

Office of Science
Linac Coherent Light Source Project
at the
SLAC National Accelerator Laboratory

Hanley Lee, Federal Project Director
DOE Project Management Workshop
March 10, 2010

2010 Department of Energy
Project Management Workshop
March 9 - 10, 2010, Alexandria, VA



*"Meeting
The
Challenge"*

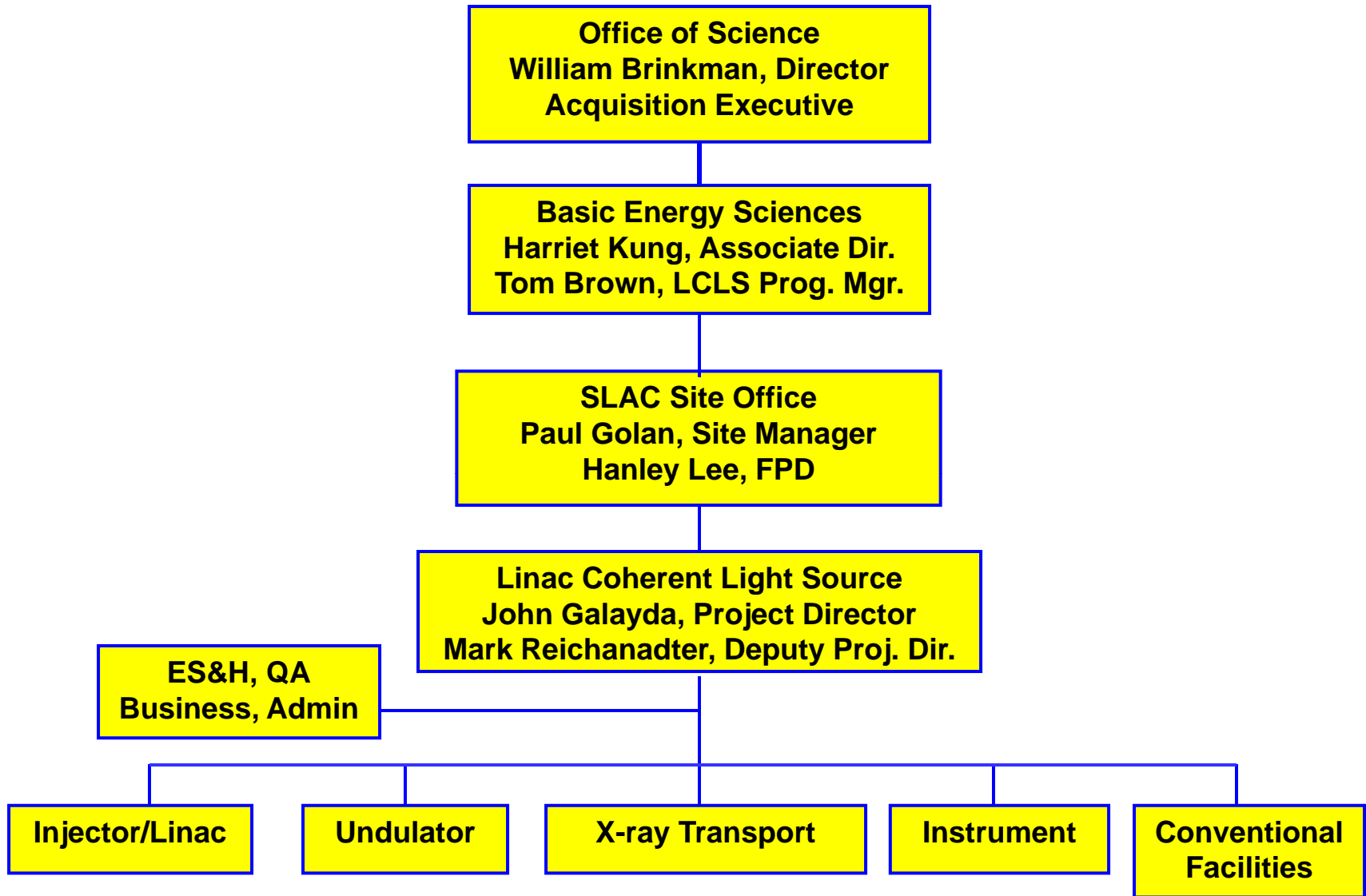


LCLS

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Organization

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- World's first free electron laser in the hard x-ray region
 - 10 billion times greater in peak brightness than any existing light source and at the time, pushing the technical capabilities to build a **4th generation light source**
- Baseline TPC \$420M - forecast \$416M; CD-4 July 2010
- Project is 98% complete; anticipate completing under budget and ahead of schedule
- Extend existing accelerator by half mile
- Technical facility
 - Injector, undulator, transport systems, controls, diagnostics
 - Atomic Molecular and Optical Physics instrument
- Civil construction
 - Half mile of tunnel, two experimental halls, office building

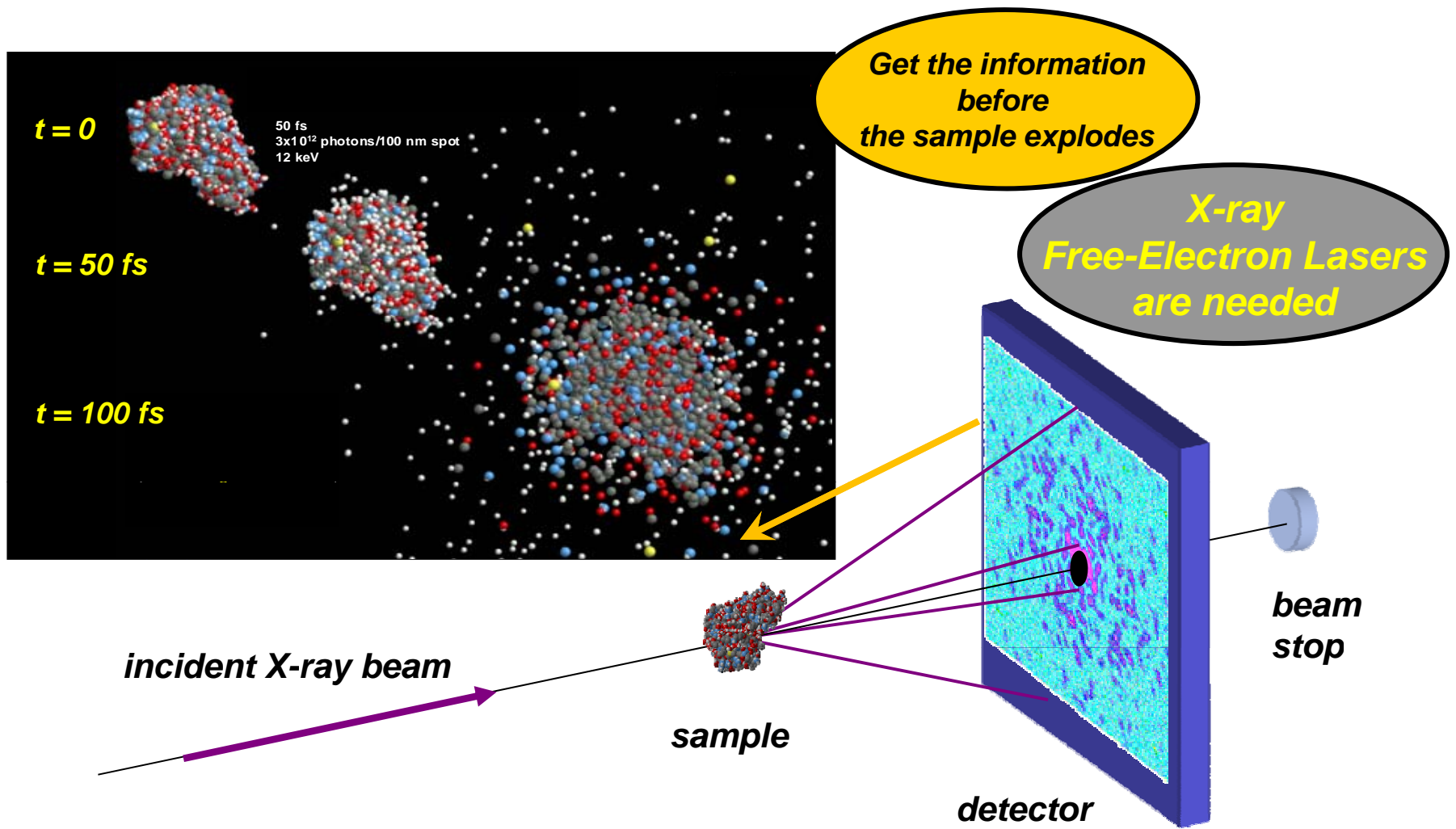
4

Vital Statistics

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R. Neutze, R. Wouts, D. van der Spoel, E. Weckert, J. Hajdu: *Nature* **406** (2000) 752-757

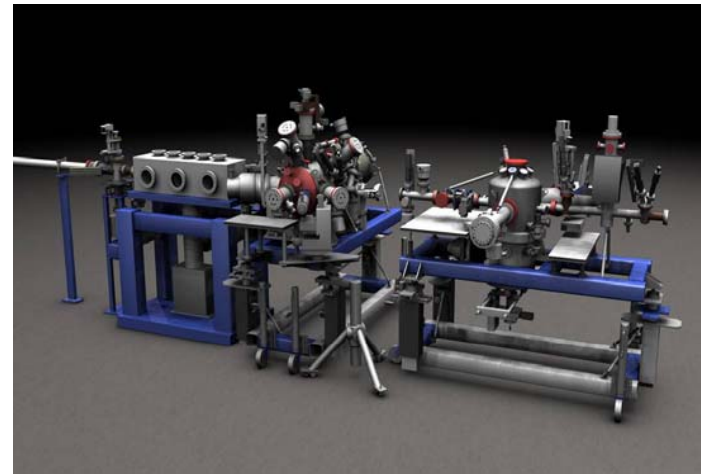
Single Particle Imaging

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- **1st Experiment run Oct - Dec 2009**
 - Received 28 proposals from 219 scientists
 - 10 experiments completed
- **2nd Experiment run May - Sept 2010**
 - Received 62 proposals from 469 scientists
 - 21 experiments scheduled (+ 4 in-house)
- **3rd Experiment run Oct 2010 - Feb 2011**
 - Received 107 proposals
 - Plan to schedule ~25 experiments



6

Users

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- Proactive Program Office
 - Support and guidance
 - Transparent communication and open forum that fostered timely resolution of issues/barriers
 - Actively resolved issues at the HQ level
 - Funding through continuing resolutions
 - Allowed project to focus on delivering against performance management baseline and mitigating risks

Lessons Learned

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- Civil Construction Costs
 - Construction environment in the area was intense
 - Bids averaged 30% above estimate with very little competition; however, tunneling bids were on target
 - Project baseline set prior to the market volatility
 - Assessed options and risks; communication was critical in developing a path forward
 - Selecting a good CM/GC contractor is critical
 - Incorporate real time assessment of the extremely volatile market conditions



9

Lessons Learned

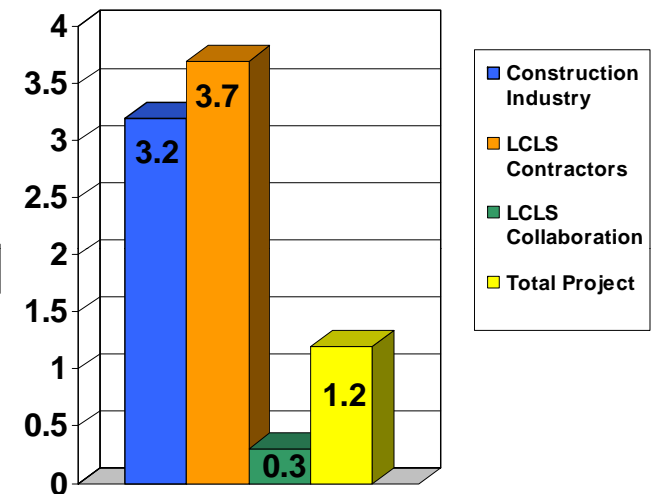
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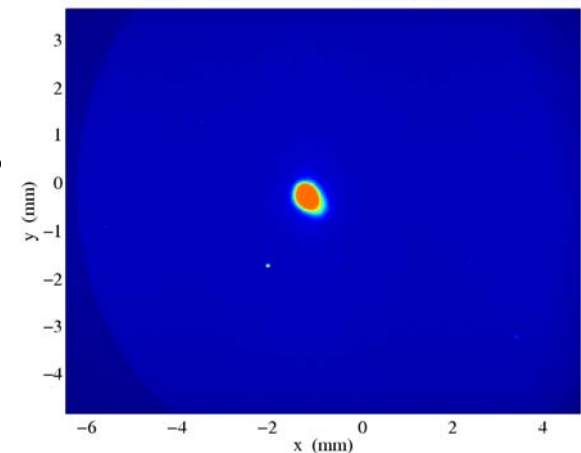
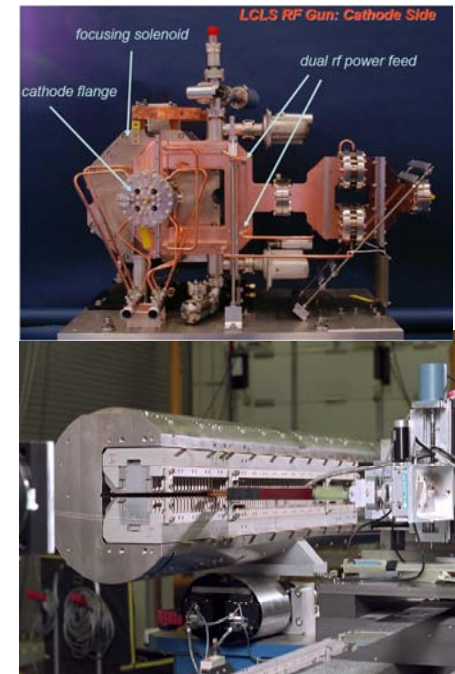
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- Set Clear ES&H Expectations
 - Contractor was unfamiliar with DOE safety expectations
 - Good safety plans in place but poor execution, inadequate oversight
 - Increased SLAC/DOE field presence
 - On-site medic aggressively managed cases
 - Communicate and engaged workers
 - Positive reinforcement/recognition
 - Safety Stars program
 - No TRC/DART in the past 20 months

April 2008 DART Rate



- Tailoring DOE O 413.3A Requirements
 - Long lead procurements
 - Injector system
 - Undulator magnet material
 - Magnet measurement facility
 - Mitigated technical risks
 - Phased commissioning
 - Commissioned systems when completed
 - Technical systems optimized in operations
 - Allowed start of scientific program while completing later phases of project

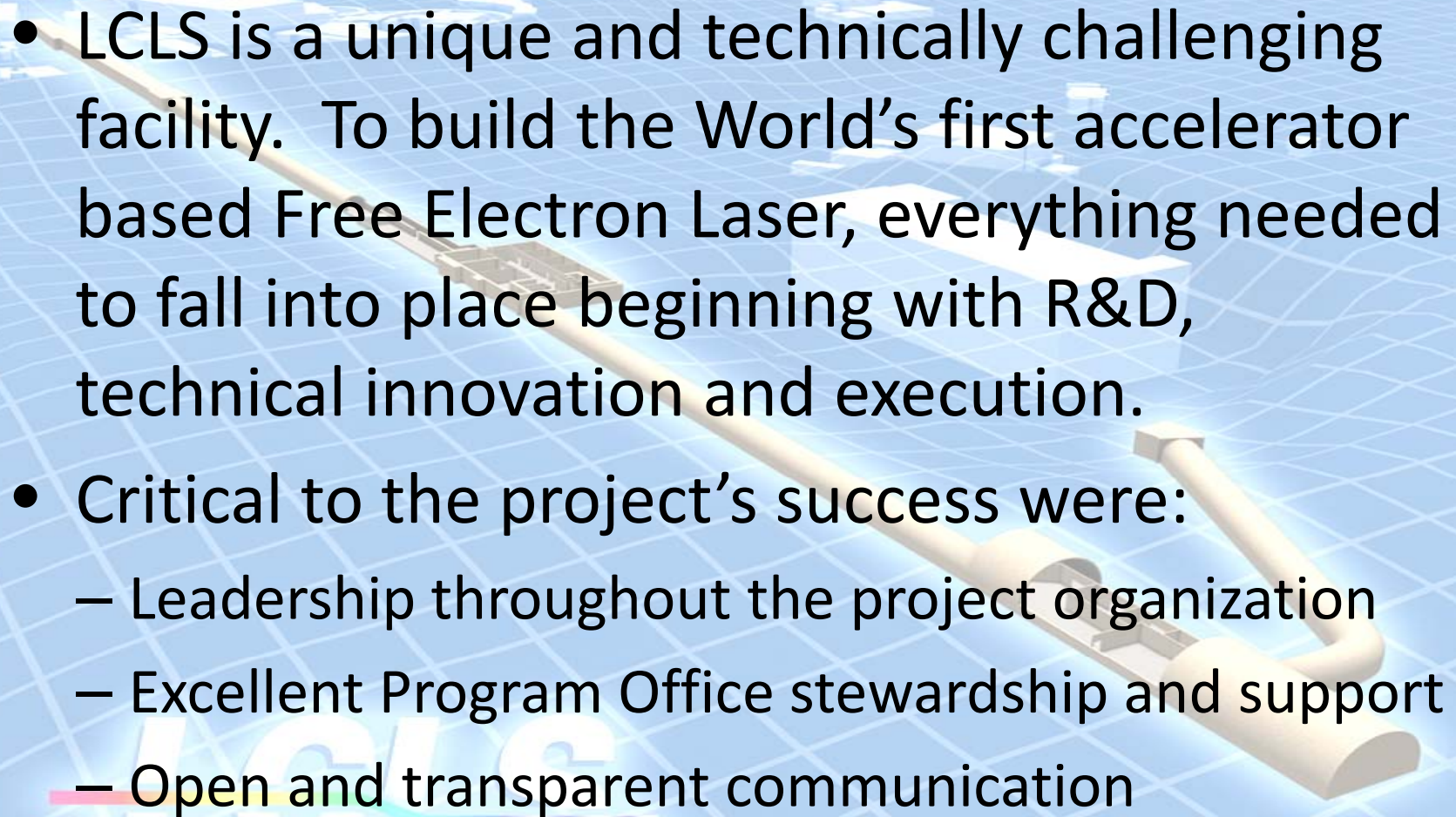


Lessons Learned

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- A 3D rendering of the Linac Coherent Light Source (LCLS) accelerator structure, showing a long, curved pipe with various components and a glowing blue light trail along its length. The background is a blue grid pattern.
- LCLS is a unique and technically challenging facility. To build the World's first accelerator based Free Electron Laser, everything needed to fall into place beginning with R&D, technical innovation and execution.
 - Critical to the project's success were:
 - Leadership throughout the project organization
 - Excellent Program Office stewardship and support
 - Open and transparent communication

Summary

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