NEWAM – the next generation laser directed energy deposition process?

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Currently directed energy deposition additive manufacture processes give a wide range of different capabilities with a trade-off between build rate and accuracy and surface roughness. A further limitation is that material properties are not optimised due to the use of standard welding wire compositions. Finally a major barrier is the very high cost of qualification if standard statistical approaches are used for engineering materials. EPSRC NEWAM is a major new project funded by EPSRC to address these limitations. Led by Cranfield University the project is a collaboration with Manchester, Strathclyde and Coventry Universities.

Four major challenges have been identified:

- **New innovative** high build rate metal wire AM processes and systems for net shape deposition at low cost over large volumes with homogeneous microstructure and properties – **target 8kg/hr net shape for Ti**
- To build robust **physics-based process and materials' models** that give detailed process understanding, to enable more rapid process development and provide algorithms for **in-process microstructure control**
- Design of **new materials and alloys**, **tailored** to both existing and new deposition processes, giving performance **better than the equivalent wrought alloys currently used**
- To ensure guaranteed as-built structural integrity with process-independent **physics-based quality control and assurance** enabling low cost industrial qualification

The research approach adopted to address these challenges will be explained. The project has been running for more than one year now and there are already many major exciting results. These will be highlighted including the first demonstration of the innovative laser based multi energy source (MES) process.