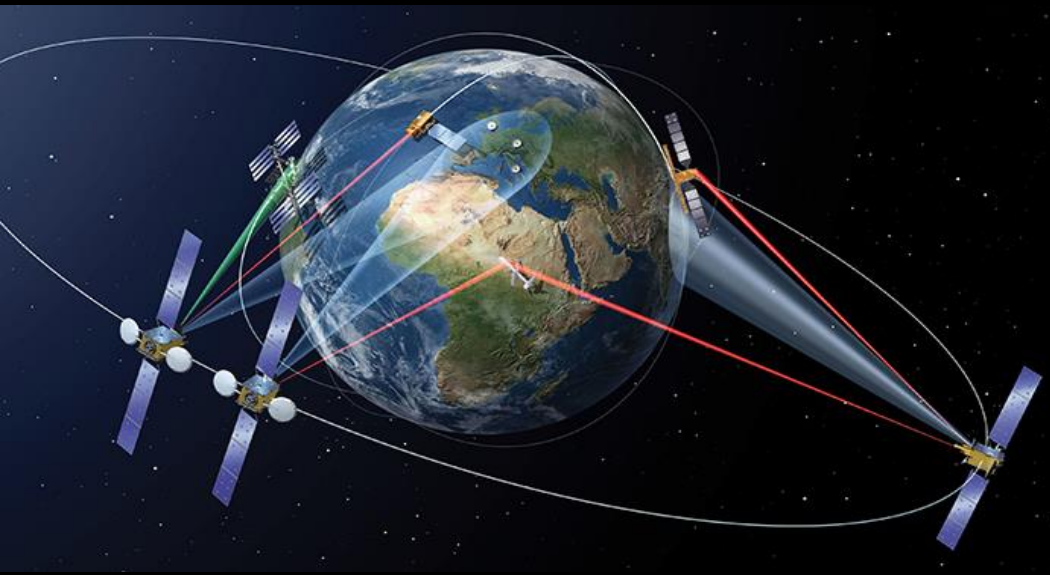
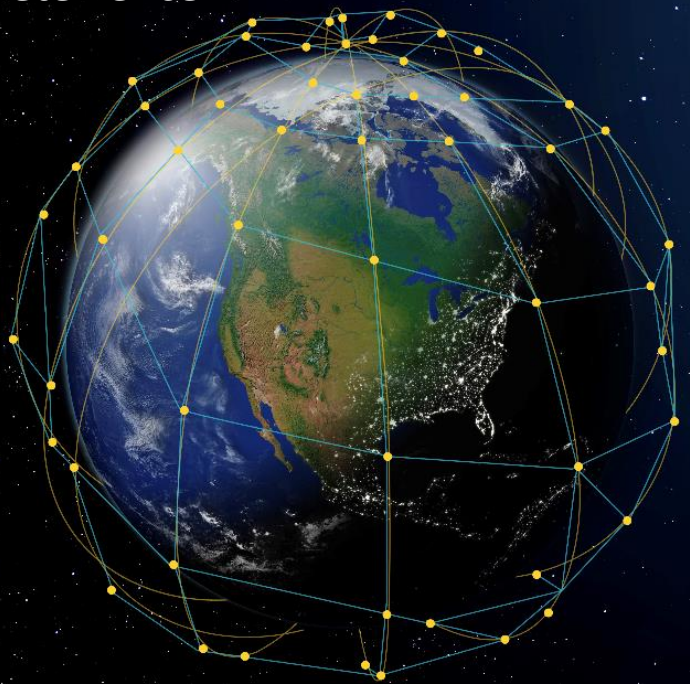
Changing the deterrence paradigm: A world without ICBMs

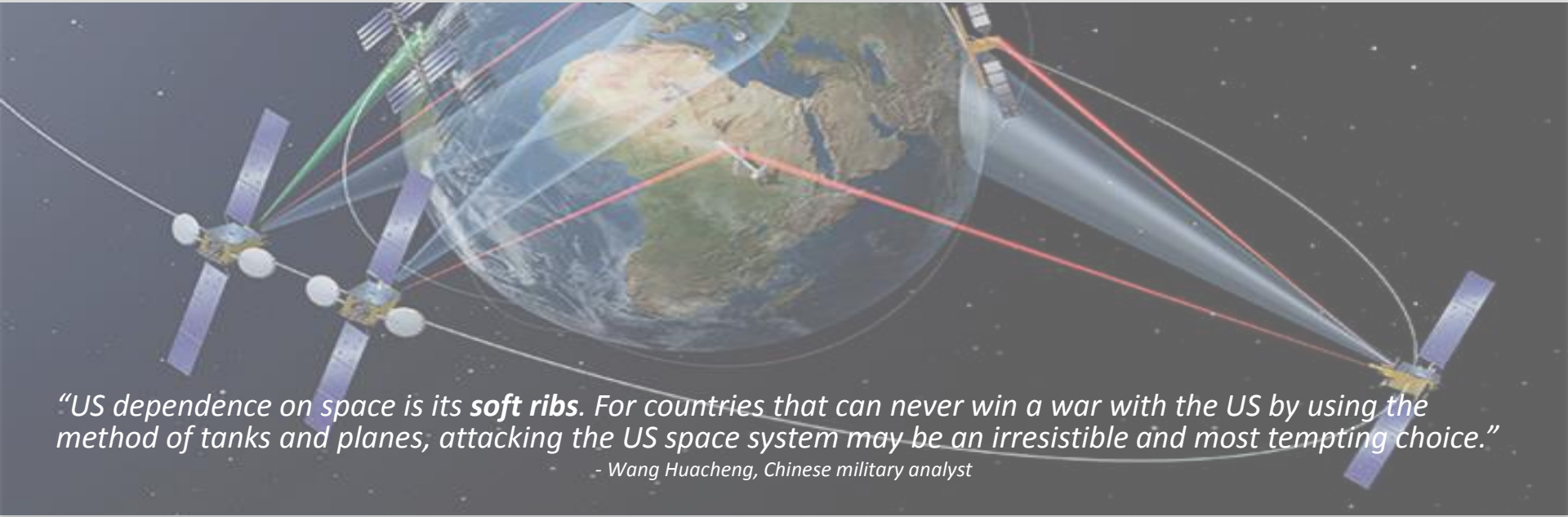
A space-based directed energy grid for worldwide security and deterrence





Position

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

Changes concept of deterrence from retaliatory to preventative

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

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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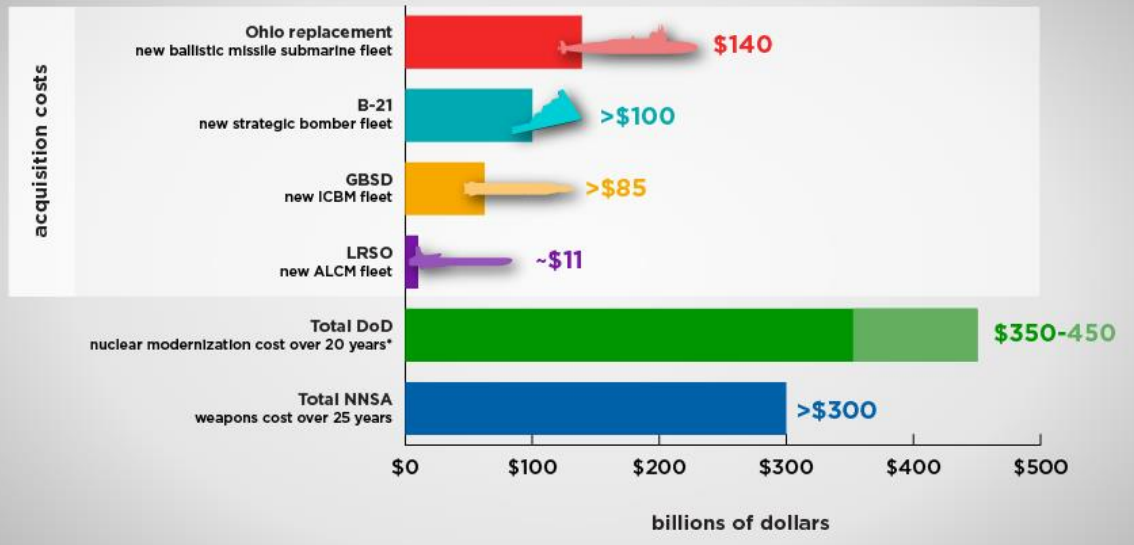
BACKUP SLIDES

Nuclear modernization



- Modernizing the total nuclear enterprise is a trillion-dollar investment
- Space-based capabilities can be an alternative to nuclear modernization

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

Third Order Effect
Industry Boom

- 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%
  - Estimated nuclear arsenal costs over next decade: $348B (2015)
- Benefits US and world economies
  - Further technology for space travel
  - New jobs/investments

Third Order Effect
Cyber Attacks

- 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
    - 2008 – Hackers "nearly" took control of NASA observation satellite (*2011 Report to Congress* 216)
  - Encryption Backdoors
    - 2007 – Microsoft research showed "glaring" weakness in US approved encryption (Shurmow 7)

Third Order Effect
Damage to Sovereign Space Assets

- 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