FY 2005 President's Budget Request
Technology Administration

Office of the Under Secretary for Technology
Office of Technology Policy
National Institute of Standards and Technology
National Technical Information Service

U.S. Department of Commerce

President's FY 2005 Budget Request for TA

- Supports TA programs that promote U.S. technology industries to meet the President's national priorities of economic growth, providing for a secure homeland defense, and winning the war on terrorism.
- Invests in the NIST core mission of measurements, standards, research, and services to industry.
- Provides NIST scientists with the laboratory equipment and facilities necessary for world-class research.
- Restructures Manufacturing Extension Partnership and eliminates the Advanced Technology Program in order to fund higher national needs.

Technology Administration
President's FY 2005 Budget Request ($M)

	FY 2004 Request	FY 2004 Appropriation	FY 2005 Changes	FY 2005 Request
Office of the Under Secretary / Office of Technology Policy	8.0	6.3	+2.0	8.3
National Institute of Standards and Technology	496.8	610.7	–89.3	521.5
National Technical Information Service	0	0	0	0
Total	504.8	617.1	–87.3	529.8

President's FY 2005 Budget Request for US/OTP

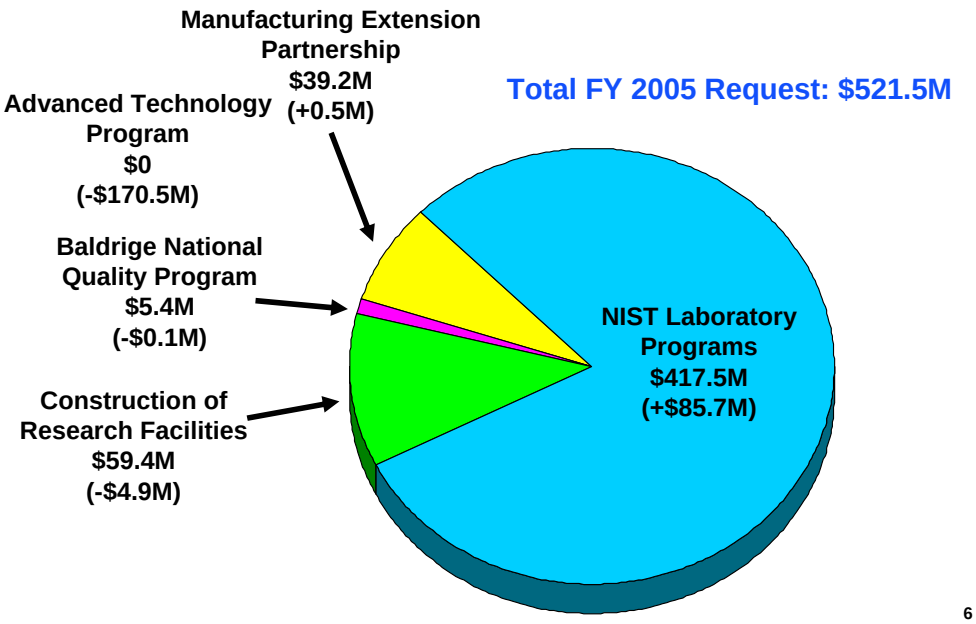
- Serve as the primary advisor to the Secretary of Commerce for innovation, entrepreneurship, and competitiveness within the government and the private sector.
- Act as an interagency leader on the President's National Science and Technology Council (NSTC) and within the Department on the Commerce Coordinating Council for Technology (C3T).
- Provide analyses that maximize technology's contribution to the economy and improve the environment for technological innovation leading to the creation of high-wage jobs and improvements in our quality of life.
- Identify strategies that facilitate technology-led economic growth, technology transfer, promote the competitiveness of the U.S. S&T workforce, homeland security, standards, and nanotechnology, among others.

National Institute of Standards and Technology
President's FY 2005 Budget Request ($M)

Appropriation:	FY 2004 Request	FY 2004 Enacted	FY 2005 Changes	FY 2005 Request
Scientific & Technical Research & Services (STRS):				
NIST Laboratories	**381.8**	**331.7**	**+85.7**	**417.5**
Baldrige National Quality Program	**5.8**	**5.5**	**–0.1**	**5.4**
Subtotal, STRS	**387.6**	**337.2**	**+85.6**	**422.9**
Industrial Technology Services (ITS):				
Advanced Technology Program(ATP)	**27.0**	**170.5**	**–170.5**	**0**
Manufacturing Extension Partnership(MEP)	**12.6**	**38.7**	**0.5**	**39.2**
Subtotal, ITS	**39.6**	**209.3**	**–170.1**	**39.2**
Construction of Research Facilities(CRF)	**69.6**	**64.3**	**–4.9**	**59.4**
Total	**496.8**	**610.7**	**–89.3**	**521.5**

Numbers may not add due to rounding.

President's FY 2005 Budget Request for NIST Compared to FY 2004 Enacted



NIST attends to the health and vigor of the science and technology infrastructure—the nation's platform for discovery, innovation, and commercialization.

Its outputs are ubiquitous and pervasive—embedded in the economy and in society. The beneficiaries are numerous, although NIST's contributions are often behind the scenes, unrecognized by lots of people.

Thankfully, NIST's key customers recognize the agency's essential role.

Here are excerpts from letters or statements by a few of these customers: the Industrial Research Institute, Semiconductor Industry Association, and Biotechnology Industry Organization.

Together, they convey much of the essence of NIST.

NIST Research and Services

Integral to a Competitive, Productive Economy

Embedded Tools Essential to Commerce, Industry

- **Consumer Trust**—ultimate references for $5 trillion in annual sales based on measurement
- **Secure Automated Banking**—encryption technology embedded in nation's 300,000+ ATMs
- **Integrity of Financial Transactions**—time-stamping of stock trades, etc., totaling hundreds of billions of dollars daily
- **Manufacturing Quality Control**—U.S. automakers and suppliers rely on 350 NIST reference materials
- **Reliable Data**—more than 53,000 volumes of NIST/ACERS "phase diagrams" distributed to materials researchers & manufacturers

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Permit me to take a moment to illustrate, beginning with examples of how NIST supports economic growth.

The first, NIST's Weights and Measures function, is integral to the integrity of the marketplace—consumers are assured that they get what they pay for. In our economy, more than $5 trillion worth or sales are based on measurements of weight, volume etc.

Encryption technology developed by NIST and industry partners scrambles personal identification numbers (PINs) used to secure ATM transactions.

NIST's time-keeping services, based on the world's most accurate atomic clock, support a rich and growing diversity of activities—from time-stamping stock trades to coordinating the electric power grid and telecommunications networks.

Virtually every facet of manufacturing—from automotive parts to zinc oxide particles for suncreen. After all, if you can't measure, you can't manufacture—at least not up to specfications.

NIST Research and Services

Vital to Quality of Life

Practical, Indispensable Technical Contributions

- **Diagnostic X Rays**—*Standards & tests underpin 30 million mammograms performed each year*
- **Prostate- and Breast-Cancer Treatment**—*Among 10 million medical procedures using radioactive materials traceable to NIST measurements*
- **Smoke Detectors**—*Performance standards for devices now in 94% of U.S. homes*
- **Drinking-Water Quality**—*Accreditation enables 55,000 community water systems to check, prove regulatory compliance*

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Some more examples, from the quality-of-life domain. I never ceased to be amazed by NIST's usefulness—or maybe even helpfulness.

NIST X-ray standards and proficiency tests help to ensure proper radiation exposure levels in more than ***9,000 facilities*** that perform more than ***30 million mammograms*** yearly. Similarly, the accuracy of cholesterol test has increased significantly over the years—thanks, in large part, to NIST's uncertainty-reducing Standard Reference Materials.

NIST standards underpin the safety and effectiveness of about ***10 million medical procedures*** that use radioactive materials—from prostate- and breast-cancer treatment to diagnostic imaging.

NISTand industry collaborators developed performance standards and placement recommendations for ***smoke detectors—a tremendously valuable technology.*** Half of home fire deaths occur in the 6% of homes with no smoke alarms

NIST-accredited organizations conduct proficiency tests of some ***8,000 water-analysis laboratories*** across the U.S.

My last set of examples. NIST has long been a key technical contributor to the nation's security, its defense, and to public safety overall. Its role has increased significantly since 9/11.

Its highest-profile activity is its ongoing investigation of the collapse of the World Trade Center structures. One result will be recommendations for improving building and fire codes, standards, and practices.

NIST's contributions to homeland security and public safety cut a broad swath, and are usually made in support of other agencies—such as the Departments of Homeland Security, Justice, and Defense.

These are just a few examples. There are more than 500 for the Defense Department, alone.

I should note that the private sector is a direct beneficiary of many of these efforts. A telling example is the Advanced Encryption Standard—the--*strongest-yet encryption standard* for protecting sensitive, non-classified electronic information.

By the way, NIST's involvement in developing encryption standards has been estimated to *save private industry more than $1 billion*

President's FY 2005 Budget Request for the NIST Laboratories

- Enhance NIST's **Measurement Science, Standards, and Services** to anticipate the needs of the Nation's scientific and industrial communities in rapidly developing technology areas **($16.2M).**
- Provide the **Equipment ($25.5M) and Facilities ($36.3M)** that the NIST Laboratories need to fulfill their mission in the 21st century.
- Provide the measurement and standards infrastructure to support **Advances in Manufacturing ($15.6M).**
- Provide the measurement infrastructure necessary to improve **Public Safety and Security ($18.6M).**
- Increase the **National Neutron Research Capability** at the world's premiere neutron research facility **($8.3M).**

Advances in Measurement Science, Standards, and Services ($16.2M)

The Nation's scientific and industrial communities are challenged to keep pace with fast-breaking developments at the forefront of science and technology.

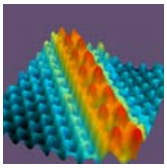
NIST solutions:

Promoting innovation by ensuring that advanced measurements, standards, and services are available in rapidly developing technology areas:

- Expand the NIST Competence Program ($7.5M)
- Biosystems ($5.0M)
- Quantum Information Science ($3.0M)
- Time Scale and Time Dissemination Services ($0.725M)

Measurement Science, Standards, and Services

The NIST Competence Program ($7.5M)

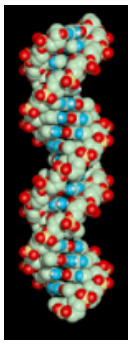


Fundamental research and innovative tools to advance measurement science and engineering.

- The NIST Competence Program is NIST's program of innovative high-risk research to ensure that measurements, standards, and data will be available in the future for the most advanced areas of science and engineering. This is NIST's seed corn – it has led to two Nobel Prizes.
- The initiative doubles this critical component of NIST's work to nearly 5% of the Laboratories' overall program.
- The initiative will allow NIST to create the new "state-of-the-art" capabilities and knowledge needed for NIST to meet future national measurement needs.

Measurement Science, Standards, and Services

Biosystems ($5.0M)



- Measurement science, standards, and data for applications of biotechnology, including:
  - gene and protein expression in medical and agricultural applications
  - nanobiotechnology for biosensors for threat detection and forensics
  - DNA and protein markers related to biological function
- Addresses a wide range of contemporary needs and will give NIST a strong foundation to develop highly innovative and critically needed measurements for emerging biosystems technologies.

Measurement Science, Standards, and Services

Quantum Information Science ($3.0M)

Measurements and standards for quantum-level communications and computing systems

- Leading edge research
- Key to unbreakable communications security
- Potential for tremendously powerful computing capabilities.

Measurement Science, Standards, and Services

Time Scale and Time Dissemination Services ($0.725M)

Enhancement of capability and durability of NIST'S time dissemination infrastructure

- Ensure continuity of time and frequency dissemination services during natural disasters or hostile activities.
- Enhance survivability of NIST's time and frequency services.
- Improve dissemination of technology leading to substantial improvements in GPS (global positioning) and telecommunications networks.

Equipment and Facilities

AML Equipment ($25.5M)

- Advanced Measurement Laboratory: World's leading measurement facility; starting occupancy in February 2004.
- Enhances NIST's support for biotechnology, nanotechnology, semiconductors, telecommunications, advanced manufacturing, homeland security and other key areas.

State of the art equipment is needed to maximize return on investment in the AML

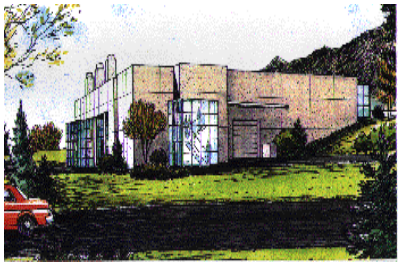
NIST solution:

- Equip the AML for success: the $25.5 million builds on one-time FY 2003 appropriation of $11 million.

Equipment and Facilities

Construction and Major Renovations ($25.7M)

World-class work is impeded by inadequate, 50-year-old Boulder facilities.



NIST solutions:

- Completion of Central Utilities Plant to provide stable environmental control and electric power, building on FY 2003 funding ($16.4M).
- Design and limited renovation of laboratory Building 4, necessary prelude to renovation of Building 1 ($1.8M).
- Design major renovation of Building 1, largest Boulder facility housing the atomic clock and other key lab activities ($6.5M).

Equipment and Facilities

Safety, Capacity, Maintenance, and Major Repairs – SCMMR ($10.6 M)

Inadequate, aging facilities impede world class measurements and research.

NIST solutions:

- Bring maintenance and repair to $34 million, to avoid more costly deterioration and obsolescence issues such as experienced in the Boulder labs.
- Most NIST buildings are more than 40 years old – past their planned useful life as laboratory facilities.
- Air handling equipment are particularly at risk; fire and safety systems need upgrades.
- Increase productivity of NIST measurement and research programs.
- Strengthen security to protect staff and facilities.

Advances in Manufacturing ($15.6M)

Advances in measurement technology are needed to support sustained, superior innovation in 21st century manufacturing.

NIST solutions:

Research initiative focusing on four strategic measurement capabilities and activities with an emphasis on cooperative research with the private sector

- Nanomanufacturing Research ($8.0M)
- Nanometrology for Electronics and Semiconductor Industries ($4.0M)
- Advanced Medical Technologies ($1.6M)
- Measurements and Standards for International Trade ($2.0M)

Advances in Manufacturing

Nanomanufacturing Research ($8.0M)

Research and partnerships to translate nanoscience discoveries into manufacturing innovation:

- Leverage the unique resource provided by the recently completed **NIST Advanced Measurement Laboratory.**
- Establish a **National Nanofabrication and Nanometrology User Facility**, to involve research universities, manufacturers, and other government laboratories.
- Develop nanoscale measurement and fabrication technologies.
- Develop measurements, standards, and data to support nanomanufacturing.

Advances in Manufacturing

Nanometrology for Electronics and Semiconductor Industries ($4.0M)

- Develop new measurement and modeling tools for designing, fabricating and testing nanoelectronic devices.
- Develop measurements and modeling tools for nanomagnetic devices to enable increased data storage density and improved magnetic sensors.
- Develop measurement technologies for characterization of magnetic sensors with applications in power generation, health care, homeland security, and transportation.
- Enable the evaluation of nanostructured materials for a host of potential applications such as highly efficient thin-film, solid state lighting with consequent tremendous cost savings.

Advances in Manufacturing

Advanced Medical Technologies ($1.6M)

Critical measurements and standards to advance medical technology development and commercialization of in vitro diagnostics and regenerative tissue growth

- In vitro diagnostics:
  - medical devices used to gauge health or diagnose disease
  - HIV test kits
  - blood analyzers
  - glucose or cholesterol monitors
- Regenerative tissue growth:
  - Manufacture of biocompatible polymers and other materials as scaffolds to support and encourage regenerative tissue growth.

Advances in Manufacturing

Measurements and Standards for International Trade ($2.0M)

International standards to enable U.S. manufacturers' innovative technology access to foreign markets

- Expand and enhance NIST efforts to monitor and analyze the development of international technical standards.
- Develop an on-line searchable database of this information.
- Create an "early-warning system" of developing regulations and standards in the European Union.
- Disseminate U.S. documentary standards in key foreign markets.
- Work to establish global conformity in key standardization areas.

Public Safety and Security ($18.6M)

Traditional requirements for public safety now have the added dimension of human-engineered threats.

NIST solutions:

- Standards, Technology, and Practices for Buildings and First Responders ($4.0M)
- Measurement Infrastructure for Homeland Security ($7.6M)
- Standards for Biometric Identification (USA PATRIOT Act) ($1.0M)
- Cybersecurity ($6.0M)

Public Safety and Security

Standards, Technology, and Practices for Buildings and First Responders ($4.0M)

Typical U.S. building and fire codes are based on outdated research and may be inadequate for current building practices.

- Develop technical foundation for improved building and fire codes, standards, and practices to:
  - Improve structural fire protection
  - Enable faster, more effective emergency response
  - Reduce building vulnerability
  - Increase safety for building occupants and first responders

Public Safety and Security

Measurement Infrastructure for Homeland Security ($7.6M)

Successful response to chemical, biological, radiological, nuclear, or explosive (CBRNE) attacks requires more accurate and faster detection capabilities.

- Provide measurements, standards, techniques, testbeds, and data for multicomponent CBRNE threats.
- Work closely with the Department of Homeland Security to assure widespread dissemination and implementation of advanced measurement technologies for CBRNE weapons detection and response.

Public Safety and Security

Standards for Biometric Identification (USA PATRIOT Act) ($1.0M)

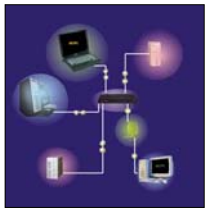
Mandated NIST roles in USA PATRIOT Act and Enhanced Border Security and Visa Entry Reform Act to certify technical performance standards.

- To support the requirements of the USA PATRIOT Act by developing standards for testing the accuracy of fingerprint and facial biometrics for identification.
- Implement accuracy certification tests for multi-modal biometrics that use fingerprints simultaneously.

Public Safety and Security

Cybersecurity ($6.0M)

Attempts to compromise the Nation's information infrastructure as well as networked industrial control systems must be prevented and combated.



- Develop improved protocols and standards for applications, communications, and cryptography for information systems, including wireless and industrial control systems for the power grid, water and fuel distribution systems, chemical plants, refineries, and buildings .
- Work closely with industry and the Department of Homeland Security to develop the necessary test methods, protocols, and standards to seal the holes in cybersecurity.

National Neutron Research Capability Improvements ($8.3M)

NIST Center for Neutron Research: The highest performing neutron facility in the United States

- With more than 1600 users, the NCNR serves nearly *twice* the number of users compared to the nation's other three neutron sources *combined.*
- A unique, indispensable research tool in materials science, biotechnology, chemistry, engineering.
- The NCNR must increase capability and capacity – there will be no other national resource to meet neutron measurement needs for the next decade.

NIST solutions:

- Fund increased expenses to enable continued operation, including reactor fuel costs; expand capabilities with new instrumentation and analysis methods ($3.3M).
- Expand capacity to leverage 400 new strategic collaborations with U.S. industrial and academic researchers ($5.0M).

National Neutron Research Capability

NCNR operations support ($3.3M)

- Costs associated with reactor operation – reactor fuel, fuel storage, fuel shipment, and heavy water – have spiraled. (e.g. 140% in reactor fuel in 2 years).

- Costs are expected to continue to rise due to a very small market for reactor-related services and materials.
- Result -- Other expenses for storage, shipping, and instrument upgrades are being deferred.

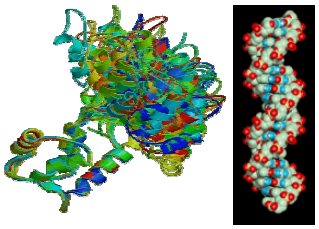
NIST solutions:

- Proposed initiative will allow NIST to cover increased costs of operating the NCNR.
- NIST will operate the facility to its maximum utility and meet the growing demands of the U.S. research community that have been seriously curtailed.

National Neutron Research Capability

Leverage new strategic collaborations ($5.0M)

- NCNR's unique features have stimulated the use of neutrons for new multidisciplinary research areas unforeseen when the facility was first designed.
- Result -- NCNR now serves over 4 times the number of users predicted in 1987 when it was first funded.



Nanobiotechnology

NIST solutions:

- Strengthen strategic program areas (to meet demands of new collaborations): *Macromolecular Dynamics*, *Neutron Trace Analysis, Neutron Chemical Spectroscopy , Neutron Imaging , Neutron Spectroscopy.*
- Greatly expanded capabilities for state-of-the-art sample environment equipment (pressure, temperature, magnetic field, stress, shear, etc.) for new research areas.

President's FY 2005 Budget Request for NIST Industrial Technology Services

- **Eliminate the Advanced Technology Program in order to address higher priority national needs.**
- **Restructure the Manufacturing Extension Partnership**
  - Provides stable funding by matching the Congressional FY04 funding.
  - Strengthens MEP program while preserving a national network.
  - Focuses on effectiveness and efficiency.
  - Emphasizes linkages to universities and community colleges.
  - Fully coordinates MEP with other Commerce programs and staff across the country for trade promotion and sector expertise.