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CASE STUDY · MARLUC SYNOPSIS

LEAP 71 Noyron rocket engines

IMPLEMENTED 2023–2026 · MANUFACTURING AND INDUSTRIAL · UAE · BAND C · CLAIMED ONLY

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LEAP 71, a Dubai company founded in 2023, says its Noyron model generates rocket engine designs from a specification without human design input. Engines printed from those designs have been hot-fired from 2024, and The Exploration Company signed a licence in March 2026. The test data are the company's own, and the method is a computational model rather than machine learning.

ABOUT THIS SYNOPSIS

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Facts and figures are as reported by the sources listed below, which may be incomplete, self-reported or out of date. Check the original source before relying on any figure.

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NOTICE WORDING LAST UPDATED 16 NOVEMBER 2026

AT A GLANCE

Frontier case: AI used for a scientific, medical or engineering breakthrough. The transformation is potential and unproven; MarLuc grades what has changed in practice so far.

AI and automation used: Proprietary computational engineering model (Noyron) that generates rocket engine geometry from performance specifications. The company describes it as deterministic; some press calls it AI.

Implemented: 2023–2026. Grade: band C, Process change, Claimed only.

Headline result, as reported: Rocket engines generated by LEAP 71's Noyron model have been hot-fired roughly every four weeks since mid-2024, by the company's account; a European space company licensed it in March 2026

1 · The case

The facts, as reported by the 5 sources listed at the end. Where a source is silent, the field says "Not reported".

Organisation

LEAP 71. Computational engineering company based in Dubai, founded in 2023 by an aerospace engineer and an entrepreneur. It designs machinery in aerospace, electric mobility, robotics and thermal systems for customers. Headcount: Not reported. Canvas block: 6. Data and technology. Also 4. Operations and process, 3. Customers and proposition.

Business challenge

The challenge. By LEAP 71's account, most space companies still rely on labour-intensive geometric design workflows, and engine design and iteration take months or years. Complex engines such as aerospikes (central spike, toroidal combustion chamber) are hard to design and cool.

How it was addressed. LEAP 71 built Noyron, which it calls a Large Computational Engineering Model, to generate engine geometry and manufacturing files from a performance specification. Partners print the engines and LEAP 71 fires them. First engine: a 5 kN liquid oxygen and kerosene thruster fired in June 2024 at Airborne Engineering in the UK, printed in copper alloy by AMCM. Later tests: a 5 kN aerospike in December 2024, kerosene engines from 1.5 to 7.5 kN, and two 20 kN methane and liquid oxygen engines (bell nozzle and aerospike) in December 2025, printed by Aconity3D. In March 2026 LEAP 71 and HBD printed a 200 kN aerospike in Inconel 718. The same month The Exploration Company signed a five-year, renewable agreement to use Noyron RP for propulsion component geometry generation. [1] [2] [3] [4] [5]

Who implemented it

In-house (In-house): LEAP 71: Built and operates the Noyron model and runs the test campaigns.
Printing partners named in the sources: AMCM (2024 engine), Aconity3D (2025 engines) and HBD (200 kN engine). Airborne Engineering hosted the 2024 tests and the University of Sheffield prepared and inspected the first engine. The Exploration Company is a licensing customer.

Technology (SEAM pillar E)

SEAM types: T5 Custom / fine-tuned models. Deployment: Not reported. Vendors and products: Noyron (Noyron RP for rocket engines), PicoGK geometry kernel.

Where it was built in: A proprietary software model that outputs engine geometry and manufacturing files; engines are printed by partners (AMCM, Aconity3D, HBD) and fired in test campaigns whose data feed back into the model.

What changed

Before: by LEAP 71's account, engine design took many months or years, per 3DPrint.com. After: the company says geometry is generated by software, with under three weeks from specification to first flame for its 20 kN engines and each design is tested by firing; The Exploration Company uses the software inside its own computational engineering programme and validates designs through its standard analysis and test approach. [1] [2] [3] [4] [5]

What it cost

Not reported

What it saved

By the company's account: under two weeks from final specification to manufacturing for the first engine (3DPrint.com) and under three weeks from specification to first flame for the 20 kN engines. Money saved: Not reported. [1] [2] [3] [4] [5]

Governance and control

LEAP 71 reports physical hot-fire tests as the check on the model, with data fed back into Noyron. The Exploration Company says it validates designs through its own analysis and test approach. Named owner, safety rules for test firing and independent review: Not reported.

S2 · Accountable owner · Not reported
Not reported.

A1 · Safe use · Not reported
Not reported.

A2 · Human in the loop · Claimed
The Exploration Company says designs from Noyron will be validated through its standard analysis and test approach. [4]

A3 · Monitoring and assurance · Claimed
LEAP 71 says it hot-fires engines frequently and feeds the data back into the model; a University of Sheffield team inspected the first engine after testing, per 3DPrint.com. [1] [3]

A4 · Vendor AI · Not reported
Not reported.

A5 · Agent controls · Not reported
No agents described.

A6 · Standards and regulation · Not reported
Not reported.

What worked, what did not, what is unproven

WORKED

– The June 2024 5 kN engine reached its target thrust on the first test, and a University of Sheffield team inspected it afterwards and found it intact, per 3DPrint.com.

– The 20 kN bell-nozzle engine reached steady state at nominal chamber pressure and thrust, with combustion efficiency above 93%, by the company's account.

– A European space company, The Exploration Company, which says it has worked with LEAP 71 since 2023, signed a five-year licence in March 2026.

DID NOT

– The 20 kN aerospike could be operated for only one burn because of startup transient issues, though it reached full chamber pressure of 50 bar, per LEAP 71.

– LEAP 71 says no aerospike has ever successfully flown to space; none of its engines is reported to have flown.

UNPROVEN

– Hot-fire results for the 200 kN aerospike: Not reported; HBD says the hardware is ready to move toward hot-fire qualification.

– LEAP 71 says it plans to test engines in a thrust class ten times larger than 20 kN in 2026; no such results are reported in the sources checked.

– Whether the method works for designs outside LEAP 71's own test campaigns, and whether it changes how the industry designs engines: potential and unproven.

– Independent test data on any engine: Not reported.

Timeline

2023 LEAP 71 founded in Dubai [3]

Dec 2024 Noyron-generated 5 kN aerospike fired as part of a four-engine campaign [2]

Dec 2025 Two 20 kN methane engines (bell nozzle and aerospike) hot-fired [3]

Mar 2026 200 kN aerospike printed with HBD; hot-fire not reported [5]

Mar 2026 The Exploration Company signs a five-year renewable licence for Noyron RP [4]

2 · Grade and SEAM assessment

MarLuc's opinion, made on the evidence above. How cases are graded: marluc.co.uk/case-studies/how-we-rate

Level of change and impact

Claimed: A. Grade: C, Process change. Proof: Claimed only. Level of change: Process change.

Process change (Level 2, band C) at LEAP 71 and, by its own account, one customer. Claimed as a wider transformation of engineering (band A); that is potential and unproven.

A changed design process: engine geometry is generated by software from a specification, printed, and fired, and one customer has licensed the software for component design. That is a process change (band C, level 2), proved only by the company's own test reports. LEAP 71 and its coverage describe a wider transformation of how engineering is done. That is potential and unproven: no flight, no independent test data and no 200 kN hot-fire have been reported in the sources checked.

The SEAM view and lessons learnt

The hardware results are specific and repeated, which is unusual for claims in this field. They are also the company's own, and the 200 kN engine has been printed but not reported fired. The method is a computational engineering model that LEAP 71 calls deterministic, so it is not machine learning in today's sense, and the case is marked as partly AI. Anyone buying or licensing such a tool needs the test data, not the label.

1. Ask for physical test data on the exact hardware you will use, not model predictions.
2. Check whether a design tool is machine learning or rule-based before comparing it with AI claims.
3. Keep your own analysis and test approach in place when you license a design model.

Evidence

Score 2 of 4. Self-reported: company releases and trade press repeating them; hardware was fired, but no independent test report was found.

Evaluation method. Company announcement and press reporting: LEAP 71 releases, a partner release and trade press; no independent test data or regulator finding.

Sources disagree. LEAP 71's releases describe Noyron as a deterministic system and also quote it being called "the first AI that builds machines". 3DPrint.com calls the model an A.I. model; LEAP 71's own text describes a computational engineering model.

3 · Original sources

Read these in full. To challenge a fact or a grade, use the contact form at marluc.co.uk or the link on https://marluc.co.uk/case-studies/leap-71-noyron-rocket-engines

[1] 3DPrint.com: LEAP 71's AI-Designed Rocket Engine Passes First Hot-Fire Test
https://3dprint.com/310671/leap-71s-ai-designed-rocket-engine-passes-first-hot-fire-test/

[2] TCT Magazine: LEAP 71 successfully hot fire tests additively manufactured aerospike engine
https://www.tctmagazine.com/leap71-successfully-hot-fire-tests-aerospike-engine/

[3] LEAP 71: LEAP 71 hot-fires two orbital-class methalox engines designed autonomously by Noyron
https://leap71.com/2025/12/11/leap-71-hot-fires-two-orbital-class-methalox-engines-designed-autonomously-by-noyron/

[4] LEAP 71: The Exploration Company licenses LEAP 71's Noyron RP for the design of next-generation rocket engines
https://leap71.com/2026/03/24/the-exploration-company-licenses-leap-71s-noyron-rp-for-the-design-of-next-generation-rocket-engines/

[5] LEAP 71: LEAP 71 and HBD produce world's largest 3D-printed aerospike rocket engine
https://leap71.com/2026/03/12/hbdxleap71tctshanghai2026/

LEAP 71 website: https://leap71.com

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