AGV Integration and IIoT Strategies to Gain Agility and Competitive Advantage

Presented by:

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About Vecna Robotics

- ESTABLISHED IN 1998
- PRIVATELY FUNDED
- $50+ MM IN ROBOTICS R&D
- 170,000 COMMUNITY SERVICE HOURS
- 125 PATENTS
- ENTERPRISE-GRADE INTEGRATION AND SUPPORT

Logos:
- The Best in SBIR TIBBETTS Award
- Winner AI Impact Awards
- Top 100 Women-Led Businesses
- Industry Week’s Women in Business Leader

MHI: The Industry That Makes Supply Chains Work®
Vecna Robotics’ Fleet

**Mixed fleet of collaborative, autonomous mobile platforms to cover any application**
- Transport cases, totes, pallets or incompatibles
- Designed to interact and coordinate with each other

**Integrated, Intelligent Control**
- AI control system integrates directly with IT systems for optimized fleet management

**Comprehensive Support**
- Pre-sales simulation to determine optimum configuration
- Remote Assist solves issues without need for physical interventions
The Landscape
Market Challenges

RISING CONSUMER EXPECTATIONS

Faster delivery
Top challenge to 57% of executives

LABOR SHORTAGES

Finding & Retaining Staff
Top challenge to 58% of executives

MHEs Cost
Operators account for 80% of cost

Labor Cost
$14.1 billion

Labor Demand
750k new jobs by 2018

INCREASING OPERATING COSTS
Businesses Investing Heavily In Robotics To Sustain and Compete

**BUSINESS CASE**
1.5-2.5 year ROI for technology investment

**AUTOMATE REDUNDANCIES**
Automate horizontal travel, save 50% of picking labor

**REDUCE COSTS**
Labor accounts for 80% of MHE ownership cost

**INCREASE SAFETY**
110,000 human-caused accidents per year
IIoT and Robotics: Drivers of Transformation

Robots Are Part of the IIoT Infrastructure, Serving As a Hub or Gateway Device

- Intelligent machinery networked into intelligent systems
- Real time, quantifiable and decisive data is received
- Intelligent decision making and optimization of networks, fleets, facilities, and assets
Robotic AGVs as a Hub or Gateway

The Internet of Robotic Things (IoRT) requires sensing, communication, processing and actuation to take the smart factory to new levels of intelligence. (Courtesy of ABI Research)
Progression Toward IIoT Process Automation

- **Instrumented**
  - Connected or Connectable
  - Provides Data Externally

- **Smart**
  - Enhanced Intelligence
  - Active Condition
  - Monitoring
  - Self Optimization
  - Interact w/Ecosystem

- **Conventional**
  - No Intelligence or Connectivity

- **Software Defined**
  - Some Local Intelligence
  - Software Tunable Asset
  - Enhanced Data Feeds

- **Autonomous**
  - Additional Sensors
  - Real-time Analytics
  - Onboard Execution Software
  - New Business Models Emerge
  - Performance Guarantees

**IloT Enabled**
6 Elements of a Winning Robotic AGV Strategy

1. Understand Your Metrics
2. Simulate for Full Optimization
3. Prepare Staff
4. Leverage Flexible Robust Technologies
5. Constant Optimization
6. Remote Support
1) Understand Your Metrics

**WHAT IS MOST IMPORTANT?**
- Cost?
- Throughput?
- Efficiency?

**OFTEN FORGOTTEN, BUT EQUALLY IMPORTANT**
- Flexibility
- Robustness
- Scalability

![Graphs and charts showing data on orders, occurrences, notifications, total receivables, deliveries, transfer orders, and negative stock over different dates.]
2) Simulate for Full Optimization

Simulation is the key to automation success in complex environments

- Different Space Configurations & Characteristics
- Different Operating Scenarios
- Different Strategies

**SIMULATION**
- Determine optimum solution for your individual needs before committing to a specific system
- Identify types of platforms, size of fleet, and business case ahead of time

**ENTERPRISE-WIDE**
- End-to-end model of all material flows
- Model specific facilities down to individual vehicle performance
3) Prepare Staff

EDUCATION AND TRAINING

- Employee buy-in just as important
- Help them understand that the goal is to make their jobs better and help the company grow
- Get them into contact with real robots ASAP to combat common misperceptions

“SAFETY-TO-AUTONOMY” GLIDE PATH

- Rather than massive overhauls, automate familiar processes incrementally
4) Leverage Flexible, Robust Technology

The industry is moving away from large, complex systems and towards more flexible solutions

Mobile robot systems allow for incremental scalability to combat seasonal peaks and unexpected surges in demand
Smart Navigation

**SENSOR AGNOSTIC**
- Sensor fusion for robust, reliable navigation

**ZERO INFRASTRUCTURE CHANGES**
- Quick install
- Scalable - no need for additional integrations

**COMPREHENSIVE LOCALIZATION**
- Visual landmarks, fiducials, Wi-Fi localization, etc.

**DYNAMIC PLANNING**
- Automatically navigates around obstacles or reroutes itself if path is completely blocked
Core Task Management

**AI RESOURCE ALLOCATION**
- Coordinate robots, manual equipment and workers through one system

**FLEET MANAGEMENT**
- Actively manage robot traffic

**TRACK STATUS AND PROGRESS**
- Track agents and fleet status in real time
- Enable supervisor drill-down into individual unit
5) Smart Optimization

- There is no “one-size-fits-all” automation solution
- Fast implementation and learning cycles make for a quick ROI and an overall better solution
- Sync with IIoT/Industry 4.0 Initiatives for even greater value
6) Remote Support Is Critical

ROBOTICS-AS-A-SERVICE (RaaS)

- One of the largest in the mobile robotics industry to date has been poor post-sales support
- The paradigm needs to change from thinking of the robot as a piece of equipment to thinking of it as a service.

VECNA’S IIoT Monitoring (Remote Assist)

- Real-time system monitoring and support either on-site or via remote support team
- Resolve issues directly through Remote Assist tool rather than manual intervention
- Physical interactions with platforms required less than 5% of time expert remotely supports
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“If you are in business in a few years it’s because you decided to invest in automation. It will be difficult to compete in a global economy without a robust automation strategy.”

- Daniel Theobald, CIO, Vecna Robotics