

EPIC Members Event Report



JNPLI – Journées Nationales des Procédés Laser pour L'Industrie

28-30 April 2015

Nantes, France

ALPhA NOV

Centre Technologique Optique et Lasers

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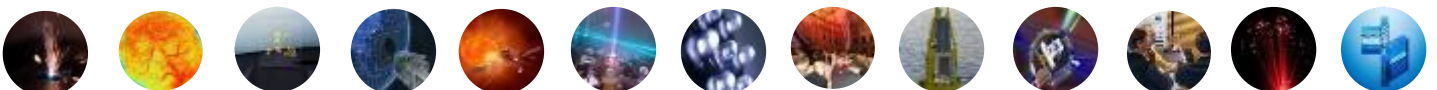
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About the EPIC Members Event Reports

Initiated by the founder of EPIC Dr. Thomas Pearsall in 2003, these reports are prepared by members of EPIC to the benefit of the wider community. If you did not have a chance to attend the event but would like to know some key highlight, this report is for you. Emphasis is placed on exploring technical and business opportunities for the members of EPIC.



Introduction

This edition of JNPLI (Journées Nationales des Procédés Laser pour L'Industrie) was jointly organized by the Club Laser et Procédés (CLP), the Franco-German Laser Cooperation and the Maupertuis Institute in partnership with the Jules Verne Technologic Research Institute. Europe had strong representation with speaker from Germany, Great Britain, and Spain. The aim of this conference is to offer an overview of the latest innovations and recently developed Laser applications serving the industry (AIRBUS, France STX shipyards, etc.).



The 2015 edition had 8 sessions with a total of 33 presentations. The main topics discussed included: heavy section welding and heterogeneous assembly, selective laser melting, composite processing, laser surface treatment, and laser applications for lightweight design.

This event provides an opportunity for in-depth exchanges between experts, ordering parties and contractors. Is there a better way to build strong professional relationships and maintain an effective business network of contacts?

Exhibition

During the conference, the members were able to meet 15 exhibitors showcasing their latest products in Laser technology, optoelectronics, optical components, and other fields of the photonics industry.

A great way to share, discover and learn about new nano and micromachining solutions for engraving, marking, anti-counterfeiting, cutting, drilling, etc. Furthermore, some applications of welding or cladding parts were presented.

Let us not forget, the participation of high-quality machinery producers in power-meters, galvanometer scanners, etc. and one training center in optics and lasers, as well.

Conferences

The JNPLI conference started with the **'heavy section welding' session**, a way to discover welding solutions of new steels, for light weight construction, very high penetration in a single pass with good seam quality and robustness against workpiece tolerances (gap bridgeability, vertical edge offset). Since laser became more and more powerful (ten of KW), welding speeds are increasing and hybrid welding (combining Laser and Metal Active Gas (MAG) technologies) now offers the ideal solutions for increased productivity and quality for several industries (shipbuilding, pipeline transport, etc.).

A new emerging topic is **dissimilar assembly** (ex: additive-free polymer materials or composites material-metals). Laser can now provide solutions for pre-treatment of metal surfaces prior to composite material-metal bonding and joining with good mechanical properties serving the automotive and aerospace industries. New research has shown a considerable improvement in adhesive and additive-free polymer welding, by laser in the mid-infrared. In different applied fields such as the medical device industry using sterilized materials, absence of adhesive residue will guarantee cleanliness and security. Imagine the possibility to produce complex, precisely designed industrial shapes, normally impossible to be machine by conventional mechanical means. This is made possible with **additive manufacturing and cladding**. Additive manufacturing – the industrial version of 3-D printing (because it builds an object by adding ultrathin layers of material one by one) can now provide full, functional parts with high mechanical resistance to serve the aeronautics industries: manufacturing of preforms to be machined, material deposition for repair of worn or damaged parts, etc. Additive manufacturing technology has a rosy future ahead of it.

Composites machining represented a major part of the event. More than ever, in the present very demanding aeronautical and automotive markets, using composites materials (ex: CFRP) is increasingly important. It offers strength, light weight and very high mechanical properties for manufactured parts. The stakes are: reduction on weight of the airplane/automotive therefore, significant fuel savings, lower maintenance costs, etc.

Thanks to the new development of high power **ultrafast laser** (femtoseconds) it is now possible to increase machining speed, cutting thickness, machine harder alloys and without increasing heat affected zone and damages. Furthermore, new high **power diode Laser** (10-20 kW) offers welding of carbon fiber resin stripes, high speed cladding, etc. Tests have been conducted in order to replace hybrid welding. From the aeronautical or automotive industry to the medical industry, using diode Laser and ultrafast Laser can only continue to increase.

Surface treatment has been an interesting part as well. Further than welding, machining, surfaces can be polished or treated with laser shock peening. On average, laser polishing is much faster than all conventional mechanical polishing processes (automated or manual) and above all on complex parts (3D geometries). Micro-scratches in the material are avoided during the laser polishing process, which makes this process suitable for medical applications, especially for components in contact with bacteria.

The use of technologies inducing residual stresses can be employed in aeronautical and automotive industry as technology, to improve resistance to fatigue, corrosion and thus reducing maintenance costs of structures by inhibit fatigue crack initiation and crack propagation. Laser Shock Peening process offers best residual stress profiles compared to conventional shock peening process.

Let us not forget for each of these topics, the remarkable modelling works. Theoretical and experimental work need to go hand in hand for a fast track of innovation.

Conclusion

Today's high performing organizations require visibility into the innovation market: what has been done, what is being done and what remains to be done. With many interesting and eclectic conferences, this year JNPLI 2015 has been the best way for industrials to get such information. Over the conferences, networking continued with a wonderful dinner onboard a barge, the impressive visit of the "Machine de l'île – Nantes". The end of JNPLI2015 conference concluded with a tour in the research campus IRT Jules Verne.



Social programme at "Machines de l'île" in Nantes, France <http://www.lesmachines-nantes.fr>

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ALPhANOV is a private, non-profit organization and is the Technology Center of the French “Route des Lasers” competitiveness cluster. It provides technical resources and expertise required to fulfill R&D challenges and innovative development in photonics, optics and Lasers. Located in the Bordeaux area, ALPhANOV employs about 50 highly skilled Researchers, Engineers and Technicians. The Technological Center offers dedicated facilities and equipment for Laser developments, implementation and characterization. It has strong expertise in Laser micro-machining developments, optical design and prototyping in vision, microscopy and spectroscopy, and fiber Laser sources and optical fiber components. www.alphanov.com



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