



# Qualitative Considerations of Nuclear Forces at Lower Numbers and Implications for Future Arms Control Negotiations

Rebecca Davis Gibbons and Tom Devine  
6 December 2011

NATIONAL SECURITY • ENERGY & ENVIRONMENT • HEALTH • CYBERSECURITY

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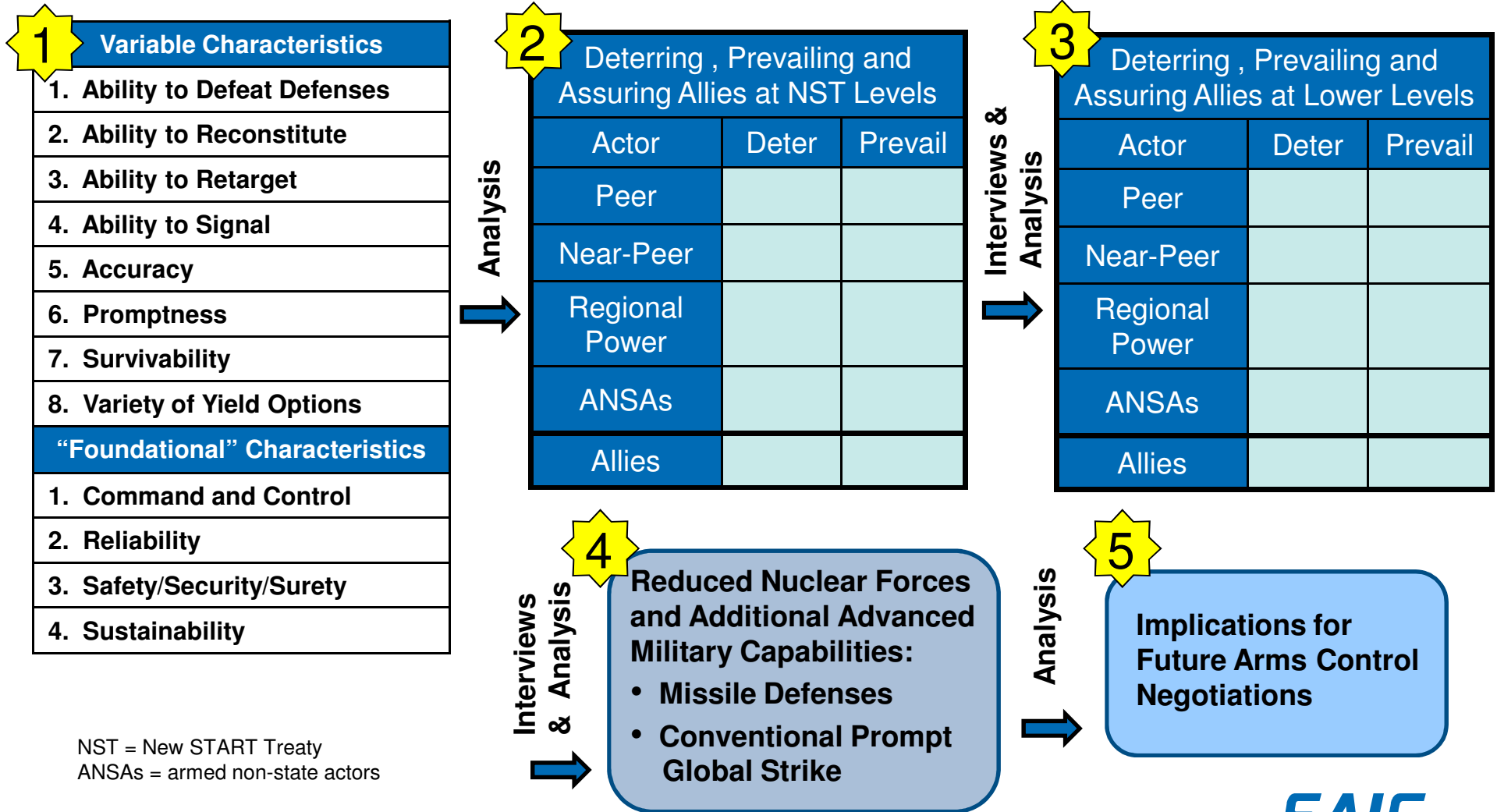
## Study Overview

- **Study questions:**
  - What qualitative characteristics of current U.S. nuclear forces are most critical to the nuclear mission, and how might they change in importance at lower numbers?
  - What are the implications for future arms control negotiations?
- **Study goal:**
  - Consider the specific characteristics of nuclear forces that should be maintained within future arms control negotiations.

“Maintain stability with major nuclear powers, deter potential adversaries, and reassure our partners and allies.”

-2010 Nuclear Posture Review

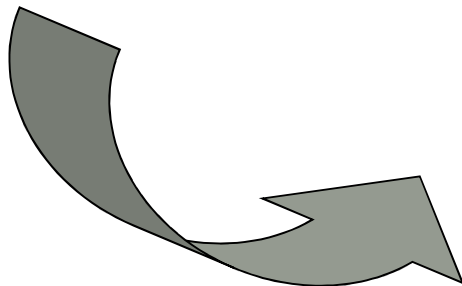
# Study Methodology



NST = New START Treaty  
ANSAs = armed non-state actors

# Study Methodology II

Variable Characteristics
1. Ability to Defeat Defenses
2. Ability to Reconstitute
3. Ability to Retarget
4. Ability to Signal
5. Accuracy
6. Promptness
7. Survivability
8. Variety of Yield Options



Actors	Deter Adversaries at NST Levels		
	Tier 1	Tier 2	Tier 3
Peer	1. 2. 3.	1. 2. 3.	1. 2. 3.
Near-Peer	1. 2. 3.	1. 2. 3.	1. 2. 3.
Regional	1. 2. 3.	1. 2. 3.	1. 2. 3.
ANSAs	1. 2. 3.	1. 2. 3.	1. 2. 3.

Actors	Deter Adversaries at NST Levels		
	Tier 1 (most important)	Tier 2	Tier 3 (least important)
Peer			
Near-Peer			
Regional			
ANSAs			

Actors	Deter Adversaries at NST Levels		
	Tier 1 (most important)	Tier 2	Tier 3 (least important)
Peer			
Near-Peer	<p>Ability to Defeat Defenses</p> <p>Ability to Reconstitute</p> <p>Ability to Signal</p>	<p>Accuracy</p> <p>Promptness</p> <p>Survivability</p>	<p>Ability to Retarget</p> <p>Variety of Yield Options</p>
Regional			
ANSAs			

Actors	Movement From NST Numbers to Lower Numbers: Deterrence		
	Tier 1 (most important)	Tier 2	Tier 3 (least important)
Peer			
Near-Peer	<p>Ability to Defeat Defenses</p> <p>Ability to Reconstitute</p> <p>Ability to Signal</p>	<p>Accuracy</p> <p>Promptness</p> <p>Survivability</p>	<p>Ability to Retarget</p> <p>Variety of Yield Options</p>
Regional			
ANSAs			

Actors	Movement From NST Numbers to Lower Numbers: Deterrence		
	Tier 1 (most important)	Tier 2	Tier 3 (least important)
Peer	Ability to Defeat Defenses Ability to Reconstitute Survivability	Ability to Signal Accuracy Promptness	Ability to Retarget Variety of Yield Options
Near-Peer	Ability to Defeat Defenses Ability to Reconstitute Ability to Signal	Accuracy Promptness Survivability	Ability to Retarget Variety of Yield Options
Regional	Ability to Defeat Defenses Accuracy Promptness	Ability to Retarget Ability to Signal Variety of Yield Options	Ability to Reconstitute Survivability
ANSAs	Accuracy Promptness Variety of Yield Options	Ability to Retarget Ability to Signal	Ability to Defeat Defenses Ability to Reconstitute Survivability



## Analytic Findings – Nuclear Forces I

- Today's key qualitative characteristics remain critical to tomorrow's nuclear force
  - Need to maintain force with flexible effects and diverse delivery options
- No qualitative characteristic is always of most importance
  - All but one - *ability to retarget* - appear in Tier 1 at least once
- ***Survivability* and *variety of yield options*** increase in importance as numbers decline
  - Past arms control has impacted *survivability*
- Reductions may strain those qualitative characteristics viewed as foundational to fielding a viable nuclear force
- Sustaining strategic stability at reduced numbers requires qualitative characteristics that hold the other party's nuclear weapons at risk, while also signaling a steady state of mutual deterrence

# Analytic Findings – Nuclear Forces II

- A combination of continued U.S. reductions and increases in adversary arsenals raises the likelihood of more future “peer” and “near-peer” adversaries
- Two distinct sets of characteristics are required to deter or prevail:

Peer & Near Peer	
Deter at NST Numbers	Deter at Lower Numbers
Ability to Defeat Defenses Ability to Reconstitute	Ability to Defeat Defenses Ability to Reconstitute Survivability
Prevail at NST Numbers	Prevail at Lower Numbers
Ability to Defeat Defenses Promptness	Ability to Defeat Defenses Ability to Signal Survivability

Regional & ANSAs	
Deter at NST Numbers	Deter at Lower Numbers
Accuracy Promptness	Accuracy Promptness
Prevail at NST Numbers	Prevail at Lower Numbers
Accuracy Promptness Variety of Yield Options	Accuracy Promptness Variety of Yield Options

At lower numbers, a diverse range of characteristics is still required

# Implications for Arms Control I

- **Balance qualitative and quantitative considerations in negotiations**
  - Tendency to focus on numbers in future rounds but study shows value of multiple qualitative characteristics
- **Protect mix of qualitative characteristics across nuclear force**
  - No current monad or dyad combination can replicate this mix for all required missions
  - Requires a variety of platforms, weapons profiles, and warhead yields
- **Protect *survivability***
  - Oppose measures that may hurt survivability, such as limits to deployment patterns
- **Ensure reductions do not impact “foundational” characteristics**
  - Subject matter experts not sure where “redline” number is where foundational characteristics affected by cuts, but worry that U.S. could inadvertently cross it
- **When a future near-peer can threaten the *survivability* of U.S. forces, it will be time to make arms control talks multilateral**

# Beyond “next round”

- **Findings relevant beyond next round arms control / next round of reductions**
  - Not tied to one number or to specific delivery systems
- **Balancing reductions against broad range of enduring qualitative requirements will prove continual challenge to negotiators and Services on “road to zero”**
- **U.S.-peer reductions do not necessarily lessen need for qualitative diversity**
  - Range of potential adversaries and global requirements of U.S. and allies will continue to drive requirement for diversity even as U.S. and peer arsenals decline
  - U.S.-peer arms control may have little to no effect on arsenals of other nuclear states
- **Deterrence, prevailing, and assuring not “one size fits all”**
  - What deters major nuclear power may not deter minor power (same with prevail)
  - Assuring allies may carry additional requirements beyond what we consider adequate to deter/prevail over adversaries
- **All current delivery systems provide different set of key qualities to the overall force**
  - Eliminating any leg of the triad would likely result in the degradation of important qualitative characteristics