

2019 Kick Off Tech Talk

Bridging the Gap Between Material Science & FEA

January 8, 2019

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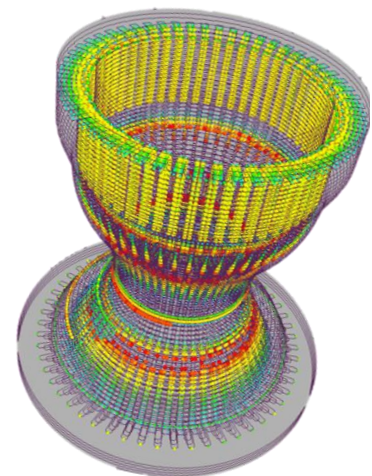
Our Focus

AlphaSTAR Corporation is a leading engineering services and software company that provides innovative physics-based simulation technologies for additive manufacturing, material modeling and analysis of advanced composite structures in the aerospace, automotive, defense, and energy industries worldwide. As a solution provider, AlphaSTAR proudly partners with DS SIMULIA, LSTC, ANSYS, MSC, ALTAIR and SIEMENS PLM. AlphaSTAR is headquartered in Long Beach, California and is the recipient of esteemed industry and technology awards for R&D and software development.

What's New with ASC Products?



- ✓ **Validated Analysis for Temperature Dependent Material Properties**
 - This new feature implements calibrated and validated temperature dependent material properties (mechanical properties beyond glass transition temperature) into AM process simulation which is critical to accurate predictive analysis of the build.
- ✓ **Path Coverage**
 - This new feature is a preprocessor for assessing printer path quality. It is a visualization tool that highlights problematic bald spots on the printed part. It provides quantitative measure of voids that can be computed per element for subsequent material property degradation analysis.
- ✓ **ZOM (Zeroth Order Thermal Analysis) {coming soon}**
 - This new feature predicts the transient temperature, material phase (powder, liquid, and solid) for Powder Bed Fusion Additive Manufacturing. It can predict different material states (heating, melting, super-heating, solidification, cooling) and the defects in the printed part, such as balling, humping, and overheating.
- ✓ **Feed Forward Control {coming soon}**
 - This new feature utilizes advanced algorithms to process real time sensor data associated with an AM build in order to predict the state of melt pool and generate a dynamic process map that identifies regions of instability. Information may then be fed forward through the print machine to correct previous layer anomalies.



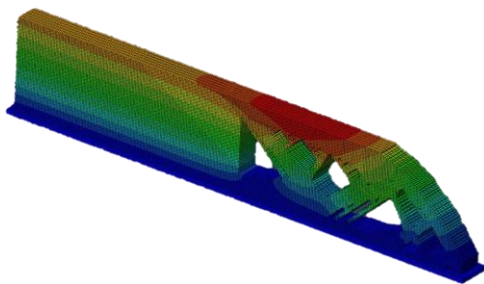
A heat chamber nozzle visualization shown using GENOA 3DP's Path Coverage feature.

AlphaSTAR and NIAR Partner for *AM Simulation Workshops*

With mutual interests in the growing industry of Additive Manufacturing, the National Institute for Aviation Research (NIAR) and AlphaSTAR Corporation (ASC) have partnered to host industry workshops on The Role of Simulation in AM.

The first workshop of its series, was held on November 6th, at NIAR’s Training Center for Advanced Manufacturing. Focusing on the use of AlphaSTAR’s AM simulation tool set, GENOA 3DP, attendees were invited to learn how accurately predicting the deformation (net shape), residual stress, damage initiation and damage propagation has such value in the print process. Cody Godines, Structures Group Lead at AlphaSTAR and workshop trainer also emphasized the importance of material characterization and advanced structural analysis in determining and addressing manufacturing defects and anomalies such as: voids, delamination, bald spots, and other irregularities during the print of plastic and metal parts.

“We are delighted to join forces with NIAR which is a world renowned Research Institute, and we look forward to continuing this partnership and hosting additional workshops in 2019”, says AlphaSTAR VP of Business Development, Dr. Anil Mehta



Where to find AlphaSTAR in Q1 & Q2:

43rd Annual Conference on Composites, Materials, and Structures <i>AlphaSTAR CTO, Dr. Frank Abdi to present</i>	January 28-31, 2019 Cocoa Beach, FL
Role of Simulation in Additive Manufacturing Workshop	February 14, 2019 ORNL – Oakridge, TN
AMUG 2019 <i>Visit Us at the AlphaSTAR Booth!</i>	March 31-April 4, 2019 Chicago, IL
Role of Simulation in Additive Manufacturing Workshop	May 20, 2019 ETA – Troy, MI
RAPID + TCT <i>Visit Us at the AlphaSTAR Booth!</i>	May 21-23, 2019 Detroit, MI

GENOA 3DP selected by IRT Jules Verne for AM Simulation

Scientists at IRT Jules Verne (Bouguenais, France) are engaged in a multi-year 3D printing project, which explores the nexus between Additive manufacturing technologies, affordable printers using Laser Sintering and Fused Filament Fabrication for the production of light weight functional parts for the medical, aerospace and automotive industries.

Looking for a robust and accurate simulation tool to provide a deeper understanding of material modeling & characterization and part performance, while also aiming to save costs and improve productivity in their 3D printing process, the IRT team set out to find a solution. After extensive evaluation, AlphaSTAR's GENOA 3DP was selected as the right tool for the job.

"We needed software capable of analyzing the materials, modeling the AM process and accurately replicating LS & FFF printing methods" says R&D Simulation Engineer Tuan Linh Nguyen. "With advanced features, such as analysis of temperature dependent material properties beyond glass transition temperature, we felt GENOA 3DP was the perfect fit."

The AlphaSTAR team is thrilled to participate in this exciting project with IRT Jules Verne and their reputable partners.

Full Press Release to Follow.

AlphaSTAR Team Receives 2018 ASME Best Paper Award

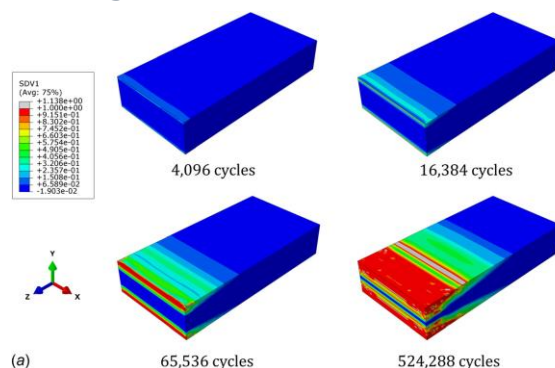
"With MCQ and GENOA, users have the freedom to use a reverse engineering approach to make material modeling decisions based on application usage and without anticipating the need to have raw data from material suppliers. The simplicity in calibration and ability to predict test results accurately without having to rely on part testing has never been so easy"

-Bob Jovas
Senior CAE Analyst
Solvay Composite Materials

Senior Research Engineer, Dr. Harsh Baid has been awarded the 2018 ASME Best Paper Award, along with other co-authors on their research paper, "Data Driven Damage Model Based on Nondestructive Evaluation".

Using funding provided by the Army SBIR Health Conscious Structures for Zero-Maintainence Rotorcraft Platforms Phase I, it was shown that research on computational damage models ultimately showed that coupling experiments with simulations using the GENOA MS-PFA software proved useful for remaining life estimations.

Visit ASME Digital Collection to read this full paper.



Damage evolution under cyclic loading