AIR TRAFFIC CONTROL SYSTEM

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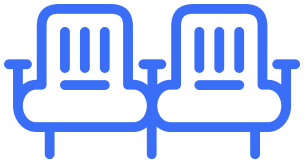

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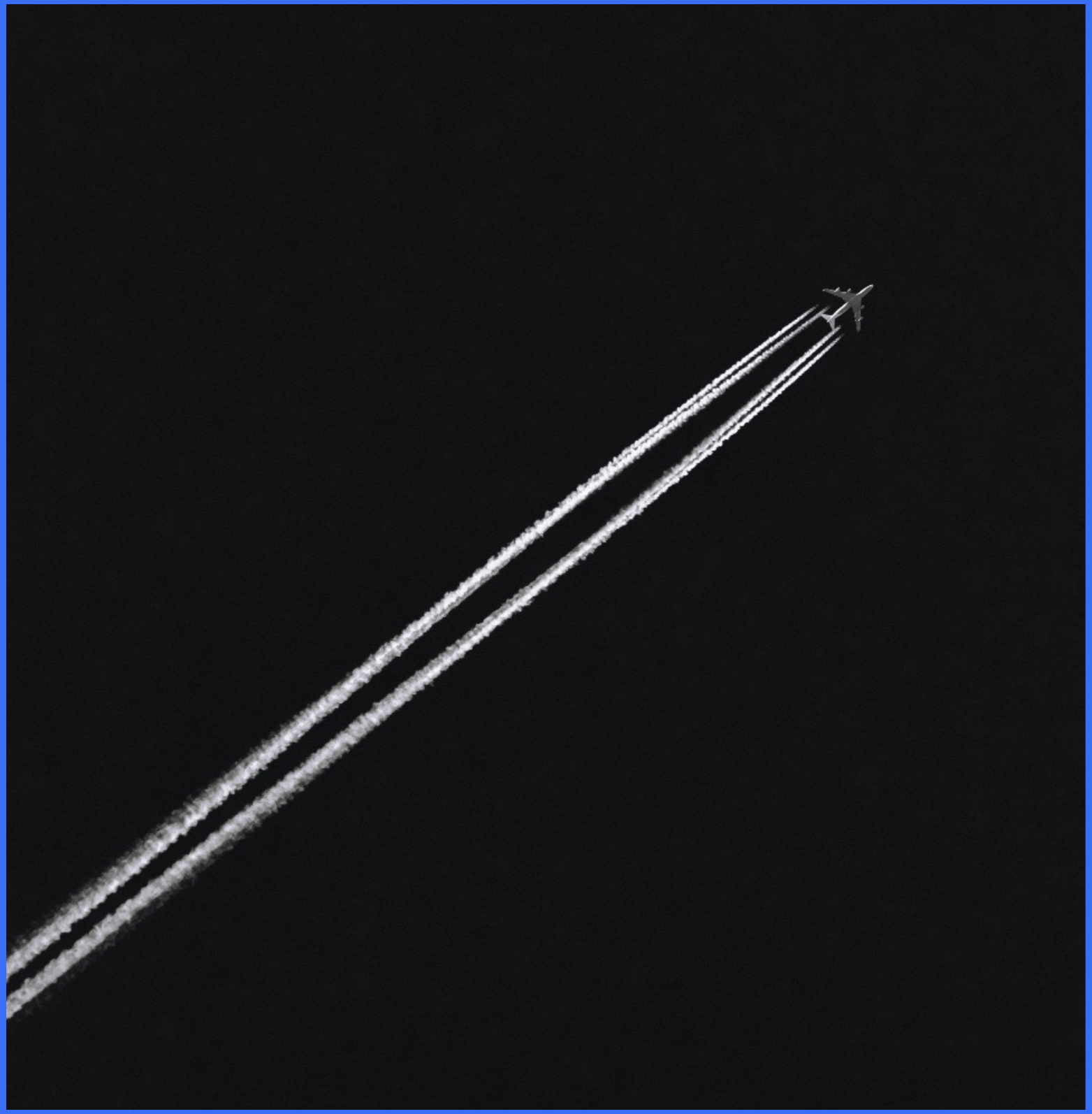

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What Does an Air Traffic Control System Do?

The role of an air traffic controller is quite complex. They're the person who works from the control tower, giving clearance for aircraft to take off and land safely in the airport. The air traffic controller works within a system, coordinating patterns to ensure aircraft keep a safe distance in the air and on the ground. The main goal of an air traffic controller is to ensure the safety of aircraft, pilots, flight attendants, and of course, the airline passengers.

How Air Traffic Control Towers Work?

- **Preflight** is when the weather forecast is communicated from the air traffic control tower to the pilot and clearance is provided for the flight's route.

- **Takeoff** is when the tower gives the airplane clearance to lift off the ground.

- **Departure** occurs when the plane is five miles beyond the airport and flight control is transferred to a Terminal Radar.

- **In the air** describes when the oversight is given to an Air Route Traffic Control Center (ARTCC), which is a radar system supervising flights within the area.

- **Descent** is when the plane is within 50 miles of its destination airport.

- **Approach**, the TRACON controller fuses several streams of descending airplanes into one even pace.

- **Landing** is when the local controller gives clearance for landing and directs pilots through taxiways.

TRACON and Air Traffic Control

According to the FAA, "TRACONs are FAA facilities that house air traffic controllers who use radar displays and radios to guide aircraft approaching and departing airports generally within a 30- to 50-mile radius up to 10,000 feet, as well as aircraft that may be flying over that airspace." When landing at the destination airport within five miles, TRACON controllers hand off the aircraft to the local air traffic controllers and vice versa during departure. However, TRACON controllers aren't responsible for landings and takeoffs.

CONTROL

Air route traffic control centers - ARTCC -

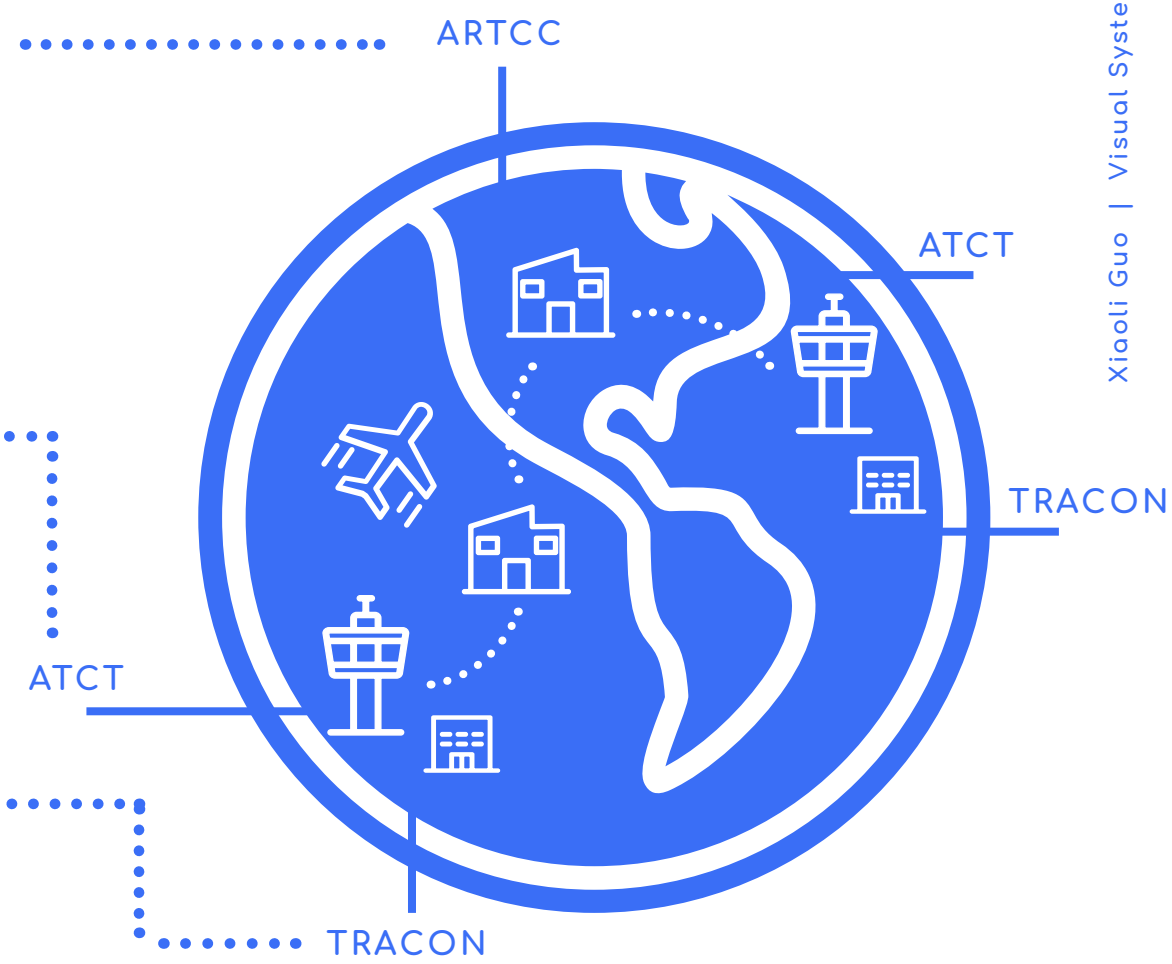
There is one ARTCC for each center. Each ARTCC manages traffic within all sectors of its center except for TRACON airspace and local-airport airspace.

Air traffic control tower - ATCT -

An ATCT is located at every airport that has regularly scheduled flights. Towers handle all takeoff, landing, and ground traffic.

Terminal radar approach control - TRACON -

TRACON handles departing and approaching aircraft within its space.



Flight service station - FSS -

The FSS provides information (weather, route, terrain, flight plan) for private pilots flying into and out of small airports and rural areas. It assists pilots in emergencies and coordinates search-and-rescue operations for missing or overdue aircraft.

Air Traffic Control System Command Center - ATCSCC -

The ATCSCC oversees all air traffic control. It also manages air traffic control within centers where there are problems (bad weather, traffic overloads, inoperative runways).

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Why Are Traffic Controllers Important?

The role of an air traffic controller is very important. Pilots cannot fly an airplane without the safety of an air traffic control system. In the event of an emergency, an air traffic controller will notify authorities and calmly handle the situation, thinking while under pressure and multitasking throughout the event.

To be an air traffic controller there are certain skills you must possess. You must be great under pressure, have the time and concentration to sit long hours while reading graphs and visuals, and you must also be proficient in math.

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HOW

What Qualifications Do You Need to Be an Air Traffic Controller?

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If you're wondering how to become an air traffic controller, acquiring the proper certifications is a great start. You will need three years of schooling in the National Air Traffic Services (NATS). To begin, you must be at least 18 years of age or older. Speaking English as well as completion and passing a medical examination as well as a security clearance are also requirements.

With the proper air traffic controller qualifications, you will then be assigned to one of three specific air traffic control positions:

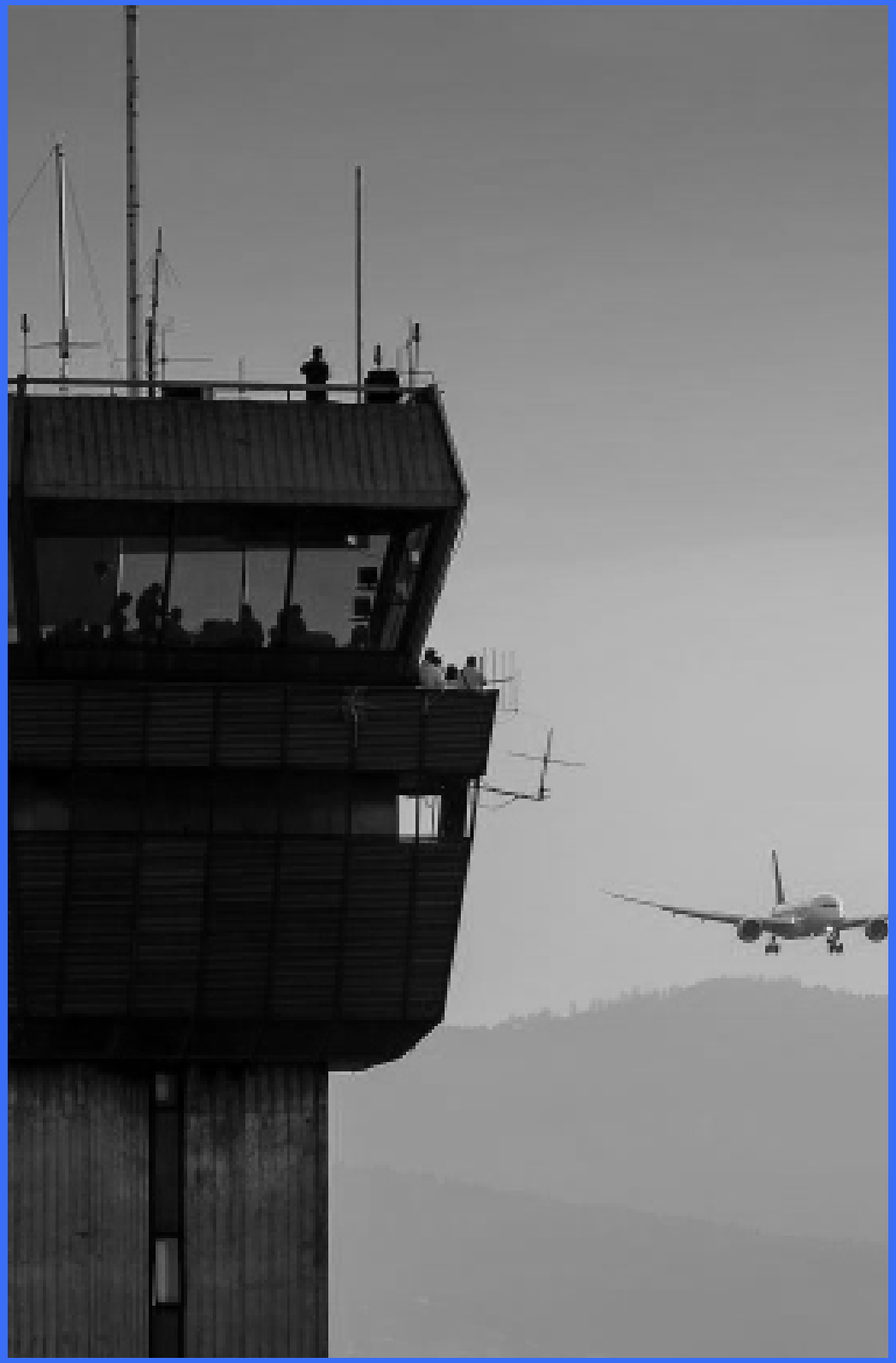
- Area Controller
- Approach Controller
- Aerodrome Controller

It takes a certain skill level and several requirements to become an air traffic controller. Although this is a great job, it is not meant for everyone. However, there are other aviation jobs similar to air traffic controllers that may better suit you if you are interested in a career in aviation.

An aircraft dispatcher is one of the other great professions to look into. Being an aircraft dispatcher requires patience and training. The excellent professors at Sheffield School of Aeronautics teach aircraft dispatcher courses for those interested in a career with airlines. Contact our aviation crew at the Sheffield School of Aeronautics if you have questions about the programs and certifications we offer and get started on your air traffic controller education!

Air Traffic Control Problems

Air travel has increased dramatically since the U.S. federal government deregulated the airline industry in the 1970s. However, the construction of new airports and runways has not kept pace with the increase in air traffic. This has put excessive pressure on the air traffic control system to handle the nearly 50,000 flights per day, a number projected to increase in the near future. To handle these flights and avoid delays and collisions, the FAA and NASA have developed modern software, upgraded existing host computers and voice communications systems and instituted full-scale GPS (global positioning system) capabilities to help air traffic controllers track and communicate with aircraft. The FAA is currently redesigning U.S. airspace to make more room for increased traffic. For example, the U.S. military has freed previously restricted airspace off the coast of North Carolina for use by commercial aircraft. These efforts should help ease traffic and minimize delays in the short term; however, increasing airport capacity by building new runways and airports is ultimately the way to handle the problem.



1922 Picardie mid-air collision

The 1922 Picardie mid-air collision took place on 7 April 1922 over Picardie, France, involving British and French passenger-carrying biplanes. The midair collision occurred in foggy conditions. A British aircraft flying Croydon – Paris with only mail on board impacted a French aircraft flying three passengers Paris – Croydon, which resulted in seven deaths.

AMERICANS DIE IN FRENCH AIR CRASH

Christopher Bruce Yule and Wife Killed on London-Paris Airplane Route.

WERE ON THEIR HONEYMOON

French and British Planes in Collision in a Fog—Six Are Dead and One Dying.

Copyright, 1922, by The New York Times Company.
Special Cable to THE NEW YORK TIMES.

PARIS, April 7.—The Goliath airplane

Background

Following World War I, there was a steep decline in demand for military aircraft and their pilots. Like other countries, France and Britain turned to establishing a civilian air industry, initially converting military designs to domestic purposes.

The first Airco-designed aircraft for airline work after World War I was the de Havilland DH.18A. One aircraft owned by the Air Ministry (registration G-EAWO), was transferred from Instone Air Line to Daimler Hire Limited for operation on the Croydon-Paris route until the three de Havilland DH.34s which Daimler had on order could be delivered. The service commenced that week on 2 April 1922.

The French company Compagnie des Grands Express Aériens (CGEA) was operating a Farman F.60 Goliath (registration F-GEAD) on a daily service from Le Bourget to Croydon.

The Flight

On 7 April 1922, four days after Daimler Hire commenced operations with the DH.18A, G-EAWO was flying mail from Croydon bound for Le Bourget, Paris, with only the pilot (Lieutenant R. E. Duke) and a boy steward (Hesterman) aboard. Meanwhile, the Goliath (F-GEAD) piloted by M. Mire had departed Le Bourget with three passengers and a mechanic. The three passengers were an American couple, Christopher Bruce Yule and the new Mrs. Mary Yule, who were on their honeymoon, and a French national, Monsieur Bouriez.

Following the normal route in drizzle and fog at an altitude of 150 m (492 ft), the DH.18A collided with the Goliath over Thieuloy-Saint-Antoine, 4 kilometres (2 mi) south of Grandvilliers in the Oise department (now part of Picardie), France, some 27 kilometres (17 mi) north of Beauvais and some 70 miles (110 km) north of Paris. All seven people died in the first-ever mid-air collision between airliners.

mid-air collision

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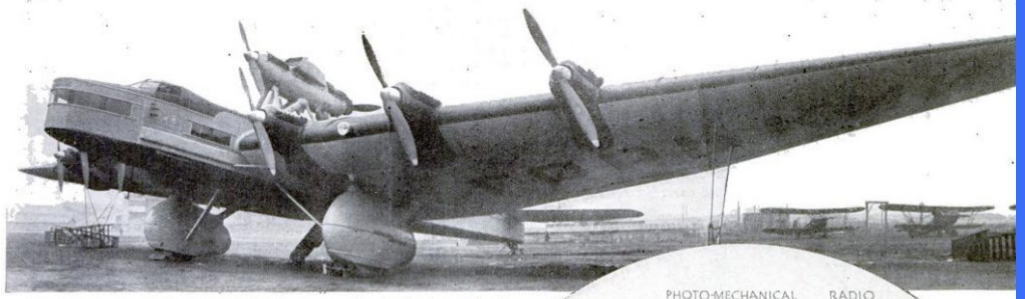
Aftermath

Following the accident, a meeting was held at Croydon Airport by representatives of Compagnie des Grands Express Aériens, Compagnie des Messageries Aériennes, Daimler Airway, Handley Page Transport, Instone Air Line and KLM, as well as two representatives from the Air Ministry and various pilots employed by the companies. Among the resolutions passed at the meeting were that "keep to the right" was to become the universal rule of the air, new airliners should provide a clear view ahead for the pilot, and that all airliners should be equipped with radio. Clearly defined air routes were to be introduced in Belgium, France, the Netherlands and the United Kingdom.

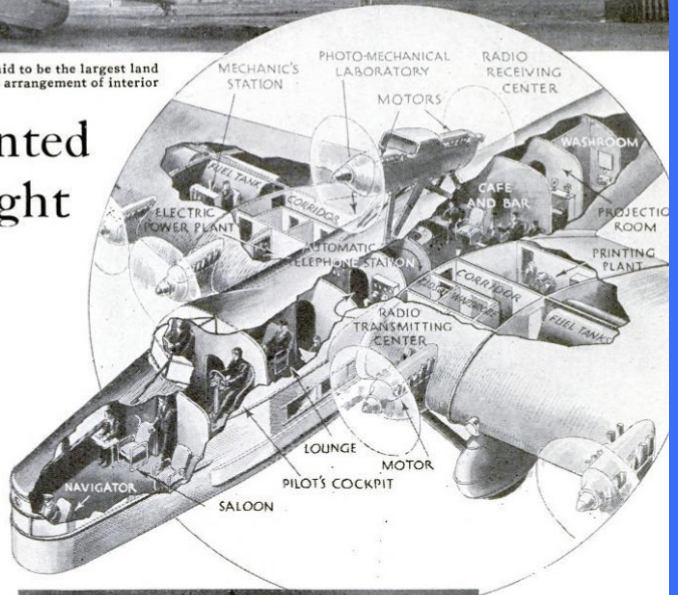
1935 Maksim Gorky Crash

On 18 May 1935, the Maksim Gorky (pilots – I. V. Mikheyev and I. S. Zhurov) and three more aircraft (a Tupolev ANT-14, R-5 and I-5) took off for a demonstration flight over Moscow. The main purpose of the other three aircraft flying so close was to make evident the difference in size. The accompanying I-5 fighter piloted by Nikolai Blagin had performed two loop manoeuvres around the Maksim Gorky. On the third loop, they collided. The Maksim Gorky crashed into a low-rise residential neighbourhood west of present-day Sokol metro station. Forty-five people were killed in the crash, including the fighter pilot as well as both crew members and the 33 passengers on the Maksim Gorky, and an additional nine people on the ground.

mid-air collision



The *Maxim Gorki*, Soviet educational plane, said to be the largest land plane in the world. Right, cutaway view shows arrangement of interior



Newspaper Printed on Plane in Flight

A MONSTER airplane that carries a printing plant aboard is the Soviet's latest tool to educate the masses, in flying trips to outlying districts. Named the *Maxim Gorki* and called the largest land plane ever built, the huge machine measures 210 feet in wing span and weighs forty-two tons when ready for flight. Eight motors totaling 7,000 horsepower propelled it at a speed well in excess of two miles a minute, in recent successful flight tests.

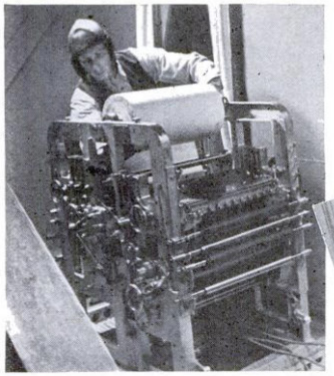
The printing plant contains all the equipment necessary for issuing a complete newspaper during a flight. A rotary press designed especially for the plane prints as many as 10,000 copies an hour of an illustrated paper of twelve- by sixteen-inch size, for distribution on landing. Pictures taken during flight are prepared for the paper in a photo-mechanical laboratory aboard.

Movie shows may be given the populace by a folding screen carried in the rear of the plane and set up on the ground so that 10,000 spectators may view the show. The movies are thrown on the screen from a projection room within the plane, through a window in fuselage.

Speech and music, fr a microphone or pho graph within the pla may be broadcast audi so that they are heard all those beneath, wit an area of nearly f square miles. Other c munication facilities the plane include hi speed radio apparatus transmitting routine c and telegrams, and an tercommunication syst aboard, a new depart in aviation. By switch a lever, the comman or navigator may addr all occupants of the plane simulta ously in order to deliver instructio while at other times the system is u for conversations between the vari cabins.

Lounging and sleeping cabins seventy passengers are furnished comfortably as a hotel, and food served from an electric kitchen dur flight. An electric power plant of s ficient capacity to light more than fifty-watt lamps, provides current.

Passengers taking refreshments in the plane's cozy cafe



The printing press aboard the *Maxim Gorki*, which turns out 10,000 copies per hour of a newspaper while the airplane is in flight

The radio room, with its high-speed equipment

ANT-20bis

A replacement aircraft, designated ANT-20bis had begun production the following year and first flew in 1938. It was largely identical in design but with six more-powerful Mikulin AM-34FRNV engines. In December 1940, the aircraft was re-engined with two slightly more powerful Mikulin AM-35 engines in the inner positions (numbers three and four). This aircraft, designated PS-124 and registered CCCP-L760, served with Aeroflot on transport routes in Russia and Uzbekistan. On 14 December 1942, it crashed after the pilot allowed a passenger to take his seat momentarily and the passenger apparently disengaged the automatic pilot, sending the airplane into a nosedive from an altitude of 500 m (1,600 ft), killing all 36 on board.

History

The air age arrived on Dec. 17, 1903, when the Wright brothers succeeded in a 120-foot flight in a heavier-than-air craft at Kitty Hawk, N.C., U.S. It is difficult to imagine the rapid technological advances that now allow interplanetary travel by unmanned, but directly controlled, satellites and probes. The earliest common uses of aviation were by the military and the civilian postal service. With infrequent flights and virtually no carriage of passengers, the primary concern was for the integrity of the aircraft and the management of safe takeoffs and landings. One of the principal distinguishing characteristics of aviation, compared to other transportation modes, is the high speed and "vertical" nature of operations. Because of these unique features, aviation has always posed the highest risk of severe injuries and fatalities, given an accident, of almost any transportation mode. When passengers began to be carried in significant volumes in the 1920s, it became clear that a systematic set of air traffic control principles were needed to handle the increasing volumes at several critical airports.

Airplanes travel along established routes called airways, which are analogous to guideways, even though they are not physical constructions. They are defined by a particular width (e.g., 32 miles) and also have defined altitudes, which separate air traffic moving in opposite directions along the same airway. Because of the ability to vertically separate aircraft, it is possible for through traffic to fly over airports while operations continue underneath. The economics of air travel require relatively long-distance travel from origin to destination in order to retain economic viability. For the vehicle operator (i.e., the pilot), this means short periods of high concentration and stress (takeoffs and landings) with relatively long periods of low activity and arousal. During this long-haul portion of a flight, a pilot is much more concerned with monitoring aircraft status than looking around for nearby planes. This is markedly different from highways, in which a collision threat is nearly always apparent. While midair collisions have occurred away from airports, the scenario most feared by safety analysts is a midair collision near or at an airport because of a traffic control misunderstanding. These concerns led to the evolution of the present air traffic control system.

The first attempt to develop air traffic control rules occurred in 1922 under the auspices of the International Commission on Air Navigation (ICAN) under the direction of the League of Nations. The first air traffic controller, Archie League of St. Louis, Mo., U.S., began working in 1929. The long distances traveled by aircraft show why aviation quickly became an international concern. The capabilities of aircraft to fly hundreds or thousands of miles at several hundred miles per hour created a market for long-distance, high-speed transportation. Two immediate concerns were in the areas of language and equipment compatibility. Pilots from many countries and with many native languages needed to communicate with each other and with controllers on the ground. Electronic equipment including radios and, more recently, computers needed to exchange information. English was established as the international language of air traffic control, but even within this context, there was a need for precise use of phrases and strings of words. These common practices have their conceptual roots in the same issues of uniformity that are directly applied to highways. The operator needs to be given clear and simple information that meets a direct need. In road transportation, this is conveyed through verbal or symbolic visual images; in aviation, it is achieved through the spoken word, supplemented by aircraft instrumentation. The initial international activity in navigation also distinguishes air transport: finding a way to a destination was an area of principal concern in the early years of aviation. Because aircraft could not operate without fixed land references (particularly on long-distance trips), it became necessary to develop an elaborate system of navigation aids (first visual, using beacons, now electronic, using radar) to help indicate the current aircraft position. Availability of inertial navigation units for commercial aircraft has reduced the need for this communication in the passenger sector; en route information is still provided through a variety of communication media on long-distance trips to warn of impending delays or other conditions.

Paul Rinaldi

National Air Traffic Controllers Association

Paul Rinaldi has served as the sixth president of the National Air Traffic Controllers Association since October 2009. In March 2012 and March 2015, Rinaldi was re-elected by acclamation. In July 2018, Rinaldi won re-election to serve an unprecedented fourth, three-year term. Rinaldi is the first in NATCA's history to serve more than two terms as president.

That is not, however, the first time Rinaldi and Executive Vice President Trish Gilbert have made history; though NATCA's top two positions are elected separately, in 2009 they campaigned for their respective positions as a team, which had never been done.

Since taking office in 2009 Rinaldi and Gilbert have continued to work as a team, along with the NATCA National Executive Board, elevating NATCA to new levels of success. NATCA's team is committed and focused on improving the working relationship between the Union, the Federal Aviation Administration and Department of Transportation. Efforts like the Air Traffic Safety Action Program (ATSAP), fatigue mitigation, Professional Standards, and Partnership For Safety are a result of the team's focus on progress and safety. These processes have led to collaborative decisions on important issues involving airspace, procedures, technology, staffing and training while cementing NATCA's leadership role and voice in the aviation industry.

Prior to being elected NATCA President, Rinaldi served three years as NATCA's Executive Vice President, after 16 years as an air traffic controller at Washington-Dulles Tower (IAD). Rinaldi currently holds positions on the NextGen Advisory Committee (NAC), the FAA Management Advisory Council (MAC) and at the AFL-CIO 2013 Convention he was elected as a vice president of the labor federation's Executive Council. He was re-elected to that position at the AFL-CIO 2017 Convention. Rinaldi also serves on the RTCA Policy Board and the Board of Advisors for the Eno Center for Transportation. He is also the Vice President of the Global Air Traffic Controllers Alliance, a partnership of air traffic control unions in Australia, Canada, New Zealand, Spain, the United Kingdom, and the United States which strengthens ties and establishes a collective voice to speak on a range of subjects.