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[www.cnt-ltd.co.uk](http://www.cnt-ltd.co.uk)



[www.cedarmetals.com](http://www.cedarmetals.com)



[www.tisics.co.uk](http://www.tisics.co.uk)



[www.brunel.ac.uk/bic](http://www.brunel.ac.uk/bic)



[www.carrswelding.co.uk](http://www.carrswelding.co.uk)



[www.kspecialprojects.com](http://www.kspecialprojects.com)



[www.nqminds.com](http://www.nqminds.com)

## Innovate UK

**UltraMAT** Project Ref. 102802

Innovate UK is the UK's innovation agency

Innovate UK is the UK's innovation agency. It works with people, companies and partner organisations to find and drive the science and technology innovations that will grow the UK economy. For further information visit [www.innovateuk.gov.uk](http://www.innovateuk.gov.uk)



## UltraMAT

*Power ultrasound as a generic tool for  
micro/nanoscale processing of metals*



[www.ultrammat.co.uk](http://www.ultrammat.co.uk)

Innovate UK

**UltraMAT** is an Innovate UK Project Ref. 102802

## Power ultrasound as a generic tool for micro/nanoscale processing of metals

# UltraMAT

The goal of the **UltraMAT** is to develop a novel generic technology for materials processing of fluid and semi fluid phases that are widespread in manufacturing including welding and adhesive joining components and manufacturing of bulk composite components with nanomaterials additives such as carbon nanotubes and graphene.

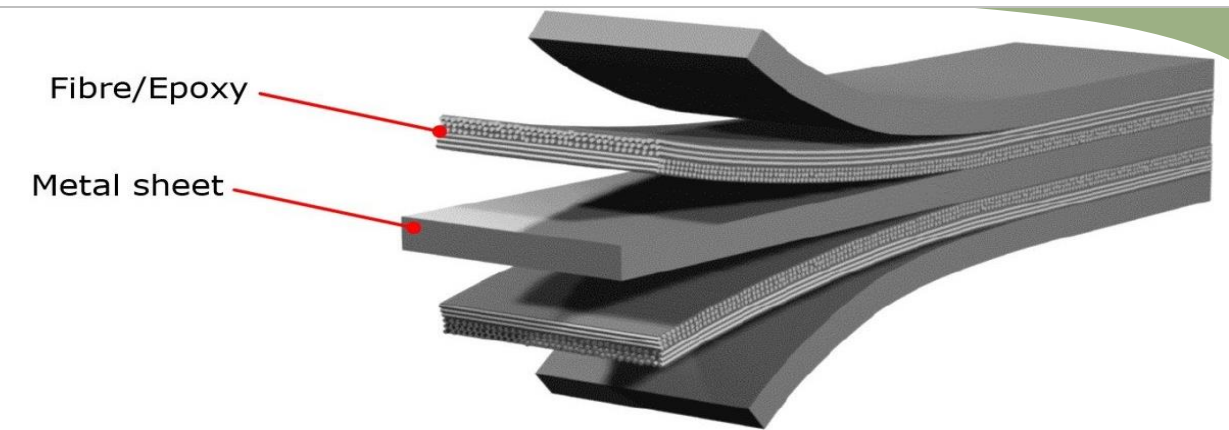
### Objectives:

- ✓ To enable production of manufactured components with step improvements in specific strength (yield/ fatigue/ impact) and modulus, fatigue life and thus light weighting.
- ✓ To reduce energy consumption and emissions in manufacture and transport.
- ✓ To homogeneously produce distributed and shaped nanoscale particulates, fibres or grains.

### Overview:

- ✓ Manufacturing processes selection :
  - LASER Welding
  - Laminated composites manufacturing (with and without nanoparticles)
- ✓ Literature review: studying current state-of-the-art on power ultrasonic assisted manufacturing processes.
- ✓ FEA simulations of ultrasound propagation in selected manufacturing processes
- ✓ Aluminum plates
- ✓ Laminated GLARE plates
- ✓ Experimental validations: 3D- Laser Doppler Vibrometry tests
- ✓ Building an UltraMAT system: Power amplifier, transducers, software ...
- ✓ Manufacturing and testing of Ultrasonic processed samples

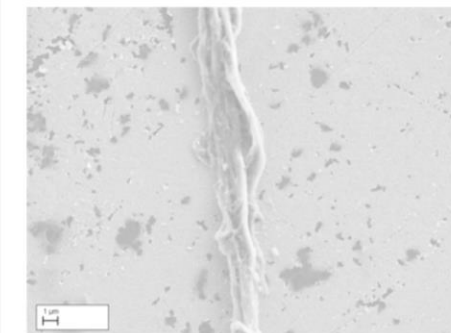
### PARTNERS



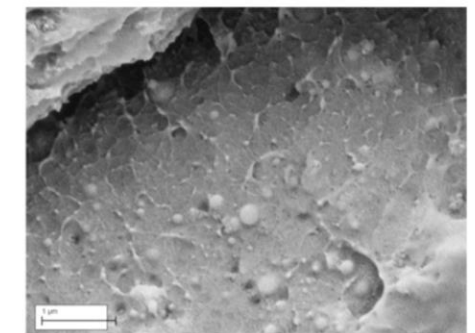
### Trials:

The **UltraMAT** technical partners have completed successfully a series of trials, using ultrasonic aided laser welding process at Carrs Welding and KWSP.

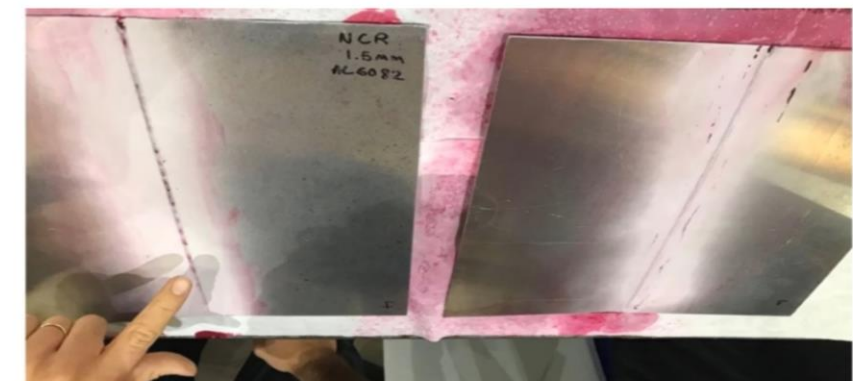
GLARE with MWCNT



Without ultrasound



With ultrasound



Without ultrasonic processing

With ultrasonic processing