

Architecture and Engineering

Aerospace Engineering and Operations Technicians

- **2014 Median Pay** \$63,780 per year
\$30.66 per hour
- **Typical Entry-Level Education** Associate's degree
- **Work Experience in a Related Occupation**..... None
- **On-the-job Training** None
- **Number of Jobs, 2014** 11,400
- **Job Outlook, 2014–24**..... 4% (Slower than average)
- **Employment Change, 2014–24** 400

What Aerospace Engineering and Operations Technicians Do

Aerospace engineering and operations technicians operate and maintain equipment used in testing new aircraft and spacecraft. Increasingly, these workers are being required to program and run computer simulations that test new designs. Their work is critical in preventing the failure of key parts of new aircraft, spacecraft, and missiles. They also help in the quality assurance, testing, and operation of advanced technology equipment used in producing aircraft and the systems that go into the aircraft.

Duties. Aerospace engineering and operations technicians typically do the following:

- Meet with aerospace engineers to discuss details and implications of test procedures
- Build and maintain test facilities for aircraft systems
- Make and install parts and systems to be tested in test equipment
- Operate and calibrate computer systems so that they comply with test requirements
- Ensure that test procedures are performed smoothly and safely
- Record data from test parts and assemblies
- Install instruments in aircraft and spacecraft
- Monitor and ensure quality in producing systems that go into the aircraft

New aircraft designs undergo years of testing before they are put into service, because the failure of key parts during flight can be fatal. As part of the job, technicians often calibrate test equipment, such as wind tunnels, and determine the causes of equipment malfunctions. They also may program and run computer simulations that test the new designs.

Some aerospace engineering and operations technicians are beginning to specialize in three-dimensional printing, or additive manufacturing, as this technology becomes more common in the work they do.

Work Environment

Aerospace engineering and operations technicians held about 11,400 jobs in 2014. The industries that employed the most aerospace engineering and operations technicians were as follows:



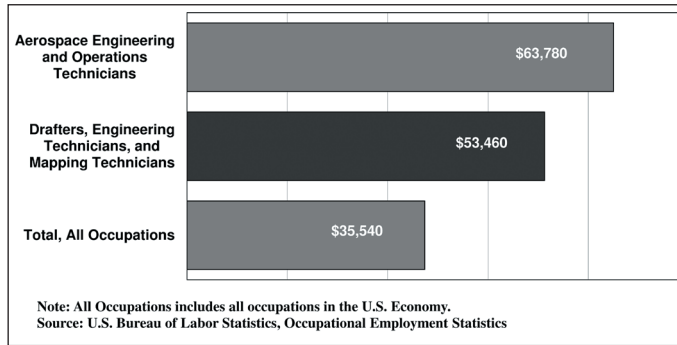
Aerospace engineering and operations technicians work to prevent the failure of key parts of new aircraft, spacecraft, or missiles.

Aerospace product and parts manufacturing.....	33%
Engineering services.....	18
Computer and electronic product manufacturing.....	17
Testing laboratories.....	16
Research and development in the physical, engineering, and life sciences.....	5

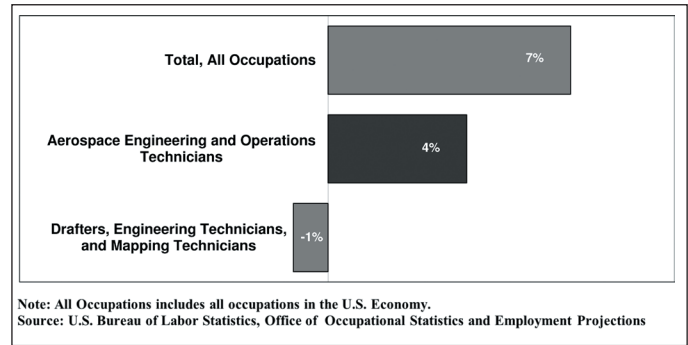
They usually work in manufacturing or industrial plants, laboratories, and offices. Aerospace engineering and operations technicians who work in manufacturing or industrial plants are frequently directly involved in assembling aircraft, missiles, and spacecraft. Many are exposed to hazards from equipment or from toxic materials, but incidents are rare as long as proper procedures are followed.

Work Schedules. Aerospace engineering and operations technicians have opportunities for employment throughout the private sector, with large and small manufacturing organizations, as well as with engineering services firms. Schedules worked tend to parallel those of the other engineering and operations staff members, and most work full time.

Median Annual Wages, May 2014



Percent Change in Employment, Projected 2014–2024



Education/Training

Many employers prefer to hire aerospace engineering and operations technicians who have earned an associate’s degree in engineering technology. Prospective technicians also may earn certificates or diplomas offered by vocational or technical schools. Some aerospace engineering and operations technicians must have security clearances to work on projects related to national defense. U.S. citizenship may be required for certain types and levels of clearances.

Education. High school students interested in becoming aerospace engineering and operations technicians should take classes in math, science, and, if available, drafting and computer skills. Courses that help students develop skills working with their hands also are valuable, because these technicians build what aerospace engineers design. In addition, technicians should have a basic understanding of computers and programs in order to model or simulate products.

Aerospace engineering and operations technicians typically need to earn an associate’s degree or a graduate certificate from a community college or vocational-technical school. Community colleges offer programs similar to those in technical institutes but include more theory-based and liberal arts coursework and programs. Community colleges typically award an associate’s degree. Vocational-technical schools include postsecondary public institutions that emphasize training needed by local employers. Students who complete these programs typically receive a diploma or certificate.

The Engineering Technology Accreditation Commission of ABET accredits programs that include at least college algebra, trigonometry, and basic science courses.

Many vocational and community colleges offer cooperative programs with work experience built into the curriculum.

Important Qualities

Communication skills. Aerospace engineering and operations technicians receive instructions from aerospace engineers. Therefore, they must be able to understand and follow those instructions, as well as communicate any problems to their supervisors.

Critical-thinking skills. Aerospace engineering and operations technicians must be able to help aerospace engineers troubleshoot particular design issues. They must be able to help evaluate system capabilities, identify problems, formulate the right question, and then find the right answer.

Detail oriented. Aerospace engineering and operations technicians make and keep precise measurements needed by aerospace engineers. Consequently, they must make correct measurements and keep accurate records.

Interpersonal skills. Aerospace engineering and operations technicians must be able to take instructions and offer advice. The ability to work well with supervising engineers, other technicians, and mechanics is essential because technicians interact with people from other divisions, businesses, and governments.

Math skills. Aerospace engineering and operations technicians use the principles of mathematics for analysis, design, and troubleshooting tasks in their work.

Mechanical skills. Aerospace engineering and operations technicians must be able to assist aerospace engineers by building what the engineers design. Mechanical skills are needed to help with the processes and directions required to move from design to production.

Licenses, Certifications, and Registrations. Although not required for the job, certification is offered by the Federal Aviation Administration (FAA). Certification may be beneficial because it shows employers that a technician can carry out the theoretical designs of aerospace engineers.

Both companies and the FAA seek to ensure the highest standards for the safety of the aircraft. SpaceTEC, the National Science Foundation’s Center for Aerospace Technical Education, coordinates a nationwide program through community and technical colleges to help students prepare for certification.

Pay

The median annual wage for aerospace engineering and operations technicians was \$63,780 in May 2014. The median wage is the wage at which half the workers in an occupation earned more than that amount and half earned less. The lowest 10 percent

Employment Projections Data for Aerospace Engineering and Operations Technicians

Occupational Title	SOC Code	Employment, 2014	Projected Employment,		Change, 2014–2024	
			2014	2024	Percent	Numeric
Aerospace engineering and operations technicians.....	17-3021	11,400	11,400	11,800	4	400

Source: U.S. Bureau of Labor Statistics, Employment Projections Program

Similar Occupations. This table shows a list of occupations with job duties that are similar to those of aerospace engineering and operations technicians.

Occupations	Entry-level Education	2014 Median Pay	Projected Job Growth	Average Annual Openings
Aerospace Engineers	Bachelor's degree	\$105,380	-2%	-160
Drafters	Associate's degree	\$51,940	-3%	-620
Electro-mechanical Technicians	Associate's degree	\$53,070	1%	10
Industrial Engineering Technicians	Associate's degree	\$53,370	-5%	-300
Mechanical Engineering Technicians	Associate's degree	\$53,530	2%	90

earned less than \$38,440, and the highest 10 percent earned more than \$93,330.

In May 2014, the median annual wages for aerospace engineering and operations technicians in the top industries in which they worked were as follows:

Aerospace product and parts manufacturing.....	\$69,400
Computer and electronic product manufacturing.....	67,180
Research and development in the physical, engineering, and life sciences.....	60,440
Engineering services.....	59,550
Testing laboratories.....	56,350

Job Outlook

Employment of aerospace engineering and operations technicians is projected to grow 4 percent from 2014 to 2024, slower than the average for all occupations. Aerospace engineering and operations technicians work on many projects related to national defense and therefore require security clearances. This restriction will help to keep jobs in the United States. In addition, aircraft are being redesigned to cut down on noise pollution and to raise fuel efficiency. Need for such redesigns should raise demand for research and development, particularly in support of air transportation.

Aerospace engineering and operations technicians work mainly in national defense-related projects or in constructing civilian aircraft. These technicians also are employed in the rising market for pilotless aerial vehicles. Successful research and development projects, ranging from more efficient propulsion systems to new air transport concepts, will result in new product lines and create demand for these workers.

Those who work on engines or propulsion will be increasingly needed as design and production emphasis shifts to rebuilding existing aircraft so that they give off less noise while using less fuel. Opportunities for employment with civilian space companies should increase as spaceflight shifts to the civilian market from government agencies.

However, aerospace engineering and operations technicians also are working to improve productivity through the use of automation and robotics, and the increased productivity likely will reduce low-end production employment in this occupation. Another factor that may slow growth in the occupation is the continuing adoption of computational fluid dynamics software. This technology has lowered testing costs and has replaced more traditional testing. As a result, these technicians will see a shift toward more high-end technology tasks.

Contacts for More Information

For more information about accredited programs, visit

- ▶ ABET (www.abet.org)

For more information about careers in engineering, visit

- ▶ Technology Student Association (www.tsaweb.org)

For more information about certification, visit

- ▶ Federal Aviation Administration (www.faa.gov)
- ▶ SpaceTEC (<http://spacotec.us/wordpress11>)

O*NET

- ▶ Aerospace Engineering and Operations Technicians (17-3021.00)

Aerospace Engineers

- **2014 Median Pay** \$105,380 per year
\$50.66 per hour
- **Typical Entry-Level Education** Bachelor's degree
- **Work Experience in a Related Occupation**..... None
- **On-the-job Training** None
- **Number of Jobs, 2014** 72,500
- **Job Outlook, 2014–24** -2% (Decline)
- **Employment Change, 2014–24** -1,600

What Aerospace Engineers Do

Aerospace engineers design primarily aircraft, spacecraft, satellites, and missiles. In addition, they test prototypes to make sure that they function according to design.

Duties. Aerospace engineers typically do the following:

- Direct and coordinate the design, manufacture, and testing of aircraft and aerospace products
- Assess proposals for projects to determine if they are technically and financially feasible
- Determine if proposed projects will result in safe aircraft and parts
- Evaluate designs to see that the products meet engineering principles, customer requirements, and environmental challenges
- Develop acceptance criteria for design methods, quality standards, sustainment after delivery, and completion dates
- Ensure that projects meet quality standards
- Inspect malfunctioning or damaged products to identify sources of problems and possible solutions

Aerospace engineers may develop new technologies for use in aviation, defense systems, and spacecraft. They often specialize in areas such as aerodynamic fluid flow; structural design; guidance, navigation, and control; instrumentation and communication; robotics; and propulsion and combustion.

Aerospace engineers can specialize in designing different types of aerospace products, such as commercial and military airplanes and helicopters; remotely piloted aircraft and rotorcraft;