APS Overview

George Srajer

Deputy Director, Advanced Photon Source

Deputy Associate Laboratory Director, Photon Sciences

March 16, 2016

The Advanced Photon Source is an Office of Science User Facility operated for the U.S. Department of Energy Office of Science by Argonne National Laboratory

Volunteering: The happiness effect

Helping others kindles happiness, as many studies have demonstrated. When researchers at the London School of Economics examined the relationship between volunteering and measures of happiness in a large group of American adults, they found the more people volunteered, the happier they were, according to a study in Social Science and Medicine. Compared with people who never volunteered, the odds of being “very happy” rose 7% among those who volunteer monthly and 12% for people who volunteer every two to four weeks. Among weekly volunteers, 16% felt very happy—a hike in happiness comparable to having an income of $75,000–$100,000 versus $20,000, say the researchers.

Adapted with permission from
Simple Changes, Big Rewards: A Practical, Easy Guide for Healthy, Happy Living, a special health report published by Harvard Health Publications.

2016 Argonne Open House
Saturday, May 21, 2016, 9 am to 4 pm

- Join us in representing the APS to the ~14,000 visitors who will come to see our facility
- Volunteer to act as a tour guide or answer questions on the visitors' viewing gallery
- Volunteers can work as many hours as they'd like*
- In addition to interacting with an enthusiastic and interested public, perks include donuts and coffee, a special APS tour-guide t-shirt, and maybe some kind of headgear from CEPA (not sure yet).
- **Contact your Division's 2016 Open House Co-chair:**

  AES: Jeff Toeller jtoeller@anl.gov

  ASD: Al Hillman hillmana@aps.anl.gov

  XSD: Volker Rose vrose@aps.anl.gov

Agenda

- Pacesetters and Service Awards
- Safety
- Organization and Funding
- User Program and Machine Status
- Science Advisory Committee Meeting
- Highlights

Pacesetters and Service Awards

RF1 Matching Transformer Failure – December 20, 2015

- Insulation failure caused 13.2kV phase-to-phase and phase-to-ground faults
- The resulting fire destroyed the transformer and enclosure
- Storage ring beam operation recovered in 3 hours, 45 minutes

RF1 Recovery Plan

- Transformer replaced with on-hand spare
- New enclosure rush-ordered from vendor
- Installation of new components completed

NEW TRANSFORMER INSTALLATION – Feb 1st, 2016

Corrective Actions:

- Implement improved remote monitoring of transformer temperatures and status
- Implement continuous heating of transformer enclosures
- More frequent visual inspections and electrical testing on all matching transformers
- Begin routine ultrasonic corona testing of all matching transformers

Pacesetter Award:

Joshua Abraham (FMS), Michael Douell, Bruce Epperson, Douglas Horan, Mark Moser, David Meyer, Gian Trento (all ASD-RF)

L. to r.: Joshua Abraham, Michael Douell, Bruce Epperson, Douglas Horan, Mark Moser, David Meyer, Gian Trento

This award is presented in recognition of Extraordinary Effort and due diligence in the investigation and recovery of the APS 352-MHz rf system (RF1) matching transformer failure and resulting fire on December 20, 2015. Their tireless work to establish normal systems operation within a few hours of the incident allowed users' operations to recommence.

Pacesetter Award:

Steven Davey (AES-ADM), Linda DeVito (AES-ADM), Anita Garcia (ASD-ADM), Jude Kitching (XSD-ADM), & Diane Kurtz (XSD-ADM)

L. to r.: Linda DeVito, Anita Garcia, Jude Kitching, Diane Kurtz. Inset: Steven Davey

In recognition of initiative, diligence, comprehensive knowledge, and Extraordinary Effort in bringing the APS into compliance with the DOE Public Access Plan of 2014 and in meeting PEMPs 1-3 regarding "close[ing] the gap between publications attributed to Argonne and those that have gone through the review process."

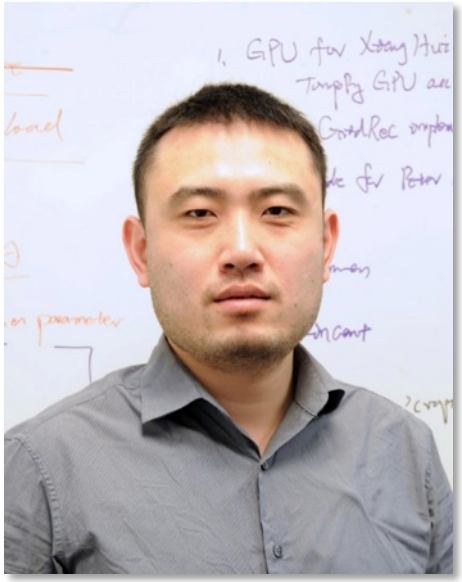
Pacesetter Award:

Diego Casa (XSD-IXN), Jung Ho Kim (XSD-IXN), Jeffrey Kirchman (XSD-BC), Richard Krakora (XSD-IXN), Timothy Roberts (XSD-IXN), Mary Upton (XSD-IXN)

L. to r.: Diego Casa, Jung Ho Kim, Jeffrey Kirchman, Richard Krakora, Timothy Roberts, Mary Upton

In recognition of the Extraordinary Effort involving relocation of a large spectrometer and extensive associated instrumentation, and the implementation and commissioning of the new RIXS beamline in APS Sector 27, for general user operation, in a timely fashion.

Pacesetter Award:
Ke Yue (XSD-SDM)



Ke Yue

In recognition of Extraordinary Innovation involved in the implementation of the Laue diffraction depth reconstruction data on the modern GPGPU using the CUDA programming language, specifically for increasing the performance of the Laue diffraction depth reconstruction data analysis algorithm, ten-fold at beamline 34-ID of the APS.

Thirty-Five-Year Service Award

Congratulations to the following individuals for 35 years of dedicated service to Argonne National Laboratory (2016):

Debbie Curry (AES-MOM)

Pat Den Hartog (AES-MED)

Twenty-Five-Year Service Award

Congratulations to the following individuals for 25 Years of dedicated service to Argonne National Laboratory (2016):

Michael Borland (ASD-ADM)
Mark S. Engbretson (XSD-BC)
Al Hillman (ASD-PS)
Michelle Leighton (AES-IS)
Grace Lynch (ASD-ADM)
Christopher Piatak (XSD-DET)
Anthony Pietryla (AES-CTL)
George Srajer (PSC-PA)
James Stevens (AES-CTL)
John Weizeorick (XSD-DET)
Shenglan Xu (XSD-MX)

Safety

Safety

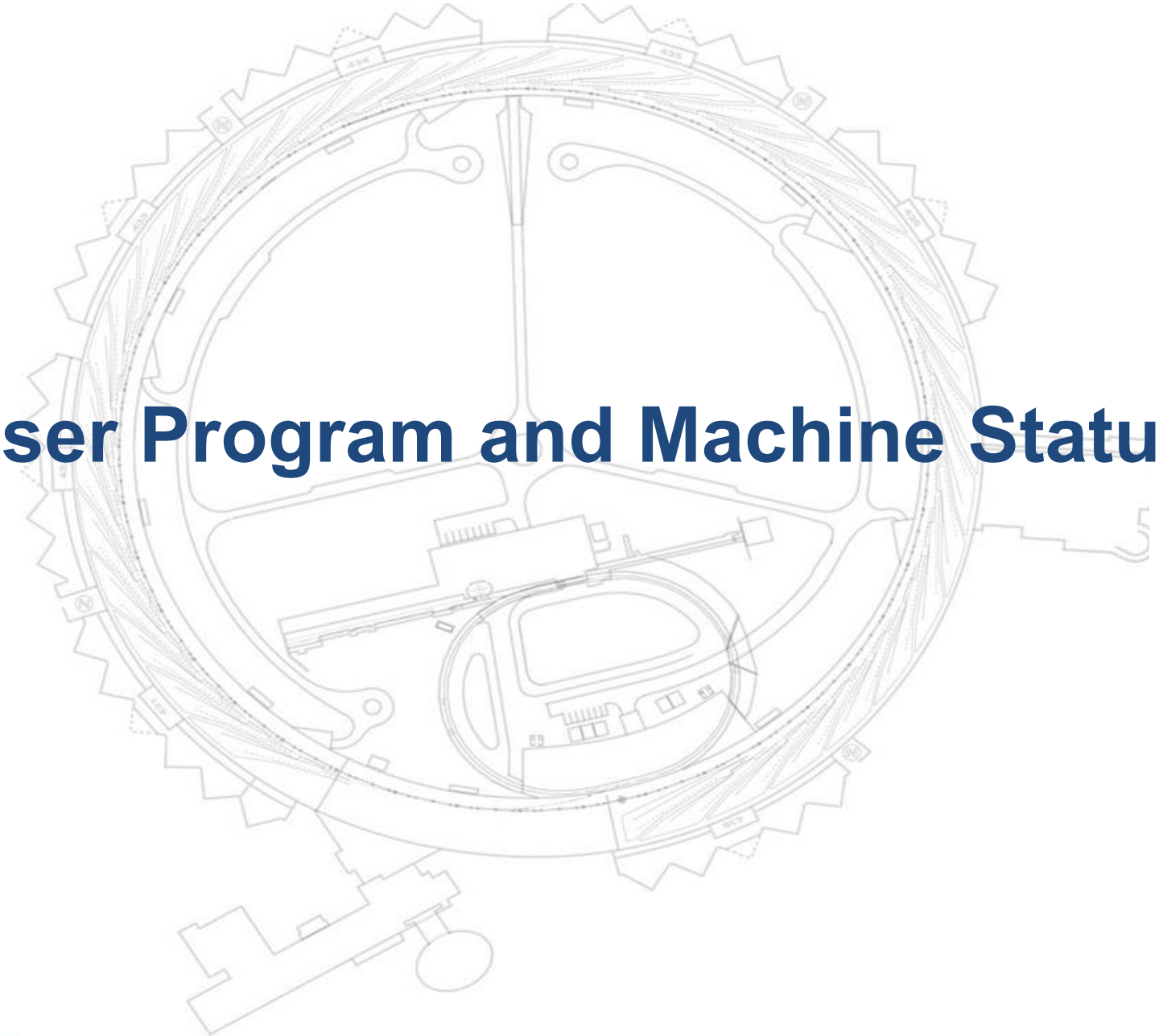
- **Slips and Falls**
  - Employee turned ankle on Jan 19, 2016, while in another employee's office
  - Three slips on ice so far in March 2016 resulting in a fractured knee and elbow for two individuals.

- **Transformer fire occurred on 12/20/2015 resulting in beam loss**
  - ORPS reportable due to time taken to extinguish from start of firefighting
  - Destroyed transformer and cabinet replaced, spares on order

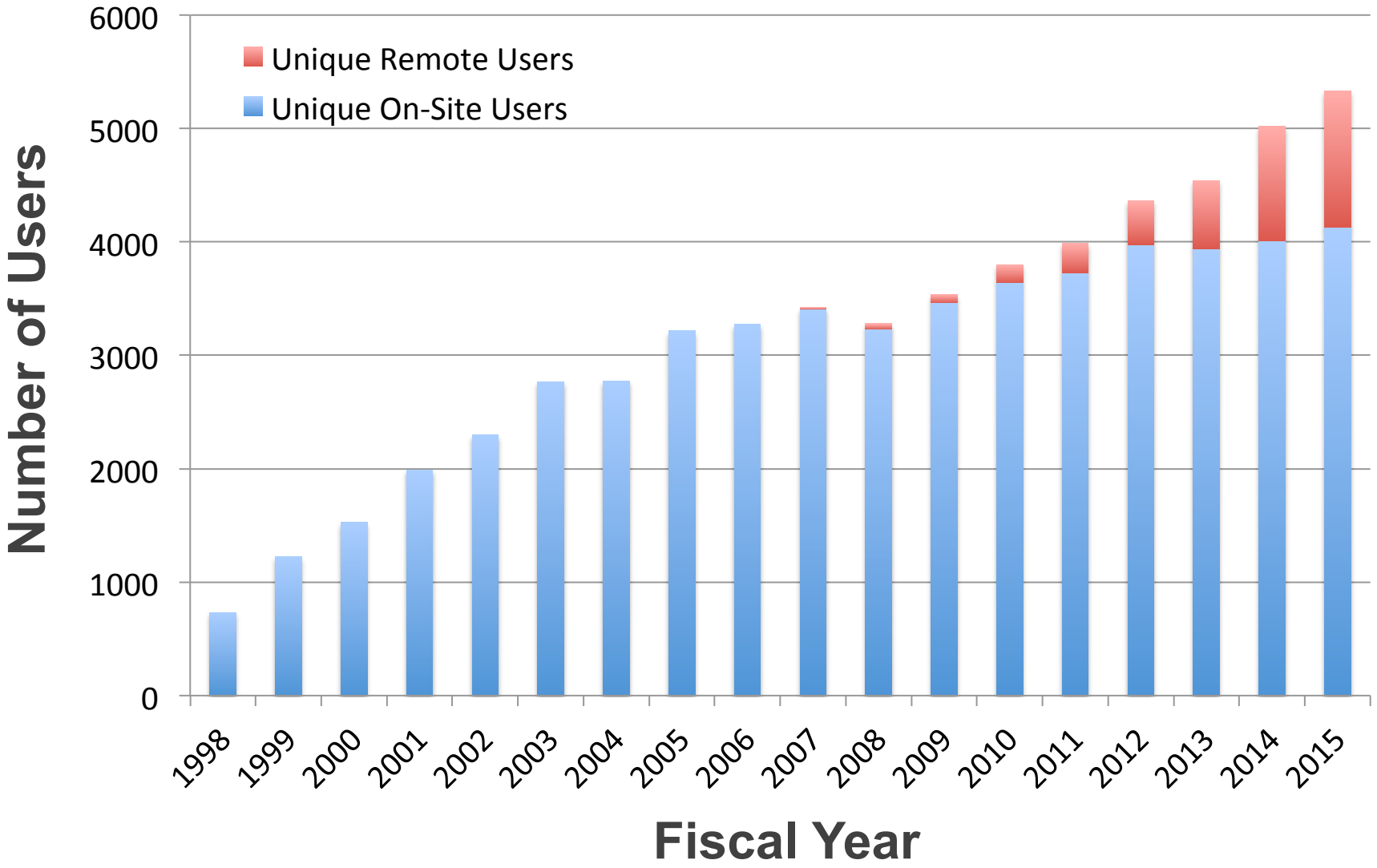
- **DOE-OE will be at Argonne during the first week of April to investigate a near finger amputation which occurred in Central Shops last year**
  - All machine shops and machine tools are being inspected for proper guarding
  - APS training and qualification requirements for users of the LOM machine shops is being looked at as a possible model for Argonne

- **Opportunity:** New project in collaboration with ESQ to request a Richardson waste exemption and apply for Authorized Limits for radiological samples

User Program and Machine Status



User Program



*FY14-15 include mail-in users in the unique remote users category

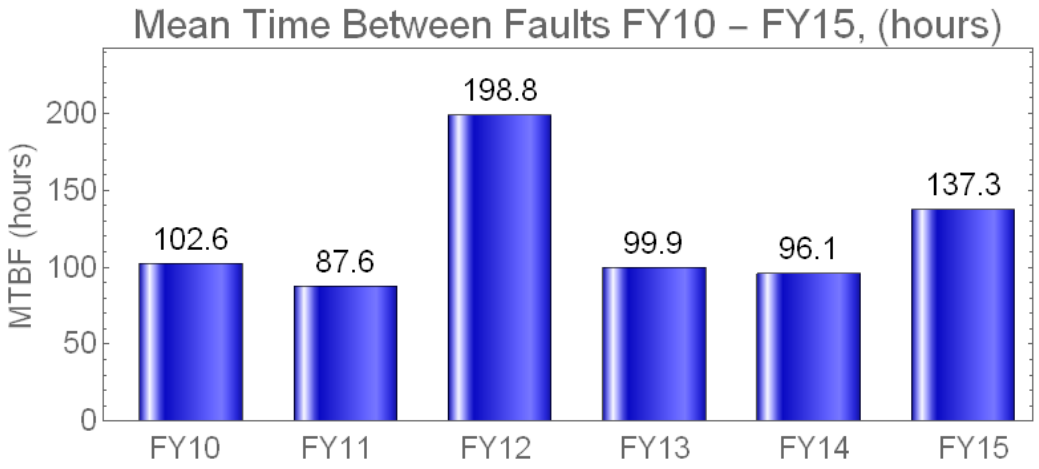
Accelerator Operations Status 2016-1
As of March 15, 2016 10:00

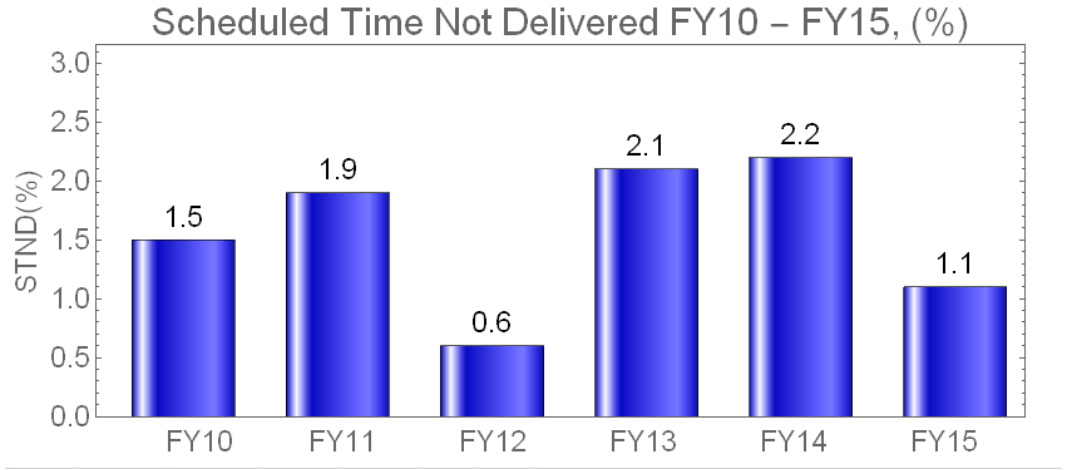
- Run 2016-1, started February 2, 2016 at 0800:

Total Amount of User Time	862.9 Hours
Delivered Beam	854.4 Hours
Percentage of Scheduled Time	99.0 %
Mean Time Between Faults (MTBF)	142.4 Hours
Downtime During Period	8.5 Hours
Mean Fill Duration in Period	122.0 Hours
Faults per Day of Delivered Beam	0.17
Total Number of Faults	6

- Overall: smooth run for the most part

Accelerator Reliability and Availability





Four best-ever results were achieved in the last six years

March 2016 Scientific Advisory Committee

Charge: To assist the APS in making decisions on the on-going operation of the APS, our current and future scientific programs, and the APS Upgrade

1. XSD Strategic Plan

2. Beamline Enhancement Planning Progress

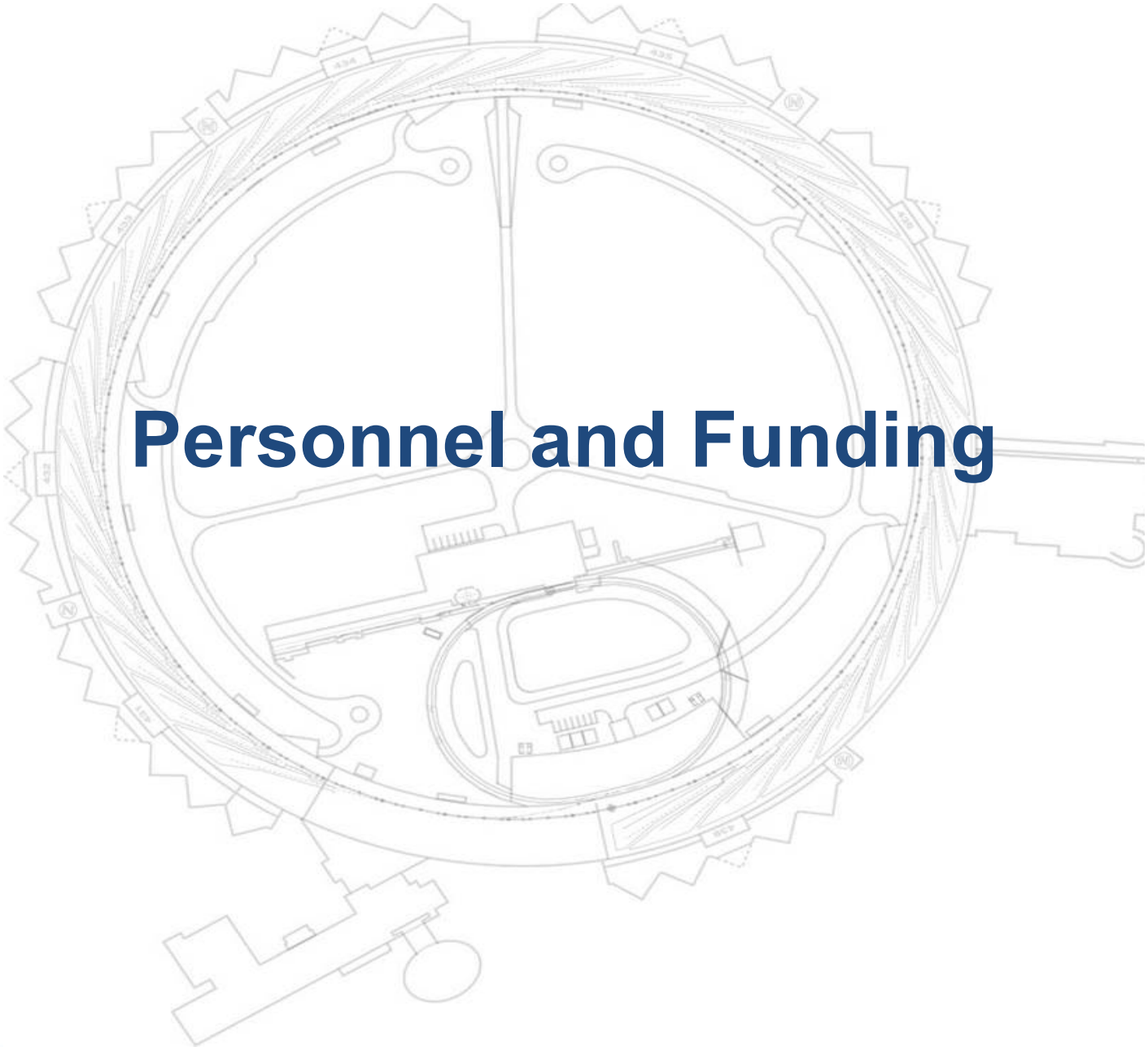
3. Down-Selected White Paper Portfolio for APS-U Project Beamlines

4. Beamline Plans

5. Beamline Reviews

- Final reports: XSD Magnetic Materials, Time-Resolved, Materials Physics & Engineering, Chem. & Materials Science, and Spectroscopy groups.
- Appointment of Chairs for November reviews: Surface Science & Microdiffraction, Structural Science, Inelastic & Nuclear Resonant Scattering

Personnel and Funding



XSD Division Director Search Status

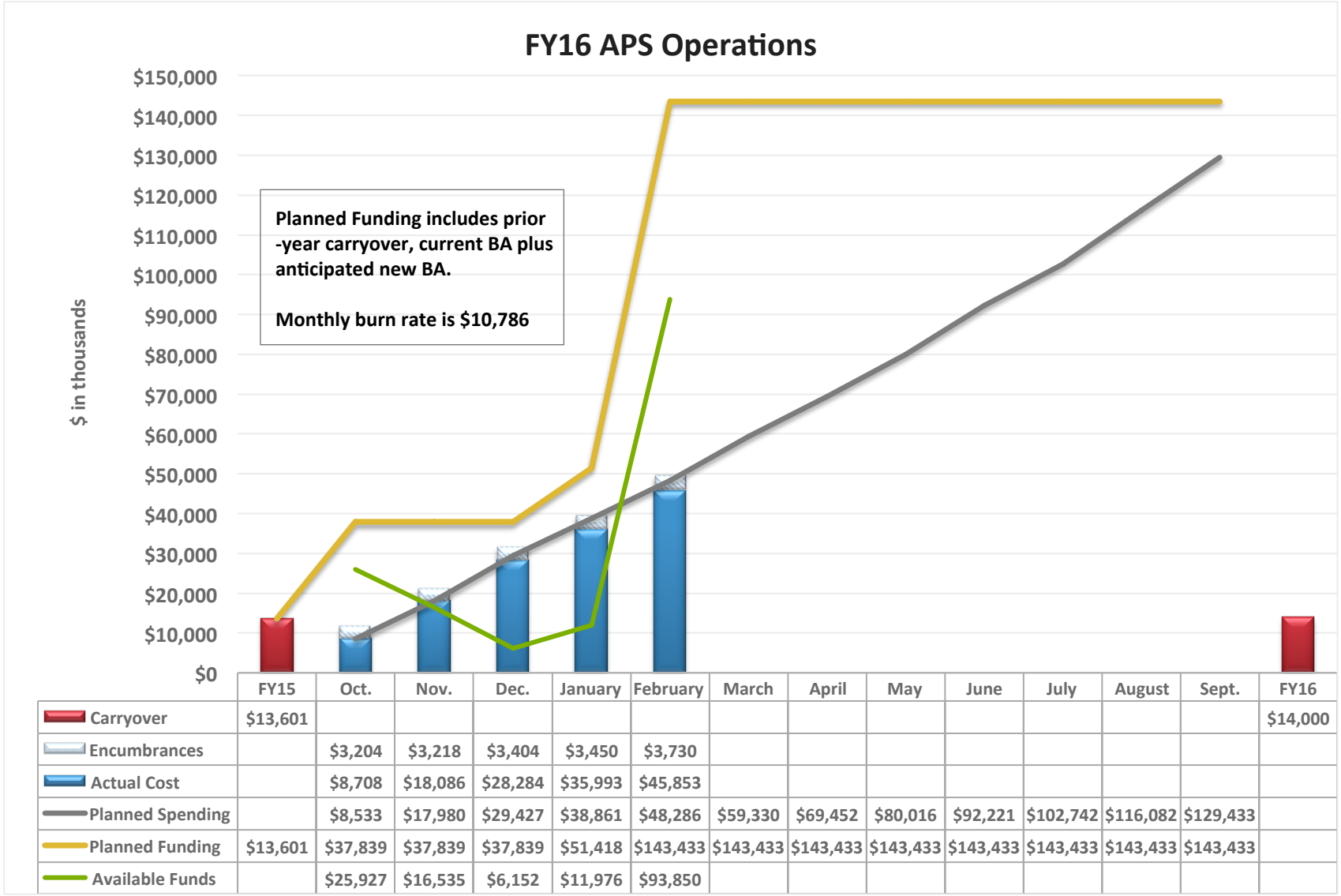
- Search Committee working hard
- Preparing to have initial on-site interviews with down-selected candidates

New AES Division Director: John Connolly

- Started March 14, 2016
- 15-year professional engineering career at Westinghouse Electric, LLC
  - Global Operations, Planning, R&D and Product Director (Global Fuel Engineering & Product Management)
  - Recipient of two George Westinghouse Signature Awards of Excellence
  - Alumnus of Westinghouse's highly-selective Six Sigma and Lean Manufacturing Black Belt program
- University of Pittsburgh, Bachelor of Science in Mechanical Engineering
- Duquesne University, MBA

Many many thanks to John Maclean!!

APS Operations - FY16 Planned vs Actual Spending



	FY15	Oct.	Nov.	Dec.	January	February	March	April	May	June	July	August	Sept.	FY16
Carryover	$13,601													$14,000
Encumbrances		$3,204	$3,218	$3,404	$3,450	$3,730								
Actual Cost		$8,708	$18,086	$28,284	$35,993	$45,853								
Planned Spending		$8,533	$17,980	$29,427	$38,861	$48,286	$59,330	$69,452	$80,016	$92,221	$102,742	$116,082	$129,433	
Planned Funding	$13,601	$37,839	$37,839	$37,839	$51,418	$143,433	$143,433	$143,433	$143,433	$143,433	$143,433	$143,433	$143,433	
Available Funds		$25,927	$16,535	$6,152	$11,976	$93,850								

APS Operations Integrated Planning

Divisions maintain 5-yr. internal plan including all proposed projects

→

Divisions funding request (preliminary cost/ scope/schedule for projects)

→

APS Senior Management creates annual funding plan

→

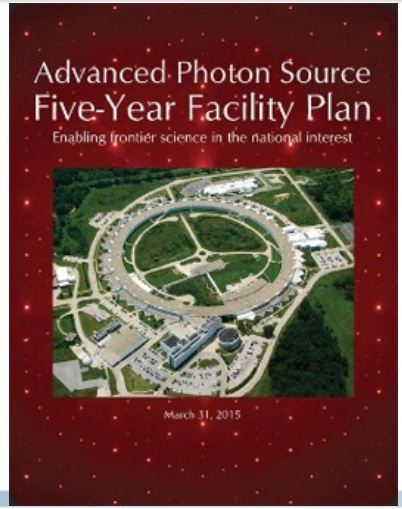
Divisions execute

↑

Guided by Facility Plan/Strategy

↕

Resource Evaluation Group

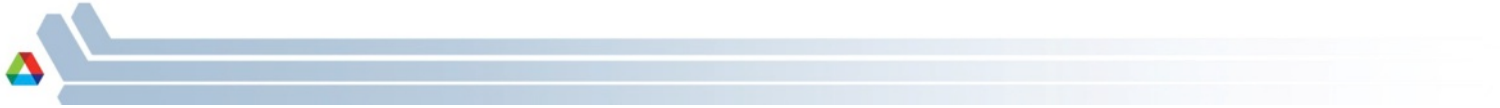


FY16 Budget: Received President's Budget Request

- Approved budget of **$130.4M** includes:
  - Operating funding of **$129.8M** (includes APS operations hiring plan)
  - $240K for APS 3D Detector, $60K for Megapixel Detector for Fermi Lab and $300K for CAMERA at LBNL

- **$9.68M** available in FY16 for equipment, projects & non-recurring M&S (incl. overheads)
  - $2.37M for commitments from FY16
    - LN_2 purge piping, SCU0 upgrade, 500W SS amplifier, IXN chopper, GMCA detector contrib.,…
  - $500K reserved for contingency
  - $300K ($100K/Division) discretionary funding for small items
  - $2.435M for Machine
    - Linac S-band klystron spare, redundant server for accel. operations, transformer spare, ….
  - $2.291M for Beamlines
    - Detectors, 6-ID FE, cant 2-ID, modify 4-ID cant, optics for 6-ID-B/C, 20-ID K-B mirror system,…
  - $1.783M for Facility
    - 100GBit/sec network mods, business systems server replacements, Victolic gasket repairs, …

- Start procurement process on CdTe PAD for high-energy beamlines
- Approx. $2.5M mortgage on FY17, about the usual number



Highlights

IEX Beamline Opens for Business

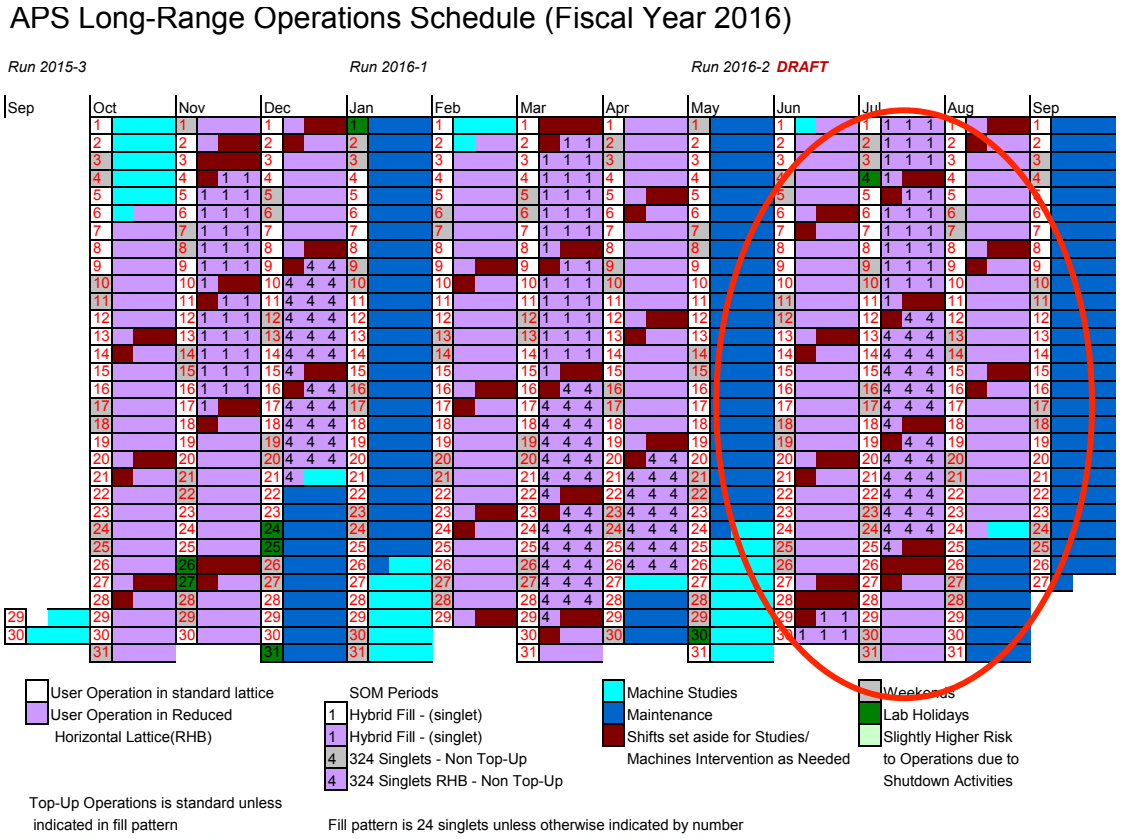
- First general user runs January 2016
- Intermediate energy (250 to 2500 eV) for scattering and electron spectroscopy
- Anomalous and resonant scattering (soft x-ray)
- X-ray photoemission spectroscopy
- Electromagnetic Variable Polarizing Undulator for circularly polarized light
- 2 end-stations:
  - Angle-resolved photoemission spectroscopy (ARPES)
  - 6-axis goniometer, 5.5-300K
  - Resonant soft x-ray scattering (RSXS)
  - Unique in-vacuum Kappa geometry diffractometer w/ variable temperature cryostat (T = 20-300K)

LED Lighting Coming to the Experiment Hall

- A study done with FMS ~2 years ago to examine the economics of installing LED lighting in the experiment hall determined the only feasible solution included replacing all the light fixtures. This was cost prohibitive and we decided to wait until better products came to market.
- Screw in replacement now available. No need to change fixtures.
- Last 2.5 times longer than current HID lamps.
- Use 50% less energy for similar light output.
- Promise better light quality.
- One sector of the experiment hall (empty sector) will be converted for a 6 month trial.
- If acceptable to stakeholders, we can then go ahead with the rest of the Hall.

Machine Study Day Will Move to Monday in 2016-2

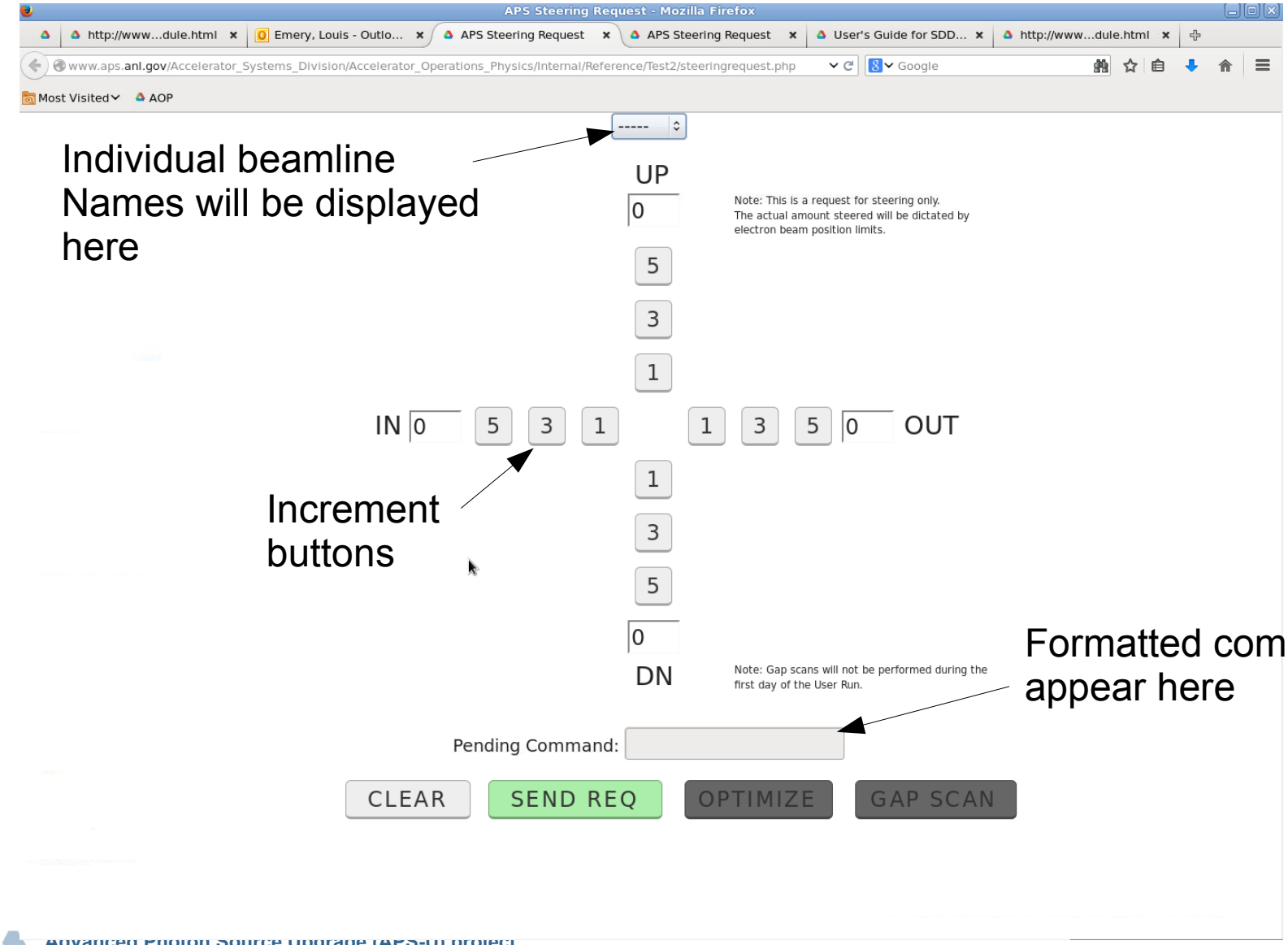
- APSUO Steering Committee made a request in October 2015 to consider changing the standard machine study day from Tuesday to Monday
- Motivation: decrease experiment changeovers during weekends
- Operations Directorate surveyed ALL beamlines, ASD and AES staff
- Based on responses, Operations Directorate made a decision to implement the change starting with 2016-2 User Run



Automated Steering Request Program Status

- Starting February 2 expanded to ALL sectors
  - Feedback at the Technical Working Group Meeting on January 21 was very positive
  - Introduced automated steering request web pages
- Significant accomplishment: user-programmed steering without the intermediary of floor coordinators and main control room operators

User Friendly Steering Request Web Page



Steering Request Status Page

What operators see.

Operators need to acknowledge by clicking the check button.

After operator acknowledge and produce an estimate of time.


Here’s to continued
excellence in FY16!