# 2020 Laboratory Agenda

## Simultaneous Excellence in...

NUCLEAR SECURITY

MISSION-FOCUSED SCIENCE, TECHNOLOGY, AND ENGINEERING

MISSION OPERATIONS

COMMUNITY RELATIONS

Los Alamos NATIONAL LABORATORY EST. 1943

DEPARTMENT OF ENERGY · UNITED STATES OF AMERICA

NNSA National Nuclear Security Administration


**Three murals (a portion of one shown here) now grace the halls of PF-20, the entry point into PF-4. Representing the past, present and future of Weapons Production, the colorful depictions serve as both a learning tool for visitors and a tribute to the employees of the Weapons program.**

# Preface

Simultaneous excellence in nuclear security, ST&E, operations, and community relations—these will be the hallmarks of Los Alamos National Laboratory.

LANL's employees are charged with an important national security mission. Every day, we apply world-changing science and technology to ensure the safety, security, and effectiveness of the U.S. nuclear deterrent and solve some of the nation's toughest national security challenges.

**Thom Mason**
**Director,**
**Los Alamos National Laboratory**

In FY19 alone, our 12,000 employees completed a significant amount of work and advanced each of the four strategic objectives in the 2019 Lab Agenda:

**Nuclear Security**
- Submitted the annual assessment letter
- Manufactured five development pits, and delivered our plan to meet the 30-pits-per-year mission
- Met LANL's commitments on the B61-12, W88 Alts 370 and 940, and W76-2
- Enhanced the nation's ability to detect underground nuclear detonations with the DAG shot series

**Mission-focused ST&E**
- Applied data-mining techniques to advance earthquake prediction, machine learning
- Performed the world's first billion-atom biomolecular simulation
- Designed, developed, and delivered the SuperCam instrument for the Mars 2020 Rover mission
- Created the world's first atomtronic rotation sensor, a quantum device enabling accurate navigation without GPS

**Mission Operations**
- Developed the future campus plan
- Resumed WIPP waste shipments
- Made strategic facility and infrastructure investments
- Crafted a new subcontractor strategy

**Community Relations**
- Reset relationships with our community, the press, and our stakeholders
- Donated $2.9M during the LANL Employee Giving Campaign
- Launched strategic training programs for key workforce needs
- Invested resources in education, economic development, and philanthropy through the Community Commitment Plan

This past year also saw the launch of many long-term efforts to lay the foundation for our Laboratory's future. These efforts include refining our employee performance and reward systems, planning rigorously for pit manufacturing, developing new approaches to procurement and subcontracts, and advancing mission-critical capabilities. These foundational efforts are essential for delivering our programmatic commitments.

**The plan for 2020**

We have laid the groundwork for a culture where *how* we work is as important as *what* we do. Developing this culture is an evolving, iterative journey that will require continuous effort. In the coming year, we pledge to proactively manage risk, focus on our work, and rely on continuous learning to further strengthen this foundation.

The FY20 Lab Agenda establishes our priorities and is aligned with the NNSA's Strategic Integrated Roadmap. By focusing on these priorities, we will demonstrate simultaneous excellence and build on foundational initiatives that help our nation meet the challenges of today and tomorrow.

**About the cover images:**

- Daniel Byers, DET-2, produces flat cable that will be used for multiple projects.
- Emilio Racinez stands next to a power line near TA-03. After more than 30 years on the job, he remains passionate about bringing more electrical power to the Laboratory.
- Harshini Mukundan, C-PCS, aligns the fieldable optical biosensor developed at LANL.
- Laboratory volunteer Vangie Trujillo helps out at United Way of Santa Fe County's Kaune Early Learning Center in Santa Fe.

# The Laboratory Agenda

The Laboratory Agenda provides a structured framework that identifies the critical outcomes, strategic initiatives and near-term R&D, and production and mission-support activities needed to accomplish our mission.

| Simultaneous Excellence | NUCLEAR SECURITY | MISSION-FOCUSED SCIENCE, TECHNOLOGY, AND ENGINEERING |
|---|---|---|
| Strategic Objective (10–20 years) | Excellence in Nuclear Security | Excellence in Mission-Focused Science, Technology, and Engineering |
| Critical Outcomes (5–10 years) | Design, produce, and certify current and future nuclear weapons, and reduce global nuclear threats | Deliver scientific discovery and technical breakthroughs that support DOE and NNSA missions |
| Major Strategic Initiatives (1–5 years) | 1.1 Execute LANL's manufacturing mission to deliver 30 plutonium pits per year<br>1.2 Transform nuclear weapons warhead design and production<br>1.3 Anticipate threats to global security; develop and deploy revolutionary tools to detect, deter, and respond<br>1.4 Continue to support the W88 Alt 370, the Alt 940, and the B61-12 LEP<br>1.5 Assess the stockpile as it ages and project weapon system lifetimes | 2.1 Refresh and refine the LANL capability pillar framework<br>2.2 Advance accelerator science, engineering, and technology to enable future stewardship capabilities<br>2.3 Advance the frontiers of computing to exascale and beyond<br>2.4 Assert leadership in the national quantum initiative<br>2.5 Develop and implement an integrated nuclear energy and materials initiative<br>2.6 Develop and implement an integrated initiative for plutonium and actinide missions |
| Champion | Bob Webster  | John Sarrao  |

| MISSION OPERATIONS | COMMUNITY RELATIONS |
|---|---|
| Excellence in Mission Operations | Excellence in Community Relations |
| Execute sustained operations that are reliable and responsive to mission needs | Sustain and enhance LANL's partnership with the community across the Northern New Mexico region |
| 3.1 Change organizational culture with an emphasis on organizational learning<br>3.2 Improve integrated planning across priority mission activities and infrastructure<br>3.3 Address critical issues related to NMCA, nuclear safety, criticality safety, and classification enhancements<br>3.4 Implement systematic process improvement to drive increased rigor and efficiency in work execution<br>3.5 Enhance quality of work life, workforce planning, and training and development | 4.1 Continue commitment to the community with educational, economic, and philanthropic investments of time and resources<br>4.2 Strengthen pipelines and partnerships to build the workforce of the future<br>4.3 Enhance small business participation in executing LANL's scope across all directorates |
| Kelly Beierschmitt  | Frances Chadwick  |

Please see page 34 for a list of acronyms and their definitions.

# Excellence in Nuclear Security

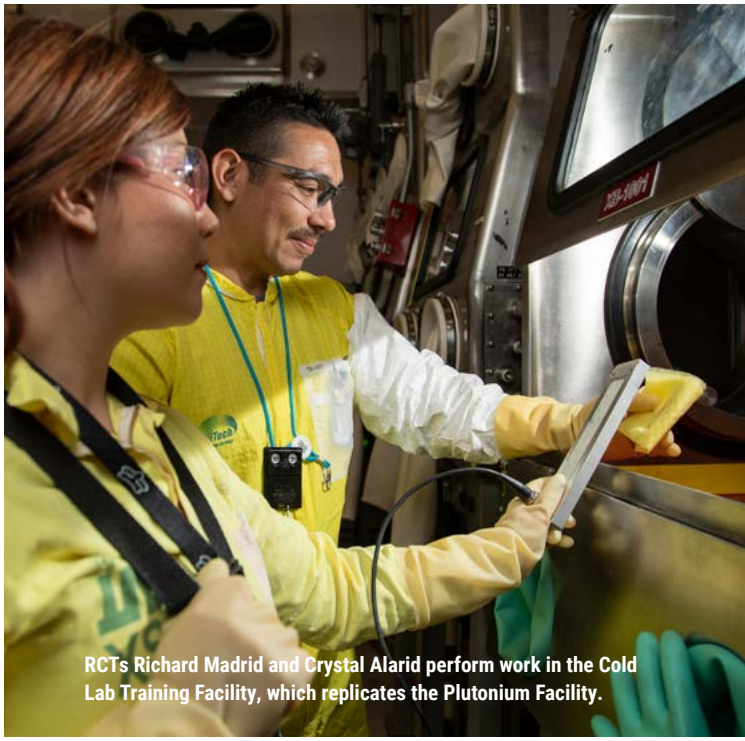
BOB WEBSTER, DEPUTY LABORATORY DIRECTOR FOR WEAPONS

## 1.1 Execute LANL's manufacturing mission to deliver 30 plutonium pits per year

- Execute projects necessary to support FPU
- Work with NNSA to define all PF-4 program requirements
- Update the integrated schedule for TA-55 to meet all institutional deliverables, including information to support NNSA budget submittals (Lead: David Dooley)
- Meet FY20 pit production goals, including the PRT schedule for PPI activities (Lead: Frank Gibbs)
  - Update the 30-pits-per-year plan in April 2020
  - Execute the PRT plan for pit production PPI
- Enhance the quality of the work environment (Lead: Dan Mack)
  - Expand office space and parking in the Pecos Road corridor
  - Expand training capabilities
- Build the specialized workforce needed for TA-55's mission (Lead: Dave Eyler)
  - Focus retention and hiring to support expansion of critical skills

Debbie Martinez, DET-1, is performing explosive powder–pressing operations on a B61 detonator.

Responsibility
**DAVE EYLER**



RCTs Richard Madrid and Crystal Alarid perform work in the Cold Lab Training Facility, which replicates the Plutonium Facility.

- Execute the plan to achieve in-process monitoring for NMCA (Leads: Dan Mack, Jeff Heath)
- Execute the NGEN TRU waste plan to de-inventory TA-55 (Lead: Frank Gibbs)
- Execute projects in support of the 30-pits-per-year plan (Leads: Kathye Segala, Paul Kreitz)
- Execute the plan to improve analytical chemistry turnaround time (Lead: Pat Fitch)
- Continue support to SRS pit production scope as defined in MOAs and SRPPF scope (Leads: David Dooley, Kathye Segala)

## 1.2 Transform nuclear weapons warhead design and production

- Provide the best options for the nation's future stockpile, including
  - Advancing the next Navy warhead through the Phase X process (Lead: James Owen)
  - Vigorously executing the Stockpile Responsiveness Program (Lead: Michael Bernardin)
  - Developing the advanced tools needed for certifying and qualifying future options (Lead: Michael Bernardin)
- Meet weapons program production deliverables beyond pits (Lead: Dave Eyler)
- Develop and prototype integrated design-for-manufacturability approaches in weapon design, engineering, and production (Lead: Charlie Nakhleh)
- Develop advanced manufacturing capabilities for warhead modernization (Lead: James Owen)

Responsibility
**BOB WEBSTER**

Responsibility
**MICHAEL BERNARDIN**

**Wearing personal protective equipment that includes a respirator, RCT Alejandra Munoz-Loya is prepared to work safely onsite at LANSCE.**

**High-tech additive manufacturing (3D printing) takes the guesswork out of making a hollow metal object while tweaking and fine-tuning the properties of the material composing it.**

# Excellence in Nuclear Security

## 1.3 Anticipate threats to global security; develop and deploy revolutionary tools to detect, deter, and respond

Responsibility
NANCY JO NICHOLAS

- Deliver on NNSA and SPP projects that support nonproliferation, counterproliferation, and emerging threats, with particular focus on high-priority commitments (Lead: Andy Erickson)
  - ARIES deliverables
  - Remediate, obtain free release, and turn over the Research and Technical Building to the University of Washington
  - Space instruments for NNSA and NASA; agile space development and delivery for DoD
  - Low-yield nuclear monitoring experiments
  - Foreign Nuclear Weapons Intelligence Initiative and related intel products
- Develop and deliver on programs with DoD that support key national security challenges (Lead: Bill Humbert)
  - Identify programs for advanced reactors and power systems for DoD applications
  - Provide operational support to the combatant commands
  - Build on recent successes to establish a Laboratory approach to detect and deter emerging counterfeit media (deepfakes)
- Establish leadership in experimentally verified intelligence (using LANL as a testbed) in the area of multiple-phenomenology detection (Lead: Eric Dors)
- Advance and demonstrate large-scale, high-fidelity modeling and simulation of complex systems (Lead: Andy Erickson)
- Establish a Laboratory critical materials technology strategy (Leads: Melissa Fox, Andy Erickson)

**LANL-designed sensors attached to a satellite were sent into space from Cape Canaveral Air Force Station in Florida, serving a crucial role in detecting nuclear explosions.**

**Mark Nelson, NEN-2, inspects the electronics used in the innovative, lightweight, and portable neutron multiplicity detector, called the MC-15.**

## 1.4 Continue to support the W88 Alt 370, the Alt 940, and the B61-12 LEP

- Deliver design agency responsibilities for LEPs and Alts (Lead: James Owen)
  - Continue system qualification testing to meet the baseline B61-12 schedule
  - Continue system qualification to meet the revised baseline W88 Alt 370 schedule
  - Deliver Alt 940 hardware to support the baseline W88/Alt 370 FPU schedule
  - Complete weapon response work to achieve FPU on W88 Alt 370 and B61-12
  - Qualify the pit recertification facility at Pantex in support of FPUs

Responsibility
**JAMES OWEN**

This B61-12 bomb is a representative JTA used in ongoing qualification flight testing.

The Laboratory owns seven confinement vessels that are used at DARHT. Each fully outfitted vessel costs about $2 million and can be cleaned and reused after an experiment.

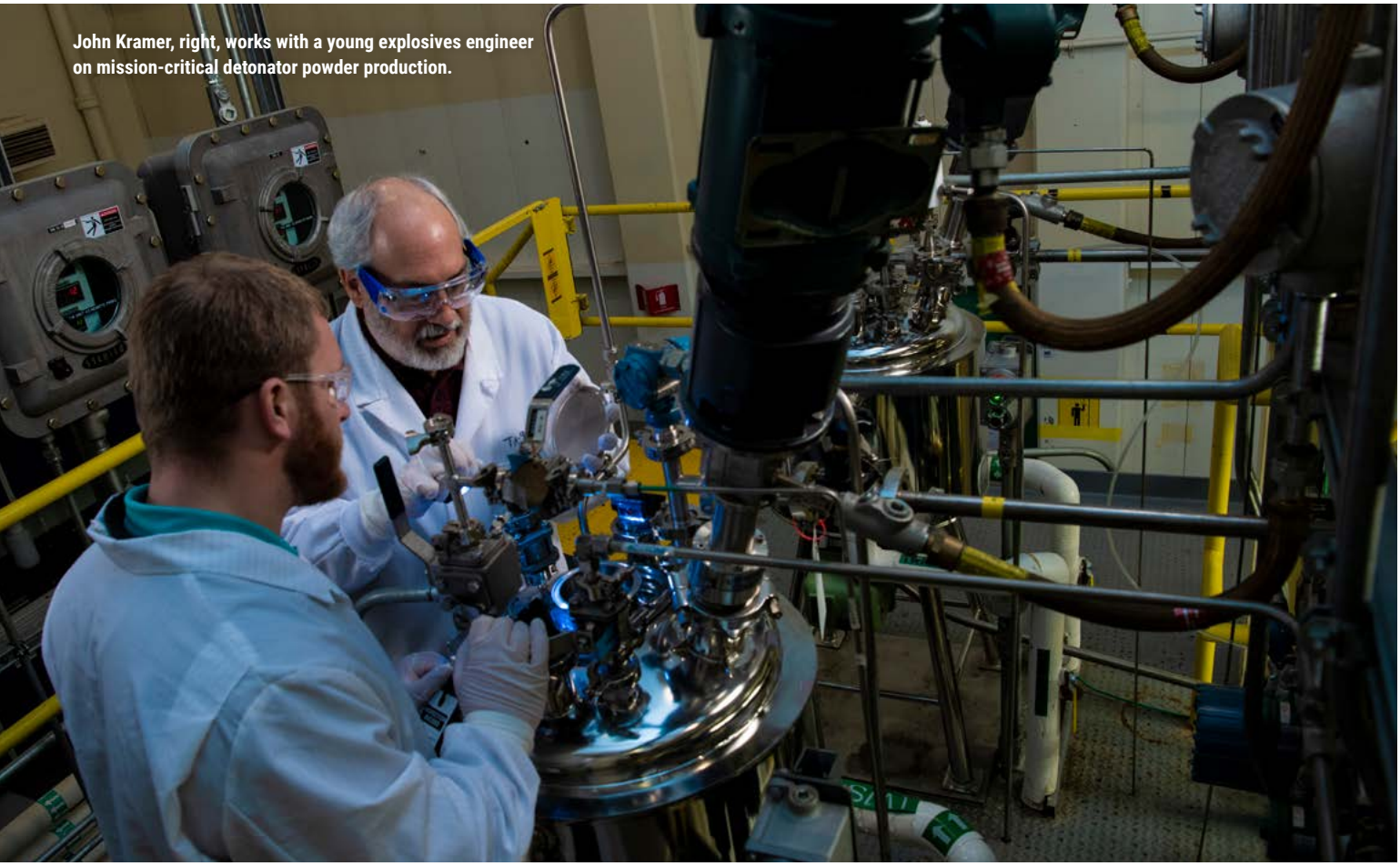
# Excellence in Nuclear Security

## 1.5 Assess the stockpile as it ages, and project weapon system lifetimes

- Deliver annual assessment reports (Lead: Sieg Shalles)
- Aggressively advance cutting-edge weapons science to enhance the technical foundation for underwriting weapons assessments, including effects caused by intrinsic radiation, reactive chemical species, and environmental/operational results (Lead: Michael Bernardin)
- Continue the development of higher-fidelity diagnostics and models to assess and project weapons-aging rates (Lead: Donald Haynes)

Responsibility
**BOB WEBSTER**

Responsibility
**MICHAEL BERNARDIN**



**John Kramer, right, works with a young explosives engineer on mission-critical detonator powder production.**

Boris Maiorov is mounting a sample, machined as a cylinder, between two piezo-electric transducers in an RUS system. With the RUS technique, scientists at LANL are able to obtain the complete elastic tensor of the material, shedding light on a variety of phenomena and materials—from magnetic skyrmions to aging of plutonium.

The Trinity supercomputer supports the NNSA's Stockpile Stewardship Program. Trinity is ranked #7 on the Supercomputing TOP500 list of the world's fastest supercomputers.



The centrifuge at Los Alamos is one of the only centrifuges in the world that allows scientists and engineers to approximate certain flight conditions on a nuclear warhead re-entry system. Previously, this capability would have required a full-scale missile flight test.

# Excellence in Mission-Focused Science, Technology, and Engineering

JOHN SARRAO, DEPUTY LABORATORY DIRECTOR FOR SCIENCE, TECHNOLOGY, AND ENGINEERING

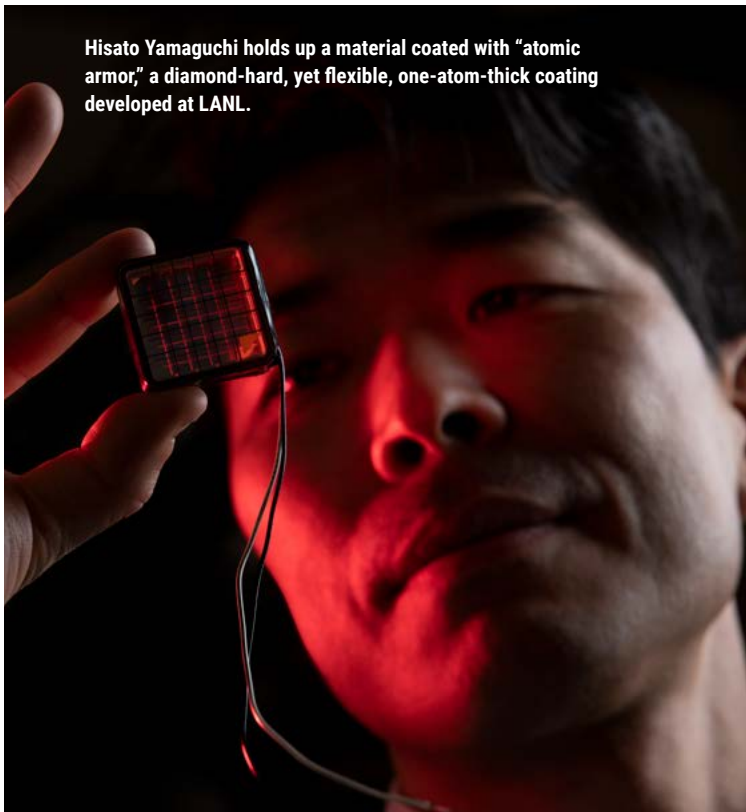
## 2.1 Refresh and refine the LANL capability pillar framework

- Complete Phase II of the pillar refresh (Leads: Carol Burns, pillar-owning ALDs)
  - Identify any gaps, inconsistencies, and negative overlaps in the pillar framework
  - Propose modifications or additions to the pillar framework
  - Charter the formation of new pillars as appropriate, including investment strategies
  - Re-initiate capability reviews in FY20 within the pillar framework
  - Enhance internal and external communication plans for capabilities
- Continue to support the long-term health of our underpinning research; pursue priority initiatives identified in health of science discussions (Lead: Carol Burns)

Responsibility
CAROL BURNS

Explosives chemist David Chavez synthesizes a new, high-performance, melt-castable explosive developed in collaboration with the scientists at ARL.

Lab employees check the operations of a new technology, called ALFa LDS, an affordable, robust, autonomous system for the detection of natural gas leaks.



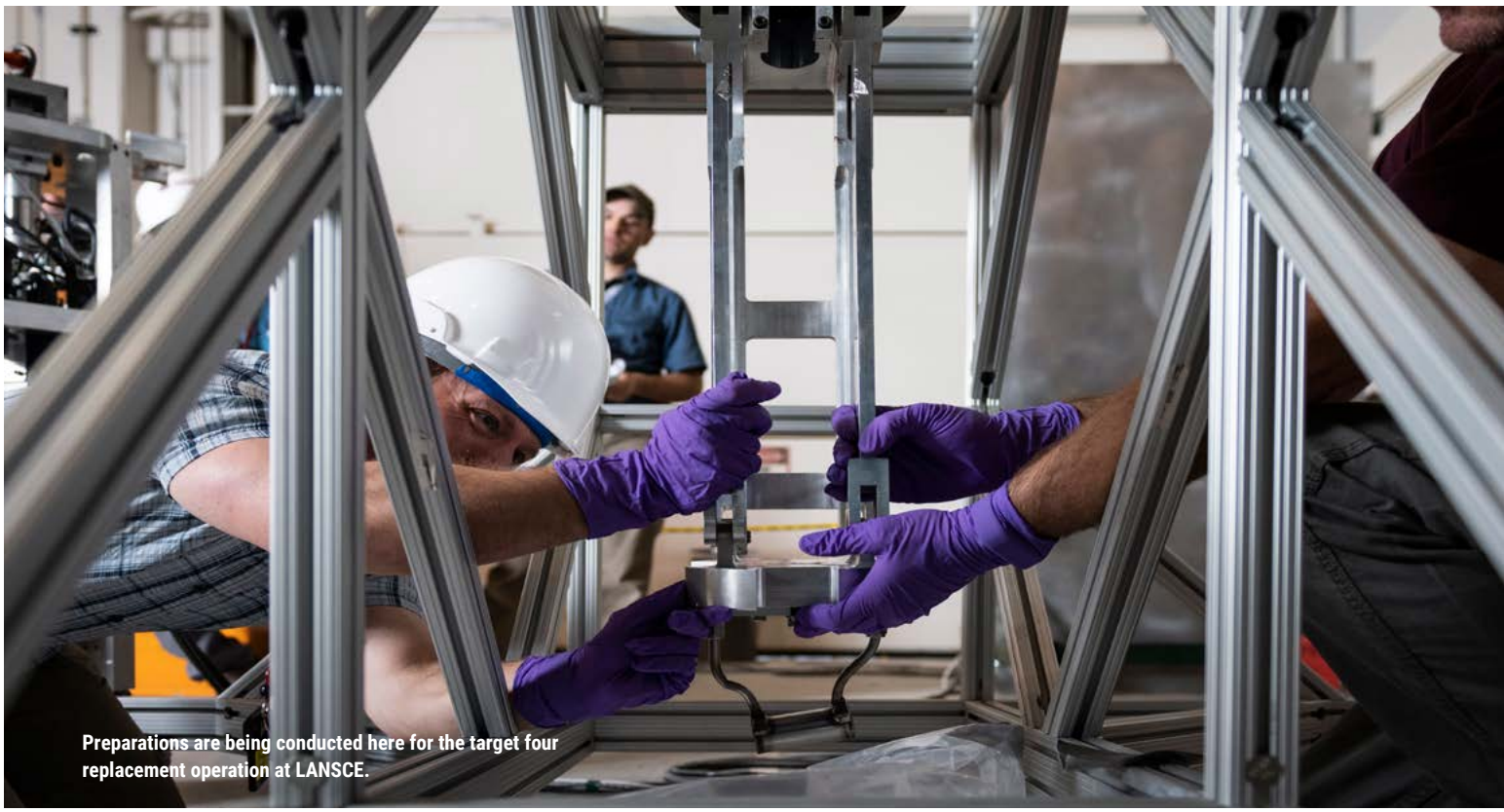
Hisato Yamaguchi holds up a material coated with “atomic armor,” a diamond-hard, yet flexible, one-atom-thick coating developed at LANL.

## 2.2 Advance accelerator science, engineering, and technology to enable future stewardship capabilities

- Develop and nurture world-class, accelerator-based R&D, enabling responsive solutions to emerging national security needs consistent with the institutional accelerator strategy (Lead: Stephen Milton)
- Strengthen and expand our accelerator ST&E workforce and inter-laboratory and university partnerships (Lead: Bruce Carlsten)
- Steward existing facilities, including sustaining and enhancing DARHT and LANSCE operations and mission impact (Leads: Gus Sinnis, Chuck Mielke)
- Demonstrate exceptional project management practices and execution for the ASD Scorpius project (Lead: David Funk)

Responsibility
**TONI TAYLOR**

- Review, and if needed refresh, the accelerator strategy, and develop an implementation plan (Lead: Toni Taylor)
- Develop and implement a strategy to upgrade LANSCE (LANSCE 2050) (Leads: Gus Sinnis, Stephen Milton)



**Preparations are being conducted here for the target four replacement operation at LANSCE.**

# Excellence in Mission-Focused Science, Technology, and Engineering

## 2.3 Advance the frontiers of computing to exascale and beyond

- Participate in national-level strategy and planning efforts for ECP and beyond; provide multi-institution leadership within the ECP (Lead: Irene Qualters)
- Shape ASCR post-ECP planning and ASC future platform strategies (Leads: Michael Bernardin, Irene Qualters)
- Explore, build, and lead novel computing initiatives, including industrial/academic/Laboratory partnership strategies in support of our mission (Leads: Beth Kaspar, Gary Grider)
- Establish LANL as a national leader in AI by accelerating development of AI-enabled capabilities for science and security (Lead: Aric Hagberg)
- Successfully procure, deploy, and operate the Crossroads Advanced Technology System and infrastructure to advance mission goals (Leads: James Lujan, Gary Grider)

Responsibility
**IRENE QUALTERS**

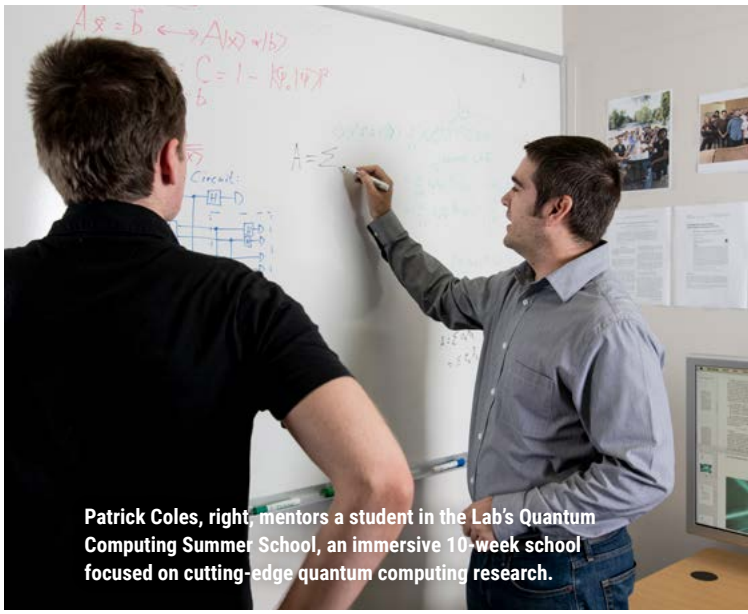
- In addition to meeting program milestones in ASC, ASCR, and SPP, respond to emerging challenges and opportunities (Leads: Jason Pruet, Aric Hagberg)
- Assess and adjust institutional computing to meet a more diverse and innovative portfolio of emerging computing models and platforms at LANL (Leads: Michael Bernardin, Irene Qualters)

JiaJia Waters, left, and David Carrington discuss a computer simulation from their multiphysics software system, FEARCE, that investigates and simulates turbulent, chemically reactive flows in fuel combustion.

## 2.4 Assert leadership in the national quantum initiative

- Define and enhance Laboratory capabilities and areas of emphasis at the frontiers of quantum information sciences; support Weapons Program and national security mission needs (Leads: Michael Hundley, Michael Di Rosa)
- Develop and implement strategies for the Laboratory's quantum information sciences engagement with industry (Lead: Candace Culhane)
- Lead and define the Laboratory's engagement in the national quantum information sciences strategy (Lead: Irene Qualters)

Responsibility
**TONI TAYLOR**



Patrick Coles, right, mentors a student in the Lab's Quantum Computing Summer School, an immersive 10-week school focused on cutting-edge quantum computing research.

LANL is exploring the future of computing by critically evaluating quantum annealing technology with a D-Wave quantum computing system.

- Expand the number of researchers and students with training in quantum information science and technology to develop a workforce pipeline (Leads: Filip Ronning, Stephan Eidenbenz)
- Form alliances and partnerships to participate with the National Quantum Information Sciences Research Centers (Lead: Toni Taylor)
- Establish (with SNL) the CINT as the premier quantum information sciences leader for Nanoscale Science Research Centers (Lead: CINT Co-Director)

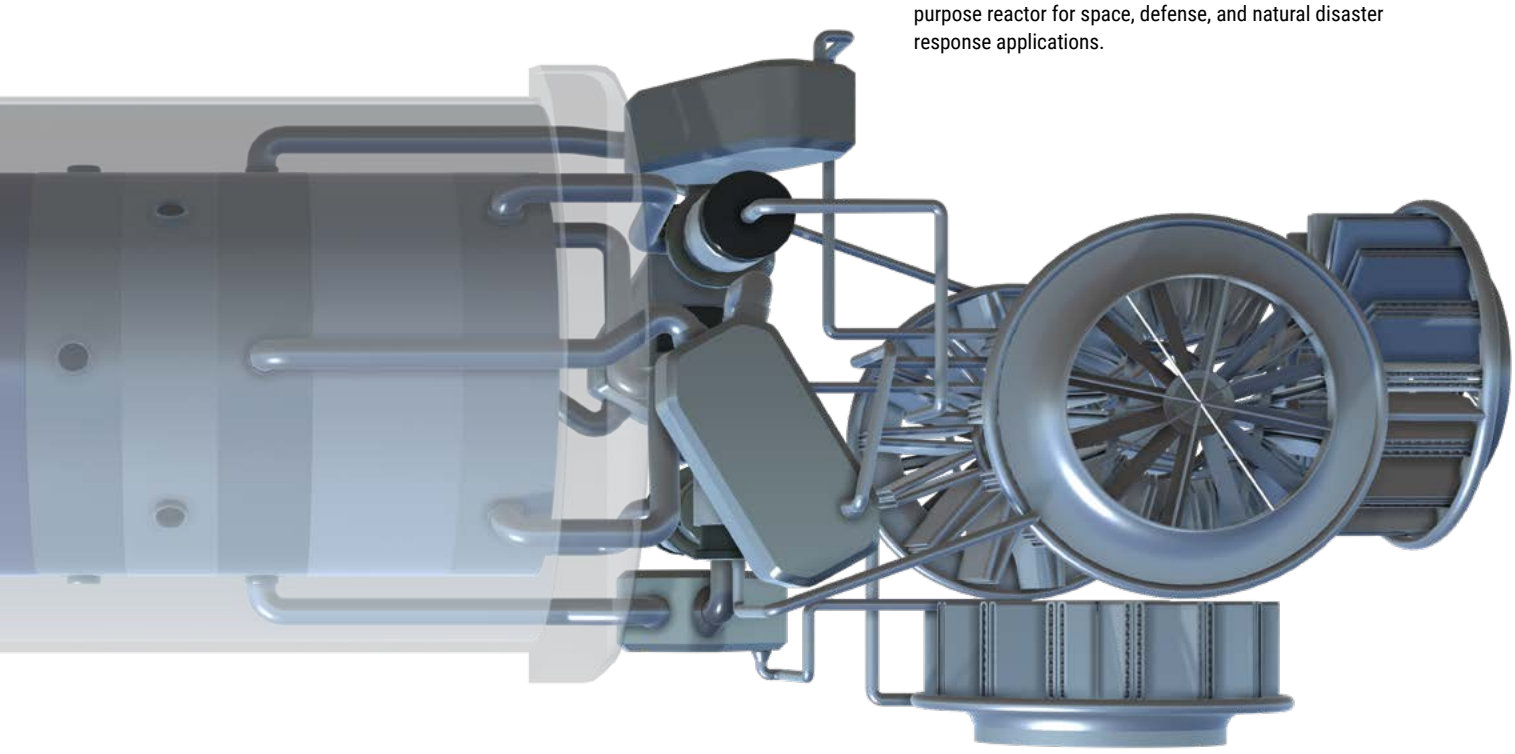
# Excellence in Mission-Focused Science, Technology, and Engineering

## 2.5 Develop and implement an integrated nuclear energy and nuclear materials initiative

- Successfully initiate microreactor projects (Leads: David Cremer, Matt Griffin, DV Rao)
- Establish capabilities for isotope production and separation (Lead: Eva Birnbaum)
- Solidify and potentially expand leadership roles in the new DOE-NE modeling and simulation program (Lead: Christopher Stanek)
- Continue early-stage R&D on nuclear energy materials, and work with strategic partners in translating the R&D to engineering solutions; expand key partnerships in advanced ceramic fuels, incorporating R&D, modeling and simulation, and advanced characterization work (Lead: Ellen Cerreta)
- Integrate plans for infrastructure needs, and secure resources (Leads: Carol Burns, Mary Hockaday, Brian Bluhm)

Responsibility
**CAROL BURNS**

- Continue to represent appropriate program interests in PF-4 (Lead: Carol Burns)
- Modernize Monte Carlo neutron/gamma transport software, and develop appropriate features and interfaces to simplify coupling to multiphysics frameworks; facilitate nuclear reactor design and related applications (Leads: Mark Schraad, Travis Trahan)

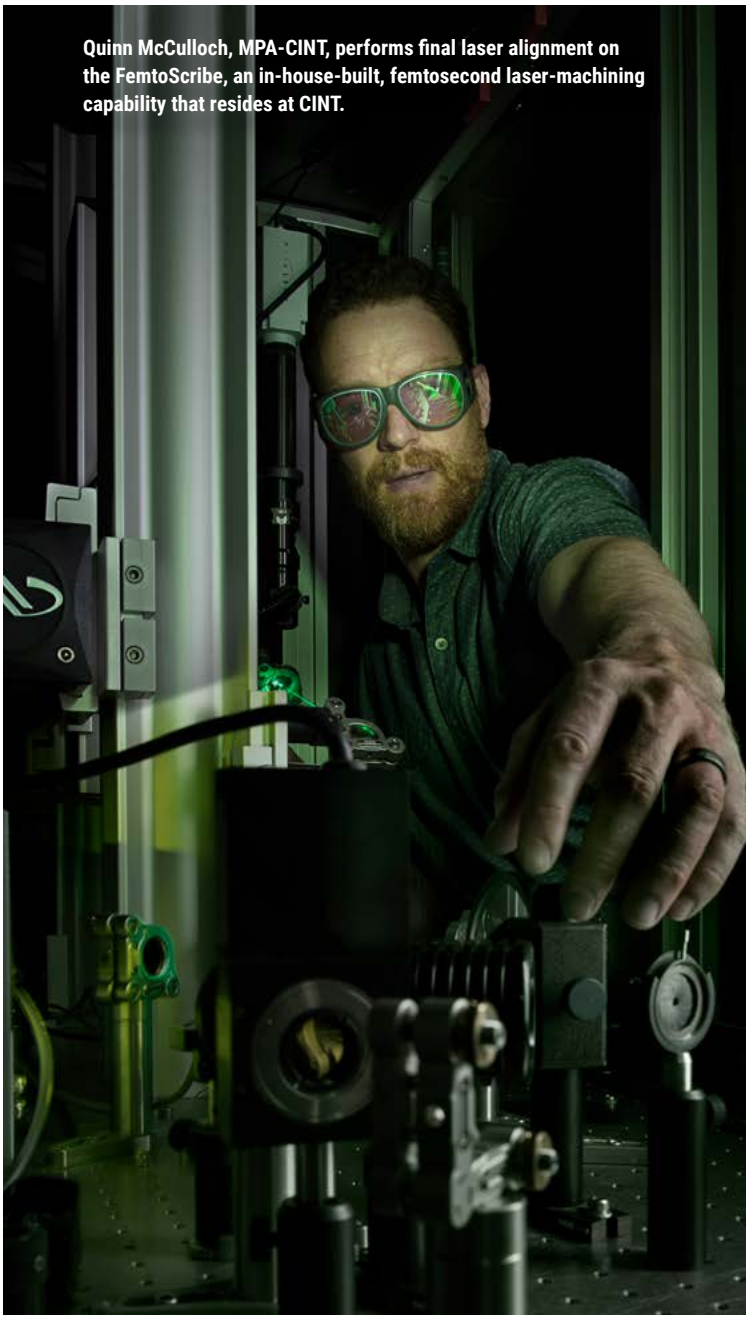


LANL is conducting research and development on a special purpose reactor for space, defense, and natural disaster response applications.

# 2.6 Develop and implement an integrated initiative for plutonium and actinide missions

- Identify and document internal strategic priorities for actinide capabilities (science, engineering, manufacturing) for the near, mid, and long term (Lead: Stacy McLaughlin)
- Engage stakeholders to draft an ST&E roadmap to achieve our strategic goals (Lead: Franz Freibert)
- Provide recommendations for FY21 actions, considering management and application of multiple isotopes of Pu; separation/recovery; alloys, materials, and manufacturing; safety, criticality, and security; and linkages with Lab infrastructure planning for radiological and nuclear facilities (Lead: Steve Schreiber)
- Work with key stakeholders to develop and implement a stewardship model for actinide missions, with an emphasis on the Laboratory's role as the plutonium center of excellence; integrate this model with long-term program priorities in nuclear weapons, in global security, and with DOE (Lead: Frank Gibbs)

Responsibility
**FRANK GIBBS**



**Quinn McCulloch, MPA-CINT, performs final laser alignment on the FemtoScribe, an in-house-built, femtosecond laser-machining capability that resides at CINT.**

**Using the first-ever scanning probe microscope dedicated to surface studies of plutonium, researchers in the Plutonium Surface Science Laboratory at LANL recently produced 3D surface topography images with nanometerscale resolution. Here, Miles Beaux of MST-7 uses the microscope at the TFF.**

# Excellence in Mission Operations

KELLY BEIERSCHMITT, DEPUTY LABORATORY DIRECTOR FOR OPERATIONS

## 3.1 Change organizational culture with an emphasis on organizational learning

Responsibility
THOM MASON

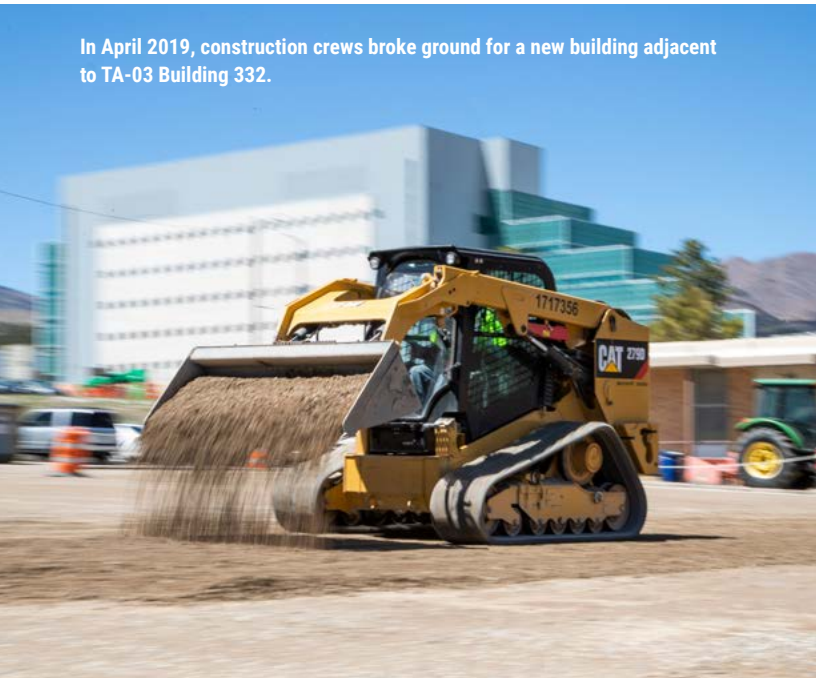
- Advance LDO leadership
  - Continue to develop and communicate a compelling strategic vision
  - Integrate existing programs and support operations
  - Make timely decisions, and communicate effectively
  - Establish shared values focused on integrity, competence, and service
  - Make ISM, ISSM, and Conduct of Operations priorities
- Develop a culture of empowerment, ownership with clearly defined roles and responsibilities, defined timelines, and deadlines (Lead: Kelly Beierschmitt)
  - Key Lab staff participate in relevant Battelle Communities of Practice (planning, conduct of research, conduct of operations, metrics, etc.)
  - Provide coaching on proper planning, hazard identification, and work control
  - Mentor key first-line supervisors
  - Leverage communities of practice and peer-review processes
  - Incorporate diagnostic tools to assess a culture-change program
  - Establish a "just culture," and offer training in this area
- Empower our managers and staff (Leads: Kelly Beierschmitt, John Sarrao, Bob Webster)
  - Provide LOSA training to all first-line managers and supervisors
    - H-20 reads "Implement Laboratory Operations Supervisor Academy (LOSA) to train all supervisory staff in hazardous operations areas within 12 months of the start of the base period and all remaining supervisory staff within 24 months of the start of the base period."
  - Continuously monitor and adjust through culture survey tools

**Kathye Segala: "It really is about reinforcing behaviors we want to see—that positive recognition and engagement."**

  - Reduce management layers to put leadership closer to work and to simplify interfaces
  - Involve workers directly in process-improvement efforts
  - Foster development of critical-thinking skills in staff for assessing risk
- Strengthen LANL's relationship with NNSA and DOE (Leads: Kelly Beierschmitt, Frances Chadwick, John Sarrao, Bob Webster)
- Partner with mission organizations, be viewed as our customers' partner, and celebrate successes (Lead: Kelly Beierschmitt)

## 3.2 Improve integrated planning across priority mission activities and infrastructure

- Create a single Waste Operations Program to support the waste needs of the entire site (Lead: Michael Hazen)
- Deliver on planned infrastructure projects (Leads: Bret Simpkins, Kathye Segala)
- Support NA-50 MAP process (Lead: David Teter)
- Develop a comprehensive site plan that includes needs for future mission-relevant facilities, space, decontamination and decommissioning, support infrastructure, and associated systems (Lead: Bret Simpkins)
  - Implement an integrated infrastructure investment prioritization process (Lead: Ed Keith)
  - Complete development of a comprehensive site plan (2.0)
  - Develop and implement an integrated radiological capability initiative (Lead: Michael Hazen)
  - Continue to advance the Laboratory's vision for a future advanced characterization, qualification, testing, and experimental campus (Lead: Tri Tran)




In April 2019, construction crews broke ground for a new building adjacent to TA-03 Building 332.

Responsibility
**KELLY BEIERSCHMITT**

Responsibility
**BRET SIMPKINS**

  - Develop and deliver an integrated decontamination and decommissioning plan
  - Incorporate long-term, deferred maintenance planning into the comprehensive site plan
- Improve facility and operational functions for small projects management, maintenance, configuration management, waste handling, and operations management (Leads: Kathye Segala, Bret Simpkins, Michael Hazen)
- Reduce IT and Cyber risks; advance IT (Lead: LeAnne Stribley)
  - Continue to work with NA-LA and CenturyLink on ongoing efforts to provide a second data line to the Laboratory
  - Identify and analyze opportunities for a remote backup data center to supplement local backup capabilities; expand services to LANL's TA-50 remote backup data center
  - Provide enhanced computing capabilities on the classified red network to support programmatic performance; continue to improve the red network's security profile
  - Implement further segregation of network architecture to improve security; complete quarantine and printer enclaves
  - Begin the multi-year implementation of 470.6 ACD

# Excellence in Mission Operations

## 3.3 Address critical issues related to NMCA, nuclear safety, criticality safety, waste, and classification enhancements

- Develop a Waste Management FOD (Lead: Bret Simpkins)
  - Confirm the organizational structure for waste operations
  - Transfer legacy waste to the new Waste Management FOD in ALDFO
  - Foster key relationships
  - Continue to participate in the multi-year TA-55 waste de-inventory program; develop and implement a plan to transfer waste facilities to the newly formed Waste Management FOD
  - Evaluate and develop funding for advanced IT/IM tools for tracking and managing an integrated waste life cycle process (increase compliance, efficiency, and effectiveness)
    - › Develop a Tier 1 plan to outline DCEI
  - Identify a long-term, RCRA-permitted storage facility for HazChem and MLLW (to replace Area L)
  - Establish a process for RCRA compliance accountability among line management
  - Achieve LLW CD-4 approval; TLW CD-2/3 approval and construction start
    - › Design and develop facilities to support waste stream storage, processing, and transportation
  - Perform R&D to address key science and technology gaps to improve waste operations, advance characterization technologies, and reduce waste life cycle
- Address critical issues related to NMCA (Lead: Michael Hazen)
  - Execute Cycle 2 of the multi-year TA-55 Process Monitoring Implementation Plan
  - Improve cohesion between support organizations and operations/production to change the culture and view NMCA and safety as critical foundational elements to the Laboratory's mission

Responsibility
**MICHAEL HAZEN**

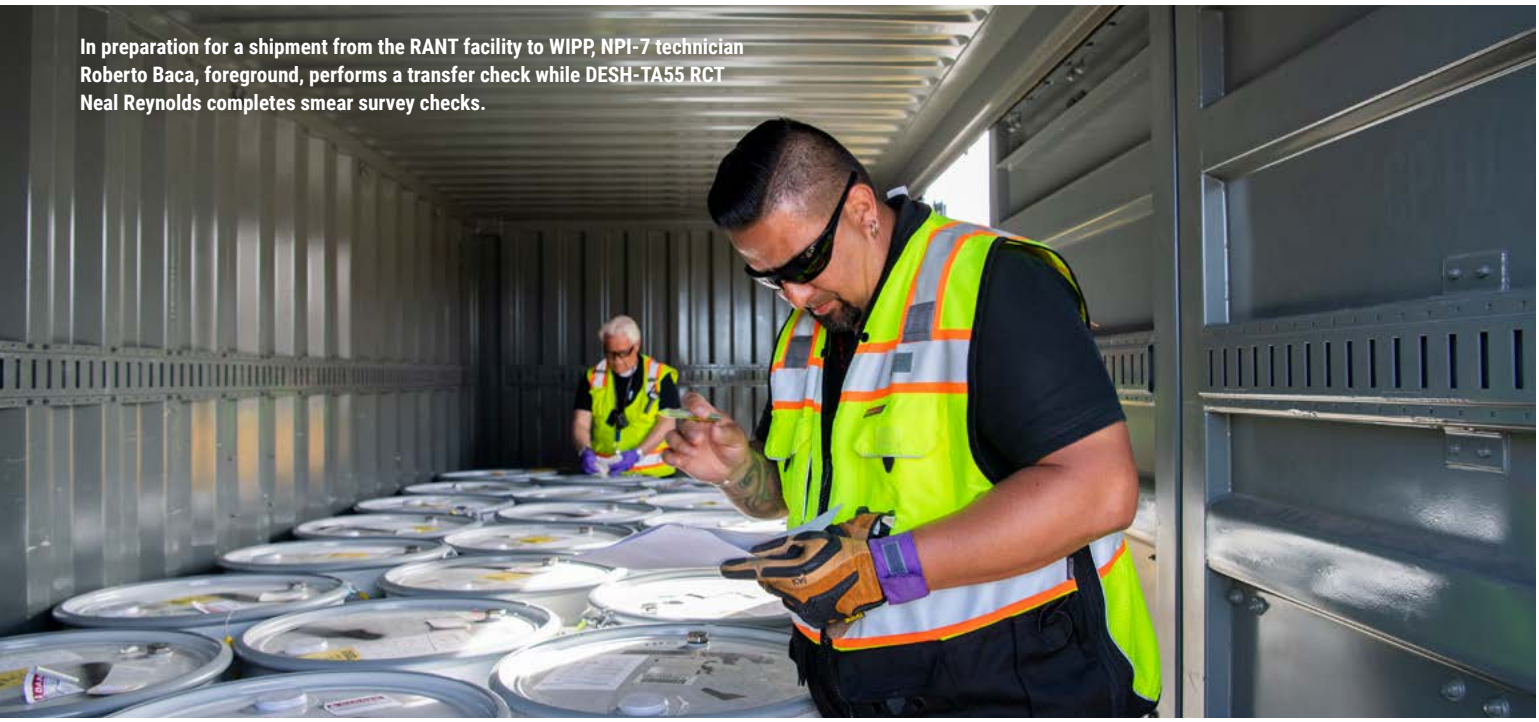
Responsibility
**BRET SIMPKINS**

- Address critical issues related to nuclear safety, criticality safety, and classification analysis (Leads: Bret Simpkins, Michael Hazen)
  - Use corporate reachback to bring resources to accelerate high-priority evaluations

**Waste-handling operators in the WIPP underground move contact-handled TRU waste drums across a transition line. From here, the drums are taken to an emplacement panel room for permanent disposal in the salt repository.**

  - Establish and sustain good working relationships with key NA-LA counterparts
  - Establish enhanced coordination/ communication systems/processes to ensure that all ALDs remain aware of planned/ ongoing activities designed to affect the institution as a whole
  - Improve efficiency and reduce cycle time for the Termination of Safeguards process
- Address critical issues related to Lab-wide RCT support (Lead: Michael Hazen)
  - Work with HR to develop a competitive package to recruit and retain necessary experienced and qualified talent
- Enhance emergency management and continuity programs (Lead: Michael Hazen)
- Implement an effective COOP (Lead: Michael Hazen)
- Enhance mission security through more robust processes regarding classification training and education (Lead: Michael Hazen)


LANL integrates LAFD into all Laboratory activities through a combination of unique training, facility-specific tours, drills and exercises, and apparatus maintenance and replacement to support safe and effective response services.



In preparation for a shipment from the RANT facility to WIPP, NPI-7 technician Roberto Baca, foreground, performs a transfer check while DESH-TA55 RCT Neal Reynolds completes smear survey checks.

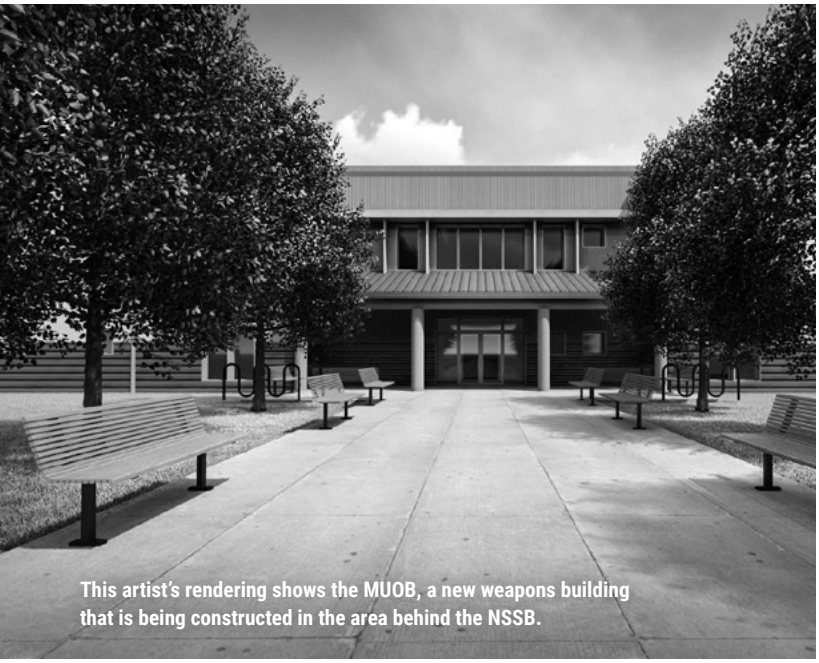
# Excellence in Mission Operations

## 3.4 Implement systematic process improvement to drive increased rigor and efficiency in work execution

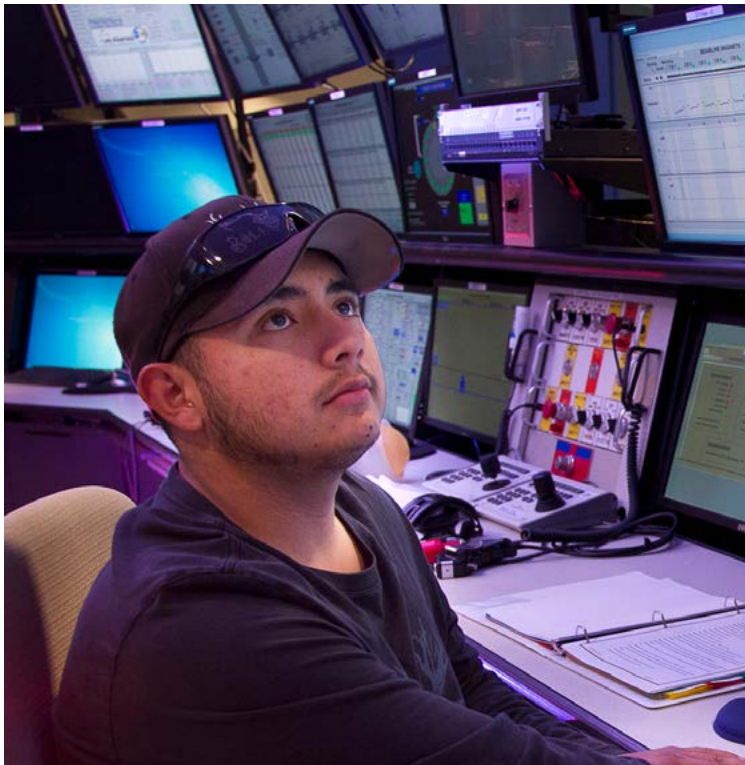
- Strengthen Lab-wide Lean Six Sigma capabilities (Lead: Michael Hazen)
- Improve Business Services to reduce risks through streamlining business processes, implementing automation tools/systems, and establishing clear roles and responsibilities for service delivery (Lead: LeAnne Stribley)
  - Modernize craft time entry; continue to develop and implement
  - Automate/streamline manual and paper processes; continue to implement an improved source-to-pay process in connection with Ariba/Fieldglass and the new contracting model, ServiceNow (upgraded UTrain system)
  - Provide IT customer interface improvements and collaborative tools to enhance productivity and ease of use; implement the single to-do work list
  - Implement classified wireless in support of pit production
  - Implement ServiceNow for enhanced delivery of IT services

Responsibility
**KELLY BEIERSCHMITT**

- Design and set up MSs as mechanisms to strategically organize functional processes and business systems of the Laboratory that are aligned with the current organizational structure (Lead: Rekha Pillai)
  - Develop and deploy improved management processes and procedures
- Implement an integrated CAS and process to transition LANL to a higher-performing organization, nurturing a robust continuous performance improvement culture toward standards of excellence (Leads: Marc Clay, Michael Hazen)



**This artist's rendering shows the MUOB, a new weapons building that is being constructed in the area behind the NSSB.**



- Leverage MSs and CAS; implement a robust institutional performance management process (including issues management) to routinely monitor performance against standards of excellence and to foster organizational learning (Lead: Michael Hazen)
- Execute the Capital Projects Program (Lead: Kathye Segala)
  - Baseline the capital projects culture using methods developed for the construction industry; develop an improvement plan to build on the findings from the FY19 baseline
  - Develop consolidated project management tools, including a dashboard that provides routine access for all stakeholders regarding capital projects progress
  - Deliver on the small project portfolio of critical projects (parking garages, DARHT, MUOB, CEFC, Sigma addition) safely, on time, and within budget
  - Establish the MATOC subcontractor base


Construction progresses on the DARHT Weather Enclosure project.

At DARHT, Josh Esquibel of J-1 Operations analyzes accelerator waveforms. DARHT consists of two large X-ray machines that produce freeze-frame radiographs (high-powered X-ray images) of materials that implode at speeds greater than 10,000 miles per hour.

  - Develop an integrated program/project schedule with TA-55 through collaboration with the Weapons Program
  - Implement the PRID/NEPA process early in all planned initiatives
  - Implement a collaborative and customer-focused PSR process
- Develop a Laboratory-wide EVMS system description to support all projects, including multiple Lab, Weapons, and APM line items; and small projects (Lead: Kathye Segala)
  - Develop resource-loaded schedules in P6 for the consolidated capital projects portfolio
  - Establish COBRA as the capital projects cost processor, and load all projects into the system for consolidated reporting

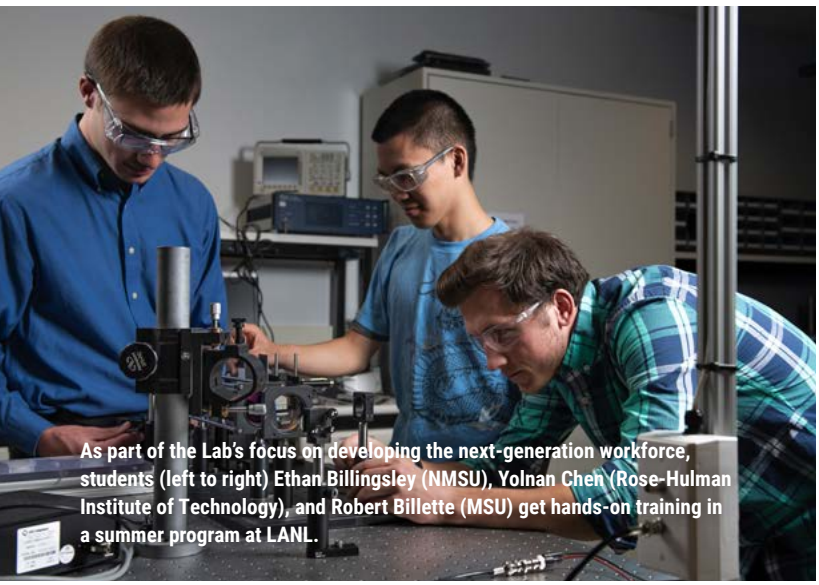
# Excellence in Mission Operations

## 3.5 Enhance quality of work life, workforce planning, and training and development

- Enhance staff recruitment, retention, and development (Lead: Laurie Monfiletto)
  - Implement compensation reviews and associated improvements; complete Phase 2 (all remaining job descriptions)
  - Develop and implement performance management improvements, including review of pay for performance and merit implementation; update rating titles/ definitions, and introduce institutional behaviors
  - Develop and implement a talent acquisition and retention strategy, including pipeline development
  - Strengthen staff development
  - Invest in the workforce to sustain capabilities and develop the next generation of leadership
  - Develop and implement a pilot program for "Management 2 Go" training for future leaders (Lead: Nic Smith)
- Develop and implement a comprehensive succession-planning process (Lead: LeAnne Stribley)

Responsibility
**LEANNE STRIBLEY**

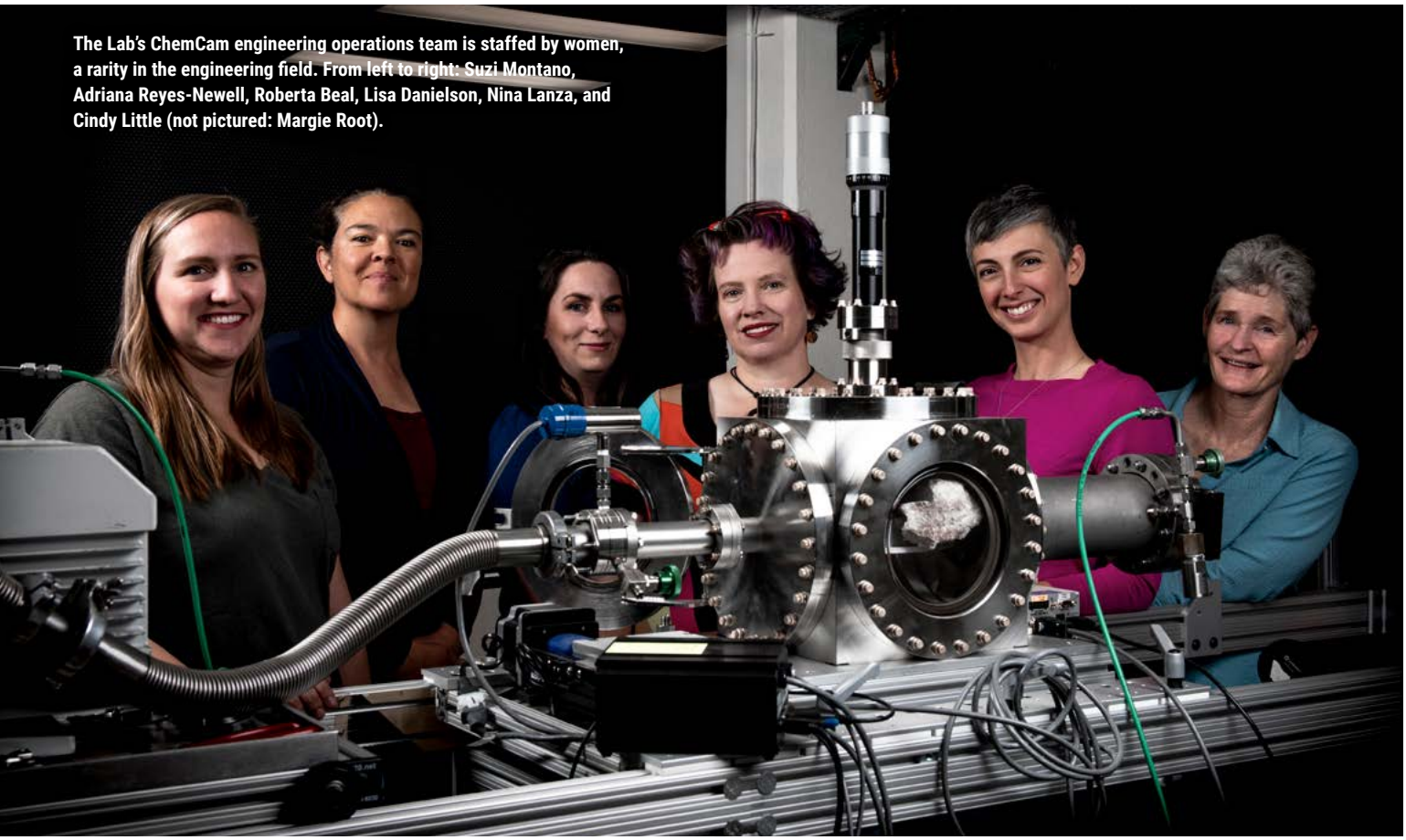
- Continue to strengthen efforts to attract and retain a diverse workforce; develop and implement improved metrics for effective measurement (Lead: Laurie Monfiletto)
  - Streamline training and qualification; evaluate effectiveness
- Implement modern software (Lead: Laurie Monfiletto)
- Develop and implement a Laboratory-wide modernization of LANL's approach to training, including coordination across all directorates that currently have substantial responsibility for elements of training (Lead: Laurie Monfiletto)



**As part of the Lab's focus on developing the next-generation workforce, students (left to right) Ethan Billingsley (NMSU), Yolnan Chen (Rose-Hulman Institute of Technology), and Robert Billette (MSU) get hands-on training in a summer program at LANL.**

**Research technologist Claudia Papola, C-CDE, prepares samples for a corrosion study as scientist Beth Judge, also with C-CDE, records the mass measurements.**

## EXECUTE SUSTAINED OPERATIONS THAT ARE RELIABLE AND RESPONSIVE TO MISSION NEEDS



**The Lab's ChemCam engineering operations team is staffed by women, a rarity in the engineering field. From left to right: Suzi Montano, Adriana Reyes-Newell, Roberta Beal, Lisa Danielson, Nina Lanza, and Cindy Little (not pictured: Margie Root).**


UC President Janet Napolitano espoused confidence in the new leadership structure and LANL's "forward-thinking" scientists. Napolitano began her New Mexico visit at a Lab-sponsored community breakfast, where she announced two Triad grants to regional education nonprofits. These grants totaled nearly $800,000.

# Excellence in Community Relations

FRANCES CHADWICK, STAFF DIRECTOR

## 4.1 Continue commitment to the community with educational, economic, and philanthropic investments of time and resources

Responsibility
KATHY KEITH

- Continue to work with local stakeholders—including the LANL Foundation, local schools, United Way of NNM, and RDC—to further Triad's presence as an active participant in the community according to the Community Involvement and Outreach Plan and Triad's Community Commitment Plan (Lead: Kathy Keith)
  - Engage with and advise the Los Alamos County Economic Vitality Action Team (Lead: Bret Simpkins)
- Communicate with and inform Triad partners and the public regarding progress, and ensure alignment with partner goals and philosophy (Lead: Frances Chadwick)
- Establish trust between the Laboratory and its local and national elected officials (Lead: Patrick Woehrle)
- Promote LANL's achievements and investments to the workforce, our customers, and the community (Lead: Matt Nerzig)

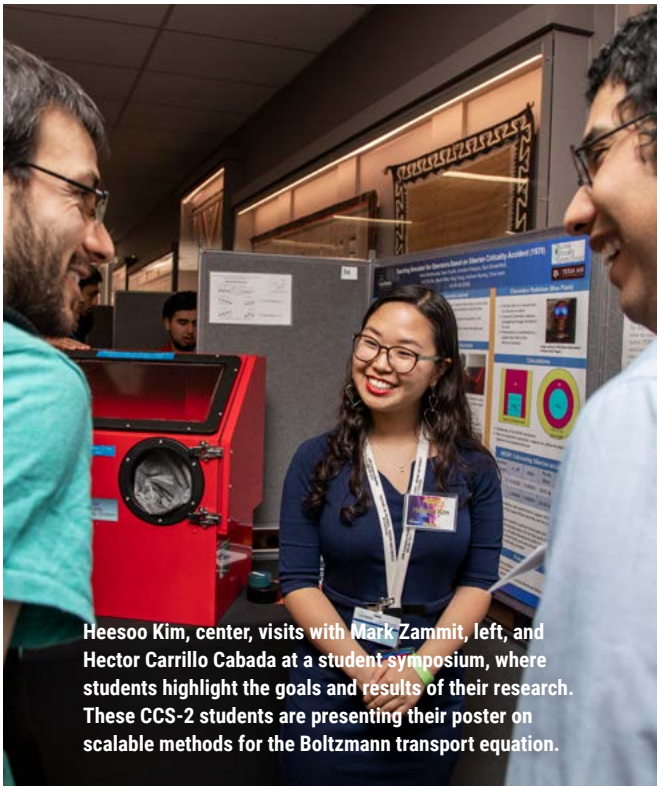

Laboratory Director Thom Mason and NMT President Stephen Wells shake hands at a ceremony to mark the first joint scientific staff appointment under a cooperative agreement between the Laboratory and NMT.

Lab Director Thom Mason, with NA-LA Manager Steve Goodrum, cuts the ribbon for a new pedestrian and bicycle path beside West Jemez Road.

## 4.2 Strengthen pipelines and partnerships to build the workforce of the future

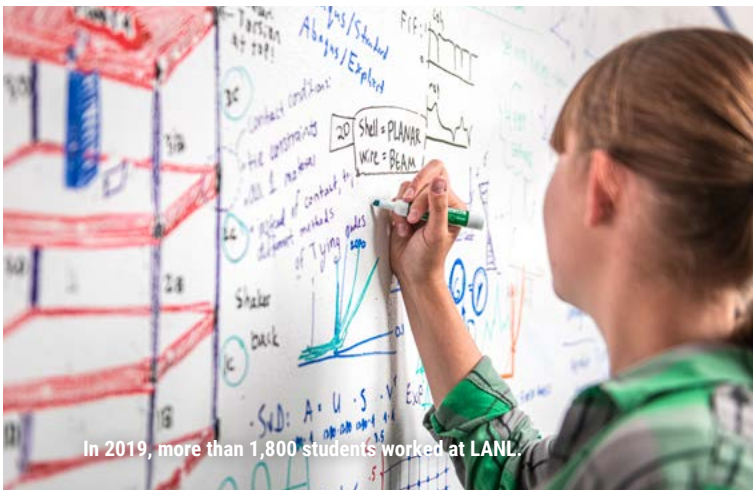
- Expand partnerships with local and national institutions to build pipelines in needed areas of staffing; ensure alignment with HR and line organizations' required skills and capabilities (Lead: Nan Sauer)
- Improve pipeline planning in partnership with NNM colleges and NM state universities, Texas A&M University, Battelle, UC, and other institutions (Lead: Nan Sauer)
- Promote economic growth by pursuing opportunities to broaden the Lab's impact in the commercial sector (Lead: Nan Sauer)
- Continue integration of the five-year staffing plan with staffing needs and pipeline (Lead: Laurie Monfiletto)

Responsibility
**NAN SAUER**



Heesoo Kim, center, visits with Mark Zammit, left, and Hector Carrillo Cabada at a student symposium, where students highlight the goals and results of their research. These CCS-2 students are presenting their poster on scalable methods for the Boltzmann transport equation.

A Lab volunteer makes adobe bricks at Ohkay Owingeh.



In 2019, more than 1,800 students worked at LANL.

# Excellence in Community Relations

## 4.3 Enhance small business participation in executing LANL's scope across all directorates

- Continue to partner with preselected SBs (TechSource, Longenecker, Merrick) and Pueblo MOUs to build opportunities for engagement in delivering the Laboratory's mission (Lead: Drew Fuller)
- Continue to work with the Battelle network and the other UC-managed laboratories (Lead: LeAnne Stribley)
- Implement a new approach to subcontracting for capital projects and small projects (Lead: Kathye Segala)
  - Work collaboratively to restore the subcontractor base, investing in contractors' safety cultures, enhancing performance, and building longer-term portfolios
  - Establish the construction MATOCs with emphasis on SB collaboration
    - Engage the SB subcontractors in LOSA and HPI joint collaboration sessions
    - Expand the construction subcontractor forum to include Lessons Learned and Opportunities for Improvement

Responsibility
**LEANNE STRIBLEY**

- Expand the SB mentoring program with monthly forums and education to increase the likelihood that SBs can compete (Lead: Drew Fuller)
  - Target companies that can expand to meet mission needs
  - Engage an additional protégé
- Leverage alliance with Ohkay Owingeh, San Ildefonso, and Acoma Pueblos to increase subcontracting opportunities for local and regional Pueblos; and provide an innovative resource for improving Laboratory operations and workforce resourcing (Lead: LeAnne Stribley)
  - Enhance NNM and Pueblo pricing preferences (a 10% increase adjustment factor on all businesses that are not NNM SBs; a 5% price evaluation discount for the Pueblo business alliance)
  - Seek opportunities to broaden the SB supplier base and expand regional SB capabilities to include NNM and Pueblo capabilities (Lead: Drew Fuller)

**The Laboratory's NMSBA Program helped optimize a new crate for shipping valuable artwork. The crate was developed by Georgia O'Keeffe Museum Innovations, a for-profit business subsidiary of the world-renowned museum.**


**Carla Rachkowski, RDC, Thom Mason, and Val Alonzo, RDC Executive Director, talk at the announcement of Triad's investment in the RDC. Funding from Triad will support RDC efforts to create jobs and strengthen economic diversity.**

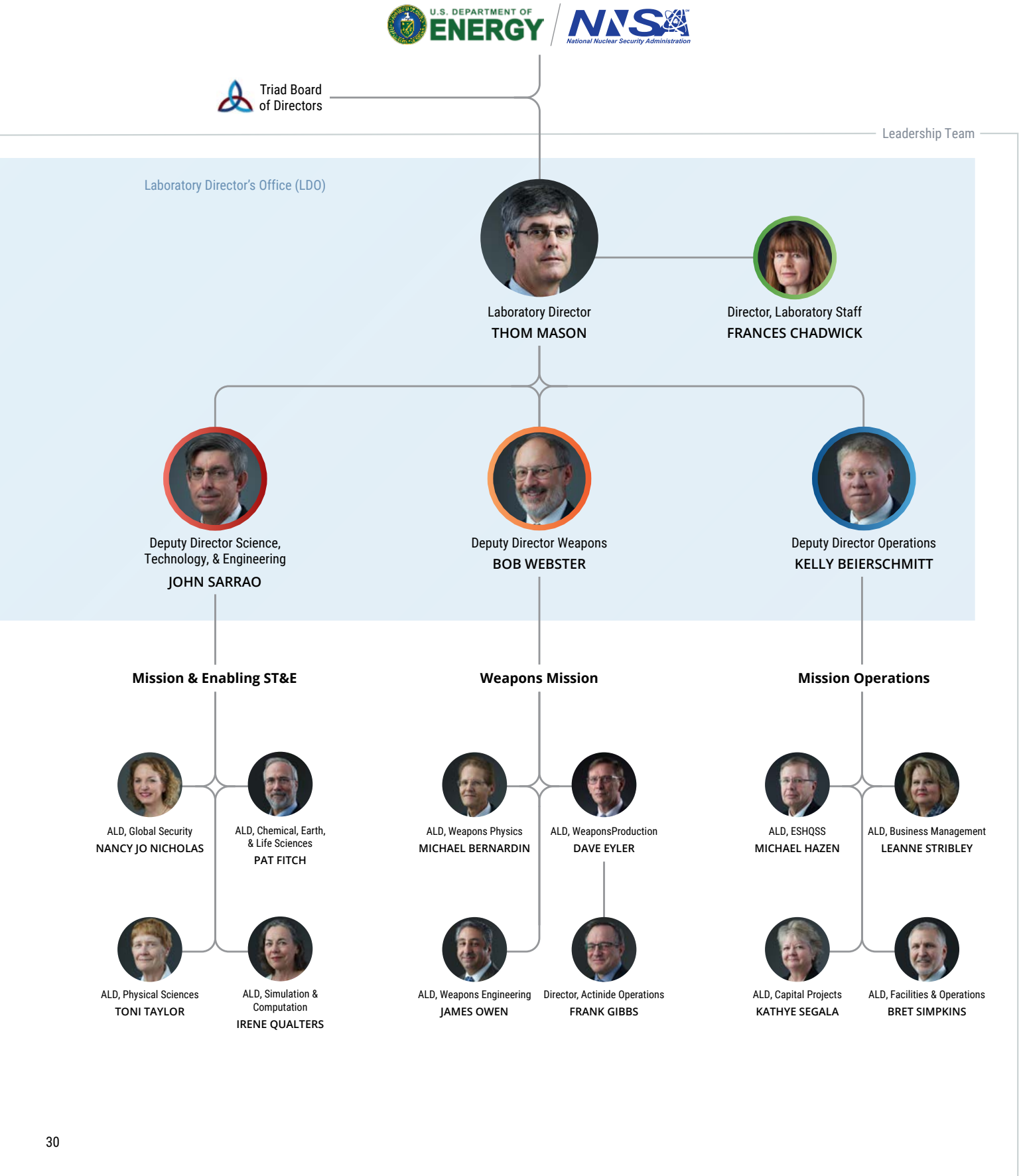
## SUSTAIN AND ENHANCE LANL'S PARTNERSHIP WITH THE COMMUNITY ACROSS THE NORTHERN NEW MEXICO REGION

Eric Quintana of PMI and Laboratory Director Thom Mason attended the ceremonial signing of PMI's subcontract with the Lab.


Meghan Ryan of N3B discusses procurement at the DOE Summer '19 New Mexico Small Business Expo. N3B remediates legacy waste on LANL property and characterizes and ships TRU waste. Conference outreach helps explain the missions of the Lab and its contractors to vendors.


Kelly Beierschmitt speaks at the DOE Summer '19 New Mexico Small Business Expo at the Albuquerque Marriott on August 6, 2019.

# Organizing for Efficient, Effective, Safe, and Secure Mission Delivery



# Organizing for success

Los Alamos National Laboratory has the longstanding aim of solving national security challenges for the U.S. To most effectively accomplish this mission and achieve sustained, simultaneous excellence, our Laboratory must operate with open communication, clear responsibilities, and close integration across our four key areas: nuclear security, mission-focused ST&E, mission operations, and community relations.

To better link these areas and the people within them, LANL organizes its people vertically and manages its programs in a way that cuts across the chain of command.

Our vertical structure is defined by organizations. Each organization has a clear chain of responsibility and is supported by peer-level coordination bodies and councils, including

- the Leadership Team that manages institutional strategic direction, planning, and decision-making;
- the Laboratory Operating Council that champions strategic institutional initiatives; and
- the Division Leader Council that leads cross-organizational information sharing, team building, and problem solving.

# Organizing for Efficient, Effective, Safe, and Secure Mission Delivery

## System of Management Systems

The Laboratory's cross-cutting method of management is the SOMS. In this system, our 29 significant functions and business processes are clearly defined and managed. Each management system represents a functional area of operation at the Laboratory (see chart on p. 33) such as waste management, legal, cybersecurity, and weapons design. These functional systems are not siloed; many of them include several line organizations. The lead assigned to each system is responsible for implementing a strategic direction and ensuring that the function or business process meets our institutional needs.

These different systems reflect Triad's approach to managing our complex Laboratory and underscore the fact that *how* we work is as important as *what* we do. They bring the right expertise together to encourage organizational learning, better understand the needs of our stakeholders and customers, and enable simultaneous excellence to better deliver on our national security mission.

Laboratory Director Thom Mason speaks at the 2019 WESST Fest.


INPUTS
PRIME CONTRACT
FEDERAL REQUIREMENTS
PERFORMANCE DIRECTION
DREW FULLER
Aquisition Services
JIM STREIT
Engineering Services
DAVID SOSINSKI
Legal
MARIA NAPPI
Radiation Protection
ENRIQUE (KIKI) TORRES
Waste Management
JOHN B MEYERS
Weapons Production
JAMES ANGELO
Logistics, Transportation, Shipping & Packaging
ENRIQUE (KIKI) TORRES
Environmental Mgmt & Stewardship
DEREK GORDON
Nuclear Safety Management
LEON LOPEZ
Document Control & Records Management
DOUG WEDMAN
Weapons Design
JOHN SCHROEDER
Ethics & Audits
MATT NERZIG
Communications, Community Relations
ED KEITH
Facilities & Operations Management
RON SCHRODER
Project Management & Execution
JIM COY
Safety & Health
ELAINE SCHUCK
Cyber Security
SHARON HICKEY
Policy
AARON MENEFEE
Financial Management & Services
DAVID PESIRI
Earned Value Management System
CAROL BURNS
Science, Technology & Engineering
UNICA VIRAMONTES
Defense Security
LAURIE MONFILETTO
Human Resources Development & Services
JAMES ANGELO
Property Management
SETH LITTLETON
Institutional Quality & Performance Assurance
DAVID STUHAN
Emergency Management
STEPHEN WARREN
Information Technology
MARC CLAY
Mission Assurance & Contract Management
LAURIE MONFILETTO
Training
Integration: Other System Inputs
Integration: Leadership Inputs
OUTPUTS
PERFORMANCE EXCELLENCE
ORG CULTURE CHANGE
DELIVERABLES

# Acronyms

| | |
|---|---|
| ACD | Advanced Change Directive |
| AI | artificial intelligence |
| ALD | Associate Laboratory Director |
| ALDFO | Associate Level Directorate Facilities & Operations |
| Alt | alteration |
| APM | Acquisition and Project Management |
| ARIES | Advanced Recovery and Integrated Extraction System |
| ARL | Army Research Laboratory |
| ASC | Advanced Simulation and Computing |
| ASCR | Advanced Scientific Computing Research |
| ASD | Advanced Sources and Detectors |
| CAS | Contractor Assurance System |
| CEFC | commercial engineered facility construction |
| CINT | Center for Integrated Nanotechnologies |
| COBRA | Consolidated Omnibus Budget Reconciliation Act |
| COOP | Continuity of Operations Plan |
| DAG | dry alluvium geology |
| DARHT | Dual-Axis Radiographic Hydrodynamic Test (facility) |
| DCEI | Defense Critical Electric Infrastructure |
| DoD | Department of Defense |
| DOE | Department of Energy |
| DOE-NE | DOE Office of Nuclear Energy |
| ECP | Exascale Computing Project |
| EVMS | Earned Value Management System |
| FEARCE | Fast, Easy, Accurate, and Robust Continuum Engineering |
| FOD | facility operations director |
| FPU | first production unit |
| FY | fiscal year |
| GPS | global positioning satellite |
| HPI | human performance improvement |
| HR | Human Resources |
| IM | information management |
| ISM | Integrated Safety Management |
| ISSM | Integrated Safeguards and Security Management |
| IT | information technology |
| JTA | joint test assembly |
| LAFD | Los Alamos Fire Department |
| LANL | Los Alamos National Laboratory |
| LANSCE | Los Alamos Neutron Science Center |
| LDO | Laboratory Director's Office |
| LEP | Life Extension Program |
| LLW | low-level (radioactive) waste |
| LOSA | Laboratory Operations Supervisory Academy |
| MAP | master asset planning |
| MATOC | multiple award task order contracts |
| MLLW | mixed low-level (radioactive) waste |
| MOA | memorandum of agreement |
| MOU | memorandum of understanding |
| MSs | management systems |
| MSU | Michigan State University |
| MUOB | modular office building |
| NA-LA | Los Alamos Field Office, NNSA |
| NASA | National Aeronautics and Space Administration |
| NEPA | National Environmental Policy Act |
| NGEN | next generation |
| NM | New Mexico |
| NMCA | nuclear material control and accountability |
| NMSBA | New Mexico Small Business Assistance |
| NMSU | New Mexico State University |
| NMT | New Mexico Tech |
| NNM | Northern New Mexico |
| NNSA | National Nuclear Security Administration |
| PF-4 | LANL's plutonium facility |
| PMI | Performance Maintenance Inc. |
| PPI | program production integration |
| PRID | permits and requirements identification |
| PRT | Product Realization Team |
| PSR | project status review |
| R&D | research and development |
| RANT | Radioactive Assay Nondestructive Testing (Facility) |
| RCRA | Resource Conservation and Recovery Act |
| RCT | radiological control technician |
| RDC | Regional Development Corporation |
| RUS | resonant ultrasound spectroscopy |
| SB | small business |
| SNL | Sandia National Laboratories |
| SOMS | System of Management Systems |
| SPP | Strategic Partnership Project |
| SRS | Savannah River Site |
| SRPPF | Savannah River Plutonium Processing Facility |
| ST&E | science, technology, and engineering |
| TA | Technical Area |
| TFF | Target Fabrication Facility |
| TLW | transuranic liquid waste |
| TRU | transuranic (waste) |
| UC | University of California |
| U.S. | United States |
| WIPP | Waste Isolation Pilot Plant |

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LA-UR-19-32742

## MISSION

To solve national security challenges through simultaneous excellence

## VISION

To be trusted by our nation, emulated by our peers, and respected by the world

## CULTURE

**How** we do work is as important as **what** we do

## VALUES

### Service

Serving our nation, our partners, our community, and each other

### Excellence

Ensuring safe and secure mission delivery in nuclear security; science, technology, and engineering; operations; and community relations

### Integrity

Demonstrating honesty, ethical conduct, accountable stewardship, and individual responsibility

### Teamwork

Achieving our best by respecting diverse opinions and backgrounds, exploring alternatives, and collaborating with our colleagues and partners

## BEHAVIORS

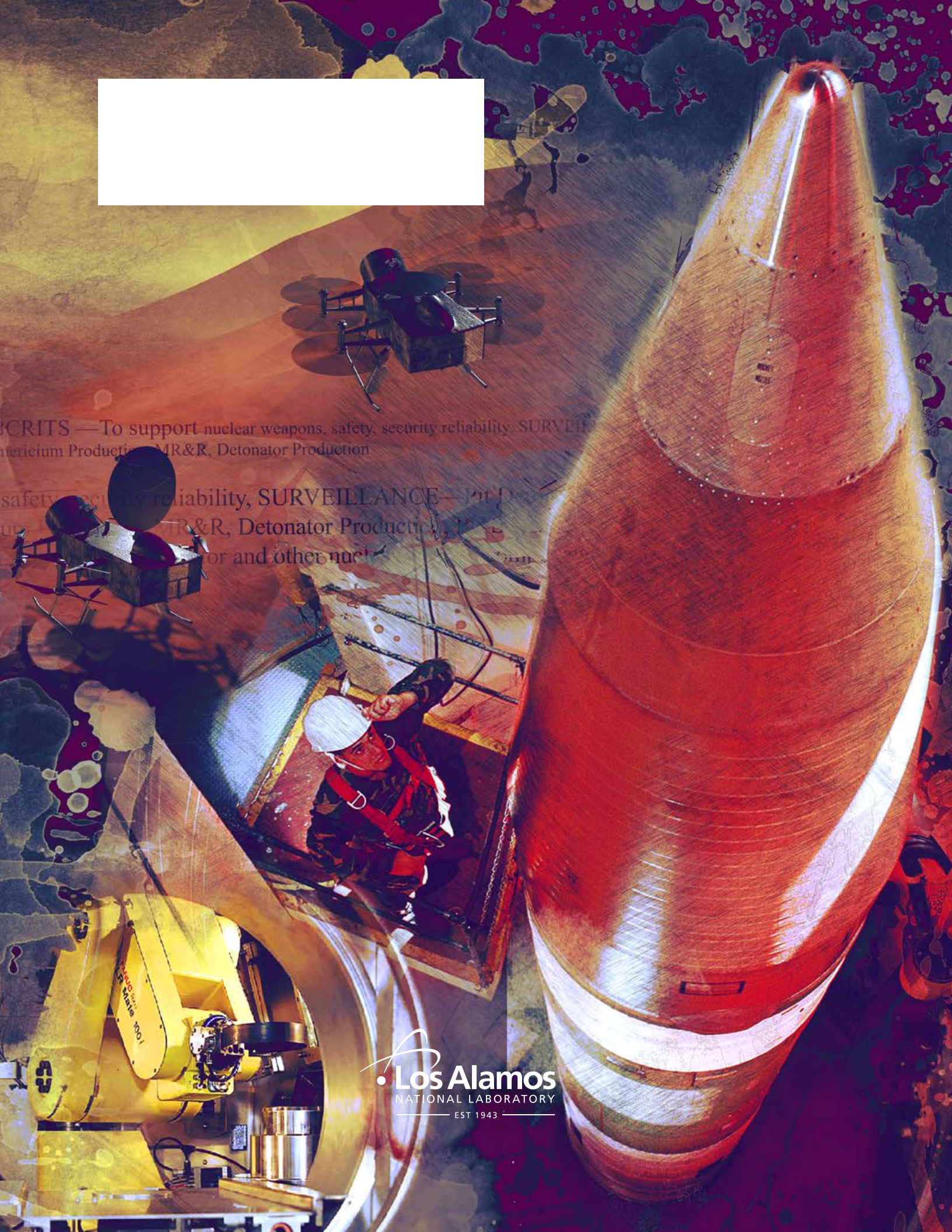
**Collaborative Problem Solving**

**Shared Outcome**

**Commitment**

**Continuous Learning**

**Trustworthy**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