autentica

# Digital Thread for Advanced Manufacturing

## Protecting IP While Optimising Resources

IDAIC Meeting - IP Considerations & Opportunities

Funded by Innovate UK

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# The AM Manufacturing Challenge

## IP Protection in digital supply chain

Securely sharing OEM design files across distributed 3D printing networks while protecting IP rights, maintaining control, and ensuring regulatory compliance.

- The Digital Thread – integrity provenance and data security
- Quality assurance and testing
- Cyber physical system and device security
- Supply chain resilience and material security

## Resource Inefficiency

Current Industrial decarbonization challenges using AM:

- Integrating AM demands robust coordination and scheduling across diverse printer platforms, while securely delivering real-time build instructions without compromising performance or reliability.
- Improving AM process efficiency requires a wholesale redesign of processes and products to use low carbon inputs,

# The Autentica Parts Solution

*ISO/ASTM 52951 Compliant Digital Thread*

**Web3 Protocols**

Blockchain-enabled audit trails

**NFT IP Protection**

Immutable ownership records

**Digital Twins**

Real-time process monitoring

**AI Optimization**

Smart printer allocation

## Key Innovation: Encrypted Session-Based Streaming

- Build files never stored on printers - only streamed during session
- End-to-end encryption with edge computing architecture
- NFT-based licensing ensures IP rights enforcement

# Live Pilot Implementation

*AFD Systems Ltd - Blackpool Advanced Engineering*

AFD SYSTEMS

ncc innovating for industry

AFD Systems serves critical sectors including Aerospace, Defence, Nuclear, and Space
Specializing in precision-engineered components with stringent IP and quality requirements
Ideal testbed environment for validating both security and efficiency improvements

## Pilot Programme Status

- System deployed and operational in production environment
- Currently measuring manufacturing process efficiency, material usage, and IP security metrics
- Early indicators demonstrate measurable improvements across all target areas

*Full results and case study to be published upon project completion in Q2 2026*

# Intellectual Property Protection

*Multi-Layered Security Architecture*

## 1 NFT-Based Licensing

- Each design file minted as unique NFT on blockchain
- Immutable ownership records prevent unauthorised use
- Smart contracts enforce licensing terms automatically
- Traceable provenance across the entire supply chain

## 2 Encrypted Streaming (No Storage)

- Build instructions streamed in real-time to printer
- End-to-end AES-256 encryption during transmission
- Files never stored on printer hardware or local systems
- Session expires immediately after build completion

## 3 Blockchain Audit Trail

- Every access event recorded on distributed ledger
- Tamper-resistant logs of who accessed what, when
- Regulatory compliance for defence & aerospace sectors
- Real-time anomaly detection for suspicious activity

# Scale-Up & Pilot Programme

## Target Sectors

- **Defence & Aerospace**
- **Nuclear**
- **Space**
- **Maritime**
- **Automotive**

## Proof of Concept Pilot Programme

- Affordable pricing for UK SMEs
- 3-6 month implementation timeline
- Full technical support & training included

## What You Get

- ISO/ASTM 52951 compliant infrastructure
- AI-powered resource optimization (25-35% efficiency gains)
- Complete IP protection with NFT licensing
- Regulatory-ready audit trails for compliance

# AI + DIGITAL THREAD ARCHITECTURE

*SECURE, ENCRYPTED MANUFACTURING WORKFLOW*

## TECHNICAL DATA INPUT

CAD File → Engineering Design → Material Specification

## NFT-BASED IP PROTECTION

NFT

- OWNERSHIP TOKENS
- ACCESS CONTROL

## DIGITAL TWINS & EDGE COMPUTING

AI

## INTELLIGENT AI ORCHESTRATOR

## ENCRYPTED DIGITAL THREAD

SECURE STREAMING

SESSION-BASED ACCESS

## AUDIT & TRACEABILITY LEDGER

BLOCKCHAIN RECORDS

IMMUTABLE AUDIT TRAILS

## AI-DRIVEN RESOURCE OPTIMISATION

DEFENCE PARTS PRINTING | AEROSPACE COMPONENTS | AUTOMOTIVE PROTOTYPES

## SECURE SESSION OUTPUT

- NO FILE TRANSFER
- ENCRYPTED INSTRUCTIONS
- TEMPORARY ACCESS
- VERIFIED BUILD REPORT

# Join Our Pilot Programme

*Be Part of the Future of Secure, Sustainable Manufacturing*

**Email:** info@autenticaparts.com
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*Limited pilot slots available for Q1 2026*

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