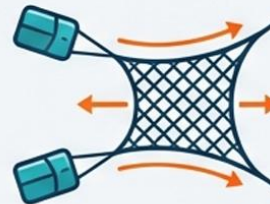
**High Door Resistance:** The Sea Master doors generate powerful spread but contribute significantly to overall drag, suggesting a configuration for hard, irregular bottoms.



**Speed-Dependent Geometry:** The trawl system is highly sensitive to speed. Above 3.6 knots, the vertical opening collapses, severely diminishing the net's effectiveness.



**Operating at the Limit:** This gear configuration pushes the Nokasa's 3,000 HP engine to its maximum capacity, especially at higher speeds.



**Potential Over-Spreading:** The doors may be generating more expansion force than the MORENOT 634# net is designed for, creating unnecessary drag.



## The Verdict: Clear, Data-Driven Recommendations

### Primary Recommendation

#### Optimal Speed Window

To maximize technical efficiency and catch potential for this specific gear configuration, operate between

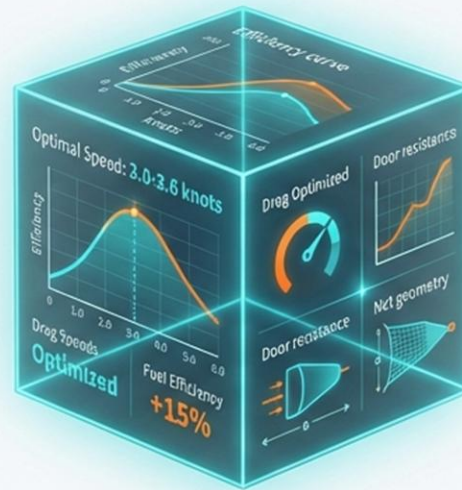
**3.0 and 3.6 knots.**

### Secondary Suggestion for Further Optimization

#### Gear Harmonization

Consider analyzing alternative door models or rigging adjustments. A better match between door spreading force and the net's design could potentially reduce overall system drag and unlock further fuel savings.

# From Black Box to a Clear Dashboard



Trawl Vision transforms the complex hydrodynamics of your gear from an unknown into an intuitive, data-rich dashboard. Make decisions with confidence, optimize fuel consumption, and maximize the efficiency of every tow.



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