

APS MEETINGS 2022 CONGRESS PROGRAM

WEDNESDAY JUNE 8, 2022

8:45 - 9:00 am Congress Introduction



Philippe BAUER, **MODERATOR**

9:00 - 9:30 am French National 3D Printing Plan



We propose to make a progress report on the "National 3D Printing Plan" led by FRANCE ADDITIVE, EVOLIS SYMOP and the UIMM within the framework of the new "Industry Solutions of the Future" sector: where are we, what dynamics with the sectors, how to jointly address their major innovation challenges such as health, hydrogen, electric motors, batteries or recycling.

Christophe ESCHENBRENNER, FRANCE ADDITIVE



9:30 - 10:00 am AERONAUTICAL DEFENSE CLUSTER GRAND EST/ 1

The floor is given to the association that supports the cluster and to some of its 70 member companies.

9:30 - 9:45 am AERIADES Association

Presentation of the AERIADES Cluster bringing together more than 70 member companies, whose mission is to structure and develop the aeronautics - defense sector in the GRAND EST region



Jean-Luc REIS, **AERIADES**



Caroline JUNGERS, AERIADES

9:45 - 10:00 am A new solution for massive part manufacturing with a hybrid DED process

Additive manufacturing technologies are in constant evolution and address more and more business sectors. This also applies to massive parts. To face this demand, a new solution of hybrid DED additive manufacturing has been developed by IREPA LASER to produce large parts, up to 5 tons and more than 5 m long. The benefit and capacities of this bi-robot machine combining DED-CLAD laser + wire and DED-CLAD laser + powder, will be presented and illustrated with different examples, as well as the needs induced by the size of the parts, like simulation and process control.



Didier BOISSELIER, IREPA LASER



Nicolas VILLEDARY, IREPA LASER



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10:00 - 10:15 am From metal powders to post-treatment of additive manufacturing products

Advances in additive manufacturing also depend on the raw material as well as the post-treatment of printed parts for surface quality. Recent work on metallic powder production by gas atomization and innovative surface treatments will be presented.



Aurélie FRANCESCHINI, IRT M2P



Jason ROLET, IRT M2P



10:15 - 10:30 am **3D printing of shape memory alloys**, an innovative technology

Discover 4D printing, an innovative technology that consists in 3D printing of shape memory alloys. The results of characterization of functional tests will also be presented.



Alain HAUTCOEUR, NIMESIS



10:30 - 11:00 am

How-to-produce-isotropic-molds-for-composite-material-parts-in-less-than-a-week



Current tooling processes for composite materials are slow and expensive - not to mention wasteful, and dependent on extensive manual labor. Join us to explore a new, award-winning, Additive Manufacturing tooling system that enables automated mold production in a matter of days, instead of weeks. It introduces to market the first true isotropic 3D printed mold for composites. It enables direct printing of a sacrificial shell into which the mold is cast on-the-fly. Commercially launched at JEC WORLD 2022, the Massivit 10000 digitalizes tooling workflows for composites manufacturing across the automotive, marine, infrastructure, aerospace, and energy industries.

Gaspare Bugli, MASSIVIT



11:00 - 11:30 am Complete connected process, from design to manufacturing



We will present a complete workflow highlighting the technologies of generative design, additive manufacturing with a robot, multi-axis machining center control through the use of scanned data and the validation of a part through simulation tools.

Bertrand MASURE, AUTODESK



11:30 - 12:00 am New metals for AM



AM has used known alloys over the last 25 years, they are not always optimized for its own requests. Where are we in terms on integration of the technology own requests?

François BONJOUR, POWDER ALLOY CORPORATION



12:00 - 12:30 pm ROUND TABLE 1

2:00 - 2:30 pm Additive manufacturing to serve the production



How does additive manufacturing enable better quality, ergonomic, cost efficiency and delivery time in production facilities? Find out about additive manufacturing's potential through concrete use cases inside one of Tooling's department.

Michael CAMUS, TOOLING RENAULT GROUP



2:30 - 3:00 pm Transforming supply chains with additive manufacturing.



The past year has shown us the challenges within our global supply chain, and the oil and gas industry is very sensitive to these disruptions. This session will discuss how additive manufacturing can transform supply chains for oil and gas applications, while reducing lead times and enabling decentralized production for low-volume critical parts.

Xavier FRUH, VELO3D



3:00 - 3:30 pm

Introduction of vibration properties in the design of structures made by additive manufacturing, towards the design of damping structures.



Additive manufacturing allows the design of complex and structured geometries. The challenge in terms of robust design is to take into account the vibration properties. Thus, it is possible to improve vibration damping by introducing a viscoelastic material, a bimaterial structure, a periodic structure...

Guillaume ROBIN, LEM3





El Mostafa DAYA, **LEM3**

3:30 - 4:00 pm Reverse Engineering & Additive Manufacturing



Reverse engineering is used in manufacturing and engineering for many reasons, from legacy parts supply chain issues to product reengineering. In this presentation, we will look at how Additive Manufacturing can be used to support reverse engineering activities.

Mathieu PERENNOU, HEXAGON



4:00 - 4:30 pm Challenges and training offer in additive manufacturing



Florian Berthelot Director of F3DF will present the major trends in training, the need for skills upgrading in additive manufacturing and existing training mechanisms.

Florian BERTHELOT, F3DF



4:30 - 5:00 pm

Manufacturability and cost analysis for additive manufacturing of a complex assembly via machine learning



Feasibility analysis for Additive Manufacturing of complex assemblies from aerospace industry. An automated and fast study on the assemblies will be done in live to find the best candidates for additive manufacturing. Parts are analysed for various 3D printing processes in polymer and metal.

Rhushik MATROJA, CDS



5:00 - 5:30 pm Additive production with high performance materials in Aerospace



Metal replacement is the substitution of metals with polymers. This procedure was made possible with the advent of high-performance polymers and composites that, thanks to their high mechanical properties and excellent temperature resistance, enabled new possible applications. But what happens when metal replacement meets a disruptive technology such as 3D printing? Roboze 3D printing technology makes the most of this opportunity especially in the aerospace sector.

Fabrizio BRANDI, ROBOZE



5:30 - 6:00 pm Navigating the Leap from Prototyping to Production

Today, AM manufacturers are faced with the challenge of crossing the chasm from early adopters to production users. The speech will cover today's challenge relying on the capacity of the ecosystem actors (printer manufacturers, materials producers, software, post-printing solutions and recycling offers, etc) to align their respective process workflows to meet scaling users expectations for end-to-end integrated solutions. We will also address the different relevant solutions that must be found to overcome the main pain points challenges that users currently face: repeatability, automation, digital tracking and productivity.



Alain MARION, POSTPROCESS



Bruno BOURGUET, POSTPROCESS



6:00 - 6:30 pm ROUND TABLE 2

8:30 - 9:00 am WAAM technology use-cases and developments at AXIVE ADDITIVE

AXIVE ADDITIVE is a young French company based in Saint-Etienne and specializing in additive manufacturing using the WAAM process (arc-fil). The company is developing expertise around this technology and offers its services in the design and production of parts. AXIVE ADDITIVE has notably developed its own means of production to best meet the needs of its customers. Industrial use cases of WAAM technology will be presented as well as current and future developments within AXIVE ADDITIVE.



Thibault AGIUS, **AXIVE ADDITIVE**



Eddy BERNOU, **AXIVE ADDITIVE**



9:00-9:30 am

Strategies for multi-criteria detection of parts eligible for additive manufacturing from an unstructured CAD model database

When it comes to adopting this new manufacturing process, companies need to determine which parts are eligible, with which printing technology and for what cost.

This is not a trivial task when there is a large history of printing and, to be effective, it must be supported by tools and strategies that will be developed in this presentation.



Gauthier WAHU, CORETECHNOLOGIE



9:30 - 10:00 am

Powder functionalization for Laser powder bed fusion process: application to hot cracking sensitive aluminium alloys and further perspectives



For 5 years, CEA has used its skills in powder metallurgy to develop functionalized powders for 3D printing processes (metal, ceramic and polymer). Metallic powders are functionalized using nanoparticles electrostatic gripping. In addition to a low operating cost, mixing process is easily scalable (>50 kg/h). This approach has shown its efficiency in overcoming hot cracking issues in certain wrought alloys (6061, 7075), but also makes it possible to increase mechanical properties by hardening (aluminum alloys, nickel alloys).

Guilhem ROUX, CEA



10:00 - 10:30 am

How to take advantage of high temperature 3D printing? The example of Alstom



Find out how Alstom's benefits from high temperature FFF 3D printing solutions and how to take advantage of this technology:

- How can 3DGence solutions be an advantage for manufacturers? Decrypting how they work and the high-performance materials available.
- *High temperature 3D printing Alstom's feedback on the integration of 3DGence technology*
- Use cases, optimizations, and future developments

Bastien DEBAUD, HAVA 3D GROUP



10:30 - 11:00 am

Is it possible to democratize generative design tools to take them out of the design office and use them directly in the workshop?



Discover how the combination of cutting-edge technologies such as topology optimization, hybrid exact/faceted body modeling and implicit modeling, within the same platform, can considerably facilitate the design of complex shapes while offering a strong associativity between these technologies and quickly test different design variants. What if it was possible to democratize generative design tools and take them out of the design office to use them directly in the workshop?

Emilien GOETZ, SIEMENS



11:00 - 11:30 am Applications du procédé de Fabrication Additive par Stratoconception® pour le BTP. Mise en œuvre d'Outillages Rapides destinés à la fabrication de pièces 3D complexes en béton chez PEDUZZI-Groupe LIVIO.



Le partenariat de R&D entre CIRTES et PEDUZZI a permis le développement de solutions originales autorisant la réalisation de pièces 3D en béton à partir d'outillages rapides réalisés par Stratoconception®. Après une phase d'étude et faisabilité, la solution a été intégrée au sein de l'entreprise PEDUZZI. Elle est utilisée pour la réalisation d'ouvrages en grandeur réelle dans un atelier dédié.

David DI GIUSEPPE , **CIRTES**



11:30 - 12:00 am

An even greener additive manufacturing process based on recycled polymers: the experience of Schneider Electric



In line with Schneider Electric's green initiative, the Grenoble OpenLab has developed a polymer recycling process. Associated with the "open systems" solutions of 3D printing from Intamsys, it is a complete process of reuse that can be contemplated. Which polymers? What reuse rate? What financial gain?

Didier THEBAULT, **INTAMSYS**





Charlène ETIENNE, INTAMSYS



Brandon ALVES, SCHNEIDER ELECTRIC





Xuechun WANG, SCHNEIDER ELECTRIC

Life Is On Schneider

12:00 - 12:30 pm ROUND TABLE 3



As a non-destructive technology, CT gives you a relevant advantage for developing additive manufacturing processes.

Inspection and measurement technologies enable holistic monitoring of your manufacturing process, from powder to final product

Frank THIBAULT, ZEISS



Seeing beyond

2:30 - 3:00 pm

Mobile Additive Manufacturing – Decentralised spare parts and repairs with WAAM



The on-demand supply of spare parts and repair solutions is gaining increased attention in many areas due to the cost and time-saving potential. Especially Wire Arc Additive Manufacturing and robot-based machining can be combined in simple hybrid process chain for metal parts.

Robert LAU, **FRAUNHOFER**



3:00 - 3:30 pm

Exploring a novel approach for support optimization aiming reduction of fabrication costs and print job failure rates



Alexandre HIRICOIU, ANSYS



Nowadays, additive manufacturing (AM) has become a competitive technology to manufacture parts that cannot be made with traditional technologies. Despite the potential of additive manufacturing for critical applications, production as well as post-production costs and build failures are slowing down technology's adoption. Simulation tools can provide meaningful insights to help engineers overcome AM specific process problems and facilitate the faster development of new products. Among the challenges faced in the workshop floors, build preparation is a critical topic. The reduction of support volume not only helps saving raw material, but also aims to reduce printing costs by reducing machine time. The key challenge is how to reduce the amount of supports while maintain part printability. The presentation discusses the strong potential for reducing build fabrication costs by mean of numerical optimization of print jobs. The first part will introduce a novel method that uses loads calculated from a build simulation as input for topology optimization. Main objective of this approach is to drastically reduce the volume of supports created for every single build job. The second part of the intervention will present an application case realized by Siemens Energy.

Timo HEITMANN, Siemens Energy Global



3:30 - 4:00 pm

EOS goes for industrialized additive manufacturing with full upstream integration. Siemens NX and Materialise Magics, first examples of end-to-end CAD-TO-3DPRINT Software workflow



Today's manufacturing software solutions (PLM) allow companies to manage all CAD and manufacturing data in a single software solution, regardless of the manufacturing process. These integrated solutions provide users with seamless and efficient data preparation workflows. A major benefit is the flexibility to make last-minute changes to the geometry without additional effort. EOS has recognized the importance of these integrated industry solutions and has developed comprehensive interfaces. As a result, these seamless workflows with key industrial solutions such as Siemens NX are already a reality today. In this presentation slot, we will show you what such integration looks like and how you can "design & print" directly from Siemens NX or Materialise Magics on EOS systems.

Fahd CHAOUI, EOS FRANCE

