Institute of Commissioning & Assurance

WHY INTEGRATION FAILURE IS A GOVERNANCE PROBLEM, NOT A TECHNICAL ONE

Issued by: Institute of Commissioning and Assurance (ICxA)

Outcome Assurance is required as a governing layer to protect outcome accountability beyond project delivery.

Integration failure is a recurring issue on large infrastructure and energy projects. Assets are constructed, systems are installed, and individual components are tested. Formal completion is achieved. Yet once the asset is placed into use, problems often emerge. Systems do not behave as a coherent whole. Controls conflict, safety responses differ when systems interact, and operational performance falls short of expectations. These issues frequently require extended corrective work after handover.

Such failures are commonly described as technical. In most cases, they are not. They are the result of how projects are governed.

The technologies involved are rarely new. Standards for designing and testing individual systems are generally mature and well understood. Delivery teams are typically capable of meeting their technical obligations. What is consistently missing is a clear governing decision on whether the combined systems are ready to operate together as a single outcome.

Projects often rely on coordination to achieve integration. Different teams are expected to collaborate, manage interfaces, and resolve issues as they arise. Each contractor verifies its own scope. If all parties complete their work, integration is assumed to have occurred. On complex projects, this assumption is unreliable.

Integration is not simply the result of cooperation. It is an outcome that must be deliberately assessed and approved. Without an explicit decision that systems are ready to operate together, integration is left to assumption rather than assurance.

Most projects carry out extensive testing of individual systems. Equipment is inspected, tests are performed, and documentation is produced. These activities are necessary, but they answer only a limited question: whether each system functions on its own.

They do not answer the more important question of whether the asset as a whole will operate safely, reliably, and controllably under real conditions. That question cannot be resolved by technical results alone. It requires a formal decision that the overall outcome is acceptable to place into operation.

Integration problems arise when no authority is clearly assigned to define what acceptable integration looks like, to determine what evidence is required, to consider real operating conditions and failure scenarios, and to approve the transition from construction to operation. In the absence of such authority, responsibility becomes diffuse.

Delivery teams focus on completing their contractual scope. Schedule pressure encourages early handover. Open integration issues are deferred into operations. When failures appear after handover, accountability is often unclear. This pattern reflects a missing governance function, not a lack of engineering effort.

Contracts alone cannot resolve this issue. While they are effective at allocating scope and commercial risk, they are not designed to authorise outcomes. Integration on complex projects typically spans multiple contracts and organisations. No single contractor is positioned to determine that the entire asset is ready to operate, even where an integration role exists.

For this reason, decisions about integration must sit above contractual arrangements. A governing authority is required to protect the outcome itself, rather than focusing solely on delivery completion.

Effective projects treat integration as something that must be formally approved. Clear decision points are established after systems are assembled but before the asset enters operation. At these points, an authorised body reviews evidence showing how systems behave together, including safety responses, control behaviour, failure modes, and operational conditions. Only when this evidence is satisfactory does the project proceed.

Where such decision points do not exist, integration is never truly approved. It is assumed. The consequences of that assumption typically surface only after the asset is in use.

Integration succeeds when it is governed as an outcome rather than treated as a technical detail to be resolved late in delivery. This requires a clear definition of the integrated outcome, explicit authority to approve it, evidence focused on system interactions, and discipline in preventing premature transfer into operation.

Projects rarely fail because engineers lack skill. They fail because no one is clearly responsible for deciding whether the asset, as a whole, is ready to operate. Until integration is governed in this way, technical competence alone will not prevent recurring integration failure.