US National Security and Space Weapons bv Richard L. Garwin **Council on Foreign Relations** rgarwin@cfr.org www.cfr.org www.fas.org/rlg in the National Security and Military Space Workshop No. 1 Naval War College, Newport RI

April 30, 2003

Council on Foreign Relations Team

- Bruce M. Deblois, Adjunct Senior Fellow at CFR. (BAE Systems; formerly National Reconnaissance Office—NRO)
- Richard L. Garwin
- Jeremy C. Marwell, Research Associate
- Scott Kemp, Research Associate

Why Space Weapons?

• Defensive counter-space (active protection of space assets)

 Offensive counter-space (deny adversaries' use of space)

Global and rapid power projection
 Less than 90-minutes (QDR)

Space vs. Conventional Weapons



Threats to Space Assets



- 1) denial & deception
- 2) electronic warfare
- 3) ground station attack
- 4) sensor blinding
- 5) microsatellites

6) direct-ascent interceptors Addressable

7) nuclear detonation in space

Space

Microsatellite Proliferation



A Non-military cooperative development effort of Surrey Satellite Technologies and Thailand

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Microsatellites



A space mine trailing behind a satellite

Four "body guard" microsatellites protecting a satellite

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Force Projection

The three most promising weapons?

• Long Rods Hard and deeply buried targets

Common Aero Vehicle
 Conventional munitions

• Space-Based Laser Very rapid force projection



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Finite Strength of Penetrator



.30 cal. bullet impacting hard steel at 2750 ft/sec

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Long Rod Penetration vs. Velocity



Impact Velocity

Common Aero Vehicle



Deployment Configuration



Minot to Holloman



Minot to Eglin



Holloman to Eglin

Space Based Laser





SBL Constellation





Cruise Missiles from Int'l Waters

Block II coverage from outside 12 Block III coverage from outside 12	-nautical mile territorial waters 2-nautical mile territorial waters	
No coverage		Sources CAO/NEIAD OF 116
		Source: GAU/NSIAD-95-116
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and Space Weapons"

Net judgments on space-weapon utility (1)

- For offensive counterspace—deny military space to others o jam uplinks or downlinks (from ground or space)
 oattack ground stations essential to satellite capability
 obscure line of sight by screens in space
- For defensive counterspace—preserve US military space capability

oattack ground systems which might be disabling satellites ointerdict ASAT in powered flight

odeter by promise of retaliation—not against satellites, but against military and political assets

Net judgments on space-weapon utility (2)

For destructive antisatellite (ASAT)

 othe most prompt means of destruction is microsatellite-asspace mine, orbiting earth within 10-100m of its quarry
 oshort-range missiles lobbing ton-class payloads of coarse sand to orbital altitude at the right time
 ohoming kill vehicles as direct-ascent ASAT

The United States can do it best, but others will soon do it well enough

Global and prompt force projection

 kinetic-energy (KE) weapons on ICBMs or shorter-range missiles
 advanced conventional weapons on ICBMs (CAV?), with observation/designation from space, ground, or UAV

Net judgments on space-weapon utility (3)

- Non-space weapons will provide more capability and sooner than space weapons.
- Destructive ASAT and space weapons are a serious threat to overall US military capability and its dependence on space.

How can US satellite vulnerability be countered?

- Reduce our dependence on satellites while maintaining the benefits of satellites at reasonable cost. Supplement satellite capabilities in wartime by theater resources:
 - High-power pseudolites (on the ground and on UAVs) in the theater of operations so that the adversary would obtain no benefit in theater conflict by destroying GPS satellites.

OUAV and rocket capabilities for imagery. At altitudes of 20-30 km, a 20-cm aperture would have the same resolution as a 2-m diameter mirror at a range of 300 km. Such platforms can provide near-constant presence, as well.

A primary means of reducing vulnerability is to reduce the threat—by agreements not to damage or destroy non-weapon satellites. This should be backed up by US developments to intercept or counter such weapons or ASAT used in violation of such an agreement.

We have found general acceptance of this (conditional) conclusion: If space weapons and destructive ASAT could be avoided by the United States giving up such capability, it would be in our national security interest to do so.

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Asserting a "might makes right" rule in space and elsewhere leads, again, to the asymmetric use of force—perhaps the destruction of critical US satellites in peacetime rather than holding them at risk for future destruction.

Nothing is forever--perhaps not even the regime we favor--so an aggressive campaign to prevent the deployment of weapons by others might best be implemented as a U.S. commitment:

not to be the first to deploy space weapons or to further test destructive antisatellite weapons¹.

This should be supported by a US initiative to codify such a rule and thus to legitimize the use of force against actions which would imperil satellites of any state.

¹See also Michael Krepon with Christopher Clary, "Space Assurance or Space Dominance? The Case Against Weaponizing Space," <u>www.stimson.org</u> (2003).