

FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC BASICS | Lesson 22: Introduction to Emergencies

ALL LESSONS FRAME: 1

Introduction to Emergencies

NEXT



How would you handle these emergencies? Who gets priority?

LEARN MORE

The knowledge and application of procedures learned in this lesson will give you confidence, which will ease stress and may mean the difference between a situation ending in tragedy or the satisfaction of knowing you prevented a disaster.

Remaining calm during an emergency offers the best chance of:

- Thinking clearly
- Following procedures properly
- Obtaining maximum assistance
- Ensuring minimum loss of life

There are many cases where a controller's calm voice over the radio has kept a distraught pilot from becoming a victim of panic, resulting in a successful conclusion instead of a statistic.



Purpose

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This lesson provides you with an understanding of your role in an emergency situation.



Objectives

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In this lesson, you will identify:

1. Terms associated with emergency services
2. Roles and responsibilities of the pilot and controller during an emergency
3. Information necessary to handle an emergency
4. Types of emergencies

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

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

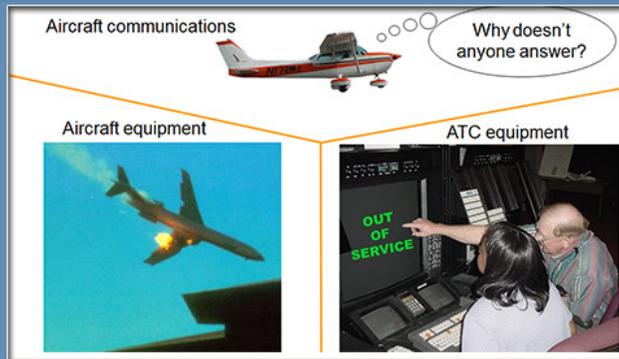




General

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Emergency Determination

Because of the infinite variety of possible emergency situations, specific procedures cannot be prescribed.

- Pursue a course of action which appears to be most appropriate under the circumstances.

Emergency situations can be classified as either:

- Distress
- Urgency

JO 7110.65, Chap. 10



General

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<ul style="list-style-type: none">• Being threatened by serious and/or imminent danger• Requiring immediate assistance	 A photograph of a fighter jet in flight, viewed from below. The word "MAYDAY!" is written in yellow, red, and white text across the sky behind the aircraft.
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Distress Definition

Distress is a condition of being threatened by serious and/or imminent danger and requiring immediate assistance.

Example: Aircraft on fire

Pilot says "MAYDAY."

- Preferably repeated three times

JO 7110.65, Chap. 10, Pilot/Controller Glossary



General

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- Being concerned about safety
- Requiring timely, but not immediate assistance
- A potential distress condition

The image contains a fuel gauge on the right with 'FUEL' at the top, 'E' on the left, '1/2' in the middle, and 'F' on the right. The needle is positioned near 'E'. Below the gauge is an airplane with the text 'PAN-PAN!' written above it and 'PAN-PAN!' written below it.

Urgency Definition

Urgency is a condition of being concerned about safety and of requiring timely, but not immediate assistance; a potential distress condition.

Example: Low fuel

Pilot says "PAN-PAN."

- Preferably repeated three times

If pilot does not use the words "MAYDAY" or "PAN-PAN" and you are in doubt that an emergency exists:

- Handle as an emergency

JO 7110.65, Chap. 10; Pilot/Controller Glossary



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Emergency Frequencies

The universal emergency frequencies are:

- VHF 121.5 MHz
- UHF 243.0 MHz

Although 121.5 and 243.0 are emergency frequencies, it is usually best to leave the aircraft on the frequency they initially used to contact you.

- Change frequency only if there is a valid reason.

JO 7110.65, Chap. 10





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Emergency Situations

Consider that an emergency exists if declared by the:

- Pilot
- ATC facility personnel
- Aircraft owner or officials responsible for operation of the aircraft

Consider that an emergency exists if:

- There is an unexpected loss of radar contact and radio communications with any IFR or VFR aircraft
- Reports indicate:
 - Aircraft has made or will make a forced landing
 - Crew has abandoned or is about to abandon the aircraft
- Emergency transponder code is received
 - Code 7700

NOTE: Code 7700 causes "EMRG" (En Route) or "EM" (Terminal) to appear on the controller's radar scope. Radar facilities are equipped so that Code 7700 may trigger an alarm or a special indicator light in the control room.

- Intercept or escort aircraft services are required
- Need for ground rescue seems likely
- Emergency Locator Transmitter (ELT) signal is heard or reported

JO 7110.65, Chap. 10





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Emergency Locator Transmitter (ELT)

An ELT is required for most general aviation airplanes.

ELTs are electronic, battery-operated transmitters.

- Emit a distinct audio tone on 121.5 MHz and 243.0 MHz
- If "armed" and when subject to crash-generated forces:
 - Designed to automatically activate
 - Continuously emit signal



Newest generation ELTs transmit a stronger signal on 406MHz and can send a digitally encoded message containing owner's information, aircraft data, and exact position allowing for a quicker response by search and rescue.

- Must be registered with National Oceanic and Atmospheric Administration (NOAA)
- Monitored by Cospas-Sarsat satellite system and allows SAR to initiate a response within minutes. Cospas-Sarsat satellite system no longer monitors 121.5 MHz

ELTs will operate continuously for at least 48 hours after they are activated.

ELTs properly installed and maintained can expedite search and rescue operations and save lives.

JO 7110.65, Chap. 10, AIM, Chap. 6



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ALL LESSONS FRAME: 10

Information Requirements

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- Aircraft identification and type
- Nature of emergency
- Pilot's desires



Obtaining Information

Obtain enough information to handle the emergency intelligently.

Minimum required information:

- Aircraft identification and type
Example: AAL83 MD80
- Nature of emergency
Examples: Icing, cracked canopy, flame out
- Pilot's desires
Examples: Dump fuel, lower altitude, bail out

LEARN MORE

After initiating action, obtain other information as necessary:

- Aircraft altitude
- Fuel remaining in time
- Pilot reported weather
- Pilot capability for IFR flight
- Time and place of last known position
- Heading since last known position
- Airspeed
- Navigation equipment capability
- NAVAID signals received
- Visible landmarks
- Aircraft color
- Number of people on board
- Point of departure and destination
- Emergency equipment on board

Reference: JO 7110.65, Chap. 10

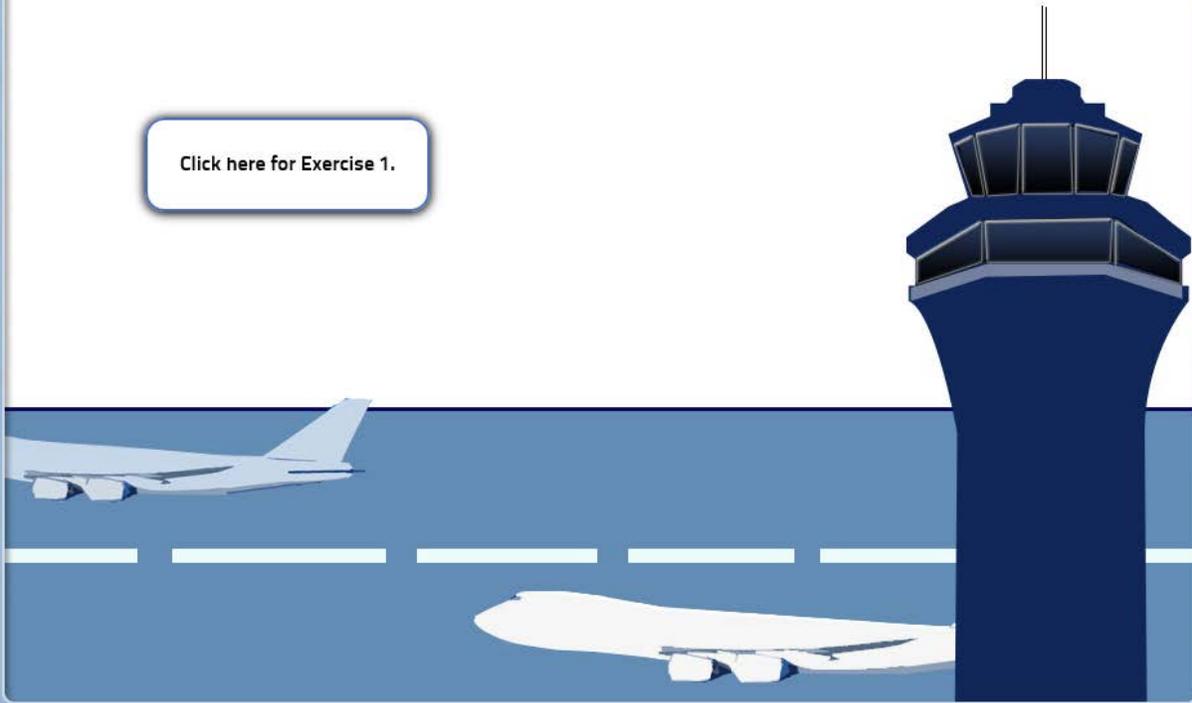


Exercise 1: Obtaining Information in an Emergency

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[Click here for Exercise 1.](#)





Roles and Responsibilities

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Pilot in Command

The pilot in command of an aircraft is directly responsible for and is the final authority as to the operation of that aircraft.

In an in-flight emergency, the pilot in command may deviate from any rule to the extent required to meet that emergency.

AIM, Chap. 6





Roles and Responsibilities

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Controller

If you are in communication with an aircraft in distress:

- Handle the emergency.
- Coordinate and direct activities of assisting facilities.
- Transfer responsibility to another facility only if better handling can be provided.
- Change frequencies only when there is a valid reason.

When you receive information about an emergency, inform the supervisor in charge of the emergency, so they can:

- Ensure Rescue Coordination Center (RCC) is notified
- Issue an Alert Notice (ALNOT)

NOTE: ALNOTs will be covered in the "Search and Rescue" lesson. ALNOTs are issued by AFSS and Centers.

The Air Route Traffic Control Center (ARTCC) shall be responsible for:

- Receiving and relaying all pertinent ELT signal information to appropriate authorities

NOTE: Terminals relay ELT signal information to ARTCC for further dissemination.

JO 7110.65, Chap. 10





Types of Emergencies

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Emergency Types

There are an infinite variety of possible emergency situations, and not all can be covered in this lesson. On the next few pages, we will cover a few of the more commonly known emergencies, such as:

- Radio failure
- Hijacked aircraft
- Bomb threats
- MANPAD alerts
- Unauthorized laser illumination
- Inflight equipment malfunction
- Aircraft in adverse weather
- Volcanic ash

JO 7110.65, Chaps. 5 and 10





Types of Emergencies

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Radio Failure

An aircraft experiencing two-way radio failure is expected to squawk code 7600.

NOTE: Code 7600 causes "RDOF" (En Route) or "RF" (Terminal) to appear on the controller's radar scope and as with Code 7700 an alarm/indicator light may be activated.

- Controller attempts to reestablish communications using various methods including use of emergency frequencies, NAVAIDs with voice capability, and relaying through other aircraft.
- ATC is based on anticipated pilot actions as set forth in procedures and recommended practices contained in the Federal Aviation Regulations (FARs), AIM, and pertinent military regulations.
- Consider the aircraft's activity to be possibly suspicious if radio communications have not been established or reestablished with the aircraft after five minutes.

JO 7110.65, Chaps. 5 and 10





Types of Emergencies

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Hijacked Aircraft

A hijacked aircraft is indicated by the nondiscrete code 7500.

Hijack attempts or actual hijacked aircraft are a matter of national security and require special handling.

NOTE: Code 7500 causes "HIJK" (En Route) or "HJ" (Terminal) to appear on the controller's radar scope and as with Code 7700 an alarm/indicator light may be activated.

JO 7110.65, Chaps. 5 and 10





Types of Emergencies

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Bomb Threats

For information on bomb threats received from any source:

- Inform your supervisor or facility air traffic manager
- If threat is general in nature it is to be handled as a suspicious activity and reported to the appropriate authorities.

If the threat is targeted against a specific aircraft and you are in contact with the suspect aircraft:

- Advise the pilot of the threat and comply with any pilot requests.
- Handle the aircraft as an emergency and/or provide most expeditious handling possible with respect to safety of other aircraft, ground facilities, and personnel.

If pilot requests, or appears to need technical assistance, DO NOT suggest actions the pilot should take, but obtain the following information:

- Type, series, and model of aircraft
- Precise location/description of bomb device if known
- Other details which may be pertinent

JO 7110.65, Chap. 10





Types of Emergencies

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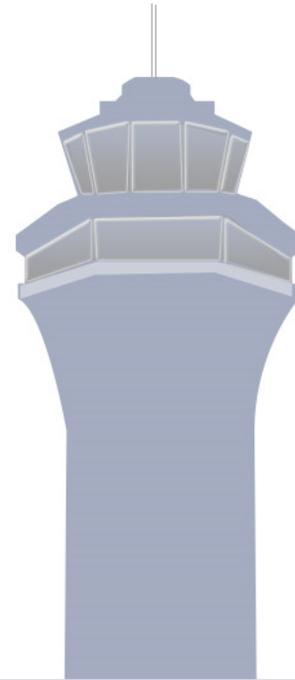
NEXT

MANPADS Alerts

When a threat or attack from Man-Portable Air Defense Systems (MANPADS) is determined to be real, notify and advise pilots as follows:

- DO NOT withhold landing clearance.
- Issue information in time for it to be useful to the pilot.
- The pilot or parent company will determine the pilot's course of action.
- Disseminate the information via ATIS and/or controller-to-pilot communications.

JO 7110.65, Chap. 10





Types of Emergencies

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Unauthorized Laser Illumination

When a laser event is reported to an air traffic facility, broadcast on all appropriate frequencies a general caution every 5 minutes for 20 minutes following the last report.

Terminal facilities shall include reported unauthorized laser illumination of aircraft on the ATIS for one hour following the last report.

JO 7110.65, Chap. 10





Types of Emergencies

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Inflight Equipment Malfunction

May include, but are not limited to, partial or complete failure of equipment which may affect:

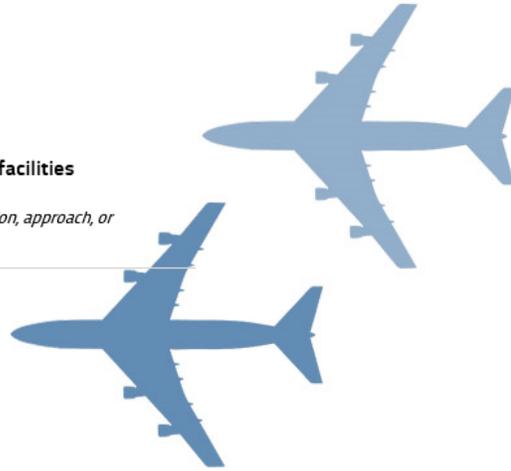
- Safety
- Separation standards
- Ability of aircraft to proceed under IFR, or in Reduced Vertical Separation Minimum (RVSM) airspace

When the pilot reports an inflight equipment malfunction:

- Request the nature of malfunction
- Ask if any special handling is desired
- Provide maximum assistance possible
- Relay any special handling being provided to other specialists or facilities

NOTE: Pilots operate under FARs and are required to report all malfunctions of navigation, approach, or communication equipment occurring in flight.

JO 7110.65, Chap. 2





Types of Emergencies

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Aircraft in Adverse Weather

VFR aircraft in weather difficulty:

- VFR aircraft unintentionally entering IFR conditions is one of the leading causes of general aviation aircraft fatalities.
- If not in your control area, determine which facility is able to provide the best service, and inform the appropriate control facility/sector.
- If a frequency change is necessary, advise the pilot of the reason for the change.

JO 7110.65, Chap. 10



Types of Emergencies

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Volcanic Ash

You will now see the video, "Volcanic Ash Hazards to Aviation."

NOTE: Volcanic ash clouds are not normally detected by airborne or air traffic radar systems.

JO 7110.65, Chap. 10





Types of Emergencies

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Minimum fuel indicates that an aircraft's fuel supply is such that it can accept little or no delay upon reaching destination.

- This is not an emergency situation.
- An emergency situation is possible should any undue delay occur.

JO 7110.65, Chap. 2





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Avianca 052

The lesson appendix contains a short summary of a fatal accident resulting from fuel exhaustion and incomplete pilot/controller communication regarding the developing crisis.





Conclusion

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Lesson Summary



This lesson covered:

- General
- Information Requirements
- Roles and Responsibilities
- Types of Emergencies





Resources

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[Click here to access all the Appendices for Lesson 22.](#)

