

## About this workshop

Additive layer manufacturing (ALM) is an exciting new concept for the direct production and repair of components. The ALM concept produces metal parts through the deposition of material in incremental stages using one of a variety of techniques. Many of these are based around laser technology. Find out about the different processes and what their capabilities are, including latest developments in commercially available systems.

The ALM concept potentially allows large improvements in performance, reduced cost and material consumption in the production and repair of high value components. This means that the scope and breadth of applications is extremely wide. Applications range from simple cladding for improvement in performance of pipes through to direct manufacture of highly complex engineered structures. Applications also include the salvage and repair of high value in-service components. Find out about these applications and see where and how ALM can be exploited. Identify potential commercial, technological and environmental benefits for your company.

Due to the high potential of the ALM concept it is the subject of extensive research and the UK has a thriving community generating technological capability. This event will provide an insight into some of the current developments in the laser based ALM research field and will highlight what impact they may have in the future.



### Stewart Williams Workshop Chair

Professor Stewart Williams holds the Chair in Welding Science and Engineering at Cranfield University. His recent move into academia follows many years as Group Leader in the Optics and Laser Technology Department at BAE Systems investigating the use of lasers for aerospace manufacturing.

### Who should attend?

The workshop is valuable to anyone with an interest in laser material processing, especially:

- Engineers and managers from manufacturing industry looking to enhance production capabilities or simply to keep abreast of the latest developments in manufacturing.
- Job shop owners looking for new technology pathways and new opportunities in services such as tool and die repair, or small batch manufacturing runs for the engineering sector.
- Researchers in laser materials processing.

### An Opportunity

One of the key features of an AILU workshop is the opportunity it provides for networking and for discussing technical matters: a comfortable environment, generous lunch and refreshment breaks, an exhibition and a clinic.

This workshop also provides an ideal opportunity to visit the Airbus Composites Structures Development Centre (CSDC), which incorporates the Additive Layer Manufacturing Centre. The CSDC is the first of a small number of specialised centres around the UK, each focusing on a specific aspect of technology, all drawn together through the Government, industry and academia-backed National Composites Network (NCN).



Entrance to the CSDC

## IMPORTANT SECURITY REQUIREMENTS

As a delegate you are required to:

- Provide the AILU office with the Airbus security information requested on the registration form by 18 March latest;**
- on the day of the event, bring with you photographic ID which must include your date and place of birth.**

Upon arrival at reception, you will be given a visitors badge which must be visible at all times and returned to reception at the end of the day.

### Venue

The workshop will be held in New Filton House (conference rooms A, B and C) on a secure part of the Airbus (UK) site.

### Delegates

After signing in, you will be directed to a car park near New Filton House. At the venue you will receive essential notes for the day, together with a CD of key slides or presentation notes. A buffet lunch (including vegetarian options) will also be provided together with refreshments throughout the day. Please advise us of any special dietary needs.

### Exhibitors

The exhibition, together with lunch and mid-morning and afternoon refreshment breaks, will take place in conference room A adjacent to the rooms (B & C) where the presentations will take place. Access to the site is available from 07:30. Temporary parking is available outside New Filton House for loading and unloading. You can bring your own display stand and backboard; otherwise a limited number of tables will be provided. 240V mains power will be available.

### Registration

To satisfy Airbus security requirements, all delegates are required to return the registration form (or otherwise provide the AILU office with the information requested, including by email to [liz@ailu.org.uk](mailto:liz@ailu.org.uk)) by **18 March**.

AILU members and members of supporting organisations for this event receive a registration discount. Delegates who pay the full price and who decide to join the Association within 10 weeks of the event will receive this discount on their first year's corporate membership subscription. For further information on membership go to [www.ailu.org.uk](http://www.ailu.org.uk) and look for the link to 'about us'.

### Clinic

As part of the mission of the Photonics KTN, AILU Secretary Mike Green will be available throughout the day to arrange informal introductions with appropriate experts at the workshop, for discussions on any technical or business matters that delegates would like to raise.

### Travel

Full address: Airbus (UK), New Filton House, Golf Course Lane, Filton, Bristol BS99 7AR

Air: The nearest airport is Bristol Lulsgate Airport, 15 miles from Filton

Rail: The nearest railway station is Bristol Parkway, 2 miles from the site

Car: The site is 3 miles from Jn.16 of the M5 motorway or from Jn.19 of the M4

### Accommodation

Hotels in closest proximity to Airbus: the Express By Holiday Inn Bristol North T: 0871 4234876; the Aztec Hotel and Spa T: 01454 201090; the Hilton Bristol Hotel T: 01454 201144; and the Forte Posthouse Filton T 0870 4009014.

**A summary sheet detailing all travel and accommodation options can be downloaded from the AILU web site, on the page for this event.**

*AILU reserves the right to alter the programme or cancel the meeting at short notice and accepts no responsibility for the views expressed by the speakers or delegates.*

[www.ailu.org.uk](http://www.ailu.org.uk)

the association of  
**AILU**  
LASER USERS

Courtesy of TRUMPF

# Additive layer manufacturing: laser techniques and opportunities

## Presentations, exhibition & clinic

**Thursday 26th March 2009**  
**Airbus (UK), Bristol (Filton)**

### Supported by:



Powdermatrix



Photonics

Knowledge Transfer Network

## Programme



Additive Layer samples

Courtesy TWI

09:00 - 09:40 **Registration and refreshments**

09:40 - 11:10 **Session 1**

### Welcome

Dan Johns Airbus UK

### Sustainable Technologies for EADS

Ian Risk Airbus UK

### The application of laser metal deposition and powders in turbine component repair

Phil Carroll LPW Technology

### Laser additive layer manufacturing applications

Rob Scudamore TWI

11:10 - 11:40 **Refreshment break**



Titanium cold spray coating

Courtesy University of Cambridge

11:40 - 12:55 **Session 2**

### Design for additive layer manufacture

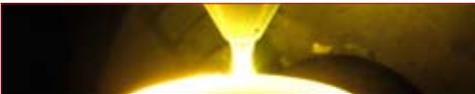
Helen Lockett Cranfield University

### Cladding process and applications

Paul Goodwin Laser Cladding Technology

### Laser assisted cold spray

Andrew Cockburn University of Cambridge



Macro cladding

Courtesy IREPA LASER

12:55 - 14:00 **Lunch & EXHIBITION**

14:00 - 14:50 **Session 3**

### Rapid manufacturing by laser cladding: the CLAD® process

Didier Boisselier IREPA LASER, France

### Equipment and applications

Juergen Metzger TRUMPF, Germany

14:50 - 15:10 **Refreshment break**



Diffractive optic element

Courtesy Loughborough University

15:10 - 16:00 **Session 4**

### Quality assurance in laser additive layer manufacturing

Otto Märten PRIMES, Germany

### Use of diffractive optics in laser additive layer manufacture

John Tyrer Loughborough University

16:00 - 17:00 **TOUR of the Airbus Composite Structures Development Centre (see below)**

## Composite Structures Development Centre including the Additive Layer Manufacturing (ALM) Centre

The Airbus Composite Structures Development Centre (CSDC) is the first of a small number of specialised centres around the UK, each focusing on a specific aspect of technology, all drawn together through the Government, industry and academia-backed National Composites Network (NCN).

This 4,500 m<sup>2</sup> facility forms the 'hub' of a regional alliance of companies, universities and colleges in the South West, who together offer a world-class capability in the field of composites technology. It will keep Airbus at the forefront of technologies key to successful development of future generations of aircraft, as well as providing capacity for development work for other sectors – including automotive, marine and construction.

The focus of the centre's activities include the development of low-cost technologies for wider structural applications of composite materials. The facilities at the centre will include: a clean room with laser positioning capability; autoclaves; a hot press; an automatic ply cutter; hot de-bulking facilities; a 5 axis router; a high temperature batch oven and supporting NDT equipment.

Within the CSDC, Airbus has established a leading international centre of excellence in polymeric and metallic ALM technology capability and a world class team. The core focus of the team is to create 'industrial ready' applications and build the research program for next generation platform technology. It has already established a European network of partnerships and, with EADS (European Aeronautic Defence and Space) Innovation Works, it now coordinates the Strategic Agenda for the EADS Corporation in this field of technology.

With over 50 Industrial partners and 30 global academic partners, the ALM program is now operating over 20 collaborative projects across National and International funding agencies.



## Registration Form

Additive layer manufacturing: laser techniques and opportunities  
26 March 2009

### Delegate information

Title First name Surname

Position: .....

Organisation: .....

Address: .....

Post Code: .....

Tel: ..... Fax: .....

E-mail: .....

### AIRBUS security requires the following additional information:

Nationality: .....

Place and date of birth: .....

### Payment options

- Please invoice me
- I wish to pay in advance by:
1. Bank/Euro cheque in £ Sterling or EURO, payable to AILU
  2. Visa/Mastercard (billing in GBP):  
Name on Card

Number \_ \_ \_ \_ \_ Exp \_ / \_ \_  
Please debit my account

- I wish to register as a delegate. The applicable rate is:
- GBP 142.00 (= £166.85 incl. VAT)  
I am a member of AILU and/or one of the supporting organisations:
- Photonics KTN  Materials KTN/Powdermatrix  Airbus/EADS
- GBP 65.00 incl. VAT  GBP 40.00 incl. VAT  
I am unemployed or retired. I am a full time student.
- GBP 175.00 (= £205.63 incl. VAT)
- I wish to register as an exhibitor. Please reserve me a table. The applicable rate is:
- GBP 135.00 (= £158.63 incl. VAT)  
I am a member of AILU or one of the supporting organisations ticked above.
- GBP 175.00 (= £205.63 incl. VAT)
- I wish to register as a delegate and exhibitor. Please give me a GBP 50 plus VAT discount on the total fee.

Signed: ..... Date: .....

Cancellations will be accepted up to 1 week before the event; otherwise the full fee may be charged.

### Information to arrive at the AILU office not later than 18 March

AILU, 100 Ock St, Abingdon, Oxon OX14 5DH UK.

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