



NATIONAL MARINE SANCTUARIES



**ONMS SMALL BOAT PROGRAM:
NEXT GENERATION
RESEARCH VESSELS**



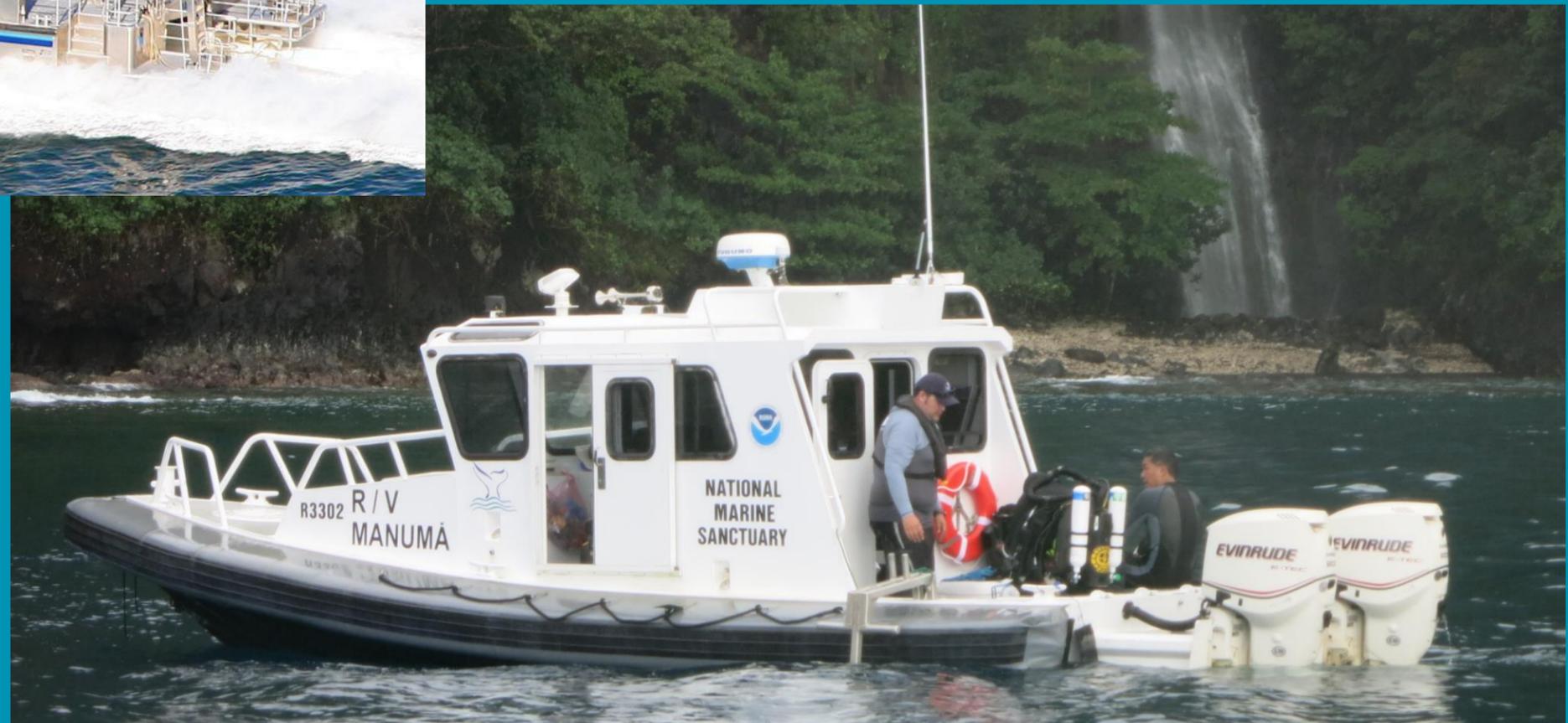
- Mammal-safe propulsion**
- Reduced emissions in transit**
- Zero-emission loitering**
- Reduced noise**
- Low wake hull forms**
- Real-time data transmission**

ONMS Fleet Range



RV Manta, 83'
Galveston TX

RV Manuma 33'
Pago Pago AS



DESIGN FOCUS:

Serial/Parallel Hybrid

Electric - Diesel - Hydrogen

Shrouded Props, Rim-drive propulsors

Auxiliary low-speed propulsors

Advanced hydrodynamics

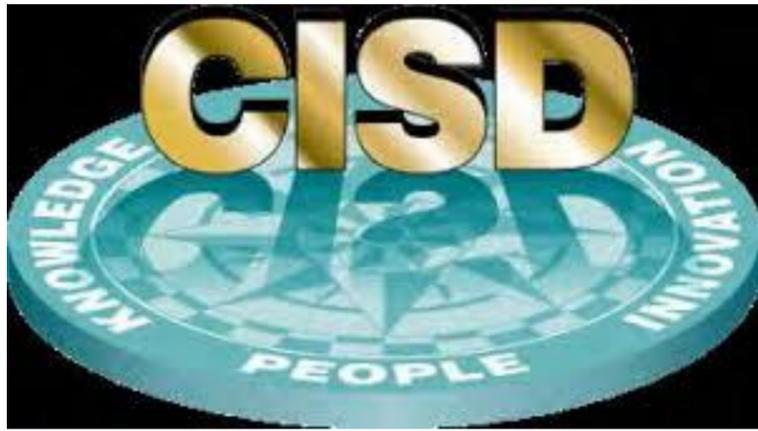
Studies by:

USN Center for Innovation in Ship Design

Stevens Institute of Technology

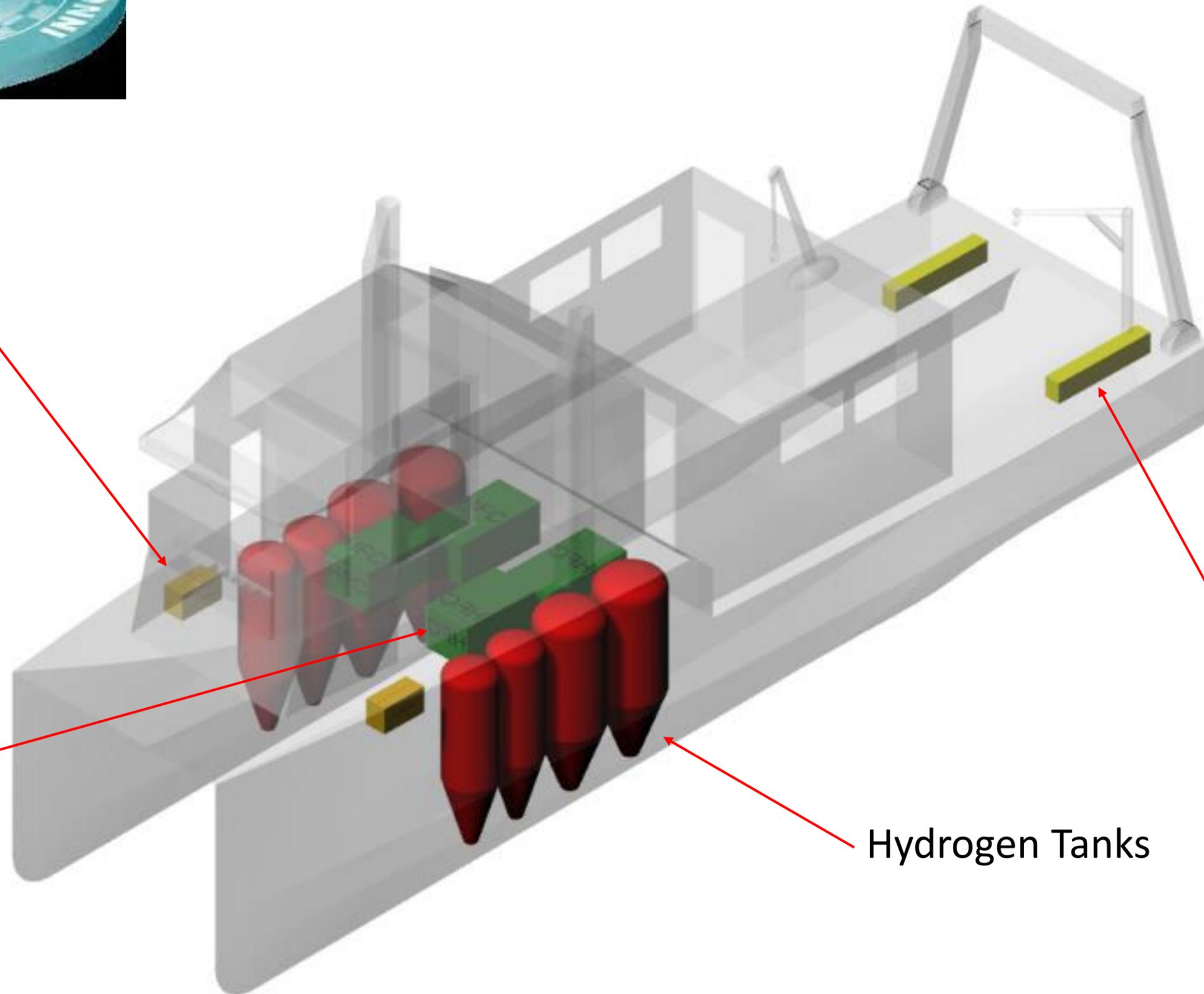
Electric Prototype Testing





Conceptual Arrangement, 52' fuel-cell variant

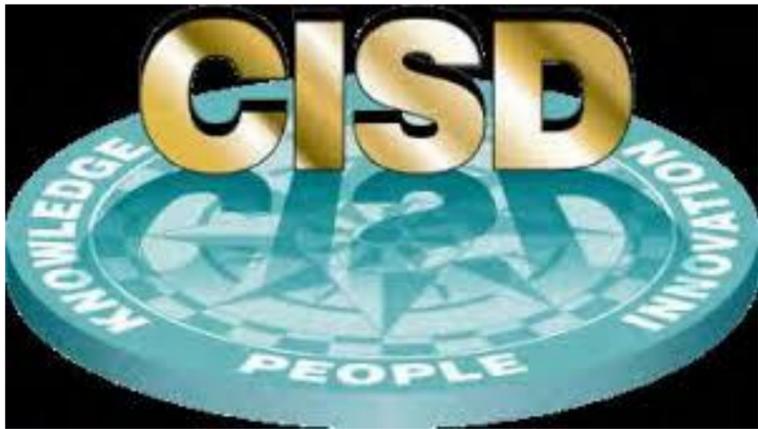
Inverters



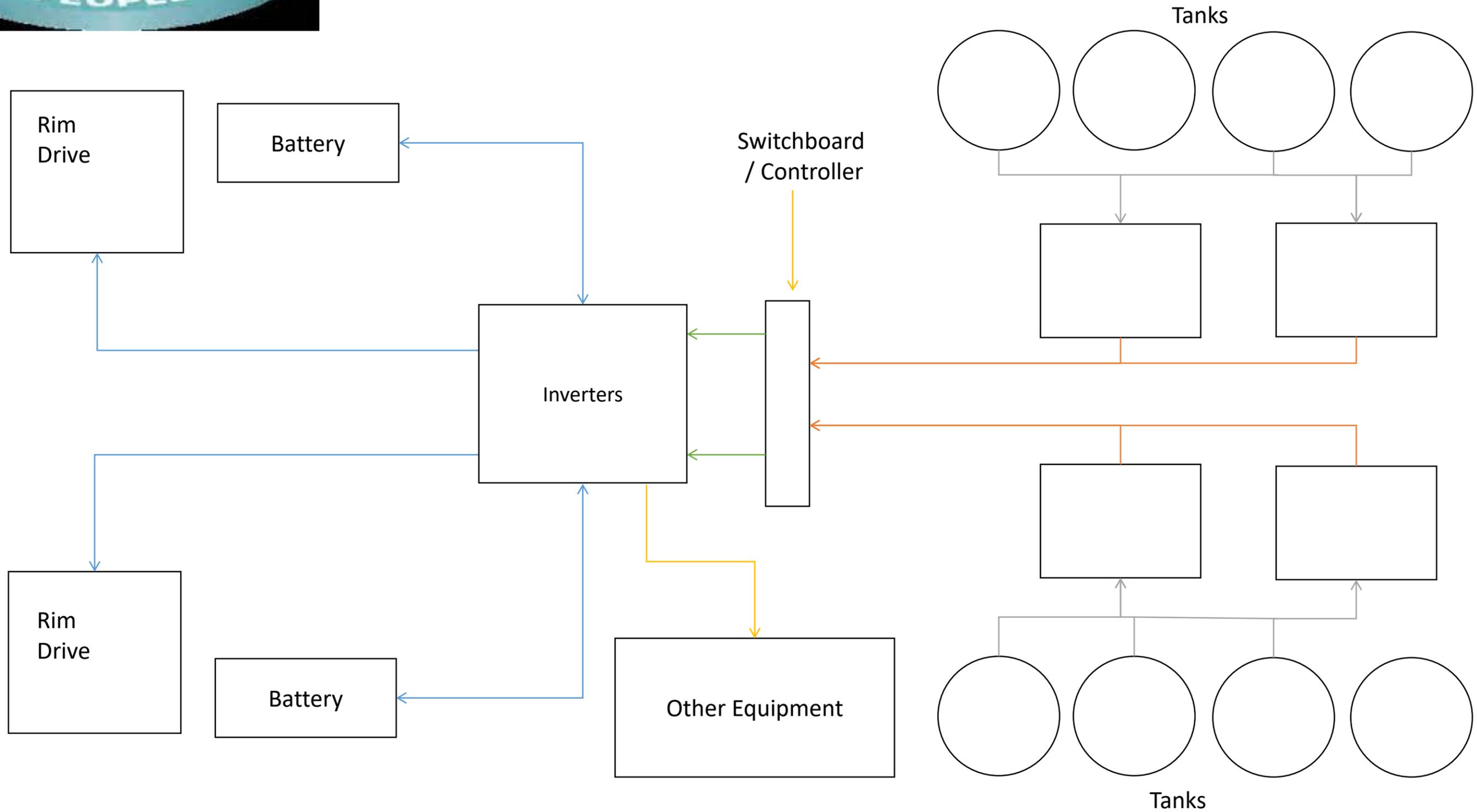
Hydrogen
Fuel Cells

Hydrogen Tanks

Batteries

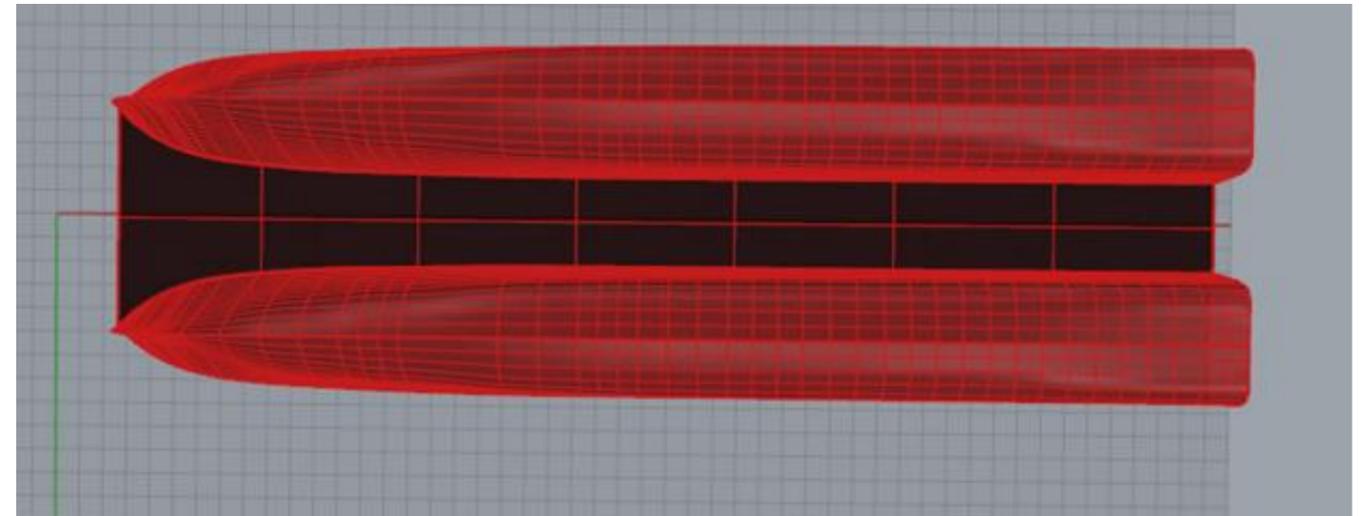
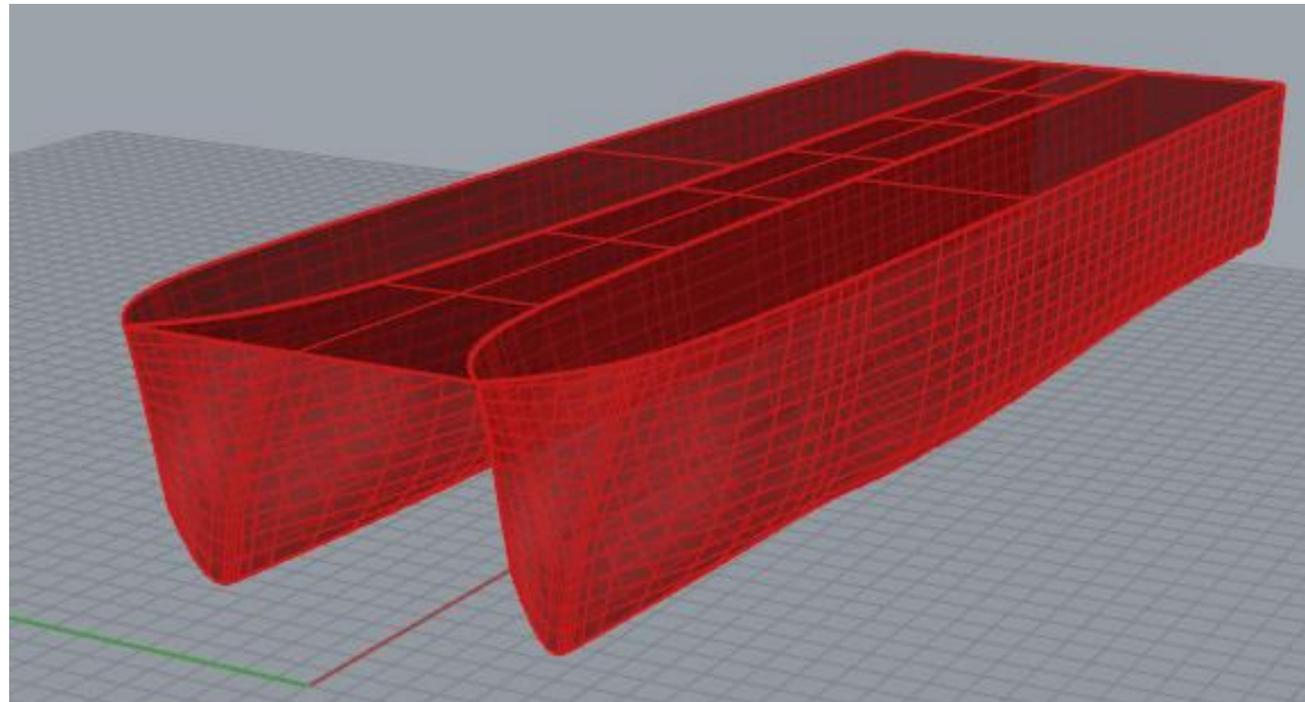
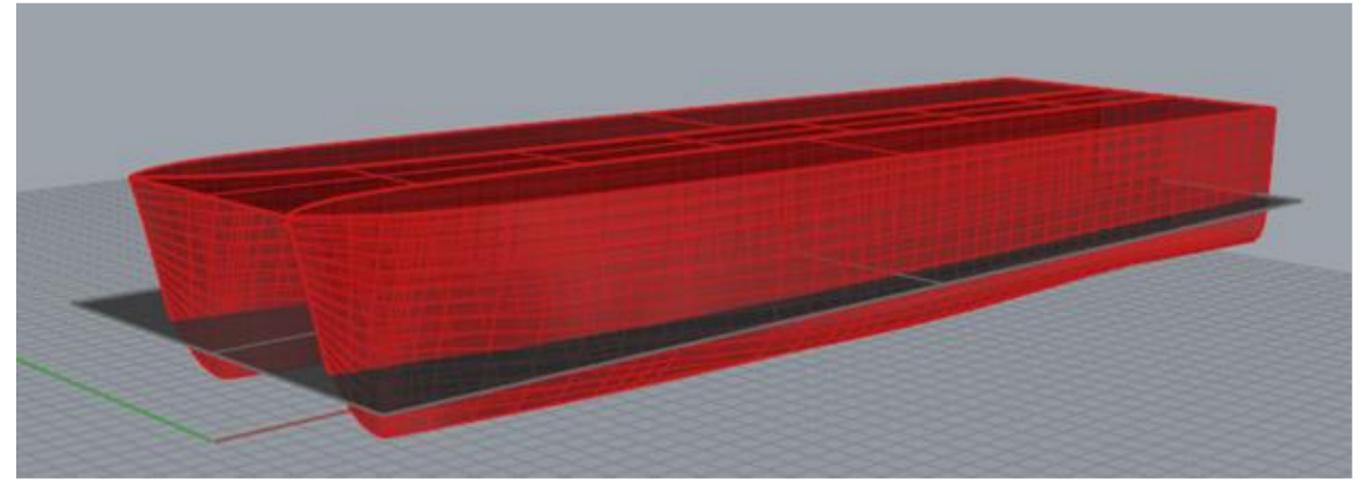
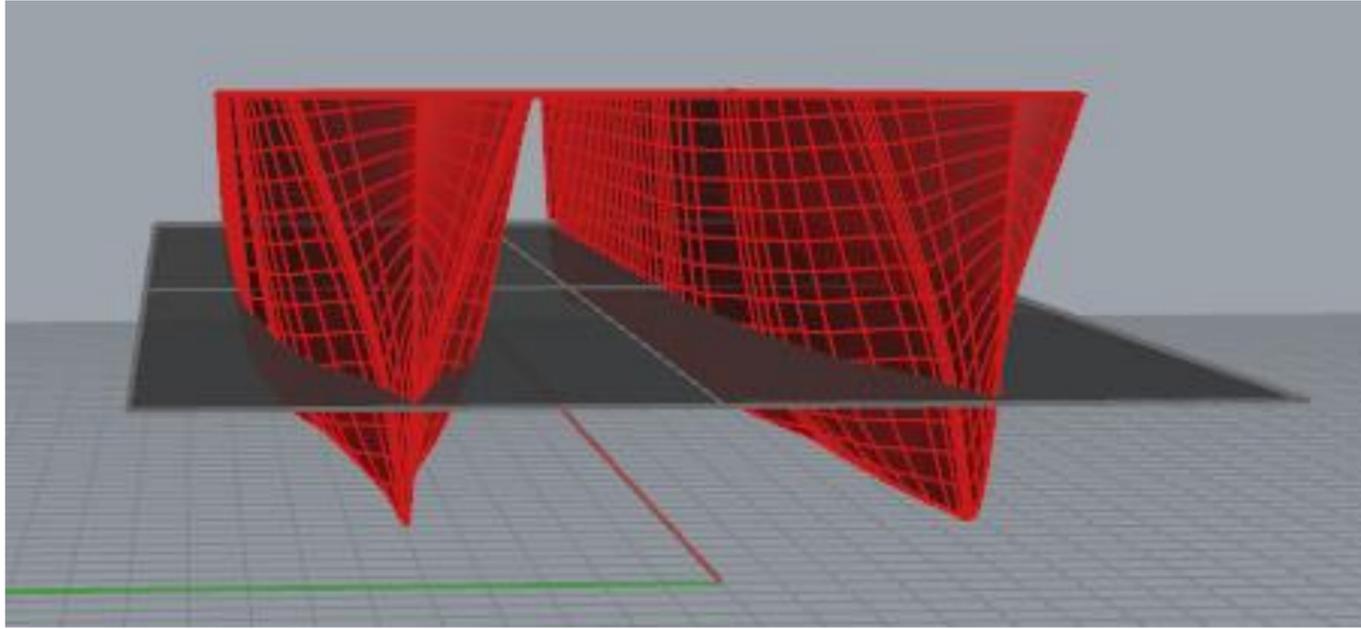


System Schematic





Hull Form Development

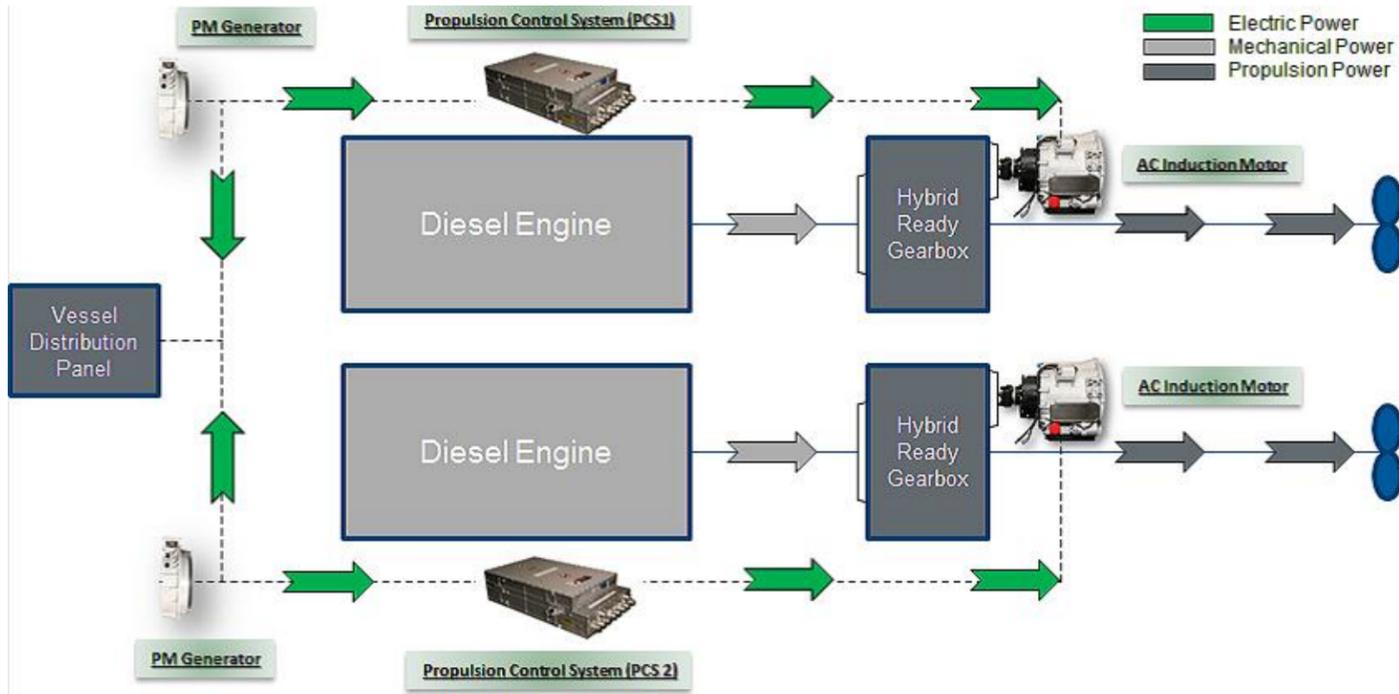




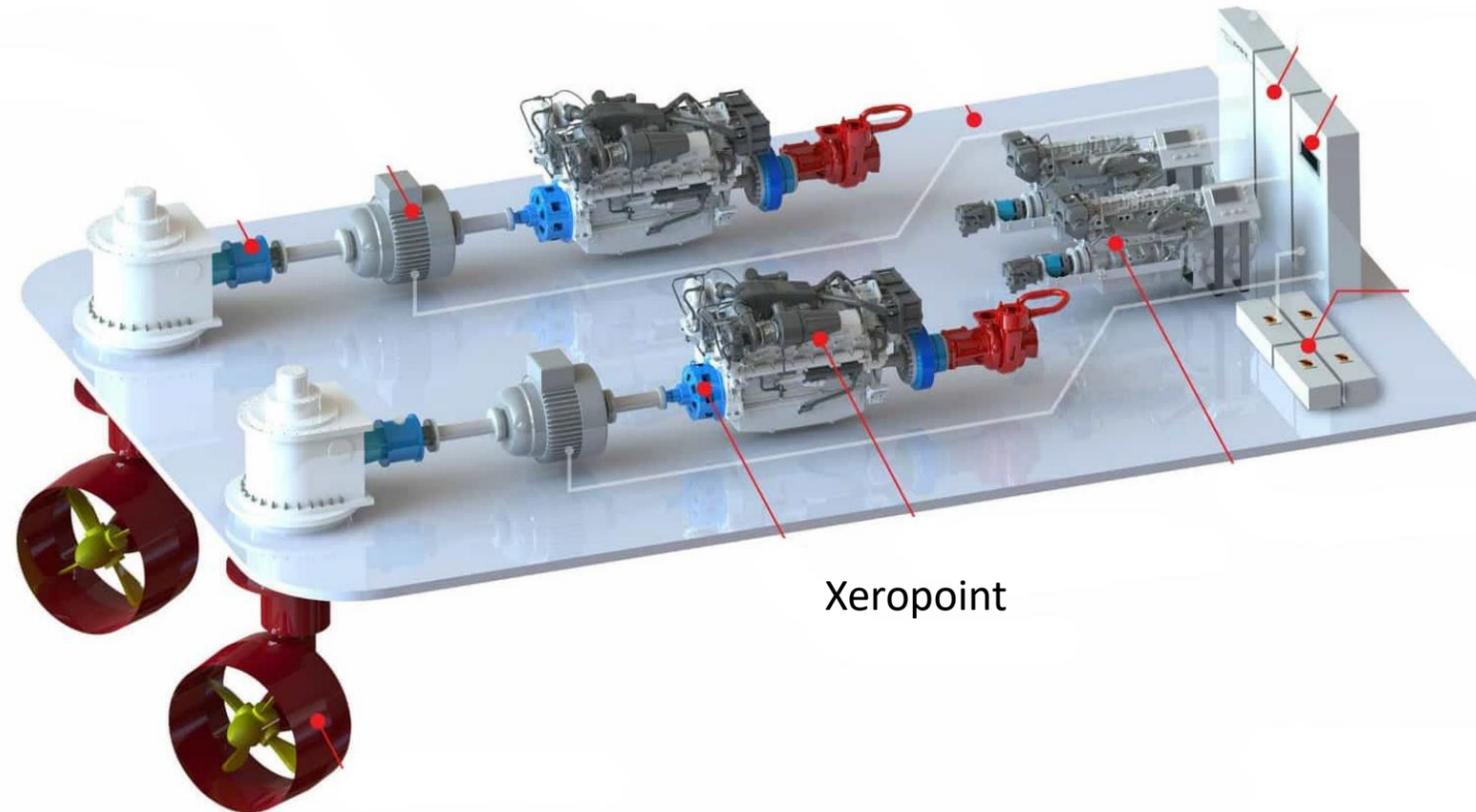
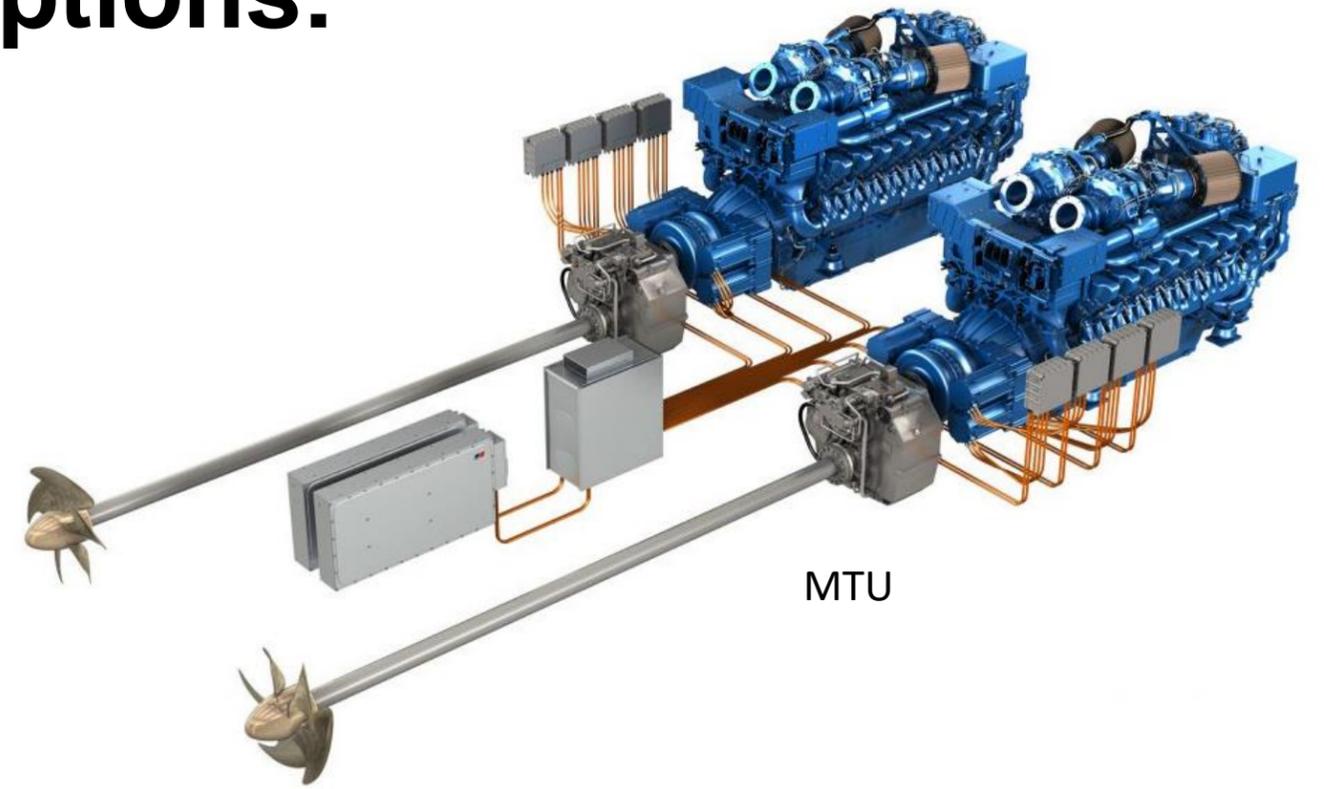
Design Attributes

Attribute	Dimensions
Length Overall (LOA)	51 ft.
Maximum Beam	16 ft.
Length on Waterline (LWL)	49.18 ft.
Beam on Waterline (BWL)	15.5 ft.
Prismatic Coefficient (Cp)	0.742
Block Coefficient (Cb)	.378
Displacement	19,042 kgf
Bare hull Draft (T)	2.25 ft.
Maximum Depth Overall (D)	8.2 ft.

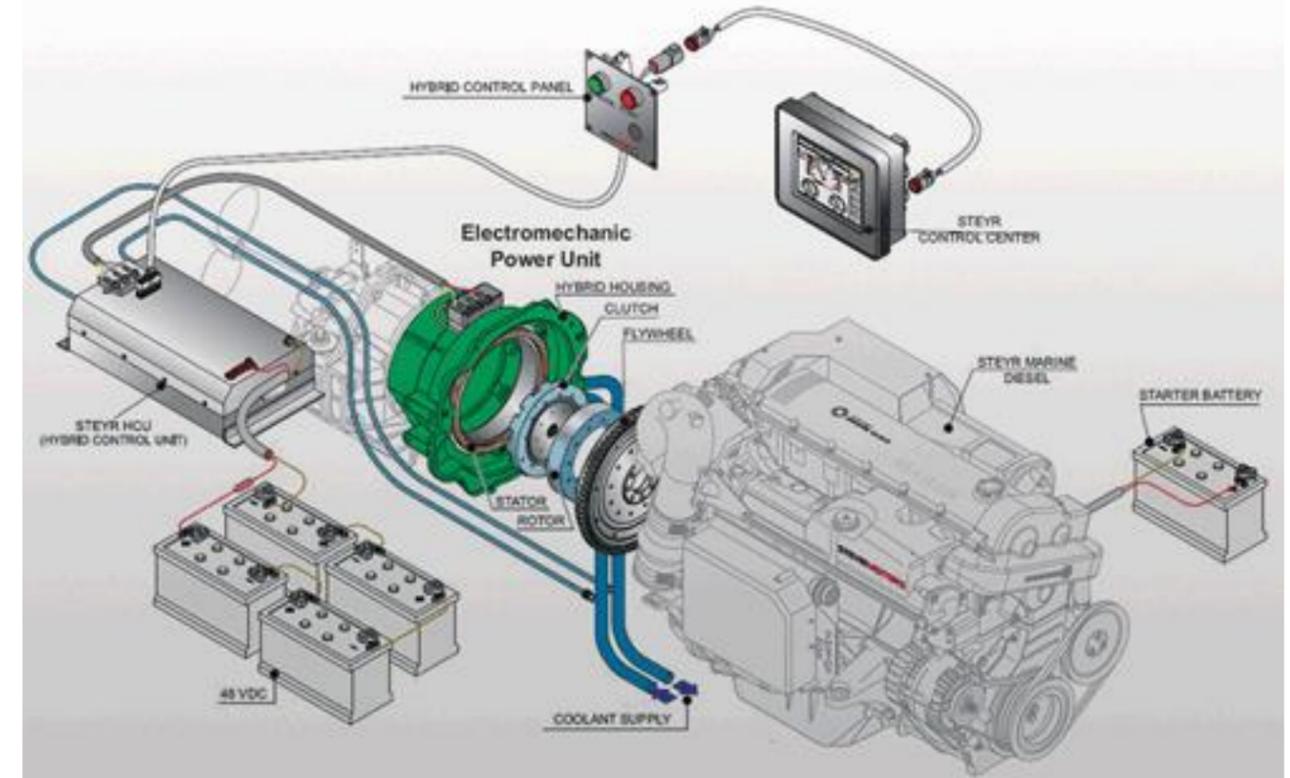
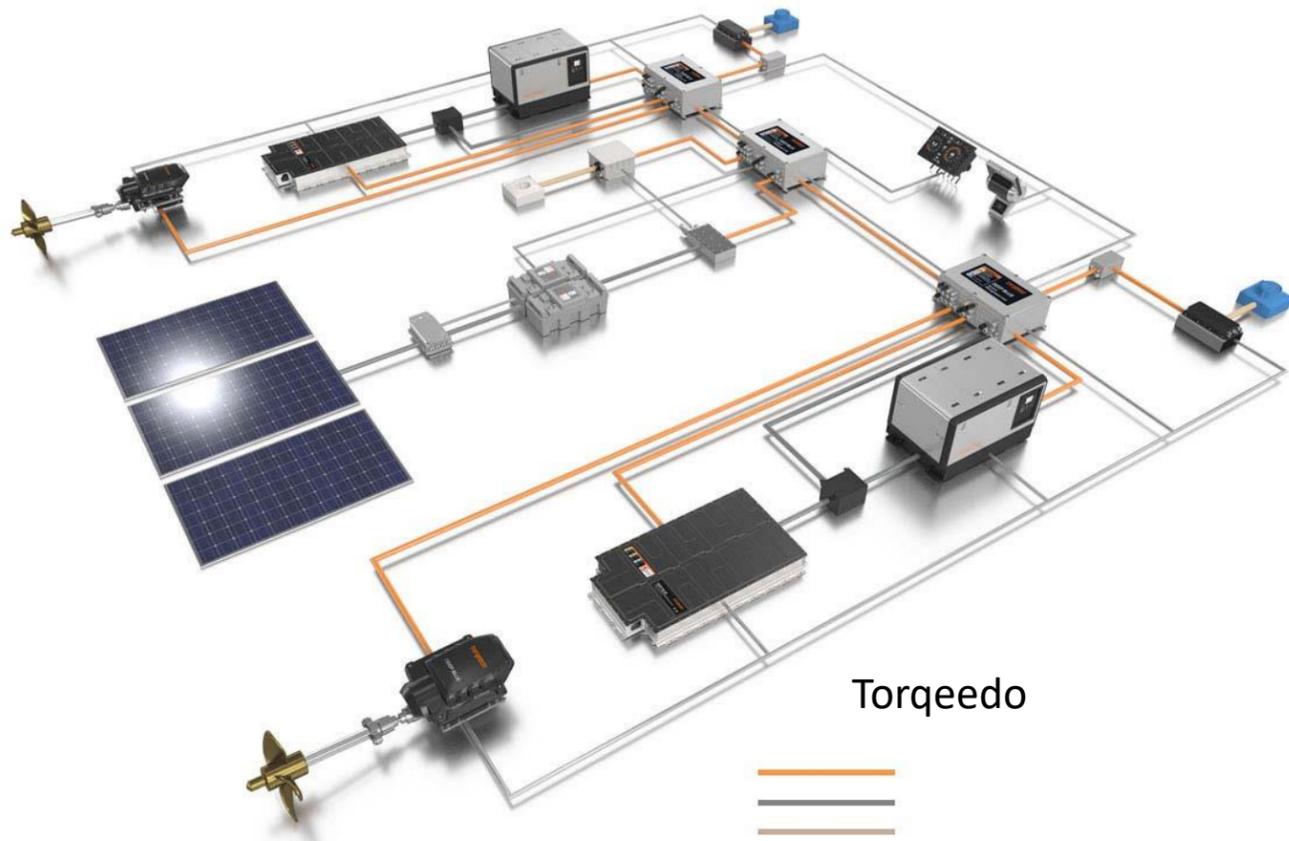
Hybrid Electric Propulsion Options:



BAE



Hybrid Electric Propulsion Options:



Steyr

