Lab Agenda

Simultaneous Excellence

January 2024

Los Alamos
NATIONAL LABORATORY

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 Laboratory Agenda.

Back row (left to right): Stacy McLaughlin, senior director in ALDWP-STEP, representing ALDWP on the day of the photo; Nancy Jo Nicholas, ALDGS; Derrick Montoya, COO, ALDW; Kim Scott, executive officer, DDW; David Teter, ALDICP; James Owen, ALDW; Angela Mielke, executive officer, DDSTE; Bert Gawthrop, LANL general counsel.

Middle row (left to right) Aric Hagberg, CCS division leader, representing ALDSC on the day of the photo; Bret Simpkins, ALDFO; Charlie Nakhleh, ALDX; LeAnne Stribley, ALDBUS; Ellen Cerreta, ALDPS; Kelly Beierschmitt, DDOPS; Unica Viramontes, ALDDPP; Bob Webster, DDW.

Front row (left to right): Mark Anthony, ALDPI; Frances Chadwick, LANL staff director; Thom Mason, LANL director; Mark Chadwick, DDSTE (interim); Steve Coleman, ALDESHQ; Laurie Monfiletto, HR senior director; Pat Fitch, ALDCELS.

Contents

Introduction

The United States of America and our allies depend on the capabilities of Los Alamos National Laboratory (LANL) to support the security of our Nation and the world. We are charged with effectively leading and coordinating efforts within LANL and across partnering institutions and communities to fulfill the responsibilities entrusted to us. Our scientific and operational strengths are vital for managing the risks we currently face. As the global environment changes, so the Laboratory must be ready to meet new challenges while delivering on current programs and deliverables. We are committed to partnerships with the National Nuclear Security Agency (NNSA), Department of Energy (DOE), Department of Defense, Congress, and other institutions central to our mission.

Simultaneous Excellence

LANL uses a comprehensive framework—the Laboratory Agenda—that is aligned with DOE/NNSA strategies and ties the Laboratory's long-term strategic intent to actionable, near-term milestones with institutional or cross-organizational impacts.[1] This agenda helps to inform LANL decisions and strategies by integrating activities to ensure simultaneous excellence in mission; science, technology, and engineering; operations; and community relations, establishing and nurturing an organizational culture of shared accountability for Laboratory performance. The Laboratory Agenda, while broad, does not encompass all R&D areas at LANL but works in tandem with other institutional strategies.

The Laboratory Agenda identifies the following:

- **Strategic Objectives** that support LANL's mission[2]

- **Critical Outcomes** needed to achieve LANL's Strategic Objectives

- Actionable **Supporting Initiatives** needed to achieve these Critical Outcomes

This year's agenda includes a new category: **Signature Institutional Commitments (SICs)**. SICs are areas for large, discretionary investments that will help ensure LANL's long-term success. The SICs work in tandem with one another and with the Supporting Initiatives in service of one or more Critical Outcomes.

The Laboratory Agenda is updated annually by the Leadership Team (LT), consisting of the Laboratory Director's Office and the Associate Laboratory Directors. The LT identifies action leaders who coordinate the implementation of each Critical Outcome and report progress to the LT throughout the year.

The Laboratory Agenda communicates institutional priorities that require additional near-term attention and focus, thereby informing decisions at all levels—ranging from institutional investments to organizational strategies to individual performance goals. In parallel, long-term investments in Capability Pillars advance high quality R&D and maintain continued strength in the scientific capabilities underlying all LANL missions.
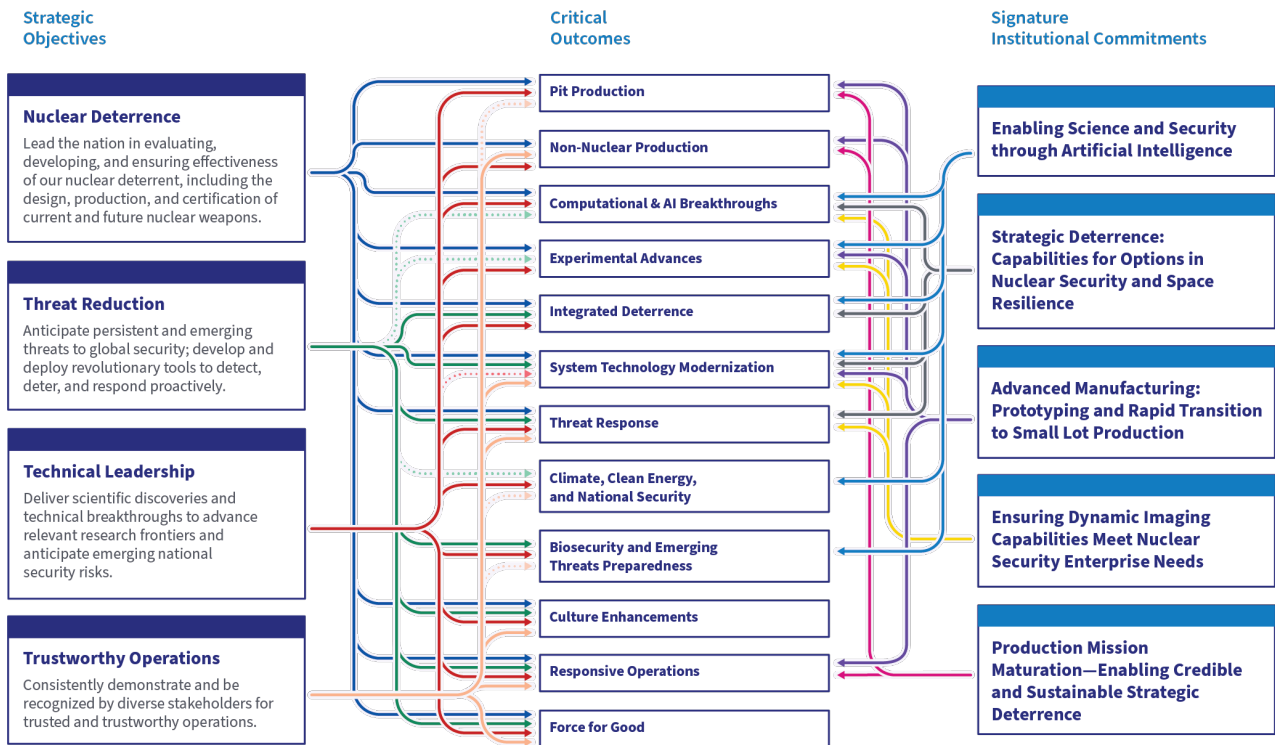
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1 For details of the Laboratory Agenda's structure and organization, refer to the LANL Management Plan (MSA-MP-001).

2 The mission of Los Alamos National Laboratory is to solve national security challenges through simultaneous excellence.

Critical Outcomes

Strategic Objectives	Pit Production	Non-Nuclear Production	Computational & AI Breakthroughs	Experimental Advances	Integrated Deterrence	System Technology Modernization	Threat Response	Climate, Clean Energy, and National Security	Biosecurity and Emerging Threats Preparedness	Culture Enhancements	Responsive Operations	Force for Good
Nuclear Deterrence 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.	✓	✓	—	—	—	✓	✓	✓	✓	✓	✓	✓

Signature Institutional Commitments

	Pit Production	Non-Nuclear Production	Computational & AI Breakthroughs	Experimental Advances	Integrated Deterrence	System Technology Modernization	Threat Response	Climate, Clean Energy, and National Security	Biosecurity and Emerging Threats Preparedness	Culture Enhancements	Responsive Operations	Force for Good
Enabling Science and Security through Artificial Intelligence	—	—	✓	✓	✓	✓	—	✓	✓	—	—	—
Strategic Deterrence: Capabilities for Options in Nuclear Security and Space Resilience	—	—	✓	—	✓	✓	✓	—	—	—	—	—
Advanced Manufacturing: Prototyping and Rapid Transition to Small Lot Production	✓	✓	—	✓	—	✓	—	—	—	—	✓	—
Ensuring Dynamic Imaging Capabilities Meet Nuclear Security Enterprise Needs	—	—	✓	✓	—	✓	✓	—	—	—	—	—
Production Mission Maturation—Enabling Credible and Sustainable Strategic Deterrence	✓	✓	—	—	—	—	—	—	—	—	✓	—

Strategic Objectives

Critical Outcomes

Signature Institutional Commitments

Nuclear Deterrence
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.

Pit Production

Non-Nuclear Production

Computational & AI Breakthroughs

Experimental Advances

Integrated Deterrence

System Technology Modernization

Threat Response

Climate, Clean Energy, and National Security

Biosecurity and Emerging Threats Preparedness

Culture Enhancements

Responsive Operations

Force for Good

Enabling Science and Security through Artificial Intelligence

Strategic Deterrence: Capabilities for Options in Nuclear Security and Space Resilience

Advanced Manufacturing: Prototyping and Rapid Transition to Small Lot Production

Ensuring Dynamic Imaging Capabilities Meet Nuclear Security Enterprise Needs

Production Mission Maturation—Enabling Credible and Sustainable Strategic Deterrence

Strategic Objectives

The mission of Los Alamos National Laboratory is to solve national security challenges through simultaneous excellence in nuclear security; mission-focused science, technology, and engineering; mission operations; and community relations. To guide our strategy, the Leadership Team has identified four Strategic Objectives with goals that align with this mission:

- **Nuclear Deterrence.** 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.

These Strategic Objectives are supported by a set of Critical Outcomes (with Supporting Initiatives), which are in turn supported by several Signature Institutional Commitments.

Critical Outcomes

The Leadership Team has identified a set of Critical Outcomes to ensure that the Laboratory successfully achieves the four Strategic Objectives and to position the Laboratory for national challenges we anticipate in the future. The goals for each of these Critical Outcomes are listed below, and the following pages provide more detail, including the Supporting Initiatives for each Critical Outcome.

As LANL reaches Critical Outcome goals, new aims are set. Previously, the Laboratory Agenda also included a Critical Outcome to develop a leadership position in quantum information science, in recognition of the field's emerging status across program areas and its potential to impact multiple aspects of our mission space. We have successfully achieved our goals: Investments in facilities, equipment, and program development have enabled broad partnerships and a healthy portfolio of quantum information science work at LANL. Additionally, organizationally we have aligned to be responsive to this work going into the future by establishing a new group—MPA-Q. Quantum information science remains active across multiple groups at LANL. Given these successes, Quantum Leadership was retired this year as a separate Critical Outcome, and we will continue to evolve it and our other computational capabilities through our Computational and AI Breakthroughs Critical Outcome as well as through other institutional mechanisms.

Fiscal Year 2024 (FY24) Critical Outcomes and Goals

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 Nuclear Security Enterprise (NSE) and DOE.

Computational & AI Breakthroughs. Transform how we advance and integrate computational platforms, methods, data, and knowledge to make revolutionary advancements in solving the hardest science and national security problems.

Experimental Advances. Modernize our diagnostic and manufacturing science capability at LANL to continue to meet mission need for certification and qualification of materials and advanced design concepts for our weapons and other DOE program space.

Integrated Deterrence. Develop and demonstrate capabilities to strengthen US deterrence across the competition–conflict spectrum.

System Technology Modernization. Coordinate and adopt a Laboratory strategy for System Technology Modernization that aligns with the nuclear deterrence objectives of the United States, its allies, and partners.

Threat Response. Develop and deploy technical solutions supporting future nonproliferation, counterproliferation, and counter-terrorism strategies.

Climate, Clean Energy, and National Security. Establish a strategic overlay that accelerates and amplifies the impacts of climate and clean energy R&D on challenges in national security.

Biosecurity and Emerging Threats Preparedness. Enable national preparedness and response by harnessing life sciences along with other innovative scientific approaches. Leverage biotechnology and artificial intelligence (AI) to support the nuclear stockpile and non-proliferation research.

Culture Enhancements. Champion enhancements that enable a more positive and productive work environment through inclusive staff engagement, respectful behaviors, and learning opportunities that are the foundation for safe, secure, compliant, and quality performance of our missions.

Responsive Operations. Provide agile and efficient operational processes and systems to effectively 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.

Critical Outcome: Pit Production

Goal(s): Reconstitute optimized rate production of pits, leveraging the nation's Plutonium Center of Excellence (Pu CoE) to support deterrence.
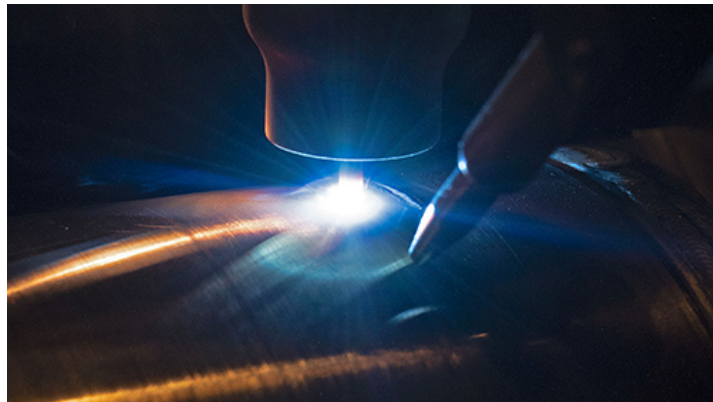
The pit production mission of LANL serves an essential role in ensuring national security. LANL supports NNSA in several critical programs that must be delivered successfully; additionally, our institutional strategy must anticipate and prepare for future national needs in deterrence.

This Critical Outcome supports three of the Strategic Objectives in accomplishing the Laboratory mission: Nuclear Deterrence, Trustworthy Operations, and Technical Leadership. This Critical Outcome also leverages the Signature Institutional Commitments in advanced manufacturing and production mission maturation.

In fiscal year 2023 (FY23), we received CD-2/3 approval for the Los Alamos Plutonium Pit Production Project (LAP4) 30-Base subproject, received approval for a CD-3A on the 30-Reliable and West Entry Control Facility (WECF) subprojects, completed the first-ever glovebox fabricability reviews, and developed an integrated master schedule (IMS) linking all pit-related work into an integrated and executable plan while also remaining on track for the projects that will support future operations.

For FY24, we will build on these successes through 12 Supporting Initiatives.

Supporting Initiatives

1. Achieve First Production Unit in 2024 and optimize rate production in accordance with NNSA milestones.

2. Install L2 Milestone planned components of the major item of equipment projects needed for reliable and modernized pit production operations in accordance with NNSA pit production milestones.

3. Receive CD-2/3 approval for the Chemistry and Metallurgy Research Replacement (CMRR) PF-4 Equipment Installation Phase 2 project and LAP4 WECF. (Note, CMRR PEI-2 is also captured in a Supporting Initiative for the Experimental Advances Critical Objective.)

4. Execute the LAP4 activities in accordance with the Integrated Master Schedule (IMS).

5. Install and certify the modern manufacturing system required to support rate production and electronic generation of the war reserve quality packages.

6. Implement nuclear materials control and accountability solutions to improve pit manufacturing operational time.

7. Achieve CD-4 Transuranic Liquid Waste Facility by the end of FY 2027.

8. Bring Waste Characterization, Reduction, and Repackaging Facility (WCRRF) online in 2024. Place Low-level Waste Disposal Facilities in service in 2027.

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 and other plutonium missions and construction execution.

10. Develop and effectively execute a robust supply chain system for procurement and inventory management and storage of quality-controlled supplies to support operations and project execution.

11. Effectively manage and balance NA-10 and NA-20 scope within PF-4 with concurrence of our federal partners.

12. Assure Nuclear Criticality Safety organizational capability and implement solutions to improve manufacturing operational time.

Critical Outcome: Non-Nuclear Production

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

LANL's non-nuclear production mission serves a unique role in ensuring the national security of the Nation. We support NNSA in several critical programs on which we must deliver successfully, and our institutional strategy must anticipate and prepare for future national needs in deterrence.

This Critical Outcome supports three of the Strategic Objectives in accomplishing the Laboratory mission: Nuclear Deterrence, Trustworthy Operations, and Technical Leadership. This Critical Outcome also leverages the Signature Institutional Commitments in advanced manufacturing and production mission maturation.

In FY23, we increased staffing in key technical and production roles to meet stockpile modernization programs requirements; improved disciplined operations associated with high explosives (HE), unique materials, and across production lines; focused attention on delivering to the next level assembly, meeting partner site lead times while keeping open communications with federal program offices and the local NNSA field office; and deployed unique manufacturing and inspection platforms.

For FY24, we will build on these successes through four Supporting Initiatives.

Supporting Initiatives

1. Assess and document current and future NSE and DOE needs that will require LANL execution; develop a strategy to obtain necessary infrastructure and personnel to meet these needs.
2. Improve and document production facility planning and execution of mission/program-assigned scopes of work.
3. Assess and document personnel, facility, and equipment capability needed to execute technology maturation.
4. Inform and obtain stakeholder support for the strategy.

Within these initiatives, we have several priorities, including engaging NA-121, NA-194, and NA-193 for opportunities to share or shoulder NSE workload activities; formalizing future planning with the Infrastructure Program & Planning Office for the SM-39 and Beryllium Technology Facility next generation capability/capacity; actively identifying necessary facilities as part of the Two Mile Mesa Campus plan, including multiple manufacturing and metrology facilities for inert components and high explosive components (e.g., staging/storage facilities associated with detonator production); evaluating a distributed model of non-nuclear manufacturing/machining facilities off main campus to bridge to the Two Mile Mesa Campus plan realization before FY2033 to meet program of record demand signals; and actively updating capacity modeling for Detonator Production and Surveillance.

Critical Outcome: Computational & AI Breakthroughs

Goal(s): Transform how we advance and integrate computational platforms, methods, data, and knowledge to make revolutionary advancements in solving the hardest science and national security problems.

Across its national-security mission space, LANL relies on the development and application of innovative computational methods, including advances in high-performance computing, artificial intelligence (AI), and quantum information science. These capabilities are foundational for our efforts ranging from simulation of complex phenomena with fast, accurate physics; to the fusing of large, disparate datasets; to the development of advanced sensing to monitor the behavior of complex systems.

This Critical Outcome is focused on ensuring a vibrant capability by pushing the forefront of our existing platforms while exploiting developments in new platforms. This Critical Outcome supports three of the Strategic Objectives in accomplishing the Laboratory mission: Nuclear Deterrence, Trustworthy Operations, and Technical Leadership. This Critical Outcome also leverages the Signature Institutional Commitment in AI, which builds on our recent investment in the Venado platform.

In FY23, we achieved the performance target in acceptance testing for Crossroads; developed facilities plans for ATS-5 and ATS-7; deployed new data-centric computing infrastructure; and continued to have a vibrant portfolio of fundamental and applied R&D efforts in computation and data science.

For FY24, we will build on these successes through 11 Supporting Initiatives.

Supporting Initiatives

1. Develop and gain Laboratory approval for a decadal plan to ensure competitive, robust, and sustainable energy and facilities computing infrastructure to meet ATS-5 and ATS-7 deployment timeframes by the end of calendar year 2025.

2. Demonstrate computational performance gain over ATS-1 of a 3D integrated code on problems of interest to the weapons program on Crossroads/ATS-3 by the end of calendar year 2024.

3. Demonstrate the capabilities of the Laboratory's modern multi-physics capabilities on El Capitan by 2025.

4. Demonstrate the unique capabilities of the Venado platform to conduct calculations ranging from integrated 3D multi-physics simulations to machine learning (ML) by the end of calendar year 2024.

5. Develop and document a strategy to achieve AI-assisted integrated weapons simulation workflows within a human learning cycle, aligned with the timeframe and technology path of the ATS-5 platform by the end of calendar year 2024.

6. Explore, develop, and incorporate high-fidelity computational exploration of narrative uncertainties into a programmatic mission-critical assessment by the end of calendar year 2026.

7. Develop a comprehensive data stewardship strategy across the portfolio of scientific data to enable effective improvement of user workflows and application of AI/ML techniques by the end of calendar year 2025.

8. Develop and apply computational methods that accelerate design for manufacturing by the end of calendar year 2025.

9. Accelerate fundamental and applied computational and data science R&D with AI/ML technologies.

10. Strengthen and diversify the talent pipeline supporting all these initiatives across the LANL information science and technology community via innovative partnerships and programs.

11. Develop and apply quantum, or hybrid quantum-classical, algorithms to security mission problems.

Critical Outcome: Experimental Advances

Goal(s): Modernize our diagnostic and manufacturing science capability at LANL to continue to meet mission need for certification and qualification of materials and advanced design concepts for our weapons and other DOE program space.
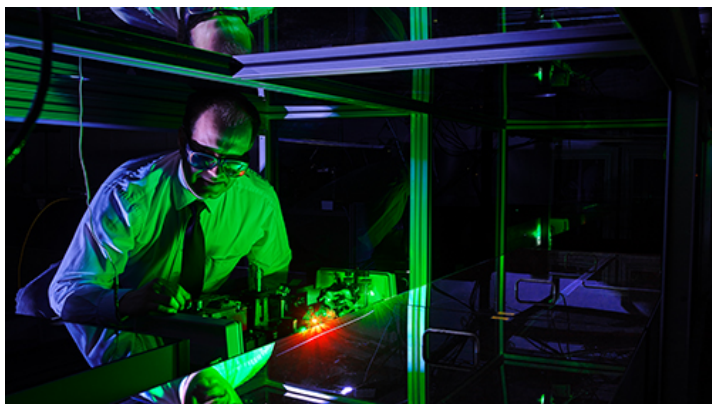
LANL's national security mission relies on strategic experiments to provide critical observations on the behavior and properties of materials, components, and systems. Experiments in nuclear science - fundamental cross sections and integral critical assemblies - also inform and validate our simulation codes. This data complements and informs our other research based on theory and simulation, and it is essential for some mission needs related to certification and qualification of materials and advanced concepts.

This Critical Outcome is focused on ensuring the vibrancy of our key experimental facilities and capabilities through targeted investments that anticipate needs of the future. It responds to specific capability needs identified from national planning documents—e.g., the Requirements Planning Document and the Stockpile Stewardship Management Plan. This Critical Outcome supports three of the Strategic Objectives in accomplishing the Laboratory mission: Nuclear Deterrence, Trustworthy Operations, and Technical Leadership. This Critical Outcome also complements the Critical Outcome on System Technology Modernization, and it leverages Signature Institutional Commitments in AI, dynamic imaging, and advanced manufacturing.

In FY23, we achieved key milestones on new high-explosive formulations, aging effects on compressibility, and the impact of carbide size on materials of interest. We also developed, staffed, and chartered our Accelerator Strategy office.

For FY24, we will build on these successes through six Supporting Initiatives.

Supporting Initiatives

1. Enable Los Alamos Neutron Science Center's (LANSCE's) Accelerator Modernization Project inclusive of enhancements beyond the front end to sustain required capabilities.

2. By 2030, develop the capability to underwrite the certification of a new weapon system with the radiographic and reactivity capabilities of the Enhanced Capabilities for Subcritical Experiments (ECSE) project and validated 3D calculations. Develop an alternative first experiment on ECSE.

3. Execute a strategy to expand the Dual-Axis Radiographic Hydrodynamic Test (DARHT) Facility capability needed to provide a growing need for this essential data.

4. Establish an Advanced Manufacturing Center of Excellence focused on prototype and small-lot manufacturing advancements to underpin multiple Critical Outcomes and mission areas that rely on engagement and the future of advanced manufacturing science expertise at LANL.

5. Execute the Chemistry and Metallurgy Research Replacement (CMRR) PF-4 Equipment Installation Phase 2 (PEI-2) project in accordance with the IMS. (Note, CMRR PEI-2 is also captured in a supporting initiative for the Pit Manufacturing Critical Objective.)

6. Complete execution of the modernization plans for the Sigma and Target Fabrication Facilities.

Critical Outcome: Integrated Deterrence

Goal(s): Develop and demonstrate capabilities to strengthen US deterrence across the competition-conflict spectrum.

LANL uses its broad capabilities in national security to support the Nation in deterrence in the face of a dynamically evolving external landscape.

This Critical Outcome focuses on nurturing the science and technology needed to support the integrated deterrence mission into the future. Deterrence has reemerged as a preeminent national security objective with a recognition that the United States must address integration across the spectrum of competition and conflict. This Critical Outcome supports three of the Strategic Objectives in accomplishing the Laboratory mission: Nuclear Deterrence, Trustworthy Operations, and Technical Leadership. This Critical Outcome also leverages the Signature Institutional Commitments in AI and strategic deterrence.

In FY23, we positioned LANL as an important partner with departments and agencies in providing assurance of the nuclear deterrent, including by increasing LANL's role in the deterrence policy community. Examples include: convening the Director's Strategic Resilience Initiative workshops on escalation management, leading (with the Center for Strategic and International Studies) tabletop exercises on escalation management, co-leading (with National Defense University) an interagency working group on integrated deterrence (with NNSA and the departments of State, Commerce, and Defense), and developing a net assessment capability for NNSA.

For FY24, we will build on these successes through five Supporting Initiatives.

Supporting Initiatives

1. Develop and publish an assessment of and internal strategy for LANL's role within the national and international integrated deterrence landscape.
2. Develop, validate, and apply modeling and simulation tools that can inform decisions for an array of use-cases related to deterrence options and operational effectiveness. Utilize sponsor use-cases to help validate and improve this capability.
3. Build programmatic opportunities related to the analysis of system-level impacts from emerging technologies through sponsor engagement and the building of LANL's external presence via targeted publications (e.g., on the deterrence policy implications of long-range threats).
4. Develop a LANL community of interest around technologies that impact integrated deterrence. Initiate program, line, and staff equities that engage in key areas of cross-domain effects. Host workshops and regular meetings to build a community of practice.
5. Advance capabilities and mature technologies directly applicable to the resilience of the integrated strategic deterrent, while aligning our space efforts with the broader LANL space strategy codified in the LANL Institutional Space Strategy. Focus specifically on three areas supporting space resilience, building on LANL's strengths and unique capabilities:
    a. Advance space-based particle accelerators by building on the recent Beam-PIE success, with the goal of deterring the use of nuclear weapons in space through high-altitude nuclear explosion remediation technology.
    b. Enhance resiliency of space systems through nuclear power technologies, both from a nuclear materials perspective and through advanced energy conversion technologies.
    c. Enhance national Space Domain Awareness capabilities in both the radio frequency and electro-optical domains with technology maturation of core sensing capabilities and novel applications.

Critical Outcome: System Technology Modernization

Goal(s): Coordinate and adopt a Laboratory strategy for System Technology Modernization that aligns with the nuclear deterrence objectives of the United States, its allies, and partners.
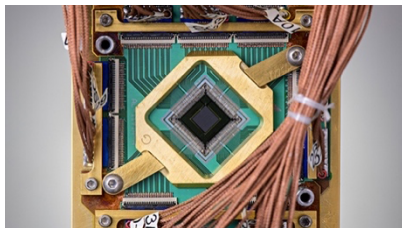
LANL designs and develops a variety of systems in support of nuclear deterrence and threat reduction.

This Critical Outcome involves developing a strategy to ensure that we remain at the forefront of system technology development for national security. This new strategy will drive identification of specific technology needs from national planning factors (e.g., the Requirements Planning Document and the Stockpile Stewardship Management Plan). Drivers for technology needs will be traceable to an existing weapon system issue, a new weapon system requirement, a future weapon system concept, an operational improvement, or a disruptive innovation either helpful or harmful. Prioritization of technology maturation activities will be coordinated with the NNSA's Defense Programs (NA-10) Technology Insertion Council, which is responsible for managing cross-cutting activities throughout the enterprise. When possible, this strategy will incorporate mature technologies from conventional weapons systems. This directly couples this Critical Outcome to the Laboratory's mission expansion into conventional weapons system design.

This Critical Outcome supports all four of the Strategic Objectives in accomplishing the Laboratory mission: Nuclear Deterrence, Trustworthy Operations, Technical Leadership, and Trustworthy Operations. This Critical Outcome also complements the Critical Outcome on Experimental Advances, and it leverages Signature Institutional Commitments in AI, dynamic imaging, strategic deterrence, and advanced manufacturing.

In FY23, we made significant progress on multiple fronts, including optical initiation systems and processing capabilities within the Sigma facility for depleted uranium.

In FY24, we will build on these successes through 10 Supporting Initiatives. We have specific focus on high-explosive (HE) activities and continued efforts on depleted uranium fabrication.

Supporting Initiatives

1. 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.
2. Develop modern manufacturing techniques for beryllium parts.
3. Advance HE formulations through an understanding of process-structure-performance interplay along with physics and chemistry at the mesoscale.
4. Enhance HE pilot-scale synthesis, formulation, and advanced manufacturing capabilities to support product development within the NSE complex and to benefit Pantex.
5. Develop effective manufacturing and supporting technologies for depleted uranium and enriched uranium that enhance fabrication readiness and agility at Y-12. This includes modernizing core facilities like Sigma.
6. Develop effective manufacturing alternatives, including electron beam additive manufacturing for upcycling components related to manufacturing at Y-12.
7. Develop effective manufacturing alternatives for polymers and other non-special nuclear material components to benefit the Kansas City National Security Campus and Y-12 (e.g., salts and special materials).
8. Develop advanced applications for gas transfer systems, power, and surety that can be applied to new weapons systems to improve reliability, performance, and safety.
9. Enhance and extend capabilities in delivery vehicle design:
   a. Payload and system integration with hypersonic platforms: Collaborate with services and industry; participate in current and future designs.
   b. 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.
10. Modernize facilities and infrastructure per LANL's current 10-year infrastructure planning.

Critical Outcome: Threat Response

Goal(s): Develop and deploy technical solutions supporting future nonproliferation, counterproliferation, and counter-terrorism strategies.

LANL uses its broad capabilities in national security to support the Nation in strategies and technology options for nonproliferation, counterproliferation, and counterterrorism.
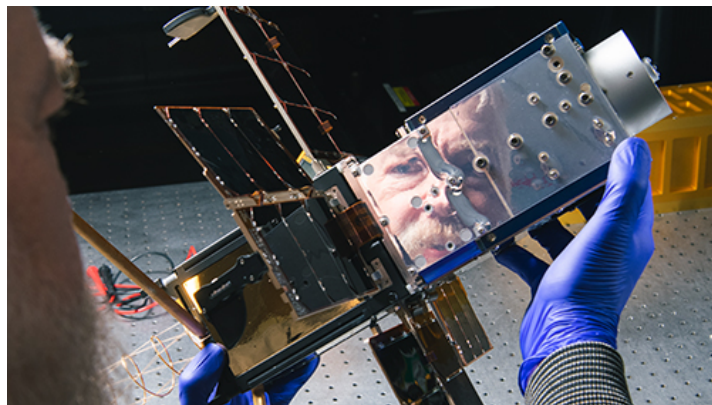
This Critical Outcome focuses on nurturing and growing capabilities needed to support these missions today and into the future. This Critical Outcome supports all four of the Strategic Objectives in accomplishing the Laboratory mission: Nuclear Deterrence, Trustworthy Operations, Technical Leadership, and Trustworthy Operations. This Critical Outcome also leverages Signature Institutional Commitments in strategic deterrence and dynamic imaging.

In FY23, we deployed ground-based electromagnetic pulse sensors to Ukraine, trained Ukrainian forces in nuclear forensic sample collection, hosted and participated in two multi-laboratory exercises supporting the Mobile Plutonium Facility, procured two HPC systems (Rendija and Tularosa) in support of nuclear intelligence and nuclear threat science missions, qualified Global Burst Detector design for GPS IIIF satellites, and successfully executed multiple nuclear test detection campaigns (e.g., low-yield nuclear monitoring PE1 HE emplacement and Vulcan CALDERA 2).

In FY24, we will build on these successes through 11 Supporting Initiatives.

Supporting Initiatives

1. Develop and field tools in support of nuclear emergency response and counter-terrorism efforts. Develop new capabilities for transition into operations within three years. Advance high-fidelity defeat diagnostics by creating a state-of-the-art radiographic facility for full-scale experimentation and validation.
2. Develop innovative technologies and methods to further national counter-proliferation goals. Provide mature solutions to FY24 challenge problems.
3. By the end of FY24, develop, communicate, and publish an integrated nuclear forensics strategy that aligns Laboratory investments and capability development with National policy, as defined in the National Security Presidential Memorandum 35 National Technical Nuclear Forensics, and in the Nuclear Forensics Attribution Strategic Plan.
4. Install Hail and Lysander HPC replacements (Rendija and Tularosa) and secure authority to operate at the appropriate classification levels.
5. Reinvigorate LANL's arms control capability and explore the role and meaning of arms control in the 21st century.
6. Enhance capability to detect underground low-yield evasive tests through successful execution of NA-22 nuclear test detection ventures.
7. Enhance capabilities to detect foreign weapons development through successful execution of NA-22 weapons device manufacturing and testing ventures.
8. Carry out first-phase renovations and infrastructure improvements for PluS Lab and develop proposal for broader plutonium science investment for nonproliferation (Harmonia).
9. Support measures to demonstrate transparency in the US nuclear security enterprise, including the design, deployment, and testing of candidate capabilities to monitor subcritical experiments. Validate that these new technologies provide the requisite validation without revealing classified information.
10. Enhance contributions to international nuclear safeguards through technology development and training activities.
11. Fabricate, test, and deliver first three modernized nuclear detonation detection payloads for future GPS-IIIF satellites.

Critical Outcome: Climate, Clean Energy, and National Security

Goal(s): Establish a strategic overlay that accelerates and amplifies the impacts of climate and clean energy R&D on challenges in national security.

For decades, LANL has applied its unique capabilities to elucidate the behavior of our climate system and to explore transformational options for our energy future. Conducting innovative research in support of the DOE's programs in these areas remains a Laboratory priority, as does extending this research into new areas important to national security, including understanding the potential implications of the concurrent evolution of the climate and the transition of energy technologies over the coming decades. In addition, we are leveraging LANL's unique capabilities to transition our own energy portfolio to one that is both carbon neutral and reliable.

This Critical Outcome focuses on ensuring a strong portfolio in climate and clean energy into the future by (1) promoting integration across the climate and energy research communities with an emphasis on the regional scale, (2) strengthening the ties between these portfolios and LANL's broad national security mission, and (3) utilizing the Laboratory as a testbed to accelerate the development of innovative technologies to transition LANL's energy mix to accomplish our mission while providing new options for the Nation.

This Critical Outcome supports three of the Strategic Objectives in accomplishing the Laboratory mission: Trustworthy Operations, Technical Leadership, and Trustworthy Operations. This Critical Outcome also leverages the Signature Institutional Commitment in [AI](#).

In FY23, we made strategic investments in facilities, including the Low Enriched Fuel Fabrication Facility and the Algae Test Lab (the latter of which has already garnered new external funding); coordinated across line and program offices to support our initiative in Climate Impacts to National Security; improved coordination and communication of climate and clean energy across multiple LANL organizations through biweekly roundtables; and developed strategic partnerships in climate and clean energy.

In FY24, we will build on these successes through six Supporting Initiatives, with a specific emphasis on exploring the intersection between climate, energy, and national security.

Supporting Initiatives

1. Produce a climate, clean energy, and national security strategy for the Laboratory that will be informed by a strategic review.
2. Develop and demonstrate a first-generation capability with higher-fidelity models and workflows to forecast regional-scale climate impacts more accurately and quickly with decadal resolution. By 2026, develop the ability to link to economic and human behavior models to predict human consequences of climate impacts more fully, including national security-relevant human migration and transboundary conflicts.
3. Demonstrate leadership and develop partnerships in the multidisciplinary experimentally informed modeling necessary to inform public and private actions related to mitigation and adaptation to both the evolving climate and the energy transformation. By 2026, ensure that the systems model (e.g., energy-water-food nexus) has sufficient resolution to identify unintended consequences of climate and energy transitions and to provide feedback to guide measurement, monitoring, and experimental verification of climate actions.
4. Accelerate, with strategic partners, the development, demonstration, and deployment of innovative technologies to mitigate climate change, address the impacts of climate change, and enable monitoring and verification of international norms and agreements related to climate change. By 2025, demonstrate success in place-based engagement to enable energy transition and climate resilience and adaptation.
5. Develop a framework for enabling successful diversity, equity, inclusion, and accessibility implementation in climate, clean energy, and national security projects, with a focus on DOE-funded projects. Establish a program plan for STEM education and outreach initiatives.
6. Be a leader within the NNSA in achieving climate mitigation goals. By 2025, leverage LANL's energy infrastructure to establish a suite of testbeds for low-carbon solutions that allow for the testing and demonstration of innovative technologies.

Critical Outcome: Biosecurity and Emerging Threats Preparedness

Goal(s): Enable national preparedness and response by harnessing life sciences along with other innovative scientific approaches. Leverage biotechnology and artificial intelligence (AI) to support the nuclear stockpile and non-proliferation research.

LANL's national security mission requires us to identify emerging threats across the globe and be prepared to respond to those threats. In addition to our work on nuclear-related threats, we also focus on infectious diseases, biological and chemical weapons, biosecurity, and bioeconomic threats. Our missions require anticipation of potential future natural and non-natural threats.

This Critical Outcome is focused on these non-nuclear threats, supporting three of the Laboratory's Strategic Objectives in accomplishing our mission: Threat Reduction, Technical Leadership, and Trustworthy Operations. This Critical Outcome also leverages the Signature Institutional Commitment in AI.

In FY23, we helped establish the NNSA Bioassurance Program and we built many new crosscutting ties within LANL, leading to the application of advanced biomanufacturing to mission-critical materials.

For FY24, we will build on these successes through six Supporting Initiatives. We will continue to demonstrate our commitment to DOE's role in biodefense, and we will ensure our alignment with other government initiatives in medical countermeasures, surveillance, AI, and biosecurity/biomanufacturing. The investments targeted by this Critical Outcome will help to ensure a foundational base of technical experts dedicated to national security concerns.

Supporting Initiatives

1. Increase DOE/LANL leadership participation in key meetings to provide technical recommendations that drive strategic planning. 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 and strengthen core capabilities and focus areas that have been externally peer reviewed (e.g., biomonitoring, biomanufacturing, medical countermeasures, biosurveillance, AI, modeling, genomics, testing and evaluations).

3. Build on LANL COVID-19 R&D to better prepare for future pandemics and national emergencies with such groups as the Centers for Disease Control and Prevention, DOE, Advanced Research Projects Agency for Health, Department of Homeland Security Fusion Centers, and Defense Threat Reduction Agency Reach Back.

4. Enable improved assessments and inference across multiple scales and time to enhance 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.

Critical Outcome: Culture Enhancements

Goal(s): Champion enhancements that enable a more positive and productive work environment through inclusive staff engagement, respectful behaviors, and learning opportunities that are the foundation for safe, secure, compliant, and quality performance of our missions.
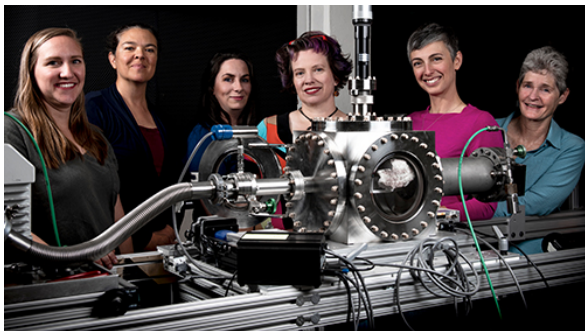
LANL approaches its national-security mission through cultivating a culture where how we work is as important as what we do. This culture is embodied in our institutional values of service, integrity, teamwork, and excellence.

This Critical Outcome focuses on nurturing these values, relying on continuous learning to strengthen our cultural foundation at the individual, leadership, and institutional levels. This Critical Outcome supports all four of the Laboratory's Strategic Objectives in accomplishing our mission: Nuclear Deterrence, Threat Reduction, Technical Leadership, and Trustworthy Operations.

In FY23, we made progress in several areas: (1) held disciplined ops meetings with all levels of managers; (2) created a Manager QuickStart training program with more than 100 managers completing the program; (3) improved job ads to increase reach and diversity of candidates, which resulted in increased hiring rates across the Laboratory; (4) supported employee resource groups to promote a culture that aligns with Laboratory values; (5) launched an initiative to increase the number of gender-neutral bathrooms available to employees (197 bathrooms converted thus far); (6) reduced the number of requirements for first line managers (FLMs); (7) upgraded the MOV (Management Observation and Verification) system to the ECHO (Engage, Communicate, Hear, and Observe) system to increase trust and employee engagement across organizational boundaries; (8) implemented improvements recommended by the Worker, Environment, Safety, and Security teams (WESST); and (9) provided nested safety talks across the Laboratory.

In FY24, we will build on these successes through three Supporting Initiatives.

Supporting Initiatives

1. Continue to evolve and enhance a Lab-wide culture of teaming and collaborative behaviors based on LANL values (service, integrity, teamwork, and excellence) and update the behavioral goals in performance planning and goal setting to match those values.

2. Annually measure and document Laboratory culture maturity with a focus on sustained improvement in four areas:

    a. Leadership, where the leadership team, through disciplined operations and responsible line manager engagement, demonstrates and models a commitment to transforming culture.

    b. Continue Laboratory leadership commitment to investing in FLMs, allowing them to engage and communicate directly with their employees more often; implement ECHO; and create and review metrics to measure areas of improvement.

    c. Incorporate/integrate into Disciplined Operations sessions, the Director's Leadership Development Program, and the Executive Leadership Development Program an in-person engagement program that places our best leaders in front of our FLMs to mentor, model, and train. Focusing on reinforcement of our Lab values and being committed to completing the mission in a manner consistent with those values.

    d. Enhance employee engagement with shared and integrated improvement actions across LANL, including through the efforts and network of the WESST; create integrated program office(s) in ESHQ/DPP focused on safety, security, performance improvement, and wellness, leveraging existing institutional strengths.

3. Communicate changes made in response to the 2022 DuPont survey and conduct a 2024 survey. Make survey results available to the workforce in a timely manner and take action based on feedback.

    a. Improve feedback/ensure organizational learning, with demonstrated excellence in safety, security, quality, and compliance by adhering to the LANL values. Increase integration of Lab value goals and deliverable/milestone goals, providing the workforce with guidance on writing actionable goals that reflect "how we do our work is as important as what we do."

    b. Develop focused and comprehensive training that integrates current training in areas related to Laboratory values, e.g., ethics, and expand to include those areas not currently covered, e.g., fraud prevention.

Critical Outcome: Responsive Operations

Goal(s): Provide agile and efficient operational processes and systems to effectively perform current and future mission.

LANL approaches its national-security mission through simultaneous excellence, achieving maximum impact by integrating research and development solutions with operational excellence and community engagement.

This Critical Outcome recognizes that our operations must be anticipatory and responsive, looking to the future as well as at our evolving mission needs. Specifically, successful delivery of our current and future missions requires that our processes, infrastructure, and facilities adapt in coordination with our research and development. This Critical Outcome supports all four of the Laboratory's Strategic Objectives in accomplishing our mission: Nuclear Deterrence, Threat Reduction, Technical Leadership, and Trustworthy Operations. This Critical Outcome also complements and leverages the investments being made under the Signature Institutional Commitment on production mission maturation.

In FY23, we provided agile and efficient operational processes and systems to meet the current and future LANL mission. Our operational capacity has increased with the growth of LANL's workforce, the development of innovative acquisition strategies, the streamlining of the Lab's acquisition policies and procedures, and the simplifying of numerous other processes.

In FY24, we will build on these successes through 12 Supporting Initiatives.

Supporting Initiatives

1. Improve the implementation of talent development through plans, tools, and practices, with an emphasis on providing career pathing to meet LANL requirements.
2. Improve procurement planning and increase procurement volume in support of Laboratory spending plans by leveraging commercial contracting approaches and using both forward-looking input and existing data from previous procurement cycles. Mature the delivery of procurement services by implementing a system of service-level agreements to increase visibility and accountability in delivery of service. Ensure that procurements are community-centered and achieve LANL's small business goals.
3. Provide agile and effective construction processes to meet LANL mission needs by leveraging commercial best practice approaches and employing the proper balance of self-perform work to efficiently manage small projects.
4. Meet increased demand for space, including office and laboratory space, for critical outcomes, and to support growth in mission and support activities.
5. Develop and execute a comprehensive parking and transportation services plan that enables mission, minimizes transportation delays, increases user adoption of alternative transit, and supports net-zero emission goals.
6. Develop and execute a comprehensive facility-based five-year plan for major maintenance to improve the overall reliability and mission readiness of LANL's facility portfolio.
7. Deliver operational tools, processes, and management systems that are modernized and integrated to provide measurable efficiencies in mission execution by leveraging NSE and industry best practices/methods. Ensure that these practices/methods are consistent with the integrated System of Management Systems online tool framework for improvement and the IT Roadmap.
8. Develop an information technology (IT) roadmap to improve and prioritize IT infrastructure investments and communications tools, including implementing wireless internet 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. Deploy innovative and strategic approaches for environmental permitting and implementation to enable mission delivery.
11. Establish an Institutional Rapid Response Program to promptly rectify facility and system upsets.
12. Establish an Experimental Capability Enablement Program to support disciplined operations, address infrastructure issues, and mitigate hazards to enable safe and continuous experimental work.

Critical Outcome: Force for Good

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

LANL approaches its national-security mission through simultaneous excellence, achieving maximum impact by integrating research and development solutions with operational excellence and community engagement.

This Critical Outcome focuses on the importance of our role in the region and beyond by engaging with our local communities, contributing to the vitality of our region, and ensuring our neighbors and stakeholders view us positively. This can be achieved through protecting and enhancing LANL's reputation, enhancing regional educational partnerships, supporting regional economic development and infrastructure, and optimizing the impact of philanthropy. This Critical Outcome supports all four of the Laboratory's Strategic Objectives in accomplishing our mission: Nuclear Deterrence, Threat Reduction, Technical Leadership, and Trustworthy Operations.

In FY23, we more than doubled our procurement spending in Northern New Mexico and quadrupled our procurement spending with the Pueblo Alliance; partnered with New Mexico schools, community colleges, and universities to develop a regional strategy to support workforce capacity needs; worked with the property-developer community and city/county officials to solve challenges in housing, transportation, and childcare; improved our giving and volunteering tools and communication; improved the visibility of the Feynman Center as a resource for local/regional businesses and entrepreneurs; and proactively partnered with NNSA to promote community engagement.

In FY24, we will build on these successes through eight Supporting Initiatives.

Supporting Initiatives

1. Protect and enhance LANL's reputation by proactively managing risk, and by proactively managing communications with our key stakeholders.

2. Demonstrate a culture of integrity in all LANL interactions with our community and public stakeholders.

3. Enhance and expand regional educational partnerships to address near- and long-term LANL workforce needs by engaging New Mexico schools, community colleges, and universities.

4. Leverage LANL technologies, expertise, and networks to accelerate the impact of LANL innovation on regional economic development.

5. Partner with the regional economic community, tribal, and state entities to effectively support infrastructure, transportation, and housing needs, including emerging projects such as offsite campus and student housing.

6. Ensure successful transition to operations for the Triad-sponsored expanded childcare operations for LANL employees.

7. Direct procurement efforts to local vendors where possible and develop a strategy to strengthen and improve the capabilities of our local mentor/protégé and other small business subcontractors.

8. Optimize investment of philanthropic dollars and employee engagement to address critical socioeconomic needs and to make a lasting, significant impact on the wellbeing of local communities.

Signature Institutional Commitments

The Laboratory Agenda now includes a new mechanism for making significant progress on larger scale challenges to achieving our Critical Outcomes and Strategic Objectives. Signature Institutional Commitments (SICs) represent a limited set of targets for large, discretionary investments over a period of a few years. After a thorough assessment, the Leadership Team identified five targets for the initial set of SICs:

- Advanced Manufacturing
- Artificial Intelligence
- Dynamic Imaging
- Production Mission Maturation
- Strategic Deterrence

The five SICs are intended to work in tandem to complement the Supporting Initiatives in many of the Critical Outcomes. These five SICs are detailed below.

Signature Institutional Commitment: Advanced Manufacturing: Prototyping and Rapid Transition to Small Lot Production

Our strategic mission objectives of nuclear deterrence and threat reduction require that LANL be at the forefront of advanced manufacturing. Innovations in manufacturing informed by strategic exploitation of our advanced computational and experimental capabilities will accelerate qualification and certification of new materials, processes, components, and systems. To solve our nation's increasingly demanding nuclear security challenges, modern prototyping capabilities are needed at our laboratory to exercise and enhance our workforce.

This SIC will ensure that LANL creates an advanced, agile prototyping capability for LANL, which supports development of new materials, processes, and components for the stockpile and other mission-critical applications. This new capability will accelerate maturation and subsequent qualification for stockpile applications by training a next-generation workforce to think differently than we have during the era of Life Extension Programs. We will develop this new capability through several strategic investments along with workforce opportunities aimed at solving our most difficult manufacturing science challenges.

By investing in agile prototyping, LANL will build a new capability that allows engineering and physics design principles to be examined while new materials and processing routes are in development. The combination of design and manufacturing science in a prototyping capability enables the acceleration of technology readiness level and manufacturing readiness level schedules. This will underpin an ability to build, qualify, and certify new components with new manufacturing technologies. This framework will drive rapid maturation of conceptual designs from prototypes to small-lot manufacturing, with the goal of new technology insertion into programs across the US nuclear enterprise.

This SIC supports Critical Outcomes in pit production, non-nuclear production, and responsive operations.

Signature Institutional Commitment: Advancing Science and Security through Artificial Intelligence

LANL has successfully applied artificial intelligence (AI) technologies such as machine learning to multiple mission areas. Recognizing the accelerated breakthroughs in AI, especially in foundational models as demonstrated in natural language applications, LANL is making strategic investments to harness these potentially transformative approaches. For example, we have invested in Venado—a next generation computational platform optimized for AI.

Building on LANL capabilities and earlier investments, this SIC will ensure that LANL

- develops extensible, domain-specific, generative AI models in two challenge areas related to LANL's mission by fine-tuning generic foundation models using high-quality domain-specific data and high-performance computing resources; and
- uses directed experiments and unique data to validate the approach and fill key knowledge gaps.

Potential challenge areas include nuclear security, biology, materials/manufacturing, and climate.

By investing in these domain-specific models, LANL will have a cutting-edge capability in AI that will then be available for use by the broader community to distill the relevant data available in many disparate unstructured forms into structured knowledge and to generate novel scientific hypotheses in the mission areas selected.[3]

This SIC directly supports the Critical Outcome computational & AI breakthroughs and has broad applicability across many of the Critical Outcomes in the Laboratory Agenda, including experimental advances; integrated deterrence; systems technology modernization; climate, clean energy, and national security; and biosecurity and emerging threats preparedness.

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[3] The need for, and promise of, these types of models has been discussed in, e.g., the recent DOE-sponsored report Advanced Research Directions on AI for Science, Energy, and Security ("SI4SES"), available at https://www.anl.gov/ai-for-science-report.

Signature Institutional Commitment: Ensuring Dynamic Imaging Capabilities Meet Nuclear Security Enterprise Needs

The Nuclear Security Enterprise (NSE) needs dynamic imaging data to underwrite the nuclear deterrent. These critical data needs range from focused experiments on materials and components to integrated systems experiments. The experimental requirements include the ability to handle high-hazard materials, classified devices, and classified data. The current national facility portfolio to deliver this data includes the Los Alamos Neutron Science Center (LANSCE), the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT), the Contained Firing Facility, and LANL and Lawrence Livermore National Laboratory firing sites. Additionally, complementary nuclear and material science data is delivered by LANSCE and other DOE facilities (e.g., light sources). LANL must ensure its continued access to critical dynamic imaging data by sustaining and modernizing facilities and by anticipating the data needs of the future.

This SIC will ensure that the Laboratory strengthens capabilities at LANSCE, DARHT, and the experimental firing sites to ensure delivery of critical data required to underwrite stockpile assessment and modernization programs. Targeted advocacy for advances in capability at national facilities, such as hazardous/classified operations at light sources, is also required to fill this gap.

- **LANSCE**: LANSCE was first commissioned more than 50 years ago. It is time to develop technology that significantly advances LANSCE's current and future national security capabilities. A needed investment is R&D for replacement of the existing LANSCE high-power 805-MHz RF stations. Such a system would significantly improve reliability and maintenance over existing pulsed, high-power radio frequency technologies. Concurrently, we will develop a software model to initiate the development of a control system for stable operation of the actual device.

- **DARHT**: Critical systems at DARHT are aging and require recapitalization to ensure reliability and performance. Technology advances will be developed and demonstrated for future elements identified in the DARHT Capability Expansion Strategy. Efforts will improve reliability, increase data quality, enable more complex environments, and establish a path for future DARHT modernization.

- **Firing Sites**: Current dynamic imaging technology at numerous firing sites is dated and increasingly unreliable. Technology advances will be fully developed and demonstrated to replace current x-ray sources and detectors. A critical capability gap in dynamic radiographic imaging for wide-view experiments will be closed, increasing the ability to safely diagnose weapon design and performance and to understand the intricacies of hydrodynamic defeat.

By investing in these mission-essential capabilities, LANL will ensure access to the dynamic imaging data needed by the NSE into the future.

This SIC supports Critical Outcomes in experimental advances, threat response, and computational and AI breakthroughs, as well as the advanced manufacturing SIC.

Signature Institutional Commitment: Production Mission Maturation—Enabling Credible and Sustainable Strategic Deterrence

The production mission of LANL is central to US national security as well as to our institutional Nuclear Deterrent Strategic Objective. The production mission is also embodied in several of the Critical Outcomes in the Laboratory Agenda. LANL must remain at the forefront of cutting-edge technologies, business systems, and processes to ensure that we are continuously improving our efficiency, productivity, scalability, and agility, with a view to anticipating future challenges, including the evolution of the global landscape.

This SIC will ensure that the Laboratory improves efficiency in production and business systems and ensure the safety and effectiveness of the LANL components in the nation's nuclear stockpile. Focused areas within this SIC include the following four interrelated components:

- **Production-enabling resources and technologies:** The transformation of the LANL production agency is unique among production processes, with a scope that transcends Laboratory organizations. Robust production-enabling resources allow for increased workflow and worker performance, and improved efficiency and productivity. *Investment in this component will increase support resources and technologies.*

- **Production support and innovation:** Increasing manufacturing throughput, reducing time- or people-intensive processes, and decreasing production lags due to system upset events through technology investment allows LANL to reliably manage production outcomes. *Investment in this component will support research and development of more efficient and robust production support processes and innovation of materials manufacturing, fabrication, and characterization.*

- **Integrated planning processes and systems:** Manufacturing and material planning processes are essential in determining the materials and quantities required in production and managing their flow to ensure timely order fulfillment. *Investment in this component will help develop contemporary integrated manufacturing and material planning processes and systems.*

- **Employee retention:** Decreasing the potential for upset events through increasing worker knowledge and retention, and ensuring the needed operational state of our manufacturing infrastructure, allows LANL to reduce significant delays and excessive rework, and is essential to successful enterprise products and projects. *Investment in this component will aid in employee retention through development programs and projects that mitigate manufacturing risks across multiple programs.*

By investing in these high-level foundational needs, we will enable the scalability of production capability and the necessary supporting organizational maturity to achieve a robust, sustainable manufacturing capability with predictable results across the nation's plutonium and non-nuclear component production at LANL.

This SIC supports the Critical Outcomes in [pit production](#), [non-nuclear production](#), and [responsive operations](#).

Signature Institutional Commitment: Strategic Deterrence: Capabilities for Options in Nuclear Security and Space Resilience

Strategic deterrence is a key component of US national defense, and it is embodied in two of the Strategic Objectives of the Laboratory Agenda. The global landscape is evolving rapidly, and LANL must remain at the forefront in its ability to provide cutting-edge technical support to the Nation.

This SIC has three interrelated components:

1. **Systems Analysis Organization**. This organization is charged with initiating and leading system studies. This capability should be based on an understanding of the strategic environment and result in options for effectively exploiting opportunities and managing risks in the mission space of the Laboratory. It also includes net assessments of outcomes after interaction with adversary capabilities. This component will inform item (2), and it also has synergy with spaced-based capabilities in item (3).

2. **Development and analysis of new concepts.** This will leverage item (1) and involves analyses of hypotheses and concepts, and analyses directed to "proof of principle."

3. **Space resilience.** Capabilities for sensing, nuclear power, and accelerators, building on the 2020 LANL Integrated Space Strategy and work in item (1).

By investing in these components, LANL will build new important capabilities in strategic deterrence, positioning LANL to remain a central national technical resource on assessing and anticipating the evolution of a complex global landscape.

This SIC supports the Critical Outcomes in integrated deterrence, threat reduction, computational & AI breakthroughs, and system technology modernization.

Acronyms & Definitions

AI	artificial intelligence
ALDBUS	Associate Laboratory Directorate Business Management
ALDCELS	Associate Laboratory Directorate Chemical, Earth & Life Sciences
ALDDPP	Associate Laboratory Directorate Defense Protection Program
ALDESHQ	Associate Laboratory Directorate Environment, Safety. Health, Quality. Safeguards, and Security
ALDFO	Associate Laboratory Directorate Facilities & Operations
ALDGS	Associate Laboratory Directorate Global Security
ALDICP	Associate Laboratory Directorate Infrastructure & Capital Projects
ALDSC	Associate Laboratory Directorate Simulation & Computation
ALDW	Associate Laboratory Directorate Weapons Engineering
ALDWP	Associate Laboratory Directorate Weapons Production
ALDWP-STEP	Associate Laboratory Directorate Weapons Production Science, Technology, and Engineering Programs Office—leads the non-defense nuclear programs with ALDWP.
ALDX	Associate Laboratory Directorate Weapons Physics
BETP	Biosecurity and Emergency Threats Preparedness
CCS	Computer, Computational, and Statistical Sciences Division
CD-2	Critical Decision 2. Marks the approval of the performance baseline and requires the preliminary design for all projects.
CD-3	Critical Decision 3. Authorizes the use of all resources necessary, within budget, to execute a project.
CD-4	Critical Decision 4. Approves project completion and initiates transition to operations.
CMP	campus master plan
CMRR	Chemistry and Metallurgy Research Replacement. A project relocating some mission-critical technical capabilities from the current Chemistry and Metallurgy Research building to the Radiological Laboratory/Utility/Office Building (RLUOB).
CO	Critical Outcome. Outcomes needed to achieve LANL's Strategic Objectives.
COO	chief operating officer
DARHT	Dual-Axis Radiographic Hydrodynamic Test (Facility)
DDOPS	Deputy Director of Operations
DDSTE	Deputy Director of Science, Technology, & Engineering
DDW	Deputy Director of Weapons
DLDP	Director's Leadership Development Program
DOD	Department of Defense
DOE	Department of Energy
ECHO	Engage, Communicate, Hear, and Observe system
ECSE	Enhanced Capability for Subcritical Experiments. A LANL program geared toward understanding how plutonium reacts under extreme pressure from explosive shocks to ensure the safety and reliability of the nation's nuclear deterrent without full-scale underground testing.
FLM	first line managers
HE	high explosives

HPC	**high performance computing. A practice using supercomputers to solve advanced computational problems. The ability to process data and perform complex calculations at high speeds.**
IMS	integrated master schedule
IT	information technology
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center. A national user facility with one of the nation's most powerful linear accelerators.
LAP4	Los Alamos Plutonium Pit Production Project. An NNSA directive to produce plutonium pits.
LT	Leadership Team. Consists of the Laboratory Director's Office and the Associate Laboratory Directors.
ML	machine learning
MOV	Management Observation and Verification system
MPA-Q	Materials Physics and Applications-Quantum (group)
NNSA	National Nuclear Security Administration
NA-10	NNSA Office of Defense Programs
NA-22	NNSA Office of Defense Nuclear Nonproliferation
NSE	Nuclear Security Enterprise
PEI-2	PF-4 Equipment Installation Phase 2
PF-4	Plutonium Facility
Pu CoE	Plutonium Center of Excellence
SIC	Signature Institutional Commitment. Areas for large, discretionary investments that will help ensure LANL's long-term success.
STEM	science, technology, engineering, and mathematics
WCRRF	Waste Characterization, Reduction, and Repackaging Facility. A facility supporting the packaging and staging of low-level waste, mixed low-level waste, and hazardous waste in PF-4.
WECF	West Entry Control Facility
WESST	Worker, Environment, Safety, and Security teams

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.

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