UTILITIES SERVICE ALLIANCE
"SIMPLE, COST-EFFECTIVE EXCELLENCE"

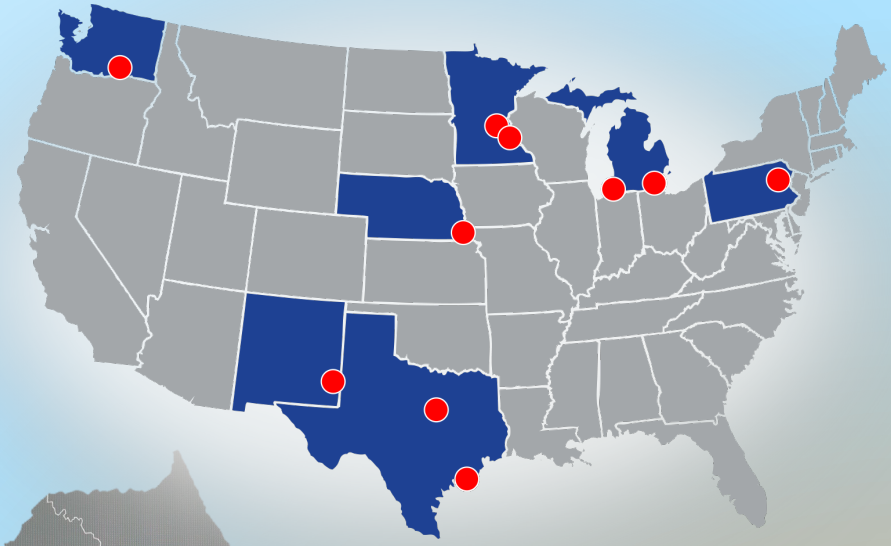
-Project Overview-

Advanced Remote Monitoring and Diagnostics

"Strengthening Safety and Resilience of Nuclear Power through Advanced Technologies"

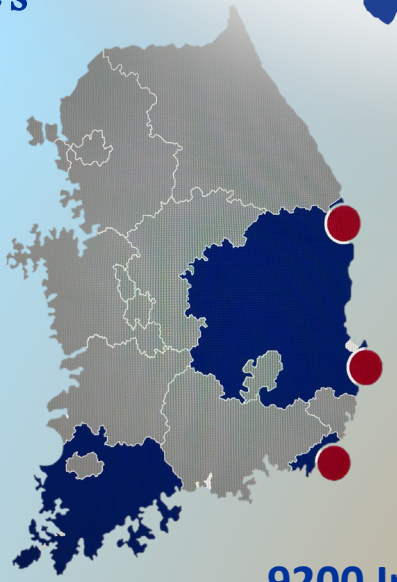
Jamie Dugan
Vistra's Power Optimization Center

USA
UTILITIES SERVICE ALLIANCE
"SIMPLE, COST-EFFECTIVE EXCELLENCE"



The Utilities Service Alliance (USA), Inc.

- Incorporated:1996
- Not for Profit: 501(c) 12 Cooperative
- Governance: Board Comprised of Member Executives



"Dedicated to helping our members achieve and maintain safe, cost-effective top-quartile operations"

USA Membership:

- *9 Utilities / 13 Sites*
- *1 Uranium Enrichment Plant*
- *39 Reactors (6 BWRs, 4 CANDUs, 29 PWRs)*
- *More than 39,650 MW(e) of Generation*

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In the beginning...

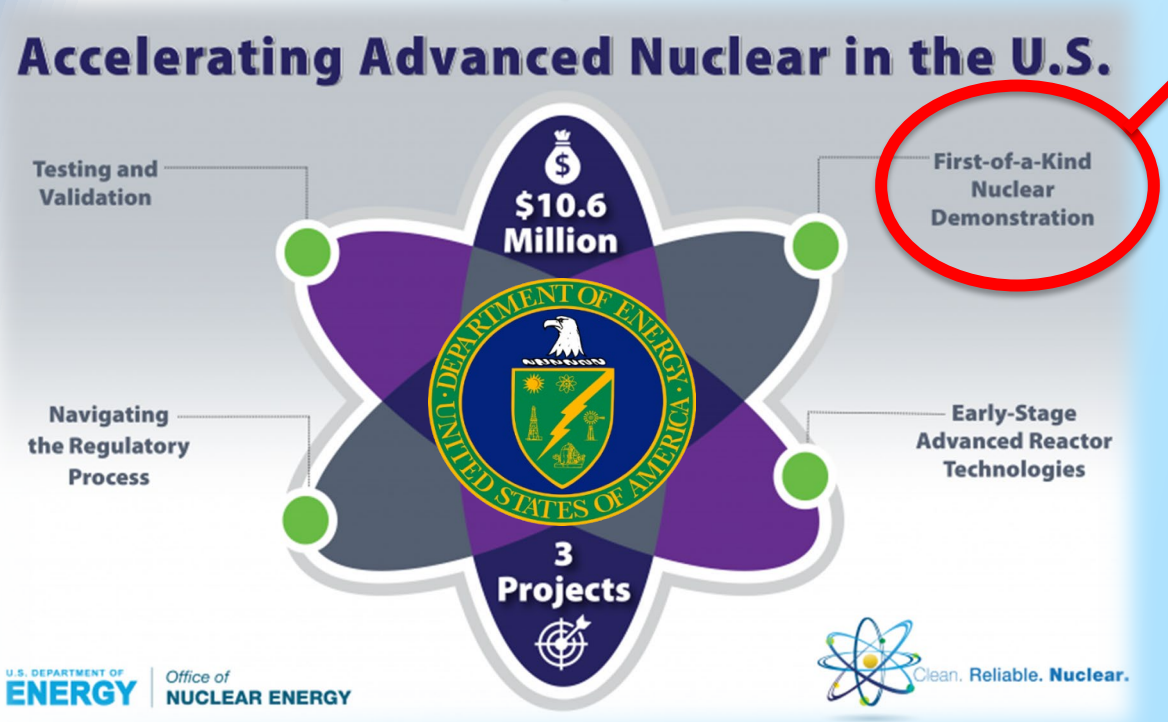
NEI NUCLEAR ENERGY INSTITUTE

DELIVERING THE NUCLEAR PROMISE

nuclear matters: my work • my plant • my industry

U.S. Industry Opportunities for Advanced Nuclear Technology Development

Funding Opportunity Announcement (FOA) DE-FOA-0001817



First-of-a-Kind Nuclear Demonstration Readiness Project pathway,

Address major advanced reactor design development projects or complex technology advancements for existing plants which have significant technical and licensing risk and have the potential to be deployed by the mid-to-late 2020s.

Assistance Agreement: DE-NE000892

Advanced Remote Monitoring

Under this proposal, Utilities Service Alliance is to research, develop, and deploy automation and advanced remote monitoring technology into the United States nuclear fleet to achieve economic viability while maintaining or improving safety and reliability.

DOE Funding: $9,183,255; Non-DOE: $4,081,445; Total: $13,264,700

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Advanced Remote Monitoring and Diagnostics

Preserve the economic viability of our nuclear energy supply by transforming core business processes through the application of Advanced Technologies

INL
Idaho National Laboratory

Objectives:

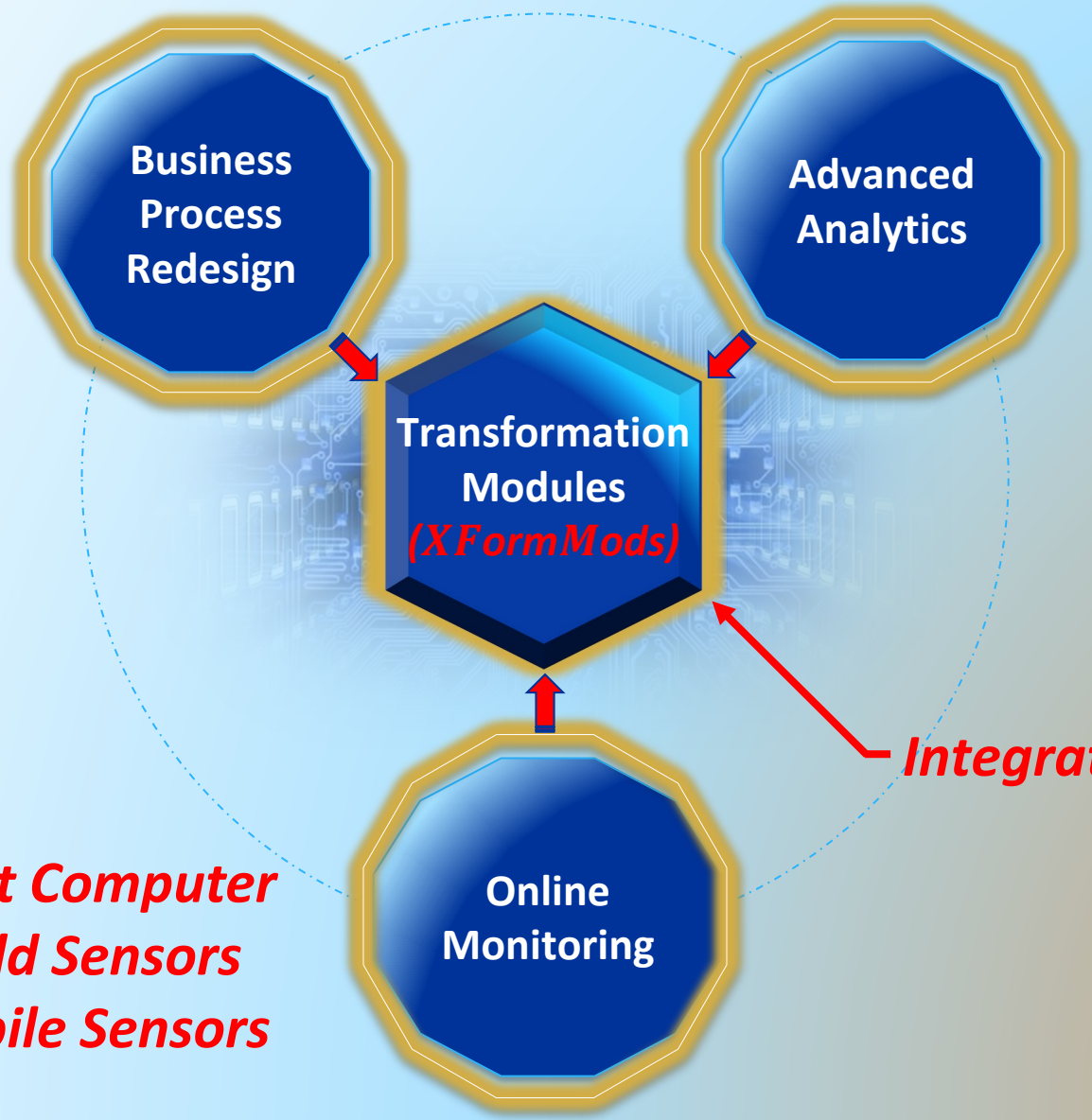
Creation of a Shared-Services Technology Platform - *NuSuite*

Transformation of Nuclear Business Processes - *Transformation Modules*

Establishment of 24x7 Monitoring & Diagnostic Services – *Vistra's Power Optimization Center*

NuSuite

Technological Transformation of Nuclear Business Processes



Simplification
Standardization
Automation

First Principles
Multivariant
Artificial Intelligence

Integrated Business Solution

Plant Computer
Field Sensors
Mobile Sensors

Business Transformation

Advanced Remote Monitoring

Phase-1 (φ1)

- *Modules Development & Configuration – In Progress*
- *Embedded AI Algorithms – Collaboration with INL*
- *Plant Demonstrations – In Progress*

Phase-2 (φ2)

- *Objective: Scale-Up and Expand Capabilities*
- *Detailed Project Proposal – Complete*
- *Status - Seeking Funding in FY25 Federal Budget*

Embedded AI

- *Classification*
- *Regression*
- *Transfer Learning*

Strengthening Practices Aligned with Regulatory Compliance

FireWatch

Roving & Dedicated
AI & Multivariant Analytics
Continuous Monitoring

Shiftly Surveillances

On-Demand Capability
1st Principals Analytics
Acceptance Criteria Determination

Operator Rounds

Automated Room Monitoring
Expanded Sensing Capabilities
AI, 1st Principals & Multivariant

Plant Benefits

- ✓ *Strengthen Nuclear Safety*
- ✓ *Sustain Plant Reliability*
- ✓ *Reduce Occupational Dose*
- ✓ *Minimize Human Error*

FireWatch System – Design Capabilities

System

- Remote management through NuSuite™
- Compliant with operational and cyber-security requirements
- Real-time recognition of potential fire through ***Artificial Intelligence***

FireWatch

FireWatch Cart

- Telescopic Detection Sensors Capability
- Portable configuration
- Capable to withstand seismic events

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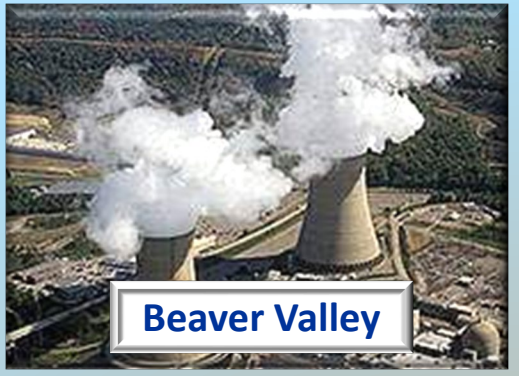
24x7 Remote Monitoring & Diagnostics

Vistra's Power Optimization Center



Sustaining High-Levels of Safety, Performance, and Reliability

Project Management Highlights

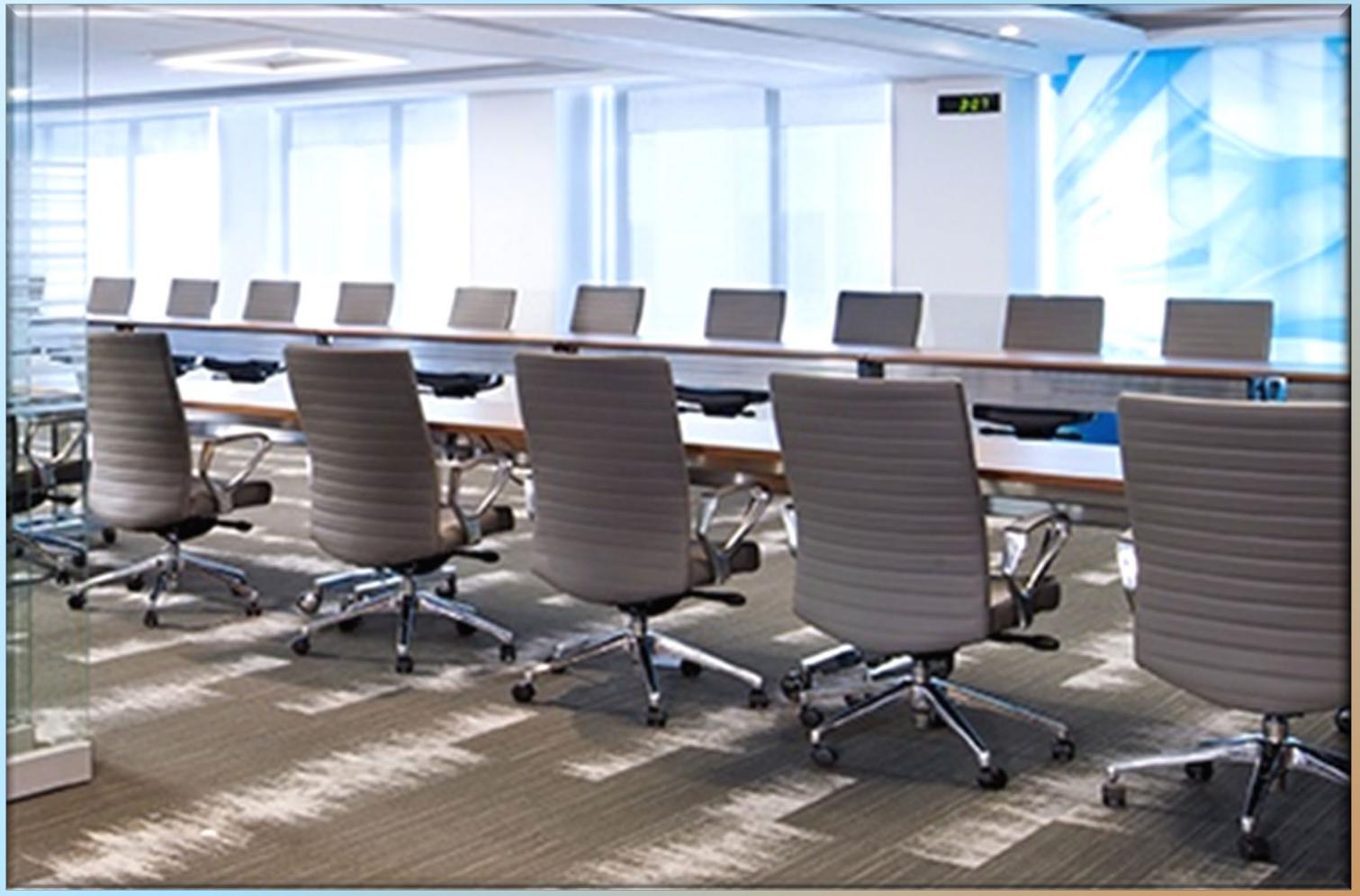
- Created NuSuite Architecture
- Installed Technologies In-Plants
- Codified Machine Learning Algorithms
- Launched Industry Collaboration Initiative
- Current Focus: Project Completion

Sharing with Industry

Industry Engagement

NEI NUCLEAR ENERGY INSTITUTE

- Digital I&C Working Group
- Innovation Task Force
- Cyber Security Task Force



ARM Use Cases in Regulatory Modernization Initiatives

ARM Regulatory Compliance Meeting

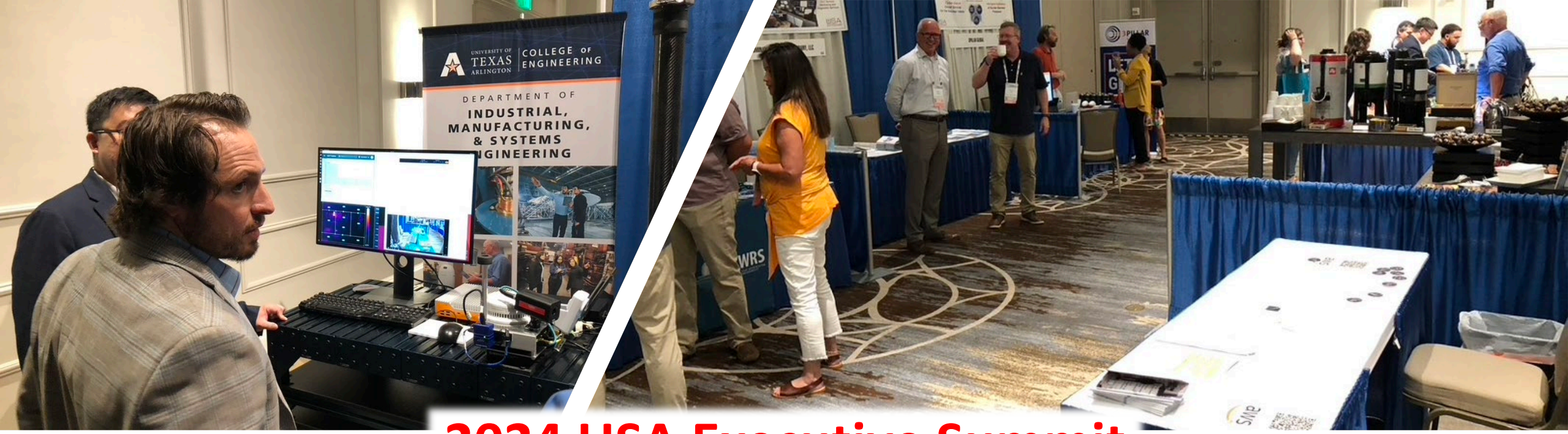
- Familiarize NRC with Project Vision and Scope
- Review Approaches for Compliance
- Plan for Ongoing Collaboration

Idaho National Laboratory

Achieving Regulatory Compliance through Industry Collaboration

Creating International Guidelines and Regulatory Frameworks

Artificial Intelligence and Near-Term Deployment in Operating Nuclear Plants



2024 USA Executive Summit

Project Completion Strategy

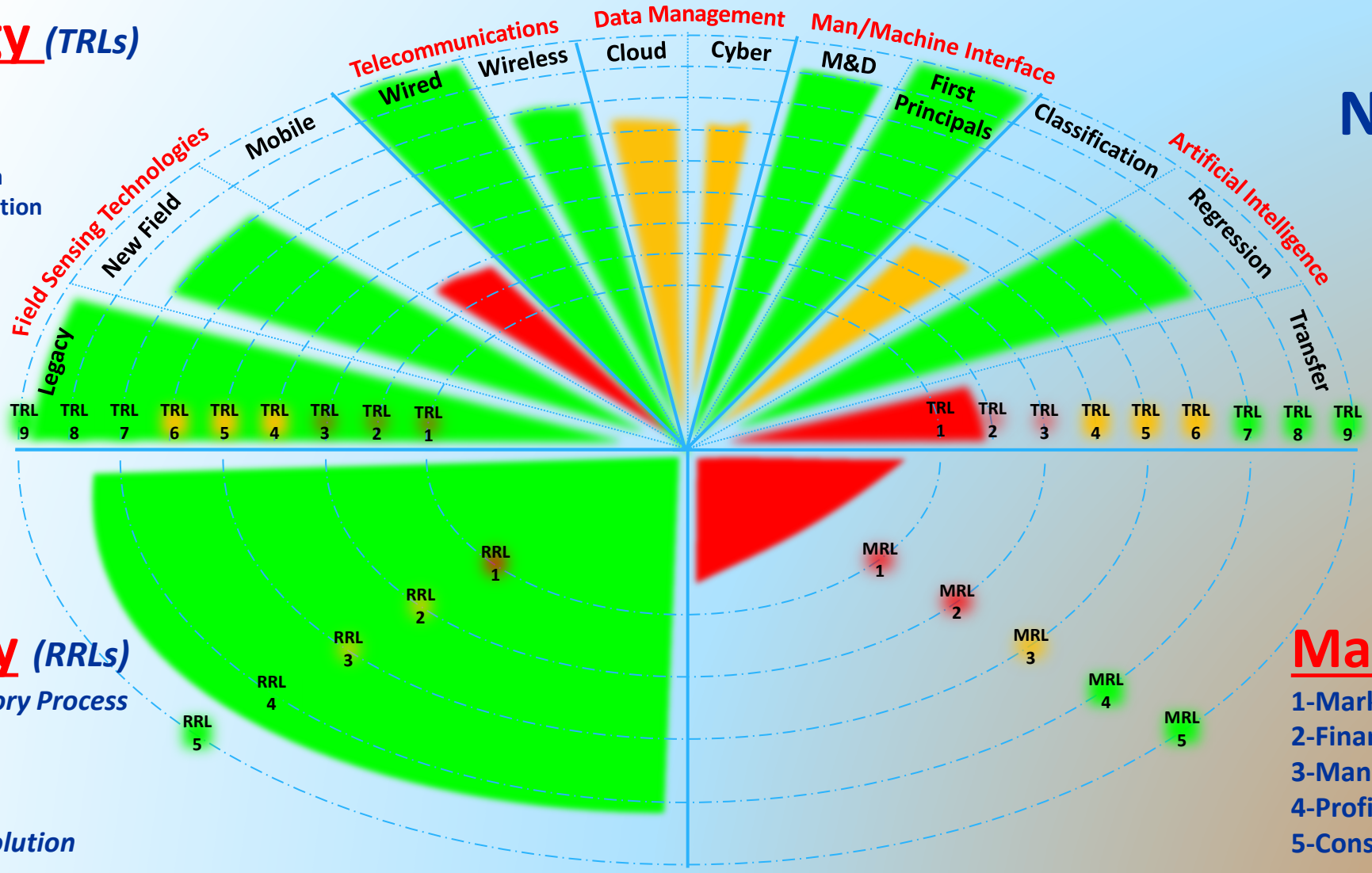
Sustaining what we've created for the industry…

Technology Transformation Framework

Technology *(TRLs)*

1-Principles Observed
2-Concept Formulated
3-Experimental Proof
4-Laboratory Validation
5-Environmental Validation
6-Environmental Demo
7-Prototype
8-System Completed
9-Proven

NuSuite



Regulatory *(RRLs)*

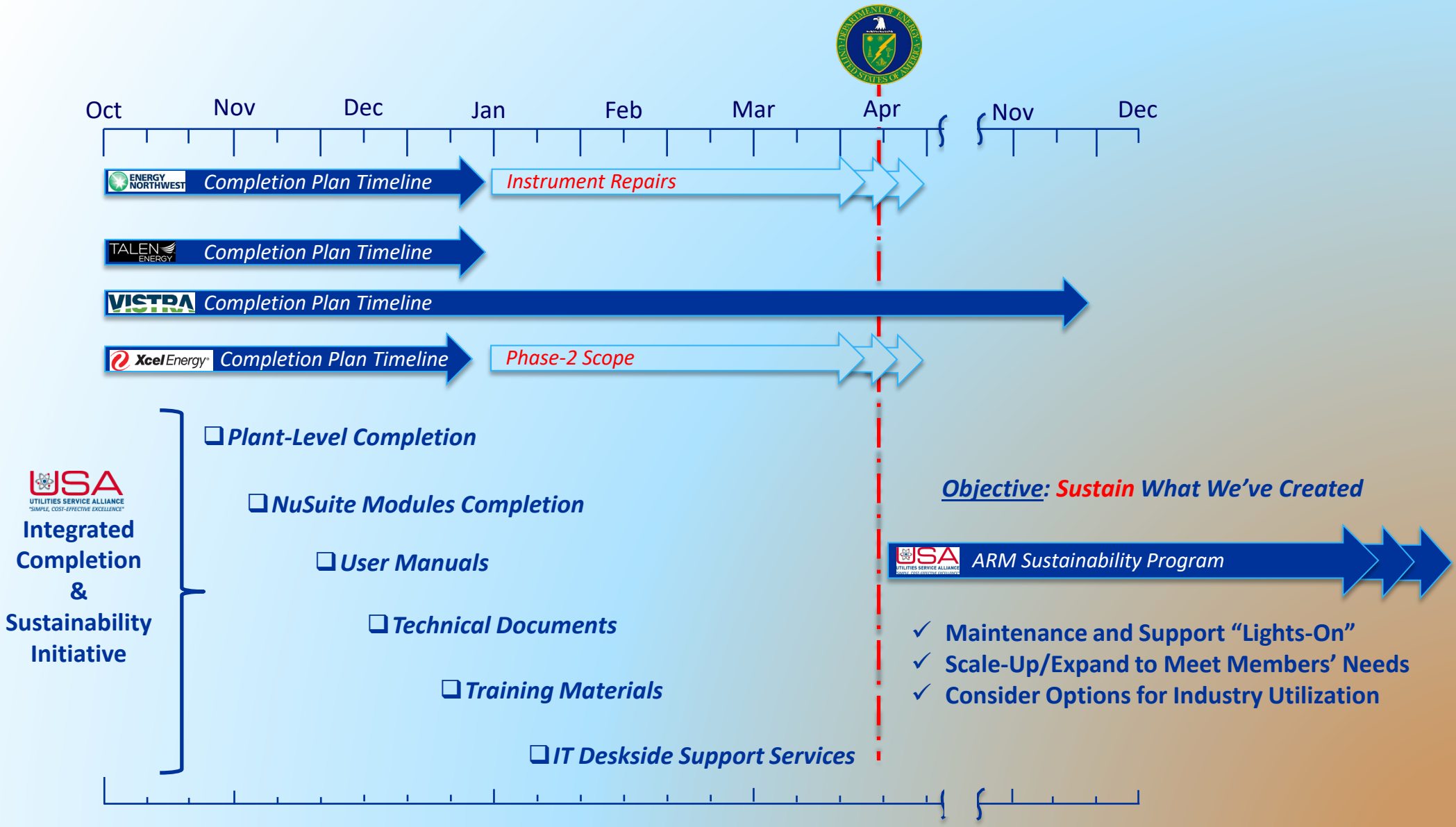
1-Access to Regulatory Process
2-Political Security
3-Effective Policies
4-Safe
5-Acceptability of Solution

Market *(MRLs)*

1-Market Access
2-Financial Capital
3-Manufacturing Capability
4-Profitable
5-Consumer Utilization

Readiness Levels must Mature across all Three Sectors

Project Completion Plan



Transformation of R&D Prototypes to Sustainable Production-Grade Products

Advanced Remote Monitoring

- ✓ *Strengthen Nuclear Safety*
- ✓ *Sustain Plant Reliability*
- ✓ *Reduce Occupational Dose*
- ✓ *Minimize Human Error*
- ✓ *Preserve Economic Viability*

Nuclear Power

Foundational to a clean, reliable, and secure energy future…