What innovative technology, solutions, ideas and learning does defence have to offer?

Dr. Jaime Reed

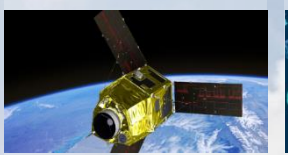
AIRBUS
DEFENCE & SPACE

WE CONNECT
AND PROTECT
lives.

Airbus Defence and Space is Europe’s largest and most innovative defence and space company. We develop and manufacture world-class aerospace products. Our exceptional platforms and services allow our customers to address even their most challenging operational needs.











AIRBUS
DEFENCE & SPACE

Strong, innovative and customer focused – Our portfolio.

- A400M
- A330 Multi-Role Tanker Transport
- Special Mission Aircraft
- Combat Aircraft
- Unmanned Aerial Systems
- Full In-Service Support

- Telecommunication Satellites
- Earth Observation Satellites
- Navigation Satellites
- Orbital and Space Exploration Infrastructure
- Science Missions
- Launchers, deterrence

- Earth Observation Satellite-based Geo-Intelligence Services
- Government Satellite Communication
- Command & Control (C5ISR) Systems
- Cybersecurity Solutions and Services

AIRBUS DEFENCE & SPACE

Is Defence relevant to Off Shore Wind?

- Defence invests heavily in Research and Development/Technology and is often the anchor customer for new technologies used in other industries; for example the helicopter industry
- Defence responsibility now takes into account the need to protect Critical National Infrastructure (CNI) in the UK, with a particular focus now on cyber-security & recognizing that energy infrastructure could be a significant national vulnerability
- Via the SDSR 2015 now has the responsibility to "promote prosperity" recognizing that security flows from a rules-based world and a strong economy; the UK is particularly interested in cross-cutting technologies
- Increasingly integrated into UK industrial strategy, e.g. for shipbuilding

AIRBUS
DEFENCE & SPACE

Examples of defence technology

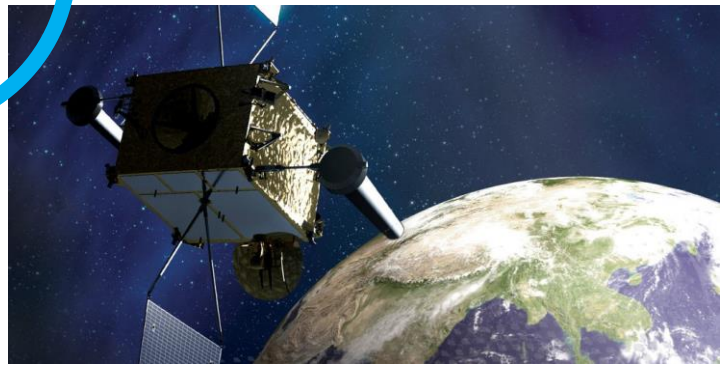
LAND

MARITIME

CYBER

AIR

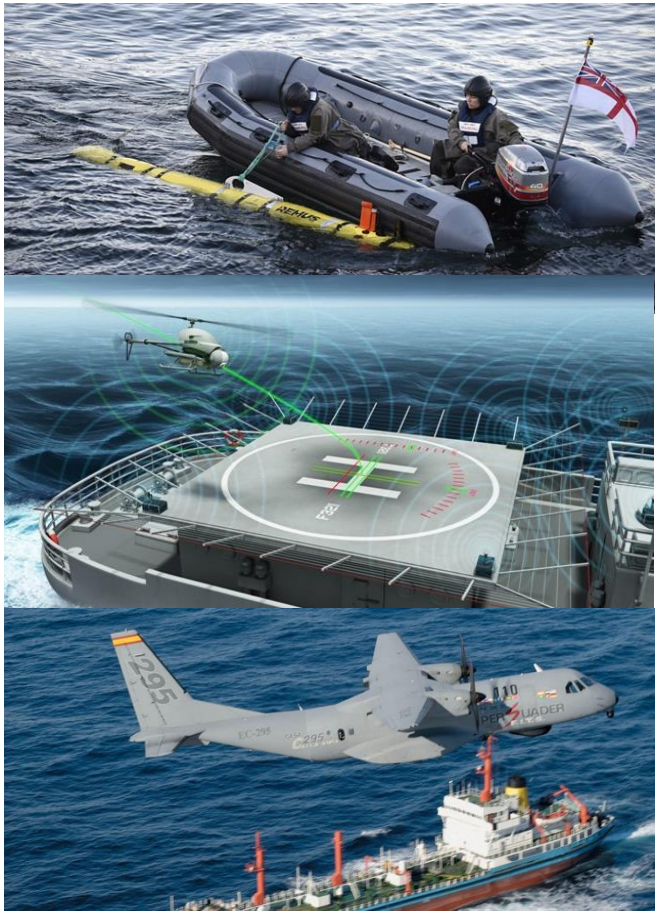
SPACE



AIRBUS DEFENCE & SPACE

Maritime

- Defence likely to be the major customer for autonomous surface vessels and submarines in the near future
- Autonomous inspection and surveying will become a reality, other maritime industries can take advantage of these developments to lower operational costs
- Development of UAVs for the maritime environment, including landing on boats has been demonstrated
- Unmanned Warrior 2016: A six week Royal Navy exercise to test autonomous technology… *"The technologies demonstrated in Unmanned Warrior have the potential to fundamentally change the future of Royal Navy operations just as the advent of steam propulsion or submarines did"* - Royal Navy Fleet Robotics Officer Commander Peter Pipkin
- Airbus supplies the C295 medium aircraft for maritime patrol
- Airbus is working on a number of maritime domain awareness concepts (see later)

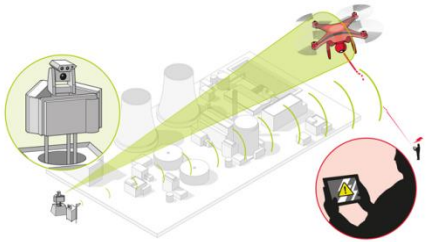


Courtesy of Royal Navy

AIRBUS
DEFENCE & SPACE

Air

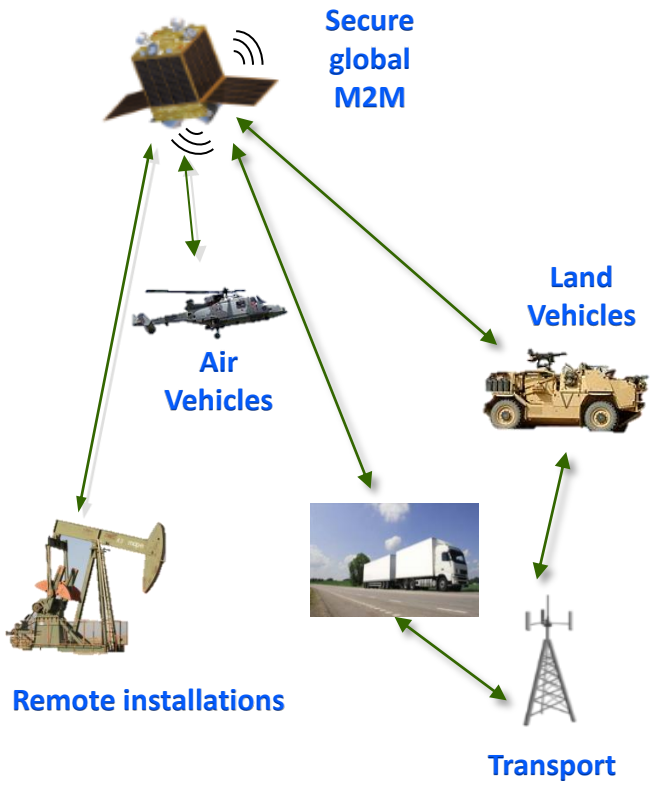
- UAVs are used in a variety of environments and Airbus has developed a navalized UAV for the maritime environment
- Airbus has also developed a High Altitude Platform System (HAPS) called Zephyr; flying at 20km it holds the world record for endurance (14 days) and will demonstrate 30days next year
- We are delivering the A400M military airlifter which features fully composite wings and propellers: Airbus sees large composite structures as a core competency (in fact some of this expertise has already been used in France)
- Airbus develops sensors and systems for air surveillance, ATM and counter-UAV protection
  - Air surveillance / ATM covers both civil and military domains
  - Radar systems for small objects such as drones and birds are being developed
  - Counter-UAV systems are designed primarily for small drones which are used for attacks and espionage
- Increasing digitalization of platforms and gathering of huge amounts of on-board data for maintenance and optimization using “big data” analytic techniques



AIRBUS
DEFENCE & SPACE

Space

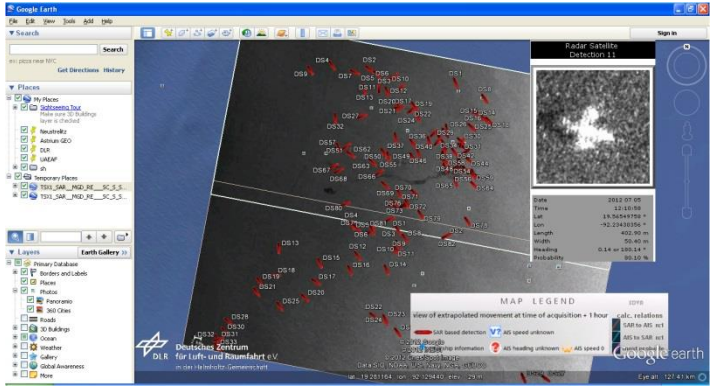
- Defence use of space covers three critical domains: intelligence gathering, secure and resilient communications, and space surveillance and tracking
- Several critical industries are now turning to “military grade” systems for secure and resilient communications for remote monitoring and control
- Airbus runs the SkyNet satellite system which provides communication services to the UK MOD under a PFI
- Increasingly we see the emergence of secure low rate machine-to-machine communications via satellite for:
  - Logistics tracking
  - Large remote sensor networks
- Data sources previously used for civil applications are now being brought into the defence domain as defence seeks to become more innovative and reduce costs
  - A good example is the world’s most accurate global Digital Elevation Model (WorldDEM) created using our radar satellites which is used for civil engineering applications but has now found success with several MODs, e.g. for mission planning
- Space systems are increasingly used to support humanitarian and disaster relief missions including optical, radar and telecommunications since satellites give capability without needing terrestrial infrastructure



AIRBUS DEFENCE & SPACE

Maritime Domain Awareness

- Increasing global need for comprehensive maritime domain awareness:
  - Border control
  - Search and Rescue
  - Traffic control
  - Anti-piracy
  - Illegal fishing
- Airbus has developed a comprehensive solution fusing various data sources:
  - Space-borne radar and optical sensors
  - Space borne AIS
  - Aircraft such as the C295 and UAVs in the future
- Events can be identified and tracking in near real-time on a global basis using a simple user interface



AIRBUS DEFENCE & SPACE

Conclusions

- Defence covers a huge range of topics and technologies, constantly seeking new innovations; often defence is the first customer

- Potentially relevant key investments and technologies:
  - Robotics and automated systems in the sea environment
  - Navalized versions of UAVs
  - Counter measures for UAV threats
  - Surveillance and monitoring technologies for remote areas from air and space
  - Ultra secure and resilient comms for military and CNI
  - Maritime Domain Awareness
  - Highly instrumented structures/systems and analytics
  - Machine to machine comms
  - Big data analytics
  - Design and manufacturing of large composite structures & cost reduction
  - Self healing structures and composites repair
  - 3D printing

AIRBUS
DEFENCE & SPACE