Air Traffic Controllers

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Significant Points

- Nearly all air traffic controllers are employed by the Federal Aviation Administration (FAA), an agency of the Federal Government.
- Replacement needs will continue to account for most job openings, reflecting the large number of air traffic controllers who will be eligible to retire over the next decade.
- Competition to get into FAA training programs is expected to remain keen; however, graduates of these programs have good job prospects.
- Air traffic controllers earn relatively high pay and have good benefits.

Nature of the Work

The air traffic control system is a vast network of people and equipment that ensures the safe operation of commercial and private aircraft. Air traffic controllers coordinate the movement of air traffic to make certain that planes stay a safe distance apart. Their immediate concern is safety, but controllers also must direct planes efficiently to minimize delays. Some regulate airport traffic through designated airspaces; others regulate airport arrivals and departures.

Although *airport tower controllers* or *terminal controllers* watch over all planes traveling through the airport's airspace, their main responsibility is to organize the flow of aircraft into and out of the airport. Relying on radar and visual observation, they closely monitor each plane to ensure a safe distance between all aircraft and to guide pilots between the hangar or ramp and the end of the airport's airspace. In addition, controllers keep pilots informed about changes in weather conditions such as wind shear, a sudden change in the velocity or direction of the wind that can cause the pilot to lose control of the aircraft.

During arrival or departure, several controllers direct each plane. As a plane approaches an airport, the pilot radios ahead to inform the terminal of the plane's presence. The controller in the radar room, just beneath the control tower, has a copy of the plane's flight plan and already has observed the plane on radar. If the path is clear, the controller directs the pilot to a runway; if the airport is busy, the plane is fitted into a traffic pattern with other aircraft waiting to land. As the plane nears the runway, the pilot is asked to contact the tower. There, another controller, who also is watching the plane on radar, monitors the aircraft the last mile or so to the runway, delaying any departures that would interfere with the plane's landing. Once the plane has landed, a ground controller in the tower directs it along the taxiways to its assigned gate. The ground controller usually works entirely by sight, but may use radar if visibility is very poor.

The procedure is reversed for departures. The ground controller directs the plane to the proper runway. The local controller then informs the pilot about conditions at the airport, such as weather, speed and direction of wind, and visibility. The local controller also issues runway clearance for the pilot to take off. Once in the air, the plane is guided out of the airport's airspace by the departure controller.

After each plane departs, airport tower controllers notify *enroute controllers* who will next take charge. There are 21 air route traffic control centers located around the country, each employing 300 to 700 controllers, with more than 150 on duty during peak hours at the busiest facilities. Airplanes usually fly along designated routes; each center is assigned a certain airspace containing many different routes. Enroute controllers work in teams of up to three members, depending on how heavy traffic is; each team is responsible for a section of the center's airspace. A team, for example, might be responsible for all planes that are between 30 and 100 miles north of an airport and flying at an altitude between 6,000 and 18,000 feet.

To prepare for planes about to enter the team's airspace, the radar associate controller organizes flight plans coming off a printer. If two planes are scheduled to enter the team's airspace at nearly the same time, location, and altitude, this controller may arrange with the preceding control unit for one plane to change its flight path. The previous unit may have been another team at the same or an adjacent center, or a departure controller at a neighboring terminal. As a plane approaches a team's airspace, the radar controller accepts responsibility for the plane from the previous controlling unit. The controller also delegates responsibility for the plane to the next controlling unit when the plane leaves the team's airspace.

The radar controller, who is the senior team member, observes the planes in the team's airspace on radar and communicates with the pilots when necessary. Radar controllers warn pilots about nearby planes, bad weather conditions, and other potential hazards. Two planes on a collision course will be directed around each other. If a pilot wants to change altitude in search of better flying conditions, the controller will check to determine that no other planes will be along the proposed path. The team responsible for the aircraft notifies the next team in charge of the airspace ahead as the flight progresses. Through team coordination, the plane arrives safely at its destination.

Both airport tower and enroute controllers usually control several planes at a time; often, they have to make quick decisions about completely different activities. For example, a controller might direct a plane on its landing approach and at the same time provide pilots entering the airport's airspace with information about conditions at the airport. While instructing these pilots, the controller also might observe other planes in the vicinity, such as those in a holding pattern waiting for permission to land, to ensure that they remain well separated.

The FAA has implemented an automated air traffic control system, called the National Airspace System (NAS) Architecture. The NAS Architecture is a long-term strategic plan that will allow controllers to more efficiently deal with the demands of increased air traffic. It encompasses the replacement of aging equipment and the introduction of new systems, technologies, and procedures to enhance safety and security and support future aviation growth. The NAS Architecture facilitates continuing discussion of modernization between the FAA and the aviation community.

In addition to airport towers and enroute centers, air traffic controllers also work in flight service stations at more than 35 locations, including 17 locations in Alaska. These *flight service specialists* provide pilots with preflight and inflight weather information, suggested routes, and other aeronautical information important to the safety of a flight. Flight service specialists relay air traffic control clearances to pilots not in direct communications with a tower or center, assist pilots in emergency

situations, and initiate and coordinate searches for missing or overdue aircraft. At certain locations where there is no airport tower or the tower has closed for the day, flight service specialists provide airport advisory services to landing and departing aircraft. However, they are not involved in actively managing and separating air traffic.

Some air traffic controllers work at the FAA's Air Traffic Control Systems Command Center in Herndon, VA, where they oversee the entire system. They look for situations that will create bottlenecks or other problems in the system and then respond with a management plan for traffic into and out of the troubled sector. The objective is to keep traffic levels in the trouble spots manageable for the controllers working at enroute centers.

Work environment. During busy times, controllers must work rapidly and efficiently. Total concentration is required to keep track of several planes at the same time and to make certain that all pilots receive correct instructions. The mental stress of being responsible for the safety of several aircraft and their passengers can be exhausting. Unlike tower controllers, radar controllers also have the extra stress of having to work in semi-darkness, never seeing the actual aircraft they control except as a small "bleep" on the radarscope. Controllers who work in flight service stations work in offices close to the communications and computer equipment.

Controllers work a basic 40-hour week; however, they may work additional hours, for which they receive overtime, or premium pay, or equal time off. Because most control towers and centers operate 24 hours a day, 7 days a week, controllers rotate night and weekend shifts. Contract flight service station working conditions may vary somewhat from the FAA.

Training, Other Qualifications, and Advancement

To become an air traffic controller, a person must complete an FAA-approved education program; pass a pre-employment test; receive a school recommendation; meet the basic qualification requirements in accordance with Federal law; and achieve a qualifying score on the FAA-authorized pre-employment test. Candidates also must pass a medical exam, undergo drug screening, and obtain a security clearance before they can be hired.

Air traffic controllers are primarily concerned with safety, but they also must direct planes efficiently to minimize delays.

Education and training. Individuals must enroll in an FAA-approved education program and pass a pre-employment test that measures the applicant's ability to learn the controller's duties. Exceptions are air traffic controllers with prior experience and military veterans. The pre-employment test is currently offered only to students in the FAA Air Traffic Collegiate Training Initiative Program or the Minneapolis Community and Technical College, Air Traffic Control Training Program. The test is administered by computer and takes about 8 hours to complete. To take the test, an applicant must apply under an open advertisement for air traffic control positions and be chosen to take the examination. When there are many more applicants than available positions, applicants are selected to take the test through random selection. In addition to the pre-employment test, applicants must have 3 years of full-time work experience, have completed a full 4 years of college, or a combination of both. In combining education and experience, 1 year of undergraduate study—30 semester or 45 quarter hours—is equivalent to 9 months of work experience. Certain kinds of aviation experience also may be substituted for these requirements.

Upon successful completion of an FAA-approved program, individuals who receive school recommendation, meet the basic qualification requirements (including being less than 31 years of age) in accordance with Federal law, and achieve a qualifying score on the FAA-authorized pre-employment test become eligible for employment as an air traffic controller.

Upon selection, employees attend the FAA Academy in Oklahoma City, OK, for 12 weeks of training, during which they learn the fundamentals of the airway system, FAA regulations, controller equipment, and aircraft performance characteristics, as well as more specialized tasks.

After graduation from the FAA Academy in Oklahoma City, candidates are assigned to an air traffic control facility and are classified as "developmental controllers" until they complete all requirements to be certified for all of the air traffic control positions within a defined area of a given facility. Generally, it takes new controllers with only initial controller training between 2 and 4 years, depending on the facility and the availability of facility staff or contractors to provide on-the-job training, to complete all the certification requirements to become certified professional controllers. Individuals who have had prior controller experience normally take less time to become fully certified. Controllers who fail to complete either the academy or the on-the-job portions of the training usually are dismissed. Controllers must pass a physical examination each year and a job performance examination twice each year. Failure to become certified in any position at a facility within a specified time also may result in dismissal. Controllers also are subject to drug screening as a condition of continuing employment.

Other qualifications. Air traffic controllers must be articulate to give pilots directions quickly and clearly. Intelligence and a good memory also are important because controllers constantly receive information that they must immediately grasp, interpret, and remember. Decisiveness also is required because

controllers often have to make quick decisions. The ability to concentrate is crucial because controllers must make these decisions in the midst of noise and other distractions.

Advancement. At airports, new controllers begin by supplying pilots with basic flight data and airport information. They then advance to the position of ground controller, then local controller, departure controller, and, finally, arrival controller. At an air route traffic control center, new controllers first deliver printed flight plans to teams, gradually advancing to radar associate controller and then to radar controller.

Controllers can transfer to jobs at different locations or advance to supervisory positions, including management or staff jobs—such as air traffic control data systems computer specialist—in air traffic control, and top administrative jobs in the FAA. However, there are only limited opportunities for a controller to switch from a position in an enroute center to a tower. Contract flight service station working conditions may vary somewhat from the FAA.

Employment

Air traffic controllers held about 25,000 jobs in 2006. The vast majority were employed by the FAA. Air traffic controllers work at airports—in towers and flight service stations—and in air route traffic control centers. Some professional controllers conduct research at the FAA's national experimental center near Atlantic City, NJ. Others serve as instructors at the FAA Academy in Oklahoma City. A small number of civilian controllers work for the U.S. Department of Defense. In addition to controllers employed by the Federal Government, some work for private air traffic control companies providing service to non-FAA towers and contract flight service stations.

Job Outlook

Most employment opportunities are expected to result from the need to replace workers who retire or leave the occupation for other reasons; graduates of an FAA training program have good prospects.

Employment change. Employment of air traffic controllers is projected to grow 10 percent from 2006 to 2016, about as fast as the average for all occupations. Increasing air traffic will require more controllers to handle the additional work. Job growth, however, is not expected to keep pace with the increasing number of aircraft flying. New computerized systems will assist the controller by automatically making many of the routine decisions. This will allow controllers to handle more traffic, thus increasing their productivity. In addition, Federal budget constraints may limit hiring of air traffic controllers.

Job prospects. Most job opportunities are expected as the result of replacement needs from workers leaving the occupation. The majority of today's air traffic controllers will be eligible to retire over the next decade, although not all are expected to do so. Nevertheless, replacement needs will result in job opportunities each year for those graduating from the FAA training programs. Despite the increasing number of jobs coming open, competition to get into the FAA training programs is expected to remain keen, as there generally are many more applicants to get into the schools than there are openings, but those who graduate have good prospects of getting a job as a controller.

Air traffic controllers who continue to meet the proficiency and medical requirements enjoy more job security than do most workers. The demand for air travel and the workloads of air traffic controllers decline during recessions, but controllers seldom are laid off.

Earnings

Air traffic controllers earn relatively high pay and have good benefits. Median annual earnings of air traffic controllers in May 2006 were $117,240. The middle 50 percent earned between $86,860 and $142,210. The lowest 10 percent earned less than $59,410, and the highest 10 percent earned more than $145,600. The average annual salary, excluding overtime earnings, for air traffic controllers in the Federal Government—which employs 90 percent of all controllers—was $122,220 in May 2006.

The Air Traffic Control pay system classifies each air traffic facility into one of eight levels with corresponding pay bands. Under this pay system, controllers' salaries are determined by the rating of the facility. Higher ratings usually mean higher controller salaries and greater demands on the controller's judgment, skill, and decision-making ability.

Depending on length of service, air traffic controllers receive 13 to 26 days of paid vacation and 13 days of paid sick leave each year, in addition to life insurance and health benefits. Controllers also can retire at an earlier age and with fewer years of service than other Federal employees. Air traffic controllers are eligible to retire at age 50 with 20 years of service as an active air traffic controller or after 25 years of active service at any age. There is a mandatory retirement age of 56 for controllers who manage air traffic. However, Federal law provides for exemptions to the mandatory age of 56, up to age 61, for controllers having exceptional skills and experience. Earnings and benefits for controllers working in contract towers or flight service stations may vary.

Related Occupations

Airfield operations specialists also are involved in the direction and control of traffic in air transportation.

Sources of Additional Information

For further information on how to qualify and apply for a job as an air traffic controller, contact the FAA:

➤ Federal Aviation Administration, 800 Independence Ave. SW., Washington, DC 20591. Internet: **http://www.faa.gov**

Projections data from the National Employment Matrix

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Air traffic controllers	53-2021	25,000	28,000	2,600	10

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.