Airport

The majority of the world's airports are non-towered, with no air traffic control presence. Busy airports have air traffic control (ATC) system. All airports use a traffic pattern to assure smooth traffic flow between departing and arriving aircraft. There are a number of aids available to pilots, though not all airports are equipped with them. Many airports have lighting that help guide planes using the runways and taxiways at night or in rain, snow, or fog. In the U.S. and Canada, the vast majority of airports, large and small, will either have some form of automated airport weather station, a human observer or a combination of the two. Air safety is an important concern in the operation of an airport, and airports often have their own safety services. The majority of the world's airports are non-towered, with no air traffic control presence. However, at particularly busy airports, or airports with other special requirements, there is an air traffic control (ATC) system whereby controllers (usually ground-based) direct aircraft movements via radio or other communications links. This coordinated oversight facilitates safety and speed in complex operations where traffic moves in all three dimensions. Air traffic control responsibilities at airports are usually divided into at least two main areas: ground and tower, though a single controller may work both stations. The busiest airports also have clearance delivery, apron control, and other specialized ATC stations. At extremely large airports, a circuit is in place but not usually used. Rather, aircraft (usually only commercial with long routes) request approach clearance while they are still hours away from the airport, often before they even take off from their departure point. Large airports have a frequency called Clearance Delivery which is used by departing aircraft specifically for this purpose. This then allows aircraft to take the most direct approach path to the runway and land without worrying about interference from other aircraft. While this system keeps the airspace free and is simpler for pilots, it requires detailed knowledge of how aircraft are planning to use the airport ahead of time and is therefore only possible with large commercial airliners on pre-scheduled flights. The system has

recently become so advanced that controllers can predict whether an aircraft will be delayed on landing before it even takes off; that aircraft can then be delayed on the ground, rather than wasting expensive fuel waiting in the air. On runways, green lights indicate the beginning of the runway for landing, while red lights indicate the end of the runway. Runway edge lighting consists of white lights spaced out on both sides of the runway, indicating the edge. Some airports have more complicated lighting on the runways including lights that run down the centerline of the runway and lights that help indicate the approach (an approach lighting system, or ALS). Low-traffic airports may use pilot controlled lighting to save electricity and staffing costs. Tower Control controls aircraft on the runway and in the controlled airspace immediately surrounding the airport. Tower controllers may use radar to locate an aircraft's position in three-dimensional space, or they may rely on pilot position reports and visual observation. They coordinate the sequencing of aircraft in the traffic pattern and direct aircraft on how to safely join and leave the circuit. Aircraft which are only passing through the airspace must also contact Tower Control in order to be sure that they remain clear of other traffic. Airports are divided into landside and airside areas. Landside areas include parking lots, public transportation train stations and access roads. Airside areas include all areas accessible to aircraft, including runways, taxiways and aprons. Access from landside areas to airside areas is tightly controlled at most airports. Passengers on commercial flights access airside areas through terminals, where they can purchase tickets, clear security check, or claim luggage and board aircraft through gates. The waiting areas which provide passenger access to aircraft are typically called concourses, although this term is often used interchangeably with terminal. Following the war, some of these military airfields added civil facilities for handling passenger traffic. One of the earliest such fields was Paris - Le Bourget Airport at Le Bourget, near Paris. The first airport to operate scheduled international commercial services was Hounslow Heath Aerodrome in August 1919, but it was closed and supplanted by Croydon Airport in March 1920. In 1922, the first permanent airport and commercial terminal solely for commercial aviation was opened at Flughafen Devau near what was

then Königsberg, East Prussia. The airports of this era used a paved "apron", which permitted night flying as well as landing heavier aircraft. At all airports the use of a traffic pattern (often called a traffic circuit outside the U.S.) is possible. They may help to assure smooth traffic flow between departing and arriving aircraft. There is no technical need within modern aviation for performing this pattern, provided there is no queue. And due to the so-called SLOT-times, the overall traffic planning tend to assure landing queues are avoided. If for instance an aircraft approaches runway 17 (which has a heading of approx. 170 degrees) from the north (coming from 360/0 degrees heading towards 180 degrees), the aircraft will land as fast as possible by just turning 10 degrees and follow the glidepath, without orbit the runway for visual reasons, whenever this is possible. For smaller piston engined airplanes at smaller airfields without ILS equipment, things are very differently though. Most major airports provide commercial outlets for products and services. Most of these companies, many of which are internationally known brands, are located within the departure areas. These include clothing boutiques and restaurants. Prices charged for items sold at these outlets are generally higher than those outside the airport. However, some airports now regulate costs to keep them comparable to "street prices". This term is misleading as prices often match the manufacturers\' suggested retail price (MSRP) but are almost never discounted.[citation needed Ground Control is responsible for directing all ground traffic in designated "movement areas", except the traffic on runways. This includes planes, baggage trains, snowplows, grass cutters, fuel trucks, stair trucks, airline food trucks, conveyor belt vehicles and other vehicles. Ground Control will instruct these vehicles on which taxiways to use, which runway they will use (in the case of planes), where they will park, and when it is safe to cross runways. When a plane is ready to takeoff it will stop short of the runway, at which point it will be turned over to Tower Control. After a plane has landed, it will depart the runway and be returned to Ground Control. Hazards to aircraft include debris, nesting birds, and reduced friction levels due to environmental conditions such as ice, snow, or rain. Part of runway maintenance is airfield rubber removal which helps maintain friction levels.

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The fields must be kept clear of debris using cleaning equipment so that loose material does not become a projectile and enter an engine duct (see foreign object damage). In adverse weather conditions, ice and snow clearing equipment can be used to improve traction on the landing strip. For waiting aircraft, equipment is used to spray special deicing fluids on the wings. Many ground crew at the airport work at the aircraft. A tow tractor pulls the aircraft to one of the airbridges, The ground power unit is plugged in. It keeps the electricity running in the plane when it stands at the terminal. The engines are not working, therefore they do not generate the electricity, as they do in flight. The passengers disembark using the airbridge. Mobile stairs can give the ground crew more access to the aircraft's cabin. There is a cleaning service to clean the aircraft after the aircraft lands. Flight catering provides the food and drinks on flights. A toilet waste truck removes the human waste from the tank which holds the waste from the toilets in the aircraft. A water truck fills the water tanks of the aircraft. A fuel transfer vehicle transfers aviation fuel from fuel tanks underground, to the aircraft tanks. A tractor and its dollies bring in luggage from the terminal to the aircraft. They also carry luggage to the terminal if the aircraft has landed, and is being unloaded. Hi-loaders lift the heavy luggage containers to the gate of the cargo hold. The ground crew push the luggage containers into the hold. If it has landed, they rise, the ground crew push the luggage container on the hi-loader, which carries it down. The luggage container is then pushed on one of the tractors dollies. The conveyor, which is a conveyor belt on a truck, brings in the awkwardly shaped, or late luggage. The airbridge is used again by the new passengers to embark the aircraft. The tow tractor pushes the aircraft away from the terminal to a taxi area. The aircraft should be off of the airport and in the air in 90 minutes. The airport charges the airline for the time the aircraft spends at the airport. Most airports welcome filming on site, although it must be agreed in advance and may be subject to a fee. Landside, filming can take place in all public areas. However airside, filming is heavily restricted, the only airside locations where filming is permitted are the Departure Lounge and some outside areas. To film in an airside location, all visitors must go through security, the same as

passengers, and be accompanied by a full airside pass holder and have their passport with them at all times. Filming can not be undertaken in Security, at Immigration/Customs, or in Baggage Reclaim. The title of "world\'s oldest airport" is disputed, but College Park Airport in Maryland, US, established in 1909 by Wilbur Wright, is generally agreed to be the world\'s oldest continually operating airfield, although it serves only general aviation traffic. Bisbee-Douglas International Airport in Arizona was declared "the first international airport of the Americas" by US president Franklin D. Roosevelt in 1943. Pearson Field Airport in Vancouver, Washington had a dirigible land in 1905 and planes in 1911 and is still in use. Bremen Airport opened in 1913 and remains in use, although it served as an American military field between 1945 and 1949. Amsterdam Airport Schiphol opened on September 16, 1916 as a military airfield, but only accepted civil aircraft from December 17, 1920, allowing Sydney Airport in Sydney, Australia-which started operations in January 1920-to claim to be one of the world\'s oldest continually operating commercial airports. Minneapolis-Saint Paul International Airport in Minneapolis-Saint Paul, Minnesota, opened in 1920 and has been in continuous commercial service since. It serves about 35,000,000 passengers each year and continues to expand, recently opening a new 11,000 foot (3,355 meter) runway. Of the airports constructed during this early period in aviation, it is one of the largest and busiest that is still currently operating. Rome Ciampino Airport, opened 1916, is also a contender, as well as the Don Mueang International Airport near Bangkok,Thailand, which opened in 1914. Increased aircraft traffic during World War I led to the construction of landing fields. Aircraft had to approach these from certain directions and this led to the development of aids for directing the approach and landing slope. Airports may also contain premium and VIP services. The premium and VIP services may include express check-in and dedicated check-in counters. These services are usually reserved for First and Business class passengers, premium frequent flyers, and members of the airline's clubs. Premium services may sometimes be open to passengers who are members of a different airline's frequent flyer program. This can sometimes be part of a reciprocal deal, as when multiple airlines

are part of the same alliance, or as a ploy to attract premium customers away from rival airlines. The distances passengers need to move within a large airport can be substantial. It is common for airports to provide moving walkways and buses. The Hartsfield-Jackson Atlanta International Airport has a tram that takes people through the concourses and baggage claim. Major airports with more than one terminal offer inter-terminal transportation, such as Mexico City International Airport, where the domestic building of Terminal 1 is connected by Aerotrén to Terminal 2, on the other side of the airport. Generally, this pattern is a circuit consisting of five "legs" that form a rectangle (two legs and the runway form one side, with the remaining legs forming three more sides). Each leg is named (see diagram), and ATC directs pilots on how to join and leave the circuit. Traffic patterns are flown at one specific altitude, usually 800 or 1,000 ft (244 or 305 m) above ground level (AGL). Standard traffic patterns are left-handed, meaning all turns are made to the left. One of the main reason for this is that pilots sit on the left side of the airplane, and a Left-hand patterns improves their visibility of the airport and pattern. Right-handed patterns do exist, usually because of obstacles such as a mountain, or to reduce noise for local residents. The predetermined circuit helps traffic flow smoothly because all pilots know what to expect, and helps reduce the chance of a mid-air collision. Airports have played major roles in films and television programs due to their very nature as a transport and international hub, and sometimes because of distinctive architectural features of particular airports. One such example of this is The Terminal, a film about a man who becomes permanently grounded in an airport terminal and must survive only on the food and shelter provided by the airport. They are also one of the major elements in movies such as The V.I.P.s, Airplane!, Airport (1970), Die Hard 2, Soul Plane, Jackie Brown, Get Shorty, Home Alone, Liar Liar, Passenger 57, Final Destination (2000), Unaccompanied Minors, Catch Me If You Can, Rendition and The Langoliers. They have also played important parts in television series like Lost, The Amazing Race, America's Next Top Model, Cycle 10 which have significant parts of their story set within airports. In other programmes and films, airports are merely indicative of journeys, e.g. Good Will Hunting. Airport construction

boomed during the 1960s with the increase in jet aircraft traffic. Runways were extended out to 3,000 m (9,800 ft). The fields were constructed out of reinforced concrete using a slip-form machine that produces a continual slab with no disruptions along the length. The early 1960s also saw the introduction of jet bridge systems to modern airport terminals, an innovation which eliminated outdoor passenger boarding. These systems became commonplace in the United States by the 1970s. An airbase, sometimes referred to as an air station or airfield, provides basing and support of military aircraft. Some airbases, known as military airports, provide facilities similar to their civilian counterparts. For example, RAF Brize Norton in the UK has a terminal which caters to passengers for the Royal Air Force's scheduled TriStar flights to the Falkland Islands. Some airbases are co-located with civilian airports, sharing the same ATC facilities, runways, taxiways and emergency services, but with separate terminals, parking areas and hangars. Bardufoss Airport , Bardufoss Air Station in Norway and Pune Airport in India are examples of this. There are a number of aids available to pilots, though not all airports are equipped with them. A visual approach slope indicator (VASI) helps pilots fly the approach for landing. Some airports are equipped with a VHF omnidirectional range (VOR) to help pilots find the direction to the airport. VORs are often accompanied by a distance measuring equipment (DME) to determine the distance to the VOR. VORs are also located off airports, where they serve to provide airways for aircraft to navigate upon. In poor weather, pilots will use an instrument landing system (ILS) to find the runway and fly the correct approach, even if they cannot see the ground. The number of instrument approaches based on the use of the Global Positioning System (GPS) is rapidly increasing and may eventually be the primary means for instrument landings. An airport is an aerodrome with facilities for flights to take off and land. Airports often have facilities to store and maintain aircraft, and a control tower. An airport consists of a landing area, which comprises an aerially accessible open space including at least one operationally active surface such as a runway for a plane to take off or a helipad, and often includes adjacent utility buildings such as control towers, hangars and terminals. Larger airports may have

fixed base operator services, airport aprons, air traffic control centres, passenger facilities such as restaurants and lounges, and emergency services. Most of the world's airports are owned by local, regional, or national government bodies who then lease the airport to private corporations who oversee the airport's operation. For example, in the United Kingdom the state-owned British Airports Authority originally operated eight of the nation's major commercial airports - it was subsequently privatized in the late 1980s, and following its takeover by the Spanish Ferrovial consortium in 2006, has been further divested and downsized to operating just five. Germany's Frankfurt Airport is managed by the quasi-private firm Fraport. While in India GMR Group operates, through joint ventures, Indira Gandhi International Airport and Rajiv Gandhi International Airport. Bengaluru International Airport and Chhatrapati Shivaji International Airport are controlled by GVK Group. The rest of India's airports are managed by the Airports Authority of India. Many large airports are located near railway trunk routes for seamless connection of multimodal transport, for instance Frankfurt Airport, Amsterdam Airport Schiphol, London Heathrow Airport, London Gatwick Airport and London Stansted Airport. It is also common to connect an airport and a city with rapid transit, light rail lines or other non-road public transport systems. Some examples of this would include the AirTrain JFK at John F. Kennedy International Airport in New York, Link Light Rail that runs from the heart of downtown Seattle to Seattle-Tacoma International Airport, and the Silver Line T at Boston's Logan International Airport by the Massachusetts Bay Transportation Authority (MBTA). Such a connection lowers risk of missed flights due to traffic congestion. Large airports usually have access also through controlled-access highways ('freeways' or 'motorways') from which motor vehicles enter either the departure loop or the arrival loop. The first lighting used on an airport was during the latter part of the 1920s; in the 1930s approach lighting came into use. These indicated the proper direction and angle of descent. The colours and flash intervals of these lights became standardized under the International Civil Aviation Organization (ICAO). In the 1940s, the slope-line approach system was introduced. This consisted of two rows of lights that formed a funnel indicating an

aircraft's position on the glideslope. Additional lights indicated incorrect altitude and direction.