



FST Aviation 2050 Debate

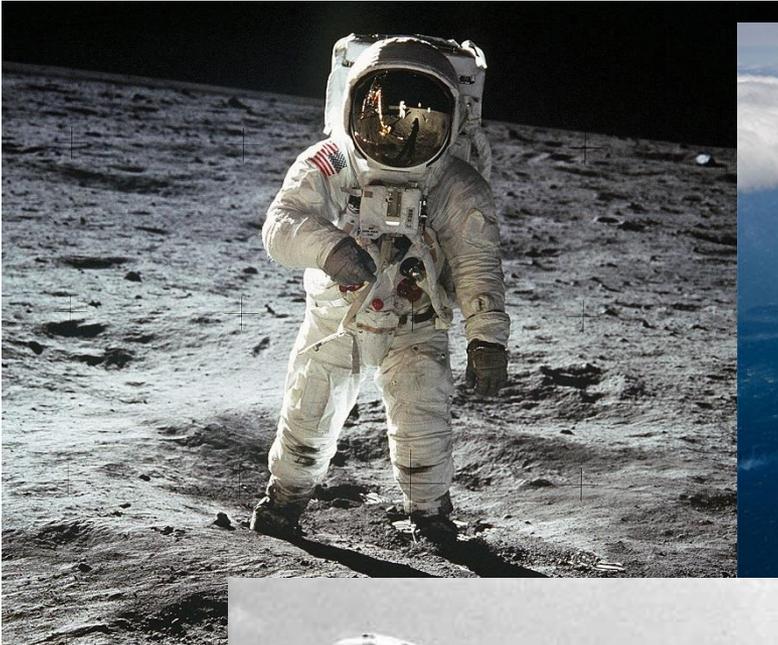


17th July 2019

Royal Academy of Engineering
Iain Gray, Cranfield University



Aviation is a Long Term Business



Source Nasa



Source Airbus



Source British Airways

Le Bourget Air Show 2019



Top 3 Priorities – “Zero carbonisation, zero carbonisation, zero carbonisation”



Unprecedented levels of activity in aircraft electrification



Technology Revolution in Aerospace

- Electric
- Artificial Intelligence
- Autonomy
- Digital
- Novel Materials

Credible Product Concepts

- Urban Air Mobility
- Electric VTOL
- Demonstrators



Uber Elevate Summit..a joined up vision



Future Air Transport & Services as a System of Systems

- System of systems architecture
- Synthetic modelling environment
 - Assess safety, environmental and economic impact
- Public engagement and survey

New models of airspace management and anticipatory regulation

- Synthetic environment for airspace management system
 - Airspace management demonstration – drones in cities
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Novel Air Vehicle Demonstrators

- Drones with scalable autonomy
 - All Electric/ Hybrid VTOL
 - All Electric/ Hybrid CTOL
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Ground Infrastructure Systems Demonstrators – city & sub-regional airport

- Drone services
 - Electrified air vehicles
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New operating models for users and commercial operators of air services

- Future market synthetic environment
 - Drone system services demos
 - Business models for electrified urban and sub-regional air vehicles
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Engagement of authorities is critical (including DfT, BEIS, Local and City Authorities, TfL, CAA, OFGEM)

Cranfield's global research airport

Multi-User Environment for
Autonomous Vehicle Innovation
(MUEAVI)

Opened 2017

Off-road autonomous vehicle test area

National Beyond Visual Line of Sight
Experimentation Corridor (NBEC)

Operational Q3 2020

Cranfield Aerospace Solutions Ltd

Cranfield
Airpark
(future)

737 Ground
Demonstrator

Holographic Radar
Operational Q3 2020

DARTeC

Operational Q2 2020

Digital air
traffic control
centre

Opened
December 2018

'Smart' car park
connected to
MUEAVI

Intelligent Mobility
Engineering Centre (IMEC)

Facility for
Airborne
Atmospheric
Measurements
(FAAM)

Cranfield Eagle Lab
Opened January 2019

Aerospace Integration
Research Centre (AIRC)
Opened 2017

- National Flying
Laboratory Centre
(NFLC)

- SAAB 340B Flying
Test Bed
Arriving June 2019,
operational 2020

Clean, renewable energy for the airport
flows from a **solar power farm** located on
the other side of the airfield.





Integrated Transport Vision





DARTeC

...a global Centre of Integrated Digital Aviation Systems Research at Cranfield

£67m industry led infrastructure investment in:

- Airport capacity
- Airspace management capability
- Visualisation and modelling
- Physical and simulated experimentation (HWIL)





11 Universities across the UK



UK Aerospace Research Consortium

▶ UK Aerospace Research Consortium will work in partnership with industry, the Aerospace Technology Institute, research councils and the government to seek to create a UK-wide infrastructure of accessible, integrated and world-class university strategic facilities that align with industry's priorities.



Does Aviation 2050 go far enough?



Source Aston Martin

- Raise our ambition – we need to do more and quickly
- We need more join up across Government, Business and Universities
- Zero carbonisation is key priority
- Infrastructure and Regulation needs to be developed alongside platforms
- We need to look beyond 2050
- Future of Flight Challenge can result in major environmental , social and economic benefits