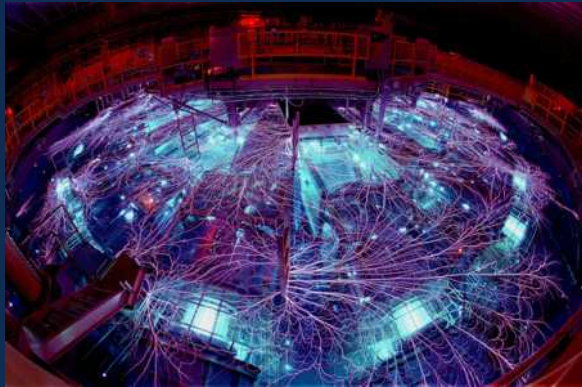


Exceptional service in the national interest



Z Facility Overview

Keith Matzen

8/16/2012



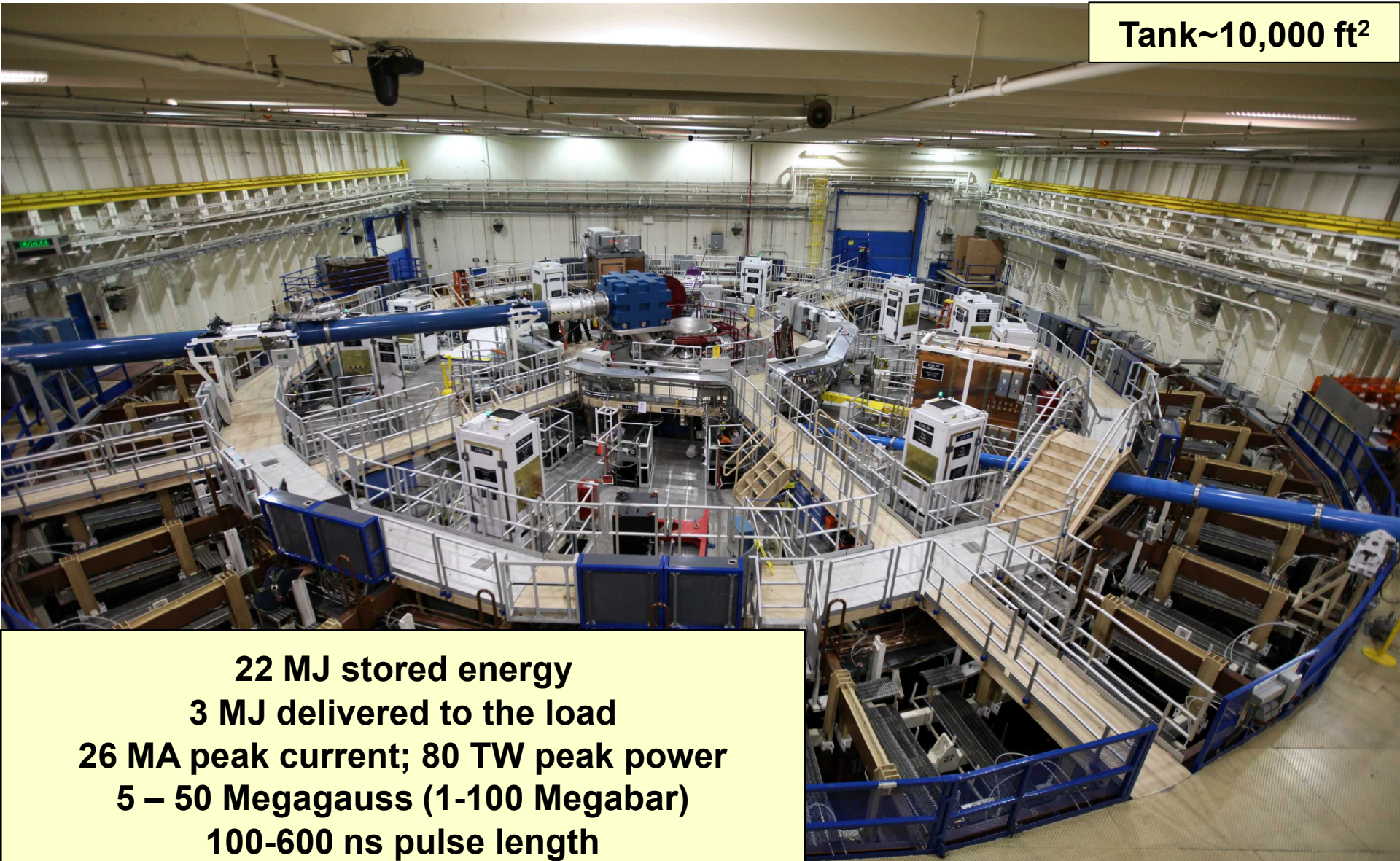
U.S. DEPARTMENT OF
ENERGY



Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.






The Z facility generates large magnetic fields for dynamic materials and magnetic implosion experiments

Tank~10,000 ft²



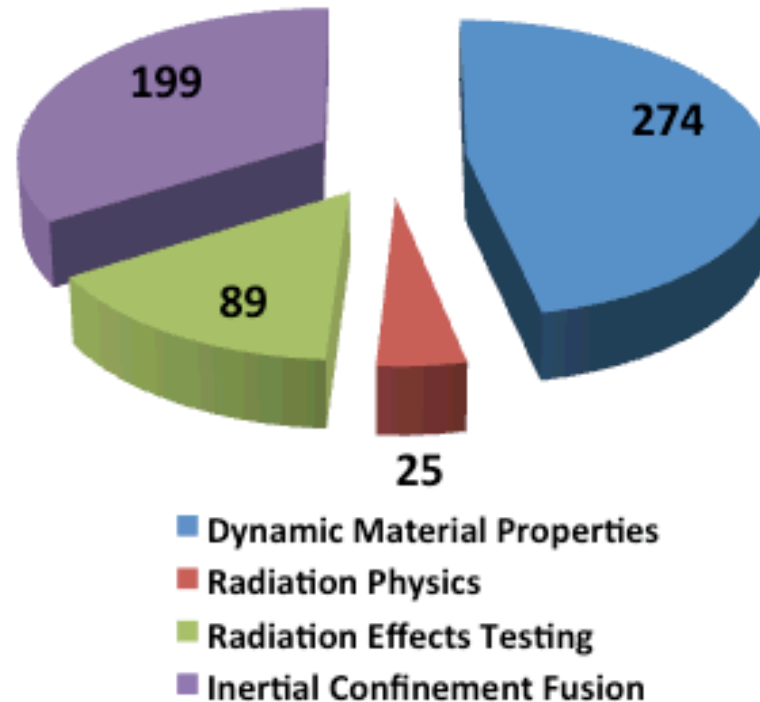
22 MJ stored energy
3 MJ delivered to the load
26 MA peak current; 80 TW peak power
5 – 50 Megagauss (1-100 Megabar)
100-600 ns pulse length

Recent Accomplishments and **Impact**

- | | | |
|--|--|---|
| <ul style="list-style-type: none">■ Material Properties<ul style="list-style-type: none">■ Performed plutonium experiments and obtained excellent data■ Obtained data on several materials at very high pressures■ Radiation Effects<ul style="list-style-type: none">■ Developed and applied Z x-ray source for radiation effects testing■ Fusion<ul style="list-style-type: none">■ Exciting results from novel laboratory fusion concepts■ Radiation Physics<ul style="list-style-type: none">■ Performed Z experiments with newly developed x-ray source and unique radiographic capabilities■ Z operations<ul style="list-style-type: none">■ Prepared and executed special nuclear materials experiments■ Performing 40 to 50 shots per quarter, including experiments with SNM | 



 | <ul style="list-style-type: none">■ Data provides surprising insights into the behavior of plutonium at pressures found in nuclear weapons■ Key data for stockpile modernization options and hydrodynamic experiments■ Qualified a new key component for insertion into the stockpile; SGEMP, Impulse, Thermo-structural response■ Pulsed power may enable cost effective path to robust ignition and high gain. Boost applications are being explored■ Z experimental data helped resolve the long standing “energy balance” issue; High-Z opacities■ Z is the only HEDP/ICF facility qualified to perform experiments on plutonium■ Z is a cost effective way of addressing critical stockpile stewardship science challenges |
|--|--|---|

Z continues to be heavily oversubscribed

Stockpile Stewardship Shot Days Requested for CY13



587 shot days have been requested for stockpile stewardship and related national security applications for Calendar Year 2013

- **Strong connection to stockpile issues is a strength**
 - **Focus on milestones**
 - (+) Coordinated national effort on critical issues
 - (+) Mission; HED council: Z, NIF, Omega
 - (-) Impact on scientific understanding and innovation
 - **Necessity of large facilities**
 - (+) Provide conditions relevant to NW performance
 - (-) Impacts balance of exploration and creativity using smaller facilities
 - (-) Limited throughput and number of experiments
- **Operational oversight and regulatory environment**
- **Balance between S&T and weapon delivery**
- **Preparing to address the science challenges of long term stewardship**
 - Developing the next generation of NW scientists (unclassified work, fundamental science program)
 - Building ties to academic community
 - Investing in foundational work needed for future experimental capabilities