AUTODESK. UNIVERSITY

IM473670
Generative Design in Fusion 360: A Year in Review and a Look Ahead

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Mike Smell

Sr. Product Manager, Fusion 360

Mike has been a member of the Fusion 360 Product Management team for 5 years and is currently focused on Generative Design. Mike has spent nearly 14 years in the CAD and CAE industry, starting his career at Algor, Inc. in 2006, eventually being acquired by Autodesk in 2009. Mike holds a BS in Mechanical Engineering from the Pennsylvania State University and a Masters in Mechanical Engineering from the University of Pittsburgh. Mike has been a regular presenter at Autodesk University since 2009.

Brian M. Frank

Sr. Product Line Manager

Brian M. Frank is Sr. Product Line Manager for Generative Design solutions at Autodesk. Having held various roles within Autodesk since joining in 2008, Brian focuses on the development of simulation products and next generation technologies, including finite element analysis (FEA), computational fluid dynamics (CFD), and Generative Design offerings from Autodesk.

Agenda

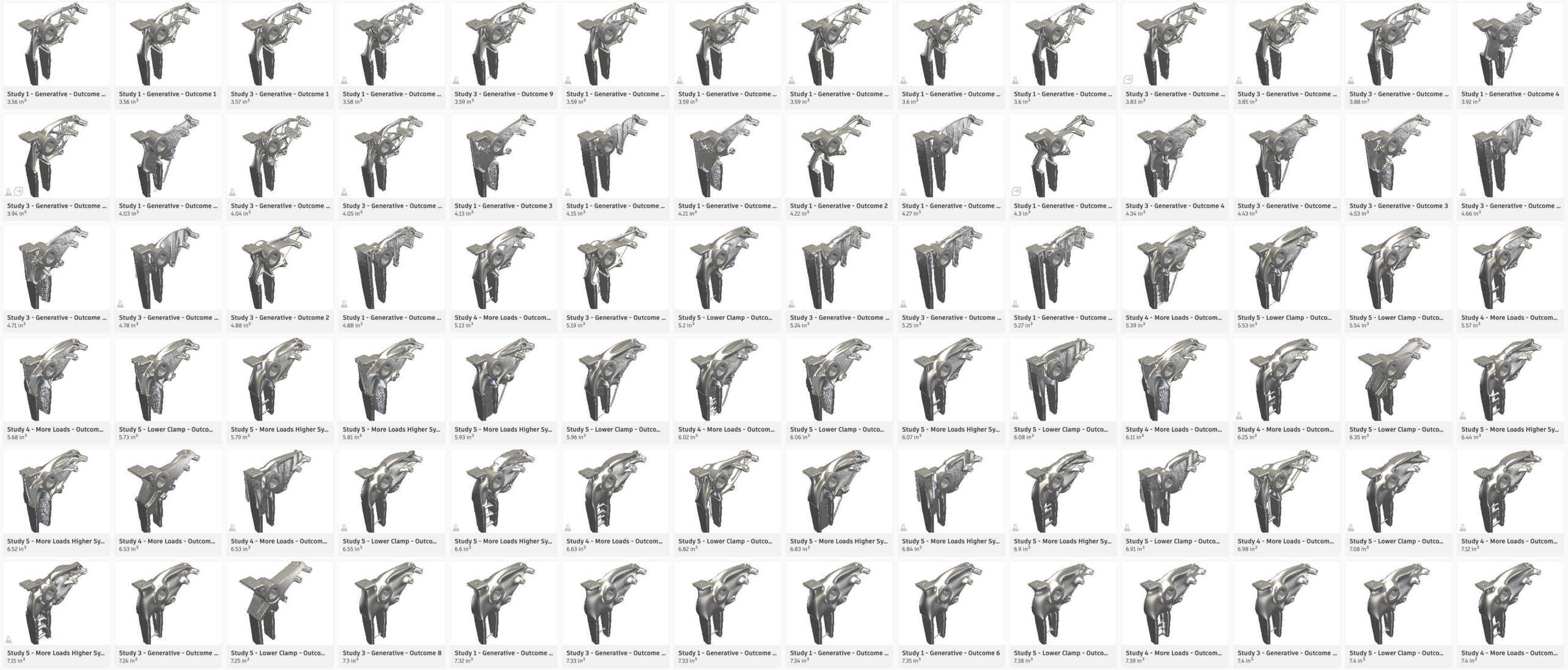
- Generative Design Foundations
- 2020 Accomplishments
- Customer Success
- Looking Ahead

What is Generative Design

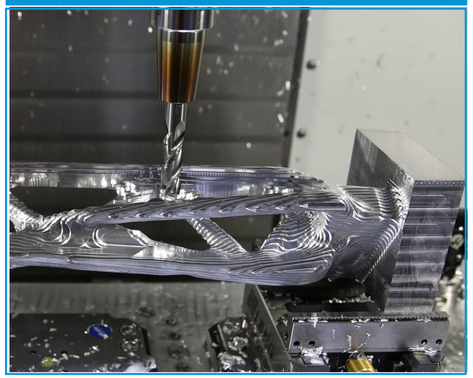
Generative design is a **design exploration** technology available **in Fusion 360**.

Simultaneously generate multiple CAD-ready solutions based on real-world manufacturing constraints, cost evaluation and product performance requirements

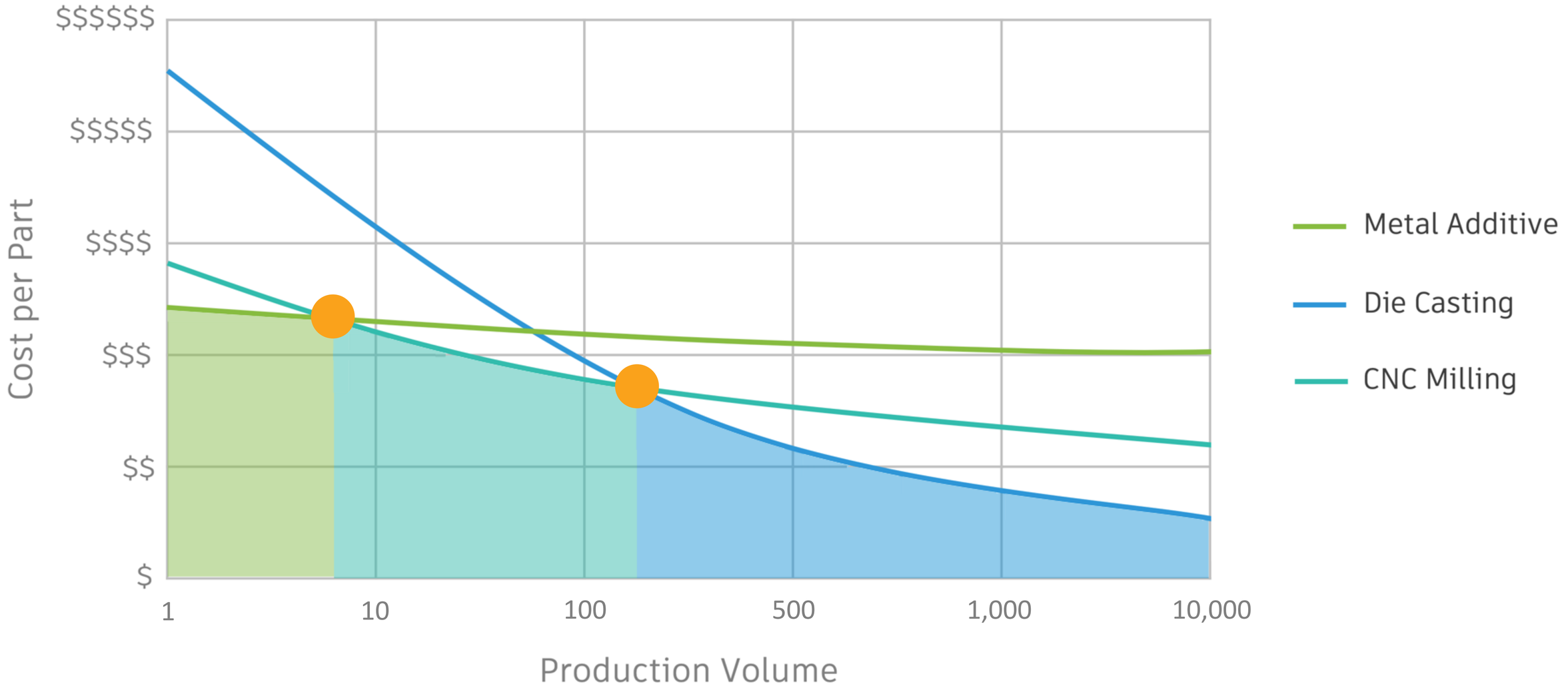
Multiple Design Solutions in Parallel



Multiple Manufacturing Methods

Additive Manufacturing	Die Casting	3 & 5 Axis Milling	2.5 Axis Milling	2 Axis Cutting
				

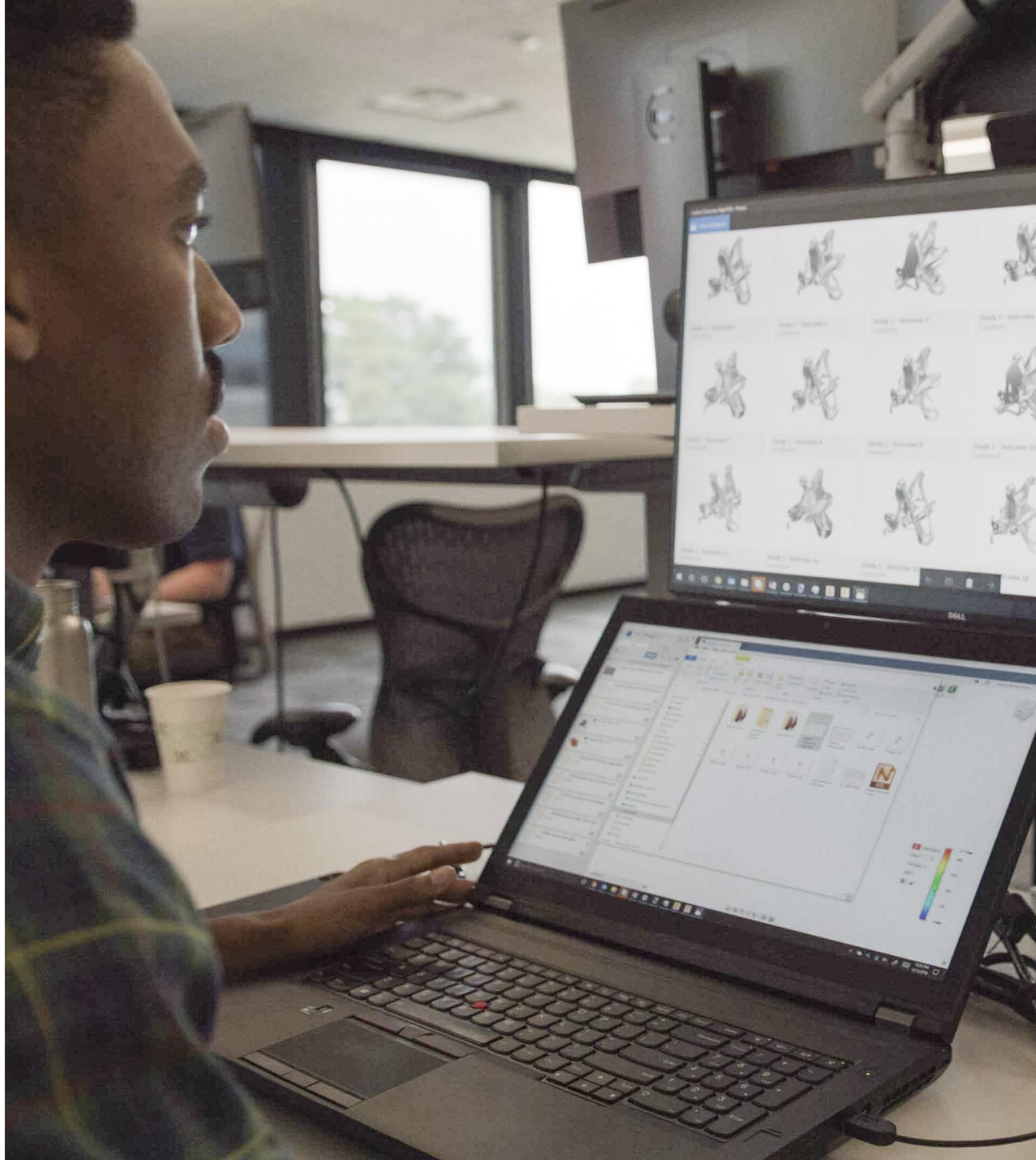
Multiple Cost Insights



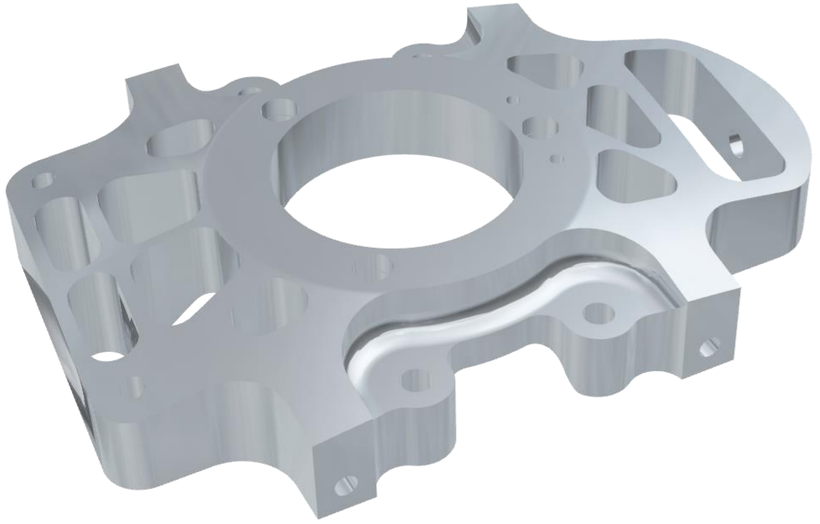
EXISTING BARRIERS TO INNOVATION, PRODUCTIVITY & PROCESS

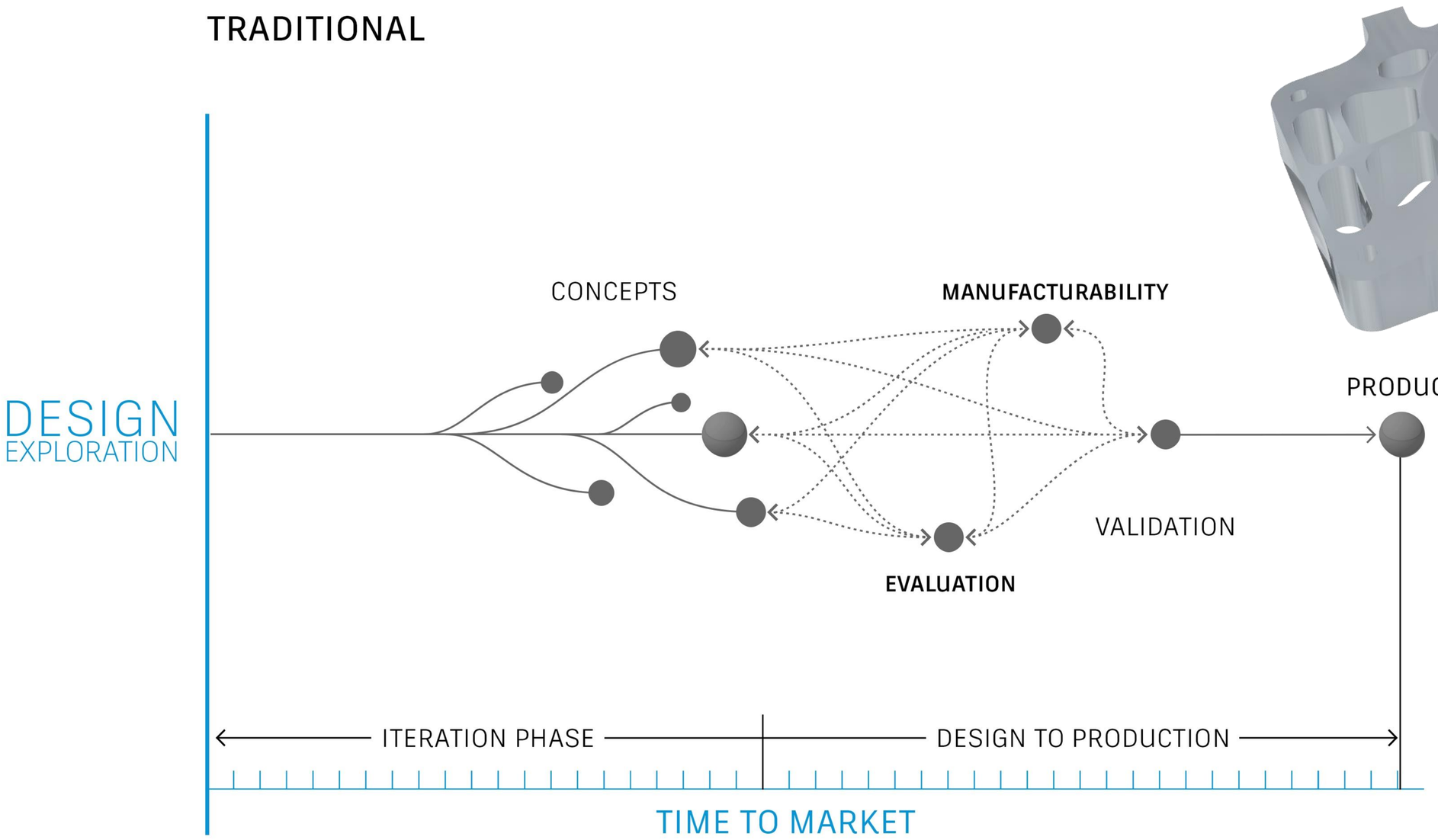
The ultimate goal for any engineering activity is to strike the **right balance between performance and cost** to produce for a given design challenge or market opportunity.

Engineers are limited in the time and energy they can spend on any design problem to fully explore the options that encompass the design space.

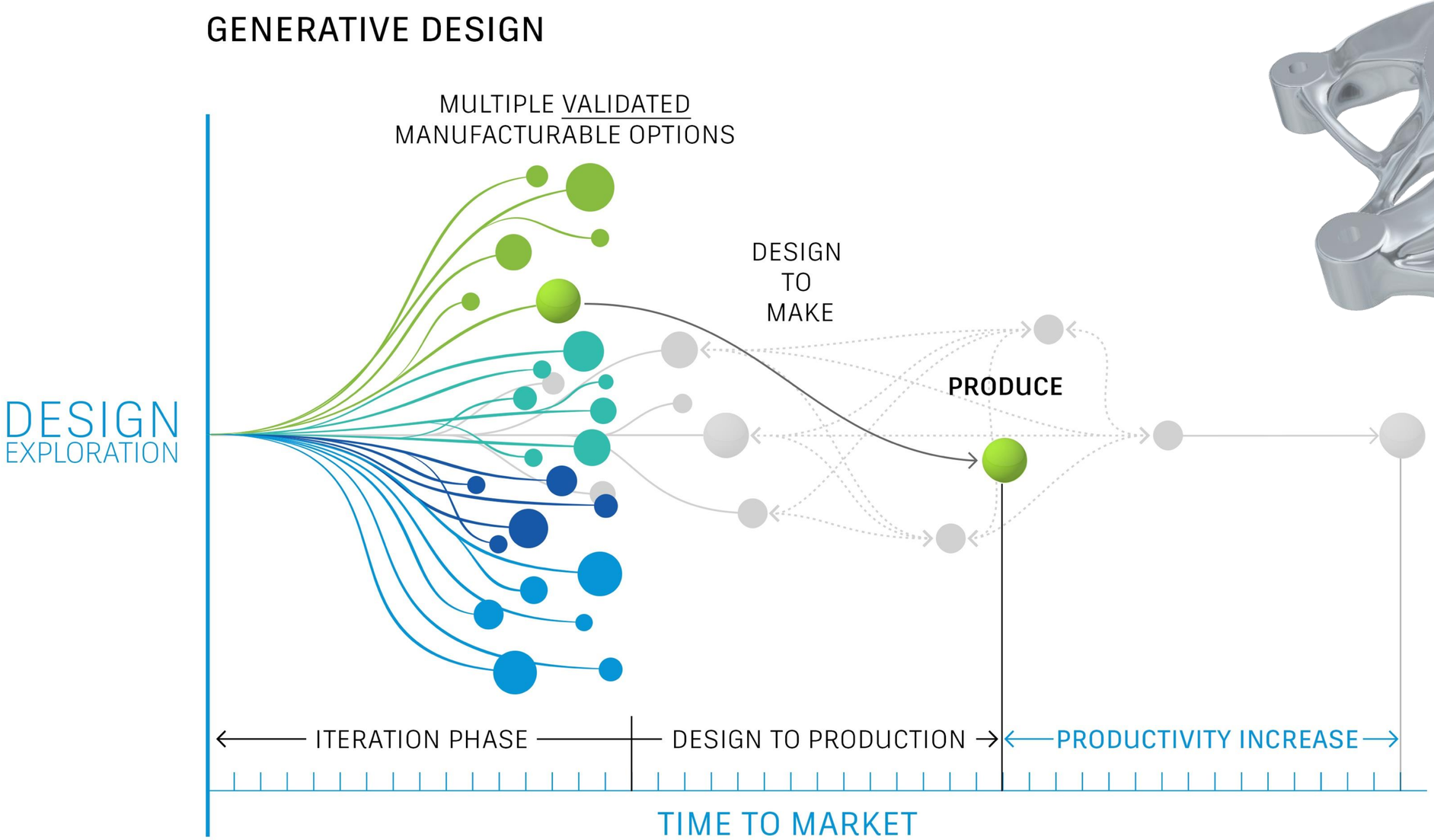


The Traditional Product Development Process



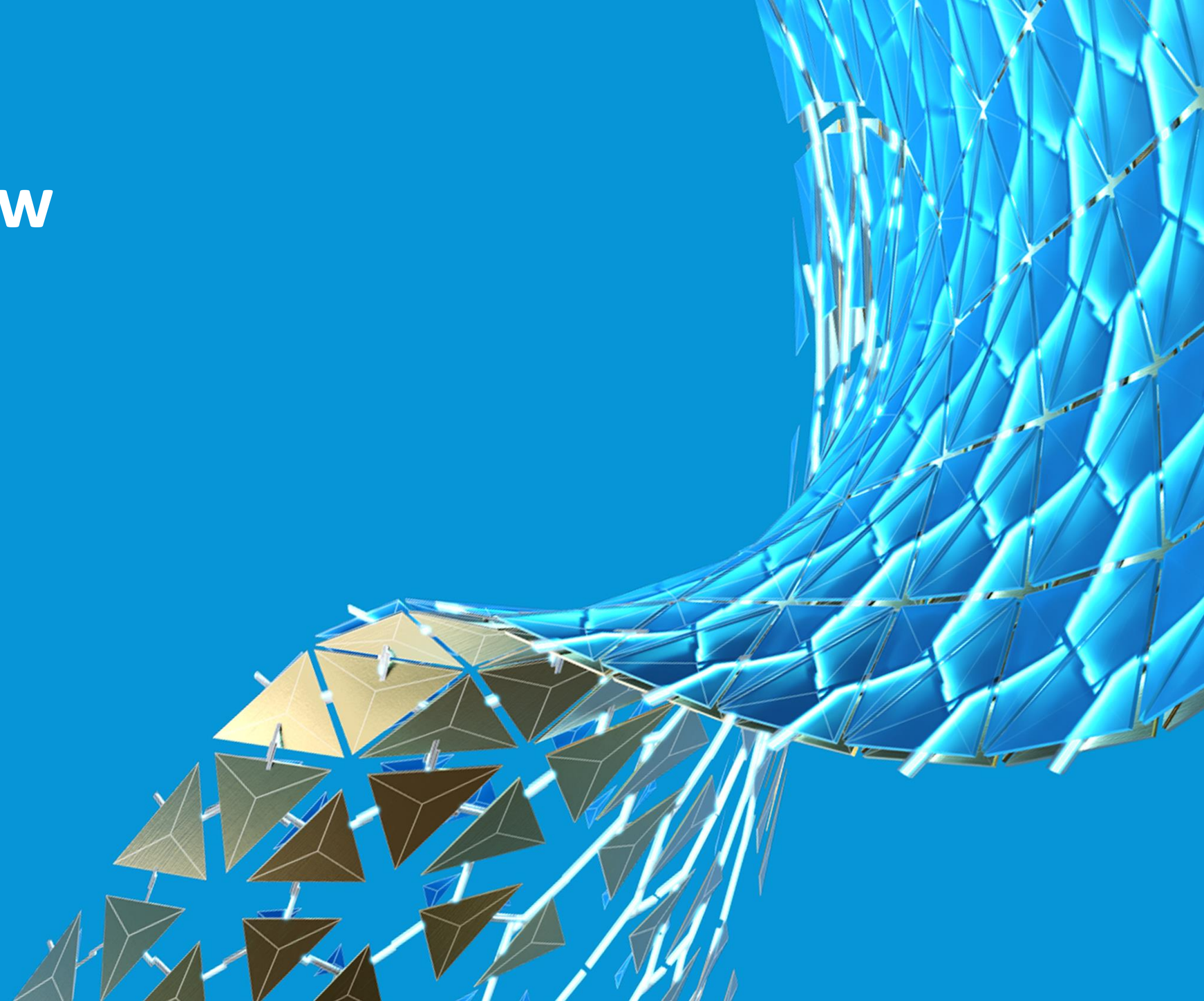


Generative Design in Fusion 360



Generative Design = Better Engineering

2020 in Review



2020 Development Focus Areas

USER EXPERIENCE

MANUFACTURING CONSTRAINTS

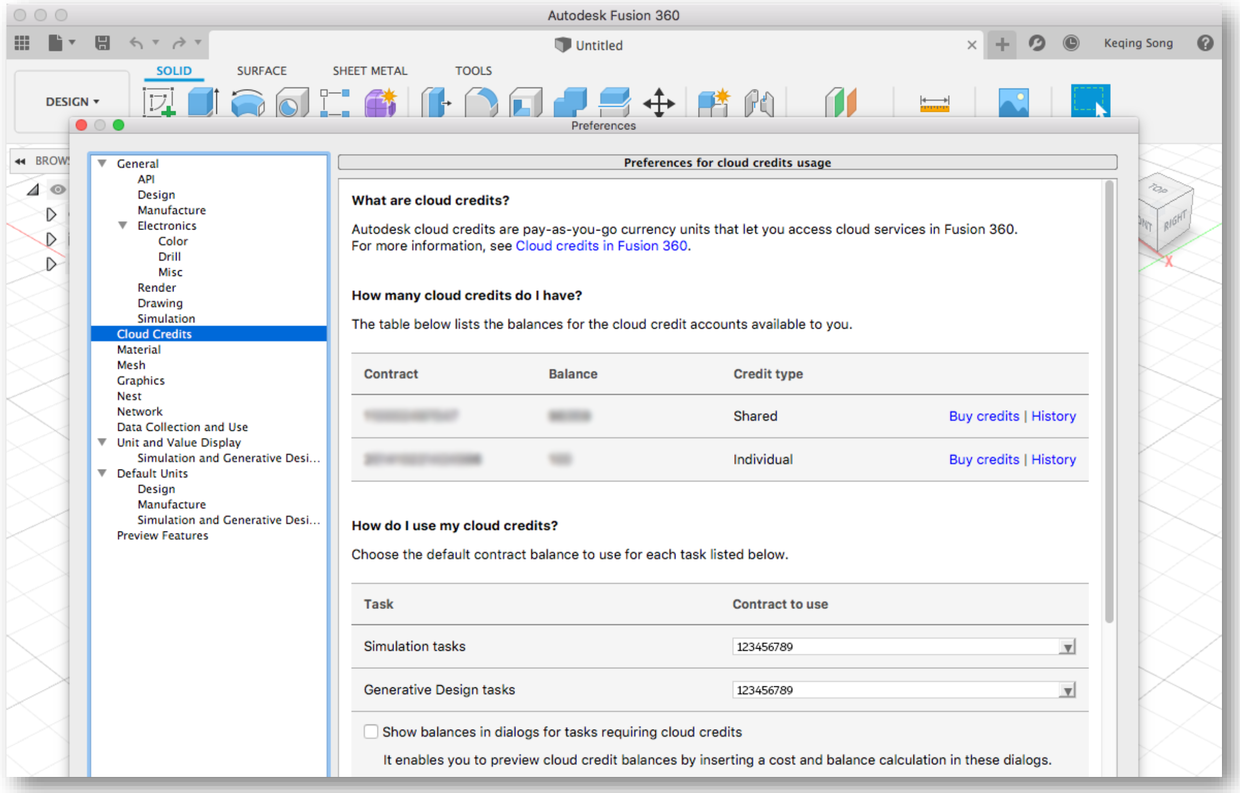
OUTCOME EXPERIENCE

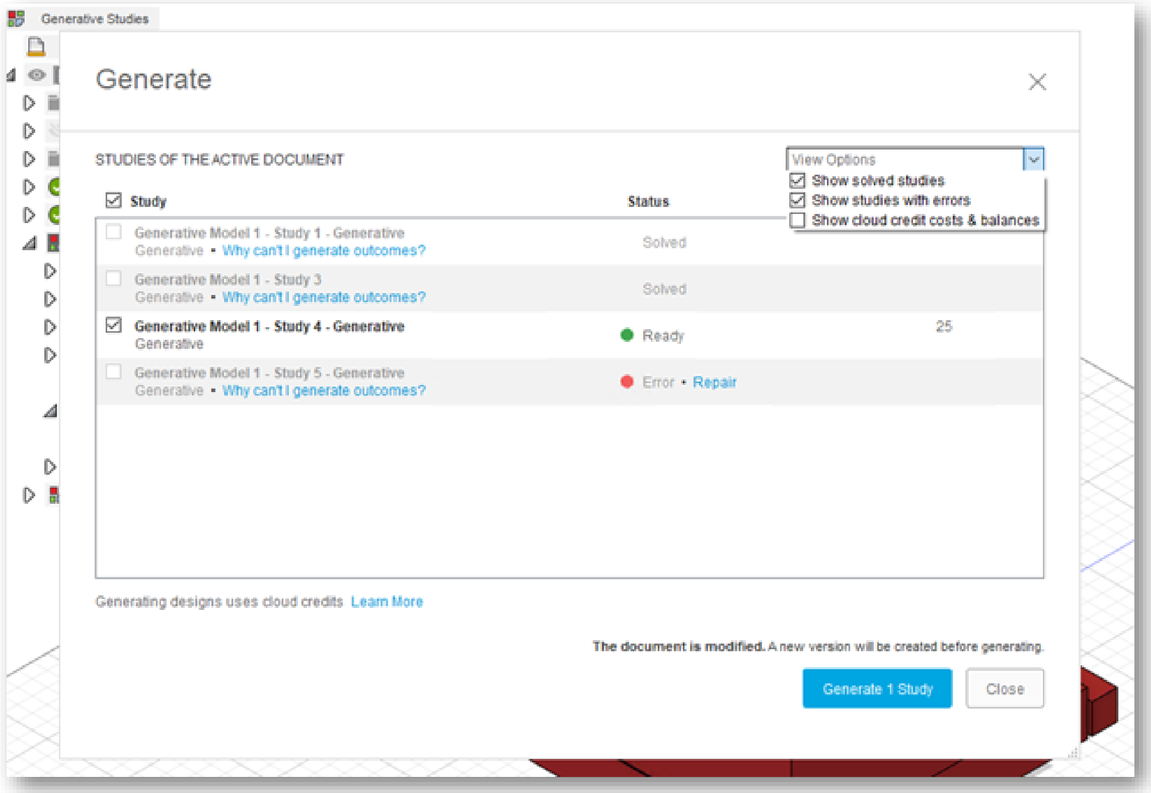
TECHNOLOGY PLATFORM

USER EXPERIENCE

March 2020

Improved Cloud Credit Management Experience

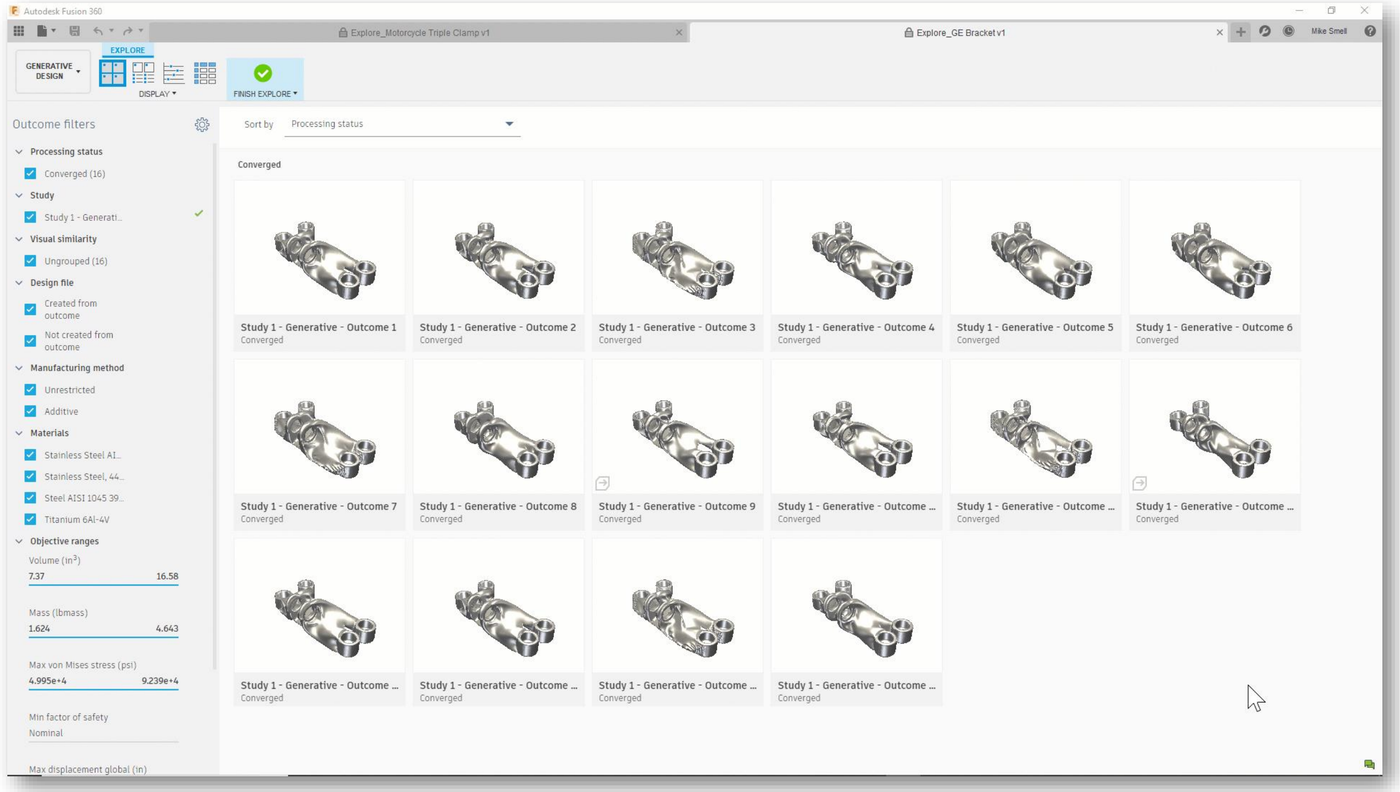




TECHNOLOGY PLATFORM

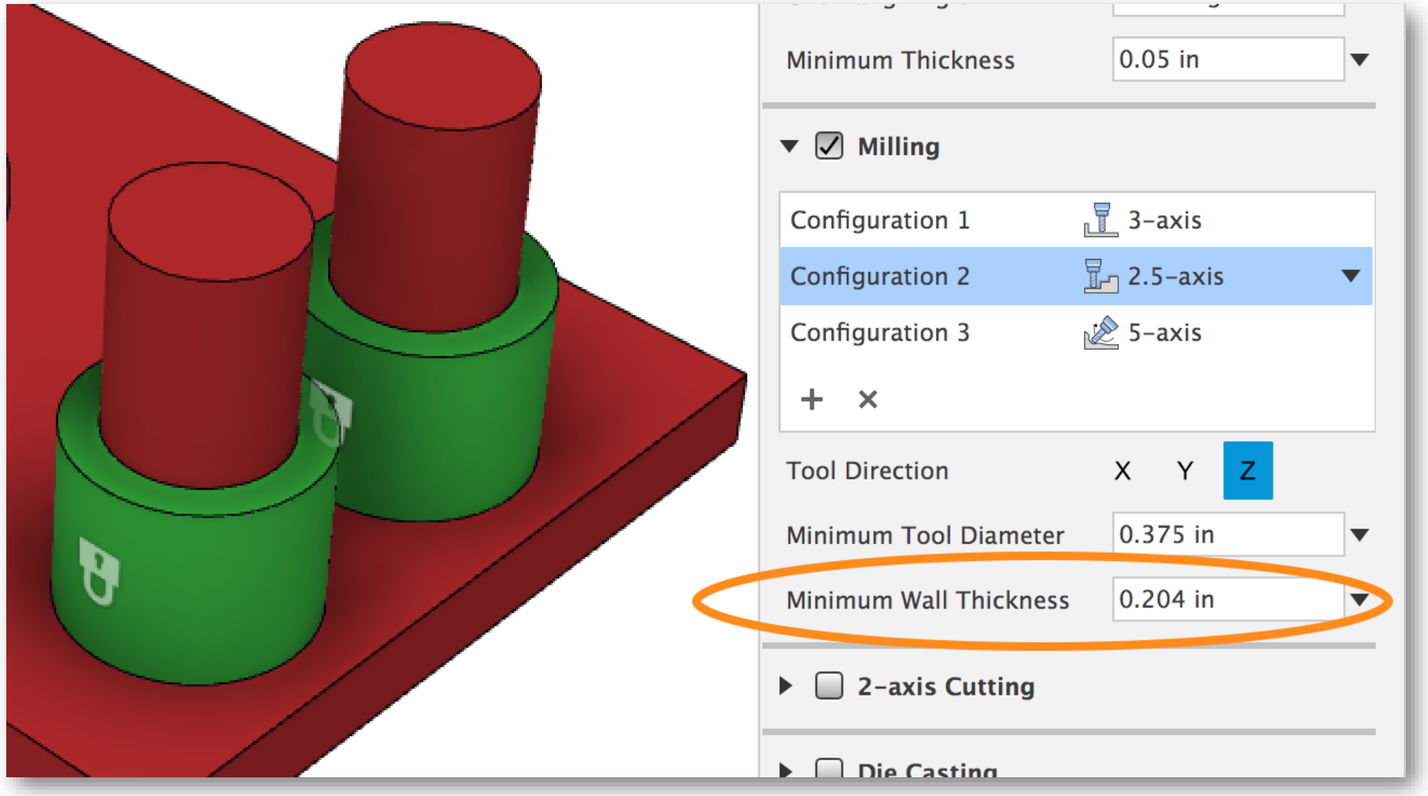
March 2020

Explore Performance and Persistence



April 2020

2.5 Axis Milling Minimum Wall Thickness



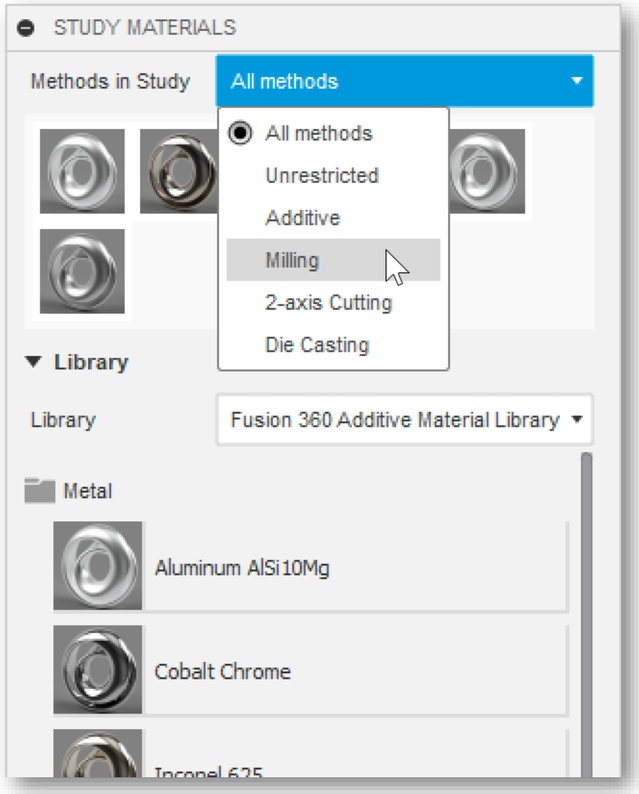
OUTCOME EXPERIENCE

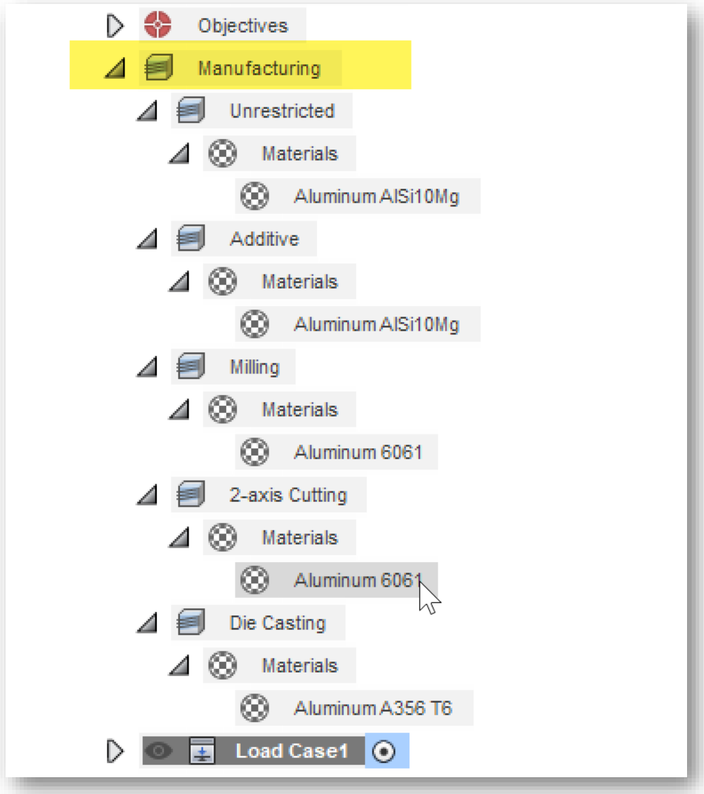
April 2020

Visual Similarity and Cost Estimations for Legacy Documents

May 2020

Material Definition per Manufacturing Process

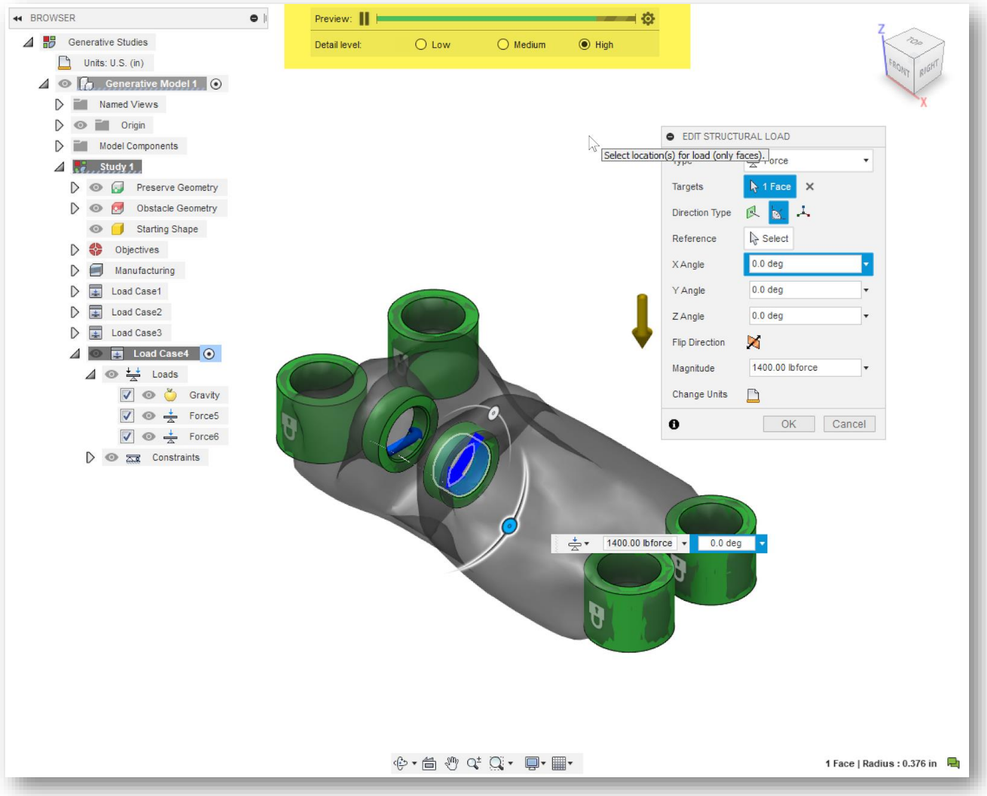




USER EXPERIENCE

May 2020

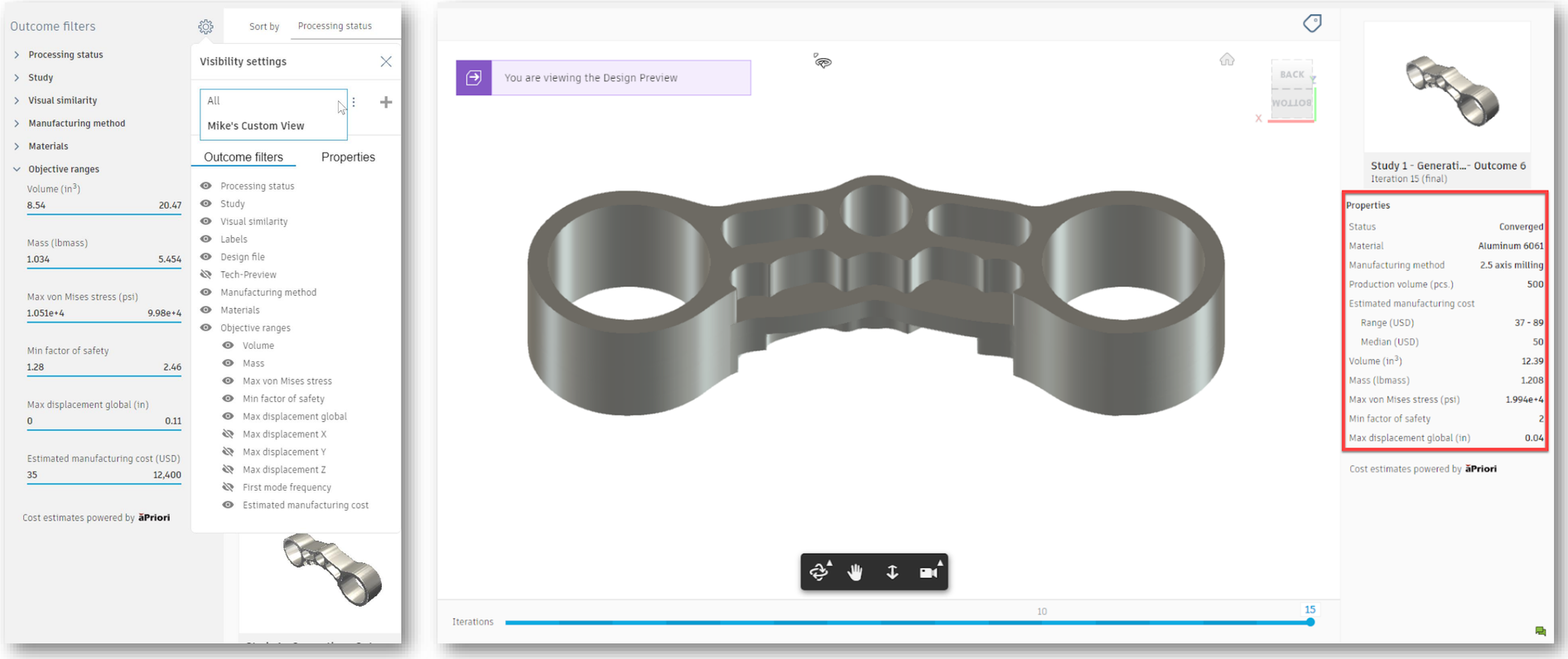
Improved Previewer Experience – Automatic Restarts and More Control



OUTCOME EXPERIENCE

May 2020

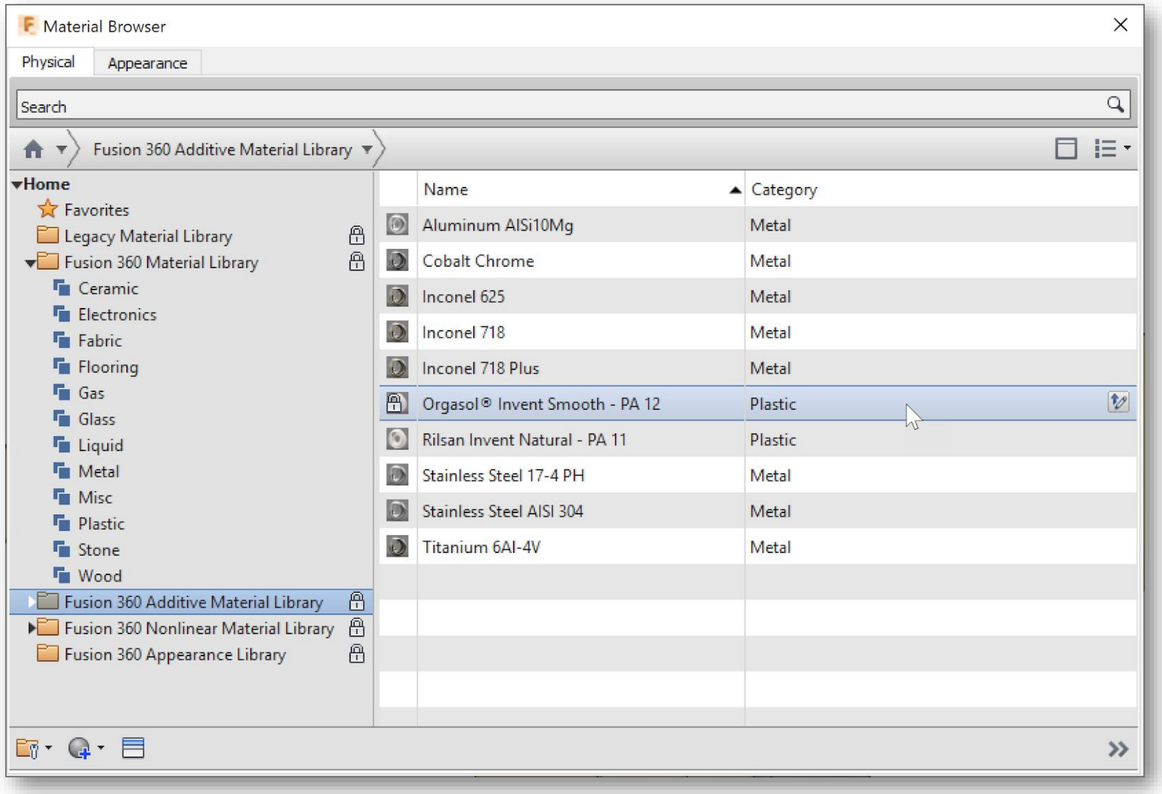
Custom Controls for Outcome Filters and Properties in Explore



USER EXPERIENCE

May 2020

Support for Orgasol® Invent Smooth – PA 12

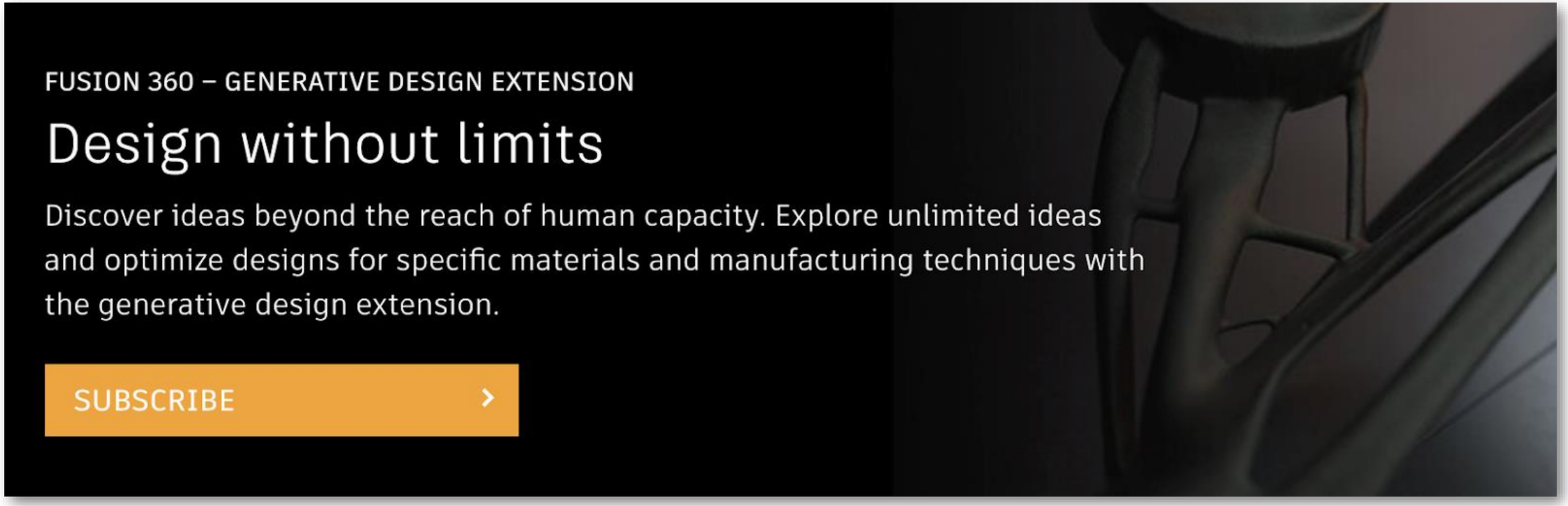


OUTCOME

EXPERIENCE

June 2020

Individual Access Extension – Monthly and Annual



USER EXPERIENCE

June 2020

Generative Design Learning Path

Generative design

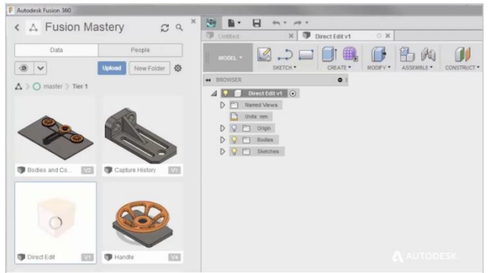
The generative design path includes a series of five courses that guide you through the generative workflow, key features, and concepts. To get started with Fusion 360 Generative Design, we recommend that you complete the five courses in sequence.

Fusion 360 Generative Design (1 of 5)

- 3 lessons
- Beginner
- Lecture

Fusion 360 Generative Design enables you to specify design objectives and generate a wide set of designs that meet the requirements. Next, using a variety of exploration tools, you can select the optimal design for manufacture.

Start learning



Fusion 360 basics for Generative Design (2 of 5)

- 3 lessons
- Beginner
- Lecture

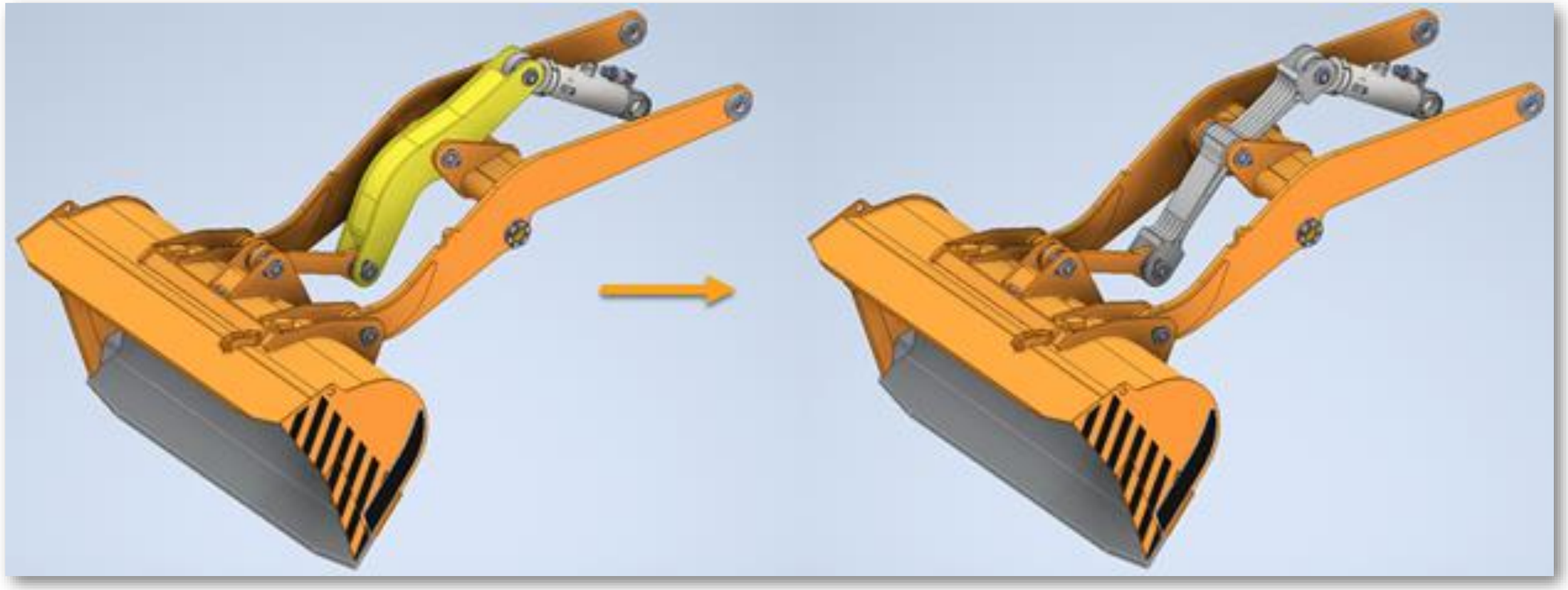
Fusion 360 is a cloud-based CAD/CAM/CAE tool for collaborative product development. Tour the Fusion 360 platform and the user interface. Learn how to open designs created in other CAD systems.

Start learning

USER EXPERIENCE

June 2020

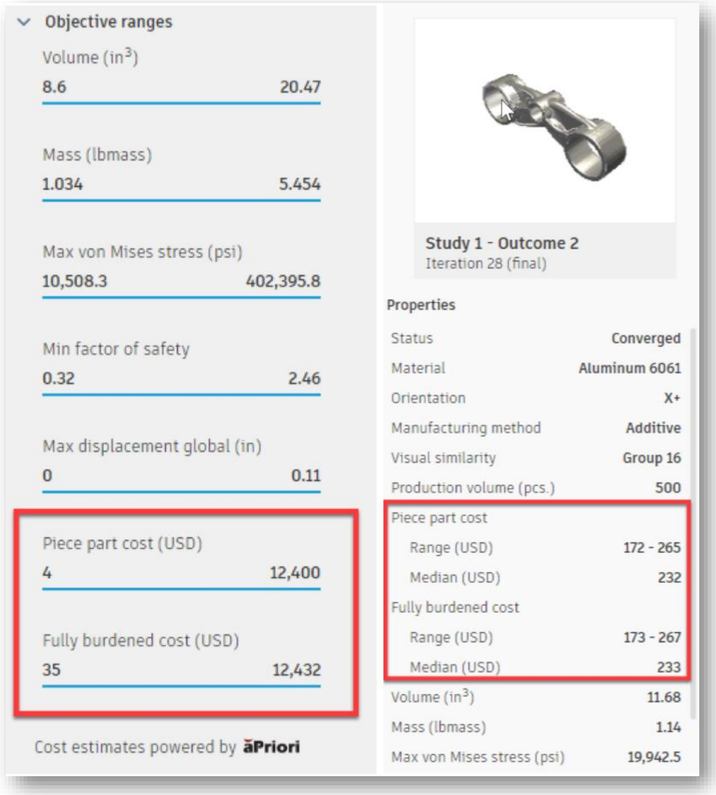
Inventor to Fusion 360 Generative Design Workflow Tutorial

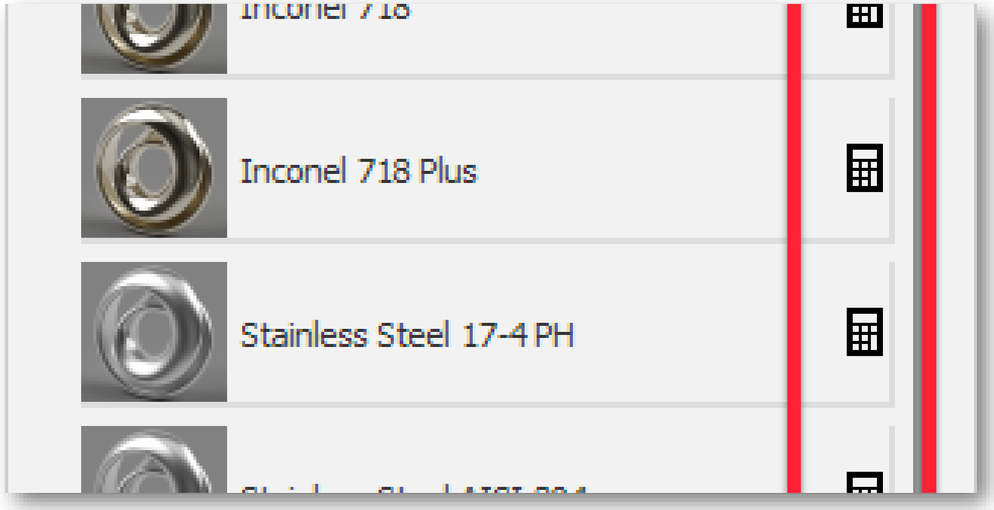


OUTCOME EXPERIENCE

June 2020

Fully Burdened Cost Calculations and Improved Library Experience

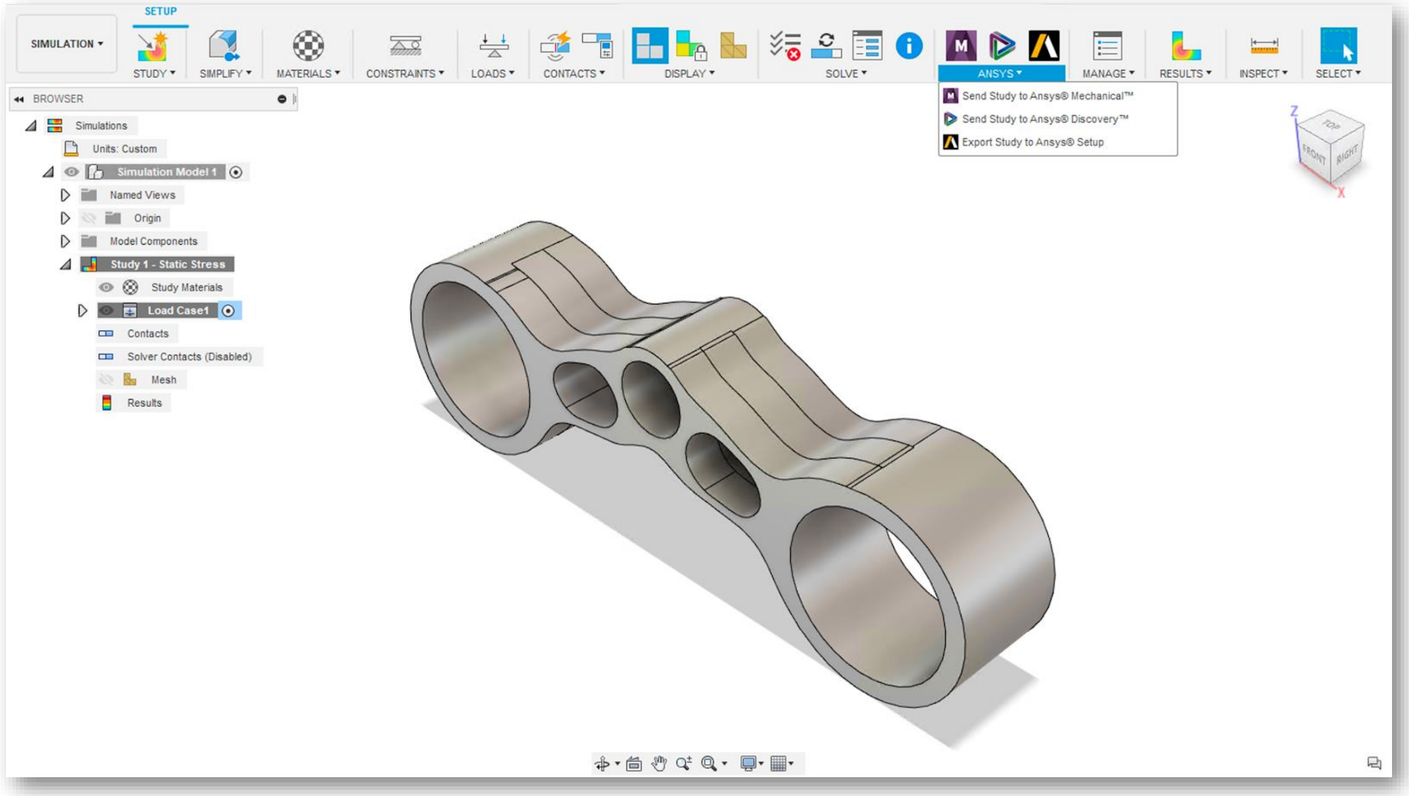




TECHNOLOGY PLATFORM

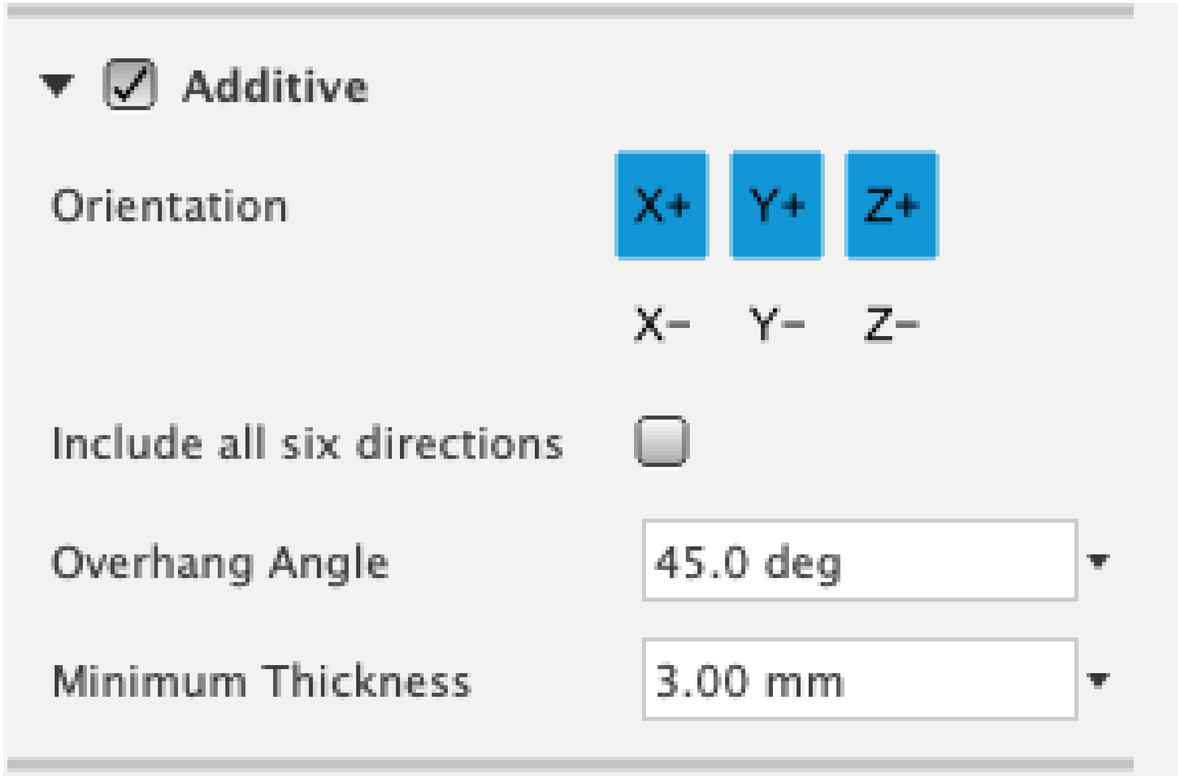
June 2020

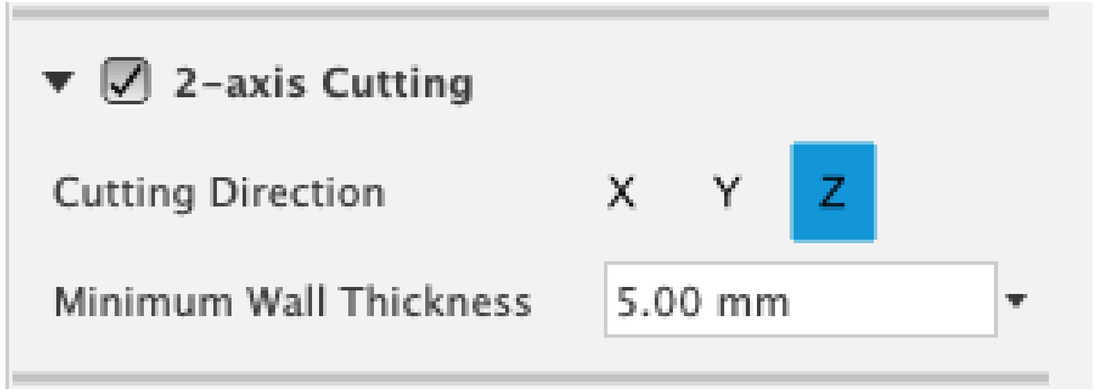
Support for Ansys Discovery 2020 R2



September 2020

Expanded Manufacturing Controls – Additive Directions and 2 Axis Minimum Wall Thickness

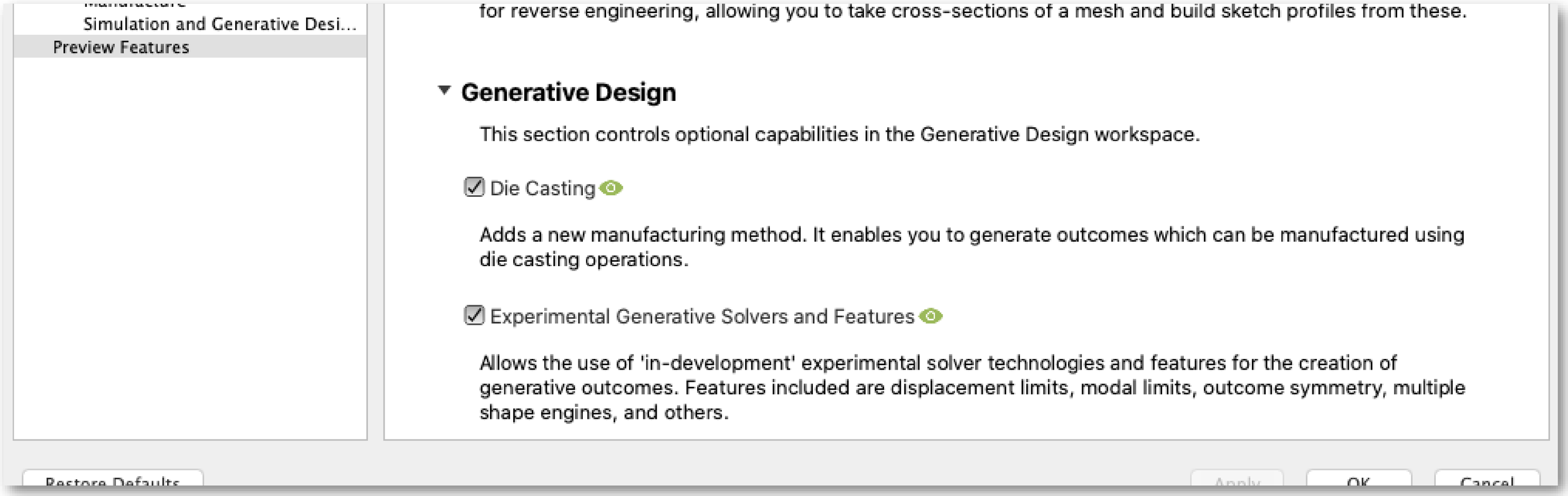




TECHNOLOGY PLATFORM

September 2020

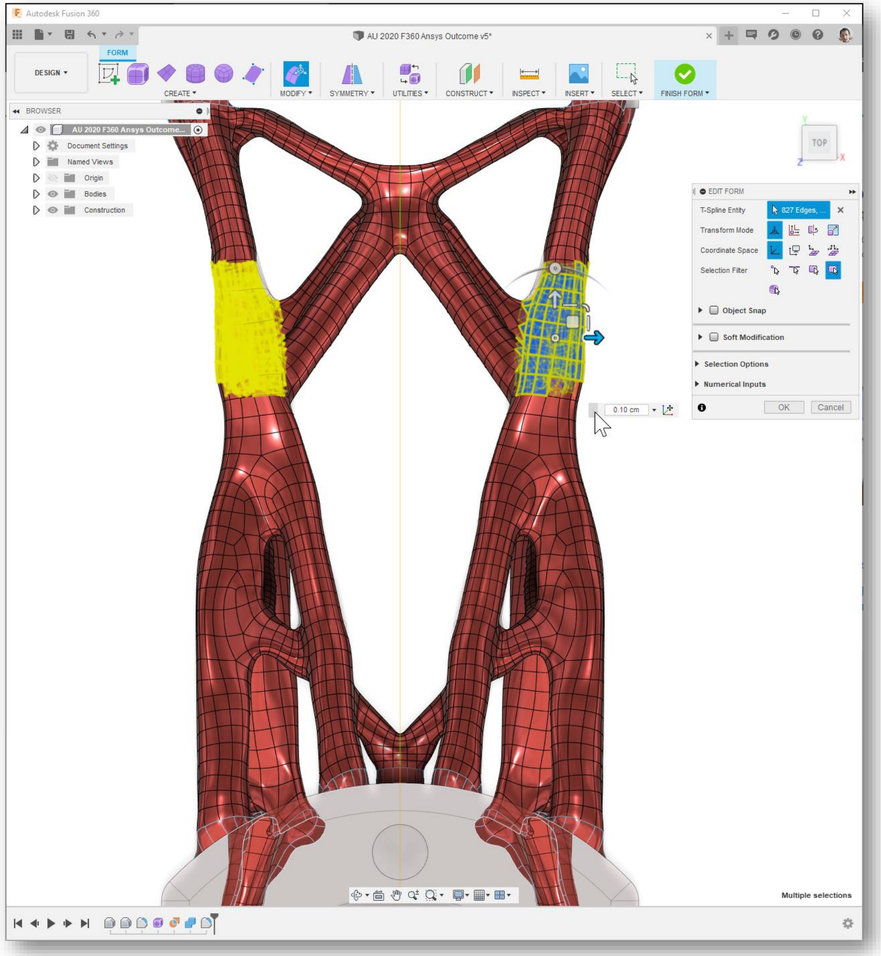
Experimental Solver Preview – Displacement, Modal and Buckling Limits, Outcome Symmetry

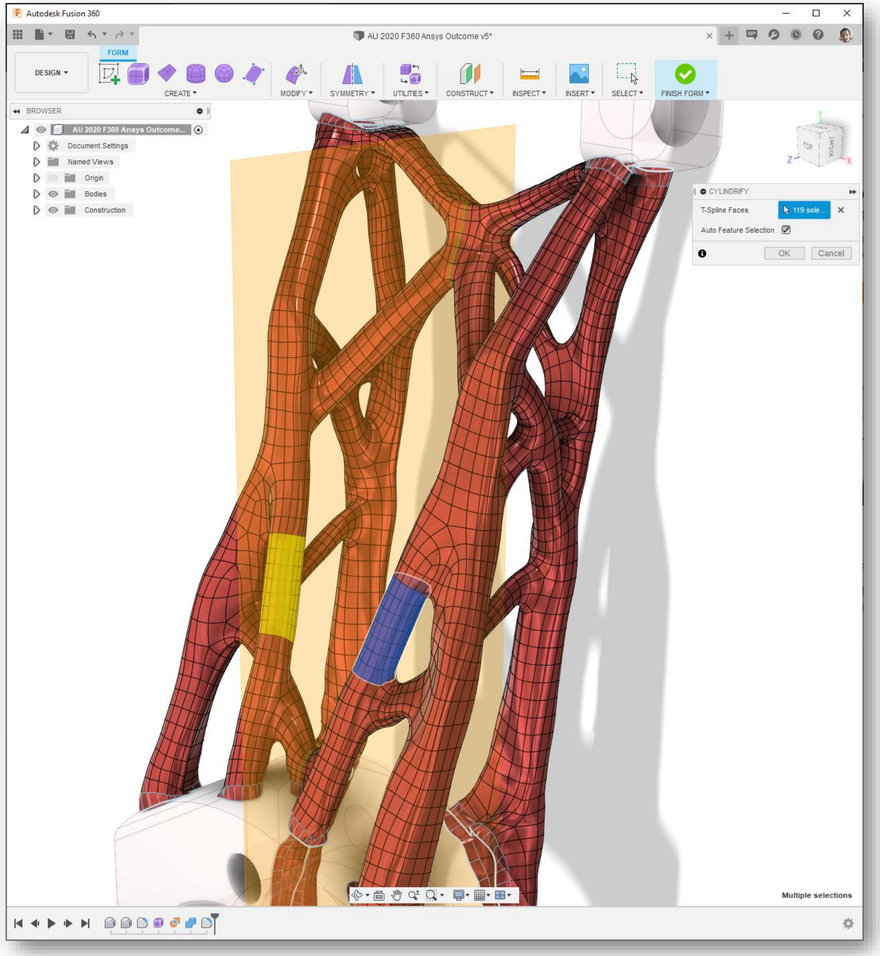


OUTCOME EXPERIENCE

September 2020

Symmetrical Outcome Editability

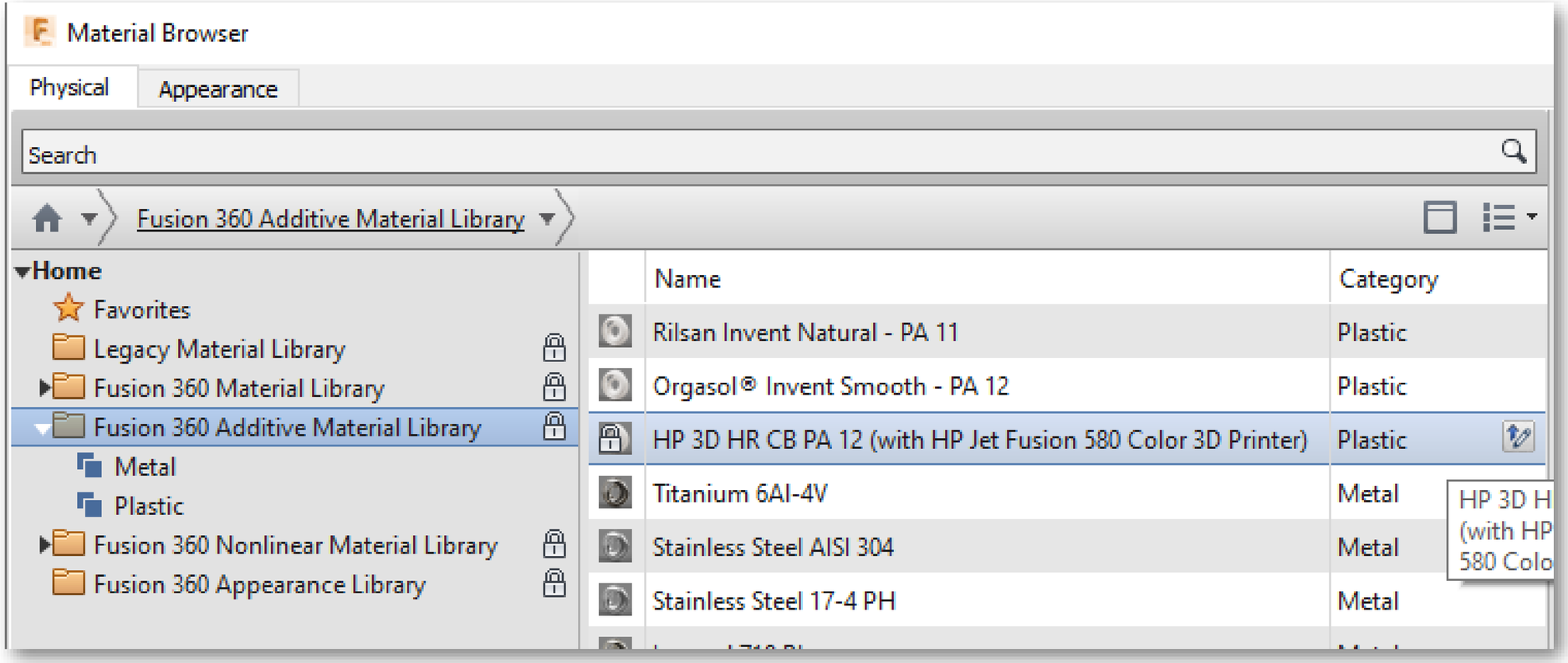




USER EXPERIENCE

September 2020

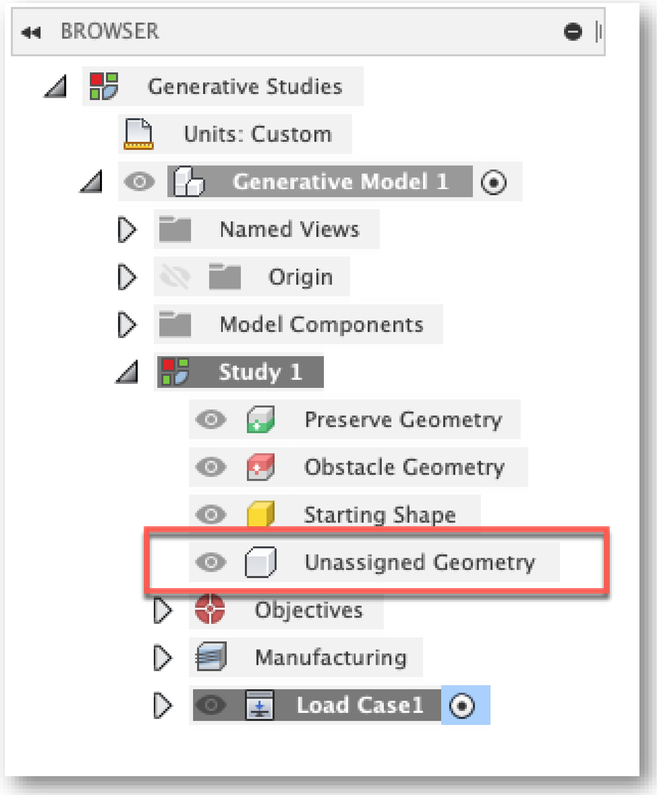
Support for HP 3D HR CB PA 12



USER EXPERIENCE

September 2020

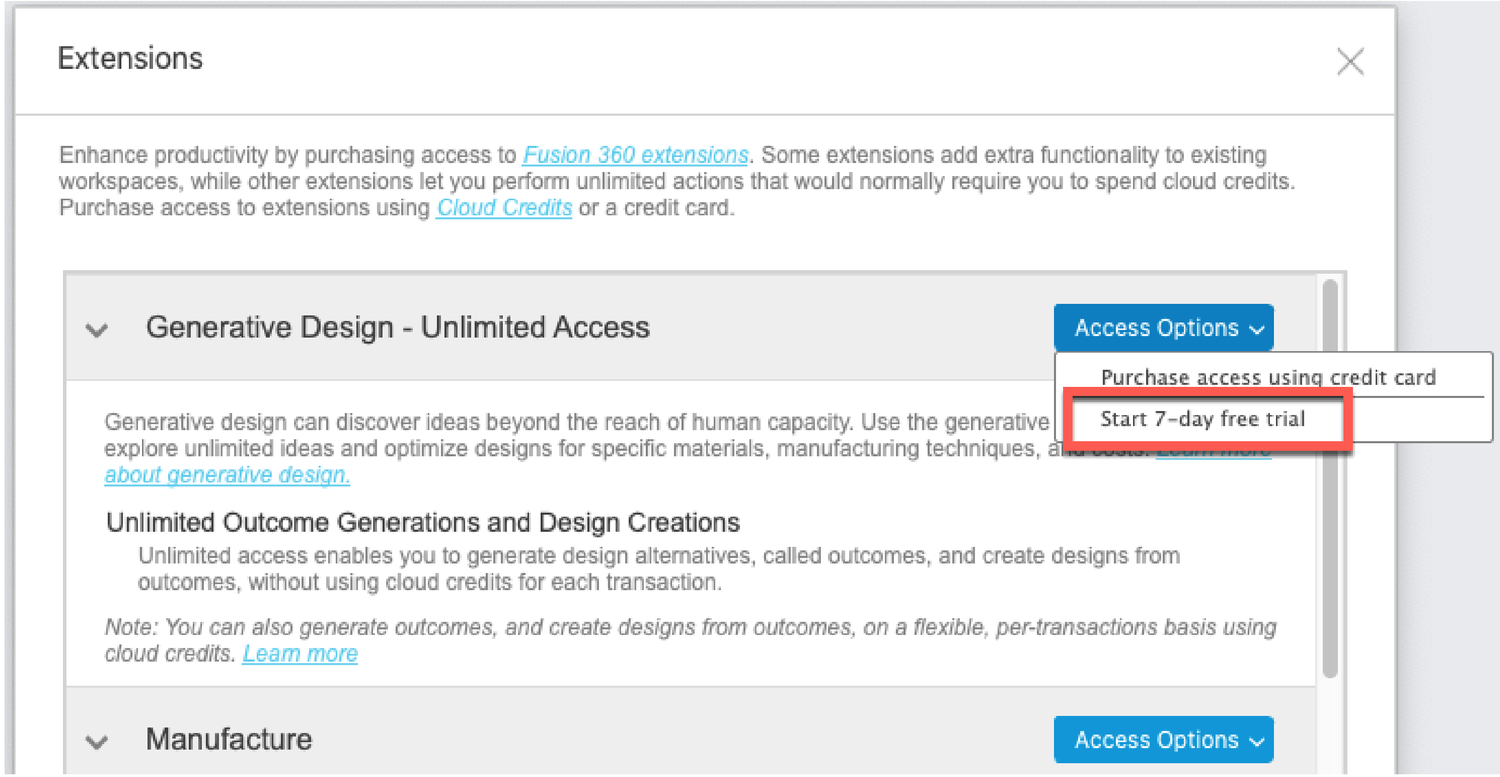
Unassigned Geometry Filter



OUTCOME EXPERIENCE

September 2020

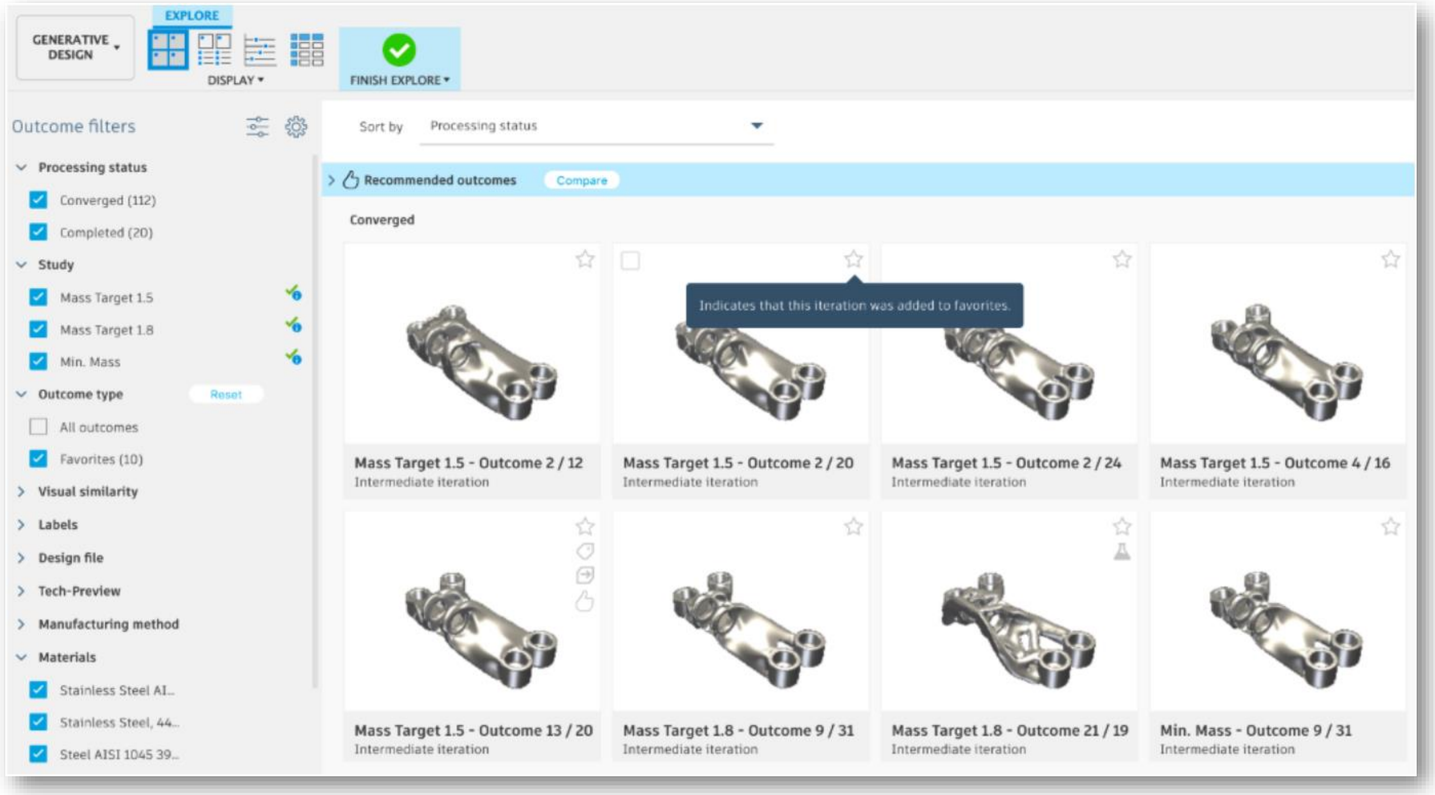
Individual Unlimited Access Extension Trial



OUTCOME EXPERIENCE

October 2020

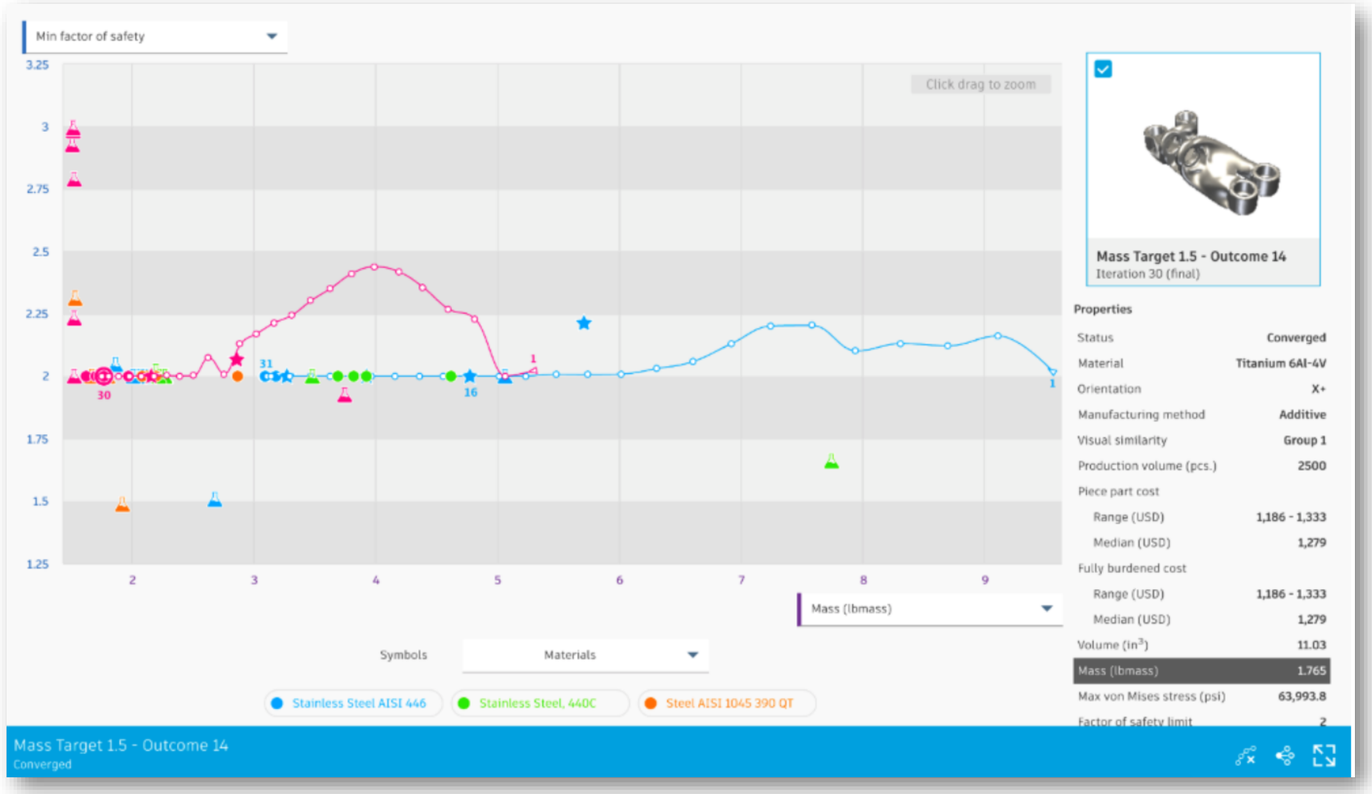
Iteration and Outcome Favorites



OUTCOME EXPERIENCE

October 2020

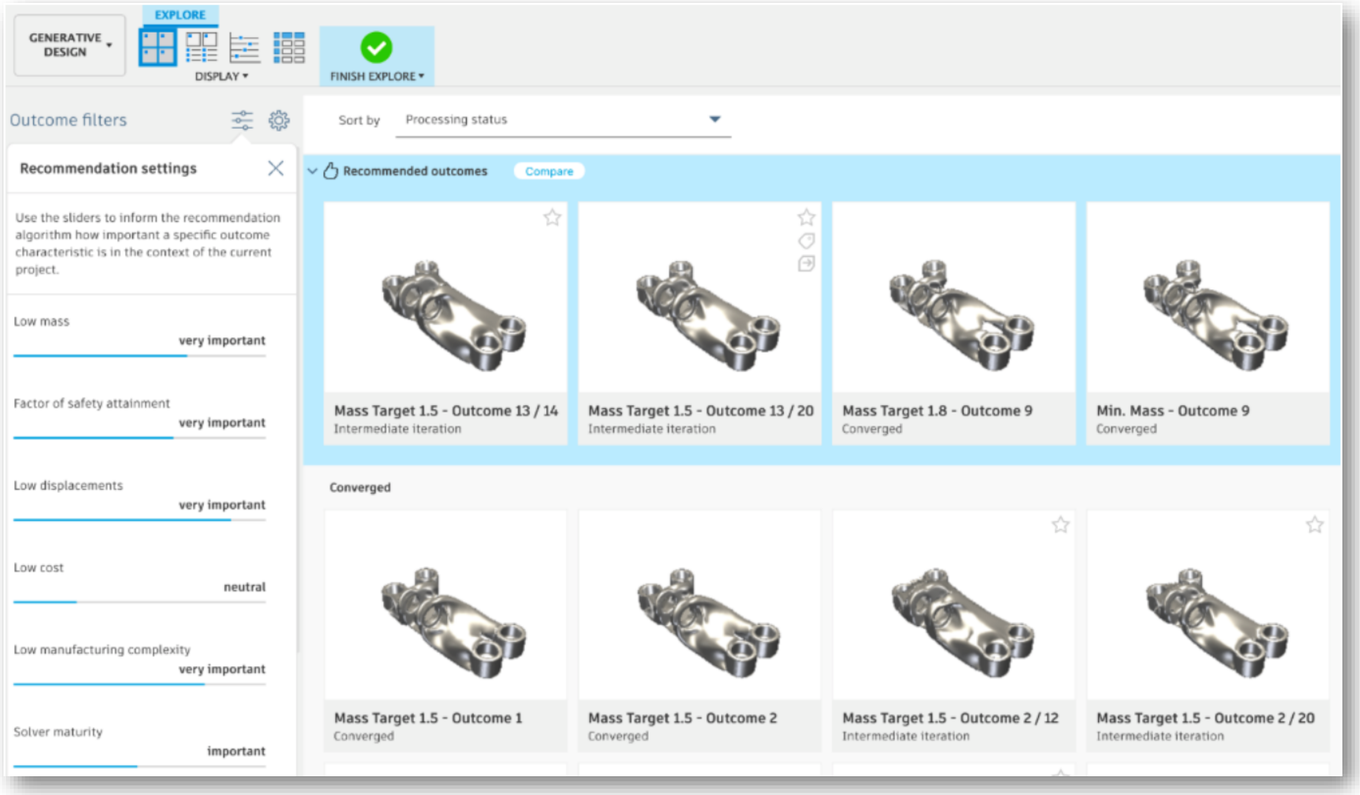
Iteration Trend Plotting



OUTCOME EXPERIENCE

October 2020

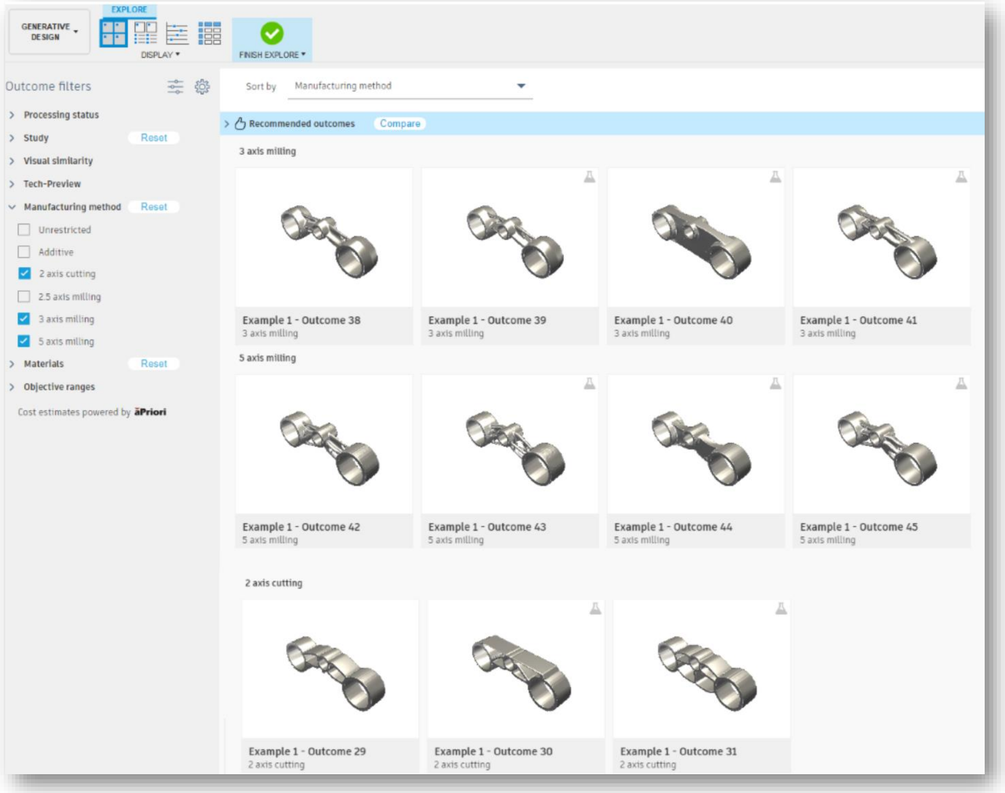
Recommended Outcomes



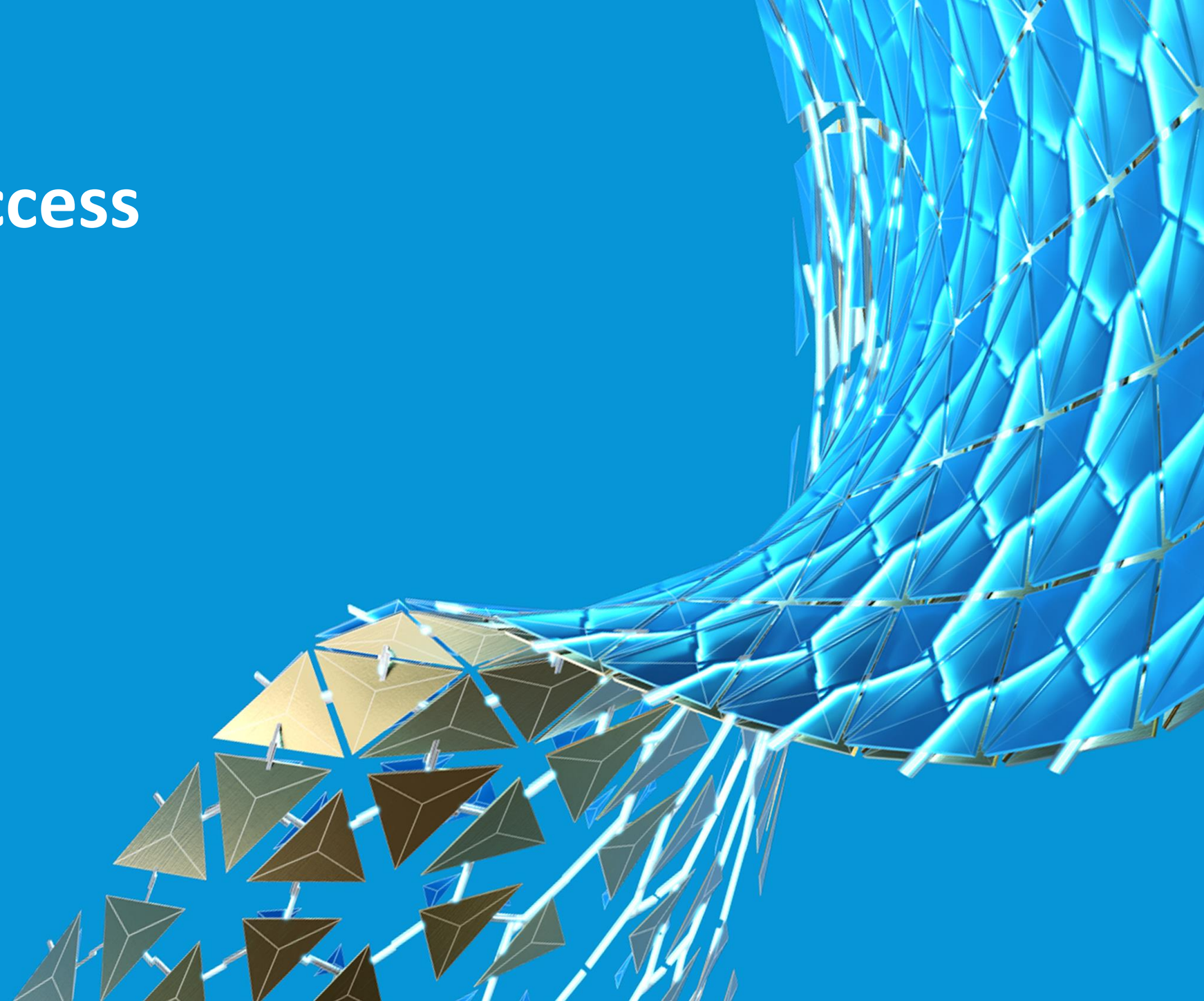
MANUFACTURING CONSTRAINTS

October 2020

Expanding Support for Subtractive MFG Constraints in Experimental Solver – 2, 3, and 5 Axis



Customer Success



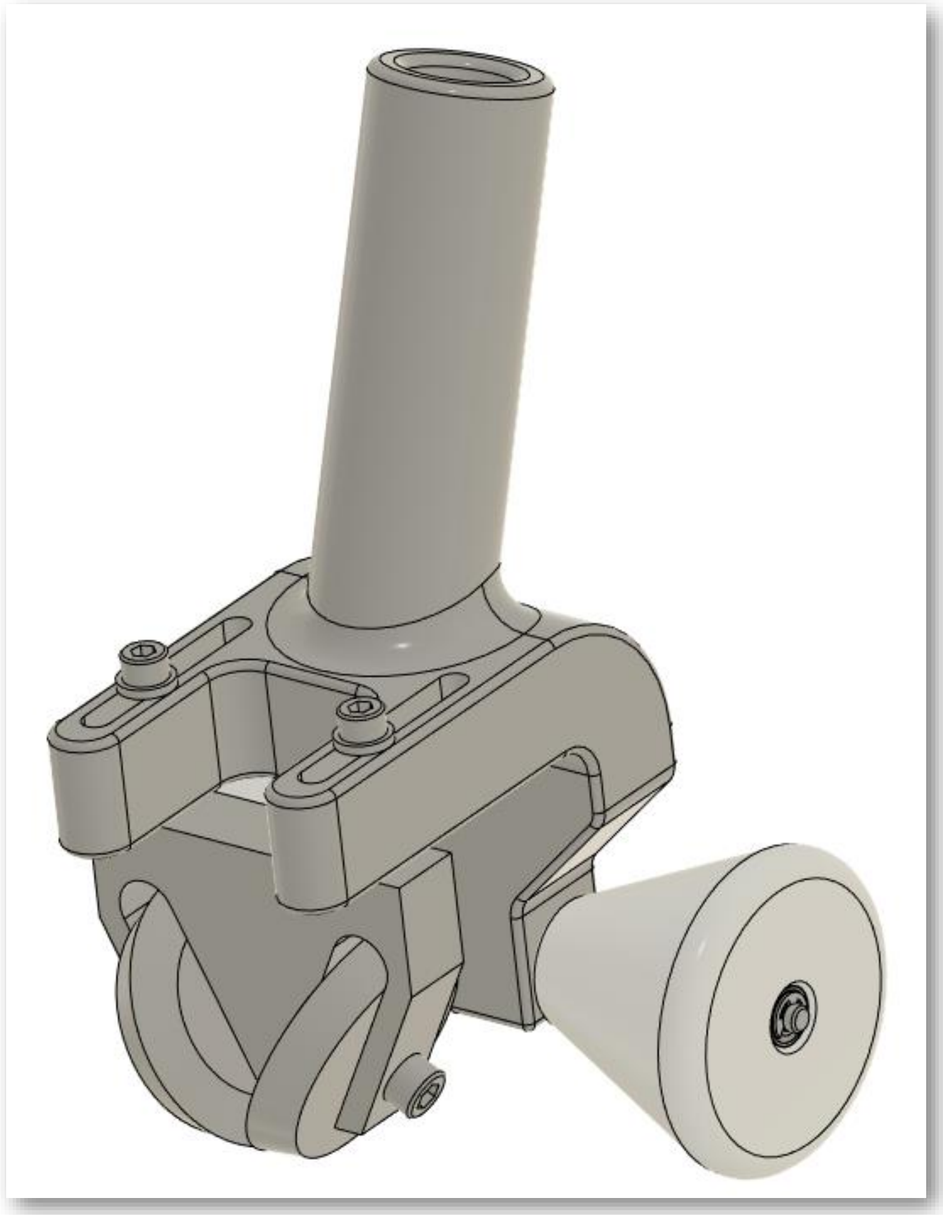

GOODYEAR®

Mark J Montgomery, P.E.

Principal Engineer, Tire Assembly Systems

Production Hand Tool Re-Design

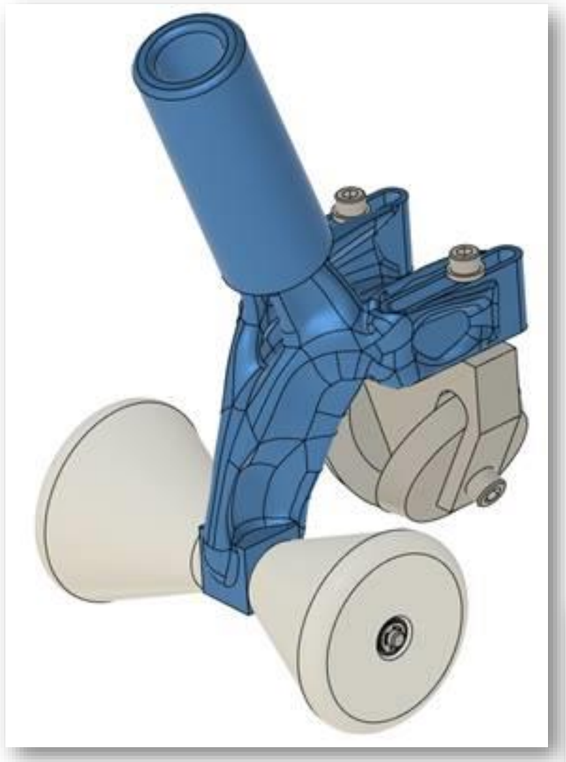
- Interested in “what’s possible” with generative design
- Focused on driving cost reduction and improving performance
- Looking to reduce time to market
- Currently machined from aluminum
- Hundreds of other “similar” tools like this



Generative Design Solution

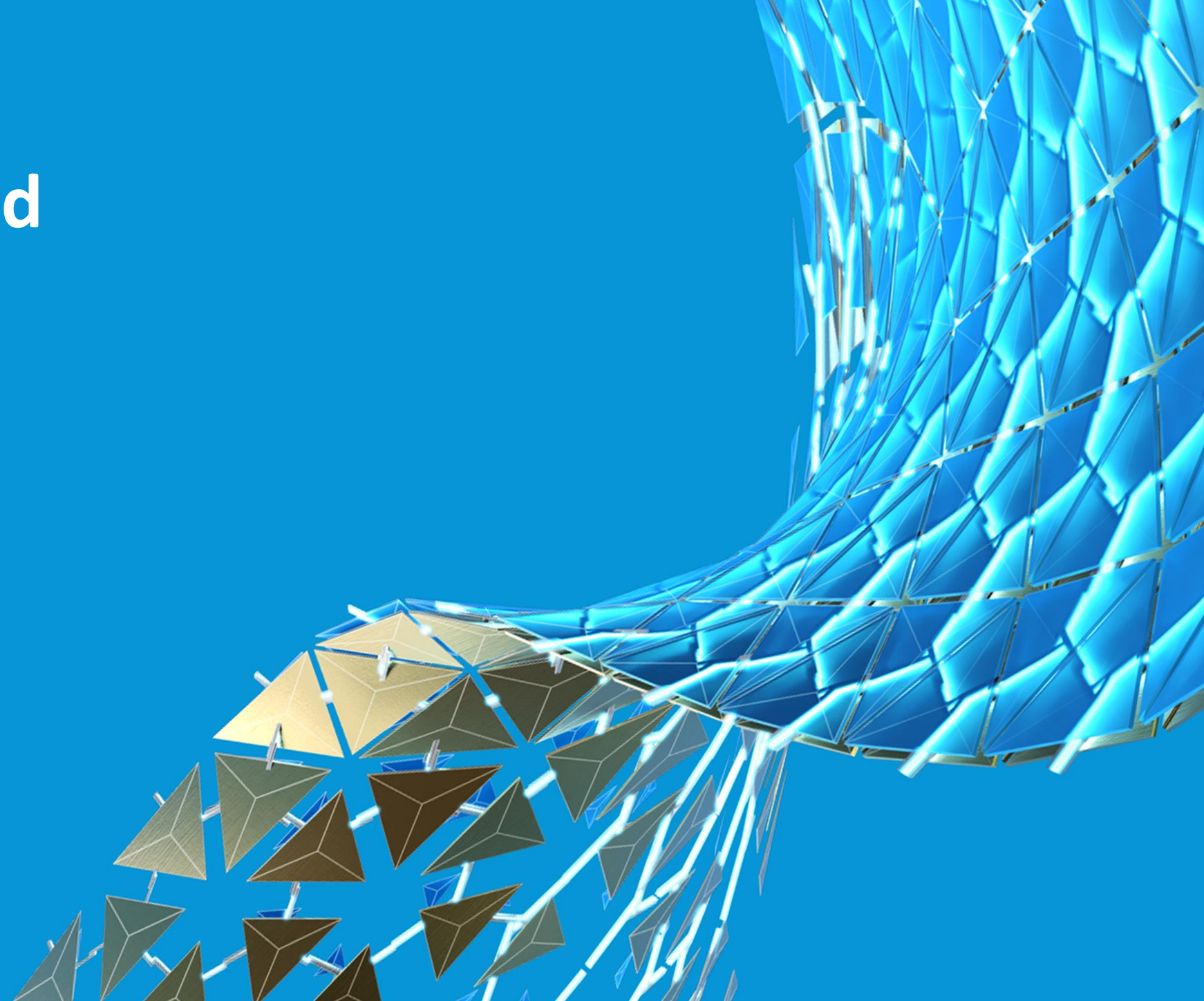
- *Results achieved within 1 hour on the first day of training*

- New Design:
  - Additively manufactured with nylon
  - 1/10th the cost to manufacture
  - 10X faster to produce
  - Met necessary performance requirements

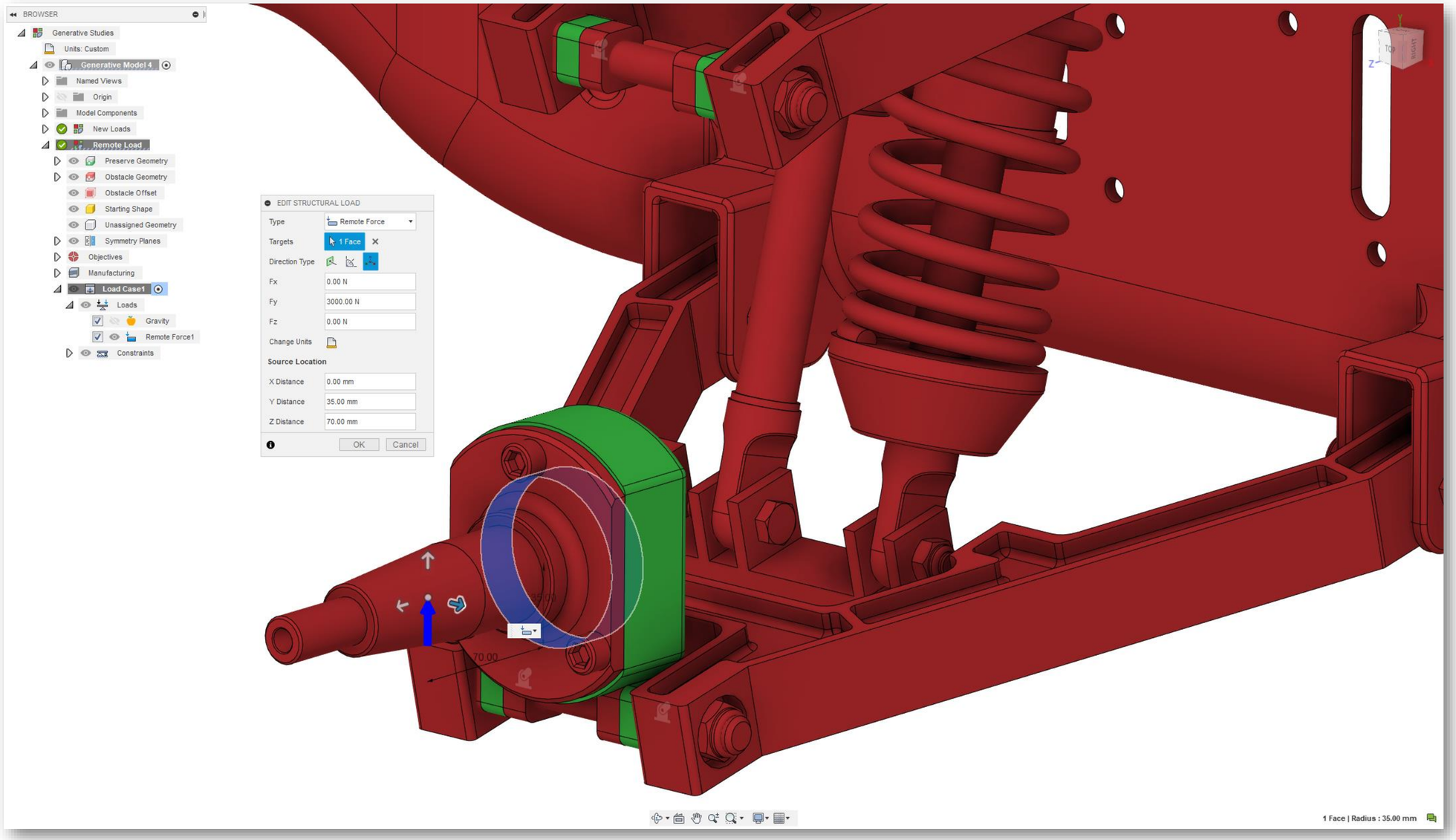


10X cheaper, 10X faster

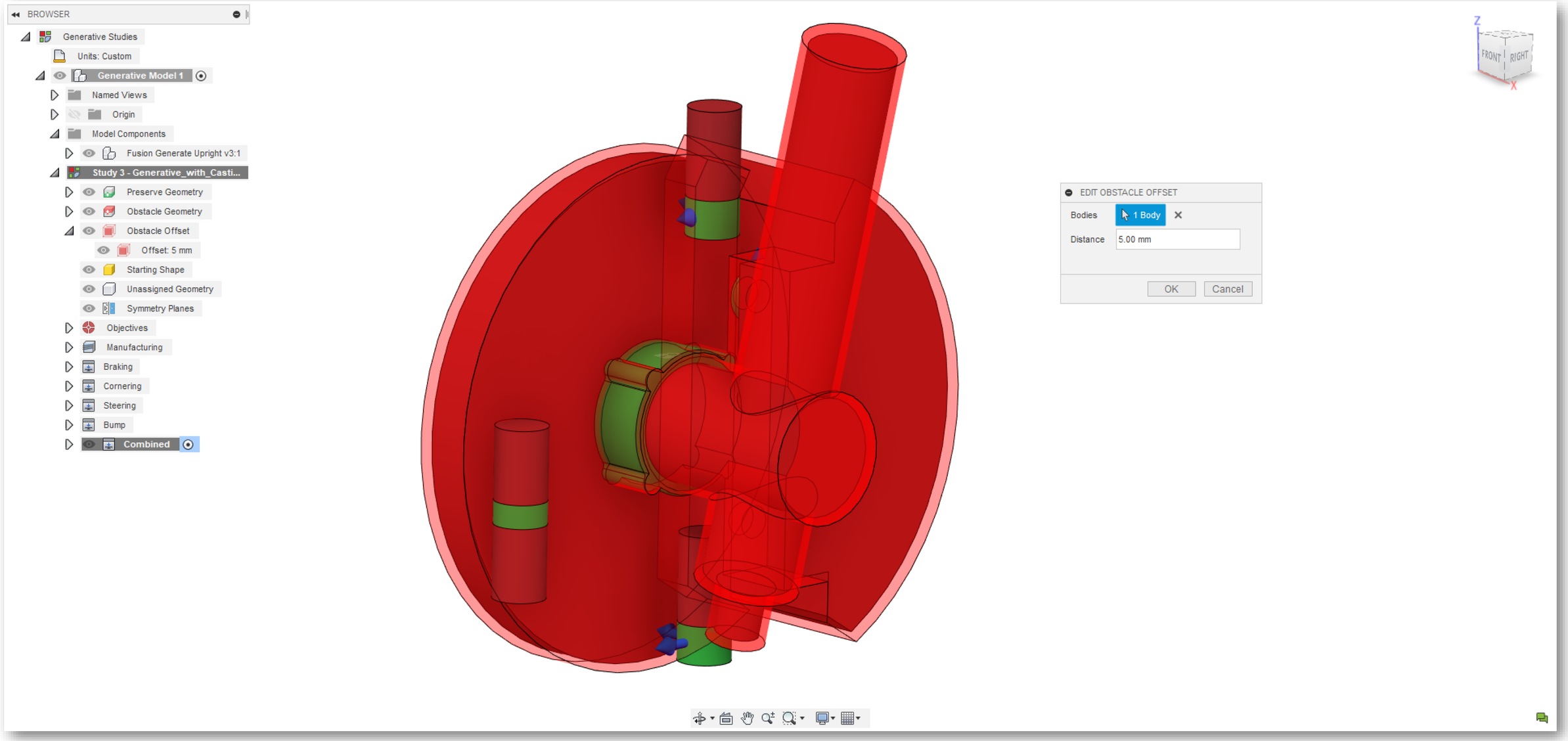
Looking Ahead



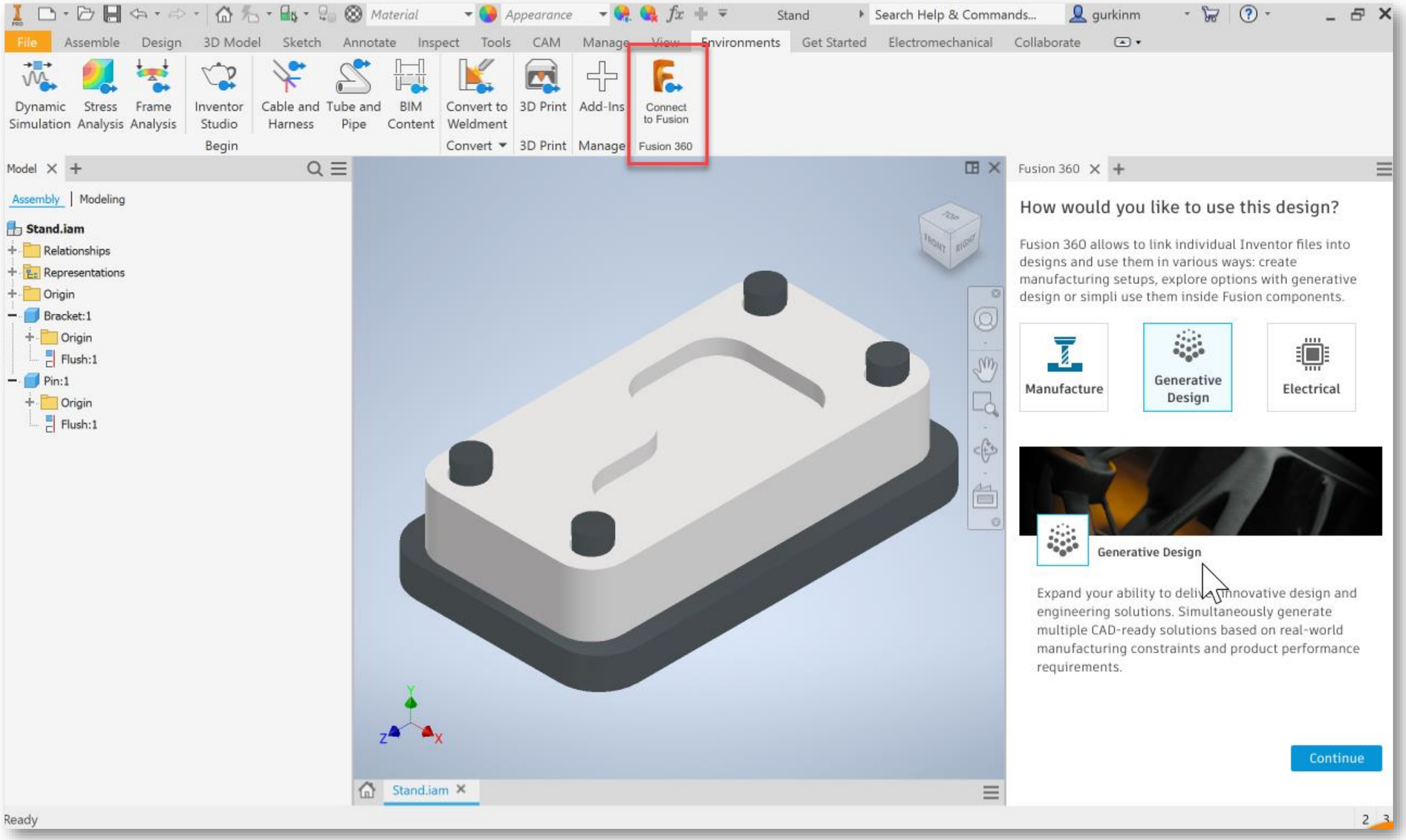
Assembly Context Loads and Constraints



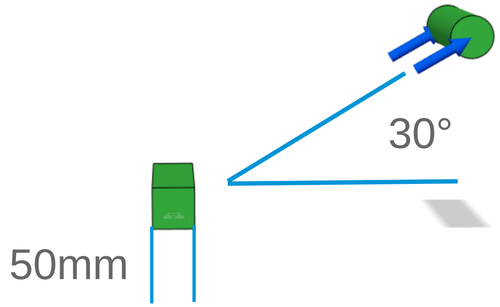
Design Space Tools

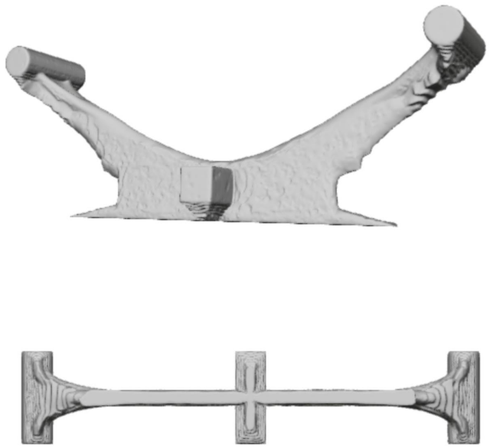


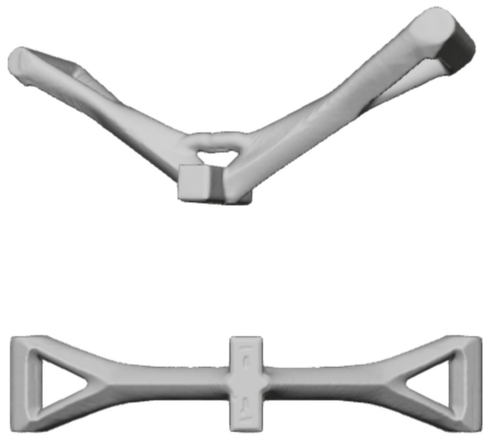
Inventor to Fusion 360



Additive MFG Constraint Improvements

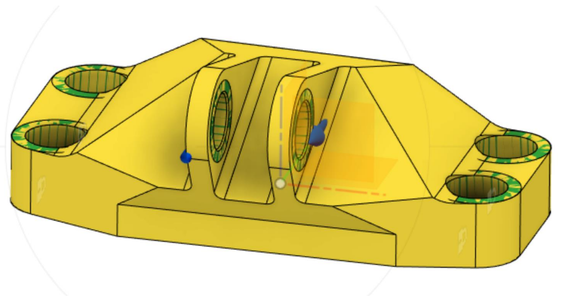


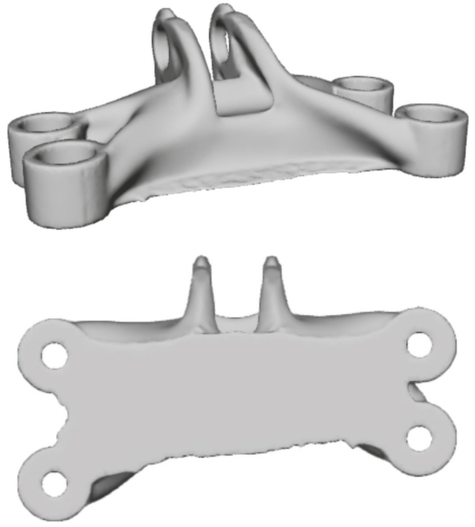


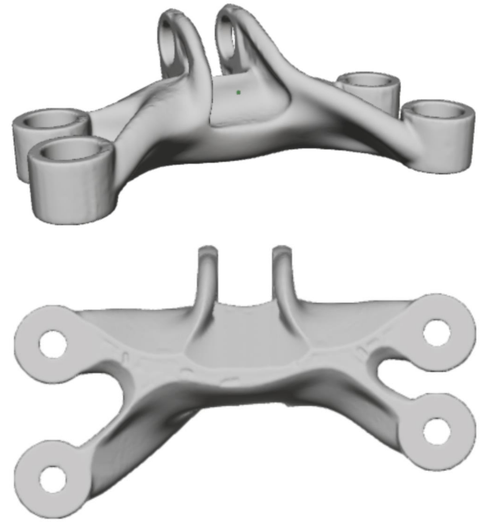


Current Production Solution

In Development Solution



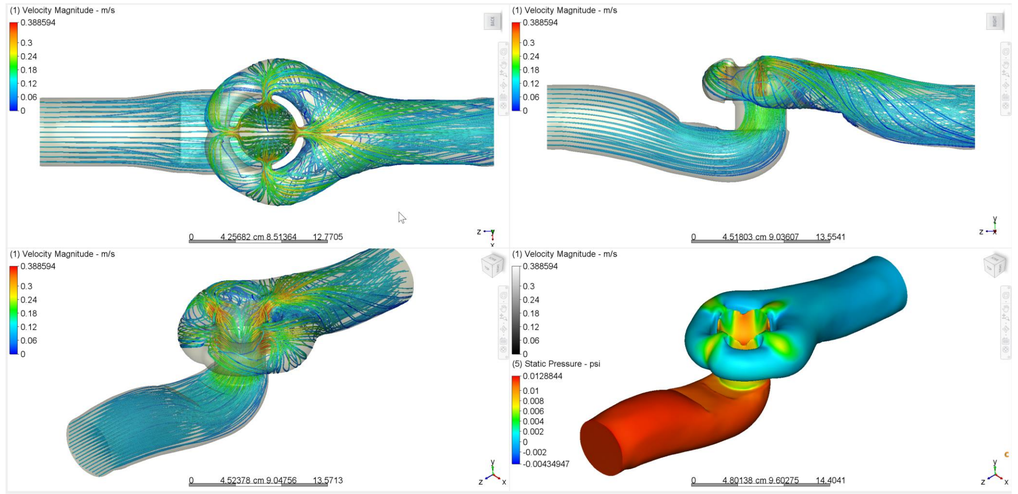


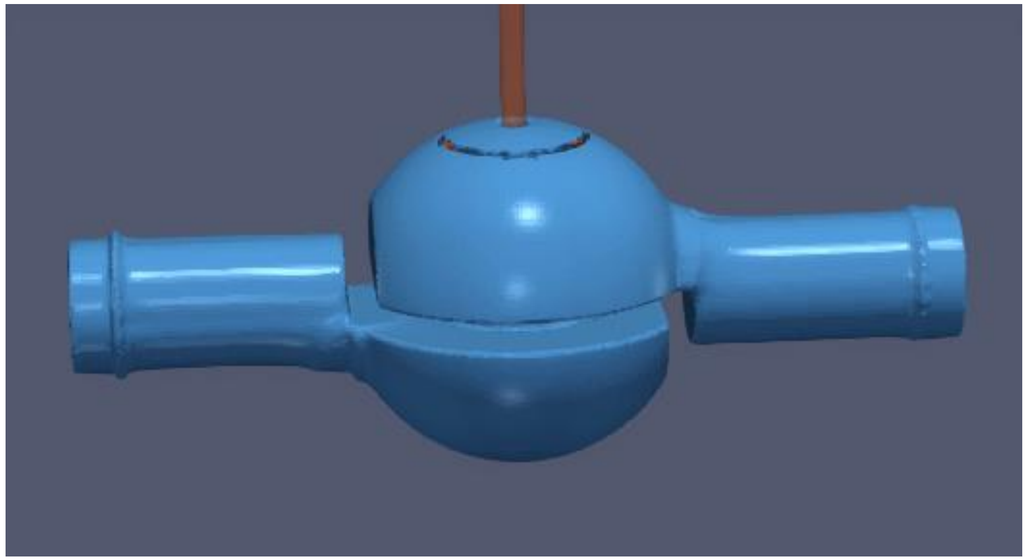


Current Production Solution

In Development Solution

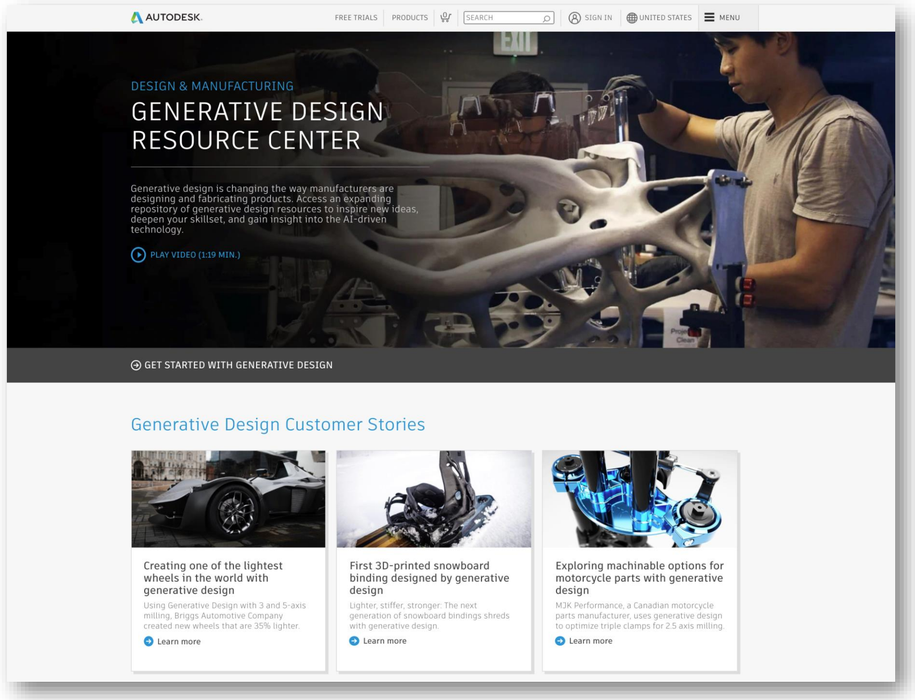
Generative Fluids

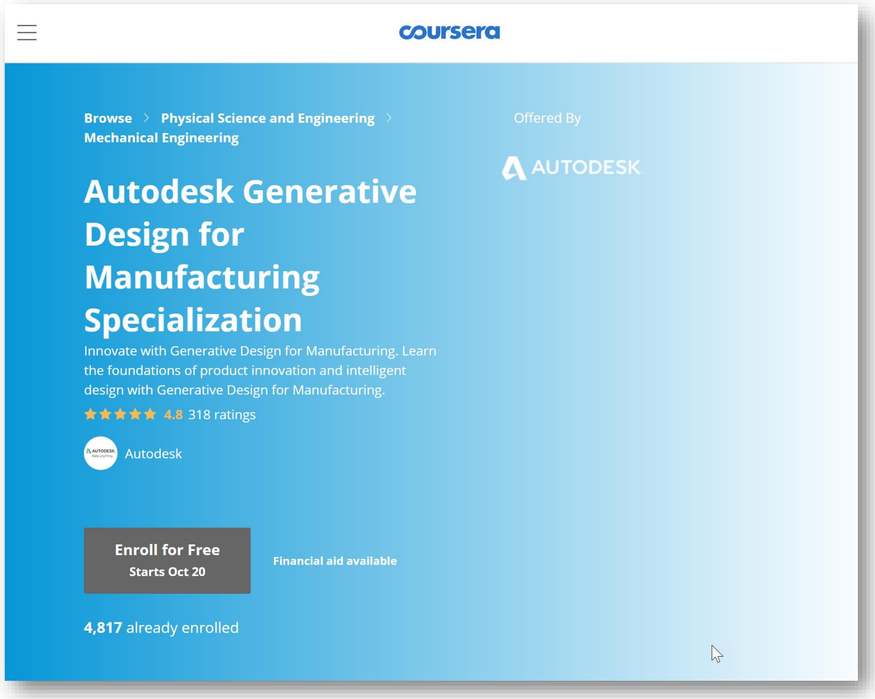




API and Template Framework

Generative Design Resource Center





More questions…

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