

# *Machines & HV Assets 2025*

*Ampcontrol  
Engineering the future with  
hybrid power solutions*

Dr Steve Mitchell  
Manager – Ampcontrol Marine





### ***What? Electric and hybrid vessels powered by Ampcontrol***

- Stebercraft approached Ampcontrol way back in 2017 with the goal of developing a stealthy Police Boat
- This set in motion a carefully staged R&D effort *leveraging a modest Federal Government grant and the University of Newcastle* to keep the **R&D costs to an absolute minimum**
- Momentum has rapidly accelerated over the past 18 months with the launch of an 600kW Electric Hybrid Vessel to demonstrate the technology





## ***Why a hybrid? Lots of advantages!***

- Environmentally
  - Lower CO<sub>2</sub>, NO<sub>x</sub>, carcinogenic diesel particulate emissions
  - Reduced noise and vibration
  - Elimination of exhaust filtering into our waterways when battery powered
- Politically
  - Seismic shift towards electric technology
  - Diesels are already being legislatively sidelined particularly in Europe



## *Why a hybrid? Lots of advantages!*

- Technologically
  - Additional operational freedom (Silent/pollution free modes without range anxiety)
- Financially
  - Attractive ROI on additional upfront costs over the life of a vessel
    - Lower energy costs (ie Diesel versus electric energy)
    - Lower maintenance costs (Diesel engine servicing costs versus neg.)
    - Calculous works well on vessels such as passenger ferries



## *Why a hybrid? Lots of advantages!*

- And the pressure continues to rise at an international level for shipping...
  - International Maritime Organization based on *meetings 7–11 April 2025*  
=> From 2028, **vessels will pay for their emissions, priced between US\$100 and US\$380 per tonne CO2 equivalent and rising over time.**

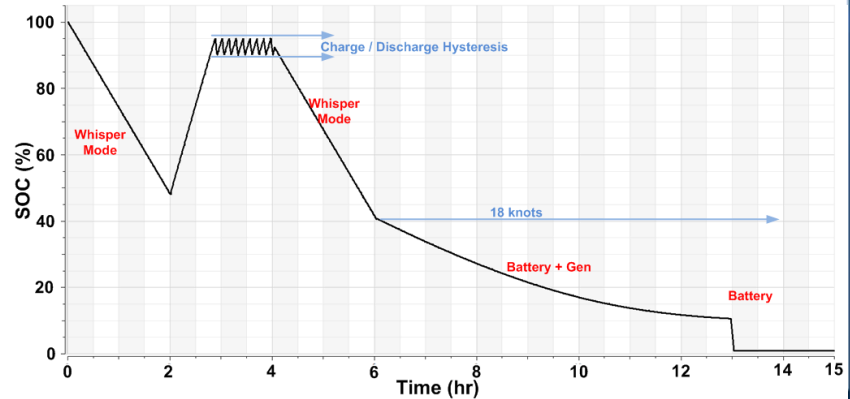
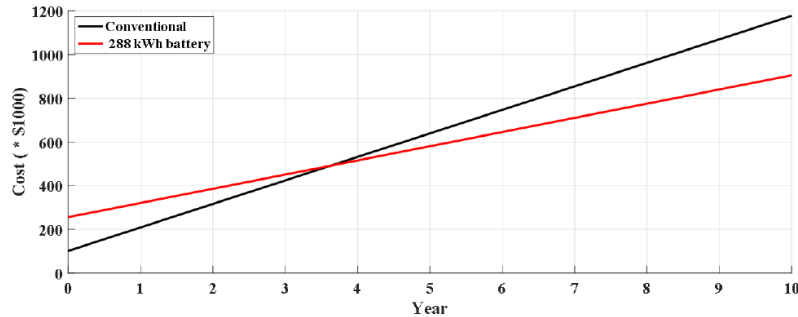
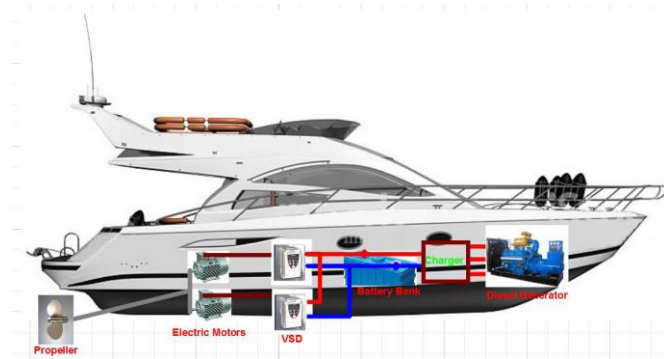
## *How – Partnerships*



**Australian Government**

## Alpha Prototype - Modelling

- Designs and operating scenarios were explored in Modelica
- Viability of full-scale use case demonstrated





## *Alpha Prototype - Lab testing*

- Laboratory demonstration of marine power system developed





## *Alpha Prototype - Install*

- Build a demonstration 22' hybrid boat



## *Alpha Prototype - On water testing*

- Demonstration on the Manning River of the hybrid boat (September 2021)

### **Specifications**

- 22' hull
- 28kWh LFP Battery
- 83kW (peak) SR Motor
- 30kW Converter
- 9kVA Diesel Gen
- 30km/hr top speed



# Media interest

NEWS

September 3, 2020



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## Early successes for electric hybrid boat

by John Bulmer 3 Sep 2020 16:17 AEST



Quickly up on the plane with Alan Steber at the helm on the Manning River © John Bulmer

Australian Government  
Department of Industry, Science,  
Energy and Resources

AusIndustry  
Entrepreneurs' Programme

Success stories

## Steber International

Anchoring down hybrid  
electric/diesel technology for  
the water



16 NEWCASTLE HERALD Friday December 11, 2020

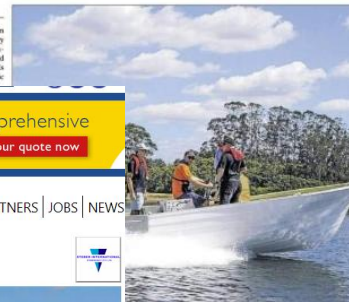
NEWS

newcastleherald.com.au

# Stealth craft passes trial

BY MATTHEW KELLY

A PARTNERSHIP between Ampcontrol, The University of Newcastle and Steber International has conducted a series of successful trials of a hybrid diesel-electric



metre test rig was officially launched on the Manning River at Taree

on board attained 20 knots and with seven people aboard the speed was 18 knots. With 90kwh of amp

director and chief executive Rod Henderson said it was great to get out on the water after extensive research and development and electric power system testing.

"The experience and on water performance are impressive there is no vi

lation; it's quiet and has excellent torque and speed. It's great to see another innovative power supply solution designed by the people of Newcastle put into practice," added Mr Henderson.

Steber International General Manager, Alan Steber said the exciting project has unlimited potential across the entire marine landscape. "Ampcontrol and the University of Newcastle have added their considerable skills making this a genuine collaborative effort on all levels."



SUCCESS: AmpControl and University of Newcastle representatives on board the boat.



VERSATILE: The boat's potential uses include police boats, recreational and leisure craft.



## ***Build a full-size demonstration vessel!***

- On the back of our success with the Alpha Prototype funding was approved to develop a Beta Prototype demonstration vessel







## 600kW Hybrid Demonstration Vessel

- Fitted to a 43-foot workboat
- 300kW/150kWh Li Ion (LFP) battery
- 60kW **land and sea charging** capability
- 2 x 300kW electric motors and drives
- 350kW diesel generator leveraging our innovative power converter design
- Full liquid cooling of power system
- Concept cloud based “Aware Marine”



Innovation of the  
Year

Australian Marine Industry  
Awards 2024



Project of the Year

Engineers Australia Regional  
Prize 2024



Finalist: Project of the Year

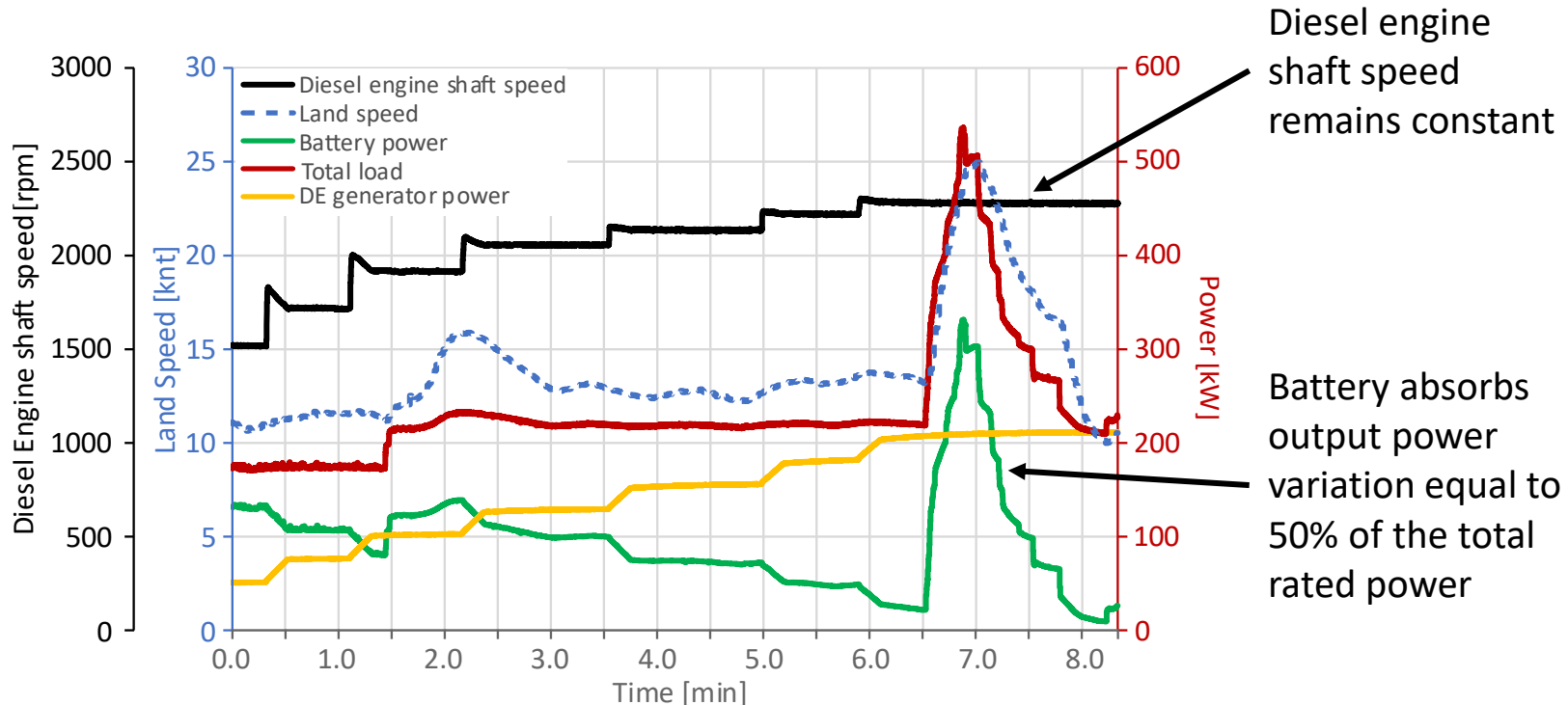
Engineers Australia National Prize 2024



## ***Advantages of a Plug-in Hybrid Power and Propulsion System***

- Leverage dockside charging => Reduced OPEX compared to diesel operation  
=> Reduced Total cost of Ownership (commercial)
- Hybrid vessel will have the following propulsion modes of operation:
  - Battery powered propulsion => Silent and pollution free
  - Diesel Generator powered propulsion => No range anxiety!
  - Battery + Diesel Generator powered propulsion => Full power/speed
  - Diesel Generator powered propulsion + Battery charging => Recharge during operation

## Hybrid mode - Constant diesel engine 'speed test'





# ***Marine Hybrid Power System***

***Full electric at 20 knots***





# ***Marine Hybrid Power System***

***Full operational range of a diesel vessel...***



# Marine Hybrid Power System

## Potential opportunities? Many...

- New vessels taking advantage of latest technology
  - **Battery mode = Low noise, low vibration, no emissions, no smell!**
    - => Rescue vessels [**Low noise more effective search**]
    - => Ferry, Dive/Fishing vessel [**More pleasant travelling**]
    - => Dredgers, workboats [**Reduce heavy emissions from harbour work vessels**]
- Refurbish aging boats:
  - **Cost effective, feature rich upgrade** to existing vessels



# Full Energy Ecosystem for Marine

## ENERGY



## INFRASTRUCTURE



## CHARGERS



## MARINE BATTERY/HYBRID



## 24/7 SUPPORT





***Questions?***

