The Role of NIST in Pipeline Safety Research and Development

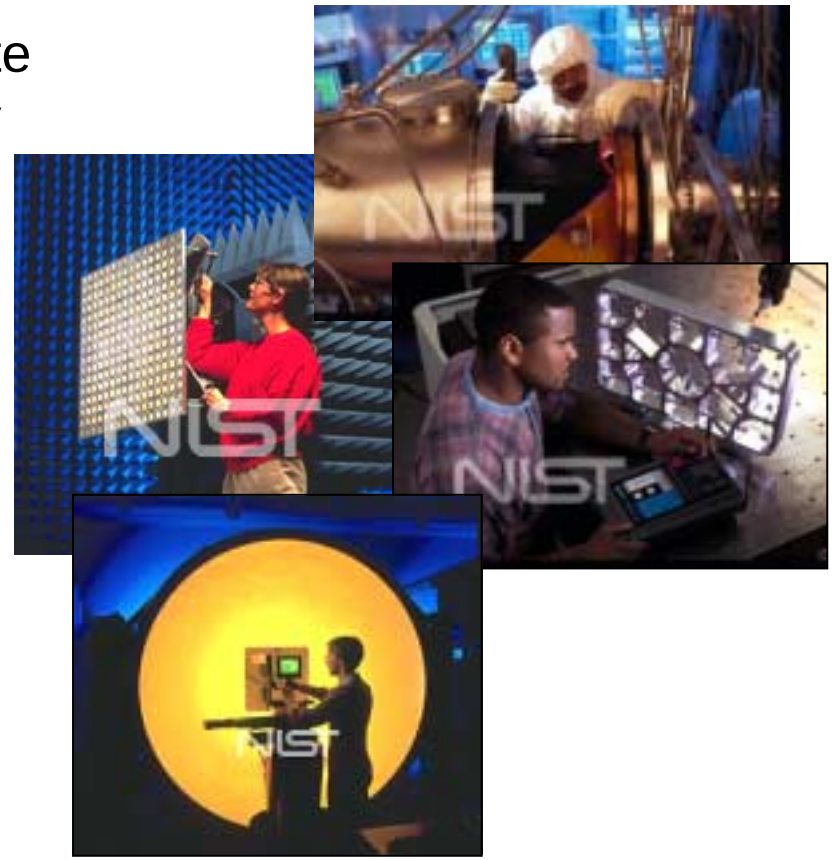
Pipeline Research and Development Forum

December 11, 2003

James E. Hill, Acting Director
Building & Fire Research Laboratory
National Institute of Standards and Technology
james.hill@nist.gov

NIST: A Unique Mission and Assets

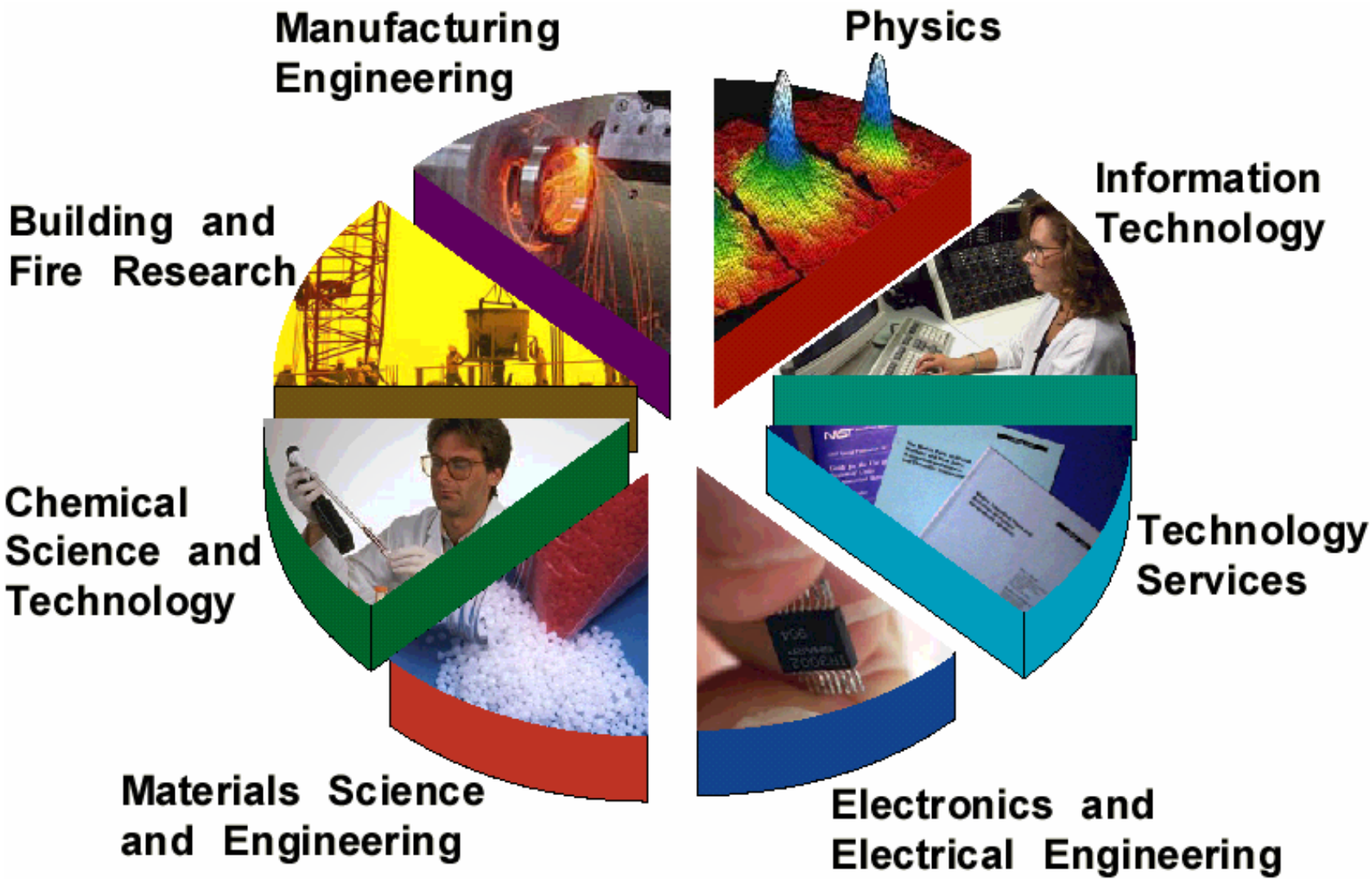
NIST's mission is to develop and promote measurement, standards, and technology to enhance productivity, facilitate trade, and improve the quality of life.



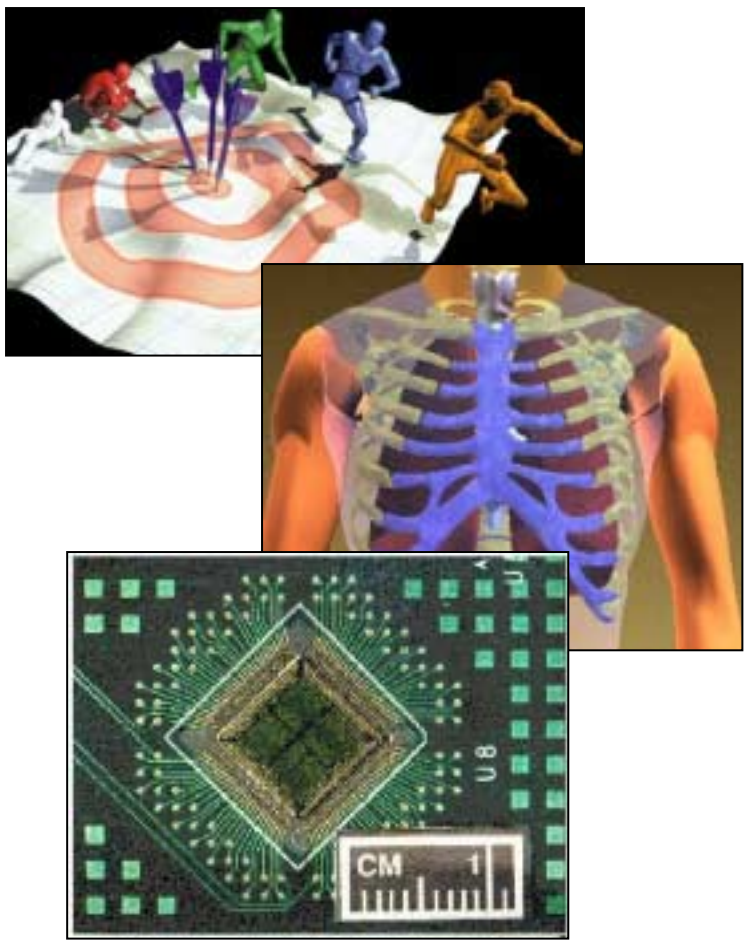
NIST Assets Include:

- **3,000 employees**
- **1,600 associates**
- **$825 million FY 2003 operating budget**
- **NIST Laboratories**
- **Advanced Technology Program**
- **Manufacturing Extension Partnership**
- **Baldrige National Quality Award**

NIST's Intramural Laboratories



NIST Advanced Technology Program



- **Co-funding of private sector R&D to accelerate the development of high-risk, broadly enabling technologies**
- **Recent successful ATP Projects**
  - **Innovative Joining/Fitting Technology for Advanced Composite Piping Systems**
  - **Spoolable Composite Tubing**
  - **Fiber Optic Sensor Suite for Corrosion and Flow-Assurance Monitoring in Deepwater Flow Lines**

www.atp.nist.gov

Advanced Measurement Laboratory (AML)

- **Will be the world's best measurements laboratory.**
- **Stringent control of temperature, vibration, humidity, cleanliness.**
- **Establishes nano and micro-fabrication capabilities, primarily in the Cleanroom Building.**
- **Opportunity for enhanced external collaborations.**
  - **511,000 gross square feet**
  - **210,000 net assignable square feet.**
  - **92,000 gross square feet Cleanroom wing.**

Pipeline Safety Improvement Act of 2002

Section 12: Pipeline Integrity, Safety and Reliability Research and Development

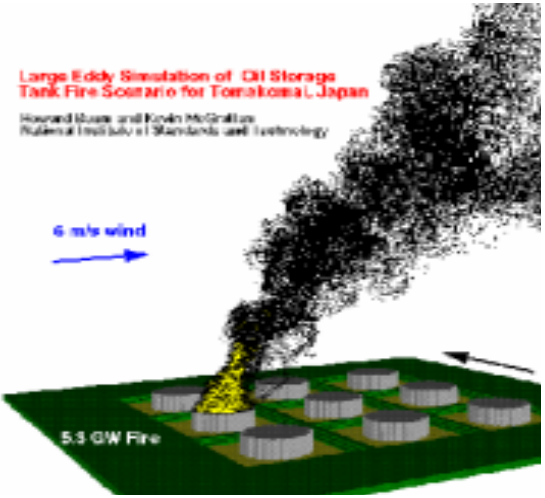
Areas of Expertise

"NIST responsibilities shall reflect its expertise in materials research and assisting in the development of consensus technical standards"

Section 12: Pipeline Integrity, Safety and Reliability Research and Development (cont.)

Program Elements

1. Materials inspection
2. Stress and fracture analysis, detection of cracks, corrosion, abrasion, other abnormalities
3. Internal inspection and leak detection technologies
4. Analyzing content of pipeline throughput
5. Pipeline security
6. Risk assessment methodology
7. Communication, control, and information systems surety
8. Fire safety of pipelines
9. Improved excavation, construction, and repair technologies
10. Other



NIST Fire Research

Outdoor Fire Tests and Simulations

Kuwait oil well fires

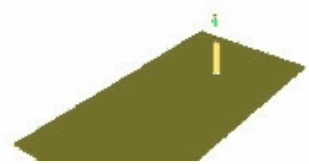
Environmental oil spill remediation - DOI/MMS

Railway car/fuel spill - DOT/FRA

Community-scale fire spread - USDA/Forest Service

Strengths Related to Pipeline Safety

- **Large-scale fire experiments and measurements**
- **Simulating gas and liquid fuel sprays at all scales**
- **Simulating jet fires, pool fires and buoyant smoke plumes**
- **Simulating building/wildland fires**
- **Linking models of vastly different length scales**
- **Predicting/measuring thermal radiation, and smoke and aerosol characteristics**



Construction Integration & Automation Technology Program

Dr. William C. Stone
Leader
Construction Metrology & Automation Group
CONSIAT Program Manager