THE SPACE REPORT

SPACE FOUNDATION

39th Space Symposium Workforce Panels Highlight Space Employment Needs

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Introduction | *Despite efforts to meet the demands of growing space companies, competition for space workers remains high, with firms often battling each other to lure top talent. Even with an uptick in enrollments at colleges and vocational programs that train space workers, industry leaders say they are struggling to fill thousands of jobs across the United States.*

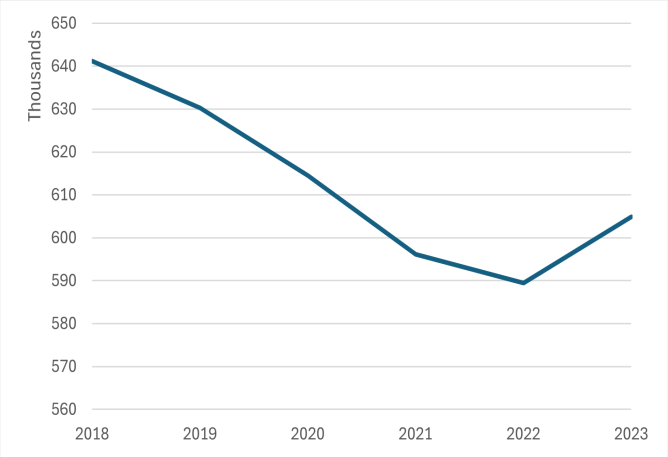
A welder at NASA's Stennis Spaceflight Center connects piping on a rocket motor. *Credit NASA*

Workforce leaders at 39th Space Symposium report progress amid struggle to fill skilled technical jobs, meet diversity goals

A vast effort to grow the space workforce to meet ever-increasing needs has shown some signs of progress, with an uptick in 2023 of 70,000 additional U.S. college students studying space-related skills including engineering, information systems and biomedical sciences.[1] But workforce shortages continued for space firms, with steady demand topping 15,000 employees, a number that has held steady for two years, according to the website spacetalent.org.[2]

That workforce demand is tied to increased launch and satellite deployment activity and the escalation globally of space companies and countries seeing the potential of space. The space industry again set records for launches and satellites sent to orbit in 2023, and the backlog of U.S. satellites licensed but not yet launched topped 23,000.[3] The unprecedented pace of work means space firms are fighting to recruit and retain workers to accommodate the growth.[4] Increasingly, firms are looking for talent outside the traditional space sector to meet their needs.

U.S. college enrollment for engineering, 2018-23



Source: National Student Clearinghouse

Workforce development, the need to expand diversity in the workplace, and the collective effort behind the Space Workforce 2030 initiative were part of presentations and panel discussions at the 39th Space Symposium in April. University leaders and space company executives joined officials from NASA and the National Space Council to focus on the challenges that lie ahead in developing skilled workers in the space industry.

"A lot of the problems is talent being pushed back and forth," said Joseph Horvath, chief executive officer and president of Nova Space, during an education to workforce panel.[5] "Small companies can't afford to keep their people. In order to grow this workforce from an inclusivity perspective, we need to reach out to those areas which haven't traditionally had a space-oriented industry."

Blue Origin's Senior Vice President for Strategy, Marketing and Sales, Mike Edmonds, told a Space Symposium audience that workforce needs are shifting quickly as the space industry transitions from building one-off prototypes to mass production of satellites and launch vehicles.[6]

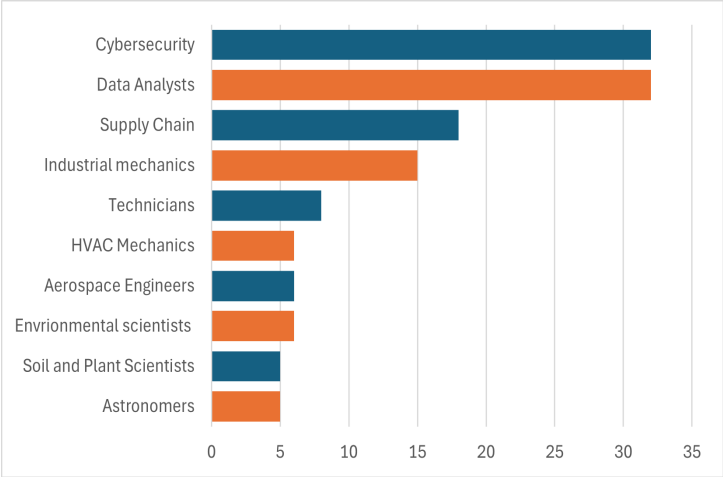
"We need welders," he said. "Lots of amazing engineering has happened, and now we need welders."

Growth in space-adjacent fields predicted

The U.S. unemployment rate held steady below 4% through 2023[7], and demand for manufacturing workers across all sectors remained strong, with more than 12.9 million workers, according to the Federal Reserve Bank of St. Louis.[8] The U.S. Chamber of Commerce in February found that the United States has more job openings than unemployed workers. If every unemployed person in the country found a job, the country would still have nearly 2.4 million open jobs, the organization found.[9]

U.S. Bureau of Labor Statistics data for five space-related job classifications showed steady growth in 2023, up 4.8% to 166,458.[10] Those five sectors represent only a portion of total U.S. space jobs. Similar data for Europe released last fall showed space payrolls grew by more than 8% over the prior year to 57, 510 workers.[11]

Percentage growth estimate for U.S. space jobs through 2032



Source: U.S. Department of Labor

In April, the U.S. Labor Department issued a broader look at space industry growth, predicting especially high demand in fields not directly associated with building and launching satellites. The fastest-growing field for space in the next decade will be cybersecurity and information technology, with the agency predicting 32% growth through 2032.[12] With more satellites gathering an ever-increasing amount of data, the Labor Department predicted 32% growth through 2032 for data analysts. Logisticians, who manage supply chains, are expected to see 18% growth through 2032.

Engineers at space firms, meanwhile, would see 6% employment growth through 2032. The agency predicted a bright future for all jobs associated with space, noting "these occupations all offer above-average projected growth and good pay."

U.S. space workers earn an average of $131,000 per year, nearly double the $70,300 average pay of all U.S. private sector workers, according to the U.S. Bureau of Labor Statistics.[13]

National Space Council plans to drive education

The U.S. system that produces space workers — universities, colleges, and technical schools — is slowly recovering from a slump in student enrollment that accompanied the coronavirus pandemic, according to data compiled by the National Student Clearinghouse.[14] In fall 2023 enrollments, the latest numbers available, the number of U.S. students seeking degrees or certifications as

engineering technicians was 92,799, up by about 1,000 from the prior year, but down from a peak of nearly 115,000 in 2018.

At four-year institutions across the United States, the number of students pursuing engineering climbed 2.6% in the fall of 2023 to 605,000. The number of prospective engineers at four-year schools was still well below the 641,000 enrolled in 2018.

Quincy Brown, the National Space Council's director of Space STEM and Workforce Policy, is leading an effort that brings together federal agencies to grow the space workforce. Space is an easy sell for young students, she said, but it is difficult to keep students inspired as they struggle through math and science classes.[15]

"Inspiration alone is not enough," she said. "There's a piece in there that's really important called preparation."

Federal leaders are developing programs under the U.S. Space Priorities Framework that connect educators and industry leaders to help develop space workers.[16] The work also emphasizes diversifying the space workforce.

"It's about us collectively coming together and being intentional," she said.

One example of collective effort, Space Workforce 2030, showed progress in growing a more diverse space workforce over the past year, with small increases in the percentage of woman and people of color taking space jobs.[17] The effort brings together dozens of space firms that have pledged to seek a more diverse workforce.

NASA workers prepare a payload for delivery to the International Space Station. NASA leaders say hands-on learning is a key to workforce development.
Credit: NASA

Greg Autry, who heads a space leadership program for Arizona State University's Thunderbird School of Global Management, said getting young people focused on space means pulling them out of the virtual world of social media and video games.[18]

"The message to young people is that space is real," he said.

Enrollment shortfalls in space-related fields during the pandemic drove some colleges to examine how to better meet student needs.

"COVID sped up something that had been talked about in the higher ed community for a long time," said Mordecai Ian Brownlee, president of Colorado's Community College of Aurora.[19] "We need to change."

The COVID experience led to Brownlee's institution offering more online classes and more flexible education schedules, with an emphasis in luring dropouts back to college. The community college

also encourages people working in lower-paid jobs to gain skills to join the more affluent space workforce.

Space seen as tool to lift nations from poverty

Space Foundation, in partnership with educational institutions, government agencies, and industry, has developed programs to inspire and educate students from preschool to industry professionals across the globe.

One of the most expansive is the foundation's Teacher Liaison Program. With nearly 400 teachers on six continents, the program is designed to inspire students to pursue space careers. The foundation also helps refine college programs and delivers lessons for space professionals and entrepreneurs.

Activities at Space Foundation's Discovery Center inspire students and encourage STEM learning.
Credit: Space Foundation

Tidiane Ouattara, who heads the African Union's science and space education programs, said the continent's 55 nations want to embrace the possibilities space brings but need training and assistance from institutions like Space Foundation.[20]

"Instead of it being a challenge, we see it as an opportunity," he said.

Ouattara does not foresee Africa's 1.3 billion residents earning doctorate degrees. Instead, he wants to work with institutions including Space Foundation to build training programs to prepare Africa to become the world's factory for space components. Space Foundation is providing K-12 programs for teachers that incorporates a space-centered STEM curriculum.

Collaboration with Space Foundation also has helped Ecuador grow its space nascent space industry, said Robert Aillon, founder and CEO of Leviathan Space Industries.[21] Space Foundation is providing its Junior Space Entrepreneur Program, which leads high school student through a Mars mission to teach space-related science and math. It also teaches business skills related to the space industry.

"You help us build the confidence to address these issues," he said.

To learn more about Space Foundation education programs, visit our website.
To view the education panels from the 39th Space Symposium, click below:
Workforce panel agrees: Skilled trades among top industry needs
Colleges work to cut barriers to space education, retrieve dropouts
International leaders view space as doorway to economic gain
Space Workforce 2030: A partnership to grow the space talent pipeline

[1] National Student Clearinghouse. "Current Term Enrollment Estimates." Jan. 24, 2024. https://nscresearchcenter.org/current-term-enrollment-estimates/

[2] SpaceTalent.org. "Job Board."

[3] The Space Report, Q4, 2023. "Led by sharp uptick in commercial demand and U.S. launches, all-time records topple for successful spaceflights, launch attempts in 2023." www.thespacereport,org.

[4] The Space Report., Q1, 2024. "U.S. private space employment shows steady growth." www.thespacereport.org.

[5] Joseph Horvath. Remarks at Space Symposium. April 11, 2024.

[6] Mike Edmonds, remarks at Space Symposium, April 11, 2024.

[7] U.S. Bureau of Labor Statistics. "The Unemployment Situation – March 2024." https://www.bls.gov/news.release/pdf/empsit.pdf.

[8] Federal Reserve Bank of St. Louis. "All Employees, Manufacturing." March 1, 2024. https://fred.stlouisfed.org/series/MANEMP.

[9] U.S. Chamber of Commerce. "Understanding America's Labor Shortage," Feb. 13, 2024. https://www.uschamber.com/workforce/understanding-americas-labor-shortage.

[10] Space Foundation database. "Space Workforce." April 2024.

[11] The Space Report Q3, 2023. "European nations lead with space workforce growth from 2021 to 2022. www.thespacereport.org.

[12] U.S. Department of Labor. "Find your place in space." April 5,2024. https://blog.dol.gov/2024/04/05/find-your-place-in-space.

[13] The Space Report Q1 2024, www.thespacereport.org.

[14] National Student Clearinghouse. "Current Term Enrollment Estimates." Jan. 24, 2024. https://nscresearchcenter.org/current-term-enrollment-estimates/

[15] Quincy Brown, remarks at Space Symposium, April 11, 2024.

[16] National Space Council. "U.S. Space Priorities Framework." https://www.whitehouse.gov/wp-content/uploads/2021/12/United-States-Space-Priorities-Framework-_-December-1-2021.pdf.

[17] Space Workforce 2030." Second Annual Report." April 2024. https://swf2030.org/2024report/

[18] Greg Autry. Remarks at Space Symposium. April 11, 2024.

[19] Mordecai Ian Brownlee. Remarks at Space Symposium. April 11, 2024.

[20] Tidiane Ouattara. Remarks at Space Symposium. April 11, 2024.

[21] Robert Aillion. Remarks at Space Symposium. April 11, 2024.