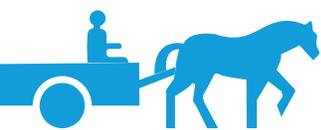


PROVISIONING
FOR AUTOMATION



Efficiency. It's the ultimate goal of manufacturers, as it's the lynch-pin of their business. The pursuit of efficiency effects every point in the production line and has led many to consider employing automation for a segment of or an entire area of their facility. A shift to automation brings a number of challenges and costs, but with the correct team and robust implantation plan, an owner can look forward to great results in both their facilities and rate of return on their investment.



Cart & horse or horse & cart?

At the inception of the project, the owner is often faced with this question: *"What factor will be driving the cart: process, budget or technology?"*

Ideally, the **process** dictates the project. However, many times due to compressed schedules and the desire to bring the systems on line quickly, the team is left with two front-runners: **technology**, and **project budget**. The reason that these two factors govern is that often, as the project is being developed, additional efficiencies and advancements in the technology will be realized and the owner is faced with the decision of *"What is good enough?"* They have to answer this question because they are either working toward a window of non-production time in their current facilities or, they are in the process of leasing or building a facility for their new

manufacturing line. The juxtaposition of this situation presents real challenges and difficult questions for the owner like *"What is the baseline requirement for our current perceived needs?"* and *"What is a reasonable provision for the future?"* These questions are compounded when issues of scalability of infrastructure are raised, and the discussion turns from one of production to company growth.

"What is a reasonable provision for the future?"

"What is the baseline requirement for our current perceived needs?"

Project Development Tools

Another major player that must be considered is project schedule. In manufacturing environments, the schedule often has the greatest influence on the overall project. There are many different methods for validating a project implementation plan early in the project and then tracking it through implementation.



Design Charette & Inter-Active Planning Session

At the beginning of our process, our team engages the owner's team in a project design charrette and Inter-Active Planning Session (IAP). Typically the charrette and IAP involves all project stakeholders and is a useful tool in establishing lines of communication, documenting and vetting requirements, and capturing pertinent information regarding project initiation.

The agenda for this meeting will focus on areas of concern including:

- the existing manufacturing environment,
- building and site design/improvements,
- conceptual design discussions,
- project schedule,
- windows in the production schedule,
- project phasing, and permitting.

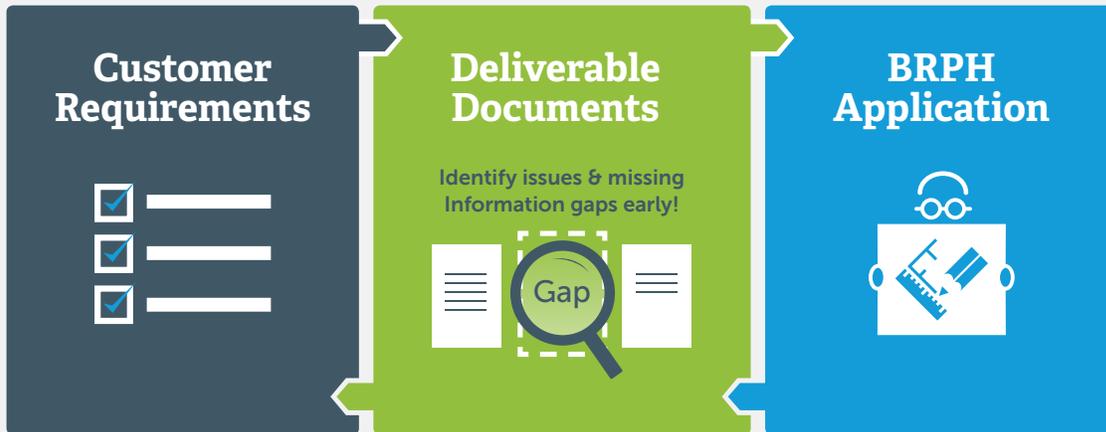
This exercise establishes cohesive decision-making processes and procedures and provides a level-set for the project team.





Gap Analysis

Process Improvement Tool



We use several exercises and tools that are part of the charrette process. One exercise that our team utilizes at the charrette is a **Gap Analysis**. Our gap analysis process assesses program requirements, highlights missing elements from customer requirements, and then serves as a record of action items moving forward.

This tool is valuable in determining whether the Owner's intentions were captured in programming and if their specifications were satisfied, if not, it will identify steps needed to do so.

A gap analysis exercise has additional benefits during later phases of the project. It serves as checklists for the team to use to confirm

that all requirements are integrated into the construction document package. This tool is used to identify shortcomings for both the customer and their suppliers as well as identify issues in the early stages of a project to:

- Verify requirements are attainable
- Identify risks to allow formulation of a mitigation plan
- Allocate resources to align with project scope
- Help maintain budget and schedule.





Coordination Meetings

Once the project is underway, regularly scheduled meetings within the project groups as well as cross-discipline coordination meetings are critical. Internal meetings for facility development would include the owner, project architect, all engineering disciplines (structural, mechanical, electrical, and data/communications) with their primary focus on the facility infrastructure.

The resulting data gathered and developed from these meetings will be used to develop construction documents. The team should be providing milestone packages for the owner's team, and the contractor if they have been selected, for their review and comment on content, constructability, and preliminary estimates.

A parallel series of meetings should be ongoing with the design team coordination meetings. These design integration meetings should be attended by the owner, the automation group, and the design team. The primary focus of these meetings is to verify that as each team matures their design, they remain coordinated with the other team members.

As is often the case, the requirements to support automation stay in flux for an extended period. Ideally, the project development schedule will allow the automation team to get started early and provide a design requirements package of roughly 60% to the facilities team, however, many times this effort is truncated due to the overall implementation schedule.

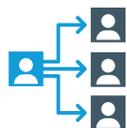
4 Items Every Team Should Have A Plan For

1



Develop scheduled meetings for sharing quantitative information

2



Define clear communication channels between the Owner, Facilities designer, & Automation Manufacture

3



A Data Information Management System for tracking the evolution of the automation systems

4



A plan for dealing with late breaking requirements.

Project & Facility Assessment

Project Requirements:

- Current automation tooling needs*
- Are there manual aspects to the build process*
- What, if any, work will occur concurrently*
- Who are the stakeholders with the best vision of the process*
- Who are the key players in the end state configuration*
- Consider a facilitator who can guide in-house engineering and the supplier*
- Access – Parts and equipment*

Facility requirements:

- Who is providing the equipment*
- What are your company's facility standards requirements*
 - General:
 - » Will there be specialty equipment necessary to convert to automation equipment standards?
 - Electrical
 - » Plug types
 - » Electrical power (weird voltage / amperage)
 - » Electrical hazard classification
 - » Network requirements
 - Compressed air
 - » Clean air standards
 - » Pressure requirements
 - » Oiled vs. Clean
 - » Manual vs. Automated
 - Structural requirements
 - » Slabs
 - » Equipment foundations
 - » Allowable deflection
- Build environment*
 - Conditions
 - » Temperature
 - » General vs. specialty production areas

- Clean room
- Unique material handling requirements
- Open time on materials
- Hazardous materials
- » Spray booths
 - Effective air flow management
 - Cure Temperature
 - Production cycles
- Automated Vehicle movement
 - » Accompanied vs. autonomous
 - Magnetic strips
 - GPS
 - » Line recycle process
 - » AGV Charging
- *Equipment Serviceability*
 - Maintenance accessibility
 - Interruptions to production allowed
 - Redundancy in building infrastructure
 - Availability of qualified personnel
 - "Filling stations" for automated systems
- *Maintenance*
 - Who is responsible for maintenance & repairs of the automated equipment?
 - Is there specialty equipment required?
 - » Crane
 - » Service lift
 - Maintenance bay
 - » Electrical requirements
 - » Mechanical systems
 - » Data/comm

Summary

Provisioning for automation involves a lot of moving parts – quite literally. The key to a great return on investment in an automation project, whether new or re-tooling, is to get the entire team on board and communicating early in order to mitigate the challenges inherent in these projects.



CREATIVE IDEAS. PRECISELY DELIVERED.

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