Welcome to Thomas Jefferson National Accelerator Facility (Jefferson Lab)

Craig Ferguson, Site Office Manager

May 14, 2025

General Information

- Protocol for the Day
  - This Zoom Webinar is being recorded
  - All slides will be posted online
  - This session is intended to provide additional background
  - Informational purposes only
    - Not intended to supersede anything in the SOW or RFP or Q&As
  - In general, no live Q&A in these sessions
    - Questions must be submitted to TJNAFcompetition@science.doe.gov
  - Interchangeable terms: Thomas Jefferson National Accelerator Facility, TJNAF, Jefferson Lab
  - There are no planned breaks

Informational Meeting Agenda

Welcome	Craig Ferguson	Site Office Manager
Welcome/Mission of Jefferson Lab	Dr. Harriet Kung	Acting Director, Office of Science
DOE and Jefferson Lab overview Major Projects Opportunities for Continuous Improvement	Craig Ferguson	Site Office Manager
Procurement Process Adjournment	Casey McCracken	Procurement Analyst

Welcome and Missions of Jefferson Lab

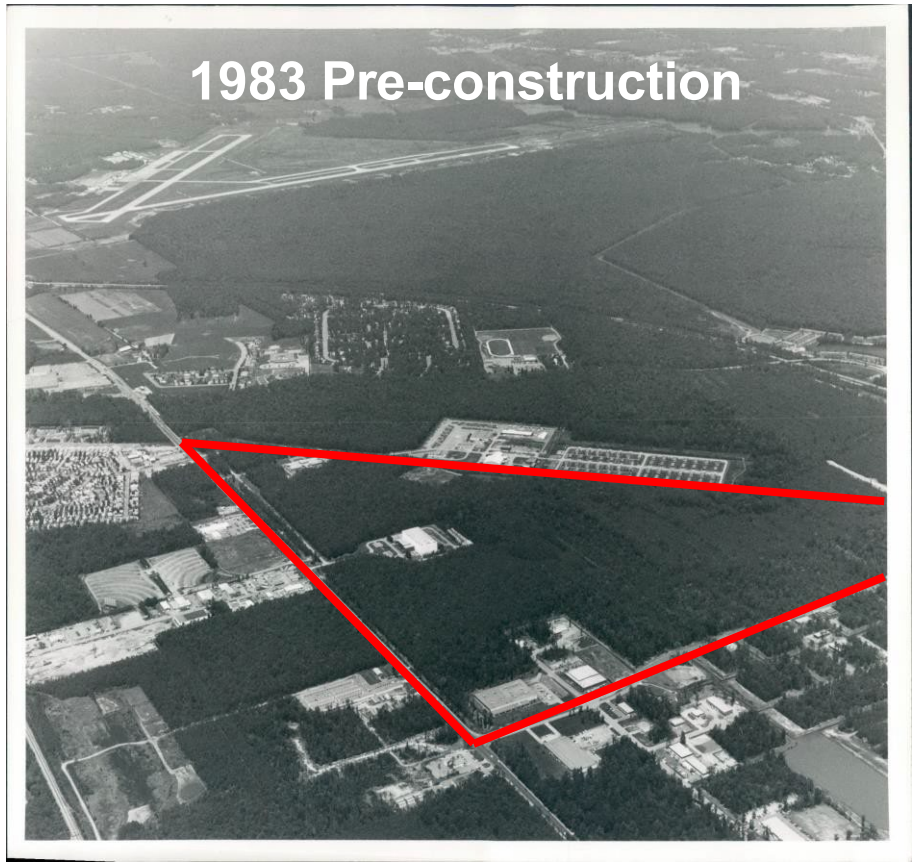
Dr. Harriet Kung, Acting Director, Office of Science

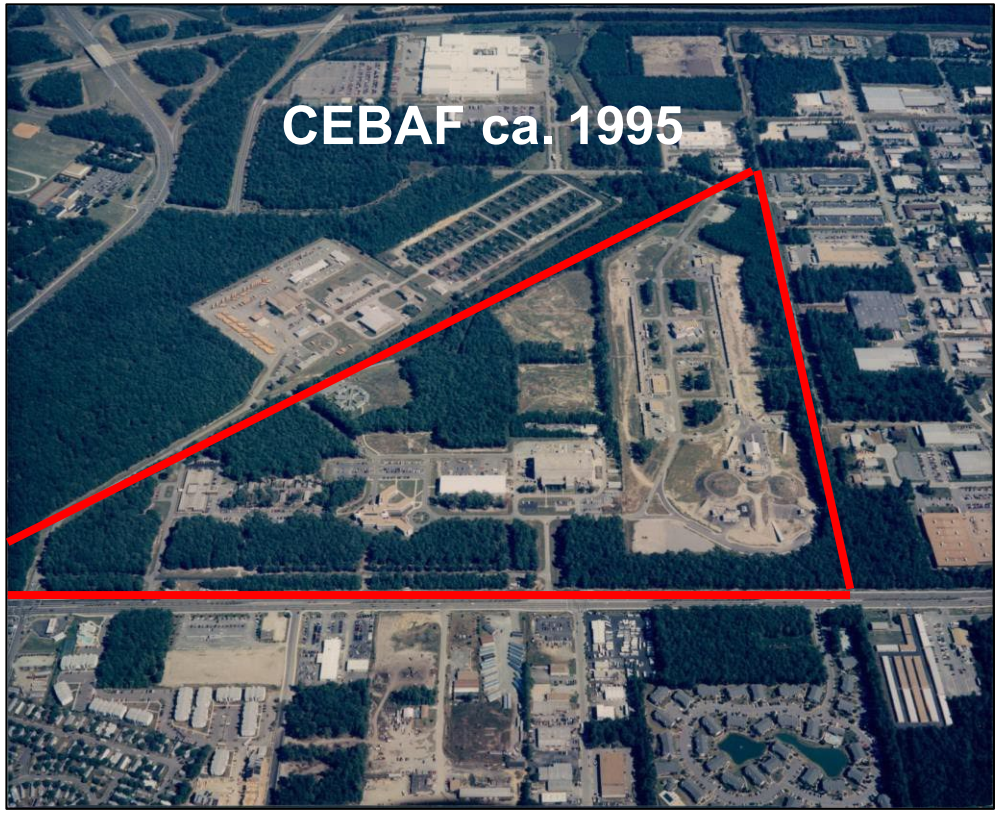
DOE/Jefferson Lab Overview

Craig Ferguson, Thomas Jefferson Site Office Manager

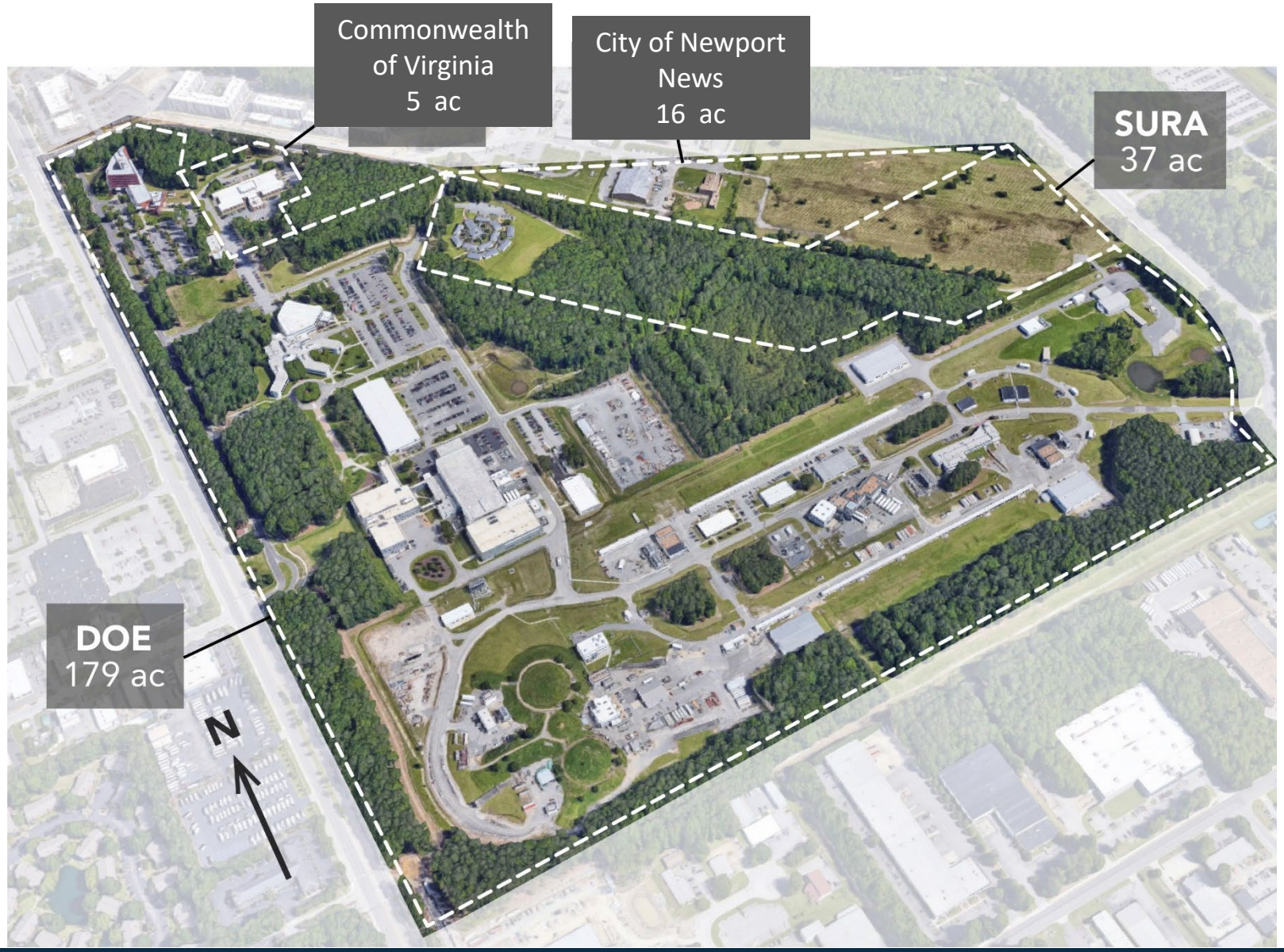
Jefferson Lab History

Continuous Electron Beam Accelerator Facility (CEBAF) was built on former NASA space radiation lab site
Renamed *Thomas Jefferson National Accelerator Facility* in 1996
"CEBAF" refers to the accelerator

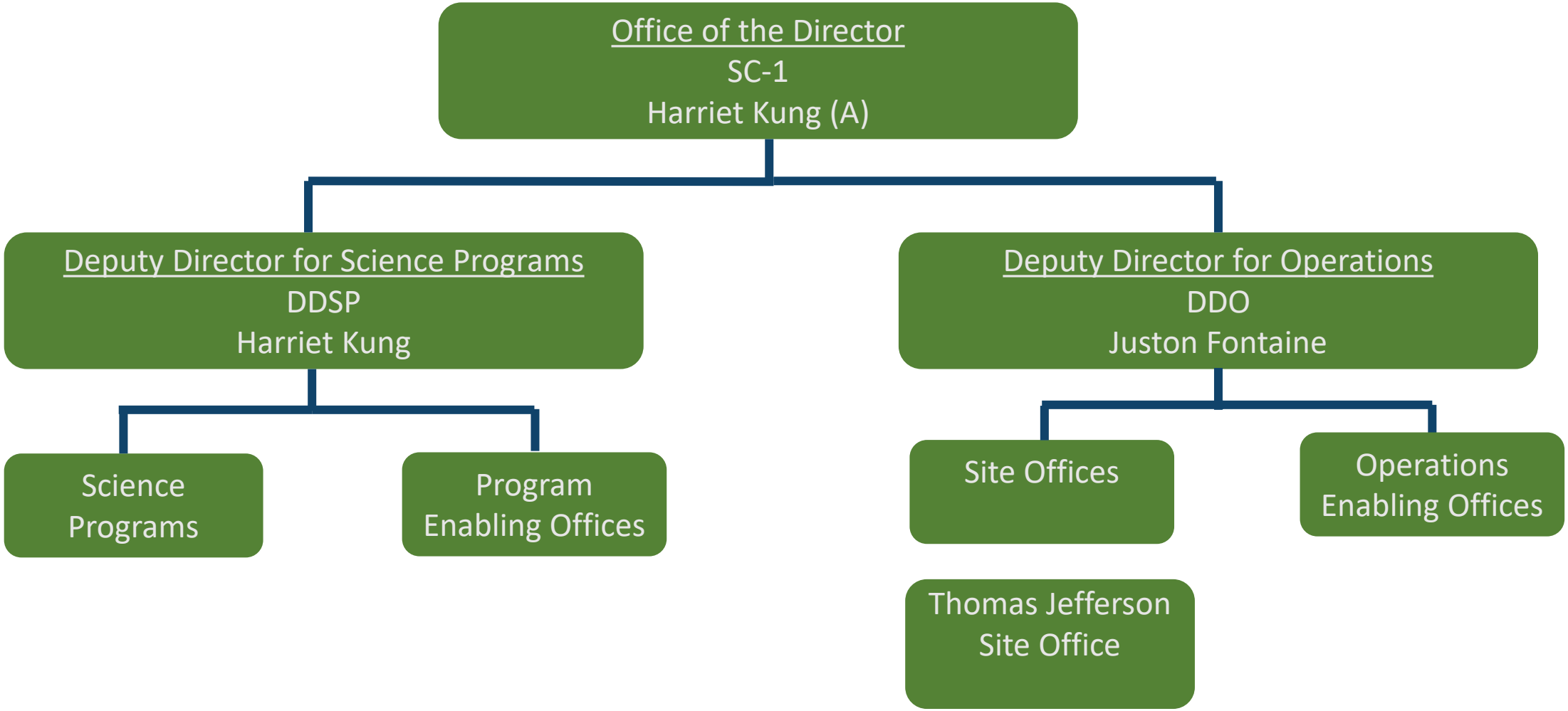




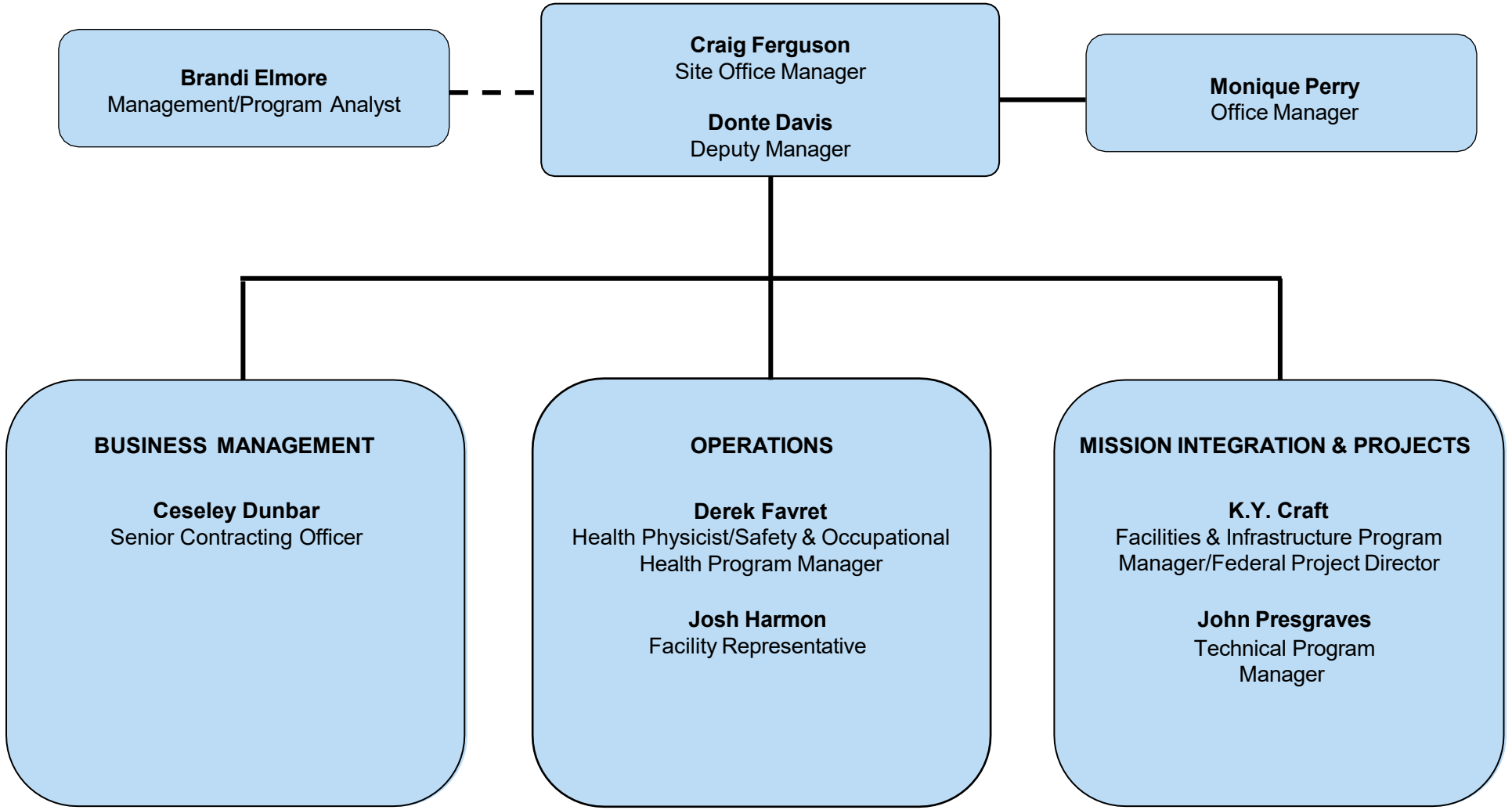
Property Lines



Office of Science

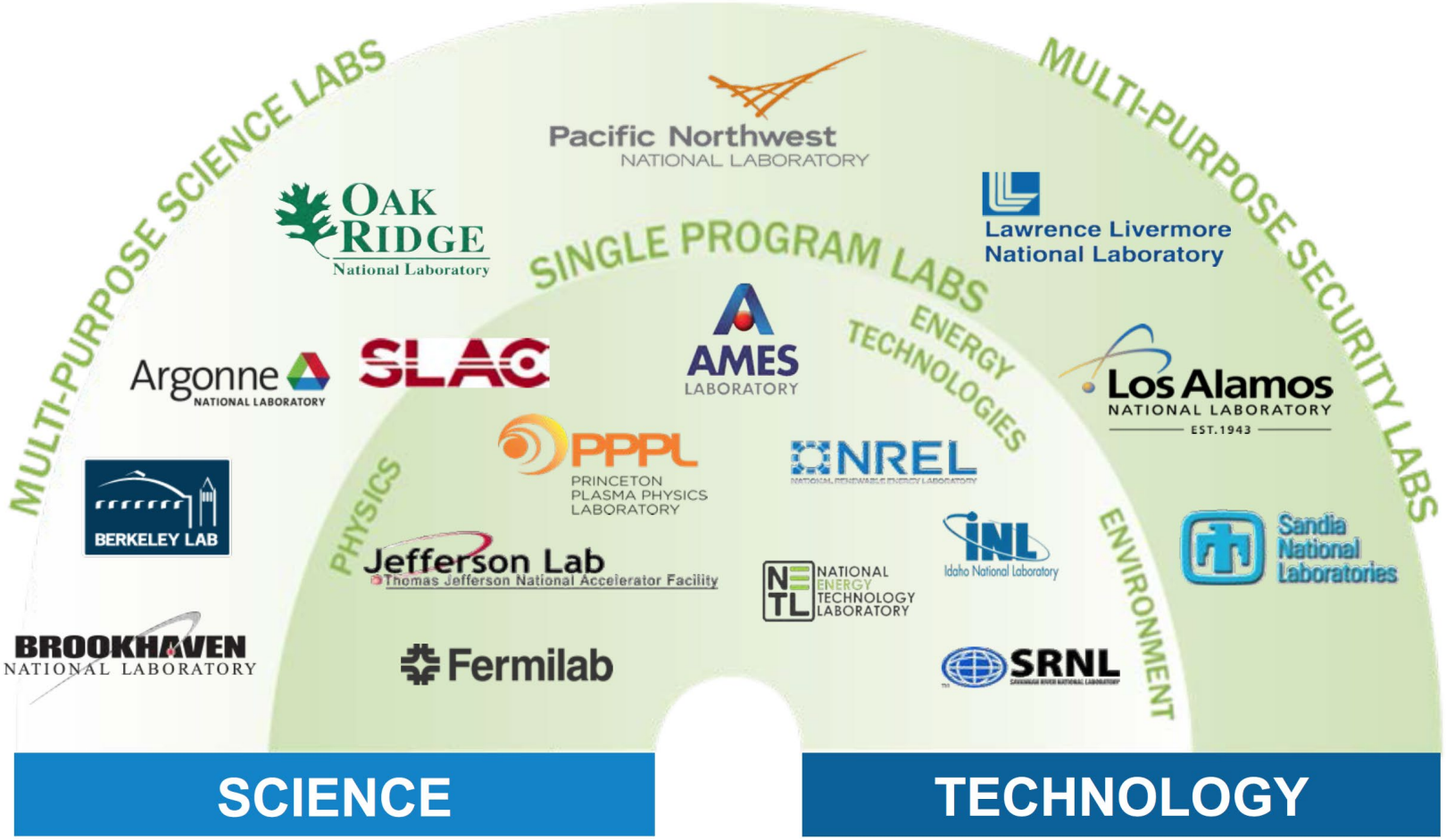


Thomas Jefferson Site Office



Jefferson Lab within the National Laboratory System

Evolving from single-program to multi-purpose Lab



Current Prime Contract

Type:	Cost Reimbursable with performance fee and award term incentive Management and Operating (M&O) as a Federally Funded Research and Development Center (FFRDC)
Current Operator:	Jefferson Science Associates, LLC (JSA)
Available Fee:	$3,345,296 All fee at risk Evaluated per SC Standard Performance Evaluation Measurement Plan
Award Term:	No longer eligible – award term not awarded 2 times
Period of Performance:	June 1, 2006 to May 31, 2026 Secretary authorized a one-year extension to current contract with JSA without competition through May 31, 2026, in conjunction with full and open competition for the Management and Operation of TJNAF.
Sponsor/Steward:	Office of Science

Mission

- **Perform the highest quality research in a manner that ensures employee and public safety and protection of the environment**
- **Develop, maintain, and operate unique national scientific user facilities that are available to qualified domestic and international investigators**
- **Train future generations of scientists and engineers to promote DOE's national science and workforce goals**
- **Transfer knowledge and technological innovations and foster productive relationships among Laboratory research programs, universities, and industry to promote national economic competitiveness**

FY24 costs:

Lab Operating Costs: $232.1M

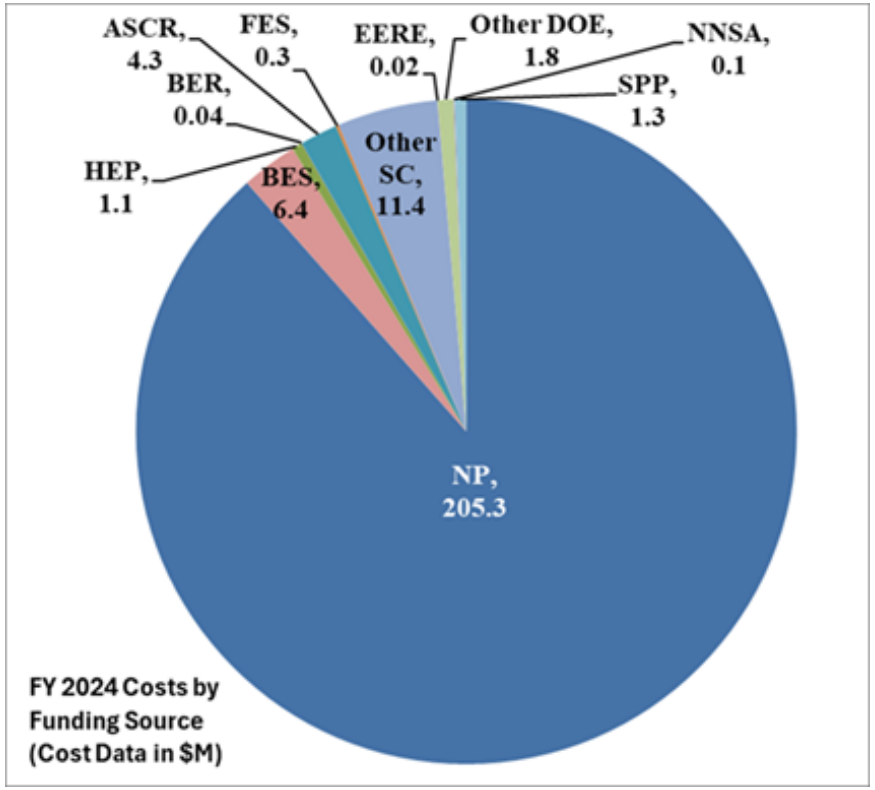
DOE Costs: $230.8M

SPP (non-DOE) costs: $1.3M

SPP as % total of Lab Operating Costs: 0.6%

Physical Assets:

179 acres, 79 buildings, $1.3B replacement plant value



COMMUNITY

Largest community of nuclear physicists in the world

980+ employees

1069 domestic scientific users

599 international scientific users

STEM COMMITMENT

800+

Ph.D.s granted to date

(196 in progress)

11000 students & **1500** teachers annually

K-12 programs serve students & teachers

21 joint faculty from 11 universities

IMPACT

In 2023, generated $452M in VA, creating 1,888 jobs, $16M in tax revenue

3969 scientific papers & journal articles

187

patents to date

Updated April 2025

CEBAF: A National Scientific User Facility

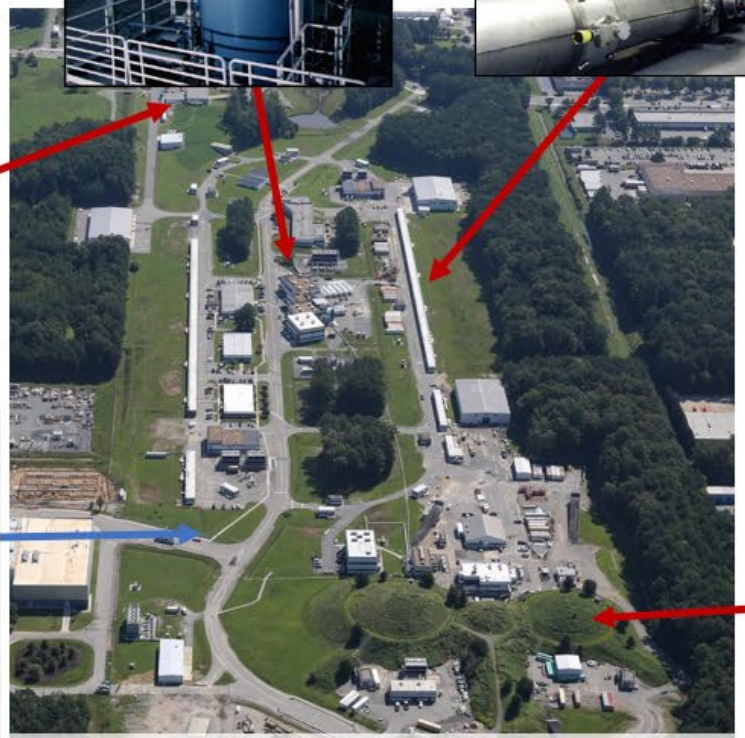
The world's most advanced continuous wave, high-energy, polarized electron accelerator

Cryogenic Refrigeration Plant

Cryomodules in the accelerator tunnel

Superconducting Niobium radiofrequency cavities

Hall D



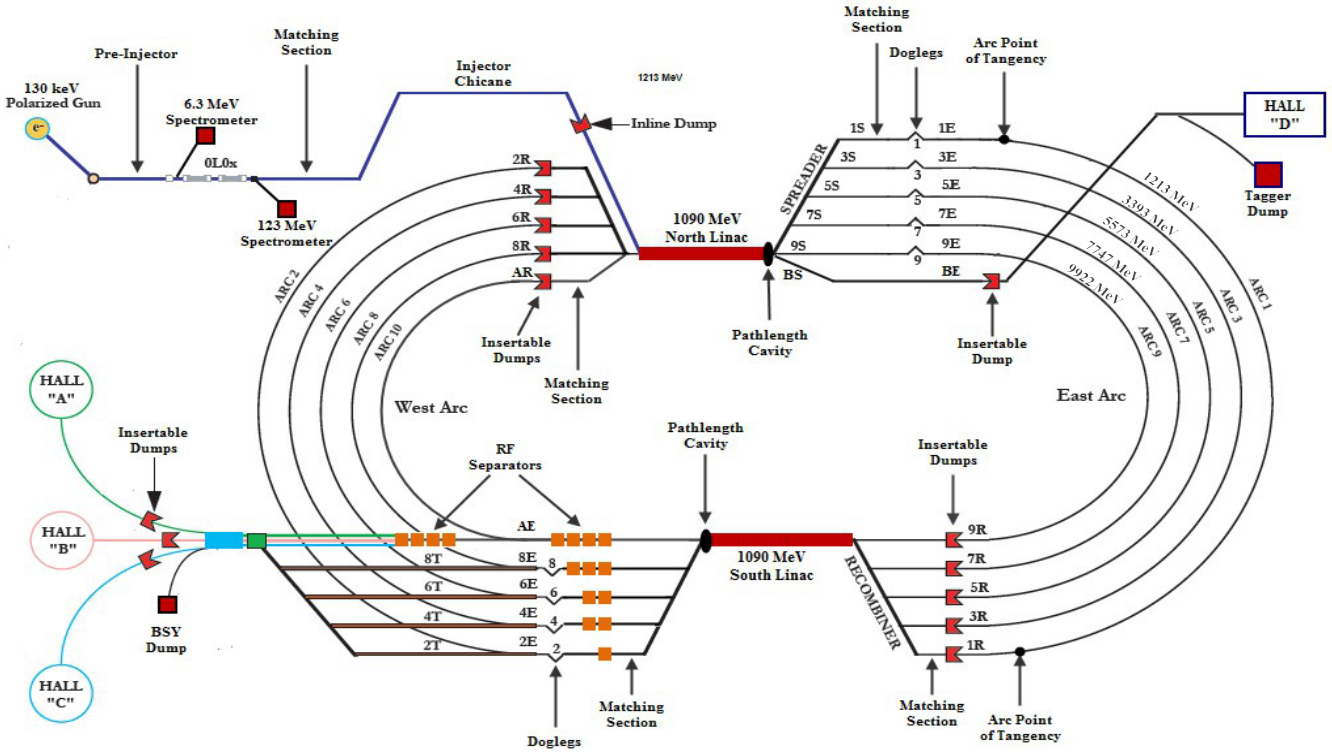
An aerial view of the recirculating linear accelerator and 4 experimental halls.

Recirculation Arcs

Hall C

CEBAF Overview

- ***User Facility:***
- Accelerator - 12 GeV electrons
- Nearly 2500 magnets of more than 81 different varieties focus and steer electron beam
- 25 feet below ground, shaped like an oval racetrack ~ 7/8 mile around
- Operates at 2 Kelvin, using ~16,500 gallons of liquified helium
- Electron beam may be split for simultaneous use in four experimental halls
- Giant particle detectors record interactions between incoming beam and quarks, protons, other particles inside target nuclei
- Experimental Halls collect 45 Terabytes of data per day



Accelerator Operations

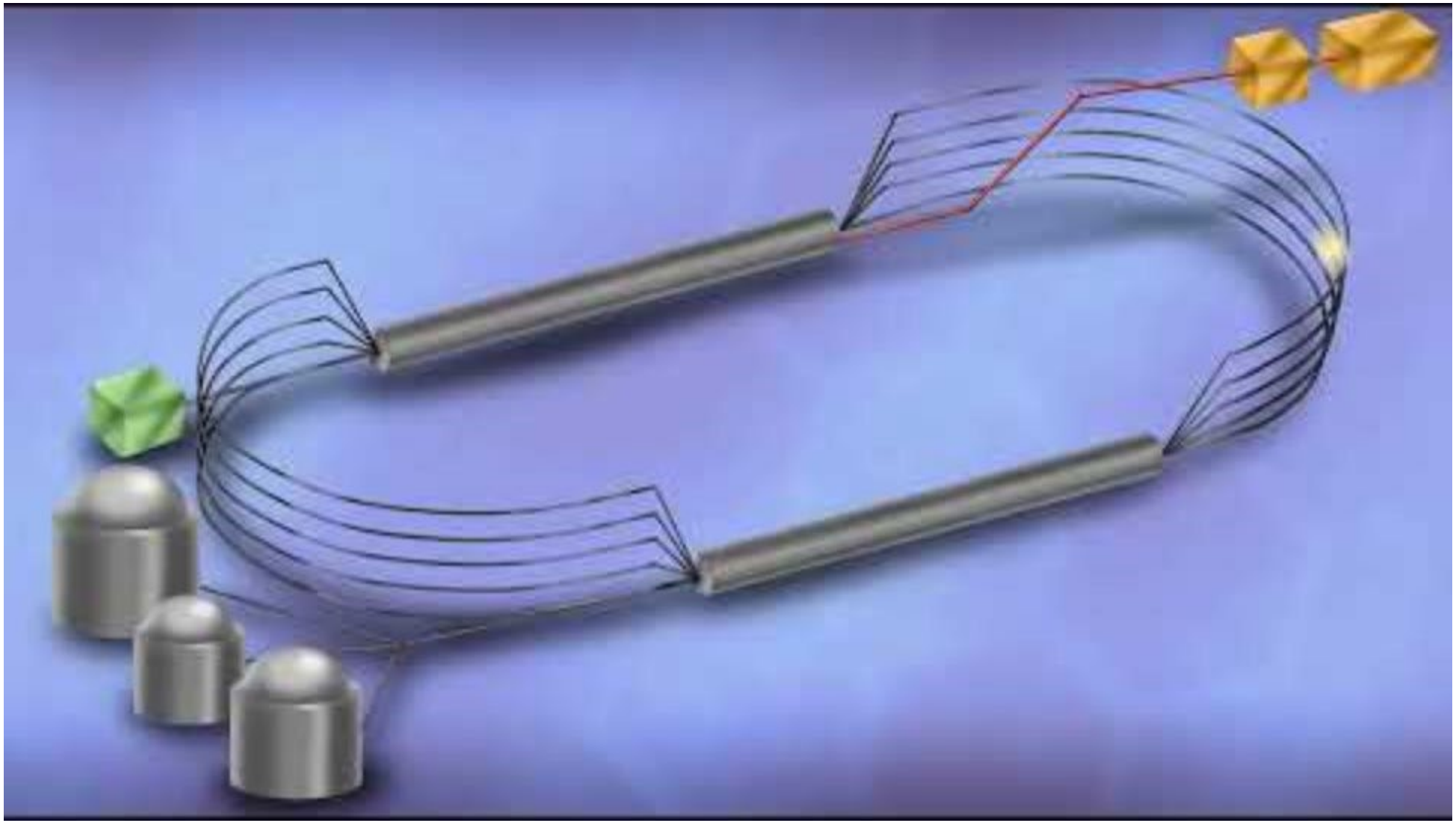
- Driven by DOE O 420.2D, Safety of Accelerator Facilities
  - Implementing this new revision now
- Safety Analysis Document (SAD) covers all accelerators, including CEBAF
  - Additional accelerators include:
    - Low Energy Recirculator Facility
    - Upgraded Injector Test Facility
    - Gun Test Stand
    - Vertical Test Area
    - Cryomodule Test Facility
- DOE-approved Accelerator Safety Envelope for all accelerators

Noted Features of TJNAF

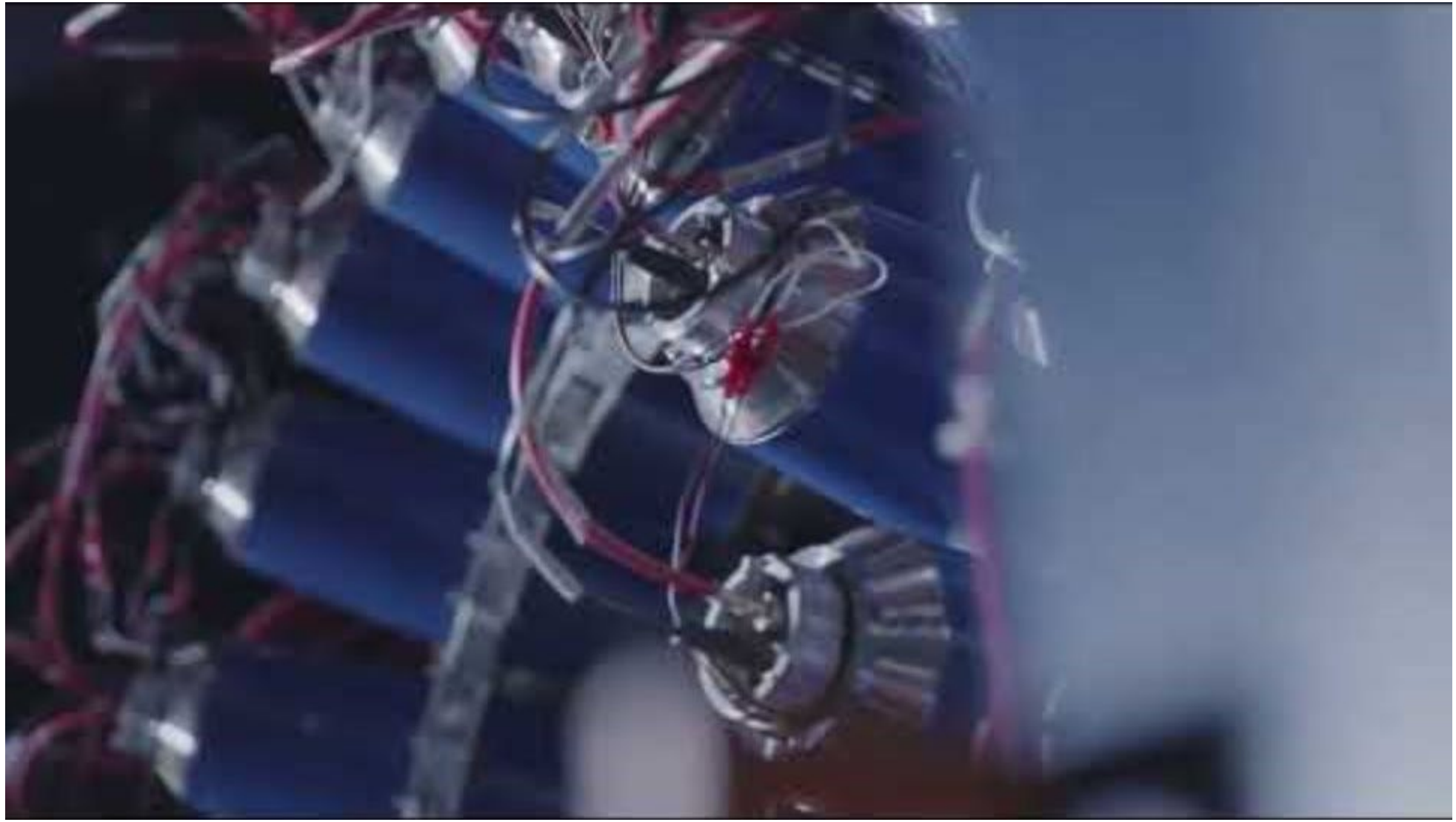
- CEBAF is funded by Office of Nuclear Physics
- Jefferson Laboratory selected by the Office of Advanced Scientific Computing Research to lead the High Performance Data Facility Hub, a $300-$500M effort, in partnership with Lawrence Berkeley National Laboratory
- Solid support from and partnership with stakeholders (local, regional, state)
  - Applied Research Center recently gifted to the DOE by City of Newport News
  - Commonwealth of Virginia supporting with over $45M to build the Jefferson Laboratory Data Center (JLDC) which will house the High Performance Data Facility (HPDF)
- Partner lab on the Electron-Ion Collider being built at Brookhaven National Laboratory with $500M of scope at Jefferson Lab
- Future renovation of Applied Research Center (ARC) and CEBAF Center
- Moving toward becoming a multi program laboratory

Exploring the Nature of Matter

Experimental Hall A



Experimental Hall B



Experimental Hall C

Experimental Hall D

Cryogenics

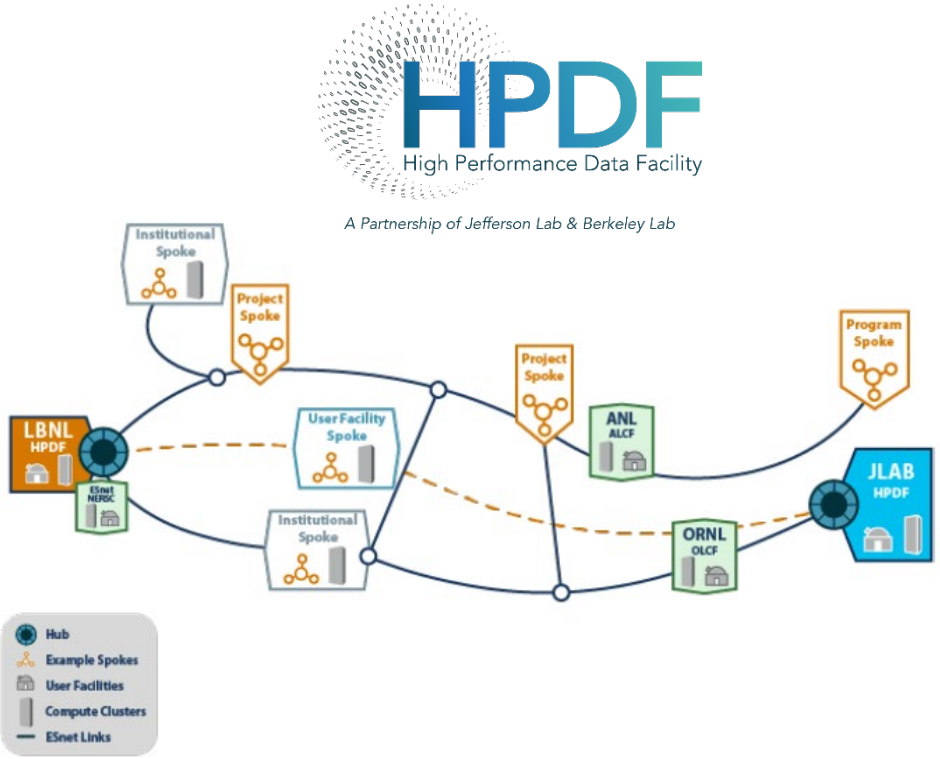
Superconducting Radiofrequency (SRF)

Computing

High Performance Data Facility (HPDF)

HPDF is a project under SC's Advanced Scientific Computing Research (ASCR) program. HPDF's mission will be to enable and accelerate scientific discovery by delivering state-of-the-art data management infrastructure, capabilities, and tools.

- **JLab is the lead for the HPDF project in partnership with LBNL.**
- **The project (TPC at CD-0 is $300M to $500M) will build a new scientific user facility** specializing in advanced infrastructure for data-intensive science, serving SC, DOE, and the nation.
- **HPDF will be an essential element of the ASCR User Facilities ecosystem with ESnet, NERSC, and the Argonne and Oak Ridge Leadership Computing Facilities.**
- HPDF will advance DOE's Integrated Research Infrastructure (IRI) program to seamlessly meld DOE's unique data, user facilities, and advanced computing resources to accelerate the pace of discovery.
- HPDF will have a hub-and-spoke model (see figure at right) with both centralized and distributed computing and data infrastructure. The Hub infrastructures will reside at JLab and LBNL. Spokes partners and users will access seamless data lifecycle services customized to their needs.

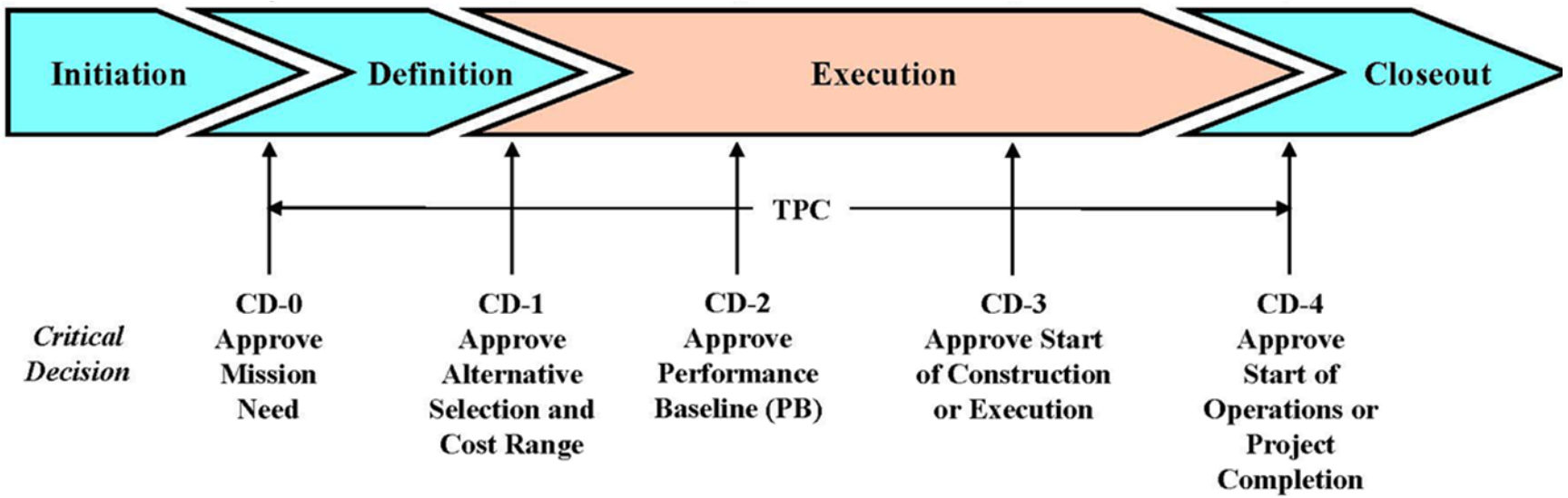


The HPDF project places Jefferson Laboratory on the path to becoming a multi-program national laboratory with two major Science programs, NP and ASCR, funding the operation of two SC User Facilities, CEBAF and HPDF, respectively.

Major Projects & Status

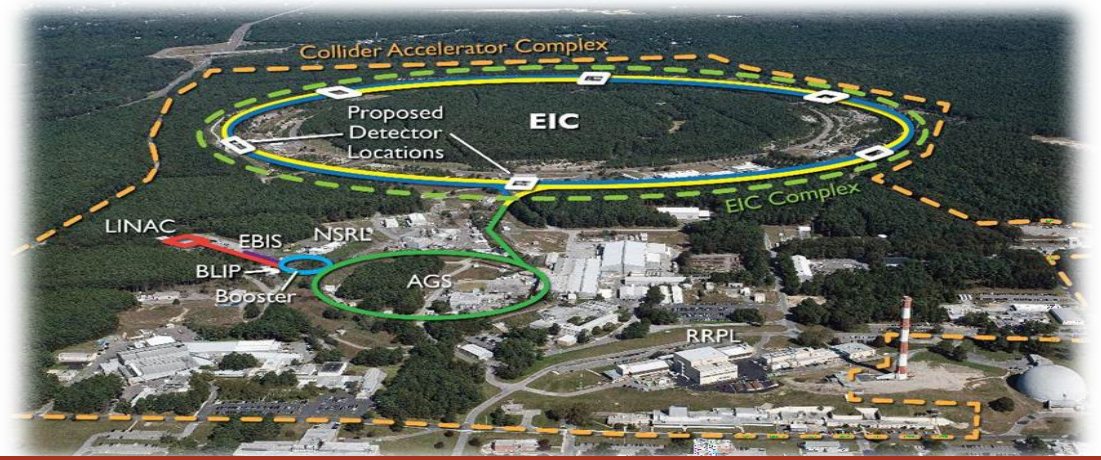
Focus on a Mission Enabling Campus

“Critical Decision” per DOE Order 413.3B



Electron-Ion Collider (EIC) Project Partnership w/Brookhaven National Lab (BNL)

Jefferson Lab scope: ~$500M



PROGRAM, MISSION, SCOPE, ACQUISITION STRATEGY

PROGRAM: Nuclear Physics (NP) **LOCATION:** BNL

PROJECT SCOPE: Design, build, and install the hardware and infrastructure for a new electron storage ring, an electron injector, and modifications to the Relativistic Heavy Ion Collider (RHIC) hadron ring required to produce an electron-ion collider. The facility is designed to meet requirements to ensure high reliability and availability for the user program. Jefferson Lab scope includes the infrastructure, accelerators, and the detector required to meet facility requirements.

EIC's TOP TAKE-AWAYS

BNL & JLab are Full Partners:

- Integrated project management at all levels
- Of the CD-3A approved $89M long lead procurements, 3 items are JLab scope with a total cost of $44M.
- JLab core expertise guided scope assignments
  - SRF technology ; Cryogenics ; Magnets
  - Particle detectors ; Electronics ; Computing
  - Accelerator physics and design

STATUS & ACTIONS

PROJECT STATUS: CD-1 was approved in 2021. Conceptual design is complete. Technical design is underway, and the project is preparing for CD-3b approval. JLab scope at CD-2 currently estimated at $526M.

CURRENT CHALLENGES/ISSUES/RISKS

Cost escalation for satellite cryoplant, technical risks on 591mHz cryomodule (first of a kind). Uncertain annual funding profile until CD-2 (Performance Baseline); CD-2 requires a complete understanding of EIC Project dependencies, including in kind contributions, and risk.

PLANNED CDs (FY Dates)

CD-3a	CD-3b	CD-2/3c	CD-3	CD-4
2nd QFY24 (A)	2nd QFY25	2nd QFY26	2nd QFY27	1st QFY35

CEBAF Renovation and Expansion (CRE) Project
TPC: $90.3M

STATUS & ACTIONS

PROJECT STATUS: CD-1 was approved in 2020. ARC acquisition was completed in October 2023. ARC Renovation bidding in progress. CEBAF Center design (35%) in progress.

CURRENT CHALLENGES/ISSUES/RISKS

High bids for ARC Renovation, M&O project management of this DOE O 413 delegated project.

PLANNED CDs (FY Dates)	
CD-2/3	CD-4
4th QFY25	3rd QFY31

PROGRAM, MISSION, SCOPE, ACQUISITION STRATEGY

PROGRAM : Science Laboratory Infrastructure (SLI) **LOCATION:** Thomas Jefferson National Accelerator Facility (TJNAF)

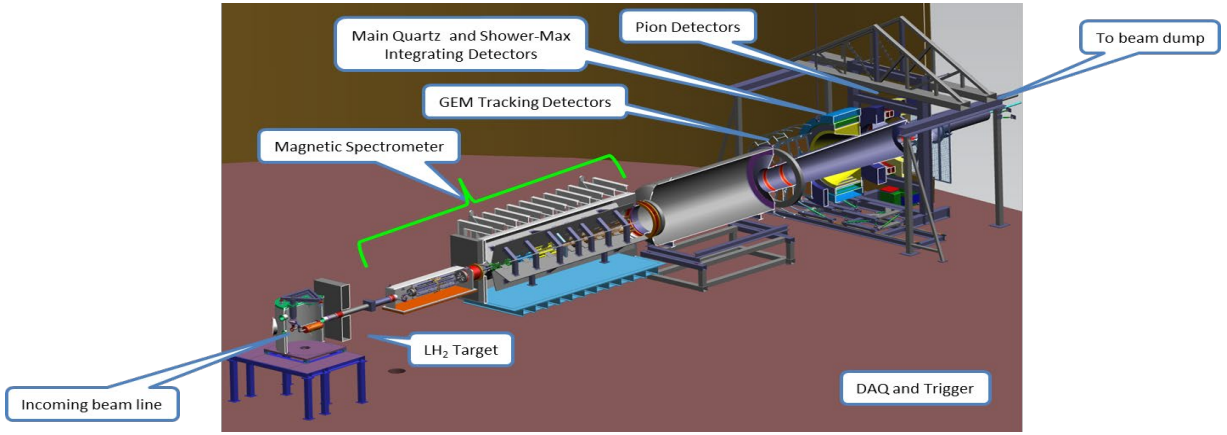
PROJECT SCOPE: Renovate the Applied Research (ARC) building and CEBAF Center. The key performance parameters (KPPs) for the project are based on a combination of renovated offices, collaboration and conference space, and recapitalization of building.

CRE's TOP TAKE-AWAYS

- Received $11M in April 2025 for a total of $60M
- Complete ARC renovation first; transition staff into ARC and then complete renovation of CEBAF Center
- Maintaining excellent safety posture throughout the duration of the construction work is critical

Measurement of Lepton-Lepton Electroweak Reaction (MOLLER)

Project TPC: $48.66M



STATUS & ACTIONS

PROJECT STATUS: 64% complete. The team is currently focused on closing out ten recommendations from the March 2025 Independent Project Review (IPR), which includes refining the overall schedule and determining remaining cost and schedule contingency. CD-3a and CD-3 scope behind schedule, recent upturn in CD-3 SPI

CURRENT CHALLENGES/ISSUES/RISKS

Critical path runs through detector and target assembly. Must establish and implement a realistic resource loaded schedule recovery plan. Supply chain issues continue.

CDs (FY Dates)	
CD-2/3	CD-4
May 28, 2024 (A)	Q4FY28 (P)

PROGRAM, MISSION, SCOPE, ACQUISITION STRATEGY

PROGRAM: NP **LOCATION:** TJNAF

PROJECT SCOPE: Design, construct, and install the experimental equipment in Hall A, and to make modifications to existing Hall A systems. It has the following principal scope elements: liquid hydrogen target, spectrometer, integrating detectors, tracking detectors, Hall A infrastructure and integration, data acquisition and trigger.

TOP TAKE-AWAYS

- Received CD-3a approval in 2nd QFY23 for $9.14M in long lead procurements to be completed in 4th QFY25.
- Received CD 2/3 Approval May 28, 2024.
- All funding to execute the TPC of $48.66M has been received.
- Will be installed in Hall A for multi-year experimental program.

HIGH PERFORMANCE DATA FACILITY (HPDF) Project

Partnership w/ Lawrence Berkeley National Laboratory (LBNL)

Cost Range at CD-0: $300M - $500M

More information at: https://www.hpdf.science/

STATUS & ACTIONS

PROJECT STATUS: CD-0 was approved in 2020. DOE announced HPDF Hub site selection in October 2023 to TJNAF as lead and LBNL as partner. The project formally kicked off in February 2024. The joint TJNAF-LBNL project team is advancing the conceptual design for the high performance data infrastructure based on stakeholder requirements. JLab has completed initial siting and architectural/ engineering studies for the JLab Data Center to house HPDF.

CURRENT CHALLENGES/ISSUES/RISKS

Requires a phased approach with strong stakeholder partnerships to complete the technical design of data services and infrastructure; requires a data center at JLab, including additional power and cooling decoupled from the CEBAF.

PROGRAM, MISSION, SCOPE

PROGRAM : Advanced Scientific Computing Research (ASCR)
Location: Thomas Jefferson National Accelerator Facility (TJNAF) & Lawerence Berkley National Laboratory (LBNL)

Mission: To enable and accelerate scientific discovery by delivering state-of-the-art data management infrastructure, capabilities, and tools to the nation's research communities.

PROJECT SCOPE: The HPDF Project scope will comprise the following: • Data center site outfitting, power, and cooling infrastructure at Jefferson Lab and Berkeley Lab. • Design, acquisition, delivery, and commissioning of the Hub computing and data infrastructure at Jefferson Lab and Berkeley Lab. • Integration of HPDF infrastructure with ESnet and the ASCR high-performance computing (HPC) facilities: NERSC, ALCF, and OLCF. • Software development for core HPDF services and development of an operations team that will support the infrastructure and scientific users.

HPDF's TOP TAKE-AWAYS

- HPDF is crucial to the Department's AI research mission and to the ASCR Facilities ecosystem.
- HPDF introduces the opportunity for JLab to move beyond being a single purpose lab to becoming a multi-program laboratory.

General Plant Projects (GPPs)/Accelerator Improvement Projects (AIPs)

All AIPs/GPP's are direct funded by Programs (no Institutional GPPs)

Current portfolio (all but 2 completed before 2025) includes Science Laboratories Infrastructure (SLI), Nuclear Physics (NP) and Jefferson Lab (JLab).

Shift in GPP strategy

Over the past couple of years, the GPP portfolio focus has shifted towards ensuring a capable and more resilient infrastructure to enhance mission accomplishment.

Transparent interface with TJSO is essential

Expectations are to deliver projects as proposed and maintain an effective and transparent interface between TJSO and the Lab in developing, proposing and delivering future projects.

SC is moving toward 2-3 year execution windows

Recent JLab experience has been 2-4 years

Cost and schedule performance in the completion of GPPs has been a concern

General Plant Projects Active after FY25

- **Cryogenic Test Facility Upgrade Project (SLI-Funded)**
- **Scope:** Replace the CTF Shield Refrigerator (CB1N) and the upgrade of the CTF Cryogenics Distribution System including the Valve Box (VB), Junction Box (JB), and Transfer Line (TL).
- **Drivers:** The CTF Upgrade will help to address capability and performance gaps in the TJNAF cryogenic system which is critical to supporting Superconducting Radio Frequency activities in the Test Lab.
- **TPC/Planned Completion:** $5.2M/ Q1 FY26
- **Status**: 95% complete. Distribution Box system completed. Cold Box fabricated by April 2025, Install by May 2025, and Commissioning then project closeout by Q1 FY26.

General Plant Projects Active after FY25

Central Utility Plant (CUP) Chiller Upgrade Project (JLab-Funded)

Mission Need: The CUP chiller upgrade project will increase chiller plant cooling capacity.

Scope: Decommission 3 chillers in the Test Lab basement with an additional 800-ton chiller to the CUP. Add a fourth 800-ton chiller to provide redundancy while responding to casualties and maintenance.

Drivers: The TJNAF need for increased system resiliency and reliability

TPC/Planned Completion: $5.2M/ 3rd QFY26;

Status: 17.4 % complete. Installed exterior foundation for transformer and switchgear, set interior switchgear, initiated installation electrical conduit for chillers/pumps.

Summarizing Line Item, MIE, GPP projects

Total project portfolio over next 5-10 years expected to be ~1B

<u>Common themes of challenges</u>

- Annual funding constraints
- Economic risks (inflation, supply chain)
- Talent to successfully execute projects with discipline
  (direct project staff and support staff)
- Ensuring business and other support functions address the challenges
  of a large and complex project portfolio

Opportunities for Continuous Improvement

M&O Contractor that understands and acts upon Contractor Assurance System implementation, including rigorous self-assessment of management systems and follow through.

M&O corporate reach-back capacity that is timely to help lab leadership both identify and address risks across operations, ES&H, project management, human capital, etc.

Establish a culture of accountability and stewardship

- Emphasis on “normalization of excellence” versus “normalization of deviation”
- Focus on effective field implementation of ISM and work planning and control
- Emphasis on questioning attitude throughout organization vs. acceptance of past practices
- Instill “Pride of the Lab” in all activities
- More thorough causal analysis to understand issues and extent of conditions resulting in continuous improvement.

Almost half the lab staff are new in past 4 years

Opportunities for Continuous Improvement

Stewardship of the Laboratory, protecting and preserving DOE assets

- From experimental halls to sidewalks
- Chronic under investment in maintenance and modernization

Business systems

- Need for robust procurement system to support growth plus day to day
- Human Capital Management System improvements
- Support transition to multi-program laboratory – processes, systems, technology

Security

- Science and Technology security - keeping up with growing requirements, especially with open science culture
- Continuing challenge to maintain robust cyber security program with limited (but capable) staff
- Reinvigorate and balance physical security posture and access control
  - The City of Newport News has expanded and encircled the lab on all sides increasing potential for unauthorized access

Key Operational Deliverables

- Reliable CEBAF Operations
  - Increased beam availability and overall energy reach
- Deliver on up to $1B in projects over the next few years
  - Electron-Ion Collider - $500M, CD-1 approved
  - HPDF – $300M – $500M – siting at JLab and LBNL announced
  - Supporting other national labs (SRF, cryo, etc.)
  - CEBAF Renovation and Expansion - ~$90M, CD-2/3 4QFY25 (F)
  - Thomas Jefferson Infrastructure Improvement - ~$90M, CD-0 approved
  - Other GPPs

Multi-lab endeavors

Conclusions and Take-Aways

Exciting time for Jefferson Lab!

Partnership among M&O, Lab, and DOE are necessary to deliver mission and address challenges and risks

Most investment since Laboratory's inception

JLab is transitioning to a multi-program lab (NP and ASCR) and that is a major multi-year opportunity and challenge

DOE and key stakeholders are committed to the Laboratory's success

Procurement Process

Casey McCracken, Procurement Analyst

Procurement Process

- The Office of Science is committed to ensuring a fair, full and open, collaborative, and transparent process.

- Major Goals
  - Maximize competition
  - Select the best contractor
  - Improve the process

Source Evaluation Board

- Source Evaluation Board (SEB) appointed
  - DOE employees
  - Voting and non-voting members
- SEB is responsible for all aspects of the procurement
  - Developing and issuing the RFP
  - Responding to questions
  - Evaluating the proposals
- Source Selection Authority (SSA) will make selection
- We are in the midst of an active contract competition. Conversations and communications between members of the SEB and prospective offerors or other interested parties outside of the official procurement process are prohibited.

What We've Done

- Announced the intent to compete – March 27, 2025
- Launched competition website – April 15, 2025
- Issued Expression of Interest (EOI) notice – April 15, 2025
- Held Informational Meeting – May 14, 2025

Competition Website

- https://science.osti.gov/Acquisition-Management/M-and-O-Competitions/TJNAF25
- Official source of information and primary means of communication
- Contains information and direction critical to the competition and all official documents
  - RFP and amendments
  - Questions and Answers
  - Event information (e.g., registration instructions, presentations, attendee list, etc.)
  - Document library
- **Interested parties are responsible for frequently monitoring the website for information, notices, and updates regarding the solicitation.**

Question and Answer Protocol

- Questions will not be answered verbally
- A careful and deliberate Q&A process has been established to
  - Protect the integrity of the procurement process
  - Ensure the consistent transfer of information
- Questions may be summarized or synopsized
- Duplicative questions will not be repeated
- Questions must be submitted to TJNAFcompetition@science.doe.gov
- All responses will be prepared by the SEB and posted on the competition website

RFP Highlights

- Contract type – performance-based; cost-reimbursement w/performance fee and award term incentive
  - 5-year base period
  - Potential to earn up to 15 additional years of award term
- Contract awardee will be expected to assume full responsibility for TJNAF on June 1, 2026
- 60-day transition period anticipated
- Not identical to the cancelled TJNAF RFP; meaningful changes to the evaluation factors are anticipated
- General themes (subject to change)
  - Offeror's plan for implementing DOE vision
  - Laboratory operations
  - Lab Director and other key personnel experience
  - Organizational structure, governance approach, corporate reach back
  - Contractor assurance
  - Past performance

Tentative Schedule (Subject to Change)

- Release RFP – August 2025
- Pre-Proposal Conference – approximately two to three weeks after RFP release
- Receipt of Proposals – 60 days after release
- Oral Presentations – approximately three to four weeks after receipt of proposals
- Award – March 2026
- Intend to award without discussion; however, DOE reserves the right to hold discussions if deemed necessary.

DOE looks forward to engaging with the community, industry, and other interested parties in a transparent and collaborative manner throughout the solicitation process for a contractor to manage and operate TJNAF.

Questions must be submitted to: TJNAFcompetition@science.doe.gov