Accident Prevention Program

RADIO COMMUNICATIONS PHRASEOLOGY AND TECHNIQUES

GENERAL

a. Radio communications are a critical link in the ATC system. The link can be a strong bond between pilot and controller or it can be broken with surprising speed and disastrous results. Discussion herein provides basic procedures for new pilots and also highlights safe operating concepts for all pilots.
b. The single, most important thought in pilot-controller communications is understanding. It is essential, therefore, that pilots acknowledge each radio communication with ATC by using the appropriate aircraft call sign. Brevity is important, and contacts should be kept as brief as possible, but the controller must know what you want to do before he can properly carry out his control duties. And you, the pilot, must know exactly what he wants you to do. Since concise phraseology may not always be adequate, use whatever words are necessary to get your message across.
c. All pilots will find the Pilot/Controller Glossary very helpful in learning what certain words or phrases mean. Good phraseology enhances safety and is the mark. of a professional pilot. Jargon, chatter and "CB" slang have no place in ATC communications. The Pilot/Controller Glossary is the same glossary used in the ATC controller's handbook. We recommend that it be studied and reviewed from time to time to sharpen your communication skills.
d. Calls to air traffic control (ATC) facilities (ARTCCs, Towers, FSSs, Central Flow, and Communications Control Centers) over radio and ATC operational telephone lines (lines used for operational purposes such as controller instructions, briefings, opening and closing flight plans, issuance of IFR clearances and amendments, counter hijacking activities, etc.) may be monitored and recorded for operational uses such accident investigations, accident prevention, search and rescue purposes, specialist training and evaluation, and technical evaluation and repair of control and communications systems.

RADIO TECHNIQUE

a. *Listen* before you transmit. Many times can get the information you want through ATIS or by monitoring the frequency. Except for a few situations where some frequency overlap occurs, if you hear someone else talking, the keying of your transmitter will be futile and you will probably jam their receiver causing them to repeat their call. If you have just changed frequencies, pause, listen and make sure the frequency is clear.
b. *Think* before keying your transmitter. Know what you want to say and if it lengthy. e.g., a flight plan or IFR position report, jot it down.

c. The microphone should very close to your lips and after pressing the mike button, a slight pause may be necessary to be sure the first word is transmitted. Speak in a normal conversational tone.
d. When you release the button, wait a few seconds before calling again. The controller or FSS specialist may be jotting down your number, or looking for your flight plan, transmitting on a different frequency, or selecting his transmitter to your frequency.
e. Be alert to the sounds *or lack of sounds* in your receiver. Check your volume, recheck your frequency and *make sure your microphone is not stuck* in the transmit position. Frequency blockage can, and has, occurred for extended periods of time due to unintentional transmitter operation. This type of interference is commonly referred to as "stuck mike," and controllers may refer it in this manner when attempting to assign an alternate frequency. If the assigned frequency is completely blocked by this type of interference, use the procedures described for en route IFR radio frequency outage, to establish or reestablish communications with ATC.
f. Be sure that you are within the performance range of your radio equipment and the ground station equipment. Remote radio sites do not always transmit and receive on all of a facilities available frequencies, particularly with regard to VOR sites where you can hear but not reach a ground station's receiver. Remember that higher altitude increases the range of VHF "line of sight" communications.

CONTACT PROCEDURES

a. **Initial Contact.**
    1. The term initial contact or initial callup means the first radio call you make to a given facility, or the first call to a different controller or FSS specialist within a facility. *Use the following format:*
        a. name of facility being called,
        b. your *full* aircraft identification as filed in the flight plan or as discussed under Aircraft Call Signs below,
        c. type of message to follow or your request if it is short, and
        d. the word "Over"

        EXAMPLE
        "NEW YORK RADIO, MOONEY THREE ONE ONE ECHO, OVER"
        EXAMPLE:
        "COLUMBIA GROUND, CESSNA THREE ONE SIX ZERO FOXTROT, IFR MEMPHIS OVER."
        EXAMPLE:
        "MIAMI CENTER BARON FIVE SIX THREE HOTEL, REQUEST VFR TRAFFIC ADVISORIES, OVER"

    2. If radio reception is reasonably assured, inclusion of your request, your position or altitude, the phrase "Have numbers" or "'Information Charlie received" (for ATIS) in the initial contact helps decrease radio frequency

congestion. Use discretion and do not overload the controller with information he does not need. If you do not get a response from the ground station, recheck your radios or use another transmitter but keep the next contact short.

EXAMPLE:

"ATLANTA CENTER, DUKE FOUR ONE ROMEO, REQUEST VFR TRAFFIC ADVISORIES, TWENTY NORTHWEST ROME, SEVEN THOUSAND FIVE HUNDRED, OVER"

b. **Initial Contact When your Transmitting and Receiving Frequencies are Different**

1. If you are attempting to establish contact with a ground station and you are receiving on a different frequency than that transmitted, indicate the VOR name or the frequency on which you expect a reply. Most FSSs and control facilities can transmit on several VOR stations in the area. Use the appropriate FSS call sign as indicated on charts.

   EXAMPLE:

   New York FSS transmits on the Kennedy, Hampton and Calverton VORTACs. If you are in the Calverton area, your callup should be "NEW YORK RADIO, CESSNA THREE ONE SIX ZERO FOXTROT, RECEIVING CALVERTON VOR, OVER."
2. If the chart indicates FSS frequencies above the VORTAC or in FSS communications boxes transmit or receive on those frequencies nearest your location.
3. When unable to establish contact and you wish to call *any* ground station, use the phrase "ANY RADIO (tower) (station), GIVE CESSNA THREE ONE SIX ZERO FOXTROT A CALL ON (frequency) OR (VOR)." If an emergency exists or you need assistance, so state.

c. **Subsequent Contacts and Responses to Callup from a Ground Facility.**

Use the same format as used for initial contact except you should state your message or request with the callup in one transmission. The ground station name and the word "Over" may be omitted if the message require an obvious reply and there is no possibility for misunderstanding. *You should acknowledge all callups or clearances* unless the controller or FSS specialist advises otherwise. There arc some occasions when the controller must issue time-critical instructions to other aircraft and he may be in a position to observe your response, either visually or on radar. If the situation demands your response, take appropriate action or immediately advise the facility of any problem. Acknowledgment is made with one of the words "Wilco, Roger, Affirmative, Negative" or other appropriate remark (e.g., "PIPER TWO ONE FOUR LIMA, ROGER"). If you have been receiving services (e.g., VFR traffic advisories and you are leaving the area or changing frequencies), advise the ATC facility and terminate contact.

d. **Acknowledgment of Frequency Changes.**

When advised by ATC to change frequencies, acknowledge the instruction. If you select the new frequency without an acknowledgment, the controller's work load is increased because he has no way of knowing whether you received the instruction or have had radio communications failure.

e. **Compliance with Frequency Changes.**
When instructed by ATC to change frequencies, select the new frequency as soon as possible unless instructed to make the change at a specific time, fix, or altitude. A delay in making the change could result in an untimely receipt of important information. It you are instructed to make the frequency change at a specific time, fix, or altitude, monitor the frequency you are on until reaching the specified time, fix, or altitude unless instructed otherwise by ATC.

DIRECT COMMUNICATIONS - CONTROLLERS AND PILOTS

1. ARTCCs are capable of direct communications with IFR air traffic on certain frequencies. Maximum communications coverage is possible through the use of Remote Center Air/Ground (RCAG) sites comprised of both VHF and UHF transmitters and receivers. These sites are located throughout the U.S.. Although they may be several hundred miles away from the ARTCC, they are remoted to the various ARTCCs by land lines or microwave links. Since IFR operations are expedited through the use of direct communications, pilots are requested to use these frequencies strictly for communications pertinent to the control of IFR aircraft. Flight plan filing, en route weather, weather forecasts and similar data should be requested through FSSs, company radio, or appropriate military facilities capable of performing these services.
2. An ARTCC is divided into sectors. Each sector is handled by one or a team of controllers and has its own sector discrete frequency. As a flight progresses from one sector to another, the pilot is requested to change to the appropriate sector discrete frequency.
3. **ATC Frequency Change Procedures:**
    a. The following phraseology will be used by controllers to effect a frequency change:
    EXAMPLE:
    (Aircraft Identification) CONTACT (facility name or location name and terminal function) (frequency) AT (time, fix or altitude) OVER.
    NOTE: Pilots are expected to maintain a listening watch on the transferring controller's frequency until the time. fix or altitude specified. ATC will omit frequency change restrictions whenever pilot compliance is expected upon receipt.
    b. The following phraseology should be utilized by pilot for establishing contact with the designated facility:
        1. When a position report will be made:
        EXAMPLE:
        (Name) CENTER, (aircraft identification), (position), OVER.
        2. When no position report will be made:
        EXAMPLE:
        (Name) CENTER, (aircraft identification), ESTIMATING (reporting point and time) AT (altitude or flight level) CLIMBING (or descending) TO MAINTAIN (altitude or flight level) OVER.

3. When operating in a radar environment and no position report is required:
   EXAMPLE:
   (Name) CENTER, (aircraft identification) AT (exact altitude or flight level); or, if appropriate,
   EXAMPLE:
   LEAVING (exact altitude or flight level) CLIMBING (or descending) TO MAINTAIN (altitude or flight level) OVER.
   NOTE: Exact altitude or flight level means to the nearest 100 foot increment. Exact altitude or flight level reports on initial contact provide ATC with information required prior to using MODE C altitude information for separation purposes.

c. At times controllers will ask pilots to verify that they are at a particular altitude. The phraseology used will be: "VERIFY AT (altitude)." In climbing or descending situations, controllers may ask pilots to "VERIFY ASSIGNED ALTITUDE AS (altitude)." Pilots should confirm that they are at the altitude stated by the controller or that the assigned altitude is correct as stated. If this is not the case, they should inform the controller of the actual altitude being maintained or the different assigned altitude. *CAUTION:* Pilots should not take action to change their actual altitude or different assigned altitude to the altitude stated in the controllers verification request unless the controller specifically authorizes a change.

4. **ARTCC Radio Frequency Outage:**

a. ARTCCs normally have at least one back up radio receiver and transmitter system for each frequency which can usually be placed into service quickly with little or no disruption of ATC service. Occasionally, technical problems may cause a delay but switchover seldom takes more than 60 seconds. When it appears that the outage will not be quickly remedied, the ARTCC will usually request a nearby aircraft, if there is one, to switch to the affected frequency to broadcast communications instructions. It is important, therefore. that the pilot wait at least 1 minute before deciding that the ARTCC has actually experienced a radio frequency failure. When such an outage does occur. the pilot should, if workload and equipment capability permit, maintain a listening watch on the affected frequency while attempting to comply with the following recommended communications procedures:

1. If two-wave communications cannot be established with the ARTCC after changing frequencies, a pilot should attempt to recontact the transferring controller for the assignment of an alternative frequency or other instructions.
2. When an ARTCC radio frequency failure occurs after two-way communications have been established, the pilot should attempt to reestablish contact with the center on any other known ARTCC frequency, preferably that of the next responsible sector when practicable, and ask for instructions. However, when the next normal frequency change along the route is known to involve

another ATC facility, the pilot should contact that facility, if feasible, for instructions. If communications cannot be reestablished by either method, the pilot is expected to request communications instructions from the FSS appropriate to the route of flight.

NOTE: The exchange of information between an aircraft and an ARTCC through an FSS is quicker than relay via company radio because the FSS has direct interphone lines to the responsible ARTCC sector. Accordingly, when circumstances dictate a choice between the two, during an ARTCC frequency outage, relay via FSS radio is recommended.

AIRCRAFT CALL SIGNS

a. **Precautions in the Use of Call Signs.**

1. Improper use of call signs can result in pilots executing a clearance intended for another aircraft. Call signs should *never be abbreviated on an initial contact or at any time when other aircraft call signs have similar numbers/sounds or identical letters/numbers* (e.g., Cessna 6132F, Cessna 1622F, Baron 123F, Cherokee 7732F, etc.).
   EXAMPLE:
   Assume that a controller issues an approach clearance to an aircraft at the bottom of a holding stack and an aircraft with a similar call sign (at the top of the stack) acknowledges the clearance with the last two or three numbers of his call sign. If the aircraft at the bottom of the stack did not hear the clearance and intervene, flight safety would be affected, and there would be no reason for either the controller or pilot to suspect that anything is wrong. This kind of "human factors" error can strike swiftly and is extremely difficult to rectify.
2. Pilots; therefore, must be certain that aircraft identification is complete and clearly identified before taking action on an ATC clearance. ATC specialists will not abbreviate call signs of an air carrier or other civil aircraft having authorized call signs. ATC specialist may initiate abbreviated call signs of other aircraft by using the *prefix and the last three digits/letters* of the aircraft identification after communications are established. The pilot may use the abbreviated call sign in subsequent contact with the ATC specialist. When aware of similar/identical call signs, ATC specialists will take action to minimize errors by emphasizing certain numbers/letters, by repeating the entire call sign, repeating the prefix, or by asking pilots to use a different call sign temporarily. Pilots should use the phrase "VERIFY CLEARANCE FOR (your complete call sign)" if doubt exists concerning proper identity.
3. Civil aircraft pilots should state the aircraft type, model or manufacturers name followed by the digits/letters of the registration number. When the aircraft manufacturer's name or model is stated, the prefix "N" is dropped (e.g. Aztec Two Four Six Four Alpha).

EXAMPLE:
BONANZA SIX FIVE FIVE GOLF.
EXAMPLE:
BREEZY SIX ONE THREE ROMEO EXPERIMENTAL (omit "Experimental" after initial contact).

4. Air Taxi or other commercial operators not having FAA authorized call signs should prefix their normal identification with the phonetic word 'Tango".
EXAMPLE:
TANGO AZTEC TWO FOUR SIX FOUR ALPHA.
5. air carriers and commuter air carriers having FAA authorized call signs should identify themselves by stating the complete call sign, using group form for the numbers and word "heavy" if appropriate.
EXAMPLE:
UNITED TWENTY-FIVE HEAVY.
EXAMPLE:
MIDWEST COMMUTER SEVEN ELEVEN.
6. Military aircraft use a variety of systems including serial numbers, word call signs and combinations of letters/numbers. Examples include Army Copter 48931, Air Force 61182, MAC 31792, Pat 157, Air Evac 17652, Navy Golf Alfa Kilo 21, Marine 4 Charlie 36, etc.

b. **Air Ambulance Flights.**

1. Civilian air ambulance flights responding to medical emergencies (carrying patients, organ donors, organs, or other urgently needed lifesaving medical material) will be expedited by ATC when necessary. When expeditious handling is required, add the word "LIFEGUARD" in the remarks of the flight plan. In radio communication, use the call sign "LIFEGUARD" followed by the aircraft type and registration letters/numbers. When requested by the pilot, necessary notification to expedite ground handling of patients, etc., is provided by ATC; however, when possible, this information should be passed in advance through non-ATC communications systems. Extreme discretion is necessary in using the term "LIFEGUARD." It is intended only for those missions of an urgent medical nature and for use only for that portion of the flight requiring expedited handling.
2. Similar provisions have been made for the use of "AIR EVAC" and "MED EVAC" by military air ambulance flights, except that these military flights will receive priority handling only when specifically requested.
EXAMPLE:
LIFEGUARD CESSNA TWO SIX FOUR SIX.

c. **Student Pilots Radio Identification.**

1. The FAA desires to help the student pilot in acquiring sufficient practical experience in the environment in which he will be required to operate. To receive additional assistance while operating in areas of concentrated air traffic, a student pilot need only identify himself as a student pilot during his initial call to an FAA radio facility.

EXAMPLE:
DAYTON TOWER, THIS IS FLEETWING 1234, STUDENT PILOT, OVER.

2. This special identification will alert FAA ATC personnel and enable them to provide the student pilot with such extra assistance and consideration as he may nee. This procedure is not mandatory.

Description of Interchange or Leased Aircraft

a. Controllers issue traffic information based on familiarity with airline equipment and color/markings. When an air carrier dispatches a flight using another company's equipment and the pilot does not advise the terminal ATC facility, the possible confusion in aircraft identification can compromise safety.
b. Pilots flying an "interchange" or "leased" aircraft not bearing the colors/markings of the company operating the aircraft should inform the terminal ATC facility on the first contact the name of the operating company and trip number, followed by the company name as displayed on the aircraft, and aircraft type.
EXAMPLE
AIR CAL 311, UNITED (INTERCHANGE/LEASE), BOEING 727,

GROUND STATION CALL SIGNS

Pilots, when calling a ground station, should begin with the name of the facility being called followed by the type of the facility being called, as indicated in the following examples.

- Airport Unicom - "Shannon Unicom"
- FAA Flight Service Station - "Chicago Radio"
- FAA Flight Service Station (En Route Flight Advisory Service (Weather) - "Seattle Flight Watch"
- Airport Traffic Control Tower - "Augusta Tower"
- Clearance Delivery Position (IFR) - "Dallas Clearance Delivery"
- Ground Control Position in Tower - "Miami Ground"
- Radar or Nonradar Approach Control Position - "Oklahoma City Approach"
- Radar Departure Control Position - "St. Louis Departure"
- Faa Air Route Traffic Control Center - "Washington Center"

PHONETIC ALPHABET

The international Civil Aviation Organization (ICAO) phonetic alphabet is used by FAA personnel when communications conditions are such the the information cannot be readily received withour their use. ATC facilities may also request pilots to use phonetic letter equivalents when aircraft wiht similar sounding identifications are receiving communications on the same frequency. Pilots should use the phonetic alphabet when idetifying their aircraft during initial contact with air traffic control facilities. Additionall use the phonetic equivalents for single letters and to spell out groups of letters or difficult sords during adverse communications conditions.

CHARTER	MORSE CODE	TELEPHONY	PHONIC (PRONUNCIATION)
A	o -	Alfa	(AL-FAH)
B	o o o	Bravo	(BRAH-VOH)
C	- o - o	Charlie	(CHAR-LEE) or (SHAR-LEE)
D	- o o	Delta	(DELL-TAH)
E	o	Echo	(ECK-OH)
F	o o - o	Foxtrot	(FOKS-TROT)
G	- - o	Golf	(GOLF)
H	o o o o	Hotel	(HOH-TEL)
I	o o	India	(IN-DEE-AH)
J	o - - -	Juliett	(JEW-LEE-ETT)
K	- o -	Kilo	(KEY-LOH)
L	o - o o	Lima	(LEE-MAH)
M	- -	Mike	(MIKE)
N	- o	November	(NO-VEM-BER)
O	- - -	Oscar	(OSS-CAH)
P	o - - o	Papa	(PAH-PAH)
Q	- - o -	Quebec	(KEH-BECK)
R	o - o	Romeo	(ROW-ME-OH)
S	o o o	Sierra	(SEE-AIR-RAH)
T	-	Tango	(TANG-GO)
U	o o -	Uniform	(YOU-NEE-FORM) or (OO-NEE-FORM)
V	o o o -	Victor	(VIK-TAH)
W	o - -	Whiskey	(WISS-KEY)
X	- o o -	Xray	(ECKS-RAY)
Y	- o - -	Yankee	(YANG-KEY)
Z	- - o o	Zulu	(ZOO-LOO)
1	o - - - -	One	(WUN)
2	o o - - -	Two	(TOO)
3	o o o - -	Three	(TREE)
4	o o o o -	Four	(FOW-ER)
5	o o o o o	Five	(FIFE)
6	- o o o o	Six	(SIX)
7	- - o o o	Seven	(SEV-EN)
8	- - - o o	Eight	(AIT)
9	- - - - o	Nine	(NIN-ER)
0	- - - - -	Zero	(ZEE-RO)

FIGURES

a. Figures indication hundred and thousands in round number, as for ceiling heights, and upper wind levels up to 9900 shall be spoken in accordance with the following:
EXAMPLE:
500 - FIVE HUNDRED
EXAMPLE:
4500 - FOUR THOUSAND FIVE HUNDRED

b. Numbers above 9900 shall be spoken by separating the digits preceding the word "thousand."

EXAMPLE:
10,000 - ONE ZERO THOUSAND
EXAMPLE:
13,500 - ONE THREE THOUSAND FIVE HUNDRED

c. Transmit airway or jet route numbers as follows:
EXAMPLE:
V12 - VICTOR TWELVE
EXAMPLE:
J533 - J FIVE THIRTY-THREE

d. All other numbers shall be transmitted by pronouncing each digit.
EXAMPLE:
10 - ONE ZERO

e. When a radio frequency contains a decimal point, the decimal point is spoken as "POINT."
EXAMPLE:
122.1 - ONE TWO TWO POINT ONE
NOTE: ICAO Procedures require the decimal point be spoken as "DECIMAL" and FAA will honor such usage by military aircraft and all other aircraft required to use ICAO Procedures.

ALTITUDES AND FLIGHT LEVELS

a. Up to but not including 18,000 feet MSL - state the separate digits of the thousands, plus the hundreds, if appropriate.
EXAMPLE:
12,000 - ONE TWO THOUSAND
EXAMPLE:
12,500 - ONE TWO THOUSAND FIVE HUNDRED

b. At and above 18,000 feet MSL (FL 180) state the words "flight level" followed by the separate digits of the flight level.
EXAMPLE:
190 - FLIGHT LEVEL ONE NINER ZERO

DIRECTIONS

The three digits of bearing, course, heading or wind direction should always be magnetic. The word "true" must be added when it applies.
EXAMPLE:
(magnetic course) 005 - ZERO ZERO FIVE
EXAMPLE:
(true course) 050 - ZERO FIVE ZERO TRUE
EXAMPLE:
(magnetic bearing) 360 - THREE SIX ZERO
EXAMPLE:
(magnetic heading) 100 - ONE ZERO ZERO
EXAMPLE:
(wind direction) 220 - TWO TWO ZERO

SPEEDS

The separate digits of the speed followed by the word "KNOTS." Except, controllers may omit the word "KNOTS" when using speed adjustment procedures, e.g., "REDUCE/INCREASE SPEED TO TWO FIVE ZERO."

EXAMPLES:

(speed) 250 - TWO FIVE ZERO KNOTS
(speed) 190 - ONE NINER ZERO KNOTS

The separate digits of the mach number preceded by "MACH."

EXAMPLES:

(mach number) 1.5 - MACH ONE POINT FIVE
(mach number) .64 - MACH POINT SIX FOUR
(mach number) .7 - MACH POINT SEVEN

TIME

a. FAA used Greenwich Mean Time (GMT or Z) for all operations.
b. To convert from Standard Time to Greenwich Mean Time:
   Eastern Standard Time - Add 5 hours
   Central Standard Time - Add 6 hours
   Mountain Standard Time - Add 7 hours
   Pacific Standard Time - Add 8 hours
   Note: For Daylight Time subtract 1 hour.
c. The 24-hour clock system is used in radiotelephone transmissions. The hour is indicated by the first two figures and the minutes by the last two figures.
   EXAMPLE:
   0000 - ZERO ZERO ZERO ZERO
   EXAMPLE:
   0920 - ZERO NINER TWO ZERO
d. Time may be stated in minutes only (two figures) in radio telephone communications when no misunderstanding is likely to occur.
e. Current time in use at a station is stated in the nearest quarter minute in order that pilots may use this information for time checks. Fractions of a quarter minute less than eight seconds are stated as the preceding quarter minute; fractions of a quarter minute of eight seconds or more are stated as the succeeding quarter minute.
   EXAMPLE:
   0929:05 - TIME, ZERO NINER TWO NINER
   EXAMPLE:
   0929:10 - TIME, ZERO NINER TWO NINER AND ONE-QUARTER

COMMUNICATIONS WITH TOWER WHEN AIRCRAFT TRANSMITTER OR RECEIVER OR BOTH ARE INOPERATIVE

a. **Arriving Aircraft**

1. Receiver inoperative - If you have reason to believe your receiver is inoperative, remain outside or above the airport traffic area until the direction and flow of traffic has been determined, then advise the tower of your type aircraft, position, altitude, intention to land and request that you be controlled with light signals. When you are approximately 3 to 5 miles from the airport, advise the tower of your position and join the airport traffic pattern. From this point on, watch the tower for light signals. Thereafter, if a complete pattern is made, transmit your position downwind and/or turning base leg.
2. Transmitter inoperative - Remain outside or above the airport traffic area until the direction and flow of traffic has been determined, then join the airport traffic pattern. Monitor the primary local control frequency as depicted on Sectional Charts for landing or traffic information, and look for a light signal which may be addressed to your aircraft. During hours of daylight, acknowledge tower transmissions or light signals be rocking your wings. At night, acknowledge by linking the landing or navigation lights.
3. Transmitter and receiver inoperative - Remain outside or above the airport traffic area until the direction and flow of traffic has been determined, then join the airport traffic pattern and maintain visual contact with the tower to receive light signals. Acknowledge light signals as noted above.

b. **Departing Aircraft**
    1. If you experience radio failure prior to leaving the parking area, make every effort to have the equipment repaired. If you are unable to have the malfunction repaired, call the tower by telephone and request authorization to depart without two-way radio communications. If tower authorization is granted, you will be given departure information and requested to monitor the tower frequency or watch for light signals, as appropriate. During daylight hours, acknowledge tower transmissions or light signals by moving the ailerons or rudder. At night, acknowledge by blinking the landing or navigation lights. If radio malfunction occurs after departing the parking area, watch the tower for light signals or monitor tower frequency.
    NOTE: Refer to FAR-91.87 and FAR-91.77.

TRAFFIC CONTROL LIGHT SIGNALS

a. The following procedures are used by ATCTs in the control of aircraft not equipped with radio. These same procedures will be used to control aircraft equipped with radio if radio contact cannot be established. ATC personnel use a directive traffic control signal which emits an intense narrow light beam of a selected color (either red, white, or green) when controlling traffic by light signals.
b. Although the traffic signal light offers the advantage that some control may be exercised over nonradio equipped aircraft, pilots should be cognizant of the disadvantages which are:

1. The pilot may not be looking at the control tower at the time a signal is directed toward him.
2. The directions transmitted by a light signal are very limited since only approval or disapproval of a pilot's anticipated actions may be transmitted. No supplement or explanatory information may be transmitted except by the use of the "General Warning Signal" which advises the pilot to be on the alert.

c. Between sunset and sunrise, a pilot wishing to attract the attention to the control tower should turn on a landing light and taxi the aircraft into a position, clear of the active runway. so that light is visible to the tower. The landing light should remain on until appropriate signals are received from the tower.

d. Portable traffic control light signals:

Color and Type of Signal	On the Ground	In Flight
STEADY GREEN	Cleared for take-off	Cleared to land
FLASHING GREEN	Cleared to taxi	Return for landing (to be followed by steady green at proper time)
STEADY RED	Stop	Give way to other aircraft and continue circling
FLASHING RED	Taxi clear of landing area (runway) is use	Airport unsafe- do not land
FLASHING WHITE	Return to starting point on airport	
ALTERNATING RED $ GREEN Exercise	General Warning Signal- Exercise Extreme Caution	General Warning Signal- Extreme Caution

e. During daylight hours, acknowledge tower transmissions or light signals by moving the ailerons or rudder. At night, acknowledge by blinking the landing or navigation lights. If radio malfunction occurs after departing the parking area. Watch the tower for light signals or

monitor tower frequency.

COMMUNICATIONS FOR VFR FLIGHTS

a. FSSs are allocated frequencies for different functions, for airport Advisory Service the pilot should contact the FSS on 123.6 MHz, for example. Other FSS frequencies are listed with the FSS in the airport/Facility Directory. If you are in doubt as to what frequency to use to contact an FSS, transmit on 122.l MHz and advise them of the frequency you are receiving on.
b. On VFR flights, guard the voice channel of VORs for broadcasts and calls from FAA FSSs. Where the VOR voice channel is being utilized for ATIS broadcasts, pilots of VFR flights are urged to guard the voice channel of an adjacent VOR. When in contact with a control facility, notify the controller if you plan to leave the frequency. That could save the controller time by not trying to call you on that frequency.

EMERGENCY COMMUNICATION

EMERGENCY LOCATOR TRANSMITTERS

a. **GENERAL**
Emergency locator Transmitters (ELT's) are required for most general aviation airplanes (FAR 91.52). ELT's of various types have been developed as a means of locating downed aircraft. These electronic, battery operated transmitters emit a distinctive downward swept audio tone on 121.5 Mhz and 243.0 MHz. If "armed" and when subject to crash generated forces, they are designed to automatically activate and continuously emit these signals. The transmitters will operate (continuously for at least 48 hours over a wide temperature range. A properly installed and maintained ELT can expedite search and rescue operations and save lives.
b. **TESTING**
ELT's should be tested in accordance with the manufacturer's instructions, preferably in a shielded or screened room to prevent the broadcast of signals which could trigger a false alert. "When this cannot be done, aircraft operational testing is authorized on 121.5 MHz and 243.0 Mhz as follows :
    1. Tests should be conducted only during the first 5 minutes after any hour. If operational tests must be made outside of this time frame, they should be coordinated with the nearest FAA Control Tower or FSS.
    2. Tests should be no longer than three audible sweeps.
    3. If the antenna is removable, a dummy load should be substituted during test procedures.
    4. Airborne tests are not authorized.
c. **FALSE ALARMS**
Caution should be exercised to prevent the inadvertent activation of ELT's in the air or while they are being handled on the ground. Accidental or unauthorized activation will generate an emergency signal that cannot be distinguished from the real thing, leading to expensive and frustrating searches. A false ELT signal could also interfere with genuine emergency transmissions and hinder or prevent the

timely location of crash sites. Frequent false alarms could also result in complacency and decrease the vigorous reaction that must be attached to all ELT signals. Numerous cases of inadvertent activation have occurred as a result of aerobatics, hard landings, movement by ground crews, and aircraft maintenance. These false alarms can be minimized by monitoring 121.5 MHz and/or 243.0 MHz as follows:

1. Prior to engine shut down at the end of each flight.
2. When the ELT is handled during installation or maintenance.
3. When maintenance is being performed in the vicinity of the ELT.
4. When the aircraft is moved by a ground crew.
5. If an ELT signal is heard, turn off the ELT to determine if it is transmitting. If it has heen activated, maintenance might be required before the unit is returned to the "ARMED" position.

d. **IN-FLIGHT MONITORING AND REPORTING**

Pilots are encouraged to monitor 121.5 MHz and/or 243.0 MHz while in flight to assist in identifying possible emergency ELT transmissions. On receiving a signal, report the following information to the nearest air traffic facility:

1. Your position at the time the signal was first heard.
2. Your position at the time the signal was last heard.
3. Your position at maximum signal strength.
4. Your flight altitudes and frequency on which the emergency signal was heard - 121.5 MHz or 243.0 MHz. If possible positions should be given relative to a navigation aid. If the aircraft has homing equipment, provide the bearing to the emergency signal with each reported position.

SEARCH AND RESCUE SATELLITE (SARSAT)

Search and rescue is a lifesaving service provided through the combined efforts of the federal agencies signatory to the national search and rescue plan, and the agencies responsible for search and rescue in each state. Operational resources are provided by the U.S. Coast Guard, Department of Defense components, the Civil Air Patrol, the Coast Guard Auxiliary, state, county, and local law enforcement and other public safety agencies. The introduction of the SARSAT system enhances the effectiveness of search and rescue. SARSAT also amplifies the importance of assuring that your ELT remains silent, except for testing or in an actual emergency. Search and rescue missions launched because of a FALSE ELT signal are costly and unnecessary. Search and rescue services include search for missing aircraft, survival aid, rescue, and emergency medical help for the occupants after an accident site is located.

Check your radio on 121.5 MHz or 243.0 MHz before you leave your aircraft. Your ELT may be transmitting.

(END OF DOCUMENT FAA-P-8740-47 AFO-800-0385)