The EMS Gateway Model – Local to Global, Seamlessly

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Abstract

Choosing an outsourced manufacturing partner that is perfect for a new product and close to your design team is quite different to choosing a partner that can manufacture that same product in volume in lower cost locations and fulfil globally. This is where the Gateway model comes into its own. Most large EMS have structured their organizations to leverage proximity to OEM design teams in high cost regions while providing the benefits of low cost regions for volume manufacturing. The "Gateway" facility in higher cost regions provides design engineering, supply chain design, prototype, and NPI services. The goal of the Gateway is to develop an effective build recipe that can then be effectively and seamlessly transferred to one or more volume manufacturing facility that offers lower costs and direct fulfillment to consumers. We will present a case study that highlights the value of this model and that shows some of the key elements that allow for seamless transitions from plant to plant. The Gateway model is an essential element to a successful global manufacturing model and helps ensure that products are made in the right geography.

Introduction

The history of outsourcing in the electronics manufacturing industry can be grouped generally into three (3) main phases, in terms of geographic location(s), each a reflection of the prevailing need and wisdom of the day.

The first phase was Local. This was how the EMS industry began when OEMs outsourced to "job shops" that did basic board stuffing. In this phase, the EMS facility was located in close proximity to the OEM's facility. This was almost always in the same town or general area as the OEM.

The second phase was Remote. Driven by the pursuit of low cost wages, many EMS developed manufacturing facilities in low cost regions around the globe, the most popular having been China. These facilities were often at a great distance from the OEM team that managed the relationship.

The third phase was Regional. This is characterized by a build in region for region philosophy. This means that the OEM outsources to EMS facilities in low cost areas in the same region as its customers are located. Each main high cost region also contains a low cost region. North America has Mexico, Western Europe had Eastern Europe, and Asia has China, and increasingly India, Vietnam and other low cost countries.

Low cost regions (LCR) certainly possess great capabilities and some of the foremost manufacturing facilities on the planet. However, difficulties that always exist in such relationships, become magnified by the geographic distance, time zone and language differences that exist.

The "Gateway" model was a natural outcome of this transition. It considers the end-customer location, manufacturing and supply chain costs, and how to merge the best of the EMS company's capabilities with the needs of the OEM that results in a most cost effective solution. The goal of the "Gateway" model is to integrate local and global resources, and do so seamlessly.

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What defines a Gateway Facility?

A Gateway facility is more than just a manufacturing site. It is an EMS site that has electronics manufacturing capabilities for prototype, new product introduction, and lower volume production runs, but also includes significant support for DFM, design, supply chain and logistics.

These facilities are usually located in a higher cost region in close proximity to the OEM's design teams. The goal of the Gateway is to refine the product close to and in partnership with the design team and then develop an effective build recipe that can be effectively and seamlessly transferred to a volume manufacturing facility, or multiple facilities, that offers lower costs and direct fulfillment to consumers. This model balances the benefits of low and high cost regions.

The goal is to "copy exact" what was developed in the Gateway facility in the production facility. Therefore, commonality of process and equipment is important or the value of a Gateway is minimized. The industry is replete with examples of prototypes developed at one company and then ramped to volume at another facility with less than optimal results.

The Gateway model is an essential element to a successful global manufacturing model and helps ensure that products are made correctly in the right geography.

Issues that Require Consideration

The effective implementation of a Gateway model requires up-front assessment and planning. This includes consideration, planning and ongoing management of several key variables related to both the OEM and EMS that will be unique within each distinct business relationship.

The geographic location of the OEM is one main variable. This refers primarily to the location of the OEM's design teams. Depending on the size of the OEM, these teams could be located in only one or multiple geographies. Knowing where the team associated with the product being manufactured is located is a critical consideration for establishing the best Gateway location.

Next, the geographic location(s) of the OEM's end-customers must be identified. Again, depending on the size and scope of the OEM, the end customer base might be in one or many regions.

The geographic location of the EMS design engineering, new product introduction (NPI), and supply chain teams is another main consideration. The Gateway facility will need to align with the OEM's design team and initially work closely together to achieve the timeliest results. Therefore, close geographic proximity is ideal.

The geographic location of the EMS's low cost facilities for volume manufacturing needs to be identified. The goal is to select the best options in close proximity to the OEM's end customers. This should result in lower logistics costs, improved delivery times, and better service support.

Another important consideration for the OEM is the commonality of the EMS's processes. This means that the EMS is employing the same software tools, equipment, processes, and procedures throughout its global operations. This should ensure a seamless transition when transferring from the Gateway facility to the low cost production site.

The sophistication of tools (manufacturing cell design, supply chain design, etc.) is also an important consideration. Sophistication of tools relates to process to project requirements in another geography. For example, manufacturing cell design, supply chain support, maintenance, IP protection, test updates, etc. need to be understood so that a product change does not result in a restart of the Gateway process.

Prior analysis of all these issues allows for "tailor-made solutions" that optimize the best capabilities of both partners.

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Benefits

When executed correctly, a Gateway facility should generate benefits to both the OEM and EMS companies involved. While these might vary in degree and kind, and not necessarily be equal for both partners, the end results should reflect these benefits:

The optimization of best in class (BIC). Both partners are able to leverage their distinct strengths in a collaborative manner. For the OEM this means design, brand management and marketing, while for the EMS it is manufacturing, supply chain, and product lifecycle management.

The seamless transfer of manufacturing from the Gateway facility to the volume production facility should not cause any problems for either party. This is of greatest importance to the OEM for whom any disruption in production could cost them in terms of sales and brand reputation. The EMS also needs this process to go well to protect its reputation with its customer and avoid any unbudgeted costs associated with fixing any problems that might occur.

The Gateway model should provide benefits for the OEM's end-customers as well. The end consumers of the OEM's product(s) should benefit from delivery, service, and cost advantages achieved through the collaboration. These may not be readily apparent to the consumers, but are indeed benefits achieved.

Cost savings are the most sought after benefit by both partners. The well-considered leveraging of the distinct benefits that both high and low cost regions provide through an EMS partner with commonality of processes and equipment should produce overall cost savings when a total cost of outsourcing (TCO) analysis is conducted. These cost savings should benefit both OEM and EMS.

Time to volume and cost are major metrics in the manufacturing process. Both of these are enhanced when the NPI process is successfully partnered with a volume production solution. The Gateway model is intended to produce this seamless transfer to ensure these objectives are achieved. Naturally when a seamless transfer is achieved it occurs in a much shorter time, reducing time to market and maximizing time in market.

Business is about anticipating and managing risks. The Gateway model, based on careful up-front analysis of the factors discussed previously in this paper, is intended to minimize the risk that is inherent in the manufacturing lifecycle. Minimized risk in turn results in lower associated costs. As well as understanding risk, it is essential to have mitigation and recovery plans in place. Again, the Gateway model with consistent systems, processes and equipment lends itself to supporting manufacturing in one region when another is challenged.

Case Study

The following case study is included as a demonstration for the Gateway model.

The Product:

This case is based on a piece of Mass Spectrometry equipment that an OEM outsourced to a Tier 1 EMS company with a global manufacturing footprint. The Gateway facility was located in California, and the volume production was located in a LCR (Low Cost Region).

The basic product profile involved 10+ PCBAs, 20+ Subassemblies, mechanical assembly, elaborate testing, and global demand fulfillment.

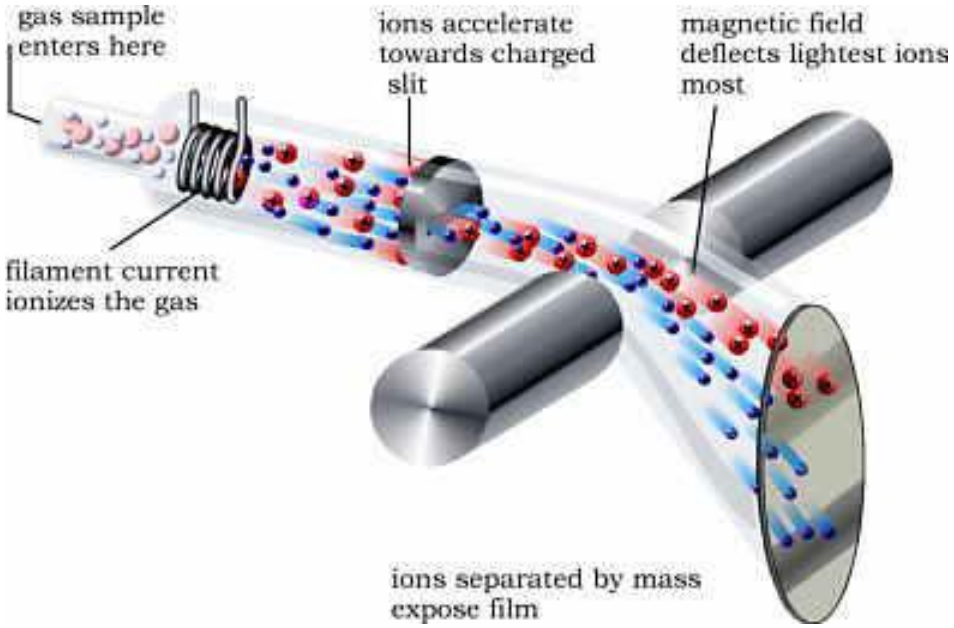

Figure 1 - Mass Spectrometry Equipment

The Challenge:

This product involved various challenges that the EMS needed to resolve for the OEM. To begin, due to the product demand profile, the product needed to be produced in multiple regions. The product itself was a complex mechatronics system so electronics and mechanical expertise were required. This included consistent quality performance and global support. The specialized nature of the product required intellectual property (IP) protection for final test and configuration processes. Lastly, the EMS needed to design the complete production line to include a clean test area.

The Solution:

To address these challenges, the EMS first designed a custom manufacturing cell using specialized software (see Figure 2 below). Once the manufacturing cell was conceived, the EMS developed a secure, clean environment within this cell to secure the customer's IP. With this accomplished, the product was transitioned from the customer's facility tothe EMS facility in the United States for Gateway process development and prove-in. Once the EMS was confident that its processes were sound, personnel from their production facility in the intended LCR were brought to the Gateway for training. After six months of production in the Gateway, the work cell was transitioned, with all associated work instructions and necessary equipment to the LCR. Select employees from the Gateway accompanied the transfer to the LCR for ramp up support.

This is clearly a brief and over simplified summary of a very complex and challenging engagement.

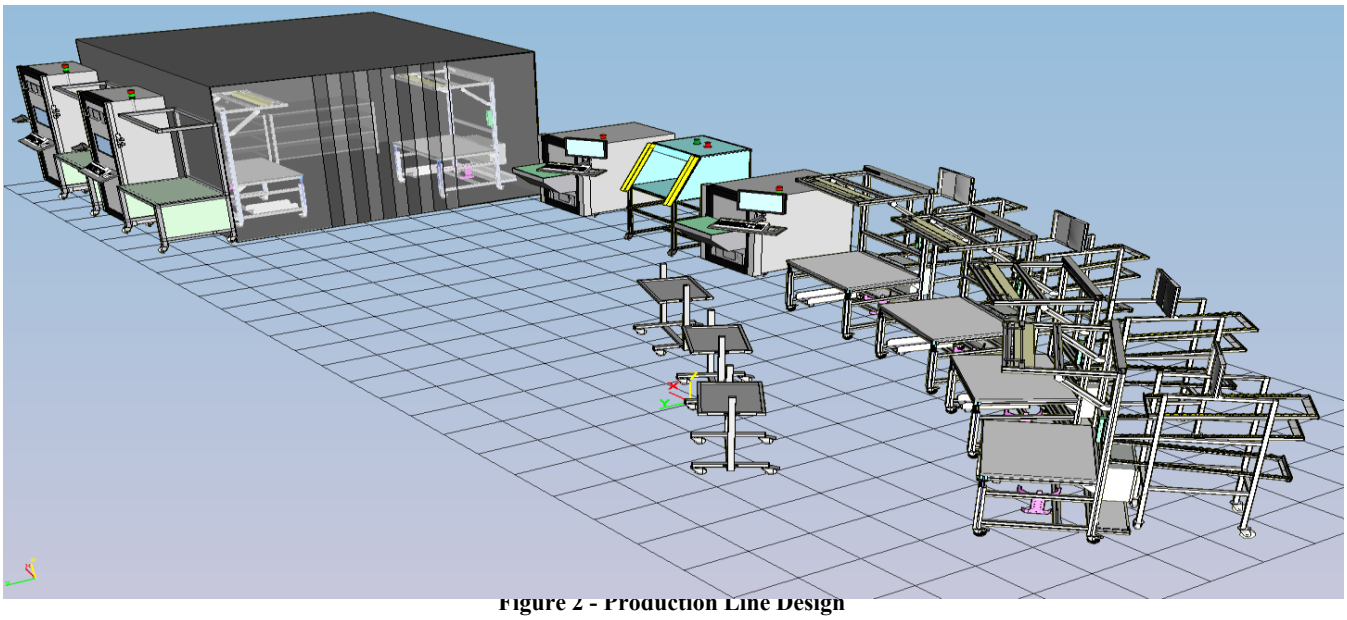

Figure 2 - Production Line Design

Results:

The results achieved by the use of this Gateway model were assessed on four important metrics. Quality: first pass yields and OOB (Out of Box)quality met the OEM's desired thresholds. Customer Service: maintained 100% OTD (on-time delivery); Cost: significant cost savings were achieved; Ease of Doing Business: EMS was recognized by the customer for not requiring OEM personnel to be in the LCR.

Lessons Learned:

As with any venture, it is always good to look back and assess what happened. This can result in valuable insight in terms of corrective actions and lessons learned. In terms of the latter issue, there were some important lessons learned from this engagement.

Consider the supply chain solution from the beginning. While the initial focus was certainly on crafting the best possible manufacturing process, consideration of the supply chain had to occur in parallel. This was made more critical when considering that the supply chain also needed to be transferred from the Gateway to the LCR, so this planning was critical to the ultimate success or failure of the engagement.

Make sure the Gateway and LCR solutions are compatible. This is in terms of the equipment, tools, processes and procedures at each location. It is best if both are similar and compatible to minimize transfer issues. As with a cooking recipe, every kitchen can render a different outcome based on the same recipe. Ensuring commonality in this manner is the best way to minimize problems.

Gateway services enable more sourcing of more complex products. OEMs frequently continue to build a product themselves because they are uncomfortable with the technical capabilities of an EMS partner to produce it, or the cost benefit is not apparent to them. With Gateway services, OEMs get the technical support to define and refine the process, and the cost benefit of a low cost solution. Therefore a comfort level develops to move on with more engagements (i.e. final system assembly and test in the case study).

Time spent upfront is time well spent. Business pressures always exist and people's patience is not always optimal. But the old adage that proper planning can prevent poor performance is absolutely applicable in this regard. The successful implementation of the Gateway model described in this paper is absolutely reliant on accurate assessment of all related variables by people experienced with its implementation.

Conclusion

To move from innovation to successful global manufacturing and fulfillment at the best possible price, quickly and effectively it is essential that both the Gateway facility and the lower cost regions work in harmony. When deployed successful, the Gateway model brings product to market faster and cheaper and more reliably than any other method.

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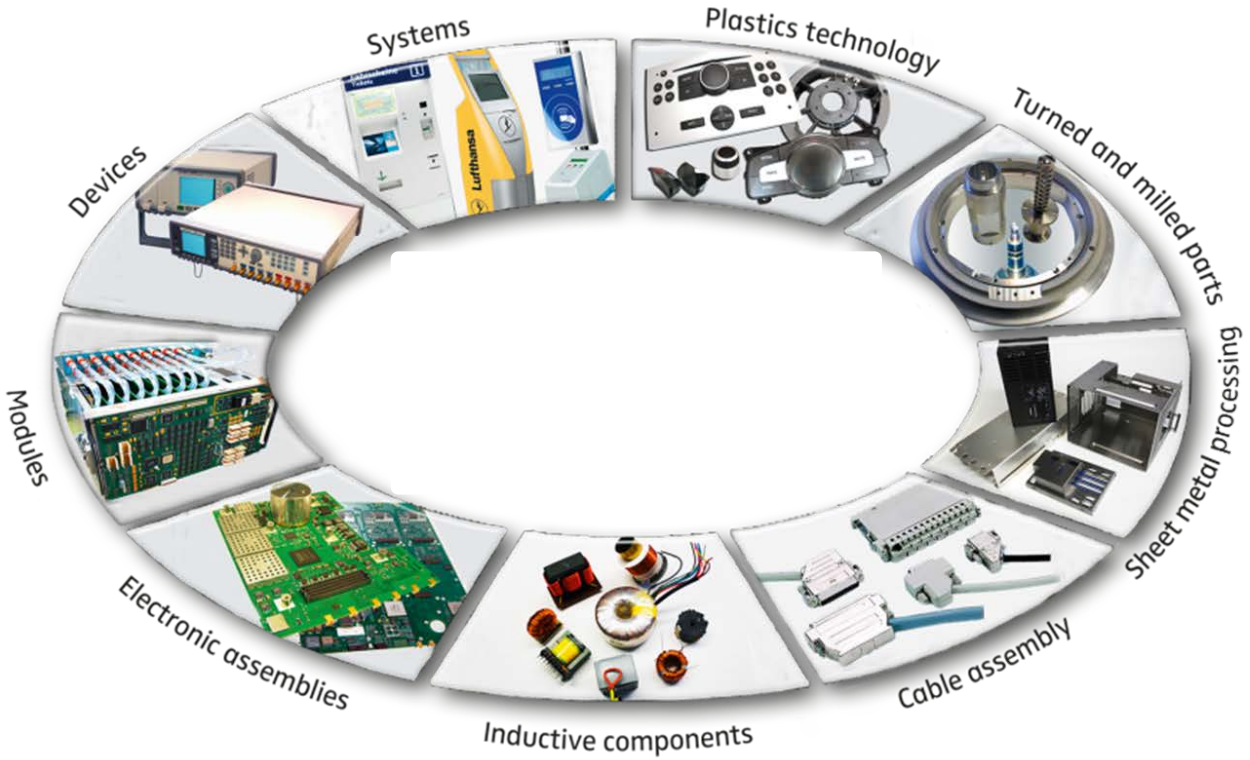
AGENDA

- Background
- Definition
- Considerations
- Benefits
- Case study
- Lessons Learned
- Q&A



THREE WAVES OF OUTSOURCING

1. Local: Someone near the OEM factory
2. Remote: Shift to low cost regions
3. Regional: In region for region; network of facilities

Waves #2 and especially #3 gave rise to the Gateway Model.

Leverage proximity to OEM design teams in high cost regions while providing the benefits of low cost regions (LCR) for volume manufacturing.

LCRs have great capabilities, but difficulties are magnified by the distance, time zones and language.

THE "GATEWAY" FACILITY

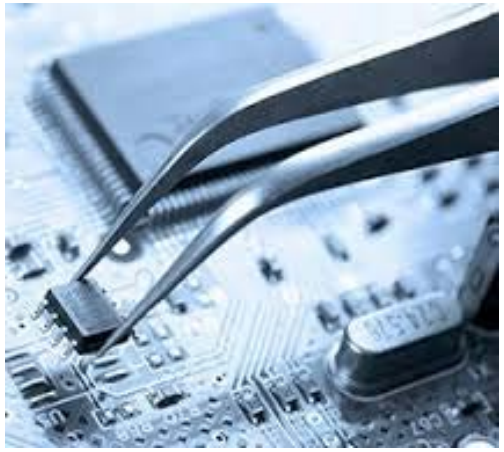
- Significant design, process and supply chain support
- Most responsive in a high cost region
- Close to OEM customers
- Balances benefits of low and high cost regions

The *gateway* facility in high cost regions provides design engineering, supply chain design, prototype, and NPI services.

The goal of the *gateway* is to refine the product close to and in partnership with the designer and then develop an effective build recipe that can then be effectively and seamlessly transferred to a volume manufacturing facility that offers lower costs and direct fulfillment to consumers.

The *gateway* model is an essential element to a successful global manufacturing model and helps ensure that products are made in the right geography.

CONSIDERATIONS

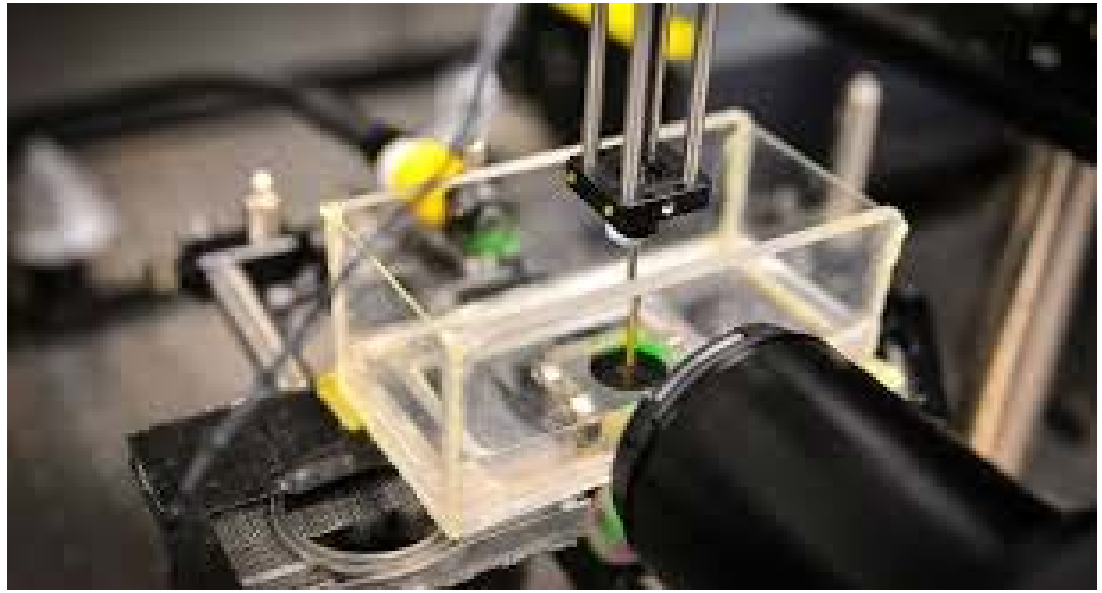


- OEM location, especially their design teams
- OEM's end-customer location(s)
- Location of EMS design engineering, NPI, and supply chain teams
- Location of EMS low cost facilities for volume manufacturing
- Commonality of EMS processes
- Sophistication of tools (manufacturing cell design, supply chain design, etc.)

Allows for "tailor-made solutions" that optimize the best of both partners.

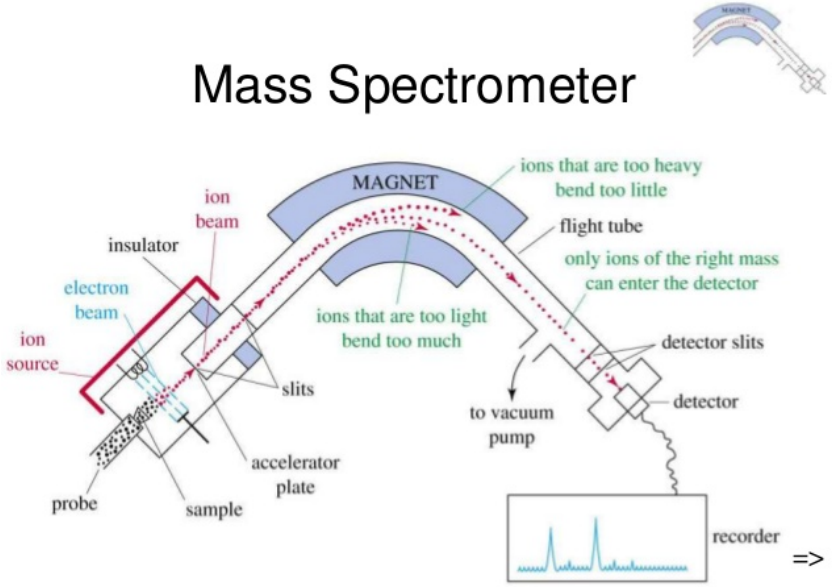
BENEFITS

- Optimize Best in Class (BIC)
- “Seamless” transfer
- Best solution for end-customers
- Time to volume and cost
- Cost savings
- Minimize risk



CASE STUDY

- **The Product:**
  - ***Mass Spectrometry equipment:***
    - **10+ PCBAs**
    - **20+ Subassemblies**
    - **Mechanical assembly**
    - **Elaborate testing**
    - **Global demand**

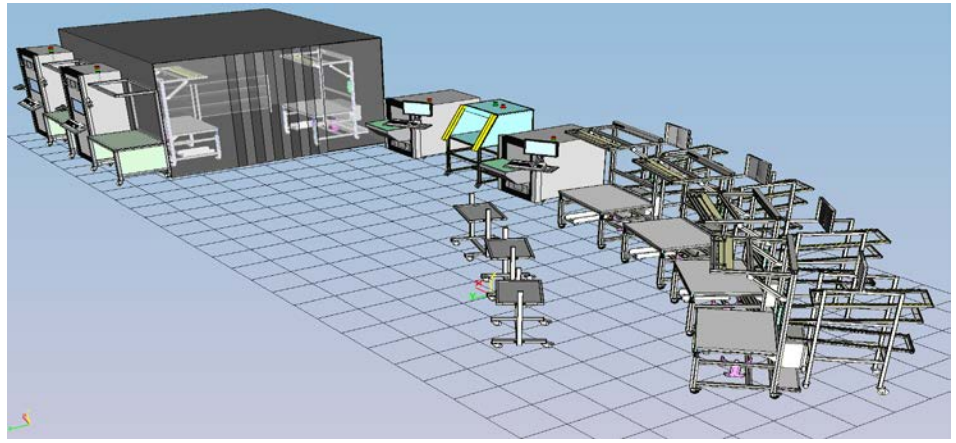


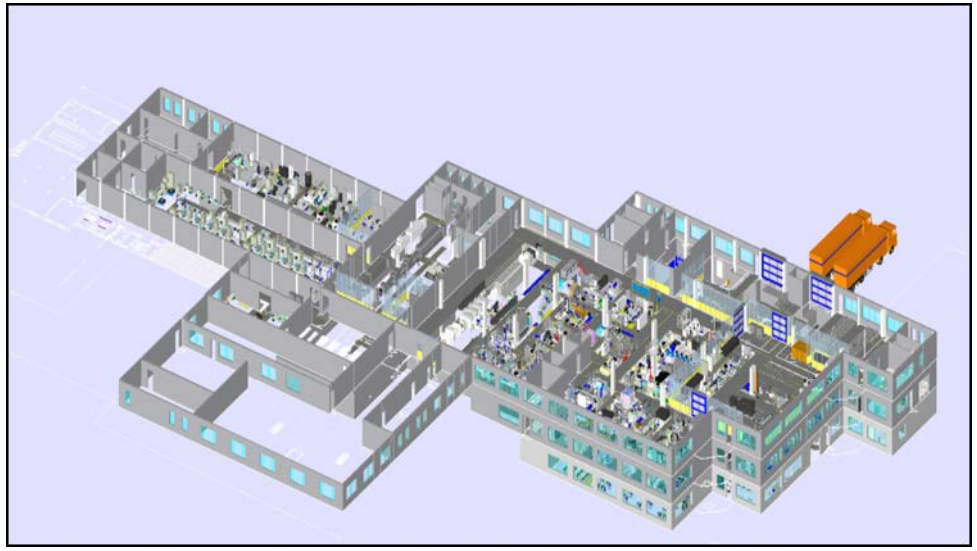
The Challenge

- Produce project in Multiple Regions
- Consistent quality and support globally
- Complex Mechatronics system
- IP protection required for final test and configuration
- Complete line design with clean test area

The Solution:

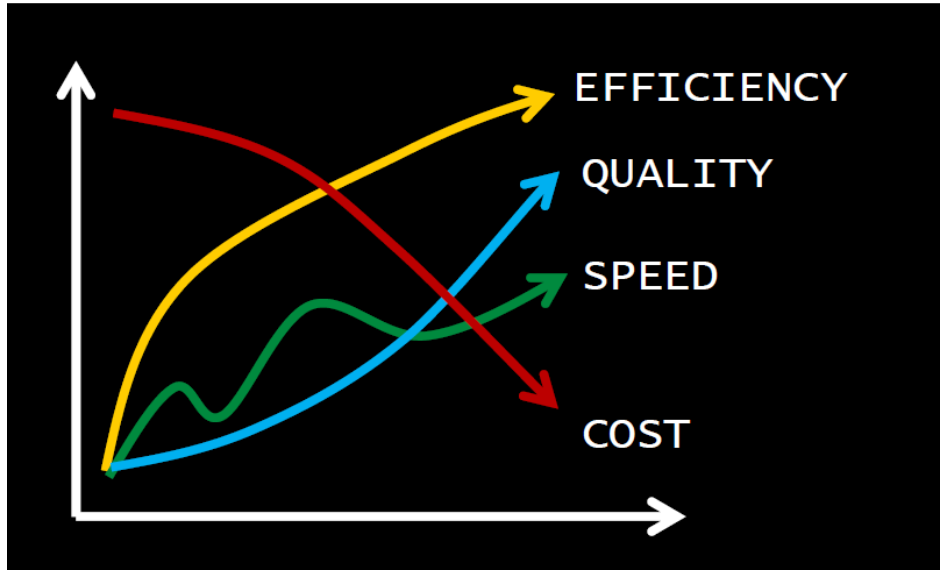
- Designed custom manufacturing cell using specialized software
- Developed secure, clean environment to secure customers IP
- Transitioned from customer to Americas region for Gateway process development and prove-in
- Brought LCR personnel to Gateway for training and sent select
  employees to LCR for ramp up support
- After six months of production, transitioned work cell, instructions, equipment to a LCR





The Results:

- Quality: Maintained First Pass and OOB Quality
- Customer Service: Continued 100% OTD
- Cost: Significant Cost Savings
- Ease of Doing Business: Recognized by customer for minimal support required and not requiring their people in LCR



Lessons Learned

- Consider supply chain solution at beginning
- Make sure *gateway* and LCR solutions are compatible
- *Gateway* services enable more sourcing of more complex products
- Time and effort can pay off with Cost, Quality and Time to Market benefits

Questions?