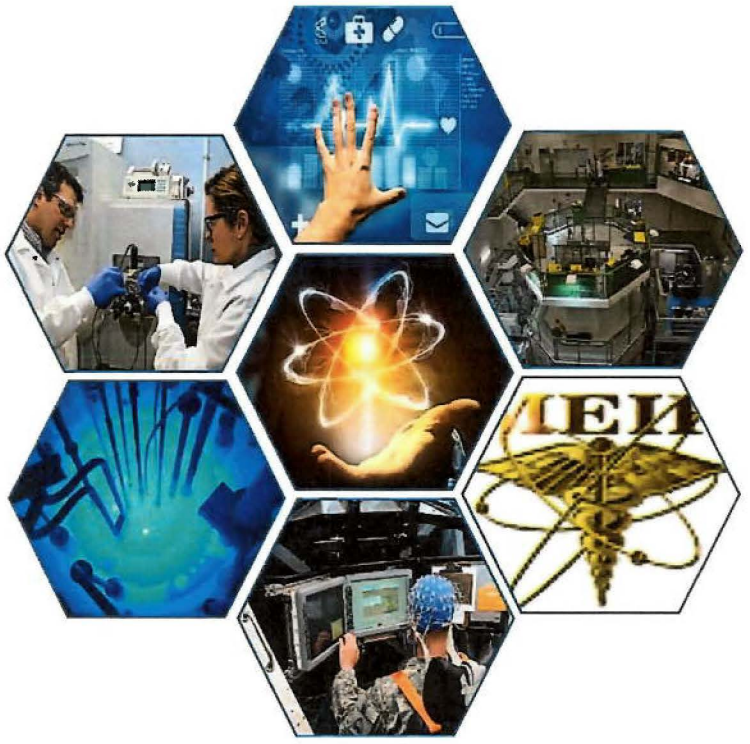
Armed Forces Radiobiology Research Institute

Strategic Plan 2023-2027



AFRRI

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"...the environment in which we will operate in the coming years requires us now to look beyond our traditional plans, anticipate both evolutionary and revolutionary developments in our core capabilities and build a strategic plan that exploits the nearly unprecedented opportunities that lie ahead."

Jonathan Woodson, MD, MSS, FACS
USU President

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The Uniformed Services University of the Health Sciences (USU) is a national treasure, providing the highest quality education, research and leadership across the Military Health System (MHS) and to those who defend the nation. Key to the accomplishment of our mission - as well as that of the entire MHS – is a nested set of strategic plans that flow from USU's vital role in the National Security and Defense Strategies. The USU Strategic Plan (2021-2025) provides the framework in which each of our schools, colleges, institutes, centers and programs fulfills its own mission and executes its supporting strategic plan.

As the nation confronts an international environment of mounting uncertainty and potential peril, the Armed Forces Radiobiology Research Institute will play an ever-increasing role in the readiness of our health professionals and our Warfighters to function in a nuclear environment. AFRRI's cutting-edge research and direct training support to units in the field are crucial components of the ability of the United States to protect and advance our vital interests around the world. In that context, the AFRRI Strategic Plan constitutes a roadmap by which AFRRI and USU will navigate our way into the future.

I extend my appreciation for the imagination, innovation and plain hard work that the entire AFRRI strategic planning team has devoted to the attached Strategic Plan. Our challenge is to now execute the plan, adapting specific initiatives to the emerging realities of our operational environment while always retaining a focus on the USU and AFRRI missions, visions and our responsibilities to those Americans who volunteer to go in harm's way in defense of the nation.

Jonathan Woodson, MD, MSS, FASC
President

THE ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE
STRATEGIC PLAN (2023-2027)

1. **Purpose:** The Armed Forces Radiobiology Research Institute (AFRRI) Strategic Plan serves as a roadmap to guide AFRRI to achieve its vision, accomplish its mission, and optimize the operational and medical readiness of its staff, to best support the Warfighter.

2. **References:**

   a) *U.S. National Defense Strategy, October 2022*
   b) *U.S. Nuclear Posture Review, October 2022*
   c) *Interim National Strategic Guidance, September 2022*
   d) *Secretary of Defense Message to the Force, March 2021*
   e) *The Military Health System Strategy Map, May 2019*
   f) *DHA Campaign Plan, 2022-2026*
   g) *Military Health System Future Strategies, August 2022*
   h) *Joint Staff Publication 3-72 Nuclear Operations, June 2019 [under revision]*
   i) *Countering Acute Radiation Syndrome Capabilities-Based Assessment study report, July 2018*
   j) *Initial Capabilities Document (ICD) and DOTMLPF-P Change Recommendation (DCR) for Countering Acute Radiation Syndrome, pre-decisional drafts, 2019*
   k) *Where are the Radiation Professionals, Statement 12 of National Council on Radiation Protection and Measurements, December 2015*
   l) *Department of Defense Directive 3150.08 DOD Response to Nuclear and Radiological Incidents, January 2010*
   m) *Department of Defense Manual 3150.08 Nuclear Weapon Accident Response Procedures, August 2013*
   n) *Department of Defense Manual 3150.08, 22 August 2013*
   o) *Memorandum of Agreement between the Defense Threat Reduction Agency (DTRA) and the Uniformed Services University of the Health Sciences (USUHS) for AFRRI, effective 13 June 2019*
   p) *Department of Defense Instruction (DODI) 5105.45 Uniformed Services University of the Health Sciences, May 2019 [incorporates and cancels prior AFRRI-specific DODI 5105.33 of March 2006]*
   q) *USUHS Strategic Plan 2019-2023, August 2019*
   r) *AFRRI Scientific Roadmap, August 2019*
   s) *Research on Health Effects of Low-Level Ionizing Radiation Exposure: Opportunities for the Armed Forces Radiobiology Research Institute, Institute of Medicine, 2014*
   t) *Leveraging Advances in Modern Science to Revitalize Low-Dose Radiation Research in the United States, NAS, 2022.*
   u) *Toward a Nuclear Mindset: Reinvigorating the U.S. Army's Ability to Survive and Operate in a Nuclear Environment, RAND, 2022.*
   v) *National Strategy for the Arctic Region October 2022*

3. **Background**: AFRRI was established by a DOD Directive in 1961 and operated by the Defense Atomic Support Agency and the Defense Nuclear Agency throughout the Cold War. In 1993, in accordance with a DOD directive, AFRRI was realigned with the Uniformed Services University of the Health Sciences (USUHS). AFRRI is a unique and the most powerful radiobiological research agency in the western world with six decades of active and outstanding support to the DOD through research, reach-back, and education. It is the only DOD medical research and development facility dedicated solely to nuclear and radiological defense that has conducted research from the cold war to the current conflict at the borders of eastern Europe and everything in between such as the 2001 anthrax attacks, the 2011 Fukushima nuclear scare, and 2020 SARS-CoV-2 novel coronavirus pandemic.

   AFRRI is a unique center which houses a 1.1-megawatt Training Research Isotopes General Atomics

(TRIGA) nuclear research reactor, a clinical Linear Accelerator (LINAC), a Computed Tomography (CT) scanner, a Small Animal Radiation Research Platform (SARRP) and two Cobalt-60 Irradiators to support the work of highly distinguished scientists.

AFRRI has the capability to start, stop, or redirect lines of effort as needed, under the guidance of the Director of Science, to produce maximal value to DOD from AFRRI activities. AFRRI capabilities include developing and sustaining training, collaboration and coordination in radiobiology, radiation physics, nuclear engineering and relevant military and social sciences at other federal and civilian research institutions, and those of allied and partner nations.

AFRRI is the DOD epicenter for radiological/nuclear research, education, training and operational support. This responsibility requires a strong relationship and partnership with allied nations for global unity and success. Striving for global integration, understanding and ability to function together to maintain peace is an integral part of winning in a nuclear battlefield. AFRRI is an excellent resource for our allies to call upon for consultation, through proper official channels, exchange ideas at the appropriate forums, learn and formulate new ideas for collaborative research and development. Partnering with our allies and incorporating their strengths, using hands on training and exercises, will enhance interoperability in contaminated/austere environments. This increased knowledge, skills, and networking is essential for future success in military operations.

Since 2020 the leadership and leader development efforts at AFRRI have been significantly enhanced. Enhancements include sending staff to outside CBRNE courses, scientific and research seminars, introducing critical thinking skills in daily operations, utilizing the Military Decision Making Process in daily briefings, assigning individual tasks of strategic importance and assessing timely and efficient completion of individually and collectively assigned tasks using SMART methodology. Special efforts have been made in the past few years to introduce and discuss the National Defense Strategy (NDS), Nuclear Posture Review, Unified Command Plan, and various other similar national strategic and doctrinal materials in order to synchronize AFRRI directed research trusts with the National Defense Strategy of the United States.

AFRRI Strategic Plan 2023 – 2027 derives its priorities from the following documents and the contemporary international dynamic threat landscape:

a) The U.S. National Defense Strategy (NDS). The NDS published in October 2022 identifies the following four top-level defense priorities that the DOD must pursue to buttress deterrence:

   1. Defending the homeland, paced to the growing multi-domain threat posed by the People's Republic of China (PRC);

   2. Deterring strategic attacks against the United States, Allies, and partners;

   3. Deterring aggression, while being prepared to prevail in conflict when necessary – prioritizing the PRC challenge in the Indo-Pacific region, then the Russia challenge in Europe; and,

   4. Building a resilient Joint Force and defense ecosystem.

   The DOD will achieve these priorities through integrated deterrence, campaigning, and building enduring advantage.

b) The U.S. Nuclear Posture Review (NPR). The U.S. NPR, published in October 2022, affirms that the fundamental role of U.S. nuclear weapons is to deter any nuclear attack against the United States or its allies and partners. The use of nuclear weapons by the United States would only be considered in extreme circumstances to defend the vital interests of the United States or its allies and partners.

c) Regional Hostile Actors such as the Democratic People's Republic of Korea (DPRK) and Iran will continue their efforts to acquire, build or improve nuclear weapons. Southwest Asia will remain a high-tension region with two rival nuclear powers ready to engage in full spectrum war with the potential of tactical nuclear weapons use on the battlefield.

d) Terrorism. Nuclear and Radiobiological terrorism remains a global risk. The President of the United States has described nuclear terrorism as "the most immediate and extreme threat to global security." A radiological or nuclear attack against the United States and its partners or allies will have catastrophic and devastating consequences.

e) Arctic Dominance. The 2022 NDS bluntly describes Russia as an acute threat. Russia's geographic proximity to North America makes it the most acute security concern to U.S. interests in the Arctic. Russia and the People's Republic of China have clearly made long term Arctic investments in the region. Increasing access to the arctic due to warming conditions will likely result in more frequent economic and military competition with these nations, which will have homeland defense ramifications. As a self-declared "near Arctic nation" the PRC is endeavoring to establish a foothold in the northern latitudes. The PRC has consistently increased its scientific economic and military activities in the arctic over the last few years working towards increasing influence through economic exploitation to gain access to vital natural resources. The PRC is applying all instruments of national power to enhance its Arctic influence, including expanding initiatives such as the Polar Silk Road. The 2022 Nuclear Posture Review emphasizes the need to modernize nuclear forces and highlights the dilemma of deterring two nuclear armed competitors, Russia and China. It stresses the importance of maintaining robust nuclear command control communications through satellites and cyberspace.

f) Electromagnetic Pulse (EMP). In case of a high-altitude low orbital nuclear detonation by a rival nuclear power, the resultant massive EMP will cause severe damage to communications equipment, power lines and grids, and electronic components of medical devices. This remains an area of vital national security concern.

g) Combined Injury. The 2022 NDS recapitulates the ever-present threat of a nuclear attack for which we are not well-prepared, highlighting the capability gap in countering the medical effects of a Chemical, Biological, Radiological, Nuclear, and high yield Explosives (CBRNE) attack. In a nuclear event, combined radiation and burn injury would be a dominant injury pattern of most casualties. For example, combined burns and radiation occurred in over 60% of survivors after the atomic bombs dropped at the end of World War II, with similar numbers after the nuclear reactor meltdown at Chernobyl. Other forms of poly trauma (e.g., blunt or penetrating injury, blast, and hemorrhage) will also occur secondary to the blast overpressure wave. Despite this fact, the pathophysiology of the various combined injuries is still not understood, and the clinical care of such casualties is far from optimized.

h) OSD Guidance. In such an environment, the Office of the Assistant Secretary of Defense for Health Affairs and U.S. Special Operations Command completed a capability-based assessment (CBA) in 2018 to define requirements, identify shortfalls, and recommend actions necessary to improve radiological and nuclear medical readiness. The 2018 CBA identified broader gaps in DOD's preparedness to operate in radiobiological environments and care for casualties, and led to the drafting of an Initial Capabilities Document (ICD) which addresses research and development priorities. In that document, AFRRI was directed to:

1. Provide continued leadership in requirements-directed research activities;

2. Oversee curricula for medical education;

3. Provide input to medical Knowledge, Skills, and Abilities (KSAs) required for effective medical readiness;

4. Assist with developing DOD concepts for specialized care of radiobiological casualties and the role of civilian expertise such as the Radiation Injury Treatment Network (RITN);

5. Develop content for Joint Force and Service training and Joint Professional Military Education;

6. Assist with refinement of materiel standards and medical logistics planning;

7. Provide reach-back support for combatant commands, planners, battle staffs, and downrange medical personnel; and,

8. Assist with the review and revision of Joint, allied/coalition/partner, and Service exercises to improve understanding of medical support and sustained military operations in the radiobiological environment.

i) USU Guidance. AFRRI is the DOD hub for subject matter expertise, basic and translational research, education, training, medical products, knowledge, advice, and operational support on issues relating to the biological and military impact of ionizing radiation. AFRRI methodologies remain state-of-the-art, characterized by agility, responsiveness, and innovation, and focused on both prophylactic and mitigation measures. AFRRI is the repository of comprehensive research and operational architecture, for the integration of multiple physical and psychological sciences.

j) U.S. Army G-3/5/7 Guidance. The U.S. Army tasked the RAND Corporation to provide a comprehensive doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) assessment with emphasis on doctrine, training, materiel, and leadership of the Army's ability to operate in a nuclear environment through the end of this decade. The RAND report published in 2022, highlighted the need for long-term research and development for radiation countermeasures which would enable soldiers to conduct operations in a nuclear and radiologically contaminated environment by mitigating the symptoms of radiation exposure. Further, the report encouraged other services within the DOD to do the same.

4. **Assumptions:** For planning purposes, assumptions are suppositions about the future that should be considered when making decisions outlined in this strategic plan. The following assumptions should be both likely to be true and necessary for the implementation of the plan:

a) The likelihood of nuclear attack on the United States and our allies and partners is an ever-present reality.

b) Medical readiness for a nuclear conflict has an important role in nuclear deterrence as it demonstrates our capability to fight and win.

c) AFRRI will continue to be DOD center for cutting-edge radiobiological research and will need to enhance its capabilities and subject matter expertise to accomplish its mission. We will continue to focus on the preparedness and strategic resilience of America's warfighters to survive and win in a future multi-domain multi-operational radiological or nuclear contaminated battle space.

d) AFRRI research in such fields as cancer biology, infectious disease, and non-nuclear disaster science are high priority objectives.

e) DOD sustained funding is essential for achieving AFRRI scientific objectives in support of force readiness.

f) AFRRI will continue to compete aggressively for human resources, funding, unique strategic branding, and academic recognition.

g) USU broadening responsibilities for medical education and training across the MHS will amplify the dissemination and impact of AFRRI education and training products.

h) AFRRI will execute a periodic research plan emphasizing the military medical operations in a radiologically contaminated environment.

5. **Mission**: The mission of AFRRI is to defend the nation from nuclear and radiological threats through research, leadership, training, and education.

   AFRRI is a unique national asset responsible for preserving and protecting the health and performance of U.S. military personnel that operate in radiologically contaminated multi-domain conventional or hybrid battle spaces as well as urban environments. Through research, education, and operational training, AFRRI advances understanding of the effects of ionizing radiation in line with the 21st century dynamic threat landscape, and national security threats posed by non-state actors, hostile state actors, and near-peer adversaries. AFRRI also provides rapidly deployable radiation medicine and health physics expertise in response to a radiological or nuclear event domestically or abroad, and develops agile, creative, and adept CBRNE leaders.

6. **Vision**: AFRRI is committed to be medically and operationally prepared to preserve operational force resilience and fighting strength in the event of adversarial employment of nuclear weapons.

   AFRRI promulgates and operates with the vested ethos of workforce diversity, integrity, dignity, and respect, while engaging in cutting-edge strategic research, education, and operational response. AFRRI is committed to be medically and operationally prepared to save lives and achieve long-term positive health outcomes, while preserving operational force strategic resilience and fighting strength in the event of adversarial employment of nuclear weapons. We envision a strong committed engagement of valor, agility, dedication, and strength to outperform our last 60 years of time-sensitive support to the Department of Defense's (DOD) mission. AFRRI will continue its invaluable support by developing Warfighter-friendly tactical and strategic reach-back tools, applying knowledge through education, and developing state-of-the-art deployable tools and countermeasures

7. **Mission Domains**: In the execution of the mission, there are four essential mission domains. These domains are interwoven and mutually supporting:

   a) Directed Research. Advance biomedical science and technology that the MHS and DOD need to ensure medical readiness for nuclear operations. AFRRI has several unique radiation facilities that support this objective. Research on preventing, diagnosing, and treating medical problems caused by external radiation exposure and internal radionuclide contamination remains the focus. Furthermore military and social sciences, such as casualty estimation and logistics, psychology, risk communication, and deterrence, are also essential to advancing medical readiness. A strong scientific direction is essential to ensure that AFRRI research activities deliver value to DOD.

   b) Education and Training. Maintain focus on scientific and technical workforce development. The collective expertise, motivation, and commitment of AFRRI workforce are our most valuable assets. Workforce development is an essential mission domain because of the specialized nature of our work. Evolving threats and emerging opportunities from new scientific breakthroughs require

workforce agility and an ambition for change. The Medical Effects of Ionizing Radiation (MEIR) multi-day course taught by the Military Medical Operations (MMO) Department is designated as mandatory by the DOD Manual on Response to Nuclear Weapons Incidents and has also been recently added to the list of essential courses for the USAF bio-environmental science personnel. AFRRI has identified opportunities to increase MEIR outreach to DOD-mandated students and to develop additional training and educational content tailored to the needs of other DOD personnel with responsibilities involving radiological and nuclear medical readiness. In addition to didactic lectures, each course is specific to the area of operation and realistic current threats in the region, whereby, high fidelity scenario-based modeling is performed to represent expected patterns of destruction and estimation of casualties. Enhanced contribution to the curricula of the schools within USU is a special priority, and must include graduate education in sciences relevant to radiological and nuclear medical readiness as well as operational doctrine and advanced concepts in casualty care. Graduate student research at AFRRI develops the scientific workforce needed by AFRRI and other DOD research institutes and also contributes to addressing significant requirements for radiation sciences professionals in the United States for public health, radiation safety, emergency preparedness, and environmental protection.

c) Operational Support. Medical readiness for nuclear operations beyond weapons accidents and response capacity-building is a substantial challenge not only because of the anticipated extent of physical destruction and casualties, but also due to the likelihood of disrupted communications, unprecedented psychological stress, and potentially profound changes to the dynamics of combat power. AFRRI maintains three worldwide deployable Medical Radiobiology Advisory Teams (MRATs), composed of radiation medicine trained physicians and health physicists. Its purpose is to advise operational commanders on medical response to radiological and nuclear incidents and provide medical expertise for casualty care. AFRRI must sustain direct engagement with both headquarters and field commanders, to translate biomedical advances to relevant fielded capability supporting policy and doctrine, and to glean military insights from the field that are essential to effectively steer the future strategic direction of scientific research.

d) Leadership and Leader Development. AFRRI has a robust CBRNE leader development curriculum to train its staff physicians and health physicists in responding to national security crises. Continuing efforts to seek USU academic appointments for AFRRI civilian and military staff, appointing staff to internal and external working groups, committees, as well as national level organizations are at the forefront of leader development strategy. In 2023 STEM and SMART programs are attracting the interest of promising new scientists, incentivizing students to pursue careers beneficial to the scientific momentum of AFRRI.

8. **Strategic Objectives.** To achieve our vision and accomplish the mission, AFRRI must meet crucial objectives in each of the following mission domains:

a) Directed Research. AFRRI conducts basic and applied research in radiobiology and related physical science according to a regularly updated research and development strategy. Our current scientific strategy prioritizes the following five lines of effort:

1. Research and Development of Radiation Medical Countermeasures: (radioprotectors, radiomitigators and radiotherapeutics);

2. Internal Contamination and Heavy Metal Toxicity;

3. Combined Injury (radiation plus trauma/hemorrhage, burns, and wounds);

4. Biodosimetry; and,

5. Low Level Radiation (low dose and low dose rate)

AFRRI ensures periodic external scientific review to validate, critique, and enrich the execution of research, education, training, and operational support. AFRRI continues to support USU research priorities and research administration system.

b) Education and Training. In coordination with the education and training functions at USU, and in coordination with the Defense Nuclear Weapons School, Service schools, U.S. Army Nuclear and Countering WMD Agency and other providers of radiobiological training, deliver training and share curricular content tailored to each of AFRRI's core constituencies:

1. Medical, nursing, and graduate students at USU;

2. Nuclear incident response forces including NORTHCOM and National Guard components;

3. DOD and Combatant Commands (COCOM) medical planners, exercise planners, and policy shops;

4. General military and military medical education recipients of Service and DOD radiobiological training;

5. Leverage AFRRI science and facilities to support undergraduate and graduate education and training at USU in career areas relevant to the U.S. radiological/nuclear medical readiness technology base; and,

6. Apply scholarship of education to continuous improvement of AFRRI educational and training curricula.

c) Support to Operational Forces. AFRRI Military Medical Operations (MMO) Department provides the nation with unique, sophisticated, and tailored capabilities supporting the warfighters operating in challenging, high-risk and austere environments around the world. This is an essential asset which highlights the importance of the operational function of carrying and connecting research and modeling with the operational units and commands.

1. Exercise the MRAT regularly and deliberately in all established channels of DTRA engagement:

   i. MEIR and MRAT deployment readiness and deployment drills;

   ii. Nuclear weapons accident drills and analysis; and,

   iii. Cooperative outreach to allies and partners to build response capacity and interoperability.

2. Formalize and maintain DOD relationships centered on clarifying and mitigating the contemporary medical problems of nuclear operations, post-detonation or in the presence of widespread contamination, using models and exercises to support medical readiness planning, analysis, and research prioritization. Key agencies and functions include but are not limited to:

   i. Office of the Joint Staff Surgeon;

   ii. Defense Threat Reduction Agency (DTRA), especially weapons effects modeling capabilities;

iii. U.S. Army Medical Research and Development Command (MRDC)

iv. National Center for Medical Intelligence;

v. DOD and Service postgraduate schools;

vi. DOD and Service nuclear/radiological special units such as:

(a) U.S. Special Operations Command's DOD Countering Weapons of Mass Destruction Fusion Center;

(b) U.S. Army 20th CBRNE Command;

(c) U.S. Army Nuclear and Countering Weapons of Mass Destruction Agency (USANCA);

(d) Army Personnel System's Functional Area 52 community (Nuclear and Counter Proliferation);

(e) Joint Product Leader for Radiological and Nuclear Defense;

(f) Medical Education and Training Campus (METC);

(g) Joint Trauma System; and,

(h) Defense Nuclear Weapons School.

3. Establish and maintain rapid and reliable access to secure communications such as Secret Internet Protocol Router Network (SIPRNet) and Secure Video Teleconferencing (SVTC) to support classified interactions with other DOD agencies and functions, enabling engagement on topics around nuclear operations with timeliness and operational relevance that is not permissible over non-secure channels.

4. Establish procedures and implement issuance of courier cards to personnel required to carry classified material during TDY travel or visits to other DOD agencies.

d) Leadership and Leader Development.

1. AFRRI will increase its visibility and status as a nationally and internationally leading institution by actively seeking appointments to the national and international organizations, committees, and working groups relevant to the "Ready Medical Force."

2. Implement a leader development program highlighting professional and military-related competencies for both military and civilian personnel.

3. Implement a mentorship program to facilitate transfer of knowledge and expertise from teacher to student.

e) Safety Conscious Work Environment (SCWE): In 2021, AFRRI implemented a SCWE program under direction from the U.S. Nuclear Regulatory Commission (NRC). The objectives are to maintain an effective Safety Conscious Work Environment (SCWE) and Employee Concerns Program (ECP) in which all employees (military, civilian and contractors) feel comfortable raising nuclear safety concerns without fear of retaliation. The program includes the following facets:

1. Initial and annual training provided to all employees;

2. Processes for raising concerns are readily accessible and everyone understands the options available;

3. Concerns are promptly addressed and feedback is provided to the concerned individual, while maintaining anonymity;

4. Ongoing feedback on the status of SCWE and ECP are provided to employees, in a general mechanism, as to maintain anonymity;

5. Internal and external assessments are conducted to evaluate the effectiveness of SCWE and ECP; and,

6. Initial and exit interviews are conducted with all employees to capture employee feedback.

f) Strategic Measures of Performance:

1. Organization Function

   i. Recruit an eminent radiation biologist into the position of Director of Science at AFRRI by FY2025

   ii. Recruit a civilian Chief of Staff at AFRRI by FY2025

   iii. Financially support frontiers of radiobiological research and increase scientific productivity through new channels of intramural and extramural funding

2. Scientific Research Department (SRD)

   i. Publish 20 scientific papers in high-impact journals by the end of fiscal year 2023, then increase the publication output by 10% of the previous year's target until the end of fiscal year 2027.

   ii. Host at least three career-enhancing events at AFRRI per fiscal year (example: internships for Science and Engineering Apprentice Program, SEAP, Naval Research Enterprise Internship Program, NREIP, and service school cadets).

   iii. Present AFRRI current scientific research to external audiences through posters or talks at least four times per fiscal year.

   iv. Staff all SRD-designated federal civilian billets by the end of fiscal year 2027.

   v. Host at least three strategic engagements per fiscal year with potential collaborators and partners from academia, industry, the DOD, and other federal agencies.

3. Research Support Group

   i. Develop a reliable and efficient mechanism with the USU travel department to support expedited funding for the rapid deployment of MRAT in response to activation by the DOD by end of fiscal year 2024

4. Radiation Sciences Department (RSD)

i. Increase the relevance to the DOD and the warfighter by expanding into the field of radiation effects and survivability for non-biologicals, such as weapons and equipment, by performing at least one investigation by the end of fiscal year 2023.

ii. Acquire an accelerator-based neutron generator that provides previously unavailable operationally relevant capabilities to AFRRI principal investigators by FY2027.

5. Military Medical Operations

i. Conduct at a minimum of 20 CONUS MEIR courses and 5 OCONUS MEIR courses per fiscal year.

ii. Provide SME support to at least four radiological response training exercises with COCOMs, MACOMs, law enforcement and/or other USG/DOD entities per FY (Nuclear Weapons Accident/Incident Exercise, Sudden Response, Vibrant Response, etc.).

iii. Maintain three simultaneously deployable MRAT teams 24/7/365 per DODDI 3150.08.

iv. Participate in at least one operationally directed research project per fiscal year (e.g., EMP or thermal testing of military uniforms).

6. Safety Conscious Work Environment

i. Evaluate the effectiveness of SCWE and ECP by arranging for at least three external assessments per year. External assessments will be conducted through the use of the Defense Organizational Climate Survey, third party organizations and the U.S. Nuclear Regulatory Commission inspections.

9. **Key Enabling Tasks: Cross –Cutting Objectives.** To fulfill its mission and accomplish the objectives nested in each of the mission domains (Directed Research, Education and Training, Operational Support, Leadership and leader development), AFRRI should accomplish a set of enabling tasks/objectives that span across the Institute.

a) Scientific and Technical Workforce Development. The collective expertise, motivation, and commitment of AFRRI workforce are our most valuable assets. Recruiting and professionally developing the 21st century NexGen workforce are paramount enabling objectives because of the specialized nature of its work, aging and retiring scientific force and the unique radiation facilities at AFRRI, which highlight the value of corporate knowledge sharing and the steep learning curve for new staff. Evolving conventional and unconventional global threats and emerging opportunities from new scientific breakthroughs require AFRRI workforce agility and desire for embracing change.

1. Conduct deliberate succession planning activities to retain and transfer institutional knowledge and create multi-generational pipelines in key scientific, technical, and support areas.

2. Expand employee development opportunities for both military and federal civilian staff, through progressive skills training, job assignments, leadership development, and support for career mobility.

3. Develop/bolster training programs for evolving or innovative highly specialized skill sets such as advanced cytogenetics, radiation facilities operators, radiation medicine, radiation psychology, radiation epidemiology, and nuclear risk communication.

4. Recognize and reward employees who demonstrate high levels of performance and significant mission contributions.

5. Conduct periodic human capital analysis to ensure that needed skill sets are identified and recruiting needs are met in the timeliest fashion.

b) Strategic Communications. To make AFRRI a 21st century state of the art facility and an ideal place to work, it should develop and implement an intra AFRRI-USU strategic communications plan built on:

1. Strategic briefs: Increase the visibility of the Institute by publishing and actively marketing an AFRRI Capabilities Manual by the end of fiscal year 2023;

2. Messages: Create messages, in cooperation with the USU Public Affairs Office (PAO), effectively communicating with and inspiring the Warfighters and the next generation of scientists;

3. Media: Utilize print, digital, and social media to disseminate timely, credible, and useful information regarding AFRRI's unique assets, scientific and operational capabilities, and subject matter expertise to various stakeholders both within and outside the US Government;

4. Delivery: Engage in speaking, writing, interview, and lecture opportunities/invitations to deliver the AFRRI strategic message; and,

5. Feedback: Seek periodic feedback on the effectiveness of the efforts from AFRRI staff, USU partners, DOD and USG customers, and the USU PAO.

c) Processes. Subject internal AFRRI administrative processes and support services shared with USU e.g., facilities, finance, HR, IT to regular evaluation for effectiveness, with feedback to service providers on both deficiencies and exemplary successes.

d) Strategic Planning. Institutionalize a strategic planning cycle which deliberately guides the design and resourcing of strategic initiatives to close gaps in domain-critical tasks, the assessment of progress against plans, and the regular review of plans against AFRRI vision and mission.

e) Explore the Feasibility of Creating an Office of Strategic Operations (OSO). By end of fiscal year 2027, AFRRI, with support from USU, should establish an Office of Strategic Operations (OSO) which will:

1. Support and establish strategic objectives that align with USU Strategic Plan.

2. Initiate and develop roadmap to enhance translational research and advance application development to support military medical enterprise.

3. Initiate, develop, and establish collaborations with key government and military stakeholders to advance the Warfighter capability in areas of CBRNE/WMD counter-technologies.

4. Conduct and participate in campaign awareness with Combatant Commands (COCOMs) to accomplish objectives through workshops in functional areas related to radiation threat and Warfighters health.

5. Assist in developing AFRRI footprint in Artificial Intelligence, Deep Learning, Neural

Networks, Nano therapeutics and high-throughput imaging techniques in biomarker and countermeasure development.

6. Assess theater strategic end states and CBRNE/WMD security by understanding objectives, focus areas, assumptions and resources available to develop courses of action and conduct tabletop exercises.

7. Assist AFRRI Director/Deputy Director and Department heads with development, management and implementation of Measure of Performance (MOP) for each department in support of the evolving DOD Mission.

8. Evaluate DOD policies and existing markets to aid in the development of advance technologies at AFRRI by assessing the market potential and impact on CBRNE/WMD policy changes.

9. Initiate and develop relations with military stakeholders to understand key objectives and requirements to assist in developing and conducting realistic scenarios, mock drill, and tabletop exercises. Assist in data collection, analyses, interpretation, and communication back to the stakeholders.

10. Assist in the integration of novel research applications, resources, and tools to leverage the informatics application in the field of radiation threats and countermeasures.

11. Assist in identifying and bridging specific research gaps at AFRRI from biotech, omics, trans-computing, Artificial Intelligence, imaging, to high throughput data computing for radiation biology.

12. Initiate, develop, and implement strategies to assist AFRRI scientists and staff by engaging cross-disciplinary experts and collaborating with established national and international labs, federal agencies and military stakeholders through workshops, meeting, symposiums, and conferences.

13. Assist in idea blitzing and next generation science discussion with emphasis on advanced technologies (e.g. cloud computing for big data analysis) in context to radiation biology.

14. Assist and promote communication among scientists, educators, application developers, stakeholders, public health funding agencies, and medical responders, to further expand AFRRI influential outreach in radiation biology research.

10. **Conclusion.** This Strategic Plan is a roadmap to navigating the 21st century dynamic threat landscape and will provide guidance as AFRRI evolves and expands to counter the unpredictable realities of this decade and beyond, by augmenting the nuclear survivability of the Warfighter and well-being of all humankind.

Annex A
Definitions

Military Health System: The Military Health System (MHS) is the global health system of the Department of Defense with the principal mission of readiness: maintaining a medically ready fighting force, and a ready medical system that is prepared to respond to the full spectrum of military operations. The MHS is comprised of medical personnel, infrastructure and resources from the Army, Navy, Air Force, Defense Health Agency and Office of the Assistant Secretary of Defense Health Affairs. One of the largest health systems in the United States, the MHS budget exceeds $50 billion.

MHS Research Enterprise: All MHS activities, programs and initiatives that are primarily focused on research.

Nuclear Operations: The methods, plans, and procedures involved in establishing and exercising military operations involving the effects of an attack by nuclear weapons or radiological warfare agents. Nuclear operations encompass both the training for, and the implementation of, these methods, plans, and procedures.

Nuclear Survivability: The ability of personnel, equipment, and systems to survive the effects of nuclear detonation, including blast thermal radiation, initial nuclear radiation and EMP.

Radiological Operations: The employment of radioactive materials or radiation producing devices to cause casualties or restrict the use of terrain. It includes the intentional employment of fallout from nuclear weapons.

Ionizing Radiation: Radiation, traveling as a particle or electromagnetic wave that carries sufficient energy to detach electrons from atoms or molecules thereby ionizing them.