ROLLS-ROYCE AND THE MTC COLLABORATIVELY DESIGNED, SET-UP, AND OPERATED AN ADDITIVE MANUFACTURING PRE-PRODUCTION FACILITY THAT SUPPLIED ALL OF THE TITANIUM ENGINE SECTION STATOR (ESS) COMPONENTS REQUIRED FOR THE ULTRAFAN™ ENGINE DEVELOPMENT PROGRAMME.

THE CHALLENGE

With the launch of the UltraFan™ Engine development programme (EDP), Rolls-Royce identified Electron Beam Melting (EBM) as the lead technology for production of Engine Section Stator (ESS) components. The UltraFan™ engine will deliver further fuel efficiency and CO₂ reductions, and provide a significant reduction in engine noise.

Building on the experience of a previous EBM programme with Rolls-Royce, the MTC were able to launch a pre-production facility in tight timescales that would enable delivery of the 240 Engine Section Stators required for the UltraFan™ EDP.

MTC’S SOLUTION

- Created a 4500ft² AM production cell that included: AM build workshop (housing six Arcam Electron Beam Melting machines running Ti6Al4V), powder handling, post processing, inspection, and office space.
- Developed a method of manufacture and a traceability management system, from powder to part, suitable for flight trials.
- Embedded an integrated project team with the machine manufacturer, the MTC and Rolls-Royce working together.
- Used technical expertise to solve AM process challenges to enable doubling of part size leading to part consolidation and enhanced part functionality.
Great teamwork between the MTC and Rolls-Royce is what made this project such a success. The challenge of building such large parts with EBM should not be underestimated!

Alan Pardoe, Partnership Manager, Rolls-Royce