# **Taking Off:** Strategies for Scaling Additive Manufacturing in Aerospace

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Christophe Blanc
*Technical Business Development Manager*

# **Lift Off:** AM Moves Beyond Prototyping to Production for Aerospace

## with Materialise for 10+ years

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Boeing 737 dado panels

Airbus retrofit timeframes

Component for the
liquid-fueled rocket engine

Custom ground support tools


Aircraft cable twists

eVTOL LIFT's ENDY bracket


DARE
Delft Aerospace Rocket Engineering
DARE
SPARROW
Burn brighter with SPARROW
NIPPON GASES
C. VANGOMPEL
ERIKS
TNO
DLX-150B 'Firebolt' Engine Test 7
August 2022

# Hear from our customer at

AERO FRIEDRICHSHAFEN

The Leading Show
for General Aviation
**April 9-12, 2025**

Stefan Gorkenant
CEO

VOCUS
we shape the future

Mittwoch 09.04.2025
**12:00 - 13:00 Uhr**

Upcoming Projekt HYDRA: H2 Hybridantrieb für UAM 2t Abfluggewicht - Ein Vortrag von Stefan Gorkenant (VOCUS)

Samstag 12.04.2025
**13:00 - 14:00 Uhr**

SafeBat2Fly - in der Musterzulassung - Ein Vortrag von Stefan Gorkenant (VOCUS)

Now 3d printed in
Nickel alloy Inconel 718

Formerly
Stainless steel
1.4571

# To 3D print in-house or outsource?
## Or a Hybrid model?

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materialise manufacturing

**Pros**
- ✓ Cost Savings
- ✓ Access to expertise
- ✓ Scalability to handle overflow
- ✓ Simplified logistics, reduce need for warehousing

**Cons:**
- **X** Quality and traceability risks
- **X** IP vulnerability
- **X** Coordination challenges
- **X** Regulatory compliance


**De-risk** the full AM production chain and **increase quality control** of critical parts with AM Process Control System.

materialise co-am software platform

**Pros**
- ✓ Full control over quality and process
- ✓ Faster iteration for design optimization
- ✓ IP Protection
- ✓ Control over the supply chain

**Cons:**
- **X** High upfront cost
- **X** Scalability limitations
- **X** Regulator and testing burdens
- **X** Operational complexity to maintain consistent quality

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# Leverage 35+ years of AM experience to enable your aerospace use cases

## Manufacturing Services

Rely on our EN9100 certified production line for Aerospace and Form-1 accreditation to deliver your applications

## Consultancy

Work and team up with our experts to translate your business challenges into 3D printing opportunities

## Training

Scale your AM knowhow. From technology introduction to design for AM and certification processes

## Software

Build successful additive manufacturing plants by making use of our software tools and digital solutions

# Materialise Aerospace Experience

**+500k**
Flying parts produced

**+4k**
Part series per year across diverse aero customers

**+20K**
In our longest running series of recurring parts

**26K**
Parts produced per year for the Airbus A350 ecosystem

# Case Study: Airbus Spacer Panels

## Challenge

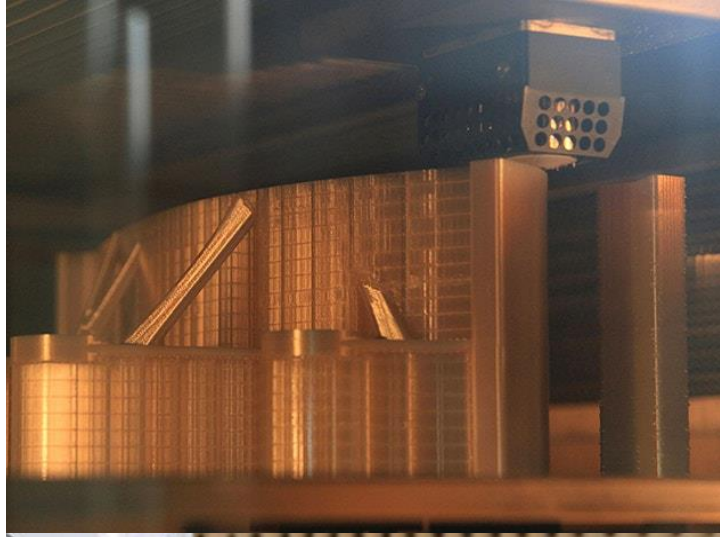
Airbus needed a quick, cost-effective solution for producing small batches of custom spacer panels for aircraft cabin retrofits.

## Solution

**Technology**: FDM (Stratasys)
**Material**: ULTEM 9085

To meet the **Airbus' stringent requirements**, our aerospace manufacturing facility:

- ✓EN9100 certified
- ✓EASA Part 21.G certified
- ✓End-to-end QMS system



**Result:** Flight-ready, aesthetically perfect panels that are **15% lighter. Since 2014,** Materalise has printed 100+ different part numbers for the Airbus A350, totaling around 26,000 parts produced annually

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# Case Study: Materialise and EOS opened new applications and design possibilities for Airbus

## Challenge

Airbus needed a scalable way to adopt AM for **complex design features**, such as interlocking mechanisms.

## Solution

**Technology**: EOS SLS
**Material:** EOS PA 2241 FR

**Result:** Materialise printed 100+ different part numbers for the Airbus A350, totaling around 26,000 parts produced annually – since 2021

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# Certified Production

**Cabin and interior parts**

**Structural Parts**

**Aftermarket parts**

**Production tools**

1

## On-hand expertise

Our team can help you manage exacting project specifications, printing requirements, and assembly needs, and can advise you on design and material choices.

2

## Certified processes and materials

We're certified for the 3D printing processes you need, so you don't have to be.

3

## Historical performance data

Our data lake gives you access to performance data from hundreds of aerospace builds, including parameters like part density, tensile strength, and elastic modulus.

4

## Complete process documentation

We can support you in ensuring every project is documented to perfection. As well as First Article Inspection, CoCs, and SLAs on all manufacturing projects

5

## Applied R&D support

In addition to existing certified processes, we can also support you in developing and qualifying new 3D printing applications and materials.

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# Materialise Software

## Globally acknowledged by aerospace leaders

Baker Hughes
CARPENTER ADDITIVE
AIRBUS
GE Additive
LOCKHEED MARTIN
Wabtec

# Case Study: Avio Aero


## Challenge

Avio Aero needed to efficiently manufacture lightweight, high-performance titanium blades for jet engine turbines. **This required**: **precise control, repeatability, and full traceability to meet stringent aerospace regulations**.

## Solution

**Materialise CO-AM** was implemented to manage the entire AM process, from data preparation to production control and traceability.

**Result:** Avio Aero was able to certify their 3D printing workflow and print over 60,000 parts/year of their lightweight titanium blade for jet engine turbines while meeting regulatory requirements since 2015.

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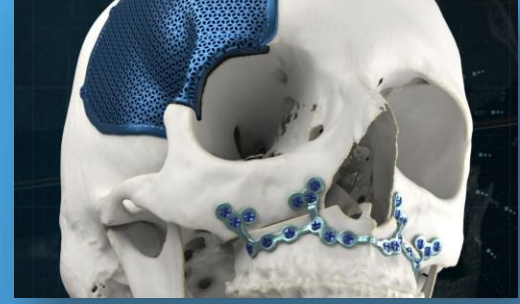
# N P I

**New** **Product** **(Process)** **Introduction**



**Medical CMF implants for US market**
Material: Titanium
Designed & manufactured by Materialise

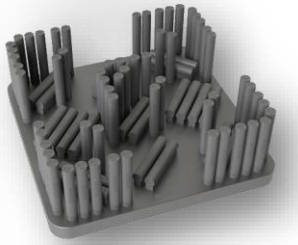
**Aircraft cabin spacer for Airbus**
Material: FDM Ultem 9085
Manufactured by Materialise

**eVTOL bracket by LIFT**
Material: Titanium
Manufactured by Materialise

Research | Validation | ! | Production | RCA

co-am

## AM Process Backbone System

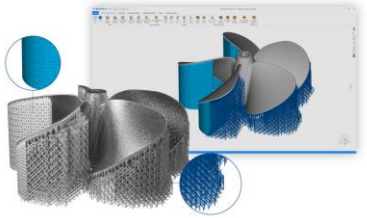



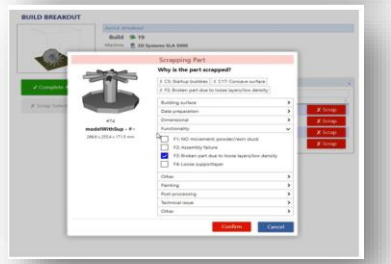
**BACKBONE**
AM Process Backbone system

Traceability
Efficiency
Quality

AM
Materialise co-am

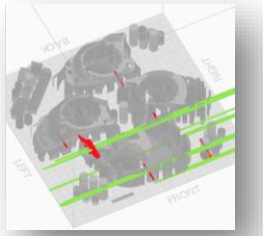
## AM Pre-Print & Digital Factory Software





## AM Quality & Process Control System





3D DATA
LAYER DATA
EQUIPM & ENV.
QPC
AM Quality & Process Control system
PROCESS DATA
MATERIAL
TEST DATA

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# QPC: AM Quality & Process Control

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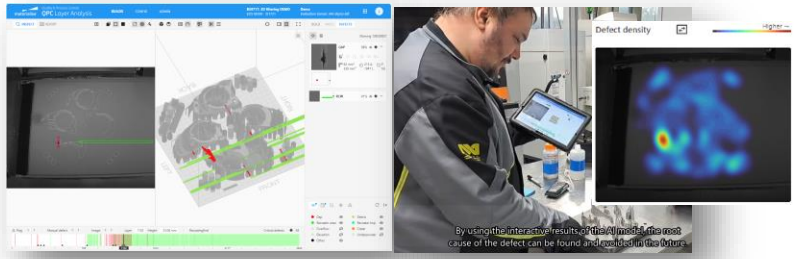
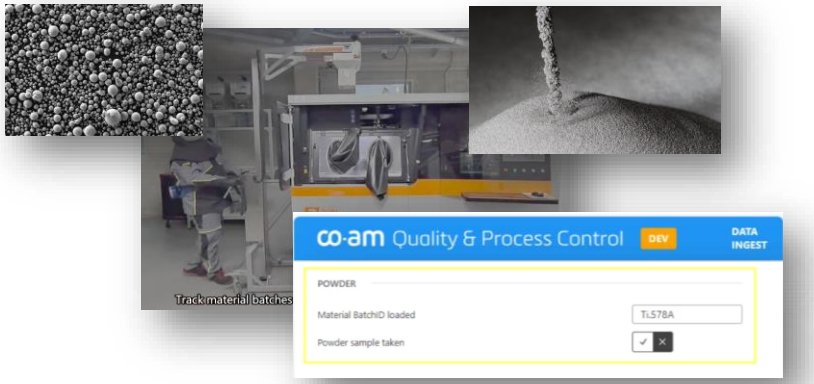
## Layer Analysis

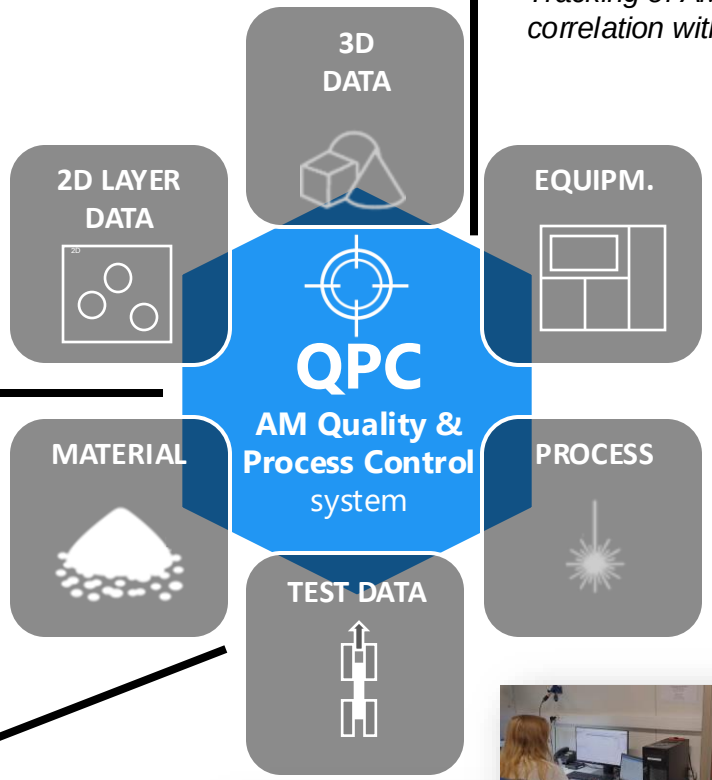
*Correlation & AI analytics of 2D/3D AM data sources for early scrap detection & RCA (Root Cause Analysis)*




## Material Management

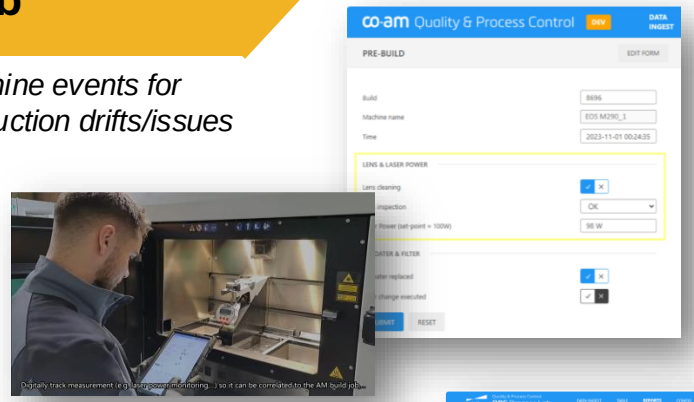
*Management of complex AM powder genealogy (batches, mixing,...) for enhanced quality & traceability*



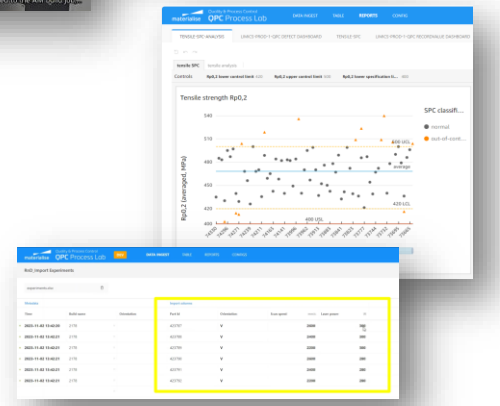




## Process Lab

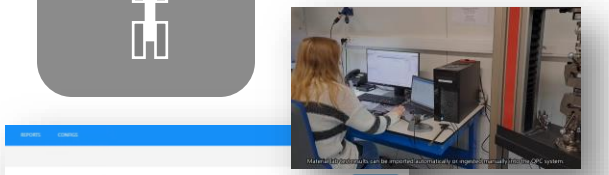
*Tracking of AM machine events for correlation with production drifts/issues*

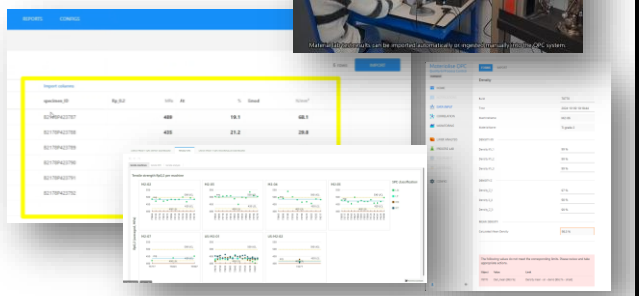



*Central tracking of (AM) process parameters for experiments/research*

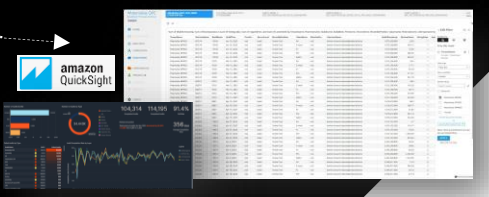


*Fast specification compliance checks of material test lab results*





***Stitched, correlated & actionable data of all 6 data sources***



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Contact us: