



INNOVATIVE PRINTING  
DURABLE THINKING

**We pioneer a sustainable model  
for industrial spare parts manufacturing**



An isometric illustration of a global supply chain network. It features a stylized world map in light blue with several yellow circular nodes connected by dashed yellow lines. Various 3D objects are placed around the map: a large white semi-truck in the top left, a white passenger airplane in the top right, a white cargo ship in the bottom left, a white oil tanker in the center, and several stacks of white and blue cargo boxes. The background is a solid light blue.

# **The global crisis revealed the limits of the global supply chain :**

- ✓ Parts sourced from around the world
- ✓ Excess orders of spares to avoid production downtime
- ✓ Lots of discarded obsolete parts





# **And the challenges ahead will only amplify the phenomenon :**

- ✓ Inflation of primary resources leading to higher transportation costs
- ✓ Geopolitical conflicts that complicate supply flux
- ✓ Environmental crisis generating social and economic disasters



**3D printing is the sustainable solution to revolutionize the global supply chain by manufacturing spare parts on-demand, on the spot, in record time.**



**Less**

**Transports  
Warehouses  
Logistics  
Obsolescence  
CO2 emissions**

**More**

**Flexibility  
Control  
Functionalities  
Innovation  
Sustainability**



A close-up, blue-tinted photograph of a 3D printer's nozzle printing a complex, lattice-structured part. The part has a repeating diamond-shaped pattern. The printer's mechanical components are visible in the background.

**3D printing accounts for only 0.1% of global industrial production\***

# Why?

No 3D technology fully meets industrial requirements:

- ✓ **Certified and high-performance materials** (fire-resistant, light but strong, durable)
- ✓ **Fully functional printers** to manufacture complex, standardized, ready-to-use parts in the most suited materials



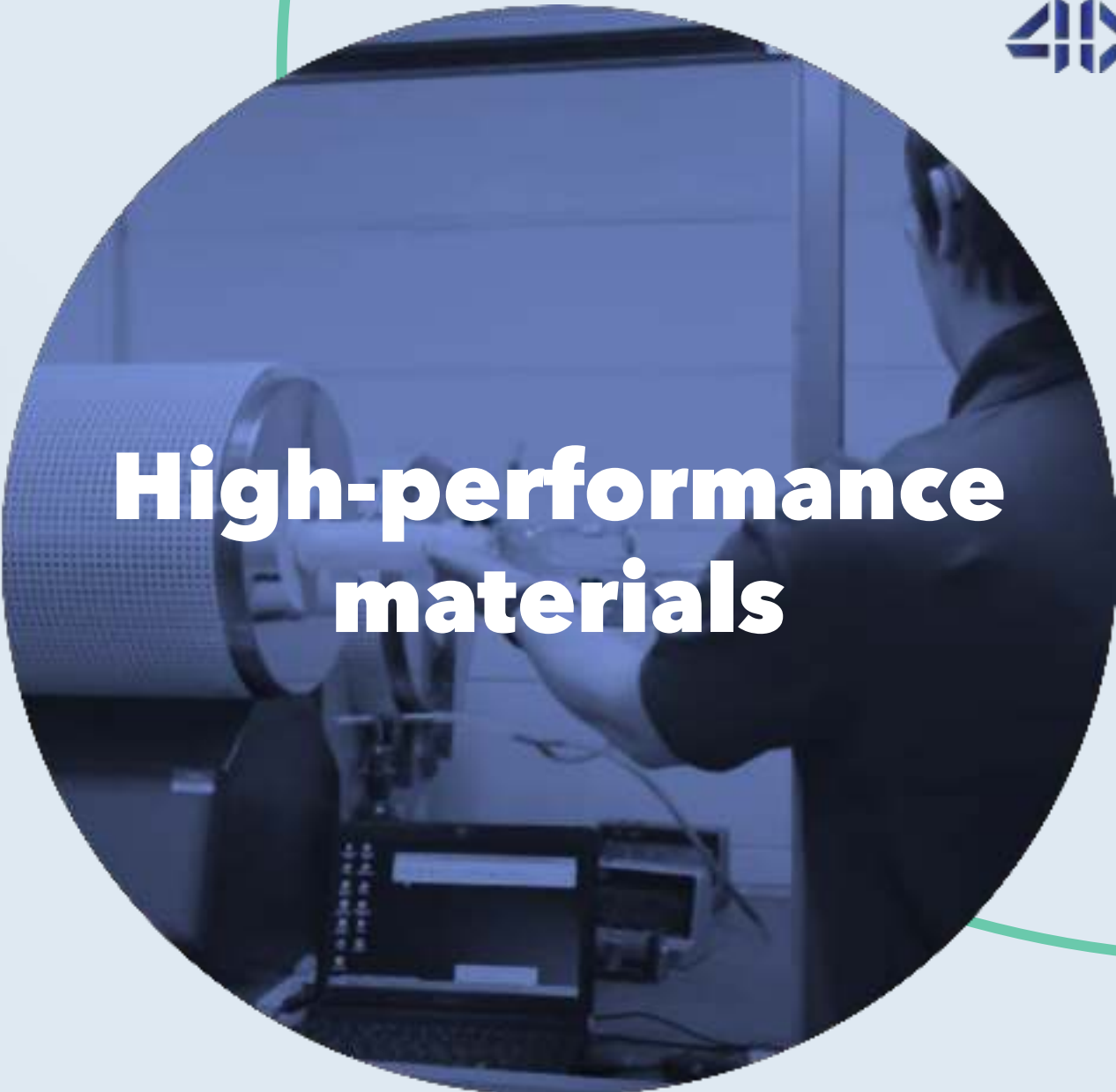
# Our talented team made of engineers and doctors in chemistry, processes and robotics solved this complex equation.





# We operate at 3 complementary levels to drive the industrial use of 3D printing forward.

Formulation of high-performance and printable materials designed to fulfill industrial certification requirements

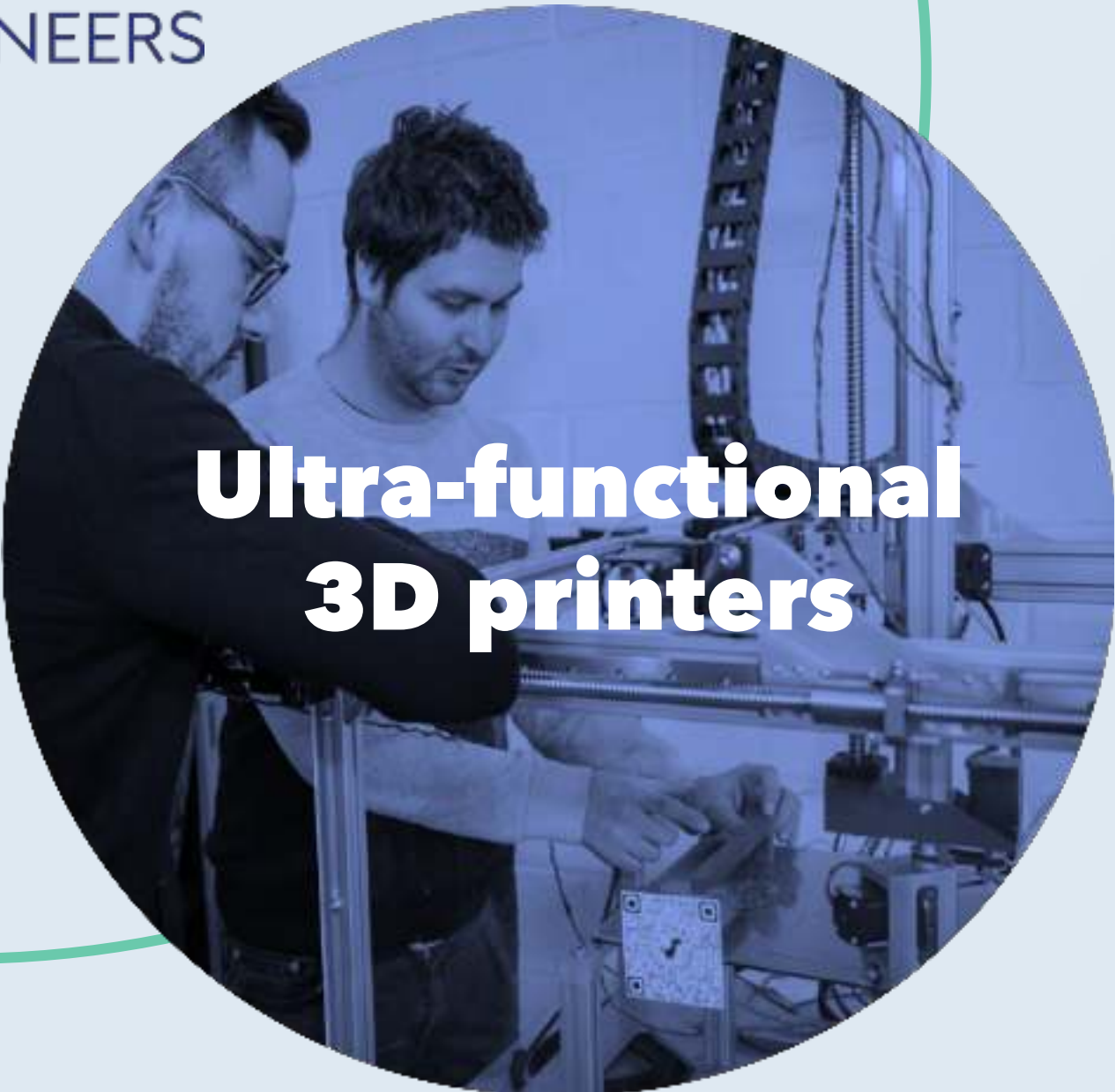


**High-performance materials**



**High-tech service**

Innovative industrial projects on hybrid processes ,materials expertise on sustainability and mechanical behavior.



**Ultra-functional 3D printers**

Development of innovative hybrid printers allowing to print complex, ready to use and standardized parts in any materials whilst limiting waste







# Our polyvalent and evolutive 4SHIFT printer

## Printing ready-to use and complex parts

Integrated post-processing layer by layer on all surface  
and hands-free

## Multiple high-performance materials

Polymers, composites, metallic, elastomers  
and ceramic,

## Productive manufacturing

Robotic tool change

## 3 industrial Patents

Robotic tool change, Full-hybridation,  
5 axis in high temperature environment



# Allowing us to pioneer the railway maintenance revolution



3DBIORAIL

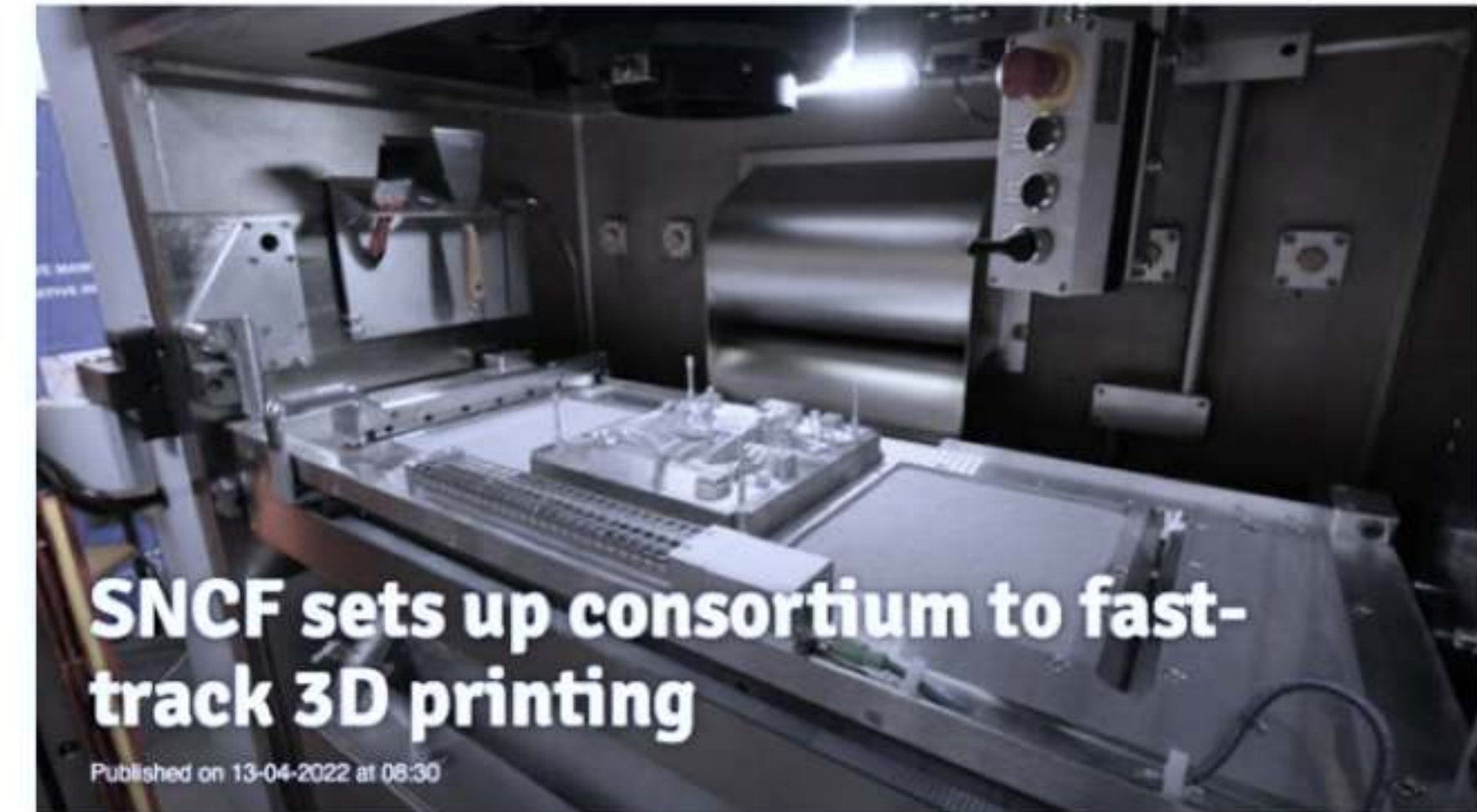


***7 Materials** patented and certified for Railway  
Spare parts production on-demand with our **IUF** for trains maintenance  
Hundreds of spare parts **digital designs***

**More than 10% of the 1500,000 references we have  
could be converted to 3D, but only 20 references roll**  
(Laetitia Kirschner, head of additive manufacturing projects, SNCF)



HOME INFRASTRUCTURE DIGITALISATION ROLLING STOCK POLICY MAGAZINES



## SNCF sets up consortium to fast-track 3D printing

Published on 13-04-2022 at 08:30

SNCF set up a new consortium earlier this month to accelerate the development of 3D printing on an industrial scale. Along with partners Centrale Nantes, VLM Robotics and 4D Pioneer, the railway company hopes this process can optimise train maintenance and reduce costs.



21-23 JUNE 2022  
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According to SNCF, the maintenance of rolling stock requires thousands of individual parts. In some cases, certain parts are no longer produced or only manufactured on demand, which usually means at an elevated price. Additive manufacturing (AM), more commonly known as 3D printing, will enable SNCF to do more of that production in house and at lower costs.

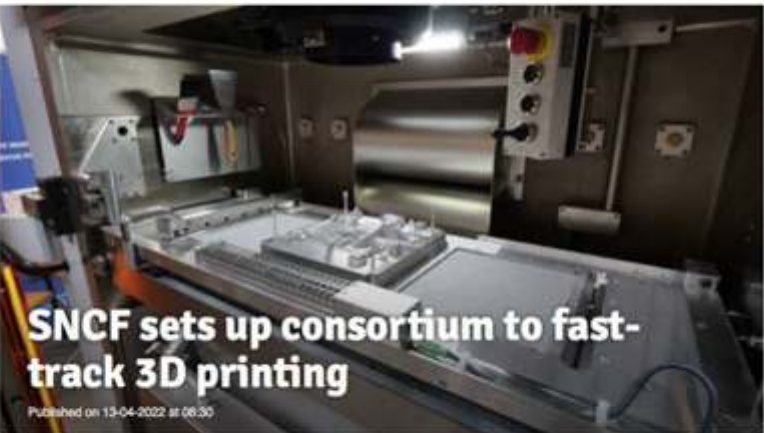
SNCF's consortium, labelled Additive4Rail, will therefore set up a production line for the repair and manufacturing of parts. This should result in better availability of parts and shorter delivery times. 3D printing also opens the door to make improvements to the existing parts, making them more reliable or lighter.

Additive4Rail comprises complementary partners, with SNCF contributing its experience with maintenance while prominent engineering school Centrale Nantes contributes its knowledge of materials, digital simulations and design and production. VLM Robotics brings to the table its experience with manufacturing the required machinery for additive manufacturing and the technology behind it. Finally, 4D Pioneers helps develop materials and finetune processes. Additive4Rail represents a combined investment of 10,7 million euros, with SNCF putting in the lion's share.

One of the main items the consortium will focus on is the development of a bogie, also known as a wheel truck. Additive4Rail hopes to have this structure ready for manufacturing in 2026.



# They talk about us





# Together let's change the game







PRINTING TODAY  
PIONEERING TOMORROW

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