Artemis
TECHNOLOGIES

ISPO – CORK 22

Artemis eFoiler® and Pilotage application

CONTENT

- Artemis Technologies background
- eFoiler Sub System overview
- Current status - On the water testing & Validation in Belfast
- Performance; Efficiencies, Range and Comfort
- Pilotage application
- Shore Based Charging Solution

JAMES STAGG

Technical Business Development

Bit of Background

ARTEMIS TECHNOLOGIES

High-performance heritage

- Founded in 2017 as a spin off from Artemis Racing America's Cup team (AC 35 and 36)
- AC Rules - £250m spend and IP
- Expertise in foil design, simulation & control systems
- Developing transformative green zero-emission vessels - 100% electric

EXPERTISE

Artemis

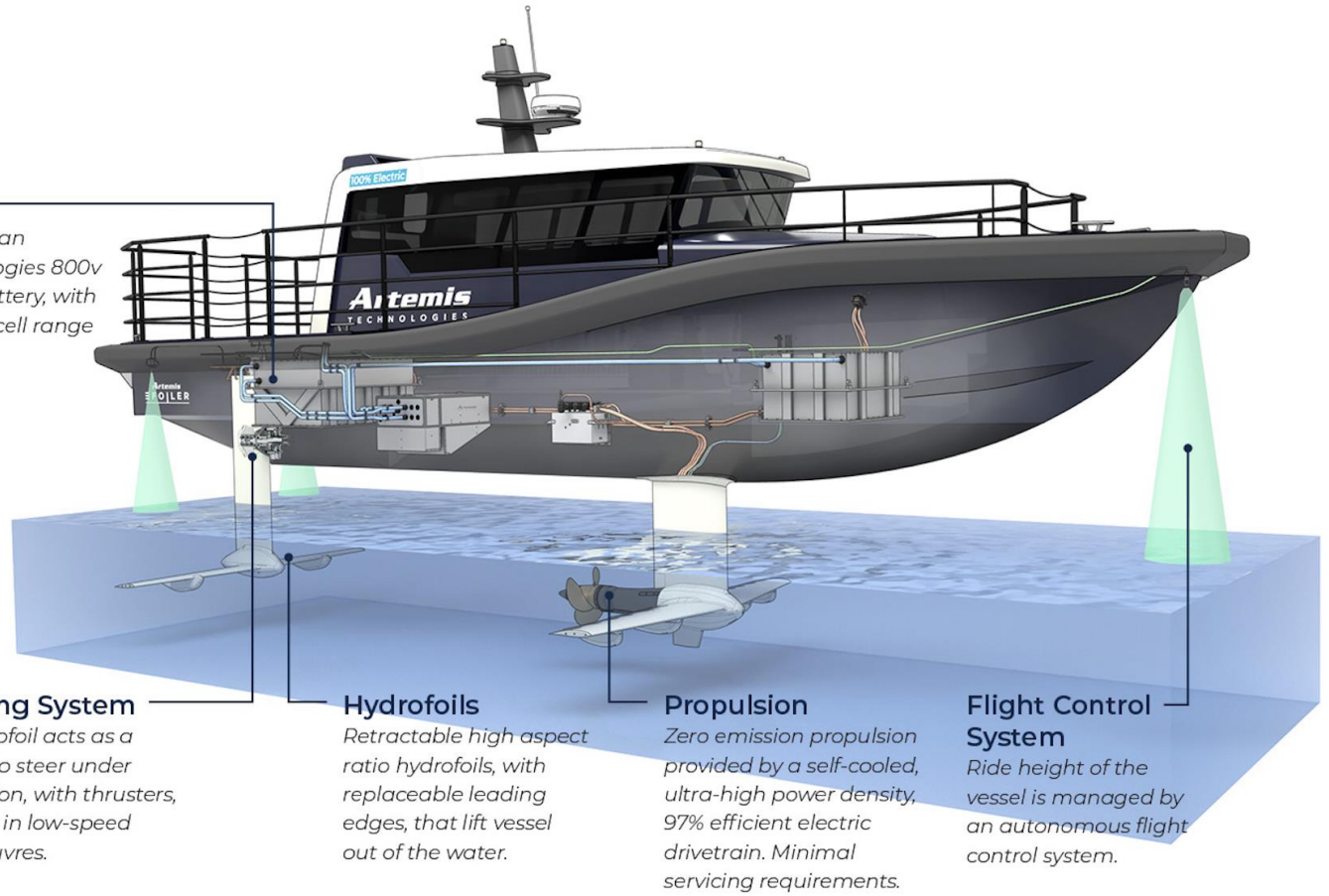
TECHNOLOGIES

Artemis eFoiler®
Vessels

Applied Technologies
& Services

PLATFORM & eFOILER SYSTEM

Environmental, operational, and business benefits



Comfortable Ride

90% Energy Savings

Quiet Performance

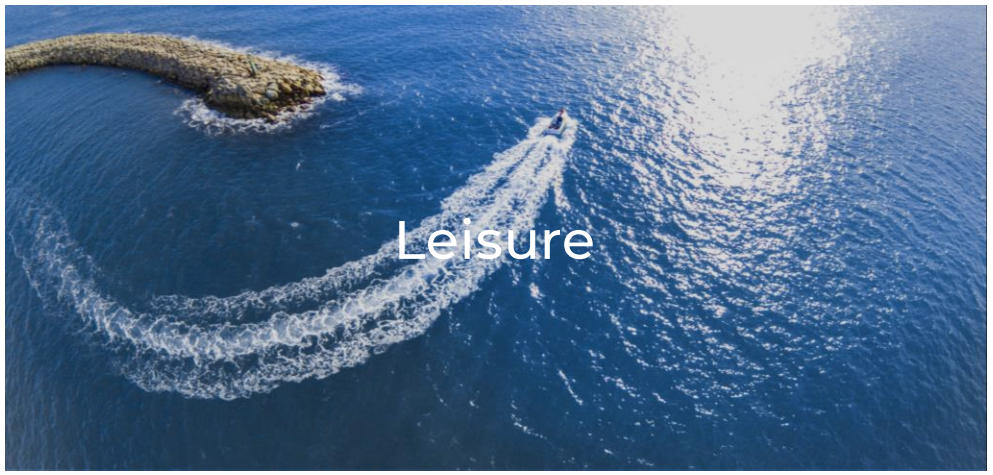
Zero Emissions

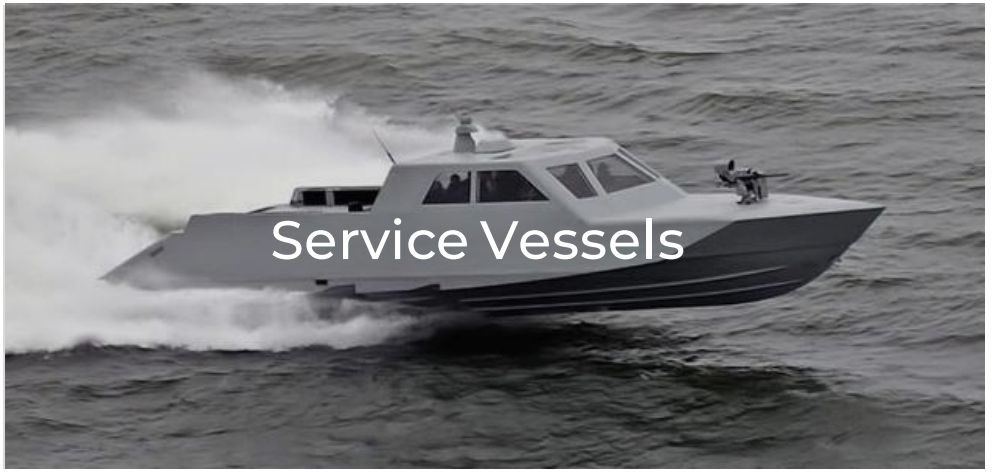
Minimal Wake

Significant OPEX Savings

USE CASES

High-speed & mileage or where technology meets specific use case requirements

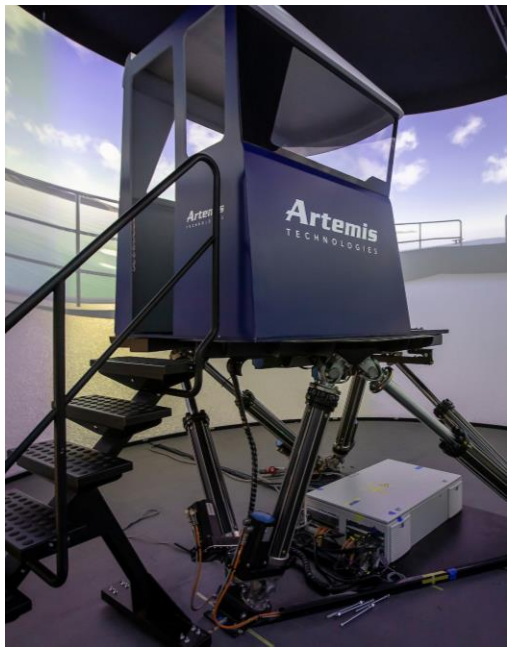




DESIGN TOOLS – USE OF SIMULATION & HIL

Physics modelling, Flight Control , HMI Development & Training

AC 50 Crew training – Human feedback essential



Simulator

Pioneer of Belfast

PIONEER OF BELFAST

Technology Demonstrator & 2 Boat Testing

11M WORKBOAT - TECHNOLOGY DEMONSTRATOR

'Pioneer of Belfast'

April 22 – **Launched –** DNV & MCA Workboat Cat 2
May / June **- Sea Trials** – Safety & Functionality
July / September **- Validation** – Design Tools & Performance
Oct / Nov **- Development & Operational Reliability –** Environment testing & System Health

TESTING - Support Boat & Non Foiling Sistership

Objectives & Use case

- Non foiling sister ship powered by Mercury outboards
- Support boat for sea trial
- Validation tool
  - Telemetry for Engineers / Guests to view system health
  - Inertial Measurement Units to collate motion data to quantify ride comfort – same location and spec
  - Accelerometers and microphones to quantify ride comfort
  - High accuracy fuel gauge sensors to compare efficiencies; Petrol v kW demand
- Technology demonstrator
  - Guest experience to compare ride experience first hand.
  - Identical seats fitted to motion simulator, Test and Support Boats

TWO BOAT TESTING

Validation of Operational, Environmental and Business Benefits

Comfortable Ride

90% Energy Savings

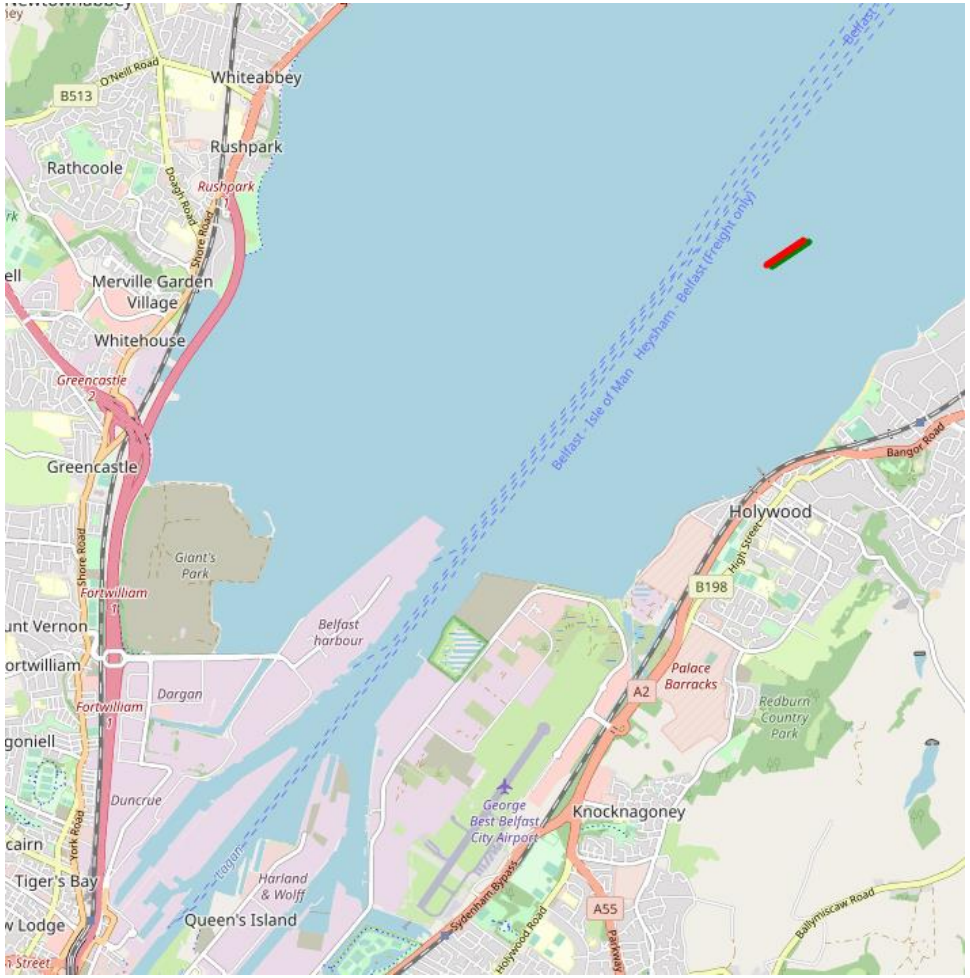
Quiet Performance

Zero Emissions

Minimal Wake

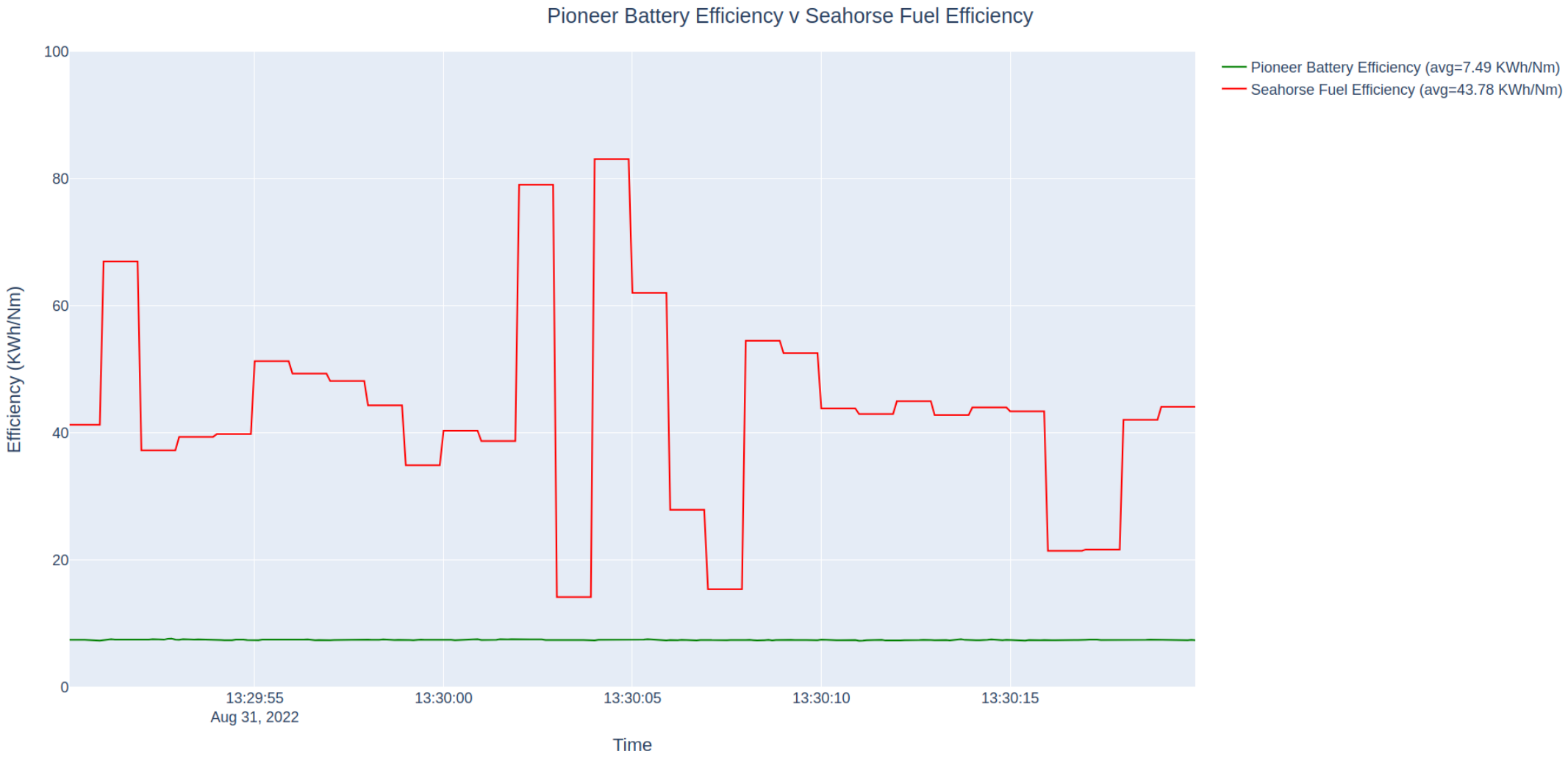
Significant OPEX Savings

EEFICIENCY – KWH / NAUTICAL MILE



- Data captured on 31-Aug-2022
- Seahorse (conventional gasoline powered sistership) driven alongside Pioneer (ATL eFoiler) at 24 knots
- Seahorse efficiency derived from fuel flow rate to outboard engines,
- Pioneer efficiency derived from battery voltage and current draw

FUEL EFFICIENCIES



SUMMARY

30 second mean ;

- of the displayed data-sets

Boat Speed;

- Pioneer: 23.63 knots
- Seahorse: 23.83 knots

Efficiency;

- Pioneer: 5.9 KWh/Nm
- Seahorse: 43.78 KWh/Nm
- eFoiler 86% more efficient

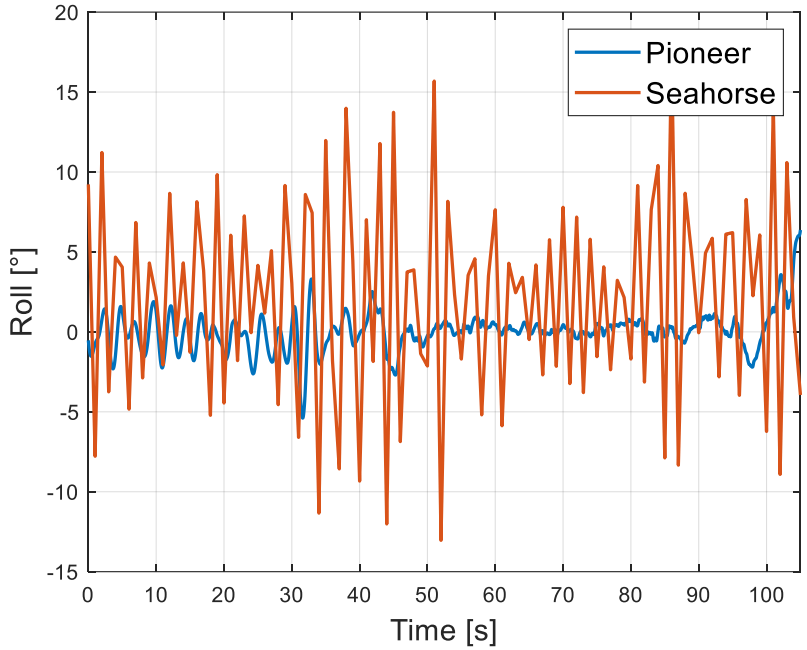
Improvements;

- Refinements; Drive train / Gearbox, Foils subtle fine tuning
- Sea state – Efficiencies increase with sea state

ARTEMIS EFOILER® TECHNICAL & ECONOMIC BENEFITS

RIDE COMFORT – PITCH & ROLL

	Pitch Comfort Metric (k)	Roll Comfort Metric (k)
Sistership	5.7	6.6
TMV1	3.2	1.3



- Pitch and roll data from the IMUs (inertial measurement unit) was extracted and shown in the attached graphs.
- Pitch closed loop control was not turned on for the test, passive effect of foils on pitch comfort is clearly demonstrated in above diagram.
- Roll control is activated in both displacement and foiling mode. The decrease in signal amplitude is quite apparent.

WORKBOAT RANGE

EF – 12 – Multi Purpose Workboat – Harbour & Pilotage

EF – 12 – Crew Transfer Vessel

ARTEMIS EF-12 WORKBOAT

Multi-purpose walkaround cabin

PRINCIPLE DIMENSIONS	
Length Overall (m)	12.5
Hull Length (m)	12.0
Beam Overall (m)	4.0
Draft (m)	2.2
Air Draft (m)	4.6
Lightweight Displacement (t)	7.5
Maximum Displacement (t)	10.0

PERFORMANCE	
Top Speed	32 Knots
Cruise Speed	25 Knots
Cruise Speed Efficiency	5.6 KWh / Nautical Mile
Range (@ Cruise Speed)	60 Nautical Miles
Full Charge Time	52 Seconds per Nautical

ARTEMIS EF-12 CTV

Wide cabin & bow fender for offshore operations

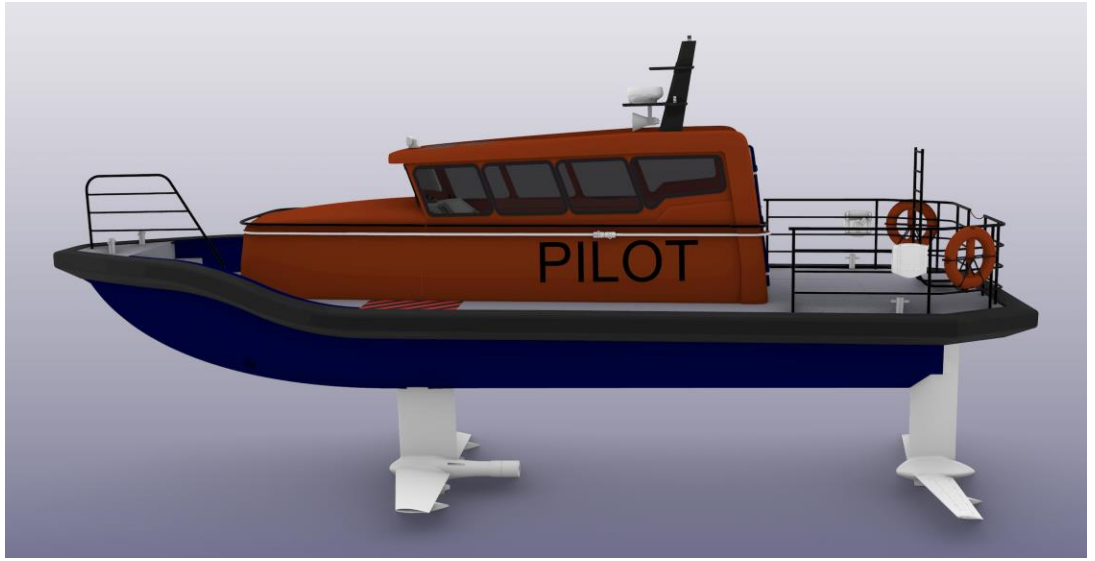
PRINCIPLE DIMENSIONS	
Length Overall (m)	12.5
Hull Length (m)	12.0
Beam Overall (m)	4.0
Draft (m)	2.2
Air Draft (m)	4.6
Lightweight Displacement (t)	8.2
Maximum Displacement (t)	12.0

PERFORMANCE	
Top Speed	32 Knots
Cruise Speed	25 Knots
Cruise Speed Efficiency	6.8 KWh / Nautical Mile
Range (@ Cruise Speed)	50 Nautical Miles
Fast Charge Time	52 seconds per Nautical Mile

PILOTAGE

Enquiries
Numerous from harbours following the launch of the test boat

eFoiler Benefits
Improved stability – Foiling and displacement
Improved Comfort
Reduced Op Ex – Fuel & Maintenance
Potential increase in transfer speeds (wake)
Offers Emission Free Operations



Complexity
Challenging operational conditions. Wind, sea state, wave interaction with ship and safe transfer.
Varying range of Transfer speeds
Will not suit all harbour requirements

Clean Maritime Demonstration Grant
Awarded beginning of the month in conjunction with **Belfast Harbour**

CLEAN MARITIME DEMONSTRATION COMPETITION
FEASIBILITY STUDY

- Jan 23 for 8 months – ATL will commit work prior to funding
- Belfast Pilot Study – Existing Vessel - Performance and Duty Cycle Analysis. Inc approach & boarding (measure friction)
- Belfast Crews operate test boat for Operational feed
- Develop Digital Twin of Belfast Pilot in Sim
- Design and Develop eFoiler Pilot Boat in Sim using EF-12 Work Boat Platform
- Naval Architecture (Optimise Interior & deck layouts) and Compliance
- Report and Validate

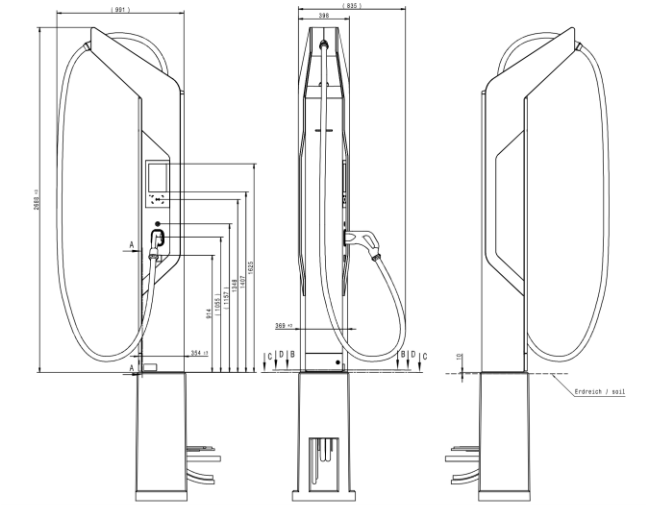
CHARGING

Hardware and Infrastructure

SHORE BASED 250 kW FAST CHARGING SOLUTION

Grid fed Booster with Fast Charge Dispenser

CHARGING SYSTEM	
High Power Charging	
DC Charging Power	320 kW
Architecture	Grid fed Booster (Battery Storage System) and Dispenser (1 or 2 outlets)
Operational Voltage Level Range	150 V to 920V
Mains / Grid Supply	3 Phase, 60HHz, 50 or 110kVA,480V Input (+/-10%) & Max Input 186A



VISIT US IN BELFAST

Experience the technology and meet the team

Artemis

TECHNOLOGIES