



Lab Agenda

January 2022 Update

Simultaneous Excellence





Pictured from bottom left are Kelly Beierschmitt, Bob Webster, Thom Mason, Frances Chadwick, and John Sarrao; (row two) Irene Qualters, Kathye Segala, John Benner, Angela Mielke, LeAnne Stribley, and James Owen; and (row three) Nancy Jo Nicholas, Charlie Nakhleh, Bret Simpkins, Toni Taylor, and Mark Anthony. Not pictured: Pat Fitch and Michael Hazen.

Commitment Statement

The Leadership Team is fully committed to enabling the Laboratory's mission while supporting its people, further enhancing the culture, and meeting the goals outlined in the Agenda.



Contents

Introduction	3
Strategic Objectives	3
Snapshot	4
Roadmap	5
Critical Outcomes	6
Pit Production	7
Non-Nuclear Production	8
Computational Breakthroughs	9
Experimental Advances	10
Integrated Deterrence	11
Technology Modernization	12
Threat Response	13
Quantum Leadership	14
Climate and Clean Energy	15
Biosecurity Preparedness	16
Culture Enhancements	17
Operational Capacity	18
Force for Good	19



Introduction

The United States of America and our allies depend on LANL's ability to innovate in and execute on our Federally Funded Research and Development Center functions supporting the security of our nation and world. We are charged with effectively leading and coordinating efforts within Los Alamos National Laboratory (LANL) and across partnering institutions and communities to fulfill the responsibilities entrusted to us. Our scientific and technical prowess, ingenuity, and executional precision is vital for managing risks facing our nation and world. And, LANL must find better ways to enhance transparency and distribute decision making within the Laboratory and in partnership with the National Nuclear Security Agency (NNSA), Department of Defense (DOD), Congress, and other institutions central to our mission.

Strategic Objectives

- **Nuclear Deterrent.** Lead the nation in evaluating, developing, and ensuring effectiveness of our nuclear deterrent, including the design, production, and certification of current and future nuclear weapons.
- **Threat Reduction.** Anticipate persistent and emerging threats to global security; develop and deploy revolutionary tools to detect, deter, and respond proactively.
- **Technical Leadership.** Deliver scientific discoveries and technical breakthroughs to advance relevant research frontiers and anticipate emerging national security risks.
- **Trustworthy Operations.** Consistently demonstrate and be recognized by diverse stakeholders for trusted and trustworthy operations.

Lab Agenda Snapshot

January 2022 Update

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



Strategic Objectives

Nuclear Deterrent

Lead the nation in evaluating, developing, and ensuring effectiveness of our nuclear deterrent, including the design, production, and certification of current and future nuclear weapons.

Threat Reduction

Anticipate persistent and emerging threats to global security; develop and deploy revolutionary tools to detect, deter, and respond proactively.

Technical Leadership

Deliver scientific discoveries and technical breakthroughs to advance relevant research frontiers and anticipate emerging national security risks.

Trustworthy Operations

Consistently demonstrate and be recognized by diverse stakeholders for trusted and trustworthy operations.

Critical Outcomes

Pit Production

Reconstitute optimized rate production of pit leveraging the nation's Plutonium Center of Excellence (Pu CoE) to support deterrence.

Non-Nuclear Production

Develop targeted non-nuclear production capabilities to address gaps in the national Nuclear Security Enterprise (NSE).

Computational Breakthroughs

Research, develop, and routinely apply world-leading computational methods, approaches, applications, and technologies to solve Los Alamos' most computationally challenging science and security problems.

Experimental Advances

Advance LANL's experimental characterization tools in conjunction with our computational advances to underwrite stockpile assessment without the need for a nuclear test.

Integrated Deterrence

Anticipate, develop, and demonstrate capabilities to solve emergent deterrence gaps.

Technology Modernization

Optimize and apply advanced technologies to enable modernization of the deterrent and its nuclear warheads.

Threat Response

Develop methodologies and tools, drawing on unique weapons capabilities, that influence international nonproliferation strategies, next generation arms control regimes, and technical solutions for counterterrorism, counterproliferation, and emergency response.

Quantum Leadership

Assert LANL leadership in the National Quantum Initiative; enable emergent scientific and national security needs by advancing quantum-relevant capabilities in materials, algorithms, simulation, and devices.

Climate & Clean Energy

Enable regional and national achievement of 2030/2050 climate and clean energy objectives through scientific, technological, and partnership innovations that build on established LANL capabilities.

Biosecurity Preparedness

Enable national preparedness and response to infectious diseases and biosecurity threats by harnessing life sciences along with other innovative scientific approaches.

Culture Enhancements

Champion enhancements to our work environment that support inclusive staff engagement, respectful behaviors, and learning opportunities that are the foundation for safe, secure, compliant, and quality performance of our missions.

Operational Capacity

Meet the capacity requirements necessary to perform current and future mission.

Force for Good

Be recognized as a force for good by Northern New Mexico communities and trusted by stakeholders to perform missions with minimal operational issues.

Lab Agenda Roadmap

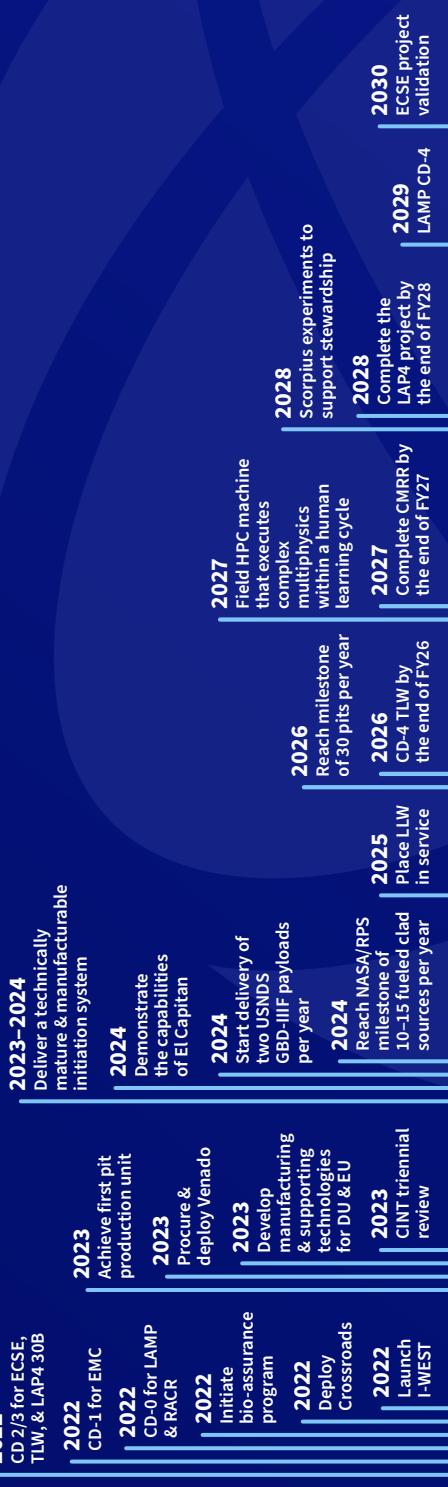
January 2022 Update

The Laboratory Agenda provides a structured framework that identifies the strategic objectives, critical outcomes, 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



Mission Operations



Community Relations

Strategic Objectives

Nuclear Deterrent

Lead the nation in evaluating, developing, and ensuring effectiveness of our nuclear deterrent, including the design, production, and certification of current and future nuclear weapons.

Threat Reduction

Anticipate persistent and emerging threats to global security; develop and deploy revolutionary tools to detect, deter, and respond proactively.

Technical Leadership

Deliver scientific discoveries and technical breakthroughs to advance relevant research frontiers and anticipate emerging national security risks.

Trustworthy Operations

Consistently demonstrate and be recognized by diverse stakeholders for trusted and trustworthy operations.

2022 2023 2024 2025 2026 2027 2028 2029 2030 ➡

Our Values	Mission	Vision	Culture
Service Serving our nation, our partners, our community, and each other.	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 our work is as important as what we do.

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



Critical Outcomes

Pit Production. Reconstitute optimized rate production of pits leveraging the nation's Plutonium Center of Excellence (Pu CoE) to support deterrence.

Non-Nuclear Production. Develop targeted non-nuclear production capabilities to address gaps in the national Nuclear Security Enterprise (NSE).

Computational Breakthroughs. Research, develop, and routinely apply world-leading computational methods, approaches, applications, and technologies to solve Los Alamos' most computationally challenging science and security problems.

Experimental Advances. Advance LANL's experimental characterization tools in conjunction with our computational advances to underwrite stockpile assessment without the need for a nuclear test.

Integrated Deterrence. Anticipate, develop, and demonstrate capabilities to solve emergent deterrence gaps.

Technology Modernization. Optimize and apply advanced technologies to enable modernization of the deterrent and its nuclear warheads.

Threat Response. Develop methodologies and tools, drawing on unique weapons capabilities, that influence international nonproliferation strategies, next generation arms control regimes, and technical solutions for counterterrorism, counterproliferation, and emergency response.

Quantum Leadership. Assert LANL leadership in the National Quantum Initiative; enable emergent scientific and national security needs by advancing quantum-relevant capabilities in materials, algorithms, simulation, and devices.

Climate and Clean Energy. Enable regional and national achievement of 2030/2050 climate and clean energy objectives through scientific, technological, and partnership innovations that build on established LANL capabilities.

Biosecurity Preparedness. Enable national preparedness and response to infectious diseases and biosecurity threats by harnessing life sciences along with other innovative scientific approaches.

Culture Enhancements. Champion enhancements to our work environment that support inclusive staff engagement, respectful behaviors, and learning opportunities that are the foundation for safe, secure, compliant, and quality performance of our missions.

Operational Capacity. Meet the capacity requirements necessary to perform current and future mission.

Force for Good. Be recognized as a force for good by Northern New Mexico communities and trusted by stakeholders to perform missions with minimal operational issues.



Pit Production

Reconstitute optimized rate production of pits, leveraging the nation's Plutonium Center of Excellence (Pu CoE) to support deterrence.

Initiatives

1. Achieve First Production Unit in 2023 and optimize rate production by 2026.
2. Install the eleven items of the major item of the equipment project needed for 10 PPY reliable and modernized operations.
3. Complete the Chemistry and Metallurgy Research Replacement project in accordance with the approved baseline by the end of FY 2027.
4. Complete the Los Alamos Pu Pit Production Project in accordance with the approved baseline by the end of FY 2028.
5. Install and certify the Modern Manufacturing System required to support rate production and electronic generation of the war reserve quality packages.
6. Incorporate in-process monitoring (material control and accountability) to ensure plant availability.
7. Achieve CD-4 Transuranic Liquid Waste Facility by the end of FY 2026.
8. Place Low-level Waste Disposal Facilities in service by the middle of FY 2025.
9. Develop and execute a comprehensive plan for human capital that includes retention, recruitment, and training of all necessary skill sets to support the Pu CoE, including pit production to support 30 PPY by FY 2026 and other plutonium missions and construction execution.
10. Develop a robust supply chain system for procurement and inventory management of quality-controlled supplies to support operations and project execution.
11. Develop a strategy to de-conflict NA-10 and NA-20 scope within PF-4 with concurrence of our federal partners.



Non-Nuclear Production

Develop targeted non-nuclear production capabilities to address gaps in the national Nuclear Security Enterprise (NSE).

Initiatives

1. Assess and document current and future NSE needs that will require LANL execution; develop a strategy to obtain necessary infrastructure and personnel to meet these needs.
2. Develop a formal work acceptance process to support non-nuclear mission production growth, sustainment, and deprecation.
3. Improve and document production facility planning and execution of Mission/Program-assigned scopes of work.
4. Assess and document personnel, facility, and equipment capability to execute technology maturation.
5. Inform and obtain stakeholder support for the strategy.



Computational Breakthroughs

Research, develop, and routinely apply world-leading computational methods, approaches, applications, and technologies to solve Los Alamos' most computationally challenging science and security problems.

Initiatives

1. Develop and gain approval for a decadal plan to ensure competitive, robust, and sustainable energy and facilities infrastructure to meet ATS-5 deployment timeframes.
2. Meet performance targets for weapons simulations on Crossroads by 2023.
3. Demonstrate the capabilities of the Laboratory's next-generation code project on El Capitan by 2024.
4. Demonstrate and use the capabilities of Venado to increase predictive capabilities qualitatively through improved three-dimensional (3D) multi-physics simulations and advanced machine learning techniques, enabling a broad set of science and security breakthroughs by 2024.
5. Identify and field a high-performance computing (HPC) machine that executes complex multi-physics simulation workflows within a human learning cycle by 2027.
6. Incorporate high-fidelity computational exploration of narrative uncertainties into programmatic mission-critical assessments.
7. Document a strategy to explore, develop, deploy, and operate HPC resources and services that are robust and forward-looking to meet program needs.
8. Accelerate fundamental and applied computational and data science R&D efforts to enable achievement of critical outcomes for LANL priority areas.
9. Strengthen and diversify the associated pipeline across the LANL information, science, and technology community.
10. Develop and apply computational tools that improve prediction of high-explosives behavior in full weapons stockpile-to-target-sequence (STS) regimes.
11. Develop a computational and analytic strategy for exploring key narrative uncertainties in problems of interest.



Experimental Advances

Advance LANL's experimental characterization tools in conjunction with our computational advances to underwrite stockpile assessment without the need for a nuclear test.

Initiatives

1. By 2030, underwrite the certification of a new weapon system with the radiographic and reactivity capabilities of the Enhanced Capabilities for Subcritical Experiments project and validated 3D calculations.
2. Advance our understanding of static and dynamic mesoscale material science at existing light sources and accelerators to impact annual assessments. Provide leadership for upgrades to the Advanced Photon Source and Linac Coherent Light Source-Materials in Extreme Conditions to enable critical mesoscale materials science measurements.
3. Establish and sustain leading roles in high-energy density experimental design and analysis.
4. Develop and apply fundamental and empirical tools that improve the characterization of high explosives (HE) in full weapons STS regimes.
5. Deliver the accelerator-related projects Enhanced Capabilities for Subcritical Experiments, Plutonium Proton Radiography, Los Alamos Neutron Science Center (LANSCE) Modernization and LANSCE Enhancements, Dual-Axis Hydrodynamic Test Facility Capability Expansion needed to provide essential data.
6. Establish and sustain the leading role as the NNSA Accelerator Laboratory, aligning investments in LDRD, staffing, equipment, and infrastructure with LANL's Accelerator Strategy.



Integrated Deterrence

Anticipate, develop, and demonstrate capabilities to solve emergent deterrence gaps.

Initiatives

1. Analyze the impacts of cross-domain deterrence to the existing nuclear deterrent; derive modernization requirements for the current stockpile and delivery systems and new employment concepts to address these impacts and consider the implications to nuclear force policy.
2. Assess how evolving adversary stockpiles (e.g., tactical nuclear systems) and adversary defense systems (e.g., anti-access and area denial) affect the efficacy of the current US stockpile and delivery systems. Propose options for alternative US weapons and delivery systems that address gaps.
3. Anticipate how advances in nuclear power, cyber, space, quantum, and computing technologies could lead to strategic surprise and gaps in the overall strategic deterrent. Evaluate technical, tactical, and policy countermeasures to those gaps.



Technology Modernization

Optimize and apply advanced technologies to enable modernization of the deterrent and its nuclear warheads.

Initiatives

1. Develop effective manufacturing and supporting technologies for depleted uranium and enriched uranium that enhance fabrication readiness and agility at Y-12.
2. Develop effective manufacturing alternatives, including electron beam additive manufacturing for upcycling components related to manufacturing at Y-12.
3. Develop effective manufacturing alternatives for polymers and other non-SNM material components to benefit KCNSC and Y-12 (e.g., salts and special materials).
4. Advance HE formulations through an understanding of process-structure-performance interplay along with physics and chemistry at the mesoscale.
5. Enhance HE pilot scale synthesis, formulation, and advanced manufacturing capabilities to support product development within the NNSA complex and to benefit PX.
6. Deliver a technically mature and manufacturable initiation system for the next LANL weapon system that improves reliability and safety of the warhead and that is applicable to multiple weapons systems.
7. Develop advanced applications for gas transfer systems, power, and surety that can be applied to new weapons systems to improve reliability, performance, and safety.
8. Enhance and extend capabilities in delivery vehicle design:
 - Payload and system integration with hypersonic platforms – Collaborate with services and industry; participate in current and future designs.
 - Hypersonic flight analysis and platform design – Identify gaps and develop options to bridge them; strengthen collaboration with the Texas A&M University's University Consortium for Applied Hypersonics; ensure coordination of Lab-wide capabilities are applied to problems.
9. Modernize facilities and infrastructure per current ALDW ten-year infrastructure plan.



Threat Response

Develop methodologies and tools, drawing on unique weapons capabilities, that influence international nonproliferation strategies, next generation arms control regimes, and technical solutions for counterterrorism, counterproliferation, and emergency response.

Initiatives

1. Anticipate asymmetric threats and analyze, demonstrate, and develop new technologies that are manifested in the national response. Publish technical papers that inform policy on integrated deterrence strategies, especially regarding the integration of nuclear, space, cyber, and hypersonic technologies. Transition from research to deployment of new technologies that integrate into the national global security mission space.
2. Develop methodologies and tools to support international nonproliferation and next generation arms control. Demonstrate enhanced nonproliferation stewardship capacity through testbed and monitoring technology demonstrations and increased staffing.
3. Transition staffing from a field deployment posture with execution of hiring plans to support a new R&D/reach-back portfolio and forensics strategy. Develop innovative technologies and methods to counter terrorism and support emergency response and counterproliferation.



Quantum Leadership

Assert LANL leadership in the National Quantum Initiative; enable emergent scientific and national security needs by advancing quantum-relevant capabilities in materials, algorithms, simulation, and devices.

Initiatives

1. Develop and nurture the Laboratory's quantum information sciences capabilities (as measured through capability/program reviews and developed quantum information science [QIS] programs), supporting R&D at the frontier of quantum information sciences to enable responsive solutions for emerging national security needs.
2. Develop, communicate, and publish an integrated QIS strategy that spans multiple capability pillars and identifies specific areas of leadership and partnership, as well as areas of lower priority. Align QIS LDRD, instrument, staffing, and infrastructure investments to the QIS strategy priorities.
3. Strengthen and grow the LANL workforce in QIS through education and training.
4. Increase regional, inter-laboratory, industrial, and academic partnerships.
5. Advance the Center for Integrated Nanotechnologies (CINT) as the leading Nanoscale Science Research Center (NSRC) for QIS, as validated through the NSRC program manager and the CINT triennial review in FY 2023.
6. Demonstrate the Quantum Science Center's leadership role among the National Quantum Information Science Research Centers.
7. Expand funding in basic and applied quantum information sciences that leverages our capabilities and underpins our national security mission.



Climate and Clean Energy

Enable regional and national achievement of 2030/2050 climate and clean energy objectives through scientific, technological, and partnership innovations that build on established LANL capabilities.

Initiatives

1. Enhance capability to forecast at regional scale impacts of the evolving climate to enable science-based civilian and military actions both domestically and globally, particularly at the sub-decadal scale and integrated with weather, infrastructure, disease, and other models. Deploy LANL tools to decision makers.
2. Demonstrate leadership, with relevant partners, in the multidisciplinary experimental R&D needed to inform near- and long-term predictions that influence action, as well as provide technical options to support those actions.
3. Develop, with relevant partners, innovative technology that can mitigate climate change, address the impacts of climate change, and enable monitoring of international norms and agreements.
4. Inform and facilitate implementation of a rapid transformation of the energy system domestically, which will be paralleled by a transformation of the global energy system.
5. Support NNSA in establishing and achieving climate mitigation goals, including using the Laboratory as a testbed for demonstration and deployment efforts.



Biosecurity Preparedness

Enable national preparedness and response to infectious diseases and biosecurity threats by harnessing life sciences along with other innovative scientific approaches.

Initiatives

1. Assert leadership in national security life sciences that demonstrates current national laboratory capabilities and a vision for increased impact.
2. Expand national security R&D in areas that align with core capabilities and focus areas that have been externally peer reviewed.
3. Build on LANL COVID-19 R&D for future pandemics and national emergencies.
4. Enable near-term decision making that demonstrates the impact of science-informed planning.
5. Create technical options through a productive and dynamic innovation pipeline from research to adoption.
6. Form partnerships to enable achievement.



Culture Enhancements

Champion enhancements to our work environment that support inclusive staff engagement, respectful behaviors, and learning opportunities that are the foundation for safe, secure, compliant, and quality performance of our missions.

Initiatives

1. Evolve to a Lab-wide culture of teaming and collaborative behaviors based on common values.
2. Measure and document annually the Laboratory culture maturity with a focus on sustained improvement in three areas:
 - Leadership, where the leadership team through the responsible line managers (RLMs), demonstrates and models a commitment to transform culture.
 - Employee Engagement, with shared and integrated improvement actions across LANL, leveraging the Institutional Worker Environment, Safety, and Security Team (IWESST), WESST, Voluntary Protection Program, and Safety and Security Improvement Program.
 - Organizational Learning, with demonstrated excellence in safety, security, quality, compliance, and behaviors (i.e., how we do our work is as important as what we do).
3. Increase focus on disciplined operations by learning from upsets in order to reduce mission and operational impacts



Operational Capacity

Meet the capacity requirements necessary to perform current and future mission.

Initiatives

1. Implement talent acquisition plans, tools, practices, and career development opportunities to meet requirements of the Laboratory missions.
2. Improve the fidelity of procurement planning and increase procurement volume in support of Laboratory spending plans, leveraging new tools such as Ariba and Master Agreement Task Order Contracts (MATOCs), and using both forward-looking input and existing data from previous procurement cycles. Assure procurements are executed efficiently and support missions and community-centered/small business targets to the extent possible.
3. Ensure construction capacity to meet construction growth by leveraging tools such as MATOCs to decrease self-perform work and to support entire site's plans as identified in the critical outcomes.
4. Meet increased demand for space including office space and lab space for critical outcomes and to support growth in mission and support activities.
5. Complete and present a comprehensive transportation study and develop/execute a plan that enables mission, optimizes commute times, incentivizes user adoption of mass transit as the preferred option, leverages regional partnerships for off-hill parking/bussing, and supports net-zero goals.
6. Develop and execute a comprehensive facility-based plan for major maintenance to improve the overall reliability and mission readiness of the LANL facility portfolio.
7. Improve and measure critical mission process efficiencies through innovations in process design and implementation, increased use of automation and workflow tools, better training with end users in the loop, consistent with the integrated System of Management Systems (iSoMS) online tool framework for improvement.
8. Leverage IT Governance Council to improve and prioritize IT infrastructure investments and communications tools, including wireless in PF-4, red net capacity in new and existing Laboratory facilities, and other capabilities to ensure modern collaboration tools.
9. Continue to develop the campus master plan (CMP) and the CMP White Board application to fully integrate facility/infrastructure requirements with mission drivers, environmental opportunities and constraints, and security requirements.
10. Deliver best-in-class "life cycle" waste management from generation through disposition.
11. Deploy innovative and strategic approaches to permitting strategy and implementation to enable mission delivery.



Force for Good

Be recognized as a force for good by Northern New Mexico communities and trusted by stakeholders to perform missions with minimal operational issues.

Initiatives

1. Partner proactively with NNSA headquarters and NA-LA to create new opportunities to earn the trust of, and directly engage with, New Mexico leaders and the public on operational competence and contributions to national security and other missions.
2. Define and pursue novel and varied communication channels and technologies to reach employees both onsite and at offsite/remote locations to ensure internal communications are accurate, transparent, timely, responsive, and agile. Reinforce desired Laboratory culture, values, and organizational learning objectives, regardless of physical location of employees.
3. Protect the Laboratory from reputational risks by proactive management of legal, regulatory, environmental, counterintelligence, and financial/audit risks and by promoting integrity throughout our Laboratory culture.
4. Design and implement a regional educational partnership strategy with New Mexico schools, community colleges, and universities to support near-term and decadal institutional workforce capacity needs. Define and explore potential mechanisms to reach more high school and middle school students.
5. Stimulate starting new companies by leveraging LANL technological innovations through Feynman Center for Innovation and provide expertise through the Community Technical Assistance program to position LANL as a driver for regional economic development.
6. Partner with county and state entities in the community to promote infrastructure investments that enable increased capacity at LANL.
7. Direct procurement effort to local vendors where possible and develop a strategy to strengthen and improve pueblo alliance.
8. Optimize investment of philanthropic dollars to address critical socioeconomic needs and to make a lasting, significant impact on the wellbeing of the communities.

Behaviors

There are five behaviors that support the Lab's values, and that are used to evaluate employee performance. These behaviors, which shape how we work, include:

Collaborative Problem Solving

Exhibits initiative and willingness to work with others and be inclusive with people inside and outside their organization; is open minded to find appropriate solutions to facilitate the accomplishment of Laboratory work goals.

Continuous Learning

Proactively develops, adapts, and transforms oneself and shares lessons with others. Applies feedback and lessons learned in response to changing mission, business needs, processes and work responsibilities. Assesses risk to ensure it is addressed appropriately.

Shared Outcome

Demonstrates a shared purpose within the Laboratory. Respects others and maintains a positive/responsive attitude to accomplish work in an ethical, efficient, and cost-effective manner. Encourages and supports security and safety for ourselves and each other.

Trustworthy

Interacts with others in a way that gives them confidence in one's intentions and those of the organization; communicates openly, honestly, and with integrity with colleagues and customers; follows through on initiatives.

Commitment

Stays motivated, focused, and dedicated to a position or plan of action.



Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by Triad National Security, LLC for the National Nuclear Security Administration of U.S. Department of Energy under contract 89233218CNA000001. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.