INTRODUCTION
- Operating in and out of a controlled airport, as well as in a good portion of the airspace system, requires that an aircraft have two-way radio communication capability
- A pilot should be knowledgeable of license requirements and radio equipment and procedures

RADIO LICENSE
- There is no license requirement for a pilot operating in the United States
- A pilot who operates internationally is required to hold a restricted radiotelephone permit
- There is also no station license requirement for most general aviation aircraft operating in the United States
- A station license is required for an aircraft which is operating internationally

RADIO EQUIPMENT
- In general aviation, the most common types of radios are VHF
- A VHF radio operates on frequencies between 118.0 and 136.975
- VHF radios are limited to line of sight transmissions
- Therefore, aircraft at higher altitudes are able to transmit and receive at greater distances

PHRASEOLOGY
- Using proper radio phraseology and procedures will contribute to operate safely and efficiently in the air
- The Pilot/Controller Glossary contained in the AIM will assist a pilot in the use of standard terminology
- The AIM also contains many examples of radio communications, which should be helpful
- ICAO has adopted a phonetic alphabet, which should be used in radio communications
- When communicating with ATC, pilots should use this alphabet to identify their aircraft

LOST COMMUNICATION
- A pilot might experience a malfunction of the radio
- This might cause the transmitter, receiver, or both to become inoperative

Receiver
- Remain outside or above Class D airspace until the direction and flow of traffic is determined
- A pilot should then advise the tower of the aircraft type, position, altitude, and intention to land
- The pilot should enter the pattern, report a position as appropriate, and watch for light signals from the tower

Transmitter
- Follow the previously stated procedures and monitor the appropriate air traffic control frequency
- ATC transmissions may be acknowledged by rocking the wings, or by blinking the landing light at night

Both
- Remain outside of Class D until the flow of traffic is determined, enter the pattern and watch for light signals

Departure
- If a radio malfunctions prior to departure, it is advisable to have it repaired
- If repair is not possible, a call ATC and request authorization to depart without two-way radio communications
- If authorization is given, you will be advised to monitor the frequency and/or watch for light signals
## LIGHT GUN SIGNALS

<table>
<thead>
<tr>
<th>COLOR AND TYPE OF SIGNAL</th>
<th>MOVEMENT OF VEHICLES, EQUIPMENT AND PERSONNEL</th>
<th>AIRCRAFT ON THE GROUND</th>
<th>AIRCRAFT IN FLIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEADY GREEN</td>
<td>Cleared to cross, proceed or go</td>
<td>Cleared for takeoff</td>
<td>Cleared to land</td>
</tr>
<tr>
<td>FLASING GREEN</td>
<td>Not applicable</td>
<td>Cleared for taxi</td>
<td>Return for landing (to be followed by steady green at the proper time)</td>
</tr>
<tr>
<td>STEADY RED</td>
<td>STOP</td>
<td>STOP</td>
<td>Give way to other aircraft and continue circling</td>
</tr>
<tr>
<td>FLASING RED</td>
<td>Clear the taxiway/runway</td>
<td>Taxi clear of the runway in use</td>
<td>Airport unsafe, do not land</td>
</tr>
<tr>
<td>FLASING WHITE</td>
<td>Return to starting point on airport</td>
<td>Return to starting point on airport</td>
<td>-</td>
</tr>
<tr>
<td>ALTERNATING RED AND GREEN</td>
<td>Exercise Extreme Caution!!!!</td>
<td>Exercise Extreme Caution!!!!</td>
<td>Exercise Extreme Caution!!!!</td>
</tr>
</tbody>
</table>
TRAFFIC PATTERNS

DEFINITION
- A pattern used to control the flow of traffic in both controlled and uncontrolled airports

OBJECTIVE
- Discuss airport operations and identifies features of an airport complex, as well as provide information on operating on or in the vicinity of an airport

TYPES OF AIRPORTS
- May be a small grass field or a large complex utilized by air carriers
- There are two types of airports; Controlled Airport and Uncontrolled Airport

CONTROLLED AIRPORT
- Has an operating control tower
- Used where the type of operations and/or volume of traffic requires such a service
- ATC is responsible for providing for the safe, orderly, and expeditious flow of air traffic
- Required to maintain two-way radio communication with ATC
- Required to acknowledge and comply with ATC instructions
- Required to advise ATC if you cannot comply with instructions and request amended instructions
- A pilot may deviate from an instruction in an emergency, but must advise ATC as soon as possible

UNCONTROLLED AIRPORT
- Does not have an operating control tower
- Two-way radio communications are not required
- It is a good operating practice for pilots to transmit their intentions on the specified frequency

SOURCES FOR AIRPORT DATA
- Different airports have different traffic pattern procedures, it is important to review the current data for an airport
- Communication frequencies, services available, closed runways, or airport construction
- Three common sources of information are; Aeronautical Charts, Airport/Facility Directory and Notices to Airmen

TRAFFIC PATTERNS
- Many different tasks must be carried out in order to make a successful traffic pattern - see page 2
- The key to a successful traffic pattern is not to get behind the aircraft

GENERAL
- Five legs; Upwind, Crosswind, Downwind, Base and Final
- Helicopters should avoid the flow of fixed wing traffic
- The designated altitude to be flown is called the Traffic Pattern Altitude
- Keep the traffic pattern tight, don’t make unnecessary long legs - aim for the ends of the runways

HAZARDS
- Runway incursions
- Collisions with other aircraft
- Overflying buildings

ERRORS
- Getting behind the aircraft
- Over controlling
- Radio work
CROSSWIND

Turn
- At 300 feet pick reference point
- Trim aircraft
- 27° Power
- At 50-55 kts adjust attitude
- Small gap
- Tip path to horizon
- Slow forward hover
- Tower - “On the go”
- 360° clearance turn
- Departure path

- Pre take-off checks

U P W I N D

At 550 feet level out (10%)

At 600 feet pick reference point

Turn

At 550 feet level out (10%)

W I N D

At 300 feet pick reference point

H

GATE

300 feet - 50-60 kts

300 feet

BASE

60 kts descend

60 kts descend

Start descend 60 kts / 20°

Reduce speed 60 kts / 25°

Check spot

70 kts / 26°

70 kts / 26°

D O W N W I N D

Pre take-off checks

FIN A L

- Loss of ETL
- Raise collective / Fwd cyclic
- Eyes out front
- Aim beyond the spot
- 100’ - Align to ground track
- 200’ - Carb heat off (Dual)
- Start descend
- Site picture
- Slow down - Look down
- 300 feet - 50-60 kts

Start descend 60 kts / 20°

At 600 feet pick reference point

Roll out at 55 kts attitude

At 550 feet level out (10%)

At 550 feet level out (10%)

V A I A

Slow down - Look down

Loss of ETL

At 300 feet pick reference point

Trim aircraft

27° Power

At 50-55 kts adjust attitude

Small gap

Tip path to horizon

Slow forward hover

Tower - “On the go”

360° clearance turn

Departure path

- Pre take-off checks

Reduce speed 60 kts / 25°

Start descend 60 kts / 20°

Check spot

70 kts / 26°
AIRPORT LIGHTING
- The majority of airports have some type of lighting for night operations
- The variety and type of lighting systems depends on the volume and complexity of operations at a given airport
- Airport lighting is standardized so that airports use the same light colors for runways and taxiways

AIRPORT BEACON
- Airport beacons help a pilot identify an airport at night
- The beacons are operated from dusk till dawn and sometimes they are turned on if the ceiling is less than 1,000 feet and/or the ground visibility is less than 3 statute miles (visual flight rules minimums)
- However, there is no requirement for this, so a pilot has the responsibility of determining if the weather is VFR
- The beacon has a vertical light distribution to make it most effective from 1-10° above the horizon, although it can be seen well above or below this spread
- The beacon may be an omni-directional capacitor-discharge device, or it may rotate at a constant speed, which produces the visual effect of flashes at regular intervals
- The combination of light colors from an airport beacon indicates the type of airport

- Some of the most common beacons are:
  - Flashing white and green for civilian land airports
  - Flashing white and yellow for a water airport
  - Flashing white, yellow, and green for a heliport
  - Two quick white flashes followed by a green flash identifies a military airport

REFERENCES
- FAR/AIM, AIM 2-1-8 - Airport/Heliport Beacons
SELECTED AIRPORT MARKINGS AND SURFACE LIGHTING

- See airport sign and markings supplement

REFERENCES

- FAR/AIM, AIM, Chapter 2, Section 3
- Airport Marking Aids and Signs