LEAM TECHNOLOGIES

Improve layer adhesion without losing part stability.

LEAM adds localized thermal control to large-format extrusion additive manufacturing so operators can manage the thermal process window: enough heat where layers need to bond, less uncontrolled heat where geometry needs to stay stable.

-50-75%	**WHY IT MATTERS** LFAM parts can show 50-75% lower mechanical performance in Z-direction than X/Y direction.
+457%	**UNREINFORCED LMPAEK** Published trials show Z-direction tensile-strength increase from PLT 300 C to PLT 340 C.
+70%	**REINFORCED LMPAEK** Published trials show Z-direction tensile-strength increase from uncontrolled printing to PLT 340 C.

PROBLEM

The same print can be too cold to bond and too hot to stay stable.

Long layer times may leave the previous bead too cold for strong interlayer formation. Short paths, thick walls, and high material flow can retain too much heat until the part loses geometric stability.

Print-speed changes, pauses, chamber heat, rejected parts, or manual temperature tuning can help in specific cases, but they make repeatability harder to document and scale.

TECHNOLOGY

Heat the deposition interface, then make the thermal process visible.

LEAM applies localized light-based energy near the deposition interface so the previous layer can be brought closer to a bondable state before the incoming bead arrives.

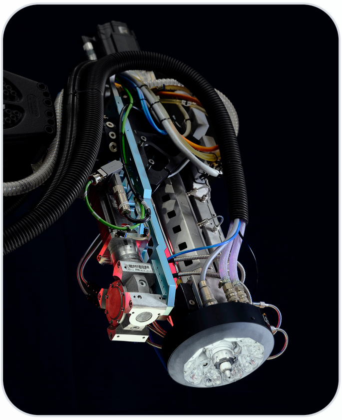
The control target is a hot, bondable surface where the next bead joins, while the broader bulk remains stable enough to hold geometry.

The light-based approach also keeps safety planning simpler than a laser installation, while LED power can be modulated faster than typical IR heating hardware.

Thermal sensing, machine communication, and process logging support tuning, repeatability review, and future qualification work.

Real-time process data gives teams visibility into when heat is added, what the part retains, and which settings produced the final build record for process QA.

Strength figures: SAMPE Europe 2025 paper, NLR and LEAM co-authorship, "Effect of Interlayer Temperature Control on Interlayer Strength for LFAM of High Performance Thermoplastics." Tested LMPAEK conditions, not a universal part-performance guarantee.



DEMEX SYSTEM

A retrofit thermal-control layer for existing platforms.

DEMEX brings LEAM thermal control to eligible existing extrusion AM platforms. It is a concrete installation package around the existing printer, robot cell, pilot platform, or production workflow.

END EFFECTOR

Process module around the extruder with sensing, localized heating, communication, and cooling connections.

CABINET AND HMI

Electrical cabinet with operator interface, LED supply controls, air regulation, and integration logic.

MACHINE ACCESS

OPC UA communication where the controller interface is available, with integration review before installation.

APPLICATIONS

Applications with proven production value and focused R&D potential.

MARINE

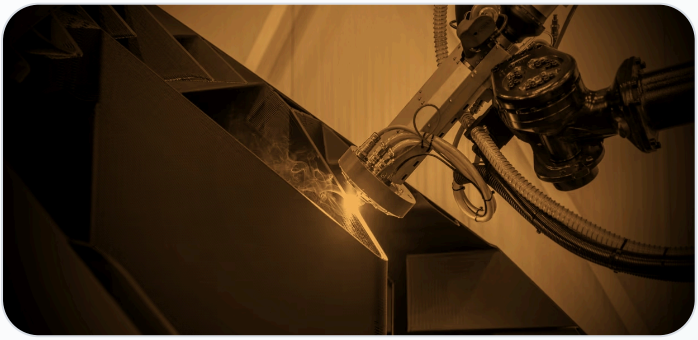
Large structures, long tool paths, and maritime application development where thermal stability constrains the process.

OIL AND GAS

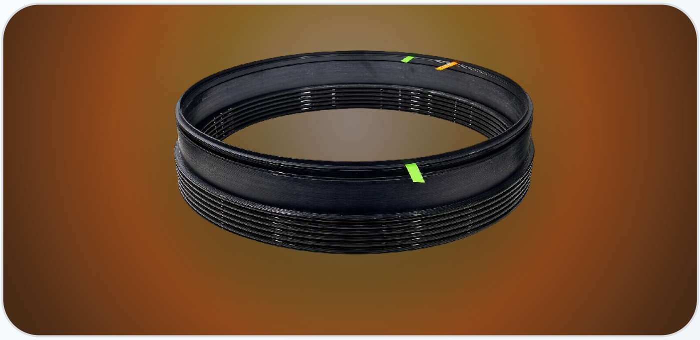
Large polymer components, seals, rings, and thick-wall geometries that need material and process-window review.

MOLDS AND TOOLING

Large-format tooling, plugs, molds, fixtures, and production aids where bonding, geometry, and repeatability matter.



Marine application development context with IMPACD.



Oil and gas seal geometry example for material and process review.

FIT REVIEW

Start from the application, not a generic machine claim.

- Process type, print path geometry, end-effector access, and machine/controller interface.
- Material category, color, transparency, pigment, fiber content, and absorption constraints.
- Part size, wall thickness or bead width, print speed, throughput, layer time, and target outcome.

R&D OPPORTUNITIES

Aerospace end-use parts, rail, and automotive cases should start from a defined part, material, machine, and target performance requirement. Useful paths include composite overprinting, injection-molding-grade materials, inventory reduction, and productivity under changing production conditions.

NEXT STEP

Let us figure out your application together.

Include the machine or platform, material, target part size, wall or bead dimensions, print speed, throughput, and the thermal limitation you are trying to solve.

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