Changing the deterrence paradigm: A world without ICBMs

A space-based directed energy grid for worldwide security and deterrence
The US should invest in a global, defensive, space-based, additive directed energy grid to co-target nuclear and ASAT threats.

“US dependence on space is its soft ribs. For countries that can never win a war with the US by using the method of tanks and planes, attacking the US space system may be an irresistible and most tempting choice.”

- Wang Huacheng, Chinese military analyst
Discussion

Increases nuclear deterrence: ballistic launch missiles near-obsolete
– Destroy nuclear employment using additive space-based laser tech to co-target
– Low power of individual beams: Limits collateral damage
– Allows US to safely decrease nuclear capability

Second order effects

• Change in nuclear posture worldwide
  • Peer capability adds transparency
• Shift in nuclear threat: global to regional
• Cyber Vulnerability

Third order effects

• Shift to distributed space architecture
• Commercial space industry boom
  • “Freedom of navigation” in space
• Sets stage for nuclear disarmament

Changes concept of deterrence from retaliatory to preventative
The New World Order

- Multi-platform space systems can host co-located global wifi, secure comms, PNT
- Can pursue international funding and cooperation to reduce friction with rivals
- Modernize only bomber, submarine nukes
  - “Bipod” preserves strategic surprise, second strike, extended deterrence
- Constellation can defend itself
  - Appearance of an offensive capability
  - Deterrence against a space attack
- System capacity limitations: all-out attacks
- Does this increase likelihood of conventional wars between world powers?

Maintains today’s near-peer nuclear relationships, opens a door to worldwide nuclear force reduction, disincentivizes rogue actors to whom deterrence models don’t apply

“The best way to predict the future is to create it.” -- President Lincoln
Changing the Deterrence Paradigm

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Nuclear modernization

Modernizing the total nuclear enterprise is a trillion-dollar investment

Space-based capabilities can be an alternative to nuclear modernization

Estimated Costs for Nuclear Triad Modernization

- Ohio replacement: new ballistic missile submarine fleet - $140 billion
- B-21: new strategic bomber fleet - $>100 billion
- GBSD: new ICBM fleet - $>85 billion
- LRSO: new ALCM fleet - $~11 billion

- Total DoD nuclear modernization cost over 20 years* - $350-450 billion
- Total NNSA weapons cost over 25 years - $>300 billion

* in FY 2016 constant dollars

Note: All figures in then-year dollars unless otherwise noted.
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Second Order Effect
Change in ICBM posture

• Space weaponization shift from offensive to defensive
  – Purpose: Reduce enemy desire or ability to launch ICBM attacks on the US
  – Offensive weapons can be used defensively; adversary knowledge of US capability deters attack worldwide

• Equivalent near-peer capability negates the use of multi-stage nuclear weapons
  – Should another country field a similar capability, worldwide defense and safety is reinforced, instead of an arms race
  – Losing ability to have weapons impact at desired locations reduces the need or potential to launch
Second Order Effect
Shift in Nuclear Posture

- Nuclear deterrence focus shifts from global to regional: Nations without SLBM or nuclear capable bombers can only hold neighbors at risk
  - China, Russia, North Korea // India, Pakistan: must engage with one another for mutually assured security
  - UK and France have allied relationship
  - Israel solidifies regional power
  - US is unthreatened regionally: increase strategic advantage
Second Order Effect
Shift to Distributed Space Architecture

- Current space architecture is focused on large, non-redundant, expensive space systems
  - Centers of Gravity for enemy attack: Systems not resilient
- Distributed worldwide defense platforms encourage a shift toward fractionated, distributed space systems
  - Applicable to national systems such as GPS, Missile Warning, secure communications
  - Graceful degradation, resiliency in numbers
  - Overall system capable of surviving attack against few nodes
Enforcing a no-weaponization policy for space will encourage commercial space enterprises worldwide

- $330B annual industry, primarily US dominated (2014)
- US share in worldwide space spending (government): > 50%

Benefits US and world economies

- Further technology for space travel
- New jobs/investments
Space platforms have vulnerabilities to asymmetric warfare

- Jamming
  - 2003-2012 – Iran jammed Persian-language satellite channels (“Satellite Jamming in Iran: A War Over Airwaves” 6)

- Spoofing
  - 2012 – Yacht steered off course by fake GPS (Rutkin 1)

- Ground-infrastructure attacks

- Encryption Backdoors
  - 2007 – Microsoft research showed “glaring” weakness in US approved encryption (Shurmow 7)
• An attack on a US satellite is an act of war with possible nuclear retaliation. Risk of damage to another nation’s space asset while employing the defensive grid must be accounted for.
  – Destroying a US satellite is considered an act of war
    • US policy states that it may retaliate with force if its satellites are attacked.
  – Other nations have adopted a similar stance
    • Use of the defensive grid would be viewed as equivalent to downing an aircraft or missile strikes within a nation’s borders.
    • International opinion will be a primary concern
Operationalizing Space

CURRENT OPERATIONS

• Space Operations Specialty Team at the Operational Level
  • Advises JFACC on friendly, hostile, neutral space forces
  • Assesses impact on theater operations
• Utilize Intel to bridge the gap between space and the operator
  • Space is “magic” to the operator
  • Operations are “magic” to space

SPACE ISR TO WARFIGHTER

• Educate
  • Operators must be aware of space capabilities
• Integrate
  • Add to mission planning process for F2T2EA
  • Add space operator dedicated to mission in AOC
• Communicate
  • Space-> Tac C2-> Asset
Operationalizing Space

SPACE WEAPONS (PRECISION GUIDED LASER)

- Add a Space Fire Coordination Officer to Control and Reporting Center
- Deliberate Targets
  - Execute ATO taskings
- Dynamic Targets
  - Laser-on-coordinates
- Close Air Support
  - JTAC to CRC/SFCO
  - Laser-on-coordinates

LIMITATIONS TO ISR/WEAPONS

- Classification
  - Paper being written at USAFWS to facilitate this process
- Cultural Barriers
- Communication