

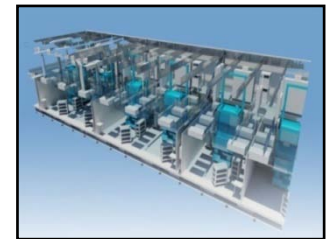
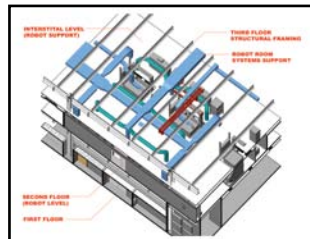
## Enhancing Delivery of Facilities with BIM Technology

### Key IPS Value Add

- Using BIM during design, we developed alternative approaches, enabling our client to easily differentiate and make a quick, informed decision.
- We used BIM optimized construction sequencing and phasing for a 2 million sf assembly plant; meeting project milestones and the owners aggressive timeline.
- The day before construction issue was sent, the owner wanted to extend an exterior wall out 10'. We made the change - the model adjusted the roof, floor and other impacted components and automatically updated all views and schedules - within minutes.
- We extracted building envelope data for multiple energy analysis. We oriented the building to maximize the energy performance of the HVAC systems in response to solar impact.
- Using parametric models of robotic assembly equipment, we optimized the size of a manufacturing facility to accommodate equipment without making it so large that it generated excessive utility costs.
- For a vaccine production facility, the overall MEP scope was under budget, our approach cut nearly 10 weeks off the critical path, and the owner met the desired goal of beating its "historical best" timeline by three months – nearly 10%.

**Building Information Modeling (BIM) technology represents a new approach to architectural and engineering design that delivers a multitude of benefits around the delivery of technically complex projects, including:**

- Lower First Costs
- Compressed Construction Timelines
- Reduced Operational Costs
- Enhanced Project Management, Coordination, Integration
- 3D Models Improve Visualization / Communication
- More Robust / Accurate Documentation Helps to Predict Performance



**BIM provides owners and operators with unprecedented control over challenging fast-track capital projects, expansions or major renovations.**

- "Build" the project virtually and check for accuracy
- Build the "real" project accurately from the virtual BIM model
- "Build it twice", once in the computer, once in the field.

**BIM helps shave construction costs by as much as 10-15%.**

- Database-driven platform that tracks all project design information and manages it within a single file location
- Quantify the project, i.e. material take-offs, cost estimates, project phasing, etc.
- Real-time spreadsheet and schedule generation via database
- Collectively sharing BIM model data to understand and visualize as full-color, digital 3D models in real-time

**BIM offers operational advantages**

- Facilitates more energy efficient design and supports analysis of building lifecycle behaviors
- Ability to track utility requirements associated with materials and/or equipment
- Project database simplifies record-keeping and provides clarity regarding building components and system configurations-helping to reduce maintenance costs