Modular Magnetic Bio-Inspired Autonomous Underwater Vehicle

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Manoeuvrability

Multi actuated body is able to perform a range of unsteady locomotions, such as C & S starts and agile turning manoeuvres.

Efficiency

Designed to mimic efficient Body Caudal Fin Fish swimming the robot generates thrust by forming a travelling wave along its central line.
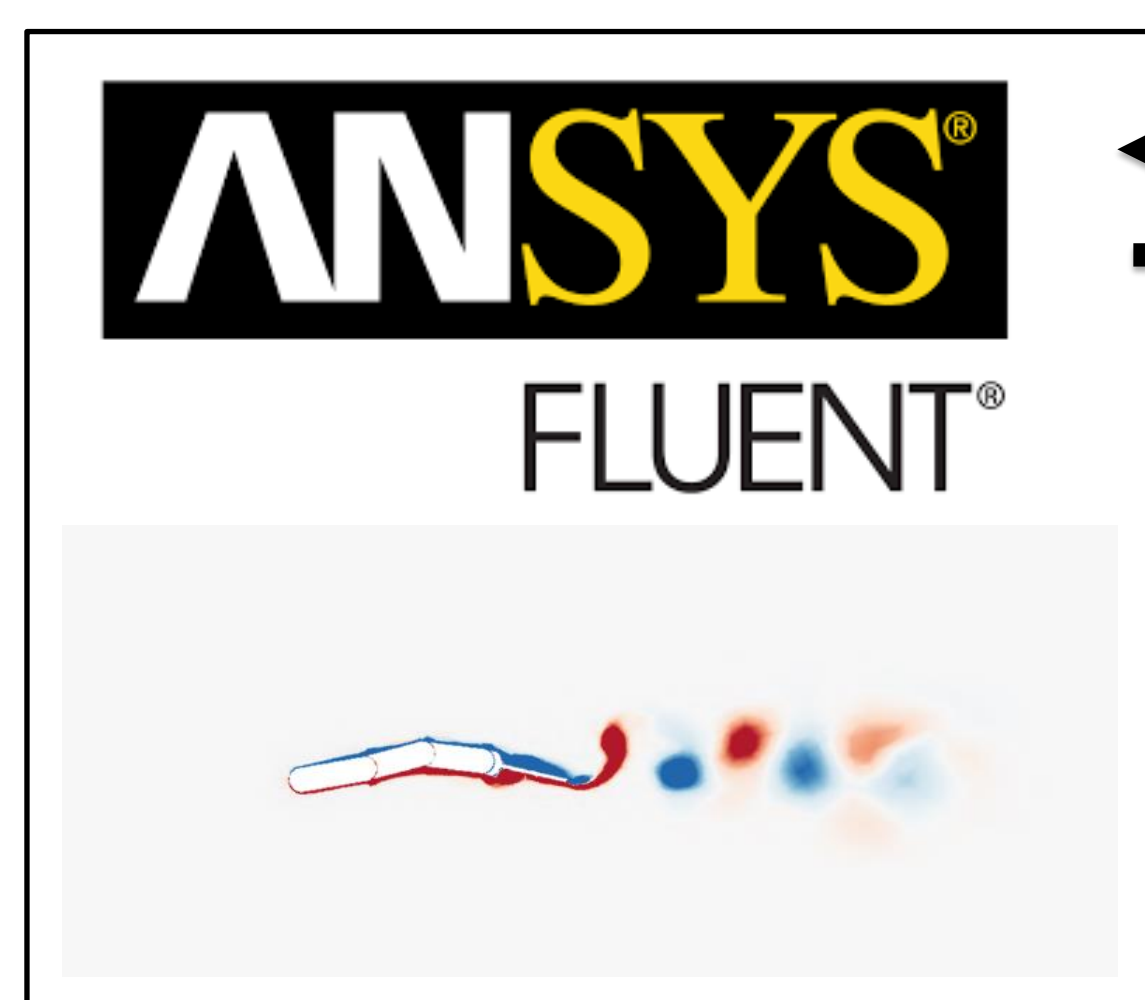
Modularity

True mechanical and system modularity thanks to synchronous magnetic coupling plus electronics and software redundancy.
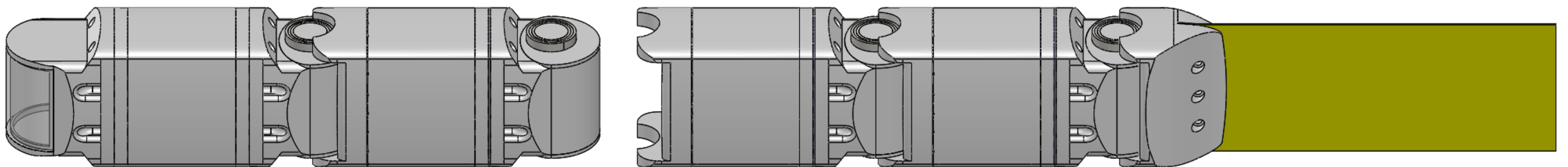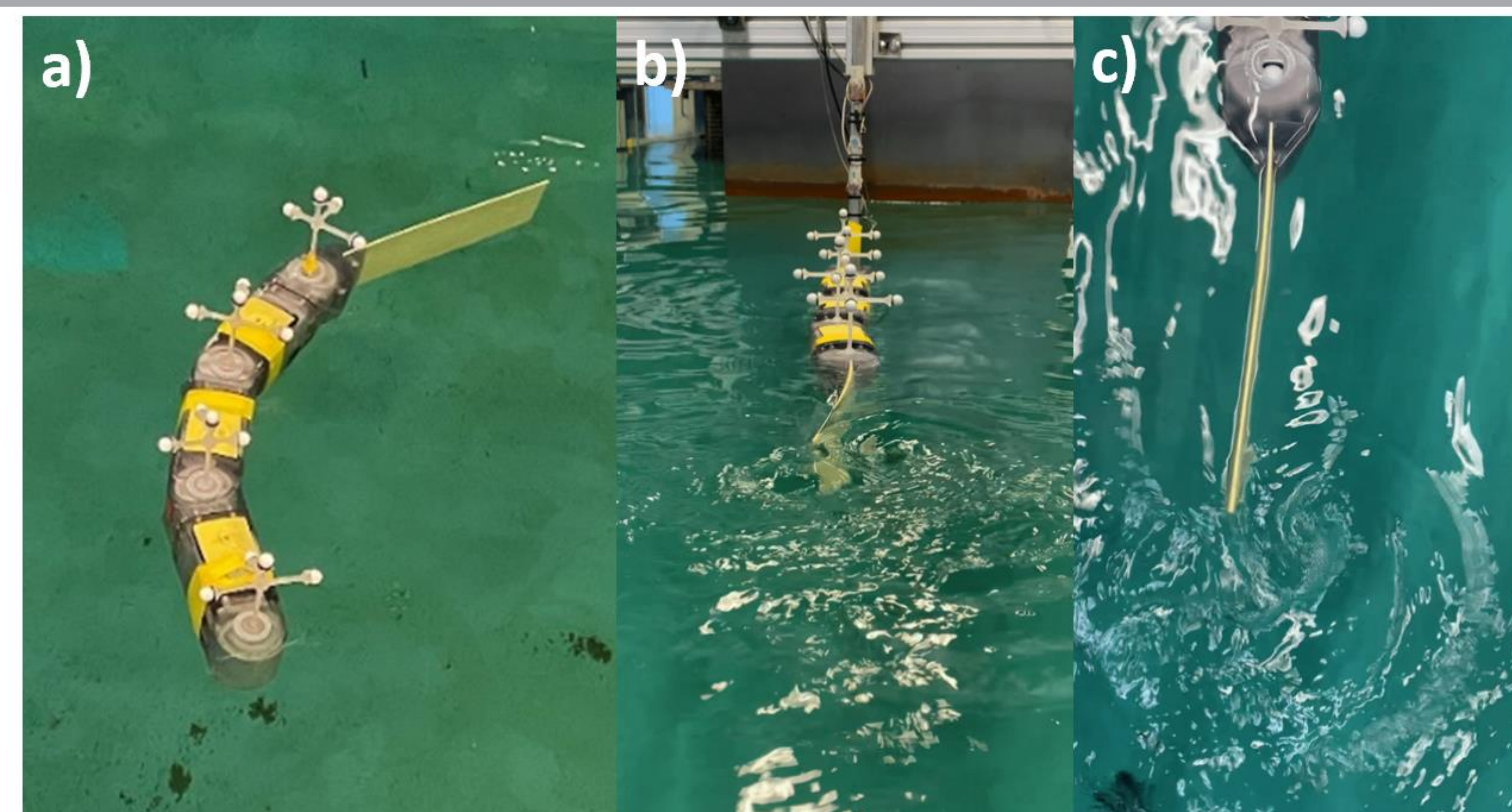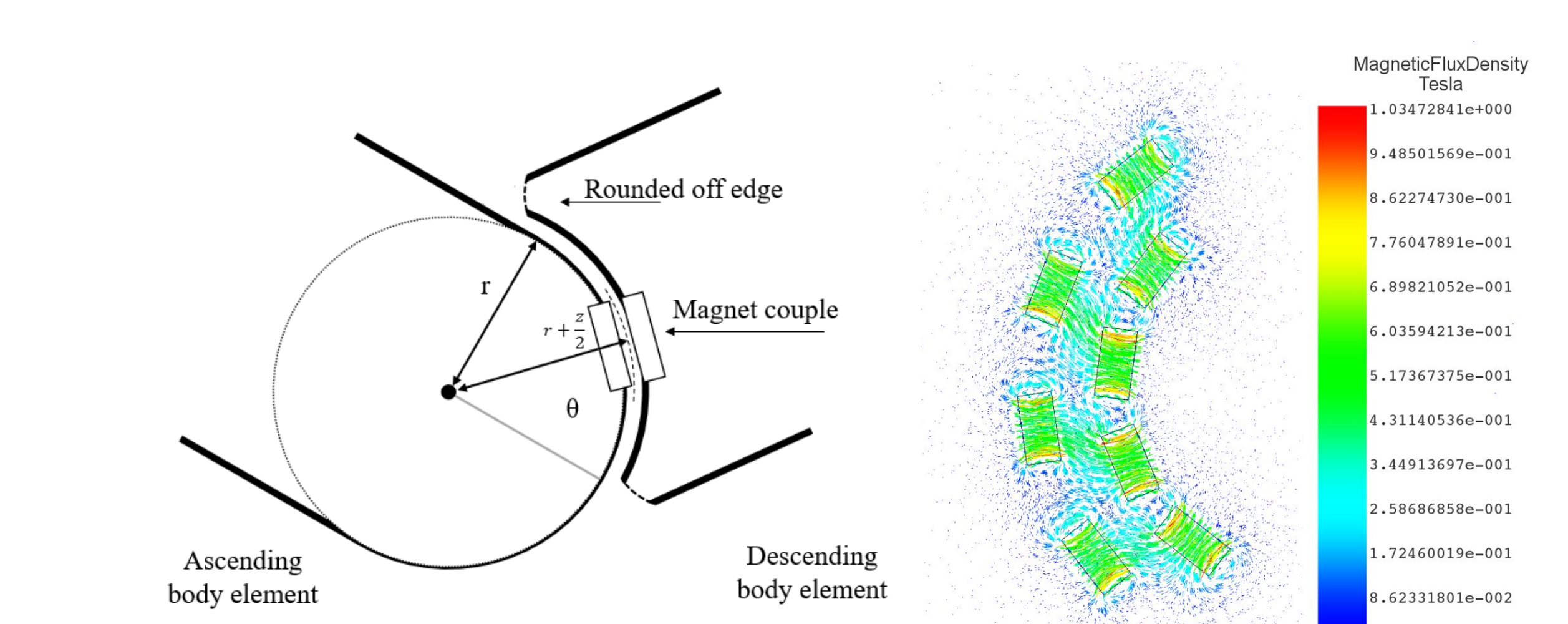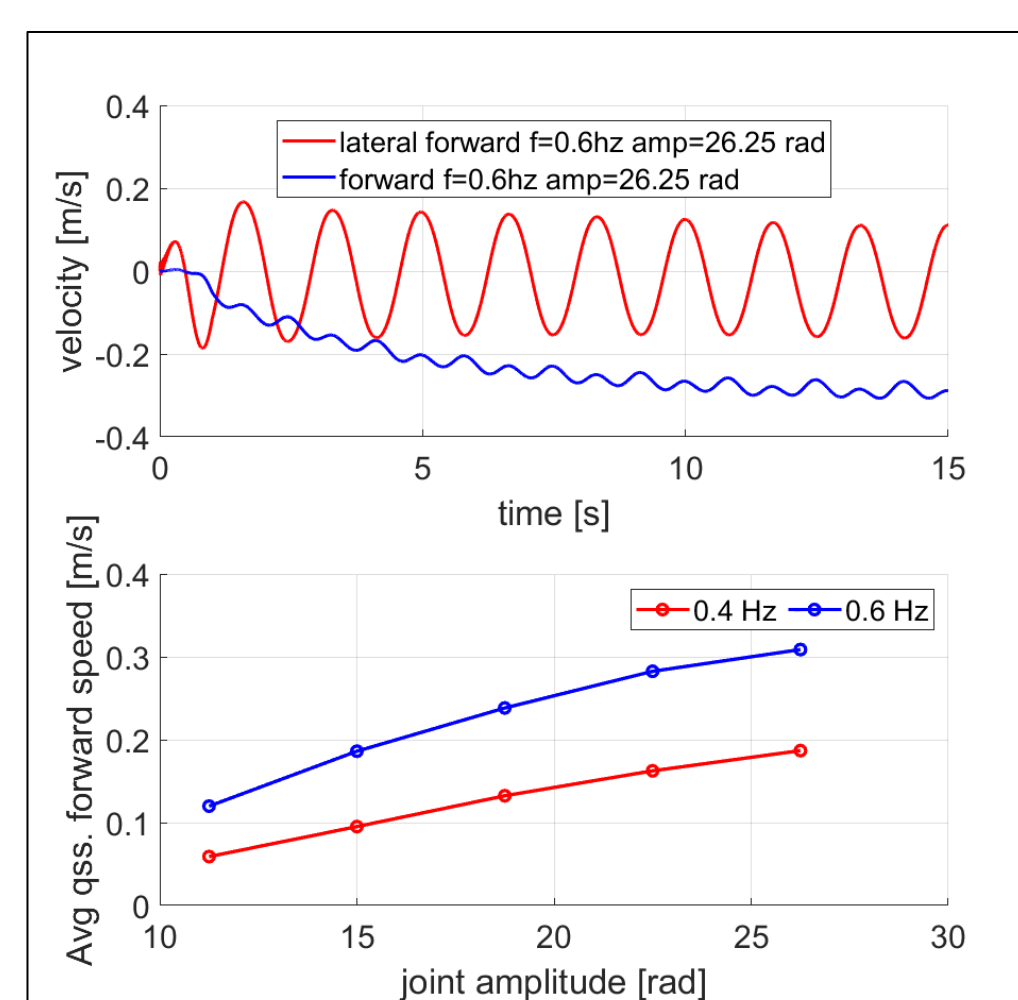
Fully 3D printed 4 module prototype | Statically sealed synchronous magnetic coupling | Wireless BT communication | Length: ca. 1m | Weight ca. 5 kg

Multi-body CFD & Control Simulation

ANSYS FLUENT

In-house developed code
- Mobile multibody framework
- Speed & waypoint tracking control

Analytical and Magnetostatic Modelling

Prototype: Modular Magnetic Bio-inspired AUV
a)   Free swimming 3 body + caudal fin
b)   Load cell thrust measurement
c)   Flexible caudal fin vortex generation

Scan QR code for videos

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[3] Schomburg, Werner Karl, et al. "Equations for the approximate calculation of forces between cuboid magnets." Journal of Magnetism and Magnetic Materials 506 (2020): 166694.