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LLNL History and Current Activities

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LLNL History and Current Activities

Presented to:
The Dublin Soroptimist
September 26, 2006

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NMTP/DTED Superintendent LLNL
Vice Mayor City of Dublin

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Agenda

- **Brief overview of Lawrence Livermore National Laboratory**
- **Current activities at the NTS**
  - NIF
  - » Other LLNL activities (brief)

A “new ideas” Laboratory

- Lawrence Livermore National Laboratory (LLNL) is one of two nuclear weapons laboratories in the United States
- While built on the foundation of weapons research, research in other areas is also conducted

Team Science in the National Interest

LLNL prides itself in putting together multi-disciplinary teams to solve complex technical problems

Pushing the Frontiers of Nuclear Weapon Design

1953

- LLNL's entrance into nuclear testing was a "fizzle"
- Pushing the frontier of science has risk
- Perseverance led to LLNL's future contributions to smaller warheads and the possibility of the Polaris submarine program

Strategic Breakthrough

1956

Project Nobska – "We at Livermore can deliver it in 5 years and it will yield 1 megaton." Edward Teller

First Underground Nuclear Test

1957

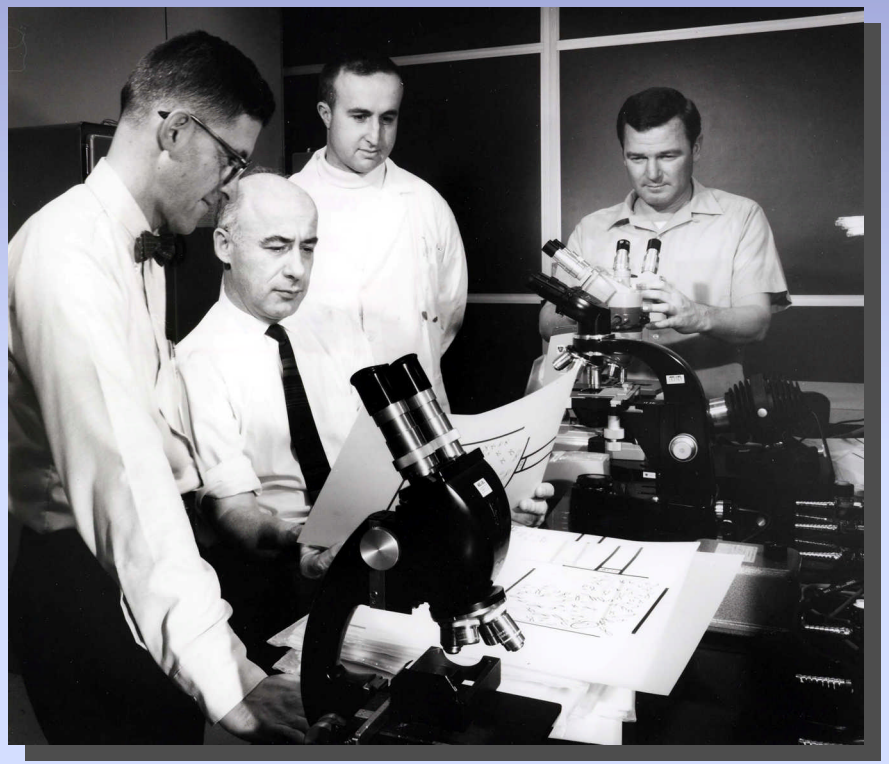
Providing Technical Support for Arms Negotiations

1958

Since 1958, many scientists have contributed their expertise to the negotiations of nuclear arms reduction and nuclear test ban treaties

Understanding the Effects of Radiation

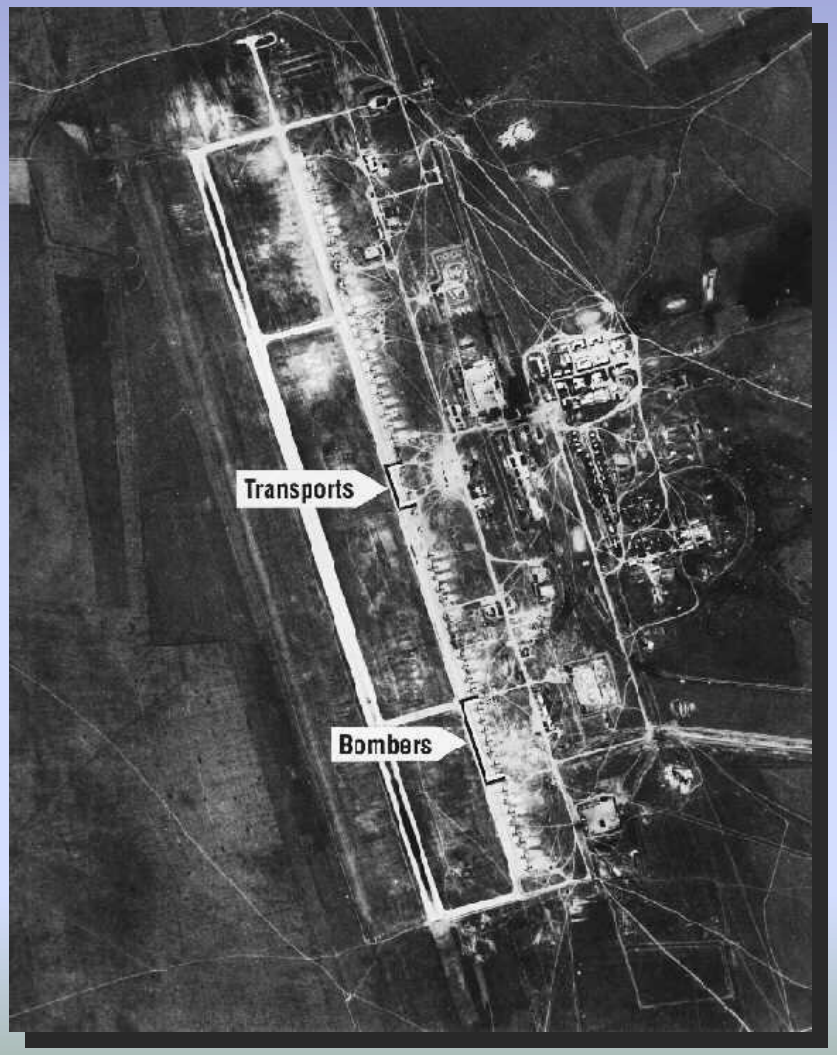
1963



Research into the biological consequences of fallout radiation (begun in 1954) led to the creation of biomedical and environmental research programs at LLNL

Assessing the Weapons Capabilities of Others

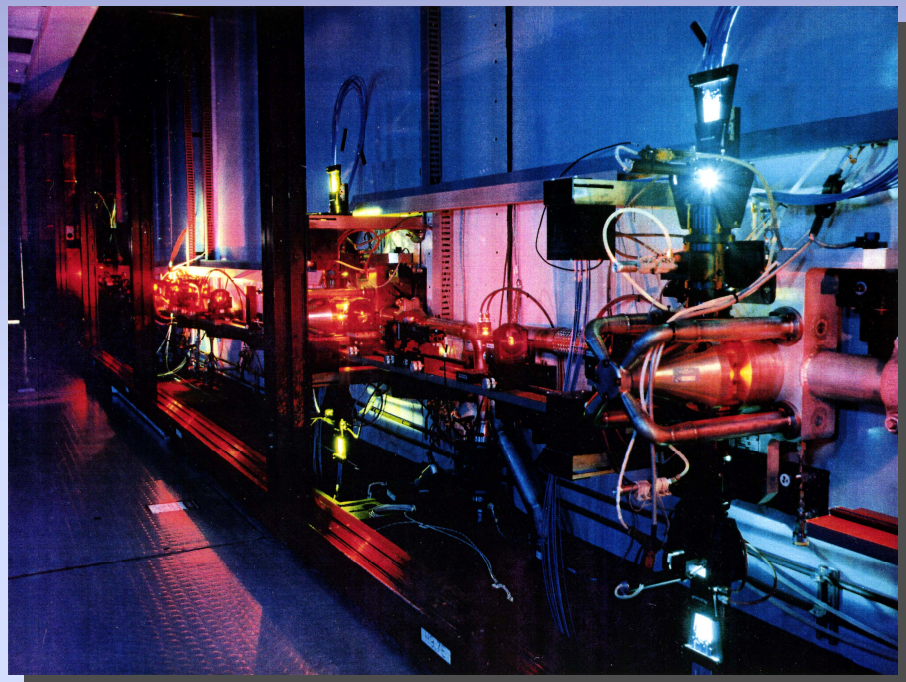
1965



- Since the early days of Livermore, intelligence agencies have sought LLNL expertise to analyze atmospheric nuclear tests conducted by the USSR
- Nonproliferation, Arms Control, and International Security Directorate works today to respond to WMD proliferation and terrorism

Industrial-Scale Applications for Lasers

1973



New tools for today's energy problems

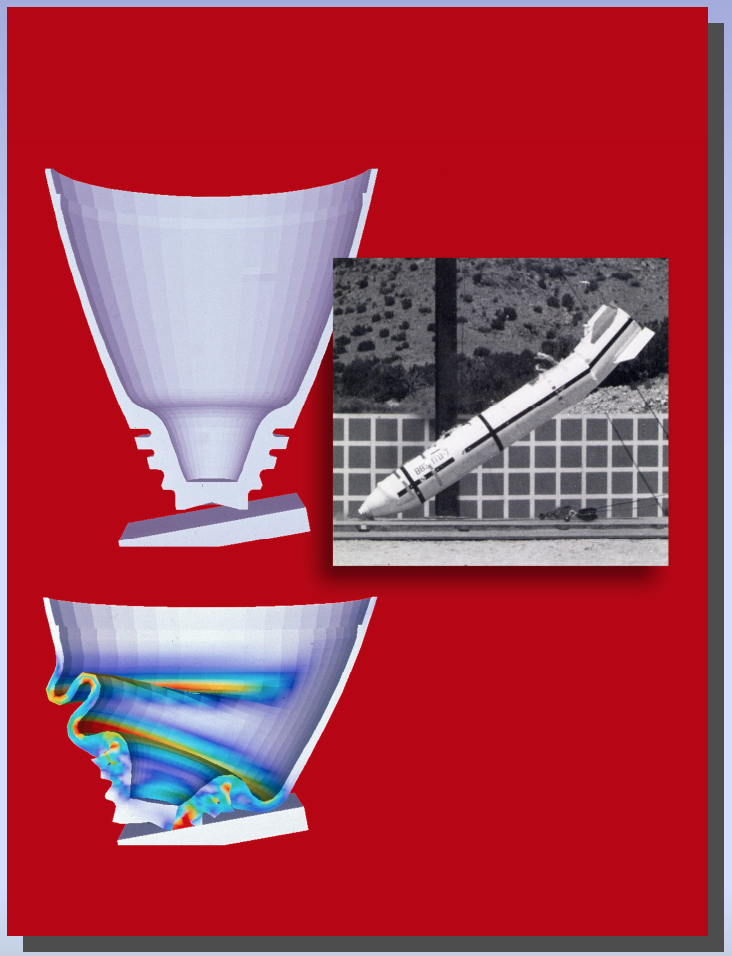
Enormous Strides in Magnetic Fusion

1977

As a national laboratory, LLNL is involved in high-risk, high-value science requiring diverse technical teamwork

Swords to Plowshares with DYNA3D

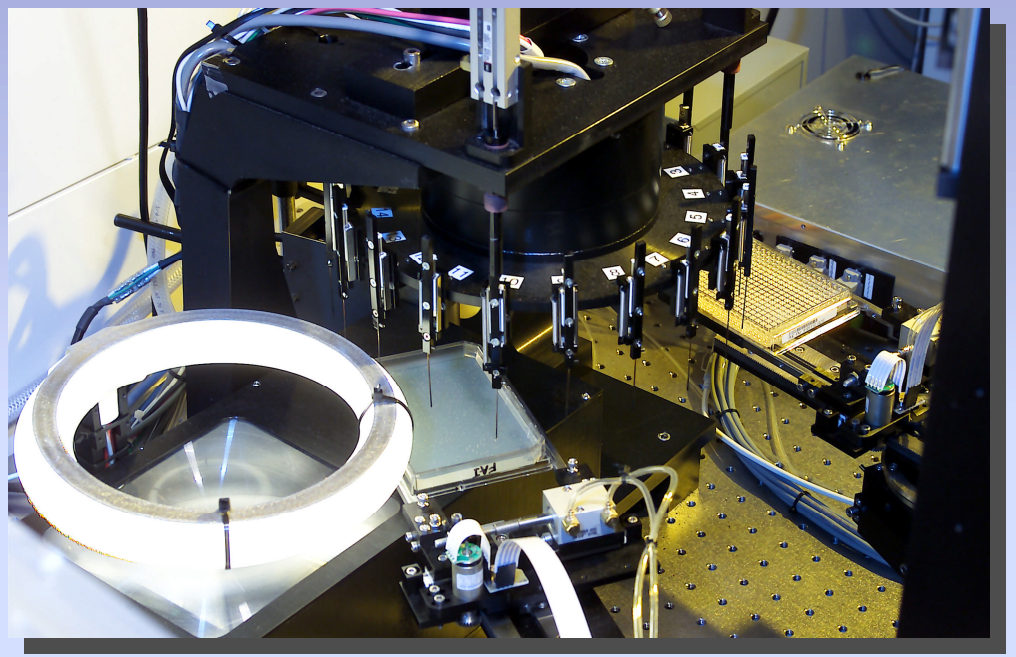
1982

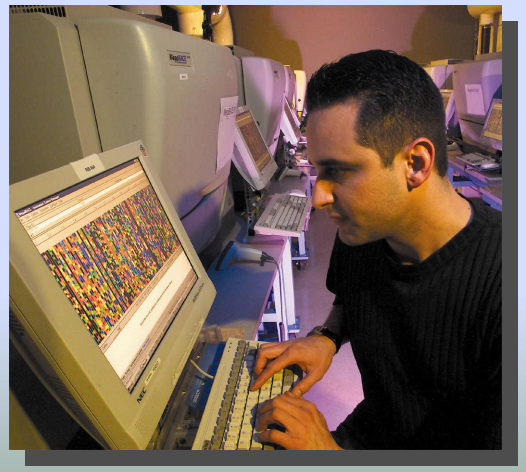


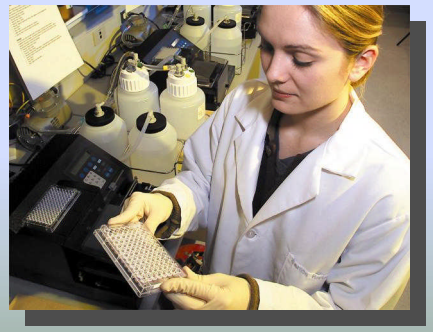
- **DYNA3D calculation of the crush-up of the nose cone of the B83 strategic bomb**
- **DYNA3D spread into industry**
  - » Current users (over 300) represent a “Who’s Who” list of major US firms
  - » Study shows $350M savings annually by US industry

Deciphering the Human Genetic Code

1987 LLNL's biomedical research program has evolved from early radiation studies to become a major player in the international effort to decode the human genome







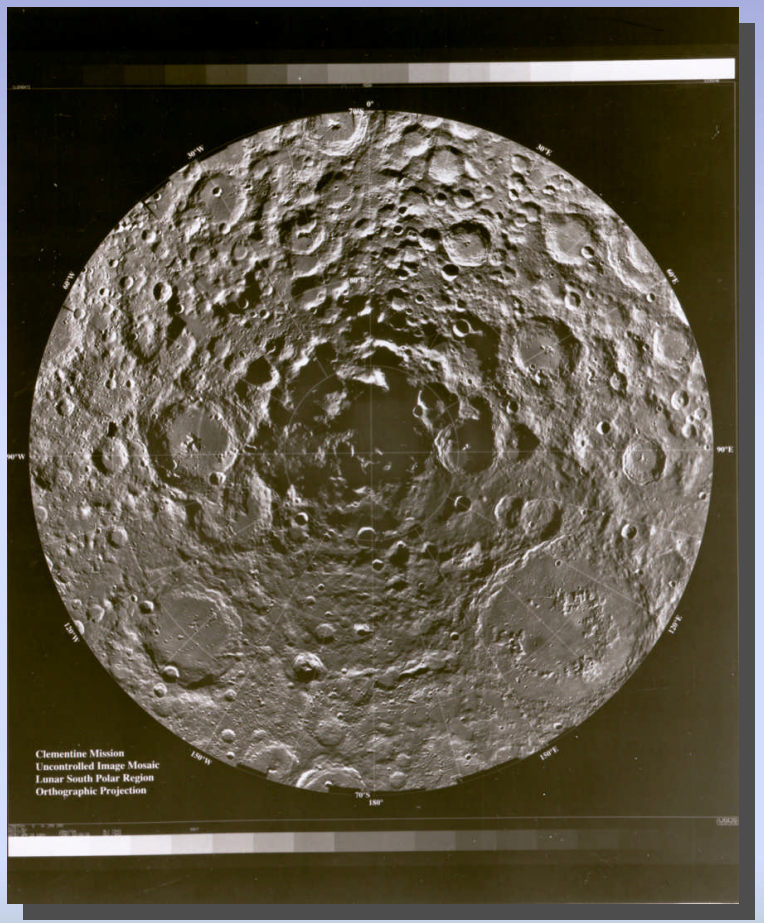
Inspecting for Weapons of Mass Destruction

1991

- Laboratory physicists found the Iraqi isotope separation technology to be similar to early UC enrichment technologies pioneered at UC Berkeley
- Research effort estimated at $8B

Advanced Sensors Map the Moon

1994



- Six cameras designed and built at LLNL mapped the entire surface of the Moon at resolutions never before attained
- State-of-the-art technologies developed at LLNL continue to be leveraged into non-weapons related fields

Understanding the Details of Nuclear Weapon Performance

1995

- The Stockpile Stewardship Program is used to validate the viability and safety of the nuclear stockpile

- Much of the activities at the Nevada Test Site support this program

Defending against Terrorism

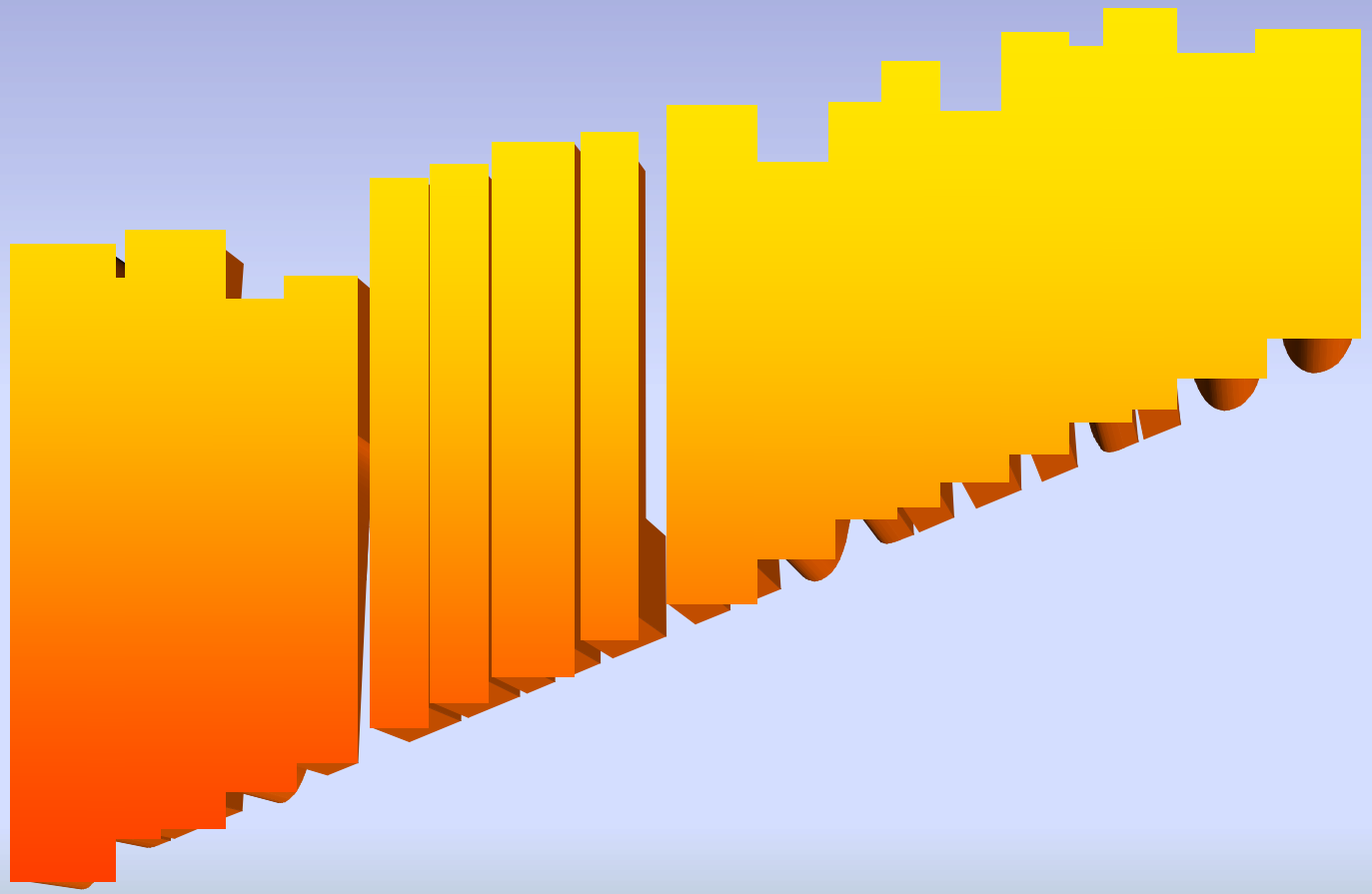
2001

- Lawrence Livermore and Los Alamos (LANL) National Laboratories deployed the Biological Aerosol Sentry & Information System (BASIS) for 2002 Winter Olympics
- LLNL is poised to make additional contributions to homeland defense
- The NTS will play an important part

JASPER is an example of an outstanding team

- LLNL has lead role in all aspects: technical direction and management of design, startup, and operation of the facility and program
- Bechtel Nevada (BN) supplies resources for facility maintenance & operation, and diagnostic design & operation
- National Nuclear Security Administration (NNSA) has oversight responsibilities

JASPER team: LLNL, BN, and NNSA engineers, scientists, technicians, and administrators



Big Explosives Experimental Facility (BEEF)

- Up to 70,000 lb of explosive authorized
- 1.2 km buffer zone or larger if required
- High-speed optical photography
- Flash x-ray photography
- Laser Doppler velocimetry