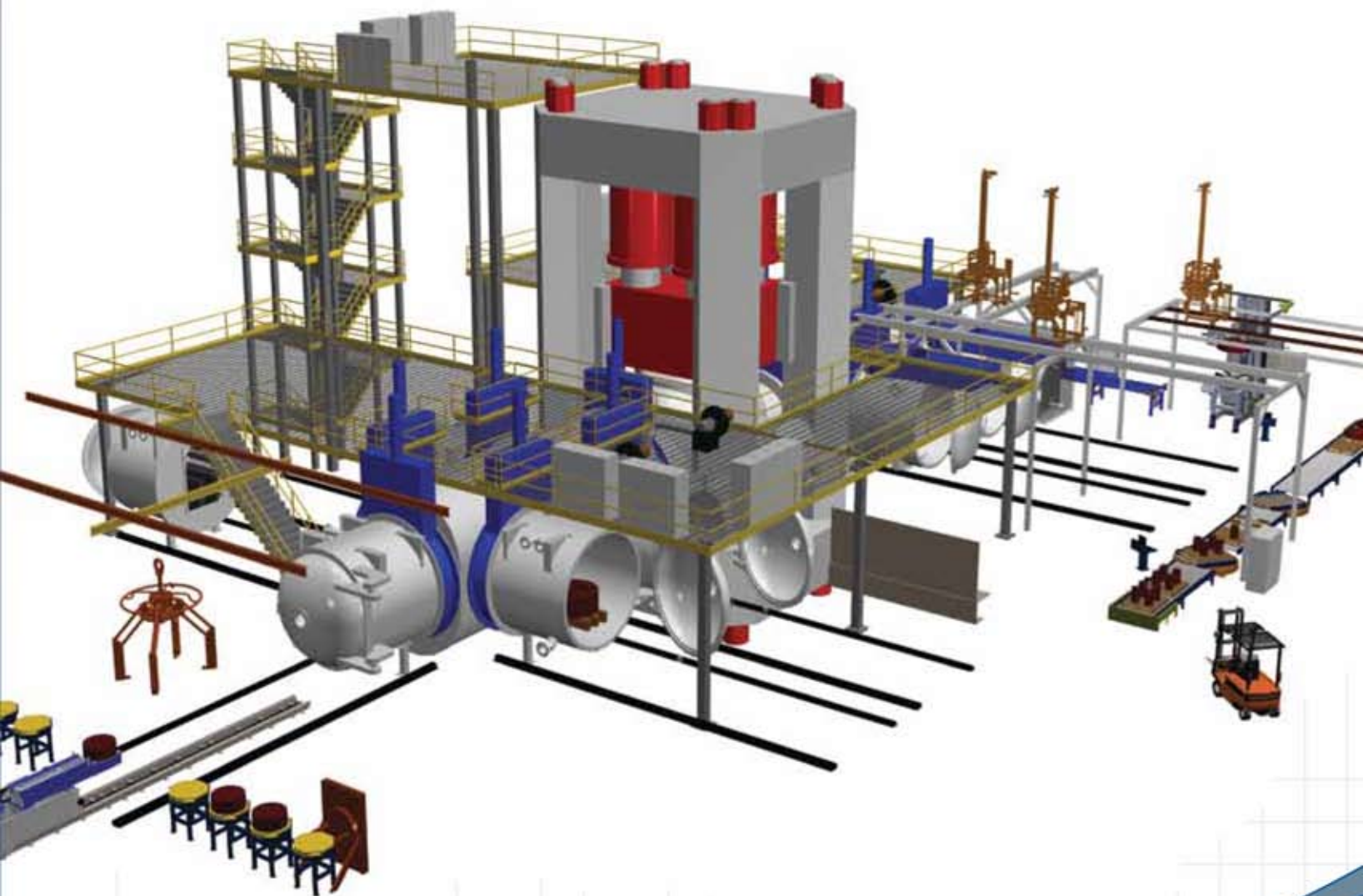


**BLUE**arc  
ENGINEERING

Design & Fabrication of  
**Large Scale Automation**



## Engineering Services

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Blue Arc offers a wide range of engineering services, each focused on your application requirements. Each Engineering project is examined and executed holistically while focusing on project technical objectives, design reviews with our customer, schedule status, financial targets and above all customer satisfaction.

### Engineering Services;

- 3D parametric modeling engineering designs
- Comprehensive engineering studies
- Prototype design modeling and fabrication
- Engineering simulations
- Engineering animations
- Failure Mode and Effects Analysis (FMEA)
- Finite Element Analysis (FEA)
- Engineering material analysis

### Blue Arc Engineering Design Philosophy

Blue Arc Engineering designs are conceived with the simplest end solution as our goal. Blue Arc recognizes that while there may be several design options to consider at the conception state, the simplest approach is usually the most robust, most cost competitive and easiest for our customers to maintain.

### Blue Arc Engineering's Design and Prototyping Process

Blue Arc Engineering utilizes a proven and methodical 7 step process for our Engineering Design and Prototyping Service. This comprehensive process was conceived and implemented with an emphasis on efficiency, achieving optimum results and exceeding our customer's expectations.

## About Blue Arc Engineering

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Blue Arc Engineering was founded in 2003 and has quickly emerged as a leading engineering solutions provider across many industries. We attribute our growth to our dedicated focus of helping our customers maximize their productivity by providing them "state of the art" custom engineered and fabricated automation solutions. Every engineering solution Blue Arc proposes is considered on its own merits to provide tremendous productivity gains and a quick return on investment.

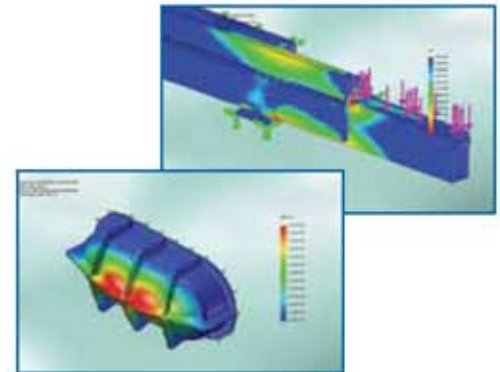


### Competitive Advantage

Blue Arc Engineering's strength is our ability to conceptualize and implement clear-cut and precise custom engineering solutions for your complex automation requirements. This approach allows us to provide you a more robust and cost competitive solution that can be efficiently implemented so you can quickly recognize the benefits of your investment.

### Our Strongest Resource

We recognize that behind every successful business stand successful employees. Blue Arc constantly strives to foster an atmosphere where every employee is valued and respected. We also focus on ensuring our employees are professionally trained on the latest engineering and fabrication technologies. As a result, our team provides our customers the best engineered solution possible.



### Finite Element Analysis

We utilize the latest technologies of finite element analysis to ensure our designs will deliver to the performance criteria of the project. It allows us to optimize design for material selection and thicknesses. In addition to structural analysis we also perform thermal FEA on our designs based on the application.



### Robotic AS/RS Fabrication

Blue Arc collaborated on this system with other partners to develop an automated mixed case picking system. Blue Arc developed the automated storage and retrieval system (AS/RS) that was employed in this application. The AS/RS included four build pallet positions with stretch wrappers as well as two robots that travel 41' of the total 60' length of the AS/RS carriage to pick and place cases of product.



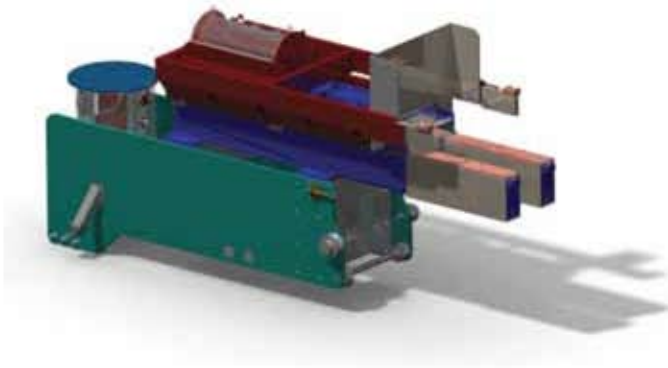
### Ultrasonic Part Clean and Quench

An all stainless robotic gantry picked parts off a pneumatic pedestal and moved the parts into an ultrasonic cleaning bath. Once cleaned the parts were raised into a sound reducing glass enclosure and blown off until dry. Parts were then conveyed and accumulated on a heavy duty drag chain conveyer.



### High Precision Diagnostic Manipulator

Custom manipulator used to extract a detector module from a mounting bracket with high precision. This design features three linear and four rotation degrees of freedom all with a 200 pound cantilevered load. A combination of mechanical and electrical components aids the operator in attachment and maneuvering of the detector at an ergonomic height.



### Heavy Duty Die Shuttle

This heavy duty shuttle moves a forging die to die preheat, then to the forging press, then to die cooling and back out of the cell. Some unique features of this shuttle are the fact that it resides inside of a large vacuum chamber and handles dies that weigh upwards of 10,000 lbs. The 24" diameter dies are also heated to 2,100°F so our design has to account for hot dies and as well as precise positioning that can place within .008" repeatability.



### Precision Bar Code Print & Apply

Automated system that takes individual parts through a print head and checks integrity of print before determining if the part passes or goes to a reject position. Technologies included high precision pick and place, in-motion bar code printing, camera vision quality control, and custom human machine (HMI) interface. Input and discharge of the cell is at an ergonomic height for the operator.



### Mobile Engine Build Stand

As part of a lean manufacturing initiative, this mobile engine cart would move a jet engine along an assembly line to various workstations. The engine needed to be manipulated to allow for many different processes – raise up and down and rotate for ease access. It also required a stability to allow an operator to properly torque fasteners on the engine, which we obtained with stout outriggers to lock the cart in place. The 5' diameter fan is housed in a 18' x 25' assembly platform.



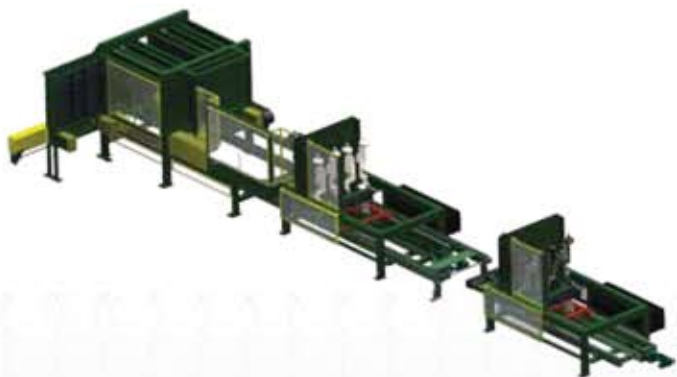
### Extreme Environment Custom Robot

This extreme environment custom robot picks preheated parts (2,100 degrees F), rotates, then telescopes 16' and places the part within a .08" repeatability tolerance. Blue Arc developed many new technologies for this robot that allow it to operate in a vacuum environment.



### Gantry Robot

This customizable gantry design can accommodate small to large loads with a modular range of motion. All motions are encoder controlled with available HMI. Camera feedback is available to verify part position and size. Additional catwalk and tunnel are available to lift loads over high traffic areas. This particular gantry traveled 27'.



### Automated Pallet Building Machine

Custom integrated line to construct new hybrid wood/plastic pallets included automated dispensers for end bumpers, pallet stringer boards and top and bottom boards. Once dispensed, the parts were precisely held in place and fixed with automated screw guns. This progressive assembly line was designed to build a range of 36" – 60" long pallets.

## Partial Client List

Alltech Biotechnology  
Anheuser Busch Companies  
Blue Rhino  
Cabela's  
Caterpillar  
CitiTrends  
Cleveland Clinic  
Coca-Cola  
ConAgra Foods  
Coors  
Covance  
CVS/Pharmacy  
Delco Electronics  
Eli Lilly and Company  
Fastenal Company  
Garmin Ltd.

General Electric  
General Motors  
Masterbrand Cabinets  
Heaven Hill Distilleries  
Hoosier Racing Tire  
Houghton Mifflin Company  
Hussman Refrigeration  
International Paper  
Johnsonville Sausage  
Kellogg Company  
Kroger  
Morton Salt  
MSC Industrial Supply  
Pepsi  
Pitney Bowes

Pratt & Whitney  
Prime Distribution Services  
Rexam  
Roche Diagnostics  
Rolls Royce  
Ryobi Die Casting  
Sauer Danfoss  
Sherwin Williams  
Snap-On Tools  
St. Gobain Containers  
Square D  
Subaru of America  
Toyota Motor Sales  
United Technologies Carrier  
Zimmer

## Industries Served

Aerospace  
Alternative Energy  
Automotive Manufacturing  
Energy  
Food & Beverage  
MRO  
Nuclear  
Pharmaceuticals  
Transportation

### BLUE ARC ENGINEERING

#### address

2155 Fields Blvd.  
Greenfield, IN 46140  
P (317) 467-2583  
F (317) 467-4701

#### email

[info@bluearceng.com](mailto:info@bluearceng.com)

#### website

[www.bluearceng.com](http://www.bluearceng.com)



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