



EPSCoR 2005

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Brookhaven National Laboratory

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History

- BNL is located in Upton, New York (Long Island) on the former site of the Army's Camp Upton during World War I and II, and opened its doors in 1947



- BNL is owned by the U.S. Department of Energy (DOE) and operated by Brookhaven Science Associates (BSA) under a prime contract
- BSA is a nonprofit organization formed from a partnership of the State University of New York at Stony Brook and the Battelle Memorial Institute

Brookhaven National Laboratory



RHIC

BLIP and BAF

AGS
Complex

Isotope Production

EE

NS

PET

Chemistry
LEAF

MRI

Tandem

Instrumentation

Material
Science

Physics

Computing

NSLS

Medical
Research

Biology

STEM
CDIC

Total Buildings – 365
BNL Total Staff – 2,900
PhD – 640; Master/Bachelors – 860
Total Users - 3400

BNL Missions

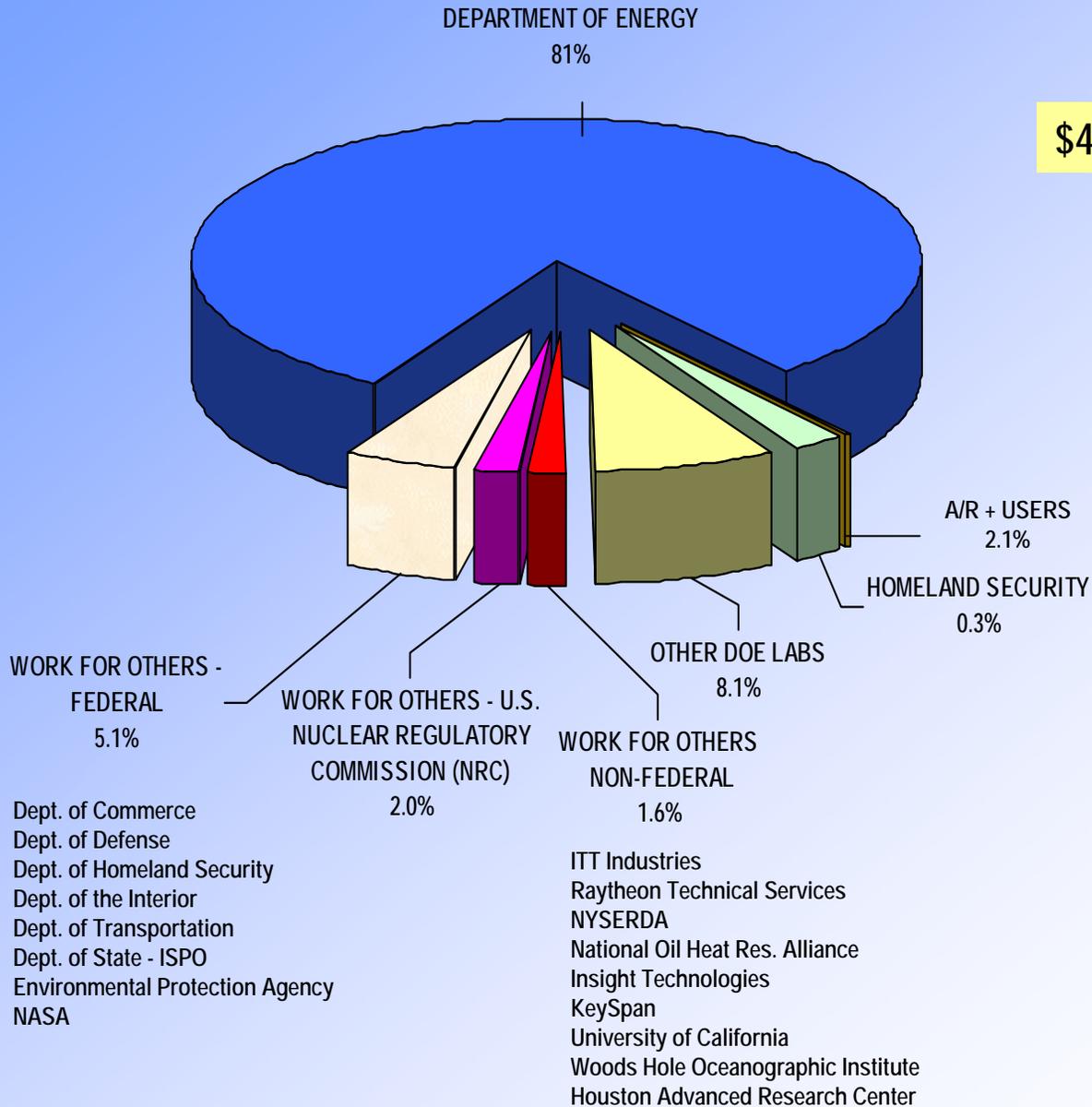
- **Undertakes high risk, long lead time research in key DOE mission areas.**
- **Provides accelerator-based research tools for the nation's science and technology enterprise,**
- **Leads users in the exploitation of the most advanced tools available for scientific and technical R&D.**
- **Assists in addressing the Nation's Energy, Environmental and National security needs**
- **Transfers Innovation and Technology into the market**

BNL Core Competencies

- Accelerator Physics and Instrumentation
- High Energy Physics
- Nuclear Physics
- The Physics and Chemistry of Materials
- Structural and Molecular Life Sciences
- Biology and Chemistry of Radiation
- Imaging Science and Neuroscience
- Energy Sciences and Technologies
- Environmental Science
- Nuclear Safeguards and Sensor Technologies
- Superconducting Materials and Magnets

All experimental work at BNL based on advanced instrumentation

BNL Total Program Spending – FY 2004

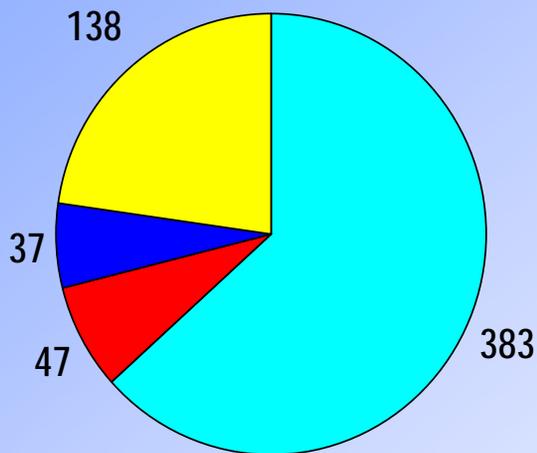


\$454.0M - COST PLAN

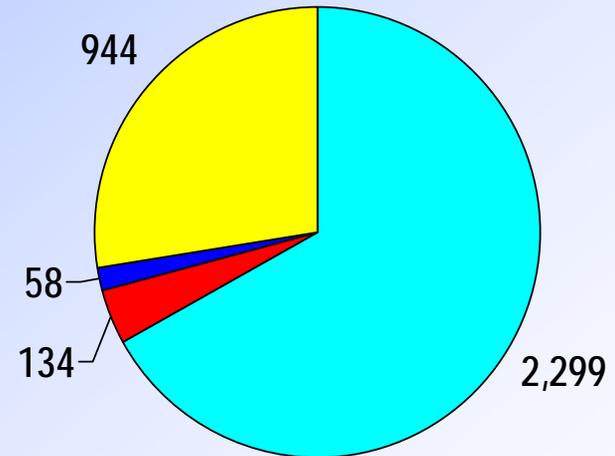
USER FACILITIES

FY 04 Activity at Major BNL User Facilities

Institutions -



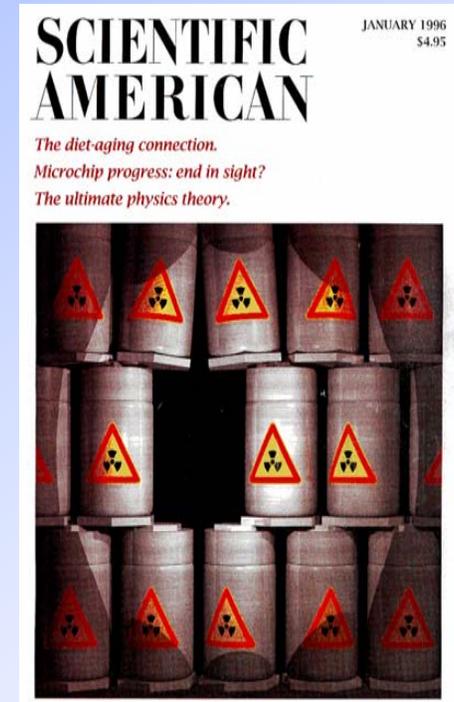
Researchers -



Energy, Environment & National Security Directorate Capabilities and Facilities

Meeting the Energy Challenges of our Nation

- Liquid Fuels Research Laboratories
- Proliferation Resistant Nuclear Fuel Cycles
- Probabilistic Risk Assessment
- Economic/Environmental Energy Modeling
- Geothermal and Wind Energy
- National Nuclear Data Center



Science Supports Environmental Quality

- Atmospheric Transport and Dispersion
- Formation and Behavior of Aerosols
- Terrestrial Carbon Cycle Research
- Radioactive Transfer and Fluxes in Atmosphere
- Development of Unique Instruments for Sampling/Detection
- Accelerated Remediation Technologies

Nonproliferation of Nuclear Materials

- Russian Nuclear Materials Protection, Control, and Accounting
- Safeguards and Arms Control Verification and Transparency
- Advanced Sensor Technologies

Biomedical Engineering

“Imaging the Awake Animal brain”

Develop technologies for PET and MRI imaging of the brain in awake, non-anesthetized, & non-comatose animals

-MRI

“Animal drives MRI scanner”: MRI & magnet instrumentation;
optical tracking system

Retrospective motion correction of MRI data

-PET

Mobile PET camera

PET reconstruction for moving objects

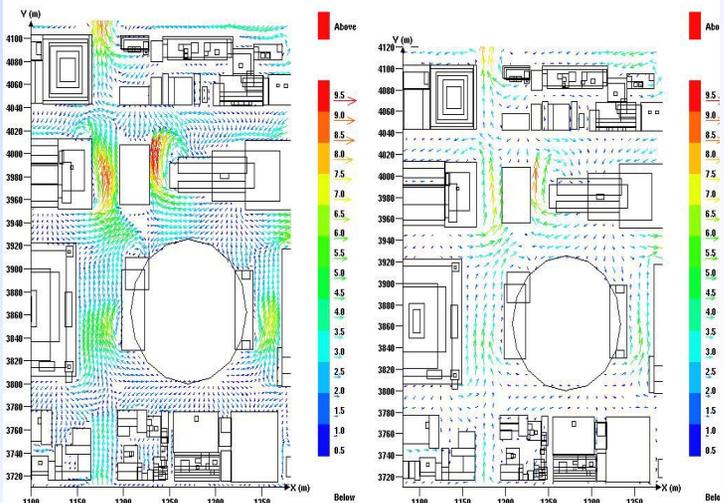
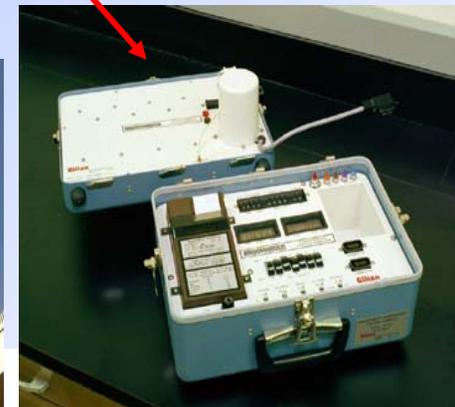
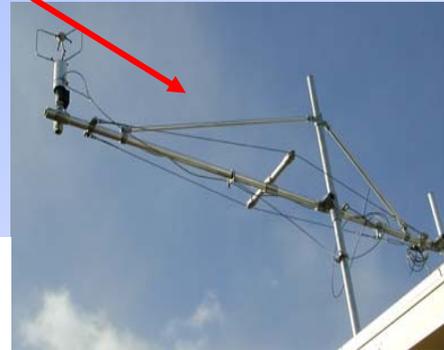
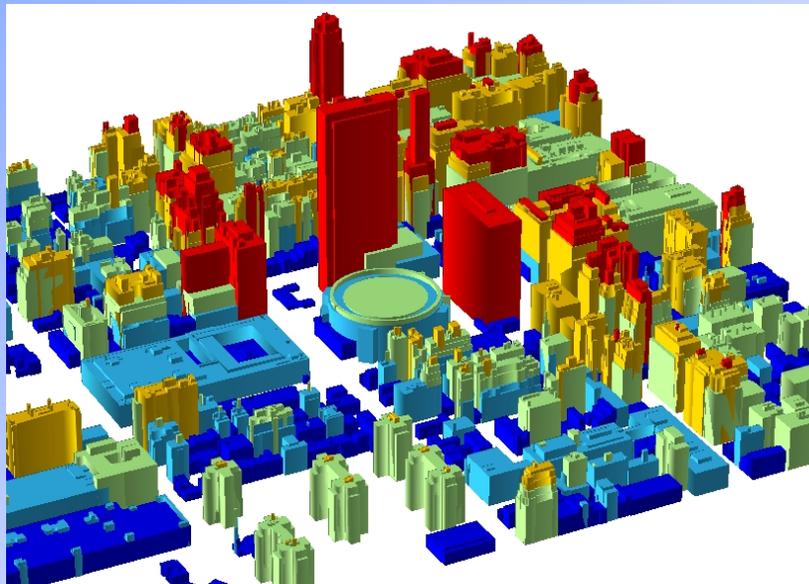


BNL: Medical, Chemistry, Physics, Magnet, Instrumentation

SUNY-SB & LBNL

DHS NYC Urban Dispersion Program: Phase 1: Madison Square Garden (MSG) 05 Experiment Co-funded by DTRA, DOE, EPA

- Modeling of contaminant flow in urban canyon environments
- Tracer experiment to evaluate actual contaminant flows:
 - Perfluorocarbon tracers (PFTs) with detection capability of 10^{-15}
 - Real-time meteorological monitoring
- Evaluation of vertical flows
- Evaluation of personal exposure doses



MSG05- Tracer Study & Wireless Communications

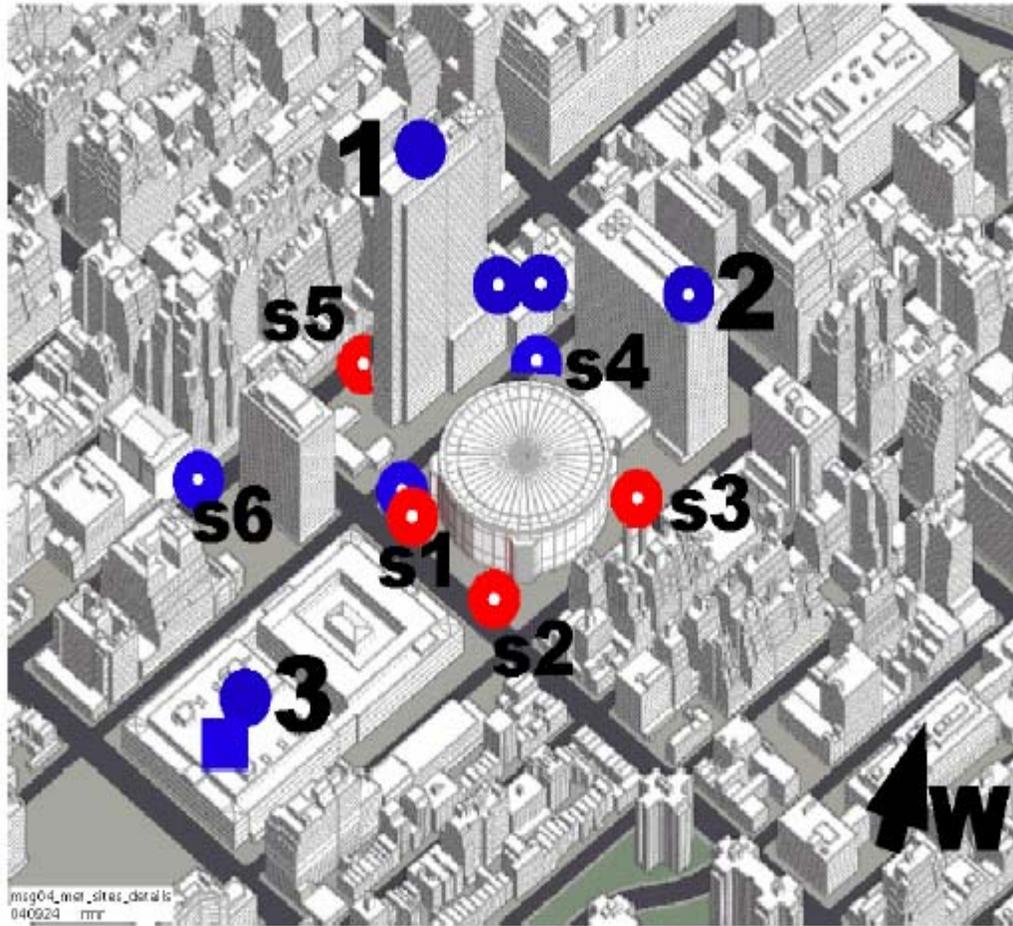


Figure 2. A detail from figure 1 showing the numbering of street sites, S1 to S6. Street stations will be deployed approximately mid-block at the locations of the PFT release sites and one station will be deployed around the corner on 34th Street. This site was selected because early model runs indicate that for westerly winds, the desired wind direction is a vortex-driven back flow can occur and bring tracer in this direction. Note, red dots indicate locations from 2D and blue dots indicated 3D stations.

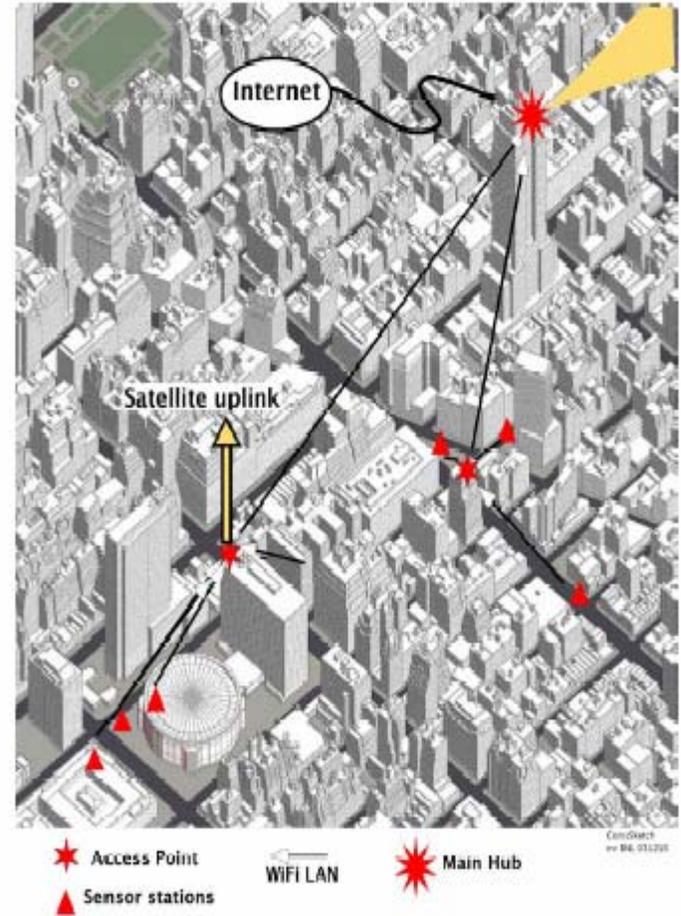


Figure 2 – Three-dimensional view of the buildings around MSG, which is the circular building in the near left. It is 700 m from MSG to the Empire State Building, where the Internet star is located. The W-E line runs approximately from MSG to the "Internet" oval. One Penn Plaza is the 250 m tall building located just north of MSG.

 **Tracer Release**

 **Tracer Sampler**

Associates
of Energy

BROOKHAVEN
NATIONAL LABORATORY

RADTEC SITE



Brookhaven Science Associates
U.S. Department of Energy

BNL Center for Functional Nanomaterials



The latest renderings of the CFN facility



- Central material thrust is the nanoscale chemistry *and* physics of *functional materials*
- New collaborative nanofabrication facility for BNL and its first-rate collaborating universities.
- Northeast location with large group of nearby university and industrial collaborators
- Strong support from Industry

How Do I Learn More?

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