The Value of FDM End-Use Parts

Who, What, Where, When & Why

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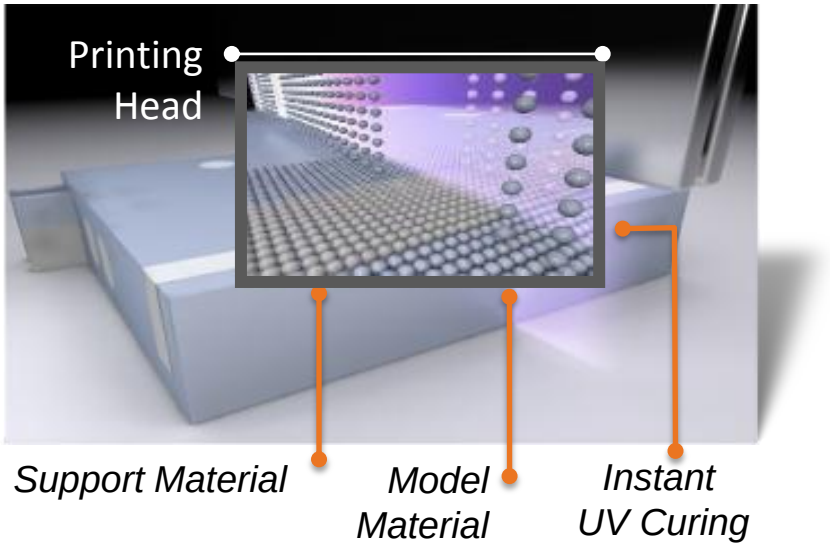
Who Is Stratasys?

We are passionate believers in the value and power of 3D printing, and in the change it can bring to the world.

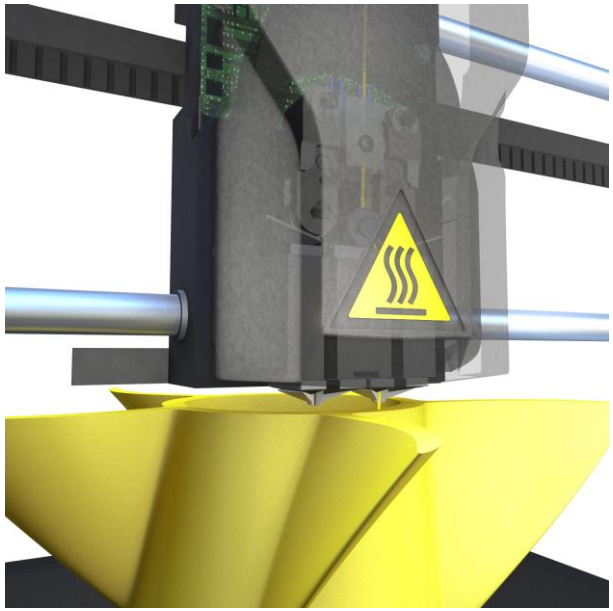
And we're here to lead it.

PolyJet & FDM Technologies

PolyJet™



FDM®



- Fine feature details
- Material versatility
- Multi-material product realism

- Industrial thermoplastics
- Accuracy
- Durability

Primary Applications for Additive Manufacturing

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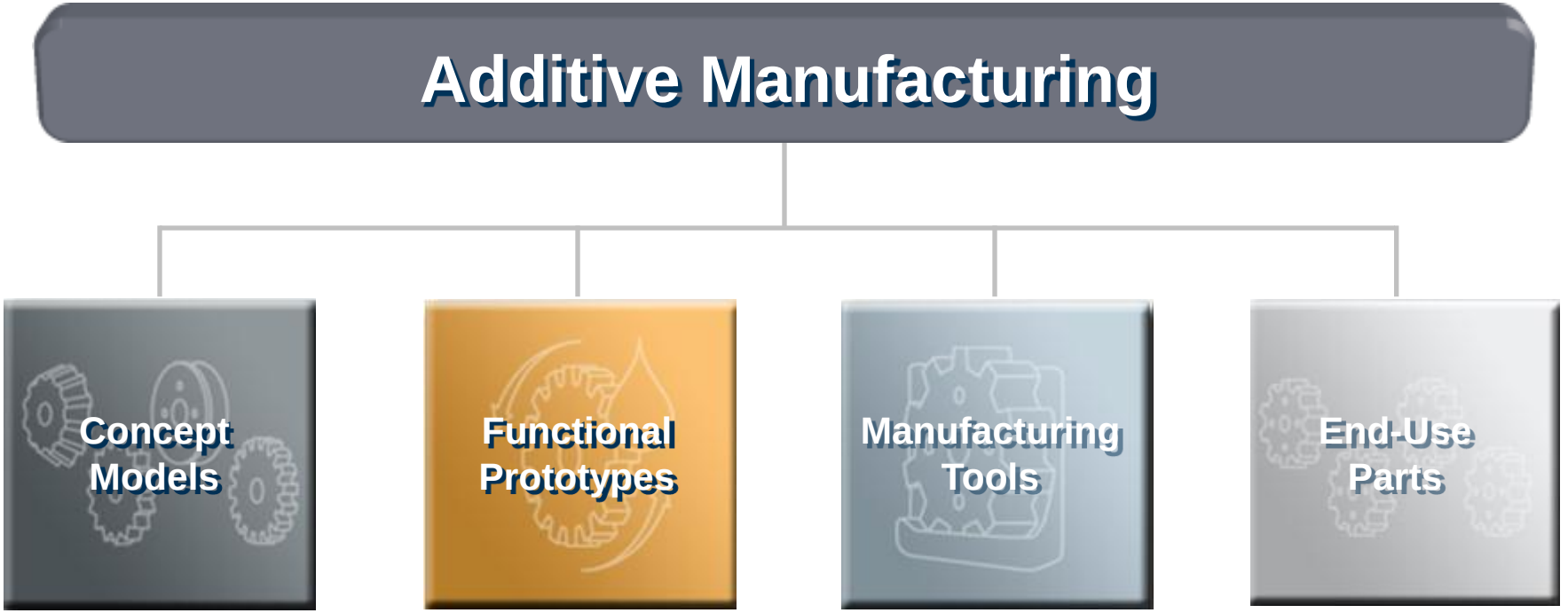


Established / Traditional
(Design)

Direct Digital Manufacturing
(Manufacturing)

FDM End-Use Parts

Leverages full system potential

- High system utilization
- Enhanced ROI
- Value is significant vs. traditional
- Applicable to any industry

Greatest savings are realized in regions with highest labor costs

Agenda

Application overview

Where used

Traditional process

FDM’s role

FDM best fits

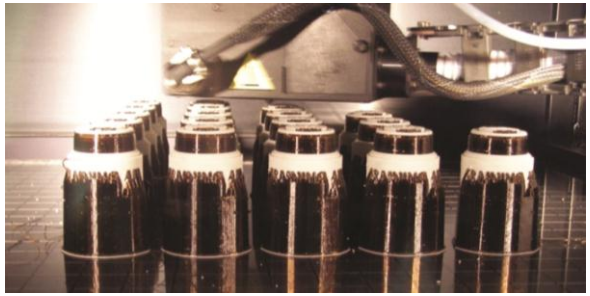
Benefits

Customer success story

End-Use Parts: Application Overview

Production of finished goods & sub-assemblies

- Pilot production
  - Production simulation
- Bridge-to-production
  - Production before tooling & first article
- Full production
  - Full-scale manufacturing
- End-of-life (bridge)
  - Extend product life without tooling
  - Produce spares for repairs



Where It's Used

Plastic components – widely used

- No link to:
  - Company size
  - Types of products
  - Target markets

Wide industry adoption

- Aerospace
- Automotive
- Motorsports
- Processing equipment
- Medical device

Candidate Profile

Manufacturers using plastic components for finished goods

Need low-volume production alternative

- Pilot, bridge, production or end-of-life

Current methods are limiting (considering time, cost)

- Design optimization isn’t practical

Need efficiency, flexibility

- Low-volume, high-complexity parts

Open to change or seeking innovation

Companies Benefiting

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prodrive

Motorsports/Automotive

Orange County Choppers

Motorcycle

ACIST MEDICAL SYSTEMS

Medical Device

TDA

Aviation

NASA

Aerospace

Minimizer

Automotive (aftermarket)

NOVA-TECH ENGINEERING, INC.

Processing Equipment

Traditional Processes

Injection molding

- Machined tooling
- Plastic molding
- Low cycle time (seconds)

Machining (CNC / manual)

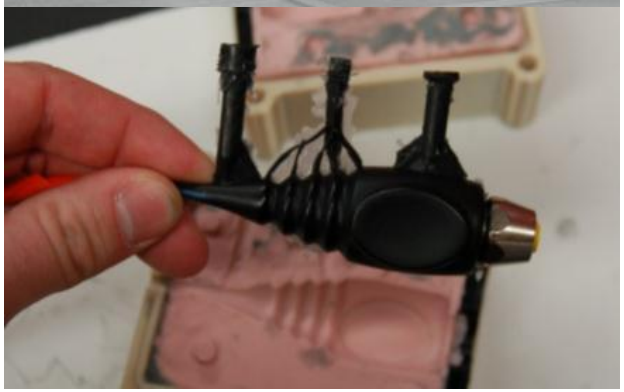
- Fixture/set up
- Cut part
- High cycle times (hours)

RTV/RIM molding

- Make pattern and/or mold
- Cast/inject urethane
- Moderate cycle times (minutes to hours)

For all traditional processes

- Added features increase cost & time
- Requires skilled labor



FDM's Role

Alternative or complement to traditional

- Any part of production cycle
- Custom/configured products
- No tooling required
- Automated process

Prototype → Production in 1 day

When FDM is a Best Fit

Quantity

- 1- 1000's

Size (XYZ)

- ≤ 300 mm (12 in.) per side*

Manufacturing requirements:

- Thermoplastic material properties
  - Mechanical
  - Electrical
  - Chemical
  - Thermal: up to 200 °C (390 ° F)
- Accuracy tolerance ≥0.13 mm (0.005 in.)

**a best fit, not a rule: larger FDM end-use parts possible & widely adopted*

When FDM is a Best Fit

Redesigns

- Custom or configured to order
- Frequent stock item revisions

Optimization desired

- Complex designs
- Design for performance

FDM Benefits

Lead time

- Production starts immediately (time-to-market)
- 75% - 90% reduction

Cost

- No up front cost
- 50% - 90% reduction

Inventory

- Just-in-time (JIT), as needed
- Digital inventory
- Eliminate carrying expense

FDM Benefits

Design freedom

- Optimize performance
- Reduce part count/eliminate assembly

Flexibility (change as needed)

- Part design
- Production schedule
- Part mix in production runs

Automated (lights-out)

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Customer Success Story

Nova Tech Engineering

Success Story:
Nova Tech Engineering

NOVA-TECH ENGINEERING, INC.

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Automated systems for fowl hatcheries

- Components vary by species/breed
- Aid in inoculation & health administration

Injection molded components

- 1 mold for each system, species & breed
- Limited revisions & constrained designs

FDM for pilot production

- No tooling: saved $42K
- Parts made as needed

Advantages

- Design changes on the fly
- Digital inventory – no carrying cost

Method	Time	Cost
Injection molding	**4 weeks**	**$44,175**
FDM	**3 days**	**$1,490**
Savings	**25 days (89%)**	**$42,685 (97%)**

End-Use Parts: NASA

How It's Used

Final video:

Stratasys-EndUse_HowItsUsed_Feb2014_1080P

End-Use Parts: Summary

Application

- Production of finished goods and sub-assemblies through the product lifecycle

FDM's role

- Pilot production
- Bridge-to-production
- Full production
- End-of-life (bridge)

Where used

- Anywhere plastic components and thermoplastic materials are desired

More Information & Resources

www.stratasys.com/webinar-enduseparts

- Download webinar or application documents
- View webinar on-demand
- Ask an engineer technical questions
- Contact your local reseller to request a benchmark

Questions?

More information:

www.stratasys.com/webinar-enduseparts

Thank You!

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