The Future of Submarines

FACILITATED BY ANALOX

A USER PERSPECTIVE

- Walrus class replacement NL → AIP;
- TNO research -> aim is to provide a ‘banned materials’ list and set requirements for substances we’re not monitoring yet;
- What are the best AMAP system characteristics for me as a user?
- Improvements I’ve seen for the past 2 days
- Next SAMAP → Das boost and TNO?

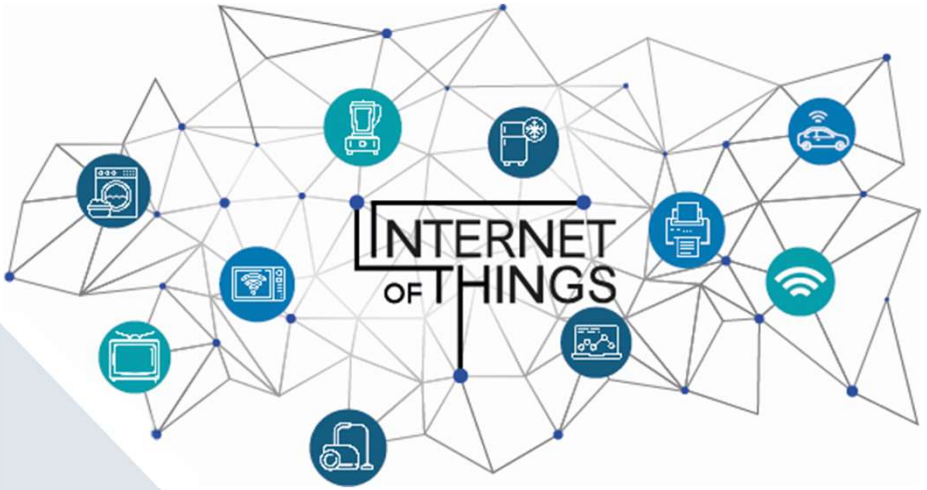
FUTURE SUBMARINES

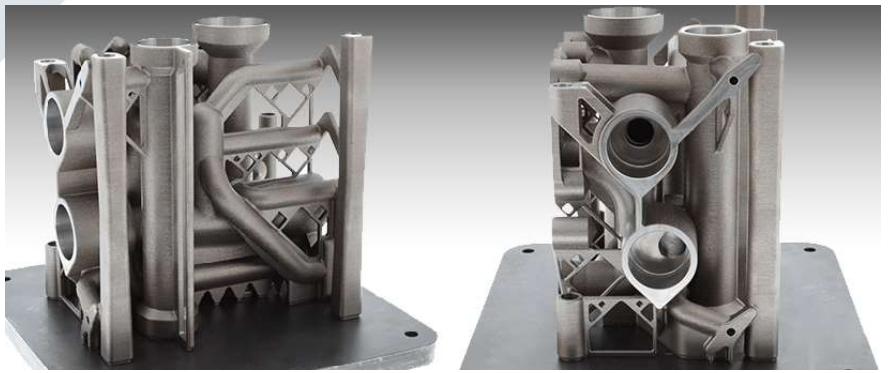
Huge changes to submarine warfare in the next decades

- Capability delivered across multiple platforms
- Modularity/ adaptability
- Unmanned systems
- Different forms
- Anti-submarine warfare

Technologies

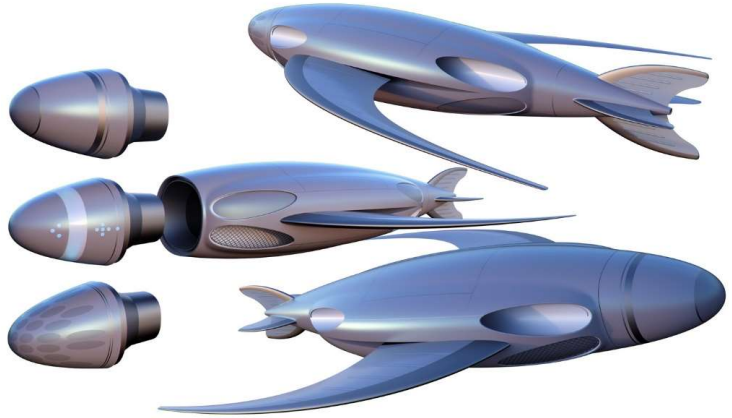
- Processing power
- Internet of things
- Reducing transducer prices
- Big data
- Artificial intelligence
- Communications
- Materials – e.g. graphene
- Manufacturing e.g. 3D printing
- New battery technologies





TECHNOLOGY IMPLICATIONS

- Increased automation and decision support
  - Improved HMIs
  - Condition monitoring
  - Automated diagnostics
- Increased integration
  - Ability to connect systems for improved control
  - Improved interoperability
- Improved techniques
  - Sensing on board
  - Threat detection



HUMAN ASPECTS

- Crew costs are very high – wages, training, food, accommodation, pensions etc.
- Pressure to reduce manning levels
- Less people will do more, supported by technology
- Need to be highly capable
- Selection, training and retention will change
- Health and safety and environmental legislation increasing

PROCUREMENT

Ministry of Defence faces fury over cost of Dreadnought subs

There are growing fears that the Dreadnought submarine project will blow its budget
CROWN COPYRIGHT

Britain is in danger of another defence spending blow-up after a complex part of the new Dreadnought submarine fleet soared in price.

Engineers have told officials that a stability system for the nuclear submarines will cost more than an entire warship, stoking fears that Britain's costliest defence project is veering off budget.

UK armed forces 'face £7bn equipment funding black hole'

1 February 2019 | Share

MPs have demanded more information on the financial risks of purchasing F-35 stealth jets

The Ministry of Defence has a funding black hole of at least £7bn in its 10-year plan to equip the UK's armed forces, according to a report by the Commons spending watchdog.

- Affordability challenges
- Lead times and Programme complexity
- Ensuring availability
- Through- life cost minimisation

WORKSHOP EXERCISE

- In your tables we would like you to work together as teams
- Use your experience to generate insight into how the following areas will change in the future, what benefits they will deliver and what we need to do as a community to realise the benefits

Name badge colour	Area for discussion
Red	Atmosphere management and control
Green	Automation and the crew
Blue	Atmosphere monitoring and analysis

- 30 minutes discussion
- 10 minutes presentation