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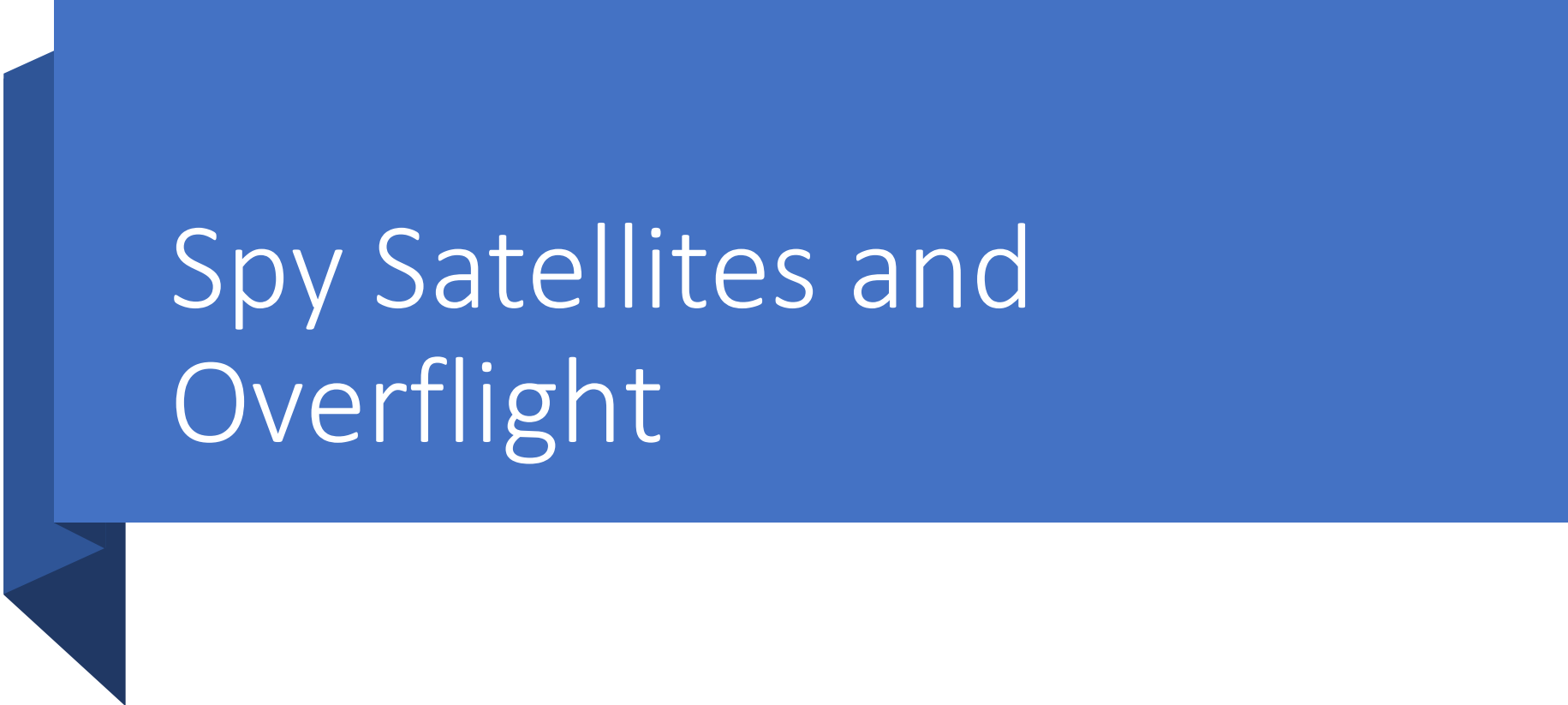
National Security Space Policies

Overview

- What is public policy?
- Case Studies
 - Spy Satellites and Overflight
 - Space Sanctuary and Defense
 - Soviet Reactions to Star Wars
 - “Luch” and French Defence Space Strategy
 - Satellite Navigation Wars
- Discussion

What is public policy?

- “The principled guide to action taken by the administrative executive branches of the state with regard to a class of issues in a manner consistent with law and institutional customs” (Wikipedia)
- “The public and its problems” (Dewey 1927)
- “How issues and problems come to be defined, and how they are placed in the political and policy agenda” (Parsons, 1995)
- “How, why, and to what effect governments pursue particular courses of action or inaction” (Heidenheimer et al, 1990)

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Spy Satellites and Overflight

Eisenhower and the Intelligence Challenge

- After World War II, it became clear to the U.S. that the next major competition was with the Soviet Union
- Eisenhower was very concerned about tracking Soviet development of strategic bombers, missiles, and nuclear weapons
- Traditional methods (surveillance by aircraft) was becoming increasingly difficult



*Francis Gary Powers, on trial in the Soviet Union on Aug 17, 1960.
Photo: AP*

NSC/6108 – January 18, 1961

The President has established the following programs as having the highest priority above all others for research and development and for achieving operational capability; scope of the operational capability to be approved by the President:

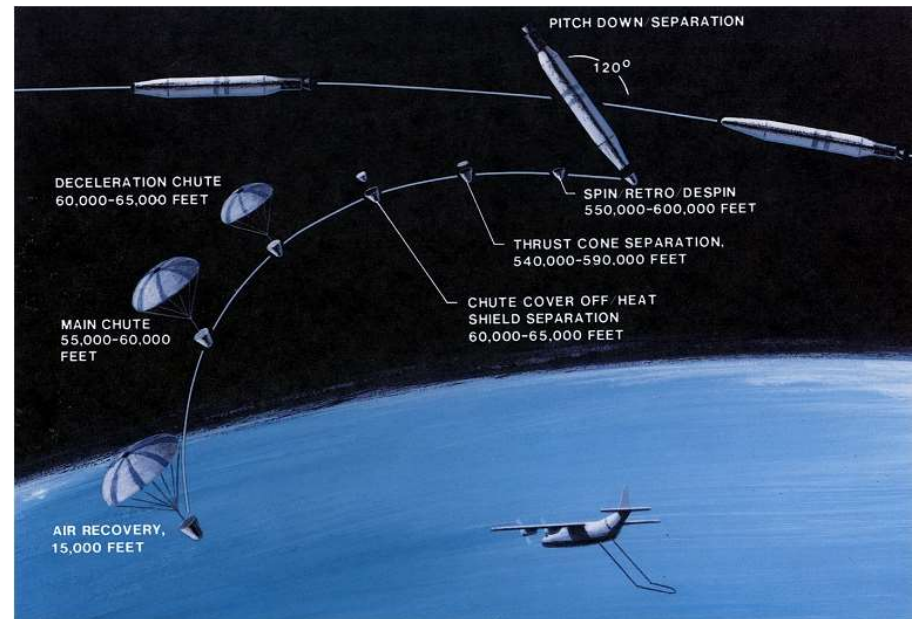
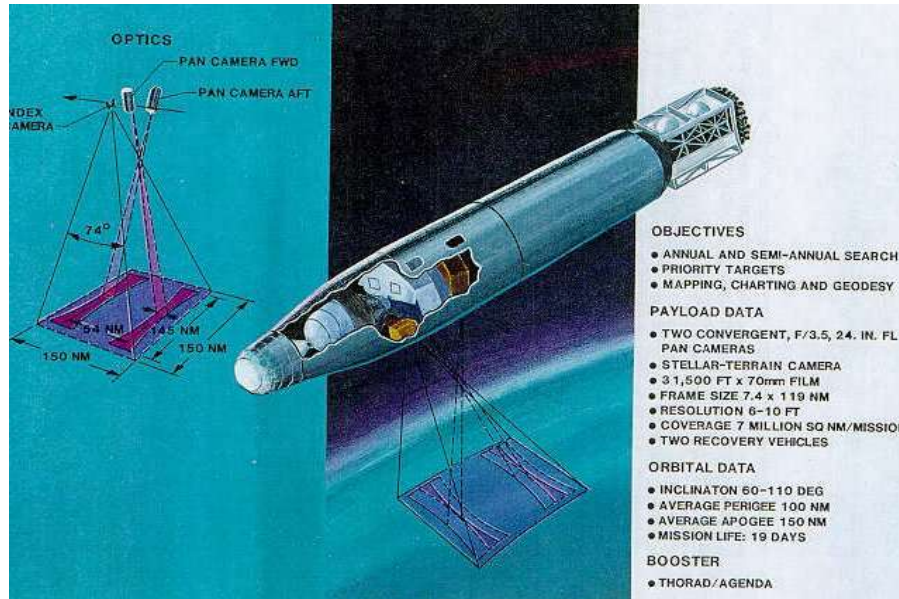
(Order of listing does not indicate priority of one program over another)

- (1) ATLAS (ICBM) Weapon System
- (2) TITAN (ICBM) Weapon System
- (3) POLARIS (FBM) Weapon System
- (4) MINUTE MAN (ICBM) Weapon System
- (5) Ballistic Missile Early Warning System (BMEWS)
Phase I, including Project DEW DROP
- (6) NIKE-ZEUS Weapon System (research and development only)
- (7) Space programs determined by the President on advice of the National Aeronautics and Space Council to have objectives having key political, scientific, psychological or military import.

The President has designated the following projects under the category specified in (7) above:

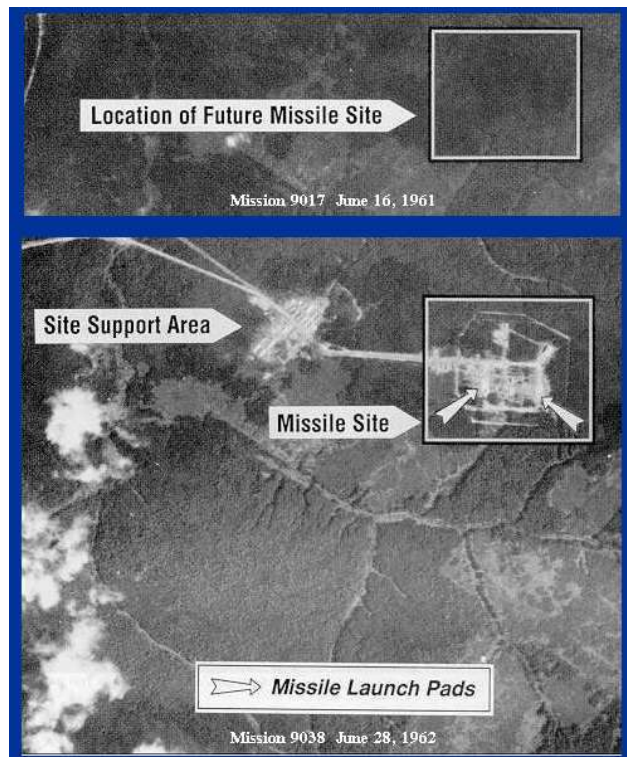
SAMOS (satellite-borne visual and ferret reconnaissance system)
DISCOVERER (satellite guidance and recovery)
MERCURY (manned satellite)
SATURN (1,500,000 pound-thrust, clustered rocket engine)*

Corona Satellite and Recovery



Source: [The National Reconnaissance Office](#)

Corona Achievements



*Yurya ICBM Complex Showing Construction of an SS-7 Launch Site
(Mission 9038, June 28, 1962)*

- Imaged all Soviet medium-range, intermediate-range and ICBM complexes
- Imaged each Soviet submarine class from deployment to operational bases
- Provided inventories of Soviet bombers and fighters
- Revealed the presence of Soviet missiles in Egypt protecting the Suez Canal
- Identified Soviet nuclear assistance to the People's Republic of China
- Monitored the SALT I treaty
- Uncovered the Soviet ABM program and sites (GALOSH, HEN HOUSE, etc.)
- Identified Soviet atomic weapon storage installations
- Identified People's Republic of China missile launching sites
- Determined precise locations of Soviet air defense missile batteries
- Observed construction and deployment of the Soviet ocean surface fleet
- Identified Soviet command and control installations and networks
- Provided mapping for Strategic Air Command targeting and bomber routes
- Identified the Plesetsk Missile Test Range, north of Moscow

Broader Policy Impact

- Provided much greater US understanding of Soviet capabilities, debunked the “missile gap”
- Laid the foundation for verification capabilities that enabled nuclear arms control treaties
- US led push to establish separate space law regime that allowed freedom of overflight by satellites for “peaceful purposes” (Outer Space Treaty)
- Created reliance on space that led to desire for a “space sanctuary”

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Space Sanctuary and Defense

Threats to Satellites

- Counterspace capabilities developed alongside space capabilities
 - Anti-satellite weapons
 - Laser dazzling/blinding
 - Radio-frequency jamming/interference
- Counterspace is the response to the threat posed by satellites (or their military value in a conflict)

Ford Administration Debate

- In 1975, Ford Administration began a debate on survivability of U.S. satellites and potential for new U.S. ASAT capabilities
- Concluded that U.S. satellites were vulnerable and steps should be taken to increase their resilience
- Also concluded U.S. should pursue **limited** ASAT capabilities of its own

As you, George Bush and I have discussed, the United States has no anti-satellite capability at the present time and only a minimal R&D program for the development of such a program.

We also discussed the fact that current studies are under way in this area. Under NSC auspices, a team of civilian experts is examining the situation. CIA is doing a supporting study in connection with this NSC effort.

The NSC study is examining three major areas:

- (1) Near-term measures (3-5 years) which can be taken to decrease the vulnerability of our satellites;
- (2) Projection of the military use of space over the next 15 years, including analysis of the problems of satellite survivability; and
- (3) The most feasible options for development of a U.S. anti-satellite capability.

While this is a very extensive study, I anticipate receiving a preliminary report by the end of April, including a description of alternates for reducing satellite vulnerability over the near-term.

Ford Policy Decisions

- (1) Provide unambiguous, high confidence, timely warning of any attack directed at U.S. satellites;
- (2) Provide positive verification of any actual interference with critical U.S. military and intelligence satellite capabilities;
- (3) Provide sufficient decision time for judicious evaluation and selection of other political or military responses after the initiation of an attempt to interfere and before the loss of a critical military or intelligence space capability;
- (4) Provide a balanced level of survivability commensurate with mission needs against a range of possible threats, including non-nuclear co-orbital interceptor attacks, possible electronic interference, and possible laser attacks;
- (5) Substantially increase the level of resources needed by an aggressor to successfully interfere with critical U.S. military and intelligence space capabilities;
- (6) Deny the opportunity to electronically exploit the command system or data links of critical U.S. military and intelligence space systems.

[NSDM-333, July 7, 1976](#)

The Panel concluded that space assets are now playing a key role in determining the effectiveness and capabilities of important elements of the military forces of both the U. S. and the Soviets. The Panel believes that, as a matter of national policy, the U. S. should not allow the Soviets an exclusive sanctuary in space. The U. S. should acquire the option of selectively neutralizing militarily important Soviet space capabilities. The need for such a U. S. anti-satellite capability is related to its military value and is not directly related to the Soviet anti-satellite program. The Panel identified several technical options for achieving such a capability, including electronic attack as well as physical attack. These preliminary conclusions are discussed in more detail in the Interim Report at Tab A.

[Smith memo NSC space panel](#)
[Nov 1976](#)

Carter Policy Decisions

d. Anti-Satellite Capability. In accordance with applicable executive directives, the United States shall seek a verifiable ban on anti-satellite capabilities and electronic warfare. DoD shall vigorously develop an anti-satellite capability, but will not produce those elements which are included in the SALT II agreement with the Soviets. Beyond that, some R&D should be continued as a hedge against Soviet breakout. The status of arms control negotiations will be reviewed periodically and will be reviewed if negotiations with the Soviet Union are unfruitful relative to the threat posed by Soviet satellites, and consequently to determine if the U.S. capabilities are still adequate. The space defense program should include an integrated attack warning, notification, and damage assessment capability which can effectively detect and react to threats to U.S. space systems.

[PD/NSC 37 – Carter National Space Policy, 11 May 1978](#)



ASM-135 ASAT missile. Source: [Wikipedia](#)

Obama/Trump Policy Decisions

The National Security Space Strategy draws upon all elements of national power and requires active U.S. leadership in space. The United States will pursue a set of interrelated strategic approaches to meet our national security space objectives:

- Promote responsible, peaceful, and safe use of space;
- Provide improved U.S. space capabilities;
- Partner with responsible nations, international organizations, and commercial firms;
- Prevent and deter aggression against space infrastructure that supports U.S. national security; and
- Prepare to defeat attacks and to operate in a degraded environment.

[2011 National Security Space Strategy](#)

FOUR PILLARS FOR A UNIFIED APPROACH: President Donald J. Trump's new National Space Strategy drives a whole-of-government approach to United States leadership in space, in close partnership with the private sector and our allies, and is based on four essential pillars:

- Transform to more resilient space architectures: We will accelerate the transformation of our space architecture to enhance resiliency, defenses, and our ability to reconstitute impaired capabilities.
- Strengthen deterrence and warfighting options: We will strengthen U.S. and allied options to deter potential adversaries from extending conflict into space and, if deterrence fails, to counter threats used by adversaries for hostile purposes.
- Improve foundational capabilities, structures, and processes: We will ensure effective space operations through improved situational awareness, intelligence, and acquisition processes.
- Foster conducive domestic and international environments: We will streamline regulatory frameworks, policies, and processes to better leverage and support U.S. commercial industry, and we will pursue bilateral and multilateral engagements to enable human exploration, promote burden sharing and marshal cooperative threat responses.

[Trump National Space Strategy, March 23, 2018](#)

Broader Policy Impact

- Increased use of satellites for military/intelligence capabilities leads to increased reliance & incentives for adversaries to develop counterspace
- Current proliferation of global counterspace capabilities
- ASAT weapons have little deterrent value, but potentially big military value in a conflict
- Imbalances in reliance on space make it difficult to get agreement on limits on ASAT testing & deployment



Soviet Reactions to Star Wars

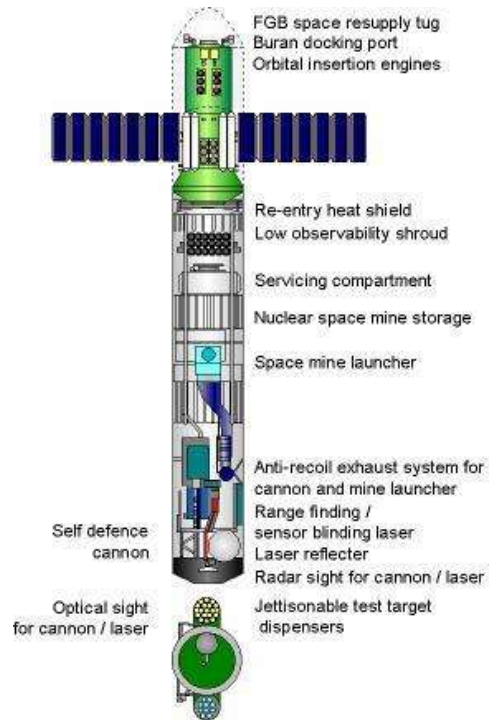
Soviet Concerns about U.S. Missile Defense

- Through 1970s and 1980s, the Soviets had become increasingly concerned about U.S. discussions for space-based interceptors (SBI) for missile defense
 - Would eliminate the Soviet nuclear deterrent
 - Could allow for precision space-based strikes on Soviet leaders
- Prompted two major Soviet R&D studies to look at potential options
 - Polyus-Skif (large laser cannon)
 - Kaskade (batteries of missiles)
 - Either could be mounted on a crewed space station based on the Salyut

Reagan Ups the Ante

- On March 23, 1983, President Reagan made his famous speech announcing the Strategic Defense initiative (SDI)
- In response, Soviet Politburo initiated a crash program for Polyus-Skif
 - 37 meters in length, 4.1 meters in diameter and weighed about 80 metric tons
 - 1-megawatt laser originally designed for an aircraft dazzler
- First demonstration version launched on May 15, 1987
 - Instead of rolling 180° to do final orbit insertion burn, Polyus-Skif rolled 360° and burned into the atmosphere

Polyus-Skif



*Polyus spacecraft layout. Source:
[Mark Wade via Astronautix](#)*



*Polyus on the pad mated to Energia
booster. Source: [Astronautix](#)*

Broader Policy Impact

- Russian space security policy today is still driven primarily by fear that space weapons will undermine its nuclear deterrent
 - Promotion of a treaty that would ban placement of weapons in outer space (PPWT)
 - Renewed development of direct ascent ASAT weapons
 - Huge investment into new nuclear weapon delivery platforms and hypersonic weapons
 - Significant concern about X-37B
- Divisions between Russia/China and the US on space security is a core roadblock to diplomatic progress

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“Luch” and French Defence Space Strategy

Luch: Up Close and Personal

- A mysterious Russian satellite known as “Luch Olym-K” has been moving around the GEO belt and getting close to other satellites since 2014
- It has parked “near” more than two dozen commercial and govt satellites owned by other countries
- Sparked concerns about intelligence collection or being a potential co-orbital ASAT threat



Russian Satellite Maneuvers, Silence Worry Intelsat

by Mike Gruss — October 9, 2015



Russian Luch Satellite Relocates – Next to Another Intelsat Craft

by Mike Gruss — October 16, 2015



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Russia 'tried to spy on France in space' - French minister

7 September 2018

French Defense Space Strategy

- On July 13, 2019, French President Emmanuel Macron announced the creation of a separate Space Command
- On July 26, 2019, French Foreign Minister Florence Parly unveiled a new French Space Defence Strategy



French Space Weapons?

Space: France will arm its next military satellites

Florence Parly detailed in Lyon France's new space strategy, based on self-defense. The budget reaches 4.3 billion euros.

From our special correspondent in Lyon, Gueric Poncet

Modified 07/26/2019 at 10:55 - Published on 07/25/2019 at 6:53 PM | [Le Point.fr](#)

In addition, the armies want to equip the next sensitive satellites with payloads. As a first step, as requested by the Minister at the end of 2018, the next generation of Syracuse satellites will be equipped with cameras that will allow them to identify possible attackers. But, in a second step, the satellites of the following generations will be able to be equipped with weapons allowing them to fight back. This could be materialized by machine guns capable of destroying the aggressor's solar panels or by lasers to blind or destroy an enemy satellite.

Source: [Le Point](#)

Actual French Space Strategy

- France reserves the right to take retaliatory measures against an unfriendly act in space;
- France may take counter-measures in response to a wrongful act perpetrated against it with the sole purpose of bringing that act to an end, in compliance with its obligations under international law, such counter-measures being strictly necessary and proportionate to the objective pursued;
- in the event of armed aggression in space, France may avail itself of its right of self-defence.

3.1.1.4 Active space defence

Military space operations, previously Earth-centred, must now also be directed towards space and seek under all circumstances to:

- preserve freedom of access to and action in space;
- discourage and thwart action by any ill-intentioned third party.

They span various passive and active measures relating to:

- prevention, taking a comprehensive approach (diplomatic, media, economic, legal, etc.);
- the resilience of all space assets;
- the defence in space of our space assets.

3.3.4 Acquire a capability to defend our interests

In order to be able to implement France's space defence strategy and better protect our space capabilities (know and act), it is crucial to give the armed forces the capabilities to defend us in space.

Studies and demonstrators over the period of the Military Planning Act

Earmarking over €3.6 billion for space, MPA 2019-2025 must provide the armed forces over the period with initial capabilities that enable them to carry out operations in space.

A long-term capability by 2030

The efforts made under MPA 2019-2025 must be the springboard for full capability by 2030.

These capabilities will be integrated, as sensors and effectors, into the scope of the future military space operations command and control system, the initial studies for which will begin as of MPA 2019-2025

Source: [*Space Defense Strategy, Report of the Working Group, 2019*](#)

Broader Policy Impact

- Lack of clarity, coupled with bad word choices/lack of technical understanding by politicians, gives wrong public impression
 - They aren't actually putting machine guns on satellites
- In-line with larger trend towards militarization and potentially weaponization of space
- No clear understanding of what “use of force”, “armed attack”, or “self-defense” means in a space context

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Satellite Navigation Wars

Short history of PNT policy

- 1973: Deal brokered between Air Force, Navy, and Army to develop a joint satellite navigation system (GPS)
- 1996: Clinton administration policy debate on selective availability
- 2001: GPS declared fully operational
- 2003: European Union officially launches Galileo program
- 2006: Bush administration policy debate on Galileo
- 2008: China leaves the Galileo program, shortly thereafter announces BeiDou program
- 2011: BeiDou-2 declared operational

Clinton Administration GPS policy

- **Core issue:** What to do about the random ~100-meter error on the public signal?
 - FAA: We want to use GPS to land airplanes so it needs to get turned off
 - DOD: Turning it off will allow bad guys to use it against us
- **Decision:** Turn it off within 10 years (by 2006) and give DOD money to develop alternative methods of controlling access
 - Make GPS the “Gold Standard” that everyone in the world uses (and thus no alternative competition)
- **Reality:** DOD pushed to turn it off after 4 years (2004) to undermine European business case for Galileo

Bush Administration GPS policy

- **Core issue:** Does the US cooperate with EU Galileo or compete?
 - EU Galileo program parked their secure signal (PRS) on top of GPS military signal (M-Code)
 - Could make it more difficult for the US to prevent adversaries from using PRS
- **Decision:** Coopetition
 - Cooperate on creating a new international civil signal common to all GNSS (L1C)
 - Compete by moving PRS and M-Code to different frequencies
- **Reality:** China gets kicked out of Galileo, parks its military BeiDou signal on top of Galileo PRS

Policy Implications

- “Gold standard” strategy failed
 - GPS (USA), Galileo (EU), Glonass (Russia), Beidou (China), IRNSS (India), QZSS (Japan)
- World is moving towards a common civil GNSS signal (L1C)
- However, that common civil signal is easily jammed/spoofed
 - US did not invest in protecting it, wanted to be able to deny it to adversaries
 - GNSS jamming/spoofing is proliferating
 - GNSS is integrated into many critical infrastructures and services
- US military still struggling to implement M-Code

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Discussion

Thank you!

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