Reducing Nuclear Risks: An Urgent Agenda for 2021 and Beyond

For many Americans, the use of a nuclear weapon—by the United States, other nations, or terrorists, or because of a terrible accident or miscalculation—may be as hard to imagine today as a world devastated by a global pandemic was before COVID-19 struck. But as with global health threats, nuclear risks have been on the rise for years. Over the course of the next four years, it will be incumbent upon our nation's president to address those risks to keep Americans and the global community safe.

Summary of Key Recommendations

Adapt U.S. Policies and Posture to Reduce Nuclear Risks

- Following careful consultations and reassurances of the U.S. commitment to, and comprehensive conventional and nuclear capabilities for, the defense of allies and partners in Europe and the Asia-Pacific, move to make deterrence of nuclear attacks against the United States and its allies the sole purpose of nuclear weapons. Call on China, France, Russia, and the United Kingdom to adopt a P5 "sole purpose" declaration.
- Adopt a negative security assurance, without caveats, that the United States "will not use or threaten to use nuclear weapons against non-nuclear weapon states that are party to the NPT and in compliance with their nuclear non-proliferation obligations."

- Put guardrails around "sole authority" by taking steps to ensure any decision to use a nuclear weapon would be deliberative and based on appropriate consultation and planning.
- Adopt "failsafe" steps to strengthen safeguards against cyber threats and unauthorized or inadvertent use of a nuclear weapon, following a thorough "Nuclear Risk Reduction Review" of the U.S. nuclear command and control system.
- Invest in the people, organizations, and technologies that are critical to nuclear security, arms control and nonproliferation, and verification.

Work with Russia to Reduce Nuclear Risks

- Extend New START for five years. Announce intention to deploy no more than 1,400 strategic warheads (fewer than the treaty's ceiling of 1,550) and invite Russia to make a reciprocal commitment.
- Commit to sustained engagement on strategic stability to address both sides' concerns about advances in weapons and technologies that increase the risk of nuclear use, including cyber threats to nuclear command and control.
- Take mutual steps to increase decision time—the time a president would have to decide how to respond after receiving warning of a nuclear attack.
- Agree not to base U.S. or Russian land-based intermediate-range ballistic and cruise missiles in Europe (west of the Urals).
- Pursue new agreements to limit strategic, intermediate-range, and tactical nuclear systems and warheads, as well as other measures to reduce the risk of conflict between the United States/NATO and Russia.
- Following close coordination between the United States and NATO, undertake serious efforts to reduce and eliminate U.S. and Russian non-strategic nuclear weapons from the European theater.
- Recommit to U.S./NATO-Russia cooperation and transparency on missile defense.
  - As a matter of policy, the United States should confirm and take programmatic steps to emphasize that missile defense is only meant to defend against rogue state and regional ballistic missile threats, not to threaten the strategic deterrent capabilities of Russia or China.

Work with China to Reduce Nuclear Risks

- Develop and sustain regular dialogue on strategic issues, including nuclear doctrine, forces, and policy, as well as cyber capabilities, artificial intelligence (AI), the weaponization of outer space, conventional and hypersonic missiles, missile defense, and North Korea. This dialogue should be informed by close U.S. consultation with allies and partners in the region.
- Develop confidence-building agreements and mechanisms such as advance notification of ballistic missile test launches, establishment of a Nuclear Risk Reduction Center channel, and reciprocal exchanges of information about nuclear forces and missile defense plans as part of a broader effort to manage and avoid crises and potential misunderstandings and miscalculations.

Strengthen the Nuclear Non-Proliferation Treaty (NPT) Regime and Roll Back and Prevent Proliferation

- Agree on a P5 (China, France, Russia, the United Kingdom, and the United States) declaration that a "nuclear war cannot be won and must never be fought."
- Reaffirm the P5 moratoria on nuclear explosive testing and commit to work to bring the Comprehensive Nuclear-Test-Ban Treaty (CTBT) into force.
- In close consultation with allies and partners in the region, reiterate willingness to engage in step-by-step negotiations with North Korea to reduce and eventually eliminate its nuclear weapons program, in exchange for corresponding measures including targeted sanctions relief. Offer a "cooperative threat reduction" program to North Korea.
- Engage Iran to deescalate tensions and chart a path for resuming the Joint Comprehensive Plan of Action (JCPOA) limits on Iran's nuclear program in exchange for relief of U.S. nuclear-related sanctions. The United States should in addition begin discussions with the P5+1 (P5+Germany) and Iran on a "JCPOA Plus" deal to extend nuclear restrictions and verification beyond those in the original nuclear deal. In parallel, the United States should pursue multilateral negotiations, including key Middle East actors, on regional and missile issues.
- Work with partners in the Gulf region to develop a new framework for peaceful nuclear cooperation that advances national security and simultaneously addresses commercial concerns.

Prioritize Efforts to Prevent Nuclear Terrorism at Home and Abroad

- Make clear that nuclear and radiological security is a priority and outline specific actions to improve nuclear materials security in the United States, including replacing all cesium-137 blood irradiators in the United States.
- Expand resources for cooperative approaches around the world, work to strengthen the International Atomic Energy Agency's (IAEA) role in global nuclear and radiological security, and lead efforts to reinforce the nuclear security treaties and institutions that protect the international community.

Strengthen Cohesion at Home and Diplomacy Abroad

All these policies will require renewed, bipartisan support for diplomacy aimed at reducing nuclear risks. It is essential to:

- Establish a liaison group between senior administration officials and a bipartisan leadership group in Congress to consult on issues related to Russia, NATO, and nuclear policy, as well as on nuclear risk reduction and stability policies toward China and our Asia-Pacific allies.
- Reinvigorate the U.S. commitment to our alliances and to strengthening vital multilateral institutions.
- Use, not shun, the tools of diplomacy and dialogue to address issues with adversaries and competitors, including Russia and China.

Full Recommendations

Today, the risk of use of a nuclear weapon is higher than at any time since the Cuban Missile Crisis. Tensions among nuclear-armed states are increasing. New technologies and evolving threats are introducing new uncertainty, increasing the risk of a catastrophic misunderstanding or miscalculation, and shortening the time leaders may have to make decisions during a crisis. The arms control framework that has contributed to stability and dramatic reductions in nuclear arsenals for the past 50 years is breaking down, increasing the likelihood of an arms race and conflict.

To mitigate these risks, the United States must engage in dialogue and tough diplomacy with Russia—which together with the United States holds 90 percent of the world's nearly 14,000 nuclear weapons—and with China, a rising nuclear power. These engagements should be aimed at reducing tensions, avoiding and managing crises, and building and maintaining stable strategic relationships that are less likely to devolve into military conflict with risk of escalation. This will require leadership and direction from the highest levels of government and wider recognition that dialogue and engagement on strategic issues should not be treated as rewards for "good behavior," but as necessary tools to regularly manage complex geopolitical relationships.

At home, the United States needs a more bipartisan, coherent, and durable policy approach to mitigate potentially catastrophic global risks. Executive and legislative branch leaders must work together to create and sustain the political space for engagement with Russia and China to reduce these risks. Toward that end, the executive branch should take the initiative to establish a liaison group (or groups) between senior administration officials and a bipartisan leadership group in Congress to consult on issues related to Russia, NATO, and nuclear policy, as well as on policies toward China and our allies in Asia related to nuclear risk reduction and stability.

Successful engagement with Russia and China also requires improved coordination with U.S. allies in Europe and Asia—relationships that have become dangerously strained but remain critical for U.S. national security interests at home and around the globe.

Through much of the Cold War, U.S. nuclear policy and posture was guided by the perceived need to deter a deliberate, massive Soviet first strike. Today, the greater risk is that nuclear conflict will result from false warning, miscalculation, or blunder. Outdated Cold War nuclear postures and policies are becoming more dangerous due to new threats in cyberspace and advances in military technology, including hypersonic weapons, space capabilities, and artificial intelligence. As was true through most of

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the Cold War, the presidents of the United States and Russia still have only a few minutes to decide whether a warning of a possible nuclear attack is real and how to respond. New technologies may further shorten that decision time and exacerbate uncertainties regarding the reliability of the warning information. Increasing warning and decision time for leaders, particularly during periods of heightened tensions and extreme circumstances, is key to increasing crisis stability and reducing the risk of nuclear use.

Advances in non-nuclear capabilities increasingly affect strategic stability and cannot be isolated from considerations of how to reduce competition in nuclear arms and prevent their use. Conventional prompt strike and hypersonic systems can have strategic implications due to their speed, range, and accuracy. Russia and China continue to express concerns about U.S. missile defense capabilities and cite the offense-defense relationship as a key motivation for expansion and advances in their respective nuclear modernization programs. Together, these factors have significant implications for command and control and early warning, perceived nuclear force requirements, and other aspects of strategic stability. They should be addressed in dialogues aimed at understanding each country's security concerns and developing possible unilateral and mutual actions and/or agreements to increase stability and reduce risks.

Although reliance on nuclear weapons for security remains a factor in today's world, the geopolitical order and technology have evolved considerably since the Cold War era and should lead us to reassess our thinking about nuclear weapons and the risks they pose. Preventing nuclear use requires a renewed focus on the expanding risks, and a reexamination of our policies and posture to ensure they are appropriate to the most likely challenges facing the United States.

U.S. Nuclear Policy and Posture

The next administration can lead the way in further reducing the risk of nuclear use through diplomacy and by demonstrating leadership through our own actions. The president should narrow the range of scenarios in which the United States would consider using nuclear weapons and urge other states with nuclear weapons to adopt similar positions. It also is time to revisit long-standing Cold War-era policies governing the authority and procedures for using nuclear weapons. The risks of placing authority for the use of a nuclear weapon solely in the hands of one person—the president of the United States—are real.

Recommendations

- Declaratory Policy: The United States should reduce the role of nuclear weapons in its national security strategy. Following careful consultations and reassurances of the U.S. commitment to, and comprehensive conventional and nuclear capabilities for, the defense of allies in Europe and the Asia-Pacific, the U.S. should move to make deterrence of nuclear attacks against the United States and its allies and partners the sole purpose of nuclear weapons, thereby narrowing the circumstances under which the United States would consider their use.
  - In addition, the United States should call on China, France, Russia, and the United Kingdom to adopt a joint P5 "sole purpose" declaration.
- Negative Security Assurance: Even before implementing a sole purpose doctrine, the United States should adopt the negative security assurance from the 2010 Nuclear Posture Review without caveats—stating that

the United States "will not use or threaten to use nuclear weapons against non-nuclear weapon states that are party to the NPT and in compliance with their nuclear non-proliferation obligations."

- Sole Authority: The administration should take steps to increase confidence in the process for considering the use of nuclear weapons and create the conditions for future improvements in that process, including steps to ensure that any decision would be deliberative and based on consultation and planning, as appropriate. This could be done through a presidential directive, legislation, or both, and should include steps to:
  - Broaden the requirement for executive and legislative branch consultations to ensure any decision on nuclear use is deliberative and undertaken consistent with the U.S. Constitution and national and international law; and
  - Strengthen executive branch procedures for internal consultation and planning regarding any potential use of a nuclear weapon.
- Nuclear Risk Reduction Review and Steps: The president should direct a review of the U.S. nuclear command and control system, leading to the adoption of "failsafe" steps to strengthen safeguards against unauthorized or inadvertent use of a nuclear weapon.
  - This is particularly important given evolving challenges of cyber threats to nuclear command and control; increasing digitization in modernized nuclear weapons and delivery and warning systems; and new, faster nuclear delivery systems. The review should examine steps the president could direct to enhance failsafe procedures, including post-launch destruct devices on U.S. nuclear weapons and other measures to reduce the risk of nuclear war. The review also should examine unilateral, bilateral, and regional risk reduction measures—focusing on confidence building and predictability—that could be taken alone and/or with Russia, China, and other nuclear-weapon states. The review should include options to increase warning and decision time.

The United States and Russia

Despite dramatic reductions in their nuclear weapons over the past three decades, the United States and Russia share an obligation to continue reducing their numbers and the risk that they might ever be used. To meet that obligation, Washington and Moscow must resume serious, sustained engagement on nuclear and strategic issues and get back on the path of mutual restraint and cooperation.

A reinvigorated U.S.-Russia dialogue on strategic stability—which should address nuclear weapons and the broad range of capabilities and technologies with strategic impact—is critical to tamp down dangerous competition and enhance

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mutual security. Because there is no "one size fits all" solution to managing these disparate but increasingly interrelated challenges, dialogue should lead to a process for addressing such issues in parallel, in several different baskets proceeding on their own timelines. Legally binding verifiable agreements to limit and reduce U.S. and Russian nuclear forces—and, eventually, forces of other nuclear powers—are important, but there is urgent need for additional, more flexible means of increasing confidence and reducing risks. These would include unilateral reciprocal actions and transparency measures, norms and rules of the road, and unilateral commitments, which can complement treaties like New START by addressing issues less suited to formal agreements. It also is essential to take steps focused specifically on the European region to restore stability, improve mutual trust, and prevent the build-up of nuclear and military capabilities that could lead to disastrous military conflict. Close U.S. consultation with NATO allies is necessary as engagement with Russia proceeds.

Recommendations

The United States and Russia should:

- Extend the New START Treaty for five years to preserve limits and verification on their strategic nuclear forces.
  - The United States should, in addition, demonstrate leadership in the context of the NPT's 50th anniversary by announcing plans to reduce its deployed strategic warheads to no more than 1,400 (below the New START ceiling of 1,550) within one year and invite Russia to make a reciprocal commitment. (Since September 2017, both sides have officially declared the number of their deployed strategic warheads to be below the treaty limit of 1,550.)
- Reinvigorate dialogue on strategic stability and reducing nuclear dangers, with a view toward developing agreements and taking concrete steps to improve mutual security and mitigate the risk of conflict and escalation to nuclear use. Topics to be addressed include:
  - Recognizing the potential for cyberattacks to lead to accidental and/or miscalculated nuclear use, a U.S.-Russia bilateral dialogue should characterize escalation pathways, identify norms, enhance transparency, and develop other joint or reciprocal actions to reduce cyber-nuclear risks. A successful effort could be expanded to include other P5 countries.
  - The impact on strategic stability of new types and kinds of nuclear weapon delivery vehicles, conventional prompt strike capabilities, the offense-defense relationship, military activities in space, and non-strategic nuclear weapons.
  - Exploring the potential for a new bilateral agreement to supersede New START that would at a minimum cover all strategic-range nuclear systems—including those covered by New START, as well as new kinds of strategic nuclear systems—and potentially strategic-range conventional prompt strike systems.
- Agree not to base U.S. or Russian land-based intermediate-range ballistic and cruise missiles in Europe (west of the Urals), as a step to improve mutual security and reduce the growing risk of conflict in the Euro-Atlantic region. This will require agreement on definitions, how to handle the disputed Russian 9M729 cruise missile, and accompanying transparency measures. The United States must consult closely with its NATO allies on such an agreement.

- Take steps to increase decision time including:
  - The presidents of the United States and Russia should direct their respective governments together to develop options to increase warning and decision time.
  - The United States should set the goal of removing all nuclear weapons from prompt-launch status globally over the next decade, and work with Russia on step-by-step reciprocal commitments to remove a percentage of missiles and warheads from prompt launch.
  - The United States and Russia should work to jointly limit, reduce, and/or eliminate silo-based intercontinental ballistic missiles (ICBMs). Consistent with this objective, the United States should postpone investment in the ground-based strategic deterrent.

The United States, NATO, and Russia: Reducing Non-Strategic and Forward-Deployed Nuclear Weapons

U.S. and Russian non-strategic nuclear weapons deployed in and near Europe increase the risk of nuclear use through escalation, accident, blunder, or catastrophic terrorism. These weapons are potential targets in the early phases of a conflict and thus could trigger early nuclear use.

Recommendations

- The United States, NATO, and Russia should undertake serious efforts to reduce and eliminate non-strategic nuclear weapons from the European theater. This will require U.S. leadership and close consultation with NATO allies, and a willingness of Russia to engage.
- In the context of strong commitments to reaffirm NATO's Article 5 obligation to collective defense and to strengthen U.S. extended deterrence, the United States and NATO should make clear they are prepared to engage Russia in dialogue on non-strategic nuclear weapons.
  - Recognizing the risks non-strategic nuclear weapons pose for early use in a conflict, NATO should make clear it is prepared to proceed with further reductions of U.S. forward-deployed nuclear weapons, with the timing and pace of such reductions to be determined by broad political and security developments between NATO and Russia.
- NATO should remove nuclear weapons from locations where there is a heightened risk of terrorism or political instability and return them to the United States or to other existing basing locations. This should be done urgently and unilaterally.
- The United States and NATO should affirm they will not locate nuclear weapons or the infrastructure to store them on the territory of NATO members that don't currently host nuclear weapons or infrastructure.

The United States and China

Rising acrimony and the lack of dialogue and engagement on strategic issues underscore the need to better manage the U.S.-China strategic relationship. With respect to strategic stability and nuclear arms control, a trilateral arms control process that includes Russia and China is very unlikely to succeed in the near term. Instead, a more productive approach to engaging China should center on three objectives: (1) reducing the risk of use of nuclear weapons as a result of miscalculation; (2) constraining the potential for

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a destabilizing arms race; and (3) establishing a foundation of engagement on strategic issues in the near term and, in the longer term, work toward more formal joint or multilateral commitments or arms control measures. Such engagement with Beijing must take into account the need to reaffirm and strengthen U.S. commitments to key allies and partners in the region, as well as the undeniable impact that North Korea's ongoing build-up of its nuclear capabilities will continue to have on U.S. policy and posture in the Asia-Pacific region.

Recommendations

The United States and China should:

- Develop and sustain regular dialogue on strategic issues, including nuclear doctrine, forces and policy, as well as cyber capabilities, artificial intelligence, the weaponization of outer space, conventional and hypersonic missiles, and missile defense. On the U.S. side, this dialogue should be informed by close consultations with allies and partners in the region.
  - This dialogue should include discussions about the threat from North Korea and its impact on security policies and postures in the region.
- Develop confidence-building agreements and mechanisms such as advance notification of ballistic missile test launches and establishment of a formal Nuclear Risk Reduction Center channel, as part of a broader effort to avoid and manage crises and potential misunderstandings and miscalculations.
- Agree, as a bilateral confidence-building measure, to exchange data about each side's strategic nuclear forces like the data exchanged between the United States and Russia under the New START treaty. China should also consider broader declarations with respect to its plans for nuclear forces. Including China in a data exchange on strategic forces (which could be extended to include Russia, France, and the United Kingdom) would be an important step toward building increased transparency, cooperation, and trust among nuclear weapons states.
- Institute specific confidence-building measures, both through unilateral actions and reciprocal commitments. Examples could include:
  - Reciprocal commitments not to conduct intercept tests against orbital objects (these could be extended to include other nuclear-armed states).
  - United States commitment not to deploy intermediate-range ground-launched ballistic and cruise missiles outside of the United States.
- Establish a U.S.-China bilateral dialogue on the responsible use of artificial intelligence, including AI-safety concerns. Such a dialogue between global leaders in development of AI could reduce risks and misunderstanding associated with use of AI.

The Offense-Defense Relationship with Russia and China

Missile defense and the offense-defense relationship have been a long-standing point of contention in strategic stability and arms control efforts, in particular with Russia but increasingly with China. Although legally binding limits on missile defense seem politically infeasible in the United States at present, progress on improving strategic stability between the United States and Russia—and to some degree between the United States and China—and reducing the risk of nuclear use will require the United States to review this matter with fresh eyes and to develop a more cooperative approach to curb the escalating offense-defense competition.

Recommendations

- Leaders in Washington/Europe and Moscow should recommit to U.S./NATO-Russia cooperation on missile defense and define a set of principles to guide this effort. This could include a joint U.S. /NATO-Russia analysis of the future framework for cooperation and establishment of a joint data exchange center.
  - These efforts could be expanded to include China, or the United States and China could pursue similar efforts in Asia on a bilateral basis.
  - In the future, the center could have potential for cooperation in other related areas (e.g., cyber and space).
- The United States/NATO and Russia should commit to maximize transparency, including exchanges of information about the missile defense deployments and plans of each side with reciprocal transparency measures, such as on-site visits.
  - Similar exchanges and measures could be adopted between the United States and China.
- As a matter of policy, the United States should confirm and take programmatic steps to emphasize that missile defense is only meant to defend against rogue state and regional ballistic missile threats, not to threaten the strategic deterrent capabilities of Russia or China. Such steps could include:
  - The United States and Russia could commit on a reciprocal basis not to deploy more than 100 strategic missile defense interceptors on their territories or to freeze deployments at existing levels.
  - The United States should not proceed with plans to test the SM-3 Block IIA interceptor against an ICBM-class target.

Eliminating the Threat of North Korea's Nuclear Weapons Program

Despite two presidential summits between Donald Trump and Kim Jong Un, North Korea continues to produce fissile material and has almost certainly increased its nuclear weapons stockpile during the past four years. It also has continued to develop its ballistic missile systems, testing new designs that are more maneuverable and quickly launchable, posing new threats to South Korea (ROK), Japan, and U.S. territory and military forces in the Western Pacific. North Korea has, for now, rejected further talks after the United States turned down its unbalanced offer in Hanoi to dismantle its nuclear facilities in Yongbyon in return for massive United Nations (UN) sanctions relief. The ongoing stalemate could easily become a new crisis as North Korea continues to develop its weapons of mass destruction (WMD) programs, agitates for more inter-Korean cooperation,

The United States should offer a "cooperative threat reduction" program to North Korea to help dismantle WMD programs and redirect personnel to peaceful economic activities.

or responds to U.S.-ROK military exercises. A diplomatic solution is needed to prevent North Korea from solidifying its de facto status as a nuclear weapon state and to reduce tensions in the Asia-Pacific region.

Recommendations

- The United States should, in close coordination with South Korea and Japan, as well as with China and Russia, indicate a clear willingness to engage in step-by-step negotiations with North Korea to reduce and eventually eliminate its nuclear weapons program, in exchange for corresponding measures from the United States including targeted (and, if necessary, reversible) sanctions relief.
  - Future negotiations will require buy-in at the leader level, but much of the work should be conducted at working levels by empowered negotiators on both sides.
- The United States should offer a "cooperative threat reduction" program to North Korea to help dismantle WMD programs and redirect personnel to peaceful economic activities.

Strengthening Multilateral Nuclear Risk Reduction

The United States should continue to engage in multilateral fora to advance global efforts around risk reduction, arms control, and nonproliferation.

The NPT remains the cornerstone of global efforts to prevent the spread or use of nuclear weapons. The Treaty is based on a fundamental bargain: that states that do not have nuclear weapons will not acquire them; that the five recognized nuclear-weapon states (NWS) will work toward nuclear disarmament; and that all states will have the opportunity to benefit from peaceful uses of nuclear energy, consistent with appropriate safeguards. It is essential to the long-term viability of the NPT and the continued commitment by all states to its core nonproliferation obligations that the five NWS—also known as the P5: China, France, Russia, the United Kingdom, and the United States—demonstrate progress on their Article VI disarmament obligations. U.S. leadership will be key to reenergizing such progress and rebuilding consensus on global nonproliferation and disarmament efforts.

Recommendations

The P5 should:

- Reaffirm their moratoria on nuclear testing, commit to work to bring the CTBT into force, and commit to consultations—and eventually transparency—aimed at addressing concerns in this regard.
- Affirm their commitment to preventing the use of nuclear weapons. This could take the form of a P5 declaration that a "nuclear war cannot be won and must never be fought."

- Follow the U.S. lead in moving toward and adopting a sole purpose nuclear declaratory policy.
- Declare a moratorium on the production of fissile material for use in nuclear weapons or other nuclear explosive devices as a concrete step toward efforts to negotiate a Fissile Material Cutoff Treaty.
- Declare that all nuclear materials associated with military programs are secured, at a minimum, consistent with applicable IAEA INFCIRC/225 standards, to be confirmed through regular international or internal peer reviews.
- Expand ongoing discussions about nuclear doctrine to also address strategic stability.

Preventing Iran from Developing Nuclear Weapons

As of Fall 2020, the JCPOA—also known as the "Iran nuclear deal"—is on life support following the U.S. withdrawal from the agreement in May 2018 and Iranian steps to exceed key limitations in the deal beginning in May 2019. Iranian President Rouhani and Foreign Minister Zarif have consistently indicated a willingness to return to the restrictions under the JCPOA if the United States were to come back into compliance with its commitments to relieve nuclear-related sanctions. In September 2020, the remaining parties to the deal (China, the European Union, France, Germany, Iran, Russia, and the United Kingdom) unanimously rejected U.S. moves to "snapback" UN sanctions, apparently with an eye to keeping the deal alive until after the U.S. elections. Iranian enriched uranium stockpiles are increasing, and, regardless of the election outcome, the next administration will need to find a way to return to the objective of preventing Iran from having enough material to produce a nuclear weapon. This will require Congressional outreach and close coordination with allies and partners and should include "quick wins" for both sides, given the Iranian general election scheduled for June 2021.

Recommendations

- The United States should immediately reopen direct engagement with Iran to deescalate tensions and develop a plan to implement an agreed set of restrictions on Iran's nuclear program in exchange for relief of U.S. nuclear-related sanctions. The priority should be on freezing and rolling back Iran's actions to expand its enrichment activities beyond JCPOA limits.
- The United States should signal early in a new administration that it seeks negotiations with the P5+1 (P5+Germany) and Iran to achieve a "JCPOA Plus"—a new deal that would strengthen and extend nuclear restrictions and verification beyond those in the original nuclear deal. In parallel, the United States should pursue a separate set of multilateral negotiations, including key Middle East actors, on regional and missile issues.

Establishing a New Framework for Peaceful Nuclear Cooperation in the Persian Gulf

Given the dual-use potential for civil nuclear programs to support clandestine nuclear weapon ambitions and the growing interest in civil nuclear power in the Persian Gulf, there is an urgent need for a more pragmatic and flexible U.S. approach to nuclear cooperation in the region to mitigate these

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risks. This new approach to nuclear cooperation would represent a major shift in previous thinking on access to the fuel cycle and the spread of enrichment technology. A new framework could include two options: (1) a "refrain" model, based on the current nuclear cooperation agreement between the United States and the United Arab Emirates (UAE), which recognizes and codifies the UAE's decision not to pursue enrichment or reprocessing capabilities in exchange for nuclear cooperation with the United States; or (2) a "constrain and verify" model, similar to the JCPOA's restrictions on the Iranian enrichment program. This second option would avoid a debate about a state's self-proclaimed "right" to develop enrichment technology, but states could develop such technology only if they bring into force both strict limits on their civilian nuclear program and greatly expanded IAEA monitoring and verification measures.

Recommendation

- The United States should work with partners in the Gulf region to develop a new framework for peaceful nuclear cooperation that advances national security and simultaneously addresses commercial concerns.

Preventing Nuclear Terrorism at Home and Abroad

U.S. leadership and global focus on nuclear materials security is essential to keep nuclear and radiological materials out of terrorist hands. The number of countries with weapons usable nuclear materials has decreased from more than 50 to 22—but there are still more than 2,000 tons of highly enriched uranium and plutonium located at hundreds of sites around the world, many of them poorly secured. Radiological devices used in medicine, industry, and research could be stolen or exploded in place, creating public panic and billions of dollars of clean-up costs and economic impact. Progress on nuclear security has slowed in recent years, however, in part owing to a decline in political attention. Recognizing that a weak link in nuclear or radiological security anywhere in the world could lead to devastating consequences here at home, a renewed global effort—led by the U.S. government—is needed to raise high-level political attention and promote ambitious action to prevent the theft and malicious use of nuclear or other radioactive materials.

Although the risks are real, emerging technologies also create opportunities. … Future arms control agreements will depend on robust verification approaches and new tools and technologies may facilitate them.

Recommendations

The United States should:

- Take an active role via senior White House, Energy, State, and Defense officials to raise high-level political attention and build up bilateral and multilateral approaches to nuclear and radiological security.
- Expand resources for cooperative approaches around the world, with a focus on building capacity for long-term, sustainable stewardship of nuclear and radiological materials.
- Work to strengthen the IAEA's role in global nuclear and radiological security and lead efforts to reinforce the nuclear security treaties and institutions that protect the international community.
- Lead by example on nuclear security by:
  - Replacing all cesium-137 blood irradiators in the United States.
  - Inviting international peer review of nuclear security at U.S. facilities.
  - Accelerating the safe and secure reduction of unneeded stockpiles of highly enriched uranium and separated plutonium and encouraging similar efforts worldwide.
  - Renewing dialogue on preventing nuclear terrorism with countries possessing large fissile material holdings, including Russia and China.
  - Enhancing information sharing and law enforcement and intelligence cooperation to counter nuclear terrorism around the world.

Emerging Technologies Present Opportunities and Risks

Recent years have seen enormous advances in technology, many of which take advantage of the exponential increases in computing power and data storage. The benefits of these technologies are many and include high-speed networking, the global connections enabled by social media, soon-to-be autonomous vehicles, and other applications fueled by AI.

The technology revolution also is changing the face of warfare and international relations. Digital systems cannot be fully secure from cyberattacks, putting military and even highly secured nuclear weapons systems at risk. Although AI is still a fragile technology and susceptible to adversarial attacks, its use is being considered in weapons systems with the potential that it could lead to dangerous conflict escalation.

Although the risks are real, emerging technologies also create opportunities. Increased data availability and sophisticated analysis tools present new opportunities to monitor potentially illicit activities such as nuclear proliferation. Future arms control agreements will depend on robust verification approaches and new tools and technologies may facilitate them. New types

and greater availability of data (e.g., satellite, trade, vessel location, etc.) and technologies also present new opportunities for the international community.

Recommendations

- The United States should lead a global innovation initiative to identify, develop, deploy and build support for monitoring and verification approaches. The first step will be to align the national research enterprise for nuclear detection, monitoring, and verification technologies. Doing so will include expert prioritization of a research agenda across the interagency and investment at scale in the creation of a dynamic innovation ecosystem joining the National Laboratories, the private sector, universities, and civil society.
  - The United States should act to promote global confidence in this national research enterprise for nuclear security by inviting active collaboration and peer-review by other governments. The United States should encourage other governments to emulate this effort by announcing that in three years it will convene a monitoring and verification technology exposition and launch an international test bed for collaboration. The exposition will demonstrate the early results of the U.S. national nuclear security research enterprise and create a high-profile forum for other governments to demonstrate the results of their own research investments to prevent the spread and use of nuclear weapons.
  - The United States should support research and development efforts for technologies that could detect covert nuclear material production, including the development of wide-area environmental sampling, which is the use of air, water, soil, and other environmental data to detect the presence of nuclear material or nuclear activity within a large area, such as a province or entire country. These R&D efforts should complement existing support to the IAEA to modernize its monitoring and verification tools.
- The United States should maximize use of emerging technologies, such as increased data availability and sophisticated analysis tools, to monitor potentially illicit activities, such as nuclear proliferation.

Investing in People, Organizations and Relationships

At home, it is essential to invest in the workforce, infrastructure, and technologies that can help address nuclear and biological risks. Abroad, where so many challenges know no borders and require multilateral solutions, alliances, international organizations, and multilateral mechanisms are force multipliers for U.S. and global interests.

Recommendations

- To help meet future nuclear security challenges, the federal government must urgently create a pipeline of diverse, young professionals to replace the U.S. nuclear enterprise's current aging and shrinking workforce. Training a skilled workforce in key areas such as cybersecurity will be vital to strong, sustainable nuclear security. Cooperative nuclear security

programs at the U.S. Departments of Energy, State, and Defense should be fully funded and staffed. The government also should invest in research and development of new technologies to support the nation's nuclear security mission.

- The United States should make a major political and economic investment in the effective functioning of international and multilateral institutions and rebuild domestic understanding of and consensus around their vital contributions to U.S. and global security. Rhetorical and practical attacks on international and multilateral institutions and agreements are counterproductive, along with withdrawal from treaties, agreements, and international organizations. The United States should work with allies and partners, international organizations, and multilateral mechanisms to address nuclear and biological risks. For example, an effectively functioning International Monitoring System of the Comprehensive Nuclear-Test-Ban Treaty Organization allows the United States access to data collected globally that it would not otherwise have and allows U.S. resources to be prioritized to fill gaps in nuclear explosive detection that cannot be met internationally; the IAEA can help the international community stay ahead of proliferation threats by developing the safeguards and security approaches of the future; the WHO collects data and provides assistance globally to address the spread of disease, which COVID-19 has shown is essential to the health and safety of every American because disease knows no borders; and NATO and U.S. alliances in the Asia-Pacific extend U.S. defense cooperation to deter and defuse threats before they reach the United States.

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This is one of two papers prepared by the Nuclear Threat Initiative for the next U.S. administration. Find the papers on nuclear policy and biosecurity at **www.nti.org/priorities**

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