



NNSA Update



C.J. Keane

**Asst. Deputy Administrator for Inertial Fusion and the NIF Project
National Nuclear Security Administration, DOE**

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Key points

- **The nuclear weapon complex is undergoing major changes**
- **NNSA is in process of implementing policy to run major facilities as “user facilities”**
- **SSAA- new solicitation on the way; some changes in responsibilities**
- **“Intermediate scale” solicitation In process (A. Hauer)**
- **Interagency Task Force on HEDP- recommendations expected by the end of this calendar year**



The “Complex 2030” scenario provides a vision for the future of the nuclear weapon complex

DOE/NA-0013



Complex 2030

*A Preferred Infrastructure Planning Scenario
for a Nuclear Weapons Complex*

Copies are available at www.nnsa.doe.gov



Ensuring the long-term health of the S+T base is a key strategy of Complex 2030

Complex 2030

Strategies

STRATEGY 4: *Drive the science and technology base essential for long-term national security:*

Long-term health of the science and technology at our nuclear weapons laboratories and plants is essential for our future. For more than a decade, a comprehensive, science-based approach has been the basis for certification of the continued viability of the nuclear stockpile. The need for a robust, scientific underpinning will remain as legacy systems are retained for the next few decades and the stockpile is transformed via development of the RRW. It is essential to maintain the capability to deal with technological surprise, to cope with planned and unforeseen changes to the U.S. stockpile and to respond to external threats. The actions below will ensure the scientific and technological base to support the stockpile today, during transition, and in the future.

- Acknowledge the competition for resources required for infrastructure and stockpile transformation will place stress on the science and technology budgets, and, if not addressed, will result in erosion of required capabilities.
- Establish a science and technology model by the end of 2007 defining the capabilities required to sustain the transformed stockpile.
- Recognize that Work for Others (WFO) plays an essential role in maintaining capabilities required for the NNSA mission. Encourage stronger WFO in key mission areas.
Incorporate the implications of WFO for NNSA laboratory missions into the science and technology model to be completed in 2007.

- Manage the transition to a lower cost, NNSA National Laboratory complex. Develop a plan in 2007 to eliminate duplicative facilities and programs and maintain key capabilities.
- Partner with the Office of Science and other leading national R&D sponsors regarding the National Laboratory complex. Define options and recommended path forward by the end of 2007.

Workers inspect the inside of the National Ignition Facilities target chamber.





Complex 2030 Plan involves greater interaction between NNSA and the DOE Office of Science

- **Considerable input on 2030 projects such as facility planning**
- **Interagency working group on High Energy Density Science**
- **Cooperative work on the LCLS and other efforts**
- **Commitment from both agencies to increasing interaction**
- **Work has begun on Defense Programs Science & Technology**

Roadmap



Complex 2030 includes uniform planning for management of national facilities

- **Complex 2030 deliverable:**
 - **“Operate major science facilities (e.g. LANSCE, OMEGA, Z/ZR, DARHT, U1a, JASPER, NIF) as effective, national, shared user facilities”**
- **DOE / NNSA HQ Team Leads for this action: Dr. Trish Baisden, Dr. Alan Wootton, Col. Mike Donovan**



There are three scales of NNSA facilities to consider

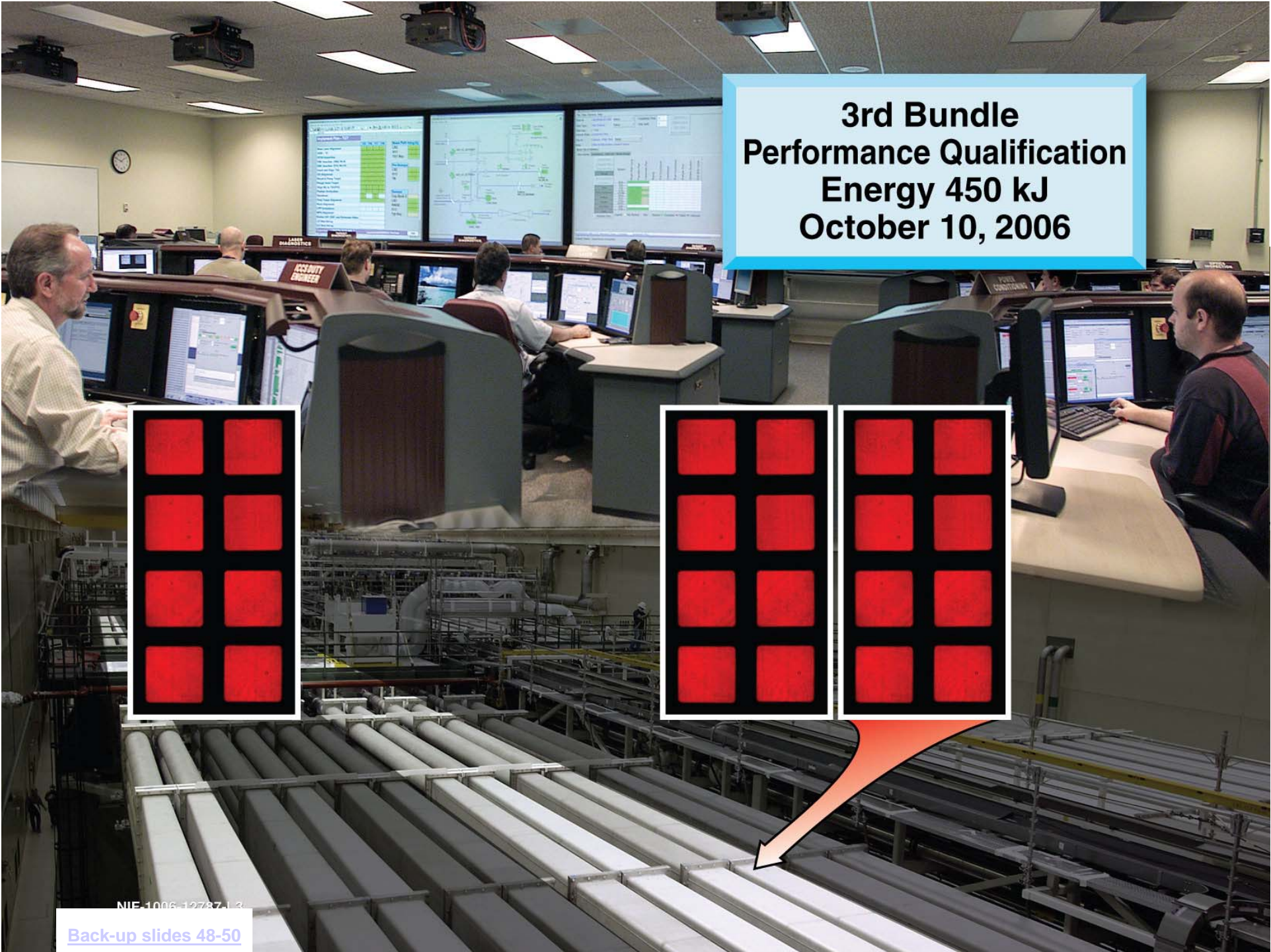
- **Large Scale: NIF, OMEGA/OMEGA EP, Z/ZR**
 - Access the widest range of the most extreme conditions
 - Oversubscribed and have limited shot rates
 - Experiments require significant design and target fabrication efforts
 - Large support staffs
- **Intermediate-scale: Trident, Titan, Z-beamlet/PW**
 - High degree of flexibility, moderate support staffs
 - Target areas can be readily reconfigured (diagnostics, etc.)
- **University-scale facilities: Texas PW, Leopard (Reno), Cobra (Cornell), others**
 - Minimal support staff
 - Often a large number of graduate students involved in the operations and maintenance
 - Greatest flexibility



An external user program was instituted for NNSA intermediate scale facilities in FY2007

- **NNSA issued a call for basic science proposals involving work at the following facilities:**
 - **Trident Laser facility at Los Alamos**
 - **Titan Laser Facility at LLNL**
 - **Z –Petawatt facility at SNL**
- **2-3 proposals will likely be funded in FY07**
- **Chairman of evaluation committee: Prof. David Meyerhofer, University of Rochester**

**3rd Bundle
Performance Qualification
Energy 450 kJ
October 10, 2006**

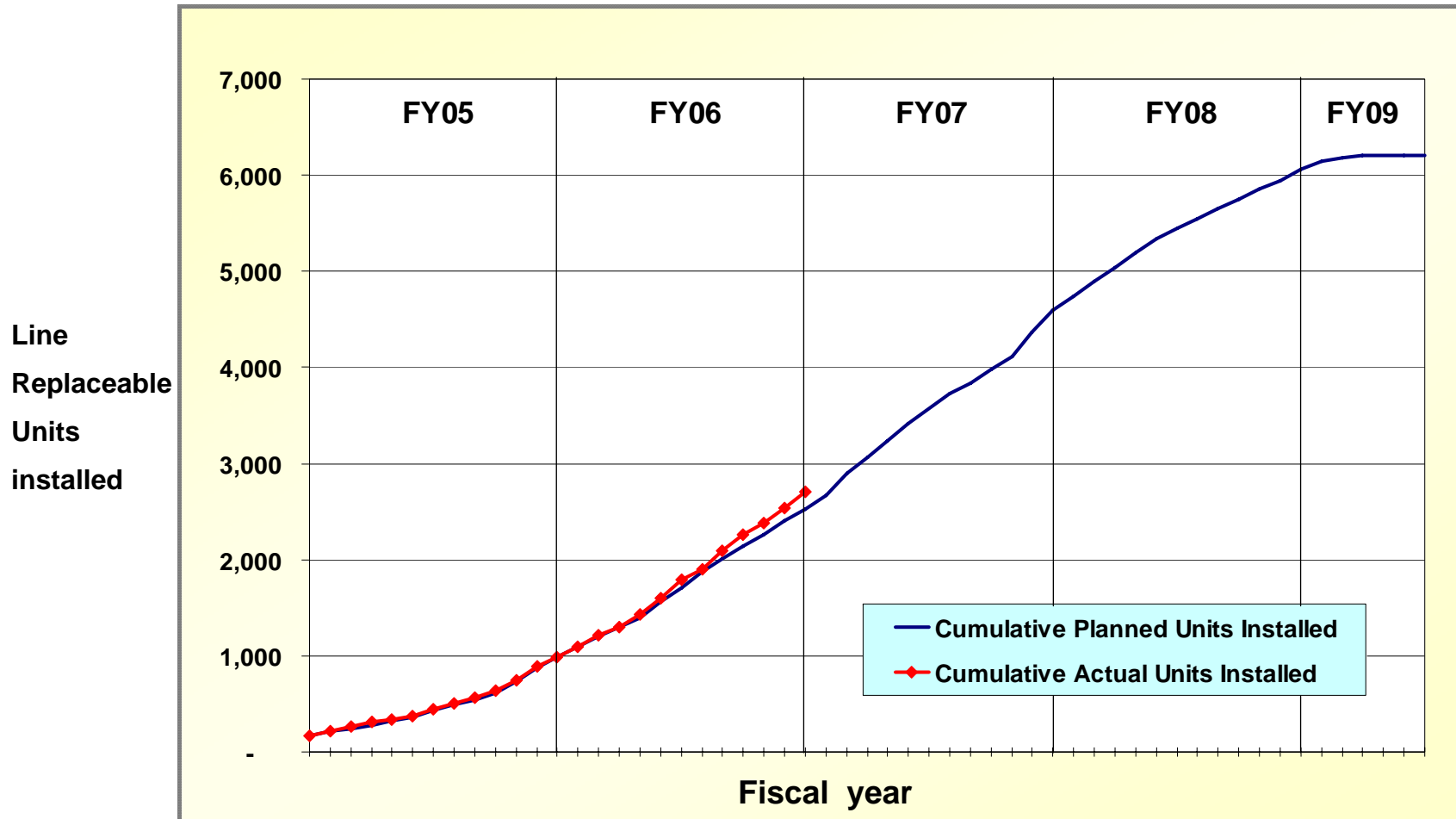


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[Back-up slides 48-50](#)



Installation of NIF line replaceable units is proceeding on schedule



2,707 Line replaceable units (43%) were installed by September 30, 2006



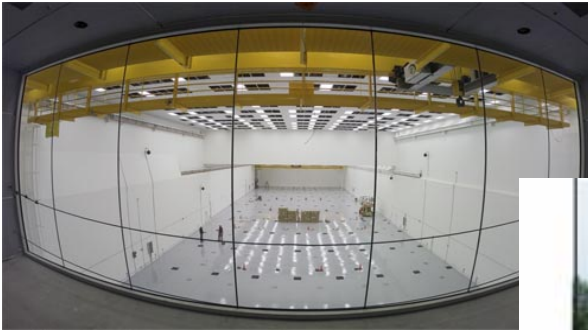
Structural steel installation is underway at Z/R



**The state
of ZR on
October
16, 2006**



OMEGA EP construction is on Schedule



OMEGA EP Building
(completed in February 2005)



OMEGA EP
Laser Bay
(Sept. 2006)

This facility will allow **important new classes of Experiments**

- integrated fast ignition tests
- very high energy radiography
- beam plasma interactions

H696b

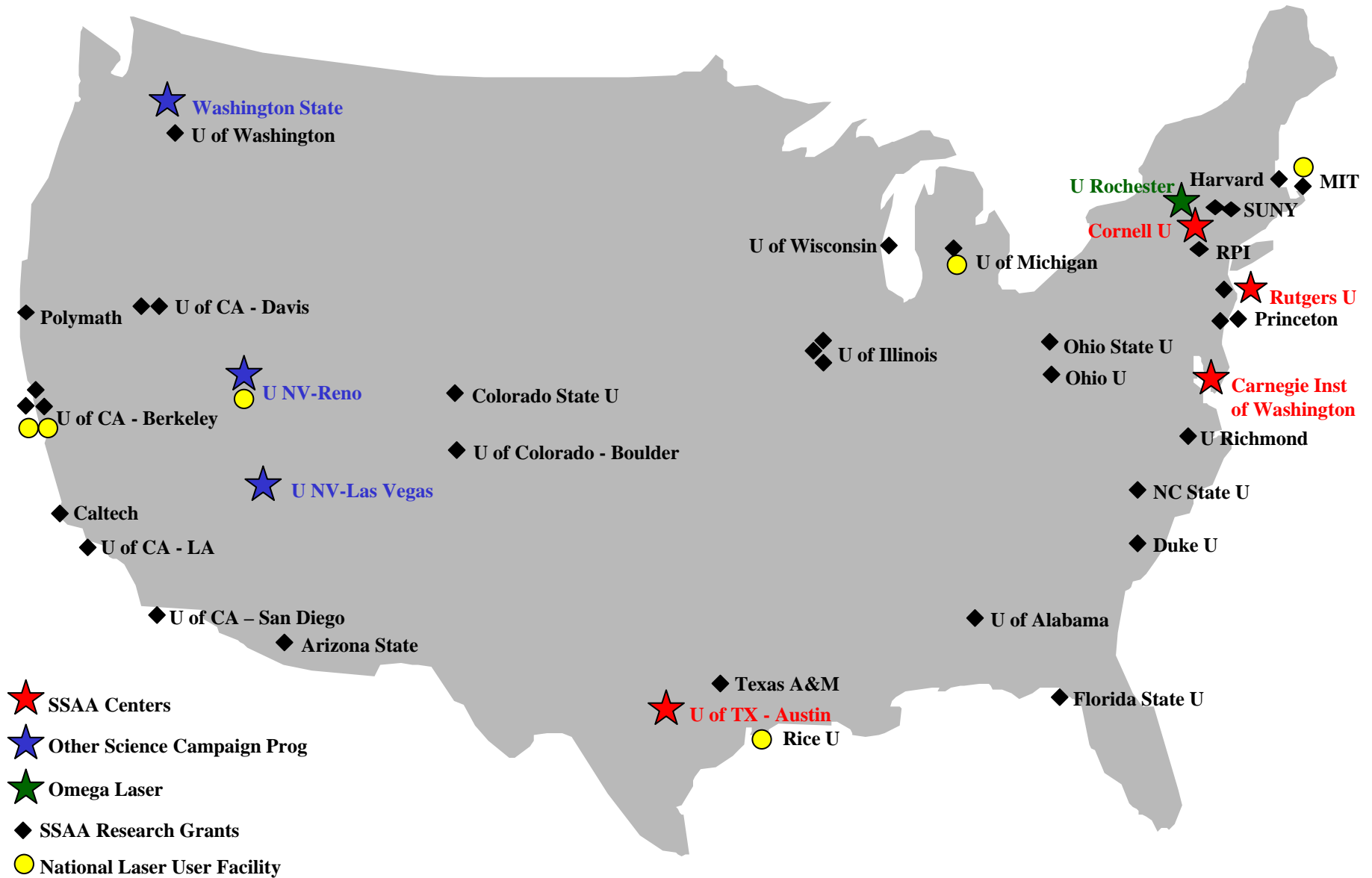


FY2006 NNSA Academic Alliances Funding

| | |
|----------------------|--------------|
| ASCI Alliances | \$20,000,000 |
| SSAA Centers | \$6,568,375 |
| SSAA Research Grants | \$9,251,211 |
| NLUF | \$1,000,000 |
| <u>Other:</u> | |
| Ohio State earmark | 2,000,000 |
| UNR earmark | 5,000,000 |
| UNLV earmark | 3,000,000 |
| Washington State | 3,400,000 |



NNSA University Programs





Stewardship Science Academic Alliance- key points for FY2007

- Some cooperative agreements (“centers”) reach end of term in early 2008-2009
- NNSA/DP wants to continue competitive peer review
 - There will be a 2007 SSAA solicitation primarily for centers
- Increased support for fundamental science recognized as important driving force:
 - “Rising Above the Gathering Storm” report
 - “Complex 2030” scenario for future of the nuclear weapon complex
- 2007 budget awaits Congressional action; 2008 budget is being planned
 - Will seek grants applications as well as centers
 - Will transform to annual solicitation



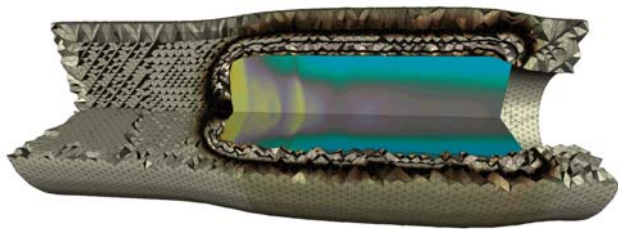
Stewardship Science Academic Alliance- key points for FY2007 (cont.)

- NNSA/DP facility use policy is a major issue
 - There is progress on access to intermediate-scale HEDP facilities
 - Policy is being developed for HEDP facilities overall
- To apply- use <http://www.grants.gov>
- Refer questions on technical and contracting issues to Kerry.Webb@nnsa.doe.gov and BCrisp@doeal.gov, respectively



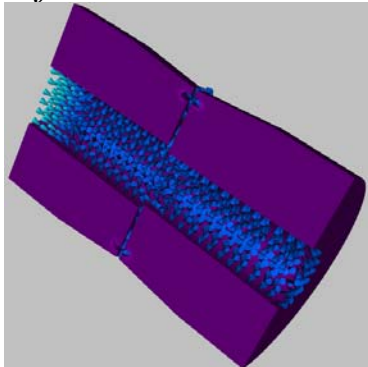
Over 500 faculty and students are involved in ASC University 'Alliance' Centers

California Institute of Technology
*Center for Simulating Dynamic
Response of Materials*



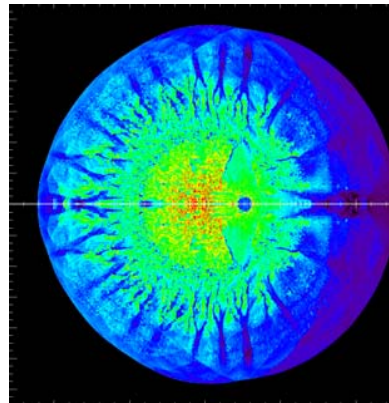
HMX detonation in a tantalum canister.

University of Illinois
*Center for Simulation
of Advanced Rockets*



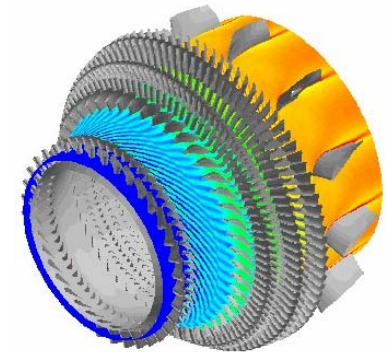
3D joint effects in Titan IV SRMU booster.

The University of Chicago
*Center for Astrophysical
Thermonuclear Flashes*



Thermonuclear burn in a
Type Ia supernova.

Stanford University
*Center for Integrated
Turbulence Simulations*



Flow through a Pratt & Whitney
6000 engine.

University of Utah
*Center for Simulation of
Accidental Fires and Explosions*



Simulation of a heptane pool fire.

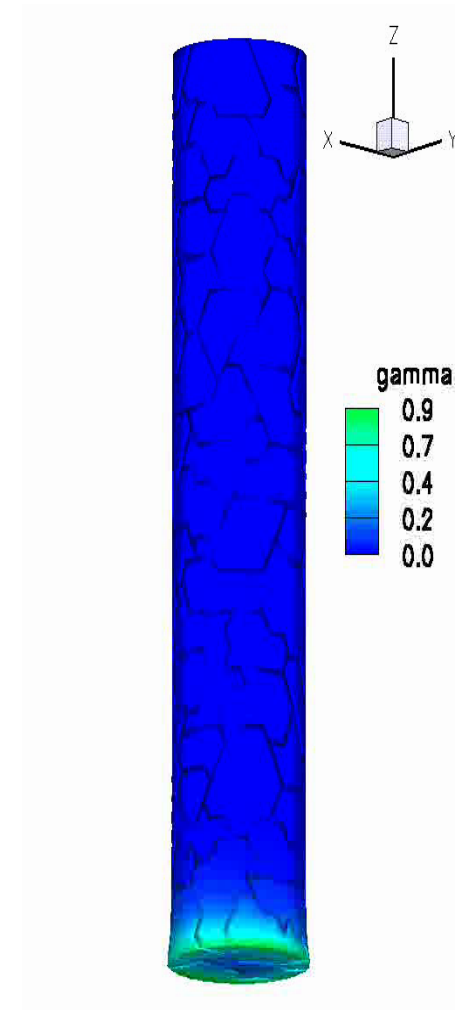


Phase-2 Competition of ASC Alliance Center Program (starting FY08)

new

new

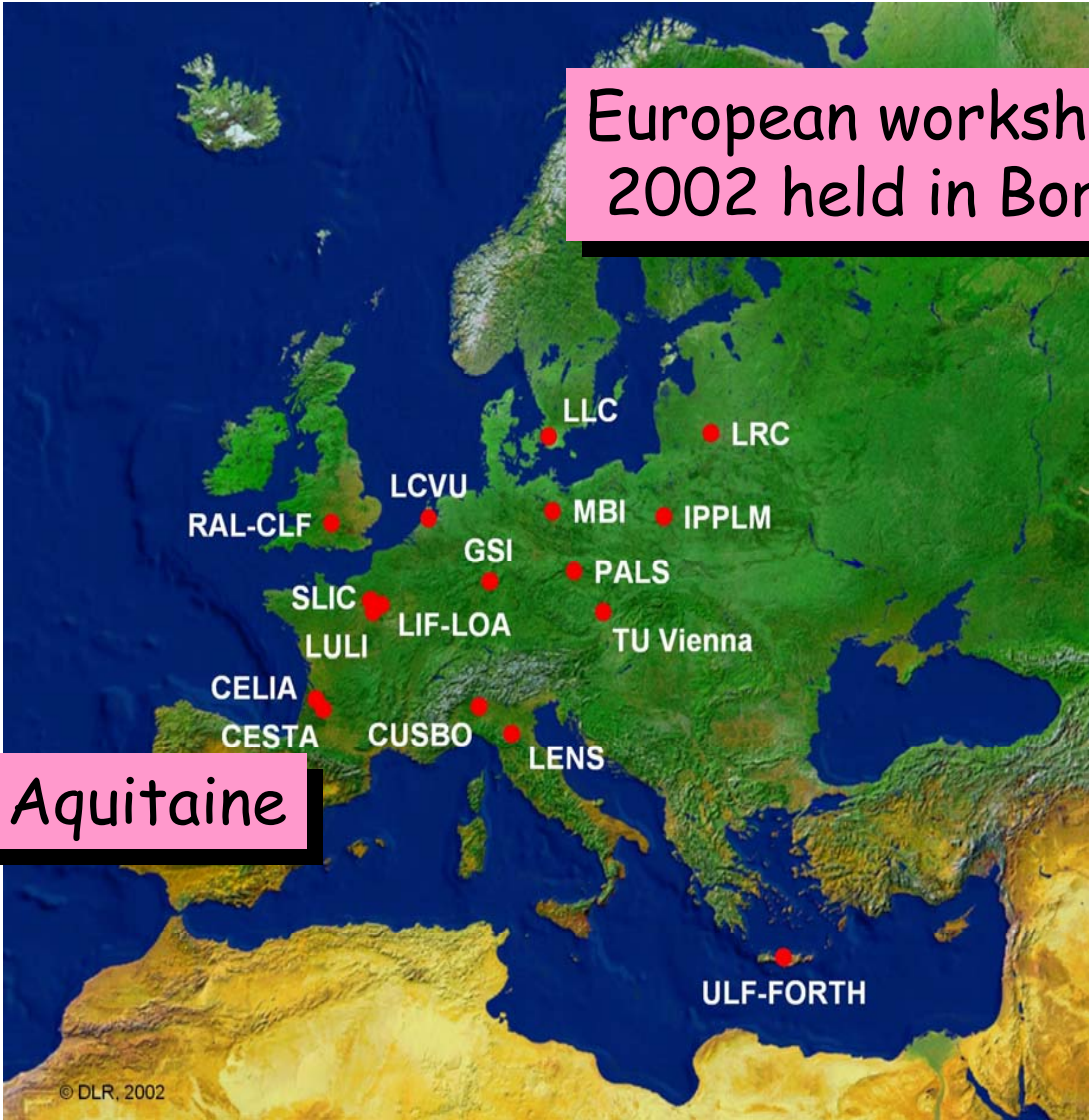
- Focus on a multi-scale, multi-disciplinary, unclassified application of NNSA interest
- Produce significant science/engineering results
- Demonstrate capability on available ASC computing systems
- Demonstrate validated simulation capability for prediction
- Produce new methodologies on:
 - Verification
 - Validation
 - Uncertainty quantification
 - Tighter integration of experiment & simulation
- Improve quantity & quality of tools and algorithms





EU Network

European workshop November 2002 held in Bordeaux



FSA 2005 in Aquitaine

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HEDP Interagency Task Force: Sponsor/Members

Sponsor: OSTP (R. Dimeo)

**Co-Chairs: C. Keane (DOE/NNSA- ICF/NIF)
D. Kovar (DOE/SC/Nuclear Physics)**

Exec. Secretary: F. Thio (DOE/SC/Office of Fusion Energy Sciences)

**Members: DOD (S. Ossakow/S. Walker)
DOE/SC/Basic Energy Sciences (E. Rolfing, M. Casassa)
DOE/SC/Nuclear Physics (J. Simon-Gillo)
DOE/SC/High Energy Physics (R. Staffin, L.K. Len)
NASA (A. Kinney, M. Salamon)
NIST (J. Gillaspay, T. Lucatorto)
NSF (J. Dehmer)**



HEDP Interagency Task Force Charter

- **Advise and assist the Interagency Working Group on the Physics of the Universe in developing and implementing a strategic plan for advancing non-defense scientific research in High Energy Density Physics**
- **Provide a forum for discussion of interagency issues in High Energy Density Physics, facilitate interagency coordination, and establish priorities for the development of scientific research capabilities to address the vexing questions and opportunities in this area**



Task Force Charter (cont.)

- **Functions may include but are not limited to:**
 1. **Review agency programs and plans for scientific research specifically relevant to research in HEDP.**
 2. **Identify and recommend priorities for scientific research in HEDP.**
 3. **Develop plans and recommendations for implementing a coordinated, multi-agency research and development agenda in this area.**
 4. **Facilitate interagency cooperation and policy development regarding use of scientific facilities.**
 5. **Foster the development of the research community and facilitate coordination of HEDP activities across the agencies.**



Issues for HEDSA to consider (besides building a field and a community)

- **Community and user facility organization-what can we learn from BES and other organizations that run major user facilities?**
- **HEDP is a highly interdisciplinary area of research- need to consider agency roles in stewarding the various major scientific areas involved**