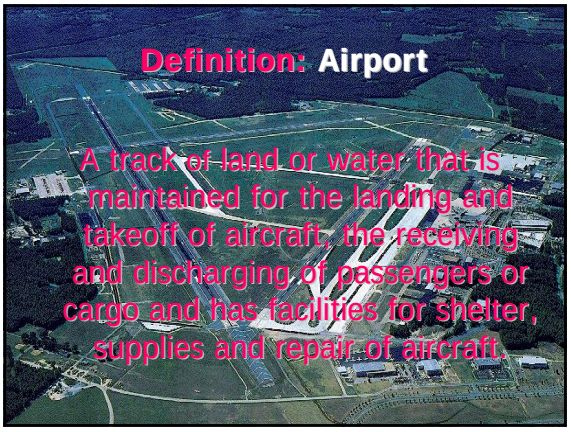
Lesson Objectives

- NFPA 1003 Standard for Airport Fire Fighter Professional Qualifications, 1999 Edition
  - 3-2.1 & 3.2.2
- Federal Aviation Regulations, Part 139, January 1, 1988
  - 139.311 & 139.315 & 139.319

Introduction

Responding to an aircraft emergency on the airport brings new rules for vehicle operation. Since time is critical in any response, Aircraft Rescue Fire Fighting personnel need to be familiar with their airport and it's operations.

Having knowledge of the airport will help insure that those critical seconds needed at the beginning of an incident will count.



Airport Certification

- Federal Aviation Regulations, Part 139, Certification and Operations: Land Airports Serving Certain Air Carriers

Part 139 for ARFF

- 139.315 Aircraft Rescue & Firefighting: Index Determination
- 139.317 Aircraft Rescue & Firefighting: Equipment and Agents
- 139.319 Aircraft Rescue and Firefighting: Operational Requirement

Part 139.315, Index Determination

- The Index of an Air Carrier Airport is determined by a combination of:
  - The length of air carrier aircraft expressed in groups
  - The average daily departures of air carrier aircraft
  - Based on Passenger Aircraft Only

Index Determination

- Index A
  - less than 90 feet (DeHavilland Dash 8)
- Index B
  - 90 feet to 126 feet (Boeing 737-500)
- Index C
  - 126 feet to 159 feet (Boeing 757-200)

Index Determination

- Index D
  - 159 feet to 200 feet (DC-10)
- Index E
  - 200 feet or greater (Boeing 747-400)
- Some aircraft may have models that will appear in more than one category.

Index Determination

- If there are 5 or more average daily departures of air carrier aircraft in a single index group serving the airport, the longest index group with an average of 5 or more daily departures is the index required for the airport.

Index Determination

- If there are less than 5 average daily departures of air carrier aircraft in a single group serving that airport, the next lower Index from the longest Index group with air carrier aircraft in it, is the Index required for the airport. The minimum designated Index should be Index A.

Military Requirements

- May differ by Service Branch
  - Army: Army Regulations
  - Air Force: Technical Orders
  - Navy & Marines: NATOPS
- Some airports may be joint usage and have FAA and military requirements.

Air Traffic Control Tower (ATC)

- The ATC also directs communication between the activating authority and the airport fire station
- The primary function of the ATC is to regulate aircraft movement both in the air and on the ground
- ATC's also control vehicle movement on or across runways and taxiways

ATC Emergency Responsibilities

- During emergencies, control tower personnel should route emergency vehicles to the accident site or to stand-by points at runway (This will very depending on local procedures)
- Communication with ATC is generally accomplished thought the use of two-way radio

Vehicle Movement

- Only operators designated by authorized approving authority will be given access to flight lines

Vehicle Movement Hazards

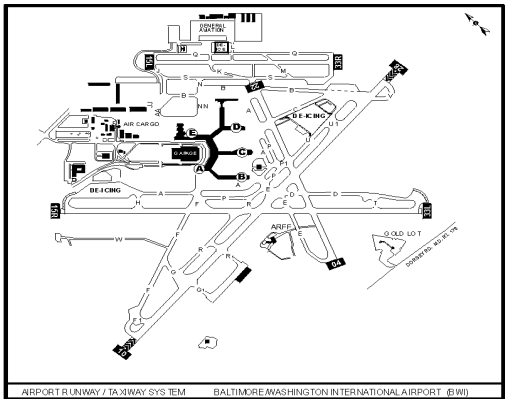
- Aircraft
- Clearance (Height)
- Speed
- Surface
- Visibility

General Rules For Vehicle Operation Around Aircraft

- Do not pass under any parts of aircraft
- Approach aircraft with the drivers side of the vehicle to the aircraft
- Do not approach aircraft closer than 25 feet to the front or 200 feet of the rear when engines are running (General Rule)
- Speeds of 15 mph on flight line and 5 mph near aircraft should be maintained
- WATCH FOR TAXIING AIRCRAFT
- Dim headlights around moving aircraft

The Movement Areas

- Runway
  - The area of an airport used for the take off and landing of aircraft
- Taxiway
  - A paved area of an airport extending from a runway to the terminal or ramp
- Ramp
  - An area of an airport used for parking aircraft



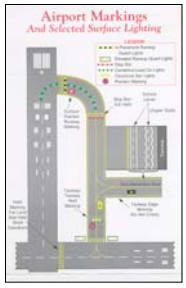
AIRPORT RUNWAY / TAXIWAY SYSTEM BALTIMORE/WASHINGTON INTERNATIONAL AIRPORT (BWI)

Surface Movement Guidance and Control System (SMGCS)

- In order to enhance taxing capabilities in low visibility conditions and reduce the potential for runway incursions, improvements have been made in signage, lighting, and markings.
- In addition to these improvements, Advisory Circular (AC) 120-57, Surface Movement Guidance and Control System more commonly known as SMGCS (acronym pronounced as “SMIGS”) requires a low visibility taxi plan for any airport which has takeoff or landing operations with less than 1,200 feet runway visual range (RVR) visual conditions.

Surface Movement Guidance and Control System (SMGCS)

- This plan affects both air crew and vehicle operators. Taxi routes to and from the SMGCS runway must be designated and displayed on a SMGCS Low Visibility and Taxi Route Chart.



Control Tower Signals

- Radio Communications
  - Comply with flight line traffic instructions received from the tower
  - Get permission from the control tower prior to entering or crossing runways, regardless if they are in use or not
  - Maintain radio/visual contact with the tower at all times while on the flight line in case of unexpected aircraft movement, landing, or emergency

Control Tower Signals

- Light Signals
  - Used when radio communications are not functioning or not available
  - Used to control flight line vehicle traffic across active runway

Control Tower Signals

- Light Signals
  - The following light signals are used for the movement of vehicles, equipment, and personnel on the ground. They may have other meanings for aircraft on the ground or in flight.

Control Tower Light Signals

Control Tower Light Signals


Control Tower Light Signals
STEADY RED
STOP


Control Tower Light Signals
FLASHING RED
CLEAR THE TAIXWAY/RUNWAY


Control Tower Light Signals
FLASHING WHITE
RETURN TO STARTING POINT ON AIRPORT

Control Tower Light Signals

AIRPORT
Lighting Systems
Surface Markings
& Signs

Color Code System for Airport Lighting

- Blue Lights
  - Taxiways and ramp edges, usually 100 feet apart

Color Code System for Airport Lighting

- White Lights
  - Runways, usually 200 feet apart

Color Code System for Airport Lighting

- Green Lights
  - "Threshold" lights, used to mark the beginning of a landing surface, red at opposite end or the runway, usually 5 lights equal distance apart

Color Code System for Airport Lighting

- Green Lights
  - Can also be used as taxiway centerline lighting.

Color Code System for Airport Lighting

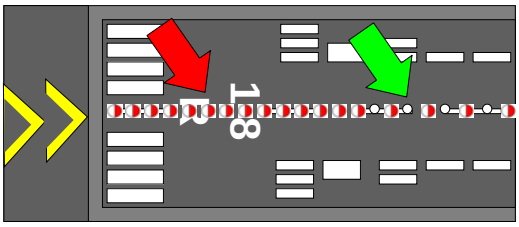
- Red Lights
  - used to mark obstructions such as buildings, parked aircraft, unserviceable areas, construction, taxiway boundaries etc..

Color Code System for Airport Lighting

- Amber Lights
  - Used to mark the departure end of the runway is use; spaced 200 feet apart, can also be used to mark taxiway centerline intersections

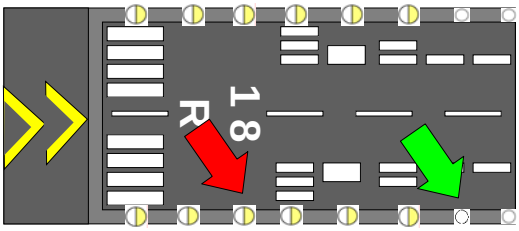
Centerline Lights

White: Alternating Red and White from 3,000' to 1,000'
Red from 1,000' to end of Runway
(Spaced 50' apart)



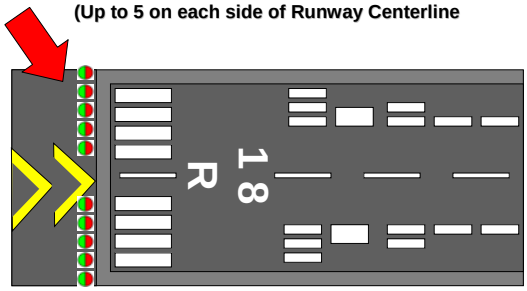
Runway Lighting

Edge Lights
White: Amber from 2,000' to end of Runway
(Spaced 200' apart)



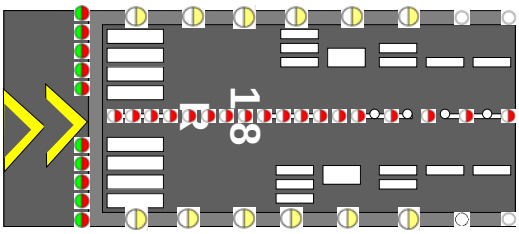
Runway Lighting

Threshold Lights
Red/Green
(Up to 5 on each side of Runway Centerline



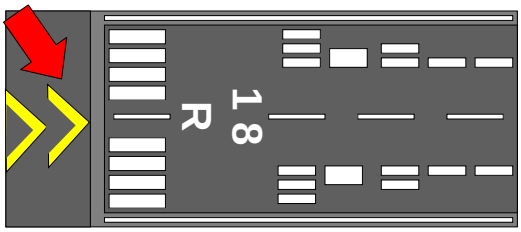
Runway Lighting

Runway Lighting
The types of runway lights may vary by airport and the type of visibility they can operate in.



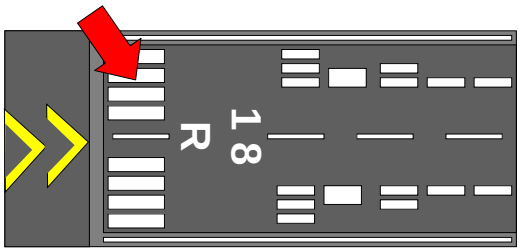
Runway Lighting

Chevron
Points to the landing threshold



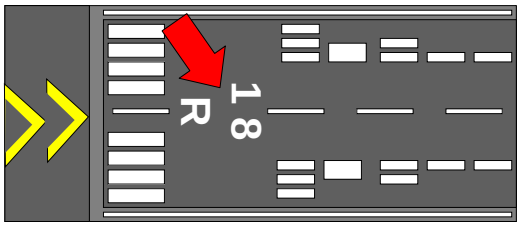
Runway Markings

Threshold Markers
150' x 12'



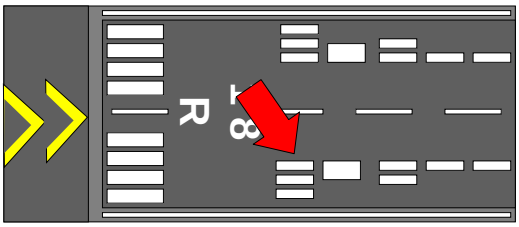
Runway Markings

Runway Designation



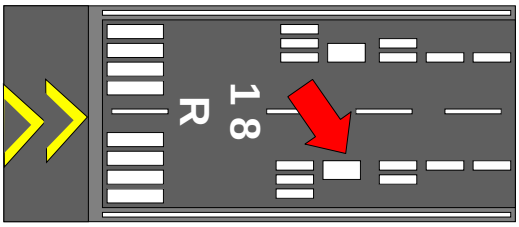
Runway Markings

Touchdown Zone Marker
75' Long



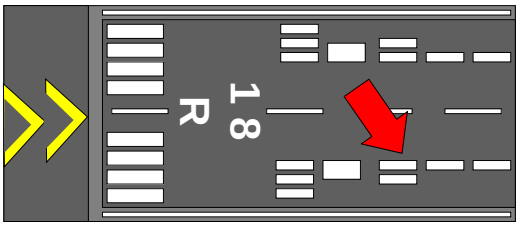
Runway Markings

Fixed Distance Marker
150' Long



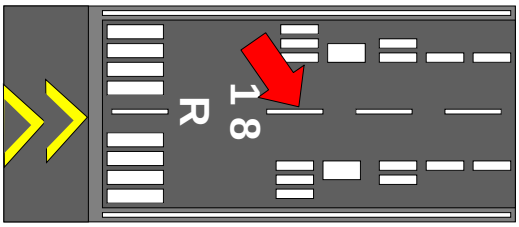
Runway Markings

Touchdown Zone Markers
75' Long



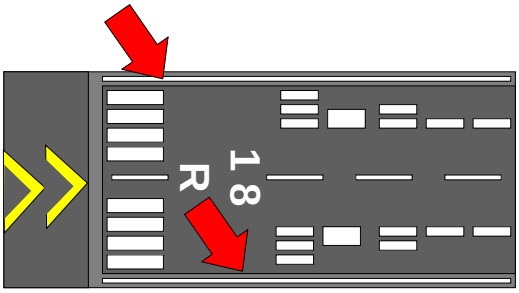
Runway Markings

Runway Centerline Marking
120’ Long with 80’Gaps
36” Wide



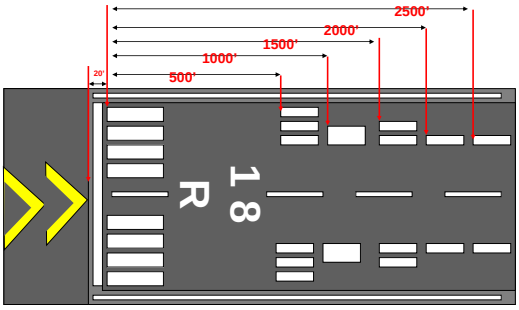
Runway Markings

Runway Edge Marking
36” Wide



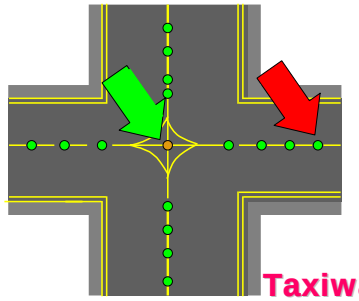
Runway Markings

Distances Between Markings



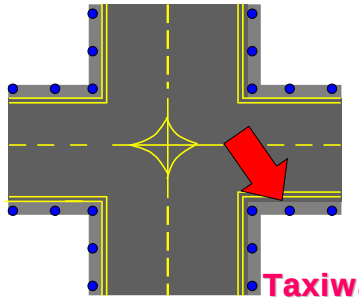
Runway Markings

Centerline
Green - Spaced 50' Apart and 1 Amber light denoting the center of the intersection



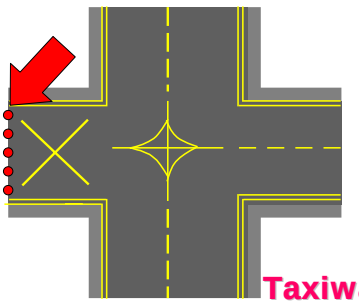
Taxiway Lighting

Edge Lights
Blue - Spaced 100' Apart



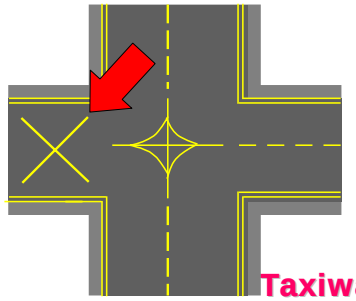
Taxiway Lighting

Denied Access
Red - 5 lights spaced evenly



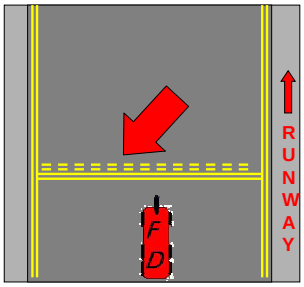
Taxiway Lighting

Denied Access
Yellow Painted "X"



Taxiway Markings

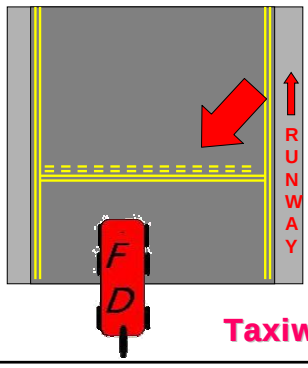
Hold Bar



A hold bar is like a stop sign for all vehicles or aircraft using the taxiways. One side of the bar is a solid line, the opposite side is a dashed or broken line. When approaching a hold bar from the solid side, the vehicle or aircraft is required to stop. When approaching from the dashed side, the hold bar is not applicable.

Taxiway Markings

Hold Bar



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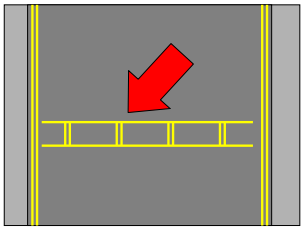
Taxiway Markings

ILS Critical Area



ILS (Instrument Landing System) Critical Area Hold Position: Hold short of ILS approach critical area.

Taxiway Markings

Taxiway/Runway Hold Position

Hold short of runway on taxiway.

Airport Signs

Multi-Purpose Signs

Some signs can include both runway and taixway information

Airport Signs

Runway/Runway Hold Position

Hold short of intersecting runway.

Airport Signs

Runway Approach Hold Position

Hold short for aircraft on approach.

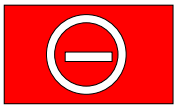
Airport Signs

ILS Critical Area Hold Position

Hold short of ILS approach critical area.

Airport Signs

No Entry



Identifies paved areas where aircraft entry is prohibited.

Airport Signs

Taxiway Location

Identifies taxiway on which vehicle/aircraft is located.

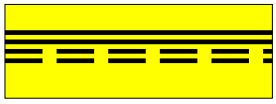
Airport Signs

Runway Location

Identifies runway on which vehicle/aircraft is located.

Airport Signs

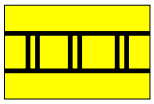
Runway/OZF Boundary



Exit boundary of runway protected areas.

Airport Signs

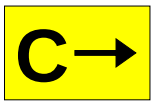
ILS Critical Area Boundary



Exit boundary of ILS Critical area.

Airport Signs

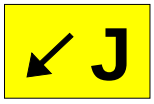
Taxiway Direction



Defines direction and designation of intersecting taxiway(s).

Airport Signs

Runway Exit



Defines direction and designation of exit taxiway from runway.

Airport Signs

Outbound Destination

Defines directions to take-off runways.

Airport Signs

Inbound Destination

Defines directions for arriving aircraft.

Airport Signs

Taxiway Ending Marker

Indicates taxiway does not continue.

Airport Signs

Runway Distance Marker

Indicates the remaining distance to the end of a runway (in thousands of feet).

Airport Signs

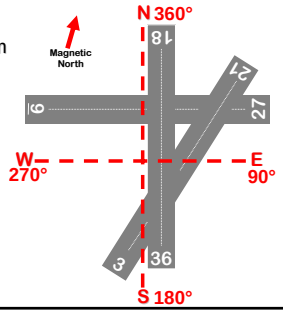
- White - Used for runway identifier numbers, letters, landing zone bars, and center line stripes
- Yellow - Used for hold bars and taxiways

Runways

- Those areas of the airport designed for landing, takeoff, and surface maneuvering of aircraft. They can be anything from a grass strip to a paved strip with lights and sophisticated landing instrumentation

Runway Numbering System

- Taken from compass bearings which run from 0° to 360 °
- 0 ° or 360 ° = North
- 90 ° = East
- 180 ° = South
- 270 ° = West
- Always drop the last number, i.e., 360 °=36



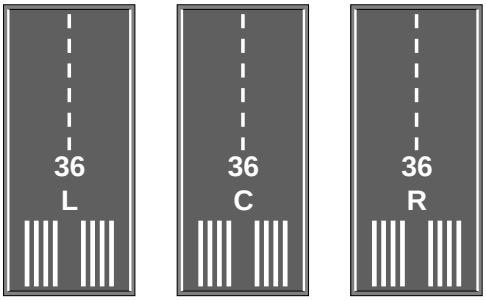
Runway Numbering System

- There is always a difference of 180 ° between opposite ends of the same runway; for instance runway 18 /36
- When the numbers of the runway are 6 or 9, a bar is placed under the base of the number to avoid confusion; i.e., 6 or 9

Runway Numbering System

- Letters distinguish between parallel runways, i.e., 36L (36 Left), 18R (18 Right), three parallel would have a center runway, i.e., 18C (18 Center)

Runway Lettering



Runway Markings

Arresting Barriers

- Arresting barriers are devices used to stop aircraft in an emergency. They are primarily found for use with military aircraft
  - The primary purpose of arresting barriers is the save lives
  - The secondary purpose is to minimize damage to aircraft

Arresting Barriers

Arresting Barriers

Emergency Egress Points

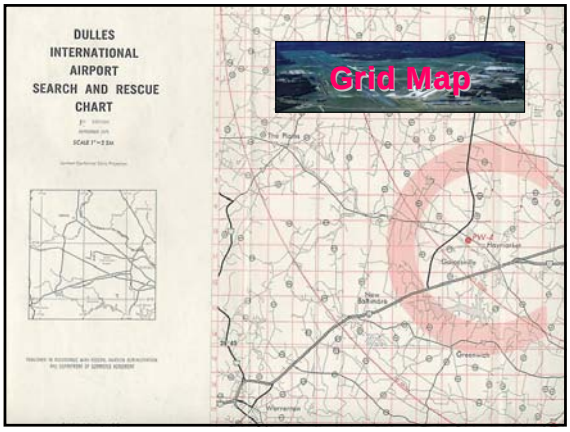
- Emergency Egress Points are usually cleared areas at the ends of runways (sometimes called the “overrun”) which very in length and are used to stop aircraft that fail to stop at the end of the runway during landing or takeoff

Breakaway Fences

- Breakaway fences are frangible gates or fence sections designed to allow rapid penetration by rescue and firefighting equipment to gain access to areas outside the airport/airfield boundary

Grid Maps

- Used by ARFF crews to locate downed aircraft on or near an airport
- Usually 5 to 15 mile radius of airport
- Should include landmarks, bodies of water, roads, bridges, as well as terrain features
- Can also be used to identify buildings is structural responses



Terrain and Travel Routes

- The biggest problem with aircraft incidents can simply be in locating the site of the crash or incident. Since time is a critical factor in aircraft incidents, response times must be kept to a minimum. This can be done through identifying routes of travel and terrain. This is considered pre-incident planning.

Terrain around the airport may be difficult, even for vehicles with off road capabilities.

Terrain and Travel Routes

- Determine areas where incidents are likely to occur. Some things to consider are:
  - Air Traffic Regulations
  - Air Traffic Patterns
  - Accident Records
  - Lessons From Other Incidents

Terrain and Travel Routes

- Terrain Considerations
  - Study Terrain in Advance of Incidents
  - Locate Obstacles in Advance
  - Locate Hard to Reach Areas
  - Indicate Quickest and Safest Routes
  - Check Ground Surfaces for Stability
  - Plan Alternate Routes of Travel

Terrain and Travel Routes

Airport Security Systems

- Federal Aviation Regulations Part 107
- Complicates Fire Protection by Preventing Access and Increasing Response Times
- Varies by Airport
- Military Security Considerations

Vehicle and other security areas may slow response times. Many security areas are required by the FAA or DOD by law and are unavoidable, even in an emergency.

Fuel Distribution Systems

- Fuel Storage Tanks
  - Above Ground
  - Below Ground
  - Pipeline Resupply

Fuel Distribution Systems

- Fuel Delivery Systems
  - Fuel Truck Delivery
  - Below Ground Piping System
  - Bonding and/or Grounding

Drainage Systems

- NFPA 15: Aircraft Fueling Ramp Drainage
  - Specifies Drainage System Requirements
  - Hazards of De-Fueling Operations
  - Local, State Federal, Regulations

Know where the drains lead.

Hazardous Materials

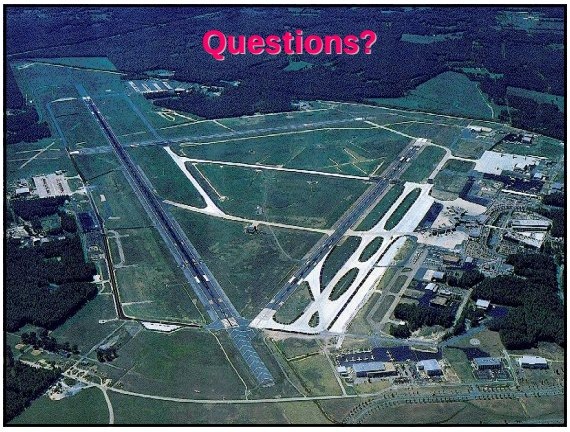
- Storage Areas
- Cargo Areas
- Materials Typically Shipped

Water Distribution Systems

- Domestic Needs
- Industrial Needs
- Fire Protection Needs

Water Distribution Systems

- Water Supplies for Fire Operations
  - Water Storage Facilities
  - Water Distribution System (At airport)
  - Alternate Water Supplies


Questions?