Future of Making

Vikram Vedantham

Sr. Manager, Design & Manufacturing | Business Strategy & Marketing

AUTODESK.


10 BILLION


MILO

BUSINESSES ARE FACING PRESSURE TO KEEP UP WITH A RAPIDLY EVOLVING MARKET

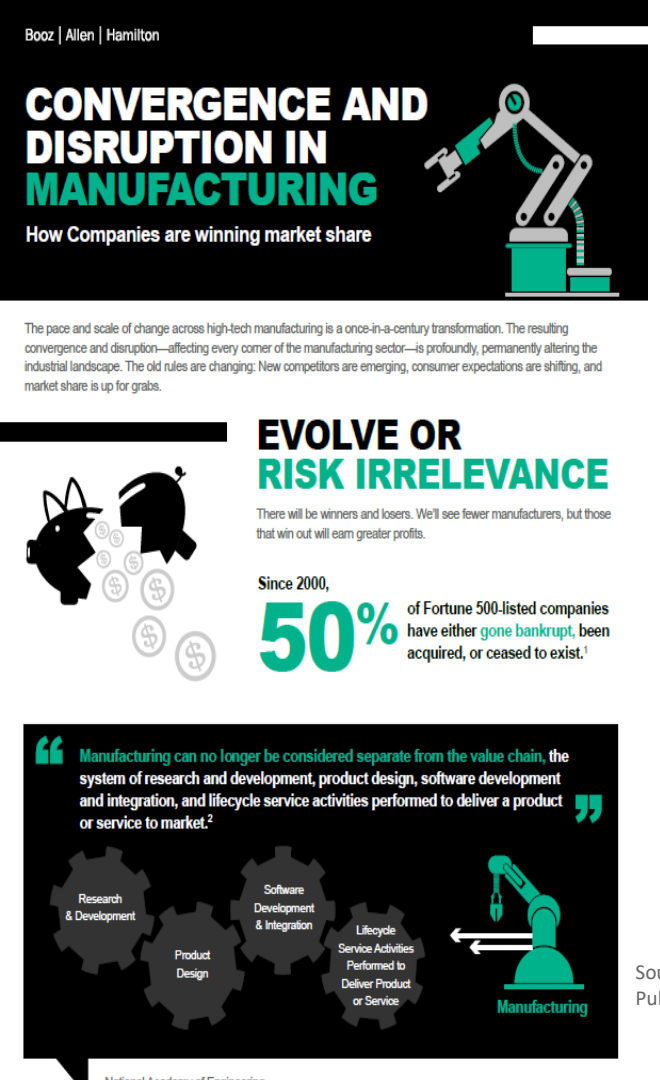

MORE
IS INEVITABLE


LESS
IS A REALITY


DMG
00 HSC


Network


BETTER
is the OPPORTUNITY



The changing nature of products is **disrupting value chains**, forcing companies to rethink and retool nearly everything they do internally.

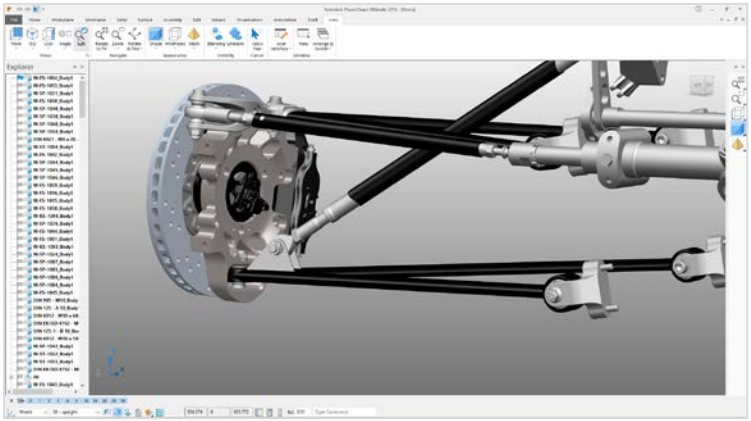
- Harvard Business Review

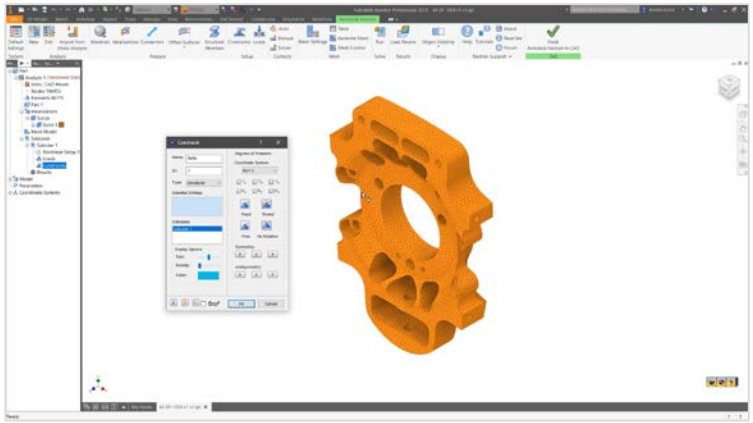
Source: Booz Allen Hamilton report on Convergence and Disruption in Manufacturing, Published in LinkedIn *Engineering, Aug 19th, 2015*

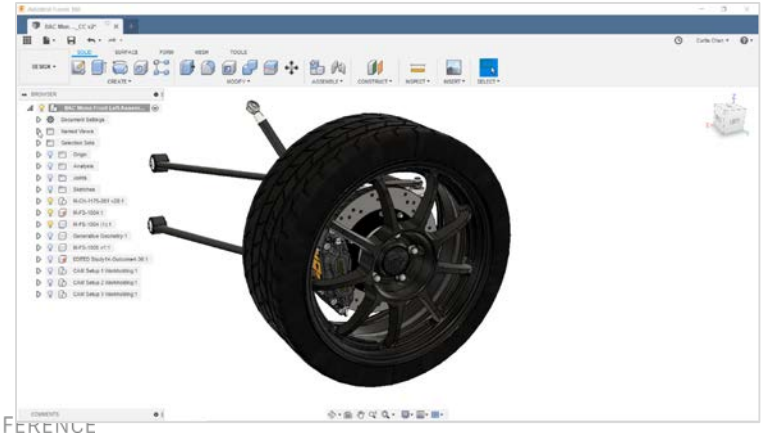
AUTODESK.

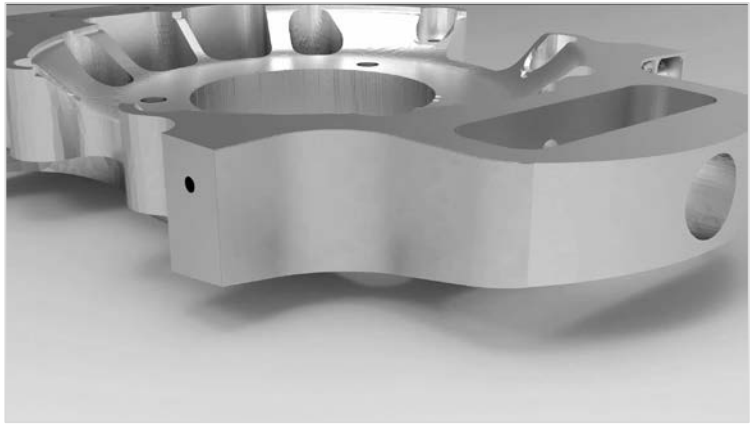

CONVERGENCE OF DESIGN & MANUFACTURING

What are the options?









Autodesk Netfabb Ultimate 2017.2

Project Edit Repair Mesh Edit View Window Settings Utilities Help

Parts
(100%) M-SP-1004 v1 v1
Part Repair
Slices
Structure Library

Clip planes
X: -101.9 mm
Y: -151.4 mm
Z: -44.12 mm
Transparent Cuts

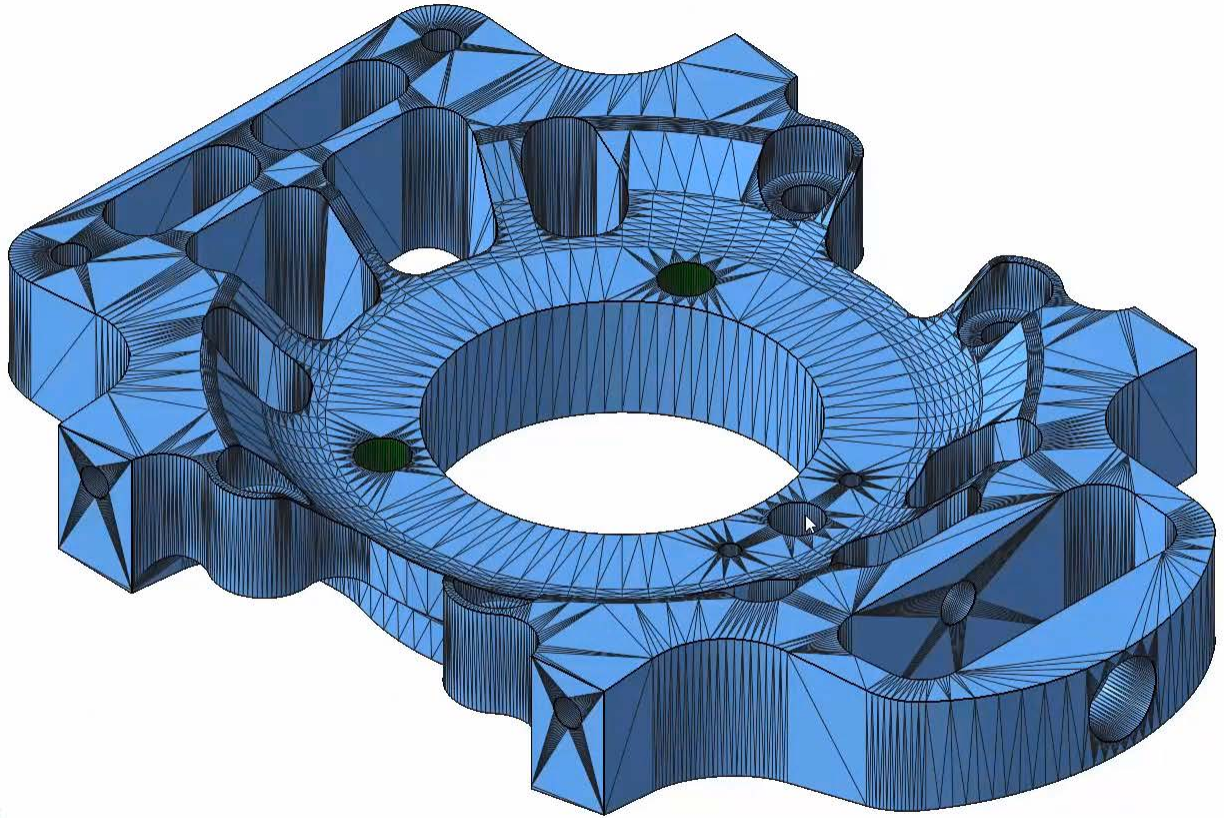
Status Actions Repair Scripts Shells View

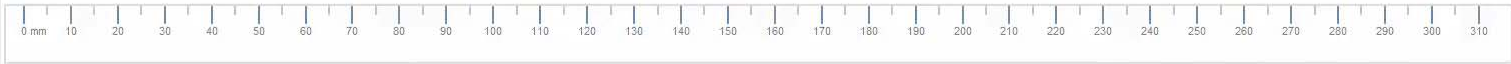
Statistics
Edges: 31527 Border Edges: 0
Triangles: 21018 Inv. Orientation: 0
Shells: 1 Holes: 0
Update Auto-Update

Visualization
Highlight Holes Triangle Mesh
Show Edges from 45°
Show Degenerated Faces
Highlight Errors

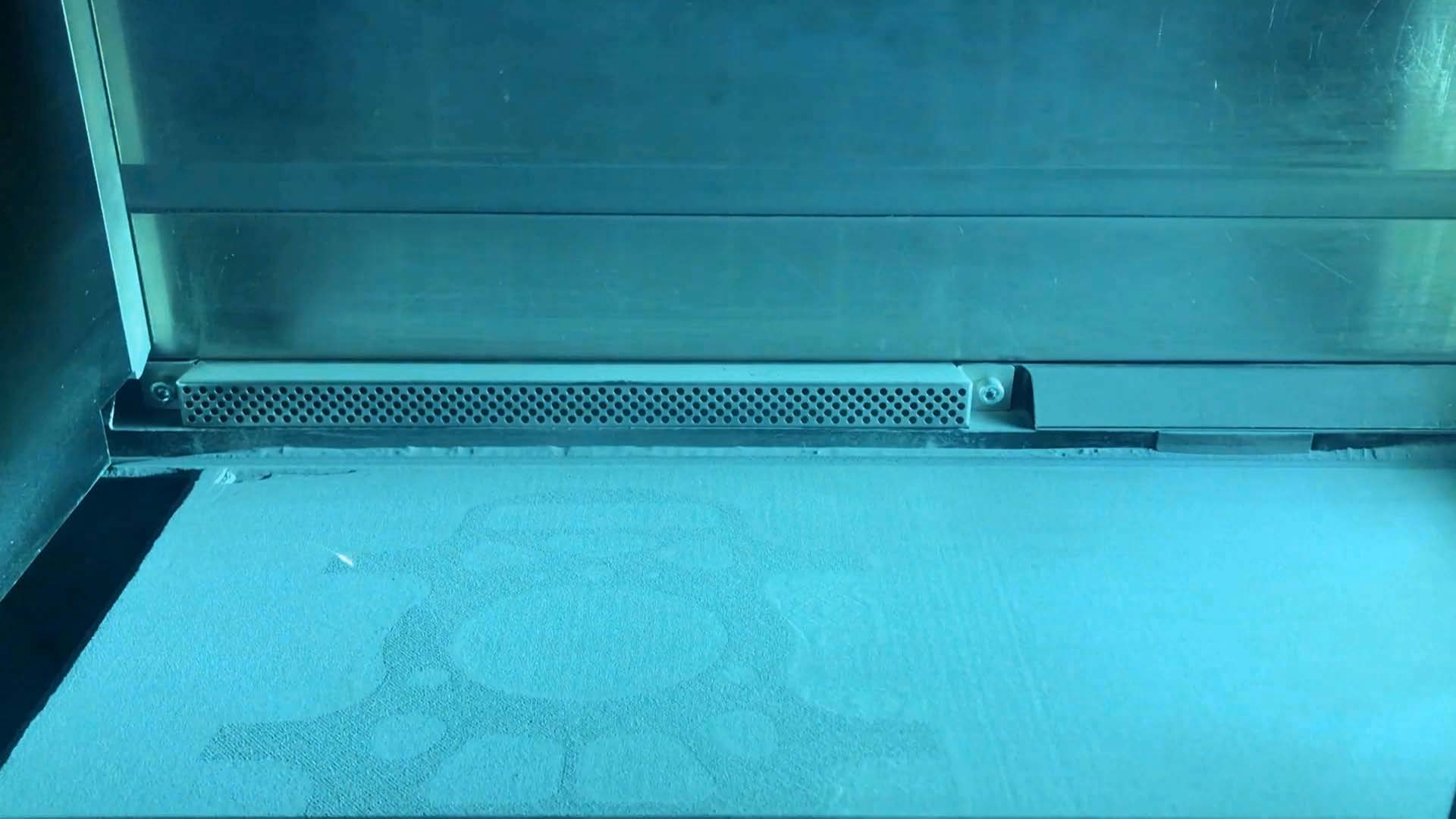
Surface Selection
Tolerance: 90°

Apply Repair Automatic Repair

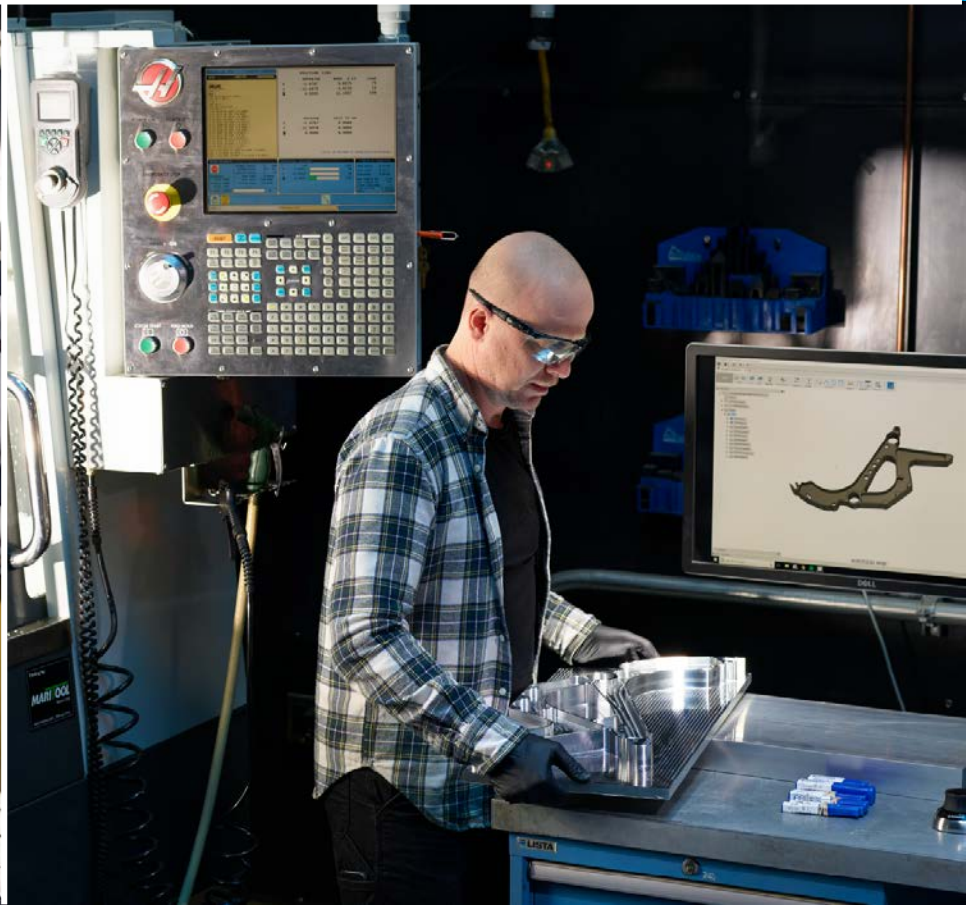


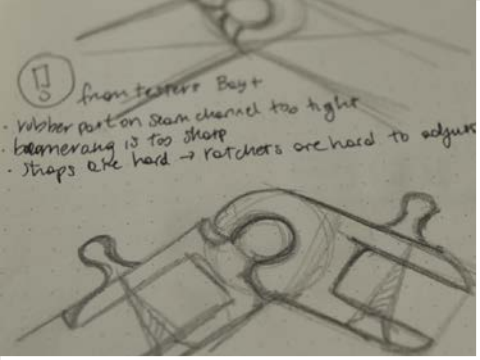
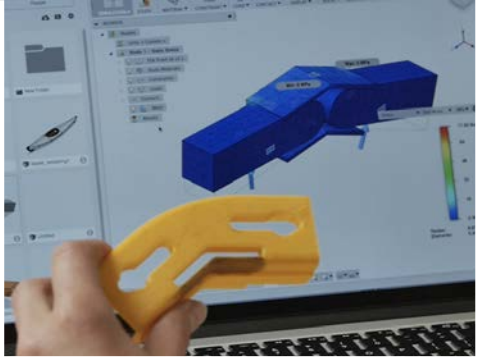
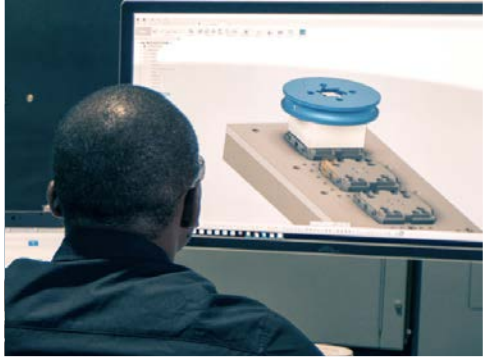
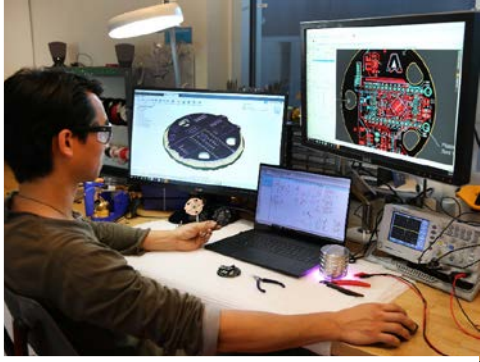
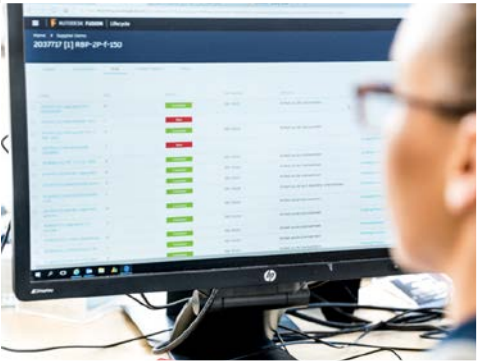
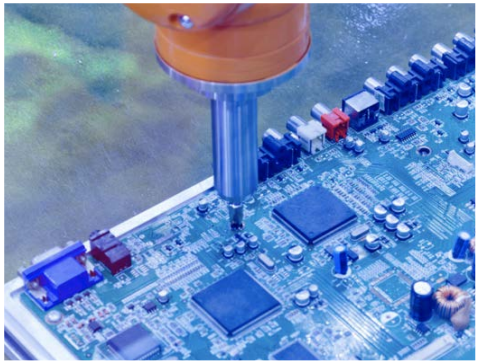
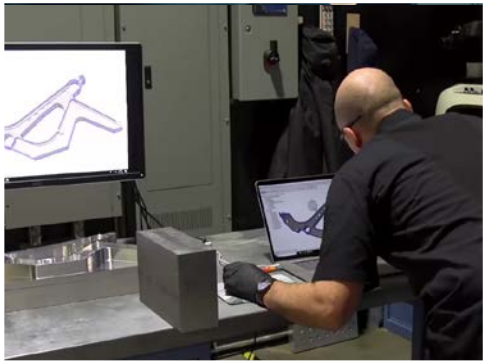


450x420x400 Select Surfaces Selects surfaces up to a sharp edge or a given maximum angle



THE FUTURE OF MAKING




front fenders Bay+
- rubber part on stem channel too tight
- boomerang is too sharp
- straps are hard → ratchets are hard to adjust







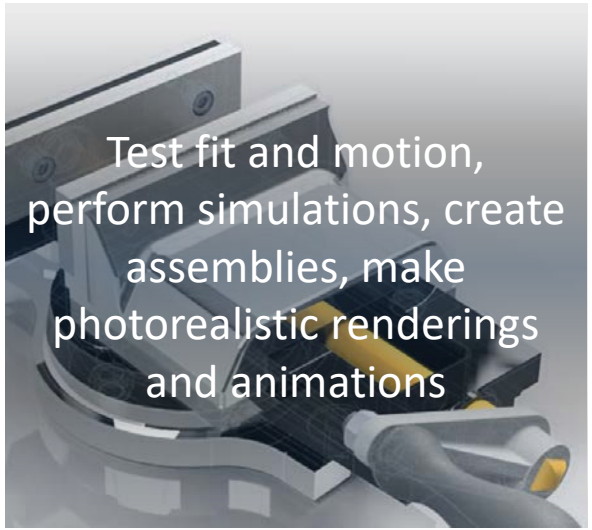



OMAX


Fusion 360 | Integrated CAD, CAE, and CAM

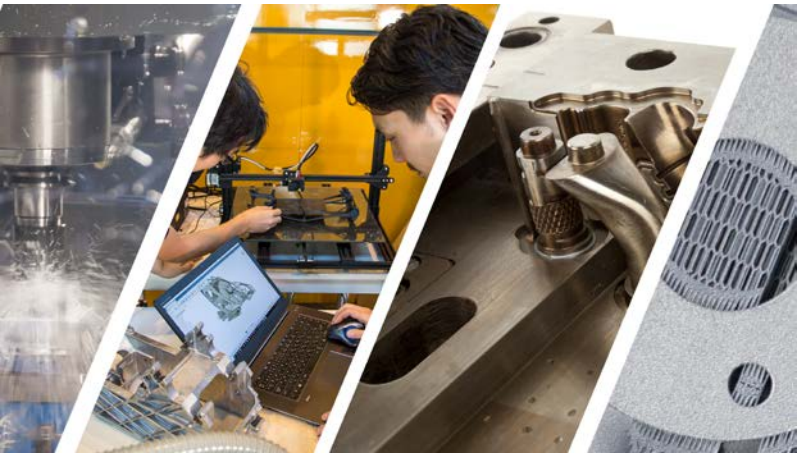
Convergence of design, engineering, and manufacturing into a single platform

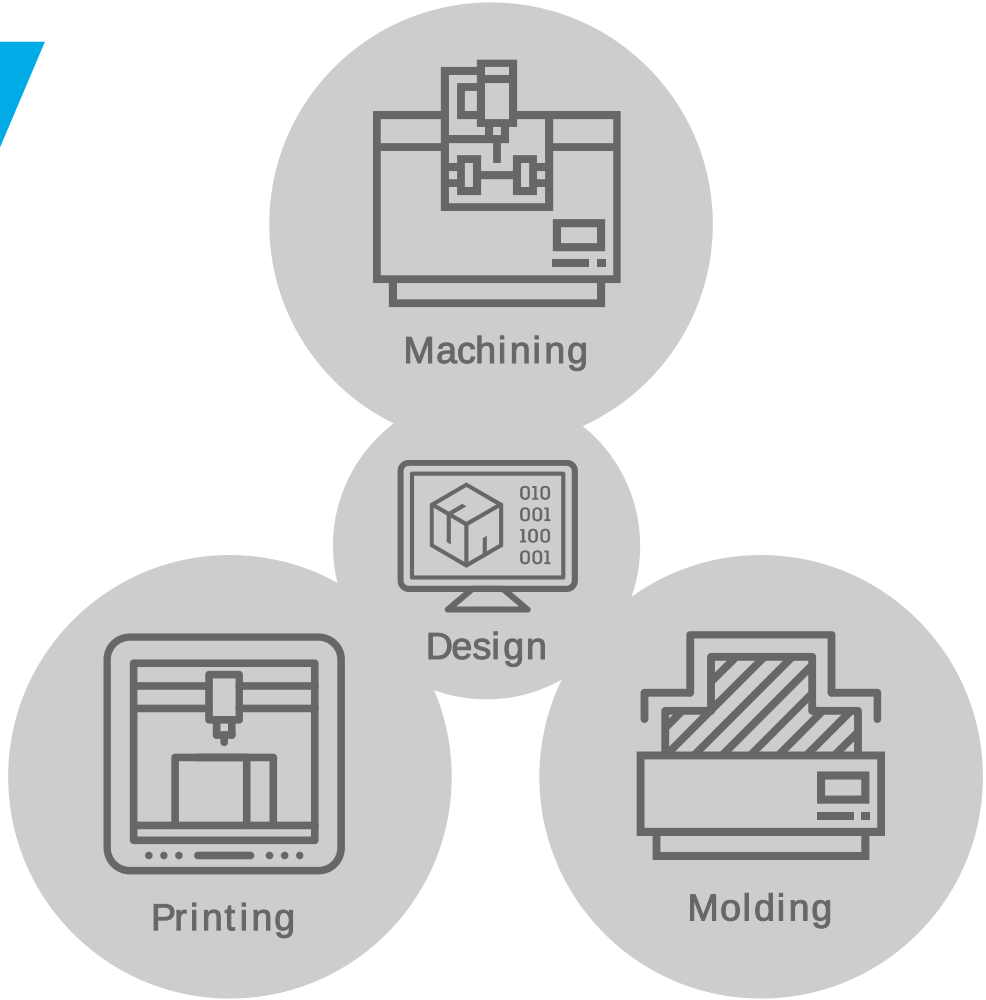
Design	Engineer & Simulate	CAM
Iterate on design ideas with generative design and sculpting tools to explore form, and with modelling tools to create finishing features	Test fit and motion, perform simulations, create assemblies, make photorealistic renderings and animations	Create toolpaths to machine your components or use the 3D printing workflow to create a prototype



Collaborate

MANUFACTURING LED DESIGN





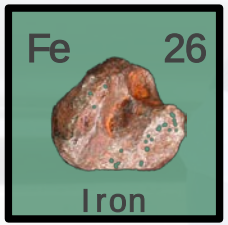
Generative Design

Algorithmic exploration of design to make

Image courtesy of Claudius Peters

Generative Design


<15 Kg


Fe
26
Iron

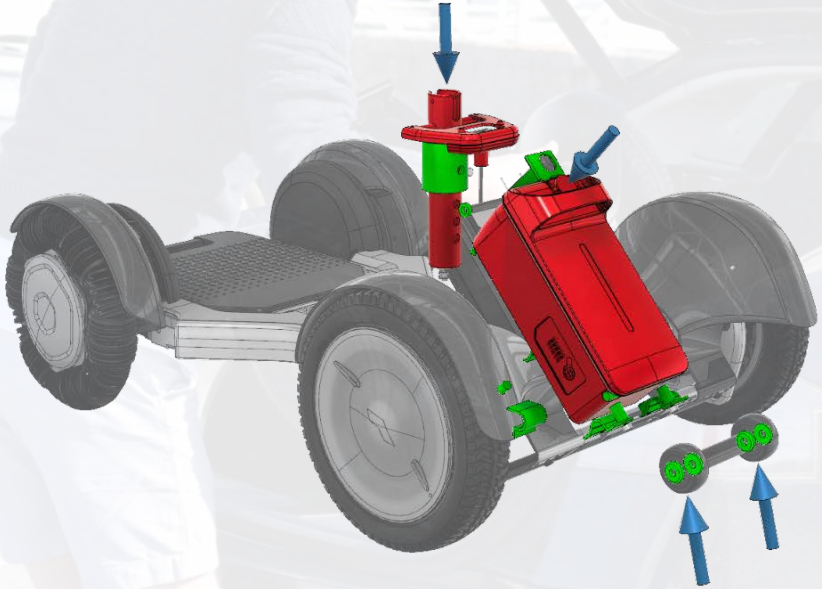

Ti
22
Titanium


Al
13
Aluminum


W
74
Tungsten

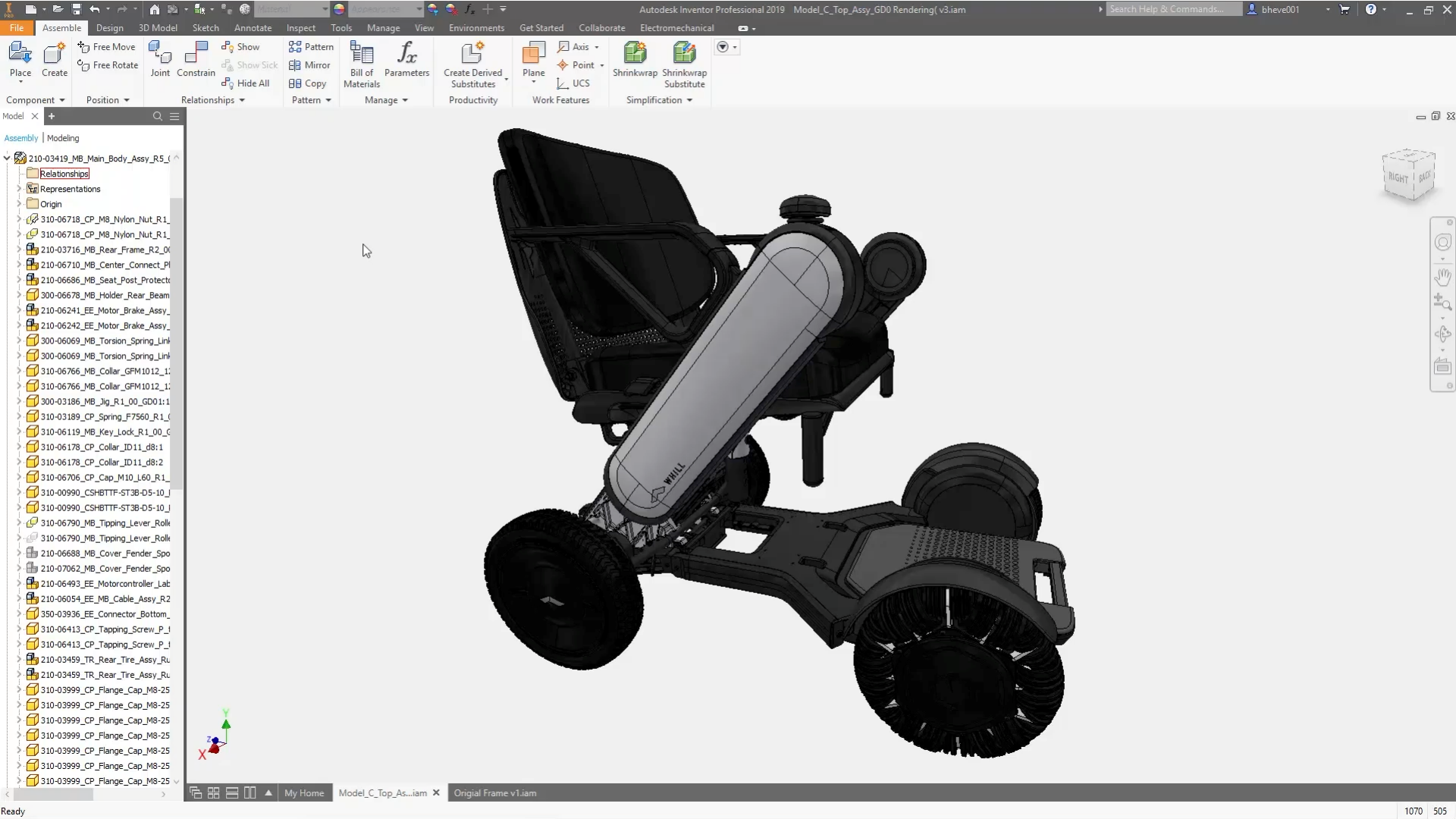

Fe
26
Iron
Al
13
Aluminum
Ti
22
Titanium
W
74
Tungsten


Fe
26
Iron
Al
13
Aluminum
Ti
22
Titanium
W
74
Tungsten

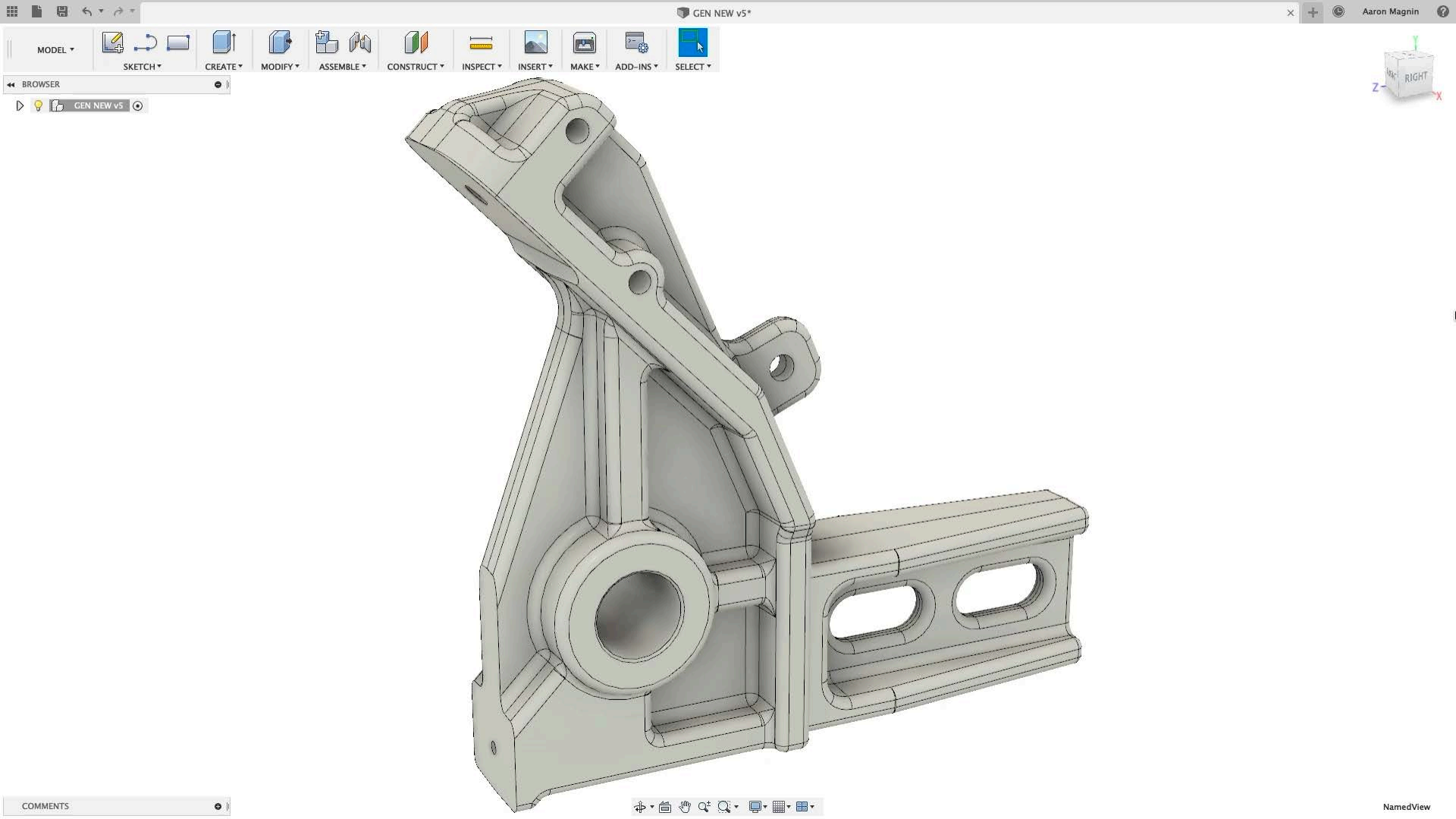



LINCOLN ELECTRIC
5100


RENISHAW
RenAM 500M


Autodesk Inventor Professional 2019 Model_C_Top_Assy_GD0 Rendering(v3.iam
Search Help & Commands...
bheve001
File
Assemble
Design
3D Model
Sketch
Annotate
Inspect
Tools
Manage
View
Environments
Get Started
Collaborate
Electromechanical
Place
Create
Free Move
Free Rotate
Joint
Constrain
Show
Show Sick
Hide All
Pattern
Mirror
Copy
Bill of Materials
Parameters
Create Derived Substitutes
Plane
Axis
Point
UCS
Shrinkwrap
Shrinkwrap Substitute
Component
Position
Relationships
Pattern
Manage
Productivity
Work Features
Simplification
Model
Assembly
Modeling
210-03419_MB_Main_Body_Assy_R5_(
Relationships
Representations
Origin
310-06718_CP_M8_Nylon_Nut_R1_
310-06718_CP_M8_Nylon_Nut_R1_
210-03716_MB_Rear_Frame_R2_0(
210-06710_MB_Center_Connect_Pl
210-06686_MB_Seat_Post_Protecto
300-06678_MB_Holder_Rear_Beam
210-06241_EE_Motor_Brake_Assy_
210-06242_EE_Motor_Brake_Assy_
300-06069_MB_Torsion_Spring_Link
300-06069_MB_Torsion_Spring_Link
310-06766_MB_Collar_GFM1012_1:
310-06766_MB_Collar_GFM1012_1:
300-03186_MB_Jig_R1_00_GD01:1
310-03189_CP_Spring_F7560_R1_(
310-06119_MB_Key_Lock_R1_00_(
310-06178_CP_Collar_ID11_d8:1
310-06178_CP_Collar_ID11_d8:2
310-06706_CP_Cap_M10_L60_R1_
310-00990_CSHBTTF-ST3B-D5-10_
310-00990_CSHBTTF-ST3B-D5-10_
310-06790_MB_Tipping_Lever_Rolle
310-06790_MB_Tipping_Lever_Rolle
210-06688_MB_Cover_Fender_Spo
210-07062_MB_Cover_Fender_Spo
210-06493_EE_Motorcontroller_Lab
210-06054_EE_MB_Cable_Assy_R2
350-03936_EE_Connector_Bottom_
310-06413_CP_Tapping_Screw_P_
310-06413_CP_Tapping_Screw_P_
210-03459_TR_Rear_Tire_Assy_Ru
210-03459_TR_Rear_Tire_Assy_Ru
310-03999_CP_Flange_Cap_M8-25
310-03999_CP_Flange_Cap_M8-25
310-03999_CP_Flange_Cap_M8-25
310-03999_CP_Flange_Cap_M8-25
310-03999_CP_Flange_Cap_M8-25
310-03999_CP_Flange_Cap_M8-25
310-03999_CP_Flange_Cap_M8-25
WHILL
RIGHT
BACK
Y
Z
X
My Home
Model_C_Top_As...iam
Origial Frame v1.iam
Ready
1070
505




GEN NEW v5*
Aaron Magnin
MODEL
SKETCH
CREATE
MODIFY
ASSEMBLE
CONSTRUCT
INSPECT
INSERT
MAKE
ADD-INS
SELECT
BROWSER
GEN NEW v5
RIGHT
COMMENTS
NamedView

POWERFUL PORTFOLIO

600

Software Developers

> $1 B

Invested by Autodesk

6

Manufacturing Innovation Centers

The Future of Making

Starts Here

The Autodesk Technology Centers bring together industry, academic, and entrepreneurial communities to create a shared vision of the future of making. In these spaces, Autodesk helps bring solutions to life that enable people to do more and make better things with less negative impact on the world.

THE AUTODESK ADVANTAGE

Value – access what you need when you need it

Coverage – we are all the software you need – simple to complex

Innovation – constantly developing new technologies & processes

DRIVING YOUR BUSINESS FORWARD

MORE

Products

BETTER

Performance

LESS

Waste

AUTODESK®

Make anything™