

How to Integrate in a Project Controls Environment (2025 Update)

By Juan Grobler, Managing Director, Global Footprints Holding LLC.

Introduction: Welcome to Integrated Project Controls (IPC)

Integration in a project controls environment has been a long-standing topic, but now we have a clear term for its ultimate goal: Integrated Project Controls (IPC). IPC refers to the merging of data silos across systems, enabling owners and operators to report with confidence, receive early warnings, proactively manage risk, and apply practical solutions. This leads to better-managed projects and programs.

This white paper expands on the core ideas from the original 2019 publication. It updates them with new capabilities, especially the integration of AI and large language models (LLMs) into the IPC system.

Integration Beyond SOA: A Shift from Manual to Intelligent Orchestration

While traditional service-oriented architectures (SOA) and enterprise service buses (ESB) have enabled structured data flows between systems such as ERPs, cost management, scheduling, and risk platforms, today's integration needs go further. We now emphasize:

- Full lifecycle integration, covering scope, change, cost, schedule, risk, and contract alignment.
- Real-time coordination of both structured and unstructured data.
- AI-driven insights that enhance dashboards with explanations, predictions, and suggestions.

The original integration patterns, especially the use of a common control account structure and harmonized WBS/OBS/CBS, remain vital. But these are now expanded by machine learning algorithms and LLMs that can analyze data, detect hidden signals, and support improved human decision-making.

Introducing Artificial Intelligence to IPC

AI has become a crucial enabler in integrated environments, especially within construction, mining, energy, and infrastructure projects. By integrating large language models (LLMs) and analytical models into IPC frameworks, we can analyze both:

- i) structured data from cost, schedule, ERP, and engineering systems; and ii) unstructured data from documents, weather APIs, satellite imagery, geological surveys, and even news or social commentary.

This dual-stream intelligence provides owner/operators with: faster responses to complex operational questions; i) early risk detection through patterns invisible to manual analysis; ii) natural language queries that make accessing data and KPIs easier; and iii) augmented reports that explain anomalies and recommend solutions.

IPC in Action: Global Integrator as the Enabler

Global Integrator has played a key role in delivering real-time, accurate IPC environments. The platform continues to offer:

- i) Harmonized WBS, CBS, OBS, and risk data through a single integration layer.
- ii) Support for NEC contract models, including automated CR/EWN processing.
- iii) Seamless integration with SAP, Oracle, P6, and modern cloud tools.
- iv) Plug-in AI modules that provide narrative analytics, scenario simulation, and root cause analysis. With the latest drag-and-drop configuration tools, Global Integrator adapts to any system architecture, providing scalable, flexible, and future-proof deployment across industries.

Practical Outcomes

Through IPC and the use of intelligent integration:

1. Stakeholders receive consistent and timely reports across all control domains.
2. Business units shift from reactive troubleshooting to predictive governance.
3. Programs improve their chances of delivering on time and within budget with increased assurance.

Conclusion

The reality of project controls in 2025 is that integration must shift from just technical details to strategic support. IPC is the new blueprint for owner/operators to achieve true situational awareness, and adding AI and LLMs ensures data turns into insight, not simply information.

This paper updates and expands on the original 2019 white paper titled *How to Integrate in a Project Controls Environment* and includes the latest developments in the field.

Note

This version of the white paper is written by Juan Grobler, founder and CEO of Global Footprints Holdings LLC., based on extensive experience implementing IPC frameworks across global infrastructure, mining, and government sectors.

Glossary of Terms

Project Structures:

WBS – Work Breakdown Structure

A hierarchical breakdown of the entire scope of work into manageable sections. It specifies what needs to be delivered.

OBS – Organizational Breakdown Structure

A description of the organization responsible for carrying out the project. It links roles, departments, or individuals to the WBS.

CBS – Cost Breakdown Structure

A hierarchical cost structure aligned with the WBS, illustrating how the overall budget is distributed across various project components.

Project Governance:

CR – Change Request

A formal proposal to modify certain aspects of the project. This may include scope, cost, schedule, or resources. CRs are assessed for their impact and either approved or rejected according to governance procedures.

EWN – Early Warning Notification

A proactive alert issued when something might affect the project, whether positively or negatively. Commonly used in NEC-based contracts to promote early response and mitigation.

Technology:

LLM – Large Language Model

An AI model (like ChatGPT) trained on large datasets to understand and produce human-like text. In project controls, LLMs can analyze both structured and unstructured data, provide natural language responses, generate summaries, detect risks, or suggest actions based on patterns.