

How to Succeed at NIF

**Presentation to
Workshop on Nuclear Astrophysics at NIF**



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NIF Science Director**

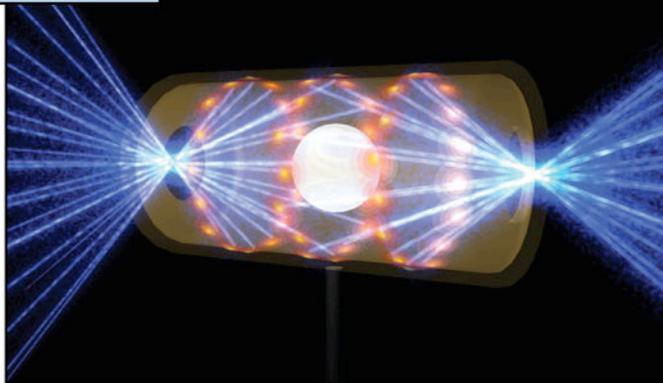
August 27, 2007

NIF Project



Completion in 2009

National Ignition Campaign



2006—2012

NIF Master Strategy

National User Facility

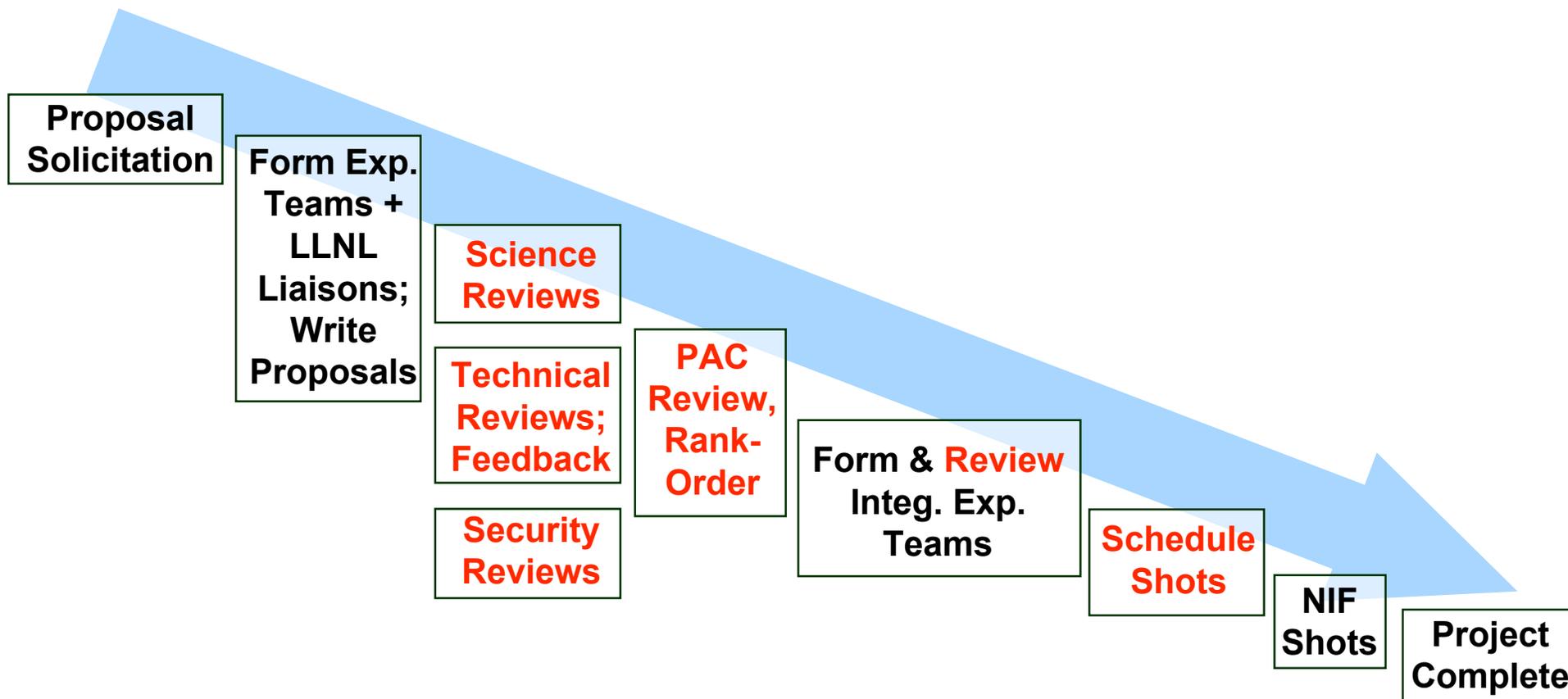


2009—2030

We want to encourage world wide outstanding scientists to do research at NIF



Inception to Completion Flow Chart





Two Forms of Success:

- **Must submit a successful proposal for NIF shot time**
 - **Science review**
 - **Technical review**
 - **Security review**

- **Must plan the project in detail to have the experiment succeed**
 - **Liaison Scientist**
 - **Integrated Experimental Team**

These two “forms” are closely correlated



Basics of Proposal Submission

- **Narrative component (< 10 pages)**
 - **Basic description of, and motivation for, the science to be addressed**
 - **Discussion of how the NIF measurements will be made, with specification of diagnostic devices that will be used**
 - **Supporting theoretical or computational work**
 - **List of all collaborators, including students, who have signed on**
 - **Mention of relevant work done previously, both by your group and by other groups**
- **Relevant references**
- **Identity of the NIF Liaison Scientist (LLNL), and members of the Integrated Experimental Team who are on board**
- **A short biography of each senior investigator**
- **A budget, both of dollar and resource costs to NIF, and to other granting sources**



A Bit More Explanation — 1

- **Science will be the primary criterion for acceptance (programmatic relevance also important for ICF and weapons program proposals)**
- **Proposals will be sent out for review**
 - **Basic science proposals will be sent mostly to external reviewers**
 - **Inertial Confinement Fusion proposals will go to experts in that field, both at LLNL and other institutions**
- **Following external reviews, Panels, one for ICF, one for Basic Science, one for weapons program, will rank order the proposals, based on**
 - **Quality of the proposed science (& programmatic relevance)**
 - **Technical feasibility (possibly with two-way interaction with collaboration)**
 - **Success of the security review (possibly with modifications)**
- **Panels will also write ~one-page review**



A Bit More Explanation — 2

- **Technical review is a threshold that needs to be exceeded; shouldn't be a large problem if team has done its homework**
- **MUST have a Liaison Scientist and, ultimately, an IET**
- **Technical review needs to have input from the Liaison Scientist (and LLNL IET members) (LLNL will work with the experimental groups on this) on:**
 - **Details of the NIF shots (Energy? Ignition? Direct/indirect drive/FI? Laser profile? Target? Diagnostic devices? Schedule?)**
 - **Match between information needed for the project and NIF diagnostics**
 - **Resulting damage to NIF components**
 - **Consumption of NIF resources**
 - **Targets**
 - **Destruction of devices**
 - **Potentially destructive (electronics!) EM pulses**
 - **Radiation (down time)**
- **Possibility of a Ride-Along shot?**



A Bit More Explanation — 3

- **Security review needs to know all the collaborators institutions and nationalities, including students. And can't add collaborators once project is approved**
- **Security review also includes export control; once the data have left LLNL they're out of our control**



Final Review Judgments —

- **NIF Director and Science Director, along with operations people, will decide on shot time allocations based on the rankings and other factors internal to NIF (ride-along compatibility, resource use, etc.), but will rely heavily on Panel rankings**
- **Expect to begin this review procedure, possibly as early as Autumn, 2008; send .pdf files to boyd11@llnl.gov**
- **Possible review outcomes**
 - **Yes**
 - **Yes, but needs modification (e.g., must not involve some collaboration members, needs technical modifications)**
 - **Interesting, but proposal needs more work**
 - **Good proposal, but may not need all of NIF's capabilities, so experiment might be performed elsewhere**
 - **Probably not**
- **We will endeavor to provide feedback to the PIs (Panel reports), as well as general information about the review process on the web-site**



Other Issues —

- **Identifying your Liaison Scientist**
 - Many people interested in doing NIF experiments know enough LLNL employees to ask one to serve as LS
 - If not, contact boyd11@llnl.gov for help
- **Currently have three, but they're busy**

We're working to grow the Liaison Scientist group, but the responsibilities/demands on those people are large

- **Note that programs that use less of NIF's "resources" are likely to get shot time sooner. Full energy fusion shots are very resource intensive (long times for radiation to decay, more damage to NIF optics, etc.).**

Responsibilities of PIs

- **Once the proposal is approved, the PI must**
 - **Submit an annual (possibly more frequent) report. This will**
 - **Serve as the starting point for project oversight**
 - **Give NIF a way of estimating when the group will be ready for shots**
- **Submit, three months before the first shot, a “proposal” that will provide additional detail to the operations folks, including**
 - **Detailed required laser conditions (drive and backlighter beams, beam profile, energy and power balance, smoothing conditions, phase plates, etc.)**
 - **Diagnostics required and DIM/port assignments**
 - **Detailed type and number of targets, including spares**
 - **Required number of shots**
 - **Any special considerations**
- **PI must monitor the actual experiment execution**
- **PI must submit a critique of the experimental execution for “lessons learned”**
- **PI must submit a copy of each publication resulting from the NIF work**



Project Oversight

- **Based on the annual report, but might also evolve from discussions with the PI/collaboration**
- **Conducted to help approved projects succeed**
- **Could simply involve reading the annual report**
- **Could involve reading the annual report, followed by some written questions/answers**
- **Might involve a one-day meeting with the collaboration after having identified some areas that need attention**



What Will NIF Do To Help?

- **We *hope* to provide targets, standard, or nonstandard within reason, but funding for this is not yet in place**
- **Much infrastructure support, from Liaison Scientists and Integrated Experimental Team members**
- **Supply the NIF, along with designer beam profiles, much diagnostics, cables, computers, office space, etc.**

We do expect the projects to supply their own summer salaries, student and postdoc support, travel expenses, per diem, etc.

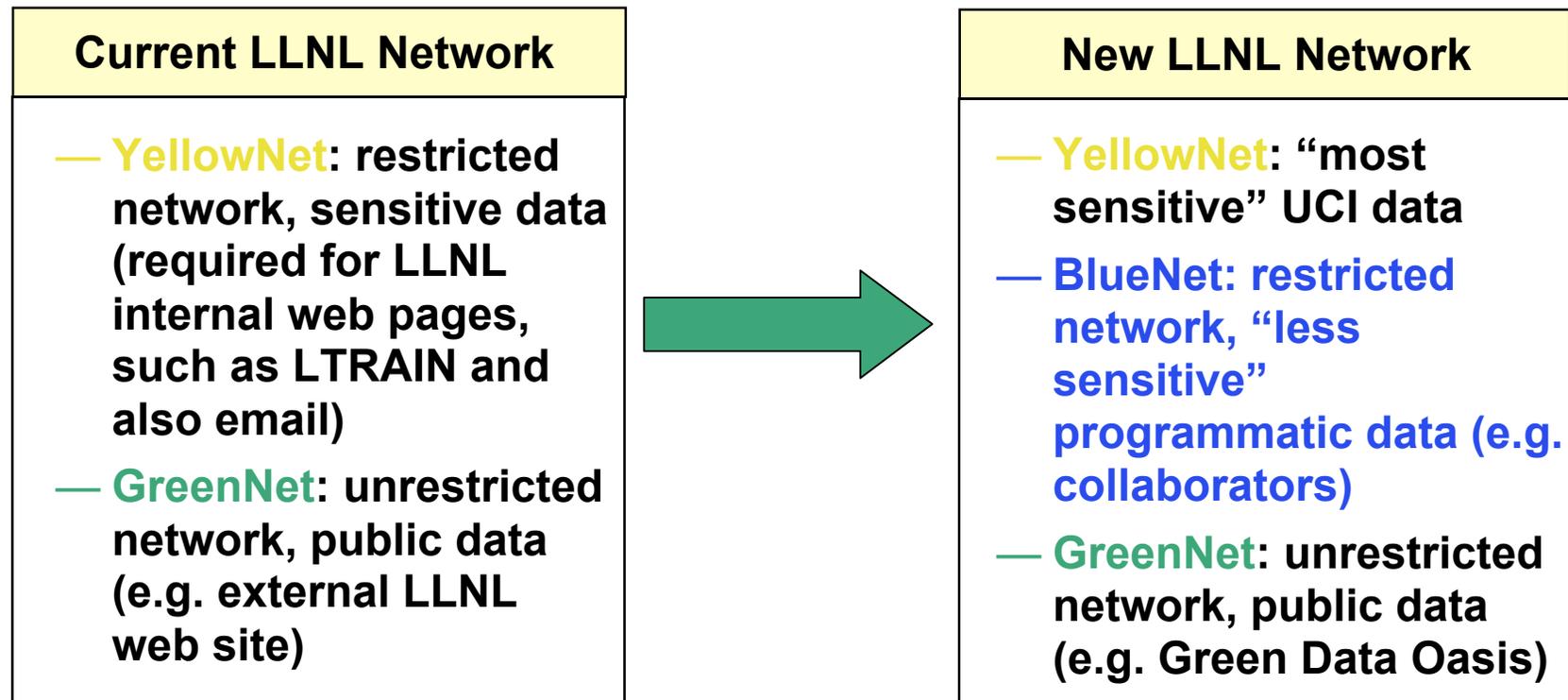
How do we manage site access?



Arrangements are being made for user groups to occupy public affairs space, near the NIF facility and personnel

How do we manage network access?

- Livermore is moving towards a layered, network architecture to expand access opportunities



- **BlueNet is managed through a Single Cyber Security Plan for FN's with Users and Computers locally managed. Sensitive Country (SC) FN users would still have individual Cyber Security Plans managed by the Institution.**
- **BlueNet will also serve Collaborators (US, FN, and SCFN)**

LLNL has invested in a Petabyte-class data portal “Data Oasis” for external collaborations



- **Petabyte-class storage system outside LLNL firewall – on Green network – hence known as Green Data Oasis**
- **Provides distribution of experimental data, remote/field observations, and simulation results obtained from unique LLNL facilities**
- **Enables science partnerships with Universities, DOE, NASA, NOAA, NSF, and many more**
 - **HEDP, Astrophysics, Climate and Carbon cycle, BioScience, Chemistry, Materials, ...**





Questions?

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