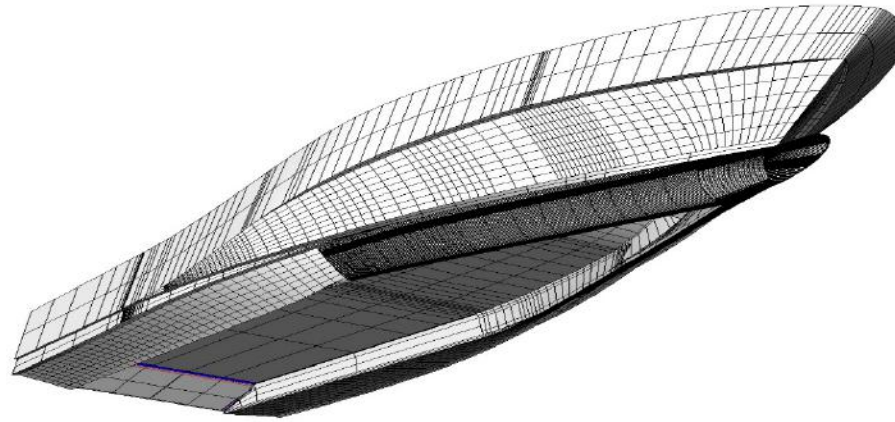


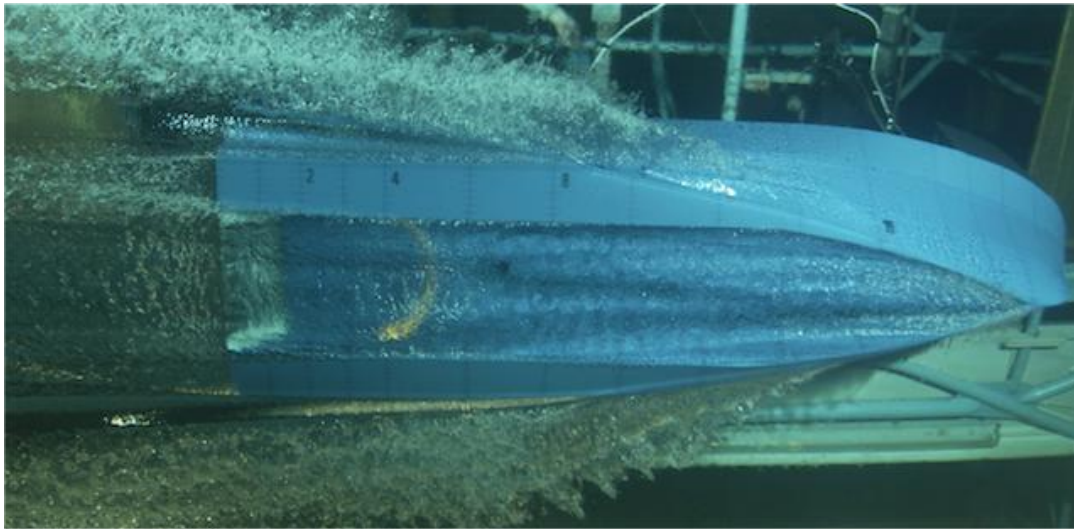
# AIR SUPPORTED VESSELS



The ASV technology has been developed by the Norwegian company Surface Effect Ships International.

Atlantic Eagle Ship Yard and my design company Euroshide both integrating the Firstlink Group made a cooperation agreement with Surface Effect Ships International for exploring the ASV high potential.

In this presentation in the first part I will use a Surface Effect Ships International presentation to explain the ASV concept and in the second part I will show Euroshide ASV designs



Tank test of 22 m ASV Mono at 60 knots

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# Air Supported Vessel (ASV) technology

Fully documented and patented in 60 countries "world wide"

Technology ownership:

Effect Ships International AS  
Sandefjord, Norway Phone: + 47 334 65 650

Contact persons:

Ulf Tudem, General manager – [ulf.tudem@effectships.com](mailto:ulf.tudem@effectships.com) , mobile: + 47 908 51311  
Tor K Livgard, Technical manager – [tor.livgard@effectships.com](mailto:tor.livgard@effectships.com) , mobile: + 47 4724 9695

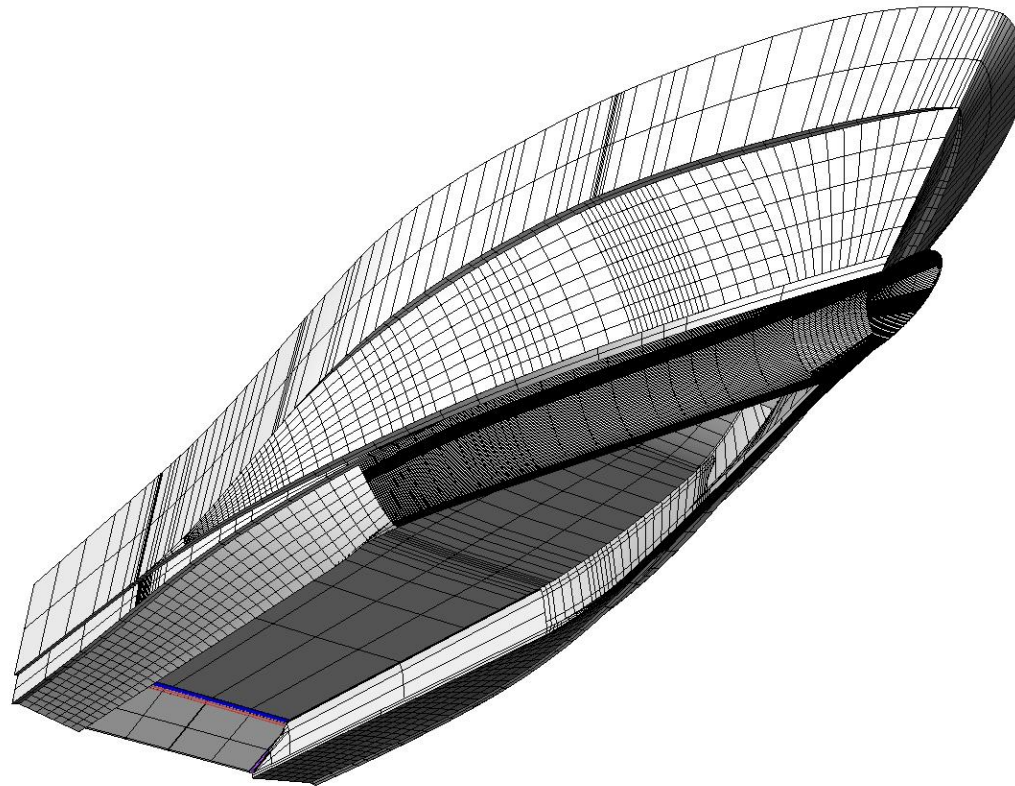
# Key investment considerations :

## Air Supported Vessel (ASV) Highlights – Revolutionary new hull technology offering major benefits:

- Up to 80% air cushion support rate – low «on cushion draft»
- Hull resistance reduction of up to 50 %
- 20 – 50 % reduction in fuel consumption
- Up to 50% faster acceleration and much higher speed with same installed power
- Extended range between refuelling
- Reduced onboard motions – ASV damping - enhanced comfort and safety in rough seas
- Excellent manouvability
- ASV mono combines key benefits of monohulled and a catamaran type vessels
- Compatible with a majority of existing above-waterline and GA designs
- Significantly reduced wake wash
- Significantly reduced engines and main systems (often only half power / size)
- Reduced emissions
- ASV lines are very strait and box shaped making construction easy

# Strong Technology Basis:

**Air Supported Vessel (ASV) Highlights –  
A typical ASV Navv vessel hull form**

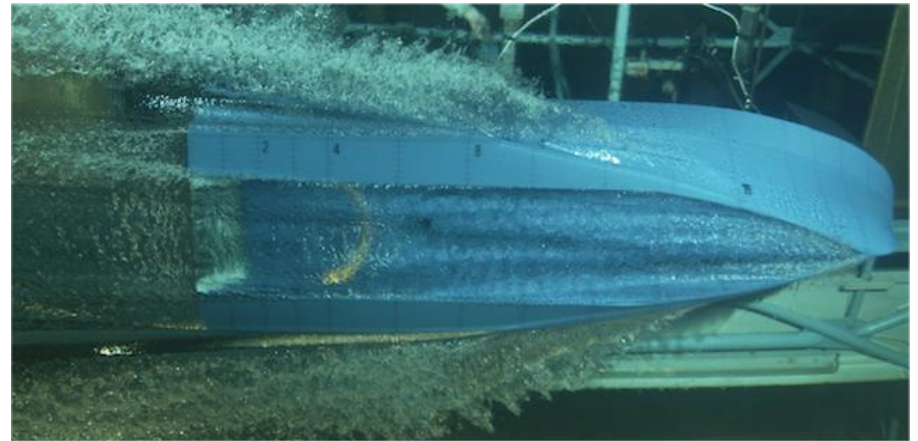


# Strong Technology Basis:

Approx. 2.000 fully instrumented tank tests at world renowned tank testing centre SSPA Sweden. Under water photos and videos



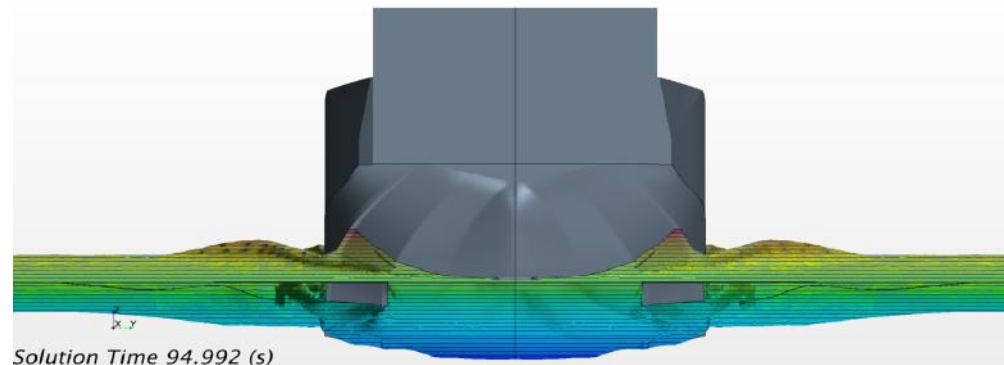
40 m ASV Cat at 70 knots



22 m ASV Mono at 60 knots

# Air Supported Vessel (ASV) Highlights – Strong and Excellent Technology Basis:

- Extensive research, testing and documentation of ASV designs
- Euro 15 mill invested in RTD, supported by EU, various national funds and the industry
- Full scale 20 m prototype – «the most efficient vessel of this kind tested» (MBY 2011)
- Tank testing of 19 different models with 2.000 fully instrumented and documented runs
- Developed and documented CFD for ASV tool for fast and cost efficient optimization
- Awarded prestigious European Powerboat of the Year 2011 Award for innovation
- «Global» patents with IPR protection in all key regions



# Wide Applications & Huge Market Potential:

## Air Supported Vessel (ASV) Highlights – 19 m ASV Navy «Soft Motion» Patrol Boat (CLYD Marine, France)

CLYD-MARINE  
64 / PATROL / BOAT-IPS



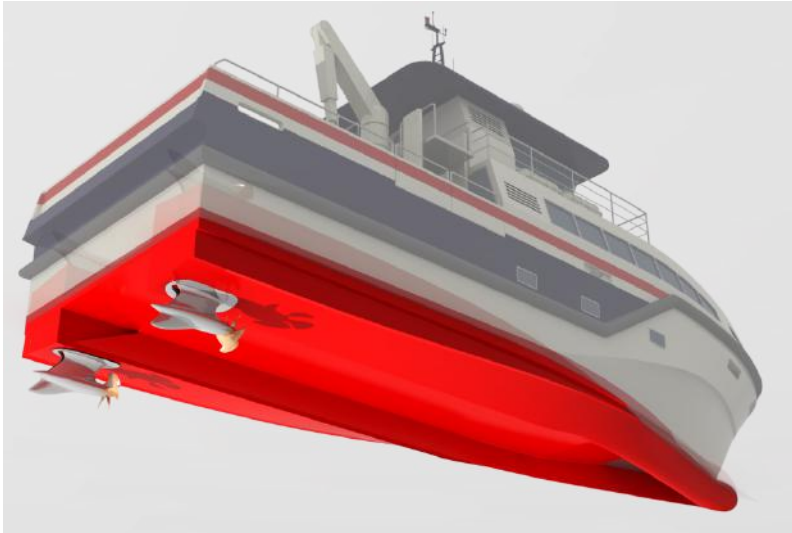
AIR / SUPPORTED / VESSEL





## Air Supported Vessel (ASV) Highlights – Applications and Market Potential:

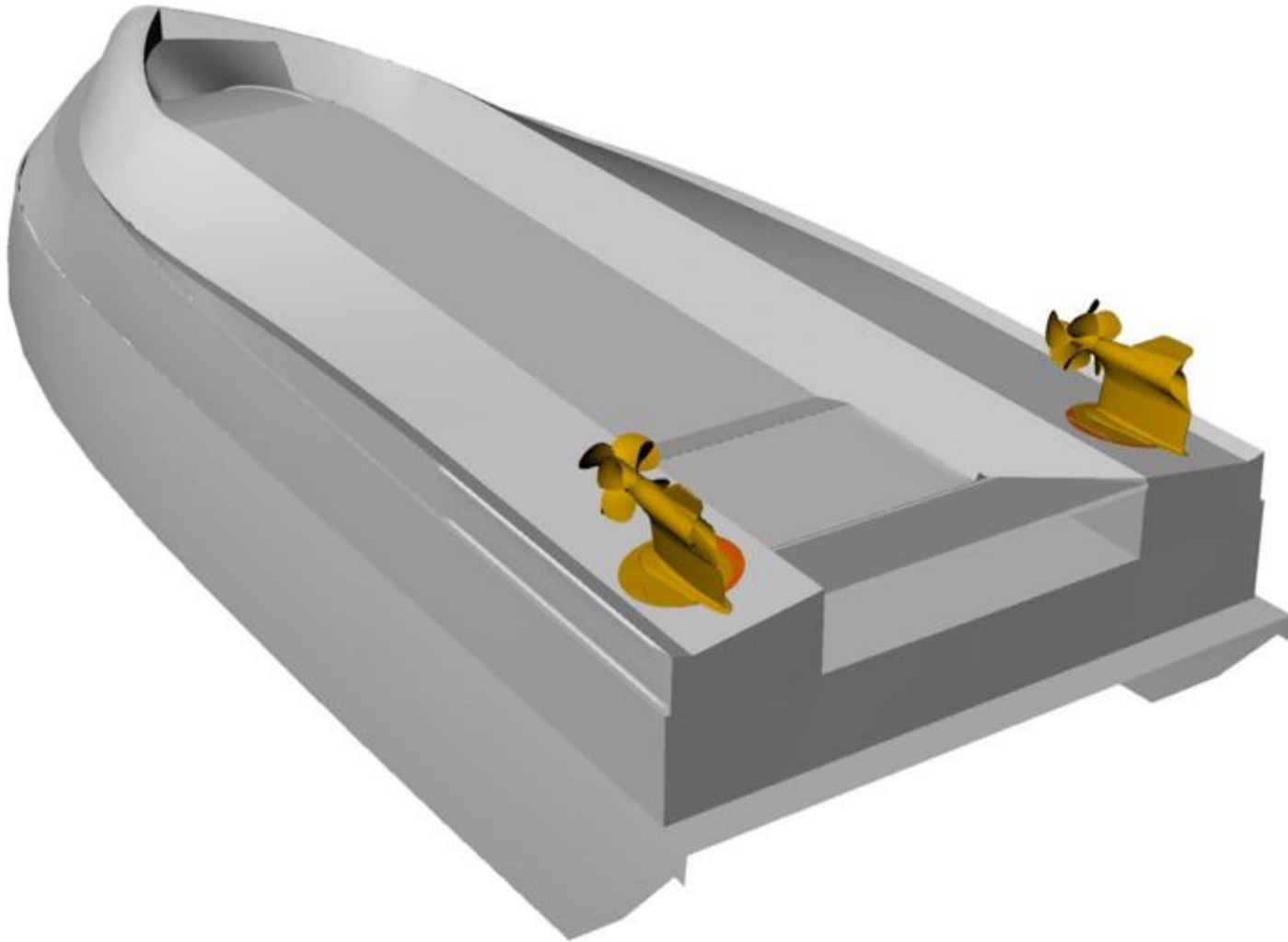
- ASV technology may be used on a wide range vessels and ships
- Covering fast vessels from 12 m LOA upwards to 100 m + LOA
- Ideal for vessels operated at high speeds – many hours a year
- Particularity suited for navy, homeland security & paramilitary operations & missions
- Equally suited for commercial applications: Fast offshore support, pilot boats, fast ferries etc.
- Multi billion Euro global markets for several ASV sectors / applications
- Technology IPR protected for both mono- and multihull applications



**ASV Mono 20 m Demonstrator underway at 30 + knots  
75% air cushion support rate and amazing 4,8 litres/NM consumption**



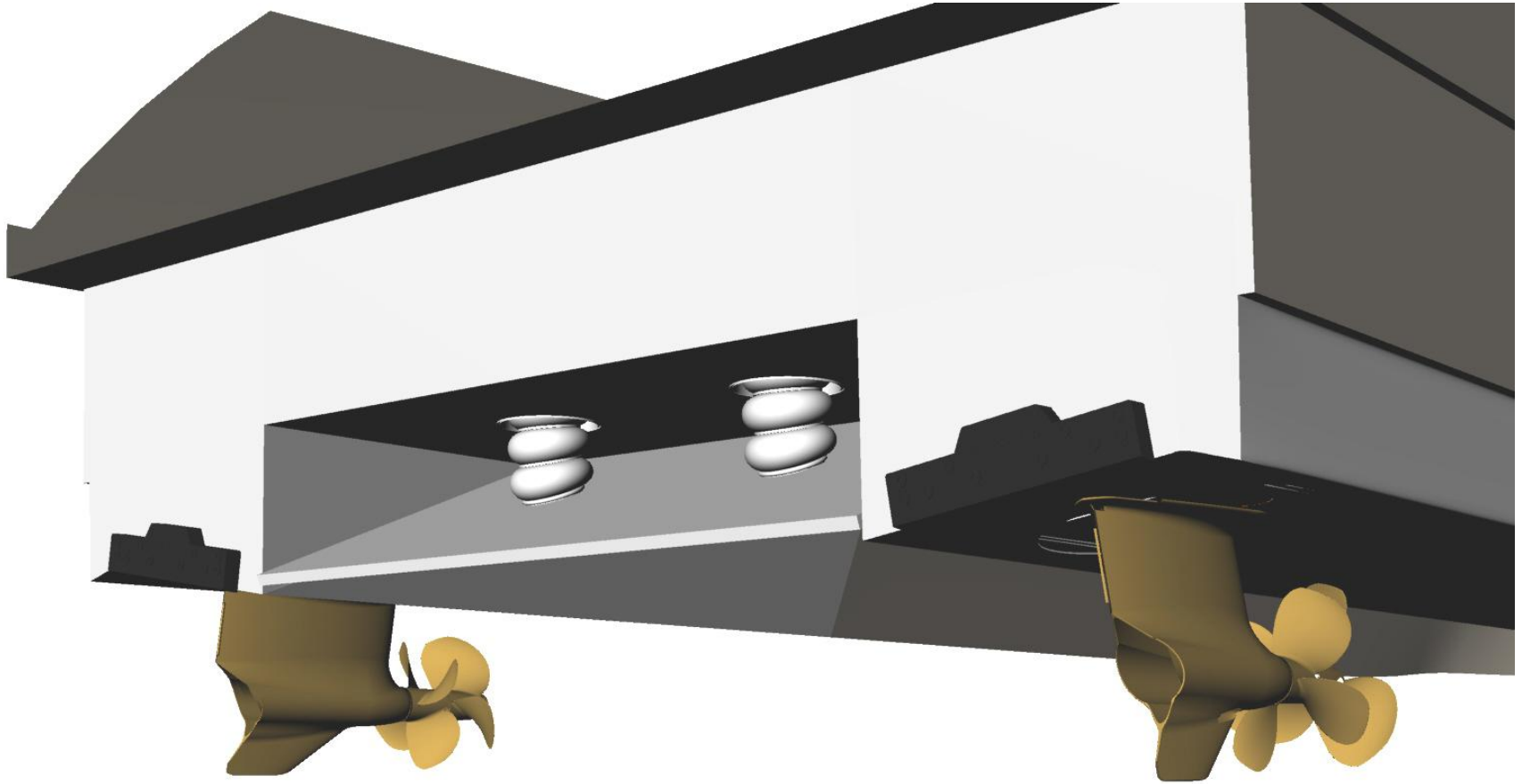
## ASV Mono basic hull form – here twin Volvo Penta IPS 2 drives



**ASV lift fan located far foward, delivering up to 15 m3 pressurized air / sec**



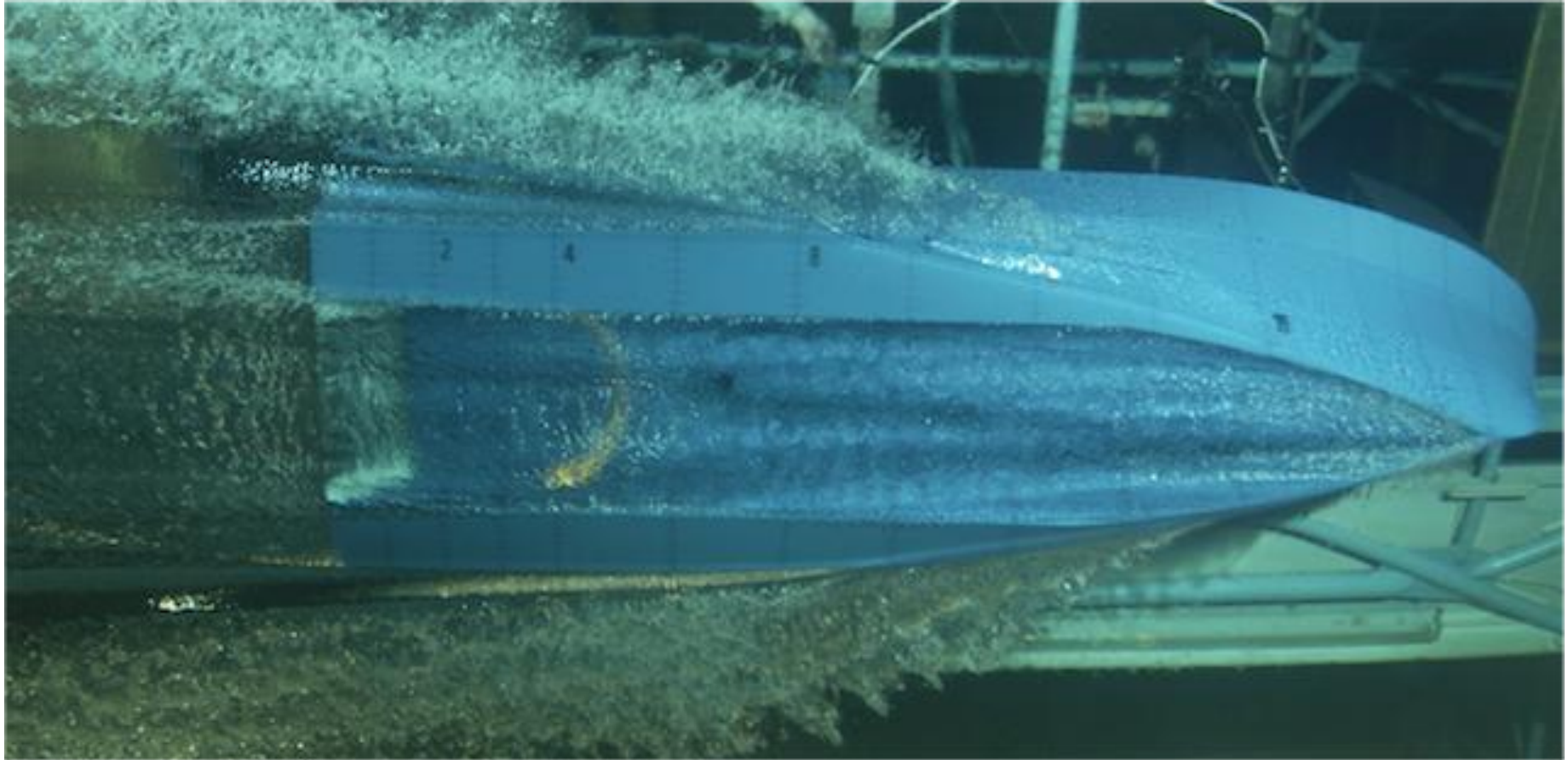
***ASV Mono 65' showing with larger Volvo Penta IPS 3 – transom, showing cushion enclosure flaps & interceptors***



***Effect Ships International AS – Patented Air Supported Vessel (ASV) Technology***



## ASV Mono in the towing tank @ SSPA Sweden. 20 m & 35 knots



**ASV Mono 20 m Demonstrator underway in short waves at 25 knots.  
The air cushion "dampens" / "softens" the ride.**

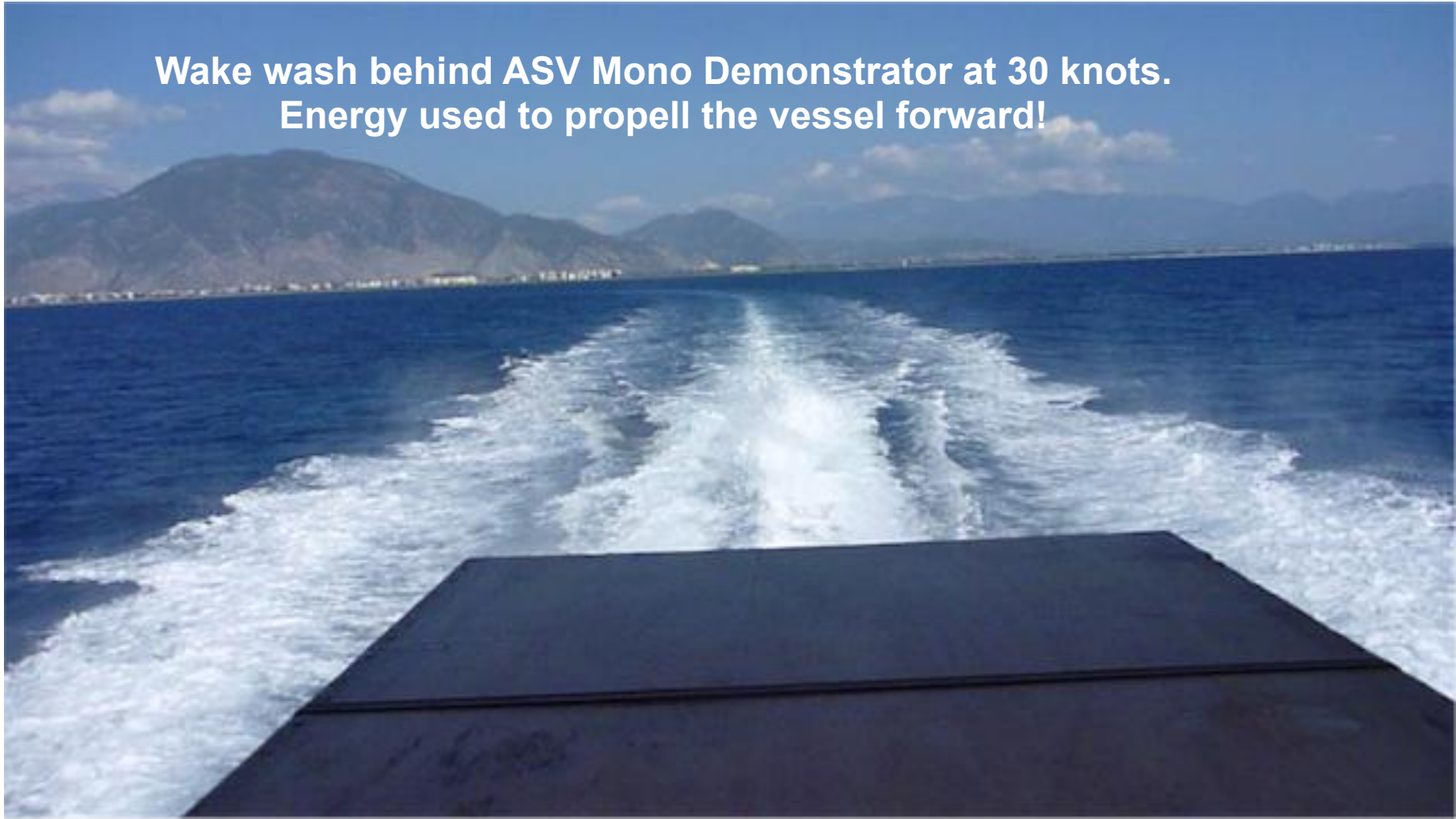


Wake wash behind a Fairline 62 Squadron (or most conventional vessels) at 28 knots. A lot of energy wasted generating huge waves!



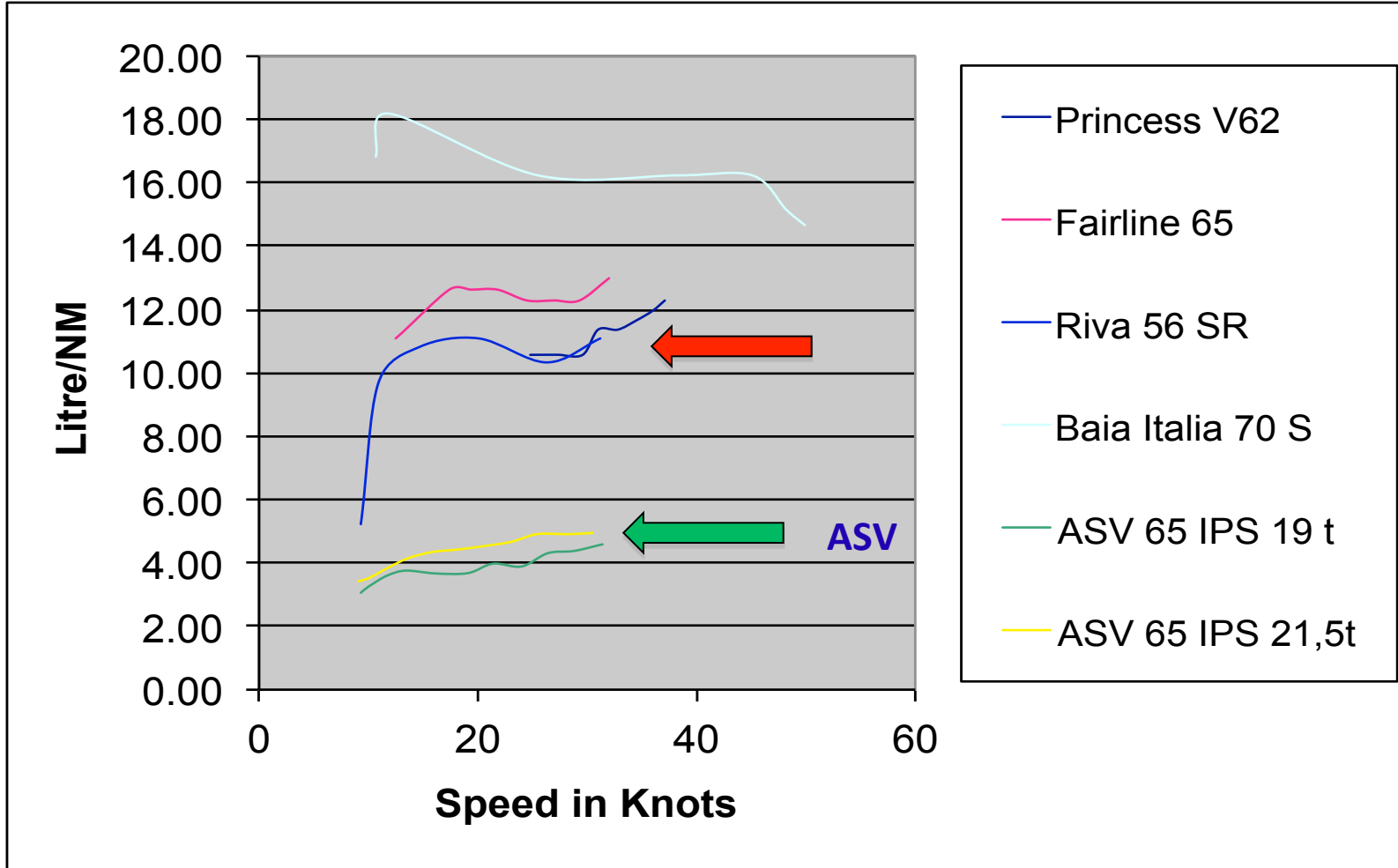


Wake wash behind ASV Mono Demonstrator at 30 knots.  
Energy used to propel the vessel forward!

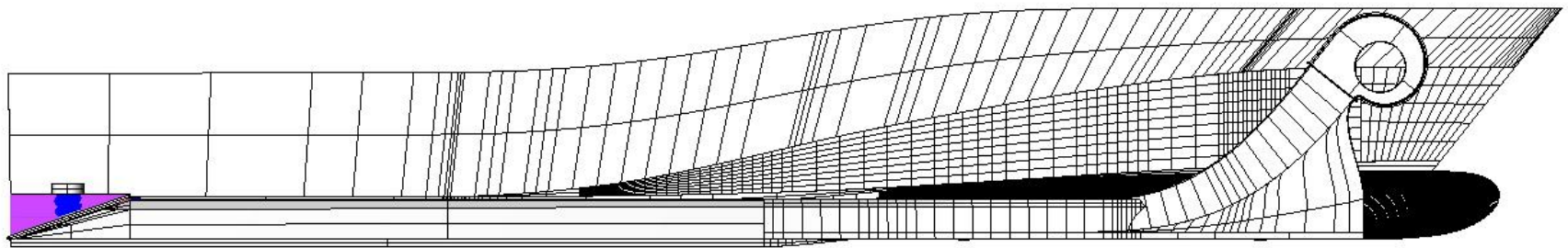


# ASV Mono 20 m test vessel vs. conventional crafts

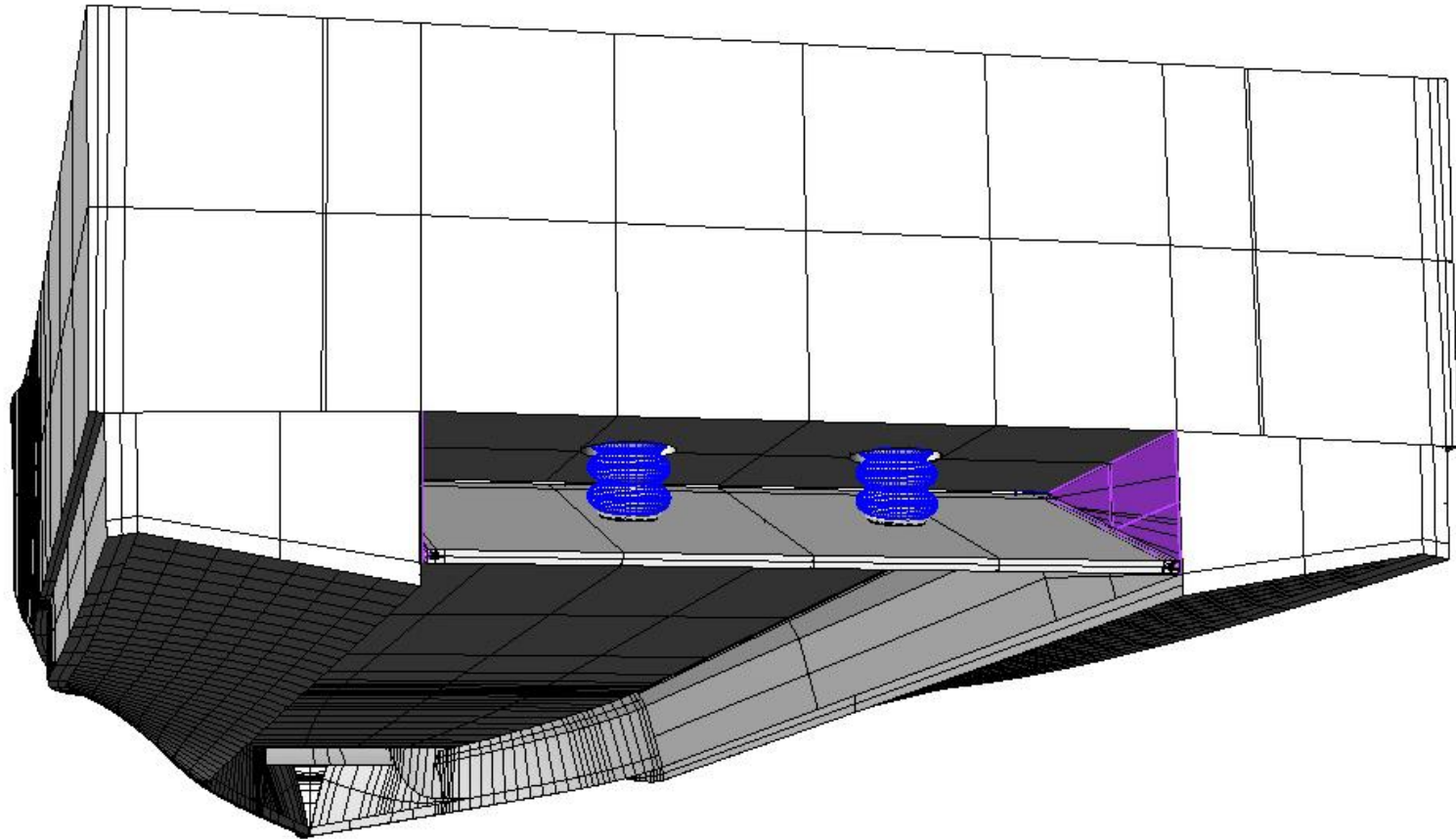
## 50% reduction in fuel consumption documented!



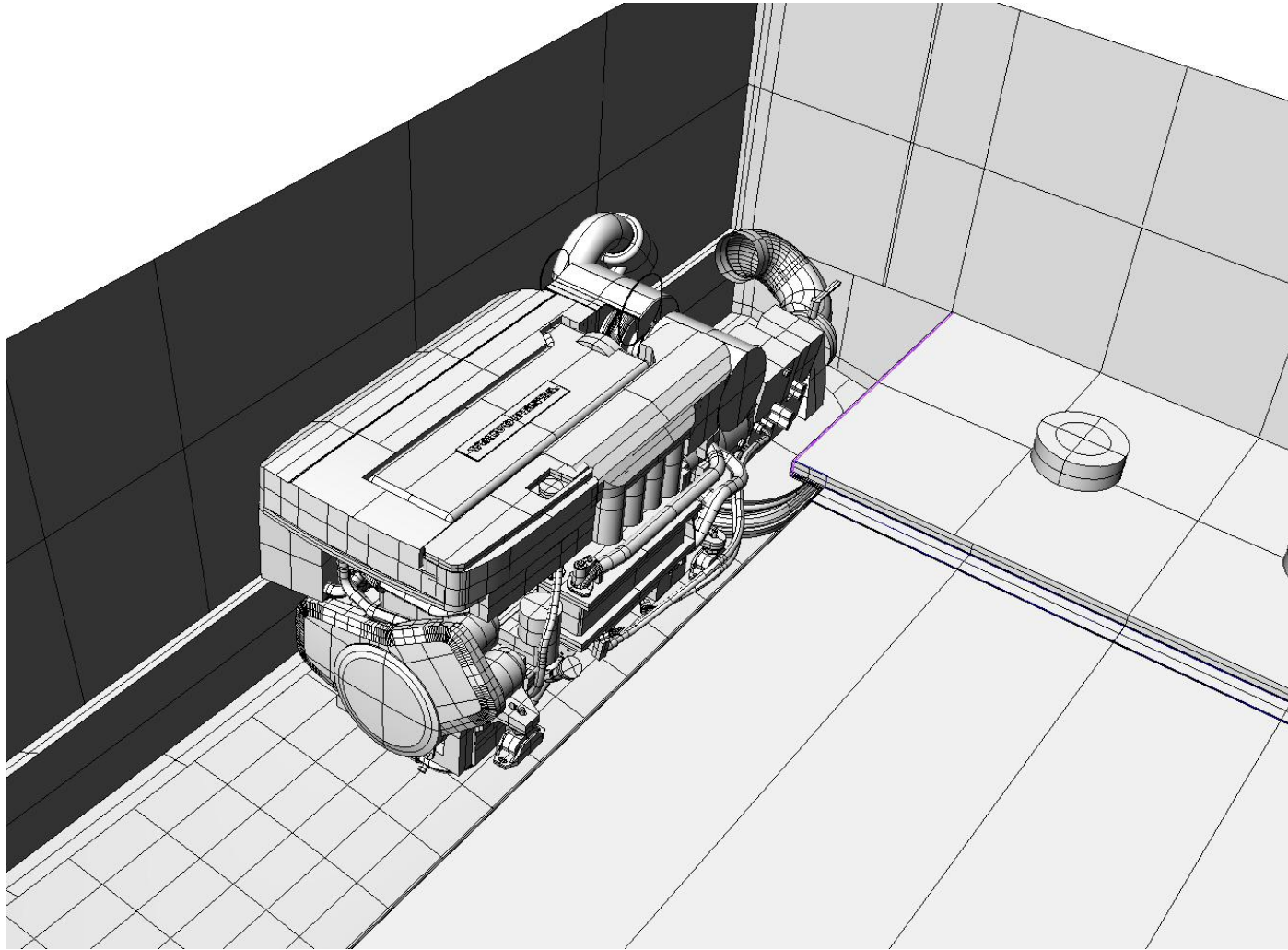
# ASV Mono 21 m Soft Motion hull – fan & cushion enclosure



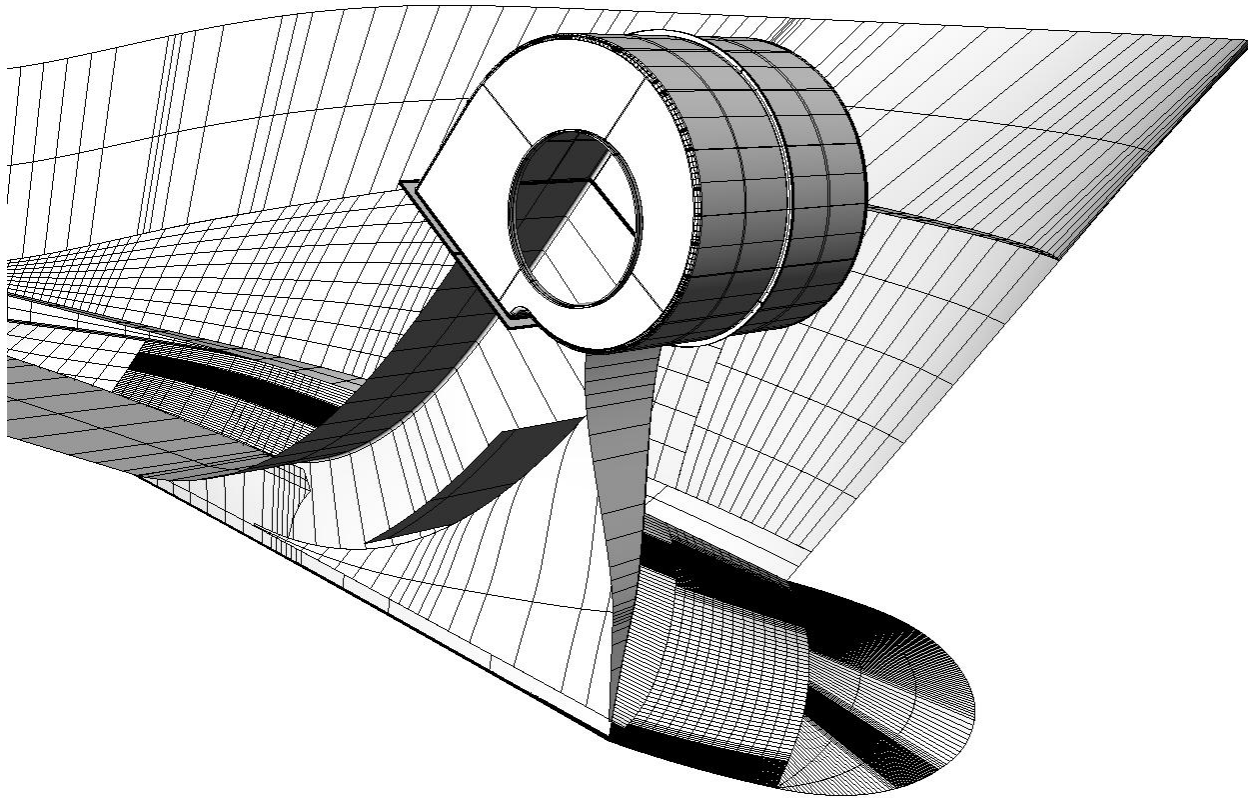
# ASV Mono 21 m Soft Motion hull – air cushion enclosure



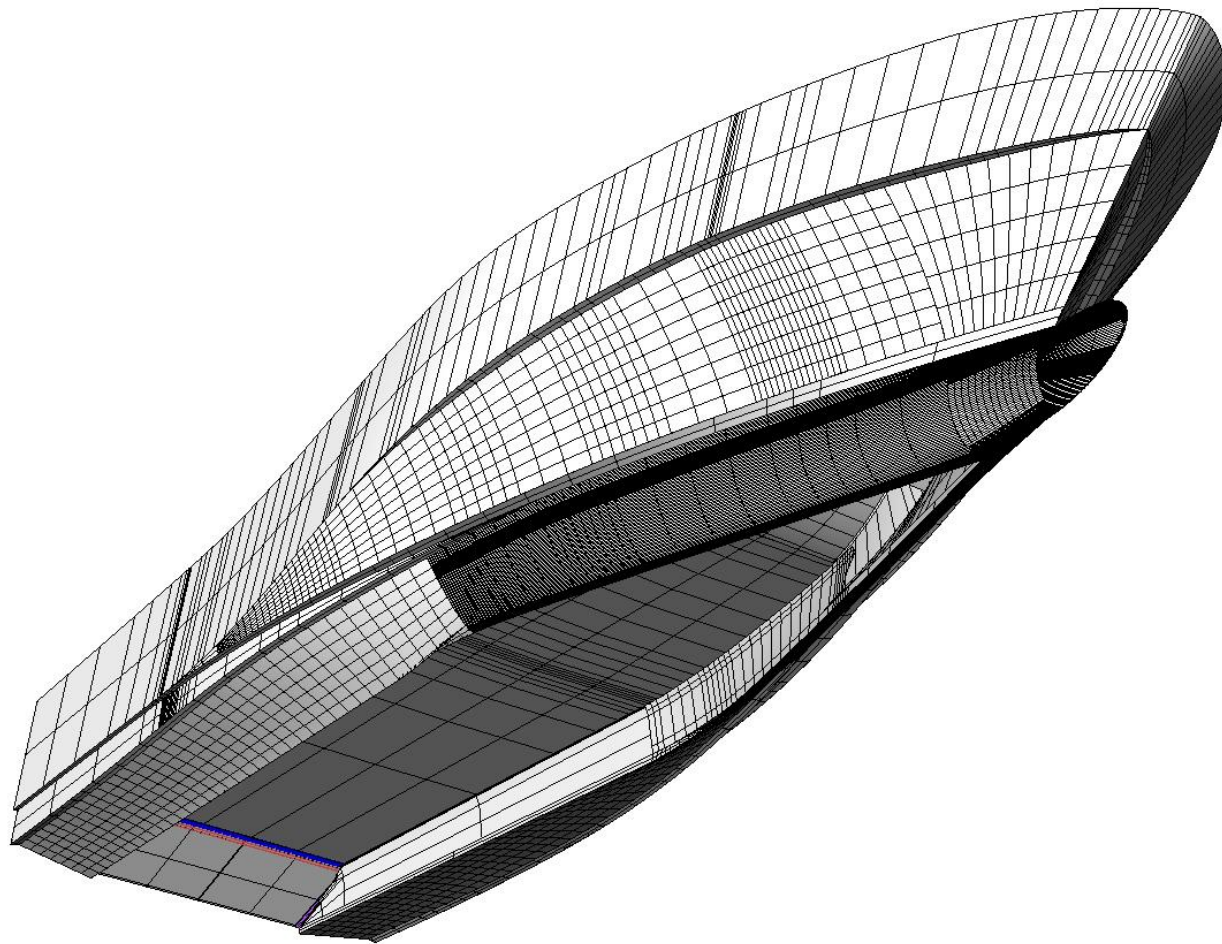
# ASV Mono 21 m Soft Motion hull – D 13 / IPS 3 installation



# ASV Mono 21 m Soft Motion hull – fan system integration



# ASV Mono 21 m Soft Motion hull – air cushion chamber



# ATLANTIC EAGLE SHIPYARD & EUROSHIDE

## ASV DESIGNS



- Contact person :
- Jose Valente
- Mobile phone :
- 00 351 917 331 558
- E-mail :
- [jose.Valente@Firstlink-sgps.com](mailto:jose.Valente@Firstlink-sgps.com)

- Contact person :
- Carlos Costa
- Mobile phone :
- 00 351 961 368 805
- E-mail :
- [ccosta@aeshipbuilding.com.com](mailto:ccosta@aeshipbuilding.com.com)



# Presentation of Euroshide and Atlantic Eagle Shipyard, ASV designs made with the technical assistance of Effect Ships International

The designs are based on two ASV hulls.

- A 16 m long hull and a 40 m long hull
- The hull lines and speed power predictions were made in collaboration with Effect Ship International.
- These designs shapes due to the high speeds are also focused in reducing the air resistance

# The aim of this exercise is to show the high potential of this technology.

The ASV main advantages are the following:

1. Propulsion power reduction up to 50 %
2. Beamy vessels that results in good stability and more interior space
3. Good seakeeping due to the damping effect of the air cushion
4. Very strait lines making building easier

# The 16 m ASV Hull - 2 versions

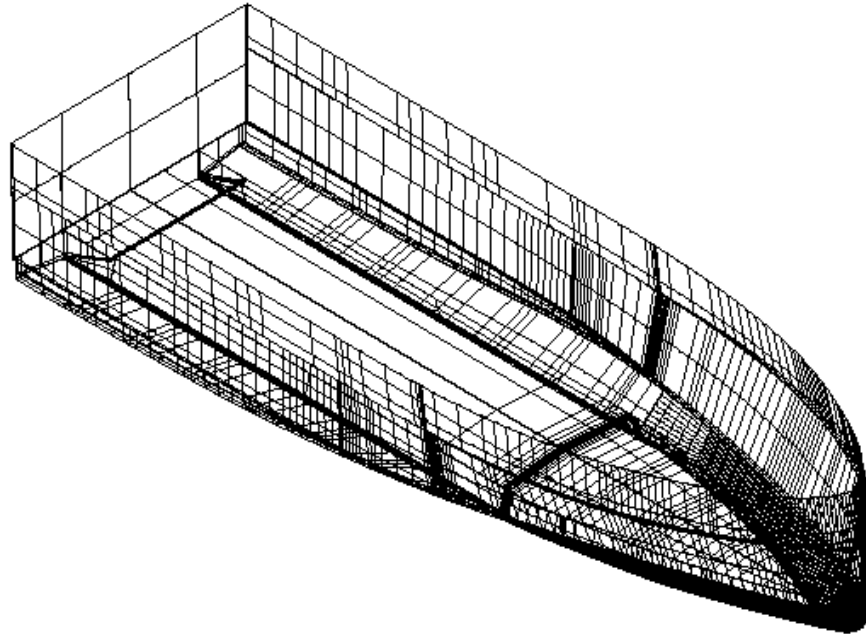
## 1. A small Coast Guard Vessel

## 2. A 37 PAX Taxi/Crew Boat

### Both versions will have the following characteristics

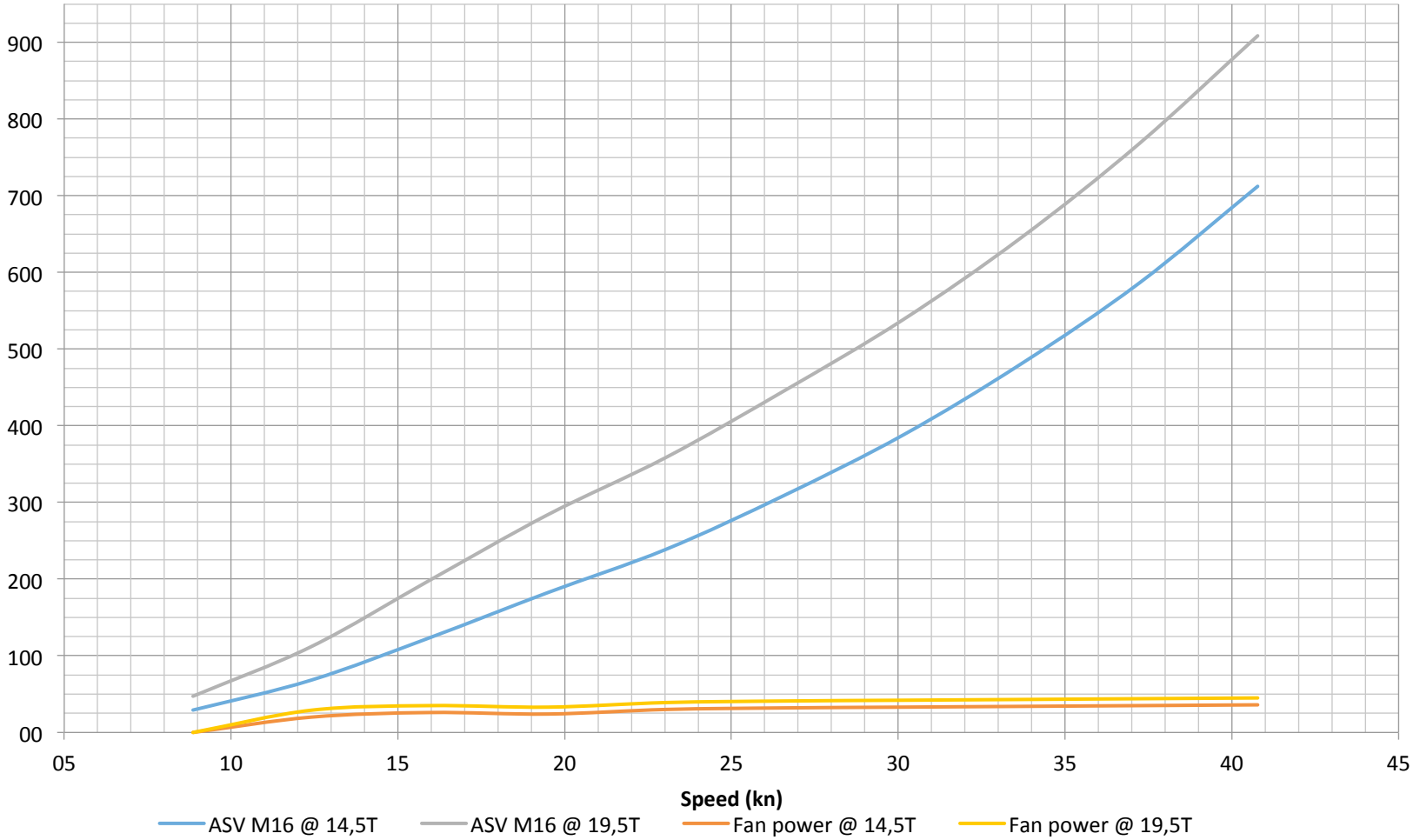
- 16 m ASV main dimensions
- Length o. a.-----16.0 m
- Beam -----5.2 m
- Hull draught-----0.8/0.9 m
- Depth-----2.7 m
- Displacement-----14.5/19.5 t
- Speed -----40 kn
- 16 m ASV propulsion equipment
- 2 Main engines Caterpillar
- Model C 18
- Engines power 2x 450 KW
- 2 Konrad 680 stern drive

# Stern view of ASV 16 m Hull lines



**ASV 16 m Speed Power curves for 2 displacements, note that power is about 50% of the power needed for a conventional hull with the same displacement**

### Speed/Engine power prediction ASV M16

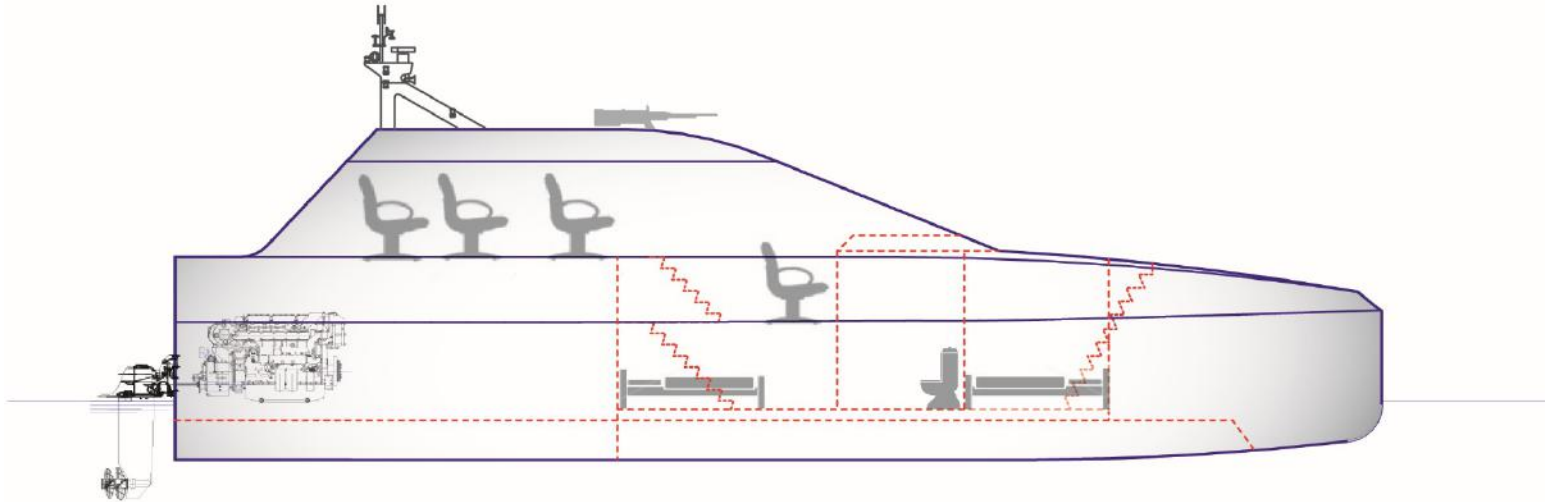


# ASV 16 m Coast Guard Vessel

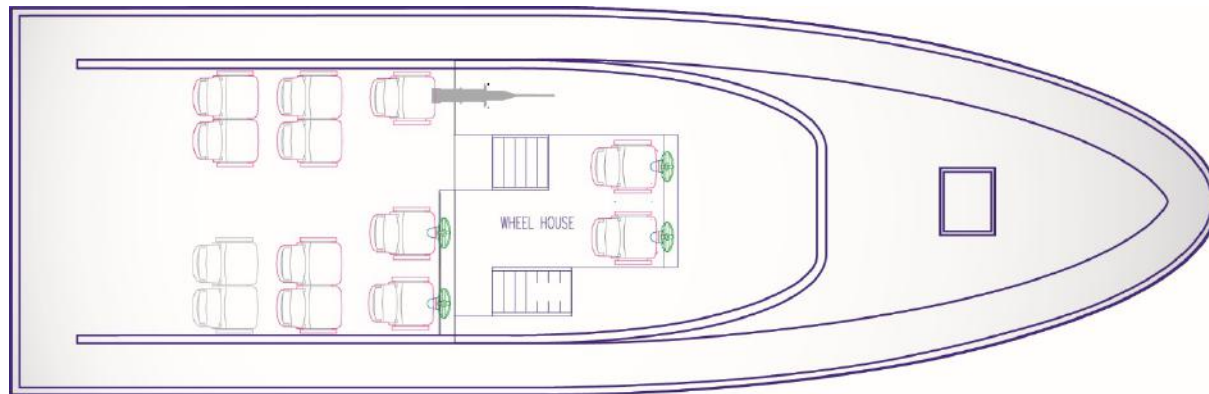
Image



# ASV 16 m Coast Guard profile view showing engine, stern drive installation, space distribution and machine gun localization



# ASV 16 m Coast Guard deck view showing cockpit, wheel house and machine gun localization

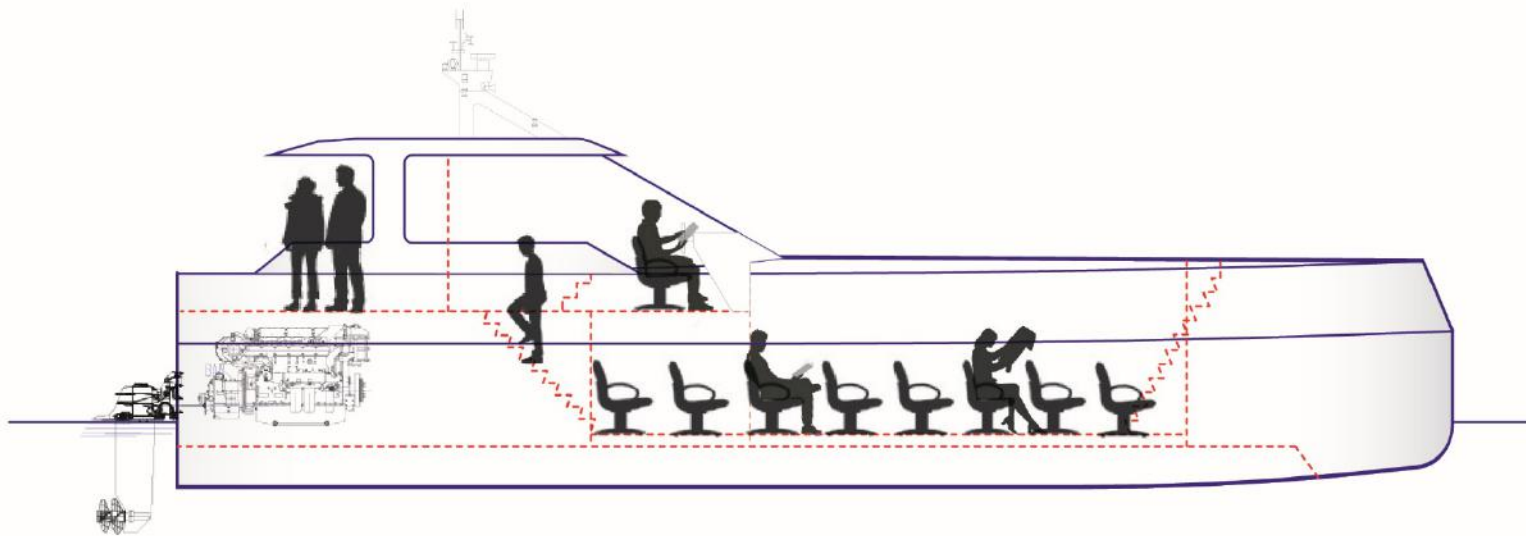




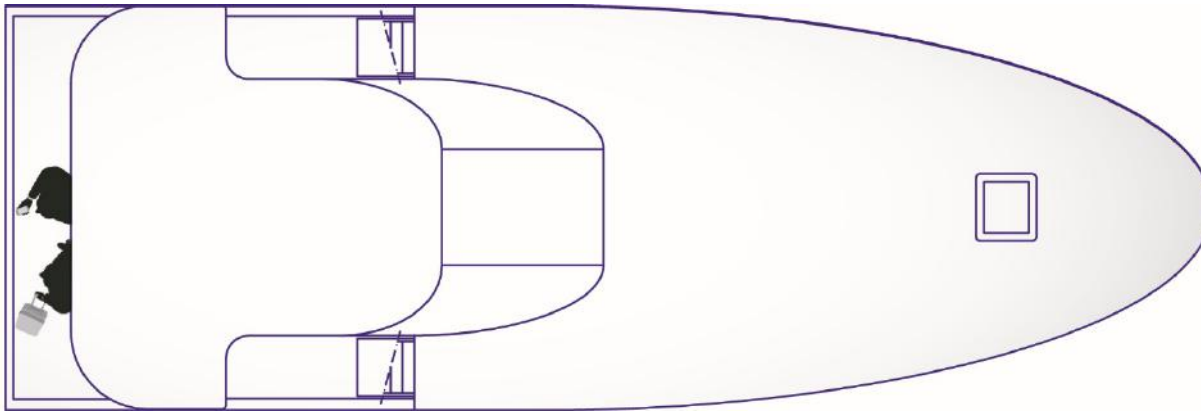
# ASV 16 m 37 PAX Taxi Boat Image



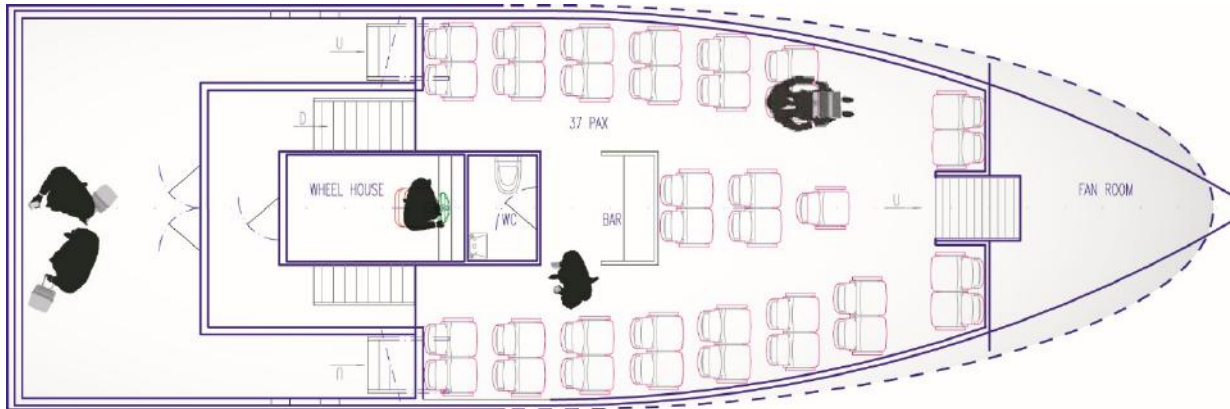
ASV 16 m 37 PAX Taxi/ Crew Boat profile view showing engine and stern drive installation, space distribution and fan room location



# ASV 16 m Taxi deck view



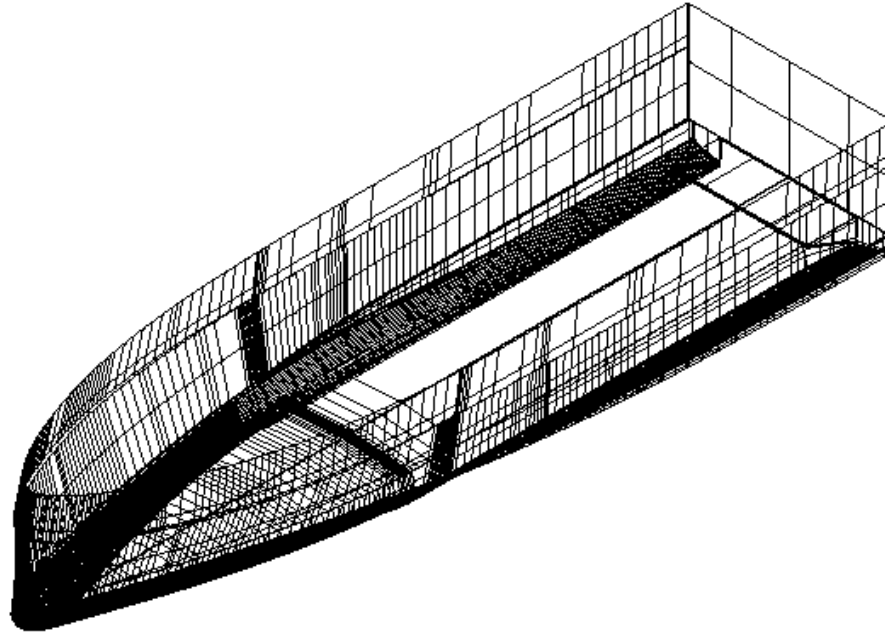
# ASV 16 m Taxi under deck view showing cockpit passenger space and fan room



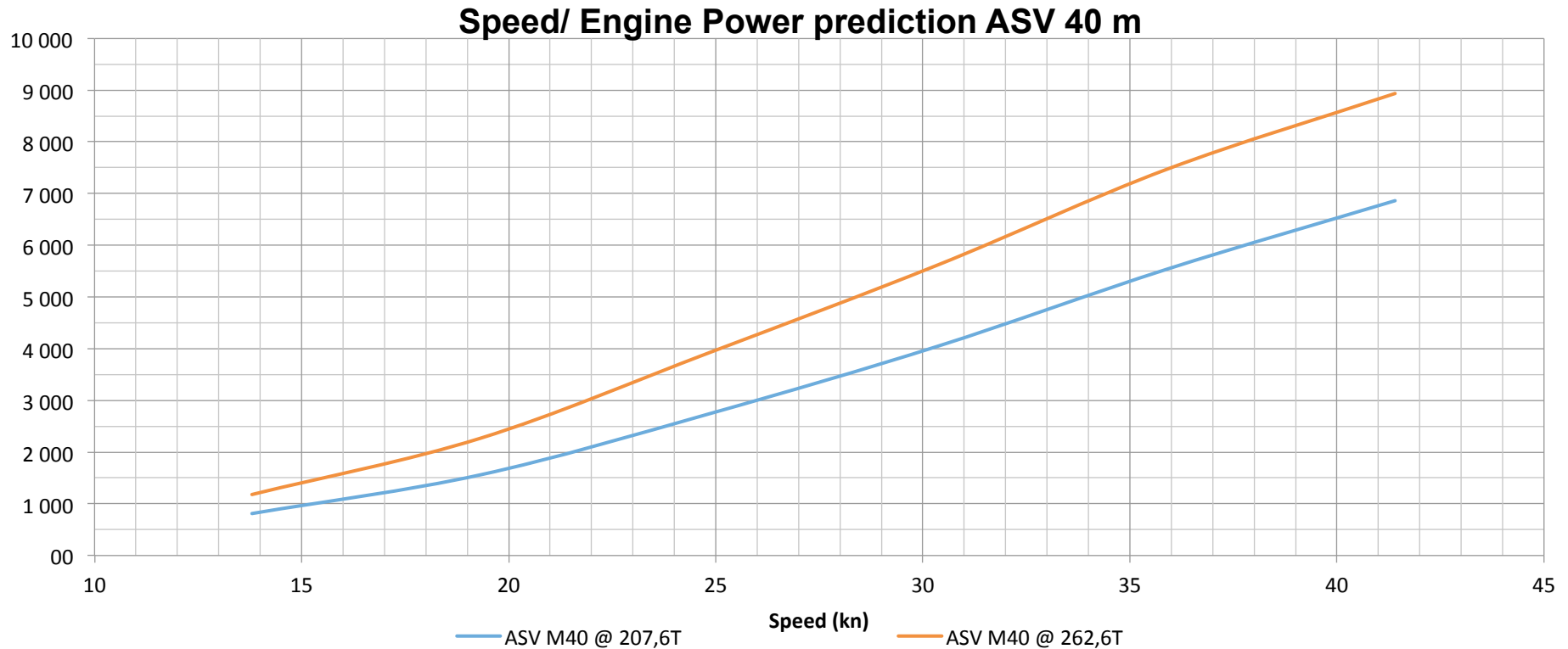
# The 40 m ASV Hull – Patrol Boat

- ASV 40 m main dimensions
- Length o. a.-----40.0 m
- Beam -----10.0 m
- Hull draught-----1.9/2.1 m
- Depth-----4.8 m
- Displacement-----207.6/262.7 t
- Speed -----40 kn
- 40 m ASV main equipment
- 2 Main engines MTU
- Model 16V 595 TE 90
- Engines power 2x 4300 KW
- 2 MJP CSU 850 water jets
- 1 small helicopter
- 1 Rib
- 1 Otomelara gun

# Stern view of ASV 40 m Hull lines



# ASV 40 m Speed Power curves for 2 displacements, power is about 50% of the power for a conventional hull with the same displacement

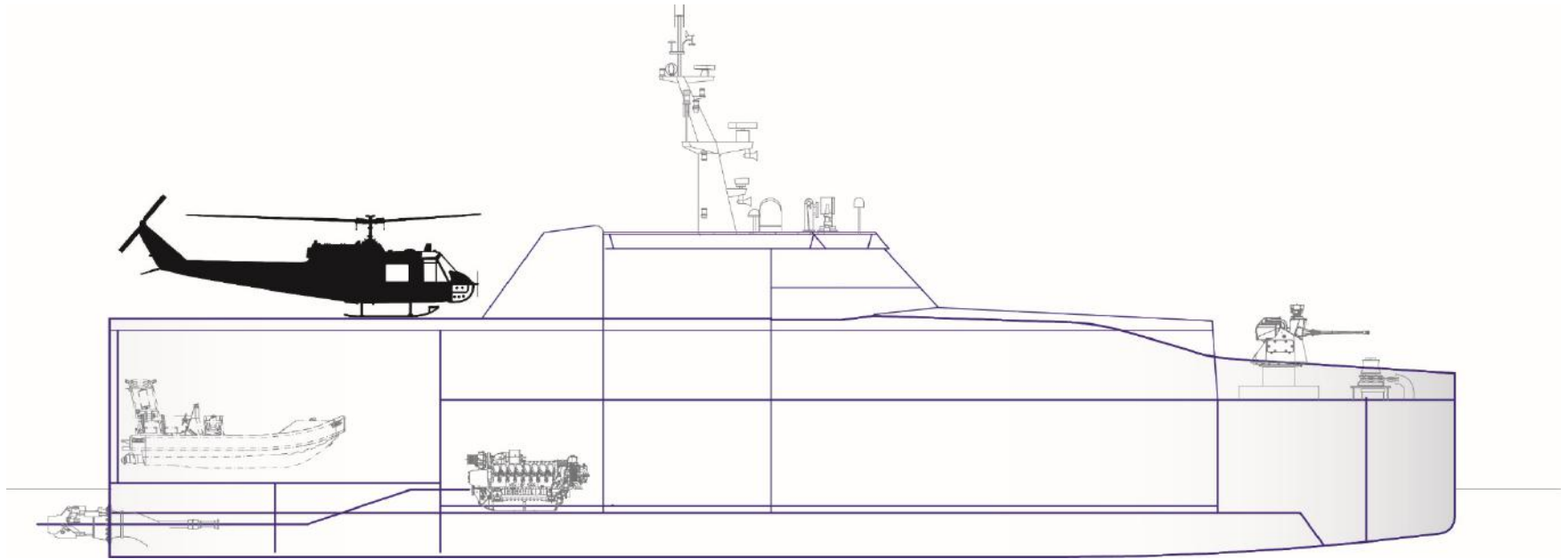


# ASV 40 m Patrol Boat Image





# Profile view showing the engines and water jets installation, the Rip, small helicopter and Otomelara gun localization



# Section showing the engines and water jets installation and the

