2017
Smart Devices & Systems
Cluster Results and Highlights

Table of Contents

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Executive Summary:

By 2023, the Internet of Things (IoT) is estimated to create $400 trillion of profitability enhancement opportunities for manufacturing, spanning all major industrial sectors.[1] IoT will be a major driver that will help increase productivity for the manufacturing community in Northeast Ohio, thus giving the region a competitive edge for global competition.

Team NEO is working to accelerate the impact of innovation in the region by developing a robust innovation cluster focused on the deployment of IoT, titled "Smart Devices and Systems." Northeast Ohio has the resources for companies focused on smart devices and systems and the cluster is actively working to grow our region's adoption of IoT technologies and capabilities. While IoT plays an important role across many industries, the cluster is focusing its efforts on the strong base of manufacturing and healthcare institutions in Northeast Ohio.

In 2017, Team NEO formed the basis of a Smart Devices and Systems Cluster by focusing on six key goals.

Cluster Goals

Goal 1. Membership: Form a regional innovation cluster that establishes Northeast Ohio as a leader in IoT implementation and attracts a robust membership spanning the entire supply chain.

> **Outcomes:** Established the foundation of a cluster by rolling out a formal membership process which resulted in 19 signed agreements, convened three cluster meetings that attracted 50 companies and institutions, and attended eight conferences to promote the cluster nationally.

Goal 2. Working Groups: Develop working groups to build out supply chain strengths in key market application segments for smart manufacturing and smart healthcare.

- Build out supply chain strengths in key manufacturing market application segments of predictive maintenance, supply chain management, operating efficiency, product quality, inventory control, and occupational safety.

- Build out supply chain strengths in key healthcare market application segments including: patient monitoring, chronic disease monitoring, complex wound healing, and asset tracking/monitoring.

Outcomes: Chartered a smart manufacturing and smart healthcare working group to build out supply chain strengths in key market application segments.

Goal 3. Develop an IoT Roadmap: Spur business growth and competitiveness for both the demand side and supply side of IoT by measuring regional strengths and filling supply chain gaps through a strategic business attraction plan.

[1] Deloitte: Mapping the Internet of Things (IoT) Economy, March 6, 2017

Outcomes: Developed a roadmap framework and received funding from the Burton D. Morgan Foundation to complete the final study. To date, 20 seeker / solver profiles have been completed.

Goal 4. Workforce Development: Use formal education and workforce training initiatives to boost the adoption of IoT and place a strong emphasis on the development and retention of computer and engineering talent.

Outcomes: Collaborated with Lorain County Community College to launch the TRAIN program.

Goal 5. Entrepreneur Support: Establish a framework that will foster entrepreneurship and commercialization of IoT supply chain technologies, as well as the Northeast Ohio "maker" community.

Outcomes: Mentored start-ups through the JumpStart Executive in Residence (EIR) network, collaborated with Lorain County Community College on the ReADI Program, offered cluster membership scholarships to promising start-ups.

Goal 6. Seeker/Solver Connections: Connect regional supply chain assets for the purpose of growing their business by mitigating innovation risk and strengthening the regions competitiveness in specific innovation topics.

Outcomes: Team NEO met with nine large anchor companies to establish relationships for future seeker/solver introductions.

Conclusion:

What is the Smart Devices and Systems cluster's value proposition within the innovation ecosystem?

Team NEO identifies the supply chain assets in Northeast Ohio relating to specific topics for the purpose of creating connections.

Team NEO aggregates data about the demand for that technology globally and then links our supply chain collaborations to this demand.

How do we identify the solvers for this technology?

- Connect Northeast Ohio regional supply chain assets for the purpose of growing their business by mitigating innovation risk and strengthening the region's competitiveness in specific innovation topics.
- Form supply chain collaboratives.
- Connect our seekers and solvers through roadmaps, convening forums, working groups, and cluster meetings.
- Introduction to market opportunities.
- Convene for the purpose of education, collaboration opportunities, provide structure.

- Identify and introduce entrepreneurs to supply chain.
- Attract innovators to the region.

How does the SD&S cluster identify demand drivers for technology?

- Keep up to date on industry trends and standards
- Provide mentoring support to the entrepreneur community as it applies to SD&S
- Consolidate industry knowledge and resources for this technology.
- Interface with U.S. manufacturing innovation institutions
    - Bring back roadmap processes and content
    - Educational Tools
    - Standards
- Attend technical conferences
- Listen to seekers regarding market needs/gaps/trends
    - Translate their needs into tech solutions
- Access market studies
- Do market research studies
- Convene thought leaders in the region

Goal 1:

Form a regional innovation cluster that establishes Northeast Ohio as a leader in IoT implementation and attracts a robust membership spanning the entire supply chain.

Convened three cluster meetings to formalize the cluster, shared industry knowledge and expertise, and to provided networking opportunities.

First Quarter Cluster Meeting - March 16
55 Attendees, 50+ companies and institutions in attendance including Rockwell, Valtronic, Blue Bridge Network, NASA, and Kent Displays.

The event featured Lev Gonick, CEO of Digial C, who gave a perspective on the smart devices and systems current landscape and evolution, a perspective on why NEO/Ohio can win in this space, barriers for entry that NEO must address, and steps companies in NEO/Ohio must take to succeed. Lev spoke about the next wave of the internet and an opportunity for Cleveland to lead the way in applying to an upcoming grant of $100,000. Rick Earles, Senior Director of Team NEO introduced the framework for the roadmapping process and introduced funding opportunities available through NextFlex. Mike Morgenstern, Director of Advancement at Lorain County Community College spoke about ReADI, a new funding vehicle for entrepreneurs in digital technology.

Second Quarter Cluster Meeting - June 29
40 Attendees, 25+ companies and institutions in attendance including Steris, Lumitex, MCPc, and Lubrizol.

The event featured Mario Garzia, President of the DIGA Group, who spoke about the opportunity for connected devices, the power these devices provide to generate, process, share data, and the unparalleled opportunity for those who can harness this data to envision new and powerful capabilities and services. Ken Loparo, Nord Professor and Chair, Department of Electrical Engineering and Computer Science at Case Western Reserve University gave an introduction on the Institute for Smart Secure and Connected Systems and the Cleveland State IoT Collaborative. Jacob Duritsky, Vice President of Strategy and Research for Team NEO presented results of a recent study titled Aligning Opportunities, addressing the demand and supply imbalance of Northeast Ohio's workforce.

Third Quarter Cluster Meeting – October 3
40 Attendees, 35 companies and institutions in attendance including Arconic, Cleveland Clinic, Goodyear, and Swagelok.

This event featured a keynote presentation by John Mack who gave an overview of how the digital transformation of manufacturing disrupts the American industry. American manufacturing faces a significant obstacle in that current machines are not connected and cannot communicate relevant data and information to management. This presentation helped manufacturers better understand implications and solutions in the IIoT implementation process. Rick Earles facilitated a panel discussion of industry experts who addressed the challenges of IIoT implementation. This included Bart Reimer, Commercial and Off Highway NA Operations Manager, Goodyear, William Butcher, Information Solutions Division, Enterprise Architect, Lubrizol. Participants had an opportunity to attend one of two working group breakout discussions to understand progress to date relative to the Smart Devices and Systems cluster's smart manufacturing and healthcare collaboratives efforts. Participants further refined the definition of issues that need to be addressed for the smart devices and systems application areas and identified opportunities for collaborative development projects.

Cluster Promotion

Creating Northeast Ohio as a leader in IoT innovation involves significant promotion of cluster activities at local and national events. The cluster was promoted at the following events:

NextFlex Technical Council Meeting, February 28

Tim Fahey and Rick Earles attended on behalf of the cluster to create relationships, identify funding opportunities and bring national roadmap insights to our cluster members.

ADM Conference, March 29 – 30

Tim Fahey spoke on Smart Devices and Systems and chaired a session of cluster member presenters. Team NEO also hosted a private networking reception with 75 targeted attendees.

Manufacturing Tech Conference, May 8-11

Rick Earles presented on behalf of the cluster and presented a smart devices and systems workshop featuring Case Western and MCPc.

Tech Connect May 15-16

Tim Fahey promoted cluster member companies through meetings with external innovation leaders from Medtronic, Baxter Health Care, Eastman, UTRC, FlexCon, Henkel, Panasonic and TE Connectivity.

FLEX Conference, June 19-23

Tim Fahey promoted the cluster in meetings with several companies including: FlexEnable Ltd, Brewer Science, AU Optronics Corporation, Korea Electronics Technology Institute.

MCPc Cybersecurity Conference, October 12

Rick Earles attended and met with Lenova (Lenovo?) and HP to promote the cluster.

Smart Factory World Symposium, October 25-26

Rick Earles attended on behalf of the cluster to build relationships with the National Manufacturing Innovation Institute.

IDTechEx, November 14-16

Tim Fahey attended and met with several companies to promote the cluster including: Elcoflex Oy? Ltd, Samsung Advanced Institute of Technology, SysteMECH, ABeetle Corporation, Bainisha, JCDecaux SA, Liquid Wire, Myant Inc., Polymatech America Co Ltd, StretchSense, Tacterion.

2017 Steering Committee

A steering committee is an important engine for decision making and driving forward cluster activities and goals. The steering committee formed reflects an impressive list of diverse industry experts all committed to driving the adoption of IoT in Northeast Ohio.

Steering Committee Members

Matt Apanius, Director, SMART Center
Eric Baumann, Flexible Electronics Sector Manager, NASA
Brian Davis, Biomechanical Engineering Dept., University of Akron
Vijay Iyer, VP Business Development, BioEnterprise
Asad Khan, CTO, Kent Displays
Kenneth Loparo, Nord Professor and Chair, Case Western Reserve University
Mark Paczlowski, Technical Fellow, New Product R&D, Lubrizol
Michael Regelski, CTO, Eaton
Bob Scaccia, President & CEO, USA Firmware
John West, Trustees Professor, Kent State University
Jennifer Thomas, Chief Strategy Officer, Digital C
Rick Nardo, Steris, Program Manager, R&D, Surgical Solutions

Company Participation Roster

****Denotes $1,000 paid member**

Anchor Company Participation
Arconic**
Eaton**
Cleveland Clinic Innovations
Goodyear
Lubrizol**
Parker Hannifin
Rockwell Automation
Steris**
Swagelok
The Timken Company**
University Hospitals

Small/Medium Enterprises
Akron Polymer Systems
Avantia
Balance
BlueBridge Networkings

Blue Spark Technologies**
Butler Technologies**
Charter Steel
Cubbison Company**
Embedded Planet**
Emanate Wireless
Engineered Materials Systems**
IIoT World
Kent Displays**
LogiSync
Lumitex**
M Genio
MCPc**
Nottingham Spirk
Orbital Research
PolymerPlus
Quality Electrodynamics
ScottCare
SmartShape**
USA Firmware**
Valtronic**
Virtual Analytics

Entrepreneurs
eSens
FITOS
Hallsten Innovations
Kebormed
Nano Bio Systems
Pulmonary Apps

Universities, Non-Profits, & Research Institutions
BioEnterprise
Case Western Reserve University
Lorain County Community College
NASA
University of Akron
Praxia

Goal 2:

Develop working groups to build out supply chain strengths in key market application segments for smart manufacturing and smart healthcare.

Working Group Roll Out

Working groups are an important mechanism used to advance key growth initiatives and to assist in attraction and recruitment of new cluster members. The working groups will develop supply chain strengths in key market application segments for smart manufacturing and smart healthcare.

Smart Healthcare

Initial Working Group Meeting – August 29
15 attendees including; Eric Bauman - NASA, Rick Nardo – Steris, Ken Loparo – CWRU, Ming-Chun Haung – CWRU, Vijay Iyer – BioEnterprise, Subba Shankar – University Hospitals, Brian Davis – University of Akron, Mike Maczuzak – Smart Shape, Kelly Emerton – CCI, Dr. Frank Papay – CCI, Dan Cusick – Emanate Wireless, Tony Crimaldi – Avantia, John Gannon – Blue Spark, Dr. Michael Forbes – Akron Children's Hospital.
The meeting was facilitated by Rick Earles, Tim Fahey, Paula Timco from Nubo Health, and Mark Cartellone from SmartShape.

The smart healthcare working group results were presented during the third quarter cluster meeting breakout session and since then has moved forward with a leadership team consisting of Mark Cartellone, Paula Timco, Rick Earles, and Ken Loparo focusing on Diagnostics in the OR.

Smart Manufacturing

Initial Working Group Meeting – September 19
8 attendees including; Hugh Arif – AT&T, Gary Klinger – Mondo Brain, Tony Crimaldi – Avantia, Bob Eckman – MCPc, Marvin Davis – Arconic, Peter Buca – Parker Hannifin, Jennifer Thomas – Digital C, Bob Baxendale – MAGNET.

Meeting facilitated by Rick Earles, Tim Fahey, Gautam Bagal from Eaton, and Bill Butcher from Lubrizol. Three primary focus areas were selected: predictive maintenance, operating efficiency, and supply chain management. The meeting results were presented during the third quarter cluster meeting breakout session.

Goal 3:

Spur business growth and competitiveness for both the demand side and supply side of IoT by measuring regional strengths and filling supply chain gaps through a strategic business attraction plan.

Roadmapping

A brand new service was created and offered to cluster members. The IoT roadmap allows companies to have their capabilities profile be recorded and entered into a database that will connect them with companies seeking IoT solutions. The roadmap will spur business growth and competitiveness for both the demand side and supply side of IoT by measuring regional strengths and filling supply chain gaps through a strategic business attraction plan.

Companies profiled include: ACI, Advantech, Arconic, Avantia, Blue Bridge Networks, Butler Technologies, CWRU, Eaton, Embedded Planet, Forcam, Intwine Connect, Linear ASICs, MCPc, Parker Hannifin, Rockwell Automation, SimuTech, Smart Microsystems, SmartShape Design, USA Firmware.

Goal 4:

Use formal education and workforce training initiatives to boost the adoption of IoT and place a strong emphasis on the development and retention of computer and engineering talent.

Team NEO is an official partner of TRAIN Ohio, a learn and earn program piloted by Lorain County Community College in 2017. Team NEO works to attract industry participation that can help create curriculum and host students as potential workers in their company. This will ensure a continuous talent pipeline for industry.

Goal 5:

Establish a framework that will foster entrepreneurship and commercialization of IoT supply chain technologies, as well as the Northeast Ohio "maker" community.

Youngstown Business Incubator Partnership

In 2017, Team NEO began partnership discussions with the Youngstown Business Incubator to expand its client base to companies focused on IoT. Team NEO is in the process of offering Executive in Residence (EIR) services to a select group of entrepreneurs.

ReADI

The Northeast Ohio Regional Acceleration in Digital Innovation (NEO ReADI) initiative will support innovation and commercialization of key technologies anchored in the region. NEO ReADI's goal is to grow and attract investment for the core regional digital technology cluster. It aims to start up eight to 12 companies with proven concepts and markets within three yearsand continue thereafter advancing four or more cluster ventures each year to marketability and commercialization.

Goal 6:

Connect NEO regional supply chain assets for the purpose of growing their business by mitigating innovation risk and strengthening the region's competitiveness in specific innovation topics.

Seekers solver introductions are an important mechanism for spurring innovation and helping small and medium companies create connections with large anchor companies.

Anchor Company Cluster Engagement Meetings

Anchor company participation is key to the outcomes of our clusters. In 2017, the cluster met with the following companies: Eaton, University Hospitals, GE, Cleveland Clinic Innovations, Lubrizol, Timken, Parker Hannifin, Rockwell Automation, Steris.