# DESIGN OF MOTORISED MODULAR FLOATING BRIDGE

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## Introduction to motorised floating bridges:

**Floating bridges are unique structures which can be utilised in the military and civilian contexts to cross large bodies of water where traditional bridges cannot be constructed. Motorised floating bridges can be remotely controlled to connect and form longer bridges via azimuth thrusters and sensors.**

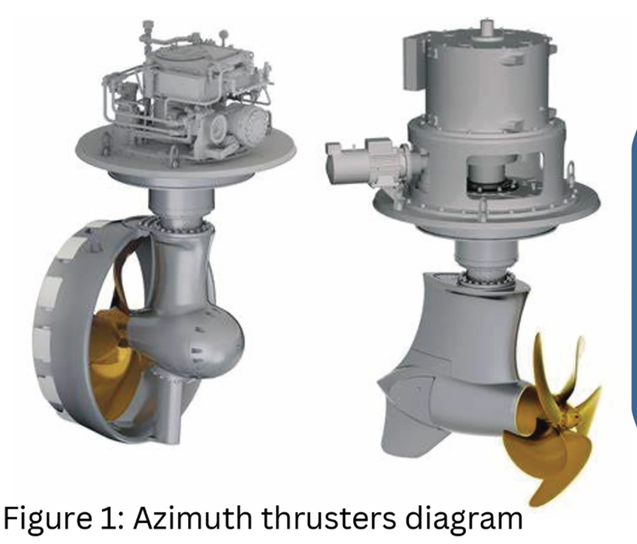
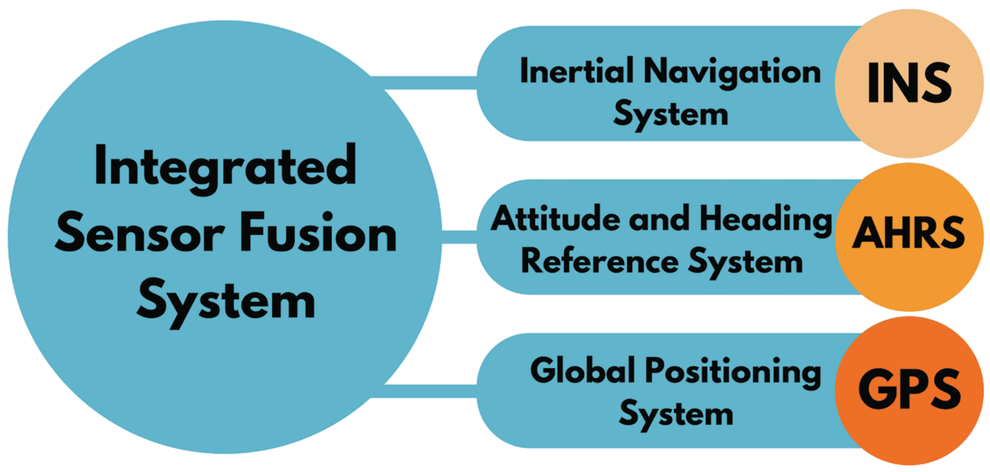


Figure 1: Azimuth thrusters diagram

### Positioning:

An Integrated Sensor Fusion System is used to obtain real-time updates on the orientation and position of the barges. Azimuth thrusters are used to transport the barges to the deployment site and for linking.




### Connection and Anchoring:

Barges are interconnected via long steel ramps that are equipped with rollers and guiding pins for locking and extending purposes. Hydraulically actuated spud poles are lowered into the sea, effectively locking the modules in place.

### Pontoon Oscillation:

The effect of the moving weight of the tanks on the floating bridge results in deflection and stress, wearing out the connectors. Dampers can be used to reduce the impact of the wave load on the structure, resulting in smoother operation. Material selection for pontoon construction is also important when analysing the elasticity and ability to absorb hydrodynamic forces.

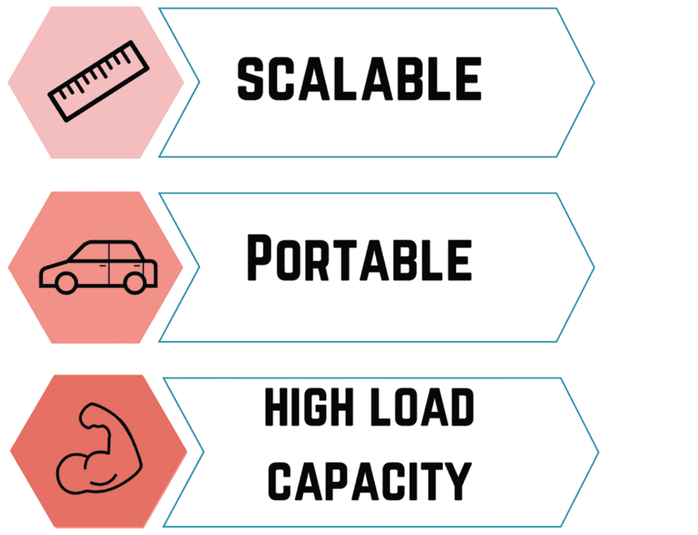



Figure 2: CNIM PFM Motorised Floating Bridge

Figure 3: Trucks crossing modular floating bridge

## Conclusion

**Motorised modular floating bridges have a lot of potential to be used in times of civil emergency and war. The main challenge with constructing a temporary floating bridge spanning 2 km is the heave motion and dynamic stability of the structure.**

## Areas for future refinement:

- **Rigorous testing such as wave simulations and weight tolerance tests**
- **Incorporation of Artificial Intelligence to remotely process and compute data from the sensors to translate into motion control of the barges**