

LARGE, COMPLEX PROJECT?

Project Risk Mitigation with a Main Automation Contractor





Large, Complex Projects are Tough to Coordinate

Large complex projects have become a way of life. Industrial companies seek out ways to minimize CAPEX and OPEX costs, prepare for scalable growth, and diversify their portfolios - all while avoiding schedule overruns and managing risk.

However, taking on large, complex projects comes with undeniable risk. Large projects are susceptible to budget and scope creep, which can lead to overspending and missed deadlines. The involvement of multiple vendors, consultants, and internal stakeholders can lead to costly miscommunication.

Despite comprising roughly 3% of a project's budget, automation system design can have a disproportionate impact on project outcome - accounting for as much as 80% of risk late in a project. With this in mind, many companies are involving a Main Automation Contractor (MAC) from the outset of large projects to ensure the project is designed, engineered, and integrated for success.

By choosing to use a main automation contractor for your large project, you can realize many benefits.

- A more comprehensive automation system design roadmap, when implemented early in the project, reduces detailed design costs.
- Standardized hardware, software, network architecture and process libraries streamline engineering work, reducing project cost and time.
- Large projects require equipment from multiple skid builders. Proper coordination of skid design and installation with the various builders results in an overall more seamlessly integrated system.
- A well-designed system is more readily accepted by operations, allowing projects to close out on time and on budget.

RISKS OF LARGE/COMPLEX PROJECTS



3 out of every 4 large/complex projects face schedule delays



More than half of large/complex projects are completed over budget



Large/complex projects often involve **more than 15 vendors** (with overlapping responsibilities)



Top three reasons large/complex projects fail:

- » **High** complexity and risk
- » **Inadequate** resources and talent
- » **Complex** technology and vast data to manage



Enter the Main Automation Contractor

End-users and engineering, procurement, and construction firms (EPCs) are increasingly seeking partnerships with MACs to share risk and navigate the complexities of large automation projects. And it's easy to understand why: a recent Frost & Sullivan analysis shows that early engagement of a MAC can result in an average of 30% project cost-savings, reduced plant commissioning, and more alignment with planned start-up schedules.

MAC as a Risk-sharing Vehicle for EPCs

A MAC takes on the risk and responsibility associated with implementing a complex automation system, allowing the EPC to focus on providing project expertise that aligns with their unique strengths.

MACs that have experience working with EPCs fare particularly well as they understand how to adjust their scope of involvement to match the skill-set and risk profile of the EPC.

MAC involvement should be strategic, and should vary based on the skills of the EPC(s) involved in the project, as well as the specifics of the particular project and/or application.

MAC as a Winning Solution for End-Users

End users reduce their project risks and improve their project outcomes by engaging a MAC, through:

- Better alignment between the project's end-result and the original vision
- Fewer delays and cost overruns as a result of miscommunication between stakeholders
- Best-in-class execution on individual project components, as each party is assigned to the tasks that align with their core business competencies

Have they met?

When the MAC brings familiarity with other project vendors, end-users can expect positive impacts on project outcomes:

- **Better overall integration of project components with one other**
- **Better integration of project components with the rest of the enterprise**
- **Increased ability to scale in the future**

ENGAGE EARLY TO MAXIMIZE BENEFITS

Historically, an automation vendor was involved in a project from the project and interface management stage through startup. However, it's become clear that decisions made in the early stages of a project have an impact throughout the project lifecycle. Because of this, as many companies are realizing that engaging a MAC earlier in the project and keeping them engaged later brings benefits like better systems integration and a more optimized user experience.

END-TO-END MAC INVOLVEMENT INCLUDES:

- FEED
- Detailed design (control system, shutdown, fire and gas, instrumentation, and electrical systems)
- Project and interface management
- Procurement (as appropriate, mainly an EPC role)
- Coordination of the machine builders
- Commissioning and startup support
- Site installation management
- Training
- Operations support (lifecycle)
- Construction support



Early Engagement is Essential

Project success can usually be traced back to quality planning. Front-end engineering and design (FEED) studies provide a thorough project scope, complete project budget, total cost of ownership, implementation timeline and initial risk assessment. All of these factors combine to help reduce risk and uncertainty during the detailed engineering and commissioning phases, and can help create lasting value throughout the production lifecycle.

When a MAC participates in the FEED analysis, they are poised to more effectively manage the project – reducing time to startup and overall risk by maintaining focus on the project goals, scope and budget. And while automation composes a small part of the overall scope of a project in terms of investment dollars, MAC engagement in the FEED is one of the best ways to achieve lower total cost of ownership.

Your MAC Should Possess the Following FEED Capabilities

- | | | |
|--|--|--|
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Process
Specifications, selection performance | 
Control & Network
Preparation and assessment | 
Instrumentation
Specifications, selections, gap analysis report |
| 
Mechanical
Processes and systems | 
Safety
Documentation, analysis, assessment | 
Information (MES/MIS)
Assessment and analytics |
| 
Power/Electrical
Design, specifications, sizing | 
Quality
Risk assessment and documentation | 
Packaged Equipment
Standards and integration |

SUCCESS STORY

Main Automation Contractor Strategy Helps Leading Energy Producer Keep Mega Project On Schedule.

A leading North American energy producer embarked on a \$2,7-billion mega program, designed to provide 1 Bcf/d of raw natural gas processing capacity to the Cutbank Ridge Partnership. To do so, they took a new management approach in order to avoid the budget and scope creep that seems to be inherent in large, complex projects.

The company engaged Rockwell Automation as the MAC throughout the entire project lifecycle - from pre-FEED through FAT and ongoing production support. They rebranded the MAC as a main automation consultant and defined formal project roles and responsibilities that elevated the MAC to EPC/works contractor equivalency.

As a result of this project management and change management shift, the company saw the project schedule accelerated by 4-6 weeks and reduced total incurred costs by an estimated 5% or more.



The MAC Must Bring Experience Working with Skid Builders

For the past five to 10 years, industrial producers have been searching for faster, cheaper ways to complete projects. Today, the traditional stick-build design approach for new projects is often tossed to the wayside in favor of a more modular approach, integrating multiple skids from multiple vendors. This new design strategy is referred to as a modular build, modular skid design, and/or package build. While this new strategy offers flexibility, scalability, and quicker time to project completion – it also harbors serious integration and project management challenges. And with large projects often pulling together services from as many as 50 skid builders, it's crucial to engage a MAC that understands the way these companies operate and can plan for seamless integration.

Rockwell Automation has a long history of working with skid manufacturers that supply control system panels, and consequently, a large percentage of OEM equipment already comes with a Rockwell Automation control system option.

And when this isn't the case, our deep understanding of skid manufacturers – in conjunction with our scalable and flexible modern DCS – helps us create cost-effective, easy and fast integration.

Engaging a MAC that understands the business drivers of the skid builders and has experience with the modular skid design approach benefits all parties:

End-user Benefits:

- **Seamless** integration – native interface
- **Reduced risk** of gaps or redundancy
- **Scalability**
- **Lower total cost** of ownership
- **Common** automation architecture throughout the plant
- **Common** spares holdings for all skid builders

Skid Builder Benefits:

- **Access** to automation design specifications to reduce engineering time and costs
- **Simplified** component and equipment integration
- **Reduced maintenance** costs
- **MAC support** with factory acceptance testing
- **Faster** troubleshooting, from anywhere in the world

PACKAGE INTEGRATION IS COMPLICATED

There are few established standards for skid integration. Engaging a MAC that brings experience coordinating skid builders can help mitigate the risks inherent in skid integrations.

SKID INTERFACE CHECKLIST:



Common network protocol: EtherNet/IP



Alarming: determining what and when to alarm – and also deciding what not to alarm



Standardized HMI security and visualization



Documentation standards



The Benefit of a MAC and Information Integration

The Industrial Internet of Things (IIoT), cloud, mobility, Big Data: These terms are increasingly tossed about in the industry as new projects are commissioned. This is because quality data that's surfaced in actionable ways leads to improvements in nearly all aspects of industrial processes - from maximizing equipment performance and meeting production targets to lowering operating costs.

A major opportunity exists to make the most of your operations by creating an intelligent automation ecosystem – one where data collection is automated and stakeholders always have actionable information at their fingertips.

Therefore, a knowledge of both automation and information systems is required for successfully implementing complex systems today. A MAC that has an understanding of the IIoT, predictive modeling, predictive maintenance, security, analytics, and big data management can help bring additional value to the project. Using this knowledge and combined skill set, a MAC can help end users dramatically reduce the risk of downtime. They design systems that improve visibility into processes, offer real-time data and alarming, and provide access to actionable data to inform decision-making.

“With the emergence of disruptive information technologies and capabilities, new levels of performance in production reliability, safety, yields, and overall gross margins can be achieved through seamless integration, enhanced visibility into performance, control and optimization, real-time reaction to events, and improved prediction of events before they occur.”

- Source: Frost & Sullivan – Competing and Differentiating in the MAC-Driven Global Oil and Gas Industry, January 2015

SUCCESS STORY FPSO AUTOMATION PROJECT

A major European energy operator engaged Rockwell Automation to serve as the MAC for a FPSO automation project and experienced the following results:



12 weeks

of project time saved



Improved

communication and integration
across third-party equipment



Minimized

time onsite during
commissioning



25% cost savings overall



Main Automation Contractor Selection Checklist

- ✓ **Full-scope** automation and related information solutions
 - ✓ **Control system** with a scalable, modular architecture built on common automation technology
 - ✓ A **complete understanding** of network design and cybersecurity and integration with upper business enterprise networking levels
 - ✓ **Multi-discipline** FEED expertise
 - ✓ **Global standard** engineering methodology, tools and project management
 - ✓ **Global network** of engineering centers and partners
 - ✓ **Expert knowledge** in coordinating disparate systems from multiple vendors for one integrated plant control system
 - ✓ Scalable **long-term support** and asset lifecycle management wherever your operations are located
 - ✓ **Process safety** engineering and consultancy services, including: functional safety management systems; SIL assessment; quantified risk assessments; product certification; HAZOP studies; and functional safety training
 - ✓ **Electrical consulting services** including coordination and integration of electrical equipment and systems; management of interfaces; design and procurement of electrical equipment; and performance of electrical studies on load flows, safety, energy management and more
 - ✓ Knowledge of **integrating skids** from numerous manufacturers
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SUCCESS STORY

MAC project implementation strategies can benefit companies in all industries:

// Centralising knowledge, refining reporting functionality and improving management across our mine were the main drivers behind this project. This level of plant control will help us improve our reagent consumptions and enhance resource management – including energy, water and skills – and keep us on track to becoming a leader in sustainable mining.”

- Louis Oosthuizen, Unit Manager C&I, Gold Fields (South Deep Gold Mine)

Resources

Learn more about how our MAC, electrical consulting services,
and FEED capabilities are helping companies around the world.

Visit www.rockwellautomation.com/global/capabilities/consulting-integration-services

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