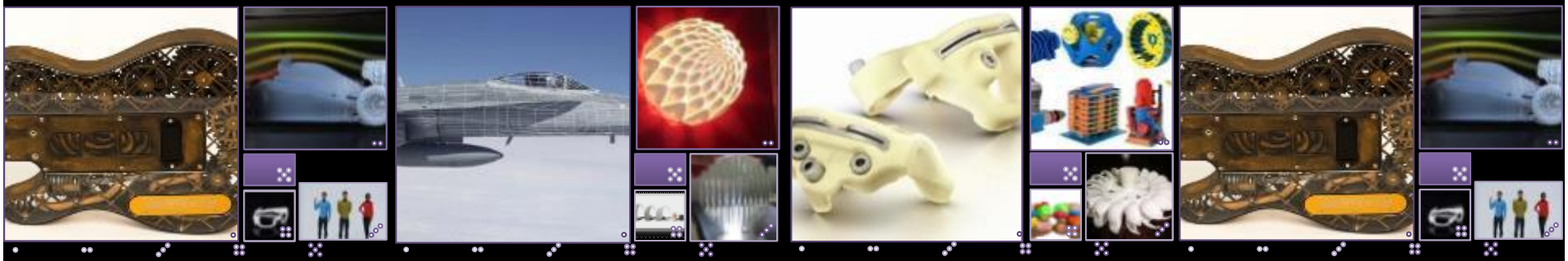
3D Printer Overview

Pasquale Di Lonardo – 3D Systems Italia

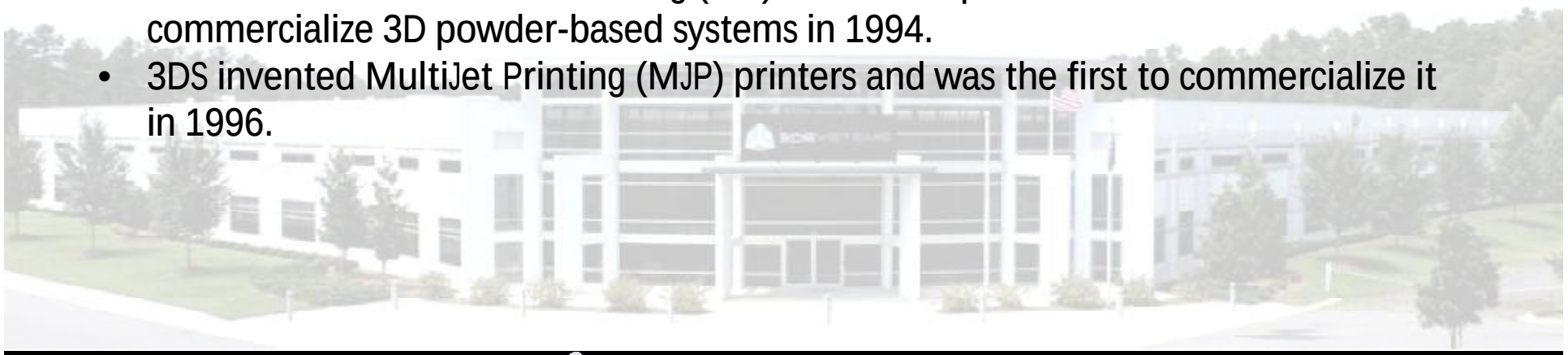


3D Systems Introduction

3D Systems (NYSE:DDD) is a leading provider of 3D printing centric design-to-manufacturing solutions

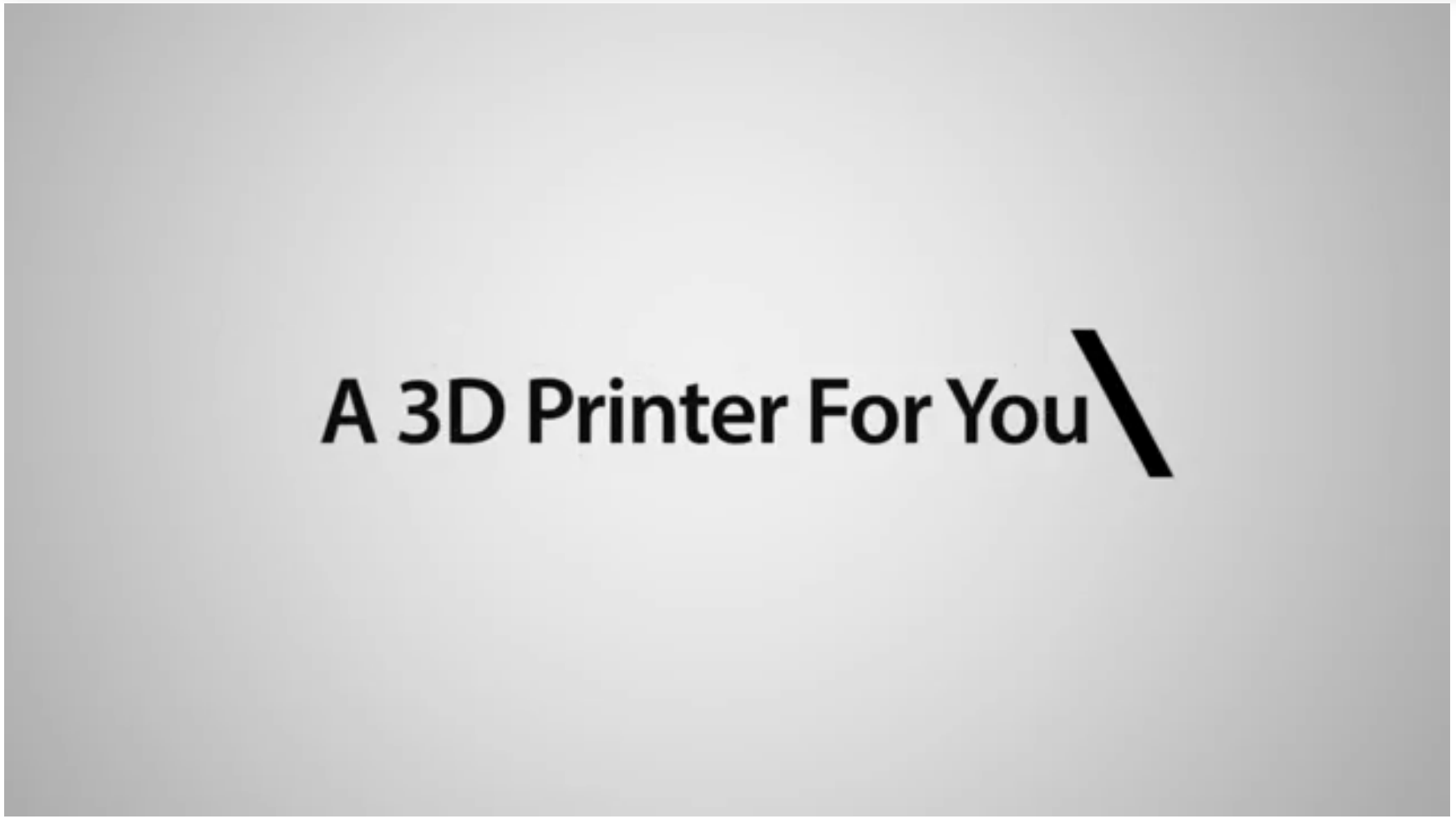
Leadership Through Innovation and Technology

- 3DS invented 3D printing with its Stereolithography (SLA) printer and was the first to commercialize it in 1989.
- 3DS invented Selective Laser Sintering (SLS) printing and was the first to commercialize it in 1992.
- 3DS invented the ColorJet Printing (CJP) class of 3D printers and was the first to commercialize 3D powder-based systems in 1994.
- 3DS invented MultiJet Printing (MJP) printers and was the first to commercialize it in 1996.



3DSYSTEMS™

A 3D Printer for You



Why 3D Systems?

- Global Footprint
- World Class Customers
- Innovation Leadership
- ~1300 Teammates

- 7 Print Engines
- ~100 Performance Materials
- Expanding Technology Platform
- ~1,300 Patents

Why 3D Systems?

3D Systems is truly a one-stop shop for all your 3D printing-related needs: from content to print

SOFTWARE & SCANNERS

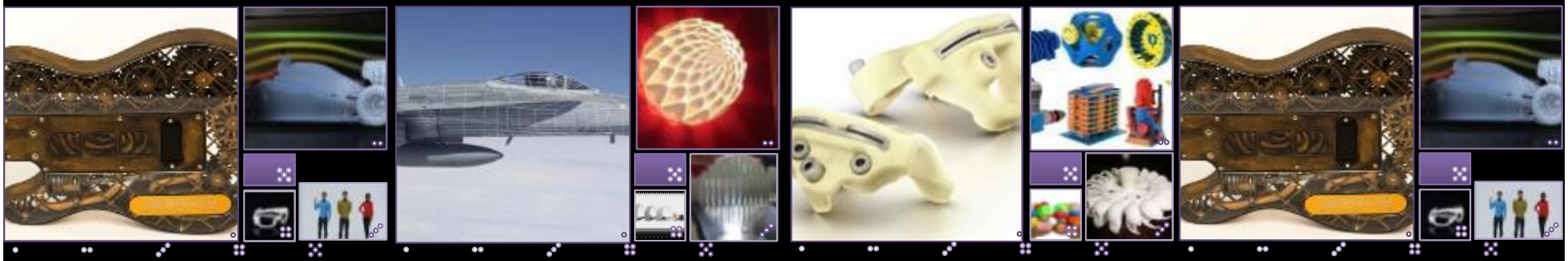
3D PRINTERS

QUICKPARTS

3D SYSTEMS

Software & Scanners

Our platform of 3D authoring tools and scanners



3D SYSTEMS™

Geomagic Software

Softwares for every kind of modeling needs

Scan-Based Design

- Geomagic Design X
- Geomagic Design Direct

Mechanical Design

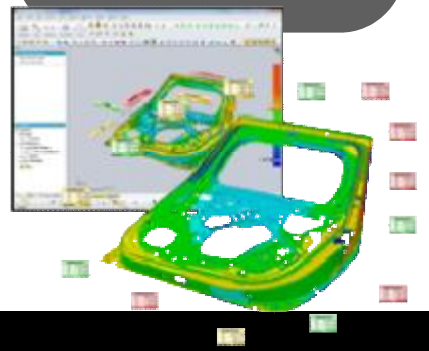
- Geomagic Design
- Geomagic Designer Packages

Freeform Design

- Geomagic Sculpt
- Geomagic Freeform

Inspection

- Geomagic Control
- Geomagic Verify



3DSYSTEMS™

Scanner & Devices

Scan and capture the real world into 3D data

Sense 3D Scanner

- Portable 3D Scanner
- Extremely easy to use

Geomagic Capture

- High Precision
- Professional Scan-Based Design
- Quality Inspection
- Reverse Engineering

3D Systems Touch

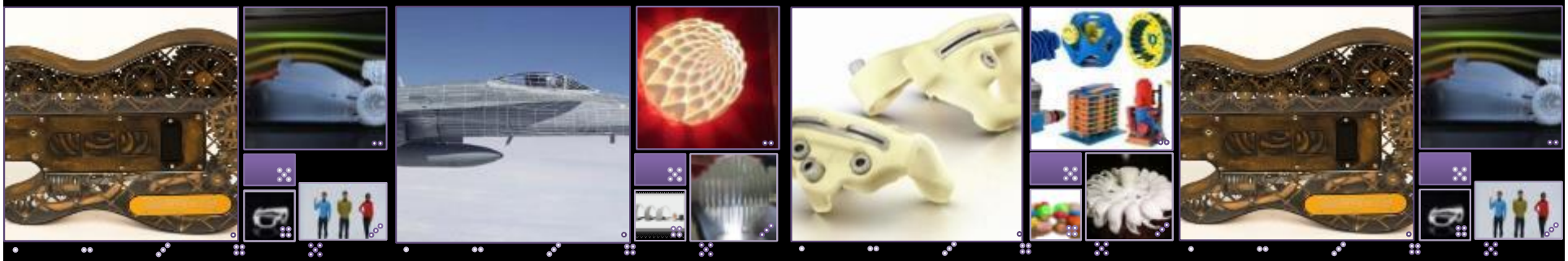
- Haptic Device
- True three dimensional input
- Force Feedback

3DSYSTEMS™

3D SYSTEMS

3D Printers

The broadest range of 3D printers, solutions and price points



3D SYSTEMS™

3D Printers

3 printers range and 7 printing engines

Personal Printers

- PJP (Plastic Jet Printing)
- FTI

Professional Printers

- MJP (MultiJet Printing)
- CJP (ColorJet Printing)

Production Printers

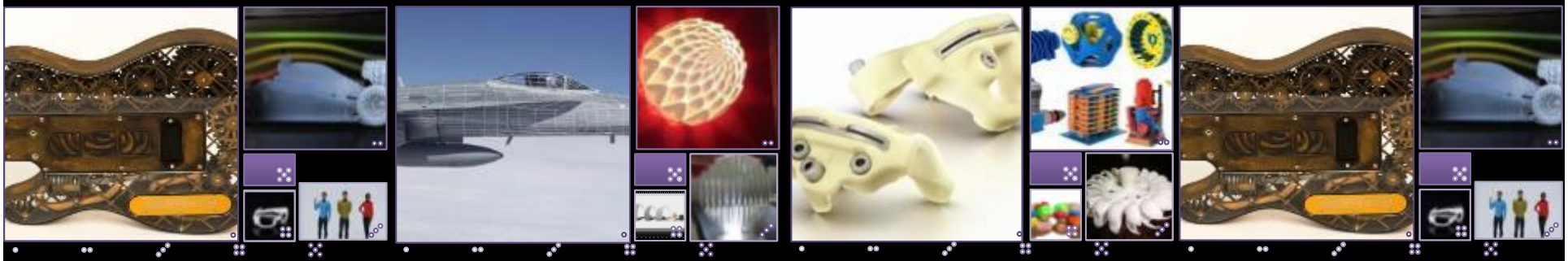
- SLA (Stereolitography)
- SLS (Selective Laser Sintering)
- DMP (Direct Metal Printing)

3DSYSTEMS™

3DSYSTEMS

Personal Printers

3D Printers for your home, school or office



3DSYSTEMS™

Personal Printers – PJP (Plastic Jet Printers)

Easy to use and affordable

Cube 3

- Compact Design
- Dual Color Printing
- ABS & PLA
- 150x150x150 mm

CubePro

- Highly Accurate
- Up to 3 printing heads
- PLA, ABS & Nylon
- 275x265x240 mm

3DSYSTEMS™

Personal Printers – FTI

Durable plastic and castable resin

Projet 1000 & Projet 1500

- Fast & Accurate
- Intuitive web browser interface
- Smooth surface finish

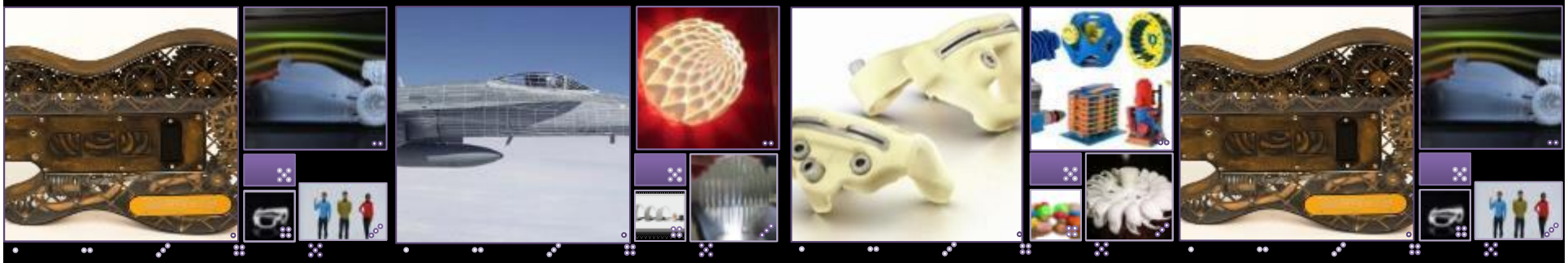
Projet 1200

- Unmatched part accuracy
- 30 microns layers
- Ideal for casting patterns

3DSYSTEMS

Professional Printers

From full-color parts to wax patterns,
from prototypes to functional parts



3DSYSTEMS™

Personal Printers – CJP (ColorJet Printing)

Full color 3D Printers for a wide variety of applications

ProJet x60 Series

- CMYK Full color
- Office Friendly
- Fastest technology
- Lowest Operating Cost

ProJet 4500

- Full color
- Flexible and strong parts
- No post processing
- Accurate details

3DSYSTEMS™

Personal Printers – MJP (MultiJet Printing)

ProJet 3500 Series for Plastic Parts

- Quickly print superior quality functional plastic parts
- High resolution with sharp edges, crisp details and smooth surfaces
- Intuitive and easy-to-use in your office or remotely
- Test more ideas faster and economically

Personal Printers – MJP (MultiJet Printing)

ProJet 3500 Series for Wax Parts

- Quickly print superior quality wax patterns for your standard casting processes
- High resolution with sharp edges, crisp details and smooth surfaces
- Fast and easy support removal
- Rapid workflow and improved casting room efficiency and productivity

3DSYSTEMS™

Personal Printers – MJP (MultiJet Printing)

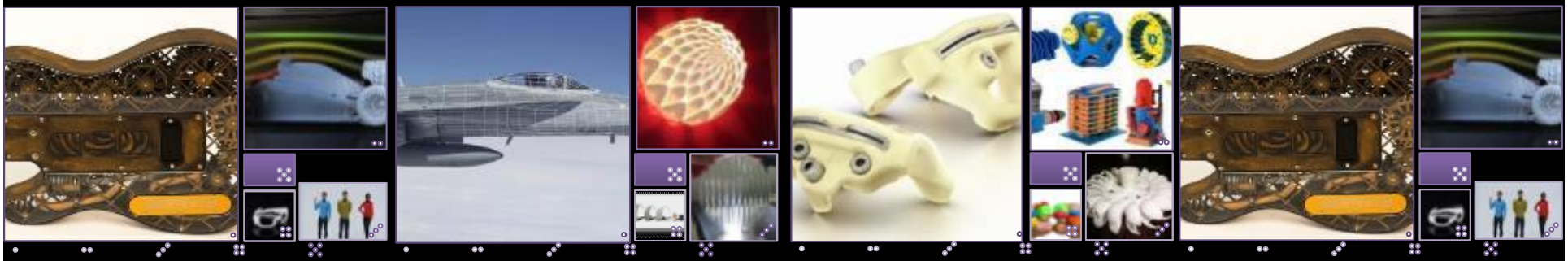
ProJet 5500x – Composite multi-material parts

- High-performance simultaneous engineered composite printing
- Multi-material mixing: from flexible to rigid and from black to clear
- High quality, accurate and tough multi-material parts

3DSYSTEMS

Production Printers

Concept models, precision and functional prototypes,
master patterns, tooling and real end-use parts.

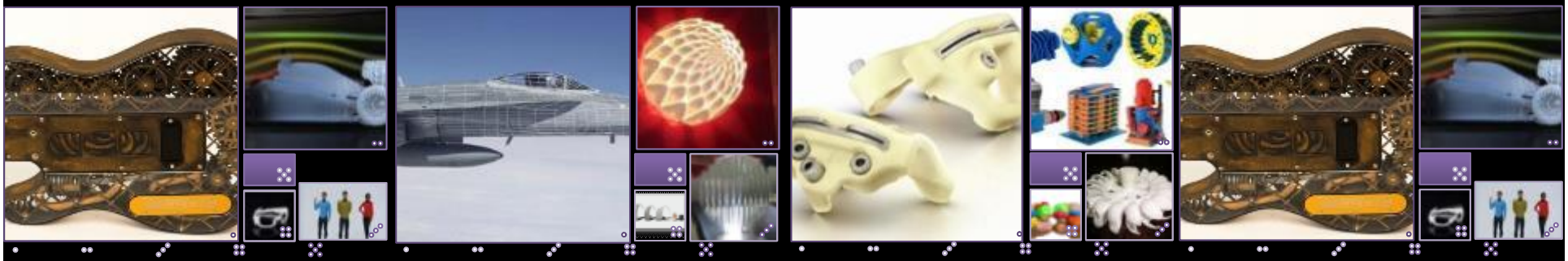


3DSYSTEMS™

3DSYSTEMS®

SLA® (Stereolithography)

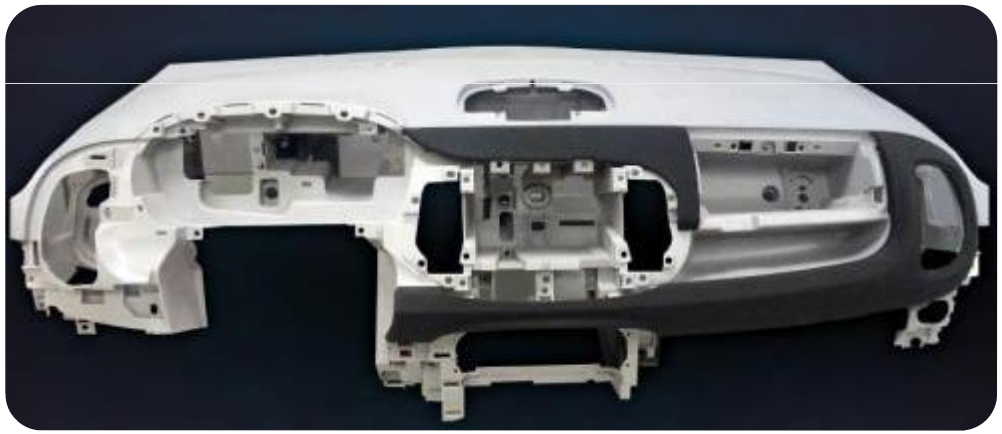
The Gold Standard in Accuracy, Performance and Materials

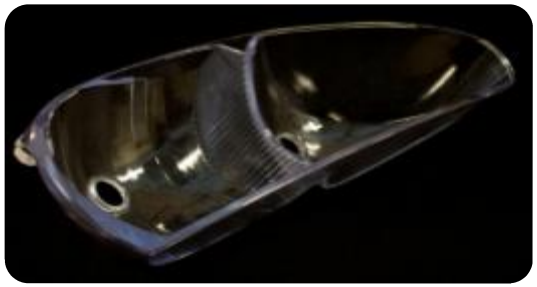


3DSYSTEMS™

3D Systems Stereolithography (SLA®) 3D Printers

Transform how you manufacture
with the gold standard in 3D printing





3DSYSTEMS™

SLA Technology Overview

Why Choose SLA 3D Printers?

- Broadest Range of Applications
- Best Surface Quality
- Cost-efficient Scale-Up
- Unmatched Accuracy and Precision
- Lowest Unit Cost Production
- Produce Large, Whole Parts

SLA Is Used for the Broadest Range Of Applications

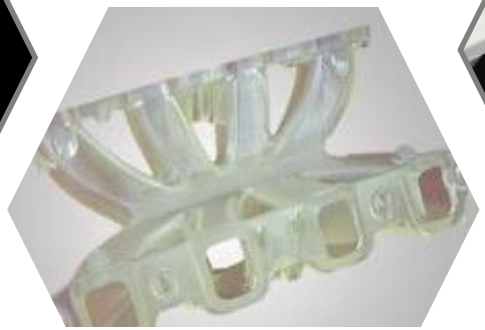
Ceramic

Casting

Bio-Compatible

Tough

Durable



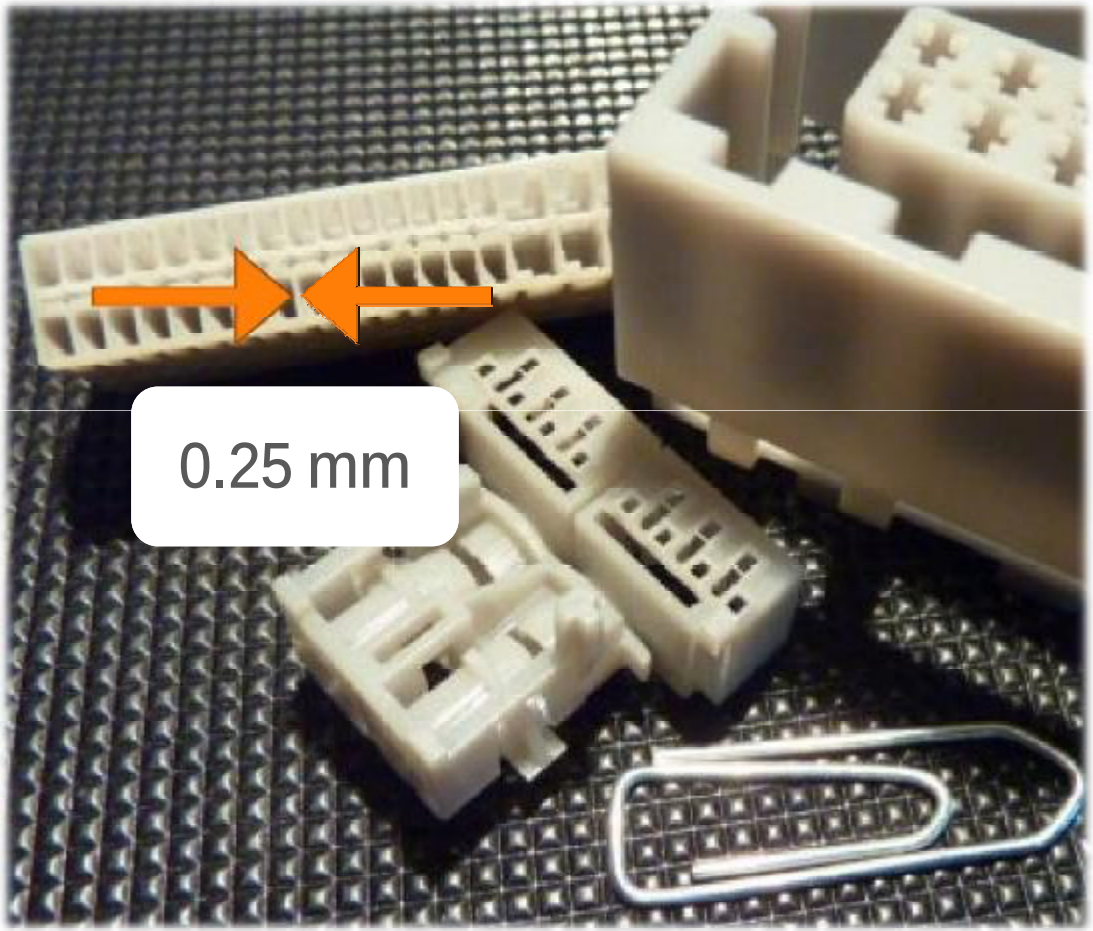
High-Temp

Optically Clear

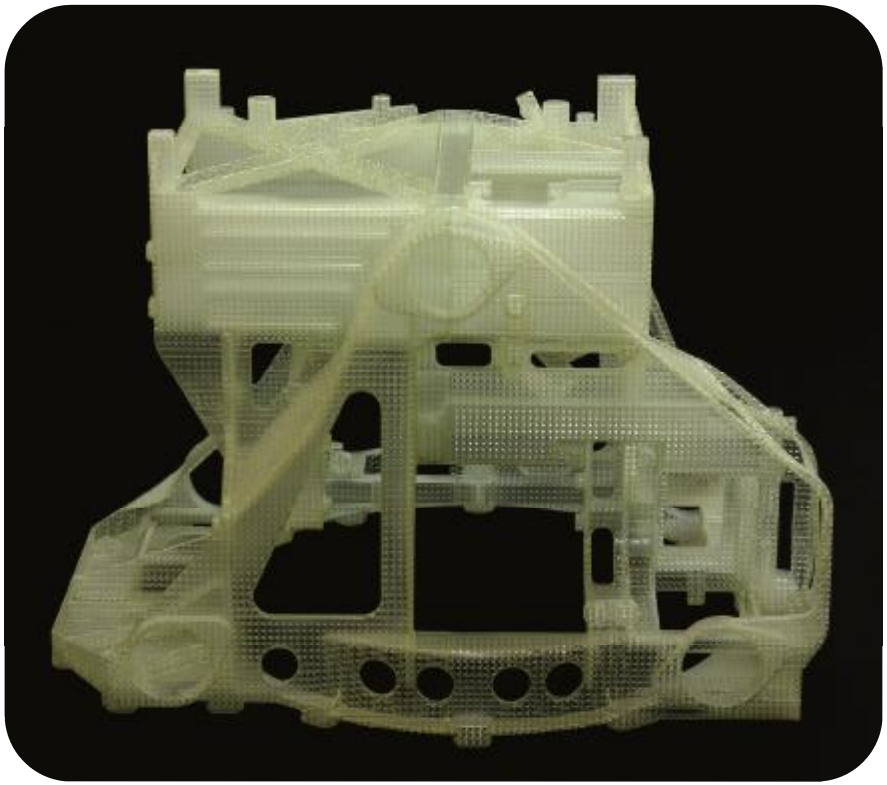
3DSYSTEMS™

SLA Offers the Best Surface Quality. Period.

Unmatched Accuracy and Precision

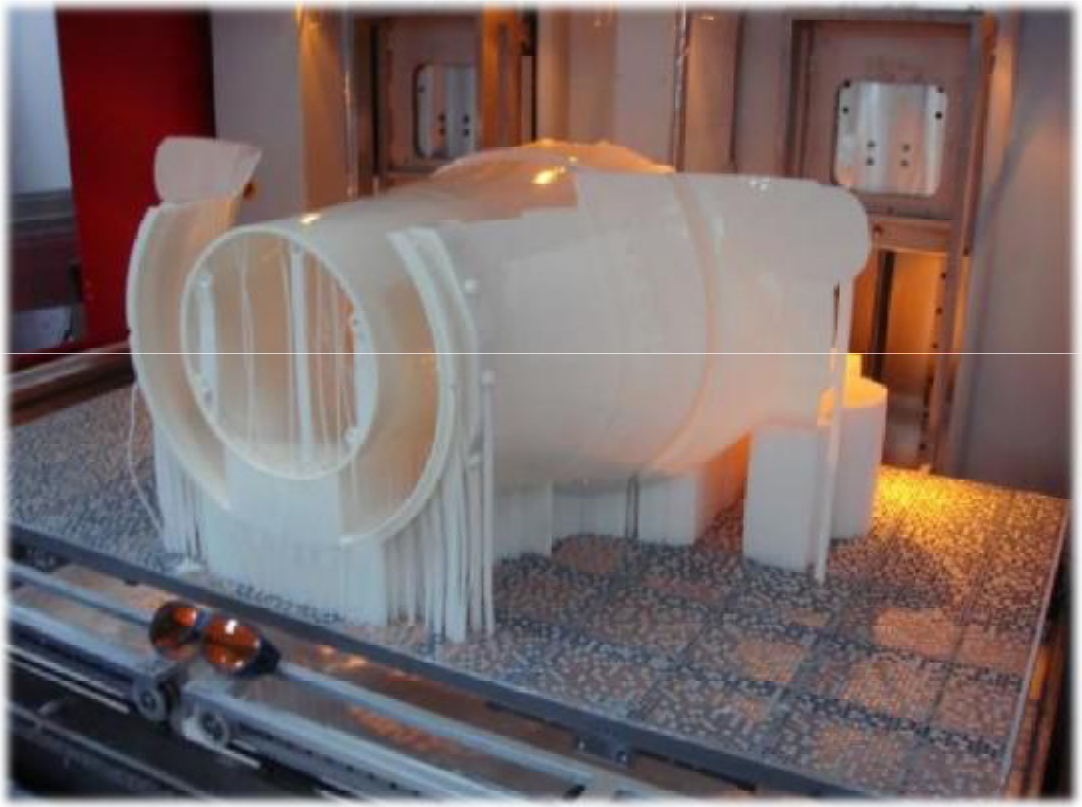


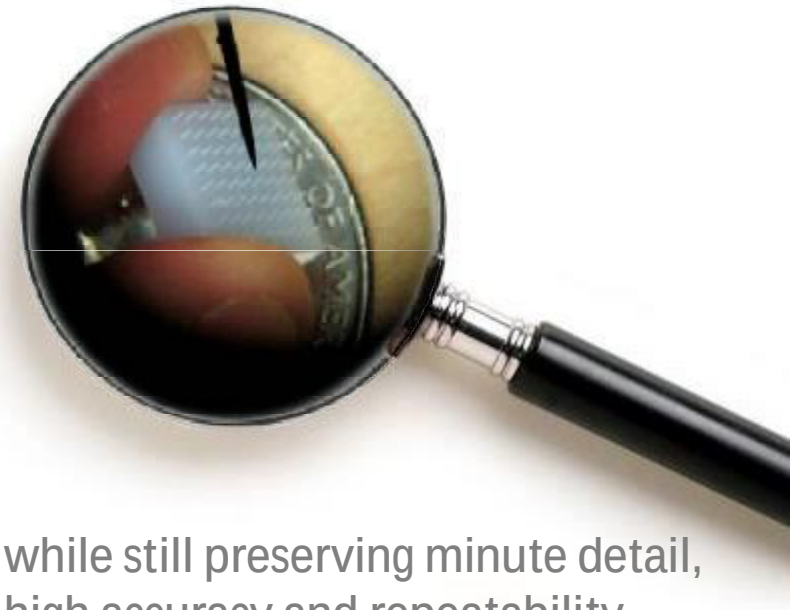
Print Large Parts, Accurate from End-to-End



Print Large Parts, Accurate from End-to-End

up to 1500 x 750 x 550 mm





while still preserving minute detail,
high accuracy and repeatability

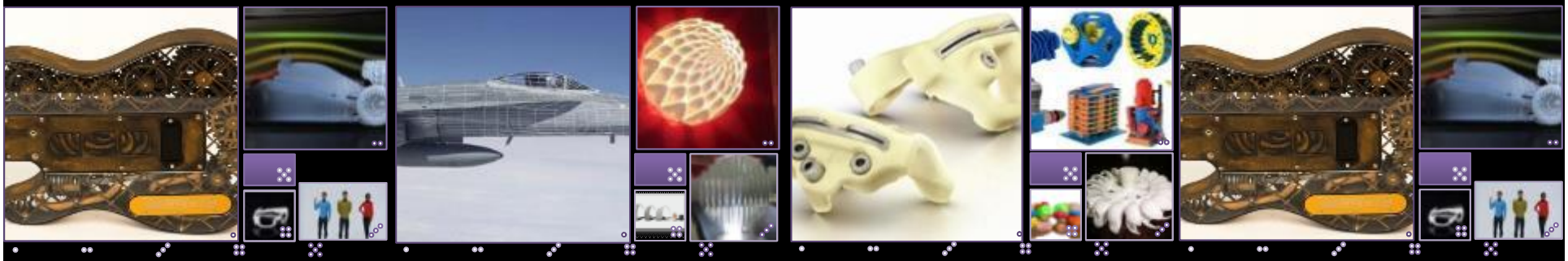
3D Systems SLA Printers

	ProJet 6000	ProJet 7000	iPro 8000	ProX 950
Maximum Build volume	10 x 10 x 10 in (250 x 250 x 250 mm)	15 x 15 x 10 in (380 x 380 x 250 mm)	26 x 30 x 22 in (650 x 750 x 550 mm)	59 x 30 x 22 in (1500 x 750 x 550 mm)
Accuracy	0.001-0.002 inch (0.025-0.05 mm) per inch of part dimension	0.001-0.002 inch (0.025-0.05 mm) per inch of part dimension	0.001-0.002 inch (0.025-0.05 mm) per inch of part dimension	0.001-0.002 inch (0.025-0.05 mm) per inch of part dimension
Maximum Resolution	0.075 mm, 0.050 mm layers	0.075 mm, 0.050 mm layers	0.075 mm, 0.050 mm layers	0.075 mm, 0.050 mm layers

3DSYSTEMS

SLS (Selective Laser Sintering)

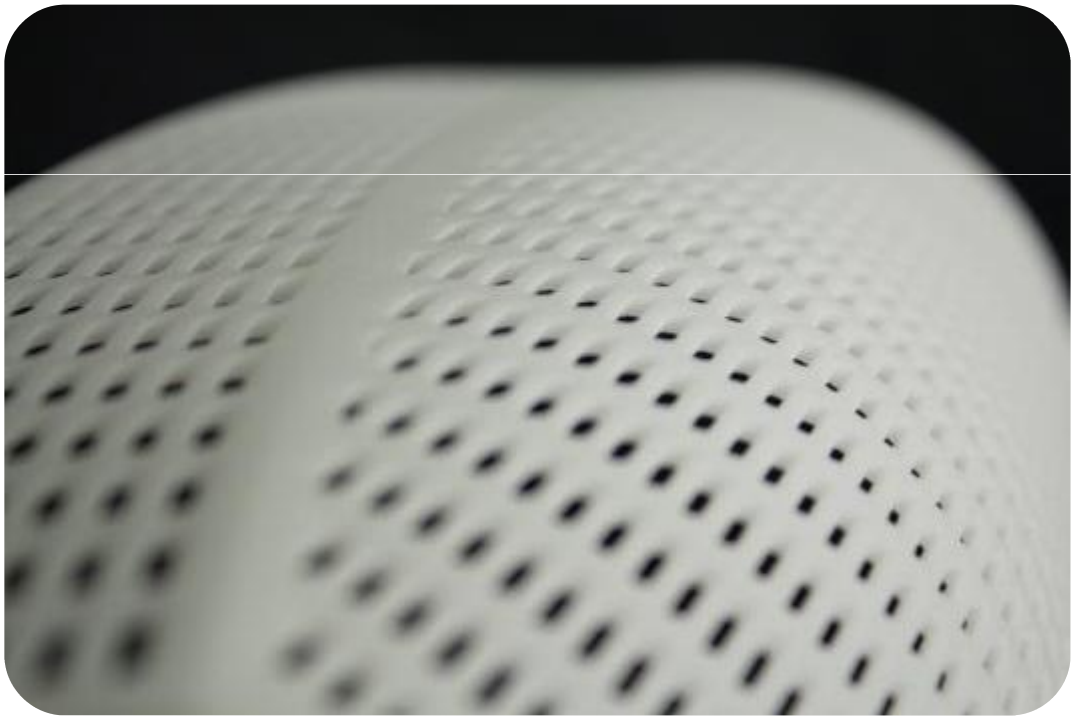
Manufacture strong end-use parts and functional prototypes



3DSYSTEMS™

3D Systems SLS 3D Printers

Economically manufacture injection molding-grade plastic parts for demanding end-use applications



3DSYSTEMS™

How it works – SLS Selective Laser Sintering

Why Choose SLS 3D Printers?

- Real Thermoplastic Manufacturing
- Tough Mechanical Properties
- Complete Freedom of Design
- High Repeatability
- Vast Manufacturing Opportunities

SLS Transforms Manufacturing

Consolidate parts, reduce labor and eliminate tooling

Traditional manufacturing:

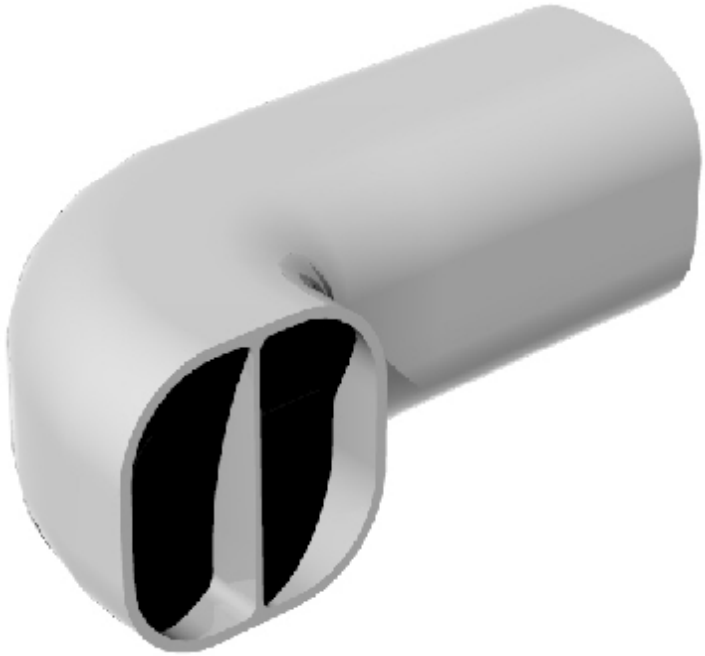
- 15 parts
- 5 SKU's
- 3 custom tools
- 10 assembly checks

SLS Transforms Manufacturing

Consolidate parts, reduce labor and eliminate tooling

SLS additive manufacturing:

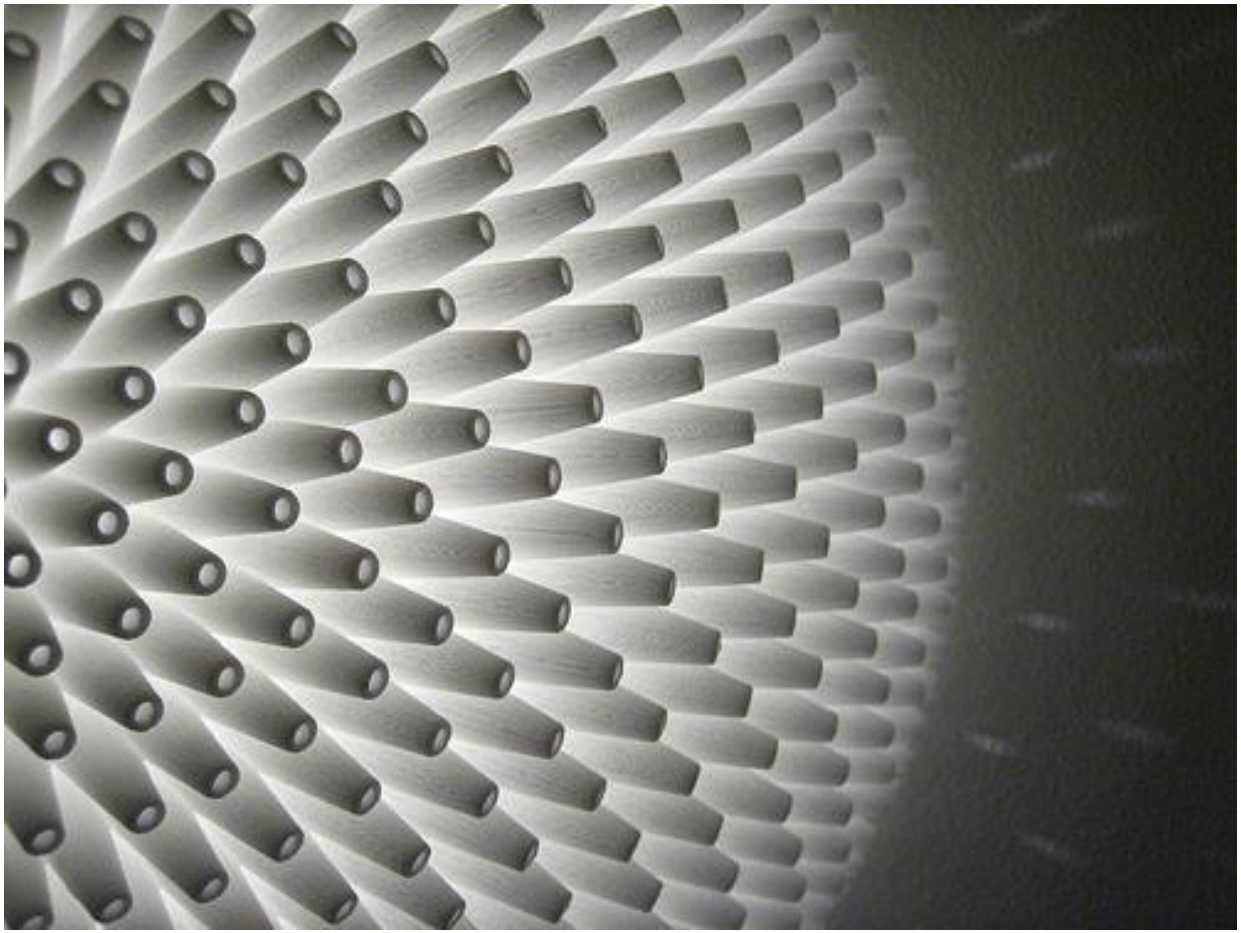
- 1 part
- 1 SKU
- 0 custom tools
- 1 assembly check

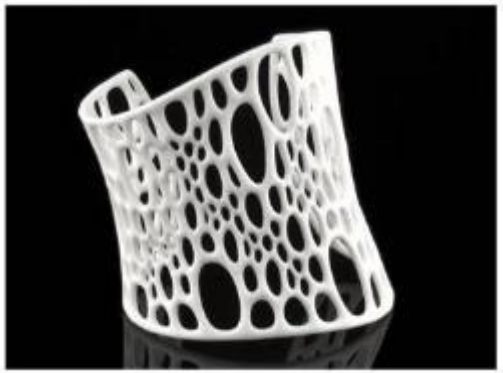


SLS Transforms Design and Manufacturing

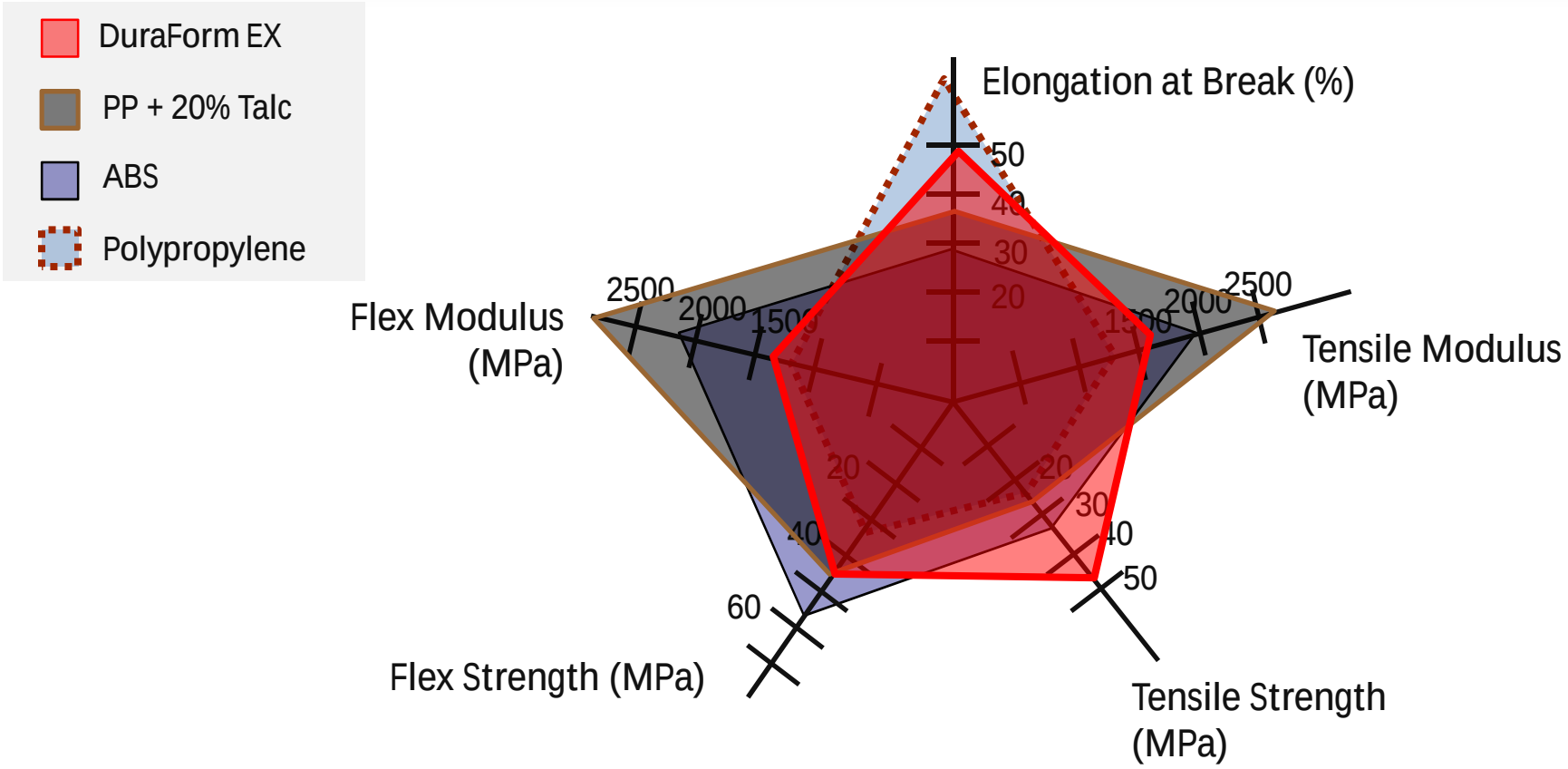
No Tooling + Complete Design Freedom

SLS – Mass Customized Industrial Design



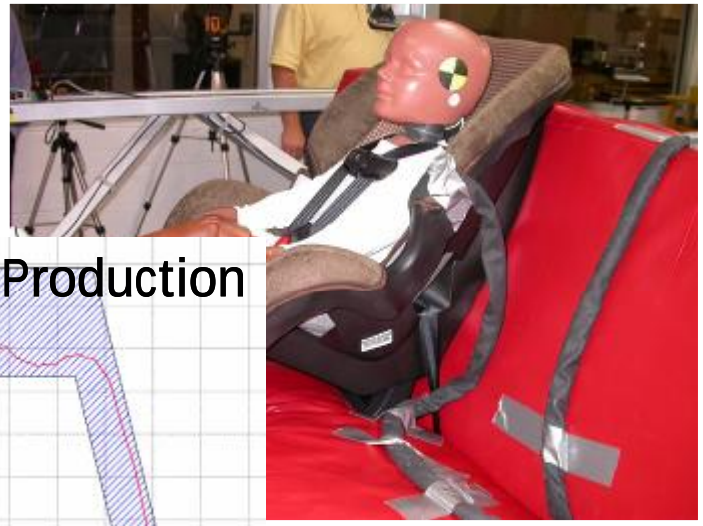


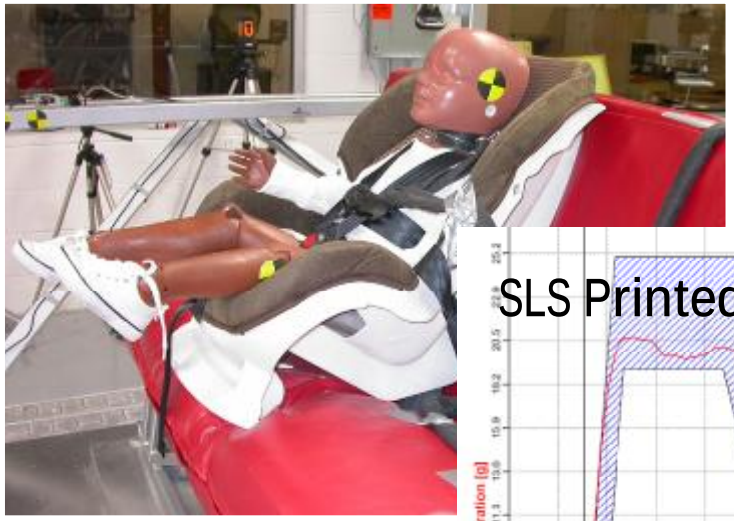
SLS – Injection Molding Performance



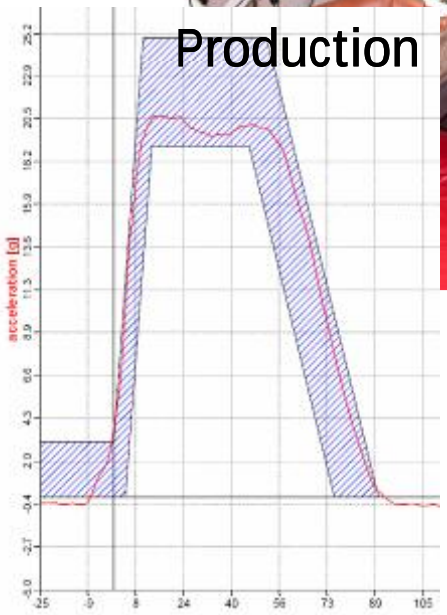
SLS – Functional Prototypes

SLS parts can mimic injection molded plastic performance

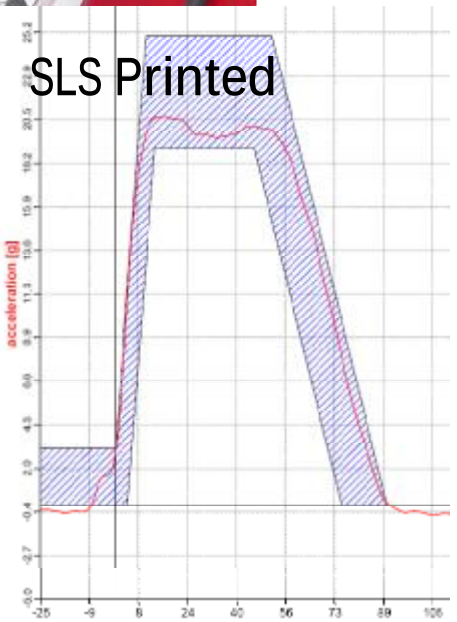




Production



SLS Printed



Performance sensor
data almost identical

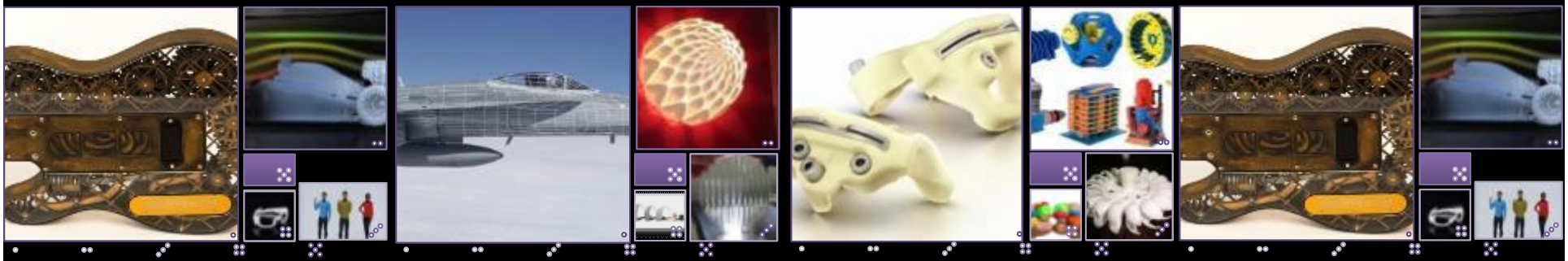
3D Systems SLS Printers

	ProX 500	sPro 60	sPro140	sPro230
Max Build volume	381 x 330 x 457 mm		550 x 550 x 460 mm	550 x 550 x 750 mm
Layer thickness range	0.08 – 0.15 mm			
Volume build rate	Up to 2 L/hr	Up to 1,8 L/hr	Up to 5 L/hr	Up to 5 L/hr

3DSYSTEMS

ProX™ 100, 200 and 300

Fully functional metal parts in hours



3DSYSTEMS™

ProX 100, 200, 300 Direct Metal Production Printers

High density, metal printed parts from a large choice of materials with the highest detail and precision

Print fully functional metal parts in hours

Large choice in standard metal alloys and ceramics

- More than 15 materials tested and available
- Steel, CrCo, Inconel, Al and Ti alloys
- Al2O3 ceramic

Inconel 718

Al_2O_3

AlSi12

Pure Cu

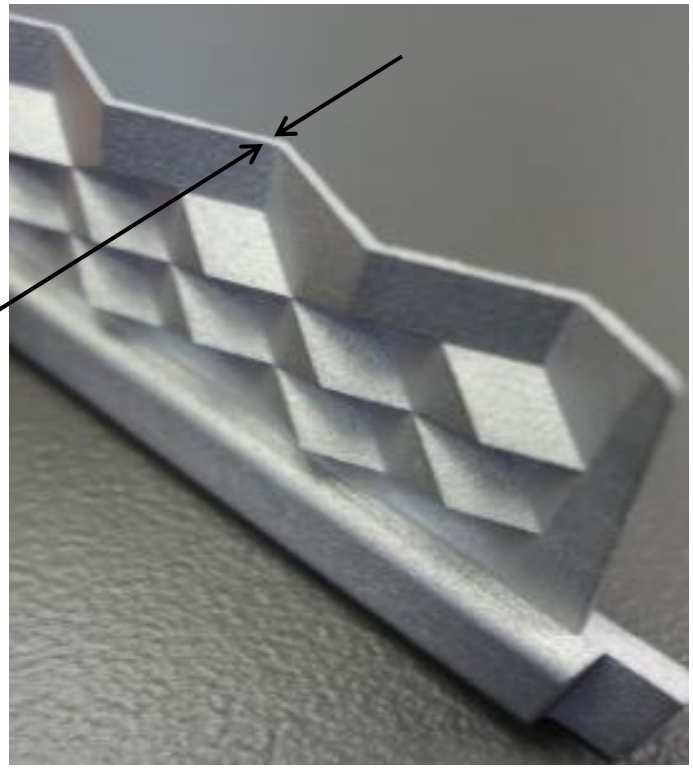
Unmatched design and manufacturing freedom

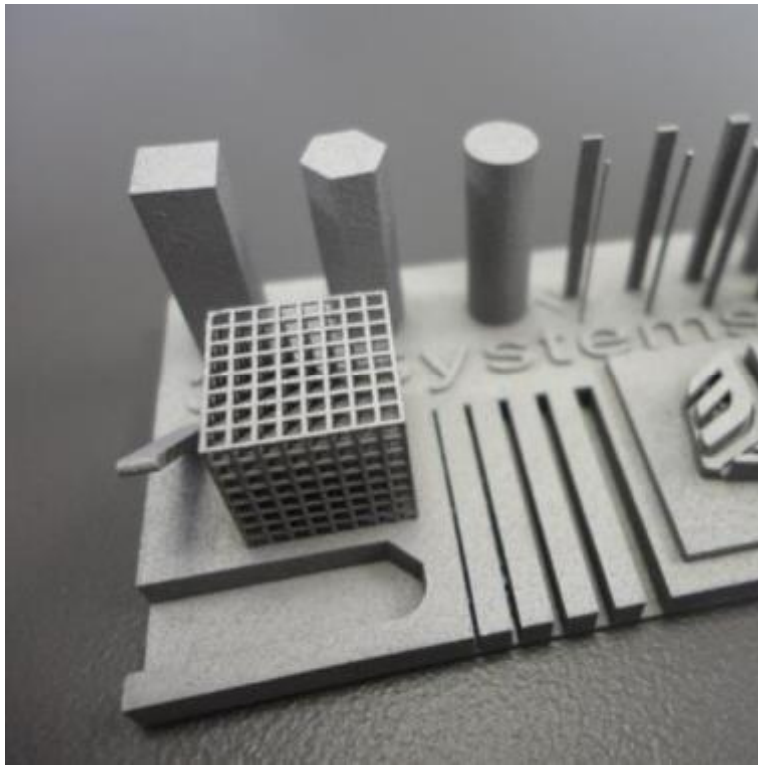
High density parts

Density> 99% of theoretical part

Highest accuracy, best detail resolution

150 micron wall thickness

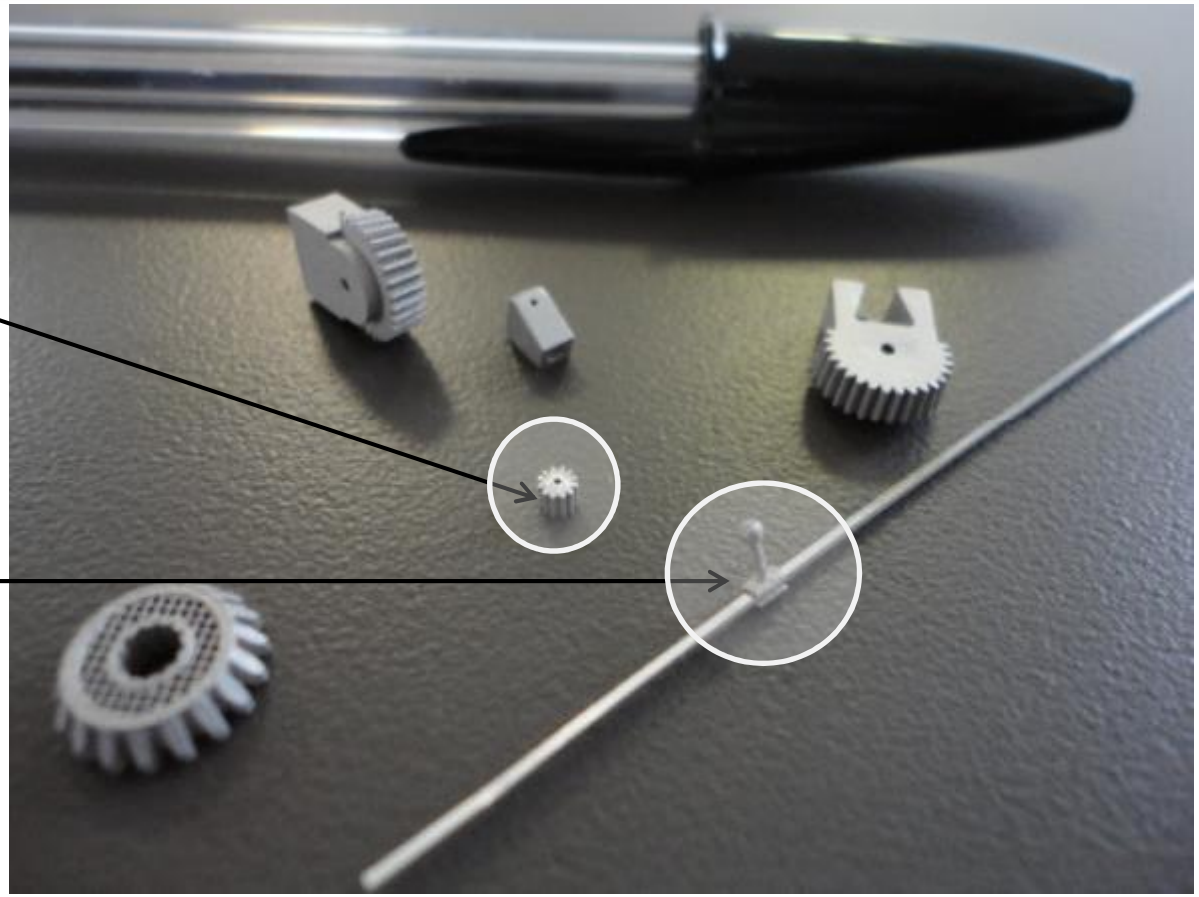




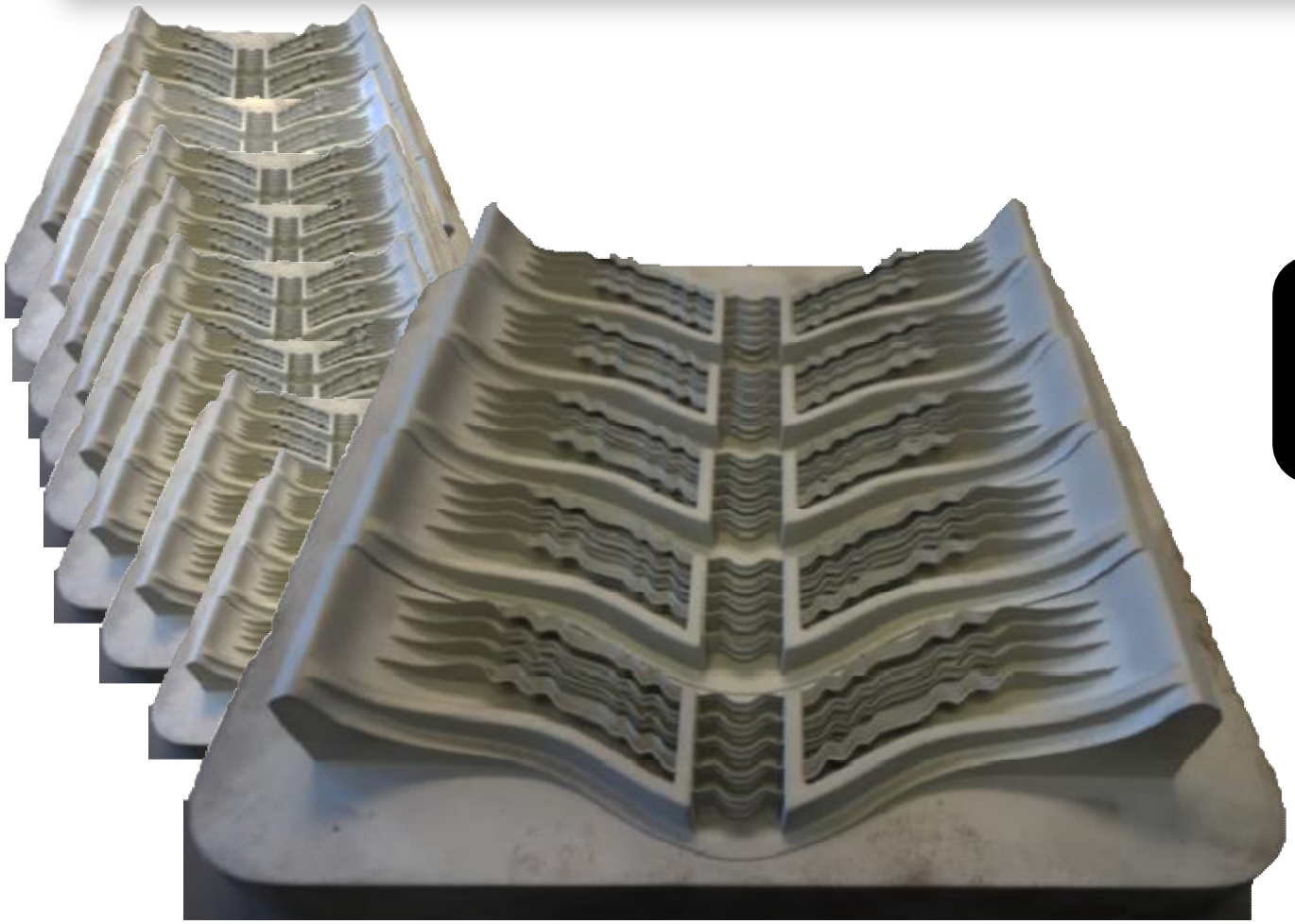
Smallest Parts – detail resolution

2mm gear with 20 teeth

C- clamp holding 16 thou wire



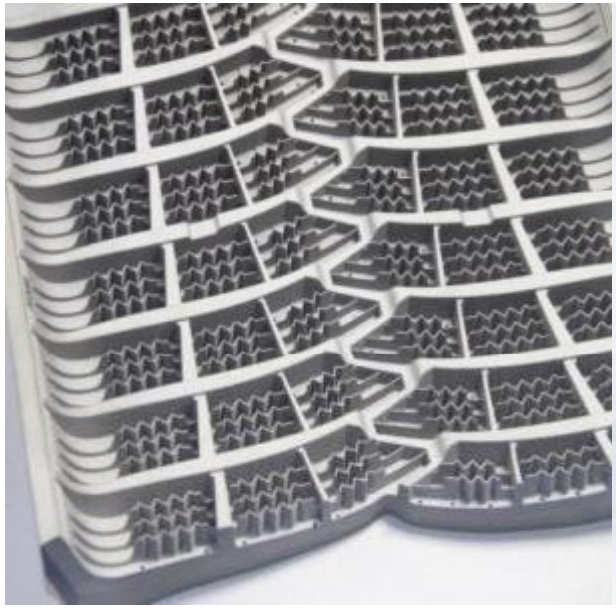
Excellent Tolerances & Repeatability



Repeatability
~20 microns in
all 3 axes

Automotive

Tire Molds

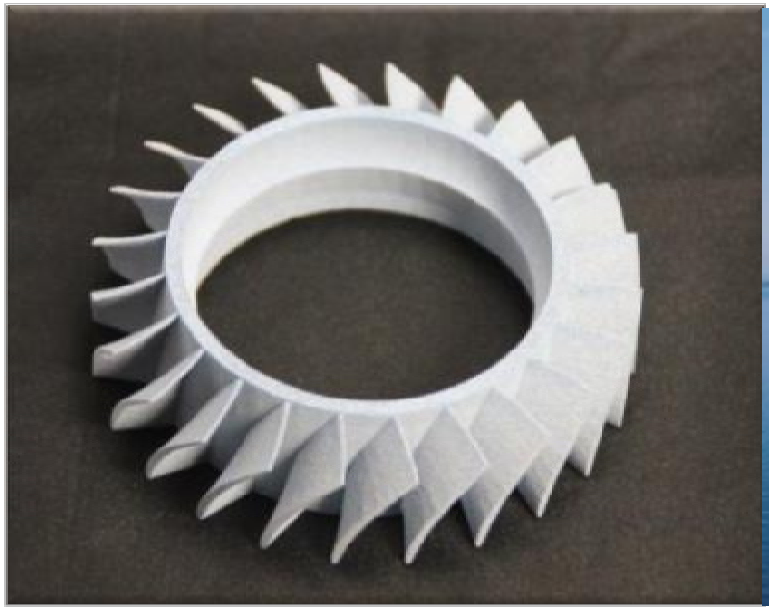


Aerospace

Jet Engine Fuel Nozzles

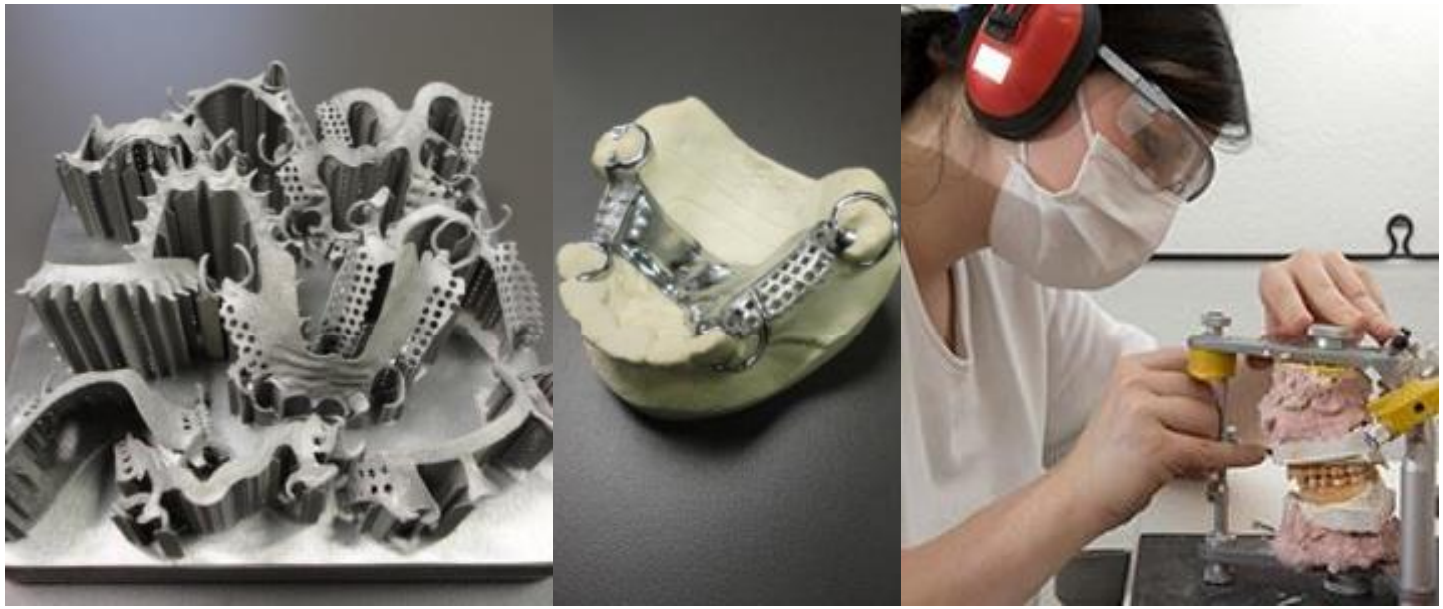
Energy

Microturbine manufactured from cermet powder

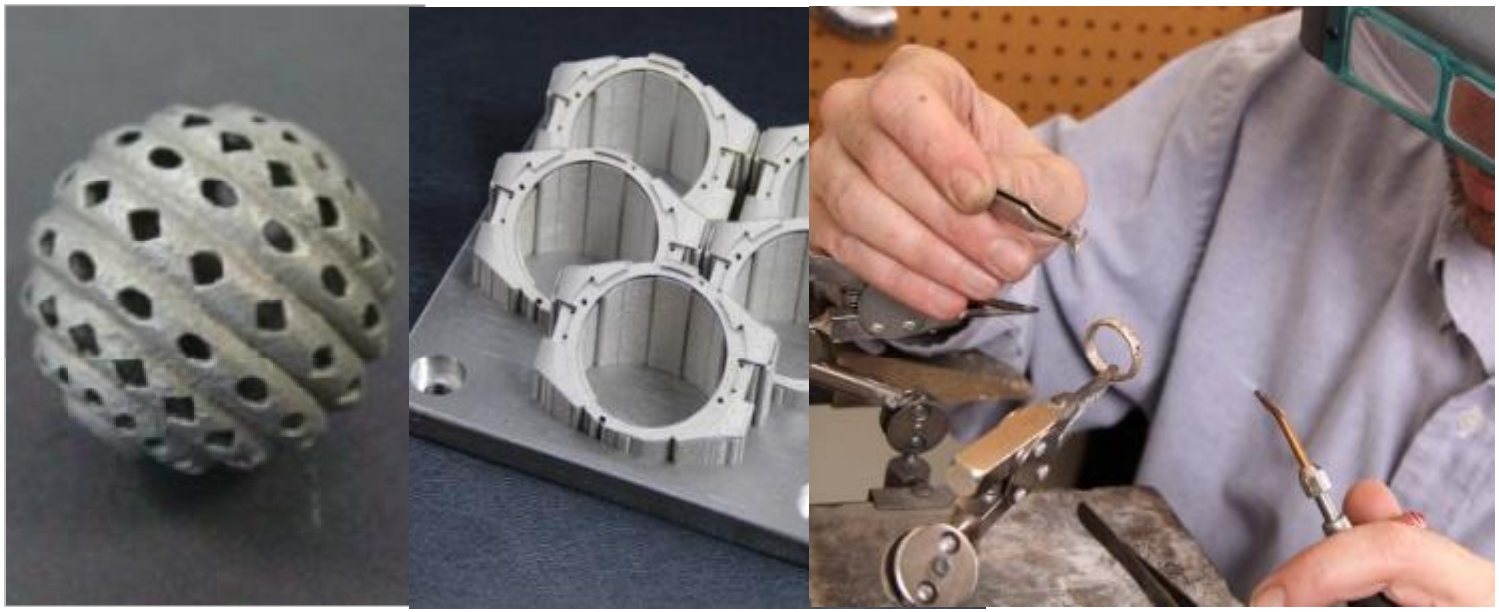


Dental

Dental partials manufacturing in CoCr



Jewelry



Tooling

Blow Mold with conforming holes

ProX™ 100, 200 and 300 Direct Metal Printers

	ProX 100	ProX 200	ProX 300
Build volume	3.94 x 3.94 x 3.15 in (100 x 100 x 80 mm)	5.51 x 5.51 x 3.94 in (140 x 140 x 100 mm)	9.84 x 9.84 x 11.81 in (250 x 250 x 300 mm)
Laser power	50W	300W	500W
Loading	Manual	Semiautomatic	Automatic
Recycling System	Optional external system (PX BOX)	Optional external system (PX BOX)	Automatic
	Dental version available	*Dental version available*	
			

3DSYSTEMS™

ProX 100, 200 and 300 Direct Metal Printers - Summary

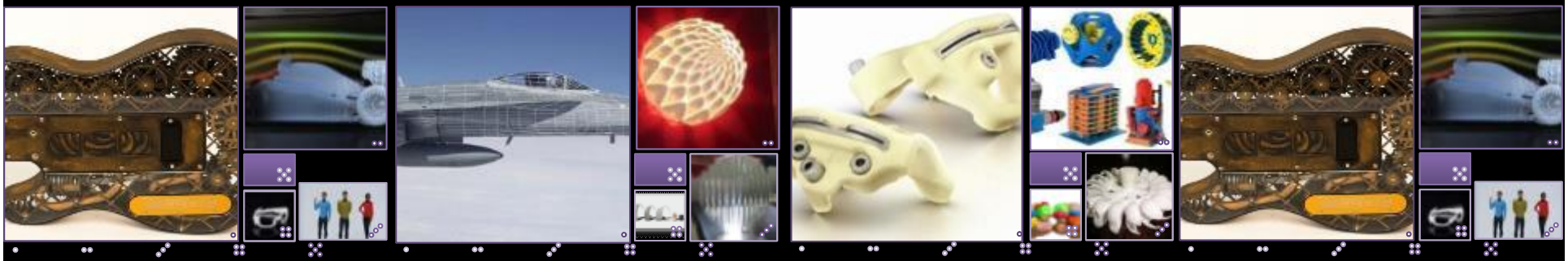
Print fully functional metal parts in hours

- Reduce time and cost of manufacturing complex metal parts
- Gain flexibility – in cycle time + part complexity
- Benefit from large choice of materials
- Finest detail resolution and highest precision in metal printing
- High repeatability guarantees true manufacturing applications

3DSYSTEMS

Quickparts

3D Systems' Rapid Prototyping and Rapid Manufacturing Service



3DSYSTEMS™

Introduction to Quickparts

The widest selection of additive and traditional materials and technologies for all your manufacturing needs

3DSYSTEMS™

What we offer to you

- The latest solutions and technology in additive and traditional manufacturing
- High-end finishing and Functional Models
- More than 20 years of experience in the Automotive and Transportation Industry
- Offices worldwide and 6 production centers in Europe
  - Italy, France, Germany, UK, Netherland, Belgium
- Our Italian office has recently obtained CNH's official vendor code

Broad Range of Applications

Transportation

Healthcare

Infrastructure/Energy

Electronic Appliances

Aerospace

Consumer Products

Powerful Performance Materials

High-Definition, Snap-Fit

High- Impact, Light-Weight

Durable, High-Temperature

~100 Materials → Wax → Nylon → Plastic → Rubber → Metal → Composite

Biocompatible

Conformal Structures

Casting

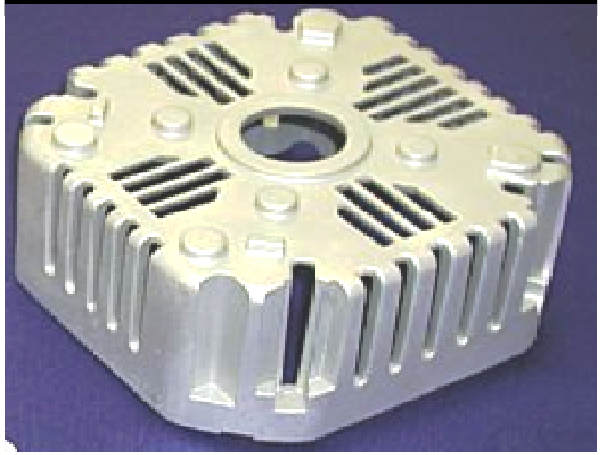
Global offer

We support you during the entire product development process

Rapid Prototyping & Pre-Production

Tooling & Production

Investment Casting



Rapid Prototyping & Pre-Production

Stereolithography (SLA)

Selective Laser Sintering (SLS)

ColorJet Printing (CJP)

MultiJet Printing (MJP)

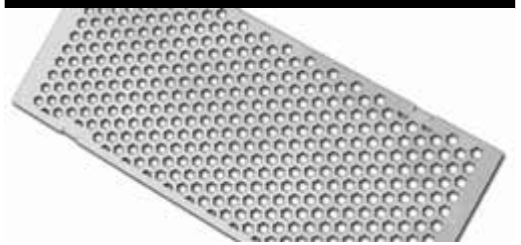
Machined Plastic Prototypes (MPP)

PlasticJet Printing (PJP)

Vacuum-Casting Parts

QuickCut™ CNC

Quick Sheet Metal™ Parts



Rapid Prototyping & Pre-Production - Finishing

We offer you a wide range of post-process treatment and finishing:
polishing, glossing, painting, transparent painting, assemblies,
vacuum metalization, chromium plating, pad printing

Investment Casting

QuickCast® Patterns

Castform Patterns

ProJet® Wax Patterns

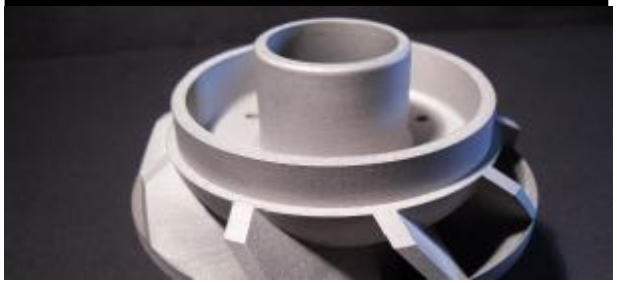
Tooling & Production

Injection-Molded Parts

Injection Mold Tooling

QuickMetal™ Plaster Mold Casting

Direct Metal Printing



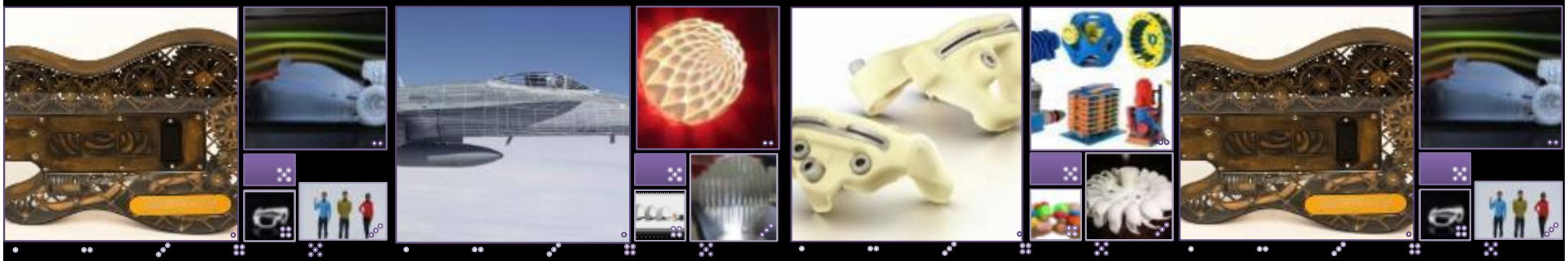
Direct Metal Printing - Layerwise

LayerWise

- Largest dedicated metal 3D printing service company, strongly focused on production parts
- Fully dense parts with accuracy up to 50 microns
- 17 materials available: Stainless Steel, Maraging, Inconel, Titanium, Inconel, Cromium Cobalt, Aluminum, Tantalum, Tungsten
- Parts up to 275 x 275 x 420 mm
- Extensive testing for validation and quality monitoring
- Full support on the re-engineering of the parts for AM
- Wide range of finishing and post-process treatment and machining

3DSYSTEMS®

Thank You!



3DSYSTEMS™