



# AUTONOMOUS MARINE TRANSPORTATION

## “Not in my lifetime”

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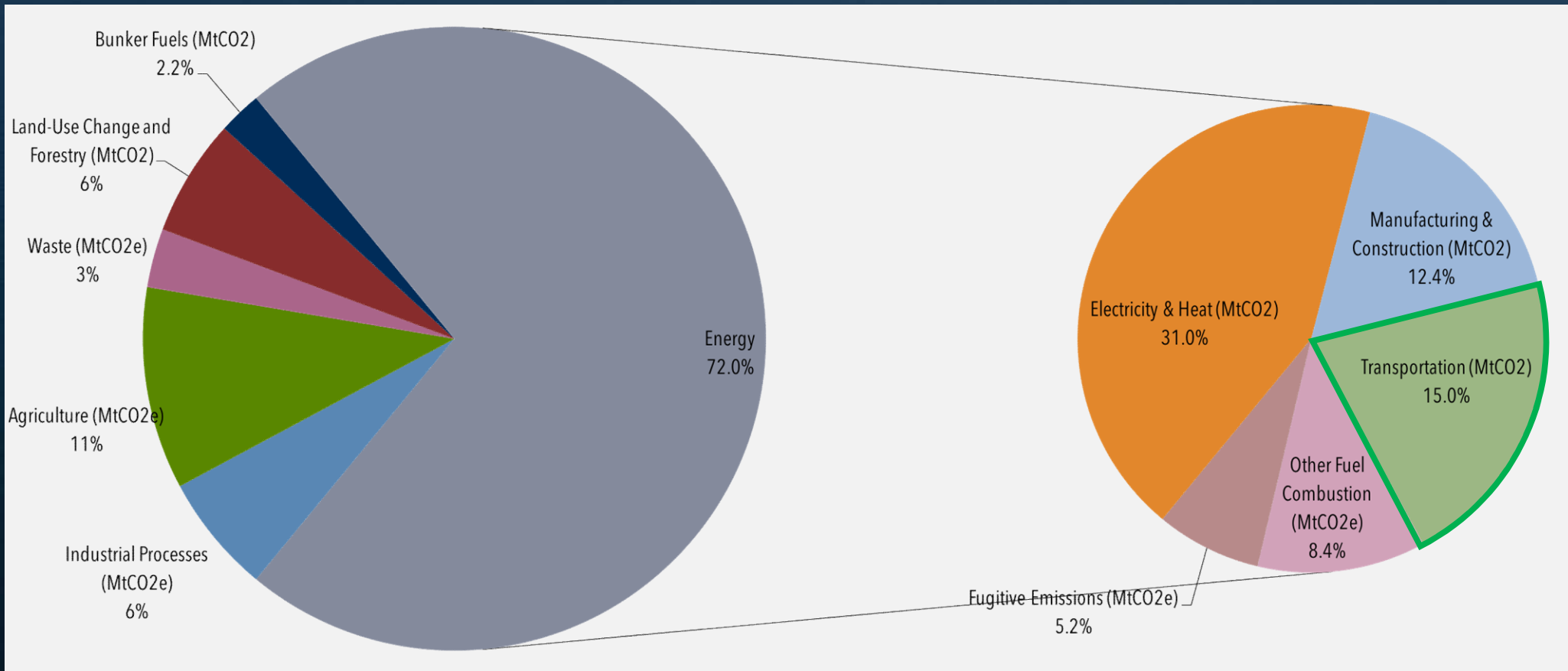




Maersk CEO Soren Skou on Unmanned  
Containerships; **“Not in My Lifetime”**

Skou doesn't believe giant containerships would be allowed to sail without humans on board, at least not in his lifetime.

# Global Manmade Greenhouse Gas Emissions by Sector, 2013



## GHG

The Third IMO GHG Study 2014 estimated that international shipping emitted 796 million tonnes of CO<sub>2</sub> in 2012, accounting for **about 2.2%** of the total global anthropogenic **CO<sub>2</sub> emissions** for that year.



## Transportation

Roughly **90% percent of the world's goods** are transported by sea with over 70% cent as containerized cargo.

*“Maritime Transport Is **Backbone of Global Trade and the Global Economy**”*



By weight

89,6  
0,3  
10,2

■ Sea  
■ Air  
■ Ground

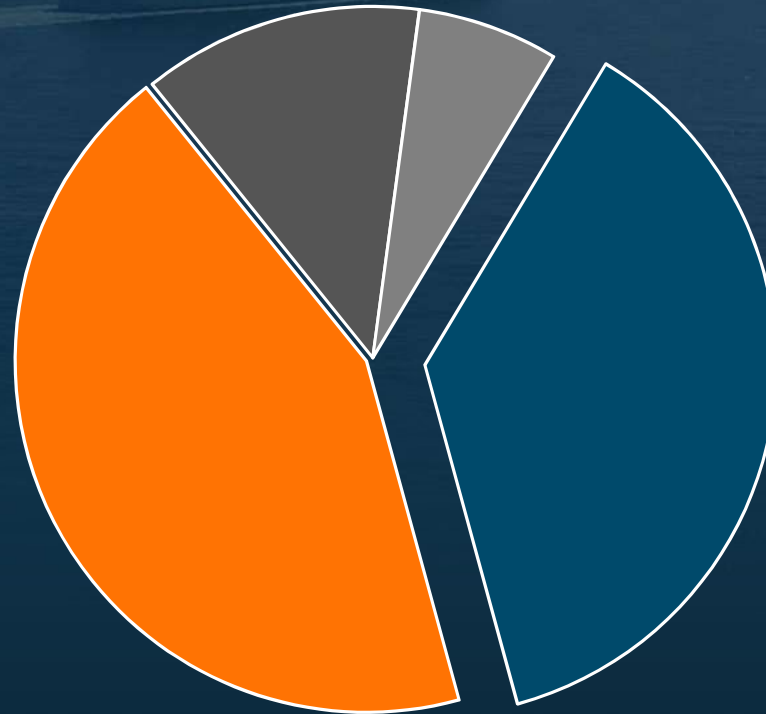
By value

70  
14  
16



World SOLAS fleet - ship sizes

- small
- Medium
- Large
- Very Large



Total 59.700 ships globally

While accounting knows about every dollar and cents across the company...

Nobody knows the true operational sweets spots or asset health across the fleet

## LACK OF OPTIMIZATION

A daily noon report based on manual input is accepted for performance comparison

Any knowledge is kept in the head of the SI and CE

Preventing best practice to be shared across fleet

### TRADITIONAL ECO SYSTEM

Charterer

Ship Manager

Ship Owner

Bank

Shipyard



Competition is only with other shipping companies

**Overall poor service** moves freight to rail, road and air

Shipmanagement has been commoditized

**TRADITIONAL ECO SYSTEM**

Charterer

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Bank

Shipyard

**LACK OF BUSINESS DEVELOPMENT**

**Financial control** instead of technology

**Economy of scale** is seen as the only viable opportunity

**Shortsighted cost savings** targeting crew and maintenance

Market does not reward quality due to oversupply of ship



In 2011, the price of a NYC taxi “medallion” was exceeding 1MUSD.

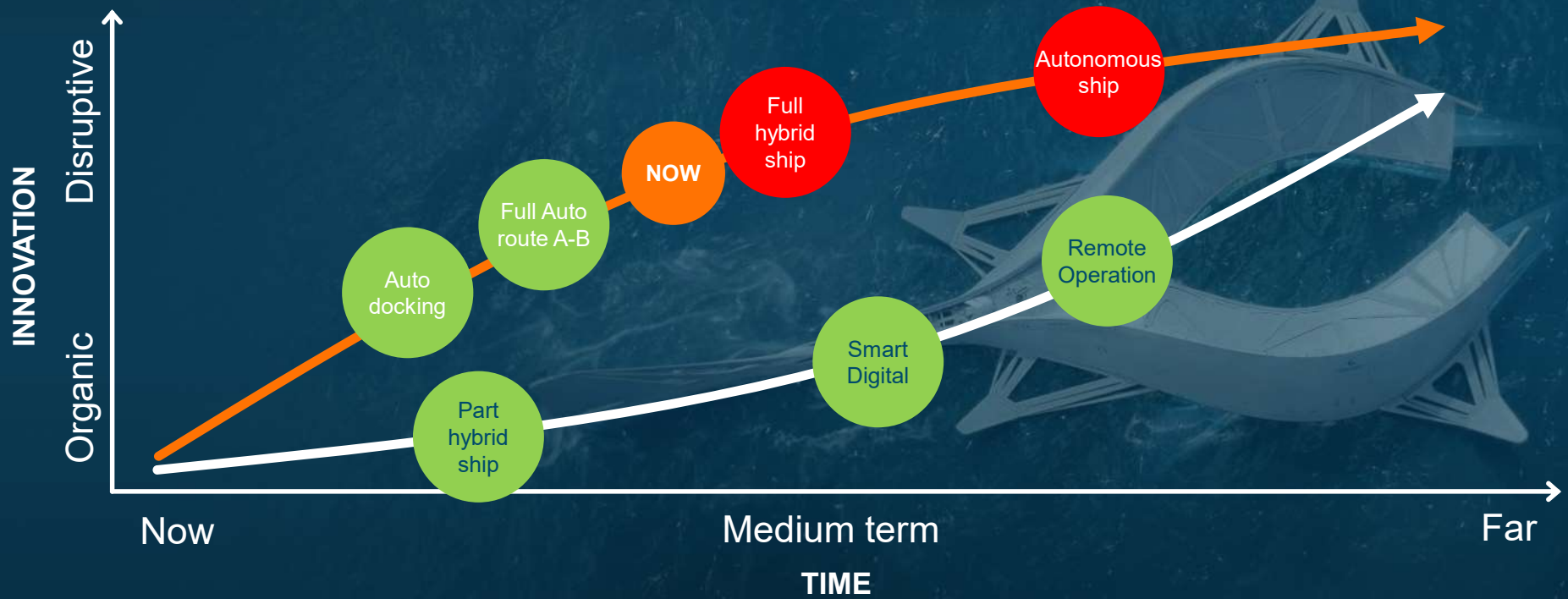
The Uber logo, consisting of the word 'Uber' in white lowercase letters on a black square background.

As of May 2019, the price has dropped to 136 000 USD.



# Historically – Human needed at every level







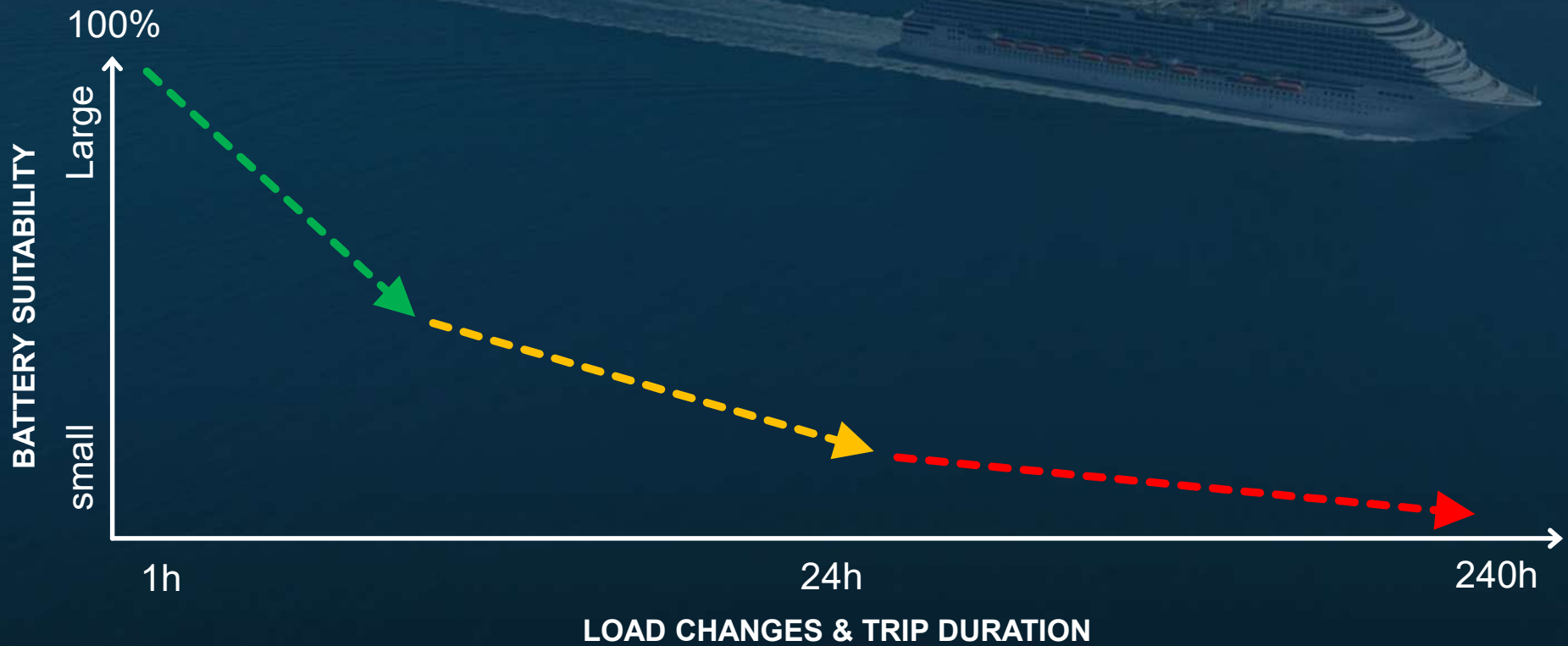
# Future – where do we have to have humans?





**For small ships, the crew cost is a large portion of overall opex**





**Batteries only make sense for short trips, hybrid when load varies frequently**

# ENABLING SUSTAINABLE SOCIETIES WITH SMART TECHNOLOGY

**INNOVATING  
SINCE 1834**

**TOGETHER**

**FOR A SUSTAINABLE  
FUTURE**

# 165 MEUR

In 2018 R&D investments amounted to 165 MEUR, representing 3.2% of net sales.

# 2 900 PATENTS AND APPLICATIONS

Approximately 2 300 patents and 600 patent applications.









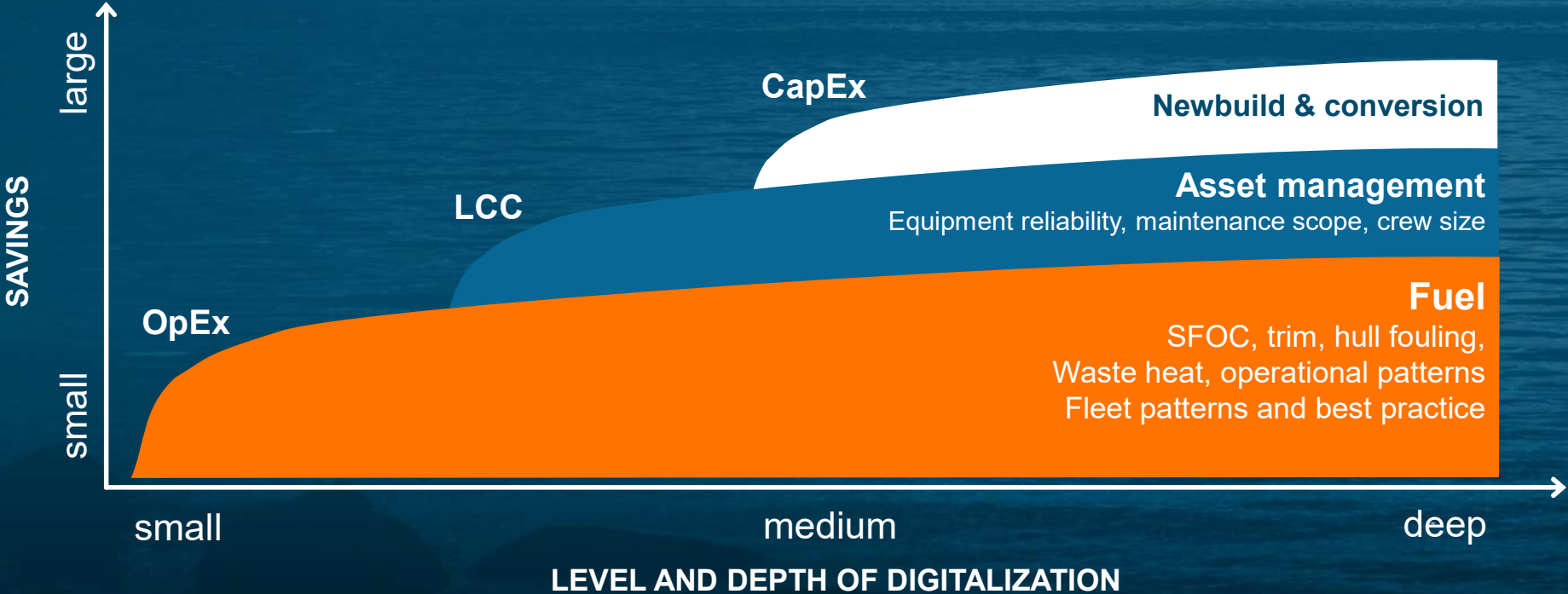
FOUNDED IN 1834

# GLOBAL LEADER

in sustainable solutions for the marine and energy markets

2018

Turnover <b>5 174 MEUR</b>		Order intake <b>6 307 MEUR</b>		Our personnel <b>APPROX. 19 000</b>	
	Comparable operating result <b>577 MEUR</b>		Operations in <b>200 LOCATIONS</b>		Nationalities <b>135</b>



Saving per voyage with just-in-time arrival:  
**74.5 TONS OF FUEL\***  
**22,200 EUR\*\***



CASE:  
5,500 TEU Containership  
Distance: 1,150 Nautical Miles

\* Assuming average SFOC : 230 g/kwh

\*\* Assuming fuel price: 300 EUR/t



# JUST-IN-TIME ARRIVAL AT PORT OF SINGAPORE



**1 600 000 T**  
CO2 emissions cut



**540 000 T**  
fuel reduction



**160 000 000 €**  
fuel bill savings



**SAFETY**  
thanks to reduced  
congestion



**JUST-IN-TIME**

arrival-departure according to customer stock level

**LAST MILE**

delivery to/from the doorstep of the customer

**AUTONOMOUS-REMOTE**

small vehicles for last mile service vehicles for manned ships

**THE OPPORTUNITY**

**SMALL PARCEL**

To open marine transportation also to small volumes

**STANDARDIZED MASS PRODUCTIONS**

to lower price of individual ships

**DRIVER ASSIST SYSTEMS**

to lower OPEX and allow periodically unmanned bridge of individual ships

# THE WORLD'S FIRST COMMERCIALY AVAILABLE AUTO-DOCKING SYSTEM





# WÄRTSILÄ HYTUG SERIES

ENSURING ENVIRONMENTAL SUSTAINABILITY



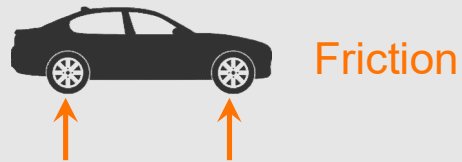


# INTELLITUG

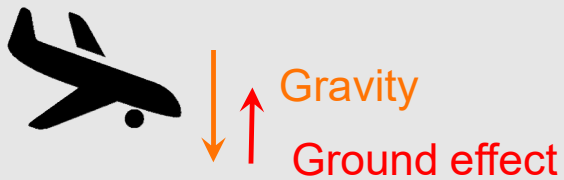
IN PARTNERSHIP WITH MPA, PSA MARINE,  
LLOYD'S REGISTER, &  
TCOMS



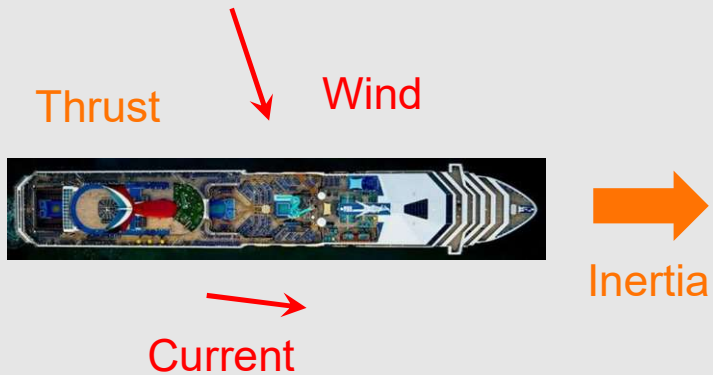
## The challenge - Control comparison



Car – road friction and wheel brakes  
 – Gravity - Friction



Aviation – gravity  
 – Thrust - Drag  
 – Lift – gravity  
 – Ground effect



Marine – Vectors are variable!  
 – Thrust – Drag (water and wind)  
 – Inertia  
 – environment



## To learn more - Youtube

- Wärtsilä in Brief - <https://www.youtube.com/watch?v=81sl6PAyvc8>
- An oceanic awakening - <https://www.youtube.com/watch?v=gS-SyFEoHF8>
- Smart Marine Ecosystem [https://www.youtube.com/watch?v=TJL6\\_yA8pZE&t=5s](https://www.youtube.com/watch?v=TJL6_yA8pZE&t=5s)
- Induction charging <https://www.youtube.com/watch?v=3p8y0bKvrz8>
- Hybrid Power <https://www.youtube.com/watch?v=r40QLf06Cgl&t=20s>
- Autodocking 360 <https://www.youtube.com/watch?v=8uedSwkeaUg&feature=youtu.be>
- Intelligent Tug <https://www.youtube.com/watch?v=81sl6PAyvc8>

# END

Come see more details and tell me why I am wrong!

Workshop in **Catella** room 13:00-14:00



**ENABLING SUSTAINABLE SOCIETIES WITH SMART TECHNOLOGY**

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