

# Additive manufacturing of metallic tracks on green ceramic/dielectrics

## OVERVIEW

Researchers at Heriot-Watt University (Edinburgh, Scotland) have patent pending for an “adhesive free” method of depositing metallic tracks on dielectric or polymer surfaces. Developed within Professor Hand research group, this fine line laser assisted metal deposition system provides a strong bond and leaves no residues that could potentially de-gas or cause premature failure making it suitable for applications within microelectronics such as manufacture of LTCC ceramic/ Dielectric antenna and rapid PCB prototyping or repair.

## PROBLEM THIS TECHNOLOGY SOLVES:

Provides a method for directly writing metallic tracks onto ceramics or flexible films without the need for an adhesive layer.

## TECHNOLOGY

Using a similar set up to the Laser Induced Forward Transfer Process (LIFT Process) where a laser deposits metal from a carrier film to the substrate, the Heriot-Watt process is carrier free and uses a proprietary “temporary

adhesion force” promoter making it suitable for flexible, small scale production, or prototyping applications.

The figures below show the process applied to Aluminium foil on a glass substrate (left hand) and Copper foil on LCP polymer film (right hand).



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## BENEFITS & APPLICATIONS:

- Process for Direct writing of conducting tracks on films & rigid substrates
- Adhesiveless process - no contamination of substrates
- Uses existing metal foil grades (Copper, Aluminium etc.) – no need for carrier
- High Speed, High Definition process - laser scanning using precision XYZ stage
- Application can be extended to non-planar surfaces (note: may require additional tooling/ set up time)
- Rapid Prototyping & small scale manufacture of electronics components
- Suitable for manufacturing Antenna, Filters, Electrodes etc.

## STAGE OF DEVELOPMENT

Technology and "Proof of Concept" has been demonstrated on a lab bench using a range of metal foils, a laser system and HWU proprietary "temporary adhesion force" promoter to produce conductive tracks of <20 micron line width on both dielectric materials and LCP polymer film.

\*\*\*Experimental set up & process data is available under confidentiality agreement only\*\*\*.

## INTELLECTUAL PROPERTY STATUS

GB patent application filed (December 2010) establishing a priority date for the method, apparatus and the use of "temporary adhesion force" material to produce a conductive metal track on RF materials.

Technology is available for license in all fields of use on an exclusive/ non-exclusive basis.

## COMMERCIAL OPPORTUNITY

Heriot-Watt seeks microelectronics/ Antenna / LTCC partners ideally with experience of laser processing who see utility in the application of this technology.

Partners should have an interest in either obtaining a licence to develop this technology or to act as industrial sponsors to collaborate and provide financial (or "in-kind") support for technological developments in specific defined areas.

UK companies (or overseas companies with a UK presence) may be eligible for UK government or Scottish Development Agency financial support to develop this Heriot-Watt technology through an industry/ university knowledge transfer partnership: Knowledge Transfer Partnership Scheme or Scottish Enterprise

## COMMERCIAL OPPORTUNITY

Heriot-Watt now seeks Photovoltaic system developers, integrators and investors who see utility in the applications of this technology.

Investors or commercial partners should have an interest in either obtaining a licence to develop this technology or to act as sponsors to collaborate and ideally provide financial (or "in-kind") support for commercial or technological development in specific defined areas.

UK companies (or overseas companies with a UK presence) may be eligible for UK government or Scottish Development Agency financial support to develop this Heriot-Watt technology through an industry/ university knowledge transfer partnership: Knowledge Transfer Partnership Scheme or Scottish Enterprise

## FOR FURTHER INFORMATION:

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