

Inkwell Data Announces Secure OT–IT Integration Architecture for CNC Environments

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Inkwell Data today announced a validated integration architecture enabling legacy CNC machines to be securely connected to enterprise IT environments using the Altior OT–IT platform, demonstrating how air-gapped operational assets can be governed, contextualised and aligned with modern digital ecosystems.

Computer Numerical Control (CNC) machines remain foundational to global manufacturing. They execute G-code instructions to mill, drill and shape high-precision components used across automotive, aerospace, electronics and medical device sectors. By the next decade, more than 2.8 million CNC machines will be installed worldwide. Many are high-value capital assets designed to operate reliably for 20–30 years.

When organisations seek to extend enterprise digital initiatives into live CNC environments, they must address additional considerations — including serial connectivity, legacy controller logic, OT security boundaries, deterministic execution requirements and regulatory obligations — that arise from the nature of operational systems rather than from enterprise platforms themselves.

Altior is designed to support this extension by operating as an independent OT–IT data infrastructure layer. It connects to CNC controllers across vendors, generations and sites, and exposes governed, contextualised operational data to enterprise systems without requiring firmware modification, bespoke integration projects or changes to established control logic.

Where appropriate, Altior introduces lightweight, deterministic logic at the edge — including structured G-code event mapping, state modelling, data filtering, aggregation and policy enforcement — close to operational assets. This enables organisations to reduce unnecessary data propagation, preserve resilience and ensure that only relevant, business-ready operational data is made available to enterprise environments, while maintaining OT safety systems and air-gap principles.

This architecture delivers several benefits for organisations integrating CNC estates into enterprise platforms:

- **Preservation of OT security and regulatory alignment**

Altior maintains clear separation between operational equipment and enterprise networks. Communication is mediated and policy-driven, avoiding persistent inbound access and supporting compliance with frameworks such as NIS2 and national critical infrastructure regulations.

- **Scalable estate-wide deployment**

The architecture supports both controlled validation deployments and production-scale rollout across hundreds or thousands of machines, without introducing vendor lock-in.

- **Structured governance and auditability**

Altior manages CNC digital twin definitions, workload policies, data lineage and access controls upstream, supporting auditability and clear responsibility boundaries between OT operators, enterprise platforms and downstream analytics or AI systems.

- **Long-term architectural flexibility**

By decoupling CNC connectivity from individual enterprise platforms, organisations retain the ability to evolve their digital twin, analytics and AI strategies without re-engineering OT integrations.

The demonstrated architecture illustrates how Altior complements enterprise systems by handling OT-specific data preparation, edge-level mediation and governance, while enterprise platforms remain authoritative for analytics, digital twin management and lifecycle operations.

This approach aligns with emerging best practices for deploying digital twins and AI within operational manufacturing environments, where separation of concerns, secure data mediation and human-supervised execution are essential to safety, resilience and regulatory confidence.

For more information about Altior and CNC integration, please contact us at info@inkwelldata.com.

About Inkwell Data

Inkwell Data provides secure OT–IT data infrastructure for industrial and critical infrastructure environments. Its Altior platform enables organisations to connect, govern and route operational data across heterogeneous OT estates, supporting digital twins, analytics and AI initiatives without compromising safety, security or operational independence.