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Hypersonic Weapon and Strategic Stability

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Strategic Instability Defined

- **Crisis Instability is a broad concept**

- ~~Any action that increases the likelihood of war~~
- Any action that makes escalation (across the nuclear threshold) harder to control
 - Actions that increase the chance for misperception, misunderstanding and miscommunication ⇒ inadvertent escalation
- Any action that significantly reduces the effectiveness of a major power's nuclear deterrent
 - Threatening the survival of “strategic” nuclear forces, i.e., ICBMs, SLBM, long-range bombers and nuclear C3, in a preemptive counterforce first strike (e.g., with accurate MIRVed ICBMs)
 - Less so “non-strategic” or theater nuclear forces
 - Homeland defense (e.g., ballistic missile, air and/or civil defense)
 - Defense of nuclear forces is OK
 - Defense of homeland is destabilizing
 - Requires a *quantitative* assessment
- The nuclear balance only becomes truly unstable in a crisis if *both sides* can significantly improve their chance for survival if, and only if, they strike first
 - Two-sided vulnerability ⇒ “reciprocal fear of surprise attack”
 - One sided advantage ⇒ disadvantaged side modernizes its forces to remove the perceived vulnerability

First-Strike Instability

- **Arms Race Instability**

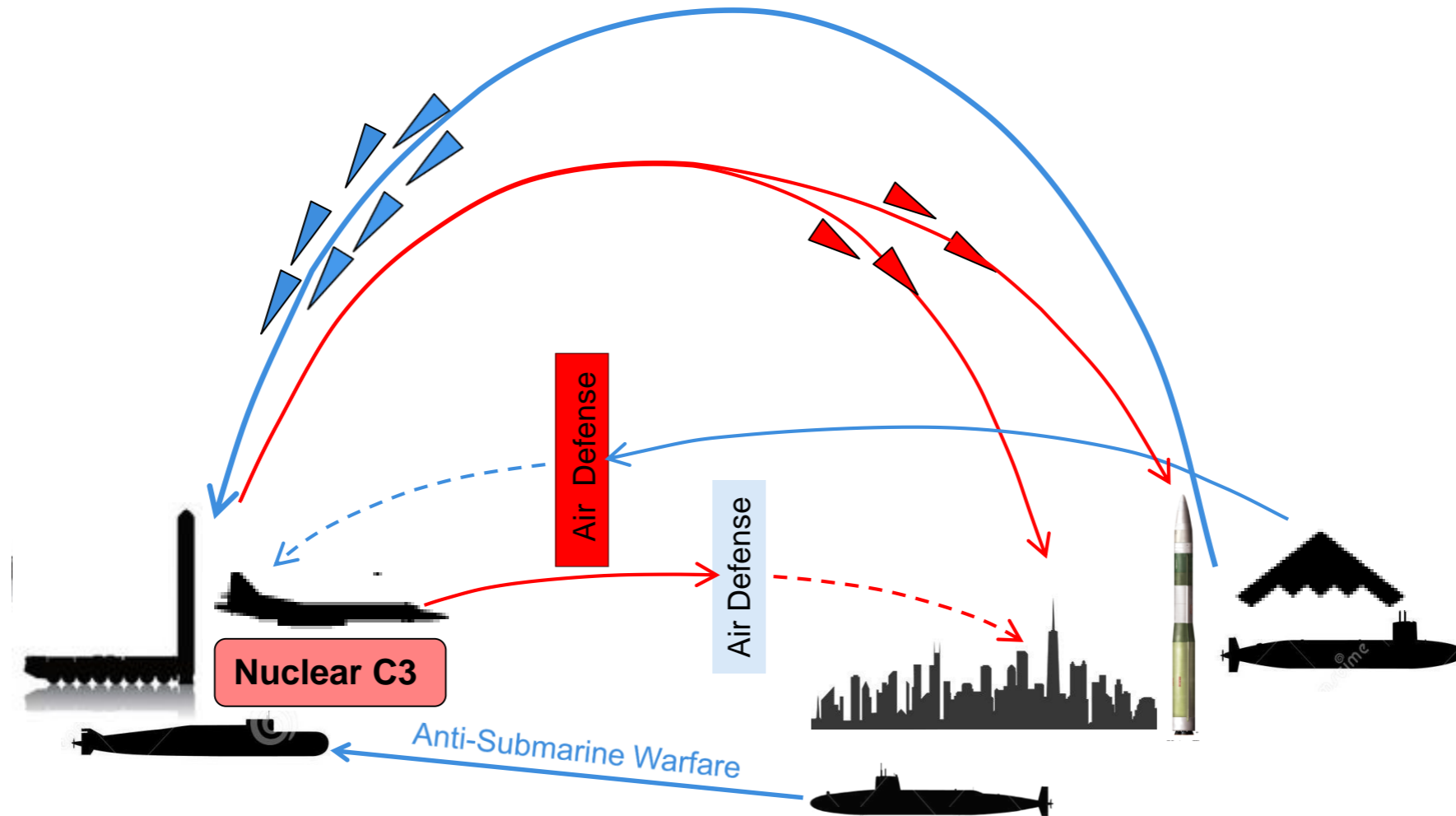
- Any action that stimulates an action-reaction arms competition
 - Increases the cost for maintaining security without adding appreciably to security
- Is this always bad?

- **For which countries is it important to maintain strategic stability?**

- Maintaining crisis stability is not a strategic choice but a fact of life between major nuclear powers

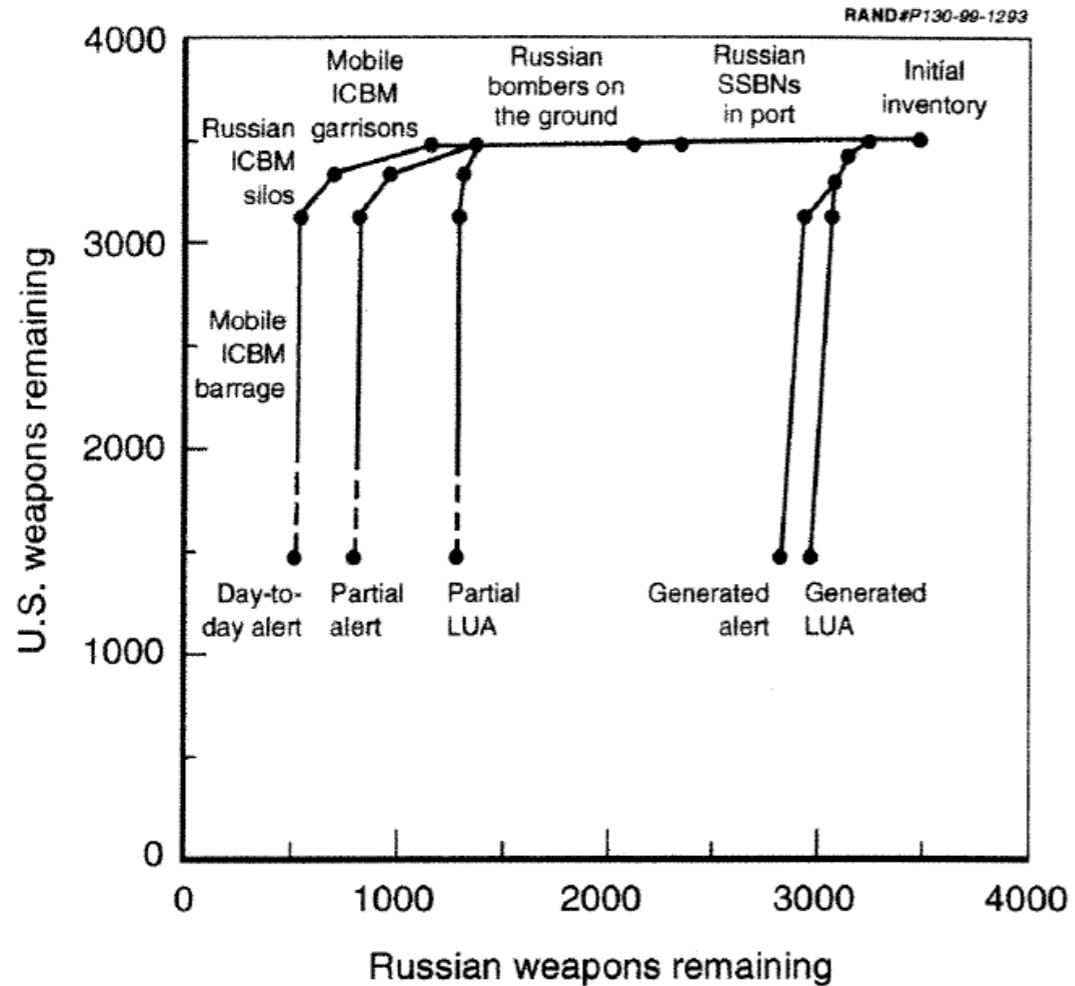
Strategic Instability circa 2000

US counterforce first strike, mostly countervalue ragged retaliatory strike

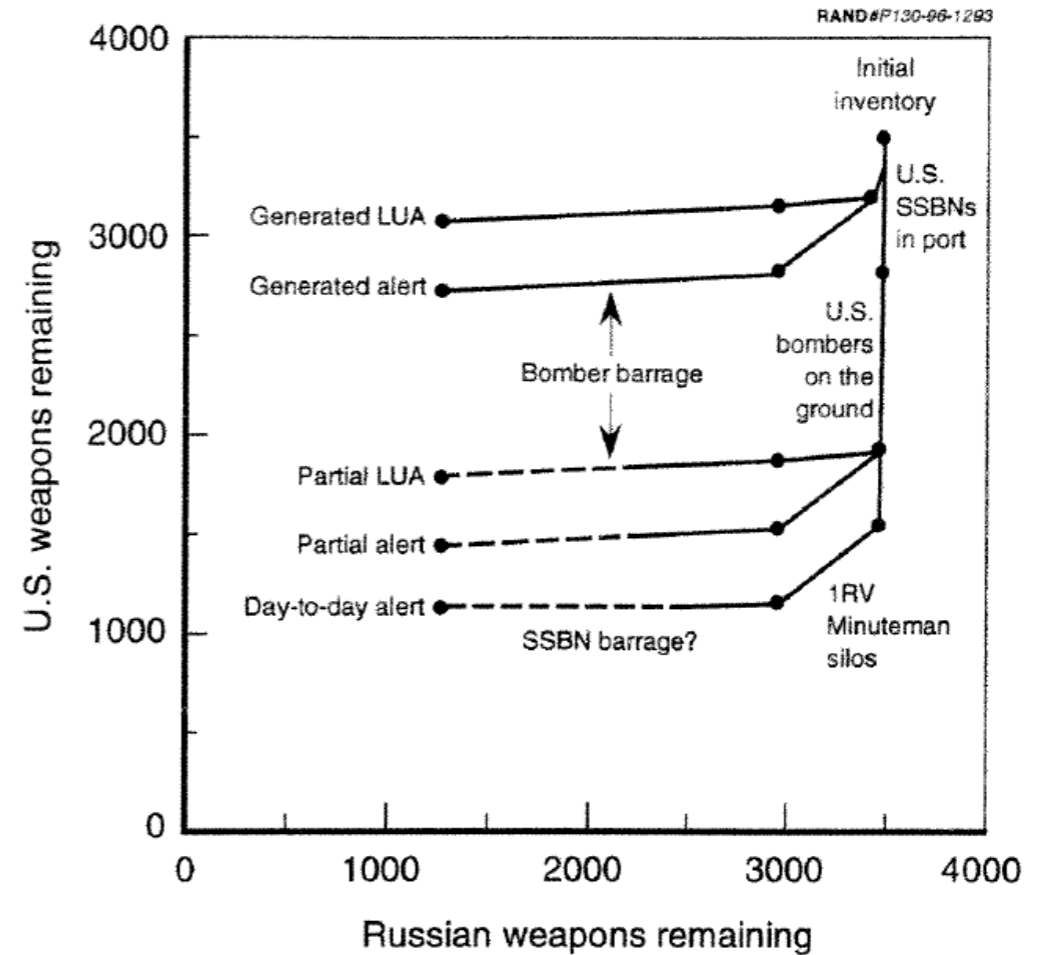


Strategic Stability Circa 2000

US First Strike

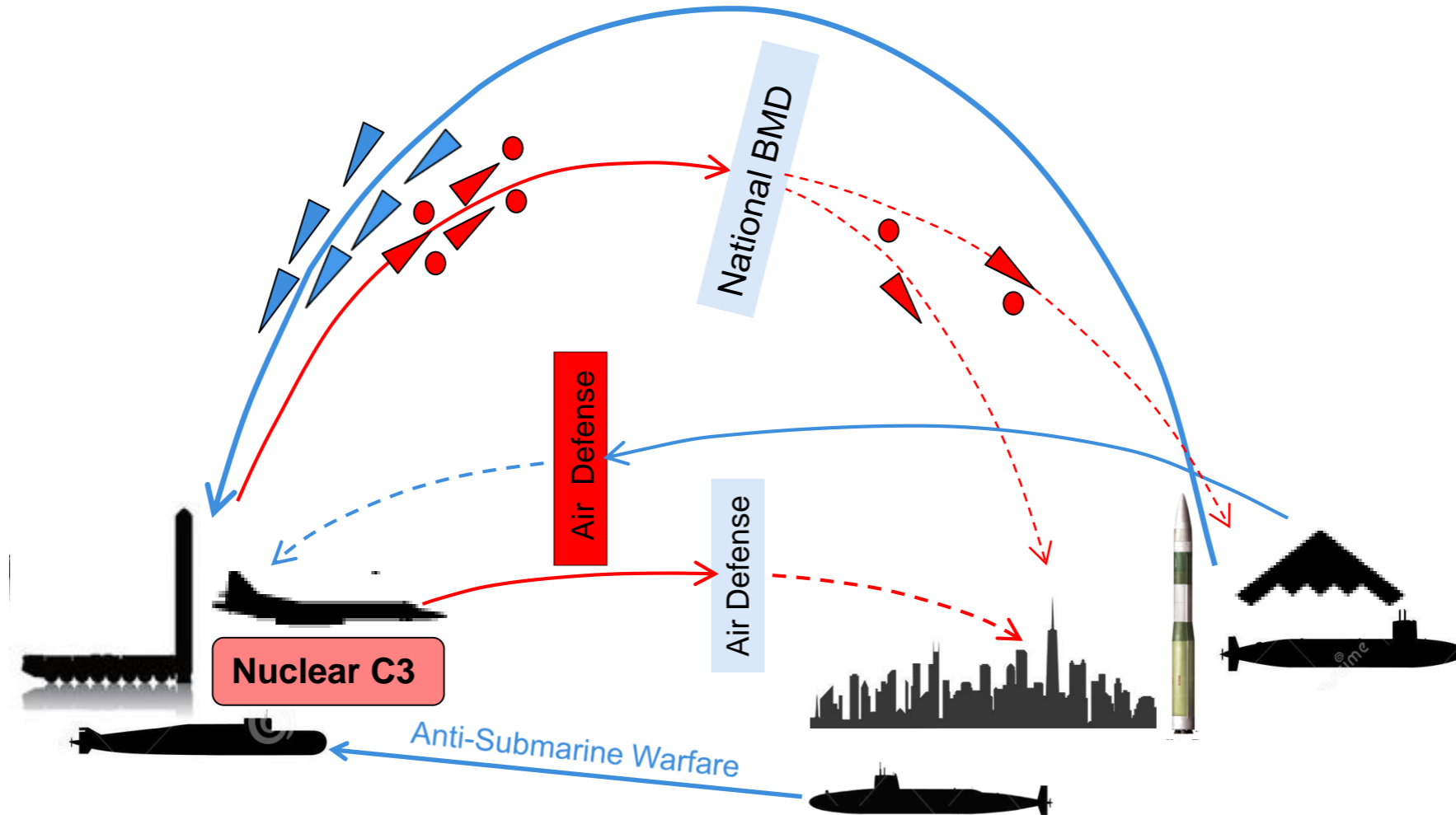


Russian First Strike



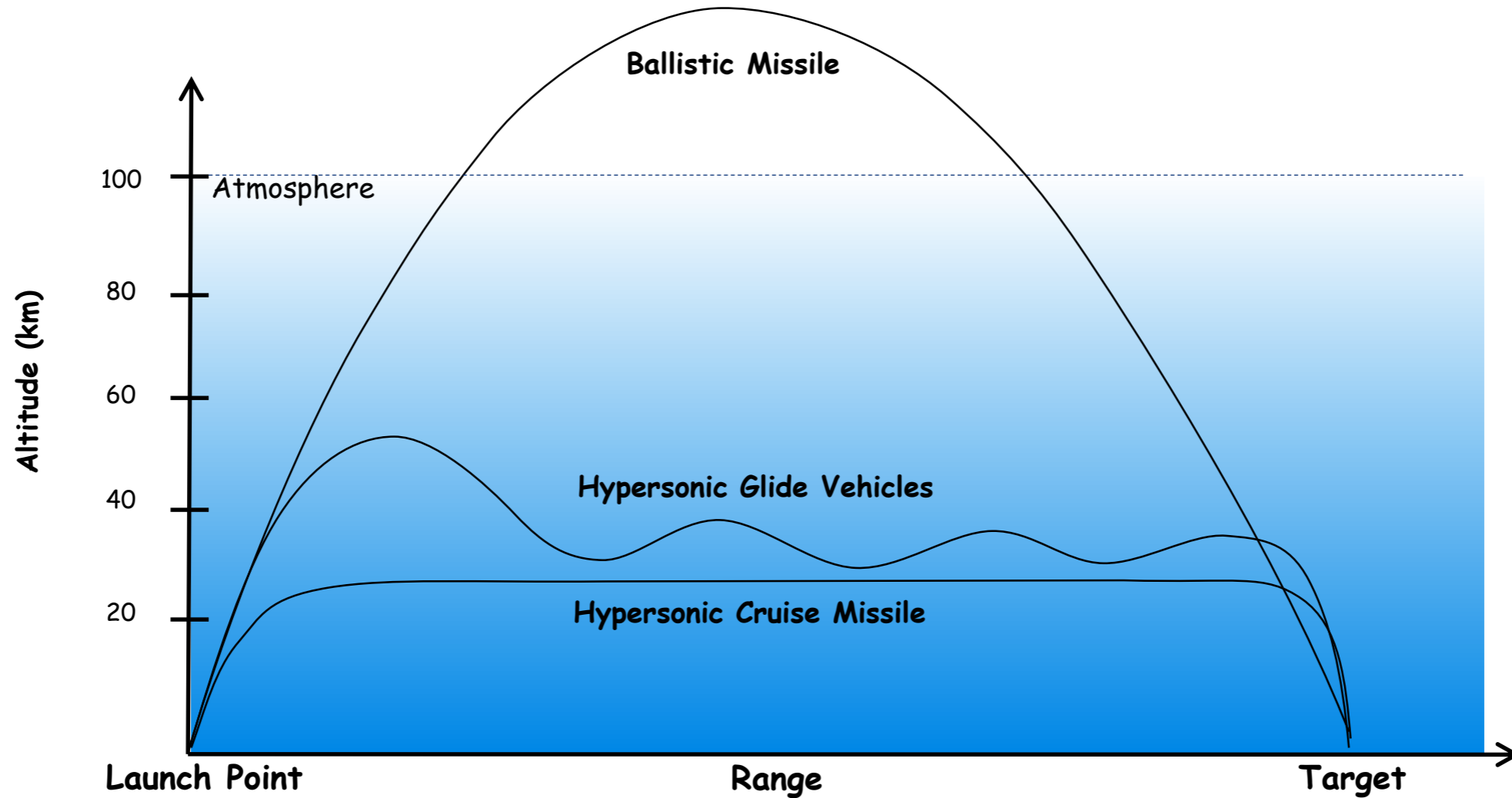
Strategic Instability circa 2020

US counterforce first strike, mostly countervalue ragged retaliatory strike



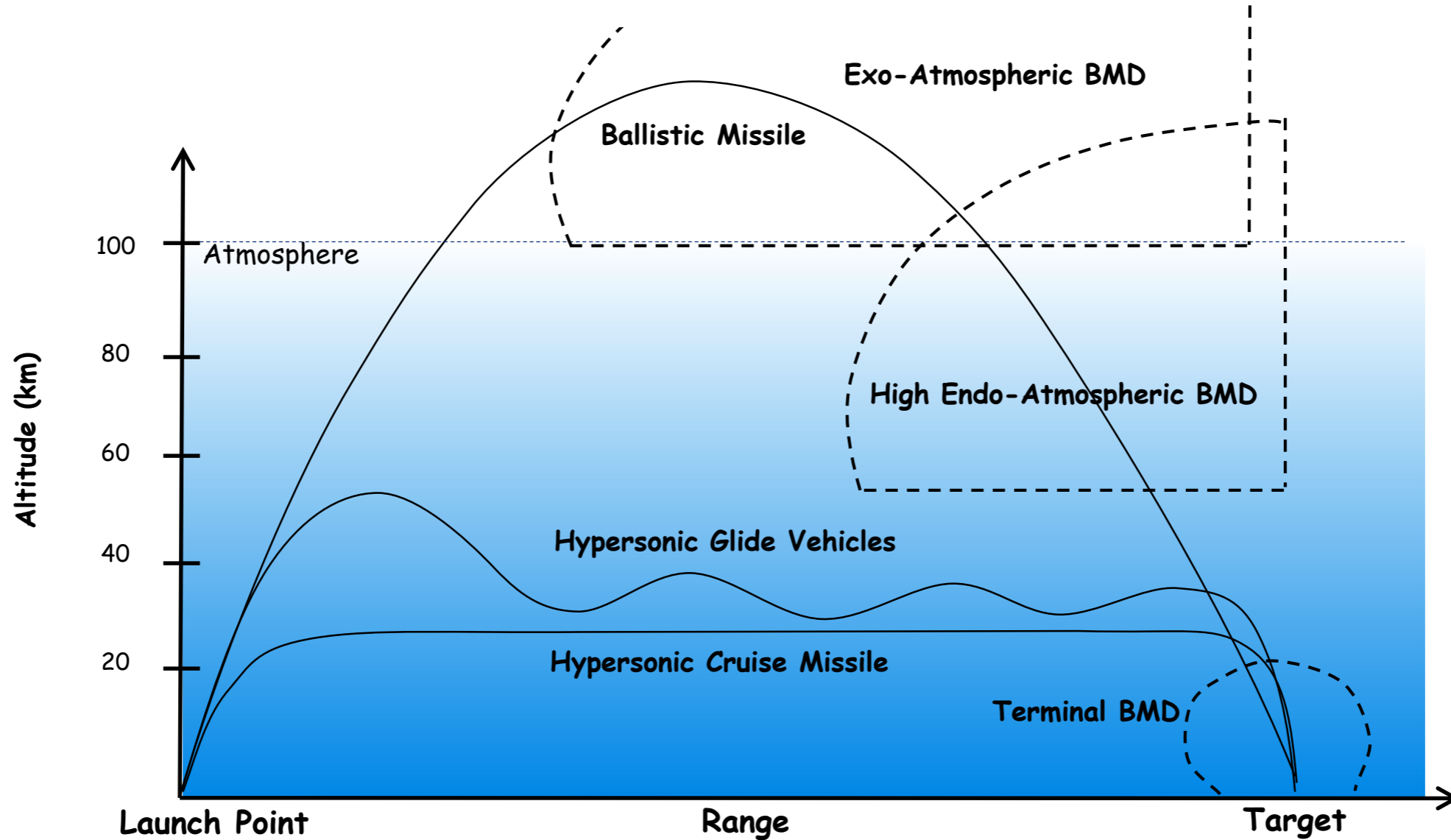
Introducing Hypersonic Weapons

Weapons that travel faster than Mach 5



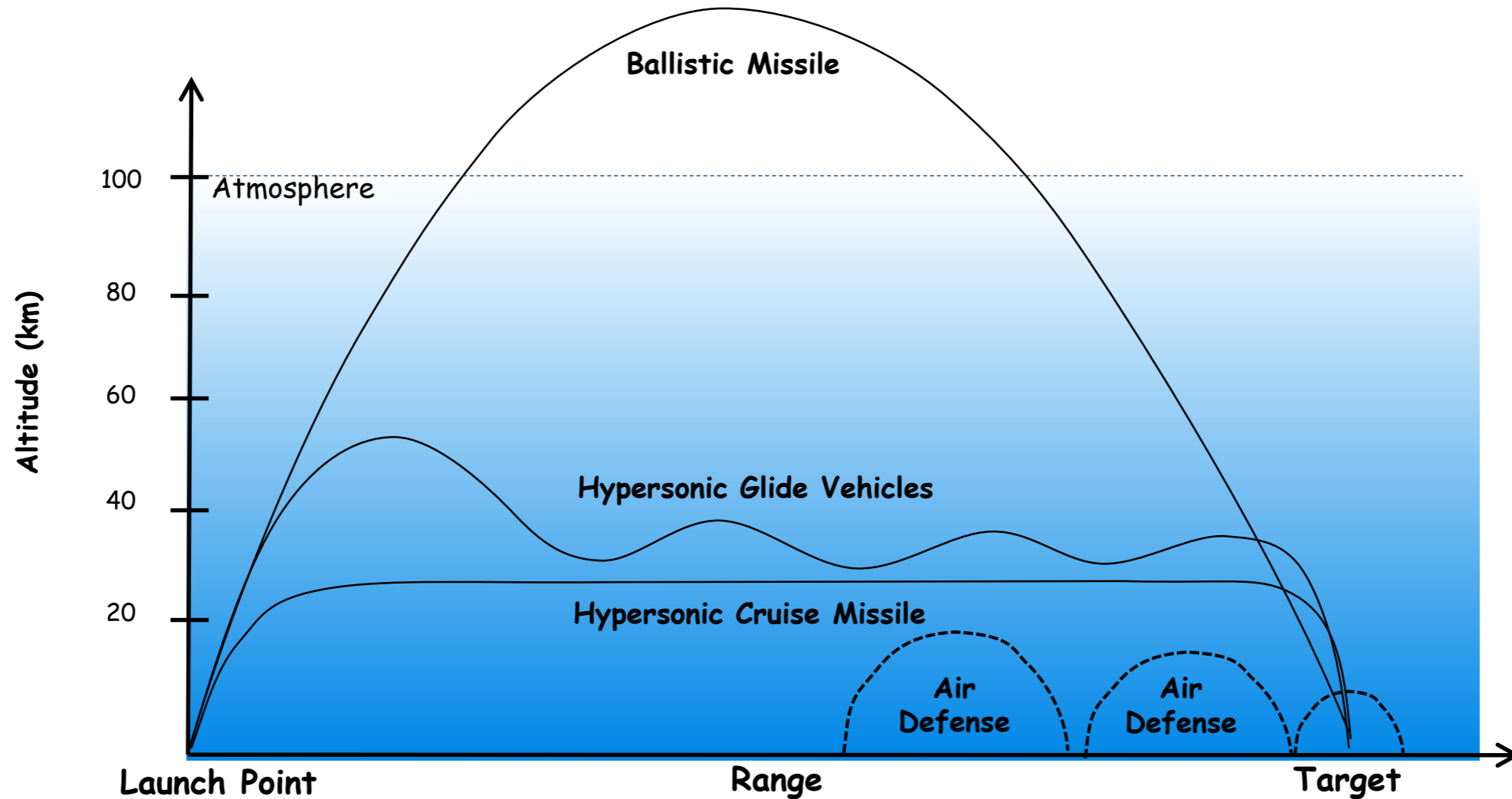
Chinese/Russian Interest in Hypersonic Weapons

Circumventing U.S. Ballistic Missile Defenses



U.S. Rationale for Hypersonic Weapons (1 of 2)

Penetrating Advanced Integrated Air Defense Systems (IADS)



Two Main Missions for U.S. Hypersonic Weapons

- 1. Penetrated advanced integrated air defense systems**
 - Using high speed, high altitude, maneuver capability
- 2. Hold time critical targets at risk**
 - Relocatable and moving targets
 - Speed is of the essence



Crisis Instability (1)

Can hypersonic weapons threaten the survival of Russia's and China's strategic nuclear forces?

Conventional Precision Strike Systems



Strategic Nuclear Systems



NB: This problem is not entirely new: ASW can be used against ballistic missile submarines

Arms-Race Instability

- **Threatening mobile ICBMs**

- Russia/China must modernize their land-based ICBMs or invest in alternatives \Rightarrow arms-race instability
 - Or, launch on warning/launch under attack \Rightarrow possible inadvertent escalation
- Is this sufficient reason not to deploy US hypersonic weapons?

- **Offense-Defense competition**

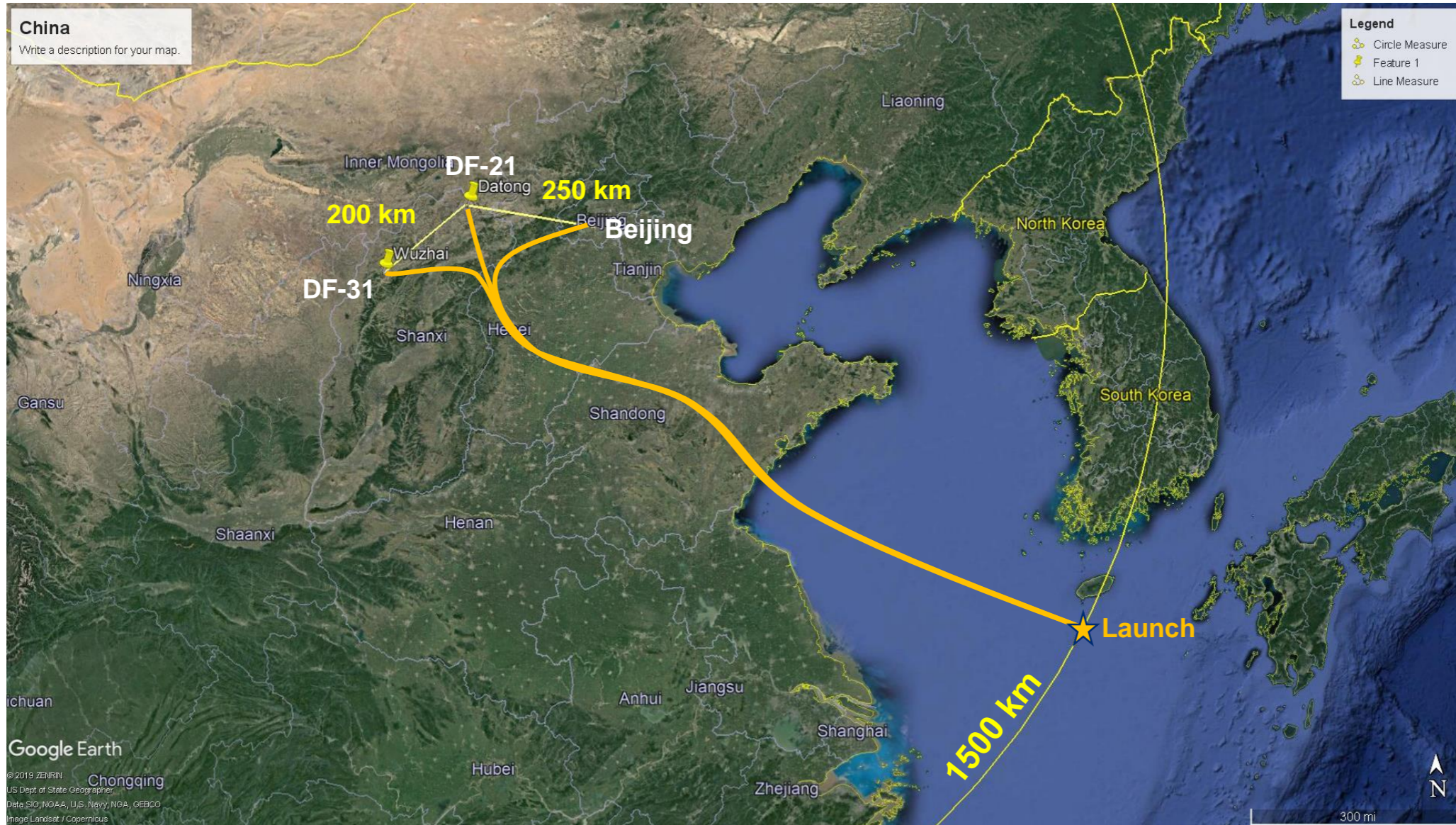
- Hypersonic weapons can penetrate IADS
 - High speed compresses timelines
 - High altitude overflies most integrated air defense systems
 - Maneuver stresses interceptor fire control and homing
- Therefore, the hypersonic offense-defense competition will be intense \Rightarrow arms-race instability

Crisis Instability (2)

Factors that make escalation harder to control

- **Speed: Compressed timelines mean less time for careful decision making**
 - Increases chance for misperception, misunderstanding, and miscommunication \Rightarrow inadvertent escalation
 - Increased chance for accidental or unauthorized attacks, especially if pre-delegation of launch authority \Rightarrow inadvertent escalation
 - NB: In conventional war the goal is to destroy the opponent's military capability as fast as possible
- **Nuclear ambiguity**
 - Warhead ambiguity: Dual-use systems may have either a nuclear or conventional warhead
 - Increases chance for misperception, misunderstanding, and miscommunication \Rightarrow inadvertent escalation
 - Target ambiguity: Comingling conventional and nuclear systems
 - Blurs the distinction between conventional and nuclear war
 - Increases the chance of misperceiving the intent of the attack \Rightarrow inadvertent escalation
 - This problem is created by the opponent, not the weapon used in the attack
 - But, hypersonic maneuvers makes attack assessment difficult
- **Use of “long-range” versus “tactical” weapons**
 - Long-range hypersonic weapons will be fewer in number and, hence, may be reserved to target the opponent's “strategic” assets \Rightarrow use may appear escalatory
 - “Tactical” systems are forward deployed in greater numbers for use in conventional campaigns \Rightarrow use may appear less escalatory

Hypersonic Maneuvers Prevent Accurate Attack Assessment



Can Strategic Instability Be Avoided?

- **Can the threat to mobile land-based ICBMs be avoided?**
- **Is it possible to slow the speed of modern conventional war?**
- **Should the hypersonic offense-defense arms race be avoided?**
- **Arms control approaches:**
 - Global INF Treaty?
 - Ban new classes of non-ballistic hypersonic weapons?
 - Ban all “fast flyers” (including ballistic missiles)?
 - Confidence building measures?
 - Keep-out zones for hypersonic weapons to increase flight times
 - Avoid conventional hypersonic delivery systems previously used for nuclear weapons (warhead ambiguity)
 - Avoid collocating nuclear and conventional forces (target ambiguity)
 - Hot line: Can misunderstanding really be avoided?
- **Declare the problem does not exist**
 - U.S. Senate Advice and Consent to the New START Treaty
 - “The Senate finds that conventionally armed, strategic-range weapon systems not co-located with nuclear-armed systems do not affect strategic stability between the United States and the Russian Federation”

Some Overarching Issues...

- **Is “near space” becoming a new domain for military competition?**
- **Will hypersonic weapons lead to offense dominance in strike warfare?**
 - Do hypersonic weapons enable an effective asymmetric offense-defense competition with Russia and China?
- **How should the United States balance the demands of conventional warfare with the need to maintain strategic stability with Russia and China?**
 - In conventional war, destroying the enemy’s military forces promptly is the goal
 - In nuclear war, avoiding war is the goal, hence, threatening the enemy’s “strategic” nuclear forces should be avoided (at least between major nuclear powers)
- **How long will land mobility be a viable tactic for ensuring the survival of critical military assets?**
- **How much strategic warning is prudent to assume for conflicts with Russia and China?**
 - Less warning implies a need for long-range systems (e.g., CONUS-based)
 - More warning suggests that tactical systems can be forward deployed in a crisis



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