U.S. NATIONAL SECURITY & NUCLEAR POLICY, 1945-PRESENT

I. HOW SHOULD THE UNITED STATES SET MILITARY REQUIREMENTS?
By answering five questions in sequence: (1) What are U.S. national interests? (2) What threats to these interests can we discern? (3) What strategies would best address these threats? (4) What missions must the US military and/or other government agencies perform to support these strategies? (5) What forces or other assets are required to perform these missions? (A framework by Steven E. Miller.)

II. FOUR KEY NATIONAL SECURITY POLICY ISSUES TODAY
What strategy should the U.S. adopt to address the WMD terror threat (al-Qaeda or ISIS with an a-bomb)? What capabilities does this strategy require? What changes are required to create these capabilities? For example: shift resources from the Army, Navy and Air Force to intelligence (CIA and FBI)? To nation building? To "public diplomacy" (shaping foreign opinion)? To locking down loose nukes around the world?
How should the U.S. address nuclear proliferation? By preventive war? By applying economic sanctions? By giving security guarantees or economic bribes to potential proliferators? Pursue world disarmament? (On disarmament see assigned article by Carla Robbins, "Thinking the Unthinkable.")
> When should the U.S. wage preventive war against emerging nuclear powers? Against which states? What forces does this require? The 2002 U.S. National Security Strategy framed a doctrine of preventive war (see Lieber and Lieber, assigned earlier). Is this a good strategy?
How should the US respond to China's rise? By pursuing containment? Cooperation?
Should the U.S. try to maintain a strategic nuclear first-strike counterforce capability against China and Russia? Toward this, should the U.S. develop a national missile defense (NMD) system?
How should the U.S. address the possibility that emerging technologies will spread WMD-scope destructive powers to non-deterrable non-state actors (e.g., terrorists or psychopaths)?
> What effects would follow if the Silex laser-enrichment process succeeds?
> ... or the power to make ultra-lethal new bioweapons proliferates?
Can we survive a world of "a nuke in every garage," or "a bioweapons lab in every garage"? What can be done to avert it? See readings assigned for this week by Martin Rees, Henry Kelly, Antonio Regalado and William Broad.

III. SPECIFIC QUESTIONS ON WMD POLICY

Which nuclear capabilities would be intolerable for the US in the hands of which other states? Specifically:

1. Which capabilities must the U.S. prevent other states from gaining?
   > A "latent" bomb--the capacity to build a bomb in a few months or years? (Example: Iran today, which has a latent bomb 1 year from completion.)
   > One or a few bombs that are unprotected from attack, and could therefore be eliminated by a US first strike; and/or that lack a delivery system required to detonate them in the US or another foreign country? (Example: North Korea today; the USSR 1949-50).
   > A secure nuclear force that could survive a US first strike and inflict unacceptable damage against the US in retaliation? (Example: the USSR 1965-89.)
   > A force that could destroy U.S. forces in a first strike?
2. Which states must be prevented from gaining these capabilities?
   > Britain/France? Israel? India? China? Russia?
   > "Rogue states" that aggress against neighbors, oppose US foreign policy, seek weapons of mass destruction (WMD), e.g., North Korea or Iran? Quasi-rogues like Pakistan? Saddam's Iraq before 2003?

   Some analysts say the key issue is: "Is the regime deterrable?" Meaning, are they (1) Prone to misperceive others' reactions to their actions? (2) Sensitive to costs? (3) Do they value conquest as highly as their own survival? If so, big trouble!
3. How to prevent unacceptable actors from gaining unacceptable capabilities?

IV. THE NUCLEAR REVOLUTION AND AMERICAN SECURITY

Three questions: (1) What have been the effects of the nuclear revolution on world politics and U.S. interests? (2) What strategy should the U.S. adopt for the use of its nuclear forces, especially toward other current and future nuclear powers? (3) How should the US address the danger of nuclear proliferation?

A. The evolution of the U.S. nuclear arsenal (see last page).
B. The effects of the nuclear revolution: good or bad? offensive or defensive? Nuclear weapons have four cascading effects:
   1. Hydrogen bombs are more powerful by six (yes, six) orders of magnitude compared to the TNT explosives used in World War II. Atomic bombs = x 1,000 increase on TNT; hydrogen bombs = x 1,000 increase on atomic bombs.
   2. Due to '1'--the destructiveness of nuclear weapons--the "cost exchange ratio" vastly favors defenders (better termed "retaliators") over attackers seeking to disarm them. Nuclear weapons pack tremendous explosive power in small, cheap, light devices that are easy to hide, protect, and deliver. Hence destroying them is very

hard, protecting and delivering them very easy.

3. Due to '2'--the cost-exchange ratio--a relationship of MAD ("Mutual Assured Destruction") tends to develop between major powers. Both can destroy the other's society even after absorbing an all-out counterforce attack by the other.
   > The U.S.-Soviet relationship reached deep MAD in the mid-1960s.
   > The US-China and US-Russia relationships may not be at MAD today. This is because those states have made little effort to create secure arsenals. If they tried, they could do it.
   > The US-North Korea relationship is not at MAD. A US nuclear strike could very likely take out North Korea's nuclear force, precluding NK retaliation.
4. "Defense-dominance." Some argue that MAD strengthens defender-states and weakens aggressor-states. Are they right?

C. Alternate nuclear doctrines: Countervalue vs. Counterforce strategies. Nuclear weapons present states with two basic nuclear doctrines toward other nuclear states: counterforce and countervalue.

>> Countervalue: the enemy society is targeted. Political aims are achieved by threatening to punish the adversary by destroying its population and industry.

>> Counterforce: the enemy nuclear forces are targeted. Political aims are achieved by threatening to disarm the adversary--to remove its capacity to inflict punishment on oneself.

Counterforce forces include forces that could preempt the others' nuclear force (e.g., accurate intercontinental missiles) and defenses that could destroy the other's retaliating weapons (e.g., national ballistic missile defenses).

Since forces can be used first or second, we have a crude universe of four possible nuclear capabilities:

1. First-strike countervalue capability: the capacity to launch a first strike that inflicts unacceptable damage on the adversary's society.

   This capability is very easy to build, for reasons noted above in Section IV B1-2, but is quite useless.
2. Second-strike countervalue capability: the capacity to absorb an all-out counterforce first strike and inflict unacceptable damage on the adversary's society in retaliation.

   This capability is easy to build, for reasons noted above in Section IV B1-3.
3. First-strike counterforce: the capacity to launch a first strike that removes the adversary's capacity to inflict unacceptable damage on oneself in retaliation.

   This capability is very hard or impossible to build, for reasons noted above in Section IV B1-3.

4. Second-strike counterforce capability: the capacity to absorb an all-out counterforce first strike and mount a counterforce counterattack that leaves the attacker's forces unable to inflict unacceptable further damage on one's own society.

    This capability is even harder to build than a first-strike counterforce capability.

These four capabilities can be displayed in a 2x2 table:

		Striking what? Values (cities)	Striking what? Forces
Striking When?	First	#1 First Strike Countervalue Capability	#3 First Strike Counterforce Capability
	Second	#2 Second Strike Countervalue Capability	#4 Second Strike Counterforce Capability

Cold War-era debates over US nuclear doctrine focused on whether the US should be content with capability #2 (a second strike countervalue capability, or SSCVC) against the Soviet Union (SU), or should also strive for #3 (a first strike counterforce capability, or FSCFC). Advocates of pursuing an FSCFC said that it was achievable, and would deter the SU more than it provoked the SU. Opponents of pursuing an FSCFC said it was unachievable; and is inherently offensive, hence would provoke the SU to worse behavior.

Current debates over US nuclear doctrine focus on whether the US should be content with a second strike countervalue capability against China and Russia, or should also work to maintain a first strike counterforce capability.

Debates over US foreign policy also focus on whether the US should allow Iran, North Korea, and other states to gain capability #1, a first strike countervalue capability.

A fifth capability can also be distinguished: a "latent bomb," meaning, the capability to make a bomb in the near future. Debates also focus on whether the U.S. should allow this latent capability in bad hands.

D. COUNTERVALUE vs. COUNTERFORCE STRATEGIC NUCLEAR WEAPONS: WHAT'S THE DIFFERENCE?

> **Second-strike countervalue nuclear forces** can survive a surprise attack and retaliate against the attacker's cities or other "value" targets.

An example of a pure second-strike countervalue weapon in the 1960s-1980s era: the U.S. Polaris ballistic missile submarine fleet. Polaris subs could hide from Soviet attack in the vast ocean and their missiles could strike Soviet cities, but these missiles lacked the accuracy to destroy Soviet hardened nuclear forces.

> **First-strike counterforce nuclear forces** can be used to destroy an opponent's nuclear forces in a first strike.

An example of a pure first-strike counterforce weapon is a highly accurate intercontinental ballistic missile (ICBM) based in a vulnerable soft silo. It could be used to launch a surprise attack on another state's ICBMs or command centers, but it could not survive an attack to retaliate against the attacker's cities.

Other forces that contribute to a first-strike counterforce capability include "killer" submarines designed to locate and sink other submarines, which can be used to destroy ballistic missile submarines (if the opponent has them); and area ballistic missile defenses (often called "national missile defense," or "NMD") deployed to protect cities. The role of NMD in a first strike would be to knock down warheads missed by the first strike that are retaliating against the attacker's cities. In this role NMD is the defensive half of a first strike system and thus is essentially offensive despite its defensive appearance.

Many weapons have both second strike countervalue and first strike counterforce characteristics--they contribute to both second-strike countervalue and first-strike counterforce capabilities.

E. THREE DANGERS THAT OTHER STATES' NUCLEAR FORCES COULD POSE

Why are other states' nuclear forces scary?

1. A nuclear-armed state might use its weapons.
2. A nuclear-armed state might be emboldened to adopt more aggressive policies, believing that its nuclear weapons protected it from retaliation.
3. A nuclear-armed state might by incompetence or inadvertence allow its nuclear weapons to be stolen, bought or transferred to bad actors, especially terrorists.

V. THE BIOLOGICAL WEAPONS REVOLUTION AND AMERICAN NATIONAL SECURITY

Bioweapons differ from nuclear weapons in five prime regards:

A. Biological weapons are cheap to make and can be made or purchased by non-state actors--that is, by terrorists.

> Moreover, bioweapons may grow much more lethal in the future as new super-pathogens are engineered by scientists exploiting new genetic engineering techniques.

B. Biological weapons programs have no clear signature that distinguishes them from peaceful biological research. As a result an arms control regime that bans bioweapons is

probably impossible to devise.
C. Biological weapons can more easily be used anonymously.
D. Defenses are more feasible against bio attack than against nuclear attack--but the attacker still has a large advantage.
E. Contagious bioweapons can spread unpredictably, harming the user's friends/family/army/society. Hence their use can be irrational.

As a result of factors 'A' 'B' and 'C' some argue that bioweapons are weapons from hell as perhaps their use cannot be deterred and cannot be defeated, while their power will only grow. If so, we face big trouble ahead.

In Kurt Vonnegut's 1963 novel Cat's Cradle a mad scientist invents a new crystalline form of water, "ice nine," that solidifies at 90 degrees fahrenheit. Its release ends life on earth by freezing the oceans. Is the biotechnology revolution handing us a biotechnical ice nine--a vastly destructive technology for which we are socially, politically and morally unready? Will it doom us?[1]

In 2016 Director of National Intelligence Thomas Clapper warned specifically that a powerful new gene-editing tool, CRISPR, might someday be used by bad actors to make ultra-lethal ultra-contagious new pathogens. Hence, said Clapper, CRISPR poses a threat to US national security. See assigned reading by Antonio Regalado.

Martin Rees, in Our Final Hour (assigned), argues more generally that vast destructive powers are spreading to individual terrorists or psychopaths. The answer must be the end of human privacy, to ensure that no lunatic can secretly make a superkiller bug in his or her basement.

What can we do to avert this threat? Can we slow or channel the process of scientific discovery away from inventing these horrors? For example, should biologists agree to regulations that limit their research, to avoid inventing superkilling agents? Or must curiosity inexorably kill the cat (us)? Or does Rees overstate this danger?

Is bioscience bringing this nightmare alive?

VI. A SECOND NUCLEAR REVOLUTION? WILL THE POWER TO MAKE NUCLEAR WEAPONS SPREAD TO CRAZY STATES AND TERRORISTS?

General Electric and Hitachi have reportedly developed a new means to enrich uranium. Enriching uranium is the key step in making an atomic bomb. The GE/Hitachi Silex process allows enrichment in a small, low-cost facility. This will put atomic bombs in close reach of crazy states and terrorists. Is Rees's nightmare coming true? Have the people at GE and Hitachi taken

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[1] Herman Kahn once likewise warned that if a $10 "Doomsday Machine" is ever devised civilization is doomed because someone will eventually use such a cheap machine, regardless of countermeasures. Oh dear.

leave of their senses? Inquiring minds want to know.

VII. SOVIET MILITARY DOCTRINE, 1947-1989: OFFENSE AND PREEMPTION. (PRETTY CRAZY! WHY ADOPTED?)

VIII. THE U.S. DEFENSE DEBATE, 1947-1989

A. America's prime problem: defending Western Europe from Soviet conquest.
B. The "how to defend Europe" debate, 1947-1989: 7 contending strategies:
   1. Strategic nuclear countervalue: threaten to punish Soviets by blasting their cities if they invade Western Europe.
   2. Strategic nuclear counterforce: threaten to disarm & conquer Soviets if they invade. (Adopted by Eisenhower, 1953-61, under doctrine of "Massive Retaliation".)
   3. Theater nuclear denial: threaten to incinerate invading Soviet armies. (Adopted briefly in late 1950s.)
   4. Conventional denial: thwart invading Soviet armies with conventional forces. (Preferred by US, 1960s-1970s, but vetoed by Germany.)
   5. Conventional offense: seize Soviet territory if they invade.
   6. German nuclear deterrent: let Germans threaten to blast Soviet cities. (Eisenhower favored, JFK opposed.)
   7. Tripwire strategy: spring-load a European war to make it uncontrollable. US goal: Conventional war ---> theater nuclear war ---> general thermonuclear war. (Actual US/NATO declaratory strategy, 1967-1989.)
C. The Third World intervention debate (The "how to contain" debate recast).

IX. NONPROLIFERATION/COUNTERPROLIFERATION: NINE STRATEGIES

A. Technology denial. Make it hard for the proliferator to acquire needed technology for nuke-making.
B. Economic sanctions: threaten or impose them.
C. Bribery: bribe the potential proliferator to eschew nukes. (See Robert Reardon's research on this.)
D. Sabotage: Stuxnet their equipment, kill their scientists.
E. Create legal framework to assign civil liability for lost nukes to the states that lose them. This threatens potential proliferators with vast lawsuits if they ever lose control of a nuke. This will make their business community question whether going nuke is a good idea.
F. Give security guarantees to potential proliferators (as the US has given guarantees to Taiwan, South Korea, Germany, Japan, and others).
G. Conventional preventive war.
   1. Focused only on destroying proliferators nuclear infrastructure, e.g., Israel's Osiraq raid.
   2. Focused on regime change in the proliferator state.
H. Nuclear preventive war.

I. Threaten to hold at risk the potential proliferator's nuclear forces by maintaining a first-strike counterforce capability, in order to devalue the proliferator's potential nuclear force. "You will never have a meaningful, useable nuclear capability, as we will maintain the capacity to disarm you."

ADDENDUM #1: US Nuclear Weapons Inventory:

1945: 2
1946: 9
1947: 13
1948: 50
1950: At least 292
1953: 1500
1959: 6000
1991: 18000
Sources for 1945-1950: David Alan Rosenberg, "U.S. Nuclear Stockpile, 1945 to 1950," Bulletin of the Atomic Scientists, May 1982, pp. 25-30. Sources for 1953-1959: Stephen Ambrose, Eisenhower, Vol. 2, p. 494. Source for 1991: Kurt Campbell, Ashton Carter, Steven Miller & Charles Zraket, Soviet Nuclear Fission, p. 22.

ADDENDUM #2: Soviet Nuclear Weapons Inventory:

First a-bomb: 1949; first fusion device (proto-H-bomb): 1953; first H-bomb: 1955; 27,000 nuclear weapons in the Soviet inventory in 1991. Source for 1953 and 1955: John Holdren, "The Dynamics of the Nuclear Arms Race," in Avner Cohen and Steven Lee, Nuclear Weapons and the Future of Humanity: 45. Source for 1991 inventory: Campbell, Carter, Miller & Zraket, Soviet Nuclear Fission: 15.

17.40 American Foreign Policy: Past, Present, Future

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