



President's Report

Dear Readers,

Greetings from Additive Manufacturing Society of India. We are thankful to AM community for being a part of the very successful AM-2018 conference.



The key element of our growth is the great support of AM community from manufacturers to end-users. AM-2018 conference was a unique event with great number of sponsors, exhibitors and delegates. We are thankful to our members, industrial partners, academic partners, media partners and volunteers for their time and effort in organizing such a memorable event.

Looking in to Indian Additive Manufacturing technology scenario, some foreign companies such as Renishaw Plc, EOS GmbH and Stratasys have already established their technical centers in India. But India is still in the emerging stage in adopting the higher end metal additive manufacturing technologies such as LMD (Laser Metal Deposition) and EBAM (Electron Beam Additive Manufacturing) technologies, which has got tremendous potential applications in aerospace, space, defence and engineering sector. We hope that Indian companies across different segments including public sectors would come forward to invest in the state of the art additive manufacturing technology as a part of MAKE IN INDIA initiative and embrace industry 4.0 AM technology.

At the end it is our great pleasure to invite you all to AM-2019 conference and exhibition scheduled during 6-7th September 2019 at The Lalit Ashok, Bangalore, India.

Dr. L. Jyothish Kumar

President – Additive Manufacturing Society of India



Highlights of AM-2018 Conference



Photo: AM- 2018 Conference and Exhibition, The Lalit Ashok, Bangalore, India



INTECH to integrate OPTOMET software into DMG MORI machines. – DMG Mori acquired a 30% stake in INTECH, INDIA

INTECH and DMG MORI seal a cooperation in the field of Additive Manufacturing at a leading Additive Manufacturing exhibition Formnext, Frankfurt. DMG MORI as a worldwide leading manufacturer of machine tools, acquired a 30% stake in INTECH, India, by integrating the SLM technology machines with the OPTOMET software from INTECH.



Committed to Additive Manufacturing and related software solutions, including machine learning and artificial intelligence for the Metal Additive Manufacturing industry, INTECH will soon release numerous solutions, aiding users with ease of machine operations and process

Photo: INTECH and DMG Mori in roundtable discussion at Formnext 2018, Germany

control, producing quality components at optimized costs, thereby empowering customers to adapt this technology quickly.



Commenting on the partnership, Mr. Sridhar Balam, CEO of INTECH noted, “Leveraging synergies is key, and the collaboration is a perfect fit of hardware and software.” He also added “OPTOMET can also be applied to other key AM technologies, such as Direct Energy

Deposition and Binder Jetting. OPTOMET is a game changer for the whole AM market.”

Mr. Christian Thönes, CEO of DMG MORI AKTIENGESELLSCHAFT, says: “With INTECH we strengthen our global footprint in India and accelerate innovative development in Additive Manufacturing. First time right – that means being fast towards the first good part. We are actively pushing ahead with integrated series solutions along the whole process chain for generative manufacturing.”

INTECH supplies software solutions not only for the LASERTEC SLM series from DMG MORI but also for other products and customers using powder bed technology. The new OPTOMET-software automatically calculates the optimal process parameters. This simplifies programming and results in a markedly improved surface quality as well as reproducible material properties. OPTOMET is a stepping-stone towards accelerated industrialization of Additive Manufacturing.



Renishaw Additive Manufacturing Solutions Centers

Renishaw Solutions Centres provide a secure development environment in which you can build your knowledge and confidence using AM technology.

Equipped with the latest AM systems and staffed with knowledgeable engineers, a Solutions Centre offers you a fast and accessible way to rapidly deploy this exciting technology in your business.

Renishaw will support you throughout your investigation and business case development process, helping you to optimise your design, build your confidence in the process, and gain the evidence you need to make investment decisions, all at predictable and manageable costs.

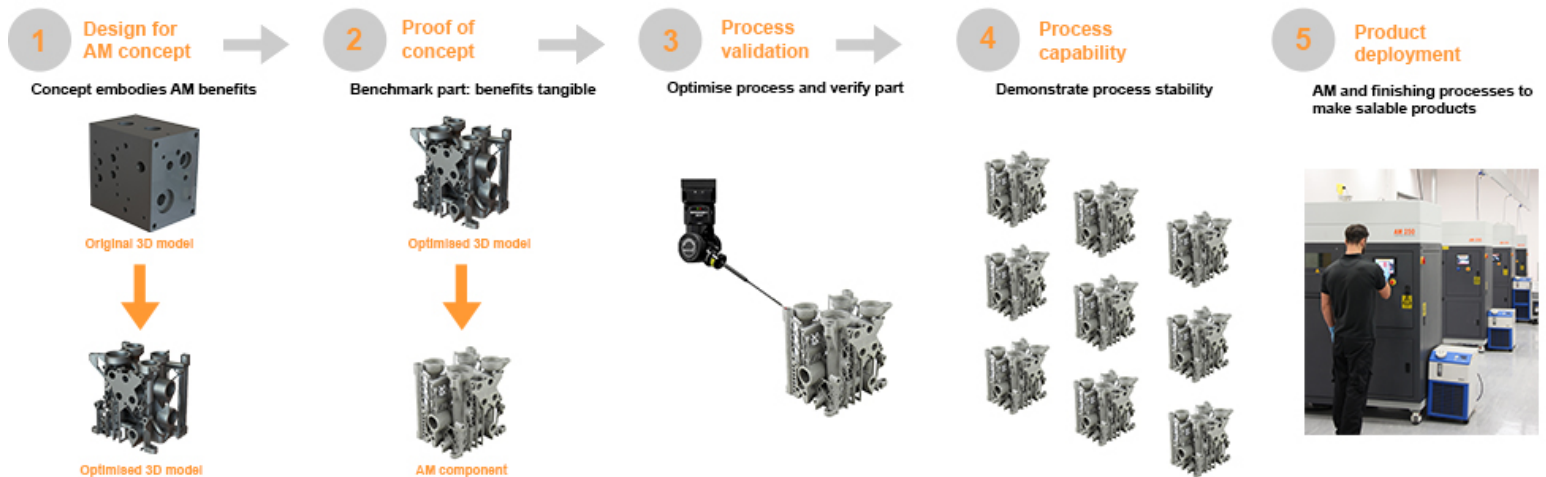
Whilst AM can create complex geometries in a single process step, some level of finishing is generally required to produce functional products. Our knowledge of metrology, machining and finishing processes can assist you to develop an integrated manufacturing solution.



Incubator cells to nurture your idea:

Your private development facility, including:

- Secure, access-controlled process incubator cell
- Direct data transfer to AM machine from non-networked computer
- Dedicated Renishaw additive manufacturing system
- Choice of materials, with the option to use your own powder
- Dedicated powder handling accessories to ensure purity
- Predictable costs and no overheads
- Access to expert Renishaw engineers and technicians
- Optional access to finishing processes, metrology and material analysis



Pre-production capacity to prove your process:

Ramp up towards production volumes

- Access to multiple AM systems
 - Metrology and finishing processes as required
 - Agreed unit costs
 - Support for process capability studies
 - Business case preparation
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Case Study

3D-printed sewer cleaning nozzles

It takes four steps to make a conventional sewer cleaning nozzle – cut, turn, mill, and glue the material. The high-tech company TRUMPF recently joined forces with the nozzle manufacturer USB Düsen and the Heilbronn University of Applied Sciences to expedite the process with additive manufacturing (AM) and optimize components. Their efforts paid off: USB Düsen’s machine availability is up 53 percent and the water jet’s guidance has improved. TRUMPF experts also expect these nozzles to do a better job of cleaning using less water.

To clean large sewer lines, workers plug a hose into vehicle-mounted machine, at the end of which is a ‘bomb’ or ‘grenade’ that slides down channels on a carriage. The head of the bomb is fitted with 12 to 15 nozzles that spray water. These jets hit channel walls at pressure levels up to 300 bar to blast away the sludge, which is then sucked into the vehicle via the hose.



3D-optimized sewer cleaning system

This 3D-printed nozzle for USB Düsen’s sewer cleaning system was optimized by TRUMPF.

Conventional nozzle manufacturing is time-consuming

The nozzles’ design is simple, but it still takes four steps to manufacture these attachments. The first is to cut the raw material – in this case, stainless steel – and then thread it on a lathe to create what is in effect a massive bolt. Then two blanks are placed in a milling machine to cut the contours of a nut into the front face. Finally, a worker glues in a ceramic insert by hand. “The operator has to remove the component from the machine for each step. What’s more, gluing often leaves imperfections that change the jet’s guidance,” says Fatih Arikcan, additive manufacturing application engineer at TRUMPF, with a note of disapproval. TRUMPF decided to go with additive manufacturing to cut production time while boosting cleaning performance.

Hybrid process chain for big savings

Its experts took a hybrid approach for the new nozzles, combining conventional and additive processes. They stuck with the lathe for the massive threaded base component, which is called a preform. “This process is solid. AM doesn’t add any value here. On the contrary, the process would end up taking longer,” says Arikcan. The 3D printer is to perform the following steps, milling and gluing. TRUMPF opted

for Laser Metal Fusion (LMF), a manufacturing process where a laser builds up the component layer by layer in the powder bed. “This process is perfect for complex geometries. We need these to put these functions – that is, maximum cleaning performance with minimum water consumption – into practice,” explains Arikcan. TRUMPF experts streamlined the component’s design so it can be printed without any supporting structures, and with no finishing to be done afterwards. This printing process is software-driven, so the imperfections associated with manual gluing have been relegated to history.

TRUMPF staff enlarged the nozzle attachment and added an outer channel guide to improve the component’s properties. This serves to furnish air to the system and creates a tighter throw pattern when the jet hits the surface to be cleaned. The preforms with the add-on component can be screwed into the bombs immediately upon printing. The substrate plate does not even have to be removed from the machine to do this. “For the first time, this will allow 10,000 nozzle inserts to be manufactured per year,” notes Arikcan.

Twofold increase in machine availability and improved component properties

TRUMPF experts set up a test bed to examine and validate the 3D-printed components. “Measurements have shown that this shortens the job time for conventional steps by 53 percent,” says a clearly delighted Arikcan. The parts were made with the TruPrint 1000 3D printer; developed by TRUMPF, it features a single laser. This expert is confident that the time savings will be even greater with a multi-laser system. The new nozzles also deliver more persuasive performance with benefit of improved jet guidance. “We demonstrated that the water jet flows smoother than with the conventional design. We also expect the pressure on the surface to increase and water consumption to decrease,” says Arikcan. Another positive side effect is that this boosts turning and milling stations’ availability.

TRUMPF not only manufactures the machines, systems, laser beam sources, and all optical components required for 3D printing; the company also has the necessary technology, process and digitalization skills. It is the only AM provider worldwide to have the full package, the entire skill-set under one roof. “We think in terms of form and function, which means we look at the product portfolio together with the customer and recommend 3D printing where it makes sense. Quality, cost reduction and time savings are our most important goals,” says Arikcan by way of explanation.

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Preforms in TruPrint 1000

A fixture holding preforms in the 3D printer's build chamber



TruPrint 1000: *TRUMPF's TruPrint 1000 3D printer*

About Additive Manufacturing Society of India

"AMSI educates and promotes the latest developments and applications in Additive Manufacturing Technologies"

Additive Manufacturing Society of India (AMSI) is a leading professional body with an objective to promote state-of-the-art 3D Printing and Additive Manufacturing technology and expand collaborative relations with international organizations in all the aspects of additive manufacturing such as R&D, manufacturing, training and skill development to empower India's advanced manufacturing technology. AMSI has a great network and MoU's with global additive manufacturing organizations.

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