Task VI.A: Radio Communicaitons and ATC Light Signals

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Lesson Overview

Objective

To familiarize the student with radio communications procedures. Also to familiarize the student with ATC light-gun signals and their meanings. Review communications requirements for different airspace areas

Reference

Pilot's Handbook of Aeronautical Knowledge — Chapter 12

Elements

1. Understanding
2. Who, Where, What
3. Plan Ahead

Equipment

- White board
- Markers
- References
- iPad

Schedule

1. Discuss objectives
2. Review material
3. Development
4. Conclusion

Instructor Actions

1. Discuss lesson objectives
2. Present lecture
3. Questions
4. Homework

Student Actions

- **Before this lesson the student should read the AIM's Pilot/Controller Glossary and AIM Chapter 4.**
- Participate in discussion Take notes

Completion Standards

The lesson is complete when the instructor determines that the student has adequate knowledge of radio communications and ATC light-gun signals by giving an oral or written exam.

Instructor Notes

Attention

Everyone wants to sound like a real, professional pilot. This lesson will explain how we do that and make us more professional pilots.

Overview

Review Objectives and Elements/Key ideas

What

Radio communication is the communication between the pilot and different ATC controllers throughout the phases of a flight.

Why

Operating in and out of a controlled airport, as well as in a good portion of the airspace system, requires an aircraft have two-way radio communications. For this reason, a pilot should be knowledgeable of radio procedures. Radio communications is a critical link in the ATC system. By understanding proper radio communication procedures, the link can be strong providing safer flying for everyone.

Lesson Details

Radio communications is a critical skill to master for large areas of the National Airspace System. The first thing to know is how to find which frequencies to use. This starts in preflight planning where expected frequencies for facilities that may be used during the flight should be looked up and noted. There are many sources of this information such as the chart supplement, sectional charts, and other. Put all this information in the flight planning log, preferably in the order in which the facilities will be encountered. There are a few rules of thumb such as the common placement of "ground" on 121 point something. So when told "contact ground on .8" what is meant is to use the frequency 121.8.

During flight frequencies may need to be looked up, which is where good cockpit organization is a benefit. Keep the cockpit orderly and know where the needed references can be found. The chart supplement will contain all the needed frequencies around a given airport.

Charts provide frequencies as you navigate, including data in communications boxes, tower/CTAF, Unicom, and weather frequencies. VOR frequencies in blue outlined boxes. Some, but not all, radar approach frequencies are provided on charts. For the full list of frequencies see the chart supplement.

When contacting a facility know who you are speaking with, and what you want to say. Remember that the button is a "push to talk" not a "push to think" button. Once in contact with controllers frequencies will be provided to reach further controllers.

Using Correct Frequencies

1. Selection and Use of Appropriate Frequencies
2. Preflight Planning
    a. Always plan ahead as to frequencies needed
    b. Look up the frequencies of all the facilities you might use and/or need during the flight
        i. This information can be found in the AFD, Sectional Charts, etc.
        ii. Ground is always 121 point something
3. Put all this information in your Nav Log, preferably in the order you will use it to make things easy
4. During Flight frequencies may need to be found - keep organized and find them before they’re needed
    a. Know who you are calling
5. The AFD contains all pertinent frequencies within/around the airport(s) you are operating in
    a. Weather, Tower/CTAF, Clearance Del, Ground, Unicom, Navaids, FSS, Approach/Departure
6. Charts provide frequencies as you navigate
    a. Communications Boxes (FSS)
    b. Airport data lists tower/CTAF, Unicom, weather frequencies
    c. VOR frequencies are shown in blue outlined boxes
        i. HIWAS, TWEB, ASOS/AWOS available on some VORs
    d. Class B, C, TRSA, and some radar approach frequencies are provided below Tower frequencies/info
7. After in contact with controllers, frequencies will be provided to reach further controllers

□□ Common Errors - Use of improper frequencies □□

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- Caused by inadequate planning, misreading frequencies, or mistuning the radio
- Double check and read out loud frequencies also repeat frequencies when advised

to change

- Failure to repeat frequencies when instructed to change
- Failure to monitor the frequency before transmitting

Procedure and Phraseology for Radio Communications

Understanding is the single most important thought in pilot-controller communications

1. Brevity is important, but if necessary use whatever words will get your message across
2. Good phraseology enhances safety and is the mark of a professional pilot
    a. Pilot/Controller Glossary is very helpful in learning what certain words/phrases mean (AIM)

Radio Technique

1. LISTEN before you transmit
2. THINK before transmitting - Know what you want to say before you say it (write it down if needed)
3. After transmitting, wait a few seconds before calling again (The controller may be busy)
4. Be alert to the sound/lack of sounds in the receiver
    a. *Note: Tell personal story of missing radio calls for departure, or embarassing example of how teacher messed up radios early on*
    b. Check your volume, frequency, and make sure the microphone isn't stuck on transmit
5. Be sure you are within the performance range of your equipment and the ground station equipment
    a. Remember higher altitudes increase the range of VHF "line of sight" communications

Radio calls can be broken down to

- **Whom** you are calling
- **Who** you are
- **Where** you are
- **What** you want to do

□□CE - Improper procedure and phraseology for radio communications□□

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- Think before you transmit and understand the controller may be busy
- Tailor your calls to match the controller's workload

ATC Clearances and Instructions

1. Acknowledge all ATC clearances by repeating key points followed by your call sign
2. You must read back all hold short instructions
3. Always repeat altitudes and headings
4. When advised to change frequencies acknowledge the instruction and change ASAP
    a. If a clearance is blocked or not understood, do not guess/ignore, ask the controller to “Say Again”
    b. Once you, the PIC, obtain an ATC clearance you cannot deviate from it unless in an emergency (91.123)
5. If you cannot accept a clearance from ATC advise them of the reason and obtain a new clearance
    a. The PIC is directly responsible for, and the final authority to the operation of the airplane
6. Obtain proper clarification on any clearance not understood or that would create a bad situation
    a. CE — Failure to acknowledge or properly comply with, ATC clearances and instructions
7. Ask the controller to repeat if you did not understand the message
8. Learn to divide attention in order to properly hear and comply with all messages

ATC Light Signals

Arriving Aircraft

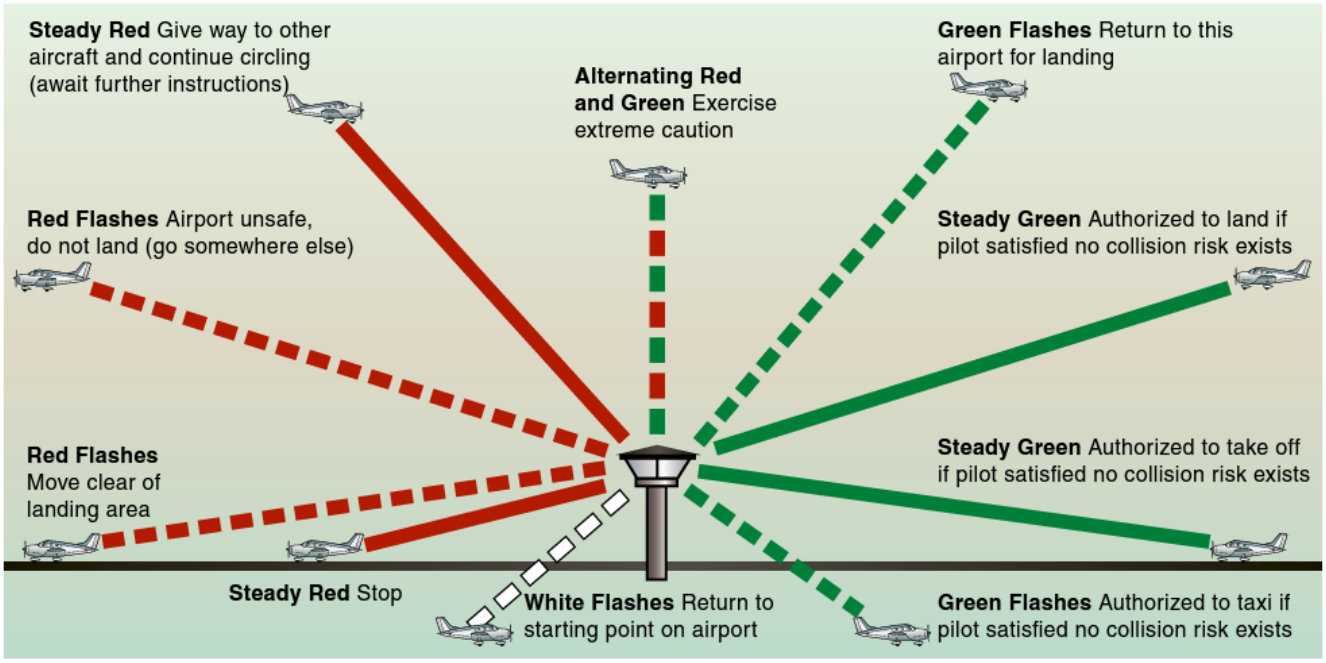
1. Transmitter Failure - Receive no response to calls, and receive calls but none directed to you
    a. Determine the direction and flow of aircraft, enter the pattern and look for light signals
    b. Acknowledge light signals by rocking wings during the day and flashing lights at night
    c. After landing, call the tower to advise them of the situation
2. Receiver Failure - Receiving no calls on tower/ATIS frequencies
    a. Transmit to the tower your position, situation, intention to land
    b. Use the same procedures as above

Departing Aircraft

- Attempt to fix any radio failure before leaving, if it can’t be fixed call tower by phone and request to depart without two way communications
- If authorized, you will get departure info and requested to monitor tower/watch for light signals
- During daylight, acknowledge transmissions/ signals by promptly executing the action requested
    - Rock wings/blink lights as well
- If the radio fails after departing the ramp, watch for light signals/monitor ground and return

⚠️Common Errors - Light Signals⚠️

- Failure to understand or properly comply with ATC light signals
  - Know the light signals and their meanings
  - Practice light signals if possible



Conclusion

Proper radio communications begin with understanding. As long as you, the pilot, and the controller understand what each other are saying radio communication is effective and clearances can be obeyed properly.

ACS Requirements

To determine that the applicant:

1. Exhibits instructional knowledge of the elements of radio communications and ATC light signals by describing:
   a. Selection and use of appropriate radio frequencies.
   b. Recommended procedure and phraseology for radio communications.
   c. Receipt of, acknowledgement of, and compliance with ATC clearances and instructions.
   d. Interpretation of, and compliance with, ATC light signals. .Exhibits instructional knowledge of common errors related to radio communications and ATC light signals by describing:
   e. Use of improper frequencies.
   f. Improper procedure and phraseology when using radio communications, such as

neglecting to state the aircraft call sign/N number, and at non-towered airports, failure to state position, runway for takeoff, and the airport of operation.

g. Failure to acknowledge, or properly comply with, ATC clearances and instructions.

h. Failure to understand, or to properly comply with, ATC light signals.

2. Demonstrates and simultaneously explains radio communication procedures from an instructional standpoint.

3. Analyzes and corrects simulated common errors related to radio communications and ATC light signals.