3D PRINTING OVERVIEW

We help our clients create remarkable experiences. And sometimes those remarkable experiences require an unconventional approach – like 3D printing a 93-foot-tall torch.

Using a variety of additive manufacturing technologies, including an in-house Large Scale Additive Manufacturing (LSAM) machine, our team can 3D print custom designs with high-quality materials and minimal waste. There are times when 3D printing can offer more flexibility than other traditional means of creation.

Layer by layer, rough sketches and designs become perfectly sculpted pieces, assembled accordingly to create a remarkable end product.

Dimensional Innovations

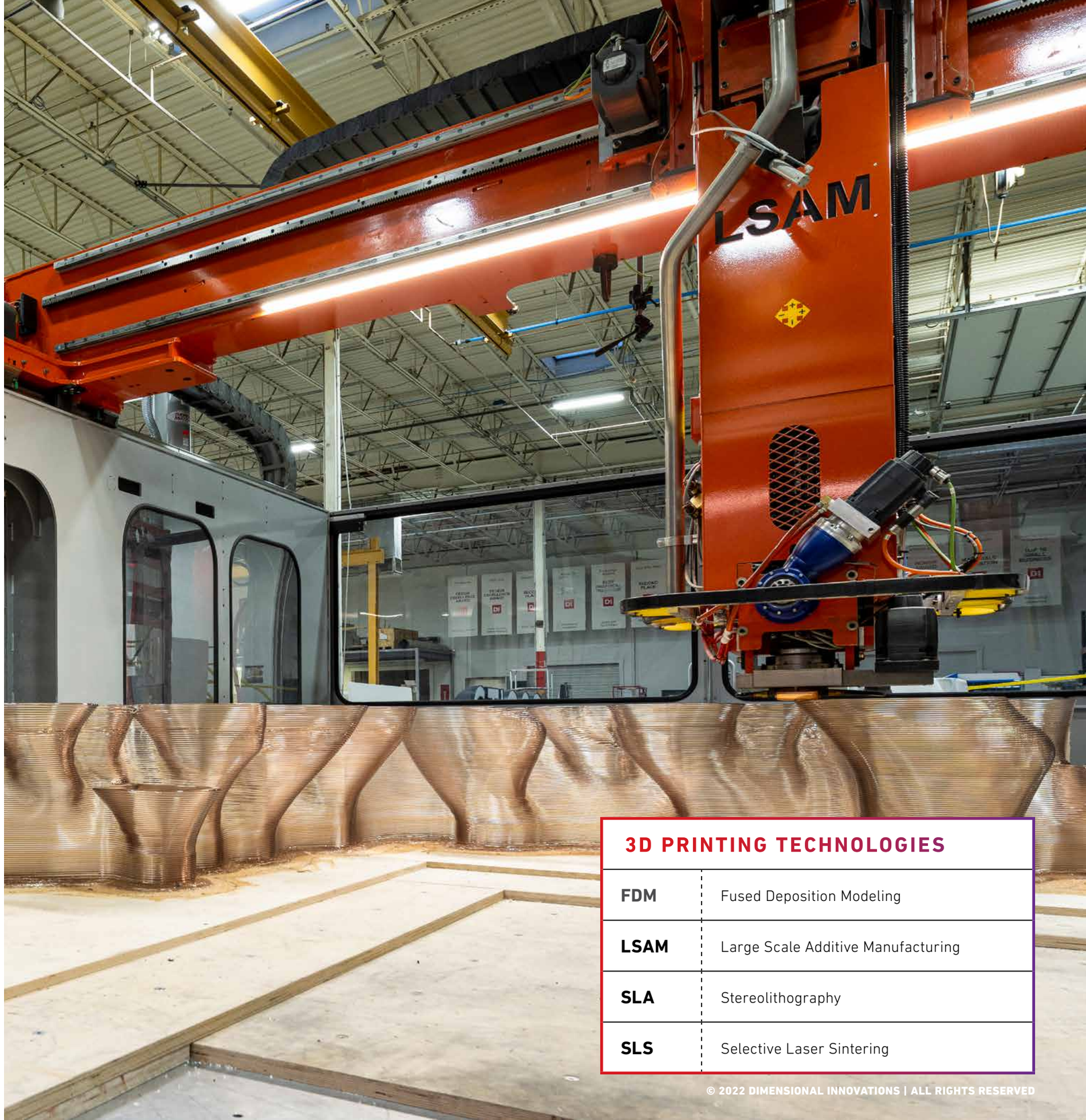
CONSIDERATIONS

While it's tempting to turn to additive manufacturing as the go-to solution, not every project can or should be 3D printed. There are certain qualifications our team takes into consideration before firing up the LSAM or other 3D printers.

GEOMETRIC COMPLEXITY – We leverage 3D printing to create detailed, intricate shapes that aren't attainable through conventional means of creation. If the piece we need is flat and square for example, we would likely utilize off the shelf sheet material and more traditional manufacturing methods.

MATERIALITY – Depending on what level of durability and resistance is needed, there are a variety of materials we can use to 3D print, including Acrylonitrile Butadiene Styrene (ABS), Polycarbonate (PC) with a fiber infill made of carbon or glass. Materiality is a key factor in the decision to 3D print, ultimately boiling down to the printed object's final use. There is a whole world of polymers to choose from, and the right material depends on the requirements of the project. We can help decide on the proper materials and even work with our suppliers to create custom material formulations if necessary.

TIMELINE AND BUDGET – Delivering projects on time and on budget is always a top priorityfor our team. If additive manufacturing can eliminate tedious, manual labor and help push a project forward more quickly at a lower cost, 3D printing might be the most effective approach.



3D PRINTING TECHNOLOGIES	
FDM	Fused Deposition Modeling
LSAM	Large Scale Additive Manufacturing
SLA	Stereolithography
SLS	Selective Laser Sintering

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LAS VEGAS RAIDERS

AL DAVIS MEMORIAL TORCH

With strict parameters, timeline and budget, creating the Al Davis Memorial Torch required an untraditional approach. Freestanding at over nine stories tall, the torch is comprised of 225 3D-printed blocks, each machined on a five-axis router to a .005 tolerance – roughly the width of a human hair.

PRINTING TECHNOLOGY	LSAM (FDM + 5 Axis Milling)
MATERIALS	Black Polycarbonate with 20% Carbon Fiber Infill
PARTS PRINTED	225 Blocks
SIZE	4ft x 4ft Blocks, 93ft Tower
PARTNERS	Manica Architecture, Ultratech Aerospace, A. Zahner, Techmer and Purdue University.

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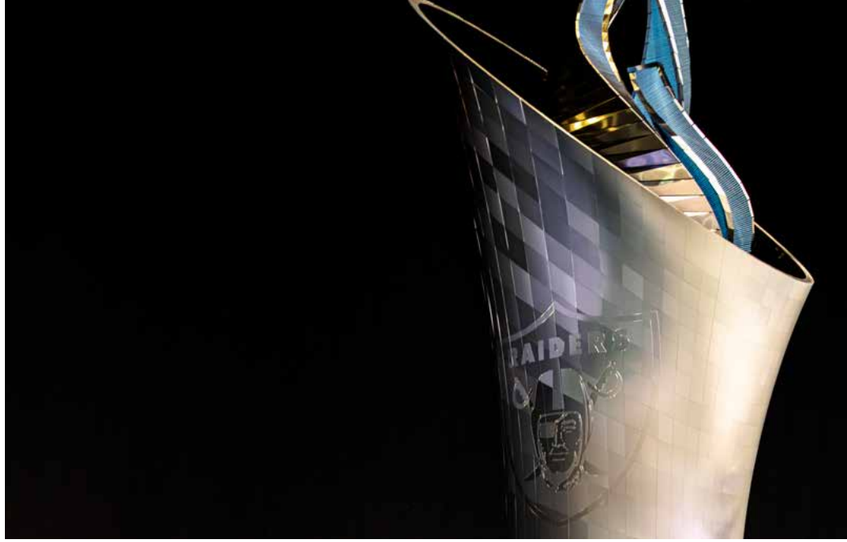

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MEANDER

ART INSTALLATION

Designed inside the DI Innovation Lab, this privately commissioned art piece was 3D printed to emulate the changing patterns and evolution of the Missouri River over thousands of years. Layer by layer, the sculpture was printed using clear PETG, otherwise known as the material used to make plastic water bottles.

PRINTING TECHNOLOGY	LSAM (FDM)
MATERIALS	Clear PETG
PARTS PRINTED	1 Full Sculpture
SIZE	4ft Tall x 14ft in Length

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IDS CENTER

CRYSTAL COURT FURNITURE

Inspired by the natural form of river rocks with smooth, round edges, these 20 benches were specifically designed for 3D printing. The furniture's sleek, resistant and durable structure makes them sustainable seating for all guests to enjoy.

PRINTING TECHNOLOGY	LSAM (FDM)
MATERIALS	Black PLA w/ Wood Fiber Infill
PARTS PRINTED	17 Benches and 3 Tables
SIZE	3'-10' Diameter Benches 42" Tall Bar Height Tables
PARTNERS	Johnathan Olivares, Perkins & Will

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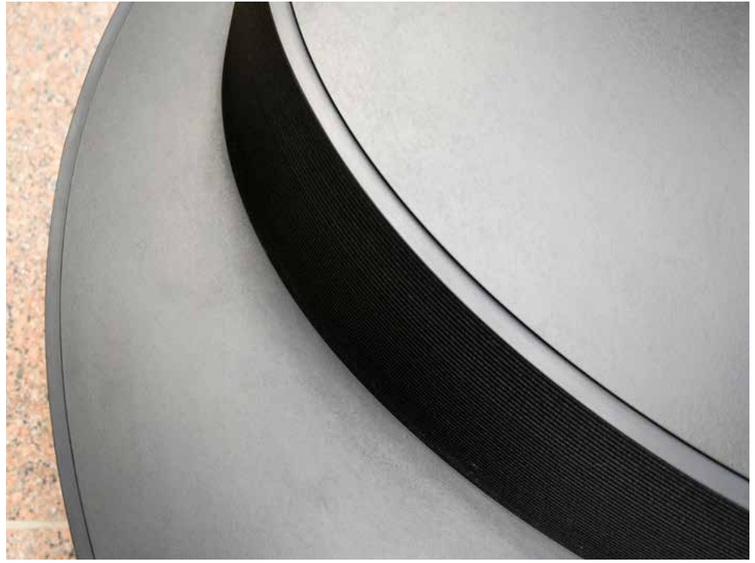

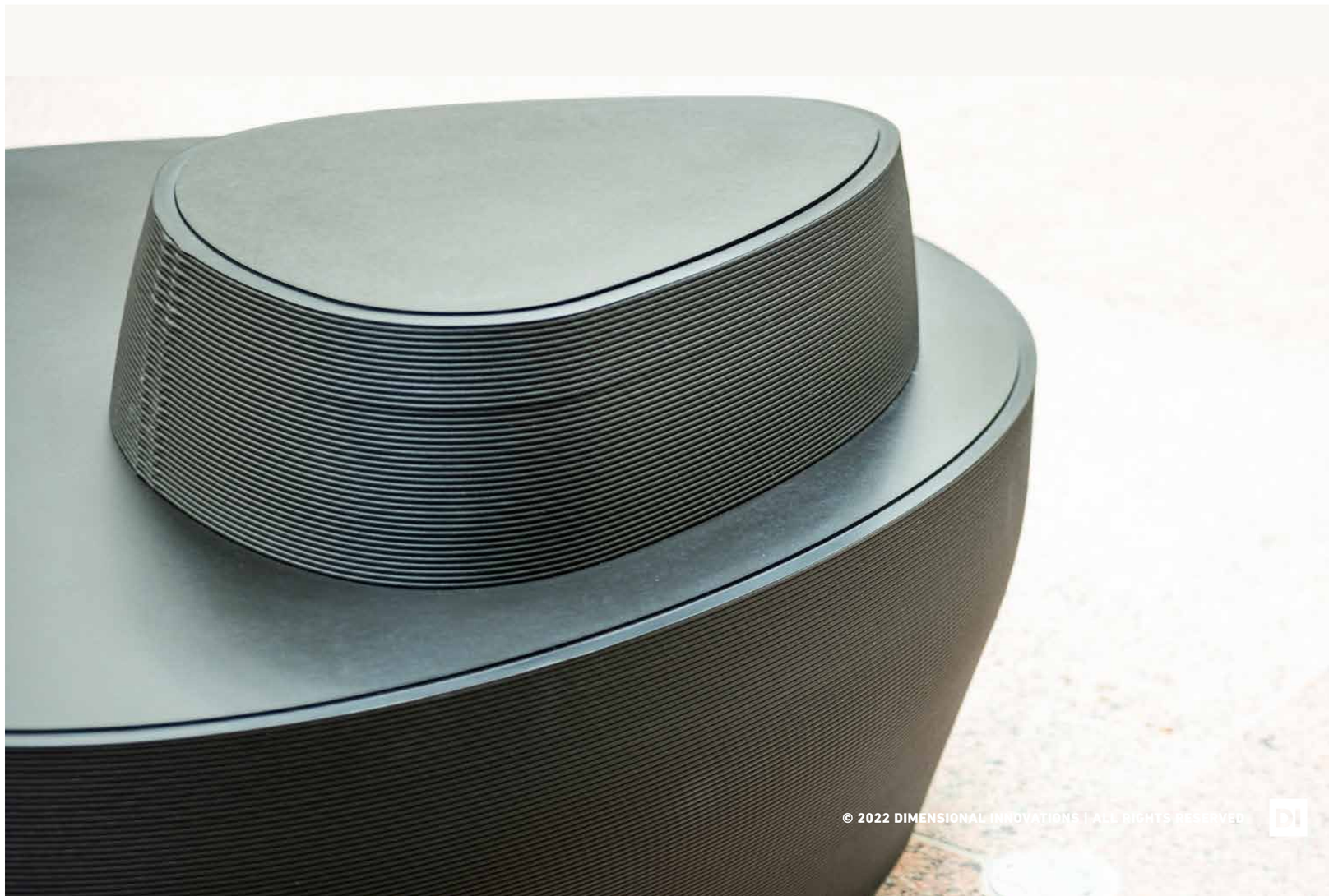

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ZOO KNOXVILLE

TURTLE & TORTOISE SHELLS

Our team created these life-like tortoise shells inside Zoo Knoxville first by scanning the turtles, then using that information to digitally texture and 3D print new shells in full color. The rigid replicas are true to size with all the texture and detail of the real deal.

PRINTING TECHNOLOGY	SLS
MATERIALS	Full Color Nylon
PARTS PRINTED	7 Different Shells
SIZE	Various
PARTNERS	Realize

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CEDAR VALLEY SEMINARY FOUNDATION

BLACKBIRD SPY PLANE

3D printing this 7-ft. A-12 Blackbird Spy Plane was not a single-step process. After a detailed design and engineering phase, the plane was split into multiple blocks, printed and then reassembled into a seamless high quality replica.

PRINTING TECHNOLOGY	FDM
MATERIALS	Black ABS
PARTS PRINTED	6 Blocks
SIZE	2ft x 3ft Blocks, 7ft Long Sculpture
PARTNERS	BigRep

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DASSAULT

GRAND CHALLENGE SPACESTATION

Dassault challenged us to bring an internally designed Space Station concept to life. The scaled model was created using a variety of fabrication methods. However, several elements required immense detail and extra fine print – only a job 3D printing could accomplish. The space station includes 110 individually 3D-printed parts, assembled together with other foam and metal elements to create an ultra-realistic scale replica.

PRINTING TECHNOLOGY	SLA
MATERIALS	SLA Resin
PARTNERS	Various
SIZE	Various
PARTNERS	Realize

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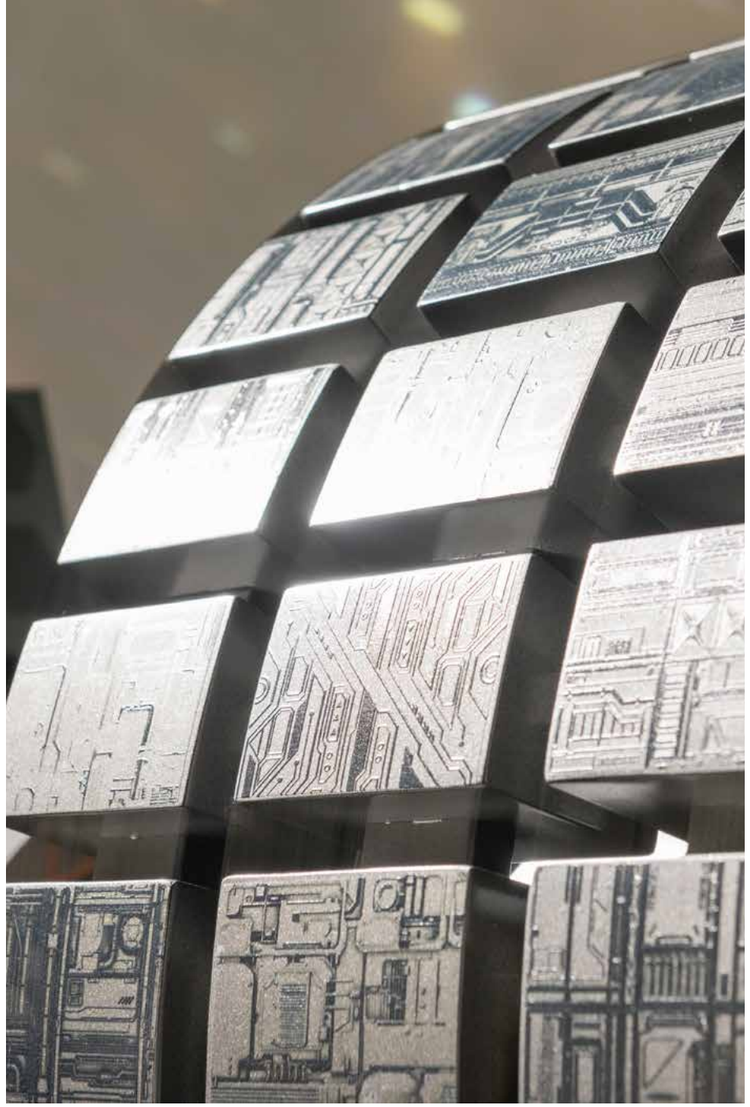

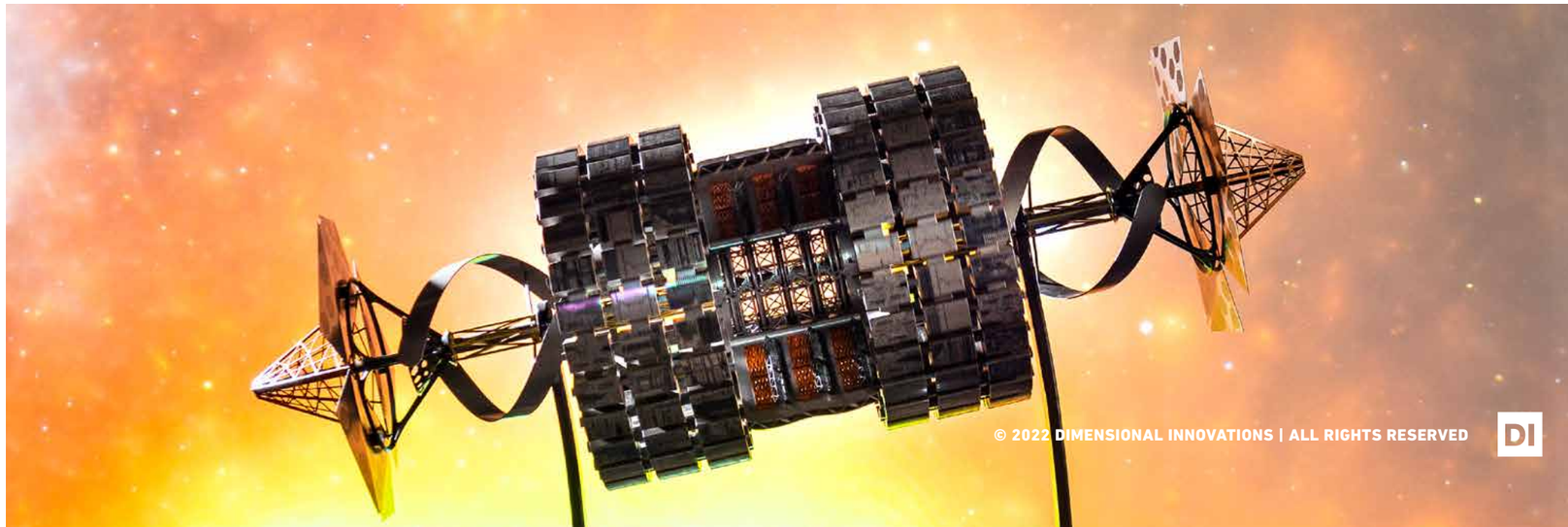

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US NAVAL ACADEMY ATHLETIC ASSOCIATION

RON TERWILLIGER CENTER FOR STUDENT-ATHLETES

This project is a testament to the importance of taking a solution agnostic approach. Our team 3D printed the horns in order to capture the extreme level of detail and textured complexity, then used faux-painted foam for the rest of the sculpture.

PRINTING TECHNOLOGY	FDM
MATERIALS	Black ABS
PARTS PRINTED	6 Blocks, Assembled into 2 Horns
SIZE	1ft x 1ft

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MONROE SCIENCE CENTER

DENTAL PUZZLE EXHIBIT

This true-to-life, oversized dental sculpture was 3D printed as an interactive piece where visitors can complete the mouth's puzzle and learn about each tooth's function. With high detail and unique shapes, 3D printing was the most efficient approach that didn't require tedious hands-on sculpting.

PRINTING TECHNOLOGY	FDM
MATERIALS	ABS
PARTS PRINTED	16 Teeth, 4 Parts Joined Together for Gums
SIZE	4ft x 4ft x 6ft Tall
PARTNERS	BigRep

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3D PRINTING MATERIALITY

One of the first steps we take in a 3D print project is determining the most suitable and efficient material to use. Depending on what level of durability and detail is needed, there are a variety of options to choose from, including:

LSAM Materials

> PLA w/ Wood Fiber Infill
> Polycarbonate w/ 20% Carbon Fiber Infill
> ABS w/ 20% Carbon Fiber Infill
> Clear PETG
> Natural PETG w/ 20% Glass Fiber Infill
> Recycled PP (Polypropylene)
> Other Custom Formulations

FDM Materials:

> PLA
> Conductive PLA
> ABS
> PETG

SLA Materials:

> High Impact Resins
> Clear Resins
> Flexible Resins

SLS Materials:

> Nylon (Black/White)
> Full Color Nylon

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