Zero Emission Speed ShuTtle

zesst

Dr Luc Blecha
Almatech SA
Switzerland
+41 78 801 30 96
Luc.blecha@almatech.ch

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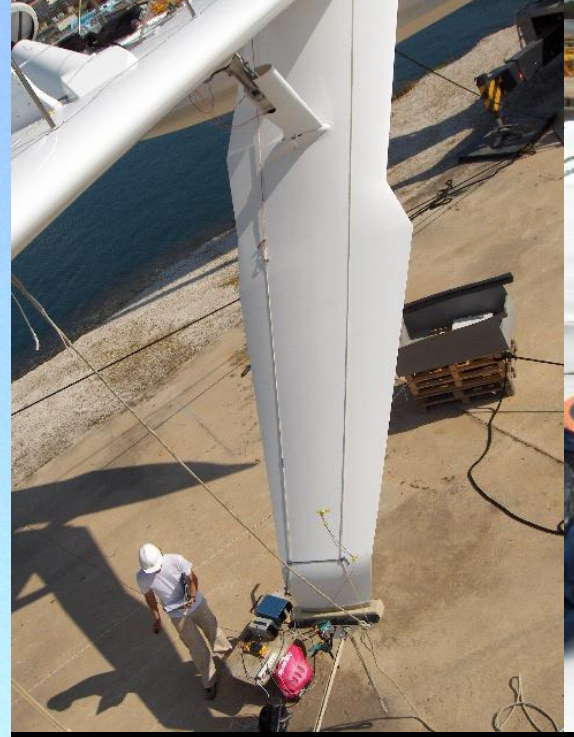
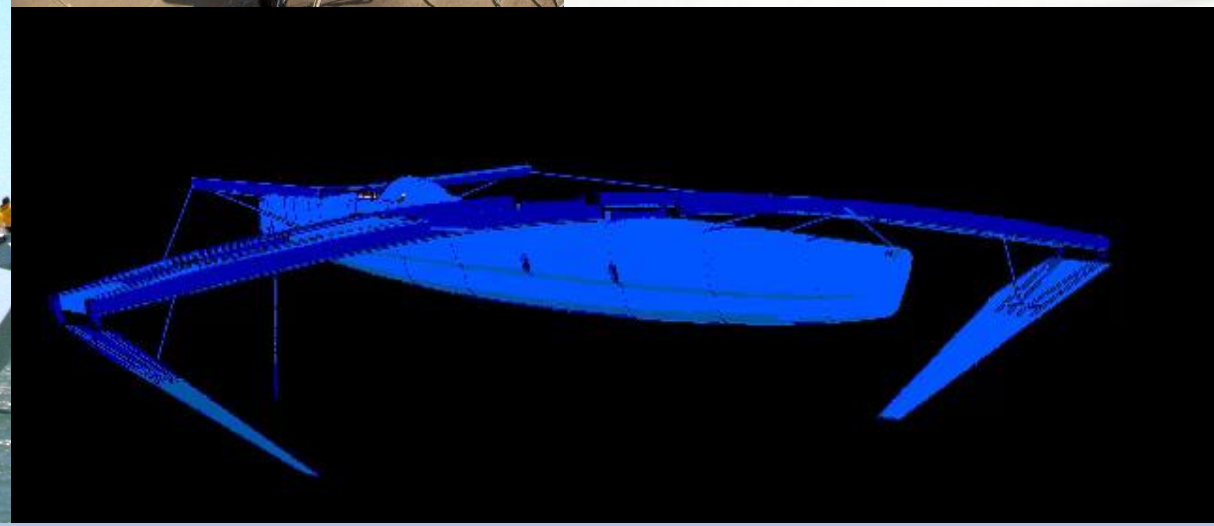
The seeds that made ZESST





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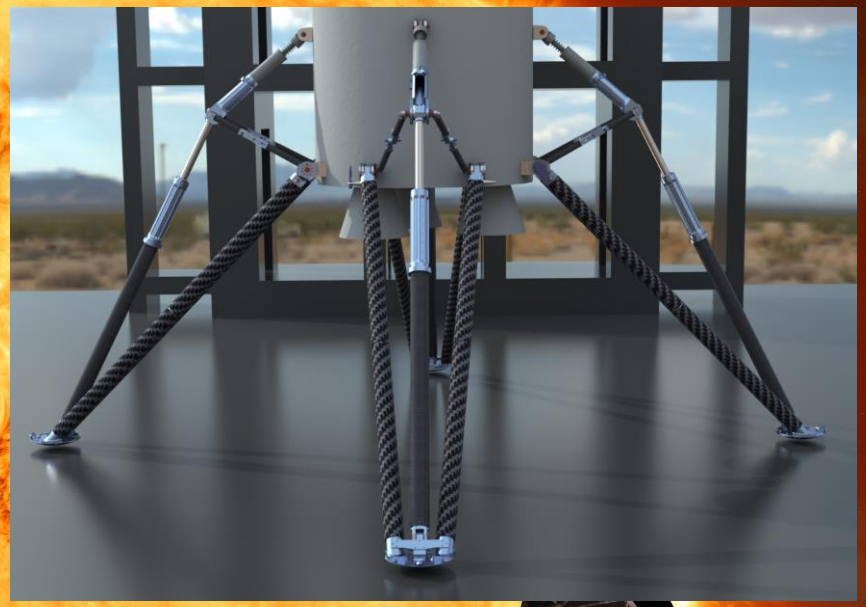
13 years of technological success for space & naval engineering



- 1st Swiss Space Telescope
- 1 sailing speed record at 95 km/h
- Prestigious customers & partners

TONY CASTRO · SIG · EPFL · Carbagas · transdev the mobility company · cnes · esa European Space Agency · ThalesAlenia Space · AIRBUS · Honeywell · LEONARDO

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Mobility emits 8.7[1] Gt of CO_2 and account for 23%[1] of global emission. We have 28[1] years to bring it down to zero!

Road mobility is saturated and congested

The new mobility hub is water

- Travel distance is cut by 75%[2]
- 50' Travel time saved[2]

Lake Geneva

Côte d'Azur

Osaka

Oslo

Stockholm

Dubai

New York

Available fast ferries are:

CO2 intensive, fossil fuel dependent, noisy, wave making, and non compliant to IMO regulation evolutions

1 IPCC AR6 WGIII, Ch 10, November 2021
2 For Lausanne-Thonon-les-bains trip on lake Geneva, 19 km by boat, 78 km by road.

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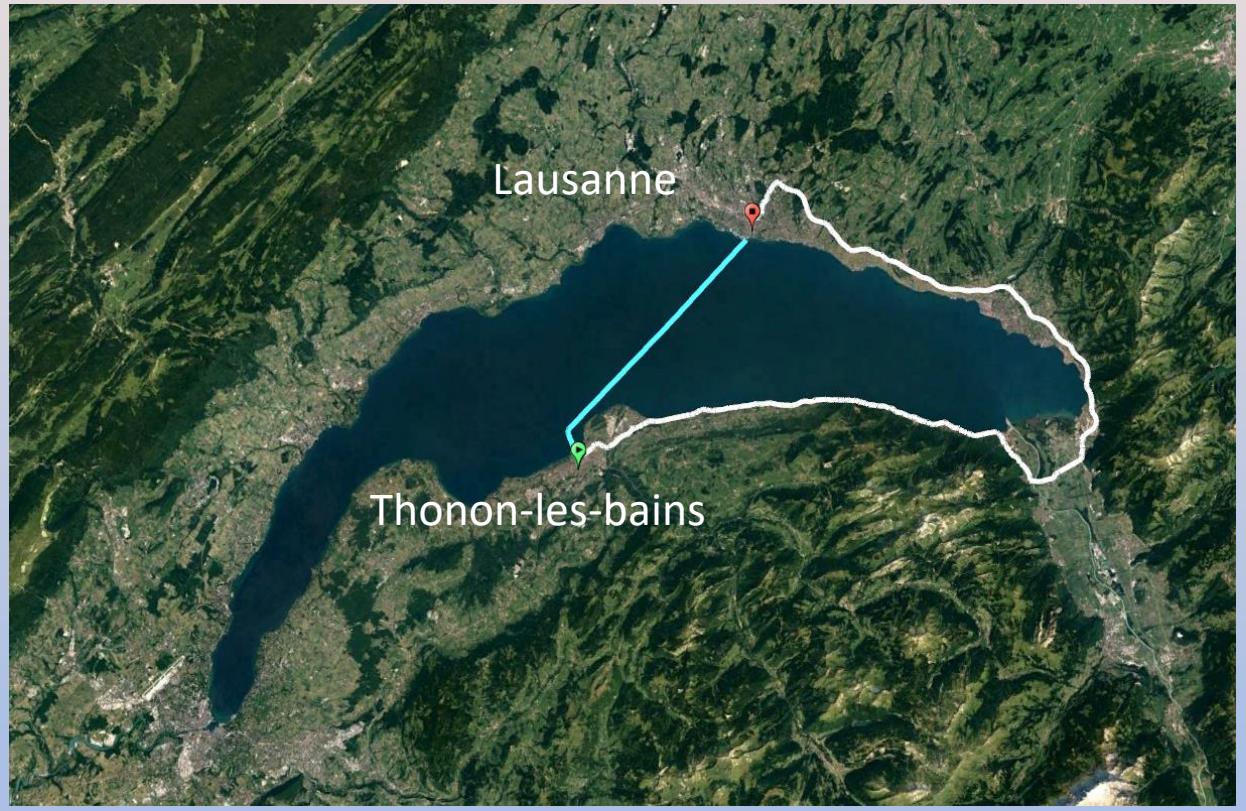
Switzerland use case
ZESST saves annually 10’000 t CO2 against car



	Car	Fast Ferry	ZESST
Distance	78 km	19 km -75%	19 km -75%
Duration	1h 20’	27’ (-53’)	27’ (-53’)
CO2 Emission during operation[1]	10’000 tons	4’300 tons -57%	0 tons -100%

[1] For 27 trip per day, 365 days per year

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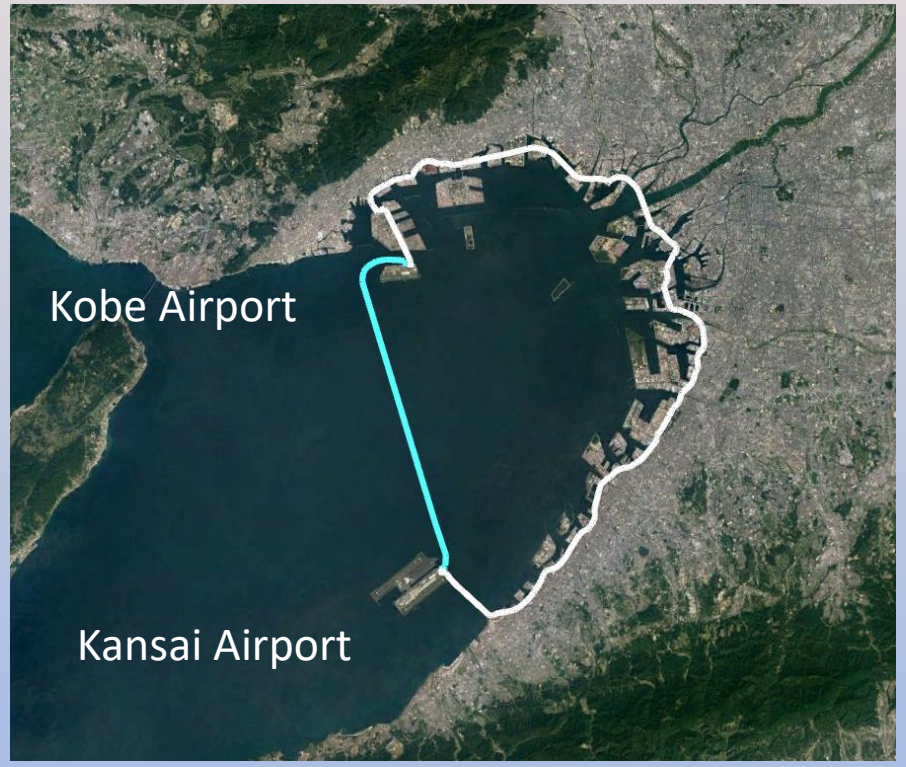
Japan use case
ZESST saves annually 6’700 t CO2 against car



	Car	Fast Ferry	ZESST
Distance	74.5 km	26 km -65%	26 km -65%
Duration	1h 04’	31’ (-33’)	31’ (-33’)
CO2 Emission during operation[1]	6’700 tons	6’100 tons -9%	0 tons -100%

[1] For 20 trip per day, 365 days per year

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ZESST - the new mobility solution

- Compliant with new regulation
- Smart ship
- Connected to MaaS network
- 85% fuel saving
- Comfortable and silent
- H2 powered
- Wave free
- High speed 50 km/h

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Pilot

Winner of Monaco Challenge Race 2022

Passenger Ferry

zesst 100 PAX

Fly on waters.

OSAKA, KANSAI, JAPAN
EXPO 2025

Swiss Engineering

Japanese Technologies

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	Existing Ship				Projects	
						
Name	Navibus	Jet Foil	Nemo H2	Sea Change	Aero 25	ZESST 100
Architecture	Monohull	Monohull Foiler	Monohull	Catamaran	Catamaran	Catamaran Foiler
Seats	99	190	87	84	98	100
Speed	50 km/h	80 km/h	16 km/h	37 km/h	48 km/h	50 km/h
Fuel	Diesel	Diesel	H2 + batteries	H2 + batteries	Batteries	H2 + batteries
CO2 emission[1]	2’570 tons	4’150 tons	0	0	0	0
Energy efficiency	1 kWh/pax/km	1.5 kWh/pax/km	~0.1 kWh/pax/km	~0.5 kWh/pax/km	~0.5 kWh/pax/km	0.15 kWh/pax/km
Wave	yes	no	yes	yes	yes	no
Silence	noisy	noisy	quiet	quiet	quiet	quiet
Comfort	Sensitive to wave	Smooth	Sensitive to wave	Sensitive to wave	Sensitive to wave	smooth

[1] Assuming 8’000’000 km.pax/year

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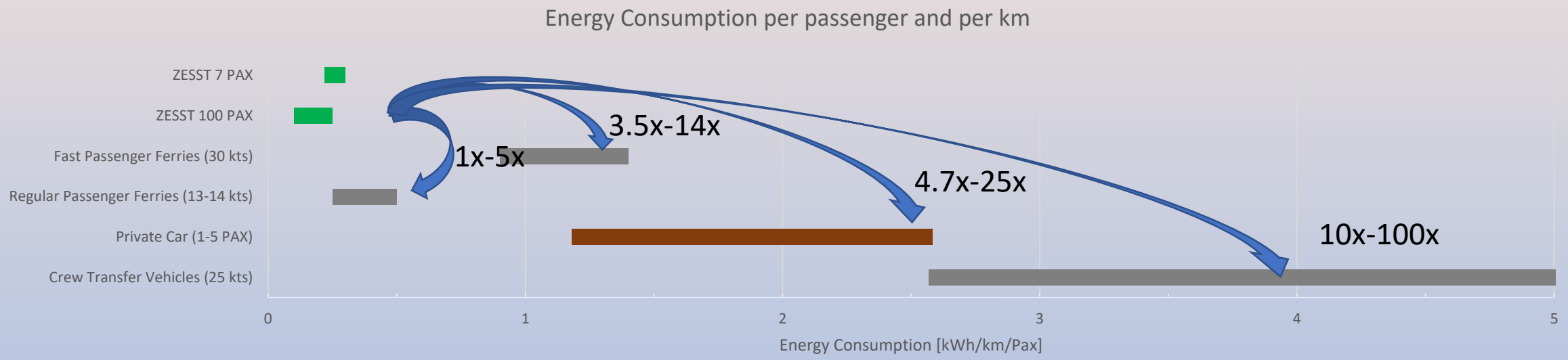
Hydrofoils can reduce energy needs by 85% in comparison with classical fast ferry



Up to 6’100 tons of CO2 can be saved every year[1]

[1] For Kansaï airport – Kobe airport 100 passenger shuttle, 20 trip per days, 365 days per year, compared to existing speed shuttle

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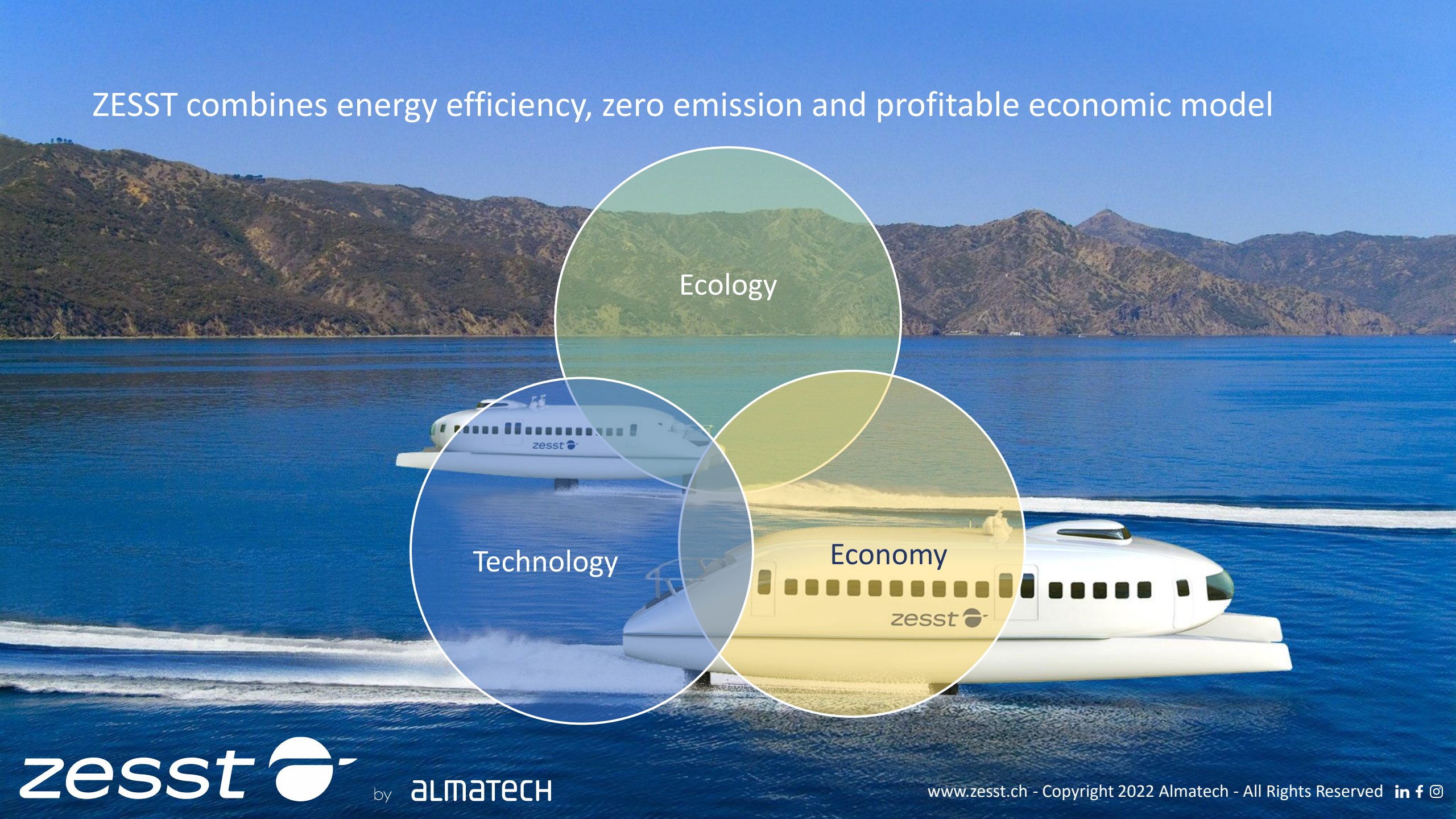
ZESST combines energy efficiency, zero emission and profitable economic model



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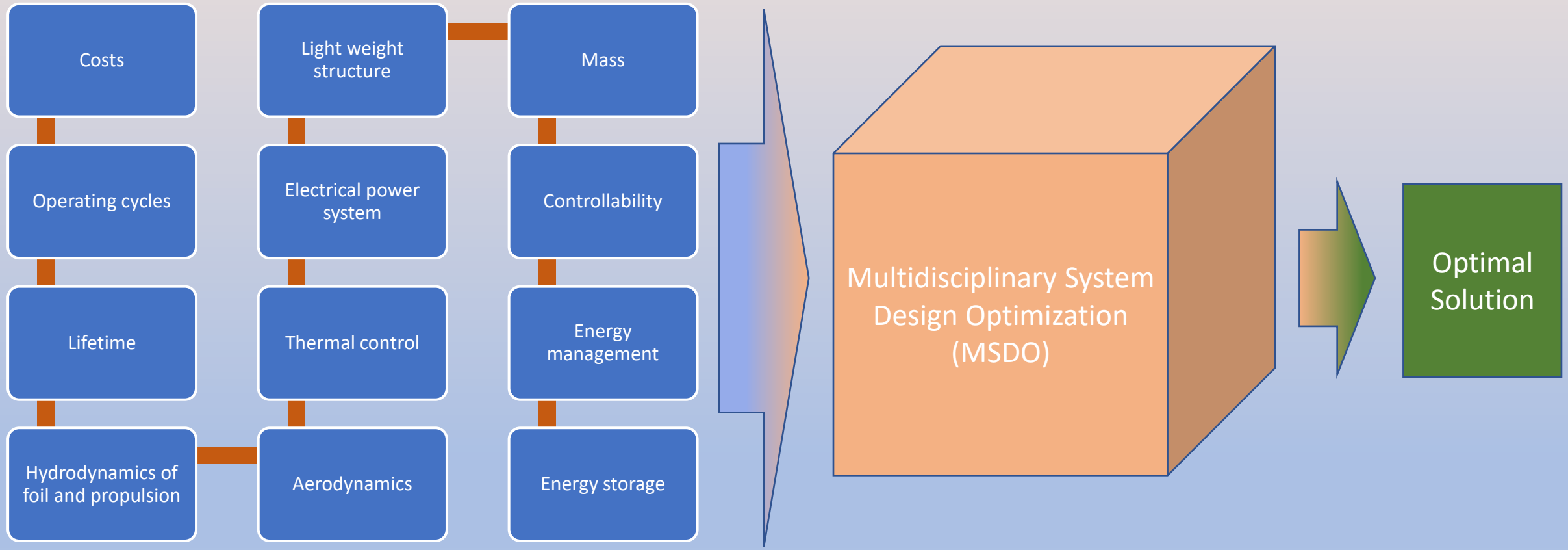
Space technology transfer for disruptive innovation



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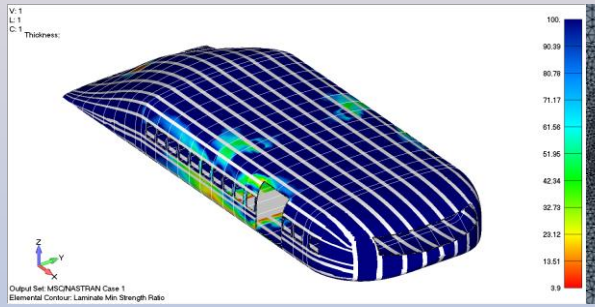
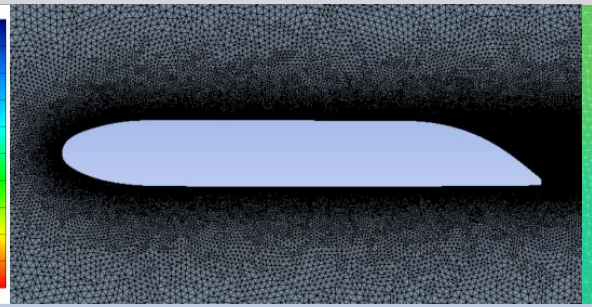
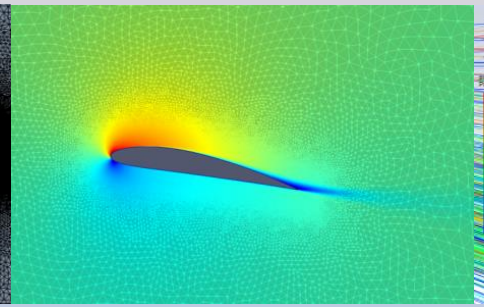
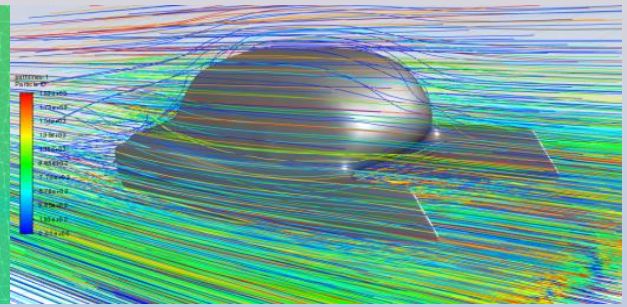
Detailed analysis are necessary to get realistic numbers

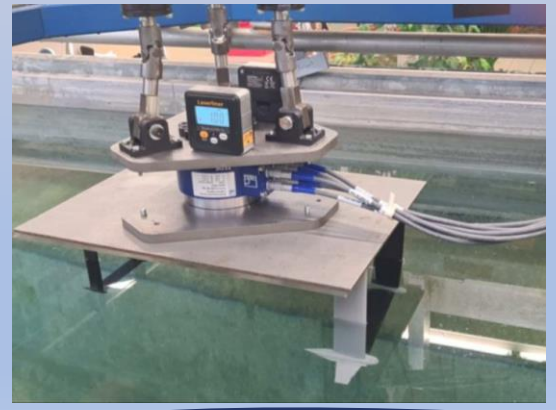
Total Costs of ownership = Initial capital expenditure + financing costs + maintenance costs + fuel costs



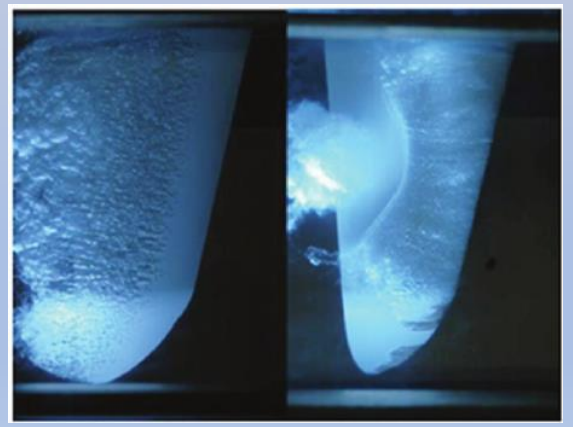








Structural Model is based on Finite Element Method computation
Hydrodynamic model on CFD computation
Towing tank and cavitation tank tests
Etc…



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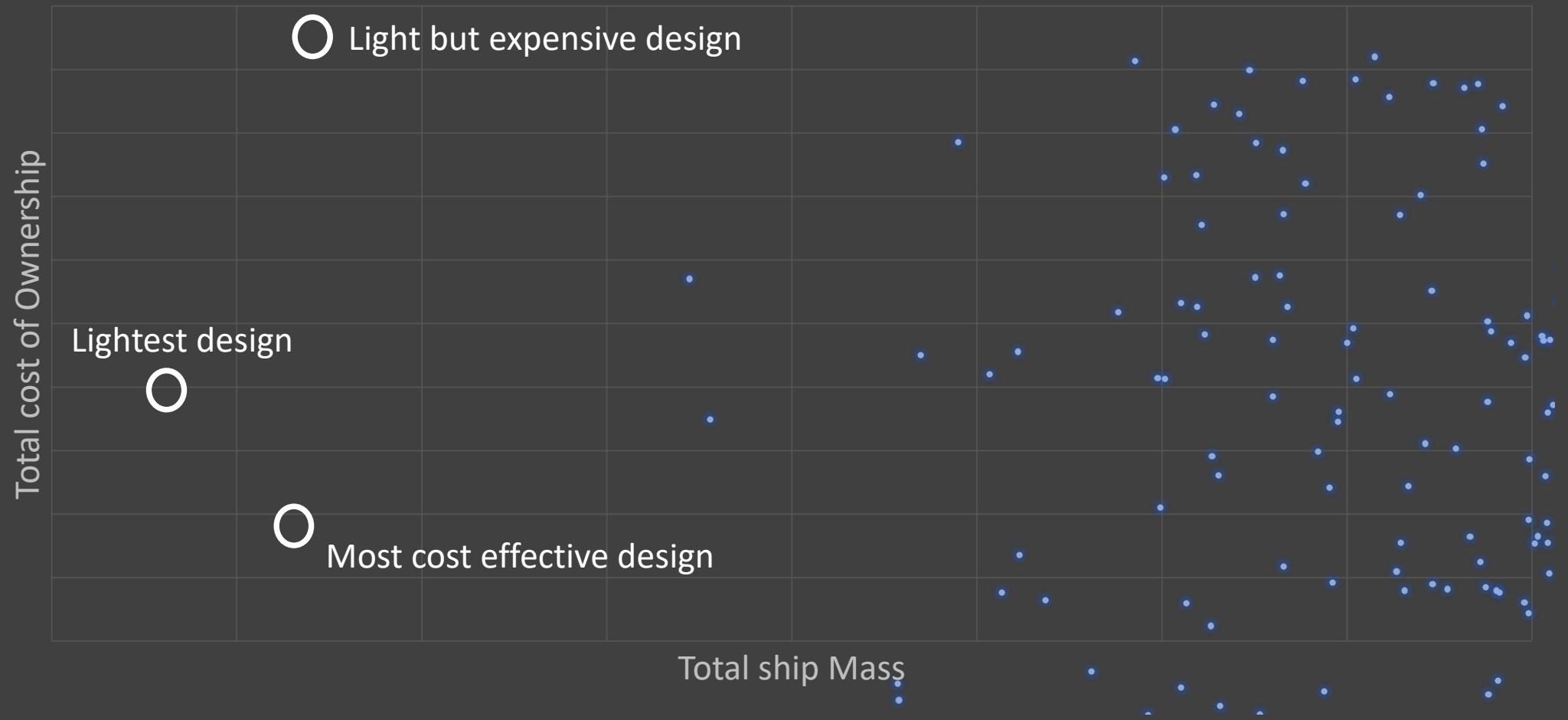
Lightest design is not the most cost effective solution



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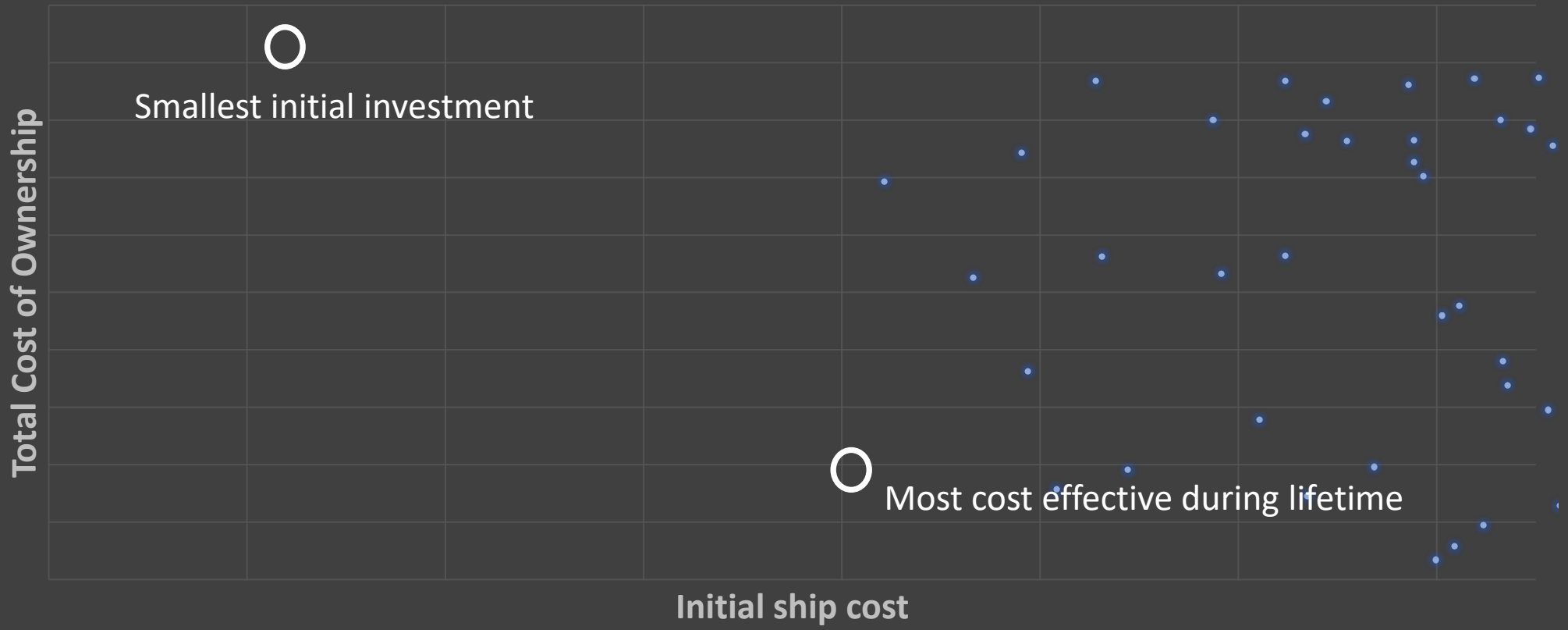
Most cost effectiveness over lifetime requires high initial investment



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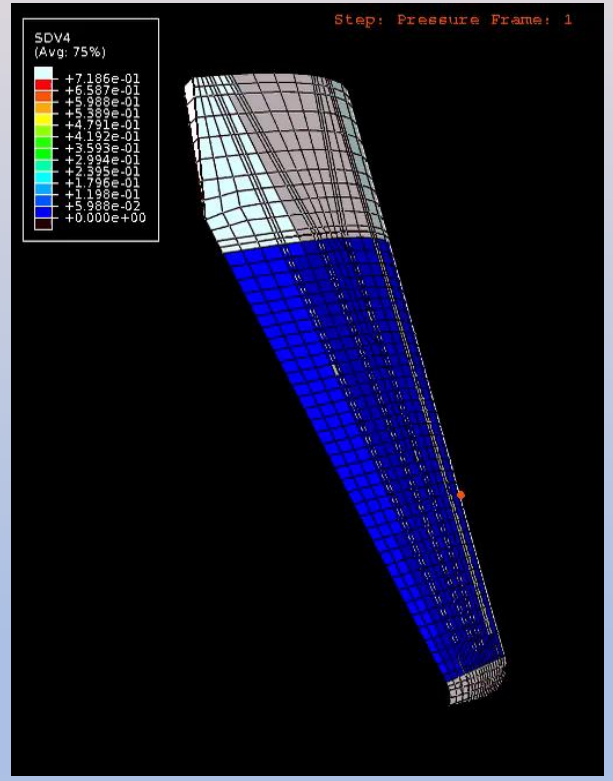
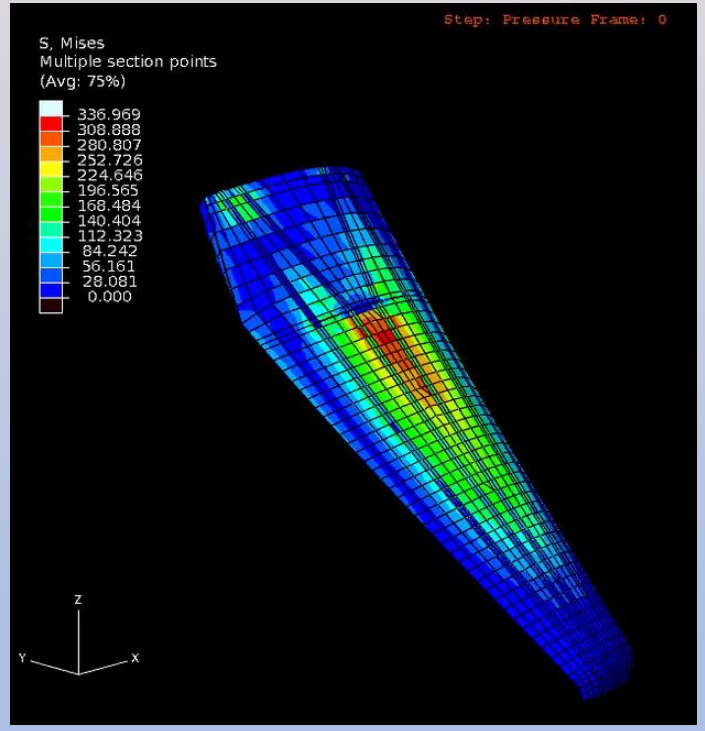
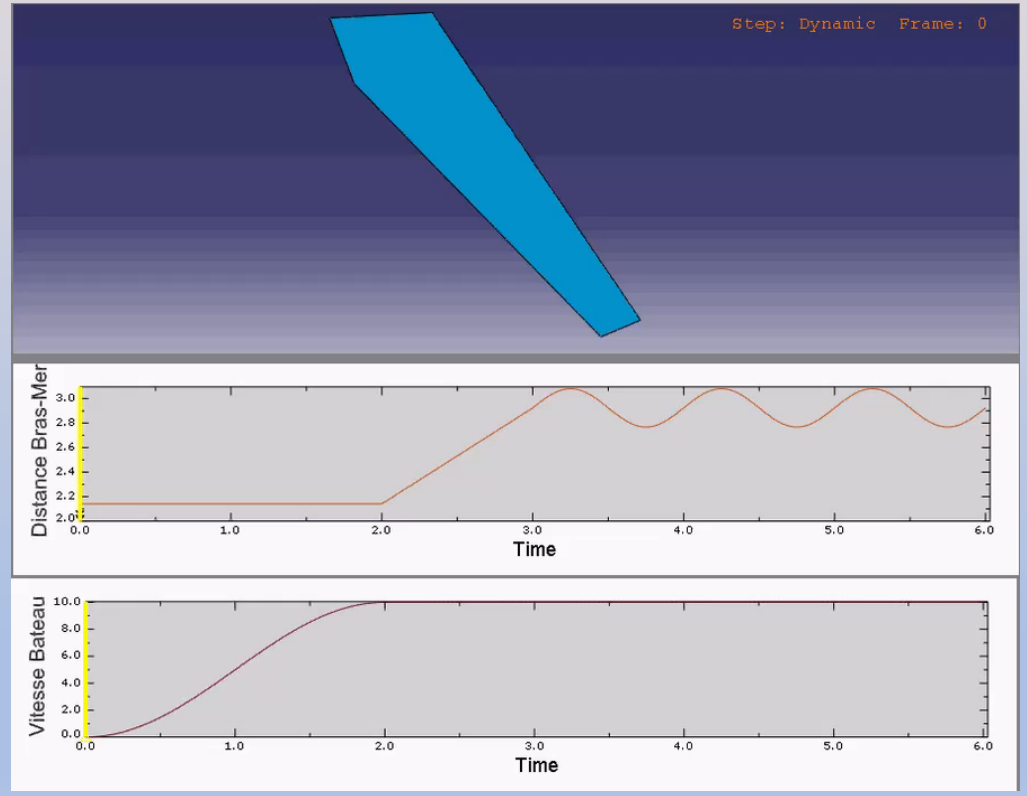
Hydrofoil modeling

Static Analysis





Dynamic Analysis



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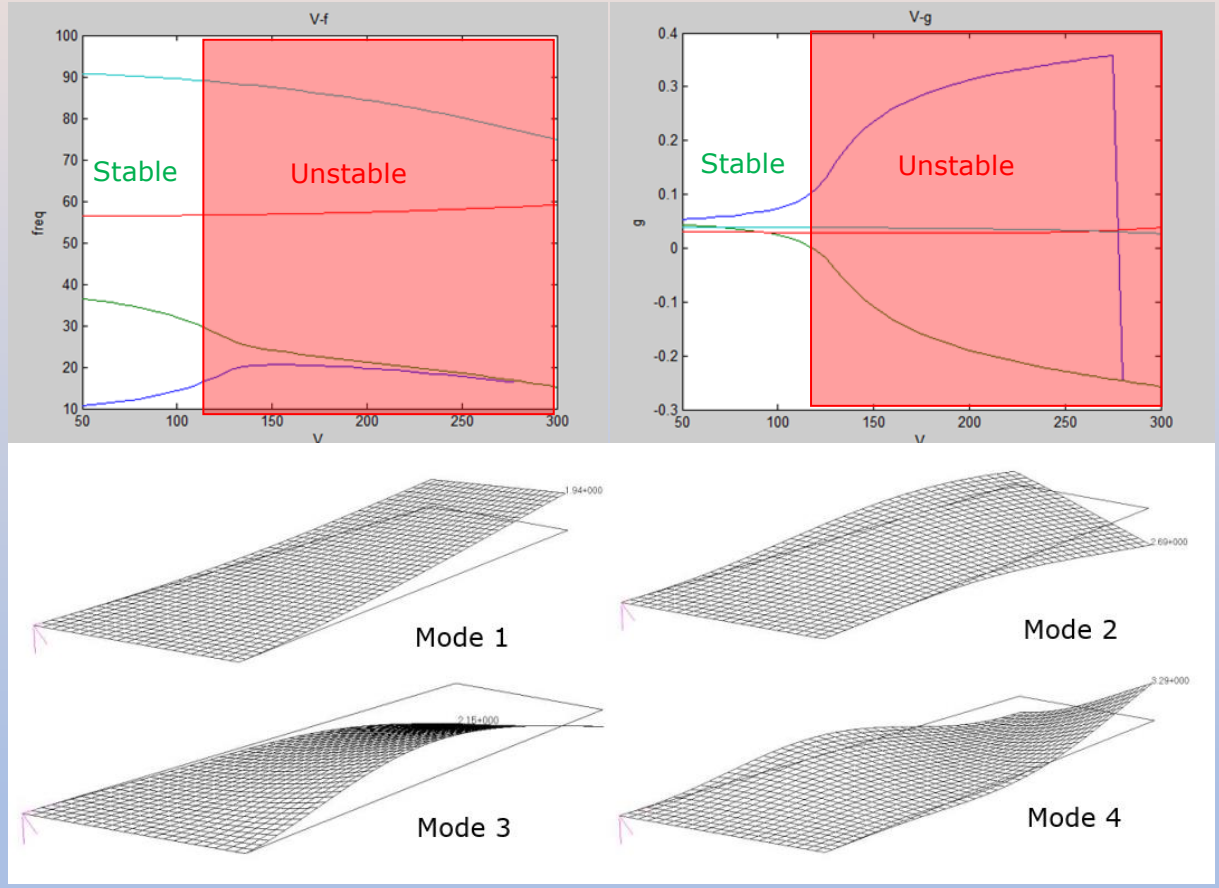
Dynamic Instability Analysis - Flutter



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Achievements in Japan

May 2021 - Almatech signed a unique partnership with **e5.lab**, Japan's largest maritime platform builder for the promotion and commercialization of ZESST in Japan

From left to right: Mr. Markus Reubi, Chargé d'Affaires of the Swiss Embassy in Tokyo, Mr. Suetsugu (CTO) and Mr. Ichida (CEO) of e5.lab, Dr. Blecha (head of ZESST) and Mr. Cottard (CEO) of Almatech and His Excellency the Ambassador of Japan in Switzerland, Mr. Kojiro Shiraishi.

- **Feb 2021**: **Market investigation** in Japan
- **May 2021**: Signature ceremony **Almatech/e5.lab** at the Swiss Embassy in **Tokyo** and at **EPFL**. Media coverage by **NHK**
- **Nov 2021**: Opening of ZESST permanent representation in **Japan** with **Ms Misaki** in Tokyo first and relocation in **Kansaï** region.
- **2022**:
  - Selection to **Kobe city SDG Accelerator,**
  - Selection to **Osaka Global Innovation Forum**
  - Discussion with **Japanese technology leaders** such as Honda, Mitsubishi, Toyota, Kawasaki,…

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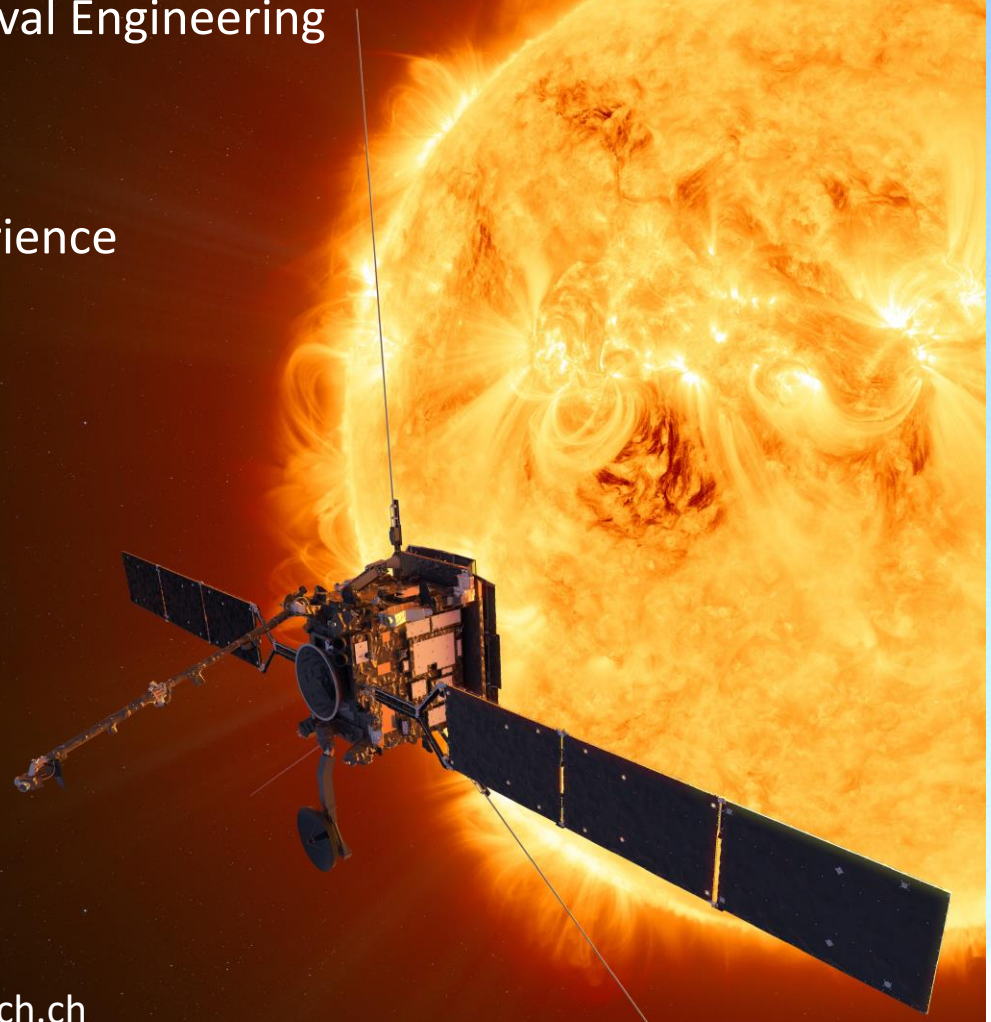
Space & Naval Engineering

13 years of experience in space & naval developments



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The Team

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