

APS Upgrade Forum



Jim Kerby

January 26, 2017

Topics du jour

- FY17 Budget
 - Continuing resolution through April 28th
- Key Decisions
- FY17 Plan
- News and Issues

APS Upgrade FY17 Objectives

The APS Upgrade Major Objectives for FY17 include the following:

- ✓ Down-select amongst accelerator lattice alternatives, bringing accelerator design to preliminary design maturity
- ✓ Complete evaluation of storage-ring radio-frequency system alternatives and select approach for baselining
- ✓ Complete the beamline roadmapping activity to assign selected beamline proposals to physical locations; bring the beamline design to preliminary design maturity.
- Carry out the APS Upgrade R&D Plan activities, with key deliverables and milestones as described below.
- Execute long-lead procurements according to the FY17 LLP plan.
- **Complete the Preliminary Design Report and achieve the FY17 Notable Outcome**

Key Decisions

1. Storage Ring RF

- Accelerator Performance / Cost / Risk evaluated
- Scientific productivity hindered by lengthened bunches
- → Keep system at 352 MHz

2. 41 pm Lattice

- Improved emittance, improved performance, minimal cost, risk impact
- → will use 41 pm reverse bend lattice as basis for PDR

3. Beamline Roadmap

- Analyzed 3 potential long beamline locations
 - Preferred site chosen (sectors 19-20)
 - Among other things, least intrusive to others and least expensive
 - Respecting MIE Civil Construction limit
- Updated ID List consistent w/ Roadmap

Decisions have been presented and vetted by SAC, ESAC and Mini-MAC.

ESAC and mini-MAC Reviews

- ESAC:

- “A suite of beamlines has been selected that take good advantage of the APS-U properties and position the APS for important science.”
- “The process used to select the beamlines was transparent and solicited a range of exciting ideas.”

- Mini-MAC:

- “The MAC is enthusiastic about the progress made on the 41-pm lattice and related system designs and supports pursuing it as the baseline design in preparation for CD-2.”
- “While the MAC continues to acknowledge the several benefits of a ~100-MHz system, the committee agrees that maintaining the 352-MHz system will be suitable for the APS-U given that some compromises in high bunch-charge operation are acceptable and the implications of reduced lifetime in all operational modes can likely be mitigated.”

ID Beamline Source Scope

Device	At CD1	Preliminary Selection	Comments
HPM Planar	39	32 + (7)	Nominal 2.8 – 2.0 cm period (Special 1.35 cm)
HPM Revolver	8 + (2)	8 + (1)	Only two headed revolvers. Reuse one existing mechanism
SCU	3 + (2)	8 + (1)	2 devices of 1.8m each in one cryostat - 2 locations 2 devices of ~1.2m with canting magnets - 2 locations 1 device - located co-linear with HPM
APPLE	4	0	
HGVPU		0	
EMVPU	1 + (1)	(1) + (1)	Reuse both IEX and CPU
Variable Polarization SCU (SCAPE)		2	2 devices in one cryostat for polarization switching studies for hard x-rays

Nominal length of PM devices are 2.4m (2.1 m in canted configurations) and SCU are 1.8m (1.2-1.5 m in canted configurations)

HPM Planar is for one set of magnets

HPM Revolver is two sets of magnets and a revolver mechanism

Both HPM Planar and Revolver will reuse the existing gap separation mechanisms

Device count in () is existing and may need minor modifications

FY17 Annual Plan Milestones

Milestone Number	Milestone Description	Quarter
AP-FY17-M1	Choose accelerator lattice in support of preliminary design	Q1
AP-FY17-M2	Complete evaluation of storage ring radio-frequency system options and select path forward	Q1
AP-FY17-M3	Complete beamline roadmapping activity	Q1
AP-FY17-M4	Complete initial beam test of prototype stripline kicker assembly and pulser system	Q2
AP-FY17-M5	Complete cold testing of the first SC harmonic cavity	Q2
AP-FY17-M6	Initiate procurement of High Heat Load Front End for Beamline 1	Q2
AP-FY17-M7	Award procurement of quadrupole doublet magnets (first APS-U LLP)	Q3
AP-FY17-M8	Award first enclosure for Beamline 1	Q3
AP-FY17-M9	Complete assembly of Q8 and M4 pre-prototype magnets	Q3
AP-FY17-M10	Complete assembly of vacuum system sector mockup	Q4
AP-FY17-M11	Complete sector mockup assembly	Q4
AP-FY17-M12	Complete APS Upgrade Preliminary Design Report	Q4

AP-FY17-M7 procurement package complete; sent to vendors for initial feedback

DOE Mini-Review / Status Presentation

- Tuesday March 14 in Germantown
- This is a status review / meeting, with probably two areas of focus:
 - assessing recent key decisions and
 - assessing trajectory towards CD-2
- If this is like other mini-reviews there will be limited Project involvement and just a few external reviewers

Long Lead Procurement Plan

- The Project submitted a formal request for approval of our FY17 long lead procurement plan:

Activity Name	Final Design Review Milestone (Level 4)	Award Milestone (Level 4)	LLP Milestone (Level 2)	Estimated Cost	Description
Q1/Q2 Quadrupole Magnets	9/19/16	3/31/17	7/1/17	\$2,138K	Procurement of Q1 Quadrupole Magnets; Option for Q2 Magnets included
Bunch lengthening system cryomodule components	4/24/2017	6/6/2017	9/6/2017	\$251K	Procurement of Initial Items for BLS Cryomodule
General Beamline Optics Package 1	2/15/17	3/31/17	7/1/17	\$355K	Procurement of First Optics Components for Beamline Enhancements

- Due to the continuing resolution, we will revise this plan delaying the Q1/Q2 quadrupole magnet procurement until an FY17 budget is known.

News and Issues

■ Personnel:

- Henderson to Jlab; Kerby Interim PD; Beno Technical Director
 - Shuffling workload during interim period, expect will be fine
- ES&H search
 - ES&H position reworked after first round of interviews; ANL ESH incorporated on search committee
 - Craig Ferguson hired as contractor during interim; NEPA and HAR being updated
- Installation Coordinator position posted just before holiday break
 - Six initial applicants (both internal and external)

■ Other:

- March 14 “mini”-review @DOE, exact scope TBD
- Aug – Sep full review expected; working timing and logistics
- Continued Work on EV reporting approach for LLPs

Timeline to CD-2 (Proposed)

- November
 - ✓ Complete beamline roadmapping
 - ✓ SAC Meeting Nov. 9-10
 - ✓ Complete Lattice/RF analyses and selection
- December
 - ✓ ESAC Meeting Dec. 1-2
 - ✓ Mini-MAC Meeting Dec. 14-15
 - ✓ Issue Enhancements call for proposals (due Feb 3)
- January
 - Begin follow-up prelim design reviews (as needed)
- February
 - Evaluate Enhancements
 - Begin full internal EVMS
 - Work plan based on funding profile
- March
 - Complete ES&H/QA doc updates
 - Specification/interface docs
 - DOE mini-review
 - Enhancements Prioritization (Mar 21)
- April
 - (workshops)
- May
 - Finalize Draft PDR
- June
 - MAC/ESAC reviews
- July
 - Director's Review
 - Finalize documents for DOE Review
- August / September
 - DOE Review

Upcoming Meetings and Events

- Upcoming Workshops
 - Beamline Preliminary Design Workshops
 - 3D Nano (Apr 14)
 - CHEX (Apr 24)
 - Polar (Apr 25)
 - InSitu/Ptycho (Apr 26,27)
 - HEXM (Apr 28)
 - ATOMIC (May 1)
 - XPCS (May 2)
 - CSSI (May 3)

Thank You!