
Overview of Y-12 Applied Technologies Division

Uranium Center of Excellence

Kevin R. Finney, Division Manager

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Uranium Center of Excellence

“Y-12’s transformation efforts are a model for what’s going to take place at other weapon sites in the U.S.”

December 2007

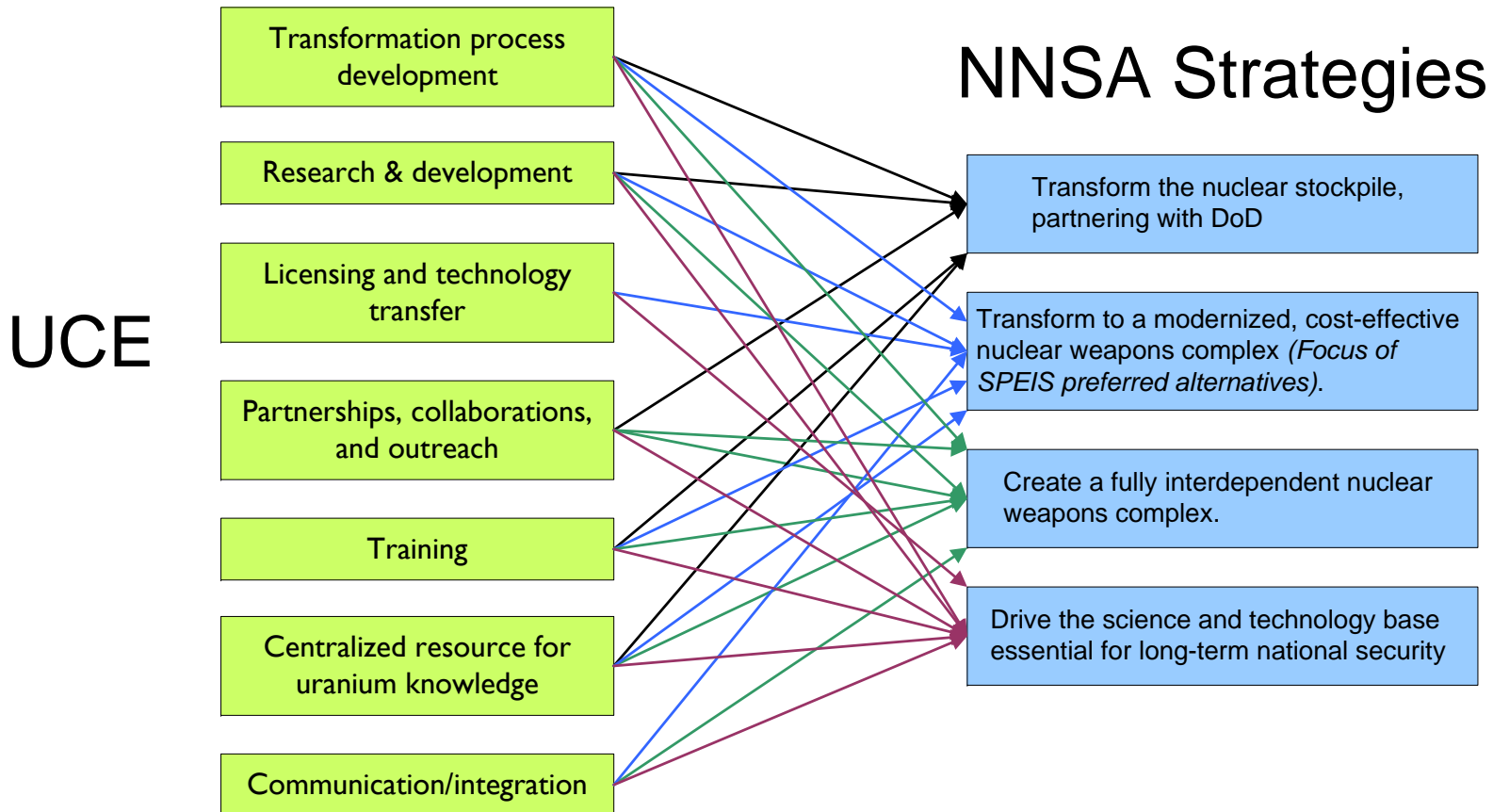


Thomas P. D'Agostino, Deputy
Administrator for Defense Programs,
NNSA

UCE supports the transformation process for “getting the job done.”

Key UCE functions

The fundamental UCE mission is defining and implementing the processes to drive transformation at Y-12, while supporting NNSA's Complex transformation.



We are:

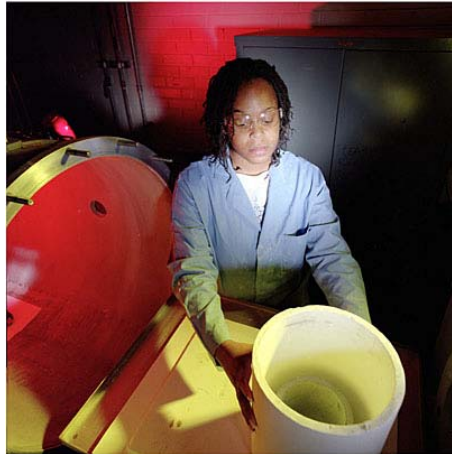
- Innovative scientists, engineers, and managers from multiple Y-12 functions.
- Integrating Y-12's history and science with its future.
- Leveraging, partnering, collaborating, and inventing.
- Innovating in strategies, technologies, and business models.
- Integrating across the complex, what we know and do with what you know and do.

As the Keystone of the Uranium Center of Excellence, Applied Technologies...

- Provides technical expertise on virtually all materials, methods, technologies, and processes utilized to fulfill the plant's mission.
- Develops the materials, methods, technologies, and processes required for future plant operations to ensure safe, secure, and cost-effective operations.
- Develops “application driven technology solutions.”



Development



Demonstration



Deployment

Applied Technologies Staff

- Organization consists of nine major technical departments:
 - **Materials Processing**
 - **Characterization and Analysis Technology**
 - **Metallurgy**
 - **Assembly Technologies**
 - **Control and Sensor Systems**
 - **Compatibility and Surveillance**
 - **Mechanical Systems**
 - **Technical Project Management**
 - **Operations and Security Management**



- Staff consists of scientists, engineers, technical support, and administrative staff (107 total), including:
 - **23 Scientists**
 - **56 Engineers**
 - **7 Project Leaders**
 - **6 Engineering Technicians**
 - **6 Administrative Staff**
 - **9 Technical Managers**



- The organization maintains key staff in all of the major and minor process materials and capabilities at Y-12.

Applied Technologies Facilities

- A variety of facilities are available to support our mission needs:
 - Foundry Operations
 - Characterization and Analysis Labs (Mass spectrometry, Auger, X-ray, SEM, etc.)
 - Large Chamber Scanning Electron Microscope (user facility)
 - Physical and Non-destructive Testing
 - Dimensional Measurement and Metrology
 - Control Systems and Sensors Testing Labs
 - Materials Compatibility Laboratories
 - Physical and Organic Chemistry Labs
 - Pilot Scale Chemical Processing Facilities



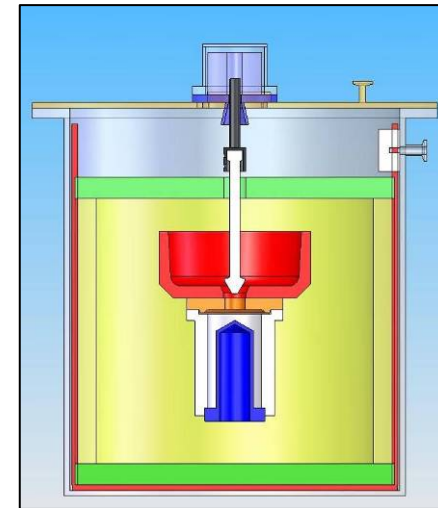
Areas of Expertise

- **Metallurgy & Materials Science**

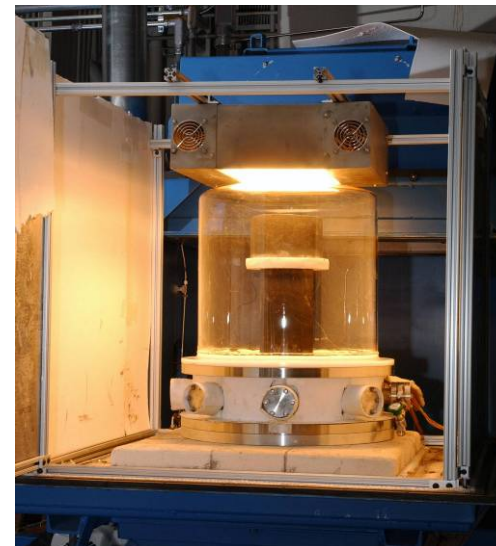
- Casting
- Forming
- Treatments
- Coatings
- Nanoparticles

- **Assembly**

- Welding
- Joining (Adhesives)
- De-Bonding



Microwave Casting



De-Bonding via Infrared (IR) Heating

Areas of Expertise (continued)

- **Materials Processing**

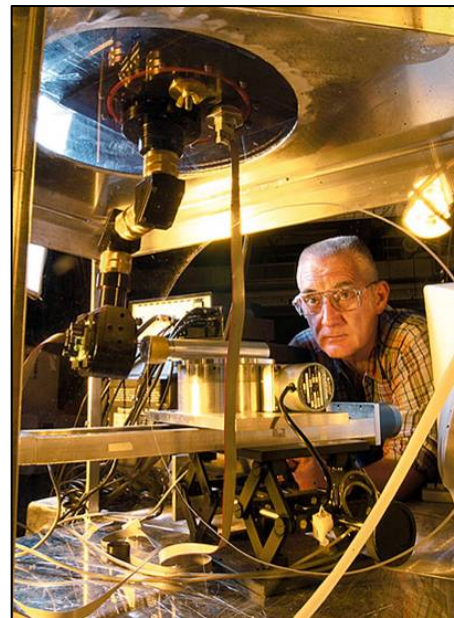
- HEU
- LEU
- Lithium
- Ceramics
- Polymers

- **Materials Compatibility & Stockpile Surveillance**

- Aging Studies
- Material Interactions



D₂ Gas
Generation

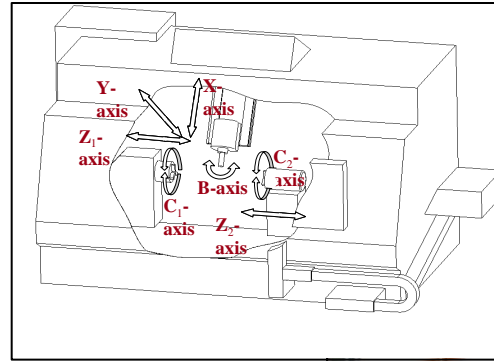


Diffuse Reflectance
Infrared Fourier
Transformation (DRIFT)

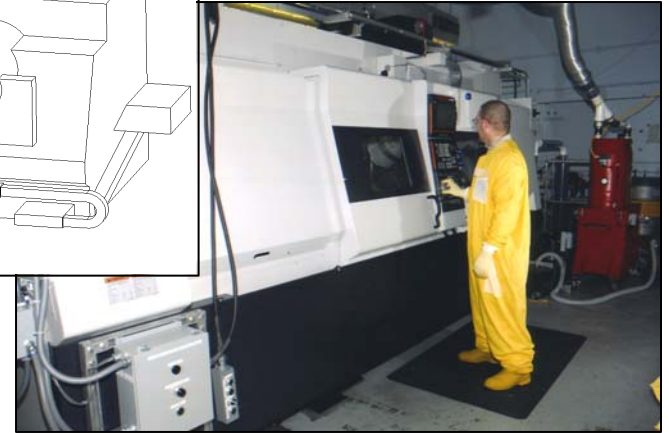
Areas of Expertise (continued)

- **Mechanical Systems**

- Machine Tools
- Inspection Systems

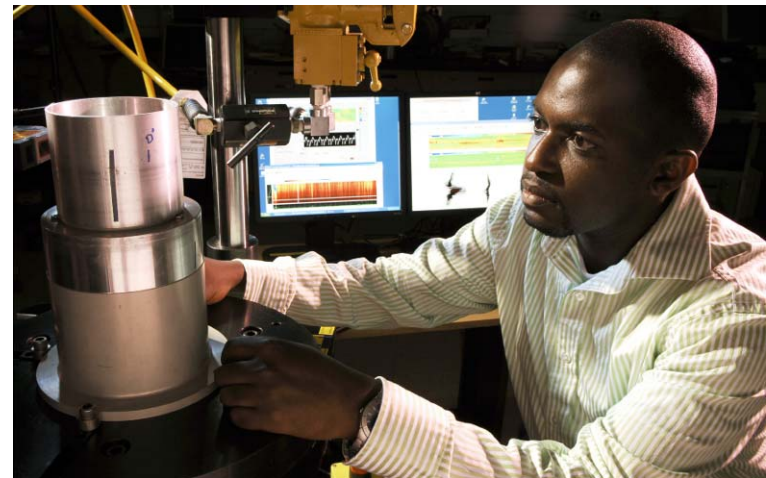


Agile Machine Tool



- **Characterization & Analysis**

- NDE
- Microanalysis
- Mechanical Properties
- Radiation Measurement

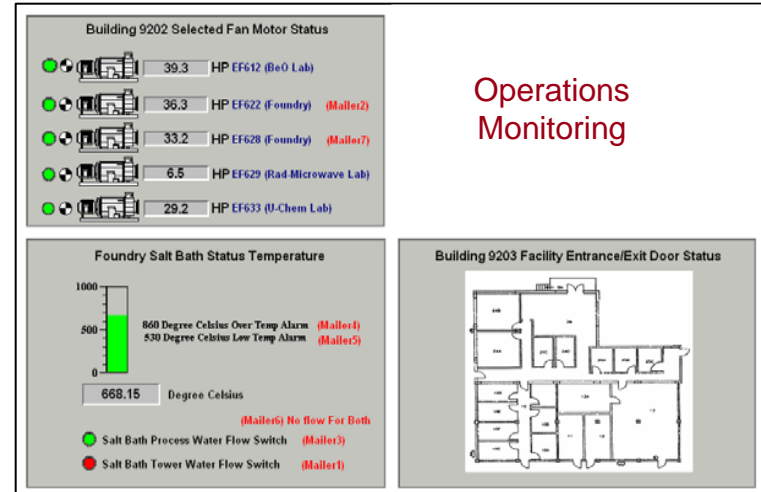


Ultrasonic Non-Destructive Evaluation

Areas of Expertise (continued)

- **Control & Sensor Systems**

- Machine Controls
- Instrumentation
- Computing
- RFID
- Tamper Detection



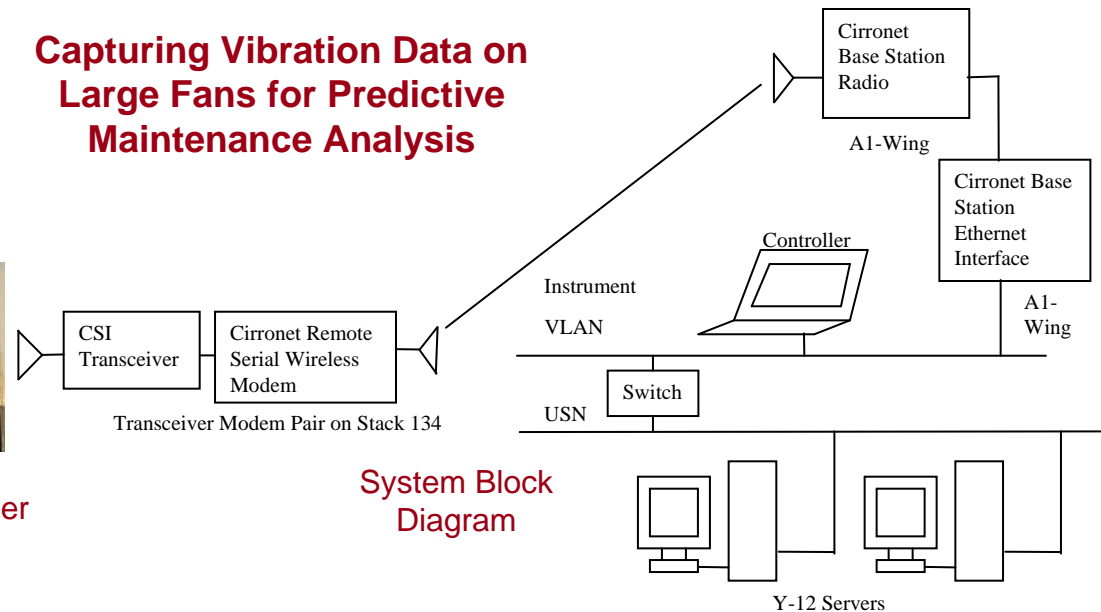
Capturing Vibration Data on Large Fans for Predictive Maintenance Analysis



Large Roof Top Fan



"Wireless" Accelerometer



Partnerships

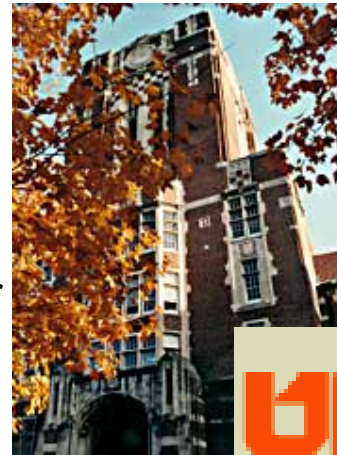
In addition to assisting Operations in improving the national assets at Y-12, Applied Technologies partners with:

- Other sites in the Nuclear Weapons Complex to collectively improve the Stockpile Stewardship Program
- Federal agencies to provide technological assistance and products
- Industry, universities, and laboratories to develop the solutions necessary to keep the United States competitive in the world marketplace
- National Center for Defense Manufacturing and Machining
- Federal Laboratory Consortium

University Partnerships

- University of Tennessee
 - Co-op Education Program
 - Law Enforcement Innovation Center
- South Carolina State University
 - Mentor-Protégé agreement for Nuclear Engineering
- Tennessee State University
 - Mentor-Protégé agreement to identify emerging technologies
- Fisk University
 - Mentor-Protégé agreement for radiation detection technologies
- University of North Carolina
 - Dimensional inspection/metrology

- R&D Collaborations



Applied Technologies

As an applications-driven technology development organization addressing the unique challenges within Y-12 and the Weapons Complex, Applied Technologies specializes in the development, integration, and transition of technologies from the laboratory to the field while ensuring the readiness and robustness required by the end user.



Integration, Fabrication & Deployment:
Mobile Weigh & Assay Cart



Testing & Evaluation:
Millimeter Wave
Full Body Scanner