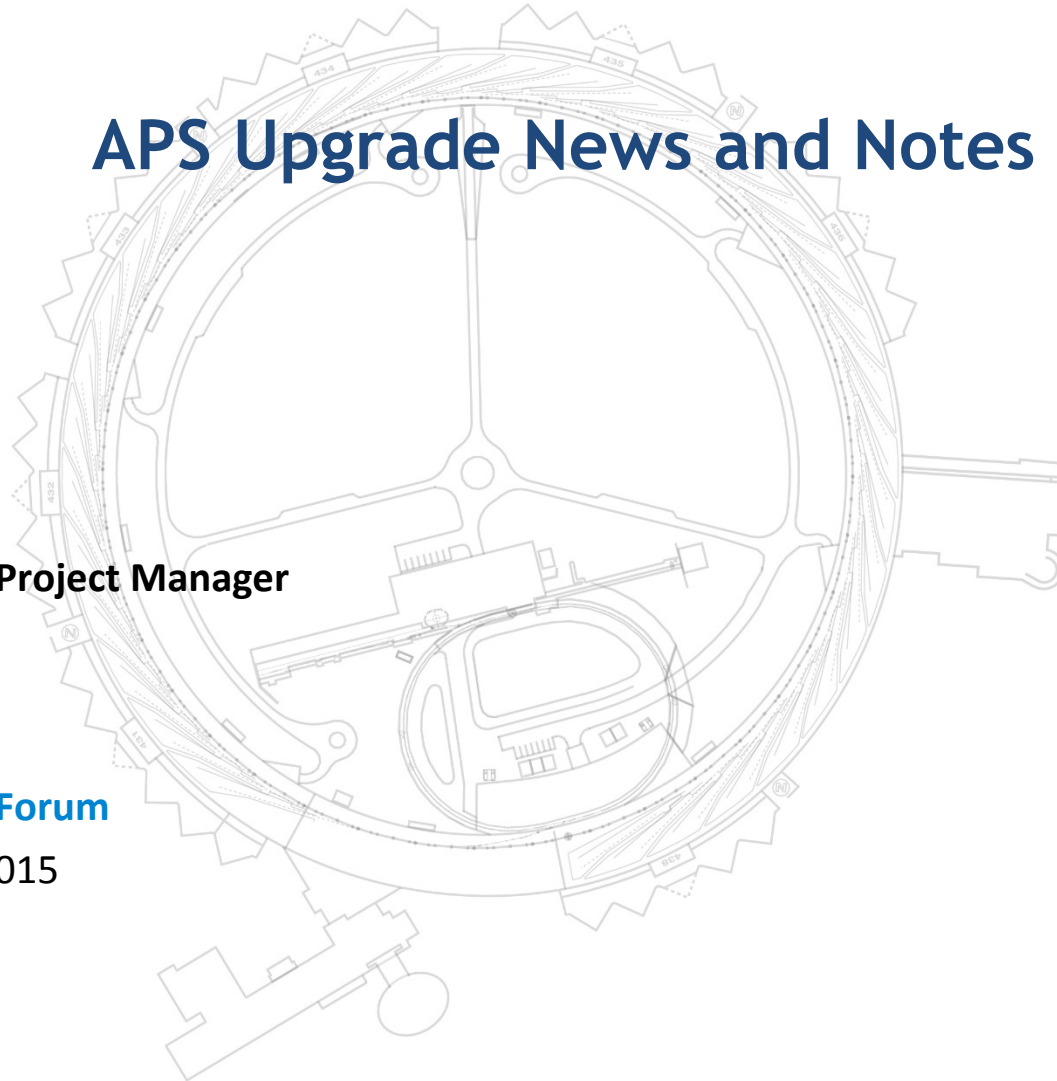


APS Upgrade News and Notes

Jim Kerby
APS Upgrade Project Manager

APS Upgrade Forum

12 February 2015



Outline



- FY16 President's Budget
- Machine Advisory Committee
- Upcoming Events



FY16 President's Budget

Basic Energy Science Capital Summary (\$K)

	Total	Prior Years	FY 2014 Enacted	FY 2014 Current	FY 2015 Enacted	FY 2016 Request	FY 2016 vs. FY 2015
Capital Operating Expenses Summary							
Capital Equipment	n/a	n/a	63,068	63,068	48,100	41,000	-7,100
General Plant Projects (GPP)	n/a	n/a	600	600	600	600	0
Accelerator Improvement Projects (AIP)	n/a	n/a	13,000	13,000	9,925	9,425	-500
Total, Capital Operating Expenses	n/a	n/a	76,668	76,668	58,625	51,025	-7,600
Capital Equipment							
Major Items of Equipment							
Advanced Photon Source Upgrade (APS-U), ANL (TPC TBD) ^a	TBD	40,000	20,000	20,000	20,000	20,000	← We are here
Linac Coherent Light Source-II (LCLS-II), SLAC ^{b,c}	—	67,000	0	0	0	0	
NLSL-II Experimental Tools (NEXT), BNL (TPC \$90,000)	90,000	27,000	25,000	25,000	22,500	15,500	-7,000
Total, Major Items of Equipment	n/a	n/a	45,000	45,000	42,500	35,500	-7,000
Other capital equipment projects under \$2 million TEC	n/a	n/a	18,068	18,068	5,600	5,500	-100
Total, Capital equipment	n/a	n/a	63,068	63,068	48,100	41,000	-7,100
General Plant Projects (GPP)							
Other general plant projects under \$5 million TEC	n/a	n/a	600	600	600	600	0
Total, General Plant Projects	n/a	n/a	600	600	600	600	0
Accelerator Improvement Projects (AIP)							
Accelerator improvement projects under \$5 million TEC	n/a	n/a	13,000	13,000	9,925	9,425	-500

^a Following the July 2013 BESAC report on Future X-Ray Light Sources, the APS-U project has been rescoped and a revised Mission Need Statement is in preparation.

^b LCLS-II is requested as a line item construction project beginning in FY 2014.

^c LCLS-II received \$85,600,000 in FY 2010-FY 2013 as an MIE.

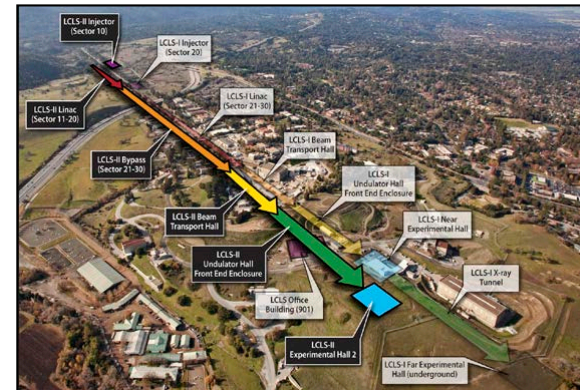


FY16 President's Budget

LCLS-II and APS-U Underway

Linac Coherent Light Source-II (LCLS-II)

- FY 2015 = \$148,000K; FY 2016 = \$200,300K for R&D, design, prototyping, long lead procurement, and construction of technical systems.
- LCLS-II will provide high-repetition-rate, ultra-bright, transform-limited femtosecond x-ray pulses with polarization control and pulse length control to ~1 femtosecond. The hard x-ray range will be expanded to 25 keV.
- Added are a 4 GeV superconducting linac; an electron injector; and two undulators to provide x-rays in the 0.2–5 keV energy range.



Advanced Photon Source Upgrade (APS-U)

- FY 2015 = \$20,000K; FY 2016 = \$20,000K for R&D, design, and limited prototyping.
- APS-U will provide a multi-bend achromat lattice to provide extreme transverse coherence and extreme brightness.
- Initial conceptual design for the new lattice completed; conducting R&D and key component prototyping in support of the new design. Key performance parameters are being defined for the project and the new storage ring.



Machine Advisory Committee

APS Machine Advisory Committee Meeting
February, 2-4, 2015 >>>>>Feb 3-5!!
Building 401/Room A5000
Agenda

Monday, February 2, 2015

8:30 AM	Executive Session	
9:00 AM	Welcome and Introduction to APS	Stephen Streiffer
9:25 AM	Introduction to APS Upgrade Project	Stuart Henderson
9:55 AM	Discussion	
10:10 AM	Break	
10:30 AM	APS Accelerator Operations Overview and Future Plans	Alexander Zholents
11:15 AM	Insertion Device Development - Revolver, SCU and HGVPD Undulators	Efim Gluskin
11:45 AM	Discussion	
12:00 PM	Working Lunch - Overview of Morning Talks and Discussion	Stuart Henderson
12:45 PM	Overview of APS Upgrade Conceptual Design	Glenn Decker
1:20 PM	APS Upgrade Lattice Design and Evaluation	Michael Borland
2:00 PM	Tolerances, Correction and Stability	Vadim Sajaev
2:25 PM	Collective Effects	Ryan Lindberg
2:50 PM	Discussion	
3:05 PM	Break	
3:30 PM	Storage Ring Injection	Aimin Xiao
3:55 PM	Injector Requirements and Plans	Chih-Yuan Yao
4:20 PM	Alternative Lattice Design and Evaluation	Yipeng Sun
4:45 PM	Executive Session	
6:15 PM	Depart APS for Capri Restaurant	

APS-U Points of Contact

<input type="checkbox"/> Name	ANL Phone	E-mail Address
Diane Wilkinson	2-7810	dwilkin@aps.anl.gov
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Tom Fornek	2-8601	fornek@aps.anl.gov
Jim Kerby	2-5264	jkerby@aps.anl.gov

Committee Members

<input type="checkbox"/> Name	Inst.
John Byrd	LBNL
Yunhai Cai	SLAC
Mark Champion	ORNL
George Ganetis	BNL
Bob Hettel (Chair)	SLAC
Yulin Li	Cornell Univ.
Guenther Rehm	Diamond Light Source
Ross Schlueter	LBNL
Timur Shaftan	BNL
Sushil Sharma	BNL
Christoph Steier	LBNL
Karen White	ORNL

- Excellent...and determined(!) committee
- 8 of 12 on-site for the review, despite some extraordinary travel adjustments

https://apsshare.aps.anl.gov/apsu/ProjectReviews/MAC_201502/Pages/Agenda.aspx



Machine Advisory Committee

THANK YOU to all speakers, writers, readers, preparers, ... everyone.

- An excellent review with an excellent committee
- The APS-U machine was well presented, and the reviewers noted as much
- “The CDR is well developed from a technical standpoint, and will provide a good basis for the CD-1 review”



Upcoming Events

Meeting with DOE Office of Science / BES – 5 March 2015

Scientific Advisory Committee – 18-19 March 2015

CD-1 Director's Review

CD-1 OPA Review

Thanks again to all for the excellent work to date...with refinement of the scope, cost and schedule in the coming months...

We look forward to successful CD-1 reviews!



Upcoming APS-U Forum Topics

26 February Chris Jacobsen – Trip to MAX IV

12 March Michael Borland – Current APS-U Lattice

26 March Tom Fornek – APS-U Storage Ring Removal and
Installation Planning

Suggestions? Topics of Interest?

Contact Dean Haeffner and / or Stefan Vogt



backup



Major Items of Equipment Descriptions

Advanced Photon Source Upgrade (APS-U)

The Advanced Photon Source Upgrade (APS-U) MIE supports activities to design, build, install, and test the equipment necessary to upgrade an existing third-generation synchrotron light source facility, the Advanced Photon Source (APS). The APS is one of the Nation's most productive x-ray light source facilities, serving over 4,000 users annually and providing key capabilities to enable forefront scientific research in a broad range of fields of physical and biological sciences. The APS is the only hard x-ray 7 GeV source in the U.S. and only one of four in the world, along with the European Synchrotron Radiation Facility (ESRF) in France, PETRA-III in Germany, and Spring-8 in Japan. High-energy penetrating x-rays are especially critical for probing materials under real working environments, such as a battery or fuel cell under load conditions. All three foreign facilities are well into campaigns of major upgrades of beamlines and are also incorporating technological advancements in accelerator science to enhance performance. With the ever increasing demand for higher penetration power for probing real-world materials and applications, the higher energy hard x-rays (20 keV and above) produced at APS provide unique capabilities in the U.S. x-ray arsenal that are a pre-requisite for tackling the grand science and energy challenges of the 21st Century. In response to the findings and recommendations of the July 25, 2013 BES Advisory Committee report, the APS-U Project will upgrade the existing APS to provide scientists with an x-ray source possessing world-leading transverse coherence and extreme brightness. The magnetic lattice of the APS storage ring will be upgraded to a multi-bend achromat configuration to provide 100-1000 times increased brightness. The APS upgrade will ensure that the APS remains a world leader in hard x-ray science. The high-energy penetrating x-rays will provide a unique scientific capability directly relevant to problems in energy, the environment, new and improved materials, and biological studies. The upgraded APS will complement the capabilities of x-ray free electron lasers (e.g., the Linac Coherent Light Source and Linac Coherent Light Source-II), which occupy different spectral, flux, and temporal range of technical specifications. The project is managed by Argonne National Laboratory.

<http://energy.gov/articles/energy-department-presents-fy16-budget-request>

(from pg 86)

