


BUILDING AMERICA'S ROBOTICS & AUTOMATION CAPABILITIES



OUR DIFFERENTIATED APPROACH

Re:Build Manufacturing offers a unique combination of mechatronics integration, precision manufacturing, and systems expertise that addresses the most critical challenges facing robotics and automation programs.

END-TO-END AUTOMATION SOLUTIONS

- Single-source accountability from concept validation through production deployment
- Integrated capabilities: mechanical design, motion control, vision systems, software, manufacturing
- Eliminates multi-vendor integration risks and interface challenges

U.S.-BASED ADVANCED MANUFACTURING

- ISO 9001 certified quality management systems
- Precision machining, fabrication, and assembly capabilities
- Domestic supply chain with technical expertise

RAPID PROTOTYPING TO PRODUCTION

- Manufacturability for Design™ (MFD) embedded from concept
- Quick-turn prototyping with iteration capability
- Scalable from pilot systems to high-volume production

MULTI-APPLICATION AUTOMATION EXPERTISE

- Industrial robotics and material handling
- Collaborative robots (cobots) and human-robot interaction
- Autonomous mobile robots (AMRs) and AGVs
- Machine vision and inspection systems
- Custom automation equipment and special machinery

EARLY-STAGE CONCEPT DEVELOPMENT & SYSTEM ENGINEERING

PROGRAM DEVELOPMENT & SYSTEM ARCHITECTURE

TECHNOLOGY ROADMAPMING & FEASIBILITY

- Product and technology roadmapping
- Automation concept and feasibility assessment
- Mission and risk analysis
- Technical feasibility assessment
- Return on investment (ROI) analysis
- Technology gap identification
- Competitive landscape evaluation

PROOF-OF-CONCEPT DEVELOPMENT

- Rapid prototyping for validation
- Proof-of-concept prototype builds
- Trade study analysis execution
- Requirements validation workshops
- Functional demonstrations and testing
- Automation cycle time studies

SYSTEM ARCHITECTURE DESIGN

- Systems engineering and architecture development
- Requirements analysis and specification
- Automation system architecture design
- Robotic cell integration planning
- Control strategy development
- Network architecture design
- Interface control documents

INTEGRATION PLANNING

- Make-vs-buy analysis for components
- Existing equipment integration assessment
- Manufacturing flow and layout planning
- Safety system requirements (risk assessment per ISO 12100)
- Preliminary design reviews

INTELLIGENT AUTOMATION & CONTROLS

CONTROL SYSTEMS, SOFTWARE & AI

PLC & INDUSTRIAL CONTROL

- PLC programming and system design
- Ladder logic, structured text, function blocks
- Distributed I/O systems
- Safety PLC integration (PLe, SIL 2/3)
- Motion control integration
- OPC UA and industrial communication protocols

SCADA & HMI SYSTEMS

- SCADA system integration
- Human-machine interface (HMI) design
- Operator interface development
- Data visualization and dashboards
- Alarm management systems
- Production monitoring and KPI tracking
- Remote monitoring capabilities

ROBOT PROGRAMMING & SOFTWARE

- Robot programming (ABB, FANUC, KUKA, Universal Robots, etc.)
- Vision-guided robotics
- Path planning algorithms
- Collision detection and avoidance
- Force control programming
- Robot simulation and offline programming

EMBEDDED SYSTEMS & EDGE COMPUTING

- Real-time embedded control systems
- Edge computing for AI/ML processing
- Edge connectivity and IIoT enablement
- Industrial PC and controller selection
- Firmware development
- Communication middleware

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

- Machine learning for quality inspection
- Predictive maintenance algorithms
- Anomaly detection systems
- Deep learning for vision applications
- Reinforcement learning for robot control
- Digital twin development

SIMULATION & DIGITAL TWIN

- Simulation and digital twin development
- Robotic cell simulation
- Cycle time analysis and optimization
- Virtual commissioning
- Discrete event simulation
- Process flow modeling

ADVANCED SENSING & MACHINE VISION

SENSORS, VISION & PERCEPTION

MACHINE VISION SYSTEMS

- 2D and 3D vision system integration
- Camera and lens selection
- Lighting design and optimization
- Part inspection and measurement
- Defect detection systems
- Optical character recognition (OCR)
- Barcode and QR code reading

VISION-GUIDED ROBOTICS

- Vision-guided robotic picking
- Bin picking with 3D vision
- Pattern matching and alignment
- Edge detection and feature extraction
- Color inspection and sorting
- Vision system calibration

SENSOR INTEGRATION

- Proximity sensors and limit switches
- Force and torque sensors
- Pressure and flow sensors
- Temperature and humidity monitoring
- Vibration and acoustic sensors
- Position and displacement sensors
- Load cells and weight measurement

3D SENSING & PERCEPTION

- LiDAR integration
- Time-of-flight (ToF) cameras
- Structured light scanning
- Point cloud processing
- Object recognition and pose estimation
- Depth mapping and 3D reconstruction

SAFETY SENSORS & SYSTEMS

- Safety light curtains and laser scanners
- Safety mats and bumpers
- Emergency stop systems
- Safety relay and controller integration
- Area monitoring and access control
- Collaborative robot safety sensors

ROBUST MECHANICAL SYSTEMS FOR AUTOMATION

MECHANICAL DESIGN & PRECISION ENGINEERING

MECHANICAL DESIGN & ENGINEERING

- Detailed CAD design models
- Structural analysis and FEA
- Mechanism design and kinematic analysis
- Tolerance stack-up analysis
- Motion planning and trajectory design
- Design for manufacturability reviews
- Modular design architecture

CUSTOM MACHINE DESIGN

- Custom machine design and fabrication
- Special purpose machinery
- Assembly machines and fixtures
- Test and inspection equipment
- Material handling equipment
- Automated workstations

PRECISION COMPONENTS

- Linear guide and bearing selection
- Ball screw and lead screw sizing
- Timing belt and pulley systems
- Gear and transmission design
- Shaft and coupling selection
- Bearing and bushing specification

STRUCTURAL FABRICATION

- Steel and aluminum frame fabrication
- Welded and bolted assemblies
- Machine bases and support structures
- Safety guarding and enclosures
- Cable management systems
- Modular frame systems (80/20, Bosch)

JIGS, FIXTURES & TOOLING

- Custom fixturing design
- Workholding devices
- Assembly fixtures
- Test fixtures
- Modular tooling systems
- Quick-change tooling

PRECISION MANUFACTURING & SYSTEM ASSEMBLY

ADVANCED MANUFACTURING & INTEGRATION

PROCESS DEVELOPMENT

- Automation process flow development
- Control system programming procedures
- Custom equipment fabrication processes
- Assembly and integration procedures
- Testing and inspection protocols
- Critical process parameter definition
- Process capability studies
- Quality control plan development

PRECISION MACHINING & FABRICATION

- CNC machining (3, 4, and 5-axis)
- Turning and milling operations
- Sheet metal fabrication
- Laser and waterjet cutting
- Welding (MIG, TIG, spot)
- Surface finishing and coating
- Tight tolerance machining

ELECTRICAL & PANEL ASSEMBLY

- Control panel fabrication and testing
- Power distribution design
- Wire harness design and manufacturing
- Cable routing and management
- Component mounting and wiring
- Panel testing and documentation

SYSTEM INTEGRATION & ASSEMBLY

- Custom mechatronic assembly integration
- Industrial automation systems integration
- Mechanical and electrical integration
- Robot installation and integration
- Conveyor and material handling integration
- Sensor and device integration
- System functional testing

PRODUCTION INFRASTRUCTURE

- Facility layout and infrastructure planning
- Equipment installation and commissioning
- Utility requirements (air, power, data)
- Safety systems and guarding
- Operator workstations
- Material flow optimization

COMPREHENSIVE VERIFICATION & DEPLOYMENT

TESTING, VALIDATION & COMMISSIONING

DESIGN VERIFICATION TESTING

- Prototype system builds
- Performance analysis and optimization
- Simulation validation testing
- Control strategy verification
- Sensor and device testing
- System load and throughput testing
- Safety system validation
- Documentation and compliance verification

SYSTEM-LEVEL VALIDATION

- Factory acceptance testing (FAT)
- Site acceptance testing (SAT)
- Performance validation in operational conditions
- Cycle time verification
- Repeatability and accuracy testing
- System reliability testing
- Quality assurance validation

SAFETY VALIDATION

- Risk assessment per ISO 12100
- Safety function validation
- Emergency stop testing
- Safety interlock verification
- Light curtain and scanner validation
- Collaborative robot safety testing
- Documentation per ANSI/RIA standards

COMMISSIONING & DEPLOYMENT

- System installation and setup
- Mechanical alignment and calibration
- Electrical checkout and testing
- Robot calibration and teaching
- Vision system calibration
- Control system commissioning
- Operator training and documentation
- Production readiness transfer

PERFORMANCE OPTIMIZATION

- Cycle time optimization
- Motion profile tuning
- Vision system optimization
- Process parameter refinement
- Throughput improvement
- Continuous monitoring setup

OPERATIONAL EXCELLENCE THROUGHOUT PRODUCTION

QUALITY SYSTEMS & CONTINUOUS IMPROVEMENT

QUALITY MANAGEMENT SYSTEMS

- ISO 9001 certified operations
- Quality system implementation
- Statistical process control (SPC)
- First-article inspection data
- Quality assurance validation
- Continuous quality improvement

PRODUCTION CONTROL

- Standard operating procedures
- Operator training and work instructions
- Quality control plan execution
- In-process inspection and testing
- Final inspection and acceptance
- Component lot traceability

PRODUCTION SCALING

- Incremental production scaling
- Workforce training expansion
- Process cycle time optimization
- Quality yield stabilization
- Automated testing implementation
- Lean manufacturing tools
- Target production rate achievement

FULL-RATE PRODUCTION

- Target production volume execution
- ISO 9001 compliance maintenance
- Customer delivery schedules
- Supply chain coordination
- Preventive maintenance programs

CONTINUOUS IMPROVEMENT

- Real-time performance monitoring
- Data-driven process analytics
- Predictive maintenance implementation
- Automated process adjustments
- Continuous improvement feedback loops
- System optimization initiatives
- Best practice implementation
- Customer support and upgrades