

How Much Will the Space Force Cost?

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THE ISSUE

The proposed creation of a new military service for space, known as the Space Force, is likely to be a hotly debated issue in the FY 2020 legislative cycle. One of the central questions about this proposal is how much it will cost and what the overall size and scope of the Space Force will be. This brief provides rough estimates for the number of military and civilian personnel, the number and locations of bases, the budget lines that would transfer to the new organization, and the additional personnel and headquarters organization that would be needed for the new military service.

INTRODUCTION

The size and budget of a new military service for space depends on how broadly its charter is defined and which existing space-related organizations it would incorporate. The three options evaluated in this analysis are: a Space Corps within the Department of the Air Force; a limited but independent Department of the Space Force (“Space Force-Lite”); and a more expansive Department of the Space Force (“Space Force-Heavy”). The Space Corps option is limited to the space-related organizations, personnel, programs, and bases currently within the Air Force, similar to the legislation that passed the House on July 6, 2017, as part of the FY 2018 National Defense Authorization Act (NDAA). The Space Force-Lite option includes everything in the Space Corps plus the space-related organizations, personnel, programs, and bases in the other Services. The Space Force-Heavy option includes everything in the Space Force-Lite option plus some missile defense activities and programs in the Army and Missile Defense Agency that could be considered space-related under a broader definition.

None of the estimates provided include the space capabilities resident in the intelligence agencies, such as the National Reconnaissance Office (NRO). This is not intended as a judgment on whether such organizations should or should not be included in a new space service but rather reflects the fact that little data is publicly available on the budgets and numbers of personnel in these organizations. The analysis also does not include the additional personnel and funding that may be needed to stand up a new combatant command for space (U.S. Space Command) or a Space Development Agency because these are separate policy decisions, and both could be created with or without a new military service. Moreover, this analysis does not assume any change in the current activities, acquisition programs, or capabilities of existing space forces as part of the reorganization. A detailed discussion of the assumptions and methodology used for the cost estimate and the specific funding lines that would be transferred to the new service can be found in the Appendix.

This analysis finds that the total annual budget of the new service would range from \$11.3 billion to \$21.5 billion

under the three options considered, more than 96 percent of which would be transferred from existing budget accounts within DoD. Of these totals, only \$0.30 billion to \$0.55 billion would be new funding (or \$1.5 to \$2.7 billion over five years).

OPTION 1: SPACE CORPS

The Space Corps option includes all the components of the 14th Air Force. The main bases and organizations included are: the 21st Space Wing at Peterson Air Force Base (AFB),¹ the 30th Space Wing at Vandenberg AFB, the 45th Space Wing at Patrick AFB,² the 50th Space Wing at Schriever AFB, and the 460th Space Wing at Buckley AFB,³ as well as the Space and Missile Systems Center (SMC) at Los Angeles AFB. It does not include 24th Air Force (Cyber), which was reassigned from Air Force Space Command to Air Combat Command in July 2018.⁴ Smaller units would transition to the Space Corps but remain as tenants on Air Force bases in other locations, such as the 20th Space Control Squadron at Eglin Air Force Base and the Space Vehicles Directorate at Kirtland AFB. This option would result in the transfer of approximately 12,100 active duty, 1,600 guard and reserve, and 11,900 civilian personnel from the Air Force to the Space Corps. An additional staff of approximately 1,700 personnel would be needed for headquarters and overhead functions, for a total workforce of 27,300.

Table 1: Estimated Annual Budget of the Space Corps Option

	Annual Budget (in FY 2019 dollars)
Military Personnel	\$1.3B
Civilian Personnel	\$1.3B
MILCON	\$0.2B
RDT&E	\$4.7B
Procurement	\$2.8B
Recruiting and Training (O&M)	\$0.1B
Operating Forces (O&M)	\$0.6B
Headquarters Staff	\$0.3B*
Total Annual Budget	\$11.3B

* New funding that is not transferred from existing accounts.

OPTION 2: SPACE FORCE-LITE

The Space Force-Lite option includes everything in the Space Corps option above plus the Army 1st Space Brigade as a tenant unit at Fort Carson, the Navy Program Executive Office Space Systems as a tenant unit at the

Space and Naval Warfare Systems Command (SPAWAR) in San Diego, and the Navy Satellite Operations Center at Naval Air Station Point Mugu. It would also include Army and Navy personnel assigned to liaison or support Air Force Space Command units. This option would transfer approximately 16,700 active duty, 1,900 guard and reserve, and 14,600 civilian personnel from the Air Force, Army, and Navy to the Space Force. An additional 2,600 new personnel would be needed for headquarters and secretariat functions for a total workforce of approximately 35,800.

Table 2: Estimated Annual Budget of the Space Force-Lite Option

	Annual Budget (in FY 2019 dollars)
Military Personnel	\$1.7B
Civilian Personnel	\$1.6B
MILCON	\$0.2B
RDT&E	\$5.1B
Procurement	\$3.2B
Recruiting and Training (O&M)	\$0.1B
Operating Forces (O&M)	\$1.1B
Headquarters / Secretariat Staff	\$0.4B*
Total Annual Budget	\$13.4B

* New funding that is not transferred from existing accounts.

OPTION 3: SPACE FORCE-HEAVY

The Space Force-Heavy option includes everything in the Space Force-Lite option plus the Army's 100th Missile Defense Brigade that operates Ground-Based Mid-Course Defense (GMD) systems at Fort Greely and Vandenberg AFB and part of the Missile Defense Agency (MDA). The MDA activities and programs included in this option are those related to sensors, tracking, and target discrimination capabilities that can be used for space situational awareness and mid-course intercept capabilities that can be used as anti-satellite and defensive counterspace weapons. It also includes a small contingent of personnel from the Defense Information Systems Agency (DISA) that work on satellite communications-related activities. This option would transfer approximately 18,300 active duty, 2,800 guard and reserve, and 24,300 civilian personnel from the other S ervices and defense agencies to the Space Force. An additional 3,100 new personnel would be needed for headquarters and overhead functions for a total workforce of approximately 48,500.

Table 3: Estimated Annual Budget of the Space Force-Heavy Option

	Annual Budget (in FY 2019 dollars)
Military Personnel	\$1.9B
Civilian Personnel	\$2.7B
MILCON	\$0.3B
RDT&E	\$10.7B
Procurement	\$3.7B
Recruiting and Training (O&M)	\$0.1B
Operating Forces (O&M)	\$1.6B
Headquarters / Secretariat Staff	\$0.5B*
Total Annual Budget	\$21.5B

* New funding that is not transferred from existing accounts.

SUMMARY

As this analysis shows, the size and budget of a new military service for space can vary considerably depending on the scope of the reorganization. It can range from a total workforce of 27,300 people and an annual budget of \$11.3 billion to a workforce of 48,500 and an annual budget of \$21.5 billion. As previously noted, these figures do not include the space-related personnel and programs in the intelligence agencies, which could be added in whole or in part to any of these options. While many other hybrid options are also possible, the three options considered here provide a broad range for policymakers to consider. Importantly, in all the options shown here, more than 96 percent of the budget is transferred from other parts of DoD and would not add to the topline defense budget. The new funding required for a Space Corps or Space Force ranges from \$0.30 billion to \$0.55 billion annually, less than one-tenth of a percent of the total national defense budget.

When compared to the other Services, as shown in Table 4, the Space Force-Heavy option would be similar in size to the

Table 4: Comparison to the Other Military Services

	Army	Navy	Marine Corps	Air Force ¹⁶	Coast Guard	Space Corps	Space Force-Lite	Space Force-Heavy
Discretionary Budget Authority (FY 2019)	\$182.1B	\$164.9B	\$29.2B	\$156.3B	\$11.7B	\$11.3B	\$13.4B	\$21.5B
Active Military	487,500	335,400	186,100	329,100	41,382	12,100	16,700	18,300
Guard / Reserve	543,000	59,100	38,500	177,100	-	1,600	1,900	2,800
Civilian ¹⁷	194,803	190,642	21,553	175,771	8,759	13,600*	17,200*	27,400*
Total Workforce (FY 2019)	1,225,303	585,142	246,153	681,971	50,141	27,300	35,800	48,500

* Includes headquarters/secretariat staff and civilian personnel

Coast Guard in terms of the total workforce, although the funding level would be nearly double that of the Coast Guard. This is mainly due to the expensive technology used in space systems and the large Research, Development, Test, and Evaluation (RDT&E) budget a space service would require. The Space Corps option would have roughly half the total workforce of the Coast Guard but would command a similarly sized budget. One notable difference from the other Services is that under all three options considered, more than 50 percent of the full-time workforce for a space service would be civilians, compared to 29 percent for the Army, 36 percent for the Navy, 10 percent for the Marine Corps, 35 percent for the Air Force, and 17 percent for the Coast Guard.

Many organizational options are available, and each has advantages and disadvantages.⁵ While the cost of a space service would largely be budget neutral, except for the additional staff needed for headquarters and secretariat functions, this means that the existing military services would stand to lose personnel and budget from such a reorganization. The Air Force would lose the most under all three options, giving up more than \$11 billion in annual budget authority. The creation of a new military service for the first time since the Air Force was created in 1947 is a monumental decision, and ultimately, Congress must decide if and when to create a Space Force.

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APPENDIX: METHODOLOGY AND COST ASSUMPTIONS USED

For transparency and completeness, this appendix documents the methodology, data sources, and assumptions used in this paper. While this analysis is based as much as possible on publicly available data sources, it inevitably involves subjective assessments about what organizations, bases, and activities to include or not include and how to estimate quantities that are not publicly known. For example, the Space Corps option includes all the Air Force personnel at Peterson AFB (except the Air National Guard Airlift Wing), but it could also be argued that many of these personnel are not doing space-related jobs and would therefore not need to transfer to the new service.

PERSONNEL NUMBERS

The numbers of active, guard, reserve, and civilian personnel are estimated using the personnel data contained in the FY 2017 DoD Base Structure Report for the bases and facilities that are most closely associated with space-related activities under each of the options analyzed.⁶ The total number of personnel at bases are adjusted as needed to remove personnel belonging to units that would not transfer to the new service, such as flying wings co-located at bases that predominantly perform space missions. For predominantly space bases, all of the base support personnel are assumed to transfer to the new service, along with the costs of maintaining the base and associated facilities. However, a detailed assessment of the billets and job functions at each location would be needed to determine precisely how many positions would need to transfer, which is beyond the scope of this assessment. Below are the numbers of personnel assumed for each of the options.

Table 5: Space Corps Personnel Estimates

Base Name	State / Country	Air Force	Air National Guard	Air Force Reserve	APF Civilian DoD	NAF Civilian DoD
BUCKLEY AFB	CO	1605	0	424	1277	0
EGLIN AFB	FL	250	0	0	0	0
KIRTLAND AFB	NM	472	0	0	464	63
LOS ANGELES AFB	CA	1127	0	146	1571	75
PATRICK AFB	FL	1398	89	0	2069	377
PETERSON AFB	CO	3068	0	0	3349	450
SCHRIEVER AFB	CO	1647	0	652	645	0
THULE AFB	GL	164	0	0	0	0
VANDENBERG AFB	CA	2413	122	211	1197	312
Total		12144	211	1433	10572	1277

Table 6: Space Force-Lite Personnel Estimates

Base Name	State / Country	Army	Navy	Air Force	Air National Guard	Air Force Reserve	Navy Reserve	APF Civilian DoD	NAF Civilian DoD
BUCKLEY AFB	CO	0	0	1605	0	424	0	1277	0
EGLIN AFB	FL	0	0	250	0	0	0	0	0
KIRTLAND AFB	NM	0	0	472	0	0	0	464	63
LOS ANGELES AFB	CA	41	169	1127	0	146	0	1571	75
PATRICK AFB	FL	45	16	1398	89	0	0	2069	377
PETERSON AFB	CO	417	165	3068	0	0	0	3349	450
SCHRIEVER AFB	CO	145	23	1647	0	652	0	645	0
THULE AFB	GL	0	0	164	0	0	0	0	0
VANDENBERG AFB	CA	18	24	2413	122	211	0	1197	312
FORT CARSON	CO	2385	0	0	0	0	0	353	111
SPAWAR PEO SPACE	CA	0	200	0	0	0	0	400	0

NAS POINT MUGU	CA	0	904	0	0	0	233	1886	21
Total		3051	1501	12144	211	1433	233	13211	1409

Table 7: Space Force-Heavy Personnel Estimates

Base Name	State / Country	Army	Navy	Marine Corps	Air Force	Air National Guard	Air Force Reserve	Navy Reserve	Army National Guard	Army Reserve	APF Civilian DoD	NAF Civilian DoD
BUCKLEY AFB	CO	0	0	0	1605	0	424	0	0	0	1277	0
EGLIN AFB	FL	0	0	0	250	0	0	0	0	0	0	0
KIRTLAND AFB	NM	0	0	0	629	0	0	0	0	0	619	84
LOS ANGELES AFB	CA	41	169	0	1127	0	146	0	0	0	1571	75
PATRICK AFB	FL	45	16	0	1398	89	0	0	0	0	2069	377
PETERSON AFB	CO	417	165	0	3068	0	0	0	472	0	3349	450
SCHRIEVER AFB	CO	145	23	0	1647	0	652	0	0	0	645	0
THULE AFB	GL	0	0	0	164	0	0	0	0	0	0	0
VANDENBERG AFB	CA	18	24	0	2413	122	211	0	66	0	1197	312
FORT CARSON	CO	2385	0	0	0	0	0	0	0	0	353	111
SPAWAR PEO SPACE	CA	0	200	0	0	0	0	0	0	0	400	0
NAS POINT MUGU	CA	0	904	0	0	0	0	233	0	0	1886	21
FORT GREELY	AK	10	0	0	0	207	0	0	0	0	1073	0
REDSTONE ARSENAL	AL	320	0	0	0	0	0	0	0	200	7332	324
FORT MEADE	MD	408	265	77	334	0	0	0	0	0	721	70
Total		3789	1766	77	12635	418	1433	233	538	200	22492	1824

Figure 1: Locations and Numbers of Personnel in the Space Corps Option

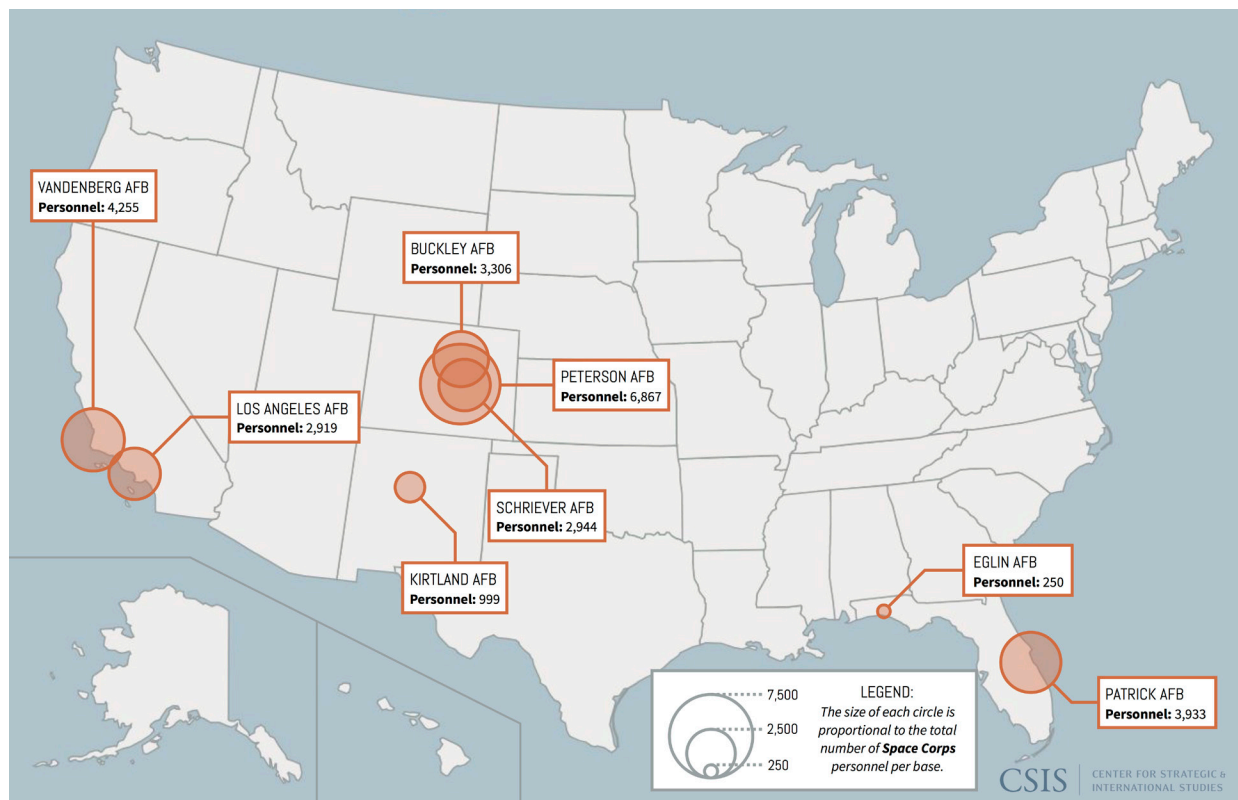


Figure 2: Locations and Numbers of Personnel in the Space Force-Lite Option

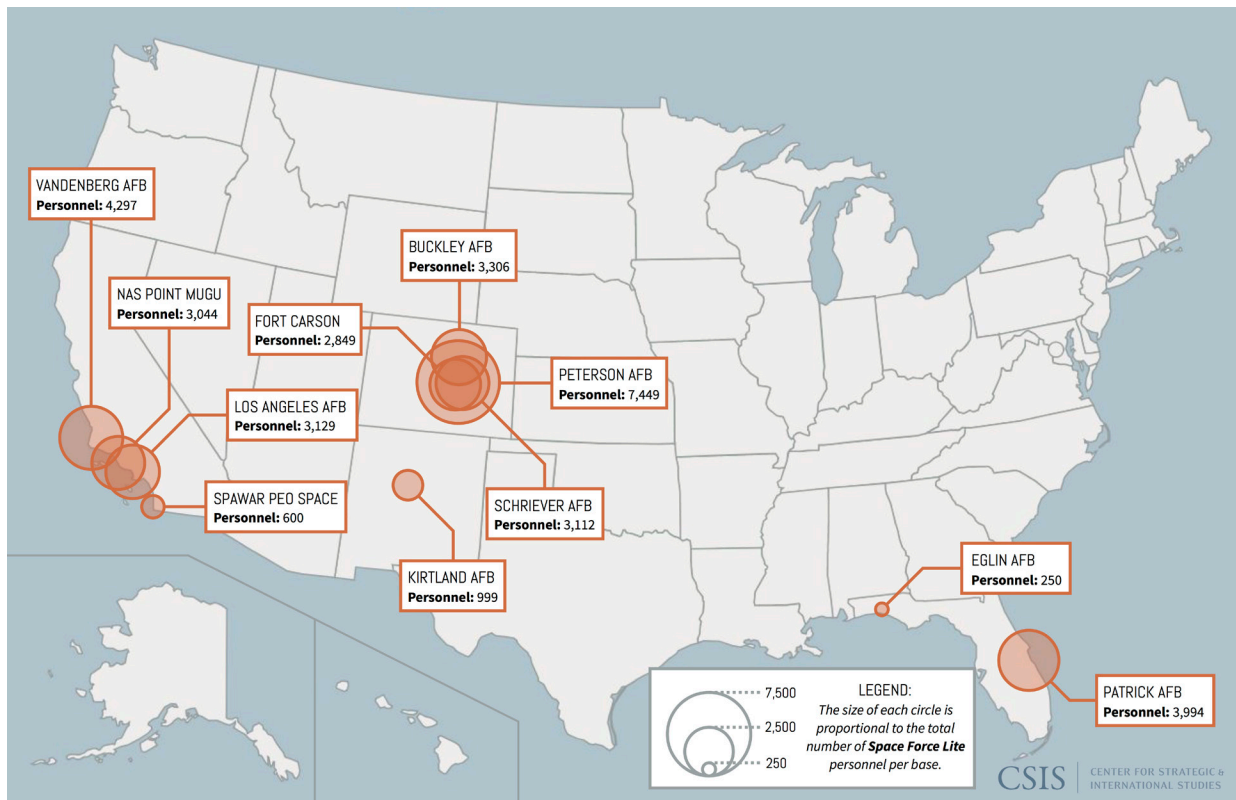
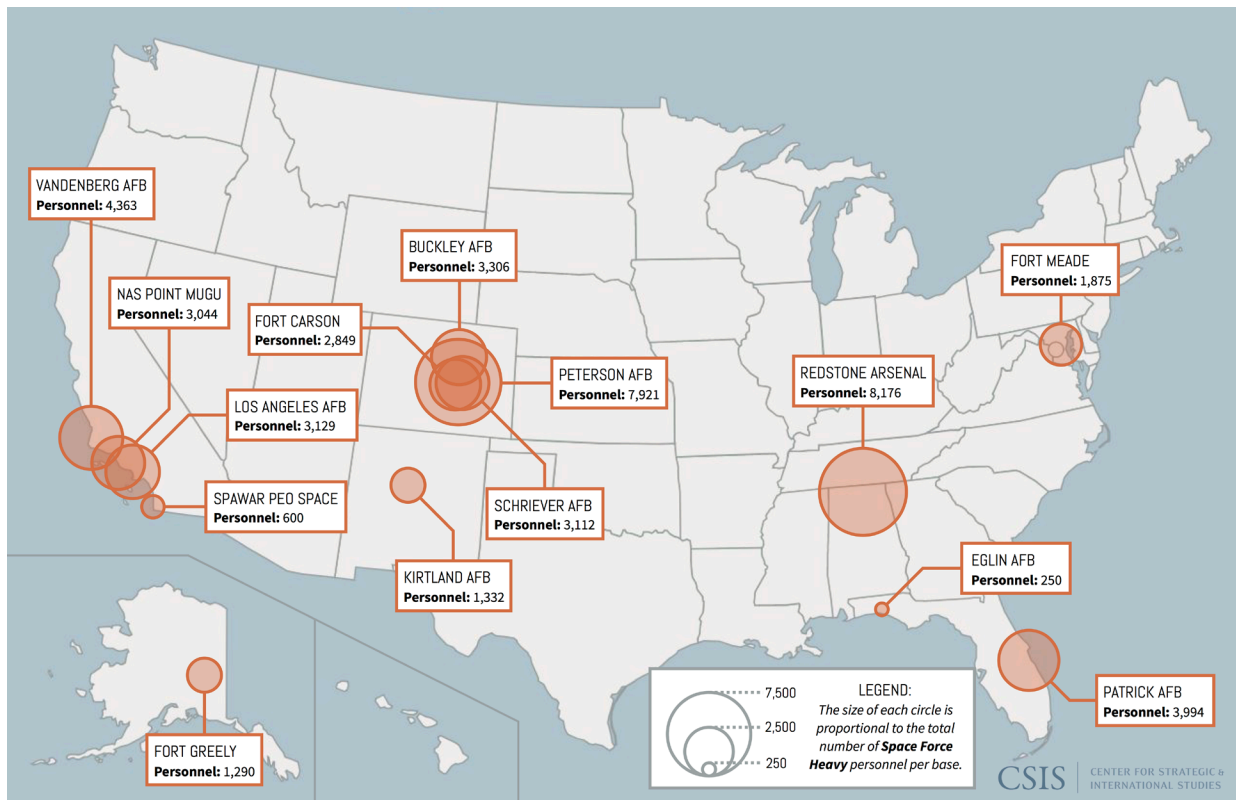


Figure 3: Locations and Numbers of Personnel in the Space Force-Heavy Option



PERSONNEL COSTS

Personnel costs are calculated by using an average cost per person in each of the Services and components. The average cost per service member includes all associated military personnel (MILPERS), family housing costs, and Medicare Retiree Health Care Contribution costs in the FY 2019 budget request. It does not include the Defense Health Program (DHP) since this activity is not paid for by the services and therefore would not transfer to the Space Force.⁷ The average cost per DoD civilian employee is calculated using the total civilian pay for DoD (\$85.0 billion) divided by the number of full-time civilian equivalents (776,000) as contained in the DoD Green Book for FY 2019, which comes to \$109,600 per person. The cost of additional headquarters personnel is handled separately since these are new personnel that would not be drawn from the existing force and would likely be higher in rank on average than the overall force. The average cost per headquarters personnel is assumed to be \$175,000, consistent with the Air Force's cost estimate from September 2018.⁸

Table 8: Personnel-Related Costs in the FY 2019 Budget Request (in thousands of FY 2019 dollars)

	MILPERS	MRHCC	Family Housing	End Strength	Cost per Person (not including DHP)
Air Force Active	\$31,004,735	\$1,448,912	\$329,968	329,100	\$99.6
Air Force Reserve	\$1,894,286	\$132,578	\$0	70,000	\$29.0
Air National Guard	\$3,725,380	\$236,097		107,100	\$37.0
Army Active	\$43,963,336	\$2,141,855	\$479,512	487,500	\$95.6
Army Reserve	\$4,955,947	\$386,853		199,500	\$26.8
Army National Guard	\$8,744,345	\$685,463		343,500	\$27.5
Navy Active	\$30,792,842	\$1,465,879	\$401,188	335,400	\$97.4
Navy Reserve	\$2,067,521	\$130,504		59,100	\$37.2
Civilian	\$85,033,552			776,000	\$109.6

MILITARY CONSTRUCTION (MILCON)

The annual cost of MILCON is estimated using the plant replacement value (PRV) from the FY 2017 Base Structure Report for the bases and facilities (and portions of facilities) that would transfer to or be used by the Space Force.⁹ The PRVs used for each option are shown in the table below. The annual MILCON funding required is estimated as 1/67th of the total PRV, which corresponds to a composite expected life of 67 years for the various structures and other improvements at each location.

Table 9: Plant Replacement Value of Space Force Bases and Facilities (in millions of FY 2019 dollars)

Base Name (* denotes bases where responsibility for only part of the facilities would transfer to the new service)	State / Country	Space Corps	Space Force-Lite	Space Force-Heavy
BUCKLEY AFB	CO	\$1,602.7	\$1,602.7	\$1,602.7
EGLIN AFB*	FL	\$97.8	\$97.8	\$97.8
KIRTLAND AFB*	NM	\$696.8	\$696.8	\$929.0
LOS ANGELES AFB	CA	\$362.4	\$362.4	\$362.4
PATRICK AFB	FL	\$1,378.1	\$1,378.1	\$1,378.1
PETERSON AFB	CO	\$1,632.0	\$1,632.0	\$1,632.0
SCHRIEVER AFB	CO	\$928.6	\$928.6	\$928.6
THULE AFB	GL	\$3,194.6	\$3,194.6	\$3,194.6
VANDENBERG AFB	CA	\$4,421.9	\$4,421.9	\$4,421.9
FORT CARSON*	CO		\$785.4	\$785.4
SPAWAR PEO SPACE*	CA		\$103.3	\$103.3
NAS POINT MUGU	CA		\$1,652.9	\$1,652.9

FORT GREELY	AK			\$2,052.8
REDSTONE ARSENAL*	AL			\$3,098.1
DISA / FORT MEADE*	MD			\$308.4
Total		\$14,314.8	\$16,856.3	\$22,547.8

RESEARCH, DEVELOPMENT, TEST, & EVALUATION (RDT&E)

The estimated RDT&E costs are calculated by identifying which existing funding lines within the FY 2019 budget request would transfer to the Space Force under each option. RDT&E funding can vary significantly from year to year as new programs are started or completed, so the annual RDT&E funding of the Space Force would vary accordingly. For example, funding for the development of the Space-Based Infrared System follow-on constellation is projected to grow by nearly \$300 million from FY 2019 to FY 2020. The table below lists the space-related RDT&E funding lines and the FY 2019 level of requested funding used in the estimated costs for each option.¹⁰

Table 10: Existing Space-Related RDT&E Line Items (in thousands of FY 2019 dollars)

Existing Service	PE	PE Title	FY 2019 Request	Space Corps	Space Force-Lite	Space Force-Heavy
Air Force	1206601F	Space Technology	\$117,645	X	X	X
Air Force	1206434F	Midterm Polar MILSATCOM System	\$383,113	X	X	X
Air Force	1206857F	Operationally Responsive Space	\$378,445	X	X	X
Air Force	1203164F	NAVSTAR Global Positioning System (User Equipment) (SPACE)	\$286,629	X	X	X
Army	1206120A	Assured Positioning, Navigation and Timing (PNT)	\$146,300		X	X
Air Force	1206422F	Weather System Follow-on	\$138,052	X	X	X
Air Force	1206438F	Space Control Technology	\$92,118	X	X	X
Air Force	1206760F	Protected Tactical Enterprise Service (PTES)	\$51,419	X	X	X
Air Force	1206730F	Space Security and Defense Program	\$45,542	X	X	X
Air Force	1206425F	Space Situation Awareness Systems	\$39,338	X	X	X
Army	1206308A	Army Space Systems Integration	\$38,319		X	X
Defense-Wide	1206893C	Space Tracking & Surveillance System	\$36,955		X	X
Air Force	1206761F	Protected Tactical Service (PTS)	\$29,776	X	X	X
Air Force	1206855F	Protected SATCOM Services (PSCS) - Aggregated	\$29,379	X	X	X
Defense-Wide	1206895C	Ballistic Missile Defense System Space Programs	\$16,484		X	X
Air Force	1203710F	EO/IR Weather Systems	\$7,940	X	X	X
Air Force	1206442F	Evolved SBIRS	\$643,126	X	X	X
Air Force	1203269F	GPS IIIC	\$451,889	X	X	X
Air Force	1206853F	Evolved Expendable Launch Vehicle Program (SPACE) - EMD	\$245,447	X	X	X

Air Force	1206431F	Advanced EHF MILSATCOM (SPACE)	\$151,506	X	X	X
Air Force	1206425F	Space Situation Awareness Systems	\$134,463	X	X	X
Air Force	1206441F	Space Based Infrared System (SBIRS) High EMD	\$60,565	X	X	X
Air Force	1203940F	Space Situation Awareness Operations	\$46,668	X	X	X
Air Force	1206432F	Polar MILSATCOM (SPACE)	\$27,337	X	X	X
Army	1205117A	Tractor Bears	\$23,170		X	X
Air Force	1206421F	Counterspace Systems	\$20,676	X	X	X
Air Force	1206426F	Space Fence	\$20,215	X	X	X
Air Force	1206433F	Wideband Global SATCOM (SPACE)	\$3,970	X	X	X
Air Force	1203176F	Combat Survivor Evader Locator	\$939	X	X	X
Air Force	1206392F	Space and Missile Center (SMC) Civilian Workforce	\$169,912	X	X	X
Air Force	1206864F	Space Test Program (STP)	\$25,620	X	X	X
Air Force	1206116F	Space Test and Training Range Development	\$23,254	X	X	X
Air Force	1206860F	Rocket Systems Launch Program (SPACE)	\$19,721	X	X	X
Air Force	1206398F	Space & Missile Systems Center - MHA	\$10,508	X	X	X
Navy	1206867N	SEW Surveillance/ Reconnaissance Support	\$8,684		X	X
Air Force	1206423F	Global Positioning System III - Operational Control Segment	\$513,235	X	X	X
Air Force	1203265F	GPS III Space Segment	\$144,543	X	X	X
Air Force	1203001F	Family of Advanced BLoS Terminals (FAB-T)	\$80,168	X	X	X
Air Force	1203614F	JSpOC Mission System	\$72,256	X	X	X
Air Force	1203173F	Space and Missile Test and Evaluation Center	\$59,935	X	X	X
Air Force	1203620F	National Space Defense Center	\$42,209	X	X	X
Navy	1203109N	Satellite Communications (SPACE)	\$39,174		X	X
Air Force	1202247F	AF TENCAP	\$31,986	X	X	X
Air Force	1203174F	Space Innovation, Integration and Rapid Technology Development	\$21,019	X	X	X
Air Force	1203913F	NUDET Detection System (SPACE)	\$19,778	X	X	X
Air Force	1203940F	Space Situation Awareness Operations	\$19,572	X	X	X
Air Force	1203110F	Satellite Control Network (SPACE)	\$17,808	X	X	X
Air Force	1203400F	Space Superiority Intelligence	\$16,278	X	X	X
Air Force	1201921F	Service Support to STRATCOM - Space Activities	\$14,161	X	X	X

Army	1203142A	SATCOM Ground Environment (SPACE)	\$12,119		X	X
Air Force	1203182F	Spacelift Range System (SPACE)	\$10,641	X	X	X
Air Force	1203165F	NAVSTAR Global Positioning System (Space and Control Segments)	\$8,937	X	X	X
Air Force	1203179F	Integrated Broadcast Service (IBS)	\$8,568	X	X	X
Army	1208053A	Joint Tactical Ground System	\$7,400		X	X
Defense-Wide	1203610K	Teleport Program	\$2,323		X	X
Defense-Wide	0603294C	Common Kill Vehicle Technology	\$189,753			X
Defense-Wide	0603760E	Command, Control and Communications Systems	\$185,984			X
Defense-Wide	0604874C	Improved Homeland Defense Interceptors	\$561,220			X
Defense-Wide	0603891C	Special Programs - MDA	\$422,348			X
Defense-Wide	0604181C	Hypersonic Defense	\$120,444			X
Defense-Wide	0603890C	BMD Enabling Programs	\$540,926			X
Defense-Wide	0604673C	Pacific Discriminating Radar	\$95,765			X
Defense-Wide	0603914C	Ballistic Missile Defense Test	\$365,681			X
Defense-Wide	0604115C	Technology Maturation Initiatives	\$148,822			X
Defense-Wide	0603907C	Sea Based X-Band Radar (SBX)	\$149,715			X
Defense-Wide	0604887C	Ballistic Missile Defense Midcourse Segment Test	\$81,934			X
Defense-Wide	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communications	\$475,168			X
Defense-Wide	0603906C	Regarding Trench	\$16,916			X
Defense-Wide	0604894C	Multi-Object Kill Vehicle	\$8,256			X
Defense-Wide	0603904C	Missile Defense Integration & Operations Center (MDIOC)	\$54,925			X
Defense-Wide	0603898C	Ballistic Missile Defense Joint Warfighter Support	\$48,767			X
Defense-Wide	0604879C	Ballistic Missile Defense Sensor Test	\$81,001			X
Defense-Wide	0603915C	Ballistic Missile Defense Targets	\$517,852			X
Air Force	0207455F	Three Dimensional Long-Range Radar (3DELRR)	\$40,326			X
Defense-Wide	0604873C	Long Range Discrimination Radar (LRDR)	\$164,562			X
Defense-Wide	0603884C	Ballistic Missile Defense Sensors	\$220,876			X
Defense-Wide	0603882C	Ballistic Missile Defense Midcourse Defense Segment	\$926,359			X

Air Force	0207423F	Advanced Communications Systems	\$14,888			X
Defense-Wide	0901598C	Management HQ - MDA	\$28,626			X
Air Force	0303131F	Minimum Essential Emergency Communications Network (MEECN)	\$99,088			X
Air Force	0606018F	NC3 Integration	\$26,112			X

PROCUREMENT

Similar to RDT&E costs, the estimated procurement costs are calculated by identifying which existing funding lines within the FY 2019 budget request would transfer to the Space Force. Procurement funding can also vary significantly from year to year as programs ramp up or down in production, and the annual procurement funding of the Space Force would vary accordingly. For example, funding for the Global Positioning System (GPS) III space segment is projected to increase by more than \$700 million from FY 2019 to FY 2020. The table below lists the space-related procurement funding lines and the FY 2019 requested funding used in the estimated costs for each option.¹¹

Table 11: Existing Space-Related Procurement Line Items (in thousands of FY 2019 dollars)

Account	Budget Activity	Budget Sub Activity	Line Item	FY 2019 Request	Space Corps	Space Force-Lite	Space Force-Heavy
Other Procurement, Air Force	Electronics And Telecommunications Equip	Electronics Programs	Strategic Command And Control	\$32,836	X	X	X
Other Procurement, Air Force	Electronics And Telecommunications Equip	Electronics Programs	Cheyenne Mountain Complex	\$12,454	X	X	X
Other Procurement, Air Force	Electronics And Telecommunications Equip	Spcl Comm-Electronics Projects	Af Global Command & Control Sys	\$6,619	X	X	X
Other Procurement, Air Force	Electronics And Telecommunications Equip	Spcl Comm-Electronics Projects	Minimum Essential Emergency Comm N	\$140,875	X	X	X
Other Procurement, Air Force	Electronics And Telecommunications Equip	Spcl Comm-Electronics Projects	Air & Space Operations Center (Aoc)	\$40,066	X	X	X
Other Procurement, Army	Communications And Electronics Equipment	Comm - Satellite Communications	Defense Enterprise Wideband Satcom Systems	\$108,133		X	X
Other Procurement, Army	Communications And Electronics Equipment	Comm - Satellite Communications	Shf Term	\$13,100		X	X
Other Procurement, Army	Communications And Electronics Equipment	Comm - Satellite Communications	Smart-T (SPACE)	\$9,160		X	X

Other Procurement, Army	Communications And Electronics Equipment	Comm - Satellite Communications	Global Brdcst Svc - Gbs	\$25,647		X	X
Other Procurement, Navy	Communications & Electronics Equip	Other Ship Electronic Equipment	Navstar Gps Receivers (Space)	\$10,703		X	X
Other Procurement, Navy	Communications & Electronics Equip	Satellite Communications	Satellite Communications Systems	\$44,405		X	X
Other Procurement, Navy	Communications & Electronics Equip	Satellite Communications	Navy Multiband Terminal (Nmt)	\$113,885		X	X
Procurement, Defense-wide	Major Equipment	Major Equipment, Disa	Teleport Program	\$37,705			X
Procurement, Defense-wide	Major Equipment	Major Equipment, Missile Defense Agency	Bmds An/Tpy-2 Radars	\$13,185			X
Procurement, Defense-wide	Major Equipment	Major Equipment, Missile Defense Agency	Ground Based Midcourse	\$409,000			X
Procurement, Defense-wide	Major Equipment	Major Equipment, Missile Defense Agency	Ground Based Midcourse	\$115,000			X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Advanced EHF	\$29,829	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Wideband Gapfiller Satellites(Space)	\$61,606	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Af Satellite Comm System	\$35,400	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Family Of Beyond Line-Of-Sight Terminals	\$27,867	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Milsatcom	\$11,265	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Integ Broadcast Serv	\$16,445	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Counterspace Systems	\$1,121	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Evolved Expendable Launch Capability	\$709,981	X	X	X

Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Evolved Expendable Launch Veh(Space)	\$994,555	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Spacelift Range System Space	\$117,637	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Rocket Systems Launch Program	\$47,609	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Sbir High (Space)	\$138,397	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Nudet Detection System	\$7,705	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	General Information Tech - Space	\$3,425	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Gps Iii Space Segment	\$69,386	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Global Positioning (Space)	\$2,181	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Space Fence	\$51,361	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Spaceborne Equip (Comsec)	\$31,895	X	X	X
Space Procurement, Air Force	Space Procurement, Air Force	Space Programs	Space Mods	\$148,065	X	X	X
Space Procurement, Air Force	Spares	Spares	Initial Spares/ Repair Parts	\$21,812	X	X	X
Weapons Procurement, Navy	Other Missiles	Support Equipment & Facilities	Fleet Satellite Comm Follow-On	\$66,779		X	X

RECRUITING AND TRAINING

The costs of recruiting and training personnel are calculated using a weighted average of the existing recruiting and training costs per active duty servicemember in the Army, Navy, Air Force, and Marine Corps. This includes basic training, specialized skills training, Professional Military Education (PME), and the costs associated with the military academies and Reserve Officer Training Corps. It is calculated by totaling the training and recruiting operation and management (O&M) budget activity for each of the Services, minus flight training funding, and dividing by the active duty end strength of that Service.¹² The resulting cost per servicemember is then multiplied by the number of personnel that would transfer to the Space Force to arrive at a total estimated annual cost of recruiting and training under each option. An implicit assumption in this methodology is that retention rates in the new service would be similar to current retention rates in the other

Services, and thus a similar proportion of new recruits would be needed each year to replace servicemembers that are separating. Moreover, it assumes that rather than creating a new military academy, war college, and other educational institutions for the Space Force, personnel would instead attend one of the existing schools in the other Services and the Space Force would reimburse the other Services for the fully burdened cost of educating these students.

Table 12: Training and Recruiting Costs (excludes flight training, in thousands of FY 2019 dollars)

Service	FY19 Request	Cost per Active Servicemember
Air Force	\$1,729,636	\$5.26
Army	\$4,059,179	\$8.33
Navy/USMC	\$2,895,029	\$5.55

OPERATING FORCES

The cost of operating forces is estimated from the existing space-related operating forces budget lines in each of the Services.¹³ Where a partial budget line is used, an estimate is made for the proportion of that budget line that is space-related. Where no specific budget line is identified, as in the case of the Army Missile Defense Battalion, an estimate is made using the generalized cost of force structure of similar size.

Table 13: Operating Forces Costs (in thousands of FY 2019 dollars)

Existing Service	Budget Activity	Activity Group/Sub-Activity Group	FY 2019 Request	Space Corps	Space Force-Lite	Space Force-Heavy
Air Force	Operating Forces	Space Operations	\$627,200	X	X	X
Army	Admin & Service-Wide Activities	Service-Wide Support / Service-Wide Communications / Enterprise SATCOM and Space-based Activities	\$197,719		X	X
Army	Estimate	GMD Battalion	\$150,000			X
Navy	Operating Forces	Combat Operations Support / Combat Communications and Electronic Warfare / GBS, MIDS, MUOS, STACC, JMINI CS, COMMERSAT, NMT	\$183,763		X	X
DISA	Admin & Service-Wide Activities	Defense-Wide Activities / Defense Information Systems Agency / STEP, Teleport, DSO, DISA SATCOM	\$101,097		X	X
MDA	Admin & Service-Wide Activities	Defense-Wide Activities / Missile Defense Agency / BMDS Radars and GMD	\$323,372			X

HEADQUARTERS/SECRETARIAT STAFF SIZE

The primary new cost from the creation of a new military service for space is the additional headquarters and secretariat staff that would be needed. Estimating this overhead burden is difficult because the amount of staff needed is ultimately a policy and management decision. In the past, Congress has set statutory limits on the size of headquarters staffs to limit their growth. The size of a headquarters staff should, in theory, scale with the size of the force it oversees but with a somewhat fixed minimum level of personnel. The Space Force-Lite and Space Force-Heavy options would arguably require a larger minimum headquarters staff level because they would involve the creation of a new Secretary of the Space Force position and associated secretariat staff. This analysis assumes a fixed minimum staff of 500 for the Space Corps option and 1,000 for the Space Force-Lite and Space Force-Heavy options in addition to a variable staff of 5 percent of the non-headquarters full-time staff. To be conservative, it does not assume that any existing Headquarters Air Force Space Command positions would be transferred to the new headquarters

staff in the Pentagon, although this would significantly reduce the number of new positions that would be needed. The table below shows the assumed headquarters staff sizes compared to the other Services. The staffing levels for the Army, Navy/Marine Corps, and Air Force shown below are the authorized levels for FY 2013, and for comparison, the workforce for these Services is also for FY 2013.¹⁴ The staffing and workforce levels for the Coast Guard are for FY 2019.¹⁵

Table 14: Comparison of Headquarters/Secretariat Staff Sizes

	Army	Navy/Marine Corps	Air Force	Coast Guard	Space Corps	Space Force-Lite	Space Force-Heavy
Headquarters / Secretariat Staff Size	3,639	4,960	2,594	2,605	1,700	2,566	3,129
Total Full-Time Workforce (Active Duty + Civilian FTEs)	788,000	532,000	376,000	50,141	25,692	33,882	45,711
Headquarters / Secretariat Staff as a Percentage of Total Full-Time Workforce	0.5%	0.9%	0.7%	5.2%	6.6%	7.6%	6.8%

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ENDNOTES

- 1 Does not include the 302nd Airlift Wing located at Peterson AFB.
- 2 Does not include the 920th Rescue Wing located at Patrick AFB.
- 3 Does not include the 140th Air National Guard Wing at Buckley AFB.
- 4 “24th Air Force (Air Forces Cyber),” Air Forces Cyber, February 8, 2017, <https://www.afcyber.af.mil/About-Us/Fact-Sheets/Display/Article/458567/24th-air-force-afcyber/>.
- 5 For different perspectives on the arguments for and against a Space Force see: Kaitlyn Johnson, “Why a Space Force Can Wait,” CSIS, October 3, 2018, <https://aerospace.csis.org/why-a-space-force-can-wait/> and Todd Harrison, “Why We Need a Space Force,” CSIS, October 3, 2018, <https://aerospace.csis.org/why-we-need-a-space-force/>.
- 6 U.S. Department of Defense, *Department of Defense Base Structure Report - Fiscal Year 2017 Baseline: A Summary of Real Property Inventory*, (Washington, DC: DoD, 2016), <https://www.acq.osd.mil/eie/Downloads/BSI/Base%20Structure%20Report%20FY17.pdf>
- 7 The Defense Health Program funding line is part of the Defense-Wide Operation and Maintenance account.
- 8 Marcus Weisgerber, “Air Force Pushes Back on Pentagon’s First Blueprints for Trump’s Space Force,” Defense One, September 17, 2018, <https://www.defenseone.com/politics/2018/09/creating-space-force-will-cost-13b-over-5-years-air-force-secretary/151312/>.
- 9 U.S. Department of Defense, *Department of Defense Base Structure Report - Fiscal Year 2017 Baseline: A Summary of Real Property Inventory*.
- 10 Office of the Under Secretary of Defense (Comptroller), *Research, Development, Testing, & Evaluation Programs (R-1): Department of Defense Budget Estimates for FY 2019*, (Washington, DC: DoD, February 2018), <https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2019/r1.xlsx>.
- 11 Office of the Under Secretary of Defense (Comptroller), *Procurement Programs (P-1): Department of Defense Budget Estimates for FY 2019*, (Washington, DC: DoD, February 2018), <https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2019/p1.xlsx>.
- 12 Office of the Under Secretary of Defense (Comptroller), *Operation and Maintenance Programs (O-1): Department of Defense Budget Estimates for FY 2019*, (Washington, DC: DoD, February 2018), <https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2019/o1.xlsx>.
- 13 Office of the Under Secretary of Defense (Comptroller), *Operation and Maintenance Programs (O-1): Department of Defense Budget Estimates for FY 2019*, (Washington, DC: DoD, February 2018), <https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2019/o1.xlsx>.
- 14 U.S. Government Accountability Office (GAO), *DEFENSE HEADQUARTERS: DOD Needs to Reassess Personnel Requirements for the Office of the Secretary of Defense, Joint Staff, and Military Service Secretariats*, GAO-15-10 (Washington, DC: GAO 2015), 15-17, <https://www.gao.gov/assets/670/667997.pdf>.
- 15 U.S. Department of Homeland Security, U.S. Coast Guard, *Department of Homeland Security U.S. Coast Guard Budget Overview Fiscal Year 2019 Congressional Justification* (Washington DC: U.S. Department of Homeland Security, Coast Guard 2018), USCG-O&S-23, <https://www.uscg.mil/Portals/0/documents/budget/FY%202019%20USCG%20Congressional%20Justification.pdf>.
- 16 The budget shown for the Air Force does not include pass-through funding.
- 17 For simplicity in this table, the additional workforce needed for headquarters and secretariat functions is included in the civilian personnel row for the Space Corps, Space Force-Lite, and Space Force-Heavy options even though some of this additional workforce would be military personnel.