



HARVARD Kennedy School
BELFER CENTER
FOR SCIENCE AND INTERNATIONAL AFFAIRS
Managing the Atom Project

For Security's Sake: Saving U.S.-Russian Nuclear Arms Control

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October 11, 2018

belfercenter.org/mta

Nuclear weapons: some good news

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- ☐ Global nuclear weapons stockpiles down ~80%
- ☐ Only 9 states with nuclear weapons – same as 30 years ago
- ☐ Almost all other states have pledged not to acquire nuclear weapons, and to accept verification
- ☐ More states have started nuclear weapons programs and given them up than have nuclear weapons – efforts to dissuade countries succeed more often than they fail
- ☐ Nonproliferation regime has proved resilient in the face of multiple challenges over 5 decades
- ☐ >50% of the states that once had potential nuclear bomb material on their soil have eliminated it
- ☐ Nuclear material around the world is far more secure than it was 25 years ago

The whole structure of U.S.-Russian nuclear arms control is in danger

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- ❑ New START is working – but expires soon
 - Both sides have met key limits
 - Inspections are almost the only remaining nuclear cooperation
 - Expires early 2021; 1-time extension possible to early 2026 (U.S. has not agreed to extend)
- ❑ Intense U.S.-Russian hostility
 - No talks on any replacement agreement underway
- ❑ Hostility plus mutual charges of INF Treaty violations will make it very difficult to reach a new treaty:
 - That Russia will accept, and
 - That 2/3 of the U.S. Senate will accept

Within 3-8 years, there may be no agreed limits on U.S. and Russian nuclear forces, for the first time in half a century

Why should we care? Benefits of U.S.-Russian arms control

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- ❑ Benefits of the agreements themselves:
 - Reduced mutual perceptions of threat
 - Force structure stability
 - Predictability (important for planning)
 - Transparency
 - Reduced cost of maintaining forces
- ❑ Benefits of the arms control process:
 - Discussions allow greater mutual understanding of nuclear policies, plans, perceived dangers
 - Build relationships, habits of cooperation that spill over to other areas
 - Offers arena in which Russia is treated as an equal – helps assuage prestige, humiliation concerns

Crisis stability: most arms control agreements have had little effect

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- ❑ Arms control theory always focused on crisis stability – ensuring neither side felt it could get a first-strike advantage
- ❑ But militaries on both sides energetically pursued counterforce, counter-C3I capabilities
 - Creates “use them or lose them” pressures
 - Most arms control agreements had little effect on this dynamic
 - Exceptions: Defunct ABM Treaty near-ban on defenses, START II ban on MIRVed ICBMS (never happened)



Test of RS-24 MIRVed ICBM. Source: ITAR-TASS

U.S.-Russian nuclear dangers are increasing

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- ❑ Intense hostility creates greater potential for conflict, miscalculation
 - Many flashpoints, e.g., in Baltics
 - Growing perceptions that nuclear use is plausible
- ❑ Both sides modernizing their forces
 - Russia building whole new types, nuclear saber-rattling, exercises
- ❑ BMD, cyber, counter-space, precision conventional create new complexities, concerns
 - May increase early escalation incentives

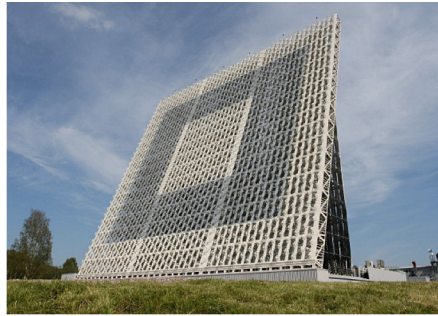


Source: ITAR-TASS

U.S.-Russian nuclear dangers are increasing (II): crisis stability at risk

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- ❑ Russian forces and command and control vulnerable; limited space-based early warning; potential for launch on false alarm
- ❑ U.S. ICBMs, SLBMs in port, C3 also vulnerable
- ❑ Both sides appear to be pursuing forces, doctrines of tactical use of nuclear weapons
 - Russian (disputed) “escalate to deescalate” doctrine
 - New NPR calls for low-yield SLBMs, SLCMs to counter



Voronezh early warning radar Source: *telemax.spb*

U.S.-Russian hostility is poisoning the atmosphere for progress

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- ❑ United States and Russia, each see the other as aggressive, hostile powers, threats to their national security
- ❑ In the U.S. view, Russia:
 - Violated longstanding norms by seizing Crimea (after Georgian war earlier), effectively invading eastern Ukraine
 - Interfered in U.S. elections, and is doing so again
 - Is protecting Assad from consequences of brutality, chemical use, thereby undermining chemical weapons regime – constant lies
 - Is murdering opponents (including with banned chemical weapons)
 - Is building new classes of nuclear weapons, planning nuclear use early in nuclear conflicts, rattling the nuclear saber in a way not seen since Khrushchev, violating arms control treaties
 - Democrats, most Republicans (except for Trump) united in anti-Russian hatred in a way not seen for decades

U.S.-Russian hostility is poisoning the atmosphere for progress (II)

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- ❑ In the Russian view, the United States and NATO:
 - Violated promises by extending NATO toward Russia's borders
 - Violated international law by bombing Serbia, invading Iraq, overthrowing Qaddafi without UN authorization
 - Organized the "color revolutions" and had one planned to overthrow Putin – routinely interferes in other countries' elections
 - Organized the ouster of the Ukrainian government and planned to draw Ukraine (and Georgia) into the EU and NATO
 - Threw out the ABM Treaty and is now building missile defenses to threaten Russia's deterrent
 - In essence, conducts more aggressive behavior than Russia – but more cynically, claiming to support a rules-based order
 - Remarkably widespread anti-American hostility

U.S.-Russian hostility is poisoning the atmosphere for progress (III)

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- ❑ Even when locked in a global Cold War, the United States and the Soviet Union cooperated on mutual interests:
 - Built the arms control structure
 - Built the global nonproliferation regime
 - In-depth military-to-military, scientist-to-scientist contacts
 - Cooperated on security in Europe – from Austrian State Treaty to OSCE
- ❑ Today, even this Cold War cooperation is largely blocked
 - Except for JCPOA, little nonproliferation cooperation
 - No arms control talks
 - Military-to-military, scientist-to-scientist contacts mostly cut off
 - No effective cooperation on security in Europe
 - Mostly looking for ways to undermine each other

Confronting Russia where needed, but cooperating where it serves U.S. interests

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- ❑ No doubt the United States needs to respond to Russian aggressive behavior – to deter Russia, assure allies
 - Elections, Ukraine, murder, nuclear threats, treaty violations...
- ❑ But Russia and the United States also have mutual interests
 - Most basic: survival – avoidance of nuclear war
 - Nonproliferation (though here, too, Russia has opposed U.S. approaches in recent years)
 - S&T, trade, some international issues
- ❑ President Reagan called the Soviet Union an “evil empire,” funded anti-communist insurgents in many countries – and negotiated new arms control agreements with them
 - Russian hostility, nuclear force buildups make arms control *more* urgent and important, not less.

Extending New START would serve U.S. national security interests

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- ❑ Limits Russian strategic forces
- ❑ Provides predictability, habits of nuclear cooperation, monitoring
 - Cheaper, higher confidence than providing information with intelligence alone
- ❑ JCS have concluded U.S. does not need larger nuclear forces
- ❑ Provides foundation for future accords, and for addressing new Russian weapons
- ❑ Significant benefit for political support for nonproliferation regime

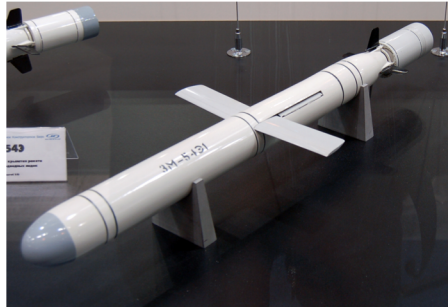


Source: Sputnik

The Russian INF violation

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- ❑ SS-C-8 ground-launched cruise missile (9M729) has a range above the 500 km INF Treaty lower limit
 - Now deployed, in very limited numbers
 - Reportedly similar to Kalibr SLCM
- ❑ Russia initially claimed it did not know what missile was at issue
- ❑ Now common understanding of which missile – Russia denies it has prohibited range



Export version of Kalibr cruise missile. *Source: Wikipedia*

Resolving the issue serves U.S. interests better than abandoning the treaty

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- ❑ An INF Treaty that collapsed over unsolved Russian violations would poison prospects for future arms agreements
- ❑ A Russia freed from the INF Treaty would pose greater perceived nuclear risks to U.S. European allies
 - Could create new alliance fears, as SS-20s did long ago
 - Coming at time of increasing doubts over U.S. reliability
 - Would likely create alliance crisis, *political* requirement for parallel U.S. response, despite its lack of military utility
- ❑ United States has no need for INF-prohibited missiles
 - Conventional targets can be addressed by more survivable SLCMs and ALCMs
 - Nuclear targets can be addressed by more survivable forces elsewhere
 - IF U.S. military determined there was a military requirement, could redeploy nuclear SLCMs, as suggested in NPR

Resolving Russian INF noncompliance

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- ❑ Recent discussions suggest Russian experts have concluded:
 - INF issue could bring down whole structure of arms control – which would be bad for Russia
 - INF Treaty is important for Russia – despite neighbors having INF-range missiles – to avoid short-time-of-flight decapitation threat from Europe
- ❑ Russia *may* be willing to dismantle the small number of prohibited missiles and launchers, without any confession
 - But only in the context of a larger deal seen as serving Russia's interests
 - U.S. demand that Russia confess, dismantle, before any further steps are discussed offers little incentive for Russian agreement
 - For face-saving might be possible to modify missiles with engines only capable of flying to shorter, compliant ranges
 - Some Kalibr variants have ranges permitted by INF
 - Russian experts' suggestion of inspections to confirm the missile is compliant won't be enough – because it's not

Russian charges of U.S. INF violations

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1. Stages of ICBMs used as BMD targets are effectively INF-range missiles
2. Large armed drones are effectively cruise missiles with prohibited range capability
3. Since the Mk. 41 launchers for sea-based Aegis routinely fire cruise missiles of prohibited range, the ground-based “Aegis Ashore” launchers are prohibited ground-based launchers for cruise missiles of prohibited range
 - Lockheed: “Aegis Ashore is the same proven, low-risk weapon system as ‘Aegis Afloat’”



Mk. 41 launching a Tomohawk cruise missile.
Source: U.S. Navy, Specialist 1st Class Leah Stiles

Resolving Russian charges of U.S. INF noncompliance

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- ❑ BMD test targets
 - Treaty permits using ICBM stages for BMD testing – resolve specific ambiguities in Special Verification Commission
- ❑ Large armed drones
 - Both sides field such drones – work out definition of distinction between them and cruise missiles in Special Verification Commission
- ❑ Aegis Ashore
 - U.S. says system is compliant – lacks software, fire-control hardware for cruise missiles – but if shoe was on the other foot, we'd complain
 - As in Russia's case, permitting inspections not likely to be enough
 - Should install "functionally related observable differences" making clear launcher is different from sea-based system
 - If necessary – and if the future of arms control plausibly hinges on it – U.S. should be willing to develop and deploy different launcher, never tested with cruise missiles

Laying the groundwork for follow-on accords

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- ❑ In-depth talks on strategic stability needed
 - Explore both sides' biggest concerns
 - How defenses, cyber, counter-space, precision-conventional may affect strategic balance, incentives to escalate in early stages of conflict...
 - Possible approaches to address concerns
- ❑ Ultimately, other countries' forces have to be limited too
- ❑ Future accords may not be treaties
 - With political polarization, 2/3 in Senate likely to be difficult to achieve – even if INF resolved, U.S.-Russian relations improved
 - Could be reciprocal initiatives – like 1991-1992 Presidential Nuclear Initiatives
 - Could be detailed accords, with verification, agreed as political commitments (JCPOA, Nuclear Suppliers Group...)
 - Congress likely to fight to maintain its prerogatives

Laying the groundwork for follow-on accords (II)

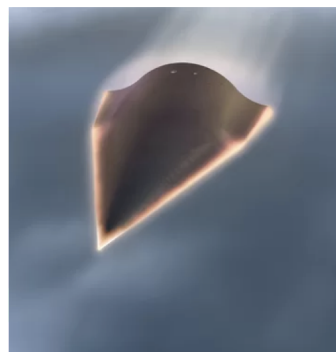
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- ❑ Some compromise on missile defenses likely essential
 - Central Russian concern – driver of Russian numbers, new types
 - Also central Chinese concern – driver of modernization, potentially future increases in numbers
 - Offense and defense inherently linked
 - Many options for including defenses – but complex, difficult
- ❑ Progress toward deeper reductions likely important for sustaining international political support for NPT regime
 - Should be designed to strengthen, not undermine, crisis stability
- ❑ Deep reductions likely to require limiting warheads themselves, stocks of fissile materials
 - Would help address "breakout" concerns at low levels
 - But will pose complex verification challenges

Limiting new types of nuclear weapons

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- ❑ Hypersonic weapons should be treated as countable reentry vehicles
 - High speed may pose a short-warning decapitation threat
- ❑ Intercontinental torpedos should be limited as strategic launchers
- ❑ Similarly, nuclear-powered cruise missiles should be limited as other cruise missiles are
- ❑ New START extension could include covering these systems, with specifics worked out in Bilateral Consultative Commission



Hypersonic weapon concept. *Source:* space.com

Other technologies affect nuclear dangers

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❑ Missile defenses

- Russia, China see as threats to their deterrent – spurring buildups
- Likely to be more effective against ragged retaliation than coordinated first strike – hence could undermine crisis stability

❑ Cyber

- Attacks on C3 may be important in conventional war, if successful could provoke losing side to escalate to nuclear level – and could exacerbate worries over vulnerability of nuclear C3
- Incentives to strike hard, early?

❑ Counterspace

- More incentives to strike hard, early?

❑ Precision conventional

- Could pose a threat to nuclear forces, C3 – “entanglement”

Other steps to reduce U.S.-Russian nuclear dangers

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❑ Rebuilding the broader relationship

- Need to respond to provocations while reducing tensions – difficult, but necessary
- Need mutual agreement not to interfere in domestic affairs, cyber rules of the road, understandings on key political issues
- Should restart mil-to-mil cooperation – so officers on each side in crisis may know each other, know where to call to talk
- Should restart nuclear energy, security, safety cooperation – danger to all for world’s largest nuclear complexes to be proceeding in isolation from each other

❑ Resolving regional disputes

- Resolving crisis in Ukraine
- Confidence-building to assure stability in Baltics, elsewhere in Europe
- Coordinating, tamping down conflict in the Middle East

Coping with a multipolar, multi-technology nuclear world

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- ❑ U.S. nuclear forces also have to deter China, N. Korea...
- ❑ Chinese nuclear forces to deter U.S., Russia, India...
- ❑ Indian nuclear forces to deter Pakistan, China...
- ❑ Missile defenses, cyber, space, precision conventional all affect balances, risks
- ❑ Will future accords be multi-party? Or coordinated accords and unilateral initiatives? Or...?



Source: defensetalk.com

Roles for the U.S. nuclear laboratories

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- ❑ Maintaining the U.S. deterrent
- ❑ Developing tools
- ❑ Providing foresight and insight
 - About technical risks and opportunities, foreign programs...
 - Combining technical and policy insights
- ❑ Implementing cooperation
- ❑ Generating ideas, and making the case for action
- ❑ Educating both Congress and the Executive Branch
 - Increasingly critical, with limited nuclear knowledge on the Hill and elsewhere



MSRE core. Source: ORNL

Summing up...

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- ☐ U.S.-Russian arms control is in danger
- ☐ U.S.-Russian arms control is worth saving – for U.S. security interests
- ☐ Should confront Russia where needed, cooperate where that's in U.S. interests – understand Russian concerns
- ☐ Resolving INF concerns is likely to require an overall deal that Russia sees as serving its interests
- ☐ Follow-on accords may not be treaties, and face complex issues
- ☐ Some compromise on missile defense likely needed



Peacekeeper bus. Source: USAF

Switching themes...

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Other Managing the Atom/Belfer Center research that may be of interest

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- ❑ Broad analyses of nuclear security worldwide
 - Progress and gaps since the last summit
 - Recommendations to fill gaps, sustain momentum
 - Suggestions for restarting cooperation with Russia (recent analysis of how nuclear security in Russia is evolving post-2014)
- ❑ Study on deterrence and the DPRK
 - Risks of living with a nuclear-armed North Korea, versus risks of military action
- ❑ Mitigating long-term risks of Iran's nuclear program
 - Revised research effort after Trump's withdrawal
- ❑ Variety of work on history, future of nonproliferation
 - Initiatives that worked, ones that didn't, and why

Other Managing the Atom/Belfer Center research that may be of interest (II)

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- ❑ U.S.-Russia, U.S.-China, U.S.-Europe relations
 - E.g., "Russia Matters" website, mil-mil and intel-intel dialogue ("Elbe Group")
 - Strategic dialogues, energy cooperation with China
 - New initiative on U.S.-European relations
- ❑ Cybersecurity – norms, conflict, deterrence
 - Active research program – many publications
 - "Defending Digital Democracy" project
- ❑ Nuclear dialogue with Pakistan
 - Group led by Gen. Kidwai

Other Managing the Atom/Belfer Center research that may be of interest (III)

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- ❑ Chinese nuclear forces, policies
 - Recent report reassessing Chinese HEU, Pu stocks
 - Forthcoming study reassessing Chinese weapons design, testing
 - Studies on reprocessing, enrichment, uranium supplies
- ❑ Future of nuclear energy, and implications
 - Constraints on, risks of scale of growth needed to contribute significantly to climate mitigation – how they might be addressed
 - Analyses of proliferation resistance, terrorism resistance, of nuclear energy systems
- ❑ Intelligence project, and Recanati-Kaplan fellows program

Illicit trade in nuclear and dual-use technology remains a critical issue

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- ❑ North Korea still shopping; surprisingly, India and Pakistan still shopping; Iran may return
- ❑ New book explores steps to strengthen global efforts to stop this trade
 - Intelligence
 - Law enforcement
 - Export, financial controls
 - Internal corporate compliance
 - Sanctions and interdiction
 - Nonproliferation culture in organizations
 - International organizations

<https://tinyurl.com/yakbop8h>

Preventing Black-Market Trade in Nuclear Technology

Edited by Matthew Bunn, Martin B. Malin, William C. Potter, and Leonard S. Spector



Insider threats are the most dangerous nuclear security problem

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- ❑ The known HEU and Pu thefts, and most sabotages, involved insiders
- ❑ People don't want to believe their friends and colleagues could betray the organization
 - Leads to serious lapses in protection against insider threats
- ❑ Getting people to report suspicious behavior is very difficult
- ❑ Often even obvious "red flags" go unreported, unaddressed
- ❑ Bunn-Sagan book offers case studies, "Worst Practices Guide" on lessons learned from past mistakes

<http://www.belfercenter.org/publication/insider-threats>



For further reading...

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- ❑ Full text of Managing the Atom publications
 - <http://belfercenter.org/mta>
- ❑ Belfer Center's "Iran Matters" website
 - <http://iranmatters.belfercenter.org/>
- ❑ Belfer Center's "Russia Matters" website
 - <https://www.russiamatters.org/>
- ❑ Belfer Center's "The Iran Nuclear Deal: A Definitive Guide"
 - <https://www.belfercenter.org/publication/iran-nuclear-deal-definitive-guide>
- ❑ My own key publications and other materials:
 - https://scholar.harvard.edu/matthew_bunn

Backup slides...

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Potential nuclear flashpoints

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❑ U.S.-North Korea

- Collapse of current process could lead to return to "maximum pressure," threats of "fire and fury" (more later)
- Miscalculation, inadvertent escalation could lead to conflict – which could escalate rapidly to nuclear use
- Other nuclear dangers from North Korea: nuclear transfers; pressures on others to match DPRK capability; "loose nukes" in the event of regime collapse; also chemical and biological weapons

❑ India-Pakistan

- Ongoing nuclear arms race, with shift toward tactical nuclear weapons that increase risks of seizure, early use in conflict
- Nuclear doctrines which, if deterrence fails, could lead to rapid escalation to nuclear war

Potential nuclear flashpoints (II)

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❑ U.S.-Russia

- Intense hostility, mistrust, “grey area” actions could lead to conflict
- Some conflicts – e.g., in Baltics – could lead to fears of rapid defeat, pressures to use nuclear weapons to prevent
- Russian nuclear forces and command and control highly vulnerable, likely pressures to “use them or lose them” – launch on warning

❑ U.S.-China

- Long-term tensions between rising, declining powers could lead to conflict – Taiwan, S. China Sea, E. China sea...

❑ U.S. or Israel – Iran

- U.S. pullout from JCPOA, threats of military strikes could strengthen Iran’s nuclear bomb advocates
- Many scenarios could lead to conflict – a few to nuclear use

Dangers to existing nonproliferation, arms reduction efforts

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❑ U.S. pullout from the JCPOA, Iran’s ongoing programs

- Little chance unilateral U.S. sanctions will lead to better agreement
- Increases risk of proliferation, conflict in the Middle East
- Decreases credibility of U.S. promises, int’l diplomacy

❑ North Korea’s ongoing nuclear and missile programs

- Current process could collapse (more later)

❑ Intense U.S.-Russian hostility

- Breakdown of cooperation on many fronts, potential risk of conflict (more later)

❑ Ongoing India-Pakistan arms race

- In addition to direct dangers, risks of theft of nuclear material, leakage of technology, blockage of fissile cutoff, likely blockage of CTBT entry into force, near-term restraint unlikely...

Dangers to existing nonproliferation, arms reduction efforts (II)

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- ❑ Nuclear powers modernizing their forces, no negotiations toward further arms reductions or disarmament under way
 - Russia introducing whole new classes of strategic nuclear weapons
 - U.S. planning \$1.2 trillion modernization with little serious debate
 - China also modernizing its much smaller forces
 - No talks on follow-on to New START, or limits on others' forces
- ❑ Nuclear powers utterly rejecting the ban treaty
 - Could further inflame NPT politics between the nuclear “haves” and “have nots”
 - Ban treaty will enter into force for many developing countries, be a feature of the international system for decades to come

Dangers to existing nonproliferation, arms reduction efforts (III)

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- ❑ No progress on key items on the NPT agenda
 - No disarmament progress (ban treaty will highlight)
 - FMCT blocked; little near-term prospect for CTBT entry into force
 - No progress on Middle East WMDfZ
 - No new initiatives on peaceful uses, security assurances
- ❑ Nuclear security efforts losing momentum after the summits
 - Five “action plans” led to little action
 - Political constraints limit IAEA as forum for decisions, actions
 - U.S.-Russian cooperation at a standstill, other bilateral cooperation slow
- ❑ Long term growth, spread of nuclear energy could create additional risks if not appropriately managed

North Korea talks: will lack of the best be the enemy of the good?

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- ❑ Highly unlikely any achievable set of incentives and pressures would lead to near-term N. Korean total nuclear disarmament
 - Nuclear weapons seen as central to regime survival, prestige
- ❑ Churchill: “Jaw, jaw” better than “war, war”
 - Recent process has offered months of reduced risk of war
- ❑ Many types of intermediate steps would serve U.S., world security interests
 - Freezes on further testing, production; reductions in some aspects of capabilities; military confidence-building measures
- ❑ Danger: disappointment over lack of total disarmament could lead to return to “maximum pressure,” “fire and fury”
 - Volatile situation could lead to military conflict
 - Intermediate opportunities may be missed

Understanding Russia’s narrative

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- ❑ Putin’s Russia perceives an array of U.S. threats, “misbehavior”
 - U.S. has >10x Russia’s GDP, ~10x Russia’s defense budget
 - Expansion of NATO brings hostile forces to Russia’s borders
 - Putin believes U.S. behind the “color revolutions” – bringing Russia’s neighbors into Western orbit – had one planned to overthrow Putin – now providing military help to hostile forces in Ukraine, Georgia
 - U.S. a “rogue superpower” – bombing of Serbia, 2003 invasion of Iraq, military action to topple Qaddafi all illegal
 - U.S. withdrawal from the ABM Treaty, refusal to limit missile defenses, increased counterforce capability, threaten Russian deterrent forces, require new Russian weapons
- ❑ Seeing the world through the adversary’s eyes can help in reaching deals that serve both sides’ interests

Implications for long-term disarmament

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- ❑ Getting to zero nuclear weapons likely to be a long and winding path
- ❑ The final step of zero will require building many foundations:
 - Robust verification (including the difficult problem of confirming a few hundred are not hidden away)
 - System to provide international security without nuclear deterrence
 - In particular, resolution of conflicts that drive some states' perceived need for nuclear weapons
 - Mutual confidence among former nuclear weapon states
- ❑ Need to maintain, build from existing regimes, resolve current dangers, to make progress

Dateline: North Korea

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- ❑ **Unpredictable dictator armed with ~15-60 nuclear weapons, ballistic missiles**
 - Regularly threatens to rain “nuclear fire” on ROK, United States
- ❑ **HEU, plutonium production unabated**
- ❑ **History of provocations against ROK – could lead to conflict**
- ❑ **Agreements, sanctions, threats have all failed**
- ❑ **Singapore Summit payoff uncertain**
- ❑ **ROK-DPRK Summit upcoming**



Source: KCNA

Dateline: North Korea (II)

43

❑ Key dangers

- Nuclear use – e.g., DPRK might use in conflict, under “use them or lose them” pressure or to scare off its enemies
- Nuclear transfer -- to other states (e.g., al Kibar reactor in Syria), or, less likely, to terrorist groups
- Pressures on others in region to match DPRK capability
- “Loose nukes” if regime collapses
- “Impatience” leading to military action

❑ Options

- Squeeze until DPRK collapses or capitulates (How feasible?)
- Seek to negotiate at least an interim freeze and no-transfer pact (What price? What risk reduction?)
- Military action (What risks? What could realistically be struck?)
- Do nothing (What risks?)

Dateline: Iran

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- ❑ Nuclear agreement reduced risk (if all sides complied)
- ❑ But key restraints end 8, 10, and 15 years after 2016
- ❑ Iran continues to support terrorist groups, undermine countries in the region, threaten Israel, test longer-range ballistic missiles – and has never given an honest declaration of its past nuclear weapons efforts
- ❑ U.S. withdrawal creates significant uncertainty



Source: khamenei.ir

Dateline: Iran (II)

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❑ Key dangers

- Nuclear proliferation – especially as key restraints expire, and Iran is permitted to build up enrichment capacity, develop more advanced (and easier to hide) centrifuges...
- Pressures on others in region to try to match Iran's capabilities
- Secondary sanctions a significant source of friction with allies

❑ Options

- Use secondary sanctions to drive Iran back to the table
- Use secondary sanctions to effect regime change
- Military action (How plausible? What risks?)
- Do nothing (What risks?)

Coercive diplomacy: Promises have to be credible too

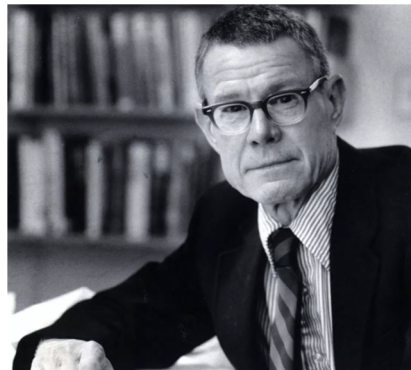
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❑ Thomas Schelling:

- “Stop or I’ll shoot” only works if the adversary:
- Believes you’ll shoot if he doesn’t stop
- ALSO believe you WON’T shoot if he DOES stop

❑ This crucial credibility of promises does not get enough attention

- Trump’s withdrawal from the JCPOA undermines the credibility of U.S. promises
- May effect N. Korea talks, broad range of other diplomacy



Source: Boston Globe

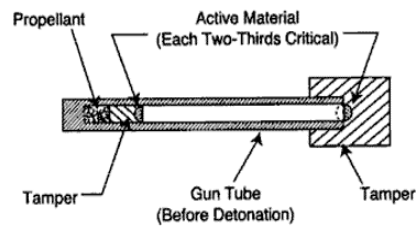
Thanks to Reid Pauly for emphasizing these points

Dateline: Unknown

Nuclear and Radiological Terrorism

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- ❑ Numerous gov't studies: terrorist group *could* plausibly make a crude bomb if it got material
- ❑ ~20 cases of seizure of stolen HEU or plutonium
- ❑ Aum Shinrikyo, al Qaeda both pursued nuclear weapons
- ❑ ISIS intent unclear, but had more money, people, territory under control, ability to recruit globally than al Qaeda ever had



Source: NATO

Dateline: Unknown

Nuclear and Radiological Terrorism (II)

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- ❑ Terrorists could also sabotage nuclear facilities (potentially cause Fukushima-scale accident), use radioactive material in "dirty bomb"
- ❑ Options
 - Improve security for nuclear and radiological materials, facilities (How to sustain momentum after the summit process is over?)
 - Block nuclear smuggling (How to find the needles in the haystacks?)
 - Counter high-capability terrorist groups (How can we do better?)
 - Prepare to respond (How much can this mitigate the harm?)

Dateline: South Asia

49

- ❑ Ongoing nuclear arms race between Pakistan and India – who have fought 4 wars
- ❑ Military doctrines with unclear redlines; terrorists might provoke conflict; could lead to blundering into war
- ❑ Pakistan has world's fastest-growing nuclear arsenal, and some of the world's most capable terrorists
- ❑ Some modeling suggests even Indo-Pakistani nuclear war could cause “nuclear fall”



Source: Wikimedia Commons

Dateline: Russia

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- ❑ Aggressive nuclear modernization, exercises, rhetoric; cyberattacks; disinformation...
- ❑ Heightened U.S.-Russian tensions – Ukraine, and other issues
 - Potential for conflict, e.g., in Baltics
- ❑ Russian forces, command and control vulnerable; potential for launch on false alarm

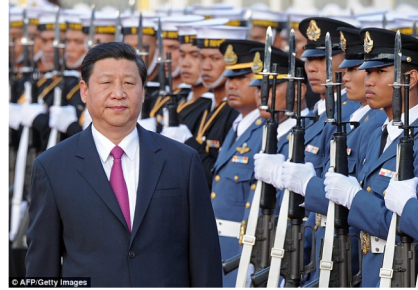


Source: ITAR-TASS

Dateline: China

51

- ❑ Much smaller nuclear force, but major modernization underway
- ❑ U.S.-China tensions – South and East China seas, cyber, other issues
- ❑ No arms control, verification, dialogue on strategic issues in place
 - China (and Russia) concerned over U.S. missile defenses, conventional strike capabilities, nuclear modernization

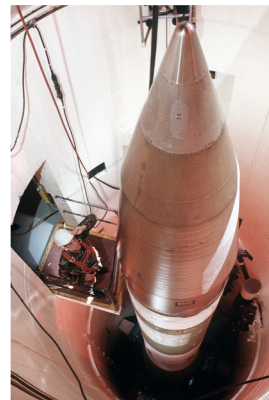


Source: ITAR-TASS

Dateline: United States Strategic modernization

52

- ❑ Existing U.S. strategic weapons are aging
- ❑ Obama and Trump administrations have laid out a plan for new ICBMs, SLBMs, submarines, bombers, and cruise missiles, with “life extended” (upgraded) warheads
- ❑ >\$1 trillion cost over 30 years
- ❑ Likely to be unsustainable in the face of conventional needs, other priorities
- ❑ Need broader debate over what is needed for deterrence, how to achieve it cost-effectively, integration with arms control



Source: DOD

Dateline: Global Strengthening the global regime

53

- ❑ Many states unhappy with Nonproliferation Treaty – failed treaty review in 2015, another coming in 2020
- ❑ Ongoing challenges controlling sensitive technologies – new tech. such as additive manufacturing makes more difficult
- ❑ Possible spread of ostensibly civilian enrichment and reprocessing as nuclear energy grows and spreads – steps needed to reduce risks
- ❑ Ban Treaty creates, manifests new frictions



Source: AFP

Dateline: Global Strengthening the global regime (II)

54

- ❑ States threatened by powerful neighbors or major powers may still seek nuclear weapons – or “hedging” capability that would allow them to build weapons quickly
 - Much to do reduce “demand” for nuclear weapons, especially in Middle East and East Asia
- ❑ IAEA needs more resources and authority
- ❑ Given U.S.-Russian tensions, accusations of violations, little near-term prospect for further arms reductions – means more political tension in nonproliferation regime
 - Little near-term prospect for bringing Comprehensive Test Ban Treaty into force or negotiating fissile cutoff
 - Little near-term prospect of real progress toward Middle East Weapons of Mass Destruction Free Zone
 - All nuclear powers modernizing their forces
 - Ban treaty manifests frustrations by non-nuclear weapons states

Huge, transformational nuclear growth needed for substantial climate role

55

