



**3DEXPERIENCE**

# ADDITIVE MANUFACTURING FOR GENERATIVE DESIGN



Solution Update

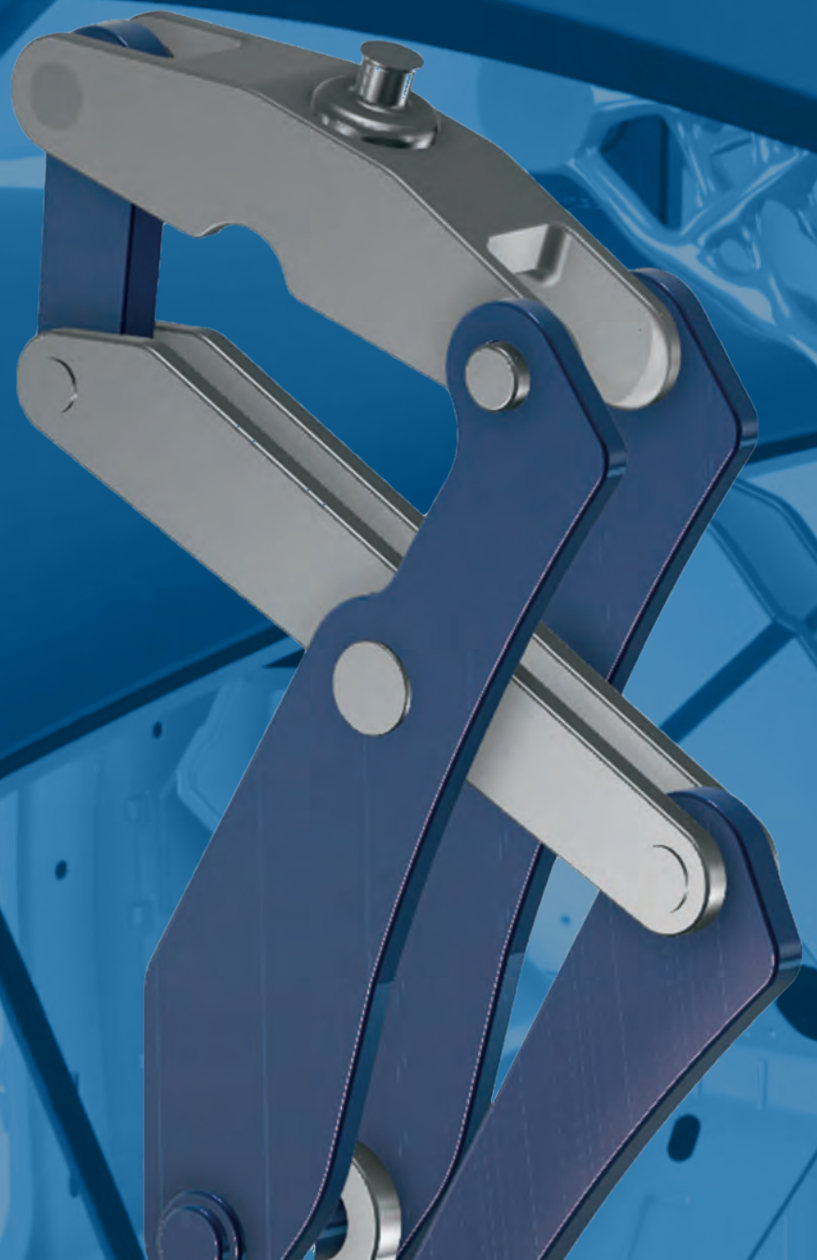
# DIGITALLY ACCELERATING ADDITIVE MANUFACTURING

MAKING PARTS THAT WORK



**DESIGN**

**PROCESS PLANNING**



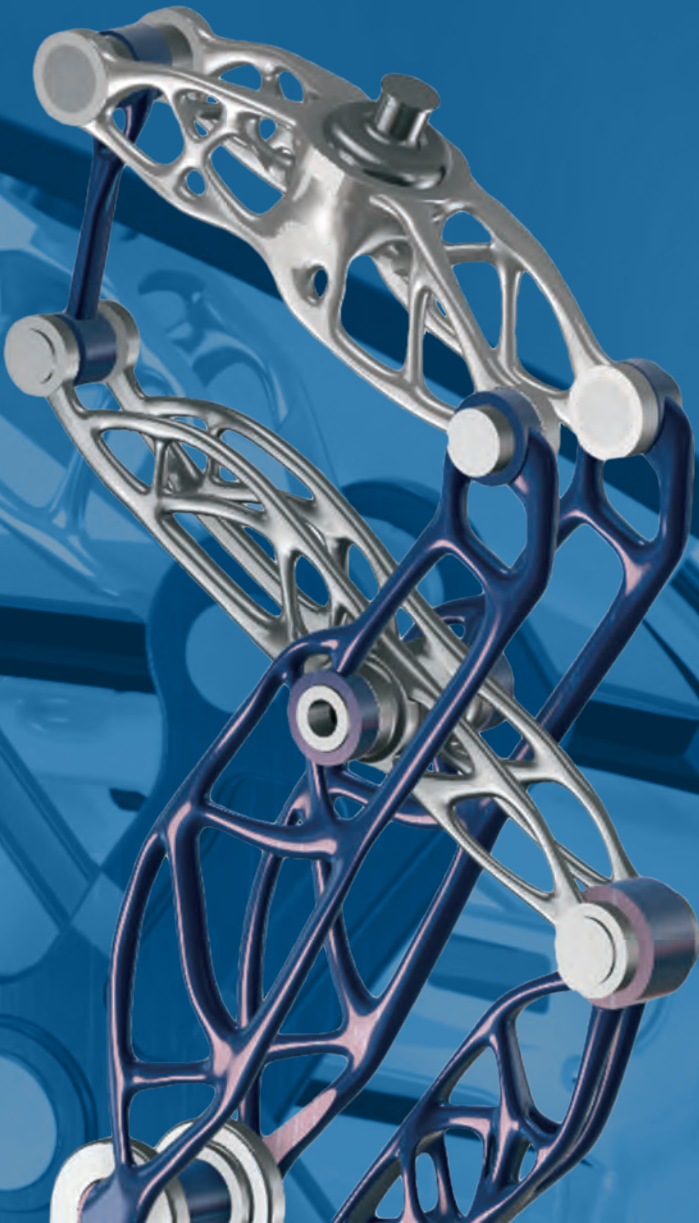
# ADDITIVE MANUFACTURING FOR GENERATIVE DESIGN

Dassault Systèmes offers a full portfolio of integrated applications for additive manufacturing that work seamlessly across design, manufacturing, and in-service performance.



**VIRTUAL PRINTING**

**POST-PROCESSING**



# AM AND GENERATIVE DESIGN REVOLUTIONIZE HOW PRODUCTION PARTS ARE CONCEIVED AND PRODUCED

## 3DEXPERIENCE

- Additive manufacturing empowered by generative design is revolutionizing how production parts are being conceived and produced
- A digital thread that connects, integrates and intuitively captures design, materials and manufacturing, is key for functional parts
- **3DEXPERIENCE**, backed by multiphysics-based simulation, enables such a transformation through a unified and simplified interface
- Provides designers, simulation analysts and manufacturing specialists a rich set of additive manufacturing applications for generative design, build planning, virtual print and shape compensation

## GENERATIVE DESIGN WITH THE FUNCTIONAL GENERATIVE DESIGNER ROLE

- Design with topology optimization in a single environment
- Create parts in context of the manufacturing process using guided workflows
- Automatically generate variants of conceptual and detailed organic shapes
- Make informed business decisions based on physics-based analytic tools

## PROCESS PLANNING WITH THE ADDITIVE MANUFACTURING PROGRAMMER ROLE

- Define and customize the manufacturing environment
- Automatically nest parts on the build tray
- Design and generate optimal support structures
- Create machine specific slicing and scan path, ready for print

## VIRTUAL PRINTING WITH THE ADDITIVE MANUFACTURING RESEARCHER ROLE

- Automatically includes machine inputs for energy, material and supports into the simulation
- Access built-in simulation best practices with minimal user-level intervention

- Simulate at layer, part and build levels for any additive manufacturing process
- Accurately predict part distortions, residual stresses and as-built material behavior
- Evaluate and correct for build failure because of interferences such as recoater collision

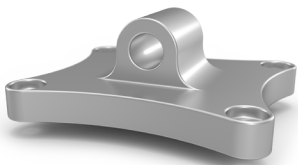
## POST PROCESSING WITH THE REVERSE SHAPE OPTIMIZER ROLE

- Use simulation to guide support-structure strategy for enhanced build yield
- Guide post-processing efforts such as removal from build plate and heat treatment
- Compensate distortion effects without the need to redesign the product tooling
- Produce high-quality morphed surface geometry with unchanged topology
- Perform final in-service performance validations of manufactured part

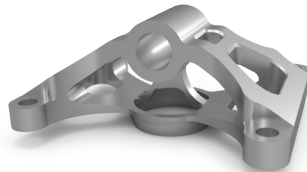
## SUMMARY VALUE

- Native integration of design, manufacturing and simulation applications
- On-premise and on-cloud with high-performance computing and visualization
- Define reusable rules for each step of the additive workflow.
- Make informed business decisions based on physics-based analytic tools

For More Information  
[www.3ds.com/simulia](http://www.3ds.com/simulia)



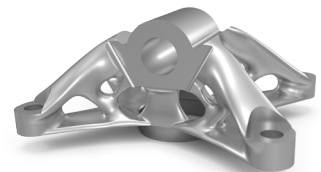
LEGACY  
**0.7 kg**



3-AXIS MILLING  
**0.45 kg**



CASTING  
**0.36 kg**



ADDITIVE  
MANUFACTURING  
**0.295 kg**

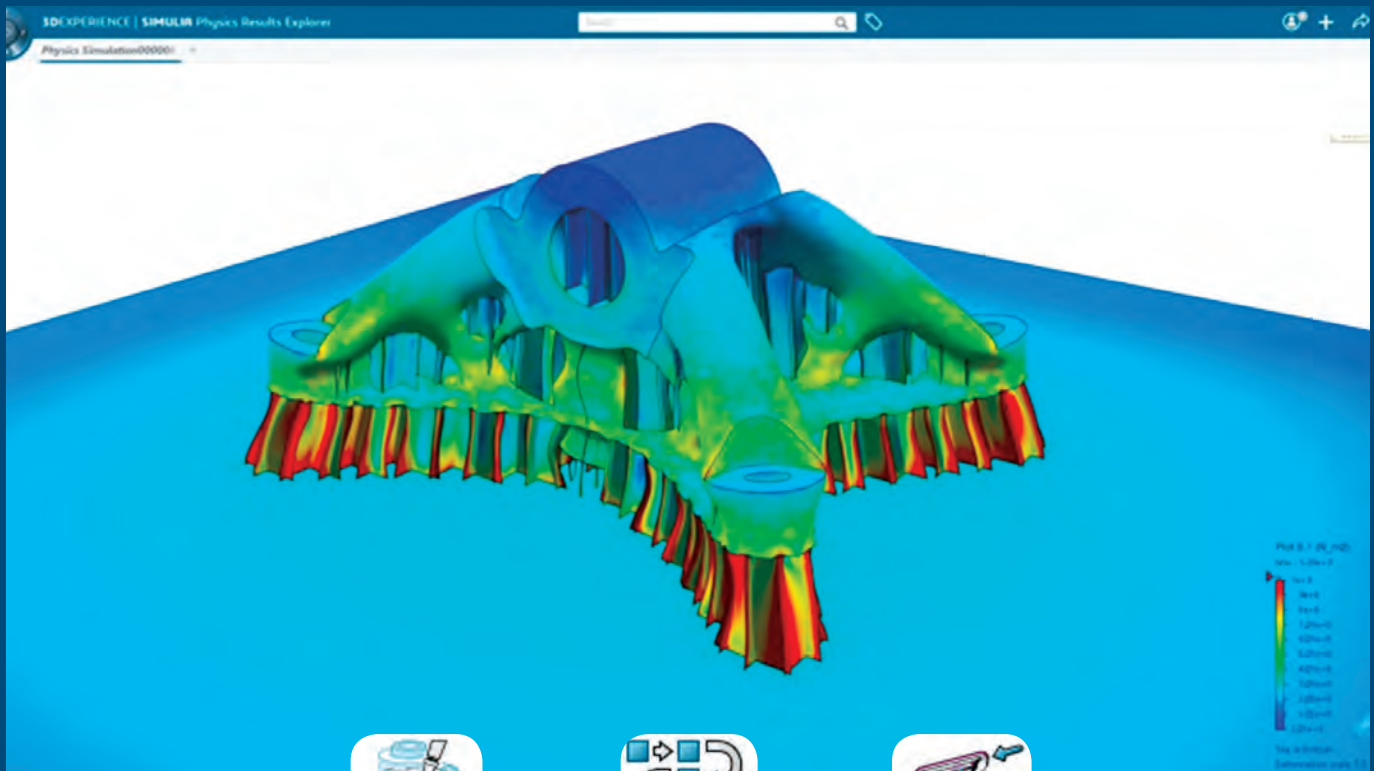
# ADDITIVE MANUFACTURING RESEARCHER ROLE OVERVIEW

## HIGHLIGHTS

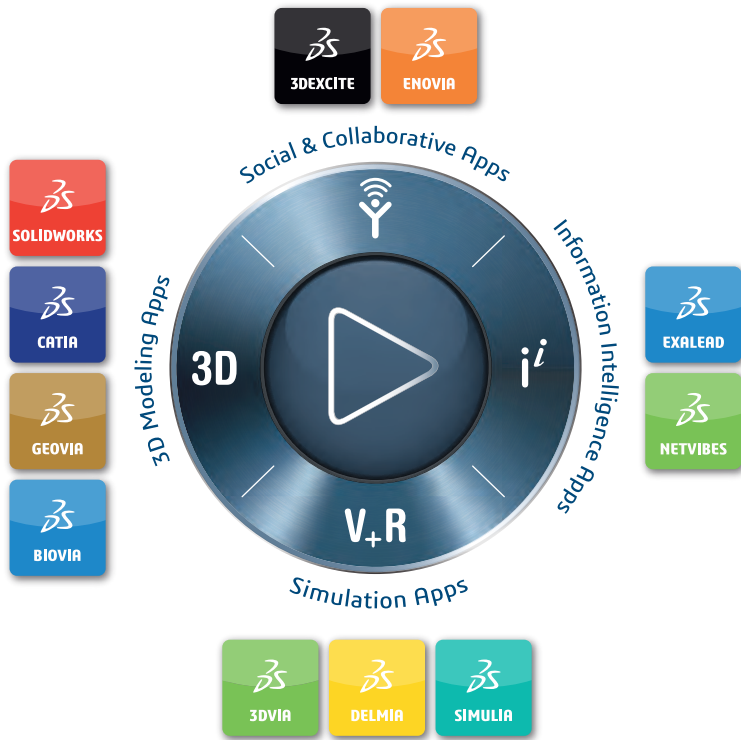
- Physically realistic simulation of 3D printing of parts including laser scan paths, material deposition and solidification, thermal distortion and residual stress, and support structures
- Allows powder bed, polymer extrusion, and direct energy deposition (plus user defined) manufacturing process simulation
- Offers a high level of automation and guidance to allow the user to easily setup complex simulations
- Provides an easy-to-use experience on top of the sophisticated technology of the Abaqus solver while allowing customization for more advanced users
- A guided user assistance panel provides a step-by-step workflow to set up a simulation
- Uses part build information, automatically set build times and populate supports for some features

## USER VALUE

- Seamless integration to design and manufacturing
- In-built simulation best practices to allow usage by additive experts
- Automatically applies settings to conform to additive manufacturing simulation best practices
- Process-level, part-level and build-level simulations in a single environment for metals or polymers.
- Reduce residual stress and distortion in completed parts
- Increase dimensional accuracy
- Optimize part orientation
- Minimize print time and material usage
- Post-processing methods for build plate removal and heat treatment
- In-service performance validations of functional part



Virtual Printing using 3DEXPERIENCE Platform



Inceptra supports engineering and manufacturing organizations with best-in-class solutions to digitally design, simulate, produce, and manage their products and processes, enabling enhanced innovation and productivity.

As the largest Platinum partner in North America, Inceptra is dedicated to Dassault Systèmes' product development software portfolio, complementary solutions, and related services, including training, implementation, integration, support, consulting, and automation services. For more information, please visit [Inceptra.com](http://Inceptra.com).

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