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ISSUE 1

KEY SERVICE



GLEEBLE THERMAL- MECHANICAL PHYSICAL SIMULATION TESTING

Gleeble testing allows physical simulation at the laboratory-scale, allowing a cost-effective and timely way of characterizing materials and studying their metallurgical properties across a range of processing conditions and treatments. Gleeble analysis has applications in optimizing current materials and developing new products and applications, particularly with regards to verifying the properties and effectiveness of welding or joining operations.

Using this testing technique can help you to:

- **Lower costs**
- **Optimize manufacturing processes**
- **Optimize materials**
- **Increase production**
- **Speed up product development**
- **Improve product quality.**

To find out more, visit:

www.lucideon.com/gleeble-testing

DID YOU KNOW?

We are the first and only ISO 17025 compliant confidential commercial laboratory in North America to offer Gleeble thermal-mechanical physical simulation testing.

UPDATE FROM JULIUS BONINI

BUSINESS MANAGER, AEROSPACE



Welcome to Lucideon's first Aerospace and Defense newsletter, an opportunity to learn about new capabilities across the business and get an insight into our key services.

I am excited to announce that we have now launched our new range of services portfolios! These showcase our services and offerings for the areas of the Aerospace and Defense industry we operate in. We work with partners throughout the supply chain, from R&D to post-market, providing materials and process development and optimization, root cause investigations of failures, Additive Manufacturing (AM) support and much more. On page 2 you can view our aircraft portfolio and find out about the services we provide to this sector.

Additive Manufacturing (AM) has been a hot topic over the last few years with continuous developments in technology and uses, partnered with skills shortages. Lucideon has experts across all types of commercially available AM technologies from Direct Metal Laser Melting (DMLM) to Electron Beam

Manufacturing (EBM). Get in touch to find out how we can help you.

We are working with our partners on some exciting and ground-breaking projects this year with the results giving them the competitive edge they need in the ever-changing Additive Manufacturing world.

We hosted a series of webinars throughout 2017 relating to Additive Manufacturing and its uses in the Aerospace and Defense sector. The recordings are available to download from the website, read more about them on page 4.

In addition to webinars, we have a number of white papers on our website that are free to download. Again, you can read about them on page 4.

Read on to find out more about what's new, and how our team can help you.

DID YOU KNOW?

We are an active member of the ASTM F42 committee and E08 (Dynamic and Fatigue testing) subcommittee, as well as a member of America Makes.



Got a question?

Please give me a call on:

(US) +1-518-382-0082

(UK) +44 (0)1782 764428

Or email:

julius.bonini@lucideon.com

LUCIDEON ASSISTS IN IDENTIFYING ROOT CAUSE OF CRACKING IN ADDITIVE MANUFACTURED COMPONENTS

The Challenge

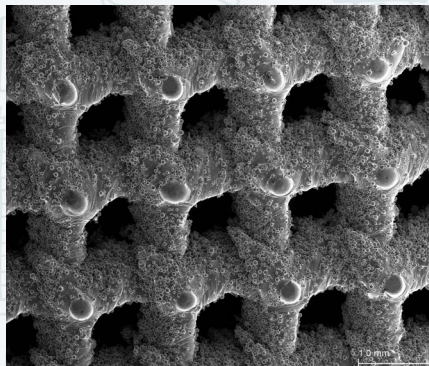
One of our clients was experiencing periodic cracking in components that were being printed at their facility, however they were unable to correlate the root cause to any of their processing parameters.

What We Delivered

Leveraging the experience of our Additive Manufacturing (AM) team, our dedicated testing and analysis laboratories and background in powder and microstructural characterization, we were able to analyze the residual stress inside the component and the changes in the recycled powder, both of which were considered likely contributors to the failure. We were able to identify the root cause as an issue in the quality of the recycled powder, and were able to recommend changes to powder handling processes, recycling programs and the in-line process settings, in order to prevent these issues moving forward.

Value to the Client

Our client was able to confidently produce high quality additive components without the scrap costs associated with periodic failures, or the concern of reliability issues in their end use application, reducing the overall liability for the company.



SERVICES PORTFOLIOS

Our new range of services portfolios gives you an overview of the services we offer in the Aerospace and Defense industries.

Did you know our expertise and experience goes beyond our testing capabilities? Whatever stage you are at in the lifecycle of your products, we can help. Our consultants can provide you with materials and process development and optimization, root cause investigation of failures and Additive Manufacturing (AM) support.

Below is our aircraft services portfolio. To find out more about our testing and consultancy capabilities visit:

www.lucideon.com/aircraft

ADDITIVE
MANUFACTURING
SUPPORT

DIGITAL IMAGE
CORRELATION (DIC)

AMBIENT & HIGH
TEMPERATURE
MECHANICAL TESTING

HIGH TEMPERATURE
EROSION &
OXIDATION TESTING

COATING
DEVELOPMENT &
QUALIFICATION

MATERIALS
DEVELOPMENT



FAILURE ANALYSIS

SURFACE ANALYSIS &
PROBLEM SOLVING

GLEEBLE TESTING

COMPOSITIONAL &
THERMAL TESTING

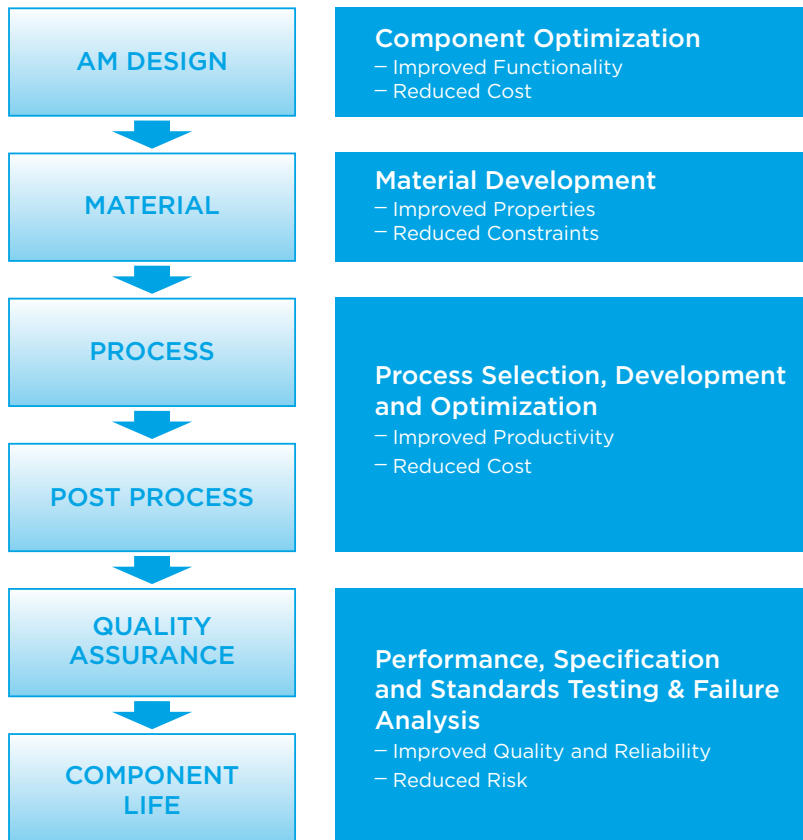
ADDITIVE MANUFACTURING

Additive Manufacturing (AM) is fast becoming the next industrial revolution, however it is not without its challenges – this is where Lucideon comes in.

Additive Manufacturing is one of the areas we specialize in, having worked with this technology for a number of years. This means we can help you integrate it into your existing processes and products, whether that be ceramics, metals or polymers.

We understand that in order to help you maintain a competitive edge it is essential to get to grips with AM – which is why we set out to help you solve any challenges you may face.

For more information visit: www.lucideon.com/additive-mfg



AMBIENT AND HIGH TEMPERATURE MECHANICAL TESTING

Our state-of-the-art laboratories (Nadcap and ISO 17025 accredited) enable us to specialize in ambient and high temperature mechanical testing ranging from tensile, fracture toughness and 3-point bending.

Our experience and expertise means we can provide not only test results but answers for when the unexpected occurs.

For more information, visit www.lucideon.com/ambient or contact

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LUCIDEON HELPS ADDITIVE MANUFACTURER SOLVE POWDER INCONSISTENCY

The Challenge

A company producing Ti 6 Al-4V components using Additive Manufacturing came to Lucideon for assistance with AM powder handling problems that arose after changing powder suppliers.

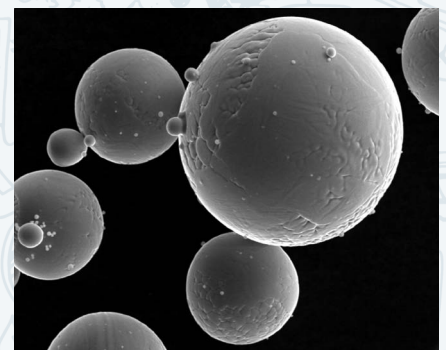
What We Delivered

Thanks to our powder expertise, we were able to:

- Determine the Particle Size Distribution (PSD) and flow characteristics of the metal powders
- Introduce the client to powder shape analysis as a means of identifying differences in metal powder morphology that influenced flow behavior
- Make recommendations regarding metal powder conditioning for use in AM.

Value to the Client

Through our detailed analysis our client could introduce procedures to condition their powders for more consistency within their process. Through the data provided on structure, PSD and morphology, they could alter their process to suit the new supply of powder and avoid the issues they were experiencing. The client was also introduced to Factorial Experimental Design (FED) expertise available at Lucideon.



MEET THE TEAM...

JULIUS BONINI
BUSINESS MANAGER,
AEROSPACE



Julius has over 35 years' experience in the Aerospace and Healthcare industries with a specific specialization in titanium alloys. Now, with the development of new 3D printing technologies, he also heads Lucideon's Additive Manufacturing support services. He is an expert in metal additive manufacturing and has provided clients with a much needed metallurgical perspective on this developing technology.

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DAN CUNNINGHAM
BUSINESS DEVELOPMENT,
AEROSPACE



Dan comes from a background in materials and aerospace engineering with a focus on R&D of ceramic and carbide materials for high temperature and wear resistant coatings.

His primary focus at Lucideon is leading the business development activities of the Aerospace group.

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We've launched our new Aerospace and Defense website! Find out more about the testing and consultancy services we offer in the following areas:

AIRCRAFT COMPONENTS DEFENSE
ENGINES SPACE

TAKE A LOOK: www.lucideon.com/aerospace

www.lucideon.com/aerospace

Tel (US) +1-919-504-4900
Tel (UK) +44 (0)1782 764428
inquiries@lucideon.com

WEBINARS

We recently hosted a number of webinars including:

- **Additive Manufacturing of Metallic Components - The Metallurgical Perspective**
- **Your Metal Component Has Failed in Fatigue: What do you do next?**
- **Validation of Additive Manufactured Components through Specialized Testing**
- **Common Post-Processing Treatments for Additive Manufactured Components**
- **Cleaning Issues with Additive Manufactured Devices**

To watch a recording or to view our varied program of webinars for 2018, click here:

www.lucideon.com/aerospace-webinars

Free to attend, the webinars usually last 30 minutes with 10 minutes for questions after.

WHITE PAPERS

Our white papers cover a range of areas within Aerospace and Defense:

- **Additive Manufacturing: A Metallurgical Perspective**
- **How Surface Characterization is Helping the Aerospace and Defense Industry to Achieve Environmental Targets**
- **Lucideon's Guide to Composites**
- **The Growth of Ceramics in Aerospace and Defense**

All of these papers are free to download at:

www.lucideon.com/aerospace-whitepapers