**Memorandum**

**Senate Armed Services Subcommittee on Strategic Forces:**

# *To receive testimony on the United States Space Force programs in review of the Defense*

***Authorization Request for Fiscal Year 2023 and the Future Years Defense Program***

May 11, 2022

**Members Participating**

Senator Angus King (I-ME)

Senator Mike Rounds (R-SD)

Senator Mark Kelly (D-AZ)

Senator Deb Fischer (R-NE)

Senator Kevin Cramer (R-ND)

Senator Tom Cotton (R-AR)

Senator Tommy Tuberville (R-AL)

**Witnesses**

Honorable Dr. John Plumb, *Assistant Secretary of Defense for Space Policy*

Honorable Frank Calvelli, *Assistant Secretary of the Air Force for Space Acquisition and*

*Integration*

General David Thompson, *Vice Chief of Space Operations*

**Summary**

While the beginning of the hearing was focused on specific aspects of the USSF FY23 Defense Authorization Request, it became a broad discussion of strategy that included shout-outs in favor of states and private companies. The hearing held many comparisons to China’s progress and covered the commonly shared ideas of integrating systems and decisively increasing acquisition rates.

**Opening Statements**

Secretary Calvelli – Goals and priorities are increasing acquisition speeds, increasing space architecture’s resilience, developing the space architecture’s integration capabilities, imposing timelines in acquisitions, developing ground systems to sustain capabilities in space.

Secretary Plumb – China is fielding wartime space architecture. Our greatest near-peer competitors. Seeks $27.6 billion for DoD space capabilities. Notably: $4.7 billion for the transition to a new missile warning and tracking architecture, $1.8 billion for two [GPS IIIF (Follow-On) satellites](https://www.af.mil/News/Article-Display/Article/1633793/af-announces-selection-of-gps-iii-follow-on-contract/) and to continue testing military GPS equipment, $1.6 billion for secure and jam-resistant satellite communications, $1.6 billion to procure six National Security space launch vehicles.

General Thompson – China and Russia continue to develop kinetic and non-kinetic space weapons. The new satellite architecture will have the capability to track hypersonics.

**Questions**

Senator King: Are the changes that need to be made to current statutes? If so, asked the witnesses to let them know so that the committee can consider the suggestion. Open invitation. What is the strategy for protecting the U.S. space assets?

* General Thompson: Architecture, size and number of satellites, updates, and fuel management were key points made in open session.

Senator Fischer: How ready is the industrial base to meet the production needs of larger constellations? Are there limitations or bottlenecks on certain things like refrigeration units? Are industrial base limitations taken into account?

* General Thompson: The industrial base is as ready as ever. Commercial investment helps that expansion because of dual-use items. Generally speaking, there are no bottlenecks except for perhaps several very specific items which do not limit production. Yes, industrial base limitations are an old process. Part of the process adds bringing in industry early to provide them with relevant data. What is new is that designs are handed to Secretary Calvelli, it is up to them to do the research necessary.

Senator Cotton: The NRO has been more efficient in delivering space capabilities, can you speak to how you plan to replicate that? What lessons have been learned?

* Secretary Calvelli: Program discipline is built into the NRO’s culture. It was expected for Ukraine's internet to be cut off within days of the invasion. It is not thanks to satellite based internet. Diversifying architecture increases your resiliency. Cannot deny satellite communication in its entirety.
* Secretary Plumb: Resilience means different things for different constellations. Elaborate on the $36 million in climate initiatives included.
* General Thompson: It is meant to understand the bases’ infrastructure. Need to ensure power systems can operate under all conditions (war, climate, etc.).

Senator Rounds: What are your thoughts on how to acquire quantum computing and what China is doing? What would be your response to those who say that space should not be thought of as a warfighting domain?

* Secretary Calvelli: Must ensure that ground systems are capable of integration with AI in the future. As for quantum computing, the U.S. is very much in the R&D stage.
* General Thompson: The advancements in America’s academic and commercial advantage is tremendous, but China plans to lead the world in AI by 2030. Many of their scientists study at American universities.
* General Thompson: Russia and China have already voted that it is. The U.S. needs to secure its assets.

Senator Kelly: The National Guard has been involved in the space mission for 25 years. What are your thoughts on the advantages of establishing a Space National Guard and would current Guardsmen potentially transfer (impacted by location, service preference, family, etc.)? And as for STM, how many objects are being tracked and how small are those objects?

* General Thompson: Cannot do without their capability in the future. The Space Force is making an assessment and making no assumptions as to whether those Guardsmen would transfer. Also considering what may happen and the work that would need to be done if Guardsmen do not transfer.
* General Thompson: The number is approaching 40,000 and tracking objects as small as 102 centimeters. Believe there are many more smaller objects. Encounter hundreds to thousands of objects that have state vectors, but can no longer be found. Often it is because of their unorthodox orbits and the objects are on the brink of being within tracking abilities—a great potential application for AI.

Senator Tuberville: How many pieces on average would come from a destroyed satellite? How long do those pieces of debris last in space?

* Gen. Thompson: The Russian ASAT test, in 2021, created over 15,000 pieces that are tracked. They last years to decades. Indicated that he wants to get Space Command to Redstone Arsenal.

Senator Cramer: The over 50-year old Cavalier Radar is not included in the FY23 budget and it is recognized as close to being in a precarious position. How will the SDA maintain its independence?

* Gen. Thompson: It plays a critical role in missile defense. It must be sustained in the near term.
* Secretary Calvelli: Does not see any major changes as to how SDA does business.

Senator Cramer: Can SDA be given Middle Tier Acquisition (MTA) authorities?

* Secretary Calvelli: Yes.

Senator King: What happens if a pilot in an F-35 can no longer use GPS because it has been shut down. What can that pilot do? Are you looking into celestial navigation?

* General Thompson: There are concerns with systems to navigate effectively over the long term. Pilots are trained to fly without GPS, but not without mission impact.
* General Thompson: Looking to train people to do it, but also creating automated tools that can provide guidance at night and also during the day when stars are not visible to humans. Must be prepared to fight through GPS denial.

Senator King: How are international negotiations progressing, relative to ASAT testing?

* Secretary Plumb: Canada has joined ranks with the U.S. Currently have U.N. mitigation guidelines, but not everyone abides by them.

Senator King: Is there systematic coordination between SF, the NRO, and other organizations to avoid duplication?

* Secretary Calvelli: There is coordination amongst NRO, NASA, and SF. The Space Force also has the Space Acquisition Council.

Senator Fischer: Are there any efforts to declassify threat information?

* Secretary Plumb: Somewhat. There is more information available than before. Important to get information out to certain think tanks who believe they know what is going on in closed sessions and behind the scenes, but often do not even come close. Think tanks make assumptions and take positions off of incorrect information.

Senator Tuberville: “With a need of speed, in the future, is there any thought of nuclear power in space?”

* Secretary Plumb: NASA has taken the lead on that research.