

# Radio Communication and Services

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## General Operating Principles

- Many radio channels are congested
- Because the channels are AM (amplitude modulation), two stations transmitting at once will result in a loud squeal and both transmissions will be lost
- It is important to listen to a frequency before transmitting. Transmit only once the channel is clear.
- After pressing the microphone transmit button, hesitate slightly so the beginning of the transmission is not cut off. Likewise, do not release the transmit button until completely finished talking.
- All transmissions should be clear, concise, and use proper phraseology

## Phraseology

- Because letters are difficult to distinguish (e.g. “B” and “D”), the phonetic alphabet is *always* used

A	Alfa	N	November
B	Bravo	O	Oscar
C	Charlie	P	Papa
D	Delta	Q	Quebec
E	Echo	R	Romeo
F	Foxtrot	S	Sierra
G	Golf	T	Tango
H	Hotel	U	Uniform
I	India	V	Victor
J	Juliett	W	Whiskey
K	Kilo	X	X-Ray
L	Lima	Y	Yankee
M	Mike	Z	Zulu

- In addition, 9 is pronounced “niner” to avoid confusion with “no” in German
- When saying an altitude, the proper phraseology is:

”Five hundred”

”Four thousand, five hundred”

”One five thousand, four hundred”

- When saying a heading, the proper phraseology is:

”Zero zero five”

”Zero niner zero”

”Two seven zero”

”Three six zero”

- When saying a runway, the proper phraseology is:

"Five"  
"Three one"  
"Two niner right"

## Communication Format

- The general format for communication is:
  - 1) Who you are talking to
  - 2) Who you are
  - 3) Where you are
  - 4) What you want

For example:

"Palo Alto tower, Cessna N1234, at the terminal, taxi for takeoff with Romeo"

"Byron traffic, Cessna N1234, right base runway 30"

## Traffic Information

- When ATC (tower, approach, or center) notifies you of another airplane in your area, the format will be:
  - 1) "Traffic"
  - 2) Clock direction (12 o'clock is straight ahead, 3 o'clock is off the right wing, 9 o'clock is off the left wing)
  - 3) Distance
  - 4) Direction of flight of the other airplane
  - 5) Altitude if known

"Cessna 12345, traffic 3 o'clock, 5 miles, westbound, 5000 feet"

"Cessna 12345 looking"

"Cessna 12345 traffic in sight"

- The direction given is based on the radar return, and does not take into account any crab angle for the wind. Thus the traffic may not be in the exact direction given. Instead the pilot should scan the entire area around the given direction.

## UNICOM

- UNICOM refers to the frequency for a Fixed Base Operator (FBO) on an airport that supplies fuel and other services
- The UNICOM frequency can be found in the AF/D or on sectional and terminal area charts
- The standard UNICOM frequency is 122.95

## Towered Airports

- Towered airports have one or more of these radio frequencies:
  - o ATIS
  - o Clearance delivery
  - o Ground control
  - o Tower
- The frequencies can be found in the AF/D. ATIS and tower can be found on sectional and terminal charts.

## ATIS

- **Automated Terminal Information Service (ATIS) provides non-control information about the airport, such as current weather and closed taxiways**
- You should always listen to the ATIS before initiating contact with ATC at the airport (tower when landing, or ground control/clearance delivery when departing)

“Palo Alto airport information Kilo, 2348Z weather, wind 270 at 10, visibility 30, sky conditions 5000 scattered, temperature 16, dewpoint 5, altimeter 29.87. Runway 31 in use. The GPS approach is in use. All aircraft read all hold short instructions and runway assignments. Advise ground control of departure request on taxi. Advise on initial contact you have information Kilo.”

“San Jose International Airport information Sierra. 2353Z. Wind 310 at 12. Visibility 10. Few clouds at 5000 towering cumulus. Temperature 15, dewpoint 3, altimeter 29.86. ILS approach 30L, Fairground Visual approach in use. Landing runway 30L, 30R, and runway 29. Notices to airman. Taxiway Z closed between taxiway B and taxiway C. Taxiway Z closed between taxiway K and taxiway L. Taxiway D closed between runway 30L and runway 30R. Advise on initial contact you have information Sierra.”

## Clearance Delivery

- Clearance delivery is used at some busy airports to request a departure routing and receive a transponder code before taxi and takeoff

“Santa Barbara Clearance, Cessna 12345, request southbound departure to Van Nuys, 5500 feet”

“Cessna 12345, Santa Barbara Clearance, fly runway heading, climb and maintain 2000, squawk 1234, departure frequency will be 121.3, advise ground when ready to taxi”

“Fly runway heading, climb and maintain 2000, squawk 1234, departure 121.3, Cessna 12345”

## Ground Control

- Ground control is used to control aircraft motion on the ground in areas that are under ATC’s control. Often the parking ramp is not under ATC control. A pavement marking will be used to indicate the control boundary.
- **When told to taxi to a runway, the pilot may taxi via taxiways and across any runway to the designated runway, but may not cross or taxi onto the designated runway at any point**
- **When landing, the pilot should contact ground control when told to do so by the tower**
- **If radar services are requested at an airport where such service is available, and clearance delivery does not exist, the services should be requested from ground control on initial contact**

“Palo Alto Ground, Cessna 12345, at the terminal, taxi for takeoff with Bravo, right Dumbarton departure”

“Cessna 12345, Palo Alto Ground, taxi to runway 31”

“Taxi to runway 31, Cessna 12345”

## Tower

- Tower is used to control aircraft in the air and on the runway

“Palo Alto Tower, Cessna 12345, Leslie Salt landing with Bravo”

“Cessna 12345, Palo Alto Tower, enter right traffic runway 31, report abeam the tower”

“Right traffic runway 31, report abeam the tower, Cessna 12345”

“Palo Alto Tower, Cessna 12345, ready for takeoff runway 31”

”Cessna 12345, Palo Alto Tower, cleared for takeoff runway 31”

”Cleared for takeoff 31, Cessna 12345”

## Land and Hold Short Operations

- Land and Hold Short Operations (LAHSO) are conducted at some airports with an operating control tower to increase runway utilization by allowing aircraft to use intersecting runways simultaneously
- A landing aircraft is told to “hold short” of a particular crossing runway or taxiway and must complete the landing and come to a complete stop before then
- **The Available Landing Distance (ALD) for a given LAHSO hold point is given in the AF/D**
- **In order for a LAHSO clearance to be given, the visibility must be at least 3 SM**
- **The pilot in command has the final authority to accept or reject a LAHSO clearance**
- **A LAHSO clearance should be rejected when it will compromise safety**
- **Student pilots or pilots not familiar with LAHSO should not participate in the LAHSO program**

”Cessna 12345, Long Beach Tower, cleared to land three-one, hold short of two-five right”

”Cleared to land three-one, hold short of two-five right, Cessna 12345”

## Uncontrolled Fields

- When operating at an uncontrolled field, or a towered field when the tower is closed, the pilot should use the Common Traffic Advisory Frequency (CTAF) to communicate with other airplanes
- **Reports that should be made include:**
  - **Taxiing onto a runway for takeoff**
  - **Turning crosswind**
  - **Turning downwind**
  - **Turning base**
  - **Turning final**
  - **Entering the traffic pattern**
  - **10 miles out with intentions**
- It’s also possible to ask for advisories from anyone at the airport

”Byron traffic, Cessna 12345, 10 south, request airport advisories, Byron”

”Byron traffic, Cessna 12345, 4 north, entering right forty-five for three-one, Byron”

”Byron traffic, Cessna 12345, right downwind three-one, Byron”

- Some airports have a UNICOM frequency operated by an operator on the field. Someone on the UNICOM can give airport information such as wind and runway in use, but such information is only advisory in nature.
- Sometimes the UNICOM and CTAF frequencies are the same

## Enroute Center and Approach Control

- Approach control facilities exist around Class C and Class B airports and may cover multiple airports
- As an extreme example, the newly commissioned “Sierra Approach” covers the area from Sausalito to the Sierras and as far south as Bakersfield
- A single approach control may have many different frequencies for the different airspace sectors (both horizontal and vertical division)
- The approach frequencies for an airport can be found in the AF/D or on a sectional or terminal chart for the major airports
- Enroute centers fill in the areas between approach control
- A center can own the airspace over several states

- Like an approach control, a center will have many frequencies for the difference airspace sectors
- The common services available to pilots from approach control or centers are:
  - Sequencing to a major airport
  - Flight following – radar tracking of a flight, and workload-permitting alerts of other aircraft along the route of flight
  - Help when lost
  - Vectors to an airport
  - Handling of emergencies

”Sierra Approach, Cessna 12345, 5 north of Tracy, request”

”Cessna 12345, Sierra Approach, go ahead”

”Sierra Approach, Cessna 12345 is a Cessna 172 slant Golf, 5 north of Tracy, five thousand five hundred feet, request flight following to Stockton”

”Cessna 12345, Sierra Approach, squawk 2323 and ident, Stockton altimeter 29.87”

”Squawk 2323, 29.87, Cessna 12345”

(later)

”Cessna 12345, Sierra Approach, radar contact 10 north of Tracy”

”Roger, Cessna 12345”

## EFAS

- Enroute Flight Advisory Service (EFAS) is provided throughout the US above 5,000 feet on the frequency 122.0
- EFAS is used solely to request weather reports and give pilot reports of weather conditions
- EFAS is addressed as “so-and-so Flight Watch”

”Oakland Flight Watch, Cessna 12345, 10 east of Tracy”

”Cessna 12345, Oakland Flight Watch, go ahead”

”Oakland Flight Watch, Cessna 12345 requests current weather conditions at Bakersfield”

”Cessna 12345, Oakland Flight Watch, last hourly report at Bakersfield is wind calm, visibility 5 in haze, altimeter 29.87”

”Thank you. Good day. Cessna 12345”

## Flight Service Stations

- Flight Service Stations (FSS) are located around the country to provide services to pilots:
  - Weather briefings
  - Filing, updating, and closing flight plans
  - Answering questions about airports, NOTAMs, etc.
- An FSS is addressed as “so-and-so Radio”
- Frequencies to use when contacting an FSS can be found in the AF/D or on sectional and terminal charts
- In many cases, the FSS will receive and transmit on different frequencies
  - A given frequency is used to transmit from the plane to the FSS
  - The FSS transmits to the plane over the voice channel of a VOR
- Because the FSS needs to know which VOR to transmit over, the initial call should include the name of the VOR to which the pilot is listening, if appropriate

”Rancho Radio, Cessna 12345, listening Manteca”

”Cessna 12345, Rancho Radio, go ahead”

”Rancho Radio, Cessna 12345 would like to open our flight plan from Stockton to Amador county, off at 15 past the hour”

”Cessna 12345, Rancho Radio, flight plan is open, have a good flight”

”Thanks. Good day. Cessna 12345”

## DF Steer

- Another, somewhat anachronistic, service provided by some FSS facilities is a “DF steer”
- This procedure is used when the pilot is lost. The FSS will use direction-finding equipment to triangulate the airplane’s location.
- In order to use this facility, you must have a VHF transmitter and receiver, and request help from the appropriate FSS

## ELT

- An Emergency Locator Transmitter (ELT) is used to broadcast a distress signal in the event of a plane crash
- An ELT is usually located in the tail cone of the airplane, and is required to be present in most airplanes
- **Most ELTs broadcast on 121.5 and 243.0, the international distress frequencies**
- A constellation of satellites detects the broadcast and triangulates the approximate location for search and rescue (SAR) crews
- ELTs can be automatically activated by a high impact, or manually activated with a switch or button
- Because a hard landing could set off the ELT, it is a good idea to check for the presence of an ELT signal before shutting down by tuning to 121.5