AEROSPACE TECHNOLOGY INSTITUTE

CROSS-CUTTING ENABLING TECHNOLOGIES ROADMAP

TECHNOLOGY INDUSTRIALISATION PHASES

2020 2025 2030 2040 2050

TRL/MRL 6 TECHNOLOGY VALIDATION

INCREASE UK INDUSTRIAL SHARE FOR PLATFORM OPPORTUNITIES THROUGH TECHNOLOGY DEVELOPMENT

INDUSTRIALISATION OF SELECTED TECHNOLOGIES AND CAPABILITIES

DESIGN & VALIDATION

- Modelling & design capabilities for alternative energy aircraft: systems, propulsion & aerostructures
- Defect analysis models
- Determinate assembly, simulation, manufacturing & inspection
- Introduction of quantum computing into engineering analysis
- Materials modelling and simulation
- Integrated multi-physics, multi-fidelity based modelling & simulation for future design solutions
- Improved validation and verification and design/ off-design modelling and simulation
- More virtual verification and validation
- Next-gen high performance and sustainable metallics & composite materials
- Aerodynamic & acoustic simulation tools for airframe and propulsion systems
- Design and analysis tools for next-gen aerostructures & systems
- Wind tunnel and heat management test rigs
- Digital thread in products and supply chain

MANUFACTURING & ASSEMBLY

- Metallics: Trade study models for NNS technologies
- Down-selected materials & process development and certification
- Design optimisation for NNS and net shape technologies, optimised material utilisation
- Circular materials processing composites and end of life metals
- High rate composites infrastructure
- High rate composites adaptable tooling, deposition, cure and inspection
- Digital and adaptable automated manufacturing and assembly systems
- End of life technologies and processes
- High accuracy affordable large volume metrology systems
- Digitally connected industrial manufacturing systems and supply chain

THROUGH-LIFE SUPPORT

- Inspection and repair technologies & processes
- Structural health monitoring and sensing
- Digitally enhanced vehicle support including digital twin

TARGETS

- Reduce energy usage
- Improve material utilisation (use and type of materials) buy to fly
- Reduce waste - manufacturing and end of life
- Reducing time and cost from design and production will secure UK competitiveness for a share of up to 18% of the £4.3 trillion market to 2050
- By 2050 the UK aerospace sector annual GVA from aerospace will grow to £34 billion
- By 2050 the UK aerospace sector will grow to 149,000 direct jobs (33,000 more highly skilled jobs than today)