## 

3D Printed Composites for High Performance Applications



#### **BRIEF HISTORY**

- BOSTON BASED
  - NORTHEASTERN UNIVERSITY SPIN-OUT '16
- MASSCHALLENGE 2016 GOLD WINNER
- \$3M SEED ROUND '17
- FORMNEXT 2019 3D PRINTING STARTUP AWARD '18
- CAMX 2019 ACE Award (Equipment & Tooling Innovation)
- \$10M SERIES A LED BY ACCEL PARTNERS (2019)
  - Backed: Facebook, Slack, Dropbox, DJI, Fictiv









#### ADDITIVE

#### **PROS:**

- COMPLEX GEOMETRIES WITHOUT TOOLING
- LESS WASTE
- ALLOWS POINT OF MANUFACTURING

#### CONS:

MATERIAL PERFORMANCE LIMITATIONS





#### COMPOSITES

#### **PROS:**

- STRONG
- STIFF
- TEMPERATURE RESISTANT

#### CONS:

- EXPENSIVE
- LABOR INTENSIVE
- LONG LEAD TIMES





COMPOSITES

# FORTIFY

ADDITIVE MANUFACTURING 10.00



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#### **MANUFACTURING 4.0**

Fortify is bringing to market the industry's first scalable manufacturing platform for high-performance composites





#### **PRODUCT PLATFORM:**

#### FORTIFY DIGITAL COMPOSITE MANUFACTURING



INFORM™ Generative Microstructure Design Software



Proven DLP Technology + Fortify Resin Delivery and Magnetics



Advanced Materials Program with Industry Partners



#### FLUXPRINT PROCESS







#### **Output of DCM Process**

#### Reinforcing fibers aligned optimally to enhance performance throughout the part.

Modulate Material properties such as:

- Strength
- Stiffness
- HDT (Heat Deflection Temperature)
- Wear Resistance
- Creep Resistance
- Fracture Toughness
- Thermal Conductivity
- **RF Absorption**





#### MATERIAL LANDSCAPE

Fortify enables geometries that were not possible with traditional composites – with competitive performance.



Materials Selection in Mechanical Design, 4th Edition, © 2010 Michael Ashby



# **FORTIFY**Applications



#### Case Study: Injection Mold Tooling









+ High Strength & Stiffness @ Temp
+ Holds Tolerances
+ Accurate parts

PROBLEM: Tool costs are high and take many weeks.-Traditional manufacturing = limited designs / slow-Current 3D printing materials are too weak

*SOLUTION:* DCM can directly manufacture tooling inserts that would otherwise need to be machined



*BENEFIT:* Ability to consolidate parts; agile manufacturing for medium-volume production



**OPPORTUNITY:** 

 Quick-turn tooling market valued at rough 6B domestically



#### **Case Study: Electrical Connectors**





- + Creep Resistance
- + High Dielectric



PROBLEM: Many SKUs at < 50,000 components/year</li>
-Traditional manufacturing = limited designs / slow
-Current 3D printing materials are too weak
-Many filled materials used today (Molded or CNC)

SOLUTION: DCM can directly manufacture components that are traditionally machined faster and more affordably than traditional manufacturing

*BENEFIT:* Ability to consolidate parts; agile manufacturing for medium-volume production



**OPPORTUNITY:** 

• 50-80 SKUs at < 80,000 components/year



#### Case Study: UAV Components





*PROBLEM:* Traditional manufacturing:

- \$30,000 in tooling + \$100/blade
- Tool Lead Time: 6 weeks

SOLUTION: Fortify can print at 10 blades/hour at \$90/blade



BENEFIT:

Reduce time-to-market

Agile and efficient manufacturing



**OPPORTUNITY:** Commercial Drone Market valued at \$2B



#### **GO-TO-MARKET**





#### **BETA PROGRAM**



- Fortify to launch the Beta Program H1 2020 to select partners
- Purpose of Beta will be to develop classes of applications that are novel and utilize our unique manufacturing platform
- Projected printer specifications:
  - Build Envelope: 4.6" x 8" x 12"
  - Build Speed: 1-2 cm/hr (Z axis dependent; X, Y independent)
  - Resins: Digital Tooling; Engineering Resin



### 

THANK YOU

www.3dfortify.com

