BASICS FOR AIR TRAFFIC CONTROL – AIR TRAFFIC CONTROL (ATC) SYSTEM AND NATIONAL AIRSPACE SYSTEM (NAS)

MODULE OVERVIEW

Purpose: The purpose of this module is to describe the Federal Aviation Administration (FAA) timeline, the functions and roles of different FAA organizations, and the responsibilities of different facility positions. It also describes the purpose of the Air Traffic Control (ATC) system, including the role of the Traffic Management (TM) system. The module ends with a description of the National Airspace System (NAS).

MODULE OUTLINE

Study Aid – ATC Commonly Used Terms and ATC Commonly Used Phraseology

Independent Review (Introduction) – ATC Terms and Phraseology

Lesson: Federal Aviation Administration (FAA) Overview

Purpose: The purpose of this lesson is to describe the hierarchy and functions of the departments within the Federal Aviation Administration (FAA).

Objective:

- Identify the functions and structure of the FAA

Topics:

Video – NextGen Gate to Gate (6:03 mins.)

- Department of Transportation
- Federal Aviation Administration (FAA)
  - History
  - FAA Headquarters Offices
  - Regions and Aeronautical Center Operations
  - Air Traffic Organization
  - Air Traffic Services
  - Air Traffic Services Service Areas
- FAA Organization
  - Field and Regional Offices
  - Lines of Authority/Communications
- Knowledge Check
- Review/Summary

Study Aid – FAA History

Lesson: Air Traffic General Control

Purpose: The purpose of this lesson is to identify the primary duties, procedures, operational priorities, and additional services provided by the Air Traffic Control (ATC) system.

Objective:

- Identify purpose and responsibilities of the ATC system

Topics:

- Air Traffic Control (ATC) System
  - Duty Priority
  - Procedural Preference
  - Operational Priority
  - Additional Services
- Knowledge Check
- Review/Summary

Exercise – Priority and Preferences

Question and Answer Session – *Parking Lot*

Lesson: Position Responsibilities in ATC System

Purpose: The purpose of this lesson is to describe roles and responsibilities of air traffic control positions in the field.

Objectives:

- Identify types of ATC facilities
- Identify the primary functions and position responsibilities of ATC facilities

Topics:

- Air Traffic Control Facility Types
  - Facility Classification
  - Air Traffic Facility Organization Chart Example
- Flight Service Stations (FSSs)
  - Flight Data/ NOTAM/ Coordinator Position
  - Broadcast Position
  - Preflight Position
  - Inflight Position
- Knowledge Check
- Airport Traffic Control Towers (ATCTs)
  - Terminal Facilities
  - Airport Traffic Control Tower (ATCT) Services
- ATCT Team
  - Flight Data (FD) Position
  - Clearance Delivery (CD) Position
  - Tower Positions (Local Control [LC] and Ground Control [GC])
  - Tower Coordinator (CC) Position
  - Tower Associate Position
- Knowledge Check
- t Approach Controls (TRACONs)
- Terminal Radar Team
  - Radar Flight Data Position
  - Radar Associate Position
  - Radar Position
  - Radar Coordinator Position
- Air Route Traffic Control Centers (ARTCCs)

- En Route Sector Team
  - Radar Flight Data Position
  - Radar Associate Position
  - Radar Position
  - Radar Coordinator Position
- Knowledge Check
- Review/Summary

Video – This is Air Traffic Control (5:15 mins.)

Question and Answer Session – *Parking Lot*

Lesson: Traffic Management (TM) System

Purpose: The purpose of this lesson is to describe the responsibilities of the Traffic Management (TM) system.

Objective:

- Identify purpose and responsibilities of the TM system

Topics:

- Traffic Management (TM) System
  - Mission of the TM System

Video – Managing the Flow (6:23 mins.)

  - Managing the Flow
  - Time Based Flow Management
  - Traffic Management Initiatives
- Knowledge Check
- Review/Summary

Question and Answer Session – *Parking Lot*

Lesson: National Airspace System (NAS)

Purpose: The purpose of this lesson is to identify the National Airspace System (NAS) and describe each of the elements included in the NAS network.

Objective:

- Identify elements of the NAS

Topics:

- National Airspace System (NAS)
- Components of NAS
  - Airspace
  - Air Traffic Service (ATS) Routes
  - NAVAIDs
  - Airport/Landing Area
  - Aeronautical Charts
  - Rules, Regulations, and Procedures
  - Personnel and Equipment

Video – How Does the National Airspace System (NAS) Work? (3:17 mins.)

- Knowledge Check
- Terms, Phrases, and Pronunciations
- Review/Summary

Lesson: Visual and Instrument Flight Rules

Purpose: The purpose of this lesson is to define Visual Flight Rules (VFR) and Instrument Flight Rules (IFR).

Objective:

- Define VFR and IFR

Topics:

- Types of Flight Rules
  - Visual Flight Rules (VFR)
  - Instrument Flight Rules (IFR)
- Knowledge Check
- Review/Summary

Question and Answer Session – *Parking Lot*

End-of-Module (EOM) Test

INTRODUCTION

LESSONS	■ Federal Aviation Administration (FAA) Overview ■ Air Traffic General Control ■ Position Responsibilities in ATC System ■ Traffic Management (TM) System ■ National Airspace System (NAS) ■ Visual and Instrument Flight Rules
TOTAL ESTIMATED RUN TIME	6 hrs. 13 mins.
MODULE CONTENT	■ Module Overview ■ Study Aid- ATC Commonly Used Terms and ATC Commonly Used Phraseology ■ Independent Review (Introduction) – ATC Terms and Phraseology ■ Lesson: Federal Aviation Administration (FAA) Overview ■ Study Aid – FAA History ■ Lesson: Air Traffic General Control ■ Exercise – Priority and Preferences ■ Q&A Session – Parking Lot ■ Lesson: Position Responsibilities in ATC System ■ Video – This is Air Traffic Control (5:15 mins.) ■ Q&A Session – Parking Lot ■ Lesson: Traffic Management (TM) System ■ Q&A Session – Parking Lot ■ Lesson: National Airspace System (NAS) ■ Lesson: Visual and Instrument Flight Rules ■ Q&A Session – Parking Lot ■ End-of-Module Test

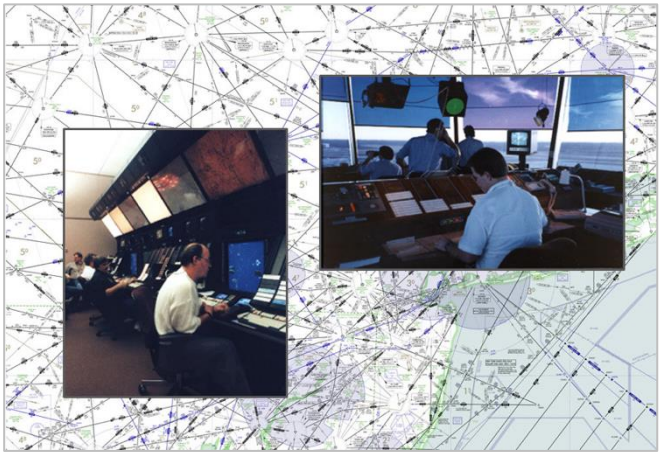
FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Instruct students to select ***ATC System and NAS*** module link within Blackboard ■ Instruct students to read the module introduction and then wait quietly for additional instructions	Blackboard
	EST. RUN TIME
	3 mins.

You are entering one of the most challenging career fields in aviation – Air Traffic Control (ATC). Your duties and responsibilities as an air traffic control specialist (ATCS) will be vital in ensuring the safety of aircraft both on the ground and in the air.

The National Airspace System (NAS) is the busiest and most complex airspace system in the world. The NAS includes every airport, runway, and taxiway in the United States. The system is woven together by airways and navigational aids (NAVAIDs) and broken into sections of airspace. It is governed by a set of rules, regulations, and procedures designed to keep it safe.

The controller works with and is a part of the NAS. You need to understand the elements and functions of the NAS and have an understanding of the role of Traffic Management (TM) in order to effectively provide air traffic service and maintain a safe and orderly air traffic system.

The purpose of this module is to describe the Federal Aviation Administration (FAA) timeline, the functions and roles of different FAA organizations, and the responsibilities of different facility positions. It also describes the purpose of the ATC system, including the role of the Traffic Management system (TMS). The module ends with a description of the NAS.



FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ This portion of training will be conducted by the facilitator ■ Instruct students to locate study aid ***ATC Commonly Used Terms*** and ***ATC Commonly Used Phraseology*** in the ***Student Guide*** ■ Inform students the study aid contains commonly used terms and phraseology used in Air Traffic Control course, and that becoming familiar with the terms will be helpful while completing the course ■ Facilitator will review terms and definitions presented in the study aid, emphasizing key terms related to ATC System and NAS module ■ Facilitator should introduce other terms and inform students they will be discussed in detail during the course ■ Instruct students to reference the study aid, as needed, as they continue the module and course ■ Instruct students to review the study aid during any downtime within the course ■ Inform students their familiarity of the terms will be reinforced and evaluated during an activity ■ Address questions and facilitate a brief discussion of the terms and phraseology included in the study aid	Study Aid **EST. RUN TIME** 25 mins.

STUDY AID: COMMONLY USED TERMS

The following is a list of commonly used words and acronyms used in air traffic control. For a more comprehensive list, refer to the Pilot/Controller Glossary in FAA Order JO 7110.65.

TERM	ACRONYM	DEFINITION
Above Ground Level Altitude	**AGL**	Altitude expressed in feet measured above ground level.
Airport Elevation (Field Elevation)		The highest point of an airport's usable runways measured in feet from mean sea level.
Airport Surveillance Radar	**ASR**	Approach control radar used to detect and display an aircraft's position in the terminal area. ASR provides range and azimuth information but does not provide elevation data. Coverage of the ASR can extend up to 60 miles.
Airspeed		The speed of an aircraft relative to its surrounding air mass. The unqualified term "airspeed" means one of the following: a. Indicated Airspeed (IAS) – The speed shown on the aircraft airspeed indicator. This is the speed used in pilot/controller communications under the general term "airspeed." b. True Airspeed (TAS) – The airspeed of an aircraft relative to undisturbed air. Used primarily in flight planning and en route portion of flight. When used in pilot/controller communications, it is referred to as "true airspeed" and not shortened to "airspeed."
Air Traffic	**AT**	Aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas.
Air Traffic Clearance		An authorization by air traffic control for the purpose of preventing collision between known aircraft, for an aircraft to proceed under specified traffic conditions within controlled airspace. The pilot-in-command of an aircraft may not deviate from the provisions of a Visual Flight Rules (VFR) or Instrument Flight Rules (IFR) air traffic clearance, except in an emergency or unless an amended clearance has been obtained.
Air Traffic Control	**ATC**	A service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic.
Air Traffic Control Specialist	**ATCS**	A person authorized to provide air traffic control service.
Air Traffic Service Routes	**ATS Routes**	A generic term that includes "VOR Federal airways," "colored Federal airways," "jet routes," and "RNAV routes." The term "ATS route" does not replace these more familiar route names but serves only as an overall title when listing the types of routes that comprise the United States route structure.
Airway		A Class E airspace area established in the form of a corridor, the centerline of which is defined by radio navigational aids.
Alert Area		A type of Special Use Airspace that may contain high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft. Alert Areas are depicted on aeronautical charts for the information of nonparticipating pilots. All activities within an Alert Area are conducted in accordance with Federal Aviation Regulations, and pilots of participating aircraft, as well as pilots transiting the area, are equally responsible for collision avoidance.

TERM	ACRONYM	DEFINITION
Altimeter		A flight instrument that indicates altitude by sensing pressure changes.
Altimeter Setting	**ALSTG**	The barometric pressure reading used to adjust a pressure altimeter for variations in existing atmospheric pressure or to the standard altimeter setting (29.92).
Altitude		The height of a level, point, or object measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL).
Controlled Firing Area	**CFA**	A type of Special Use Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons and property on the ground.
Coordinated Universal Time	**UTC**	Time is given in Coordinated Universal Time, the local standard time at the Prime Meridian at Greenwich, England. Local Standard Time is based on each 15° of longitude.
Data Block (Alphanumeric Display)		Letters and numerals used to show identification, altitude, beacon code, and other information concerning a target on a radar display.
Distance Measuring Equipment	**DME**	Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.
Fix		A geographical position determined by visual reference to the surface, by reference to one or more radio NAVAIDs, by celestial plotting, or by another navigational device.
Flight Check	**FLC**	A call sign prefix used by FAA aircraft engaged in flight inspection/certification of navigational aids and flight procedures. The word “recorded” may be added as a suffix—e.g., “Flight Check 320 recorded” —to indicate that an automated flight inspection is in progress in terminal areas.
Flight Level	**FL**	A level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury. Each is stated in three digits that represent hundreds of feet. For example, flight level (FL) 250 represents a barometric altimeter indication of 25,000 feet; FL 255, an indication of 25,500 feet.
Flight Plan	**FP**	Specified information relating to the intended flight of an aircraft that is filed orally or in writing with an FSS or an ATC facility.
Flow Control		Measures designed to adjust the flow of traffic into a given airspace, along a given route, or bound for a given aerodrome (airport) so as to ensure the most effective utilization of the airspace.
General Aviation	**GA**	That portion of civil aviation which encompasses all facets of aviation, except air carriers holding a certificate of public convenience and necessity from the Civil Aeronautics Board and large aircraft commercial operators.
Global Positioning System	**GPS**	A space-based radio positioning, navigation, and time-transfer system. The system provides highly accurate position and velocity information, and precise time, on a continuous global basis, to an unlimited number of properly equipped users. The system is unaffected by weather and provides a worldwide common grid reference system.
Handoff		An action taken to transfer the radar identification of an aircraft from one controller to another if the aircraft will enter the receiving controller’s airspace and radio communications with the aircraft will be transferred.

TERM	ACRONYM	DEFINITION
Hold Procedure		A predetermined maneuver that keeps aircraft within a specified airspace while awaiting further clearance from air traffic control. Also used during ground operations to keep aircraft within a specified area or at a specified point while awaiting further clearance from air traffic control.
IFR Conditions		Weather conditions below the minimum for flight under visual flight rules. Generally, IFR weather conditions exist when the ceiling is below 1,000 feet AGL or the visibility is below 3 statute miles.
IFR/VFR Aircraft		The pilot using Instrument Flight Rules (IFR) relies on instruments for navigation during poor weather conditions and is provided ATC separation. The Visual Flight Rules (VFR) pilot relies on his/her own vision for separation and may or may not use instruments for navigation.
Initial Approach Fix	**IAF**	The fixes depicted on instrument approach procedure charts that identify the beginning of the initial approach segment(s).
Instrument Departure Procedure	**DP**	A preplanned instrument flight rule (IFR) air traffic control departure procedure printed for pilot use in graphic and/or textual form. DPs provide transition from the terminal to the appropriate en route structure.
Instrument Flight Rules	**IFR**	Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.
Instrument Landing System	**ILS**	A precision instrument approach system that normally consists of the following electronic components and visual aids: *a. Localizer* *b. Glideslope* *c. Outer Marker* *d. Middle Marker* *e. Approach Lights*
Jet Route		A route designed to serve aircraft operations from 18,000 feet MSL up to and including flight level 450. The routes are referred to as “J” routes with numbering to identify the designated route; e.g., J105.
Lateral Separation		The lateral spacing of aircraft at the same altitude by requiring operation on different routes or in different geographical locations.
Longitudinal Separation		The longitudinal spacing of aircraft at the same altitude by a minimum distance expressed in units of time or miles.
Mach Number		The ratio of true airspeed to the speed of sound; e.g., MACH .82, MACH 1.6.
Mayday		The international radiotelephony distress signal. When repeated three times, it indicates imminent and grave danger and that immediate assistance is requested.
Mean Sea Level Altitude	**MSL**	Altitude expressed in feet measured from mean sea level.
Military Operations Area	**MOA**	An airspace assignment of defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from IFR traffic and to identify for VFR traffic where these activities are conducted.

TERM	ACRONYM	DEFINITION
Mode C		Altitude reporting transponder mode.
Movement Area		The runways, taxiways, and other areas of an airport/heliport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports/heliports with a tower, specific approval for entry onto the movement area must be obtained from ATC.
National Airspace System	**NAS**	The common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing area; aeronautical charts, information and services; rules, regulations and procedures; technical information, and manpower and material. Included are system components shared jointly with the military.
Navigational Aid	**NAVAID**	Any visual or electronic device airborne or on the surface which provides point to point guidance information or position data to aircraft in flight.
Non-directional Beacon	**NDB**	An L/MF radio beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction-finding equipment can determine his/her bearing to or from the radio beacon and “home” on or track to or from the station.
Non-movement Area		Taxiways and apron (ramp) areas not under the control of air traffic.
Nonradar		Generally means without the use of radar, such as: *Nonradar Approach* – Used to describe instrument approaches for which course guidance on final approach may or may not be provided by ATC. *Nonradar Approach Control* – An ATC facility providing approach control service without the use of radar. *Nonradar Arrival* – An aircraft arriving at an airport without radar service or at an airport served by a radar facility and radar contact has not been established or has been terminated due to a lack of radar service to the airport. *Nonradar Route* – A flight path or route over which the pilot is performing his/her own navigation. Pilot may be receiving radar separation, radar monitoring, or other ATC services while on a nonradar route. *Nonradar Separation* – The spacing of aircraft in accordance with established minima without the use of radar; e.g., vertical, lateral, or longitudinal separation.
Positive Control		The separation of all air traffic within designated airspace by air traffic control.
Precision Approach Radar		Radar equipment in some ATC facilities operated by the FAA and/or the military services at joint-use civil/military locations and separate military installations to detect and display azimuth, elevation, and range of aircraft on the final approach course to a runway. This equipment may be used to monitor certain nonradar approaches but is primarily used to conduct a precision instrument approach wherein the controller issues guidance instructions to the pilot based on the aircraft’s position in relation to the final approach course (azimuth), the glidepath (elevation), and the distance (range) from the touchdown point on the runway as displayed on the radar scope.
Prohibited Area		Designated airspace within which the flight of aircraft is prohibited.

TERM	ACRONYM	DEFINITION
Radar		A device which, by measuring the time interval between transmission and reception of radio pulses and correlating the angular orientation of the radiated antenna beam or beams in azimuth and/or elevation, provides information on range, azimuth, and/or elevation of objects in the path of the transmitted pulses.
Radar Point Out		An action taken by a controller to transfer the radar identification of an aircraft to another controller if the aircraft will or may enter the airspace or protected airspace of another controller and radio communications will not be transferred.
Radar Vectors		Specific headings, issued to the pilot by a controller, to provide navigational guidance based on the use of radar.
Restricted Area		A type of Special Use Airspace designated under FAR Part 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use and IFR/VFR operations in the area may be authorized by the controlling ATC facility when it is not being utilized by the using agency. Restricted areas are depicted on en route charts. Where joint use is authorized, the name of the ATC controlling facility is also shown.
Runway	**RWY, RY**	A defined rectangular area on a land airport prepared for the landing and takeoff run of aircraft along its length. Runways are normally numbered in relation to their magnetic direction rounded off to the nearest 10 degrees; e.g., Runway 01, Runway 25.
Safety Alert		A safety alert issued by ATC to aircraft under their control if ATC is aware the aircraft is at an altitude which, in the controller's judgment, places the aircraft in unsafe proximity to terrain, obstructions, or other aircraft. The controller may discontinue the issuance of further alerts if the pilot advises he/she is taking action to correct the situation or has the other aircraft in sight.
Special Use Airspace	**SUA**	Airspace of defined dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities.
Squawk		Activate specific codes on the aircraft transponder; e.g., "Squawk one zero two zero."
Stabilizer		Stabilizers are located in the tail section of the aircraft. The Vertical Stabilizer is in the upright position, while the Horizontal Stabilizer is in a horizontal position. These are manipulated by the pilot in order to control the aircraft.
Tactical Air Navigation	**TACAN**	An ultra-high frequency electronic rho-theta air navigation aid that provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station.
Target		The indication shown on a radar display resulting from a primary radar return or a radar beacon reply.
Traffic Alert and Collision Avoidance System	**TCAS**	An airborne collision avoidance system based on radar beacon signals that operates independent of ground-based equipment.

TERM	ACRONYM	DEFINITION
Transponder		The airborne radar beacon receiver/transmitter portion of the Air Traffic Control Radar Beacon System (ATCRBS) that automatically receives radio signals from interrogators on the ground and selectively replies with a specific reply pulse or pulse group only to those interrogations being received on the mode to which it is set to respond.
Vertical Separation		Separation established by assignment of different altitudes or flight levels.
Very High Frequency Omni Directional Range Navigational Aid	**VOR**	A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the National Airspace System. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature. Voice features may be used by ATC or FSS for transmitting instructions/information to pilots.
Very High Frequency Omnidirectional Range/Tactical Air Navigation	**VORTAC**	A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site.
Visual Flight Rules	**VFR**	Rules that govern the procedures for conducting flight under visual conditions. The term “VFR” is also used in the United States. In addition, it is used by pilots and controllers to indicate type of flight plan.
VFR Aircraft		An aircraft conducting flight in accordance with visual flight rules.
VFR Conditions		Weather conditions that are equal to or greater than minimum VFR requirements. Generally, VFR weather conditions exist when the ceiling is at or above 1,000 feet AGL and the visibility is at least 3 statute miles.
Video Map		An electronically displayed map on the radar display that may depict data such as airports, heliports, runway centerline extensions, hospital emergency landing areas, NAVAIDs and fixes, reporting points, airway/route centerlines, boundaries, handoff points, special use tracks, obstructions, prominent geographic features, map alignment indicators, range accuracy marks, minimum vectoring altitudes.
Visibility	**VIS**	The ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night. Visibility is reported as statute miles, hundreds of feet, or meters.
Visual Separation		A means employed by ATC to separate aircraft in terminal areas.
Voice Switching and Control System	**VSCS**	A computer-controlled switching system that provides air traffic controllers with all voice circuits (air-to-ground and ground-to-ground) necessary for air traffic control.
Wake Turbulence		Phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash, and rotor wash both on the ground and in the air.
Warning Area		A type of Special Use Airspace which may contain hazards to nonparticipating aircraft in international airspace.

STUDY AID: COMMONLY USED PHRASEOLOGY

The following is a list of commonly used phrases in air traffic control. For a more comprehensive list, refer to the Pilot/Controller Glossary in FAA Order JO 7110.65.

WORD/PHRASE	MEANING
Acknowledge	Let me know that you have received and understood my message.
Advise Intentions	Tell me what you plan to do.
Affirmative	Yes.
ATC Advises	Used to prefix a message of noncontrol information when it is relayed to an aircraft by anyone other than an air traffic controller.
ATC Clears	Used to prefix an ATC clearance when it is relayed to an aircraft by anyone other than an air traffic controller.
ATC Requests	Used to prefix an ATC request when it is relayed to an aircraft by anyone other than an air traffic controller.
Cleared For Takeoff	ATC authorization for an aircraft to depart. It is predicated on known traffic and known physical airport conditions.
Cleared To Land	ATC authorization for an aircraft to land. It is predicated on known traffic and known physical airport conditions.
Correction	An error has been made in the transmission and the correct version follows.
Expedite	Used by ATC when prompt compliance is required to avoid the development of an imminent situation, usually in conjunction with a request for best rate of climb/descent without requiring an exceptional change in aircraft handling characteristics.
Go Ahead	Proceed with your message. Not to be used for any other purpose.
How Do You Hear Me?	A question relating to the quality of the transmission or to determine how well the transmission is being received.
Immediately	Used by ATC when compliance with an action is required to avoid an imminent situation.
I Say Again	The message will be repeated.
Negative	“No” or “Permission not granted” or “That is not correct.”
Out	The conversation is ended and no response is expected.
Over	My transmission is ended; I expect a response.
Radar Contact	Used by ATC to inform an aircraft that it is identified on the radar display and radar flight following will be provided until radar identification is terminated. Radar service may also be provided within the limits of necessity and capability. When a pilot is informed of “radar contact,” he automatically discontinues reporting over compulsory reporting points.
Radar Contact Lost	Used by ATC to inform a pilot that radar data used to determine the aircraft’s position is no longer being received or is no longer reliable and that radar service is no longer being provided.
Read Back	Repeat my message back to me.
Roger	I have received all of your last transmission. It should not be used to answer a question requiring a “yes” or “no” answer.

WORD/PHRASE	MEANING
Say Again	Used to request a repeat of the last transmission. Usually specifies transmission or portion thereof not understood or received; e.g., “Say again all after ABRAM VOR.”
Say Altitude	Used by ATC to ascertain an aircraft’s specific altitude/ flight level. When the aircraft is climbing or descending, the pilot should state the indicated altitude rounded to the nearest 100 feet.
Speak Slower	Used in verbal communications as a request to reduce speech rate.
Squawk	Activate specific codes on the aircraft transponder; e.g., “Squawk one zero two zero.”
Unable	Indicates inability to comply with a specific instruction, request, or clearance.
Stand By	Means the controller or pilot must pause for a few seconds, usually to attend to other duties of higher priority. Also means to “wait,” as in “stand by for clearance.” If a delay is lengthy, the caller should re-establish contact.
That Is Correct	The understanding you have is right.
Verify	Request confirmation of information; e.g., “Verify assigned altitude.”
Wilco	I have received your message, understand it, and will comply with it.
Words Twice	1. As a request: “Communication is difficult. Please say every phrase twice.” 2. As information: “Since communications are difficult every phrase in this message will be spoken twice.”

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *ATC Terms and Phraseology*** in ***Exercise and Activity*** folder in Blackboard ■ ***Note:*** The intent of this session is only to introduce students to the activity, they will not conduct the activity at this time ■ Instruct students to navigate to ***Exercises and Activities*** folder in Blackboard ■ Instruct students to locate student activity ***ATC Terms and Phraseology*** ■ ***Optional:*** Allow students to launch the activity and as a class walk through the first few questions demonstrating the mechanics of the activity ■ Inform the students this activity is a drill and practice that will evaluate the students’ understanding of the terms presented in the study aid ■ Inform the students to complete the activity during periods of down time anytime throughout the course ■ Suggest repeating the activity during periods of down time until they feel they have a good understanding of the terms and phraseology ■ The ***ATC Terms and* Phraseology *(Answer Key)*** is located at the back of the ***ATC System and NAS*** facilitator guide	Independent Review **EST. RUN TIME** 10 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Federal Aviation Administration (FAA) Overview*** lesson in Blackboard ■ Instruct students to navigate to the ***Federal Aviation Administration (FAA) Overview*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or wait quietly until other students have completed	Blackboard **EST. RUN TIME** 40 mins.

FEDERAL AVIATION ADMINISTRATION (FAA) OVERVIEW

Purpose: The purpose of this lesson is to describe the hierarchy and functions of the departments within the Federal Aviation Administration.

Objective:

- Identify the functions and structure of the FAA

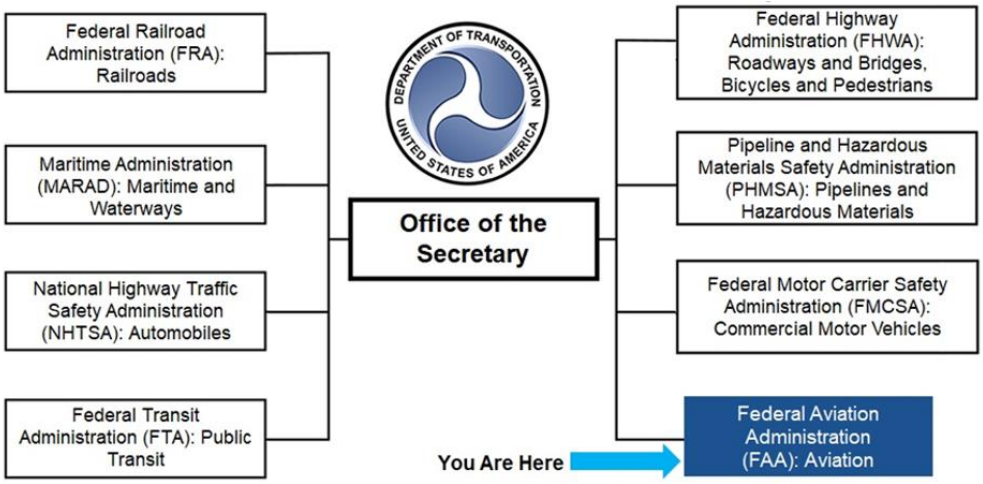
References for this lesson are as follows:

- my.faa.gov
- www.faa.gov
- www.dot.gov
- Aeronautical Information Manual (AIM)

Video – *NextGen Gate to Gate* (6:03 mins.)

Department of Transportation

The Department of Transportation (DOT), under the leadership of the Office of the Secretary (OST), oversees the formulation of national transportation policy and promotes intermodal transportation. The operating administrations and bureaus that are under the direction of the DOT are shown in the organizational chart below.

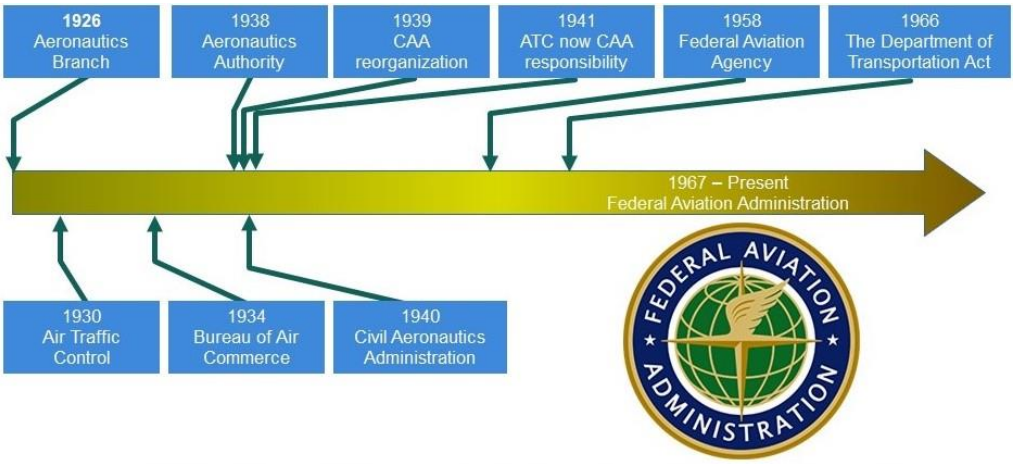


Federal Aviation Administration (FAA)

The FAA is responsible for the safety of civil aviation.

History

The FAA was established in 1967 but has existed in some form since 1926. Here is a timeline of how the FAA was established.



1926 **Aeronautics Branch**	The Air Commerce Act of 1926 charged the Commerce Secretary with certain functions and responsibilities critical to aviation. The Commerce Secretary created an Aeronautics Branch within the Commerce Department to: ■ Promote air commerce ■ Issue and enforce air traffic rules ■ License pilots ■ Designate and establish airways ■ Certify aircraft airworthiness ■ Operate and maintain navigational aids (NAVAIDs)
1930 **Air Traffic Control**	In 1930, local airport operators began to establish regulations and issue radio advisories to aircraft in the vicinity of airports in an attempt to prevent collisions. This action by airport operators was one of the first steps toward providing air traffic control.
1934 **Bureau of Air Commerce**	In 1934, the Aeronautics Branch was renamed the Bureau of Air Commerce (BAC).
1938 **Aeronautics Authority**	The Civil Aeronautics Act was passed in 1938 and established an independent agency called the Civil Aeronautics Authority (CAA), which consisted of the following: ■ Administrator of the CAA • Responsible for executing the authority's orders ■ Board for Economic Regulations and Safety Rules • Five members who regulated airline fares and determined the routes that air carriers would serve ■ Air Safety Board • Three members who investigated aircraft accidents and recommended safety improvements

1939 **CAA Reorganization**	In 1939, the Civil Aeronautics Authority (CAA) was reorganized. ■ The Air Safety Board was abolished and its duties were transferred to the Board for Economic Regulation and Safety Rulemaking ■ Board for Economic Regulation and Safety Rulemaking was renamed the Civil Aeronautics Board (CAB). • Transferred CAB and administrator to the Commerce Department • The CAB administrator reported directly to the Secretary of Commerce • The CAB remained independent (except for administrative support) ■ The collective functions of the administrator were designated to the Civil Aeronautics Administration (CAA)
1940 **Civil Aeronautics Administration**	In 1940, the CAA was split into two agencies. ■ The Civil Aeronautics Administration (CAA), which retained air traffic control (ATC) responsibility ■ The Civil Aeronautics Board (CAB)
1941 **ATC now CAA responsibility**	In 1941, the airport advisories being provided by local operators became the responsibility of the CAA. This service was given to the CAA to standardize airport traffic control procedures and expand air traffic service to additional airports. ***Note:*** *The BAC was the forerunner of the CAA, and the CAA was the forerunner of the FAA.*
1958 **Federal Aviation Agency**	Several factors led to the passage of the Federal Aviation Act of 1958. The most important factor was the growing need for a single air navigation and ATC system equipped with modern facilities to serve the vastly increasing demands of both civil and military aviation. This act: ■ Created an independent Federal Aviation Agency (FAA) ■ Transferred the CAB's safety/rulemaking functions to the FAA ■ Provided for the FAA Administrator to report directly to the president
1966 **The Department of Transportation Act**	The Department of Transportation Act of 1966: ■ Placed the FAA under the DOT ■ Changed the name of the FAA from the Federal Aviation Agency to the Federal Aviation Administration ■ Created a single department rather than separate, competing systems

FAA Headquarters Offices

The FAA's mission is to provide the safest, most efficient aerospace system in the world. The FAA provides air traffic services for the world's largest and busiest airspace.

The FAA comprises many organizations and offices. In this section, we will discuss the infrastructure of the FAA. The departments that are under the direction of the FAA Administrator are shown in the organizational chart below.

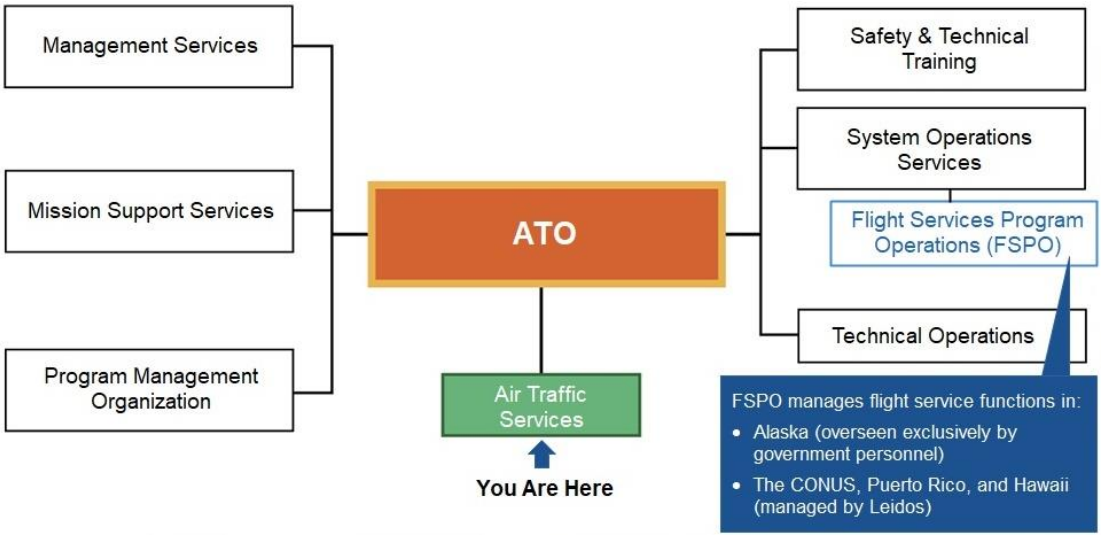
- **Office of FAA Administrator:** The office of the FAA Administrator is located in Washington, D.C., and provides direction for:
  - Headquarters Offices
  - Region and Center Operations
  - Field and Regional Offices
- **Office of Finance and Management (AFN):** The AFN streamlines agency functions to ensure that they are delivered as effectively and efficiently as possible.
- **Office of Deputy Assistant Administrator for Regions and Center Operations (ARC):** The ARC reports to the FAA Administrator for the AFN and leads the regional offices and the Mike Monroney Aeronautical Center (MMAC).
- **Air Traffic Organization:** The ATO is the operational arm of the FAA.

Regions and Aeronautical Center Operations

Shown in the map below are the nine regional offices and the Mike Monroney Aeronautical Center in Oklahoma City that ARC leads.

Air Traffic Organization

Under the Chief Operating Officer (COO), the ATO is responsible for ensuring the safety, efficiency, and security of air traffic operations across the entire National Airspace System (NAS). The ATO comprises seven service units:

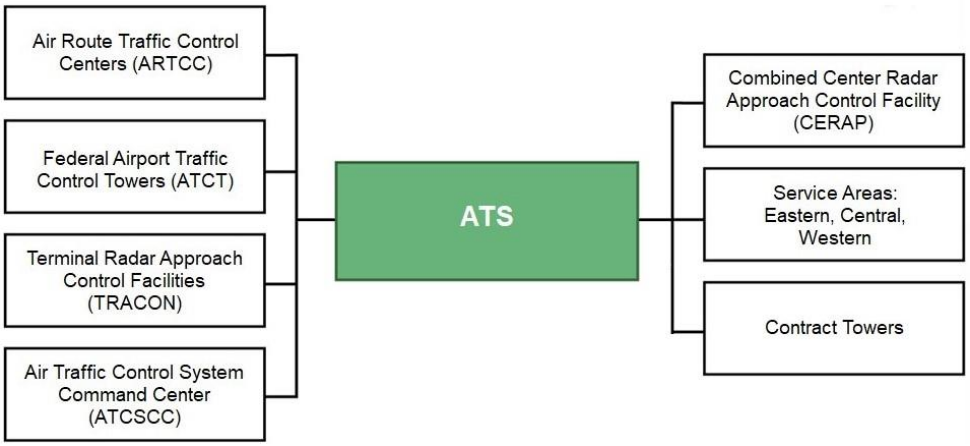


The Flight Services Program Operations (FSPO) manages flight service functions in:

- Alaska (overseen exclusively by government personnel)
- The CONUS, Puerto Rico, and Hawaii (managed by Leidos)

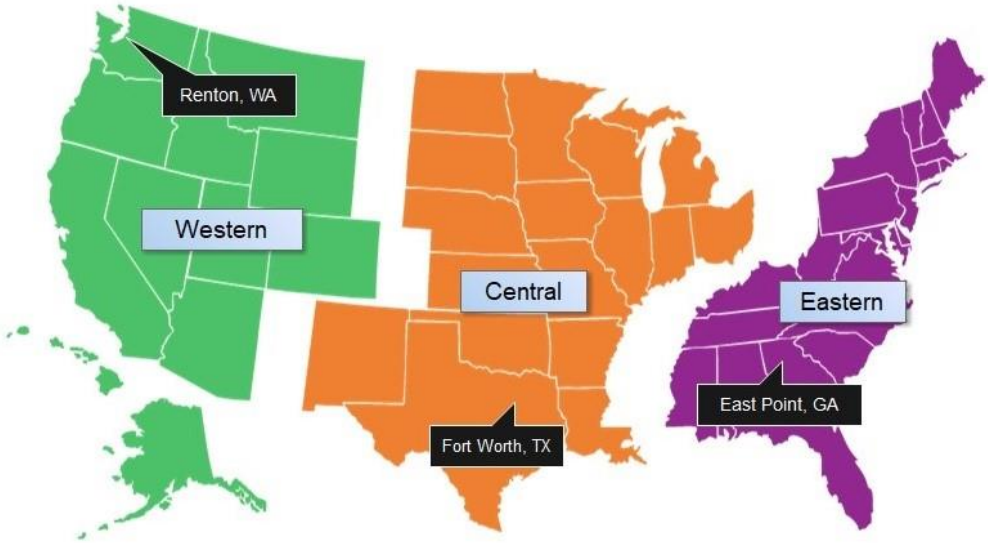
Air Traffic Services

Air Traffic Services (ATS) provides safe, secure, and efficient management for the NAS and international airspace assigned to U.S. control. ATS is responsible for the following:



Air Traffic Services Service Areas

ATO ATC facilities are under one of the three service areas according to their geographic location.

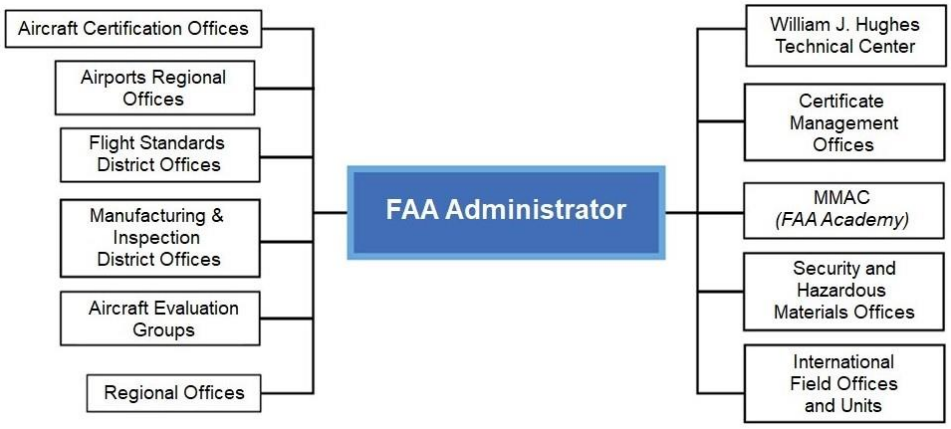


Service Areas are responsible for the following:

- **En Route Services**: Delivery of air traffic services to customers flying in en route and U.S.-controlled oceanic airspace
- **Terminal Services**: Delivery of terminal services to the customer and implementing new technology to support all terminal operations
- **Capabilities**: Daily and future terminal, en route, and oceanic capabilities
- **Performance Metrics**: Terminal, en route, and oceanic organizational performance metrics
- **Finances**: Financial management associated with providing the service
- **Administrative Communication**: Information delivery to decision makers
- **Organization Communication**: Liaison to customers, airports, and Region & Center Operations (ARC)
- **Overall Services**: Overall terminal and en route and oceanic services
- **Operations Measure**: Real-time terminal, en route, and oceanic operations measure

FAA Organization

The FAA Field and Regional Offices are:



Lines of Authority/Communications

To ensure the sound administration and management of facilities, clear lines of operating authority must be established from the FAA Administrator to you. However, communication is a two-way process that flows from you to the FAA Administrator and vice-versa.

Knowledge Check A

REVIEW what you have learned so far about the FAA. ANSWER the questions below.

1. What are the ATO service areas? *(Select all correct answers that apply.)*
   - ❑ **Eastern**
   - ❑ Northern
   - ❑ **Central**
   - ❑ Southern
   - ❑ **Western**

2. The safe, secure, and efficient management for the NAS is the responsibility of which division? *(Select the correct answer.)*
   - ❑ **Air Traffic Services**
   - ❑ Technical Operations
   - ❑ System Operations

3. The ATO is managed by a(n) _____. (*Select the correct answer.)*
   - ❑ Administrator
   - ❑ Vice president
   - ❑ **Chief Operating Officer**

Federal Aviation Administration (FAA) Overview Summary

Where exactly is air traffic control in the infrastructure of the U.S. Government? Who do we answer to, and what are everyone's roles? You now have an idea of how this massive airspace world leader is organized and run.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ This portion of training will be conducted by the facilitator ■ Instruct students to navigate to the study aid ***FAA History*** in ***Student Guide*** ■ Facilitator will review content presented in the study aid and ***FAA Overview*** lesson ■ Address questions and facilitate a brief discussion of the study aid and lesson content	Study Aid **EST. RUN TIME** 20 mins.

STUDY AID: FAA HISTORY

FAA History

The Air Commerce Act of 1926 charged the Commerce Secretary with certain functions and responsibilities critical to aviation.

- The Commerce Secretary created an Aeronautics Branch within the Commerce Department to:
  - Promote air commerce
  - Issue and enforce air traffic rules
  - License pilots
  - Designate and establish airways
  - Certify aircraft airworthiness
  - Operate and maintain Navigational Aids (NAVAIDs)

In 1930, local airport operators began to establish regulations and issue radio advisories to aircraft in the vicinity of airports in an attempt to prevent collisions. This action by airport operators was one of the first steps toward providing air traffic control.

In 1934, the Aeronautics Branch was renamed the Bureau of Air Commerce.

The Civil Aeronautics Act was passed in 1938 and established an independent agency called the Civil Aeronautics Authority, which consisted of the following:

- Administrator of the Civil Aeronautics Authority
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  - Five members who regulated airline fares and determined the routes that air carriers would serve
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  - The CAB remained independent (except for administrative support)
- The collective functions of the Administrator were designated to the Civil Aeronautics Administration (CAA).
  - In 1941, the airport advisories being provided by local operators became the responsibility of the CAA. This service was given to the CAA to standardize airport traffic control procedures and expand air traffic service to additional airports.

Note: *The Bureau of Air Commerce was the forerunner of the CAA, and the CAA was the forerunner of the FAA.*

- The Federal Aviation Act of 1958
- Several factors led to the passage of the Federal Aviation Act of 1958. The most important factor was the growing need for a single air navigation and air traffic control system equipped with modern facilities to serve the vastly increasing demands of both civil and military aviation.
- This act:
  - Created an independent Federal Aviation Agency (FAA)
  - Transferred the CAB's safety/rulemaking functions to the FAA
  - Provided for the FAA Administrator to report directly to the President

The Department of Transportation (DOT) Act of 1966

- Placed the FAA under the DOT
- Changed the name of the FAA from the Federal Aviation Agency to the Federal Aviation Administration
- Created a single department rather than separate, competing systems

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Air Traffic General Control*** lesson in Blackboard ■ Instruct students to navigate to the ***Air Traffic General Control*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or wait quietly until other students have completed	Blackboard **EST. RUN TIME** 20 mins.

AIR TRAFFIC GENERAL CONTROL

Purpose: The purpose of this lesson is to identify the primary duties, procedures, operational priorities, and additional services provided by the Air Traffic Control system.

Objective:

- Identify purpose and responsibilities of the ATC system

References for this lesson are as follows:

- FAA Order JO 7110.65, Air Traffic Control

ATC System

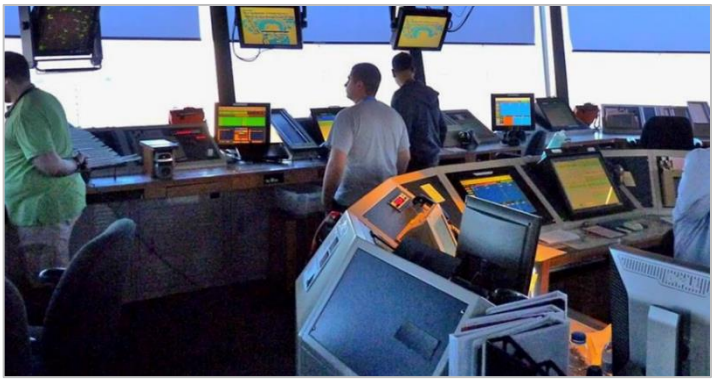
The primary purpose of the Air Traffic Control (ATC) system is to:

- Prevent a collision between aircraft operating in the system
- Provide a safe, orderly, and expeditious flow of traffic
- Provide support for National Security and Homeland Defense

ATC provides positive control among aircraft under its control.

Provides Positive Control

Positive control is the separation of all air traffic within designated airspace by ATC.



Control Standards

Separation standards are established by the federal government.

Designated in:

- Miles
- Altitude (feet)
- Minutes

Duty Priority

The following priorities are associated with duties of air traffic general control.

Separate Aircraft and Issue Safety Alerts

First priority is given to separating aircraft and issuing safety alerts.

Good judgment must be used in prioritizing all other duties based on:

- Requirements of the situation at hand
- Encountering situations for which there is no written procedure

Other Duties

Support National Security

Provide support to national security and homeland defense, activities to include, but not be limited to, *reporting of suspicious and/or unusual aircraft/pilot activities*.

Provide and Solicit Weather

Provide and/or solicit weather information in accordance with procedures and requirements outlined in JO 7110.65.

Provide Additional Services

Provide additional services to the extent possible, contingent only upon higher priority duties and other factors including *limitations of radar, volume of traffic, frequency congestion, and workload*.

Procedural Preference

The following procedural preferences are associated with air traffic general control.

Automated Procedures

Automation procedures are used in preference to non-automation procedures when workload, communications, and equipment capabilities permit.

Radar Separation

Radar separation is used in preference to nonradar separation when it will be to an operational advantage and workload, communications, and equipment permit.

Nonradar Separation

Nonradar separation is used in preference to radar separation when an operational advantage will be gained.

Operational Priority

The following operational priorities are associated with air traffic general control.

1 It is recognized that traffic flow may affect the controller's ability to provide priority handling. However, without compromising safety, good judgment must be used in each situation to facilitate the most expeditious movement of priority aircraft.

2 ATC service is provided to aircraft on a "first come, first served" basis as circumstances permit, **EXCEPT** the following:

a. Aircraft in distress
   - Have the right-of-way over all other traffic

b. Civilian air ambulance flights (call sign "MEDEVAC")
   - Priority is also provided to military air evacuation flights (call sign "AIR EVAC") and scheduled air carrier/air taxi flights, when verbally requested

c. Presidential aircraft
d. Search and Rescue (SAR) aircraft performing a SAR mission
e. Special military and civilian operations
f. Flight check aircraft
g. Instrument Flight Rules (IFR) aircraft over Special Visual Flight Rules (SVFR) aircraft
h. Diverted flights
   - Priority handling may be requested via use of "DVRSN" in the remarks section of the flight plan

Note: *Not all the flights that are given priority are covered in Basics.*

Additional Services

The following additional services are associated with air traffic general control.

1 Additional services are to be provided to the extent possible. Additional services are advisory information provided by ATC that includes, but is not limited to, the following:

- Traffic advisories
- Radar vectors, when requested by the pilot, to assist aircraft receiving traffic advisories to avoid observed traffic
- Altitude deviation information of 300 feet or more from an assigned altitude as observed on a verified (reading correctly) automatic altitude readout (Mode C)
- Advisories that traffic is no longer a factor
- Weather and chaff information
- Weather assistance
- Bird activity information
- Holding pattern surveillance

2 Additional services are limited by many factors, such as:

- Higher priority duties
- Limitations of the radar
- Volume of traffic
- Frequency congestion
- Controller workload

3 Additional services are **NOT** optional for the controller; they are required when the work situation permits. The controller has complete discretion for determining if he/she is able to provide or continue to provide a service in a particular case.

Knowledge Check B

REVIEW what you have learned so far about air traffic general control. ANSWER the questions below.

1. What is the first duty priority of the ATC system? *(Select the correct answer.)*
   - ❑ Provide weather information and issue clearances
   - ❑ **Separating aircraft and issuing safety alerts**
   - ❑ Expedite flow of traffic and monitor vectoring

2. What are the primary purposes of the ATC system? *(Select all correct answers that apply.)*
   - ❑ Provide additional support to the extent possible
   - ❑ Separating aircraft and issuing safety alerts
   - ❑ **Provide support for National Security and Homeland Defense**
   - ❑ **Provide a safe, orderly, and expeditious flow of traffic**
   - ❑ **Prevent a collision between aircraft operating in the system**

3. When should nonradar separation be used? *(Select the correct answer.)*
   - ❑ When workload permits
   - ❑ **When an operational advantage exists**
   - ❑ When equipment permits

Air Traffic General Control Summary

Your duties and responsibilities as an air traffic control specialist will be vital in ensuring the safety of aircraft both on the ground and in the air. As a controller, you need to fully understand your roles and responsibilities in order to effectively provide air traffic service.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Instruct students to locate student exercise ***Priority and Preferences*** in the printed ***Student Guide*** ■ The exercise will be performed individually ■ Instruct students to answer each question ■ At the end of the exercise, the exercise will be evaluated as a class, during discussion	Exercise **EST. RUN TIME** 15 mins.

EXERCISE: PRIORITY AND PREFERENCES

Purpose

To review the purpose of the ATC System, including duty and operational priority and procedural preference.

Detailed Facilitator Instructions: *Working individually, instruct students to answer the questions. If needed, allow them to reference the student guide to locate answers. At the end of the exercise, randomly select students to provide responses to questions. Evaluate students' responses and provide feedback. Encourage student discussion with this exercise and clarify any misunderstandings.*

Directions

Read each statement below and fill in the blanks.

The primary **purpose** of the ATC system is to **prevent a collision** between aircraft operating in the system. The ATC system also provides a **safe**, **orderly,** and **expeditious** flow of traffic and supports National Security and Homeland Defense missions.

Give first priority to **separating aircraft** and **issuing safety alerts**. **Good judgment** must be used in prioritizing all other duties. Other duty priorities include providing support to **national security and homeland defense**, providing and/or soliciting **weather information**, and providing **additional services** to the extent possible.

Air traffic control service to aircraft is provided on a **"first come, first served"** basis as circumstances permit, **EXCEPT** the following:

a. Aircraft in distress
   - Have the **right-of-way** over all other traffic
b. Civilian air ambulance flights (MEDEVAC)
   - Priority is also provided to **military air evacuation flights** and scheduled air carrier/air taxi flights when **verbally requested**
c. **Presidential** aircraft
d. Search and Rescue (SAR) aircraft performing a(n) **SAR mission**
e. Special military and civilian operations
f. Flight check aircraft
g. IFR aircraft over SVFR aircraft
h. **Diverted** flights

Directions

Read each statement below; determine if the statement is true or false. In the blank provided, write "T" for "true" next to a true statement and "F" for "false" next to a false statement.

Questions

__T__ Radar separation is used in preference to nonradar separation when it will be to an operational advantage and workload, communications, and equipment permit.

__F__ Radar separation is used in preference to nonradar separation at all times.

__T__ Automation procedures are used in preference to non-automation procedures when workload, communications, and equipment capabilities permit.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Review content presented in ***Air Traffic General Control*** lesson ■ Navigate to the ***Parking Lot*** link within Blackboard and review any student questions ■ Address ***Parking Lot*** questions and facilitate a brief discussion of the lesson content	Facilitated Discussion **EST. RUN TIME** 15 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Position Responsibilities in ATC System*** lesson in Blackboard ■ Instruct students to navigate to the ***Position Responsibilities in ATC System*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or wait quietly until other students have completed	Blackboard **EST. RUN TIME** 45 mins.

POSITION RESPONSIBILITIES IN ATC SYSTEM

Purpose: The purpose of this lesson is to describe roles and responsibilities of air traffic control positions in the field.

Objectives:

- Identify types of ATC facilities
- Identify the primary functions and position responsibilities of ATC facilities

References for this lesson are as follows:

- NATCA 2016 Bargaining Unit Agreement
- FAA Order JO 7110.65, Air Traffic Control

Air Traffic Control Facility Types

There are three types of ATC facilities:

- Flight Service Station (FSS)
- Terminal ATC facilities
  - Airport Traffic Control Towers (ATCT)
  - Terminal Radar Approach Controls (TRACON)
- Air Route Traffic Control Center (ARTCC)
  - Air Route Traffic Control Centers, or ARTCCs, are commonly referred to as En Route facilities

The organizational structure of each ATC facility varies depending upon its complexity.

- Complexity is determined by many factors, principally the number of aircraft operations a facility handles and runway configuration

Facility Classification

Terminal facilities are classified in a range from level 4 to 12 according to traffic volume and complexity.

A number of factors determine a facility's level, including:

- Traffic Volume
- Fleet Mix
- Proximity to Airports
- Class of Airspace
- Terrain
- Number of Runways
- Runway Configuration

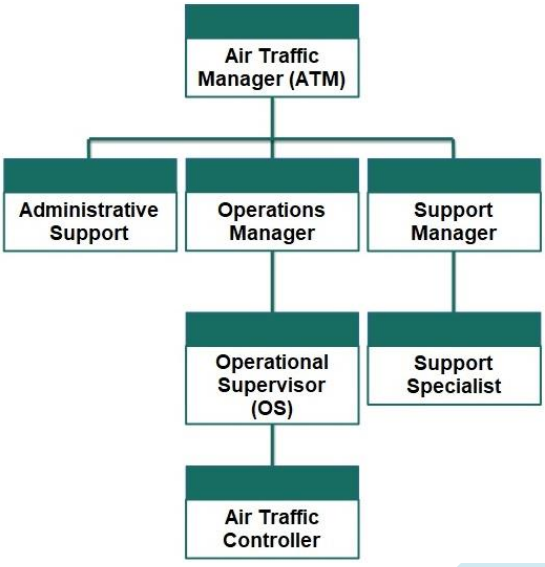
En Route facilities are classified from level 9 through level 12 based on traffic volume.

Air Traffic Facility Organization Chart Example

This is a basic facility organizational chart.

- It will vary by facility depending on its needs

A Controller-In-Charge (CIC) assumes operational responsibilities for the Front Line Manager (FLM) position when a supervisor is unavailable or to allow for breaks, administrative duties, and other tasks.



Flight Service Stations (FSSs)

FSSs are air traffic facilities that have no direct control authority over either Instrument Flight Rules (IFR) or Visual Flight Rules (VFR) traffic.

They provide the following services to all air traffic:

- Pilot Briefings
- Flight Plan Processing
- En Route Flight Advisories
- Search and Rescue Services (SAR)
- Assistance to Lost Aircraft
- Assistance to Aircraft in Emergency Situations
- Relay ATC Clearances
- Process Notices to Air Missions (NOTAMs)
- Broadcast Aviation Weather and Aeronautical Information
- Advises Customs and Border Protection of trans border flights
- Alaska only:
  - Take weather observations
  - Provide Airport Advisory Service (AAS)

They do not control traffic; however, they do have the primary responsibility for providing pilot briefings and receiving and processing IFR and VFR flight plans. Inflight position duties provide services to aircraft in flight or operating on the airport surface.

There are four basic positions in an FSS.

Flight Data/NOTAM/ Coordinator	Flight Data/NOTAM/Coordinator position duties are to: ■ Compile, evaluate, record, and disseminate NOTAMs and flight movement data such as: • VFR and IFR, civil and military flight plans • International flight plans • Flight notification messages • Customs notification • Law enforcement messages ■ Initiate required SAR situations

Broadcast	Broadcast position duties are to: ■ Compile, evaluate, record, and disseminate weather and flight information through the Automatic Flight Information Service (AFIS – Alaska only)

Preflight	Preflight position duties are to: ■ Brief and translate to pilots: • Current and forecast weather • NOTAMs • Flow control restrictions that the pilot might encounter along the route of flight ■ Apply VFR Not Recommended (VNR) procedures as prescribed

Inflight	The inflight position provides services to airborne pilots. Duties of the inflight position are to: ■ Monitor and restore navigational aids (NAVAIDs) ■ Issue airport advisories ■ Relay ATC clearances, advisories, or requests ■ Issue military flight advisory messages ■ Receive and issue NOTAMs ■ Assist in SAR communication searches ■ Activate and close flight plans ■ Make unscheduled broadcast(s) ■ Solicit and issue Pilot Weather Reports (PIREPs) ■ Present pilot weather briefings to airborne aircraft ■ Locate lost aircraft ■ Record aircraft contacts ■ Provide weather advisories and flight plan services ■ Keep airmen and weather information current ■ Apply VNR procedures as prescribed

Knowledge Check C

REVIEW what you have learned so far about factors affecting navigation. ANSWER the questions below.

1. What are the primary functions of an FSS? *(Select all the correct answers that apply.)*
   - ❑ **Provide pilot briefings**
   - ❑ Create flight plans
   - ❑ **Receive flight plans**
   - ❑ **Process flight plans**

2. When **NO** supervisory personnel are available, who is the designated person in charge? *(Select the correct answer.)*
   - ❑ **Controller-in-Charge**
   - ❑ Senior Controller
   - ❑ Air Traffic Manager

3. Match the term that identifies each operating position in a FSS with its associated function. Enter your answers in the spaces below.

__b__ Briefs pilots on weather, NOTAMs, and restrictions along proposed route; applies VFR not recommended (VNR) procedures.

__c__ **Records and d**isseminates weather and flight information through the AFIS.

__d__ Issues airport advisories; relays ATC clearances, advisories, or requests to pilots; monitors and restores NAVAIDs; activates and closes flight plans; assists pilots of lost aircraft.

.

__a__ Disseminates IFR and VFR flight plans, initiates SAR, disseminates NOTAMs, performs customs notification.

a. Flight Data/NOTAM/Coordinator

b. Preflight

c. Broadcast

d. Inflight

Terminal Facilities

Types of terminal facilities include:

- **ATCTs (or Towers) –** Provide ATC service to aircraft operating on or in the vicinity of the airport.
- **TRACONs –** Provide radar service to arriving, departing, and some en route aircraft.

Airport Traffic Control Tower (ATCT) Services

ATCT is a terminal facility wherein controllers:

- Use air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of or on an airport
- Authorize aircraft to land or take off at the airport controlled by the tower or to transit tower-controlled airspace
- May also provide approach control services (radar or nonradar)

ATCT Team

There are no absolute divisions of responsibilities regarding position operations in the tower.

- The tasks to be completed remain the same no matter how many people are working positions within a tower cab
- The team as a whole has responsibility for the safe and efficient operation of that tower cab

There are six positions in the tower.

Flight Data	The Flight Data position assists the other air traffic controllers in the Tower and performs the clerical duties inherent in the operation of any facility. ■ Normally the first position assigned to a new air traffic controller at a facility ■ Does **NOT** directly talk on the radio to pilots Flight Data position duties include but are **NOT** limited to: ■ Operate interphones ■ Process and forward flight plan information ■ Compile statistical data ■ Assist tower cab in meeting situation objective ■ Observe and report weather information ■ Utilize alphanumerics
Clearance Delivery	The Clearance Delivery (CD) position is normally the first controller a pilot talks to when departing an airport. CD position duties include but are **NOT** limited to: ■ Process and forward flight plan information ■ Issue clearances and ensure accuracy of pilot read back ■ Assist tower cab in meeting situation objective ■ Operate communications and tower equipment ■ Utilize alphanumerics
Ground Control	The Ground Control (GC) position is responsible for ensuring that aircraft are separated from other aircraft, ground vehicles, and obstructions while taxiing. ■ Ground Control has responsibility for movement areas other than active runways, including control of vehicles as well as aircraft
Local Control	The Local Control (LC) position is responsible for separating and providing safety alerts to aircraft in the airspace surrounding the airport and aircraft on the active runways.

Common Duties	Local Control and Ground Control positions exchange information for the safe and efficient use of runways and movements areas. Only Local Control and Ground Control have the distinction of being called the Tower positions, and their duties are to: ■ Ensure separation ■ Initiate control instructions ■ Monitor and operate communications equipment ■ Utilize tower radar display(s) ■ Utilize alphanumerics ■ Assist the Tower Associate position with coordination ■ Scan tower cab environment ■ Ensure computer entries are completed for instructions or clearances issued or received ■ Ensure stripmarking is completed for instructions or clearances issued or received ■ Process and forward flight plan information ■ Perform any functions of the tower team that will assist in meeting situation objectives
Tower Coordinator	The Tower Coordinator controller position (also known as Cab Coordinator [CC]) works to ensure that the overall operation is at its greatest capacity while maintaining safety standards. CC position duties are to: ■ Perform interfacility/position coordination for traffic actions ■ Advise the Tower and the Tower Associate position(s) of tower cab actions required to accomplish overall objectives ■ Perform any of the functions of the tower team that will assist in meeting situation objectives ***Note:*** *The Tower Coordinator position assumes responsibility for managing traffic flow and the Tower positions retain responsibility for aircraft separation when the Tower Coordinator position is staffed.*
Tower Associate	The Tower Associate position acts as an "assistant" to either or both of the "Tower positions," including monitoring the situation for anything Local or Ground may **NOT** be aware of. Associate position duties include: ■ Ensure separation ■ Operate interphones ■ Maintain awareness of tower cab activities ■ Utilize alphanumerics ■ Utilize tower radar display(s) ■ Assist the Tower positions by: • Accepting/initiating coordination for the continued smooth operation of the tower cab • Ensuring that the Tower positions are made immediately aware of any actions taken ■ Manage flight plan information, ensuring completion and accuracy ■ Ensure computer entries are completed for instructions issued or received and enter instructions issues or received by a Tower position ■ Ensure stripmarking is completed for instructions or received by a Tower position

Knowledge Check D

REVIEW what you have learned so far about position responsibilities in ATC system. ANSWER the questions below.

1. What is/are the function(s) of an ATCT? *(Select all the correct answers that apply.)*
   - ❑ **Authorizing aircraft to land or take off on the runway**
   - ❑ **Providing ATC services to aircraft at an airport**
   - ❑ **Transiting aircraft through tower control**
   - ❑ **May provide approach control services to aircraft**

2. Match the term that identifies the operating positions with their associated functions. Enter your answers in the spaces below.

e	Performs interfacility/intrafacility coordination, advises the Tower positions of actions required to accomplish objectives.	a.	Clearance Delivery
f	Initiates control instructions, has responsibility for control of active runways, ensures separation.	b.	Tower Associate
b	Assists the Tower positions by performing coordination and helps to ensure separation by maintaining awareness of tower traffic.	c.	Ground Control
d	Compiles statistical data, processes and forwards flight plan information, reports weather information.	d.	Flight Data
c	Initiates control instructions, has responsibility control of aircraft and vehicles on taxiways and runways that are not active, ensures separation.	e.	Tower Coordinator
a	Issues clearances and ensures accuracy of pilot readback.	f.	Local Control

Terminal Radar Approach Controls (TRACONs)

TRACON facility is an ATC facility that uses radar and nonradar capabilities to provide control services to aircraft arriving, departing, and transiting airspace in a terminal area.

- Radar approach controls may be operated by FAA (TRACONs), U.S. Air Force (USAF) (RAPCONS), U.S. Army (ARAC), U.S. Navy (USN), U.S. Marine Corps (USMC) (RATCFs), or jointly by FAA and a military service

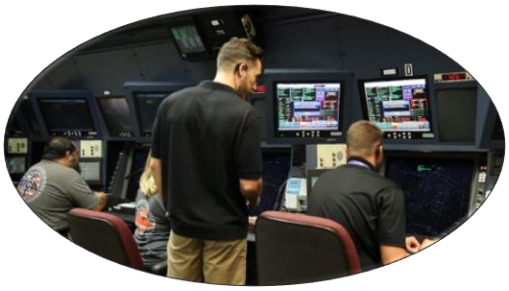
Note: *ARAC is Army Radar Approach Control Facility; RATCF is Radar ATC Facility.*

- TRACONs may serve one or more airfields, and control is exercised primarily by direct pilot and controller communications
- TRACONs are divided into sectors of airspace
- **Combined ATCT/TRACON –** In smaller metro areas, the TRACON may be located within or near the same structure as the Tower for the primary airport it serves (i.e., Oklahoma City TRACON is located at Oklahoma Will Rogers Tower). A combined ATCT/TRACON is commonly referred to as an "Up/Down" facility.

- **TRACON –** Stand alone TRACONs can be located at airports or away from them. Some facilities are a combination of multiple TRACONs and are referred to as consolidated TRACONs.
  - These TRACONs are found where there is a high density of air traffic, generally reflecting the population density of the metro areas they serve (i.e., Potomac TRACON is not located at any airport, but serves several large and small airports in the DC area)
- **No TRACON –** Where no TRACON exists (the traffic is not concentrated enough to warrant one), the ARTCC provides approach control services.

Terminal Radar Team

There is no absolute division of responsibilities regarding position operations.



- The tasks to be completed remain the same no matter how many people are working positions within a facility/sector
- The team as a whole has responsibility for the safe and efficient operation of that facility/sector

There are four basic positions in the TRACON radar sector team.

Flight Data	The responsibilities of the Flight Data position in the TRACON are similar to the Flight Data position in the Tower. Responsibilities include: ■ Processing and forwarding flight plan information ■ Compiling statistical data
Radar Associate	Radar Associate position duties are to: ■ Ensure separation ■ Initiate control instructions ■ Operate interphones ■ Maintain awareness of facility/sector activities ■ Accept and initiate non-automated handoffs ■ Accept and initiate handoffs ■ Coordinate, including point outs ■ Scan flight progress strips to correlate with radar data ■ Manage flight progress strips ■ Ensure computer entries are completed on instructions issued or received ■ Ensure stripmarking is completed on instructions issued or received ■ Adjust equipment at Radar Associate position to be usable by all members of the Radar Team
Radar Controller	The Radar position uses the radar display and air-to-ground frequencies to separate and sequence aircraft in the sector's airspace.
Radar Coordinator	Radar Coordinator position duties are to: ■ Perform interfacility/sector/position coordination of traffic actions ■ Advise the Radar position and the Radar Associate position of facility/sector actions required to accomplish the safe and efficient operation of the sector ■ Perform any of the functions of the radar team that will assist in meeting situation objectives ***Note:*** *The Radar position has the responsibility of managing the overall sector operations, including aircraft separation and traffic flows. The Radar Coordinator position, when staffed, assumes responsibility for managing traffic flows and the Radar position retains responsibility for aircraft separation.*

Air Route Traffic Control Centers (ARTCCs)

An ARTCC facility, commonly referred to as a center, provides en route ATC service to IFR/VFR aircraft principally during the en route phase of flight.

- The en route phase of flight is the segment of flight between departure and destination terminal areas

Every center is divided into several areas, which are created to distribute the workload.

- Areas are then divided into even smaller pieces of airspace (both vertically and horizontally) called sectors
- A fully certified controller is required to be proficient in all sectors in his or her area

En Route Sector Team

There are no absolute divisions of responsibilities regarding position operations.

- The tasks to be completed remain the same whether one, two, or three people are working positions within a sector
- The team as a whole has responsibility for the safe and efficient operation of that sector

There are four basic positions in the ARTCC.

Radar Flight Data	Radar Flight Data position duties are to: ■ Operate interphone ■ Assist Radar Associate Position in managing flight progress strips ■ Receive, process, and distribute flight progress strips ■ Ensure flight data processing equipment is operational, except for En Route Decision Support Tool (EDST) capabilities ■ Request, receive, and disseminate weather, NOTAMs, NAS status, traffic management, and Special Use Airspace status messages ■ Manually prepare flight progress strips when automation systems are **NOT** available ■ Enter and forward flight data into computer ■ Assist facility/sector in meeting situation objectives
Radar Associate	Radar Associate position (often called “D side”) duties are to: ■ Ensure separation ■ Initiate control instructions

Radar Associate (*Continued)*	■ Accept and initiate handoffs via landline communications and ensure the Radar position is made aware of the actions ■ Assist the Radar position by accepting or initiating automated handoff(s) and ensure that the Radar position is made immediately aware of any action taken ■ Coordinate, including point outs ■ Scan En Route Decision Support Tool (EDST) display (EDST is an automated flight data management tool commonly referred to as “electronic strips”) ■ Scan and manage flight progress strips • Correlates EDST/flight progress strips with radar data ■ Ensure that: • Computer entries are completed • EDST display information is managed • Stripmarking is completed • Instructions issued or received by the Radar position are entered when aware of those instructions ■ Request/receive and disseminate weather, NOTAMs, NAS status, traffic management, and Special Use Airspace status messages ■ Monitor radios when not performing higher priority duties
Radar	The Radar position (often called the “R side”) communicates directly with the aircraft and uses radar information as the primary means of separation. Radar position duties are to: ■ Ensure separation ■ Initiate control instructions ■ Monitor and operate radios ■ Accept and initiate automated handoffs ■ Assist the radar associate position with non-automated handoff actions when needed ■ Assist the radar associate position in coordination when needed ■ Scan radar display. Correlate with flight progress strip information or EDST data, as applicable ■ Ensure computer entries are completed on instructions or clearances you issue or receive ■ Ensure stripmarking and/or electronic flight data entries are completed on instructions or clearances you issue or receive ■ Adjust equipment at radar position to be usable by all members of the team ■ At ERAM facilities, ensure the situation display accurately reflects the status of all SAAs that impact their area of control responsibility The radar controller must not be responsible for G/G communications when precluded by VSCS split functionality.
Radar Coordinator	Radar Coordinator (sometimes referred to as "Tracker" or "Handoff Controller") position duties are to: ■ Perform interfacility/intrafacility/sector/position coordination of traffic actions ■ Advise the Radar and Radar Associate positions of sector actions required to accomplish objectives ■ Perform any functions of the en route sector team which will assist in meeting situation objectives, including accepting and initiating handoffs ■ Monitor or operate radios when precluded by VSCS split functionality ***Note:*** *The Radar position has responsibility for managing overall sector operations, including aircraft separation and traffic flows. The Radar Coordinator position (when staffed) assumes responsibility for managing traffic flows, and the Radar position retains responsibility for aircraft separation.*

Knowledge Check E

REVIEW what you have learned so far about factors affecting navigation. ANSWER the questions below.

1. Which of the following are function(s) of a TRACON? *(Select all the correct answers that apply.)*
   - ❑ **Processing and forwarding flight plan information**
   - ❑ **Providing control services to aircraft**
   - ❑ **Transiting terminal area airspace**
   - ❑ Initiating search and rescue

2. The primary function of an ARTCC is providing ATC service to en route _____. *(Select the correct answer.)*
   - ❑ **IFR/VFR aircraft**
   - ❑ VFR aircraft only
   - ❑ IFR aircraft only

3. Match the term that identifies the radar or sector team operating positions with their associated functions. Enter your answers in the spaces below.

__**c**__	The position that is in direct communication with aircraft	a.	Radar Flight Data
__**a**__	Responsible for compiling statistical data and forwarding flight plan data	b.	Radar Associate
__**b**__	Responsible for ensuring separation, initiating control instructions, managing flight strip information, and assisting the Radar position with coordination	c.	Radar
		d.	Radar Coordinator
__**d**__	Responsible for interfacility/intrafacility coordination		

Position Responsibilities in ATC System Summary

When you start your first day as air traffic controller, who will you answer to? Will you know who you need to communicate with at another facility to get your job done? You must be familiar with each position on your team and those at surrounding air traffic control facilities. By doing so, you will create an efficient and synergized force that will successfully maintain safety and efficiency for the aircraft in your airspace.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *This is Air Traffic Control*** video in Blackboard ■ Instruct student to navigate to ***This is Air Traffic Control*** video in Blackboard ■ Instruct students to view the video individually ■ ***Note:*** Movie controls in BB are limited to “Play” and “Pause” while not in full screen ■ Students should wait quietly until other students have completed viewing the video ■ Inform students a facilitated discussion will be conducted following the video to discuss content and address questions	Video **EST. RUN TIME** 10 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Review content presented in the video ***This is Air Traffic Control*** and ***Position Responsibilities in the ATC System*** lessons ■ Navigate to the ***Parking Lot*** link within Blackboard and review any student questions ■ Address ***Parking Lot*** questions and facilitate a brief discussion of the lesson content	Facilitated Discussion **EST. RUN TIME** 15 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Traffic Management (TM) System*** lesson in Blackboard ■ Instruct students to navigate to the ***Traffic Management (TM) System*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or wait quietly until other students have completed	Blackboard **EST. RUN TIME** 10 mins.

TRAFFIC MANAGEMENT (TM) SYSTEM

Purpose: The purpose of this lesson is to describe the responsibilities of the Traffic Management (TM) system.

Objective:

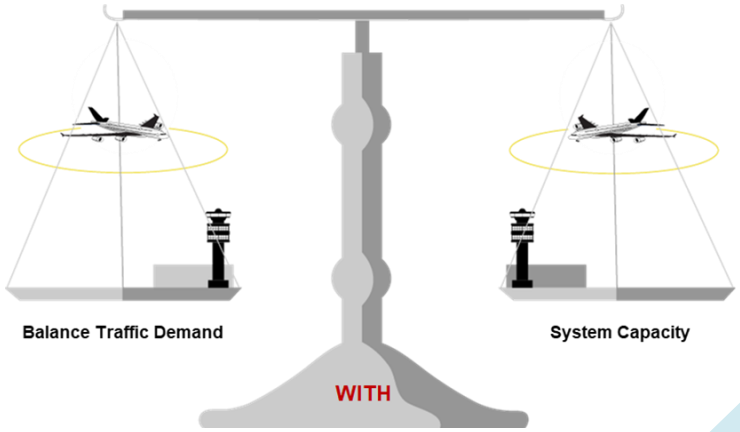
- Identify purpose and responsibilities of the TM system

References for this lesson are as follows:

- FAA Order JO 7210.3, Facility Operation and Administration
- FAA Order JO 7110.65, Air Traffic Control

Mission of the Traffic Management (TM) System

The mission of the TM system is to balance air traffic demand with system capacity to ensure the maximum efficient utilization of the National Airspace System (NAS).



Video – *Managing the Flow* (6:23 mins.)

Managing the Flow

The David J. Hurley Air Traffic Control System Command Center (ATCSCC) monitors and manages the flow of air traffic throughout the NAS.

Traffic Management Units (TMUs) monitor and balance traffic flows within their area of responsibility in accordance with traffic management directives.

TMUs are located in:

- All ARTCCs
- Busier terminal facilities

Time Based Flow Management (TBFM)

Time Based Flow Management (TBFM) is a decision support tool that provides metering and trajectory modeling capability and enhances and optimizes the FAA's departure scheduling capabilities.

Traffic Management Initiatives (TMIs)

Traffic Management Initiatives (TMIs) are techniques used to manage demand with capacity in the NAS. Properly coordinated and implemented TMIs are an important tool in the air traffic system.

Types of TMIs include, but are not limited to, those shown below.

Altitude	■ Tunneling – Term to indicate traffic will be descended prior to the normal descent point at the arrival airport to remain clear of an airspace situation ■ Capping – Term to indicate aircraft will be cleared to an altitude lower than their requested altitude until they are clear of a particular airspace
Miles-in-Trail (MIT) or Minutes-in-Trail (MINIT)	■ MIT is the number of miles required between aircraft that meet specific criteria, such as similar operating speeds ■ MINIT is the number of minutes required between successive aircraft
Fix Balancing or Airborne Holding	■ Fix balancing is assigning an aircraft a fix other than in the filed flight plan in the arrival or departure phase of the flight to distribute the demand ■ Airborne holding is planned holding normally done when the operating environment supports holding and the weather conditions are expected to improve shortly

Sequencing Programs	Sequencing programs are designed to achieve a specified interval between aircraft. ■ Sequencing assigns a departure time to achieve a constant flow of traffic over a common point ■ En route sequencing assigns a departure time that will facilitate integration in the en route stream ■ Arrival sequencing assigns fix crossing times to aircraft destined to the same airport
Reroutes	Reroutes are Air Traffic Control (ATC) routings other than the filed flight plan. ■ Ensure aircraft operate with the "flow" of traffic ■ Remain clear of Special Use Airspace (SUA) ■ Avoid congested airspace ■ Avoid areas of known weather or where aircraft are deviating or refusing to fly
Ground Delay Programs (GDP)	■ Aircraft are held on the ground in order to manage capacity and demand at a specific location by assigning arrival slots ■ Aircraft are assigned an Expect Departure Clearance Time (EDCT) ■ The EDCT is calculated based on the estimated time en route and the arrival slot
Ground Stops (GSs)	■ Ground stops override all other traffic management initiatives ■ GSs are the most restrictive method of traffic management ■ Aircraft must not be released without the approval of the originator of the GS

Knowledge Check F

REVIEW what you have learned so far about the TM system. ANSWER the questions below.

1. The mission of the TM system is to balance air traffic _____ with system _____. *(Select the correct answers.)*
   - ❑ **Demand; capacity**
   - ❑ Clearance; delivery
   - ❑ Control; demand
   - ❑ Towers; availability

2. The operation of the TM system is the responsibility of the _____. *(Select the correct answer.)*
   - ❑ TMU
   - ❑ GDP
   - ❑ **ATCSCC**
   - ❑ MINIT

3. Monitoring and balancing air traffic flows within their area of responsibility is the primary function of the _____. *(Select the correct answer.)*
   - ❑ **TMU**
   - ❑ ATC
   - ❑ GS
   - ❑ ATCSCC

4. Match the element of the TM system with its description. Enter your answers in the spaces below.

__c__ Normally done when the operating environment supports holding and the weather conditions are expected to improve shortly

__e__ Routings other than the filed flight plan; designed to keep aircraft clear of special use airspace, congested airspace, or weather areas

__f__ Overrides all other TM system programs. Aircraft remain on the ground until the program is terminated

__a__ Term to indicate aircraft will be cleared to an altitude lower than their requested altitude until they are clear of a particular airspace

__d__ Aircraft are held on the ground until a specified time

__b__ Assigns departure times that will facilitate integration into the en route traffic stream

a. Capping

b. En Route Sequencing Program (ESP)

c. Airborne holding

d. Ground Delay Program (GDP)

e. Reroutes

f. Ground Stop (GS)

Traffic Management (TM) System Summary

Disruptions in airspace flow and capacity eventually impact air traffic services. Without the response of the traffic management system, small disruptions can quickly become significant, widespread delays. Controllers rely on the traffic managers to monitor, coordinate efforts, and maintain the flow of air traffic.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Review content presented in ***Traffic Management System*** lesson ■ Navigate to the ***Parking Lot*** link within Blackboard and review any student questions ■ Address ***Parking Lot*** questions and facilitate a brief discussion of the lesson content	Facilitated Discussion **EST. RUN TIME** 10 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *National Airspace System (NAS)*** and ***Visual and Instrument Flight Rules*** lessons in Blackboard ■ Instruct students to navigate to the ***National Airspace System (NAS)*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, instruct students to proceed to ***Visual and Instrument Flight Rules*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or wait quietly until other students have completed	Blackboard **EST. RUN TIME** 20 mins.

NATIONAL AIRSPACE SYSTEM (NAS)

Purpose: The purpose of this lesson is to identify the National Airspace System (NAS) and describe each of the elements included in the NAS network.

Objective:

- Identify elements of the NAS

References for this lesson are as follows:

- FAA Order JO 7110.65, Air Traffic Control
- Aeronautical Information Manual (AIM)

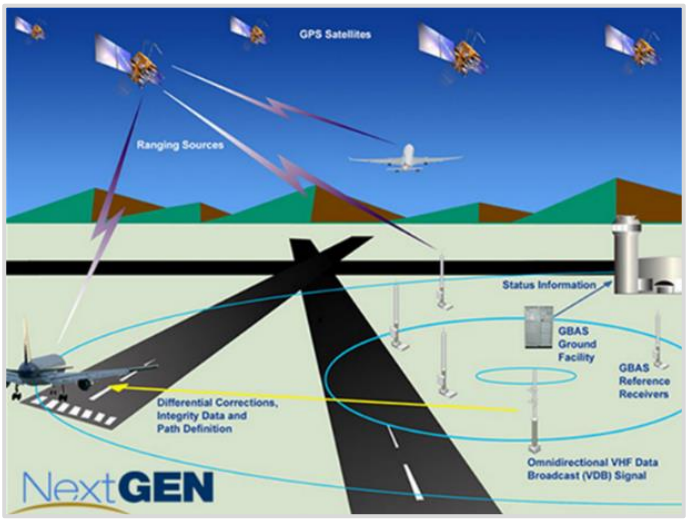
National Airspace System (NAS)

The National Airspace System (NAS) is the airspace, navigation facilities, and airports of the United States along with their associated information, services, rules, regulations, policies, procedures, personnel, and equipment.

The **NAS Plan** provides a basis for the FAA's investment decisions and provides the "roadmap" that shows the where, how, and when of NAS evolution.

- Evolutionary improvements permit greater flexibility

The current NAS modernization program is known as NextGen.



NextGen is an umbrella term for the ongoing, wide-ranging transformation of the United States' NAS.

At its most basic level, NextGen represents an evolution from a ground-based system of air traffic control to a satellite-based system of air traffic management, including:

- Surveillance
- Communications
- Navigation
- Decision-making tools

Components

In the United States, the NAS is a common network that includes:

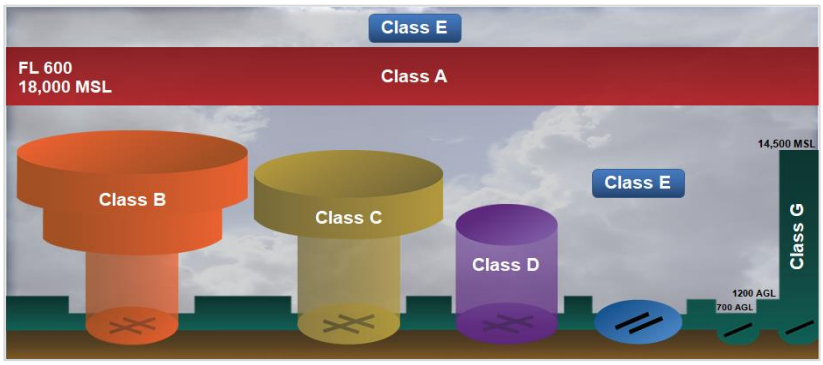
- Airspace and Routes
- Navigational Aids (NAVAIDs)
- Airport and Landing Areas
- Aeronautical Charts
- Rules, Regulations, and Procedures
- Personnel and Equipment

Airspace

The nation's airspace is divided into several different classes. Each class has unique dimensions and operating rules for pilots and controllers. For example:

- Class A airspace is reserved for high altitude travel en route from airport to airport
- Class B airspace surrounds the nation's busiest airports

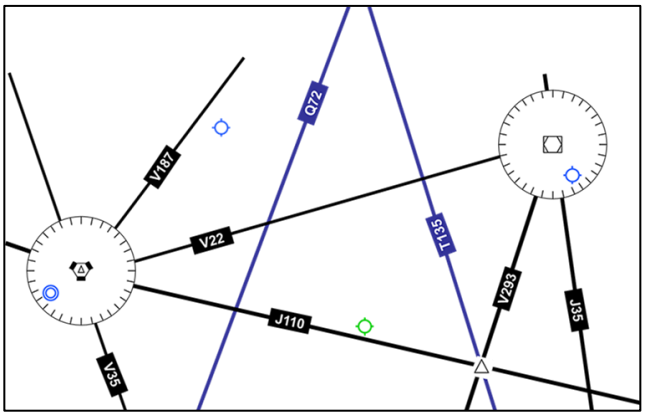
Certain other airspace areas are designated for military use and national security and are referred to as Special Use Airspace (SUA).



Air Traffic Service (ATS) Routes

Air Traffic Service (ATS) routes is a generic term used to identify the various types of routes and airways used by pilots for navigation. Listed below are types of ATS routes used by pilots.

- **VOR Airways and RNAV Tango Routes** – Very High Frequency Omnidirectional Range (VOR) airways, also called Victor airways, and Area Navigation (RNAV) Tango routes, which are used for navigation below 18,000 feet mean sea level (MSL).
- **Jet and RNAV Q Routes** – Jet routes and Area Navigation (RNAV) Q routes, which are used for navigation between Flight Level (FL) 180 and FL 450.



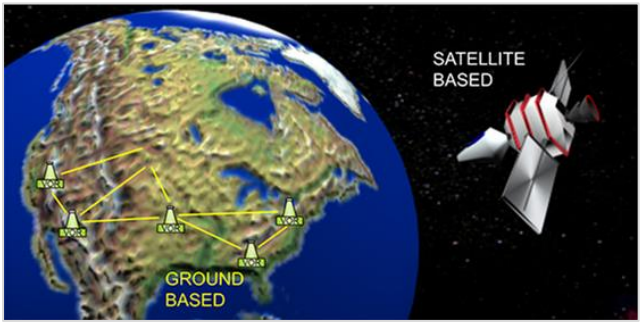
NAVAIDs

Navigational aids (NAVAIDs) are a vital part of the NAS. They are used to:

- Navigate from point to point
- Provide approach aids for landing

NAVAIDs can be:

- Ground-based
- Satellite-based



Primary NAVAIDs for the nation's airways:

- VORs
- VORTACs (Collocated VOR and TACAN Navigational Aids)

Global Positioning System (GPS) is the latest navigation system approved for use by ATC.

Airport/Landing Area

An **airport** is an area on land or water that is used or intended to be used for the landing and takeoff of aircraft and includes its buildings and facilities, if any.

Airports are not owned by the FAA. Airports are normally owned by a municipality or port authority.

A **landing area** is any locality either on land, water, or structures, including airports/heliports and intermediate landing fields, that is used or intended to be used for the landing and takeoff of aircraft whether or not facilities are provided for the shelter, servicing, or for receiving or discharging passengers or cargo.

Example: Hospitals have landing areas for medical helicopters.

Airports and their facilities are probably the most familiar element of the NAS. Over 19,000 airports are included in the NAS, and each has unique characteristics.

Every part of the airport is designed to give controllers and pilots the information and tools they need to navigate safely, such as:

- Differently colored lights that pinpoint where runways and taxiways are at night
- Directional signs and pavement markings

Aeronautical Charts

Aeronautical charts are also part of the NAS.

They are used in air navigation containing all or part of the following:

- Topographic features
- Hazards and obstructions
- Navigation aids
- Navigation routes
- Designated airspaces
- Airports

There are several different types of charts, each designed to present information required for VFR and IFR flight.

Rules, Regulations, and Procedures

Documents containing rules, regulations, and procedures are also part of the NAS.

Having rules and regulations to establish and maintain positive control among aircraft helps to prevent accidents.

Used by controllers and the aviation community to:

- Promote the safe, orderly, and expeditious flow of air traffic
- Provide a common language for controllers and pilots

Personnel and Equipment

The NAS also includes all personnel and equipment that are in any way involved in the movement of aircraft from one location to another.

Video – *How Does the National Airspace System (NAS) Work?* (3:17 mins.)

Knowledge Check G

REVIEW what you have learned so far about the NAS system. ANSWER the questions below.

1. Which of the following are components of NAS? *(Select all the correct answers that apply*.)
   - ❑ **Airport and landing areas**
   - ❑ **Airspace and ATS routes**
   - ❑ **Rules, regulations, and procedures**
   - ❑ **Aeronautical charts**

2. Why are NAVAIDs a vital part of NAS? *(Select all the correct answers that apply.)*
   - ❑ **Navigate from point to point**
   - ❑ Involved in the movement of aircraft
   - ❑ Establish and maintain positive control among aircraft
   - ❑ **Provide approach aids for landing**

Terms, Phrases, and Pronunciations

Phraseology is a series of standard words and phrases to ensure that miscommunication is kept to a minimum between the pilots and controllers. Certain letters and numbers may sound similar to each other when spoken over low-fidelity radio or telephone equipment.

To alleviate this problem, the FAA adopted a standard for pronunciation of letters and numbers for both controllers and pilots. English is the universal air traffic language.

- **Shall or Must**: *A procedure is mandatory*
- **Should**: *A procedure is recommended*

Numbers					
Character	**Word**	**Pronunciation**	**Character**	**Word**	**Pronunciation**
0	Zero	ZE-RO	**5**	Five	FIFE
1	One	WUN	**6**	Six	SIX
2	Two	TOO	**7**	Seven	SEV-EN
3	Three	TREE	**8**	Eight	AIT
4	Four	FOW-ER	**9**	Nine	NIN-ER

Phonetic Alphabet					
Character	Word	Pronunciation	Character	Word	Pronunciation
A	Alfa	**AL**FAH	**N**	November	NO**VEM**BER
B	Bravo	**BRAH**VOH	**O**	Oscar	**OSS**CAH
C	Charlie	**CHAR**LEE	**P**	Papa	PAH**PAH**
D	Delta	**DELL**TAH	**Q**	Quebec	KEH**BECK**
E	Echo	**ECK**OH	**R**	Romeo	**ROW**ME OH
F	Foxtrot	**FOKS**TROT	**S**	Sierra	SEE**AIR**AH
G	Golf	GOLF	**T**	Tango	**TANG**GO
H	Hotel	HOH**TELL**	**U**	Uniform	**YOU**NEE FORM
I	India	**IN**DEE AH	**V**	Victor	**VIK**TAH
J	Juliet	**JEW**LEE ETT	**W**	Whiskey	**WISS**KEY
K	Kilo	**KEY**LOH	**X**	X-ray	**ECK**STRAY
L	Lima	**LEE**MAH	**Y**	Yankee	**YAN**GKEY
M	Mike	MIKE	**Z**	Zulu	**ZOO**LOO
Note: *You shall familiarize yourself with the common terms, phrases, and pronunciations. Familiarization will help you grasp the concepts that will be discussed in more detail throughout this course.*					

National Airspace System (NAS) Summary

The NAS is a complex system that includes every airport, runway, and taxiway in the United States. The controller works with and is a part of the National Airspace System. In order to more effectively apply rules and procedures necessary to maintain safety in air traffic control, you must have a good understanding of the elements included in the National Airspace System.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ ***Note: Visual and Instrument Flight Rules*** lesson should have already been enabled in Blackboard, if not ensure it is enabled ■ Instruct students to navigate to the ***Visual and Instrument Flight Rules*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or wait quietly until other students have completed	Blackboard **EST. RUN TIME** 10 mins.

VISUAL AND INSTRUMENT FLIGHT RULES

Purpose: The purpose of this lesson is to define Visual Flight Rules (VFR) and Instrument Flight Rules (IFR).

Objective:

- Define VFR and IFR

References for this lesson are as follows:

- FAA Order JO 7110.65, Air Traffic Control

Visual Flight Rules (VFR) and Instrument Flight Rules (IFR)

In order to understand VFR and IFR, it is important to define the terms used to identify flight rules and flight plans.

Types of Flight Rules

Pilots must follow one set of rules when flying. There are two types of flight rules.

- Visual Flight Rules
- Instrument Flight Rules

VFR/IFR describe:

- Flight rules that pilots must follow
- Flight plans that pilots should file
- Weather conditions

Visual Flight Rules (VFR)

VFR govern the procedures for conducting flight under visual conditions. The term “VFR” is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate a type of flight plan.

Under VFR

- Aircraft must remain clear of clouds to ensure good visibility

Note: *When flying VFR, pilots are operating the aircraft visually. That is, they are looking out of the cockpit to maintain separation from other aircraft, terrain, and obstructions (man-made and natural).*

Instrument Flight Rules (IFR)

IFR govern the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate the type of flight plan.

Under IFR

- ATC maintains separation from other aircraft, terrain, and man-made objects on the ground
- The term “IFR” is also used to indicate weather conditions that are less than minimum VFR requirements

Note: *During IFR flights, the pilots are flying the aircraft strictly by instruments and navigational equipment rather than relying on visual cues. IFR is required when weather conditions are below VFR minimums or if an aircraft is flying into areas of airspace requiring it. Pilots flying under IFR must be IFR-certified and piloting an IFR-certified aircraft, and an IFR flight plan must be filed and approved by ATC.*

Knowledge Check H

REVIEW what you have learned so far about the visual and instrument flight rules. ANSWER the questions below.

1. What do VFR and IFR describe? *(Select all the correct answers that apply.)*
   - ❑ Locations and directions of airports
   - ❑ **Flight plans that pilots should file**
   - ❑ Instructions for operating aircraft
   - ❑ **Weather conditions**
   - ❑ **Flight rules that pilots must follow**

2. What responsibility does ATC have with an aircraft during an IFR flight? *(Select the correct answer.)*
   - ❑ Provide communication between the pilot and, when required, issue clearances
   - ❑ Ensure aircraft is able to approach and land safely on runways
   - ❑ **Maintain separation from other aircraft, terrain, and man-made objects on the ground**

Visual and Instrument Flight Rules Summary

The Federal Aviation Administration has established rules that govern aircraft flying under visual or instrument flight plans and has identified controller responsibilities for each condition. As a controller, you must be able to distinguish between the types of flight conditions in order to appropriately assume your responsibilities.

SUMMARY

The purpose of this module was to describe the Federal Aviation Administration (FAA) timeline, the functions and roles of different FAA organizations, and the responsibilities of different facility positions. It also described the purpose of the Air Traffic Control (ATC) system, including the role of the Traffic Management (TM) system and a description of the National Airspace System (NAS). The module ended with an explanation of the Visual and Instrument Flight Rules.

In accordance with my.faa.gov; www.faa.gov; www.dot.gov; Aeronautical Information Manual (AIM); FAA Order JO 7110.65, Air Traffic Control; Administrator's Fact Book, Air Traffic Restructuring Implementation Plan; NATCA 2016 Bargaining Unit Agreement; FAA Order JO 3120.4, Air Traffic Technical Training; and FAA Order JO 7210.3, Facility Operation and Administration; you should now be able to:

- Identify functions and structure of FAA
- Identify purpose and responsibilities of the ATC system
- Identify types of ATC facilities
- Identify the primary functions and position responsibilities of ATC facilities
- Identify purpose and responsibilities of the TM system
- Identify elements of the NAS
- Define VFR and IFR

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Navigate to the ***Parking Lot*** link within Blackboard and review any student questions ■ Address ***Parking Lot*** questions and facilitate a brief discussion of the lesson content ■ Instruct students to prepare for the End-of-Module test by putting away their Student Guides	Facilitated Discussion **EST. RUN TIME** 20 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *ATC System and NAS End-of-Module Test*** link in Blackboard ■ Instruct students: ○ Clear desks ○ Do not write anything during or after the test ○ Navigate to the ***ATC System and NAS End-of-Module Test*** link in Blackboard ○ Once they are satisfied with their responses, click "Save and Submit;" do not click "OK" to review results until directed to do so ○ Choose "Cancel" if they receive a warning message that the test has unanswered questions; choosing OK will submit the test and not allow them to go back and answer the questions ○ Leave the room after submitting the test and return at the "Be Back" time ■ ***Note:*** *This test is scored but not graded* ■ During test, monitor students to ensure a secure testing environment ■ Identify the most commonly missed questions by reviewing student statistics in Blackboard ■ Instruct students to click "View Results" when ready to review commonly missed questions ■ Review commonly missed questions with students	Blackboard Assessment **EST. RUN TIME** 25 mins.

END-OF-MODULE TEST (ANSWER KEY)

Note: *Test questions in Blackboard are presented to the students in random order. Please be aware the test key question order will not match the student version.*

1. According to their location, ATO facilities are assigned to one of _____. *(Select the correct answer.)*
   - ❑ **Three service areas**
   - ❑ Nine regions
   - ❑ Eleven FAA primary offices
   - ❑ Four FAA headquarters divisions

   Reference(s): www.faa.gov

2. When is nonradar separation used in preference to radar separation? *(Select the correct answer.)*
   - ❑ **When an operational advantage will be gained**
   - ❑ When the aircraft is not transponder equipped
   - ❑ When secondary radar is out of service
   - ❑ When controller is not radar qualified

   Reference(s): JO 7110.65, Chap. 2

3. "Presidential aircraft have priority over Flight Check aircraft" is an example of a(n) _____. *(Select the correct answer.)*
   - ❑ **Operational priority**
   - ❑ Procedural preference
   - ❑ Duty priority
   - ❑ Additional services

   Reference(s): JO 7110.65, Chap. 2

4. The organizational structure of each AT facility varies depending upon its _____. *(Select the correct answer.)*
   - ❑ **All of the answers**
   - ❑ Runways
   - ❑ Type of air traffic
   - ❑ Surrounding terrain

   Reference(s): NATCA 2016 Bargaining Unit Agreement

5. Which air traffic facility has **NO** direct authority over IFR or VFR traffic? *(Select the correct answer.)*
   - ❑ **FSS**
   - ❑ ATCT
   - ❑ TRACON
   - ❑ ARTCC

   Reference(s): AIM, Chap. 4

6. Which ATC facility is primarily responsible for conducting pilot briefings? *(Select the correct answer.)*
   - ❑ **FSS**
   - ❑ ATCT
   - ❑ ARTCC
   - ❑ ATCSCC

   Reference(s): AIM, Chap. 4

7. Which of the following is **NOT** the function of the Clearance Delivery position in the tower? *(Select the correct answer.)*
   - ❑ **Compiling statistical data**
   - ❑ Operating communication equipment
   - ❑ Processing and forwarding flight plan information
   - ❑ Issuing clearances and ensuring accuracy of readback

   Reference(s): JO 7110.65

8. Which position in the ATC terminal option is normally responsible for issuing control instructions to aircraft and vehicles operating on the airport movement area (other than active runways)? (*Select the correct answer.)*
   - ❑ **Ground Control**
   - ❑ Local Control
   - ❑ Clearance Delivery
   - ❑ Flight Data

   Reference(s): JO 7110.65

9. Which ATC facility provides ATC services to aircraft on IFR flight plans during the en route phase of flight? *(Select the correct answer.)*
   - ❑ **ARTCC**
   - ❑ FSS
   - ❑ ATCT
   - ❑ TRACON

   Reference(s): JO 7110.65, Pilot Controller Glossary

10. Which is the only en route sector team member whose duties do **NOT** include accepting handoffs? *(Select the correct answer.)*
    - ❑ **Radar Flight Data**
    - ❑ Radar Coordinator
    - ❑ Radar Associate
    - ❑ Radar

    Reference(s): JO 7110.65

11. Who is responsible for the operation of the TM system? *(Select the correct answer.)*
    - ❑ **ATCSCC**
    - ❑ ARTCC TMU for each area
    - ❑ Air traffic manager
    - ❑ Central altitude reservation facility

    Reference(s): JO 7210.3, Chap.17

12. What is included in the NAS? *(Select the correct answer.)*
    - ❑ **U.S. navigation facilities and all associated personnel and components**
    - ❑ Every employee of FAA and DOT
    - ❑ Only ATC employees who assist in operations of getting aircraft from one location to another
    - ❑ Every person employed with FAA

    Reference(s): JO 7110.65, Pilot Controller Glossary

13. Who maintains separation from other aircraft, terrain, and man-made objects on the ground for IFR aircraft? *(Select the correct answer.)*
    - ❑ **ATC**
    - ❑ Pilot
    - ❑ FSS
    - ❑ ATCSS

    Reference(s): JO 7110.65, Pilot Controller Glossary

ACTIVITY: ATC TERMS AND PHRASEOLOGY (ANSWER KEY)

Question	Answer
A defined rectangular area on a land airport prepared for the landing and takeoff run of aircraft along its length.	**Runway** Movement Area Warning Area
An airborne collision avoidance system based on radar beacon signals that operates independent of ground-based equipment.	**TCAS** TACAN GPS
A call sign prefix used by FAA aircraft engaged in flight inspection/certification of navigational aids and flight procedures.	**Flight Check** Mach Number Squawk
A preplanned instrument flight rule air traffic control departure procedure printed for pilot use in graphic and/or textual form.	**Instrument Departure Procedure** Initial Approach Fix Flight Plan
A level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury.	**Flight Level** Airspeed Above Ground Level Altitude
An L/MF or UHF radio beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction-finding equipment can determine his/her bearing to or from the radio beacon and “home” on or track to or from the station.	**NDB** VORTAC VFR
Rules that govern the procedures for conducting flight under visual conditions.	**Visual Flight Rules** Visibility Handoff
A person authorized to provide air traffic control service.	**ATCS** ATC AT
“Let me know that you have received and understood my message.”	**Acknowledge** Verify Roger
Specific headings issued to the pilot by a controller to provide navigational guidance based on the use of radar.	**Radar Vectors** Airway Fix
Specified information relating to the intended flight of an aircraft that is filed orally or in writing with an FSS or an ATC facility.	**Flight Plan** Safety Alert Air Traffic Clearance
A type of Special Use Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons and property on the ground.	**CFA** SUA GA
An aircraft conducting flight in accordance with visual flight rules.	**VFR Aircraft** VFR Conditions Visual Flight Rules
“My transmission is ended; I expect a response.”	**Over** Wilco Go Ahead
A type of Special Use Airspace that may contain hazards to nonparticipating aircraft in international airspace.	**Warning Area** Controlled Firing Area Non-movement Area

Question	Answer
A route designed to serve aircraft operations from 18,000 feet MSL up to and including flight level 450.	**Jet Route** Hold Procedures Controlled Firing Area
The ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night.	**VIS** VOR VSCS
Any visual or electronic device airborne or on the surface that provides point to point guidance information or position data to aircraft in flight.	**Navigational Aid** Target Fix
An electronically displayed map on the radar display that may depict data such as airports, heliports, runway centerline extensions, and hospital emergency landing areas.	**Video Map** Navigational Aid Tactical Air Navigation
"Yes."	**Affirmative** Wilco Over
A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site.	**VORTAC** VOR VSCS
Time is given in Coordinated Universal Time, the local standard time at the prime meridian at Greenwich, England.	**UTC** CFA DME
The longitudinal spacing of aircraft at the same altitude by a minimum distance expressed in units of time or miles.	**Longitudinal Separation** Visual Separation Distance Measuring Equipment
The fixes depicted on instrument approach procedure charts that identify the beginning of the initial approach segment(s).	**IAF** IFR ILS
The highest point of an airport's usable runways measured in feet from mean sea level.	**Airport Elevation** Altitude Non-movement Area
The airborne radar beacon receiver/transmitter portion of the Air Traffic Control Radar Beacon System (ATCRBS) that automatically receives radio signals from interrogators on the ground.	**Transponder** Radar Vectors Precision Approach Radar
A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north.	**VOR** ILS VORTAC
A space-based radio positioning, navigation, and time-transfer system. The system provides highly accurate position and velocity information, and precise time, on a continuous global basis, to an unlimited number of properly equipped users.	**Global Positioning System** Precision Approach Radar Tactical Air Navigation
The common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing area; aeronautical charts, information and services; rules, regulations, and procedures; technical information; and manpower and material.	**NAS** ATC NDB
A question relating to the quality of the transmission or to determine how well the transmission is being received.	**How Do You Hear Me?** Affirmative Negative

Question	Answer
That portion of civil aviation that encompasses all facets of aviation, except air carriers holding a certificate of public convenience and necessity from the Civil Aeronautics Board and large aircraft commercial operators.	**General Aviation** Air Traffic Control Air Traffic Service
A geographical position determined by visual reference to the surface, by reference to one or more radio NAVAIDs, by celestial plotting, or by another navigational device.	**Fix** Global Positioning System ATS Routes
A device that, by measuring the time interval between transmission and reception of radio pulses and correlating the angular orientation of the radiated antenna beam or beams in azimuth and/or elevation, provides information on range, azimuth, and/or elevation of objects in the path of the transmitted pulses.	**Radar** Instrument Landing System Global Positioning System
A means employed by ATC to separate aircraft in terminal areas.	**Visual Separation** Lateral Separation Longitudinal Separation
A predetermined maneuver that keeps aircraft within a specified airspace while awaiting further clearance from air traffic control.	**Hold Procedure** Radar Point Out Handoff
Taxiways and apron (ramp) areas not under the control of air traffic.	**Non-movement Area** Military Operations Area Alert Area
The ratio of true airspeed to the speed of sound.	**Mach Number** Altimeter Setting Above Ground Level Altitude
An action taken to transfer the radar identification of an aircraft from one controller to another if the aircraft will enter the receiving controller's airspace and radio communications with the aircraft will be transferred.	**Handoff** Instrument Departure Procedure Data Block
A computer-controlled switching system that provides air traffic controllers with all voice circuits (air-to-ground and ground-to-ground) necessary for air traffic control.	**VSCS** MOA ILS
Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.	**Distance Measuring Equipment** Navigational Aid Stabilizer
The barometric pressure reading used to adjust a pressure altimeter for variations in existing atmospheric pressure or to the standard altimeter setting (29.92).	**ALSTG** AGL MSL
"Tell me what you plan to do."	**Advise Intentions** ATC Requests ATC Clears
The separation of all air traffic within designated airspace by air traffic control.	**Positive Control** Lateral Separation Vertical Separation
Altitude expressed in feet measured from mean sea level.	**MSL** FL NAS
A type of Special Use Airspace designated under FAR Part 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction.	**Restricted Area** Prohibited Area Military Operations Area

Question	Answer
Phenomena resulting from the passage of an aircraft through the atmosphere.	**Wake Turbulence** Radar Vector Fix
Rules governing the procedures for conducting instrument flight.	**IFR** NDB UTC
Measures designed to adjust the flow of traffic into a given airspace, along a given route, or bound for a given aerodrome (airport) so as to ensure the most effective utilization of the airspace.	**Flow Control** Movement Area Non-directional Beacon
Airspace of defined dimensions identified by an area on the surface of the Earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities.	**SUA** IAF TCAS
An action taken by a controller to transfer the radar identification of an aircraft to another controller if the aircraft will or may enter the airspace or protected airspace of another controller and radio communications will not be transferred.	**Radar Point Out** Positive Control Handoff
The highest point of an airport's usable runways measured in feet from mean sea level.	**Airport Elevation** Altimeter Setting Airway
Used to prefix a message of noncontrol information when it is relayed to an aircraft by anyone other than an air traffic controller.	**ATC Advises** Affirmative How Do You Hear Me?
Used to prefix an ATC clearance when it is relayed to an aircraft by anyone other than an air traffic controller.	**ATC Clears** That Is Correct ATC Advises
Used to prefix an ATC request when it is relayed to an aircraft by anyone other than an air traffic controller.	**ATC Requests** ATC Advises Squawk
Used by ATC when compliance with an action is required to avoid an imminent situation.	**Immediately** Affirmative Expedite
Letters and numerals used to show identification, altitude, beacon code, and other information concerning a target on a radar display.	**Data Block** Fix Flow Control
A type of Special Use Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons and property on the ground.	**CFA** ATCS AGL
Altitude expressed in feet measured above ground level.	**AGL** GPS DME
The height of a level, point, or object measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL).	**Altitude** Above Ground Level Altitude Flight Level
An ultra-high frequency electronic rho-theta air navigation aid that provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station.	**TACAN** TCAS VORTAC

Question	Answer
Issued by ATC to aircraft under their control if ATC is aware the aircraft is at an altitude that, in the controller's judgment, places the aircraft in unsafe proximity to terrain, obstructions, or other aircraft.	**Safety Alert** Mayday Warning Area
Approach control radar used to detect and display an aircraft's position in the terminal area.	**Airport Surveillance Radar** Nonradar Precision Approach Radar
Separation established by assignment of different altitudes or flight levels.	**Vertical Separation** Lateral Separation Longitudinal Separation
"An error has been made in the transmission and the correct version follows."	**Correction** Say Again Read Back
Indicates inability to comply with a specific instruction, request, or clearance.	**Unable** Acknowledge Negative
ATC authorization for an aircraft to land. It is predicated on known traffic and known physical airport conditions.	**Cleared To Land** Out Go Ahead
The lateral spacing of aircraft at the same altitude by requiring operation on different routes or in different geographical locations.	**Lateral Separation** Vertical Separation Visual Separation
A Class E airspace area established in the form of a corridor, the centerline of which is defined by radio navigational aids.	**Airway** Special Use Airspace Warning Area
Activate specific codes on the aircraft transponder.	**Squawk** Air Traffic Clearance Target
Used by ATC to ascertain an aircraft's specific altitude/ flight level.	**Say Altitude** Roger Verify
A flight instrument that indicates altitude by sensing pressure changes.	**Altimeter** Stabilizer Transponder
Altitude reporting transponder mode.	**Mode C** Data Block Altimeter Setting