

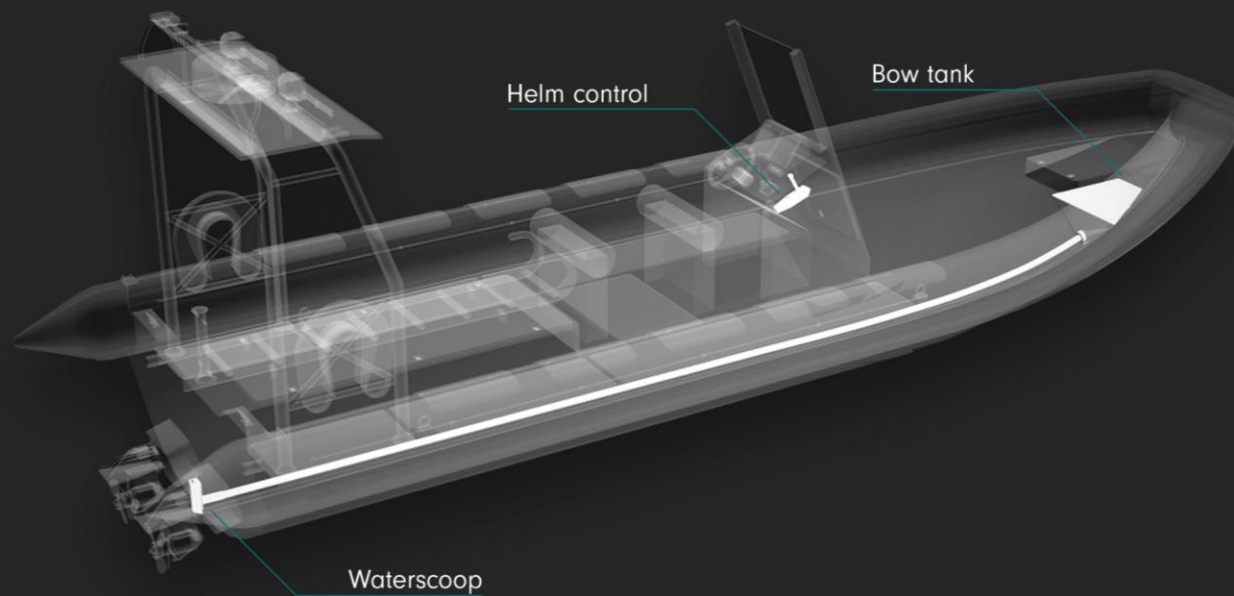
MASS EFFECT:

Simulating the effect of dynamic ballast on high-speed craft

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HOW IT WORKS



APPLICATION



SPEED

- Lightweight
- High-speed
- Minimise porpoising
- Calmer seas



SEAKEEPING

- More crew
- Rescue conditions
- Low-mid speed
- Slam reduction

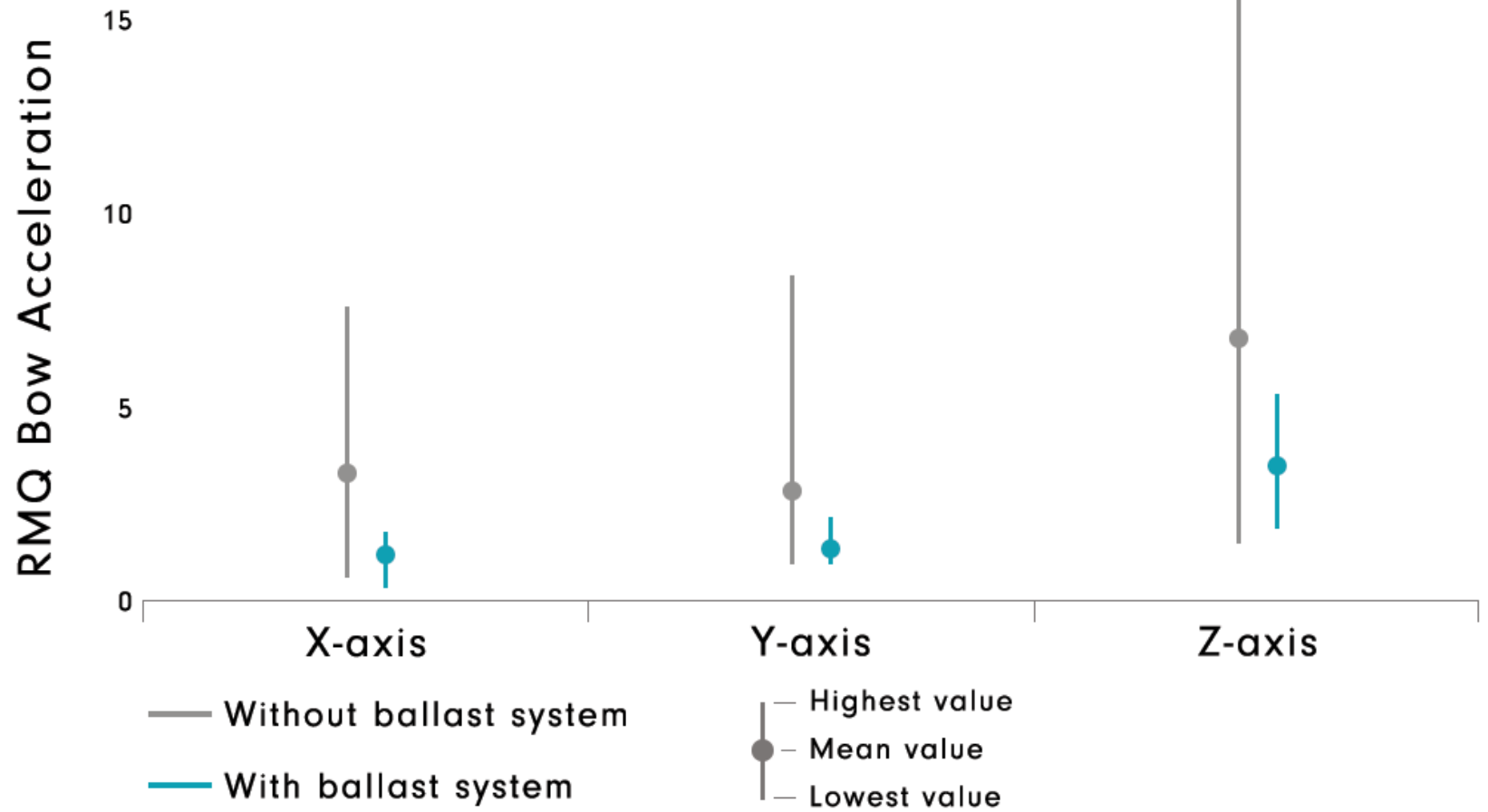
7.5m

LIFEBOAT



7.5m

LIFEBOAT

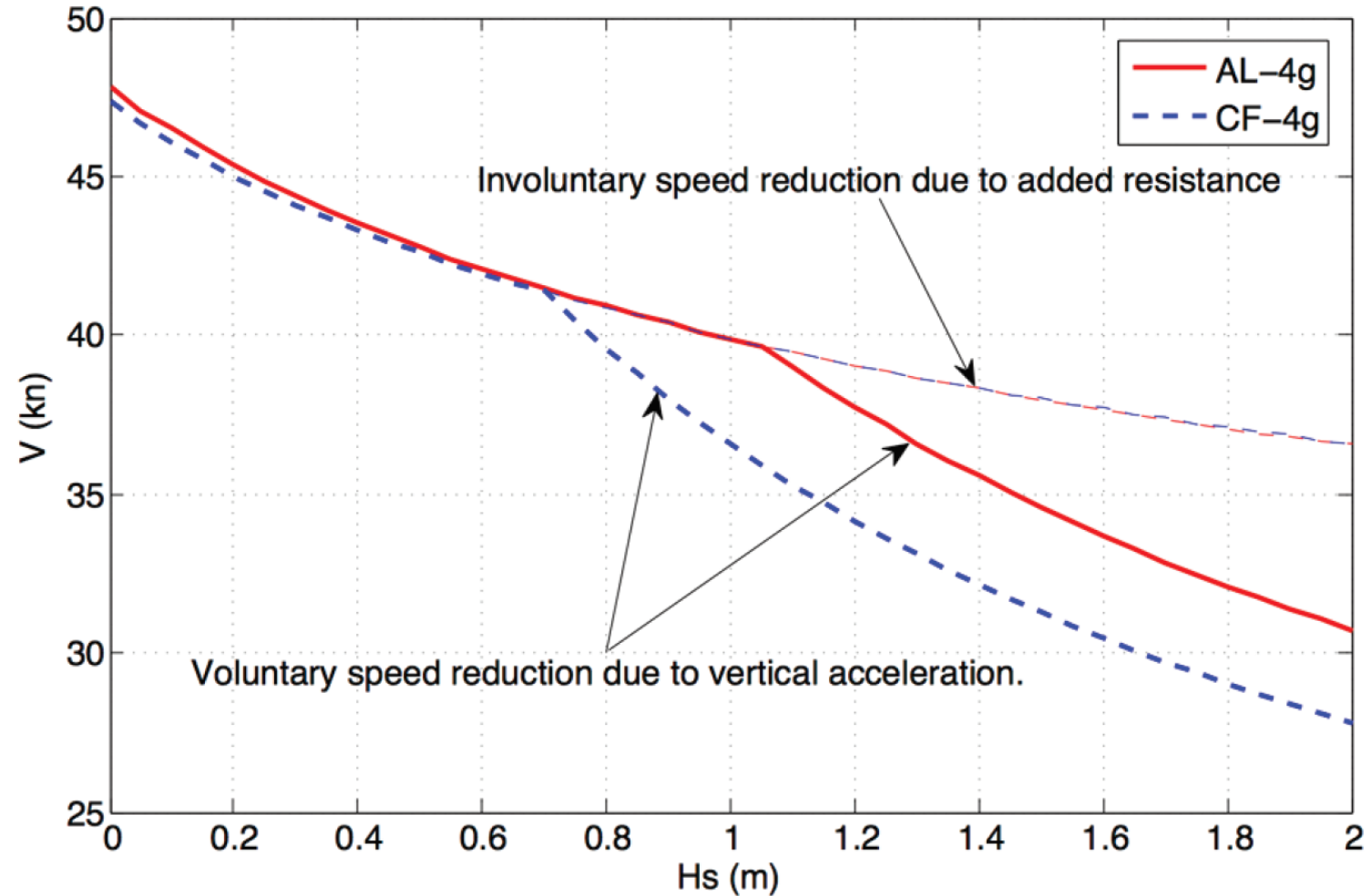


What influences rigid inflatable boat motions?, Townsend et al, 2012

24m PATROL CRAFT

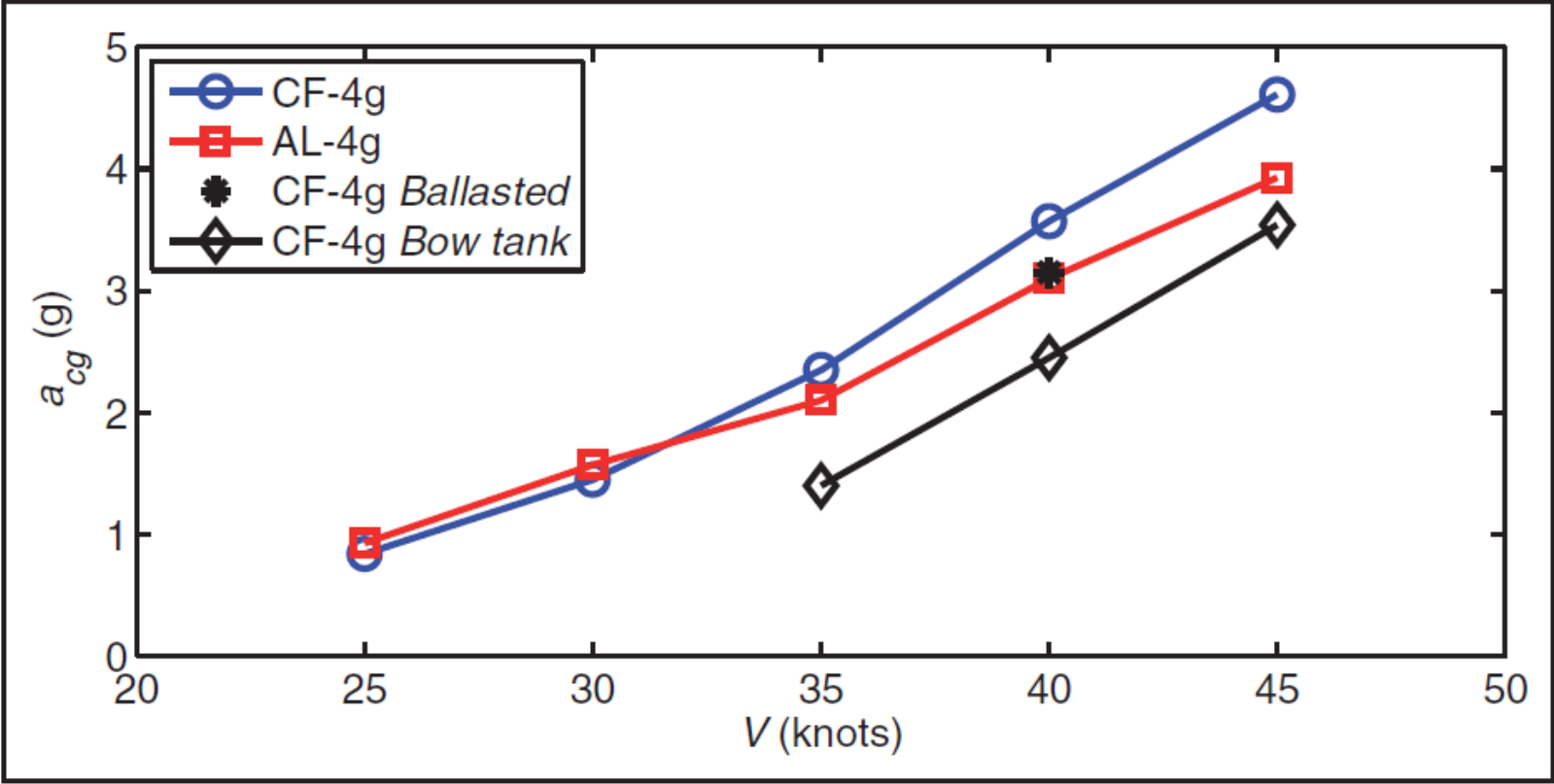


SPEED REDUCTION



Rough water performance of high-speed craft, Garne et al, 2012

LOWER IMPACTS



Rough water performance of high-speed craft, Garne et al, 2012

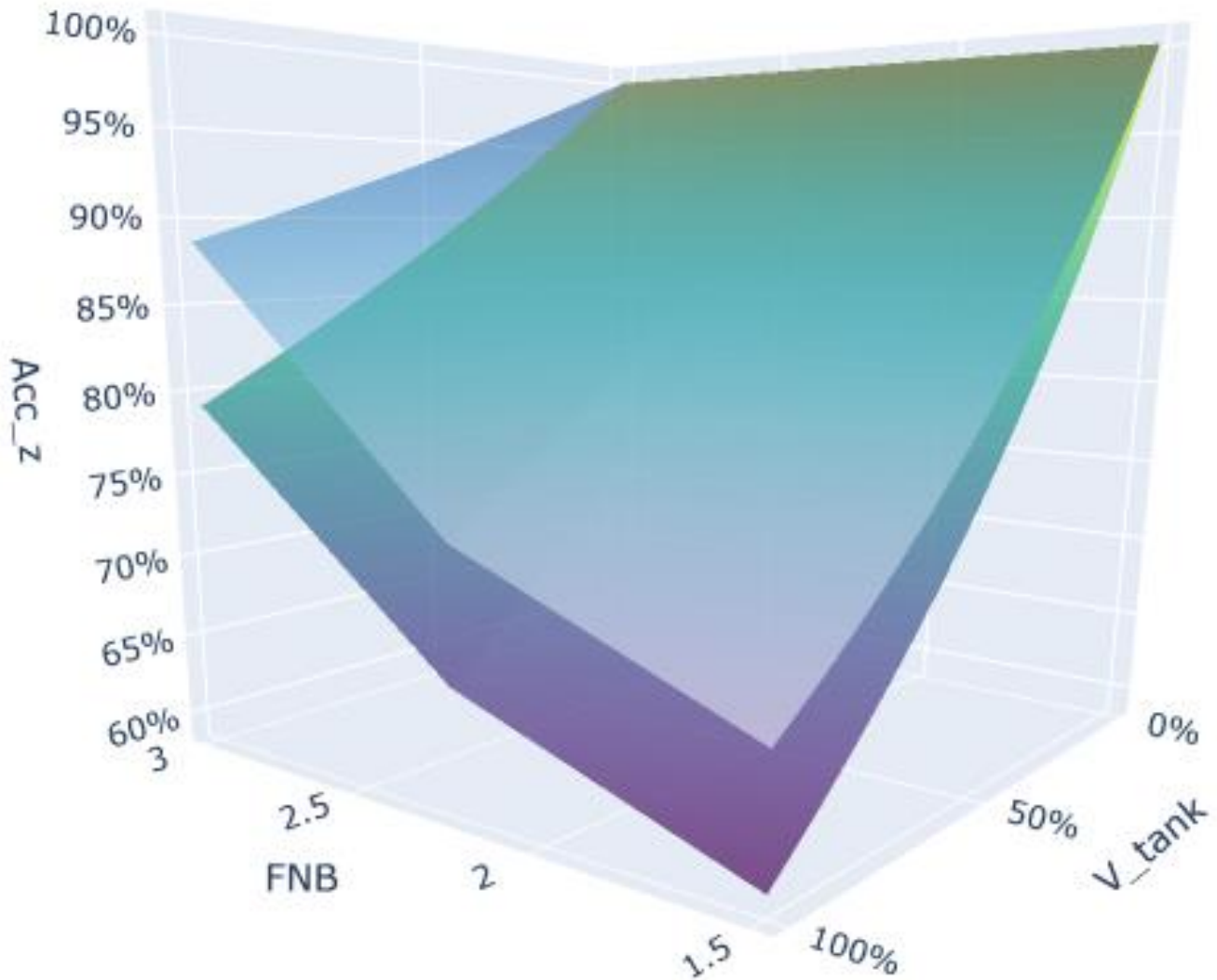
DYNAMIC MODEL

- Based on Savitsky model
- Simplified for practical use
- Early-stage design tool
- Minimal info available
- Meeting spec requirement

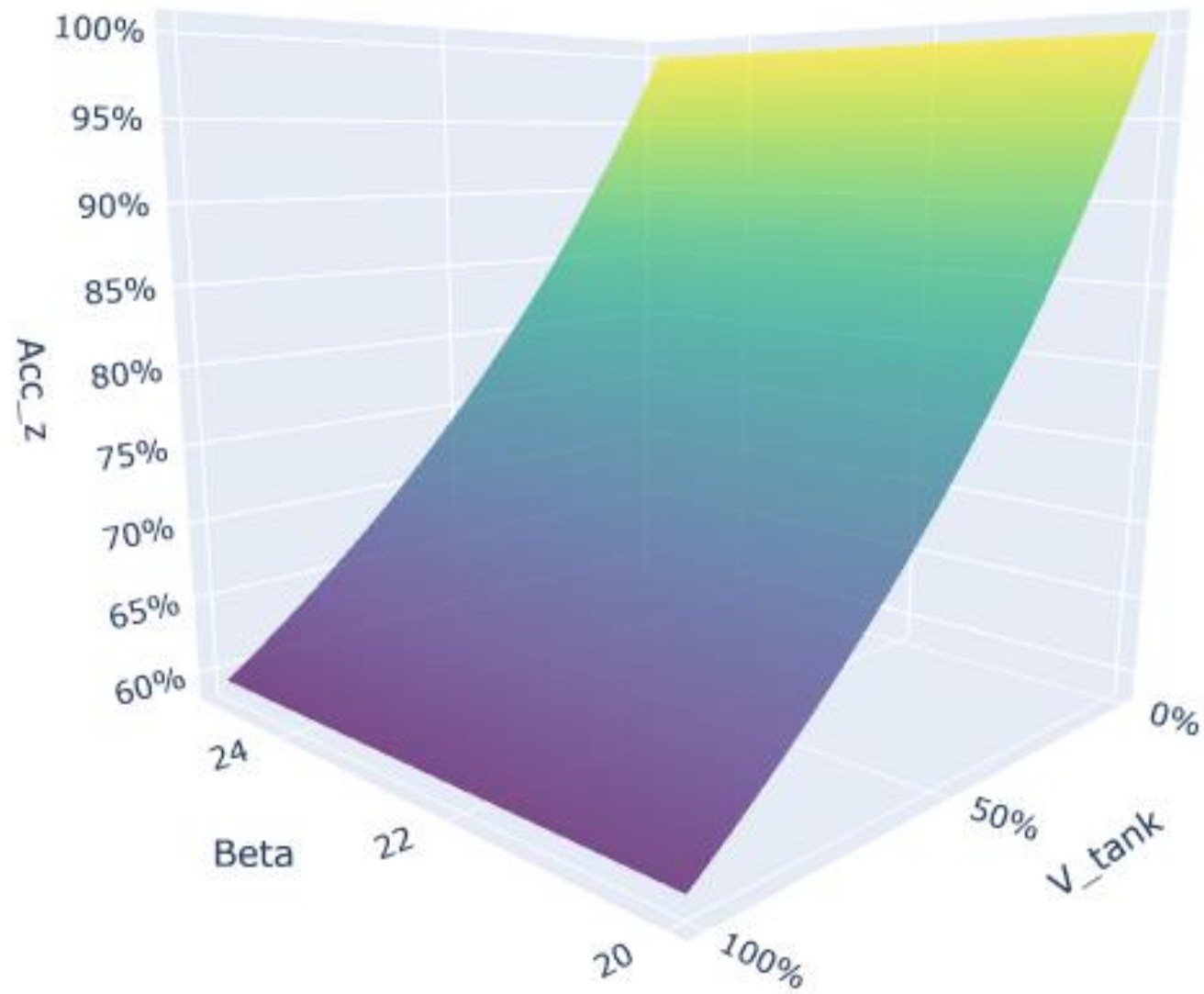
SIMULATION INPUTS

PARAMETER	UNIT	INPUT
Length of waterline	m	12.2
Chine beam	m	2.9
Deadrise	°	22
Mass (loaded excl. ballast)	kg	10,000
LCG (excl. ballast)	m	4.27
Ballast tank volume	m ³	0...1.200
Tank longitudinal location from transom	m	12.2
Significant wave height	m	1
Beam-based Froude number	-	1.5, 2.0, 3.0
Forward velocity	kts	15.6, 20.1, 31

ACCELERATION



DEADRISE





OPTIMISATION

- High-speed, shallow deadrise
- Rough water operation

NEXT STEPS

- Craft design library
- Effect of ballast on roll motion
- Midship tank position
- Data validation

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