



CARACOL

Leading Additive Manufacturing Beyond

COMPANY OVERVIEW – HERON AM

2024

ADDITIVE MANUFACTURING WITH NO SCALE LIMITS FOR ADVANCED INDUSTRIAL PARTS

3 International Offices

Europe, North America,
and Middle East

70 Employees

+250 Clients

with several
major accounts

8 Patents

AS/EN 9100

Certification for Aerospace obtained –
one of the first LFAM companies in the
world

OUR VALUE PROPOSITION

TECHNOLOGY

Starting from a deep knowhow on state-of-the-art industrial printers we developed our core large format robotic AM platform, to manufacture parts with no limits in scale.

ENGINEERING

We use the most advanced design for additive manufacturing techniques – working with generative and parametric design, and topological optimization of parts to improve geometries.

INTEGRATED PROCESS

Integrating all core competences across the value chain, starting from know-how on materials and a network of partnerships with suppliers, as well as on hardware, software and on our client's industries.

SOLUTION-ORIENTED

We accompany clients starting with identifying their needs and opportunities, and we customize our solutions to provide the most out of their adoption of additive manufacturing, addressing the most demanding requirement of the most advanced industries.

HERON AM™

LFAM integrated hardware & software modular platform developed to industrially produce 3D printed large scale parts with composite materials

No Scale Limits

Complex Geometries with 6+ axes

Extreme Flexibility

Maximize Efficiency & Sustainability

Low Operating Costs

Low Raw material costs

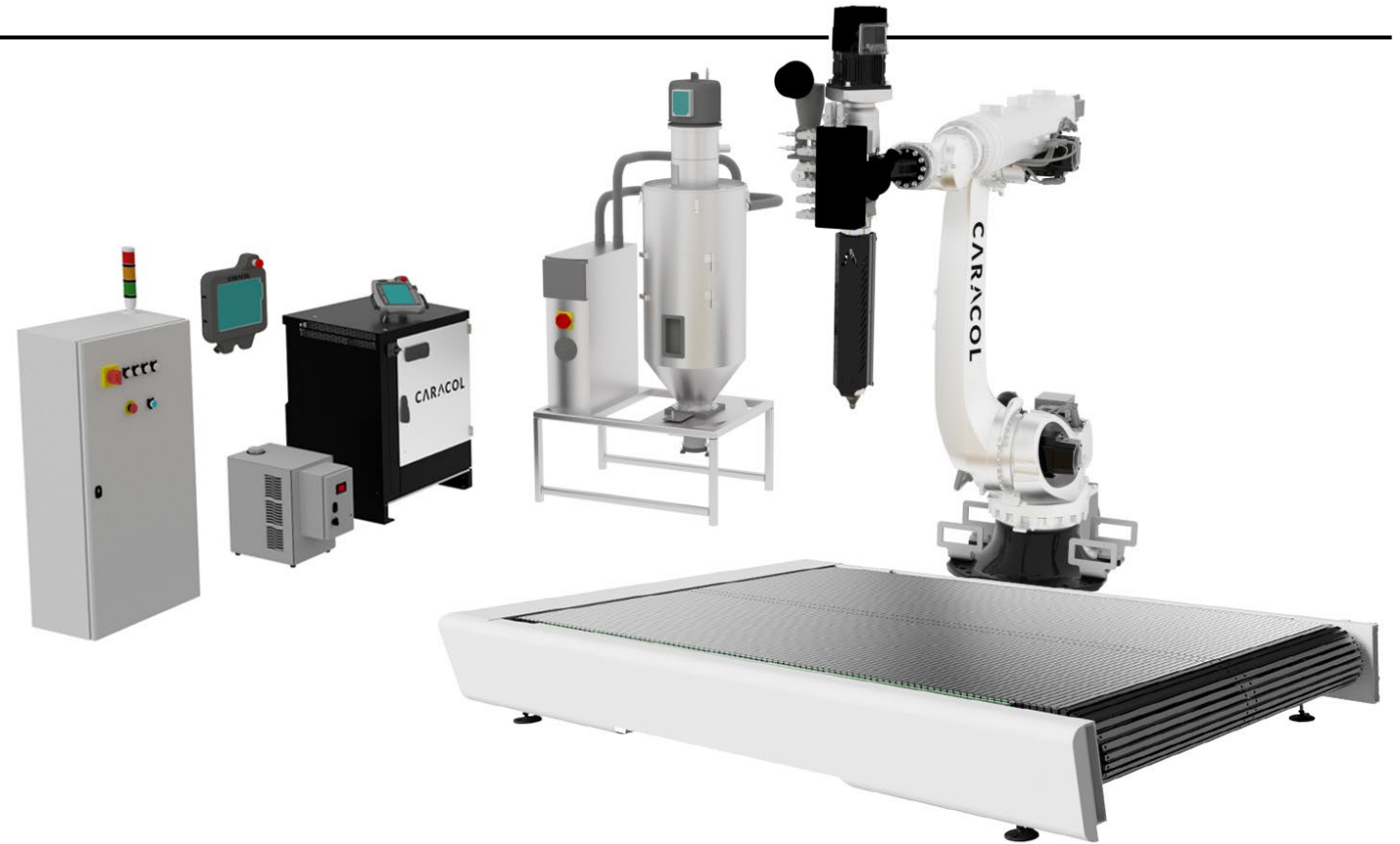
Cut Lead Time

Drastically Cut Waste

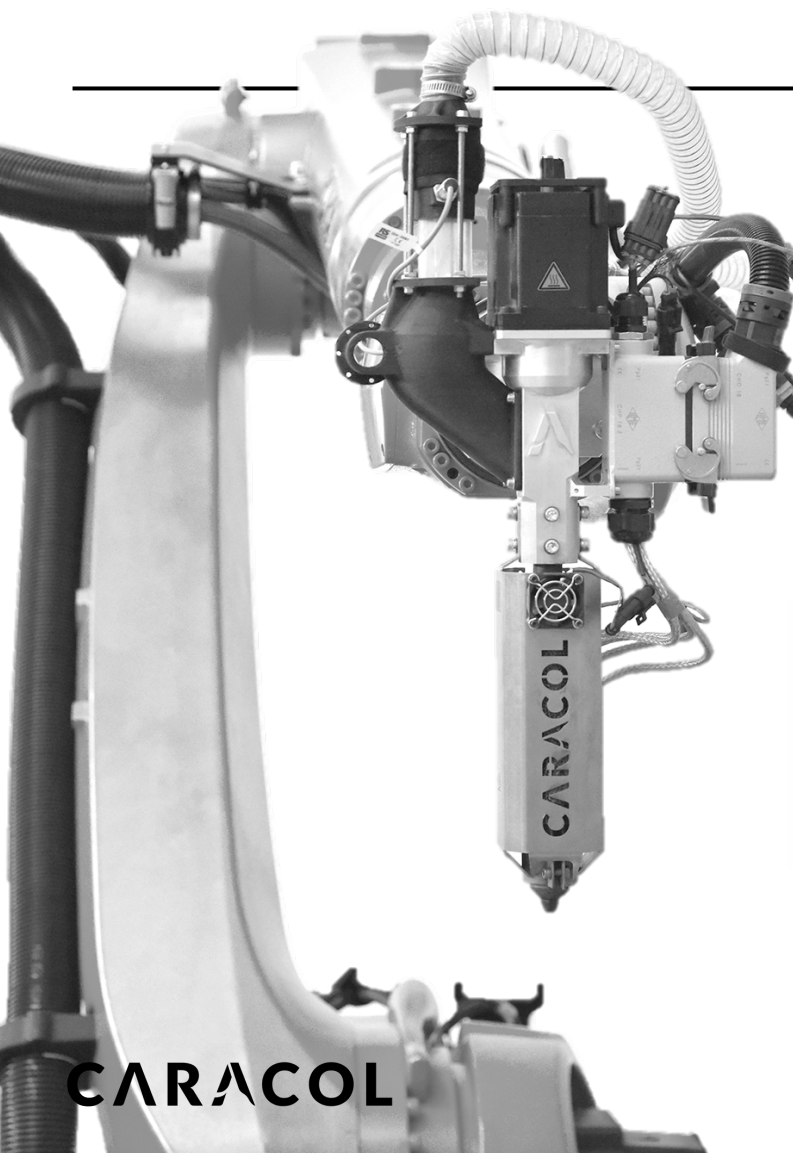
Heron AM is a turnkey solution with a set of core elements...

KEY ELEMENTS

- 1 EXTRUDER
- 2 EIDOS MANUFACTURING SOFTWARE SUITE
- 3 CONTROL CABINET
- 4 ROBOTIC ARM
- 5 PRINTING BED
- 6 DRYING & FEEDING SYSTEM



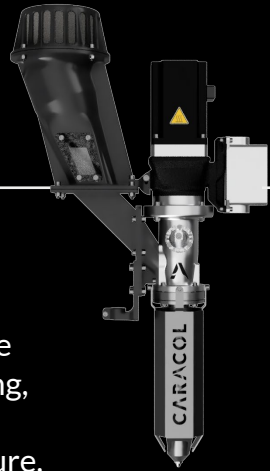
...that can be modularly configured to fit to your needs



	Studio	Industrial			
BASE CONFIGURATION					
SOFTWARE	Eidos manufacturing software suite				
EXTRUDER	HA	HV		HF	
ROBOT REACH	Max 3.1 m (10.6 ft)	Max for smallest unit 3.1 to largest 4m (10.6 to 13.1 ft), extendable with rail			
PRINTING BED	ALU	STEEL	AUTOMATIC	STEEL	AUTOMATIC
DRYING & FEEDING SYSTEM	5 kg/h	10 kg/h		30 kg/h - extendable	
ANCILLIARY FEATURES					
AXES EXTENSION (7th-axis rail or booster frame)	N/A	On-demand		On-demand	
CNC INTEGRATION	N/A	On-demand		On-demand	

Developing a set of extruders to satisfy specific manufacturing needs...

HIGH ACCURACY (HA)



Small-sized, lightweight, and compact – developed to provide agility: quality finishing, detailing, and precision. Ideal for finished parts, such as for design, furniture, and creative industries.

Dimensions (mm)	650x300x150
Weight (kg – lbs)	16 – 35.3
Nozzle (min-max, mm)	1 – 5
Temperature (°C - °F)	350 – 662

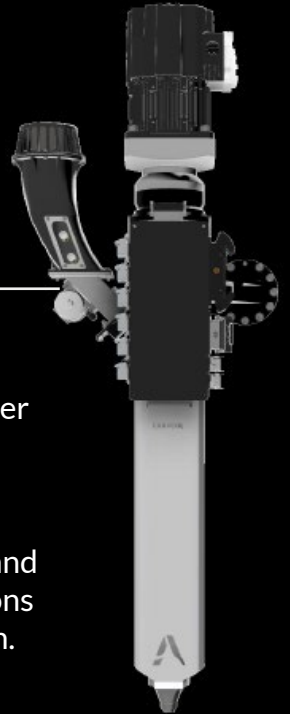
HIGH VERSATILITY (HV)



Flexibly adapts to diverse industrial needs – it was developed to cover a broad range of applications: from finished parts, such as boat super structures, small to mid-sized tools, jigs, and fixtures, to design and architectural structures.

Dimensions (mm)	1150x550x300
Weight (kg – lbs)	45 – 99
Nozzle (min-max, mm)	2 – 8
Temperature (°C - °F)	450 – 842

HIGH FLOW (HF)



Robust, high throughput extruder – developed for fast material processing, an extensive range of materials, print quality, and efficiency. Ideal for large tools and molds, boat hulls, and applications in architecture and construction.

Dimensions (mm)	1500x550x350
Weight (kg – lbs)	75 – 165
Nozzle (min-max, mm)	5 – 14
Temperature (°C - °F)	450 – 842

...and process a wide range of polymers and composites

PP GF

Lightweight with good mechanical properties, it can replace glass fiber and aluminum in marine structural parts or aerospace molds and tools.

ABS GF/CF

Cost-effective material for low temp applications (up to 80°C), used for rapid prototyping, molds and tools for trimming and gripping.

ASA GF

A versatile material, similar to ABS for mechanical and thermal properties, but UV resistant. It is suitable both for engineering applications and design.

PETg GF

This high-impact, chemical UV-resistant, and flame-retardant polymer is ideal for PVC-like, exterior structures and prototyping applications.

FLEX TPE

A high-strength and flexibility elastomer, ideal for large-scale rubber-like parts – such as topologically optimized pliable structures, like cushions and seating.

PC CF

With great thermal and mechanical properties. It has been qualified for mid-temperature autoclave processes.

PEI CF

Outstanding mechanical and thermal properties (up to 200°C), flame-resistant, dimensionally stable, great for autoclave, oven, and self-heated tools.

Bio & Recycled

We work a wide variety of recycled materials from grinding waste or parts at the end of their life, client's waste, or by purchasing upcycled material.

INDUSTRIES

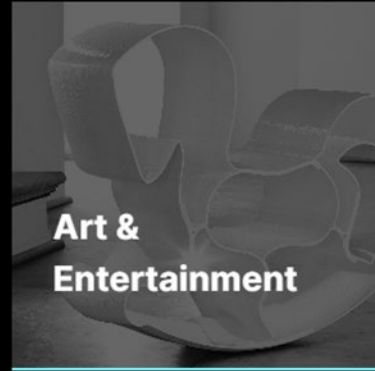
Technology qualified for production of parts
for leading companies across sectors



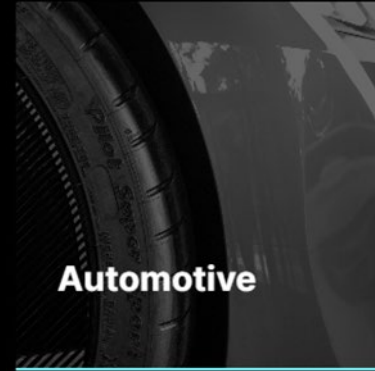
Aerospace



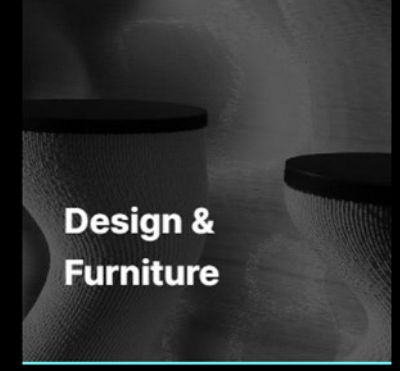
**Architecture &
Construction**



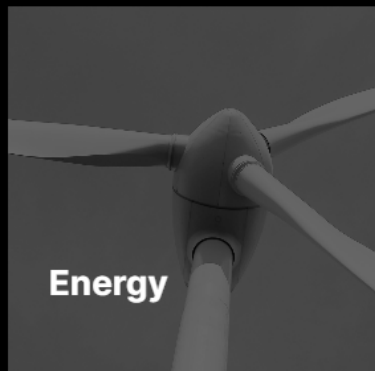
**Art &
Entertainment**



Automotive



**Design &
Furniture**



Energy



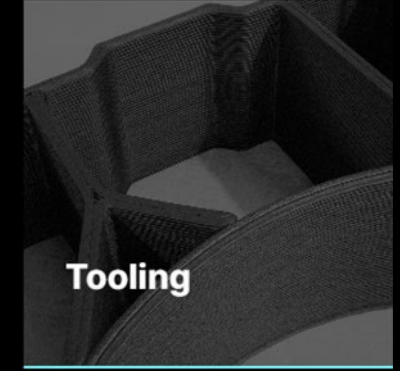
**Industrial
Machinery**



Marine

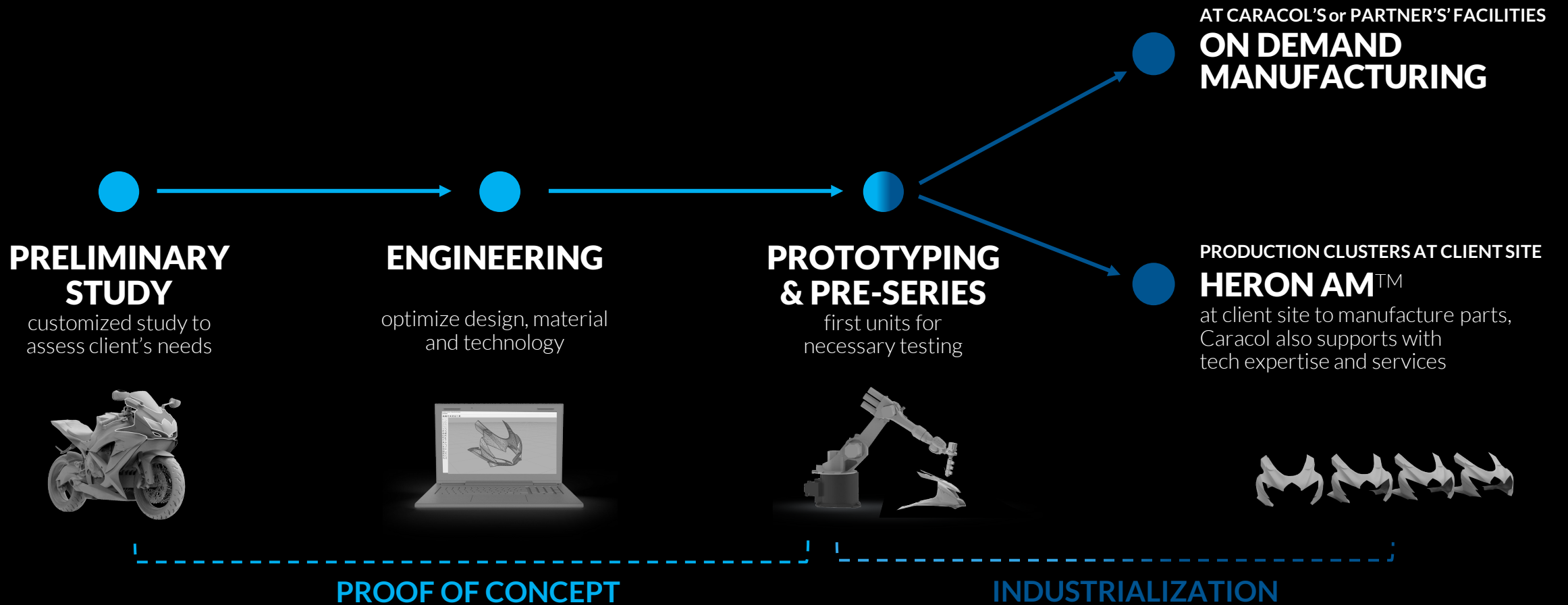


Railway



Tooling

We accompany clients through the production process



We can support clients and partners in all their manufacturing needs

Design & Concept Development

Using the most advanced AM software and design techniques we can bring to life products and components

Engineering

We optimize design for production in AM and we can test components' mechanical and thermal performance

Prototypes & Pre-Series with no size limit

Using both a variety of industrial 3D printers and an advanced robotic system for meter large prints

On-Demand Manufacturing

Our flexible manufacturing set up can be organized to print multiple series of pieces

Production Tool Manufacturing

Large-scale tools, jigs, fixtures, molds, and beams for manufacturing – e.g., positioning, drilling, cutting, assembly, and other operations

Materials characterization and waste recycling

We develop 3D printing materials in filament or pellet form, starting from production waste materials or according to specific needs

Support Internalizing Additive Manufacturing solutions

We assist in understanding needs, identifying and providing the best tech, we install it and provide after service assistance

Additive Manufacturing Training and Workshops

We train company employees on 3D printing tech: project planning, tech use, identifying and knowing materials

Our process guarantees quality and repeatability, and is certified with AS/EN 9100



RAW MATERIALS

Verify the technical specifications required

HARDWARE & SOFTWARE

Identify and characterize the most suitable HW and SW

PROCESS PARAMETERS

Investigate ideal parameters and lock optimized selection

PRODUCTION

Manufacture test specimens for required certifications

QUALITY INSPECTION

Perform all needed tests to verify conformity

REPEATABILITY

Repeat engineered process to check performance

IQ
INSTALLATION
QUALIFICATION

OQ
OPERATION
QUALIFICATION

PQ
PRODUCTION
QUALIFICATION



Aerospace
EN 9100
SAI GLOBAL



SAI GLOBAL
ISO 9001
Quality

Cure Tool: Drone Nose

Aerospace tool for pre-preg autoclave lamination of a drone nose – CNC'd and used for lamination of final carbon fiber part



PROCESS / SET UP	
SYSTEM	HERON 400, HF Extruder, 12mm Nozzle
MATERIAL	DAHLTRAM C-250 CF
POST-PROCESSING	Machining + Resin
PRINT TIME (hr)	15 (x 2 sections)
WEIGHT (kg)	130 (x 2 sections)
REQUIREMENTS	
SIZE	1100 x 1100 x 900 mm
SURFACE ROUGHNESS (µm)	0.8
DIMENSIONAL TOLERANCES (mm)	0.1
SAVINGS vs. TRADITIONAL PROCESS	
LEAD TIME	50%
WASTE REDUCTION	50%
WEIGHT REDUCTION	40%
COST SAVING	30%
PROCESS OPTIMIZATION	Optimized testing phase for design and validation of part functionality

Positioning & Drilling Jig: Airplane Belly Fairing Panels

Through redesign it was possible to integrate over 30 parts, that had to be assembled following their manufacturing through CNC milling of solid metal blocks, into one single piece. FEM analysis was conducted – both with statical and shock analysis.

After manufacturing with LFAM, an integrated digital manufacturing flow, the part's surface was milled to obtained the exact requirements in terms of surface roughness and dimensional tolerances.



PROCESS / SET UP	
SYSTEM	HERON 400, HF Extruder, 12mm Nozzle
MATERIAL	ABS 20% CF
POST-PROCESSING	Machining
PRINT TIME (hr)	10
WEIGHT (kg)	120
REQUIREMENTS	
SIZE (scale 1:2)	850 x 1250 x 330 mm
SURFACE ROUGHNESS (µm)	1.6
DIMENSIONAL TOLERANCES (mm)	0.1
SAVINGS vs. TRADITIONAL PROCESS	
LEAD TIME	75%
WEIGHT REDUCITON	90%
WASTE REDUCTION	45%
COST SAVING	50%
PROCESS OPTIMIZATION	One-piece avoiding complex components' assembly Drastic waste reduction compared to traditional manufacturing

Superstructure Finished Parts: Ventilation Air Grills

Lateral ventilation air grill manufactured for a leading luxury boat shipyard.

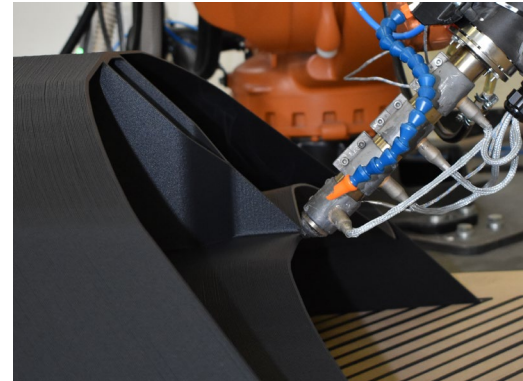
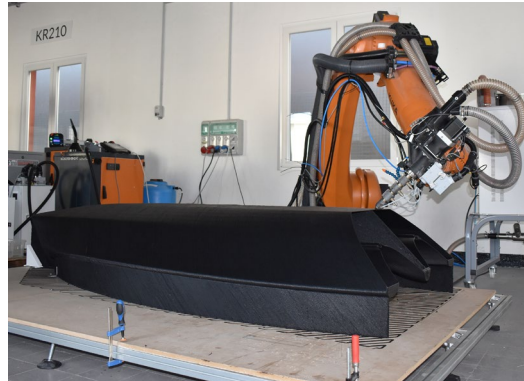
The part was built in a single piece, avoiding molds and assembly. Finished with gel coating and painting to be mounted on the yacht.



PROCESS / SET UP	
SYSTEM	HERON 300, HA Extruder, 3mm Nozzle
MATERIAL	ABS 30% GF
POST-PROCESSING	Sanding + Gel Coat + Painting
PRINT TIME (hr)	20
WEIGHT (kg)	22
REQUIREMENTS	
SIZE	1700 x 450 x 350 mm
SAVINGS vs. TRADITIONAL PROCESS	
LEAD TIME	50%
WEIGHT REDUCTION	35%
WASTE REDUCTION	60%
COST SAVING	70%
PROCESS OPTIMIZATION	Parts can be customized to fit exact requirements and space available, also introducing complex aesthetic features in the design as was done for this project Models or Molds are not needed

Beluga Sailing Dinghy

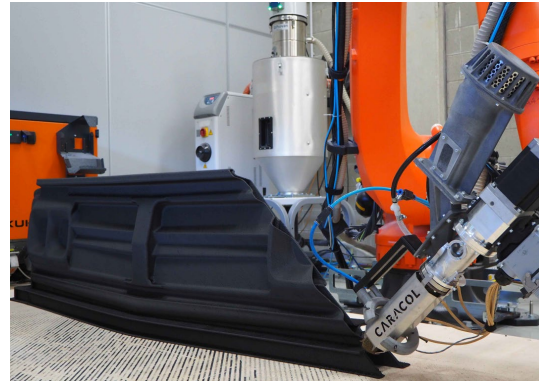
Sailing dinghy designed and optimized for 3D printing, manufactured with robotic LFAM with recycled materials



PROCESS / SET UP	
SYSTEM	HERON 300, HA Extruder, 3mm Nozzle
MATERIAL	rPP 30% GF
POST-PROCESSING	Sanding + Resin
PRINT TIME (hr)	40
WEIGHT (kg)	48
REQUIREMENTS	
SIZE	2800 x 1290 x 325 mm
SAVINGS vs. TRADITIONAL PROCESS	
LEAD TIME	50% (3 months - from design, to testing/validation, to production and post)
WASTE REDUCTION	70%
COST SAVING	30% (when production is set up)
PROCESS OPTIMIZATION	Custom design to fit sailor's specifications Avoid molds and tools, use of more sustainable materials and production method

Aesthetic Mock-up: custom Front Grille

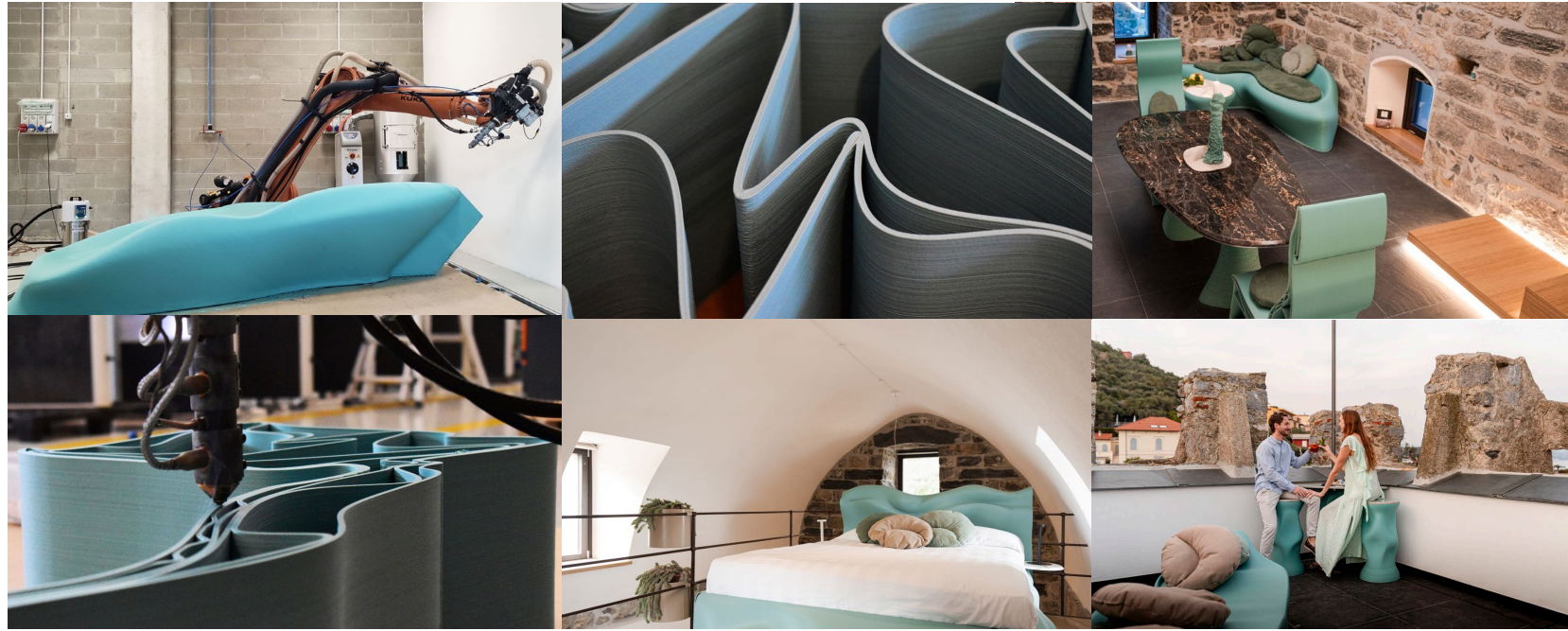
Mock-up (1:1) manufactured custom for car design, used for part fit check for 1968 Chevrolet C10 custom build by Gas Monkey Garage



PROCESS / SET UP	
SYSTEM	HERON 300, HA Extruder, 3mm Nozzle
MATERIAL	ABS 20% CF
POST-PROCESSING	Sanding
PRINT TIME (hr)	10
WEIGHT (kg)	30
REQUIREMENTS	
SIZE	1900 x 300 x 550 mm
SAVINGS vs. TRADITIONAL PROCESS	
LEAD TIME	70%
WASTE REDUCTION	50% (on single piece, avoid waste of expensive material used only for finished part)
COST SAVING	60%
PROCESS OPTIMIZATION	With this method, the company optimized design iterations, creating the final aluminum part only once, saving lead time and costs

Contract | Furniture & Architectural structures

The full installation was developed custom for the designer and architect to recall the sea



PROCESS / SET UP	
SYSTEM	HERON 300, HA Extruder, 3mm Nozzle
MATERIAL	Recycled PP 30% GF
SAVINGS vs. TRADITIONAL PROCESS	
LEAD TIME	Design + Production in 6 weeks
CUSTOMIZATION	100%
PROCESS OPTIMIZATION	Upcycled materials, No molds or tools, Zero waste generated

CARACOL

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