U.S. National Security in the 21st Century

NRC Presentation
August 3, 2009

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Talkin' About My Generation

Fourth generation warfare shifts advantage to non-state actors

	1st Generation	2nd Generation	3rd Generation	4th Generation
Time Period (roughly)	1648-1860	Civil War/WWII	WWII/Cold War	Current
Technologies	Muskets; bayonets	Breech-loading rifles; machine guns	Mechanized armor	Improvised, individual weaponry
Tactics	Line and column	Attrition	Blitzkrieg	Rear-area operation; terror strikes
Advantage	Nation-states	Nation-states	Nation-states	Non-state actors

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Source: http://www.d-n-i.net/fcs/4GW_another_look.htm

4G Insurgency Advantages

Capitalizing on the new "terrain"… **…bottom-up insurgencies…** **…attack globalization's weak points**

Internet-enabled communications: Insurgencies now routinely use the Internet to coordinate and plan attacks, thereby enabling flattened hierarchies

Pay-as-you-go approach: Involvement in global crime enables self-financing of terrorist organizations

Increasingly lethal weaponry: In addition to increasingly potent explosives/weaponry, the successful execution of a WMD attack by non-state actors is only a matter of time.

Decentralized organizational structures with long time horizons

Porous national borders: 4G insurgents able to capitalize on globalization, which depends on transporting freight across borders with minimal hassle;

Integrated systems: Attacks against dockyards, oil pipelines, power-grids, etc., can disrupt economic life and even threaten ability of nation to govern

Urban environments: Today's megacities are fertile ground for insurgencies, both vis-à-vis recruiting from conditions of poverty and also in ability to hide amidst population

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Source: Robb, John, Brave New War

Three Glaring Vulnerabilities

Seven years into the "long war," one of the three strategic centers of gravity has at last moved into focus

EGYPT

Overpopulation increasing instability along Nile delta

SAUDI ARABIA

World's leading petroleum exporter; Bin Laden's #1 target

PAKISTAN

#1 current problem; maintains 30-50 nuclear weapons

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4G vs. 5G Warfare

Next generation of warfare will shift advantage back to nation-states

	4G Warfare	**5G Warfare**
Time Period	c. 2000-2050	c. 2050-onwards
Advantage belongs to…	Non-state actors	Retooled nation-states
Space weaponization capabilities	Nascent	Maturing
Cyberspace configuration	Bottom-up ("Guerilla terrain")	Top-down ("Tool of state")
"The home front"	Under assault	Police-state

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Big Brother Is Watching

Range of technologies on the cusp of maturity will drive total surveillance society in face of 4G threats

Ubiquitous Sensors
Sensors will scale toward nano, "flood" society

Teraherz radar
Very short wavelength radar utilized to penetrate walls

RFID Proliferation
Embedding of RFID chips in devices can be extended to people

Celldar
Ability to track cell phones via microwave emission

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Source: http://www.antipope.org/charlie/rant/panopticon-essay.html

Not Your Grandfather's Internet

As the Internet becomes increasingly vulnerable to hostile incursions by both nations and non-state actors…

- *Titan Rain (2003-?)*: Series of coordinated attacks on U.S. defense industry computers since 2003; believed to be Chinese in origin
- Estonia (May 2007): Key Estonian networks subjected to massive denial-of-service attacks by Russian hackers

…governments that wish to survive will militarize increasing portions of the civilian net

- ✓ Electrical grids
- ✓ Financial databases
- ✓ Hospitals/Emergency Response
- ✓ Air traffic control systems
- ✓ Transport grids
- ✓ Landlines; wireless towers; satellites

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Sources: http://en.wikipedia.org/wiki/Titan_Rain; http://en.wikipedia.org/wiki/Cyberattacks_on_Estonia_2007

From Militarization to Weaponization

Any space-based arms race/conflict is likely to unfold in a manner analogous to the initial weaponization of the air

Theater	Era	Phase One: Militarization	Phase Two: Weaponization
Air	World War One	Aircraft used for recon purposes	Aircraft mount guns to target each other and ground
Space	21st Century	GPS, spy-sats provide recon, precision targeting	Spaceships mount weapons to target each other, as well as ground/air targets

Definitions

- *Space is already militarized (i.e., used for military purposes)*
- *Actual weaponization occurs when either (a) space-based platforms mount weaponry, or (b) an attack is launched on a space-based platform*

Source: WWI analogy used in George and Meredith Freidman's The Future of War; see also www.stratfor.com

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The Evolution of A Weapon

Directed energy development likely to unfold across four stages

	Phase One (Today)	Phase Two	Phase Three	Phase Four
Strategic Impact	Minimal*	Marked	Major	Decisive
Offensive capabilities	Nil	•Surgical strikes against satellites, aircraft •Anti-personnel applications	•Attacks on ICBM fields •Neutralization of opponent's space-based hardware	Real-time targeting of any point on planet/orbit at speed of light
Defensive Capabilities	Nil	·Theater defense ·Rogue missile strikes	Major factor in any nuclear exchange	"Industrial Strength" missile shield

*Current strategic impact limited to impact on global armaments spending, diplomacy.

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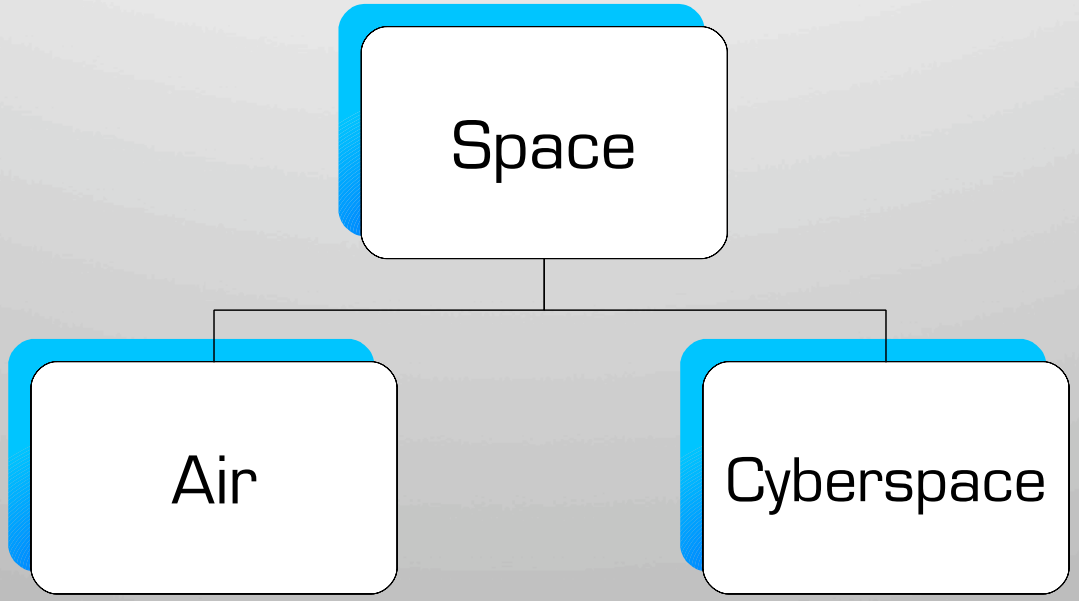
Organizing for the High Ground

Space doctrine will drive doctrine for both air forces and cyberspace



•From a command perspective, air and space will need to be integrated for maximum advantage

•Hypersonic missile and directed energy weaponry will spell end of "cult of flying ace", radical shifting of leadership mindset

•Space war likely to be as much an information war as anything else

•Strictly speaking, space and cyberspace can be regarded as equal to one another, but we surmise that hardware/budgets will ensure that space commanders maintain primacy

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Space Is the Place

Laying the groundwork for a theory of space warfare starts with the environment

Four Key Environmental Factors

#1: Emptiness:
Volume of space out to geostationary is about 50 billion times greater than air combat arena—which in turn is dwarfed by rest of Earth-Moon system.

#2: Vacuum:
Lack of atmosphere precludes propagation of explosions, while allowing electromagnetic energy/beams to radiate almost unattenuated

#3: Orbits: Spacecraft have "quasi-positional" characteristics: they are neither totally static nor totally mobile, but instead generally in predictable patterns

#4: Topography:
The topography of space is invisible, and largely a function of the gravity wells that will shape all future tactics; see next page for additional details

Sources: Petersen, Steven R., *Space Control and the Role of Antisatellite Weapons*; Lupton, David E., *On Space Warfare*

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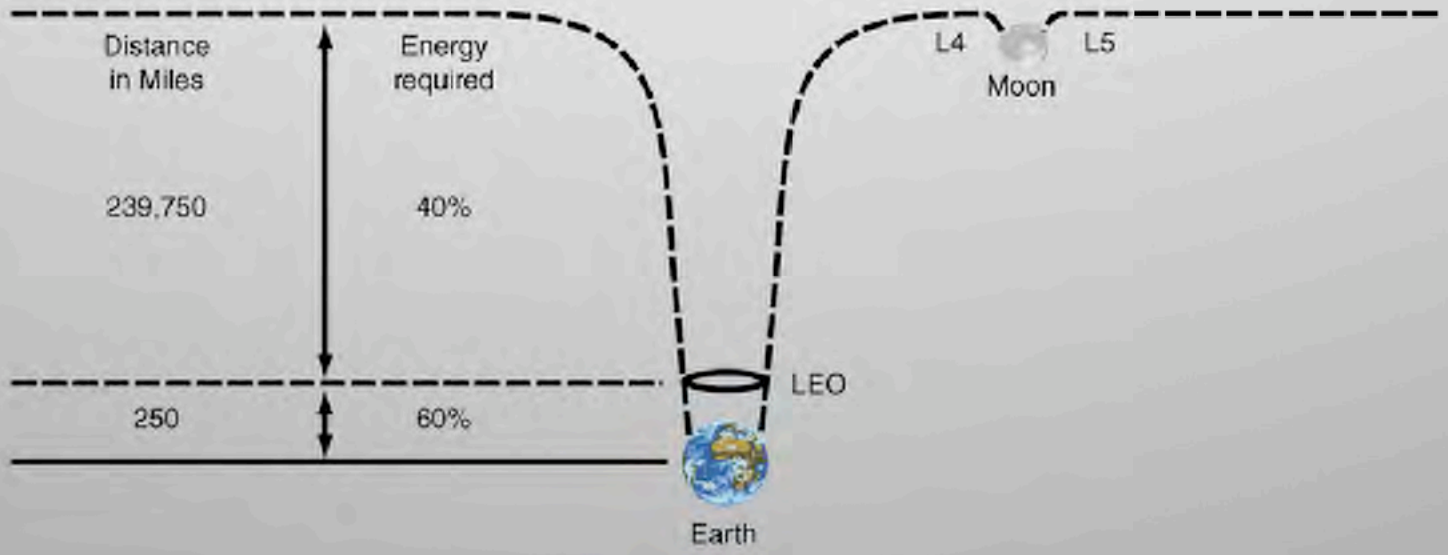
The Future Battleground

Gravity wells define topography of Earth-Moon system, will shape battle for "high ground"

Energy Requirements in Earth-Moon System



KEY CONSIDERATIONS

Overall victory will hinge on control of Moon/L4/L5
•Combat within lower orbits likely depend on control of geostationary/geosynchronous orbits

Source: Collins, John, *Military Space Forces: The Next Fifty Years*, p. 24

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Four (Initial) Doctrinal Principles

Mature directed energy capability deployed in orbit will shape a whole new doctrine

Principle	Comments
Hair-trigger deployment	•Speed-of-light weaponry allows for virtually no early warning •Humans likely to be removed from firing loop
Counterforce primacy	•Mature missile shield will necessitate (at least initially) detargeting of cities •Primary focus will be on destroying opposing forces
Rapid degradation of firepower	•Damage will be concentrated disproportionately in initial phases of war •Situation will fluctuate with unprecedented swiftness
"Solid vs. space" tension	•*E.g.* the Moon might be more advantaged than the exposed (albeit slightly "higher" L4/L5 libration points

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From Every Direction

Type of Threat	Likelihood in Next Ten Years*	Comments
WMD event	8 (10 is maximum)	Dirty bomb most likely scenario
Full-scale nuclear strike	1	A resumption of cold war with Russia would raise this risk
Assassination attempt on key leadership	7+	Maximum moments of vulnerability are gatherings of collective leadership (e.g., State of the Union addresses)
Attacks on soft targets	8	Virtually any undefended crowded event/location is vulnerable
Disastrous policies	6+	The biggest intangible of all
Internet assault	7	Rise of the "smart web" will increase national vulnerability
Satellite disruption	4	Options include hacking, EMP or kinetic disruption
EMP assault	3	Detonation of nuclear device above U.S. could paralyze large parts of nation
(Nuclear) missile strike by rogue state	2	Reprisal-destruction of aggressor nation probably limits this to accidental launch or insane leadership

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