Approaches to equipment selection in a small SSK and the alternatives

UDT 2019 - Stockholm
Session: Platform Design
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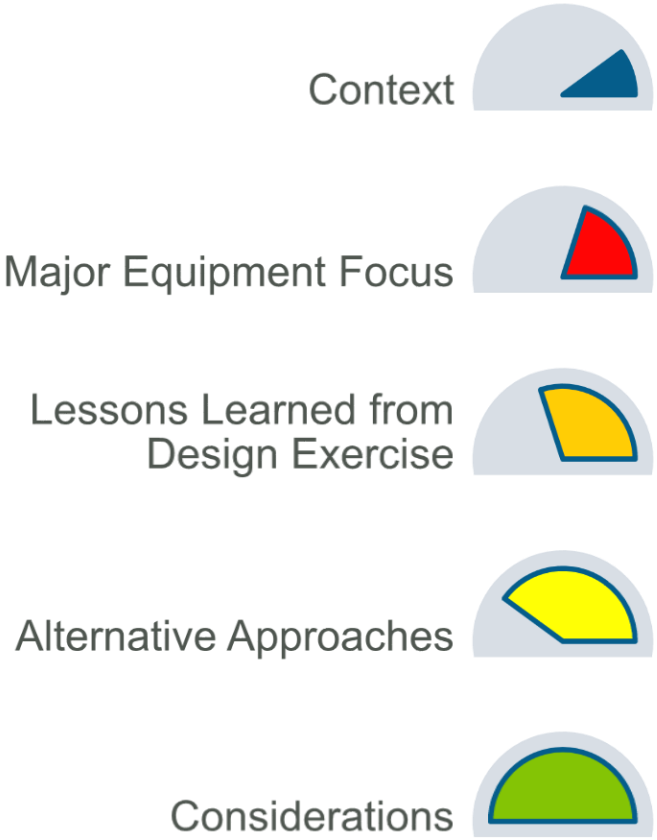
What will be covered



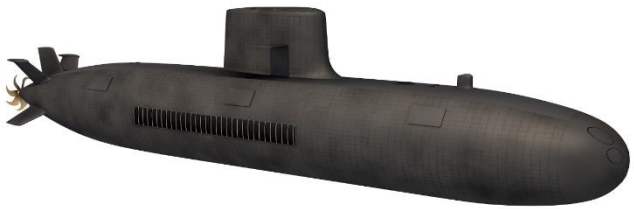
SSK Challenges

Context

- **High Capability**
  - Range
  - Endurance
  - Speed
  - Comms and Network of Assets
  - EMF

Vs.

- **Low Cost**
  - Modular builds
  - Open Architectures
  - COTS/MOTS



Why do we use COTS/MOTS equipment?

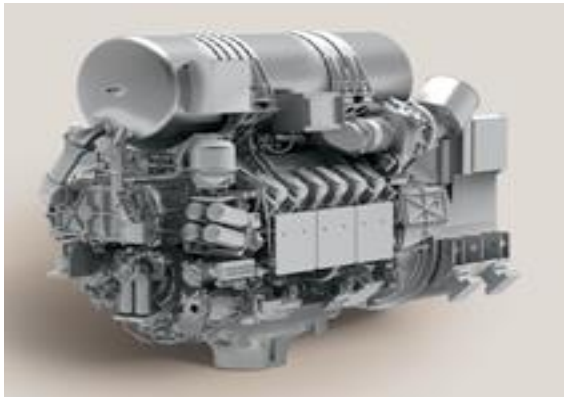
Context

- **COTS** – Commercial off the Shelf
- **MOTS** – Military of the Shelf

- **Benefits of COTS/MOTS**
  - Minimise costs
  - Standardise components across systems
  - Simplify supply chains
  - Easier upgrades
  - Removes risk
  - Legislation compliance
  - Faster technology upgrades

Does this approach work for Major Equipment?

Combat Systems



Diesel Generator

Main Propulsion Motor

Air Independent Propulsion

Does this approach work for Major Equipment

- **Combat Systems**

- **Main Motors**
- **Diesel Generators**
- **Air Independent Propulsion**

- Upgrades don’t happen as often
- Equipment usually fixed for the life of a platform
- Limited chance to improve performance through upgrade
- Potential to introduce risk and design compromise

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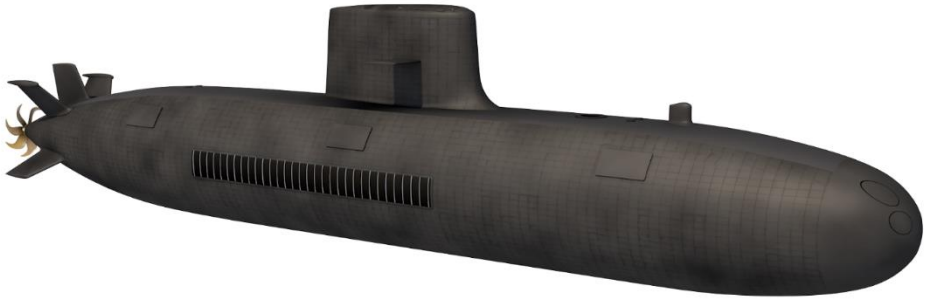
Lessons from design of a small submarine

BMT Wyvern Concept Design

GENERAL PARTICULARS	
Surfaced Displacement	720 tonnes
Submerged Displacement	863 tonnes
Reserve of Buoyancy	20%
Length Overall	46 meters
Beam	4.5 meters
Diving Depth	210 meters
RANGE & ENDURANCE	
Crew	15 plus capacity to surge to 21 crew
Endurance	20 Days (4 Days Stirling AIP)
Maximum Speed	18 Knots
Range (Snorting)	3000 nautical miles



- **Small**
- **Capable**
- **Affordable**
- **Minimise Redundancy**
- **Maximise COTS/MOTS**

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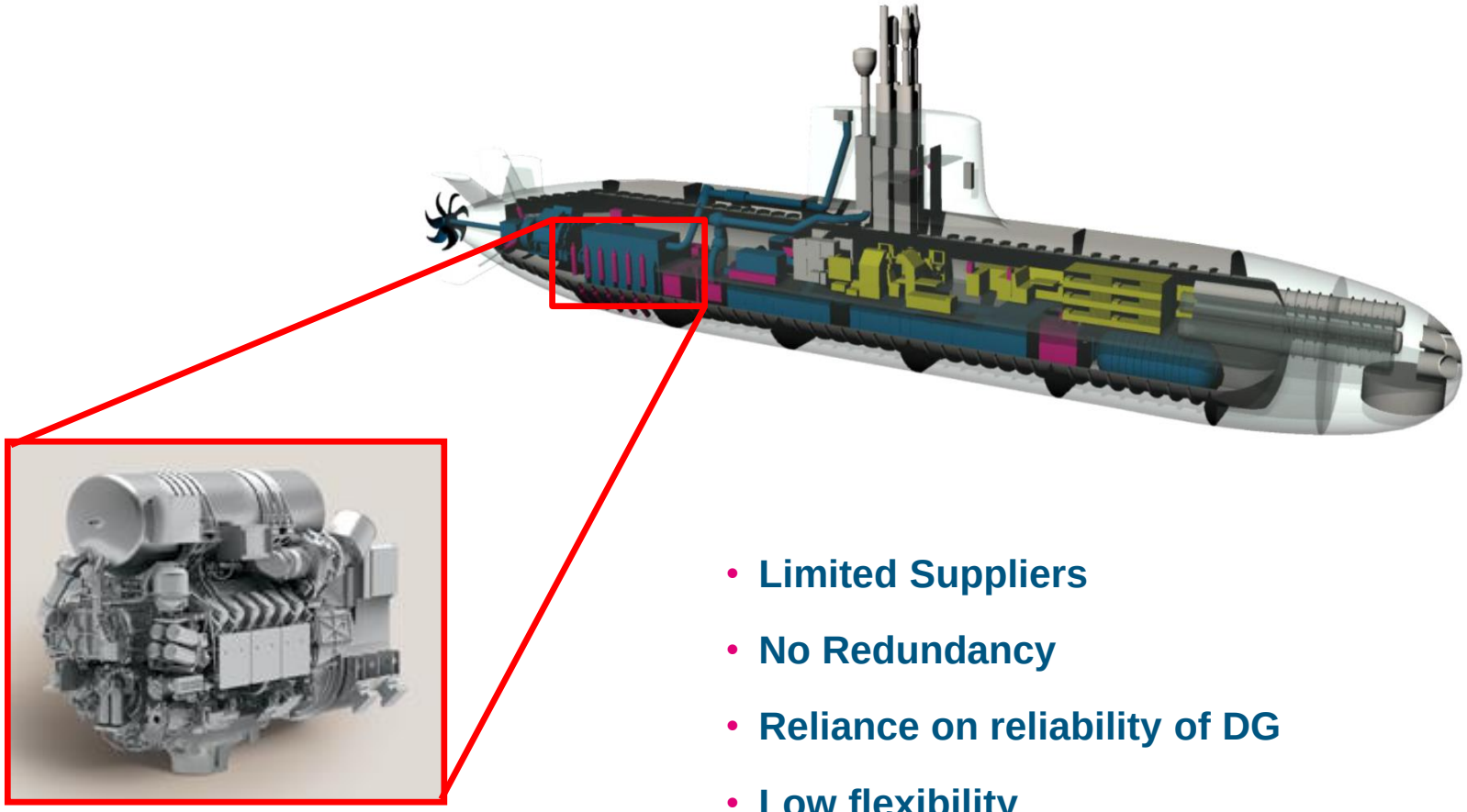
Lessons from design of a small submarine

Diesel Generator

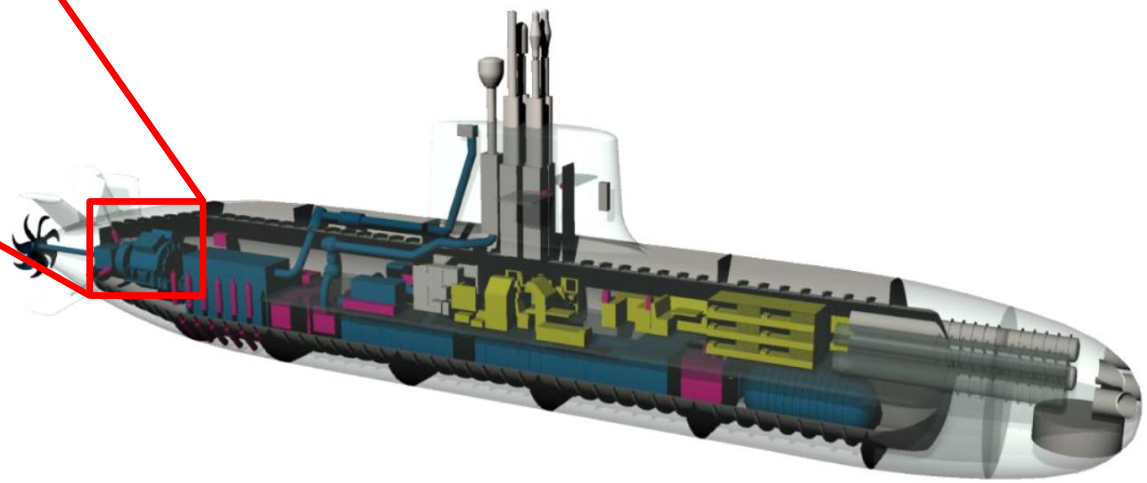


- Limited Suppliers
- No Redundancy
- Reliance on reliability of DG
- Low flexibility

Lessons from design of a small submarine

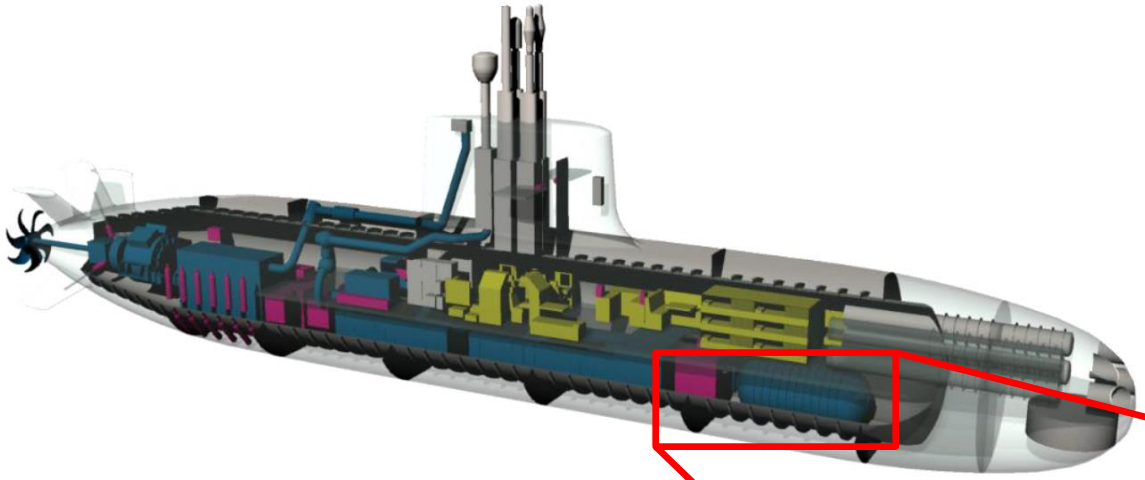
Main Motor

- Over specification against requirement
- Introduction of a cruise motor
- Trade of risk and benefits



Lessons from design of a small submarine

Air Independent Propulsion



- Supply and Licensing
- Ability to fully integrate
- Independence or Sovereignty

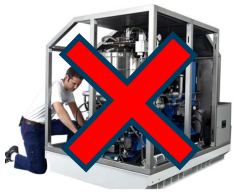
Alternative Approaches

COTS/MOTS

Tailored COTS/MOTS in Domain

Tailored COTS/MOTS Outside Domain

Fully Bespoke Solution



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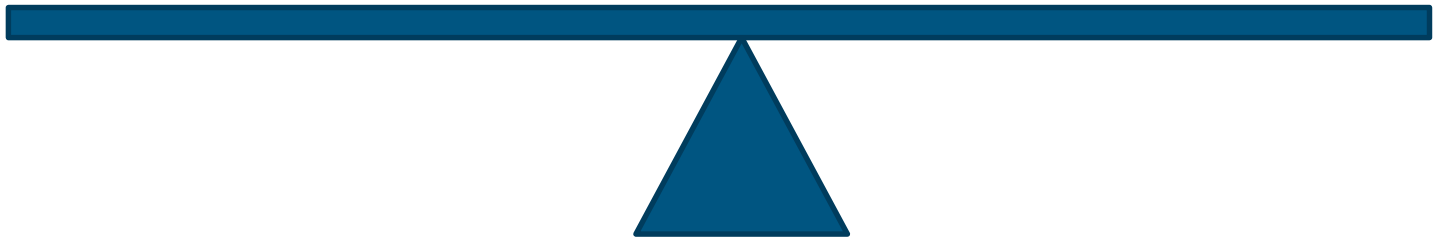

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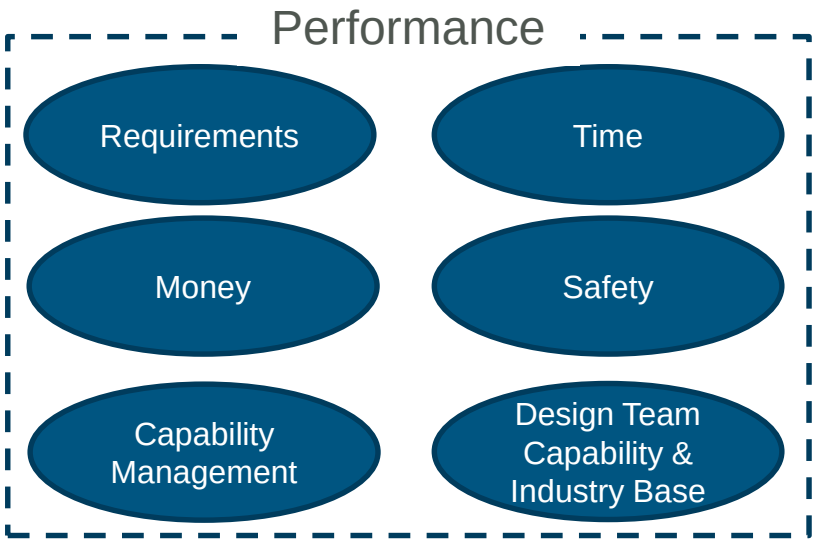
Selection Considerations



Conclusions

- COTS/MOTS has many benefits
- Major Equipment may not see all the benefits
- Appetite for risk and measure of performance plays a part in decisions
- The choice is important and needs to be made early in the design and
- Choice may not always be technical. Commercial or political aspects need to be considered and may also have an affect

Thank You

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