The Space Economy Workforce and STEM Occupations

Authors Abby R. Goldman and Asha Balakrishnan, IDA Science and Technology Policy Institute; Tina Highfill, U.S. Bureau of Economic Analysis

Contact agoldman@ida.org

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Abstract Recent BEA statistics show the U.S. space economy employed over 373,000 private sector workers in 2023, spanning almost every industry sector in the economy. However, little is known about the occupations within these industries, resulting in an incomplete understanding of the current skillsets of the space workforce and future skills needed to support the growing space economy. In this paper, we combine multiple government statistics to show the occupational makeup of the private-sector space economy workforce between 2017 and 2022. The data show that over half (56 percent) of occupations in the space economy workforce in 2022 were considered science, technology, engineering, and mathematics (STEM) jobs, more than double the rate of STEM occupations in the overall U.S. workforce. Software developers (a science and engineering occupation) represented the single largest occupation, followed by electrical, electronic, and electromechanical assemblers (a middle-skill STEM occupation) and sales representatives of services (a non-STEM occupation). These results provide important new insights into the composition of the space economy workforce, though more detailed and timely data on space-related employment and occupations would benefit further understanding of this growing area of the economy.

Keywords Space workforce, STEM, science, engineering, occupations

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1. Introduction

The United States space economy has rapidly evolved in recent years from a predominantly government-owned, government-operated endeavor to one relying more on private-sector innovation, with companies like SpaceX, Planet, Blue Origin, and many other new space companies expanding space capabilities. The increasing commercialization of space technologies is spurring the growth of emerging markets across satellite communications, Earth observation, in-space manufacturing and many more, with applications for new technologies extending far beyond the space industry itself. Understanding the current space workforce is important, as traditional assumptions about its composition—predominantly made up of aerospace engineer and physicists—may not reflect reality. Today's space sector increasingly draws talent from software development, computer engineering, advanced manufacturing, and other disciplines previously considered peripheral, challenging conventional notions about who drives space innovation and what skills fuel this expanding frontier economy. Understanding the size and composition of the space workforce will address potential skills gaps, aid in effectively investing in workforce development, and shed light on maintaining global competitiveness in the space economy.

The U.S. Bureau of Economic Analysis (BEA) began publishing statistics showing the contribution of the space economy to overall U.S. gross domestic product (GDP) in 2020, including estimates of the workforce involved in the production of space-related GDP. The BEA estimates the private sector space workforce in 2023 involved 373,000 employees, spanning almost all industry sectors of the U.S. economy (BEA 2025). However, BEA's published employment data do not show the distribution across space workforce occupations within these industries, resulting in an incomplete understanding of the current skillset and future skills needed to support the growing space economy.

In this paper, we use multiple federal data sources to estimate the size and types of occupations that make up the space economy, including those in the science, technology, engineering, and mathematics (STEM) workforce. Specifically, we use the BEA space economy industry statistics and link these data to U.S. Bureau of Labor Statistics (BLS) Occupational Employment and Wage Survey (OEWS) data on occupations within industries. We then use National Center for Science and Engineering Statistics (NCSES) designations of STEM occupation types to produce estimates of the distribution of science and engineering (S&E) workers, S&E-related workers, STEM middle-skill workers, and non-STEM workers in the space economy.

2. Methodology

2.1 Overview of BEA's Measurement of the Space Economy

The BEA space economy statistics shed light on the contribution of space-related goods and services to the U.S. economy using a framework consistent with how the overall U.S. economy is measured. These statistics show the space economy's contribution to current-dollar GDP and illustrate the contributions of individual industries to the space economy. In addition to GDP, the space economy statistics also include measures of gross output (a measure similar to revenue) and private sector compensation and employment.

The space economy statistics are developed using BEA's comprehensive supply and use tables (SUTs). The SUTs provide insight into the internal workings of the U.S. economy and detail the contribution of specific industries and products (goods and services) to GDP and gross output. Specifically, the SUTs detail the flows of products purchased by each industry, the incomes earned from production in each industry, and the distribution of sales for each product. The Economic Census from the U.S. Census Bureau is the primary data source for the SUTs. Industries within the SUTs are organized under the North American Industry Classification System (NAICS), a standardized industry classification system used by federal statistical agencies

BEA's space economy statistics highlight space production and spending that is already present in the SUTs. For example, they show the production of space-related educational services like astrophysics and astronautical engineering, while the SUTs show the production of all educational services regardless of the subject. An important aspect of identifying the relevant products to include in the statistics was deciding on a definition of the "space economy." BEA defines the space economy as consisting of space-related goods and services, both public and private. This includes goods and services that:

- Are used or produced in space, or directly support those used or produced in space
- Require direct input from space to function, or directly support those that do
- Are associated with studying space.

This definition is based on various sources, including the Organisation for Economic Co-operation and Development Handbook on Measuring the Space Economy (2012), products identified in a U.S. Bureau of Industry and Security report describing the U.S. space industry supply chain (2013), various reports from the private sector (for example, the Satellite Industry Association and Space Foundation), input from U.S. and international space agencies (including the National Aeronautics and Space

Administration (NASA), the Canadian Space Agency, and the Australian Space Agency), BEA industry analyst input, and industry expert feedback.

These BEA statistics show space goods and services are produced by most sectors of the U.S. economy, including information, manufacturing, retail trade, wholesale trade, government, professional and business services, and construction. Space-related products range from telecommunications and space vehicle manufacturing to research and development and construction of observatories, plus many others.[1] Table 1 provides a list of the major space-related industries, and the products made by these industries, that are included in the space economy statistics. The data show the space economy accounted for $240.9 billion of gross output in 2023 and $142.5 billion, or 0.5 percent, of total U.S. GDP (Georgi and Surfield 2025).

Table 1. Major Industries in the Space Economy and Associated Space-related Products

Industries	Space products
Manufacturing, wholesale trade, and retail trade	Space vehicles; space weapons; satellites; ground equipment; search, detection, navigation, and guidance systems (GPS/PNT equipment)
Information	Telecommunications, broadcasting, software
Government	Military, civilian, and federally funded research and development centers services
Professional and business services	Research and development, engineering and technical services, computer systems design, geophysical surveying and mapping services
Construction	Space facilities, observatories, planetariums, satellite dish installation
Other various services	Launch services, insurance, education, observatories, planetariums

2.2. Space Workforce Methodology

In this paper, we use information from three federal sources to estimate the distributions of occupations that comprise the space economy workforce and designate those occupations by type of STEM occupation.

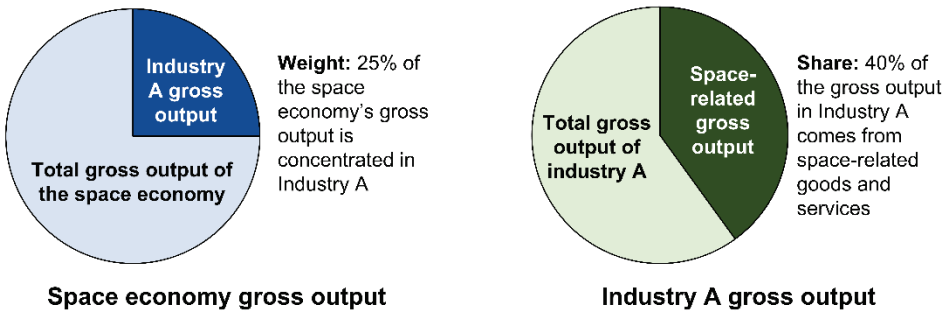
- Data about the space economy and the associated employment come from the BEA space economy statistics released June 2024, described in section 2.1.

[1] The complete list of NAICS codes can be found on BEA's website.

- Data on occupations come from the May 2017 and May 2022 BLS OEWS. OEWS provides detailed information about occupations (organized using the Standard Occupational Classification [SOC] system) within NAICS industries.
- Data on the STEM designation of occupations leverages NSF's NCSES classifications of the U.S. STEM labor force to designate occupations as S&E, S&E-related, STEM middle-skill, or non-STEM.

We use BEA's space economy data to identify the contribution of each industry to the total gross output of the space economy as well as the proportion of gross output attributable to space-related goods and services. These characteristics are described as the weight and the share of each industry and are schematically illustrated in figure 1. **Weight** is defined as the relative weight of an industry's gross output out of the total private sector space economy gross output (i.e., how much of the space economy is comprised of production from a specific industry). **Share** is defined as the percent of a given industry's gross output that constitutes space-related goods and services (i.e., how space intensive is the production within a given industry).

Figure 1. Illustrating the Concepts of Weight and Share and their Utility in Understanding the Roles that Different Industries Play in the Space Economy

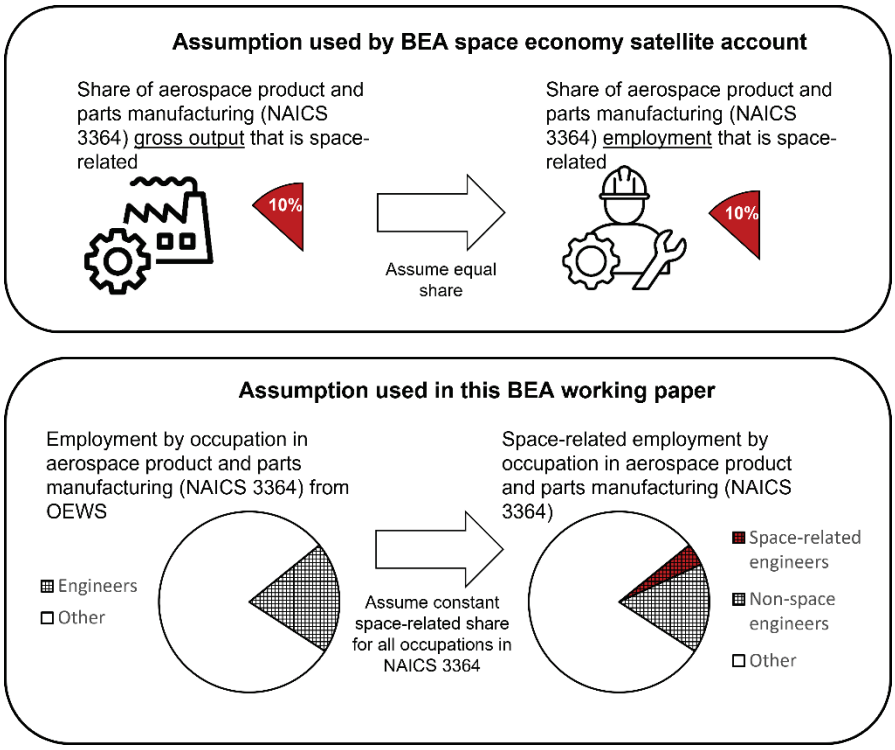


We estimate the distribution of space-related occupations in the space economy by multiplying the BLS OEWS occupational employment totals in each industry by the share of space-related gross output at the industry-level from the BEA space statistics for 2017 and 2022.[2] We mostly use four-digit NAICS industries for this analysis, but in some cases only less granular three- or two-digit NAICS data are available, as indicated in appendix table 1.

[2] NAICS codes were updated in 2022, requiring two manual alignments between BEA and OEWS data: 5112 in 2017 became 5132 in 2022 and 5151 in 2017 became 5161 in 2022. For convenience, we continue to use the 5151 classification code. Additionally, two NAICS could not be compared across 2017 and 2022 due to changes in scope of those industry groups (5152, 5191) and were excluded from the occupation-level analysis.

In line with BEA's space economy accounting, this methodology assumes that the share of an industry's gross output that is space-related is equivalent to the share of occupations in that industry that are space-related (see figure 2). One limitation of this assumption is that space occupations are likely not independently and identically distributed across industries. For example, if BEA space economy data showed that 10 percent of total gross output in the aerospace product and parts manufacturing industry (NAICS 3364) was attributable to space products, then we assigned 10 percent of each of the occupations in NAICS 3364 as a space-related occupation (figure 2, top panel). In this working paper, we further assume that the share of occupations that are space-related is constant across each occupation in that industry. In this example, 10 percent of all engineers employed in the aerospace product and parts manufacturing industry (NAICS 3364) are assigned as space-related and 90 percent of engineers are assigned as not space-related. It is plausible that in reality a larger share of certain occupations (e.g., aerospace engineers or aerospace technicians) are engaged in work that is space-related than the overall share of occupations that are space-related in the aerospace product and parts manufacturing industry (NAICS 3364); nonetheless, for this working paper and given the data we have available, we assume a constant share for each industry.

Figure 2. Space-related Employment Assumptions Based on Share of Gross Output in a Given Industry



Note: Figure shares are not to scale

Lastly, we categorize the occupations within each industry using NCSES STEM occupation designations: S&E, S&E-related, STEM middle-skill and non-STEM occupations.[3] The NCSES STEM occupation definitions are as follows:

1) *"S&E occupations* typically require a bachelor's degree for entry and are broadly composed of workers who are computer and mathematical scientists; biological, agricultural, and environmental life scientists; physical scientists; social scientists; and engineers.
2) *S&E-related occupations* require STEM skills and expertise, but they do not fall into the five main S&E occupational categories listed above. The main occupational categories and positions that make up this group include health care workers, S&E managers, S&E precollege teachers, and technologists and technicians.
3) *Middle-skill occupations* require considerable STEM skills and expertise but do not typically require a bachelor's degree for entry. These positions are primarily in the areas of construction trades, installation, maintenance, and production." (NCSES 2024a, p. 9)
4) *Non-STEM occupations* may not require STEM skills but are still relevant in the space workforce. These positions include occupations in management (excluding S&E and S&E-related managers), sales (excluding sales engineers), and education and training (excluding post-secondary STEM teachers). (Adapted from NCSES 2024a)

[3] In this analysis, we largely rely on NCSES' occupation designations, but departed from the NCSES designations in two ways. For production occupations, which NCSES largely deems non-STEM, we classified many of these as STEM middle-skill. For technician occupations, NCSES codes these into different designations, while we classify almost all technician occupations as S&E-related, which is consistent with the NCSES definition of S&E-related occupations.

3. Results

3.1 Which Industries Make Up the Space Economy?

Based on BEA space economy gross output data, we identified industries with high levels of space activity in the space economy, meaning those with high weights. While it is not possible to disclose the weights for each individual industry due to confidentiality protections associated with the underlying data, we bin groups of industries together in table 2 to illustrate the distribution of industries with different weights in the space economy. We mostly focus on the 2022 results because patterns were similar between 2017 and 2022.

Table 2. Industries with Highest Gross Output Weights in the Space Economy, 2022

Weight bin	NAICS codes	Cumulative weight
10–30%	42, 517, 3364, 3342	75%
2–6%	5417, 3345, 5151, 6112/6113	92%
0.5–1.5%	5413, 5152, 5415, 5182, 481	96%
0.2–0.49%	2379, 44–45, 2362, 3391, 5112, 5191	98%

Note: NAICS appear in order from left to right, from highest to lowest weight within their bin. Weight bins were chosen to be discontinuous to help illustrate the uneven distribution of industries at different weights.

NAICS North American Industry Classification System

The first weight bin contains four industries, each of which contributes between 10–30 percent to the total gross output of the space economy (see appendix table 1 for the full list of NAICS industries referenced in tables 2 and 3). These top four NAICS industries account for a cumulative 75 percent of the entire space economy:

- 42—wholesale trade[4]
- 517—telecommunications
- 3364—aerospace product and parts manufacturing
- 3342—communications equipment manufacturing.

Within this group, NAICS 42 has the highest weight and NAICS 3342 the lowest weight.

[4] Wholesale trade output reflects the value added by wholesalers in the distribution of a product from producers to purchasers. Wholesale trade in the space economy reflects margins earned on the use of space-related products as intermediate inputs (such as GPS receivers in cell phones) and in the distribution of final products (such as satellite phones).

The second weight bin also contains four industries, each contributing 2–6 percent to the total gross output of the space economy. These four NAICS industries in the second tier account for 17 percent of the space economy:

- 5417—scientific research and development services
- 3345—navigational, measuring, electromedical, and control instruments manufacturing
- 5151—radio and television broadcasting
- 6112/6113—junior colleges/colleges, universities, and professional schools.[5]

The top two weight bins cumulatively account for 92 percent of the entire space economy. When additional industries' weights are added from the third and fourth weight bins, 96 percent and 98 percent of the entire space economy can be accounted for, respectively.

We also identified the share of each industry that comes from space-related gross output. In table 3, we bin together groups of industries to illustrate the distribution of industries with different shares of space-related gross output. There is one industry with a considerably higher space share compared to all other industries in the space economy, NAICS 3342—communications equipment manufacturing—where over 40 percent of output comes from space-related production (table 3). The second highest group of industries with shares ranging from 5–10 percent includes NAICS 3364—aerospace product and parts manufacturing, 5151—radio and television broadcasting, 517—telecommunications, and 3345—navigational, measuring, electromedical, and control instruments manufacturing, all of which also appear in one of the top two weight bins. The third highest group of industries with shares ranging from 1–3 percent includes NAICS 5417—scientific research and development services, 42—wholesale trade, 5152—cable and other subscription programming, 2379—other heavy and civil engineering construction, 6112/6113—junior colleges/colleges, universities, and professional schools, and 3333—commercial and service industry machinery manufacturing.

[5] In BEA's space economy data, these two industries, 611—junior colleges and 6113—colleges, universities, and professional schools, are reflected as one combined industry. Therefore, we treat them as one combined industry in this workforce analysis.

Table 3. Industries with the Highest Level of Space Output as a Function of their Total Output, 2022	
Share bin	**NAICS codes**
>40%	**3342**
5–10%	**3364, 5151, 517, 3345**
1–3%	**5417, 42**, 5152, 2379, **6112**, 3333

Note: NAICS appear in order from highest to lowest share within their bin. **Bolded** NAICS are those that appear in the top two weight bins (2–6% or 10–30% in table 2).

NAICS North American Industry Classification System

3.1.1 Key Takeaways

- A relatively small number of industries comprised the majority of space economy gross output in 2022. Of the 206 NAICS industries with some contribution to the space economy as identified by BEA, 4 industries make up about 75 percent of the space economy and 8 industries make up about 92 percent.
- No industry has more than 50 percent of its gross output that is considered to be space related. Only NAICS 3342—communications equipment manufacturing has over 40 percent of its total gross output that is space related.
- NAICS 42—wholesale trade has the highest weight of gross output in the space economy, but only 1–3 percent of all gross output in wholesale trade is considered space related.
- For 7 of the 8 industries that make up 92 percent of the space economy, less than 10 percent of their industry's gross output is attributable to space-related goods and services.

3.2 Which Occupations Make Up the Space Economy?

In 2017 and 2022, about 23 percent of private-sector space employment was concentrated in one industry, NAICS 42—wholesale trade, according to BEA's data. Unlike other industries where we have four-digit NAICS level data, we only have information at the two-digit NAICS 42 sector level, which table 3 shows is mostly non-space activity. To avoid potentially biasing our understanding of STEM occupations within the space economy, we opt to exclude this sector from the remainder of our analysis.

Table 4 shows the share of workers in different STEM occupation groups in the space economy after we exclude NAICS 42. Over half of workers in the space economy were employed in a STEM occupation in both 2017 and 2022, 57 percent in 2017 and 56 percent in 2022. By comparison, 24 percent of the U.S. workforce were in STEM occupations in 2021, according to a recent National Science Board report

(NCSES 2024b).[6] This comparison shows that the space workforce is significantly more STEM-intensive than the overall U.S. workforce, with over half of all its workers in STEM occupations compared to one-quarter.

Table 4. Space Employment Shares by STEM Occupation Group

Occupation group	2017	2022
STEM occupations	57%	56%
Science and engineering occupations	25%	25%
Science and engineering-related occupations	9%	10%
STEM middle-skill occupations	23%	22%
Non-STEM occupations	43%	44%

Note: Excludes wholesale trade

STEM Science, technology, engineering, and mathematics

When we consider different groups of STEM workers, we find that most STEM workers in the space economy are in S&E occupations, followed by STEM middle-skill occupations and then S&E-related occupations. The share of workers in S&E occupations is flat at 25 percent from 2017 to 2022, while the share in middle-skill occupations drops slightly from 23 percent to 22 percent of all workers in the space economy.

Tables 5 shows the eight major occupation groups that make up the majority of the space workforce in 2022 (83.1 percent of the space workforce). These major groupings of occupations are a part of the SOC system, a standardized system used by federal statistical agencies. The SOC system is a taxonomy of occupations with specific occupations that are designated with a six-digit numerical code, of which the major groups are defined by the first two digits of the code. The largest major occupation group was production occupations, representing 14.2 percent of the space workforce in 2022, followed closely by architecture and engineering occupations at 12.7 percent. Computer and mathematical occupations is the third-largest occupation group at 12.0 percent of the space workforce. NCSES categorized specific six-digit occupations into different types of STEM workers, meaning major occupation groups (the two-digit occupational grouping) may include more than one type of STEM worker. Production occupations

[6] The NCSES report uses data from the 2021 American Community Survey (ACS) to estimate the number and share of individuals in STEM occupations. Additionally, in this analysis, we depart slightly from the NCSES classification of occupations across STEM designations, meaning some production occupations that NCSES deemed as non-STEM are considered STEM middle-skill in this analysis.

span S&E-related, STEM middle-skill, and non-STEM occupations, while architecture and engineering and computer and mathematical occupations both span S&E and S&E-related occupations.

Table 5. Major Space Workforce Occupation Groups, 2022

Major occupation group (SOC)	Space employment share	STEM groups represented
Production occupations (51-0000)	14.2%	S&E-related STEM middle-skill Non-STEM
Architecture and engineering occupations (17-0000)	12.7%	S&E S&E-related
Computer and mathematical occupations (15-0000)	12.0%	S&E S&E-related
Management occupations (11-0000)	10.7%	S&E-related STEM middle-skill Non-STEM
Business and financial operations occupations (13-0000)	9.8%	S&E Non-STEM
Office and administrative support occupations (43-000)	9.7%	Non-STEM
Installation, maintenance, and repair occupations (49-0000)	7.7%	S&E-related STEM middle-skill Non-STEM
Sales and related occupations (41-0000)	6.4%	S&E-related Non-STEM
Total	**83.1%**	—

Note: Excludes NAICS 42—wholesale trade

SOC Standard Occupational Classification

STEM Science, technology, engineering, and mathematics

S&E Science and engineering

NAICS North American Industry Classification System

Table 6 lists the top 10 detailed occupations within each STEM occupation group in 2022, with the top 10 overall occupations shaded in blue. The top occupation overall was software developers (an S&E occupation), representing 4.8 percent of occupations within the space workforce. Electrical, electronic, and electromechanical assemblers (a STEM middle-skill occupation) was the second most prevalent occupation, representing 2.6 percent of the workforce in 2022, followed by sales representatives of services (a non-STEM occupation) at 2.4 percent. When considering the top S&E occupations in the space economy, the occupations represented are narrow in their scope, reflecting only two minor

occupational groups. Of the top 10 S&E occupations, 4 are computer occupations (i.e., within SOC 15-1200) and 6 are engineering occupations (i.e., within SOC 17-2000). Other takeaways include:

- STEM middle-skill occupations make up half of the top 10 occupations.
- Three of the top 10 S&E-related occupations in the space economy are technician occupations (within SOC 17-3000).
- There are several management occupations (within SOC 11-0000) in the top 10 categories, including 3 of the top 5 S&E-related occupations in the space economy.
- Seven of the top 10 STEM middle-skill occupations in the space economy are production occupations (within SOC 51-0000).
- Three of the top 10 non-STEM occupations are administrative support occupations (within SOC 43-0000) and 4 are business and financial operations occupations (within SOC 13-0000).

Table 6. Share of Total Space Employment for Top 10 Detailed Occupations by STEM Grouping, 2022

Science and engineering		Science and engineering-related		STEM middle-skill		Non-STEM	
Occupational title and SOC code	**Share**	**Occupational title and SOC code**	**Share**	**Occupational title and SOC code**	**Share**	**Occupational title and SOC code**	**Share**
Software developers (15-1252)	4.8%	Computer and information systems managers (11-3021)	1.2%	Electrical, electronic, and electromechanical assemblers, except coil winders, tapers, and finishers (51-2028)	2.6%	Sales representatives of services, except advertising, insurance, financial services, and travel (41-3091)	2.4%
Industrial engineers (17-2112)	2.0%	Architectural and engineering managers (11-9041)	1.2%	Telecommunications equipment installers and repairers, except line installers (49-2022)	2.3%	General and operations managers (11-1021)	2.3%
Mechanical engineers (17-2141)	1.5%	Aircraft Mechanics and Service Technicians (49-3011)	0.9%	Miscellaneous assemblers and fabricators (51-2090)	2.0%	Customer service representatives (42-4050)	2.1%
Electrical engineers (17-2071)	1.4%	Electrical and electronic engineering technologists and technicians (17-3023)	0.9%	Inspectors, testers, sorters, samplers, and weighers (51-9061)	1.9%	Business operations specialists, all other (13-1199)	1.5%
Electronics engineers, except computer (17-2072)	1.2%	Natural sciences managers (11-9121)	0.4%	Telecommunications line installers and repairers (49-9052)	1.7%	Project management specialists (13-1082)	1.4%
Aerospace engineers (17-2011)	1.1%	Broadcast Technicians (27-4012)	0.3%	Machinists (51-4041)	1.1%	Buyers and purchasing agents (13-1020)	1.2%
Computer systems analysts (15-1211)	1.1%	Industrial engineering technologists and technicians (17-3026)	0.3%	Aircraft structure, surfaces, rigging, and systems assemblers (51-2011)	1.1%	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive (43-6014)	1.1%
Computer user support specialists (15-1232)	1.0%	Biological technicians (19-4021)	0.3%	First-line supervisors of production and operating workers (51-1011)	1.1%	Office Clerks, General (43-9061)	1.1%
Engineers, all other (17-2199)	0.8%	Avionics Technicians (49-2091)	0.3%	Computer Numerically Controlled Tool Operators (51-9161)	0.7%	Accountants and auditors (13-2011)	1.1%
Network and computer systems administrators (15-1244)	0.8%	Engineering technologies and technologists, except drafters, all other (17-3029)	0.3%	Industrial production managers (11-3051)	0.7%	Shipping, Receiving, and Inventory Clerks (43-5071)	0.9%
Total	**15.8%**		**6.1%**		**16.2%**		**15.0%**

Note: Excludes wholesale trade. The top 10 occupations are shaded in blue.

STEM Science, technology, engineering, and mathematics

SOC Standard Occupational Classification

4. Discussion

Estimating the size and composition of the space workforce is not straightforward, given its breadth that spans many industries. Therefore, analysts must make assumptions about how much of and which industries to count as "space" when generating estimates of the space workforce. Some organizations publish paywalled reports on the space industry that estimate the size or characteristics of the space workforce, which lack publicly available information about the methods or data used to generate their estimates, thus there is no transparency around the assumptions used to define the space workforce. Benchmark International reported that "today, the number of jobs in the space sector is estimated to be around 400,000, but that number is forecast to skyrocket to 1.5 million jobs in the future" (Benchmark International 2022). This estimate was quoted by the U.S. Chamber of Commerce in a letter to congressional committees in support of NASA's reauthorization (U.S. Chamber of Commerce 2022). The Space Foundation's Space Report is more transparent in its approach, which relies on federal statistical data from the BLS Quarterly Census of Employment and Wages. The analysis assumes all workers in five industry sectors deemed core to the space economy were employed in the space economy. Based on this approach, the Space Foundation estimated the space workforce employed 166,458 individuals in 2023 (Space Foundation 2024). However, BEA's space economy statistics reveal that no single industry has more than 50 percent of their gross output as space related. Therefore, assuming any industry is fully part of the space workforce overestimates the number of space workers in those industries. Additionally, this approach does not account for space workers working in adjacent industries such as information technology. The analysis presented in this paper makes a set of different assumptions about how to measure employment in the space workforce—namely that the share of space-related gross output in a given industry is equal to the space-related employment in that industry, and that share is constant across all occupations in that industry.

The assumptions used in this working paper compound some weaknesses stemming from source data issues. First, when we assume the share of an industry's gross output that is space-related is equivalent to the share of occupations in that industry that are space-related, we extend that assumption to some NAICS codes at the two-digit level. In general, the BEA space economy employment data and the OEWS occupational data are available at the four-digit NAICS level, though in some cases less detail is available. If the composition of space occupations in the aggregated industry is different from the underlying detailed industries this could bias our results. Another weakness is that our analysis excludes employees from two important space economy industries, wholesale trade and government, providing an incomplete picture of the STEM makeup of the space workforce. Assuming the largest industry within space-related wholesale trade (NAICS 42) is merchant wholesalers, durable goods (NAICS 4232, 4233, 4235, 4236, 4237, and 4239), the OEWS data show the top two occupations are transportation and material moving (SOC 53-0000) and sales and related occupations (SOC 41-0000). Since these occupations represent a mix of STEM and

non-STEM occupations, it's hard to know how the omission of wholesale trade impacts our results. BEA's experimental estimate of non-defense government employment can offer some insights about the impact of excluding the government industry. In 2022, BEA estimated there were 19,686 space-related non-defense government employees and over 16,000 of those came from NASA (Georgi and Surfield 2025). If we assume most NASA employees would be categorized as being in a STEM occupation, this indicates we may be underestimating the share of STEM-related occupations in the overall space workforce.

The space workforce is comprised of a wide range of occupations, reflecting economic production spanning almost every major industry in the U.S. economy (see table 1). Our analysis shows slightly more than half of the space workforce was comprised of STEM occupations in 2022, with slightly less than half of those workers being involved specifically in science and engineering occupations. The majority of the top 10 occupations in the space workforce are considered STEM-middle skill occupations, requiring some STEM skills, such as assemblers. The most prevalent occupation in the space economy was software developers, which may be surprising to some, but is consistent with the proliferation of digitalization across not just the space economy (Davenport 2024), but across the U.S. economy as a whole (BEA 2023).

Aerospace engineers are not the most prevalent type of engineer represented in the space workforce. Our analysis shows 2.0 percent of the space workforce were industrial engineers in 2022, compared to 1.1 percent for aerospace engineers. When comparing the number of aerospace engineers employed in the space economy (from this analysis) to the total number of aerospace engineers employed in any field of work (from OEWS), we find that only about 5 percent of all aerospace engineers are employed in the space economy.[7] It is plausible that our assumption that the share of space-related workers is constant across all occupations in an industry leads to an underestimate of the number of aerospace engineers employed in the space economy.

This new analysis provides previously unknown insights into the occupational composition of the space economy workforce. Information about these occupations is important for understanding and preparing for the future space economy workforce. Knowing what occupations align with the space workforce can drive the industry closer to understanding the skills needed to maintain and grow the space economy. Future work could include using job posting analysis to assess the skills sought by space employers and improving on the assumptions used in this analysis—that the share of the gross output that is space-related is equal to the share of employment in an industry and that that share of space-related workers is constant across all occupations in that industry.

[7] According to the May 2022 OEWS, there were 61,600 aerospace engineers in the U.S. workforce in 2022.

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6. Appendix

Appendix Table 1. NAICS Codes and Industry Descriptions from Tables 1 and 2

NAICS code	NAICS description
2362	Nonresidential building construction
2379	Other heavy and civil engineering construction
3333	Commercial and service industry machinery manufacturing
3342	Communications equipment manufacturing
3345	Navigational, measuring, electromedical, and control instruments manufacturing
3364	Aerospace product and parts manufacturing
3391	Medical equipment and supplies manufacturing
42	Wholesale trade
44–45	Retail trade
481	Air transportation
5112	Software publishers
5151	Radio and television broadcasting
5152	Cable and other subscription programming
517	Telecommunications
5182	Data processing, hosting, and related services
5191	Other information services
5413	Architectural, engineering, and related services
5415	Computer systems design and related services
5417	Scientific research and development services
6112/6113	Junior colleges/colleges, universities and professional schools

NAICS North American Industry Classification System