

# PSC ALL-HANDS MEETING APRIL 15, 2020



**STEPHEN STREIFFER**

Director, Advanced Photon Source

Associate Laboratory Director, Photon Sciences

# AGENDA

- **PSC Update** – Stephen Streiffer
  - Safety
  - Current Ops Status and Outlook
  - Budget
  - User Office Update
  - Highlights
  - PSC Impact & Service Awards
- **APS Upgrade Update** – Bob Hettel



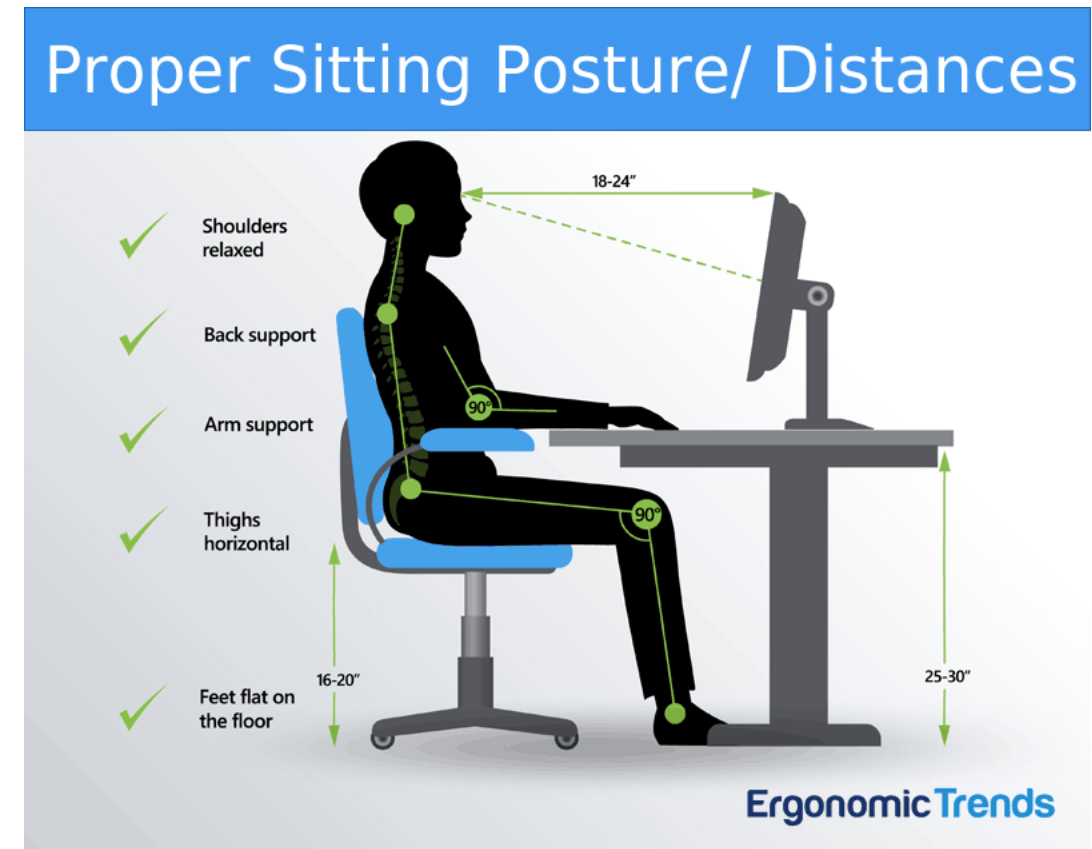
To keep up with the latest APS news & research: [www.aps.anl.gov](http://www.aps.anl.gov)



# SAFETY

## ▪ Telecommuting Safety

- General Workspace: Floors clear and free from phone line, cables, electrical cords, etc.
- Fire Safety: Working smoke and carbon monoxide detectors in or near your workspace
- Electrical Safety: Sufficient outlets or power strips equipped with circuit breakers
- Computer Workstations: Apply ergonomic self-assessment [checklist](#) and [ergonomics techniques](#)
  - Virtual ergonomics evaluations available by completing [ANL-9D](#) via XINK.
- Breaks and Stretching Sessions: HEW physical therapy lead two sessions on BlueJeans each weekday, [10:30 a.m.](#) and [2:30 p.m.](#)



# SAFETY

- Do not come onsite unless required, minimize time on site for task completion, eliminate or minimize time in contact with others while on site
- If you are sick or suspect you are sick, no matter the illness, stay home
- On-Site Safety
  - Bring your own cloth face covering as recommended on the CDC web site
  - Keep more than six feet away from another person, use face masks when social distancing isn't possible
  - Frequently wash hands with soap and water (or alcohol-based sanitizer) for at least 20 seconds
  - Avoid touching your face, especially with unwashed hands
  - Avoid touching common surfaces (door handles, elevator buttons, etc.) with your bare hands
  - Clean and disinfect frequently touched objects and surfaces in your workspace
- ANL COVID-19 Resources
  - FAQ: <https://my.anl.gov/article/covid19coronavirus-faq>
  - Argonne's 24x7 COVID-19 Question Line at 1-630-252-2555
  - Argonne Cares: A community of support
    - [Argonne Cares on Teams](#)
    - Email ideas to [ArgonneCares@anl.gov](mailto:ArgonneCares@anl.gov)

# SAFETY

## Working Within COVID-19 Guidelines

- ESHQ memo from April 3 includes a graded approach for safe work in the current environment
  - *Level 1 Protection: Safe Work Practices*, as applicable to all work on the Argonne
    - Symptom monitoring, respiratory etiquette, wash hands for 20 seconds before and after all work activities, no touching face, etc.
  - *Level 2 Protection: Additional safe work practices*, based on specifics of work activity
    - Assists with meeting Level 1 Protection
    - Mark floors to ensure proper spacing, no shared PPE, staggered work shifts or alternating work schedules, etc.
  - *Level 3 Protection: Additional safe work practices*, when Level 1 and 2 are not possible
    - Disinfect shared PPE after each use, wear nitrile gloves while handling shared tools or carefully clean and disinfect all potential handling surfaces
  - *Level 4 Protection: Task review* by ESH / WSH, HEW, and supervisor for recommendations on safest method of implementation



# WORKING WITHIN COVID-19 GUIDELINES



APS-U magnet inspection and test in Bldg 369. Photo courtesy of Ralph Bechtold, Jim Kerby

# SAFETY

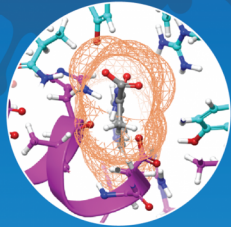
## Working Within COVID-19 Guidelines

- Note: recent Lab memo includes process for retrieving minor items from workplace
  - Limited to minor office items, not office furniture or large items
  - Work through bldg. manager for retrieval
  - Meeting point is Argonne Info Center, so that site access is not required
  - Vector ticket process is now available for these requests
  
- If at all possible, make a sincere effort to work productively from home
  - After this is all over, I hope you can look back and feel that you spent this time working creatively, and be proud of what you accomplished



# Argonne and the Dept. of Energy complex are part of the solution

## HOW DOE AND OUR LABS ARE COMBATING COVID-19



**UNDERSTANDING THE STRUCTURE –**  
DOE scientists are studying the components of the virus so we can determine how to fight it.

### MODELING EPIDEMICS –

DOE scientists use previous experience they gained modeling Smallpox, Anthrax and Ebola spread to understand how COVID-19 might behave.



### SCREENING DRUGS –

Our supercomputers are allowing us to expedite testing, screen more than 8,000 drug compounds and found 77 have potential to fight against COVID-19... what took days on Summit would take months with a MacBook.

### COORDINATING AND EXPANDING ACCESS FOR COVID-19 RESEARCH –

DOE made a nationwide call to the scientific community to utilize our state-of-the-art facilities and technologies to understand and combat COVID-19 together.



**ENERGY.GOV**

## Structural Biology Resources at DOE Light Sources



[Home](#) [DOE Basic Energy Sciences](#) [BER Structural Bio Resources](#)

### Enabling COVID-19 Research

In light of the rapidly changing situation world-wide resulting from the COVID-19 virus, the Department of Energy Basic Energy Sciences light sources want to ensure they are doing everything possible to enable research into this virus and the search for an effective vaccine or other treatment. The DOE supports research into structural biology in partnership with the National Institutes of Health, and universities. This portal collects relevant structural biology resources in a single location, listing their basic characteristics and a point of contact for each.

Researchers who would like to use these resources should reach out to that point of contact. Depending on the number and nature of the requests, the facilities will make every effort to give the researchers priority access.

Researchers who are unsure of which resource is best suited to their needs should reach out to the facility contacts below to discuss their project.

### Facility Capabilities

Crystallography

Bio-SAXS

Cryo EM

Footprinting

Infrared

### DOE Light Sources: Details and Contacts



#### NLSLS-II

National Synchrotron Light Source II  
Brookhaven

Sean McSweeney  
✉ [Email Sean](#)

[Program website](#)

[Operations Schedule](#)



#### APS

Advanced Photon Source  
Argonne

Bob Fischetti  
✉ [Email Bob](#)

[Program website](#)

[Operations Schedule](#)



#### SSRL

Stanford Synchrotron Radiation Lightsource  
SLAC

Britt Hedman  
✉ [Email Britt](#)

[Program website](#)

[Operations Schedule \(PDF\)](#)



#### ALS

Advanced Light Source  
Lawrence Berkeley

Paul Adams  
✉ [Email Paul](#)

[Program website](#)

[Operations Schedule](#)



#### LCLS

Linac Coherent Light Source  
SLAC

Sebastien Boutet  
✉ [Email Sebastien](#)

[Program website](#)

[Operations Schedule](#)

See also: [BER Structural Biology and Imaging Resources at Synchrotron and Neutron Facilities](#)



# CORONAVIRUS RESEARCH AT THE APS

## Background

The SARS CoV-2 virus, which causes coronavirus disease 2019 (COVID-19), is composed of 27 or 28 unique proteins. There are 15 or 16 non-structural proteins (NSP) involved in replication, at least 4 structural proteins including the spike (S), envelop (E), membrane (M) and nucleocapsid (N), and accessor proteins.

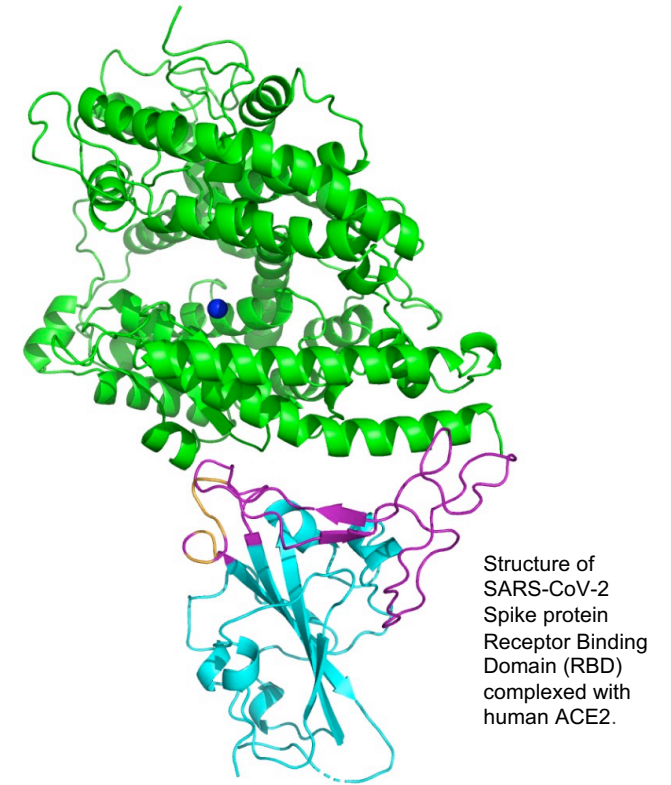
Researchers using APS beamlines have determined structures of NSP3, NSP5 (the main protease), NSP9, NSP15, NSP16/NSP10 complex, and the Spike protein with an antibody and bound to the cell surface receptor.

## Scientific Achievement

A total of 16 APS-derived structures of the 6 proteins with and without inhibitors or antibodies have been deposited in the Protein Data Bank (SBC-XSD 11, LS-CAT 3, GM/CA-XSD 1, and NE-CAT 1). These structures provide insights into drug development. Several groups are developing antiviral drugs targeting the two proteases which are involved in replication while others are focusing on antivirals or antibodies to prevent the Spike protein from attaching to and infecting a cell.

## Research Details

More than 24 groups have used or are scheduled to use APS beamlines for COVID-19 research. The Center for Structural Genomics of Infectious Diseases has labs at Northwestern U. (K. Satchell), Argonne (A. Joachimiak), Purdue U. (A. Mesecar) working on COVID-19 research. Several groups are collecting proprietary data including pharmaceutical companies at IMCA-CAT.

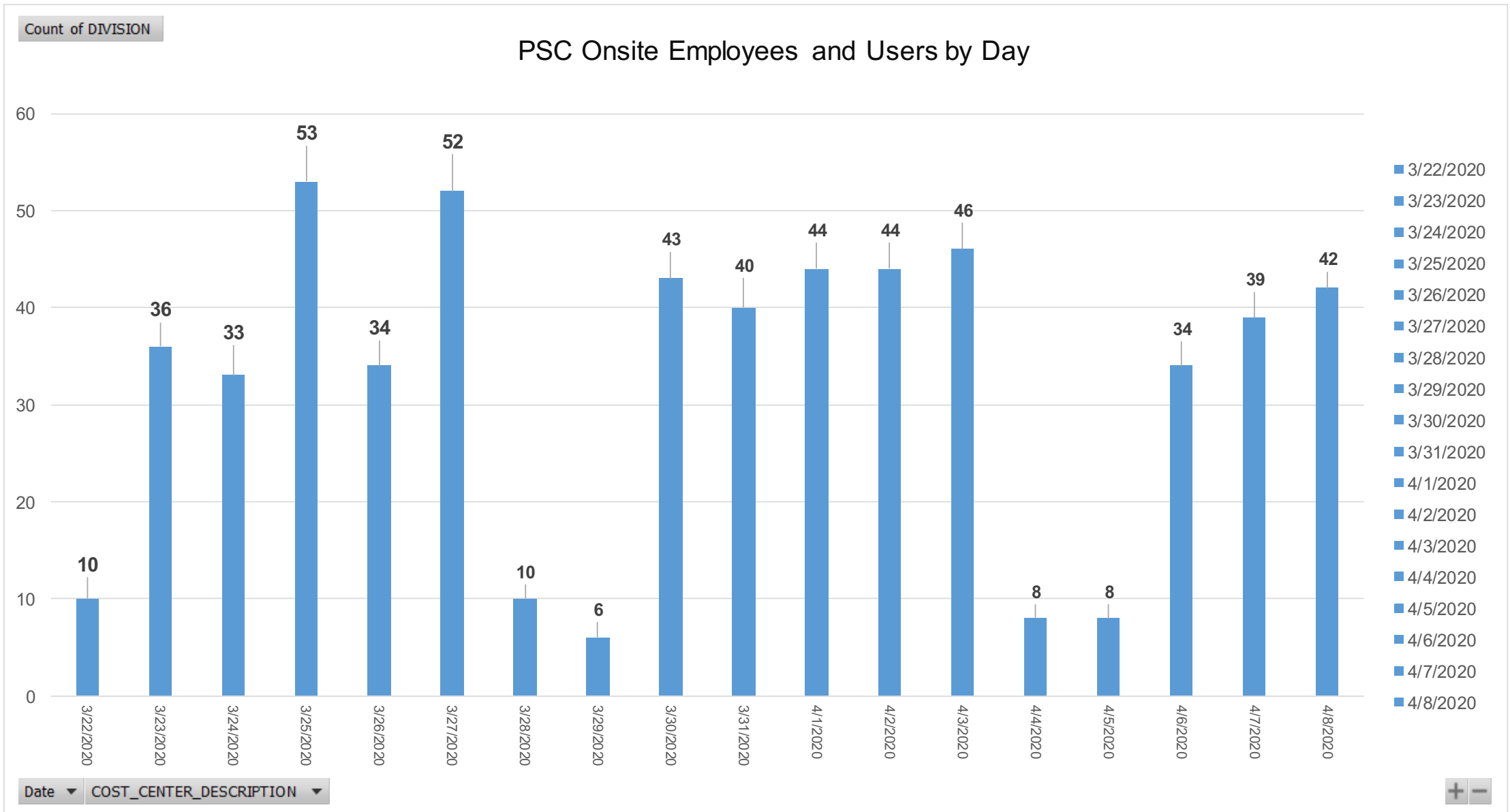


Two groups published the Spike protein structure.

NE-CAT: Shang, J., Ye, G., Shi, K. *et al.* Structural basis of receptor recognition by SARS CoV-2. *Nature* (2020). <https://doi.org/10.1038/s41586-020-2179-y>

GM/CA-XSD: Yuan, M., Wu, N.,C., Zhu, X., Lee, C-C., D., So, R., T., Y., Lv, H., Chris K. P. Mok, C., K. P., Wilson, I., A. A highly conserved cryptic epitope in the receptor-binding domains of SARS-CoV-2 and SARS-CoV. *Science* (2020): eabb7269 DOI: 10.1126/science.abb7269

# APS MOVE TO MINIMUM SAFE OPERATIONS



# 2020 USER MEETING

- Banquet at the Monte Bello Estate in Lemont on Monday
- Poster Session on Tuesday, including student poster prizes
- Large exhibitor show Monday-Wednesday
- Awards: Rosalind Franklin Young Investigator Award and Gopal K. Shenoy Excellence in Beamline Science Award
- Student travel support available

## Workshops & Satellites (SAT)

- **APS:** Advanced Spectroscopy Probes to Investigate Matter Under Extreme Conditions
- **CNM:** Hybrid Quantum Systems
- **APS:** Biological Studies Via X-ray Fluorescence and Ptychography
- **APS/CNM:** Autonomous Control of Experiments in the Laboratory of the Future
- **APS/CNM:** Advances in Phase Retrieval Methods for X-ray Imaging
- **APS:** Multi-Modal X-ray Techniques for Emulsion Characterization
- **CNM:** Artificial Intelligence for Autonomous Experimentation
- **SAT A:** Beyond R<sub>g</sub>: BioSAXS Software
- **SAT B:** TBD
- **SAT C:** SAXS Software
- **SAT D:** X-ray Ptychography
- **SAT E:** Data Analysis School for X-ray Scattering from Liquid Interfaces
- **SAT F:** Macromolecular Synchrotron Data Collection Workshop @ LS-CAT

Cancelled



Argonne  
NATIONAL LABORATORY

# 2020 PERFECT VISION

SCIENCE AT ARGONNE'S  
USER FACILITIES

## APS/CNM USERS MEETING

**APRIL 20 – 24, 2020**  
Argonne National Laboratory  
9700 South Cass Avenue, Lemont, Illinois 60439

### HIGHLIGHTS

- APS and CNM Scientific Workshops
- APS Satellite/ Training Courses
- CNM Short Courses
- Poster Session
- Student Travel Support Available
- Large Scientific Exhibitor Event
- SAXS Software Course
- Meeting Banquet

### SCIENTIFIC ORGANIZERS

**Carlo Segre**  
Illinois Institute of Technology  
Chair, APS User Organization Steering Committee

**Fan Zhang**  
National Institute of Standards and Technology  
Vice-Chair, APS User Organization Steering Committee

**Joshua Wood**  
Dynatrac, Inc.  
Chair, CNM Users Executive Committee

**Jacqueline Cole**  
University of Cambridge  
Vice-Chair, CNM Users Executive Committee

### DEADLINES

**February 3**  
Nominations for the Rosalind Franklin Award

**February 17**  
Nominations for the Gopal K. Shenoy Excellence in Beamline Science Award

**March 9**  
Poster Abstracts

**April 6**  
Lodging reservations for Argonne Guest House

**April 13**  
Registration

**REGISTER TO ATTEND**  
[www.anl.gov/register/usersmeeting2020](http://www.anl.gov/register/usersmeeting2020)

DOE  
ENERGY



JUNE 9-11, 2020

DOE-BES TRIENNIAL REVIEW OF ACTIVITIES AND RECOMMENDATIONS



U.S. DEPARTMENT OF  
**ENERGY**

Postponed until  
CY2021

your turn.



# MECHANICAL ENGINEERING & DESIGN

## ▪ MEDSI2020 conference preparation updates:

– The Local Organizing Committee for MEDSI2020 is finalizing arrangements for the conference in Chicago, Illinois, USA

– The MEDSI2020 Local Organizing Committee is postponing the conference due to the COVID-19 pandemic to assure the safety of attendees and staff. In conjunction with the International Organization of Mechanical Engineers (IOMEC), the committee has determined that the best course of action is to postpone the conference to protect the health of attendees and staff.

– At this time, the committee is working with conference organizers to determine future dates for the conference.

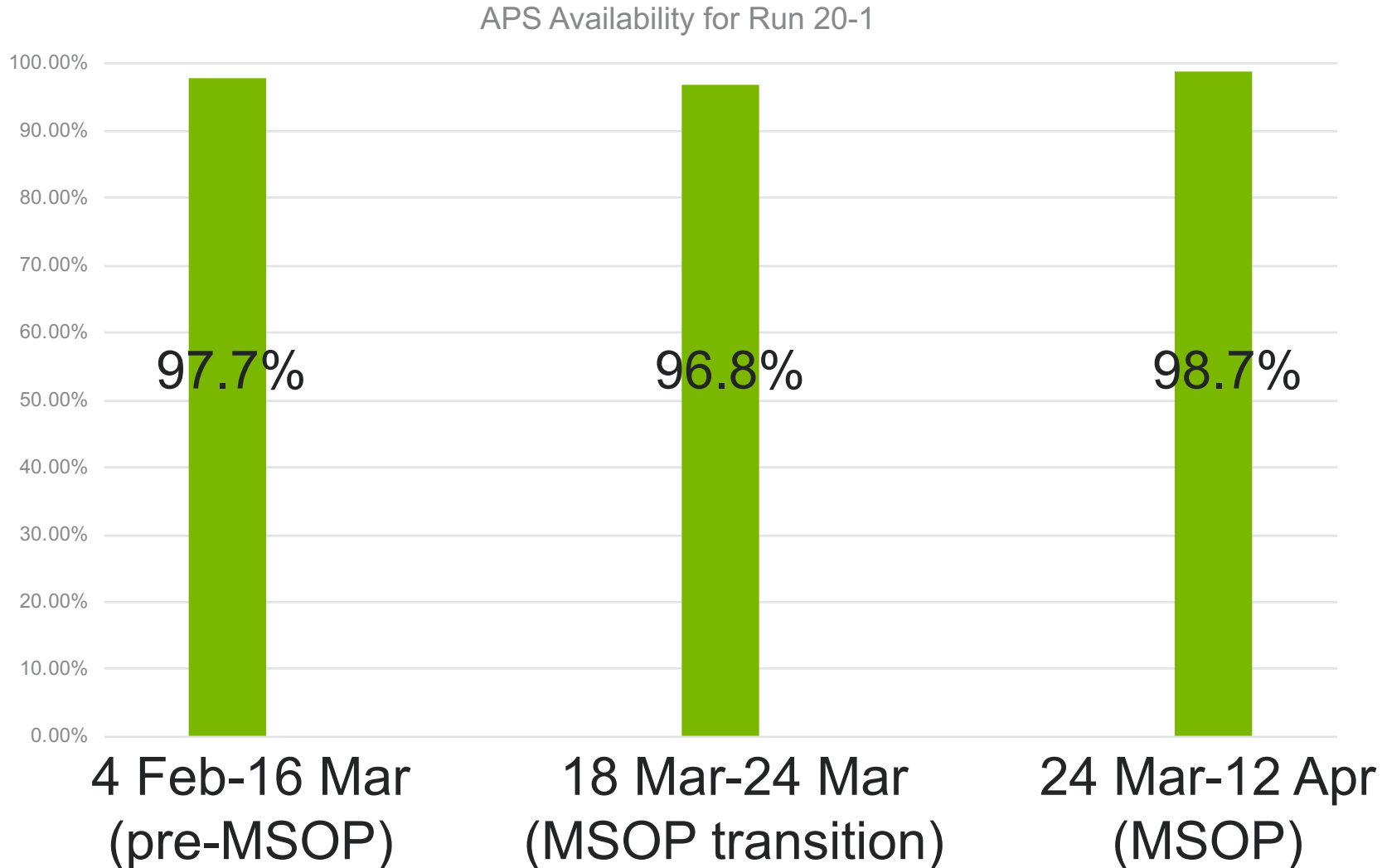
– The MEDSI2020 Local Organizing Committee is working with conference organizers to determine future dates for the conference. The committee is also reviewing legal options to terminate or reschedule previously signed contracts.

**Postponed until  
CY2021**



# OPERATION TO MSOP TRANSITION HAS BEEN EXCELLENT

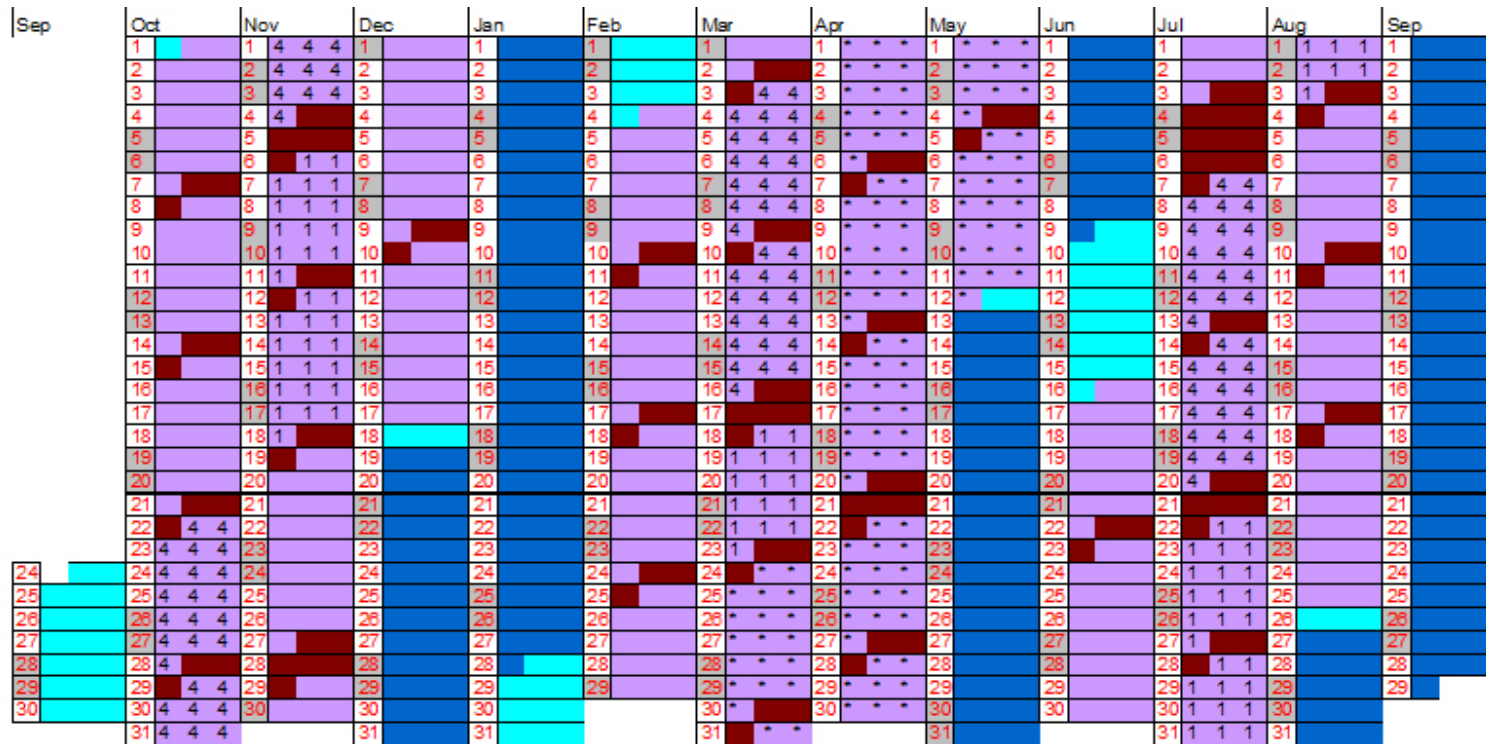
Switch to 324 bunch toptoff during MSOP has been very reliable



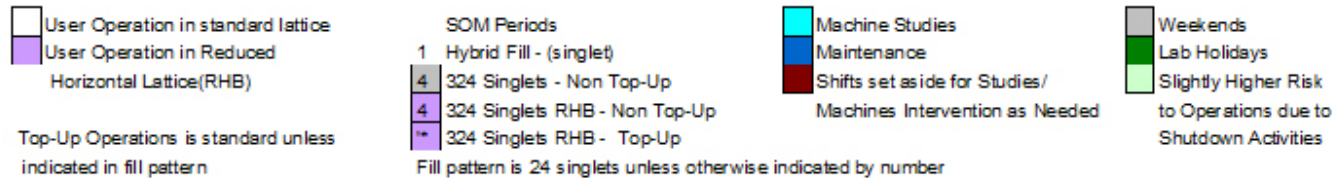
Thanks to everyone who helped make this possible, especially MCR operators!



# APS LONG-RANGE SCHEDULE



- Coordinating with NSLS-II, start of the 2020-2 shutdown moved by 2 weeks
- Currently Ops Directorate is assessing whether to cancel it altogether
- Exploring all options such as shorter shutdown later in the summer



## Breakdown of User Shifts by Fill Pattern

Number of 8-hour User Shifts

	24 Singlets - Top-Up	Hybrid Fill - Top-Up	324 Singlets - Non Top-Up	Total Shifts	Total Hours
2019-3	131	33	36	200	1600
2020-1	159	15	75	249	1992
2020-2	107	33	36	176	1408
<b>SUM</b>	<b>397</b>	<b>81</b>	<b>147</b>	<b>625</b>	<b>5000</b>

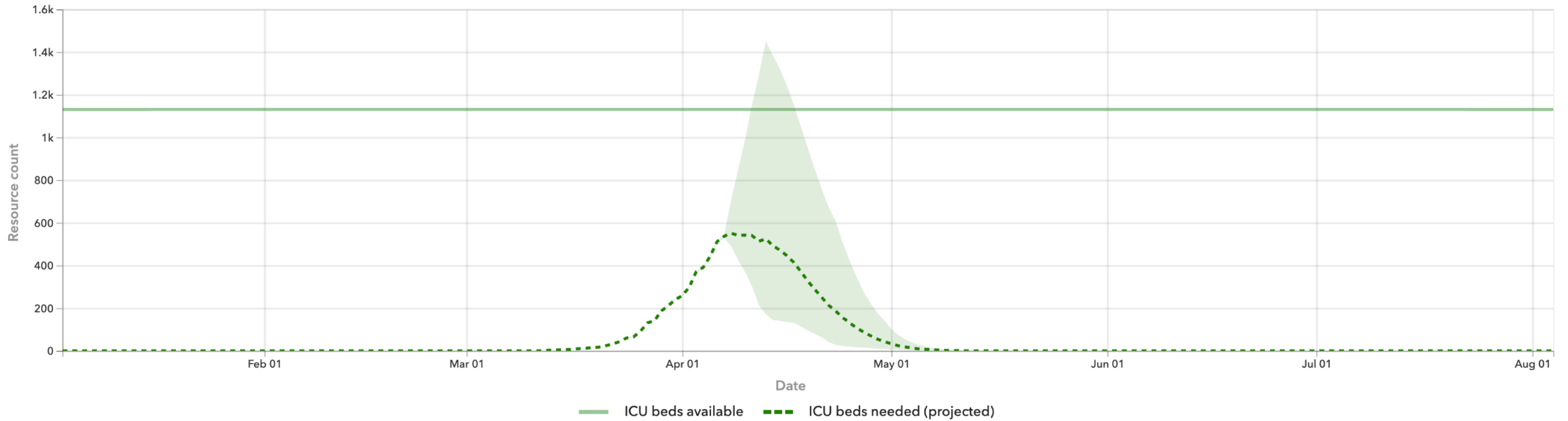
### Hospital resource use ⓘ

6 days since peak resource use on  
**April 8, 2020**

#### Resources needed for COVID-19 patients on peak date

All beds needed <b>2,416 beds</b>	→	All beds available <b>14,552 beds</b>	→	Bed Shortage <b>0 beds</b>
ICU beds needed <b>551 beds</b>	→	ICU beds available <b>1,131 beds</b>	→	ICU Bed Shortage <b>0 beds</b>
Invasive ventilators needed <b>502 ventilators</b>				

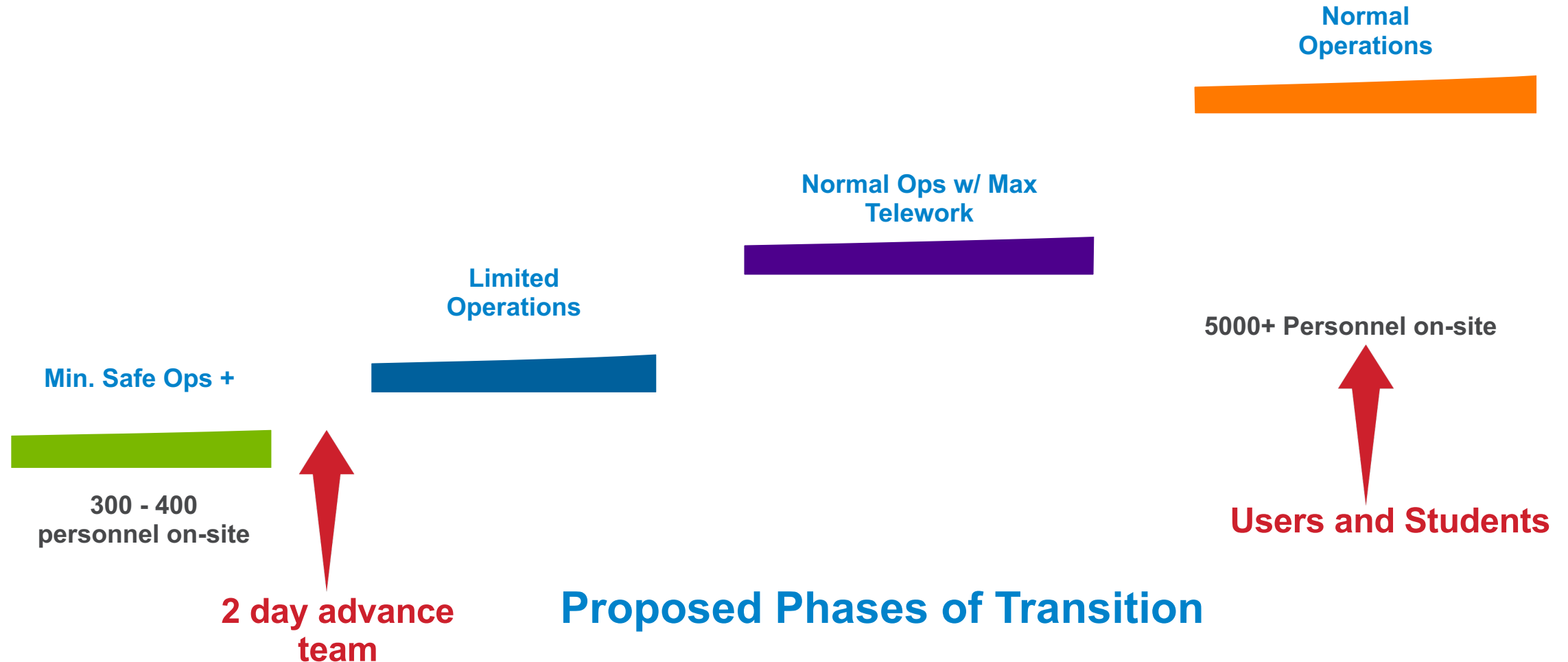
All resources All beds ICU beds Invasive ventilators



All resources specific to COVID-19 patients.  
Shaded area indicates uncertainty ⓘ

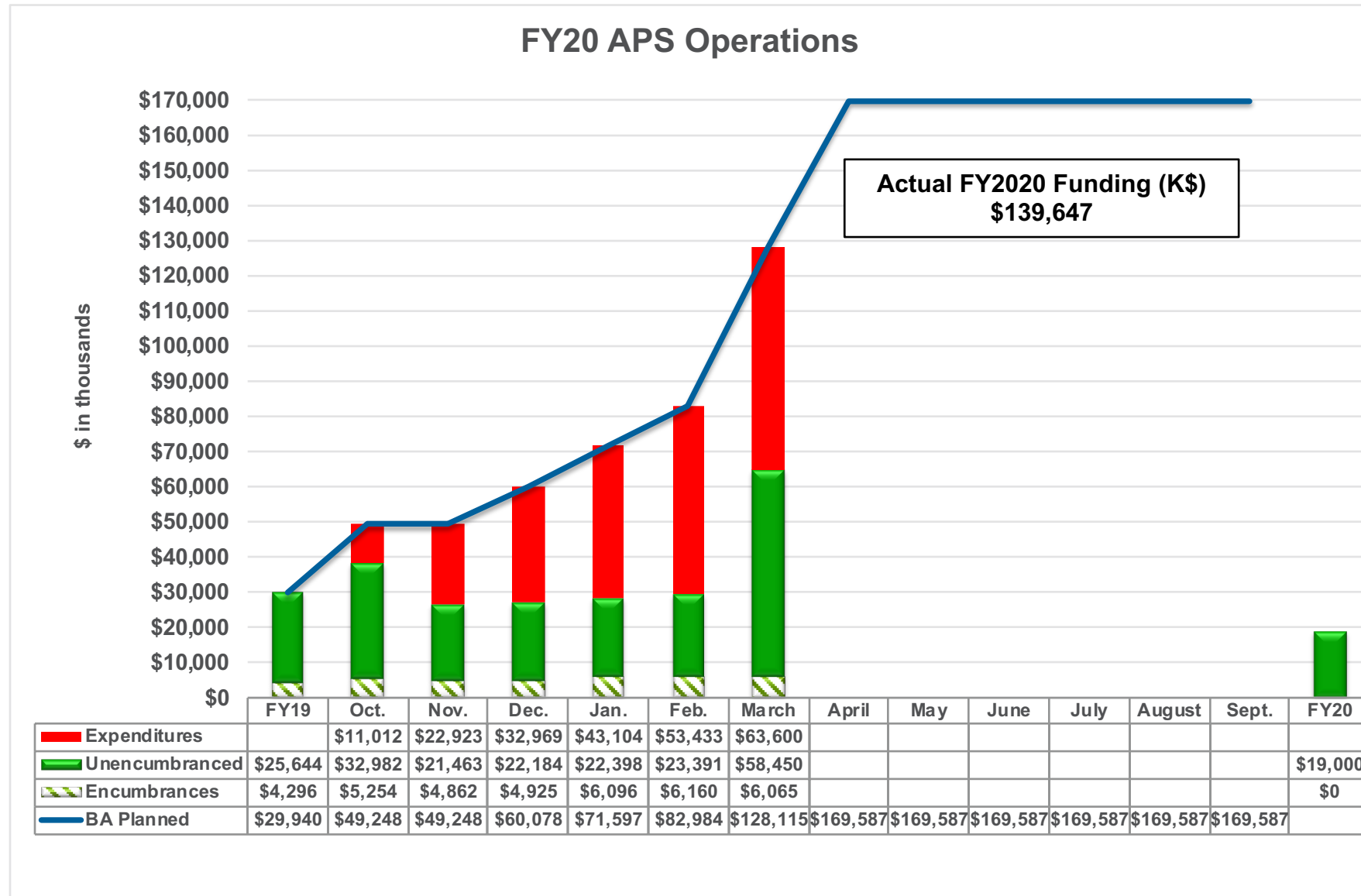
# TRANSITION BACK TO NORMAL OPERATIONS

OBJECTIVE – Safe, orderly return to normal operations with effective COVID-19 mitigation strategy



Time frame for these phases not known/determined.  
Will be likely be more deliberate than ramp down.

# APS OPERATIONS – FY20 BUDGET



# USER OFFICE UPDATE

- APSUO Steering Committee voting is going to open on April 15, please vote at <https://aps.anl.gov/About/Committees/APS-Users-Organization>
- Announcing APS Code of Conduct, which can be found at <https://www.aps.anl.gov/aps-code-of-conduct>
  - Code of Conduct content was added to user training; posters will be hung on the experiment hall floor when business returns to normal
- **Check your portal** to ensure that the information on file is accurate (specifically cell phone numbers and emergency contact information, which is a critical component to the APS safety envelope); users should submit a renewal registration form to update their profile

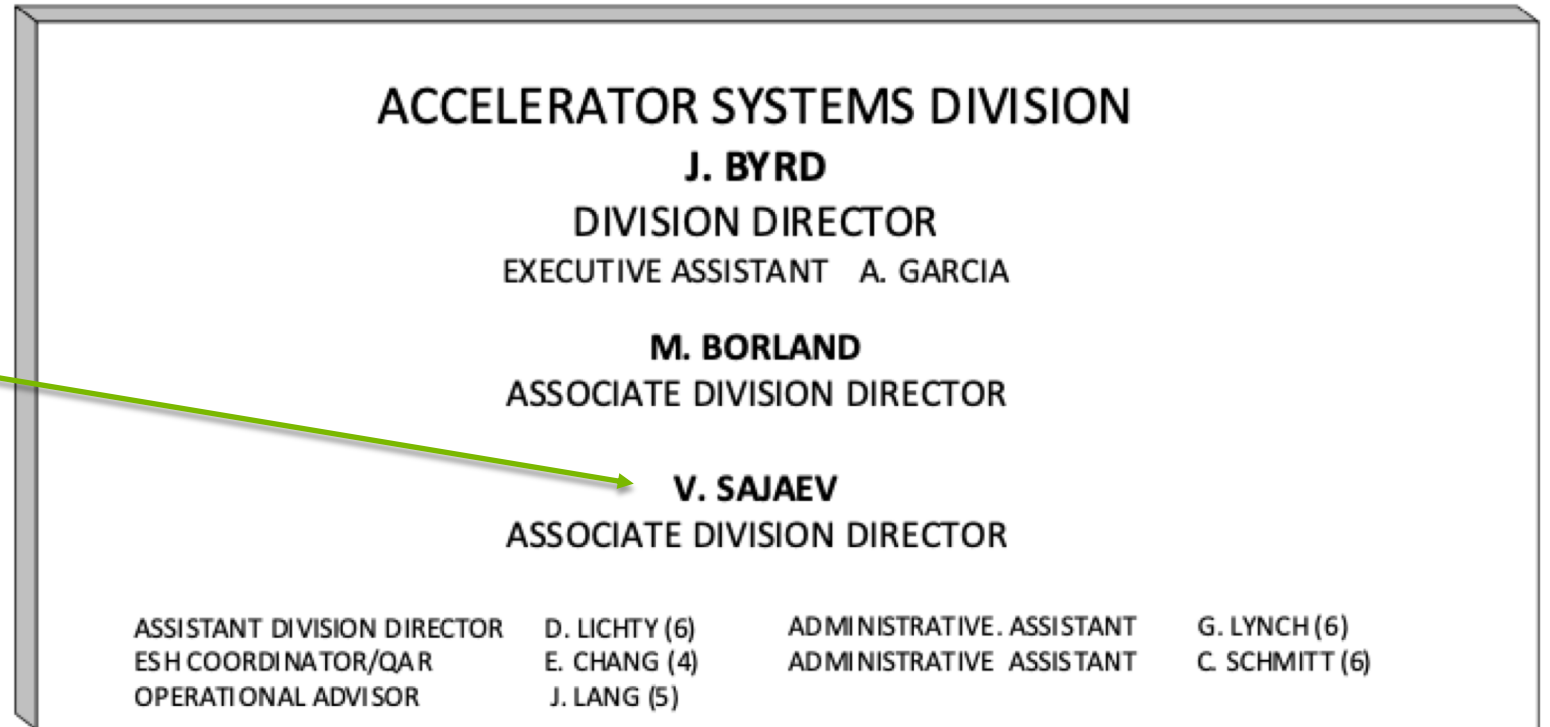


# USER OFFICE UPDATE CONT'D.

- Did you know? The APS is championing an Improving How We Work team (IHWW) on Scientific User Facilities at Argonne
  - Users and administrators will see continual improvements in user friendliness, streamlined processes, and consistency & integration across applications/platforms
- There's a new user type on ESAFs entitled "Beamline Support"
  - Identifies local beamline staff that need to appear on an ESAF for administrative purposes
  - Experiment participation limited to examining data for quality control or user support, loading and unloading samples or pucks, or managing equipment in support of an experiment
- Registration form enhancements coming soon:
  - Addition of ORCID IDs on user registration forms — currently in testing
  - Upload of USCIS documents within the registration form

# ASD ADDS VADIM AS NEW ADD

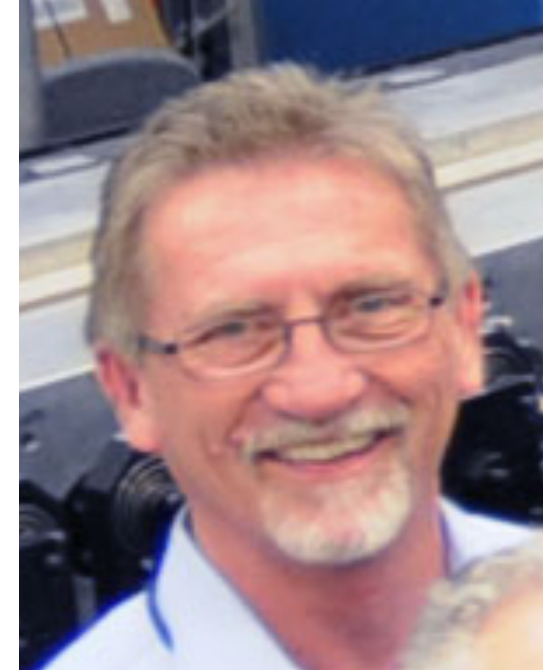
Vadim Sajaev has been selected as the second Associate Division Director for ASD



We currently have an open search for a new accelerator physics group head.

# PATRIC DEN HARTOG RETIRES

- Mechanical Engineering and Design (MED) Group Leader position posted on April 1, 2020, due to the retirement of Patric Den Hartog
- Search committee formed and identified candidates to interview in person prior to the impact on all operations due to the COVID-19 pandemic.
- Jeff Collins named Deputy Interim Group Leader (GL) for MED
- Geoff Pile assumes MED GL responsibilities in interim during impact of the pandemic on operations and eventual resumption of normal operations



# STATUS OF APS LINAC REFURB

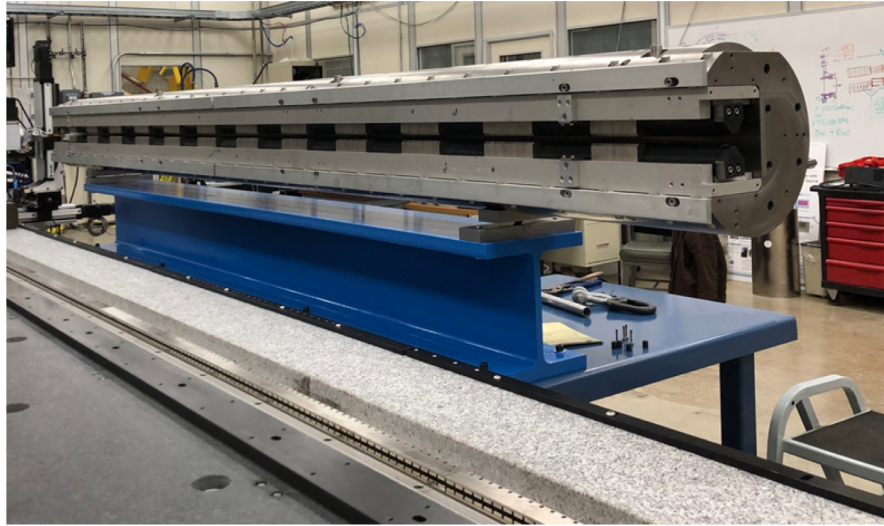
## Linac RF system needs refurbishment to meet APS-U requirements

- Structures:
  - We are building a linac RF test stand that will allow the conditioning of structures/SLEDs without impacting operations.
  - Test stand will be used for qualifying and commissioning all new linac RF stations without impacting operations.
- RF sources:
  - We have ordered two new Canon/Toshiba klystrons and a Scandinova k400 modulator at a cost of ~\$1.4M.
  - We are performing a planning exercise to understand how long the current stock of linac klystrons will last while we make a transition to a new vendor. A review with several external experts is planned for later this year.
- **Final system will allow us to run the linac at a peak energy of 530 MeV, allowing some overhead to operate regularly at 475 MeV.**



# XLEAP-II WIGGLERS FOR LCLS COMPLETED AHEAD OF SCHEDULE

Four new wigglers made from original LCLS undulator components for attosecond pulse generation.



One of the XLEAP Wigglers in the Magnet Measurement Lab at APS

Photos courtesy of Rick Fenner



The APS XLEAP team after completion of the project. Group leader and project leader Joe Xu is at far left.

# PSC IMPACT AWARDS

- **Kelly Jaje and David Wallis: Extraordinary Effort** for maintaining and updating the APS web site between the departure of the former webmaster and the hiring of the new webmaster, including negotiating technical assistance with, expeditiously solving a variety of web issues that fell below the developer level, updating web pages (including training pages), and in some cases completely re-building web pages that could not be repaired without a developer, all while carrying out their normal activities.
- **Tejas Guruswamy, Christopher Piatak, and Sunil Bean: Extraordinary Effort** for professionalism, dedication, and the will “to go the extra mile” in achieving the successful installation and operation of the transition-edge sensors-based high-resolution spectrometer in time for the subsequent experiments, and for showing how embracing the core values of “Impact” and “Teamwork” can achieve great results even under pressure.

## PSC IMPACT AWARDS CONT'D.

- **Saul Lapidus, Wenqian Xu, Kevin Beyer, Olaf Borkiewicz, Beverly Knott, Conni Vanni, Yu Huang, Arvind Ramanathan, Nena Moonier, and Sinisa Veseli: Enhancement of Argonne's Reputation** by employing various new developments and teamwork across different divisions and groups without any additional manpower or budget in expanding the existing mail-in program for high-resolution powder diffraction from 11-BM to 11-ID-B and 17-BM.
- **David Gagliano: Extraordinary Effort** for making possible the successful completion of a seminal sub-1K (680 mK) experiment on 6-ID-C, the heart of which was high-resolution, single-crystal x-ray diffraction in a magnetic field (4.5 Tesla). There were 3 critical setbacks that would have doomed the experiment had not the extra mile been traveled.
- **Daniel Haskel: Security Results** for protection of Argonne's reputation and flow of information in an appropriate manner, leading to a satisfactory resolution of the conflicting requirements around the request.

# 25+ YEARS SERVICE AWARDS

## 25 years

**Robert Keane**

## 30 years

**Charles Doose**

**Patrick Dombrowski**

**Rick Fenner**

**Anita Garcia**

**Efim Gluskin**

**Kelly Jaje**

**John Pace**



# PSC All-Hands Meeting: APS-U Update



*Bob Hettel*

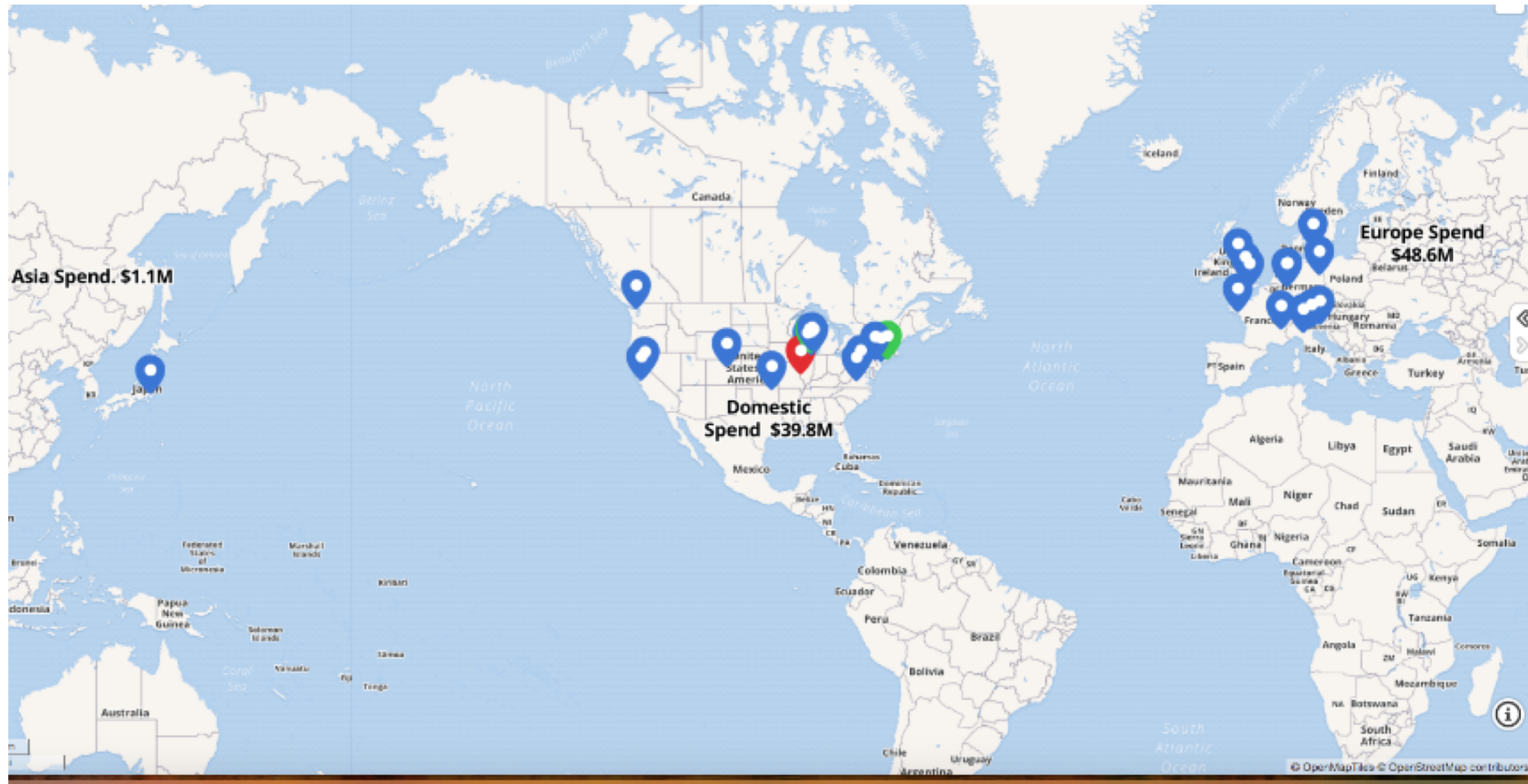
April 15, 2020

# Overall Project Status

- Adequate funding available for the project
  - \$170M (vs \$150M baselined) FY20 funding, \$119M received to date, \$178M available to spend
  - \$150/159.8M (vs \$159.8M baselined) FY21 funding proposed
- Schedule a concern at the moment as project as >\$20M schedule variance
- Several critical paths to manage to ensure project success
  - Accelerator vacuum chambers, module assembly and testing, and into removal and installation.
  - SCU R&D and production, the into removal and installation.
  - 4-ID & 28-ID design, procurement, assembly, installation and overall beamline commissioning
- Contracts awarded for many major items
  - All accelerator magnets, supports and vacuum chambers
  - ID vacuum chambers, monokeepers, magnets, absorbers and poles
  - All canted front-end components
  - BPM processors, etc.....

# APS-U Procurements

- Upgrade is ~2/3<sup>rd</sup> industrial procurements
- Vendor oversight will be key in coming years

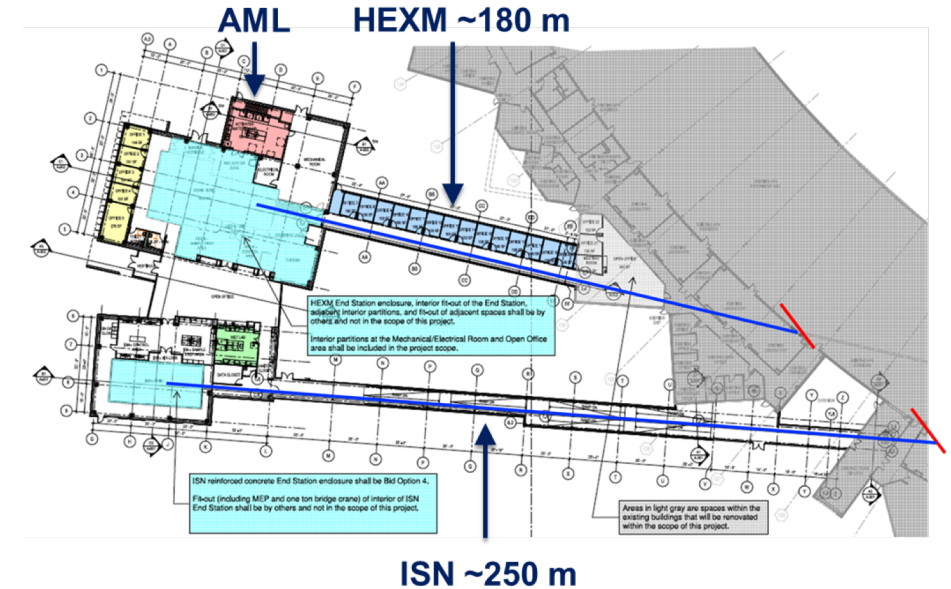


# Some issues in progress

- A complete radiation protection plan for injecting with beamlines open
- The choice of vertical vs. horizontal injection into the ring
- Beam test of the small-gap injection stripline kickers
- Maximizing robust performance of the injector for high charge operation
- Detailed design of beam size diagnostic ports
- Gap analysis in preparation for ARR
- ...

# Long Beamline Building

- New construction + modifications to LOM's
  - 20k – 22.6k SF facility connecting to LOMs 435-436
  - Demolition and site improvements (parking, landscaping)
  - Will house two new beamline end stations (HEXM & ISN)
- Special Requirements:
  - Vibration (VC-E or better) for ISN
  - Strict temperature and acoustical control requirements
  - Activated Materials Laboratory (off APS-U project)
    - 1,700 SF facility to support examination of radioactive materials at APS
    - Inventories less than Hazcat 3; ALARA engineered controls w/ HEPA filtered exhaust.
- Environmental Safety & Health:
  - Sustainability: High Performance Sustainable Buildings (HPSB)
  - Design shall support safe laboratory operations and ALARA
- Construction contract scheduled to be awarded this Summer





# Off-Site Space

- 108,000 SF warehouse with office space
- Special requirements:
  - New HVAC system
  - High speed WiFi
  - Badged entry and video surveillance
  - Electrical distribution
  - Updated fire protection system
  - Forklift charging stations
  - PA system
- Storage area with specialized pallet racking system
- Assembly and testing areas
  - Clean rooms and cranes
  - Burn-in room
  - Nitrogen gas distribution and compressed air
- Contract award anticipated in May 2020



# APS-U Ongoing Work in Min-Safe Conditions

- Completion of designs, including reviews, and assembly and processing of Procurement Packages
- Receipt of production magnets
- Receipt of production power supplies
- Testing of PAR RF12 amplifier
- On- and off-site space prep
  - Drawings for 400A being finalized, tours of the space being organized to help plan the work
  - Pre-bid meeting for off-site build-out and tours completed, bids due back in a few weeks, reqs in progress for security system and networking (equipment can be stored as soon as security system installed)
- Support for the above activities (receiving, rigging, accounts payable...)
- Hiring

The above activities involve items here or in transit; payments to vendors and contractors; and prep of areas (largely through contractors) for spaces we will need in the future.

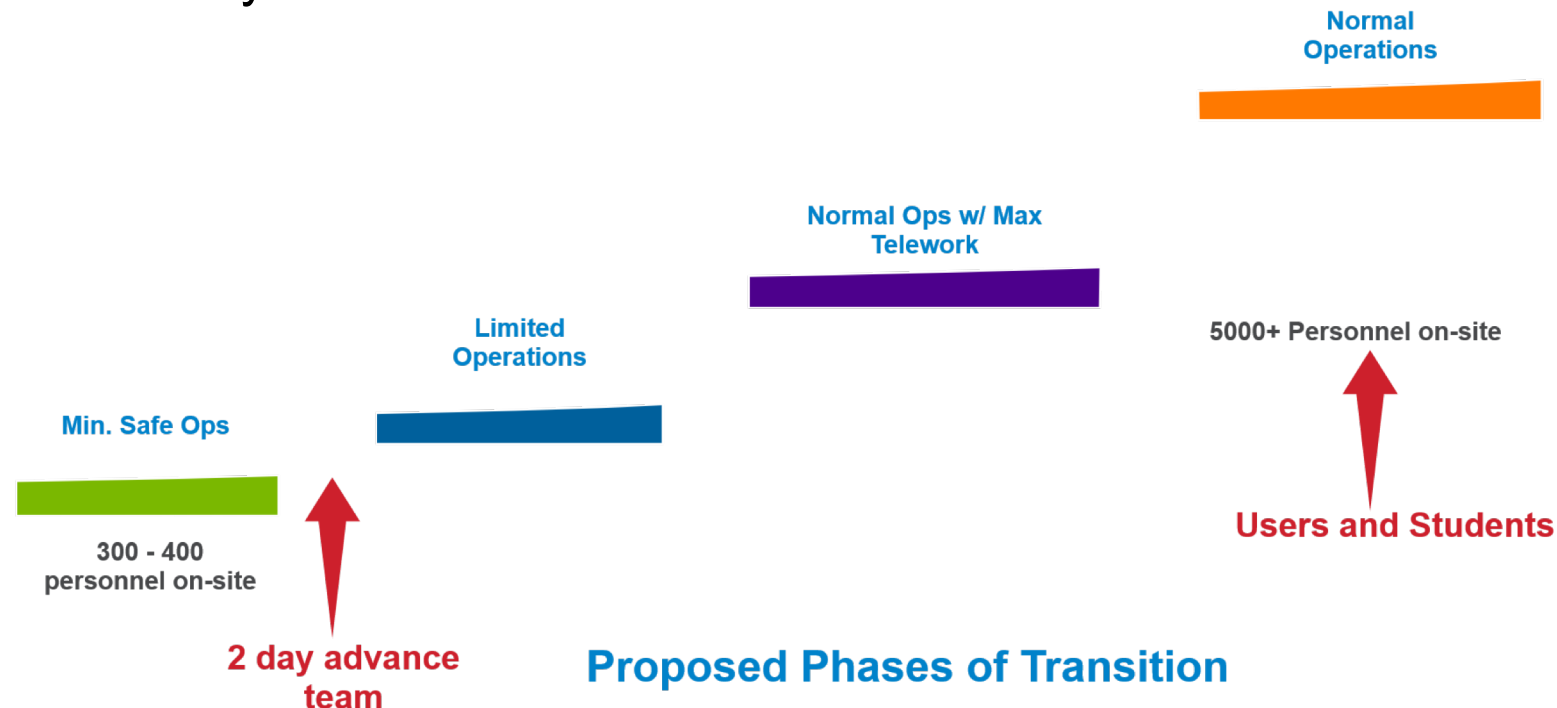
All on site work must be done on a reviewed and approved work plan. The work must then be authorized before it can proceed.

# COVID-19 – Project Risks

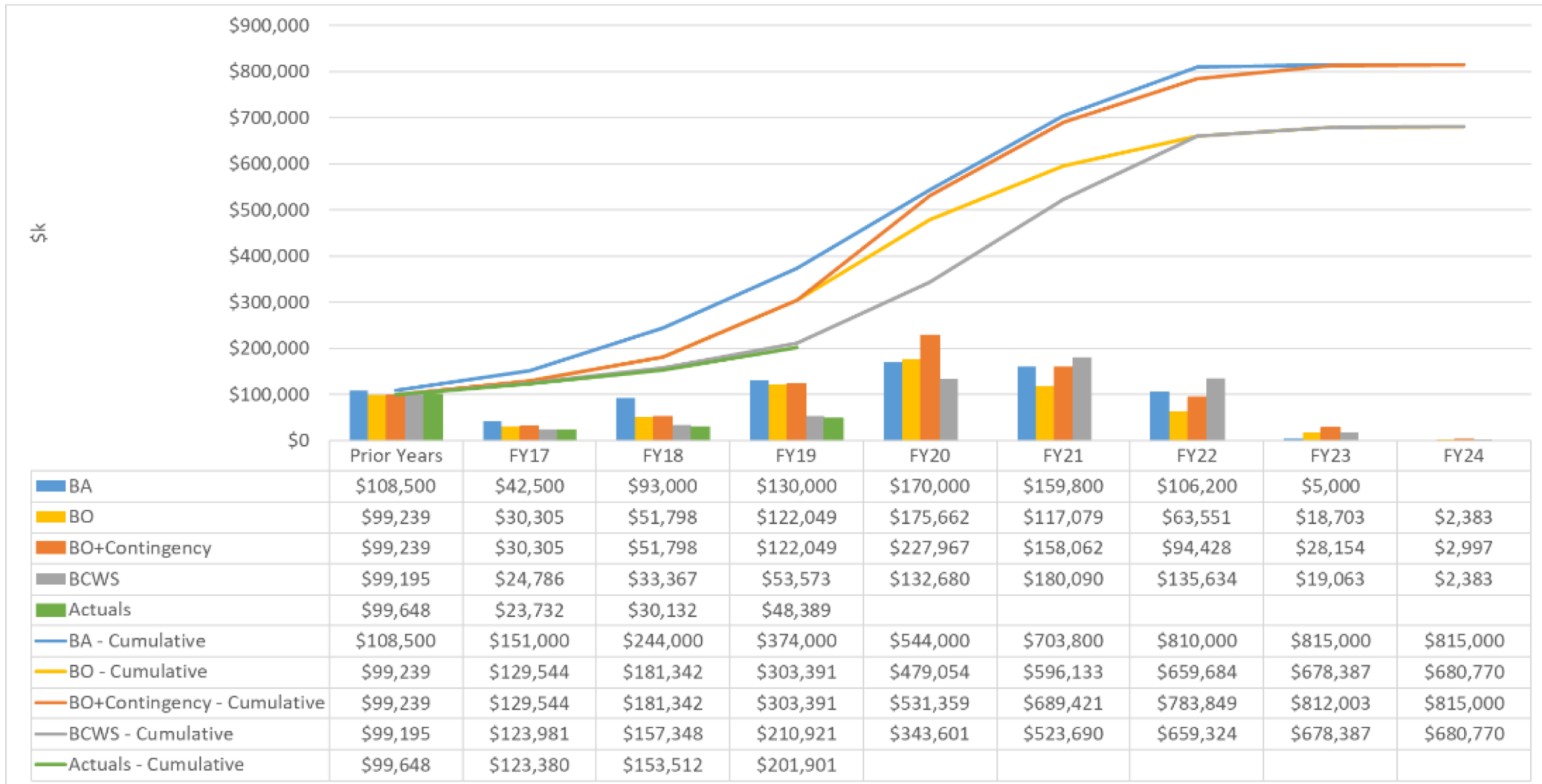
- Vendor shutdowns – High – directly delay deliverables to Argonne not just by the time of the shutdown but restart times as well. We are staying open to accept product and pay the vendors.
- Vendor Illness – High – should a critical person at a vendor become ill, we will have to react to this.
- Vendor shipments – Medium – as borders between countries or states close to shipments, we are incurring delays.
- Staff – Medium – Keeping our staff healthy is critical. We are limiting to an extreme personnel on site.
- Hiring – Medium – we have been ramping up and are working through the challenges of hiring new staff into ANL in this environment. Interviewing remotely (OK), and the onboarding process has been worked out.
- Safety – Medium – making sure our Work Plans are appropriate and ensure distance, shielding and exposure time. All Work Plans being reviewed consistent with laboratory guidance (April 3 memo).

# Looking Forward

- Initial scenarios are being formed...e.g. 3-month and 6-month slowdowns. The inputs we are getting are very fresh, the situation dynamic. Overall the initial analysis suggests this is a use of schedule contingency and possibly contained within cost contingency. We are in close communication with BES and the lab.
- These are extremely dynamic times...we are trying to develop best possible methods to react in a timely manner to reality as it arises.



# Integrated Project Profiles

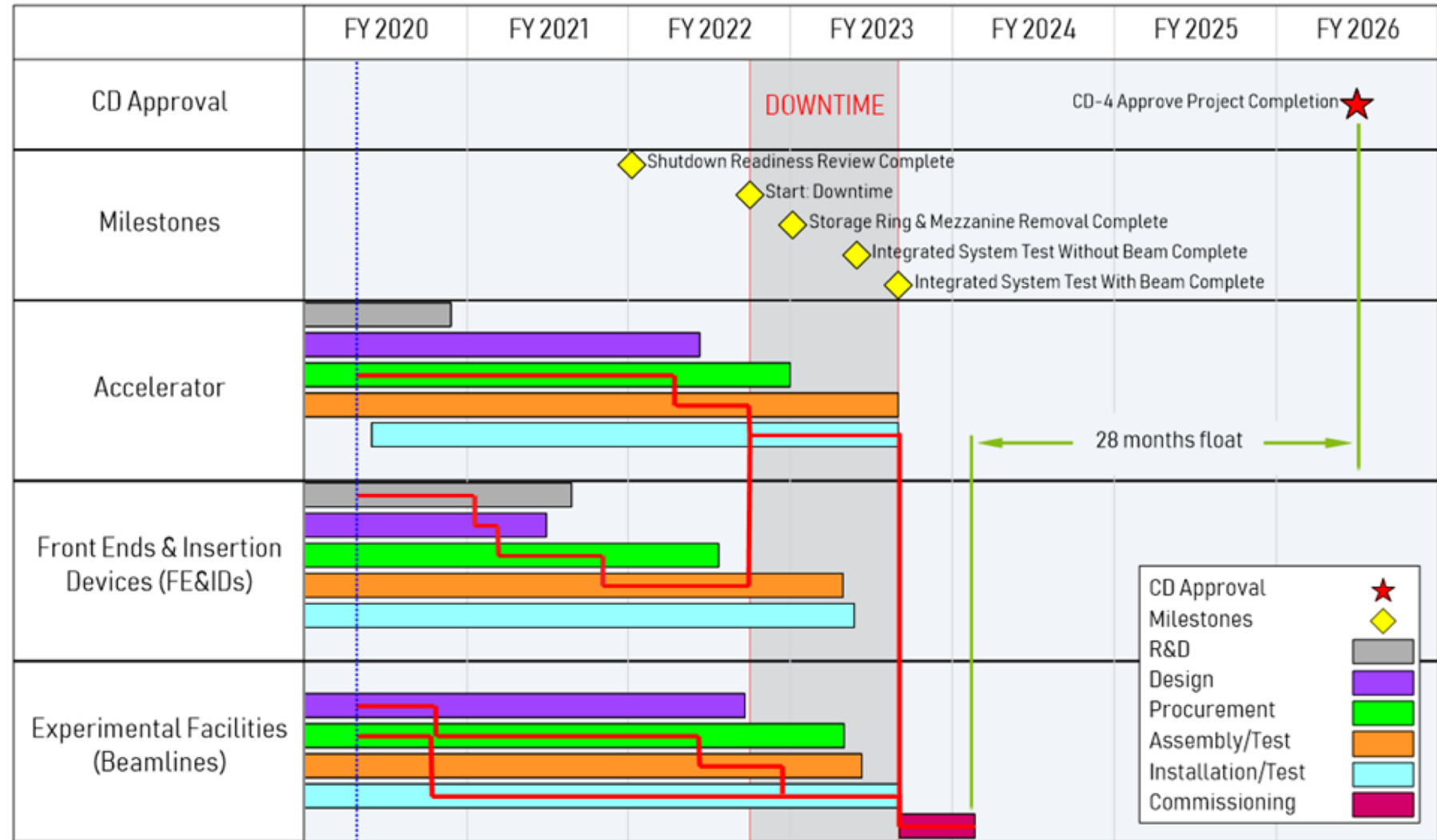


- Adequate funding available throughout the project



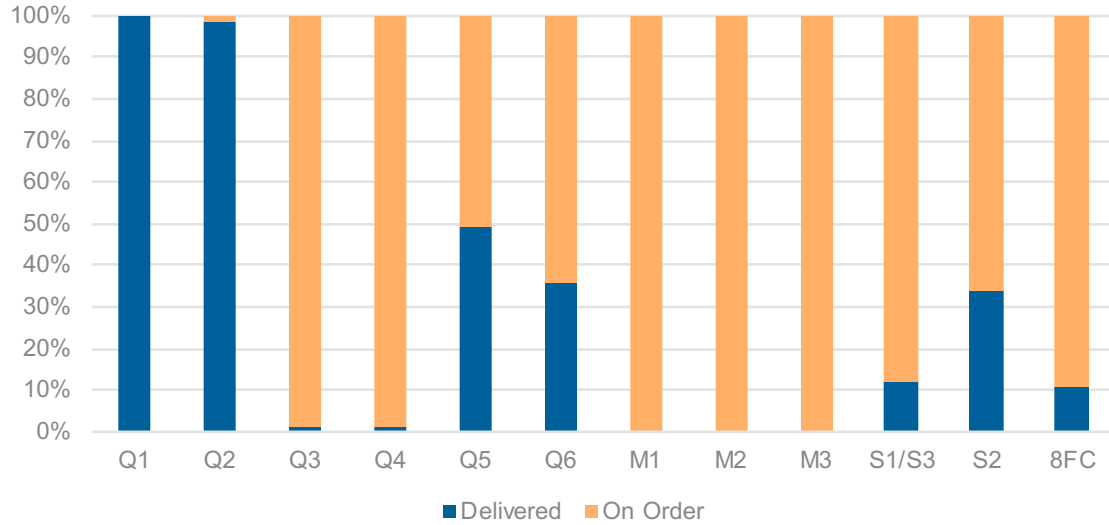
# Schedule Update

- Critical path runs through
  - Accelerator vacuum chambers, module assembly and testing, and into removal and installation.
  - SCU R&D and production, the into removal and installation.
  - 4-ID & 28-ID design, procurement, assembly, installation and overall beamline commissioning

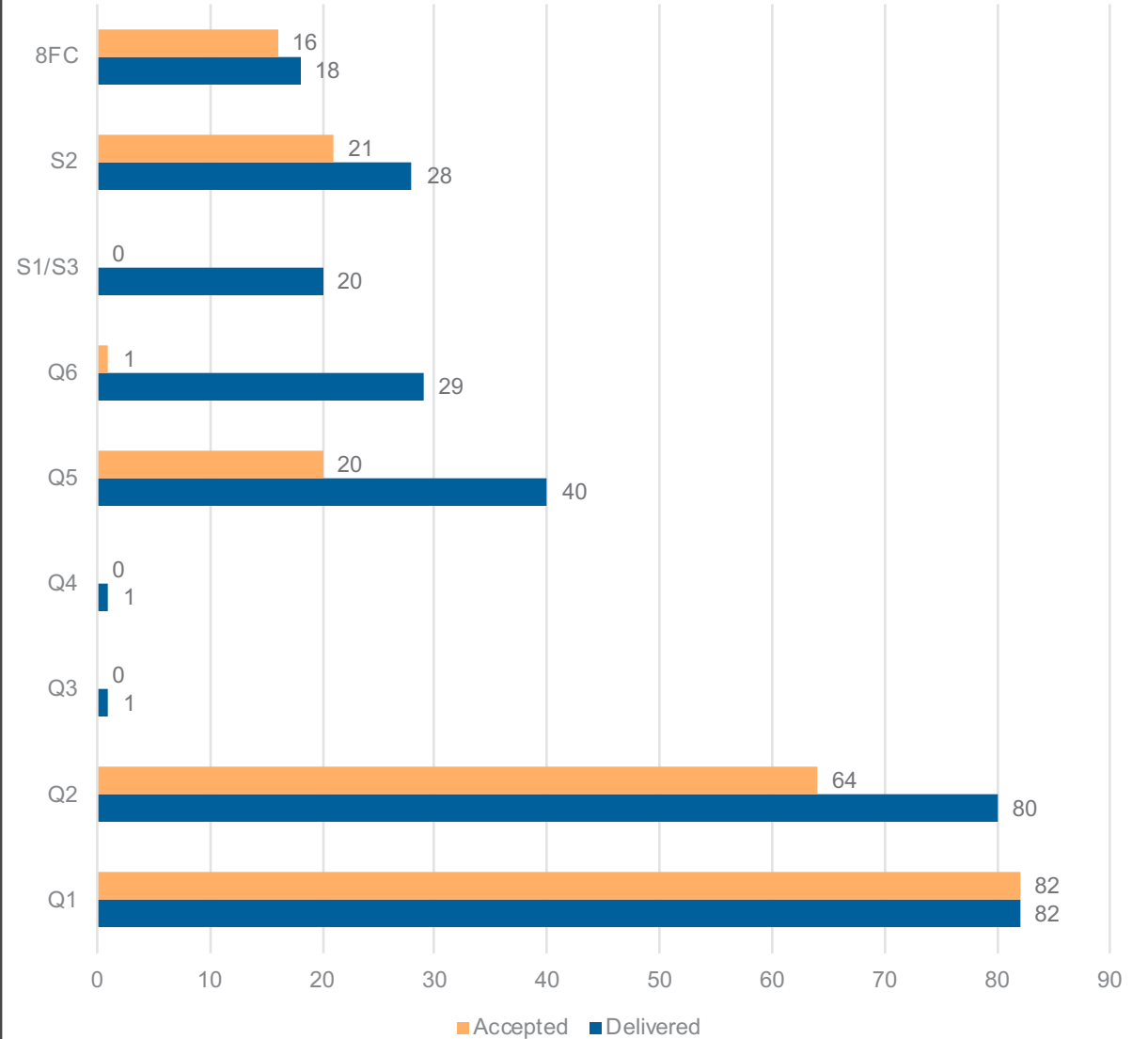


# Magnet Progress

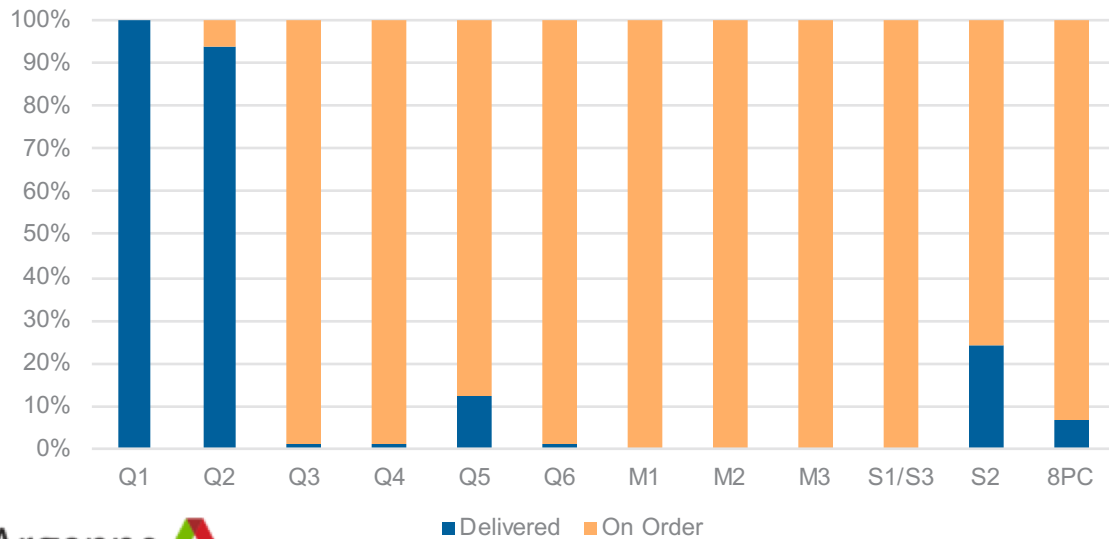
## Magnet Delivery Progress (Current)



## Acceptance Inspection Progress (Current)

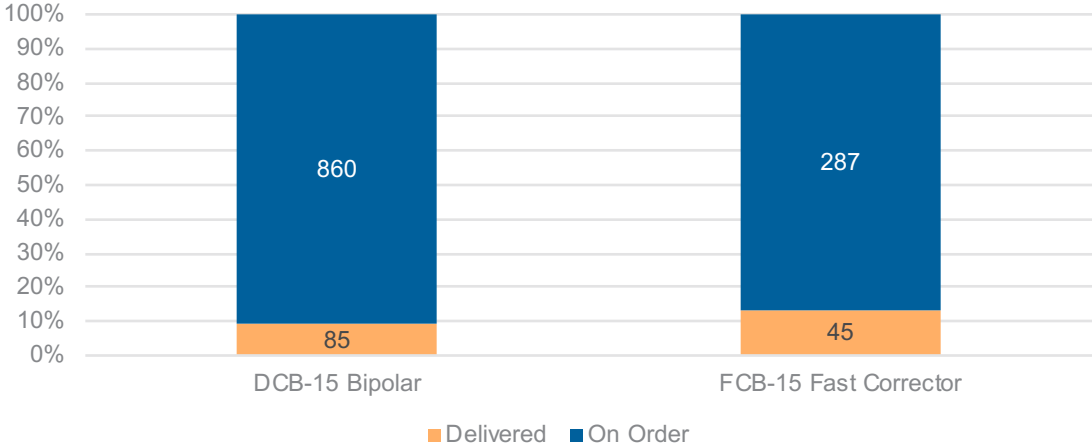


## Magnet Delivery Progress (February)

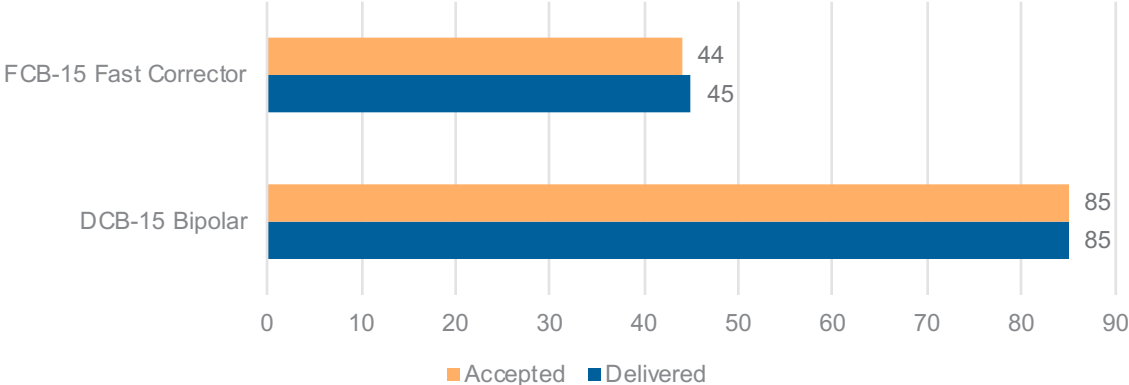


# Power Supply Progress

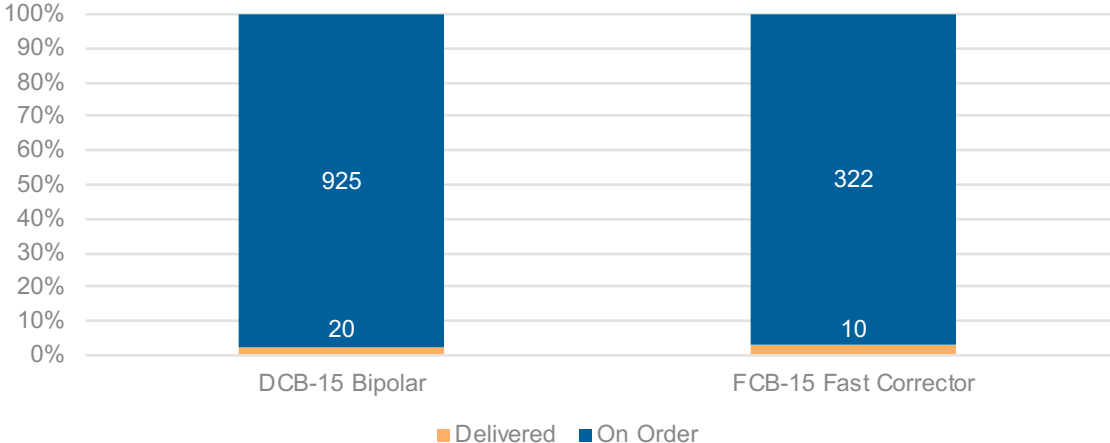
Delivery Progress (Current)



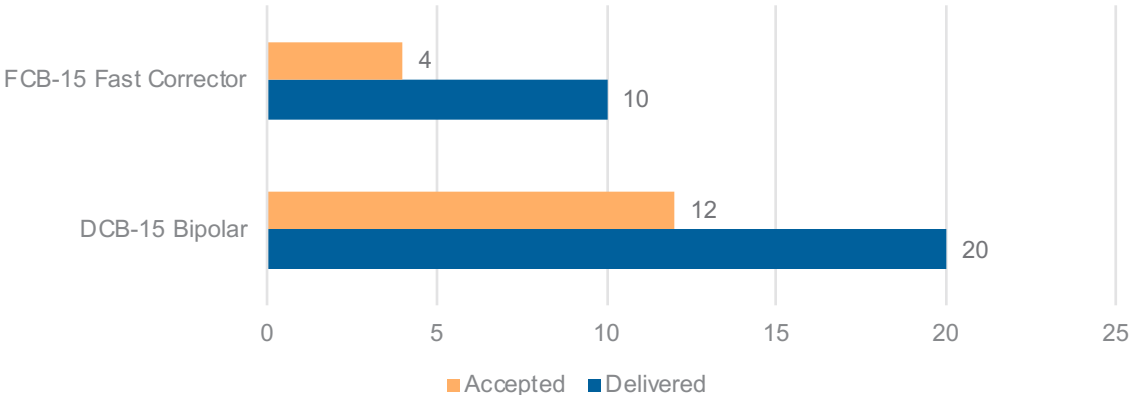
Acceptance Inspection Progress (Current)



Delivery Progress (February)

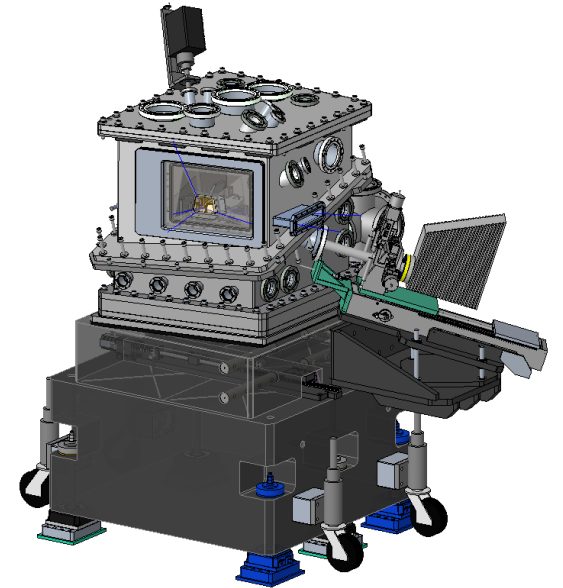


Acceptance Inspection Progress (February)

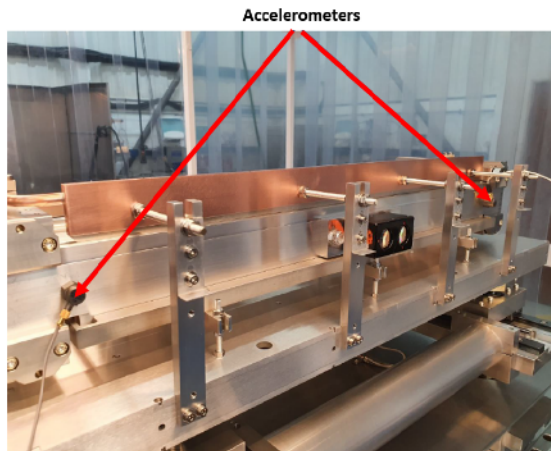


# Technical Progress – Experimental Systems

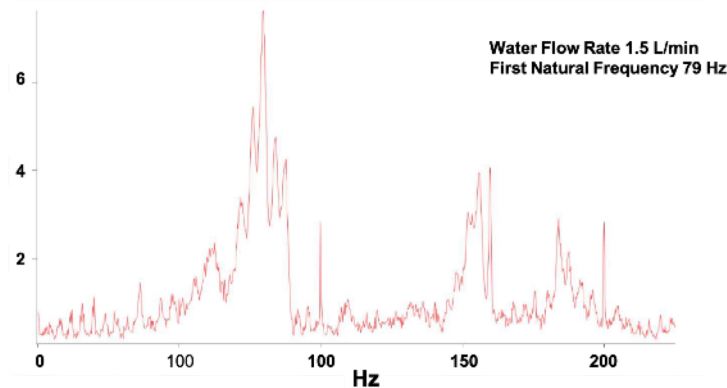
- CNM beamline (26-ID) nanoprobe instrument is being replaced with a new instrument. Planning to incorporate a robot for the diffraction detector setup pending testing of the robot in an existing beamline at APS
- Thermal analysis was performed for several beamlines to calculate the absorbed power density for critical elements under worst-case scenarios.
- ASL (25-ID) mirror system is undergoing FAT in FMB oxford. Motion testing, water testing, and alignment for all systems was completed. Vibration testing for the Inboard Reflecting Mirror System (IRM) was completed. Delivery in May 2020.



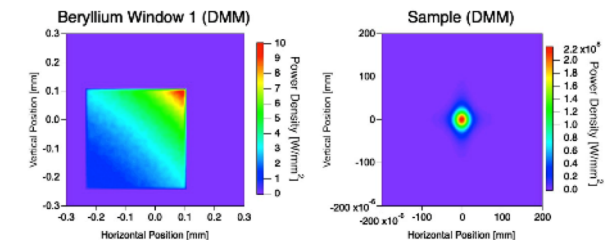
The nanoprobe instrument design for the CNM beamline (26-ID).



Vibration measurement of the 25-ID mirror as part of FAT at FMB Oxford



Measured transfer function between the pitch angle of the IRM and floor is shown with a nominal water flow rate of 1.5 L/min.



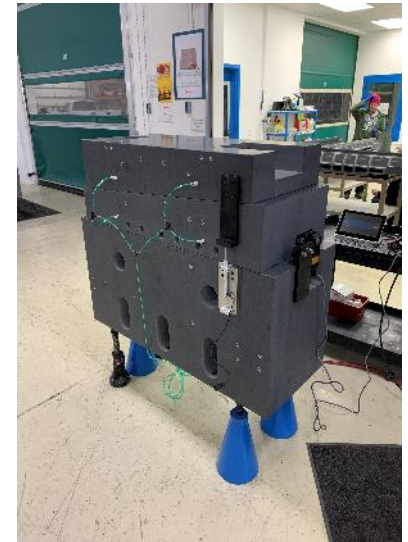
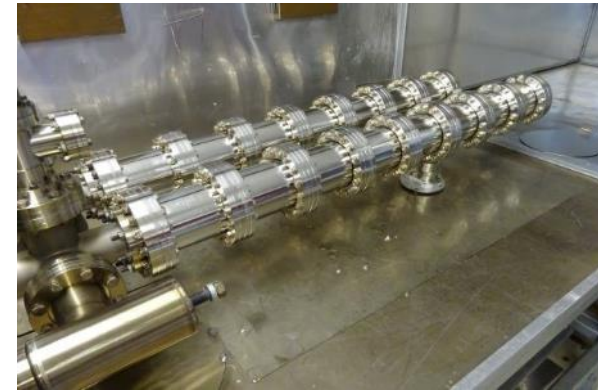
Power density calculation for the ISN beamline: focused beam power distribution on the beryllium window and sample.

# Technical Progress – Front Ends

- The first batch of wall collimators and first collimator for the CUFÉ which was awarded to MDC was receipted this month. (top right)
- The GRID XBPM support system based on APS recent design of a beamline instrument which using air bearing for motion undergoing FAT. (lower right corner)
- First batch of table for canted undulator front end received at ANL. ( lower left corner)
- The vacuum chambers and spool pieces for all the canted undulator front ends undergoing FAT. (lower middle two)



*CUFÉ first collimator assembly*



*CU front end tables (left), CU front end spool pieces undergoing FAT (middle two) and the granite base for the CU GRID XBPM support system undergoing FAT (right).*



# Insertion Devices

## Superconducting Undulator



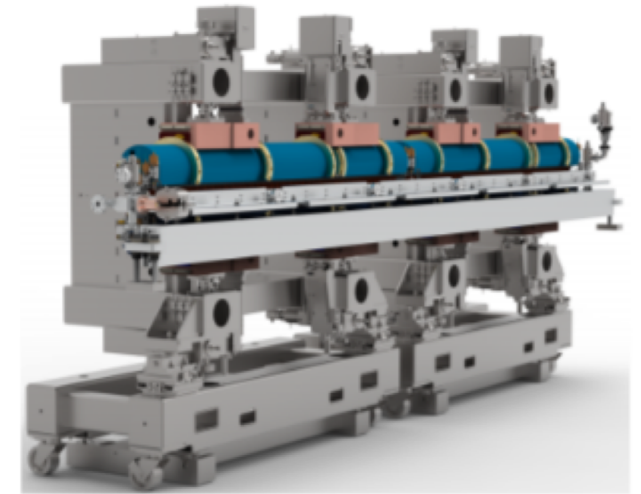
*Planar HPMU and monokeeper*



*SCU Cryostat delivered to ANL*

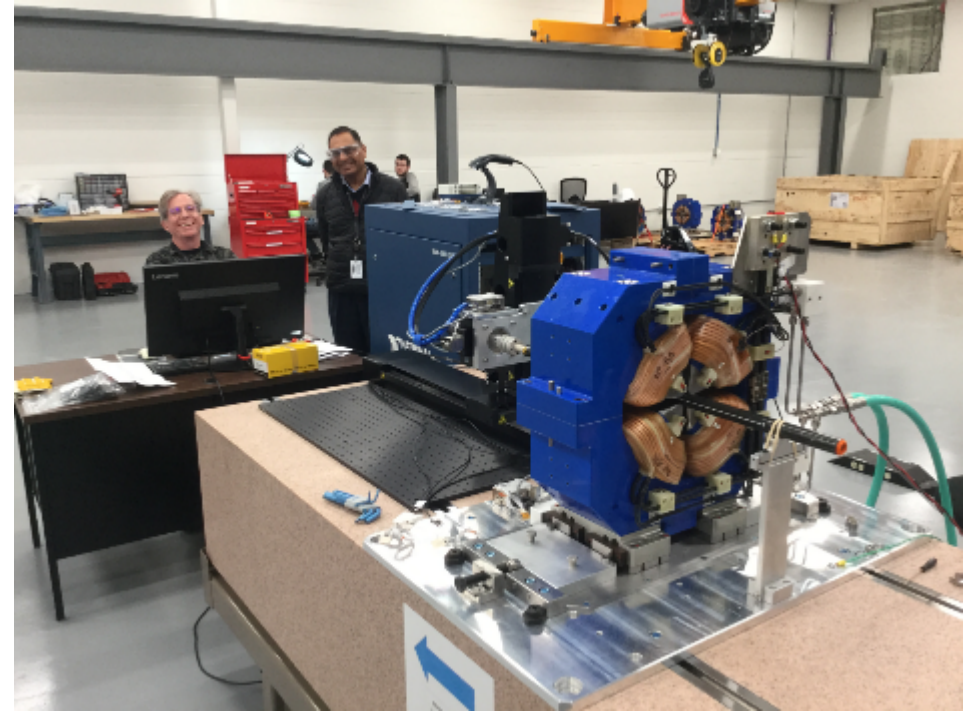


*Copper thermal shield assembly*



*Revolver ID*

# Magnets and Measurement



Animesh Jain, Chuck Doose

Magnets undergoing incoming inspection in magnet measurement lab.

299 magnets delivered, 204 accepted (over 50 showed up just last week) of 1321 total.



# Accelerator Components



First article unipolar power supplies from CAEN, Italy



ITech BPM processors



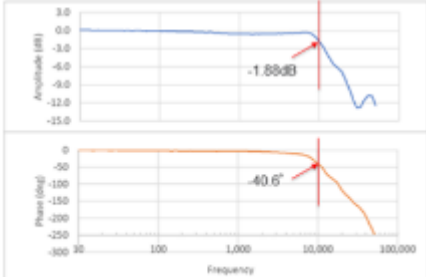
ID vacuum chambers extrusions



Fast corrector and power supply



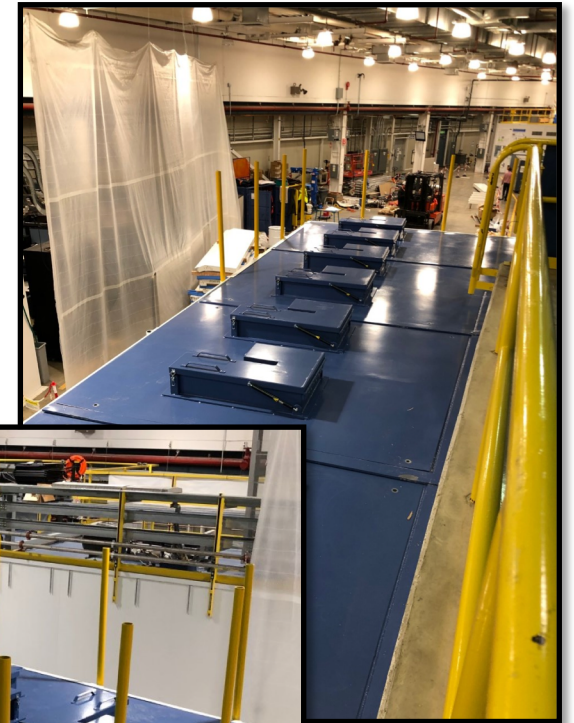
Frequency response with 8-pole magnet, small signal (1%) with 7.5A DC bias



SC bunch lengthening cavity and cryo-vessel

# Experimental Station Construction Status at 25-ID

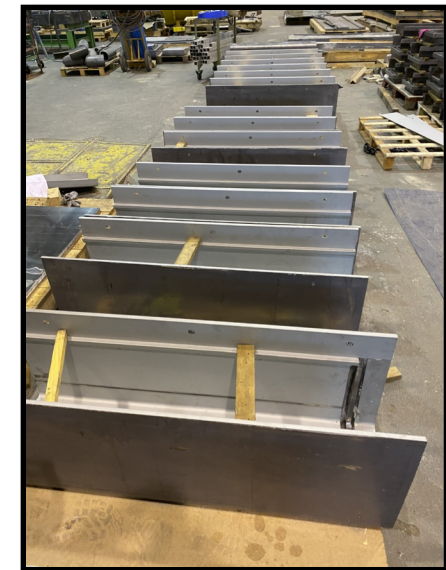
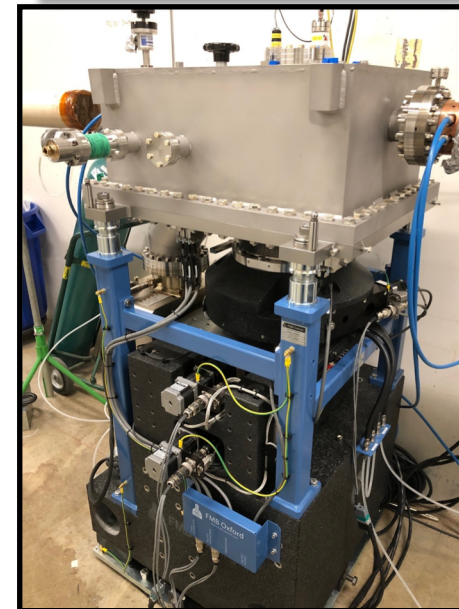
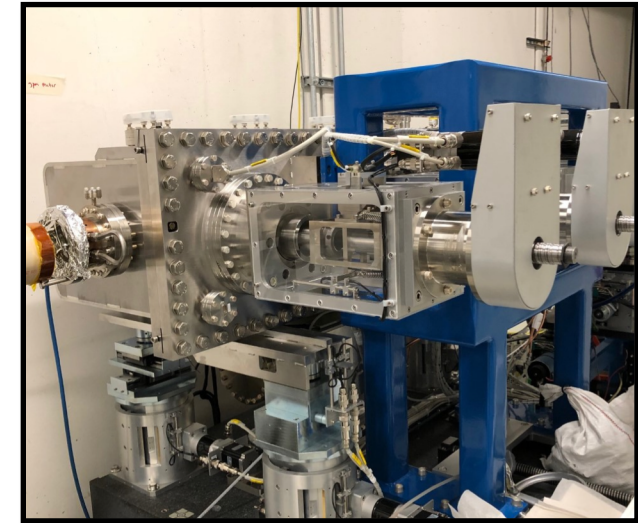
- 25-ID-A station assembly nearly complete
- Station installation will continue with the B, C, D, and E stations
- Utility installation will begin after enclosures are completed
- Beamline components being delivered and staged for installation
- Beamline optics being delivered in the next few months





# Experimental Station Construction Status at 28-ID

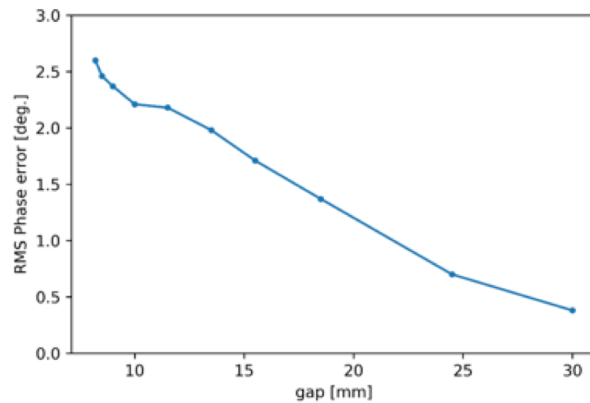
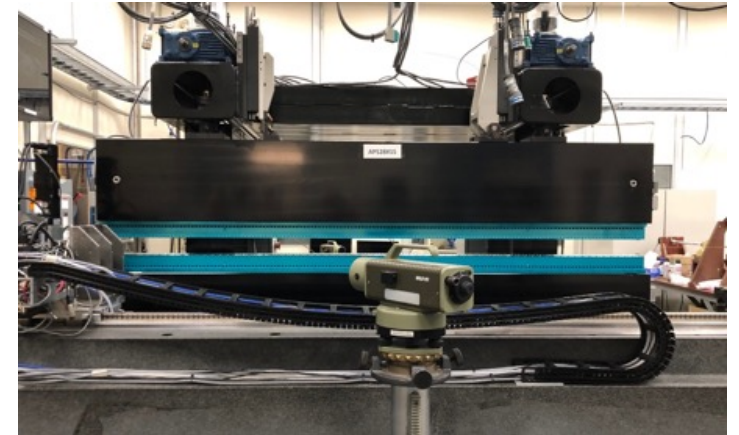
- Shielding validation underway
- Utilities installed
- Beamline optics installation in progress
- Shielded transport delivered and will be installed soon
- Preparing end stations for optics testing



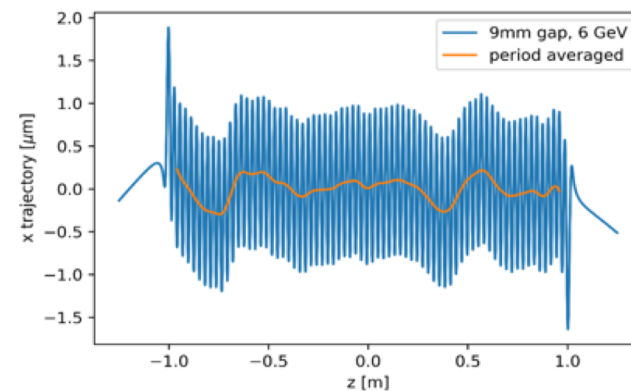


# APS-U First Article Undulator (2.8 cm) Assembled and Tuned

- New monokeeper mechanical design promises less shimming
- APS-U will build dozens of new undulators and refurbish many of the current IDs.
- The first article for 2.8 cm has been assembled and characterized. Tuning of trajectory achieved using “side shims.” Multipole correction done using a few surface shims.



RMS phase error vs gap: within the requirement of 3 degrees.



Beam trajectory along the undulator: better than +/-0.5 um

