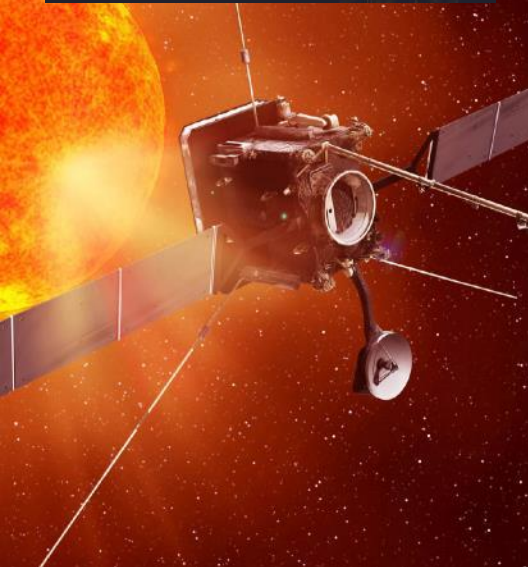


## Spearheading Innovation in Defence



Airbus Defence and Space  
UK Defence Solutions Centre  
ITEC 2018 Advanced Engineering Conference



## **Abstract Title:**

‘Leveraging cross-sector innovation techniques, collaboration and visualisation within an MBSE framework, for optimised defence export capabilities’

## **Afzal Ali**

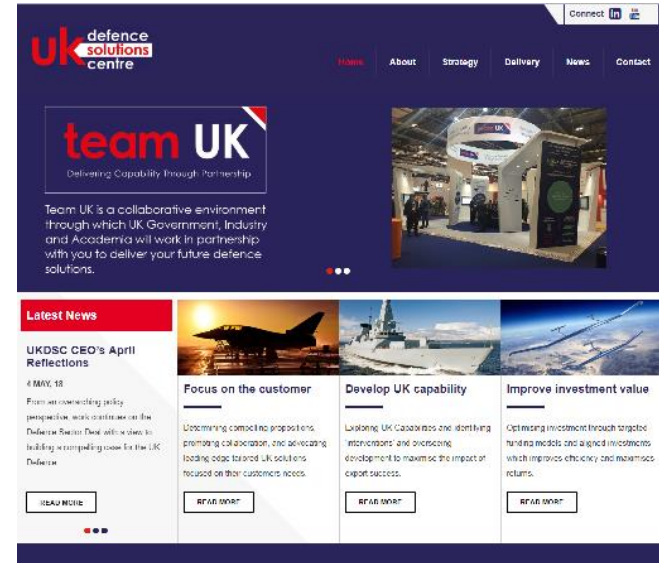
**Expert** - Systems Engineering and Simulation **AIRBUS**

Head of Visualisation - **UKDSC**

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# Background

- The UK Defence Solutions Centre (UKDSC) is an organisation stood up in 2015, to look at UK Defence Export growth providing UK prosperity and skills.
- We have been working on a number of areas for UK Defence Innovation, focusing on innovation, collaboration and exploitation of research, science and technology.
- Within this construct, we have been using a systems engineering approach:
  - understand the market → baseline → develop solution options → visualisation → stimulate innovation challenges → simulation → engagement & communication → collaboration → exploitation → develop UK defence export capabilities
- Talk will cover **cross-sector innovation and collaboration**



Innovation & Collaborative Engagement Laboratory

# Defence Growth Partnership (DGP)

## Context

- The **Defence Growth Partnership (DGP)** has been established to maintain and grow the UK's long-term position and competitiveness in defence exports. It has three goals:
  - **Grow the UK's global market share**, through increased defence exports
  - **Foster greater collaboration** and innovation across the defence sector
  - **Improve competitiveness** through the whole value chain
- DGP represents a commitment from both government and industry to the UK defence sector
- It enjoys cross-government support and the membership of 15 major defence companies



“teamUK”

**UK** defence  
solutions  
centre



Department for  
International Trade



Department for  
Business, Energy  
& Industrial Strategy

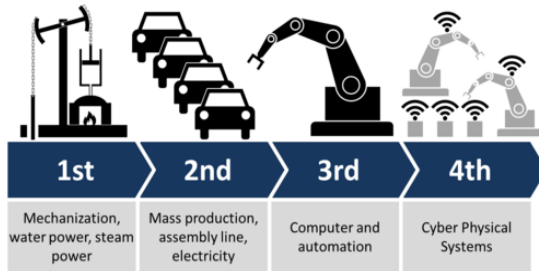
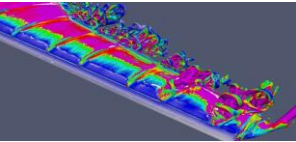
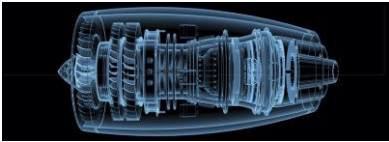
Defence & Security  
Organisation

**UK** defence  
solutions  
centre

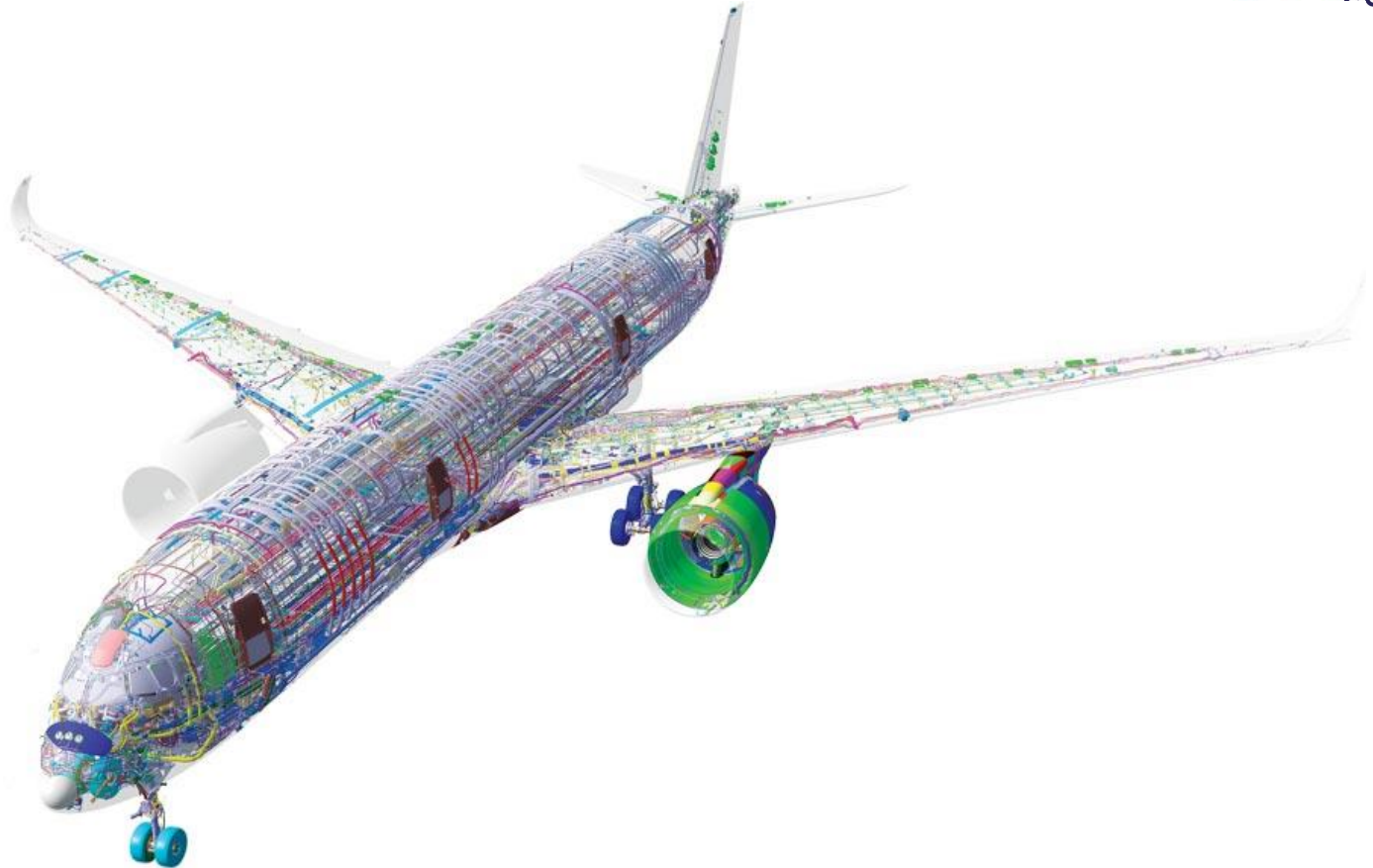


- Working with Defence Stakeholders to define future operational needs
- Look outwards (defence, security, aerospace) into non-traditional defence supply chains
- Cross sector – from fashion, petrochemical, automotive, manufacturing, design, retail, creative sector.....
  - To foster eco-systems and provide cross-sector benefits through sharing requirements and ideas increasing collaboration
  - Created a “teamUK” approach – inclusive and collaborative
- Underwater Autonomy – Robotics in harsh environments
  - Closing the gap between ROV and UxV’s
- Collaborating with UK creative sector, developing highly immersive synthetic environments; re-use techniques in design and development

# High Value Design (HVD) & Advanced Engineering (AE)



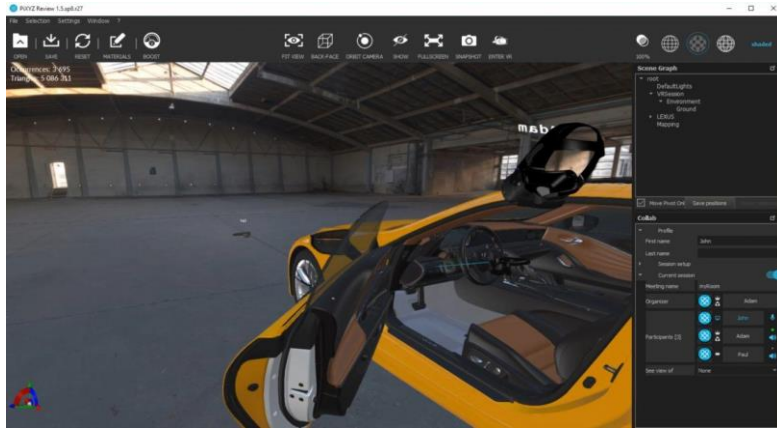
# Airbus MBSE example – Digital Mock Up (DMU)



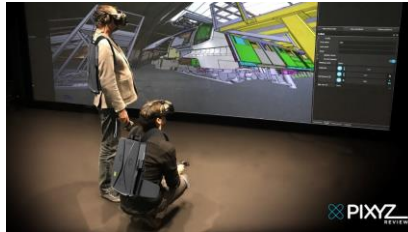


# HVD: Aerospace and Automotive

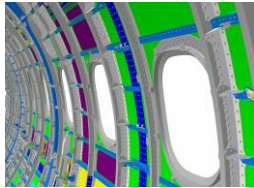
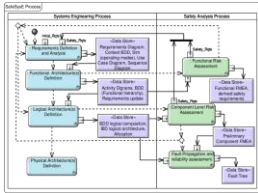
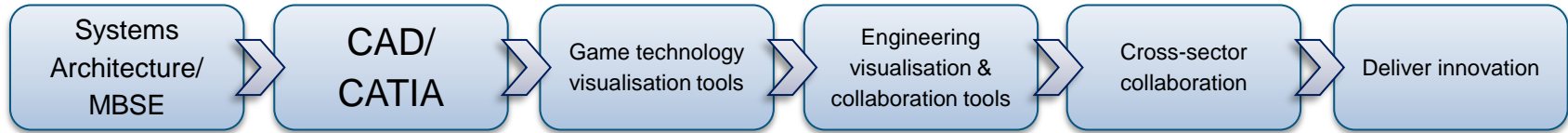
Use of game technologies, VR, AR, MR for collaboration in the design process and high end visualisation - marketing and customer engagement



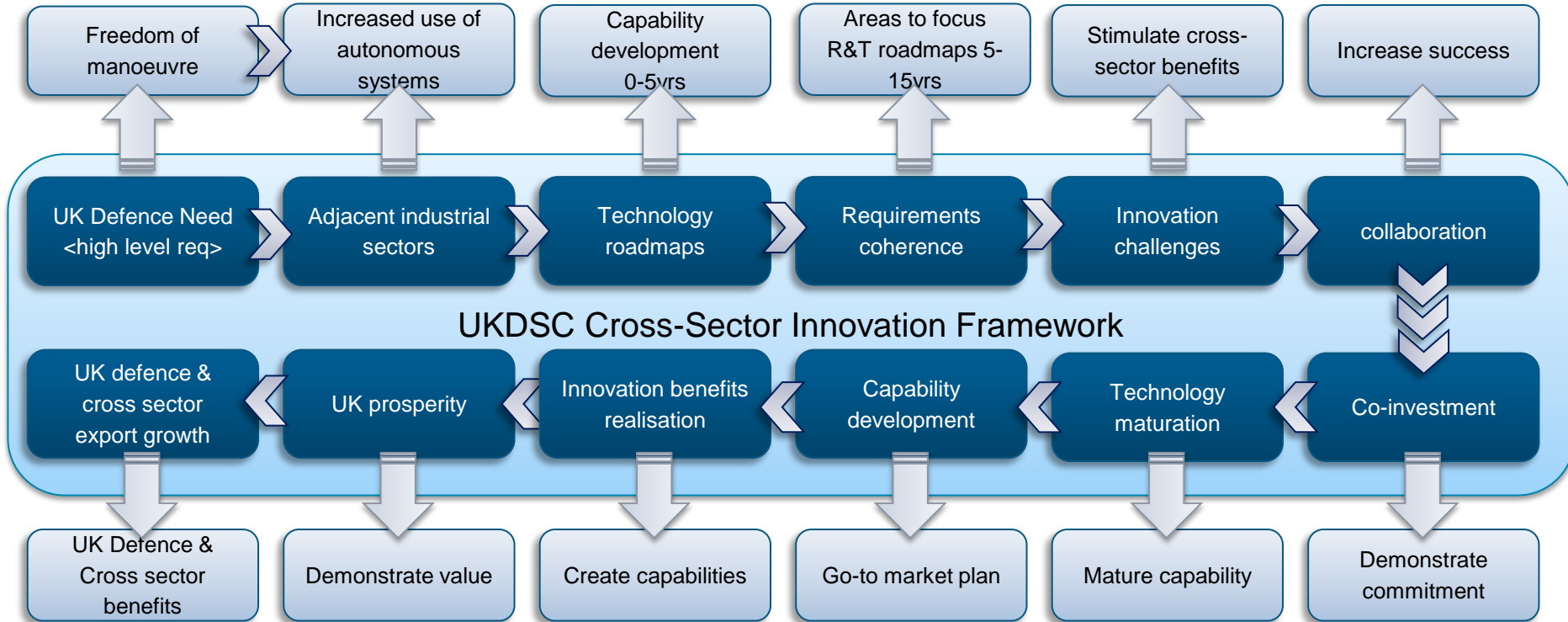
All image taken from PiXYZ – used with permission



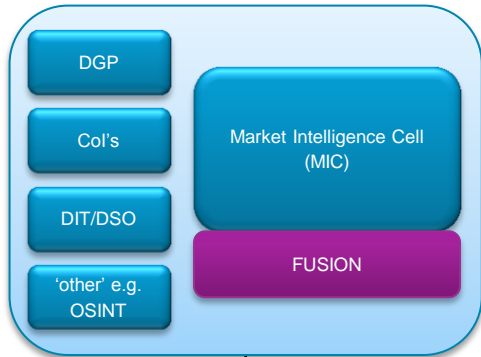
# Visualisation in the design process



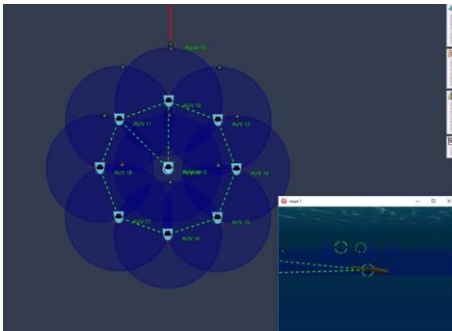
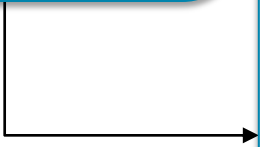
# Cross Sector Innovation Framework (CSIF) - process



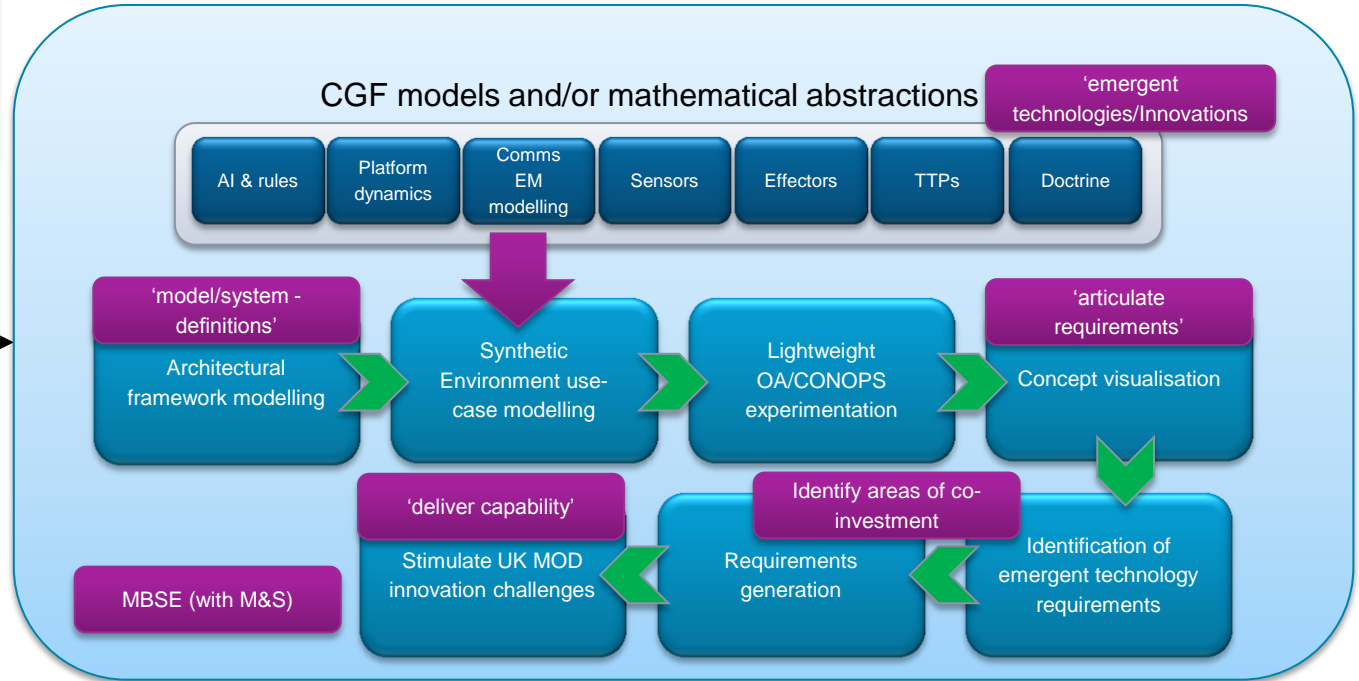
# So what? – UKDSC use of MBSE for visualisation



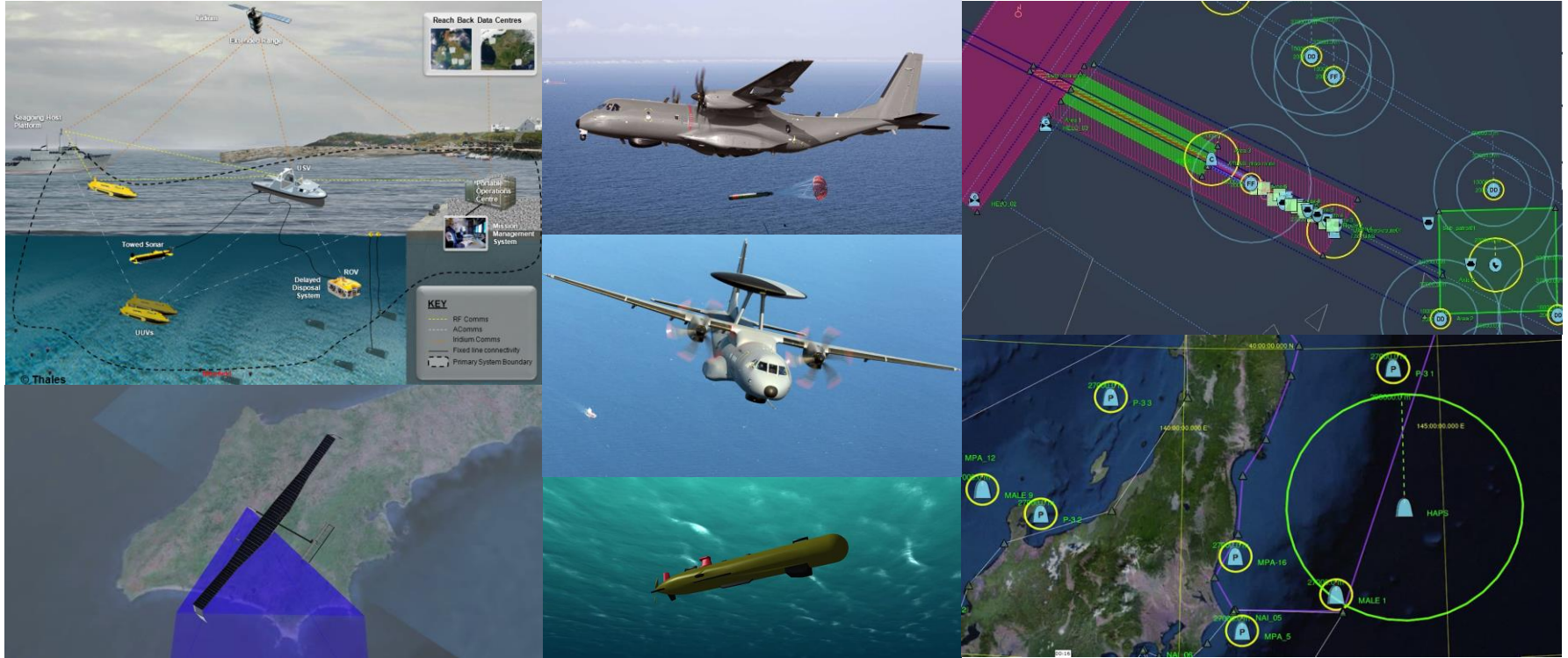
Requirements



Visualisation



# UKDSC use of MBSE - post Ex Unmanned Warrior

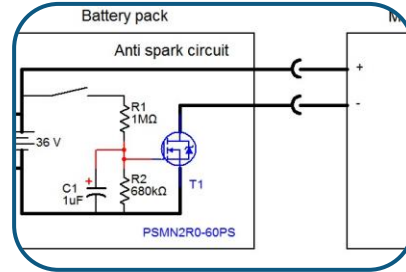


# Develop areas for coherence and future needs: Road-Mapping Themes to 2025



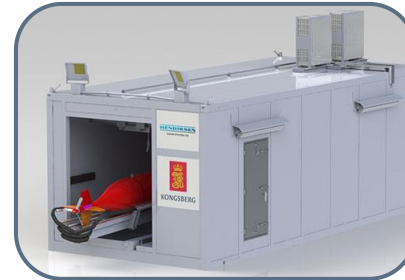
## A.1 Sensors

Bridging the ROV to AUV gap  
Faster acquisition rates  
Low power high accuracy GPS-less navigation



## A.2 Power & Comms

Extended range and operation  
Propulsion  
Battery technologies and management  
Subsea-subsea and subsea-surface comms  
Subsea power and comms networks



## A.3 Deployment

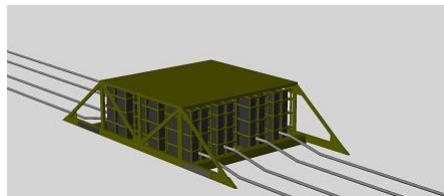
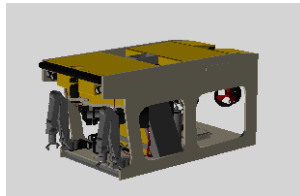
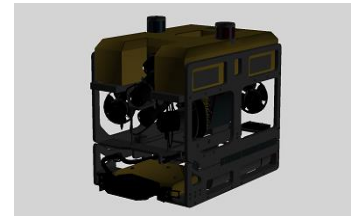
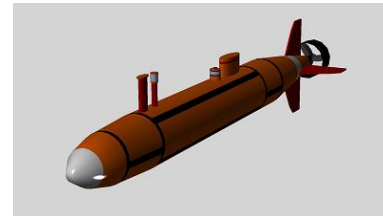
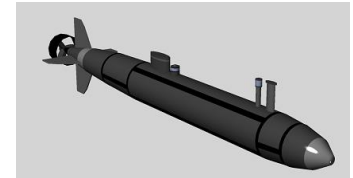
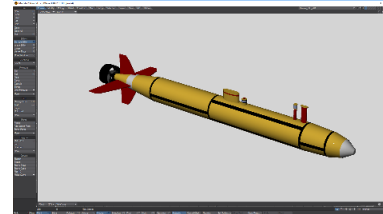
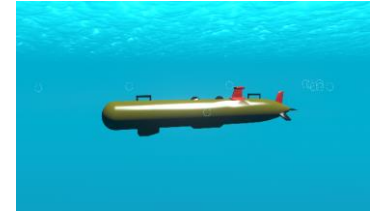
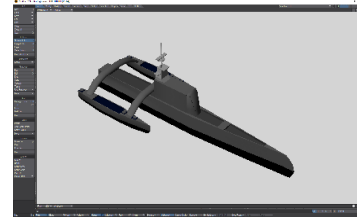
Platform friendly LARS  
Swarm launch and recovery  
Subsea repowering



## A.4 Operations

Ways of working  
Human/machine interfaces  
Autonomous operations and AI  
Underwater, surface and air integration  
Long term support

# Future Operational Context



# ICELab – Innovation & Collaborative Engagement Laboratory

- An exploitation platform for UKDSC innovation and capability development. To provide an environment that promotes:
- Innovation
  - Bringing a diverse range of users/stakeholders together to foster a defence export focused eco-system and stimulate innovative thinking.
- Collaboration
  - Enable an environment in which individuals and organisations can openly collaborate and work on innovative ideas and develop new concepts.
- Engagement
  - Provide opportunities to present, demonstrate and engage with senior stakeholders. Enable networking with potential innovation collaborators and potential research/innovation exploitation stakeholders from a diverse range of domains.

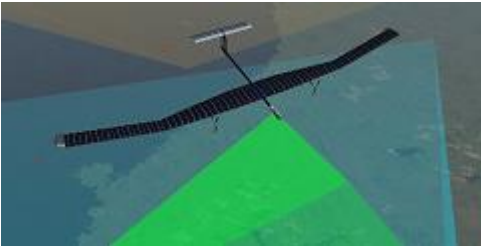
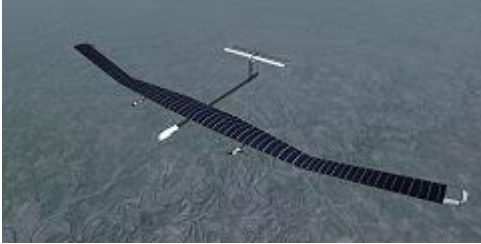




# 2020V example – Persistent Aerial Surveillance; novel ISR



# Modelling, Simulation, Innovation..... Concept Demonstrator?



# 2020V example – Glyndwr innovations



Centre for Defence Enterprise



**Thank you**  
for your attention!

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**Spearheading Innovation in Defence**



**AIRBUS**