Agenda – Group 1

• 9:00: Arrival at Fori Automation
• 9:00-9:20: Welcome and Brief Overview
• 9:25-10:45: Department Presentations
  – 20 min each with 10 minutes walk & talk time
    • Presentation 1: Sales/Estimating & Project Management
      – Location: Building 2
      – Presenters: Mark VanHaverbeck & Brain Garsky
    • Presentation 2: Mechanical and Controls Engineering
      – Location: Main Building – Near Demo area
      – Presenters: Paul Doan & Pete Karcz
    • Presentation 3: Manufacturing and Assembly
      – Location: Main Building – Near machining/shipping aisle
      – Presenters: Brett Casebolt, Jeremy Cameron, and Joe Hugland
      – Chaperones: Bill Littmann & Jim Broad
• 10:50: Gather in building 2
• 10:55: Group Photo
• 11:00: Depart from Fori
Agenda – Group 2

• 11:45: Arrival at Fori Automation
• 11:45 – 12:05: Welcome & Brief Overview
• 12:10 – 1:20: Department Presentations
  – 20 min each with 5 minutes walk & talk time
    • Group 1: Sales/Estimating & Project Management
      – Location: Building 2
      – Presenters: Mark VanHaverbeck & Brain Garsky
    • Group 2: Mechanical and Controls Engineering
      – Location: Main Building – Near Demo area
      – Presenters: Paul Doan & Pete Karcz
    • Group 3: Manufacturing and Assembly
      – Location: Main Building – Near machining/shipping aisle
      – Presenters: Brett Casebolt, and Joe Hugland

• 1:25: Group Photo
• 1:30: Depart from Fori
**Split into Groups**

**Presentation 1:**
Sales/Project Management: Start in Building 2 – Stay here

**Presentation 2:**
Mechanical & Controls Engineering: Start in Front of Main Building

**Presentation 3:**
Manufacturing & Assembly: Shipping Aisle of Main Building

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**Group 1**
Chaperones: Bob White & Brad Holoday
First Stop
Stop at Ford Caster Camber Machine

**Group 2**
Chaperones: Bruce Osani & Bryan Baer
First Stop
Stop at Martinrea Module Assembly line

**Group 3**
Chaperones: Bill Littmann & Jim Broad
First Stop
Stop at Rolls Royce AGV
Who is Fori Automation?

Global Design and Build of Assembly, Welding, and Testing Equipment for Automotive and Non-Automotive Industries
What Do We Do ???

• We don’t make parts.
  – Nothing we manufacture goes on a vehicle or assembly.

• We design and build cool stuff
  – Assembly, Testing, and Welding Equipment
    ▪ Automotive, Aerospace, Military/Defense, Agriculture, Motorcycles, Nuclear

• We solve complex problems

• We support a global customer base from our 6 global locations
  – USA, China, Korea, India, Brazil, Mexico, Germany
How do we do it??

• All star team – We hire the best
  – Skilled
  – Motivated
  – Creative
  – Team Players

• Fori team members
  – Sales/Marketing
  – Project Management
  – Purchasing
  – Finance/Accounting
  – Human Resources
  – Mechanical and Controls Engineering
  – Manufacturing
    • Fabricators, Machinist, Welders, Electricians, Assemblers
  – Service

Todays Focus
Why is This Day Important to Fori?

• Previous downturn in economy = less manufacturing jobs
  – Layoffs forced people moved, retired, or started new careers
• Negative feeling about manufacturing emerged
• School and Parents promoted more traditional secondary education
  – 4 year schools
  – Business, attorneys, engineers, finance
• Manufacturing is the backbone of Michigan, especially Macomb County
• Quick Economic recovery. Significant manufacturing resources needed
• Severe shortage of skilled workforce for the new manufacturing jobs
• Critical we promote the Importance of manufacturing in our Country, State, and County
  – The strongest countries produce something tangible
• Manufacturing Jobs are great careers that you can raise a family
• Long Term Sustainability of Fori Automation
  – Fori needs a skilled workforce
What You Will Learn Today

• What is the role of each Department at Fori Automation?
  – Sales/Project Management, Engineering, and Manufacturing
• What type of education, skills, and work experience is required to work within this department?
• How do the employees in each department apply their education, skills and work experience to their job?
• What role did this department play in the development of our AGV?

Sales Concept  ➔  Engineering Design  ➔  Final Product
Housekeeping

- Bathrooms:
  - Men’s bathroom located in each building
  - Women’s bathroom located in **front office**
- Safety Glasses **must** be worn at all times
- Please stay with your group
- Be attentive during presentation – **Turn off Phones**
- **Ask questions.**
- Please stay clear of all equipment, especially areas with Yellow or Red Tape
- Move swiftly between sessions to maintain agenda
- Split into 3 groups
What is our Role within Fori Automation?

- Business Development – Generate Sales
- Provide Engineered Solutions
  - Requirements Include:
    - Quality
    - Production Rates
    - Space Constraints
    - Operators Available
    - Automated/Manual
    - Budget and Delivery
- Develop Preliminary Design and Process
- Generate Proposals & Estimates
- Support Project Management & Engineering
- Customer Satisfaction During/After Project
- Completed R & D & Benchmark Competition
What is our Role within Fori Automation?

- Managing awarded projects
- Plan, organize and direct design & manufacture of system
- Manage budget & delivery Times
- Lead & coordinate different departments within Fori
- Main Customer Point of Contact
  - Monitor all communication
  - Ensure all agreements are withheld
  - Ensure Fori is protected legally/financially
- Work with Sales to ensure Project Scope is Achieved
- Define equipment run-off/acceptance criteria
- Schedule shipping
- Instruct Accounting on invoicing
- Coordinate installation at customer
- Coordinate final invoicing at Projects end
Sales/Estimating & Project Management

Education, skills, work experience requirements?

- Technical Degree Preferred
  - Bachelor of Science: Mechanical/Electrical
  - Bachelor of Business (Apprenticeship Program)
- Understanding of Mechanical/Electrical Drawings
- Organized with Strong Communication Skills
- Computer Skills
  - CAD (AutoDesk, CATIA, Solidworks, etc.)
  - Microsoft Office
  - Technical Presentation Skills
  - Develop/Present to Potential Customers
- Self-Starter
- Ability to Work with Teams
- Willingness to Travel
How do we apply our education, skills, experience?

- Highly Technical Product – How does it work?
  - Engineers are our Customer
- Need to have broad engineering background
  - Mechanical, Electrical, Controls, etc.
- Technical Writing, Verbal/Reading Comprehension
- Financial Feasibility
  - Balance Capabilities and Price in order to meet Budget
- Design Concept for Customers/Fori Engineers
- Identify New Products
- Engineering Calculations
  - Cycle times
  - Volume requirements
  - R.O.I.
What role did we play in the development of our AGV?

- Eyes and Ears to the Customer, Industry and Competition
- Identified a Market for highly Specialized AGV’s
  - Aerospace, Military, Nuclear
- Benchmarked Competition
  - Propulsion, Power Technologies, Navigation
  - Cost/R.O.I
  - Available Technologies to Integrate into AGV
- Project Cost
  - Numerous Design Variations
  - Specific Project Requirements (Tooling)
- Propose Different Solutions
  - Power Supplies (Lead Acid, Lithium Ion, Induction)
  - Drive/Steer System based on Requirements
  - Supervisory System (VMS)
Mechanical and Controls Engineering

What is our Role within Fori Automation?

- Support sales activities & technical correspondence with customers
- Controls Engineering
  - Process, Input/output & sequence
  - System architecture & component selection
  - Electrical hardware & Software engineering
  - Bench testing
  - System debug and validation
- Mechanical Engineering
  - Design of all products produced at Fori
    - 3D CAD Concept/Final Design
    - Engineering calculations & FEA
    - Dimensional control
    - Component specification
    - Material specifications
    - Manufacturability determination
- Research and Development (R&D)
- Manufacturing & Assembly Processes
  - Virtual Simulations
  - Layout drawings
  - Cycle time verification
  - Operator optimization
Mechanical and Controls Engineering

Education, skills, and work experience requirements?

- Engineering Entry Level:
  - Associate or Bachelor Degrees including:
    - Mechatronics
    - Mechanical Engineering
    - Electrical Engineering
    - Computer Science
  - 2D & 3D CAD Experience
  - Drafting training in High school or College
  - Co-op experience with 1st robotics is a plus

Note: Fori Automation utilizes Autodesk Inventor & AutoCAD Mechanical Software
Mechanical and Controls Engineering

How we apply our education, skills and work experience to our job?

- Mechanical:
  - Mathematic principles applied:
    - Torque & forces
    - Horsepower based on linear/angular accelerate & inertia
    - Fatigue, bending and compression stresses used for strength of materials
    - Gear tooth strength & contact stress calculation for power trains
  - Utilization of material properties and manufacturing techniques
    - Manufacturability, low cost, durability

- Controls:
  - Math, physics, chemistry, circuit design
  - Custom component design
    - Optics, magnetic, thermal
  - Scientific method
    - Problem solving & root cause analysis
  - Logic
    - Software & code development
  - Verbal & written technical communication

Note: Calculation used to predict the time before failure of a machine sub-system
What role did we play in the development of our AGV?

- Support sales & marketing
  - 3D Concepts
  - Technical discussion with customer

- Designed servo drive steer
  - Must handle 2-20 tons
  - Accurate, quick turns, crabbing, spinning

- Researched available power supplies
  - AGM, Nickel Metal Hydride, Lithium Ion, etc.

- Develop guidance system (Magnetic Pulse Measurement)
  - Tracks magnetic strip on floor

- Patented the drive steer and magnetic guidance
  - Tested durability, accuracy, etc.

- Expanded capability of current AGV’s for Aerospace
  - Transport aircraft wings, fuselage, engines, cockpits