APS Upgrade Update

Stuart Henderson

Upgrade Forum
April 23, 2015

Meeting with DOE – March 19th, 2015

- There were three main issues we wanted to discuss:
  - Science case and its demonstration of mission need
  - Our plan toward a CD-1 review by the end of the fiscal year
  - Additional beamline scope warranted by the science case and international competitiveness
- The feedback that we received was “excellent”!
- We are planning to defend CD-1 before the end of the fiscal year

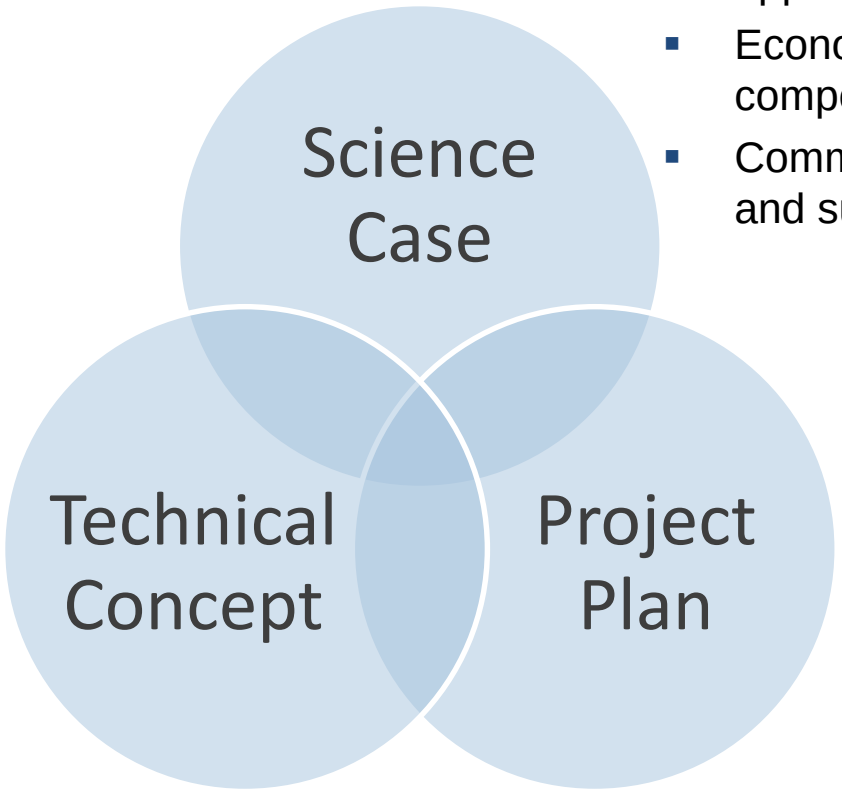
Project Plan
APS Upgrade Proposed Project Scope

- Accelerator
  - New 6 GeV MBA high-brightness storage ring lattice in existing tunnel
  - Doubling of ring stored beam current to 200 mA
- New insertion devices for 35 sectors optimized for brightness and flux
  - Incorporates SCUs on selected beamlines
- New and upgraded front-ends of common design for maximum flexibility
- Beamlines
  - A suite of 6 flagship, world-leading beamlines and major upgrades to two beamlines
  - A package of optics, stability and detector upgrades to take full advantage of MBA source properties
- Improved electron/photon beam stability
- **Well-defined** installation and testing period is a **key deliverable**
  - **External review found the present ~12-month plan achievable**
  - Given the importance of minimizing APS unavailability, the APS Upgrade will require a very different strategic approach from typical installations

Project parameters (TPC, funding profile, Key Performance Parameters) are and will continue to be subjects of active discussion prior to baselining

Moving the APS Upgrade Project forward

- Visionary scientific opportunities
- Economic and scientific competitiveness
- Community engagement and support



- Credible technical plan in place
- Plan maintains leadership capabilities in the face of international competition
- Can be built and made to work

- Project team ready to carry out a major DOE construction project
- Project scope, cost and schedule that is robust and credible
- Funding profile that is manageable

Preparation for CD-1

- Complete advisory committee structure and use them to assess our readiness
  - Project Management Advisory Committee (PMAC) has been formed – looking at 1.5 day review in mid-May to mid-June
  - Experimental Systems Advisory Committee (ESAC) membership under active discussion right now – invitations will go out this week; looking at 1.5 day review in June
- Carry out a series of internal Basis-of-Estimate drill-downs: Installation, Magnet systems, Vacuum systems, Power supplies, Control systems
- Hold Science Planning workshops in May/June; complete Early Experiments document
- Complete documentation
  - CDR
    - Incorporate MAC, ESAC suggestions in CDR
    - Complete Science Case CDR chapter based on Science Planning Workshops
  - Complete Quality Assurance Plan, Risk Management Plan, acquisition strategy,
  - Project technical documentation: technical requirements and assumptions documents
- Director's review to assess CD-1 readiness

Science Case Development

APS-U Science Planning Process

We have launched the Science Planning process leading to an "Early Science"-type document, co-chaired by Stephen Streiffer and Paul Evans (U. Wisconsin)

- The goal of this process is to:
  - "…document the most exciting directions of scientific discovery for the upgraded facility and to map out the high-level technical requirements necessary to pursue these directions."
  - "…produce a highly selective, concise, and quantitative case describing the most exciting directions of research for the upgraded APS. "
- Builds upon the 2013 Workshop series
- Ultimately the success of the APS lies in its scientific excellence and creativity
- We encourage you to contribute energetically and creatively to this process, by:
  - articulating your ideas and bringing them to the working groups
  - participating in the planning workshops, and
  - using your time and energy to put the most promising ideas on a firm technical foundation.

Timeline

- April
  - Form PMAC and ESAC
  - Set CD-1 review date
- May
  - Complete Basis-of-Estimate drill-downs
  - Science planning workshops
- June
  - Hold PMAC Meeting
  - Hold ESAC Meeting
  - Issue draft Early Experiments document from Science planning workshops
  - Complete CDR revisions
- July
  - Complete all documentation for Director's Review
  - Hold Director's Review mid-July
- September
  - CD-1 Review

Upcoming Events

- APS-U Workshops
  - May 18-19: *Chemistry and Catalysis - A. Wilkinson (Ga. Tech), David Tiede (ANL), Karena Chapman (ANL)*
  - May 18-19: *Biology and Life Sciences - Gayle Woloschak (NW), Bob Fischetti (ANL), Lee Makowski (Northeastern)*
  - May 19-20: *Soft Matter - Bob Leheny (Johns Hopkins), Alec Sandy (ANL)*
  - May 20-21: *Condensed Matter Physics - Oleg Shpyrko (UCSD), John Freeland (ANL)*
  - May 21-22: *Advanced Materials / Mesoscale Engineering - Bob Suter (CMU), Dillon Fong (ANL), Peter Chupas (ANL)*
  - June 1-2: *Environmental Science and Geo Science - John Parise (SBU), A. Lanzirotti (UC)*
- Upcoming Conferences and Meetings
  - IPAC 2015, Richmond VA, May 3-8 (~25 APS-U papers!)
  - APS/CNM Users Meeting, May 11-15
  - APS SAC Meeting, June 24
  - SRI, New York NY, July 6-10
    - Emerging Opportunities in High Energy X-ray Science, ANL, July 13-14
    - IWXM 2015 - International Workshop on X-Ray Optics and Metrology, LBNL, July 13-16
    - Complementary Methods in X-ray Spectroscopic, Structural, and Imaging Techniques, BNL, July 13-14
  - Denver X-ray Conference, Aug. 3-7