SIEMENS
Ingenuity for life

Aerospace and defense · Manufacturing

OPT'ALM

OPT'ALM enhances performance and reliability with Siemens Digital Industries Software solution

Product

NX

Business challenges

Broad and diverse markets that require costly and difficult to produce metal parts

Industrial deployment of the DED additive manufacturing process

Shorten development times and accelerate product innovation

Keys to success

Automatic transfer of expert laboratories

Complete digital chain without interruption

Automate processes

Drive growth with Siemens Digital Industries Software solutions

Results

Realized material savings of 60 percent

Reduced time and costs for obtaining parts

Prolonged lifecycle of structures in service

Stabilized repeatability and quality of finished products

French aerospace parts manufacturer uses NX to reduce development times and accelerate product innovation

OPT'ALM innovates with DED additive manufacturing

Located in Toulouse, France, SME OPT'ALM (OPT'ALM) is driven to make the industrial deployment of manufacturing processes faster, less costly and more environmentally-friendly. The company manufactures custom parts through a mix process, which combines additive manufacturing with traditional production methods. The company also maintains and repairs critical parts in maintenance, repair and operations (MRO) and maintenance in operational conditions (MCO). OPT'ALM primarily serves the aerospace and defense, naval and energy industries.

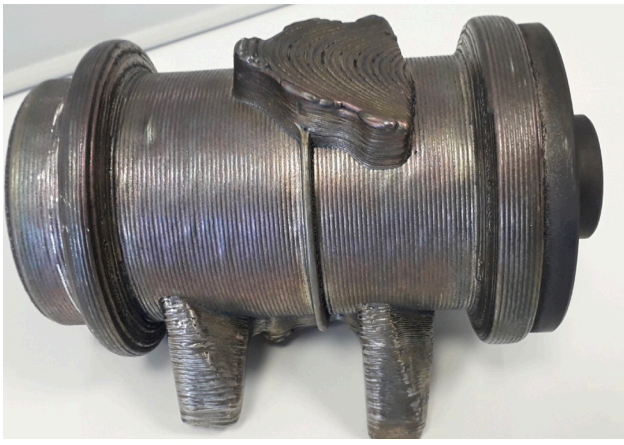
OPT'ALM has developed two patented processes for directed energy deposition (DED) additive metal manufacturing: the design and manufacture, without bonding, of sandwich structures for applications in harsh environments (subject to high temperature variations and mechanical constraints), and the simplified assembly of structures such as connecting rods and drive shafts (iso-volume optimization of the quantity of the material and the performance of the structure).

"Innovation is at the heart of our strategy," says Alain Toufine, chief executive officer, OPT'ALM. "We work in close collaboration with expert labs, which is a key to our success. We are also intricately involved in large-scale European projects, such as the Clean Sky2 program which aims to develop a clean, innovative and competitive aviation system."

Industrializing additive manufacturing processes using NX for Manufacturing

To expand its scope, OPT'ALM recently acquired a MODULO 400 BeAM 5 continuous axis machine, which is controlled by a Siemens SINUMERIK 840D controller.

After an assessment phase, OPT'ALM opted for Siemens Digital Industries Software's NX™



Courtesy of LIEBHERR to OPT'ALM

"Unlike other solutions which adapt or derive the traditional 5-axis CAM machining approach to 3D printing, Siemens has developed tools devised for additive manufacturing and its specificities."

Jean Daniel Klockenbring
Business Engineer
Janus Engineering

Courtesy of STELIA to OPT'ALM

Courtesy of STELIA to OPT'ALM

for Manufacturing software and its multi-axis deposition module to simulate and control its BeAM machine. The multi-axis deposition module simulates the complete multi-axis manufacturing process and calculates and displays the deposition device trajectories. This multi-axis 3D printing process offers numerous benefits as it's not only much faster than many fixed-axis systems, but also offers larger maximum part sizes. OPT'ALM consulted Siemens Digital Industries Software partner Janus Engineering on how best to deploy NX. Janus Engineering supported OPT'ALM and developed a postprocessor to ensure a direct connection between the NX data and the BeAM machine.

"Siemens Digital Industries Software offers a real 'additive' strategy with a high-performance, multi-axis module that immediately won us over," says Toufine. "With Siemens solutions, we went for reliability, performance and customization ability."

Jean Daniel Klockenbring, business engineer, Janus Engineering, says, "Unlike other solutions which adapt or derive the traditional 5-axis CAM machining approach to 3D printing, Siemens has developed tools devised for additive manufacturing and its specificities."

Significant benefits for industrialists

OPT'ALM observed significant gains for the manufacture and repair of critical aeronautical parts during its research and development (R&D) process. Primary among them was the cost savings for raw materials. During the mix process, the addition of shapes and functions to a structure via 3D printing reduces, at equivalent design values, the "buy to fly" ratio from 11 to 5, which measures the amount of raw material that needs to be purchased to manufacture the finished part. This process resulted in a material savings of approximately 60 percent.

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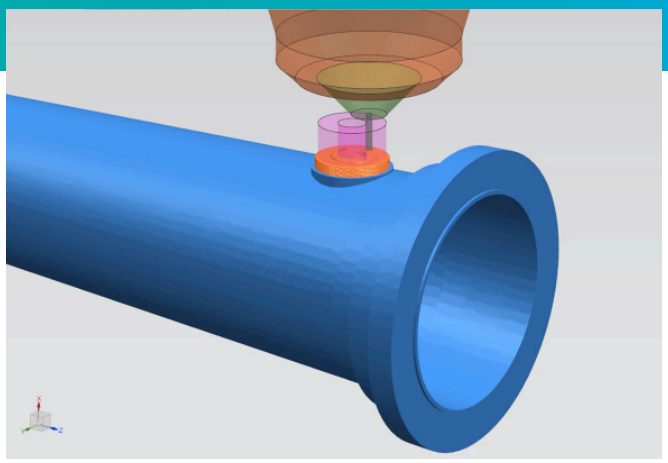

Courtesy of LIEBHERR to OPT'ALM

OPT'ALM also realized reduced cycle times. For example, an aeronautical part, such as a titanium alloy pipe produced for STELIA Aerospace. Previously produced in five sub-assemblies, this part can now be produced in a single operation thanks to the procedure developed by OPT'ALM. With shorter cycle times, reductions range from a few days to several weeks.

New alternative repair modes

In the scope of a joint project called ReadyNov with aircraft manufacturer ATR Aircraft, OPT'ALM successfully demonstrated the twofold importance of using additive metal manufacturing to repair technical parts that are otherwise difficult to repair using traditional methods.

Eco production was the first method OPT'ALM used. By restoring products which would otherwise have been destroyed, industrial companies minimize raw material waste and energy costs that would have been otherwise used to manufacture new products. In addition, OPT'ALM shaved operating losses by repairing parts in a matter of hours instead of having the parts remanufactured or rerouted, which can take several days or weeks. As a result, machines and installations were quickly put back into service.

"The processes developed by OPT'ALM pave the way for new manufacturing and repair methods that represent a game-changer for industrialists. The implementation of Siemens software solutions contributes to this digital transformation."

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Solutions/Services

NX for Manufacturing
plm.automation.siemens.com/global/en/products/nx/nx-for-manufacturing.html

Customer's primary business

OPT'ALM specializes in metal additive manufacturing. The company repairs and manufactures products using the directed energy deposition (DED) process.
optalm.fr/english/

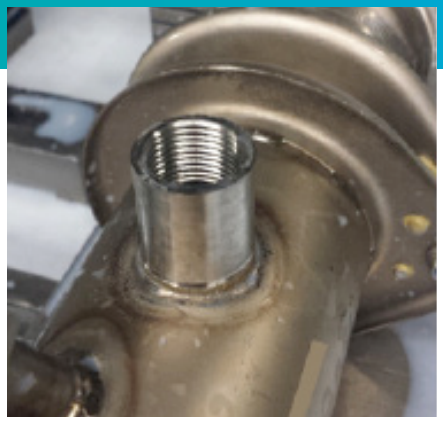
Customer location

Toulouse
France

Solution Provider Partner

Janus Engineering

Courtesy of ATR to OPT'ALM



Courtesy of ATR to OPT'ALM

Plans for the future

By drawing on its proficiency in advanced materials and expertise in aerospace systems architectures, OPT'ALM offers value-added consulting services during every step of the product lifecycle.

The company successfully deploys Siemens Digital Industries Software solutions to industrialize its DED additive manufacturing processes. This is a key step in the company's quality approach, with EN 9100 certification in the pipeline to guarantee the robustness and repeatability of the processes.

OPT'ALM is considering using the Siemens Digital Industries Software additive manufacturing process simulation module to simulate and predict part deformation during construction by powder coating.

"Industrial 3D printing is growing rapidly since it offers new manufacturing possibilities and serves to make more efficient use of materials," says Toufine. "The processes developed by OPT'ALM pave the way for new manufacturing and repair methods that represent a game-changer for industrialists. The implementation of Siemens software solutions contributes to this digital transformation."

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