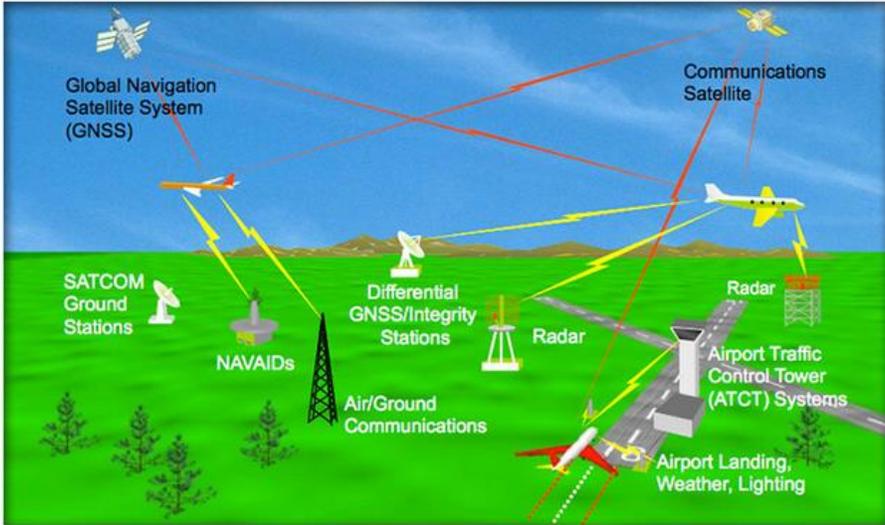


AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

ALL LESSONS FRAME: 1

Introduction to the ATC System & National Airspace System

NEXT



The diagram illustrates the National Airspace System (NAS) and its components. It shows a landscape with a green field and a blue sky. In the sky, there are two satellites: a Global Navigation Satellite System (GNSS) satellite and a Communications Satellite. On the ground, there are several ground stations: SATCOM Ground Stations, NAVAIDS (Navigation Aids), and Differential GNSS/Integrity Stations. There are also Radar stations and an Airport Traffic Control Tower (ATCT) System. The ATCT System is connected to an Airport Landing, Weather, and Lighting system. The diagram shows the flow of information and communication between these components, with red lines representing communication and yellow lines representing navigation and integrity signals.

You are entering one of the most challenging career fields in aviation —
Air Traffic Control (ATC).

LEARN MORE

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.

You need to understand the elements and functions of the National Airspace System (NAS) in order to effectively provide air traffic service. The 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. Knowledge of the elements of the NAS and an understanding of the role of traffic management helps the controller to effectively apply the rules and procedures that are necessary for maintaining a safe and orderly air traffic system.



Purpose

BACK

NEXT

This lesson describes the history of the Federal Aviation Administration (FAA), 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 lesson ends with a description of the NAS.



Objectives

BACK

NEXT

You will be able to identify:

1. Elements of the National Airspace System (NAS)
2. Role of the Traffic Management System (TMS) within the NAS
3. Purpose and responsibilities of the Air Traffic Control (ATC) System

You will meet these objectives in accordance with the following references:

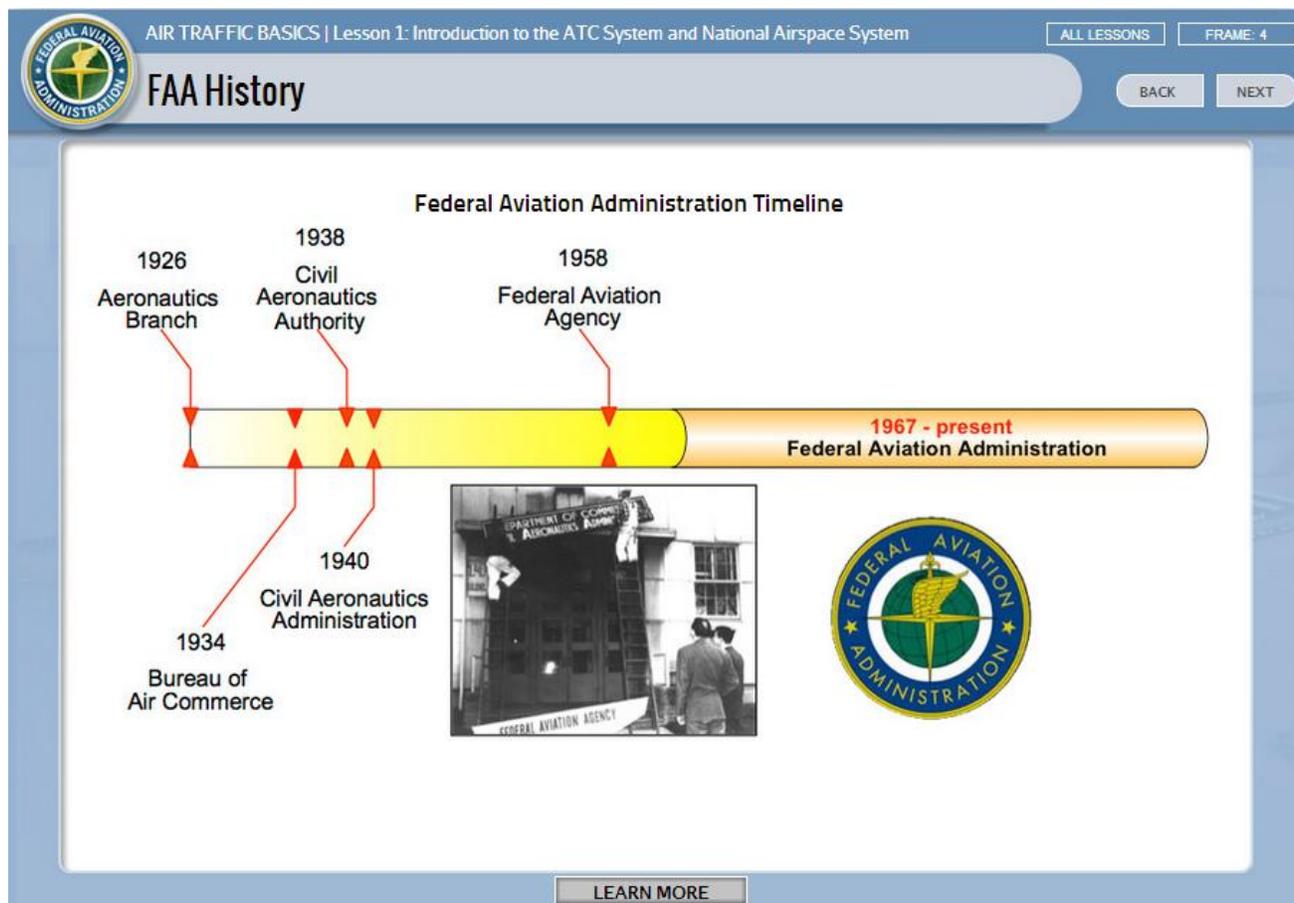
- FAA Orders
 - JO 7110.65, Air Traffic Control
 - JO 7210.3, Facility Operation and Administration
 - JO 3120.4, Air Traffic Technical Training
- Aeronautical Information Manual (AIM)

You will identify the primary functions and associated position responsibilities of:

1. Automated Flight Service Station (AFSS)
2. Tower team
3. Terminal radar/nonradar team
4. En Route sector team

You will identify the duty priority, procedural preference, and operational priorities of the air traffic controller.





The Federal Aviation Administration (FAA) was established in 1966 but has existed in some form since 1926. Here is a brief breakdown of important events related to the establishment of the FAA. For additional history related information turn to Appendix A.

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

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.

In 1940, the Civil Aeronautics Authority was renamed the Civil Aeronautics Administration.

The Federal Aviation Act of 1958 created the independent FAA wherein the FAA Administrator reported directly to the President.

The Department of Transportation (DOT) Act of 1966 changed the name of the FAA from the Federal Aviation Agency to the Federal Aviation Administration, placed the FAA under the DOT, and began formal operation on April 1, 1967.

NOTE: This is the current configuration. The DOT manages all modes of transportation such as railways, highways, waterways, and airways. The FAA deals with aviation only.



FAA Organization

BACK

NEXT

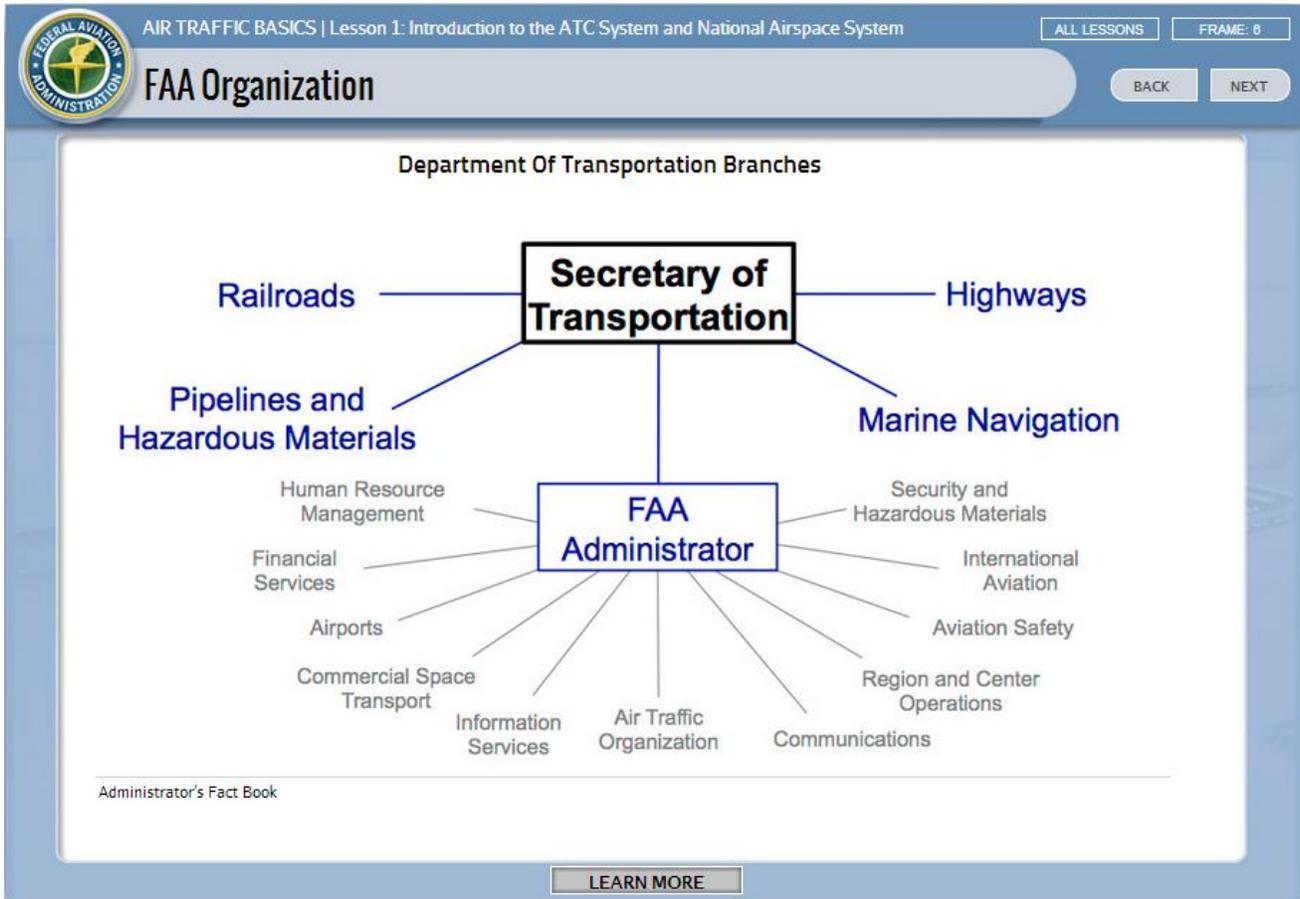
Introduction

The FAA is responsible for managing the NAS.

- The NAS is every person and thing required to successfully get a plane from one location to another.

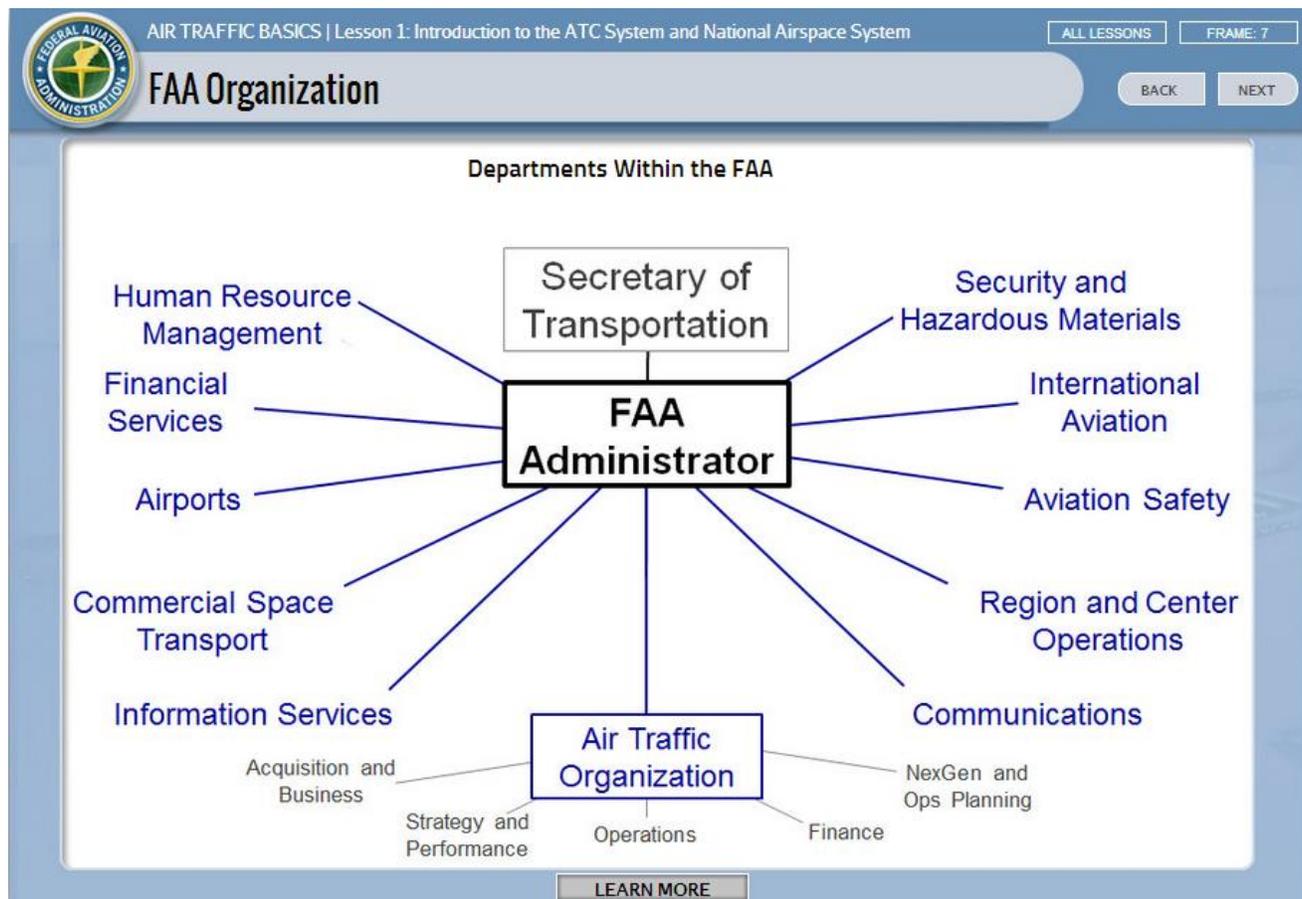
To manage the NAS effectively, many different offices with different responsibilities are involved. In this section, we will discuss the FAA organization.





Department of Transportation (DOT)

The DOT regulates all modes of transportation such as railroads, highways, waterways, and airways.



FAA Administrator's Office and Primary Offices

The FAA Administrator's office is located in Washington, D.C. and provides direction for:

- Headquarters
- Air Traffic Organization (ATO)
- Regions
 - Field facilities
- Mike Monroney Aeronautical Center
- William J. Hughes Technical Center

The FAA Administrator has delegated the responsibility and authority for FAA functions to eleven primary offices. Each primary office is divided into specific tasks/offices that manage the day-to-day operations of the NAS. Each primary office (except the ATO) is managed by an Associate Administrator.

- The ATO is managed by a Chief Operating Officer (COO).

Reference: Administrator's Fact Book

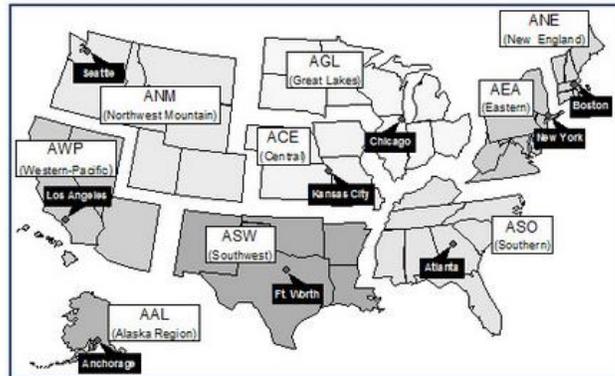


FAA Organization

BACK

NEXT

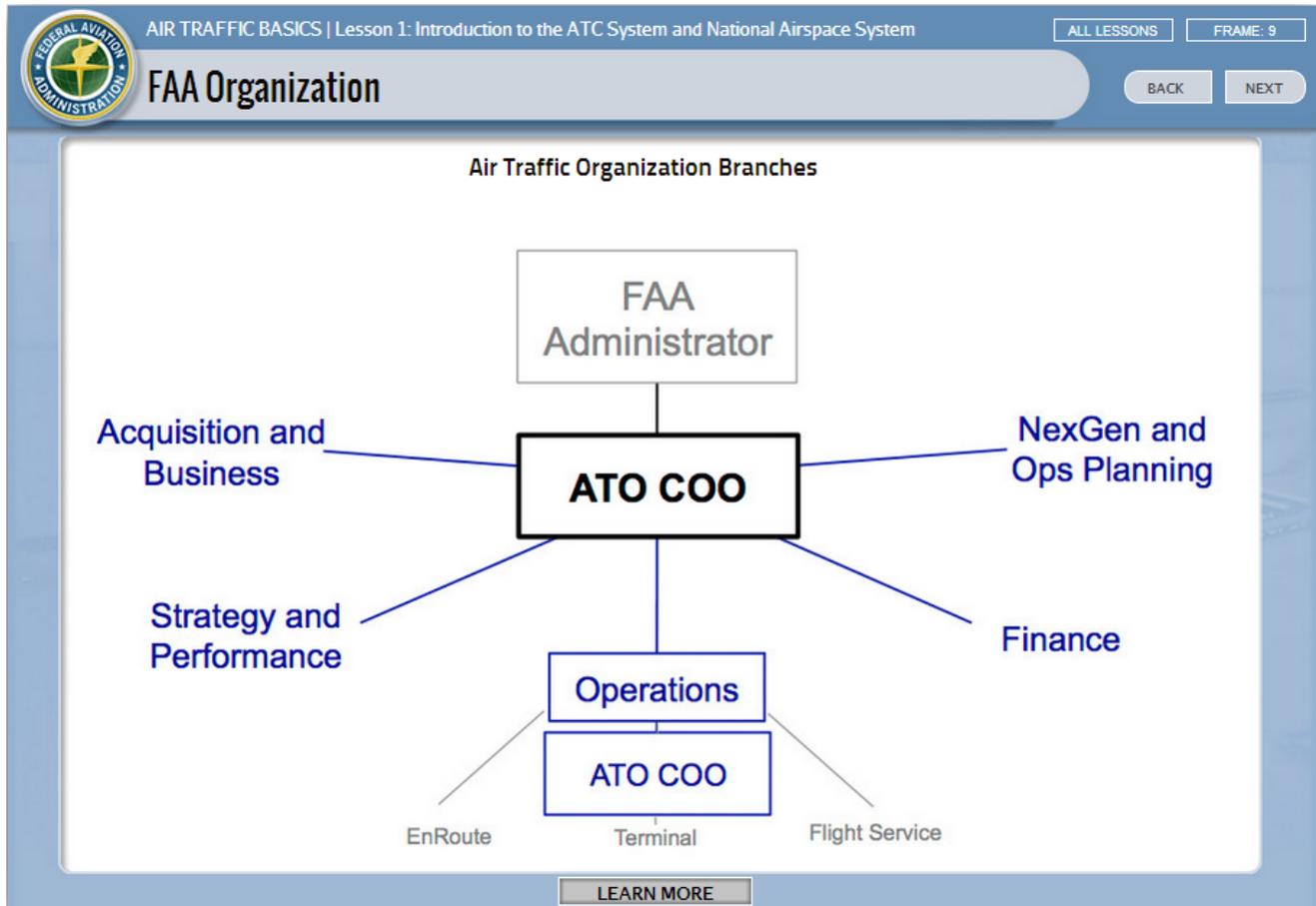
Regions and Regional Offices



FAA offices other than ATO facilities are under the jurisdiction of a regional office and operate independently using approved procedures.

- Regional offices provide facilities with direction as well as administrative and technical support.

Administrator's Fact Book



ATO Organization

Our area of concentration is the Air Traffic Organization (ATO). The ATO was created on February 8, 2004.

The ATO mission is to:

- Ensure the safe, efficient operation, maintenance, and use of the air transportation system
- Maximize utility of airspace resources
- Increase system safety, capacity, and productivity

The ATO is managed by a COO. The ATO's COO issues and enforces rules, regulations, and minimum standards relating to:

- Aircraft operations
- Licensing and rating of personnel
- Supervision and enforcement of medical standards
- Specifications for commercial air operations
- Surveillance of air operations
- Air navigation systems
- Provision of air traffic services

Reference: Administrator's Fact Book

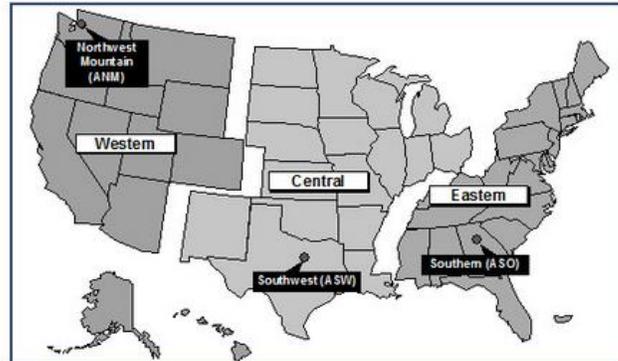


FAA Organization

BACK

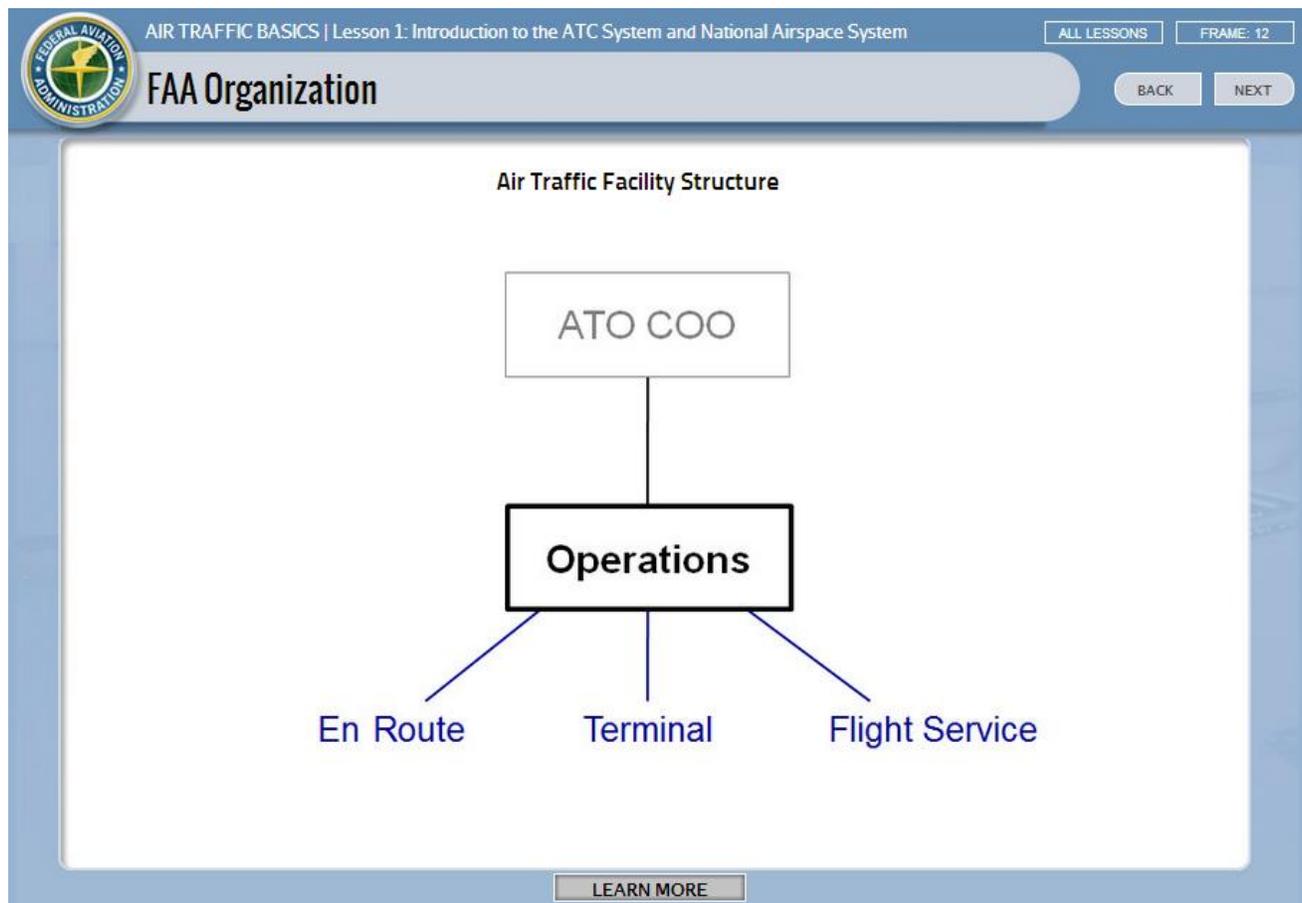
NEXT

ATO Service Areas



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

Administrator's Fact Book



ATO Operations

The ATO ATC offices and functions are identified as follows:

Office of En Route and Oceanic Service

- Air Route Traffic Control Centers (ARTCCs) are established primarily to provide air traffic service to aircraft operating on Instrument Flight Rules (IFR) flight plans within controlled airspace, and principally during the en route phase of flight.

Office of Terminal Service

- Terminal Radar Approach Controls (TRACONs) and Control Towers (ATCTs) have been established to provide for a safe, orderly, and expeditious flow of traffic on and in the vicinity of an airport.
- TRACONs and ATCTs may also provide for the separation of IFR aircraft in the terminal areas.

Reference: Administrator's Fact Book

The screenshot shows the FAA Organization page with a map titled "Flight Services Service Areas". The map displays the United States with state boundaries. A large purple box covers the central and eastern United States, labeled "Lockheed-Martin Consolidated Service Area". A red dot in the Washington D.C. area is labeled "Washington D.C.". Alaska is highlighted in green, with a callout box labeled "Alaska" and another callout box labeled "Alaska (FAA)". The FAA logo is in the top left corner. Navigation buttons include "ALL LESSONS", "FRAME: 13", "BACK", "NEXT", and "LEARN MORE".

Office of Flight Services

- Automated Flight Service Stations (AFSSs) are air traffic facilities which provide a variety of services to pilots, such as:
 - Processing flight plans
 - Pilot briefings
 - In-flight services
- They do **not**, however, engage in the control and separation of aircraft.

NOTE: *Flight service station is the generic term for both Flight Service Station (FSS) and Automated Flight Service Station (AFSS). The two acronyms can be used interchangeably.*

Reference: Administrator's Fact Book

FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

ALL LESSONS FRAME: 14

FAA Organization

BACK NEXT

Operational Authority/Communications

AUTHORITY

FAA ADMINISTRATOR ATO COO SERVICE AREAS FACILITIES YOU

COMMUNICATIONS

LEARN MORE

To ensure the sound administration and management of facilities:

- Clear lines of operating authority must be established from the FAA Administrator to you.
- However, communications is a two-way process, which flows from you to the FAA Administrator and vice-versa.

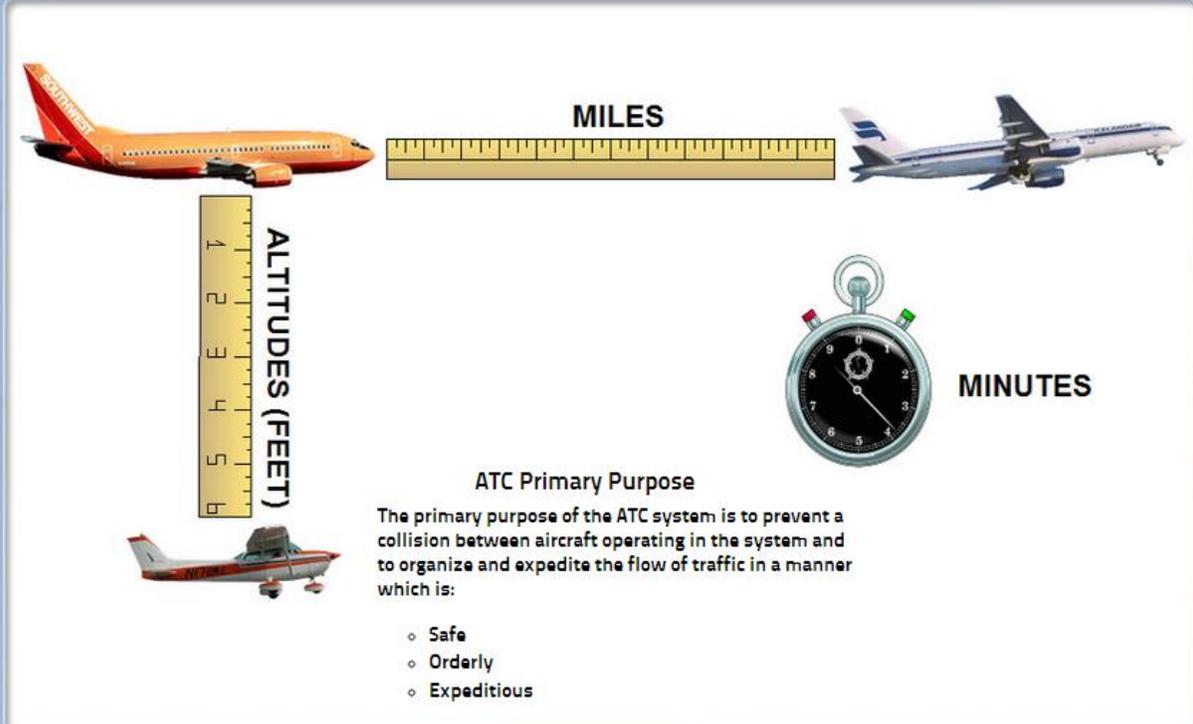
NOTE: A copy of the Organizational Flowchart can be found in Appendix B.

FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

ALL LESSONS FRAME: 15

Air Traffic Control (ATC) System

BACK NEXT



MILES

ALTITUDES (FEET)

MINUTES

ATC Primary Purpose

The primary purpose of the ATC system is to prevent a collision between aircraft operating in the system and to organize and expedite the flow of traffic in a manner which is:

- Safe
- Orderly
- Expeditious

LEARN MORE

ATC provides support for National Security and Homeland Defense.

ATC provides positive control among aircraft under its control.

- Positive control is the separation of all air traffic within designated airspace by ATC.
- Separation standards are established by the federal government, and designated in miles, altitudes (feet), and minutes.

Reference: 7110.65, Chap. 2, Pilot/Controller Glossary



Air Traffic Control (ATC) System

BACK

NEXT



Duty Priority

First priority is given to separating aircraft and issuing safety alerts. Second priority is to provide support to National Security and Homeland Defense.

- Good judgment shall be used in prioritizing all other duties based on the requirements of the situation at hand, or when encountering situations for which there is no written procedure.

JO 7110.65, Chap. 2



Air Traffic Control (ATC) System

BACK

NEXT



Procedural Preference

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

JO 7110.65, Chap. 2

LEARN MORE

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

Reference: 7110.65, Chap. 2



Air Traffic Control (ATC) System

BACK

NEXT

Operational Priority

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

- Aircraft in distress
 - Have the right-of-way over all other traffic
- Civilian air ambulance flights
 - Priority is also provided to military air evacuation flights and scheduled air carrier/air taxi flights, when verbally requested
- Search and Rescue (SAR) aircraft performing a SAR mission
- Presidential aircraft
- Flight Check aircraft
- Special military and civilian operations
- Diverted flights
 - Ensure that aircraft that have already had to divert to another airport due to weather or other phenomena do not incur an additional delay



JO 7110.65, Chap. 2



Air Traffic Control (ATC) System

BACK

NEXT

Additional Services

Additional services are to be provided to the extent possible. Additional services are advisory information provided by ATC which include, but are 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

Additional services are limited by many factors, such as:

- Volume of traffic
- Frequency congestion
- Quality of radar
- Controller workload
- Higher priority duties
- Pure physical inability to scan and detect those situations that fall in this category

Additional services are not optional for the controller; they are required when the work situation permits.

JO 7110.65, Chap. 2, Pilot/Controller Glossary

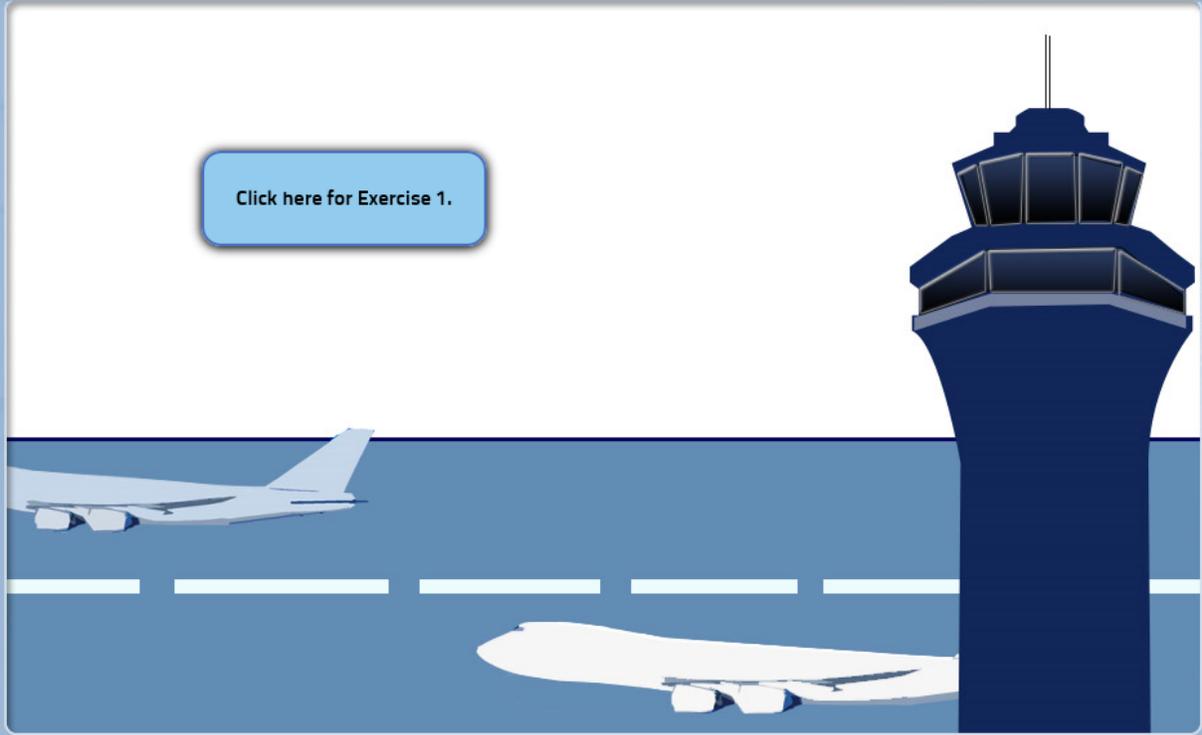


Exercise 1: Priority and Preference

BACK

NEXT

Click here for Exercise 1.





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

BACK

NEXT



Types of Flight Rules

Pilots must follow one set of rules when flying:

- Visual Flight Rules (VFR) or
- Instrument Flight Rules (IFR)

VFR/IFR describe:

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

FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

ALL LESSONS FRAME: 22

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

BACK NEXT



The diagram shows a small white airplane with the registration number N8398B flying over a landscape. Three red curved arrows illustrate different flight paths: one labeled 'OVER' pointing upwards, one labeled 'AROUND' pointing to the left, and one labeled 'UNDER' pointing downwards.

Visual Flight Rules (VFR)

Visual Flight Rules (VFR) are rules that 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.

LEARN MORE

Under VFR:

- Pilots are responsible for maintaining separation from other aircraft.
- 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 manmade objects on the ground.

Reference: 7110.65, Pilot/Controller Glossary



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

BACK

NEXT

Instrument Flight Rules (IFR)

Instrument Flight Rules (IFR) are rules governing the procedures for conducting instrument flight. IFR is 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 manmade objects on the ground.

The term "IFR" is also used to indicate weather conditions that are less than minimum VFR requirements.



JO 7110.65, Pilot/Controller Glossary



Air Traffic Facilities

BACK

NEXT

Air Traffic Facility Complexity



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

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

Air Traffic Restructuring Implementation Plan

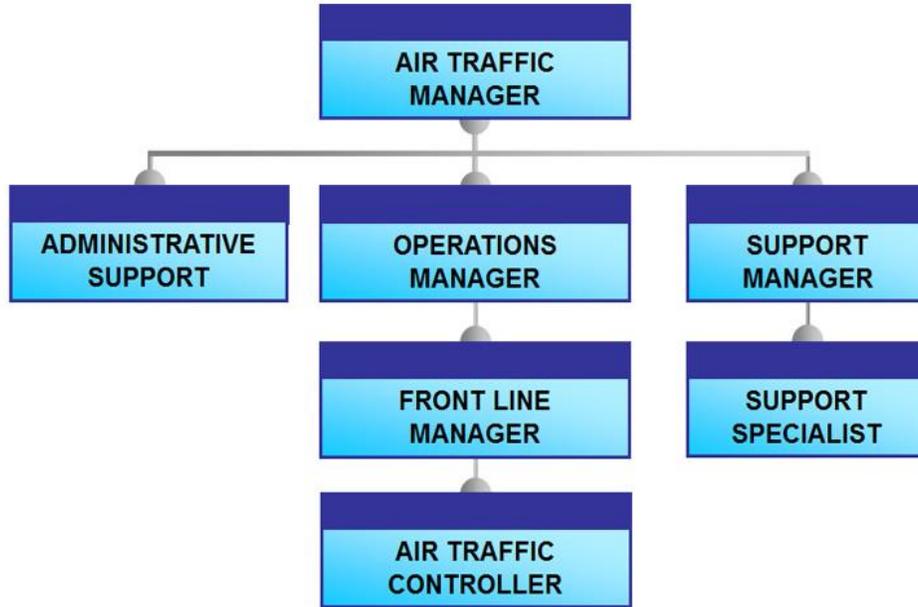


Air Traffic Facilities

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NEXT

Air Traffic Facility Organizational Chart



LEARN MORE

This is a basic facility organizational chart. It will vary by facility depending on their needs.

In any facility, when no supervisory personnel are available, one controller who is fully qualified shall be designated as Controller-in-Charge (CIC).



Air Traffic Facilities

BACK

NEXT



Terminal Radar Approach Control (TRACON)

ATC Facility Types

There are three types of ATC facilities:

- Automated Flight Service Station (AFSS)
- Terminal
 - Airport Traffic Control Tower (ATCT)
 - Terminal Radar Approach Control (TRACON)
- Air Route Traffic Control Center (ARTCC)



Airport Traffic Control Tower (ATCT)



Air Route Traffic Control Center (ARTCC)

AIM, Chap. 4



Automated Flight Service Station (AFSS)

AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

ALL LESSONS FRAME: 27

Automated Flight Service Stations (AFSS) Services

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AFSSs are air traffic facilities which have no direct control authority over either IFR or VFR traffic.

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.

They provide the following services to all air traffic:

- VFR search and rescue service
- Assistance to lost aircraft and aircraft in emergency situations
- Relay of ATC clearances
- Airport Advisory Service
- Broadcast aviation weather and NAS information
- Receive and process IFR flight plans
- Monitor Navigational Aids (NAVAIDs)
- Origin of Notices to Airmen (NOTAMs)
- En route communications
- Pilot Briefings



LEARN MORE

At select locations, AFSSs:

- Provide En Route Flight Advisory Service (EFAS) (Flight Watch)
 - EFAS is a service specifically designed to provide, upon pilot request, timely weather information pertinent to his or her type of flight, intended route of flight, and altitude.
- Take weather observations
- Issue airport advisories
- Advise Customs and Immigration of transborder flights



Automated Flight Service Stations (AFSS) Services

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NEXT



Flight Data/
NOTAM/
Coordinator
Position

Preflight
Position

En Route Flight
Advisory Service
(EFAS) Position

Inflight
Position

Broadcast
Position

AFSS Positions

There are five basic positions in an AFSS:

- Flight Data/NOTAM Coordinator
- Broadcast
- Preflight
- En Route Flight Advisory Service (EFAS)
- Inflight



Automated Flight Service Stations (AFSS) Services

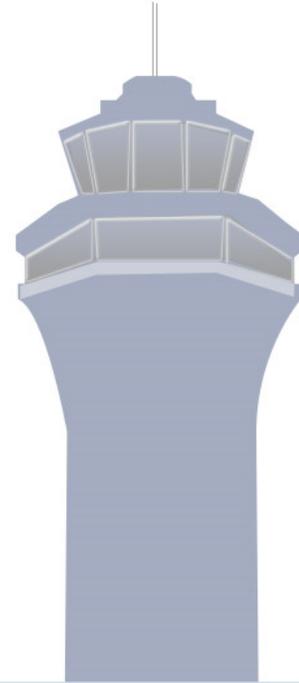
BACK

NEXT

Flight Data/NOTAM/Coordinator Position

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 search and rescue situations



3120.4, App. 3



Automated Flight Service Stations (AFSS) Services

BACK

NEXT

Broadcast Position

Broadcast position duties are to:

- Compile, evaluate, record, and disseminate weather and flight information through the following types of broadcasts:
 - Transcribed Weather Broadcast (TWEB) (Alaska only)
 - Telephone Information Briefing Service (TIBS)
 - Hazardous Inflight Weather Advisory Service (HIWAS)

3120.4, App. 3





Automated Flight Service Stations (AFSS) Services

BACK

NEXT

Preflight Position

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

3120.4, App. 3





Automated Flight Service Stations (AFSS) Services

BACK

NEXT

En Route Service Positions

The following two Flight Service positions provide services to airborne pilots:

- En Route Flight Advisory Service (EFAS) position
- Inflight position

3120.4, App. 3





Automated Flight Service Stations (AFSS) Services

BACK

NEXT

En Route Flight Advisory Service (EFAS) Position

EFAS position duties are to:

- Provide en route aircraft with timely and pertinent weather data tailored to a specific altitude and route using the most current available sources of aviation meteorological information
 - Radio call is "Flight Watch"
- Apply VNR procedures as prescribed
- Alert NWS and the Center Weather Services Unit (CWSU) immediately when conditions are reported that differ from forecasts

3120.4, App. 3



FSS providing unseen weather to aircraft inflight

N6456T

NOVEMBER SIX FOUR FIVE SIX TANGO, DENVER RADIO, WEATHER IN SALT LAKE CITY...

DENVER AFSS

MOUNTAIN RANGE OBSTRUCTING SIGHT

SALT LAKE CITY

Inflight Position

LEARN MORE

Inflight position duties include providing services to aircraft inflight or operating on the airport surface. Duties of the Inflight position are to:

- Monitor and restore NAVAIDs
- Issue airport advisories
- Relay ATC clearances, advisories, or requests
- Issue military flight advisory messages
- Receive and issue Notices to Airmen (NOTAMs)
- Assist in search and rescue 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
- Provide hazardous area reporting services
- Keep airmen and weather information current
- Apply VNR procedures as prescribed

Reference: 3120.4, App. 3

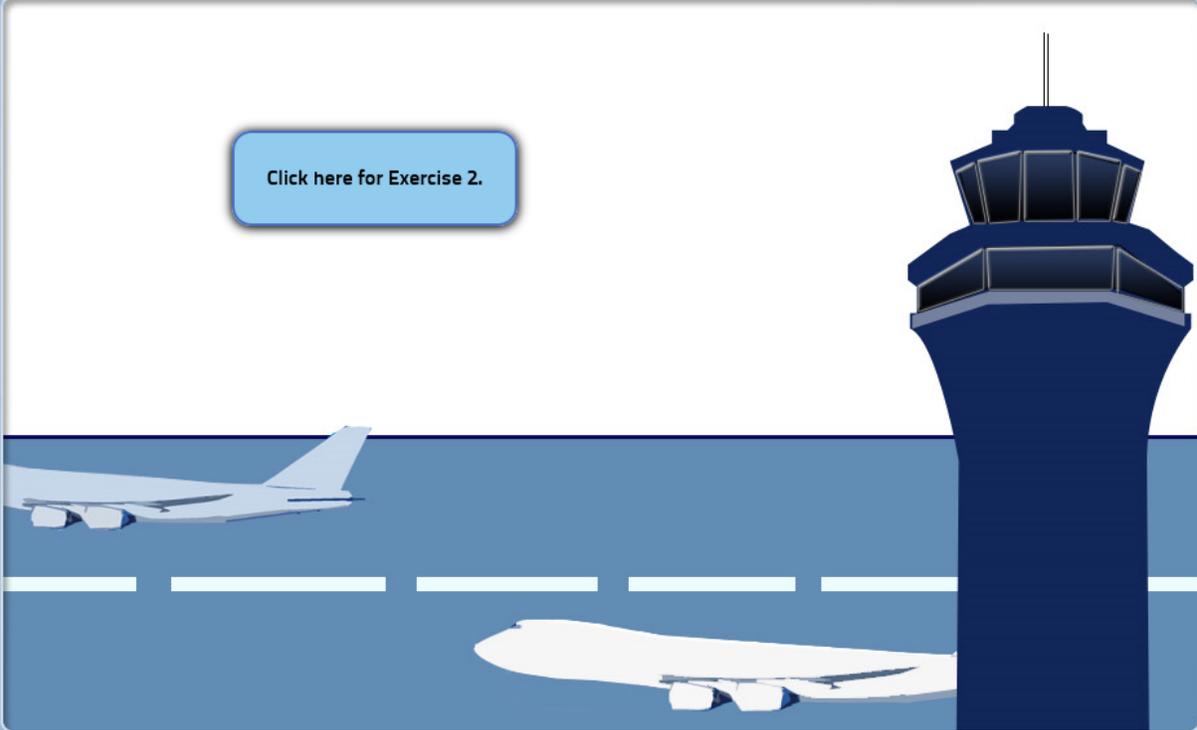


Exercise 2: AFSS Positions

BACK

NEXT

[Click here for Exercise 2.](#)





Terminal Facility Types

BACK

NEXT



AIRPORT TRAFFIC CONTROL TOWER (ATCT)

Provides ATC service to aircraft operating on or in the vicinity of the airport.

TERMINAL RADAR APPROACH CONTROL (TRACON)

Provides radar service to arriving, departing, and some en route aircraft.



Airport Traffic Control Tower (ATCT)

BACK

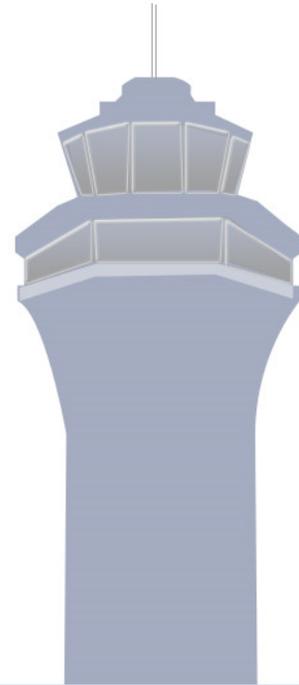
NEXT

Tower Services

The Airport Traffic Control Tower (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)

JO 7110.65, Chap. 2; AIM, Chaps. 4 and 5

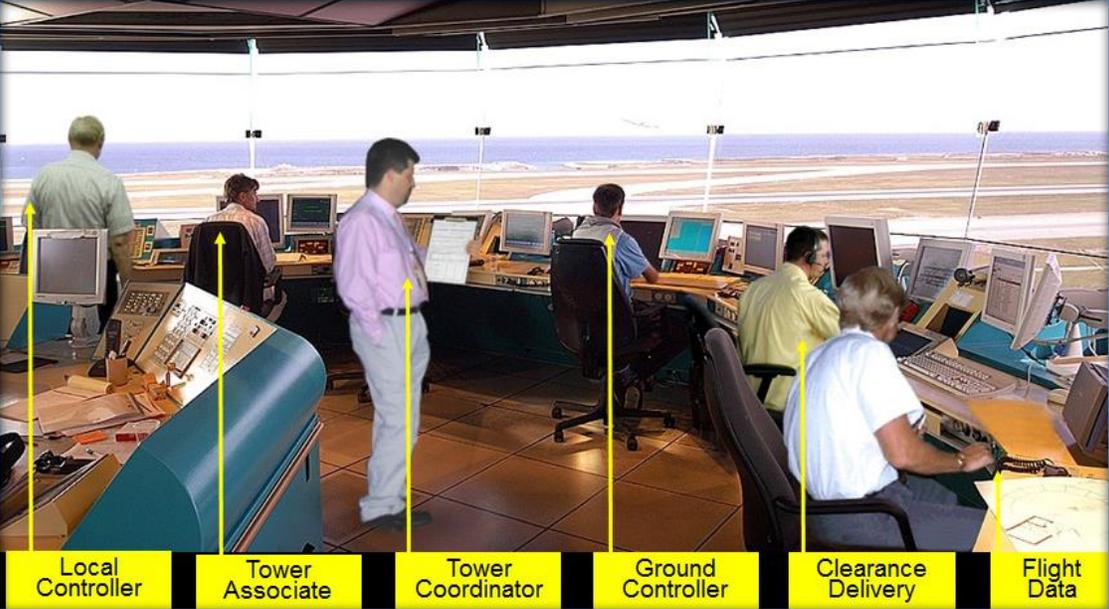


FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

ALL LESSONS FRAME: 38

Airport Traffic Control Towers (ATCT)

BACK NEXT



Local Controller Tower Associate Tower Coordinator Ground Controller Clearance Delivery Flight Data

Tower Team

LEARN MORE

There are six positions in the tower:

- Flight Data
- Clearance Delivery
- Local Control
- Ground Control
- Tower Coordinator
- Tower Associate
 - A particular tower may or may not use all positions.

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.
 - The intent of the team concept is not to hold the team accountable for the action of individual members in the event of an operational error/deviation.

Reference: 7110.65, Chap. 2



Airport Traffic Control Towers (ATCT)

BACK

NEXT

Flight Data (FD) Position

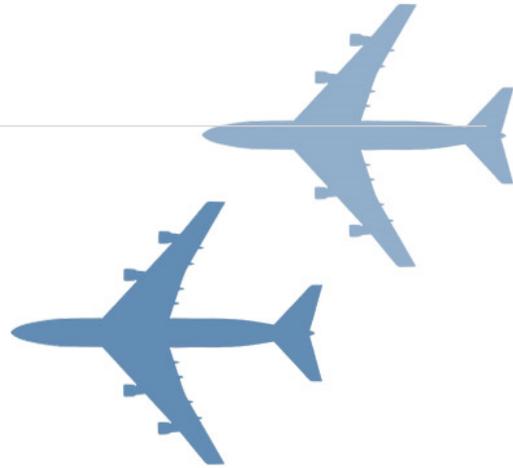
The Flight Data Controller assists the other air traffic controllers in the tower and performs the clerical duties inherent in the operation of any facility.

- 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 are to:

- Process and forward flight plan information
- Compile statistical data
- Observe and report weather information

JO 7110.65, Chap. 2





Airport Traffic Control Tower (ATCT)

BACK

NEXT

Clearance Delivery (CD) Position

The Clearance Delivery (CD) Controller is normally the first controller a pilot talks to when departing an airport.

CD position duties are to:

- Process and forward flight plan information
- Issue departure clearances and ensure accuracy of pilot readback
- Operate communications equipment

JO 7110.65, Chap. 2





Airport Traffic Control Tower (ATCT)

BACK

NEXT

Tower Positions (Local Control [LC] and Ground Control [GC])

The Ground Controller 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.

The Local Controller is primarily responsible for separating and providing safety alerts to aircraft in the airspace surrounding the airport and aircraft on the active runways.

Local Control and Ground Control positions exchange information for the safe and efficient use of runways and movements areas.

Only the Local Control and Ground Control have the distinction of being called the Tower Positions, and their duties are to:

- Ensure separation
- Initiate control instructions
- 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 which will assist in meeting situation objectives



JO 7110.65, Chap. 2 and 3



Airport Traffic Control Tower (ATCT)

BACK

NEXT

Tower Coordinator (CC) Position

Tower Coordinator Controller (also known as Cab Coordinator) 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 which 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.

JO 7110.65, Chap. 2





Airport Traffic Control Tower (ATCT)

BACK

NEXT

Tower Associate Position

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
- Maintain awareness of tower cab activities
- 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

JO 7110.65, Chap. 2



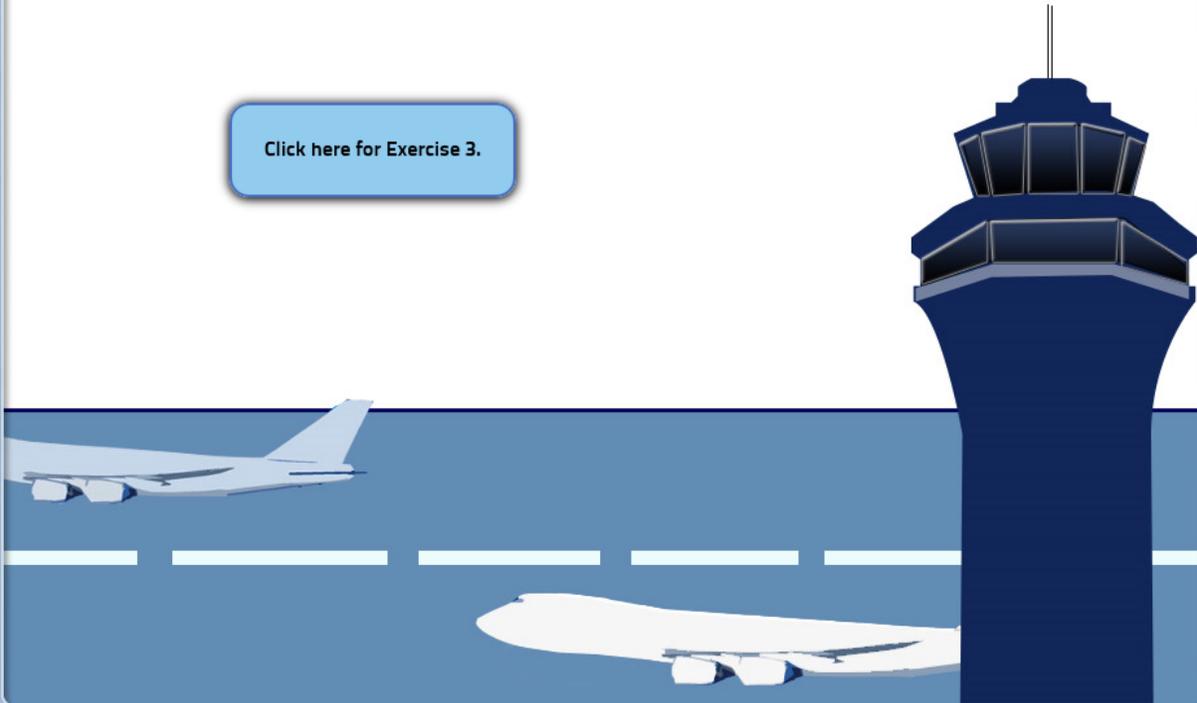


Exercise 3: ATCT Positions

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NEXT

[Click here for Exercise 3.](#)



FEDERAL AVIATION ADMINISTRATION

AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

ALL LESSONS FRAME: 45

Terminal Radar Approach Control (TRACON) Services

BACK NEXT

A Terminal Radar Approach Control (TRACONs) 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), USAF (RAPCONS), U.S. Army (ARAC), USN, USMC (RATCFs), or jointly by FAA and a military service.
- 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.



LEARN MORE

The TRACON location varies depending on the concentration of air traffic in the geographical location.

- In smaller metro areas, the TRACON may be located within or near the same structure as the Tower for the primary airport it serves (e.g., Oklahoma City TRACON is located near Oklahoma Will Rogers Tower).
- Others are located in an area remote from any airport, but serve several large metro areas. These are generally referred to as consolidated TRACONs or “Super-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 (e.g., Potomac TRACON is not located at any airport, but serves several large and small airports in the DC area).
- Where no TRACON exists (i.e., the traffic is not concentrated enough to warrant one) the ARTCC provides approach control services.

Reference: 7110.65, Pilot/Controller Glossary

FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

ALL LESSONS FRAME: 46

Terminal Radar Approach Control (TRACON) Services

BACK NEXT



Radar Controller Radar Associate Radar Coordinator Flight Data

Terminal Radar Team

LEARN MORE

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

- Radar Flight Data
- Radar Associate
- Radar Controller
- Radar Coordinator
 - A particular sector may or may not use all positions.

Reference: 7110.65, Chap. 2



Terminal Radar Approach Control (TRACON) Services

BACK

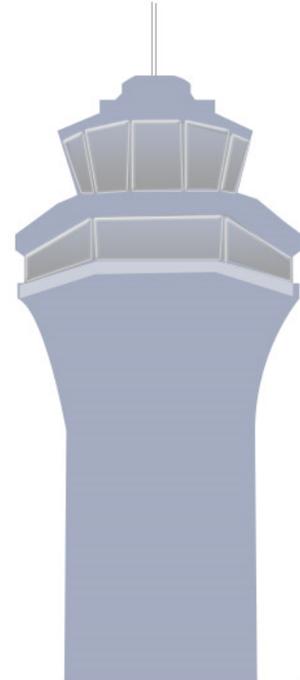
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Terminal Radar Team Concept and Intent

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.
 - The intent of the team concept is not to hold the team accountable for the action of individual members in the event of an operational accident/incident.

JO 7110.65, Chap. 2





Terminal Radar Approach Control (TRACON) Services

BACK

NEXT

Radat Flight Data Position

The responsibilities of the Flight Data Controller in the TRACON are similar to the Flight Data Controller in the Tower.

Responsibilities include:

- Processing and forwarding flight plan information
- Compiling statistical data

JO 7110.65, Chap. 2





Terminal Radar Approach Control (TRACON) Services

BACK

NEXT

RadAR Associate Position

The Radar Associate Controller provides assistance to the Radar Controller by relieving them of duties that are a distraction from the radar situation and communication with the pilots.

- The Radar Associate Controller works as a team with the Radar Controller and is particularly helpful during busy times.

RadAR Associate position duties are to:

- Ensure separation
- Initiate control instructions
- Maintain awareness of facility/sector activities
- Accept and initiate non-automated handoffs
- Assist the Radar position
- Coordinate
- Manage flight information
 - Scan flight strips to correlate with radar data
- Ensure that:
 - Computer entries are completed
 - Stripmarking is completed

JO 7110.65, Chap. 2



Terminal Radar Approach Control (TRACON) Services

BACK

NEXT

RadAR Controller Position

The Radar Controller uses the radar display and air-to-ground frequencies to separate and sequence all aircraft in the sector's airspace.

- Radar Controllers are usually identified according to the phase of flight they work (i.e., arrival, departure, final).

RadAR position duties are to:

- Ensure separation
- Initiate control instructions
- Accept and initiate automated handoffs
- Assist the Radar Associate position with nonautomated handoffs
- Assist the Radar Associate position with coordination
- Scan the radar display
 - Correlate with flight progress strip information
- Ensure that:
 - Computer entries are completed
 - Stripmarking is completed
- Adjust equipment at Radar position to be usable by all members of the team

JO 7110.65, Chap. 2



Terminal Radar Approach Control (TRACON) Services

BACK

NEXT

Radars Coordinator Position

Radars 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 which 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.

JO 7110.65, Chap. 2

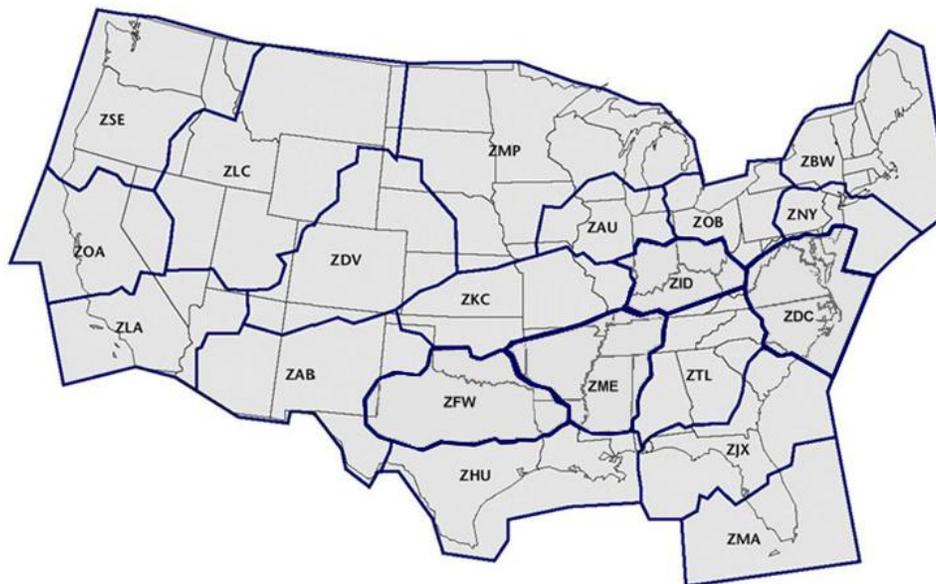




Air Route Traffic Control Center (ARTCC)

BACK

NEXT



Air Route Traffic Control Center (ARTCC) Airspace

LEARN MORE

An **Air Route Traffic Control Center (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 controller must be proficient in all of the sectors in his or her area and can be called on to work any or all sectors of that area.

References:

- 7110.65, Pilot/Controller Glossary
- Aeronautical Information Manual (AIM), Chap. 4

FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC)

ALL LESSONS FRAME: 63

BACK NEXT



En Route Sector Team

LEARN MORE

There are four basic positions in the ARTCC:

- Radar Flight Data
- Radar Associate
- Radar
- Radar Coordinator
 - A particular ARTCC may or may not use all positions.

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.
 - A sector is an area of control jurisdiction within a center that has a given airspace.
- The team as a whole has responsibility for the safe and efficient operation of that sector.
 - The intent of the team concept is not to hold the team accountable for the action of individual members in the event of an operational accident or incident.

Reference: 7110.65, Chap. 2



Air Route Traffic Control Center (ARTCC)

BACK

NEXT

RadAR Flight Data Position

RadAR Flight Data position duties are to:

- Assist Radar Associate position in managing flight progress strips
- Receive, process, and distribute flight progress strips
- 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 flight data into computer
- Forward flight data via computer
- Assist facility/sector in meeting situation objectives

JO 7110.65, Chap. 2





Air Route Traffic Control Center (ARTCC)

BACK

NEXT

RadAR Associate Position

RadAR Associate position (often called "D side") duties are to:

- Ensure separation
- Initiate control instructions
- Accept and initiate handoffs via landline communications and to ensure the Radar position is made aware of the actions
- Assist Radar position by accepting or initiating automated handoff(s), and to ensure that the Radar position is made immediately aware of any action taken
- Coordinate, including point outs
- Scan User Request Evaluation Tool (URET) display (URET is an automated flight data management tool, commonly referred to as "electronic strips.")
- Scan and manage flight progress strips
 - Correlates URET/Flight progress strips with radar data
- Ensure that:
 - Computer entries are completed
 - URET display information is managed
 - Stripmarking is completed
 - Instructions issued or received by the Radar position are entered when aware of those instructions

JO 7110.65, Chap. 2



Air Route Traffic Control Center (ARTCC)

BACK

NEXT

RadAR Position

RadAR (R) Controller 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, utilizing radar information
- Maintain direct communication with aircraft
- Accept and initiate handoffs/automated
- Assist the Radar Associate position
- Assist the Radar Associate position in coordination when needed
- Scan radar display
 - Correlate with URET and flight progress strip information
- Ensure computer entries are completed
- Ensure stripmarking is completed

JO 7110.65, Chap. 2



Air Route Traffic Control Center (ARTCC)

BACK

NEXT

RadAR Coordinator Position

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 the safe and efficient operation of the sector
- Perform any functions of the En Route Sector Team which will assist in meeting situation objectives, including accepting and initiating handoffs

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.

JO 7110.65, Chap. 2



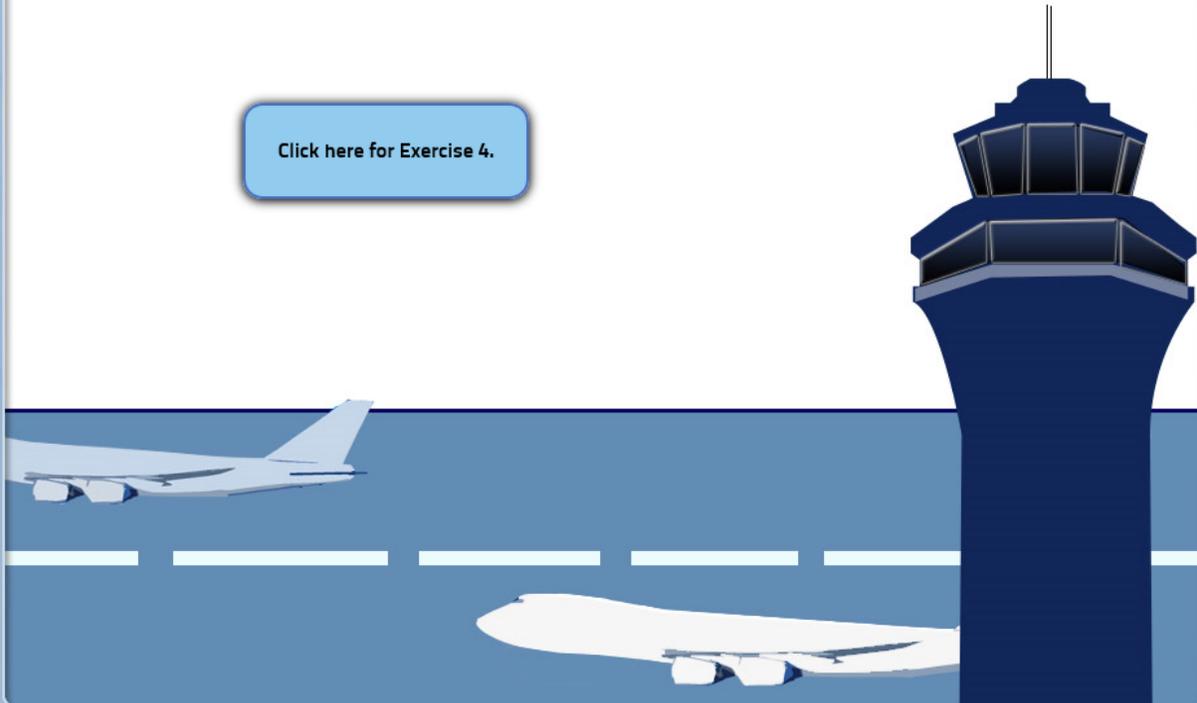


Exercise 4: TRACON/ARTCC Radar Team Positions

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NEXT

[Click here for Exercise 4.](#)

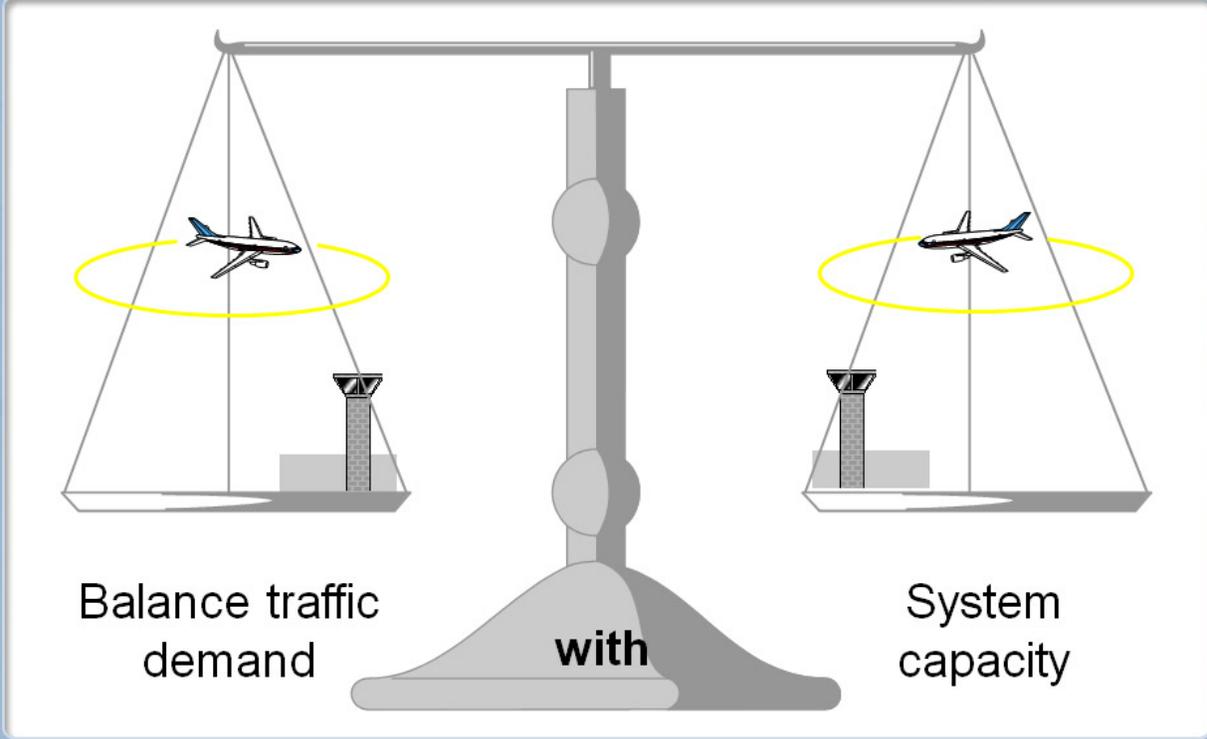


FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

ALL LESSONS FRAME: 59

Traffic Management System (TMS)

BACK NEXT



Balance traffic demand **with** System capacity

LEARN MORE

The mission of the Traffic Management System (TMS) is to balance air traffic demand with the system's capacity to ensure that the maximum efficient utilization of the NAS is maintained.

The Air Traffic Control System Command Center (ATCSCC) directs the operation of the TMS.

- Located in Warrenton, VA (near Washington, DC)
- Office of primary interest on a national level

Traffic Management Units (TMUs) are located in:

- All ARTCCs
- Busier terminal facilities
 - The primary function of the Traffic Management Unit (TMU) is to monitor and balance traffic flows within their area of responsibility in accordance with traffic management directives.

Reference: 7210.3, Chap. 17

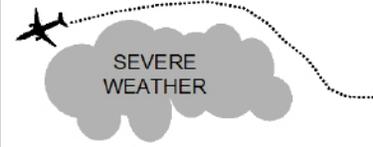
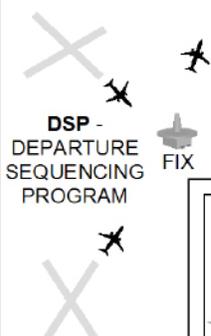
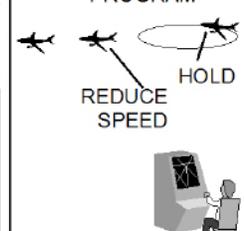
AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

ALL LESSONS FRAME: 80

Traffic Management System (TMS)

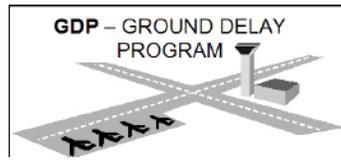
BACK NEXT

TRAFFIC MANAGEMENT PROGRAMS

| | |
|--|--|
| <p style="text-align: center;">REROUTES</p>  | <p style="text-align: center;">ESP – EN ROUTE SEQUENCING PROGRAM</p>  |
| <p style="text-align: center;">DSP – DEPARTURE SEQUENCING PROGRAM</p>  | <p style="text-align: center;">ASP – ARRIVAL SEQUENCING PROGRAM</p>  |

GROUND STOP!

GDP – GROUND DELAY PROGRAM



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Traffic Management Programs

[LEARN MORE](#)

Traffic management programs are one of several processes administered by the ATCSCC to achieve optimum use of the NAS and minimize delays without increasing controller workload.

They include:

- Departure Sequencing Program (DSP)
 - DSP assigns a departure time to achieve a constant flow of aircraft departing several airports that will fly over a common point.

Reference: 7210.3, Chap. 17, Pilot/Controller Glossary



Traffic Management System (TMS)

BACK

NEXT

- En Route Sequencing Program (ESP) assigns departure times that will facilitate integration into the en route traffic stream.
- Arrival Sequencing Program (ASP) is an automated program designed to assist in sequencing aircraft destined for the same airport by assigning times for aircraft to cross the arrival metering fixes.
- Ground Delay Program (GDP) is a traffic management process administered by ATCSCC whereby aircraft are held on the ground until a specified time.
 - The purpose is to limit airborne holding.
- Reroutes are ATC routings other than the filed flight plan.
 - Designed to ensure aircraft operate with the flow of traffic
 - Keep aircraft clear of special use airspace
 - Keep aircraft away from congested airspace
 - Avoid areas of known weather where aircraft are deviating or refusing to fly
- Ground Stops (GS) are the most restrictive method of traffic management, and override all other traffic management programs.
 - Implemented with little or no warning
 - Keep aircraft on the ground based on specific criteria, such as departure or destination airport, airspace restrictions, or aircraft type
 - Aircraft may not be released without the approval of the originator of the ground stop.

Traffic Management Initiatives (TMI) and programs do not have priority over maintaining:

- Separation of aircraft
- Procedural integrity of the sector

JO 7110.65, Chap. 11, Pilot/Controller Glossary; JO 7210.3, Chap. 17

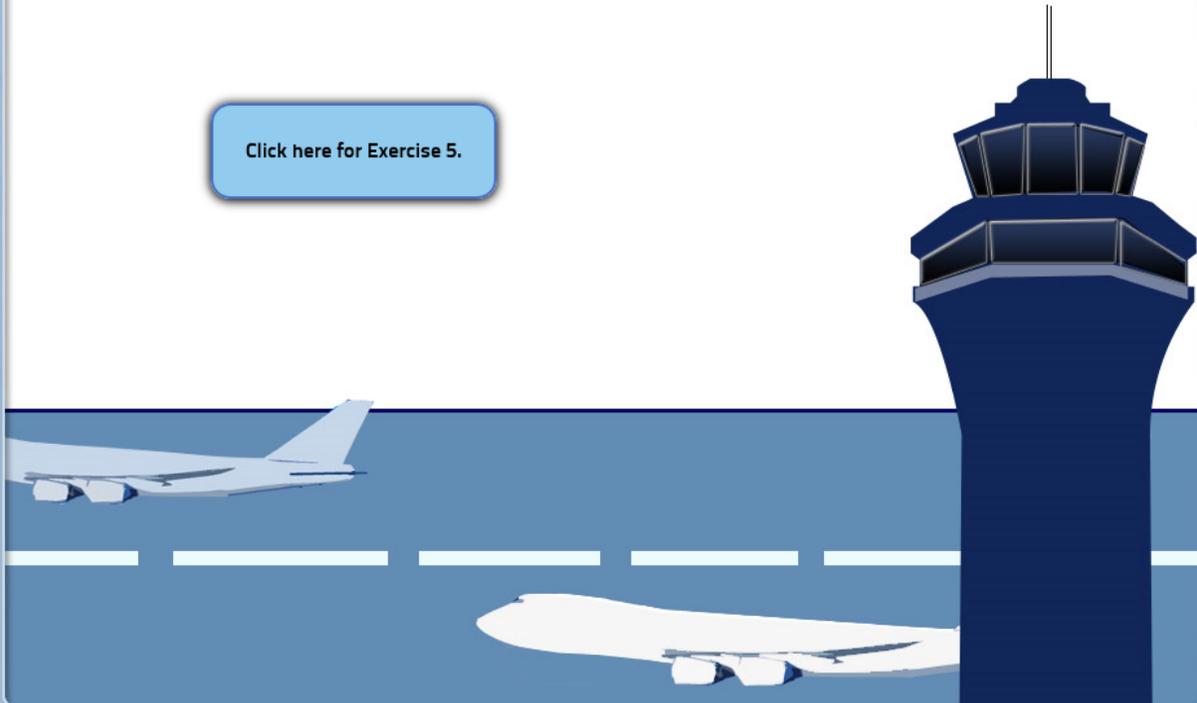


Exercise 5: Traffic Management System (TMS)

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NEXT

[Click here for Exercise 5.](#)





National Airspace System (NAS)

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NEXT

NAS Overview

As mentioned earlier in the lesson, the NAS includes every person and thing required to successfully get a plane from one location to another.

The NAS is predominately owned, operated, and maintained by the FAA with DOT involvement.

The NAS cannot be described in terms of an end-state system; it is always changing.

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, and decision making tools.



National Airspace System (NAS)

BACK

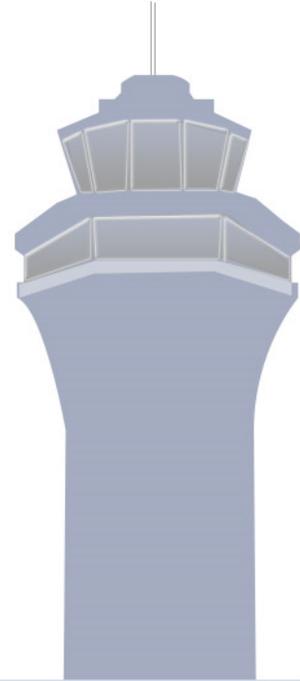
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NAS Components

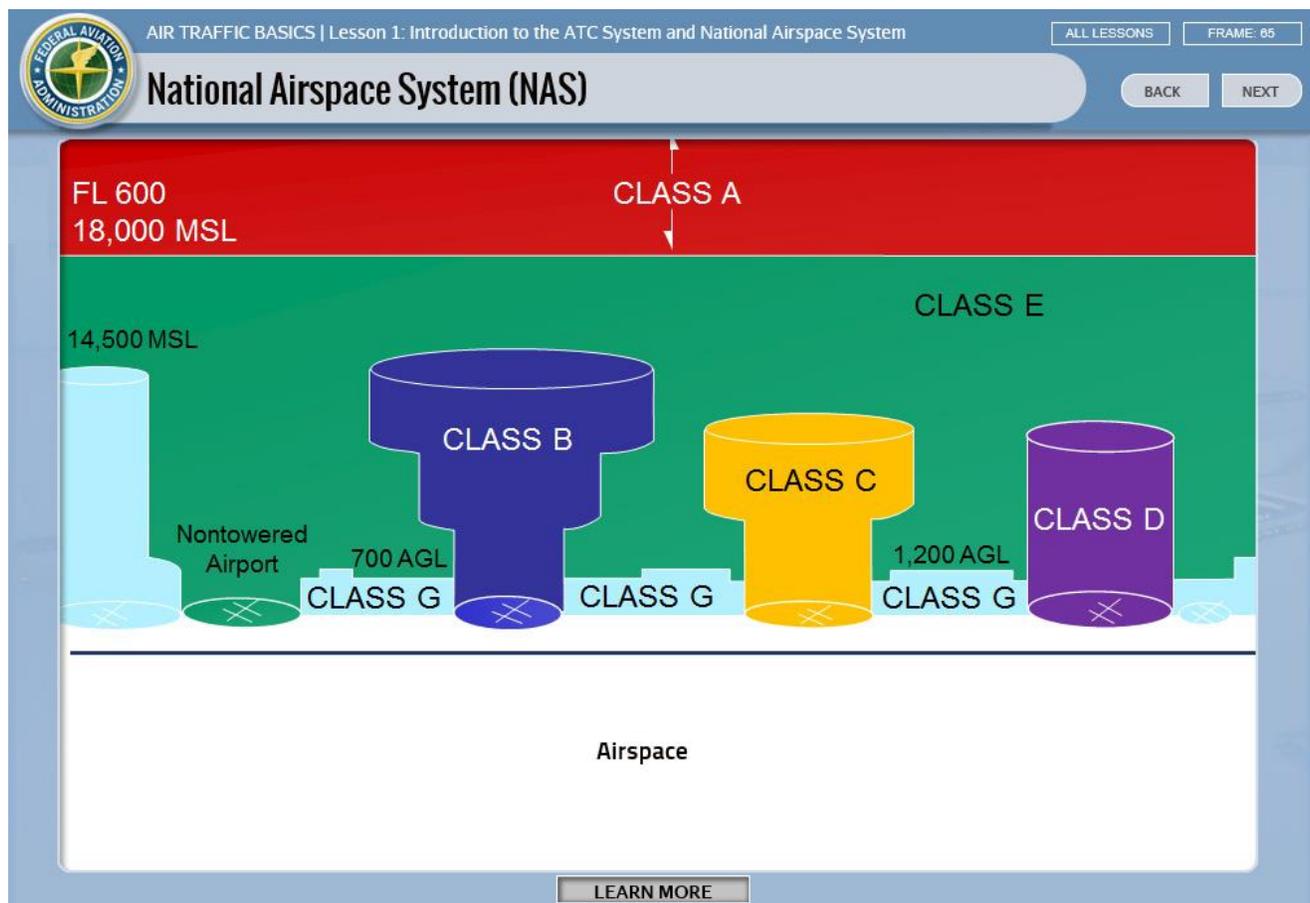
The NAS is a common network of U.S.:

- Airspace and ATS Routes
- Navigational Aids (NAVAIDs)
- Airports or landing areas
- Aeronautical charts
- Rules, regulations, and procedures
- Personnel and equipment

In this section, we will discuss some of the components of the NAS.



JO 7110.65, Pilot/Controller Glossary



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 IFR 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.

Reference: AIM, Chap. 3, Glossary

AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

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National Airspace System (NAS)

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Air Traffic Service (ATS) Routes

LEARN MORE

“ATS routes” is a generic term used to identify the various types of routes and airways used by pilots for navigation.

- There are two primary types of ATS routes used by pilots.
 - VOR airways, also called “Victor” airways, and RNAV “Tango” routes, which are used for navigation below 18,000 feet MSL
 - Jet routes, and RNAV “Q” routes, which are used for navigation between FL180 and FL450

References:

- 7110.65, Pilot/Controller Glossary
- AIM

AIR TRAFFIC BASICS | Lesson 1: Introduction to the ATC System and National Airspace System

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National Airspace System (NAS)

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The diagram illustrates the National Airspace System (NAS) with a focus on navigation aids. On the left, a map of North America shows several ground-based navigation aids (NAVAIDs) represented by yellow beacons with 'VOR' labels. These beacons are interconnected by yellow lines, forming a network. The text 'GROUND BASED' is written in yellow below the map. On the right, a satellite is shown in space, labeled 'SATELLITE BASED'. Below the map and satellite, the text 'NAVAIDs' is centered, followed by the statement 'NAVAIDs are a vital part of the NAS.' and a 'LEARN MORE' button.

NAVAIDs
NAVAIDs are a vital part of the NAS.

LEARN MORE

They are used to:

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

NAVAIDs can be ground-based or satellite-based.

VORs and VORTACs are the primary NAVAIDs for the nation's airways.

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

Reference: 7110.65, Pilot/Controller Glossary



National Airspace System (NAS)

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NEXT



Airport/Landing Area Definition

An airport or a landing area is an area on land or water used or intended to be used for the landing and takeoff of aircraft.

LEARN MORE

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 (e.g., different colored lights that pinpoint where runways and taxiways are at night, directional signs, pavement markings).

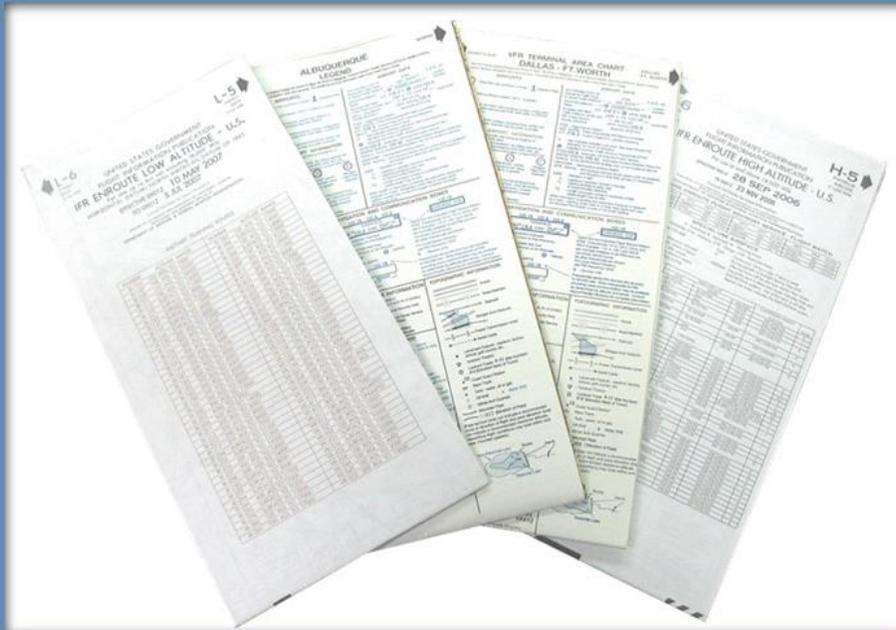
Reference: 7110.65, Pilot/Controller Glossary



National Airspace System (NAS)

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NEXT



Aeronautical Charts

[LEARN MORE](#)

Aeronautical charts are also part of the NAS.

- Aeronautical charts outline airways, mark boundaries of classes of airspace, provide airport information, and show NAVAIDs, obstacles, and landmarks on the ground.

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

References:

- 7110.65, Pilot/Controller Glossary
- AIM



National Airspace System (NAS)

BACK

NEXT



Rules, Regulations, and Procedures

[LEARN MORE](#)

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



National Airspace System (NAS)

BACK

NEXT



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.



Terms, Phrases and Pronunciation

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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.

For example:

"ALTIMETER, TWO NINER NINER TWO"



Conclusion

BACK

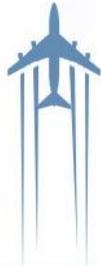
NEXT

Lesson Summary



This lesson covered:

- FAA History
- FAA Organization
- Air Traffic Control (ATC) System
- Visual Flight Rules (VFR) and Instrument Flight Rules (IFR)
- Air Traffic Facilities
- Automated Flight Service Stations (AFSSs)
- Airport Traffic Control Towers (ATCTs)
- Terminal Radar Approach Controls (TRACONs)
- Air Route Traffic Control Centers (ARTCCs)
- Air Traffic Control
- Traffic Management System (TMS)
- National Airspace System (NAS)
- Terms, Phrases and Pronunciations





Resources

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Click here to access all the Appendices for Lesson 1.

