1. General

A. The ARTEX C406-1 series ELT’s are a “third generation ELT,” transmitting on 121.5, 243.0 and 406.025 MHz. The ELT’s are designed to meet or exceed the requirements of TSO C91a, TSO C126 and the mandatory automatic ELT requirements of FAR Part 91. The ELT meets the requirements of Canadian Aviation Regulation (CAR) Part V, Subpart 51, Airworthiness Manual Section 551.104. In addition, these ELT’s are designed to meet the requirements of Eurocae ED-62.

B. The C406-1 series ELT’s employ a completely new transmitter which features higher output power and a more integrated design. The 121.5/243.0 MHz section of the transmitter is contained in a module with the 406.025 MHz transmitter. The top circuit board contains the microprocessor that controls the module and all ELT functions. The C406-1 is a single output ELT, unlike previous models of ARTEX 406 MHz ELT’s.

C. The ELT automatically activates during a crash and transmits the standard swept tone on 121.5 and 243.0 MHz. Every 50 seconds for 520 milliseconds (long message protocol) the 406.025 MHz transmitter turns on. During that time an encoded digital message is sent to the satellite. The information contained in that message is shown below:

- Serial Number of the Transmitter or Aircraft ID
- Country Code
- I.D. Code
- Position Coordinates (when coupled to an ARTEX ELT/NAV Interface unit [453-6500]).

D. The 406.025 MHz transmitter will operate for 24 hours and then shuts down automatically. The 121.5/243.0 MHz transmitter will continue to operate until the unit has exhausted the battery power which typically will be at least 72 hours.

E. The ELT/NAV Interface unit (if installed) allows the ELT to communicate with the aircraft’s navigation system and receive position data (longitudinal and latitude) which the ELT will transmit in the event of a crash. Programming the ELT with the 24 bit long message protocol allows the ELT to be automatically programmed by the ELT/NAV interface with the aircraft’s 24 bit address. The ELT/NAV interface unit must be strapped (binary “1” bits tied to ground) with the same 24 bit address as the ICAO or mode S transponder system 24 bit address. This gives the ELT the ability to be moved from one aircraft to another without the need for manual reprogramming of the ELT. This is advantageous for fleet operators since the ELT/NAV interface unit will automatically reprogram the ELT with the new aircraft’s 24 bit address identification.

F. The ARTEX DGL-a dongle allows the operator to easily program aircraft 24-bit (Long Message Protocol) address into a compatible ELT. The DGL-1 comes attached to the top cover. The top cover and dongle remain with the aircraft. When an ELT is installed, the DGL-1 reprograms the ELT with the aircraft’s 24 bit address. The operation of the dongle is fully automatic. When aircraft power is applied, the DGL-1 verifies the ELT is programmed to the 24 bit address stored in the dongle. If the addresses match, the DGL-1 shuts down. If there is no match, the DGL-1 reprograms the ELT to the 24 bit address stored in the dongle and then shuts down.
G. One advantage of the 406.025 MHz transmitter is that it will produce a much more accurate position, typically 1 to 2 kilometers as compared to 15 to 20 kilometers for 121.5/243.0 Mhz transmitters. When coupled with the aircraft’s navigation system the position accuracy improves to approximately 100 meters. The ELT also transmits a digital message which allows the search and rescue authorities to contact the owner/operator of the aircraft through a database. Information contained in the database that may be useful in the event of a crash is shown below:

- Type of aircraft
- Address of Owner
- Telephone Number of Owner
- Aircraft Registration Number
- Alternate Emergency Contact

H. Once the ELT is activated and the 406.025 MHz signal is detected from the satellite and a position is calculated, the 121.5/243.0 MHz transmissions are used to home in on the crash site. Because aircraft communication radios are not capable of receiving 406.025 MHz transmissions, the only method of monitoring the ELT is the blinking cockpit light, the buzzer or the 121.5/243.0 MHz transmissions which may be monitored on the aircraft communication transceiver.

I. The switch below the ELT cockpit light allows you to turn the unit on for testing and to reset the unit. You cannot disarm or disable the unit from the cockpit. Cockpit operation is limited to deactivating the ELT after it has been activated, or manually activating the ELT.

J. The C406-1 series ELT’s are housed in a high impact fire resistant polycarbonate plastic case. The ELT unit is able to withstand extremely harsh environments. Units, like yours, have been subjected to numerous 500g shock pulses, 1000 pound crush weights and severe penetration tests, and continue to operate normally. Continued operation in a temperature range of -20 degrees C through +55 degrees C is assured.

2. Component Details

A. ELT Transmitter

The ELT transmitter rests in a mounting tray that is attached to the aft fuselage of the airplane. The ELT transmitter consists of these components:

1. The printed circuit assembly (PCA) of the C4 06-1 series ELT is unique in that the PCA has no RF function but rather only control functions for the RF module. The PCA contains a one time programmable microprocessor that controls all the ELT functions (ON/OFF, modulation, 406 MHz digital message and RESET).

2. All RF functions are contained in a separate module. The transmitter operates simultaneously on 121.5 MHz and 243.0 MHz with the carrier frequencies remaining within 0.0005% under all environmental operating conditions. Approximately every 50 seconds the 406.025 MHz transmitter transmits. During this time the 121.5 and 243.0 MHz transmitter is momentarily turned off.

3. The AM modulation at 121.5 and 243.0 MHz is designed as A9 with the carrier amplitude modulated with an audio frequency sweeping downward or a range of not less than 700 Hz, within the range of 1,600 to 600 Hz. The sweep repetition rate is between 2 and 4 Hz with a modulation factor of at least 0.85. The modulation applied to the carrier frequency has a minimum duty cycle of 33% and a maximum duty cycle of 55%.
(4) The ARTEX C406-1 series ELT is designed for a constant power output at 121.5 and 243.0 MHz that will not be less than 23 dBm (200mW) during the 50 hour operational period at both -20 degrees Centigrade and +55 degrees Centigrade.

(5) A digital information message is sent to the satellite via the 406.025 MHz transmitter. The modulation is phase modulated and classified as 16K0G1D. Every 47.5 to 52.5 seconds the 5 watt transmitter is turned on for 440 ms (short message) or 520 ms (long message).

(6) The information sent to the satellite is programmed at the factory and contains a unique number that can be used to identify the beacon.

(7) The crash force activation sensor or G-switch is designed to activate with a change of velocity of 4.5 fps +/- 0.5 fps both under normal conditions and while being subjected to 30 G’s of cross axial forces.

(8) The Battery Pack for all the C406-1 series ELT’s consists of 4 “D” size Lithium Manganese Dioxide cells connected in series. In an effort to increase the safety of the Battery Pack, a number of features were designed into the battery pack. To prevent the cells from being charged, diodes are connected across each cell and fuses are connected to the output.

B. Programming Dongle

(1) The ARTEX DGL-1 dongle allows the operator to easily program aircraft 24-bit (Long Message Protocol) address into a compatible ELT.

(2) The DGL-1 comes attached to the top cover. The top cover and dongle remain with the aircraft.

(3) When an ELT is installed, the DGL-1 reprograms the ELT with the aircraft’s 24 bit address. The operation of the dongle is fully automatic.

(4) When aircraft power is applied, the DGL-1 verifies the ELT is programmed to the 24 bit address stored in the dongle. If the addresses match, the DGL-1 shuts down. If there is no match, the DGL-1 reprograms the ELT to the 24 bit address stored in the dongle and then shuts down.

C. Remote Control

(1) The remote control (cockpit panel switch) provides MANUAL ON, ARMED, and RESET modes.

(2) The remote control wiring between the control and the ELT is designed so that no combination of short circuits between the remote control, monitor(s), associated wiring and the airframe will:

(a) Inhibit the equipment from being automatically activated.

(b) Deactivate the ELT after it has been activated.

Result in additional power drain so that the ELT will not meet the minimum Peak Effective Radiated Power (PERP) of 17 dBm or Equivalent Isotropic Radiated power (EIRP) of 20 dBm through the 50 hour operation period at any of the specified temperatures (-20° C to +55°C).

(c)
D. Antenna

(1) The ELT system uses a blade type antenna. The antenna is installed on the exterior (top) of the aircraft at the rear, in front of the vertical stabilizer. The antenna provides efficient radiation at 121.5, 243 and 406 MHz. Antenna Features:

(a) Transmitter to Antenna connection via single cable.
(b) Blade type antenna
(c) Triple frequency 121.5/243/406.025 MHz
(d) VSWR: 2.0:1 Max at 121.5/243 MHz 1.5:1 Max for 406.025 MHz
(e) Vertical polarization
(f) BNC connector
(g) Omnidirectional radiation pattern

3. Operation

A. Operation

(1) One of the primary features of the C406-1 series ELT is its simplicity of operation. As long as the ELT is locked into its mounting tray, it will activate in a crash. Neither the cockpit switch nor the ELT unit switch can be positioned to prevent automatic activation once the unit is mounted properly.

(2) It also is designed against human error and misuse in regards to automatic activation. The unit activates only when securely mounted in its tray and has pins 5 & 8 jumpered. The ELT cannot be accidentally activated by dropping, rough handling or during shipping.

(3) When the ELT is activated, the presence of the emergency swept tone and a flashing front panel light indicates a normal functioning unit. The front panel light must immediately begin to continuously flash upon ELT activation.

(4) Under normal operation the switch configuration on your panel is the down position, reading ARM. The switch on the ELT unit will also be positioned down to read OFF. Should an emergency arise to the degree that you want to manually activate your ELT, reverse either switch so it is up (ON) position. Remember, that as long as the front panel and ELT switches are in the ARM/OFF position the ELT will automatically activate on impact.

(5) If your ELT is activated, you will need to reset it. Do this by moving the front panel switch to ON, then moving it back to ARM after approximately 1 second. You may also reset the ELT at the unit itself by positioning the switch on the ELT up to ON, then back down to OFF after approximately 1 second.

B. Overall Functions

(1) The ELT unit is considered to be active “ACTIVE” or “INACTIVE”. When “INACTIVE”, the unit lies in a state of rest and performs no functions. Taking the unit from the “INACTIVE” to the “ACTIVE” state requires a positive switch transition from one of three sources:

(a) Panel Mounted Switch
(b) Unit Mounted Switch
(c) G-switch
(2) Upon entering the “ACTIVE” state, the unit shall meet all the requirements as described herein. To exit the “ACTIVE” state and enter the “INACTIVE” state, a “RESET” condition must be entered. This may be accomplished in one of two ways.

The front panel switch may be toggled from the ARMed/RESET position to ON and then back to ARMed/RESET, or if the switch is already in the ON position, it must be placed into the ARMed/RESET position.

(a) The ELT unit switch may be moved from the OFF position to the ON position and then back to the OFF position. If the switch is already in the ON position, it must be placed into the OFF position.

(3) It should be remembered that the ELT can not be “RESET” if either the panel mounted switch or the unit switch is in the ON position.

(4) The periodicity of operational checks is at the operator’s discretion, however, a monthly test is recommended. The check shall only be conducted during the first five minutes of any UTC (coordinated universal time) hour, and restricted in duration to not more than five seconds.
1. General
   A. Before proceeding with testing, carry out the applicable Maintenance Practice depicted in this maintenance manual supplement. Any obvious damage should be rectified before proceeding.

2. System Tests
   A. The system test is an operational test used to test the basic functionality of the ELT system. This test does not give specific levels of performance for any of the functions of the ELT but it does indicate that the system is functioning in a satisfactory manner. The system test is detailed below:
      (1) Always perform the test within the first 5 minutes of the hour (UTC) as required by AC 43.13-1B, 12-21 and 12-22 Note 3. Be sure to notify any nearby control tower of your intentions.
         **WARNING:** DO NOT ALLOW TEST DURATION TO EXCEED 5 SECONDS. The ELT will transmit a 406.025 MHz signal after the ELT is active approximately 47 seconds, the satellite system considers the transmission to be a valid signal.
      (2) Ensure ELT system circuit breakers are closed.
      (3) Tune a VHF receiver to 121.5 MHz.
      (4) Turn the ELT remote switch panel to ON, wait for 3 sweeps of the receiver, which takes about 12 second, and then turn the switch back to ARM (OFF) position while paying attention to the LED activity upon entering the ARM (OFF) condition.

3. Fault Isolation
   A. The microprocessor in the ELT checks the G-switch (automatic activation switch) latching circuit, pins 5 and 6 on the 12-pin connector of the ELT; the 406.025 MHz transmitter for proper RF output; presence of valid navigation data (ELT/NAV Interface and navigation system must be active) and a battery check. If the ELT is working properly, the sequence following entry to the ARMED (OFF) condition will result in the panel LED staying ON for approximately 1 second then extinguishing.
   B. If a problem is detected, the LED provides a coded signal following the initial 1 second pulse. The coded signal and related problem are as follows (the LED will flash in order of importance with approximately a 0.5 to 1 second pulse between each error code if multiple errors are present):
      (1) 1 flash indicates a G-switch loop open failure.
      (2) 3 flashes indicates a 406.025 MHz transmitter problem (i.e. bad or unconnected coax, an antenna problem, low power output or a programming error).
      (3) 5 flashes indicates there is no navigation data present. This is most likely due to improper wiring between the system interface connections, improper programming, invalid navigation data (navigation system not powered up) or an ELT/NAV Interface Unit (453-6500) is not being utilized.
      (4) 7 flashes indicates a battery problem (i.e. battery usage time over an hour).
C. There is a sequence to the problem reporting which is the same order as listed above. That is, if the G-switch circuit has a failure, there will be a single flash then 3 flashes would appear if there was a transmitter problem and so on.

**NOTE:** For installations using the ELT/NAV interface, there is an error condition where the LED on the ELT and remote will flash rapidly. This occurs 2 minutes after power is applied to the ELT/NAV Interface if the ELT is not responding because either 1) the ELT is programmed for a protocol other than 24 bit and the ELT/NAV Interface has been strapped for a 24 bit address or 2) the RS-232 TX line from the ELT (pin 12) to the ELT/NAV Interface (pin 10) is not connected.

D. After initial installation, ARTEX recommends a monthly "self test" of the ELT by following the steps defined in the Adjustment & Test section of this Aircraft Maintenance Manual supplement. Testing of the ELT in excess of once a month is not recommended as the battery life will be shortened by excessive activation.
1. General

A. To comply with the FAA & Canadian Aviation Regulations, ARTEX Aircraft Supplies Provides the following maintenance procedures. These procedures include checks required in the United Sates.

B. In addition to the maintenance checks described in this section of the Aircraft Maintenance Manual supplement a monthly "self test" of the ELT is recommended.

C. FAR 91.207(d) requires that the ELT be inspected within 12 calender months after the last inspection for:

   (1) Proper Installation
   (2) Battery Corrosion
   (3) Operation of controls and crash sensors
   (4) The presence of sufficient signal radiated from its antenna (see D.(17), Antenna Test)

D. Periodic Maintenance Inspection Procedure

   NOTE: Steps (6) through (14) are mandatory in Canada.

   (1) Remove ELT Connections

      (a) Loosen the thumbscrew on the end cap.
      (b) Pull the end cap away from the ELT. Lift up the Protective Top Cover and push away from the connector end of the ELT to remove. Lay Protective Top Cover aside.
      (c) Remove all interconnections to the ELT unit and ELT antenna.

      Visually inspect and confirm proper seating of all connector pins. Special attention should be given to coaxial center conductor pins which are prone to retracting into the connector housing.

   (d) Remove ELT

      (a) Lift the ELT up from the connector end (careful use of a flat blade screw driver as a lever makes this step easier) to remove the ELT unit from its mounting tray.
      (b) Inspect the mounting hardware. Ensure the hardware is free of cracks or other obvious damage.
      (c) All required mounting hardware should be installed and secured and must meet the integrity requirements as defined herein.

   NOTE: Do not use contact cleaner on ELT components. Such chemical agents can be highly destructive to the mounting hardware and ELT housing, causing cracking, fracturing and breakage.
(3) Remove Battery Pack

**NOTE:** The battery pack contains static sensitive parts, take ESD precautions before handling. Remove the four screws from the battery pack. Before proceeding further, read the following advisory to avoid damage to the ELT. For detailed instructions refer to step (19) and Figure 3.

**WARNING:** The battery pack is connected to the ELT via short interconnect harnesses which limit the distance of separation between the two components prior to disconnecting the harnesses. Proceed as follows:

- Lay the ELT on its side.
- Carefully lift the battery pack away from the ELT and lay along side the ELT unit.
- Carefully disconnect the harness from the 8-pin connector on the small circuit board in the battery pack. Do not short connector pins.
- Disconnect 2-pin harness from the ELT body.
  
  
  (a) Inspect the battery pack and the underside of the ELT.
  (b) The battery cells, components and connectors should be free of corrosion.
  (c) The underside of the ELT should be corrosion free.
  (d) Inspect for any broken wires or connections.
  (e) Ensure the battery housing is free of cracks or other visible damage.
  
  Verify the battery expiration date. If the battery pack has not expired it may be reinstalled. However, for optimum performance, it is recommended that the battery be replaced if the voltage under load is less than 12.0 vdc.
  
  (f) The battery pack must be replace with a new one.
  
  1) After use in an emergency;
  2) After an inadvertent activation of un-known duration;
  3) After the total of all known transmissions exceeds one hour;
  4) On or before the battery replacement (expiration date).

(4) Replace/Reinstall Battery Pack

- To replace/reinstall the battery pack, connect the 8-pin connector to the header on the circuit board in the battery pack.
- Connect the 2-pin power harness to the ELT. This step will cause the ELT to activate.
- Reset the ELT by toggling the ON/OFF switch on the ELT from ON to OFF.
- Fit the battery pack into place dressing wires away from the standoffs to avoid pinching wires between standoffs and battery pack.
- Install two screws diagonally from each other to secure battery pack during the tests that follow.
NOTE: If the check out is going to conclude with step (5) below, then reseat the battery pack on
the ELT, dressing the harness wires away from the standoffs to avoid pinching the wires
between the battery pack and the standoffs. Reinstall the four Phillips head screws and
tighten securely. Do not over torque the screws.

(5) G-switch Check

NOTE: The ELT cannot be activated in this way unless pins 5 and 8 are jumpered (this
happens automatically when the unit is locked into the mounting tray with the connector
in place). Because of the potential physical damage which could occur through an
improper jumper, it is recommended that this step be performed only by an experienced
technician/mechanic. See ARTEX Document 570-5001, "Installation" section for pin
layout diagram. A test plug may be obtained from ARTEX (P/N 151-2012) to use in
performing this test.

(a) While monitoring 121.5 MHz on an AM receiver, and with the unit switch in the OFF
(down) position, activate the ELT by using a rapid forward (throwing) motion, in the
direction of the arrow, followed by a rapid reversing action.

(b) Verify activation via the aural swept tone on the receiver.

(c) Following activation, "RESET" the unit by toggling the ON/OFF switch to ON then
back to OFF.

(6) Electrical Check

(a) Activate the ELT. As the unit will be on for three minutes it is recommended that it be
placed in a container capable of substantially attenuating RE signals. Remember
that all tests must be performed within the first five minutes after the hour UTC
(Universal Coordinated Time).

(b) Monitor the following performance criteria for three minutes (power output must be
made at the end of the three minute period).

(c) Ensure that adequate attenuation rated for 406.025 MHz, 5 Watts is installed
between the ELT's 121.5/243/406 MHz output and the input to measurement
equipment to prevent damaging the input circuitry.

(7) 121.5/243/MHz Power Output

(a) Connect the equipment as shown below:

```
  ELT BNC (Top) CONNECTOR  Applicable Attenuator  SPECTRUM ANALYZER
```

NOTE: Use a fresh battery pack (12.5 volts nominal) or a 4 amp, 12.5 vdc power supply as
power source.

NOTE: The test equipment specified in the following steps is only a recommendation. The use
of other manufacturer's models of test equipment capable of providing equivalent
measurements results is acceptable.
(b) Set the Spectrum Analyzer as follows:

1) Center Freq: 121.5 MHz
2) Span: 1 MHz
3) Resolution Bandwidth: 1 MHz
4) Vertical Display: 10dB/Div
5) Sweep: Auto
6) Peak/Avg: Peak
7) Reference Level: 30dBm
8) Time/Div: 20ms

(c) Adjust the reference amplitude to place the peak of the carrier slightly above the top
gratitude line.

(d) Enable the “fine” amplitude adjustment. Set the carrier peak to exactly the top of the
reference line.

(e) Read the displayed amplitude.

(f) Repeat for the 243.0 MHz harmonic (Change the “Center Frequency” to 243.0 MHz. 
All other settings remain the same).

(g) The minimum allowed amplitude on 121.5 MHz and 243.0 MHz is 23 dBm (200mW).

(8) 121.5 MHz Frequency

(a) The ELT transmitter frequency may be measured as follows.

(b) Connect the frequency counter as shown below:

(c) If the 121.5 MHz carrier frequency is within specified parameters, the 243.0 MHz
frequency will also be within specified parameters.

(d) The ELT should be within 50 ppm (+/-6.075 KHz) of 121.500000 MHz.

(9) Audio Modulation

(a) During the swept tone portions the audio should "sound" like an ELT.

(b) Set the unit switch to OFF position.
(10) Audio Modulation

NOTE: The power output is approximately 37 dBm © 5 Watts. Ensure adequate attenuation is inserted in-line between the ELT’s 406.025 MHz output and the input to the spectrum analyzer to protect the analyzer’s input circuitry.

(a) Connect the equipment as shown below:

(b) Set the Spectrum Analyzer as follows:
   1) Center Freq: 406.025 MHz
   2) Span: 1 MHz
   3) Resolution Bandwidth: 1 MHz
   4) Vertical Display: 10dB/Div
   5) Sweep: Auto
   6) Peak/Avg: Peak
   7) Reference Level: 30dBm
   8) Time/Div: 20ms
   9) Max Hold: On
  10) Attenuator (as required) on Input

(c) Turn the ELT on and wait approximately 50 seconds for the 406.025 MHz transmitter to turn on (transmitter sends out first signal at 50 seconds then every 50 seconds thereafter). Determine the power output from the stored waveform.

(d) The 406.025 MHz power output should be 37dBm +/- 2 dBm (3.16 W min to 7.94 W max).

(11) Measure the 406.025 MHz Frequency

(a) Ensure that adequate attenuation rated for 406.025 MHz, 37 dBm and 5 Watts is installed between the ELT’s 406.025 MHz output and the input to the frequency counter to prevent damaging the frequency counter’s input circuitry.

(b) Set up equipment as shown below:
(c) Verify an initial frequency of 406.025 MHz +/- 2 KHz.

**NOTE:** Allow the unit to run 30 seconds before making the measurement to allow the oscillator to stabilize.

(12) Current Draw Test

**CAUTION:** The following tests involve measurements of the lithium battery pack. Exercise extreme caution to avoid causing a short circuit condition which will blow the fuses on the battery pack. It is recommended that only an experienced technician perform these tests.

**NOTE:** A test harness (P/N 611-0024) may be ordered from ARTEX Aircraft Supplies at 1-800-547-8901.

(a) All tests must be performed in an RF screen room or with the ELT in a shielded container that will substantially attenuate the RF signal.

(b) All “ON” state current measurements must be with the RF outputs loaded with 50 ohms for 5 Watts (either a resistive load or equipment with 50 ohm impedance padded with 10 dB/5 Watt attenuator, i.e. a spectrum analyzer).

**NOTE:** The ELT may activate (turn “ON”) when the various connections are initially made during the following current tests. This is normal. Reset the unit to “OFF”, if this happens, by toggling the ON/OFF switch to ON and back to OFF.

(c) **ARM (“OFF”) State Current Measurement**

1) Remove the battery pack as described in step (3), “Remove Battery Pack”.
2) Disconnect to 2-pin harness.
3) Install the test harness 611-0024 and an in-line ammeter as shown in Figure 1.
4) Ensure the ELT is “OFF”
5) Measure the current with the ammeter. The measured current should be 0 micro amps (µA) and not more than 6 µA.

(d) **ON State Current Measurement**

**NOTE:** Current draw during this test may exceed 305 Amps during the 406.025 MHz burst. Ensure the ammeter is set on the appropriate range to accommodate this level of current.
TEST HARNESS
P/N 611-0024

AMMETER

CIRCUIT BOARD IN
BATTERY PACK

TO ELT

Figure 1

EFFECTIVITY
Post ELT STC ST03081AT

23-24-00

PAGE 207
JAN 02/07
1) Activate the ELT, and allow to stabilize.
   The measured steady state current should not exceed 200 milliamps (mA).

2) When the 406.025 MHz module is on (generating the 406.025 MHz burst) the current may exceed 3.5 Amps.

3) Turn the ELT “OFF”.

4) Disconnect the test harness 611-0024.

5) Reconnect the 2-pin module power harness.

6) Reinstall the battery pack as described in step (4), “Replace/Reinstall Battery Pack”.

(13) Verification of Digital Message

NOTE: If checking the latitude/longitude, ensure that the aircraft’s navigation system and ELT/NAV Interface are connected and powered on at least 30 seconds prior to activation of the ELT.

(a) Activate the ELT and allow the ELT to transmit 15 to 30 seconds but not more than 40 seconds.

(b) The SARSAT Beacon Tester will receive the “test message” transmitted at turn off. If the 406.025 MHz oscillator is not warmed up and stabilized, a ‘BAD FRAME’ message may occur, which could be construed as a problem when, in fact, the message was generated because the oscillator had not warmed up.

(c) If a ‘BAD FRAME’ is received, repeat the activation and turn off procedure again.

(d) For all testing of the 406 MHz output, only the ‘test message’ that is transmitted at turn off is required to verify the ELT and ELT/NAV Interface function.

(e) The test message contains all the information contained in the actual distress message except there is a special digital test prefix that tells the COSPAS/SARSAT satellites to ignore the message.

NOTE: The initial display on the SARSAT Beacon Test Set can flag several problems prior to advancing into the individual page displays described later.

1) If a “BAD FRAME” message appears after the 3rd or 4th transmit attempt, the Beacon Test Set is not receiving transmit data. Verify that the SARSAT Beacon Test Set is not receiving data. Verify that the SARSAT Beacon Test Set does not have a low battery. Check the coax connection between the ELT’s TPS connector and the SARSAT Beacon Test Set. Check the internal ELT coax connection between the TPS connector and the 406.025 MHz module. Finally, try a different battery pack.

2) If a “S’ TEST BAD or ‘DATA ERROR’ message appears, there is a problem with the ELT (i.e. a programming problem or a problem with the transmitter module) or the battery pack.

3) If there is no 406.025 MHz transmitter burst present, check the 3.0 Amp fuse on the circuit board in the battery pack for an open condition. If the fuse is good, there is most likely a problem with the 406.025 MHz module or its interconnections.
(f) 24 Bit Address Protocol (Long Message) Refer to figure 2A and 2B for the Beacon Test Set display contents of each specific page described below.

1) Page 1 is the main menu screen. Press “1” for view to see received message or scroll using “up” and “down” arrow keys to view other messages. Use “left” and “right” arrow keys to scroll between pages.

2) Page 2 contains the Date and Time that the message was received. Also included is an indication of whether the message was received properly. Verify that the third or bottom line reads “‘S’ TEST OK”.
### SARSAT BEACON TESTER

<table>
<thead>
<tr>
<th>Recv</th>
<th>View</th>
<th>Quit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erase</td>
<td>Setup</td>
<td>Output</td>
</tr>
</tbody>
</table>

### PAGE 2 (VIEW MODE)

<table>
<thead>
<tr>
<th>Up/Down/Left/Right</th>
<th>F L Q EP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesg #1</td>
<td>Received At</td>
</tr>
<tr>
<td>7:10:30</td>
<td>13 FEB 1999</td>
</tr>
<tr>
<td>S' TEST OK</td>
<td></td>
</tr>
</tbody>
</table>

**VERIFY MESSAGE**
**RECEIVED "S' TEST OK"**

### PAGE 3 (VIEW MODE)

<table>
<thead>
<tr>
<th>Up/Down/Left/Right</th>
<th>F L Q EP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesg #1</td>
<td>Frequency:</td>
</tr>
<tr>
<td>406.025 MHz</td>
<td>PASS</td>
</tr>
<tr>
<td>COUNTRY:</td>
<td>366 USA</td>
</tr>
</tbody>
</table>

**VERIFY FREQUENCY AND COUNTRY CODE**

### PAGE 4 (VIEW MODE)

<table>
<thead>
<tr>
<th>Up/Down/Left/Right</th>
<th>F L Q EP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesg #1</td>
<td>96E3ADA9A5</td>
</tr>
<tr>
<td>7FDFFC7883F583E0FAA8</td>
<td>PASS</td>
</tr>
<tr>
<td>ID: 2DC75B534AFFBFF</td>
<td></td>
</tr>
</tbody>
</table>

**VERIFY HEX CODE ID:**
**2DC75B534AFFBFF**

### PAGE 5 (VIEW MODE)

<table>
<thead>
<tr>
<th>Up/Down/Left/Right</th>
<th>F L Q EP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesg #1</td>
<td>STD LOC</td>
</tr>
<tr>
<td>ELT + EXT GPS</td>
<td></td>
</tr>
<tr>
<td>AIRCRAFT #</td>
<td>ADA9A5</td>
</tr>
</tbody>
</table>

**VERIFY AIRCRAFT ID:**
**ADA9A5**

---

**Figure 2A**

**EFFECTIVITY**

23-24-00

Post ELT STC ST03081AT
B737 MAINTENANCE MANUAL

PAGE 6 (VIEW MODE)

↑ ↓ ← → F L Q   EP
Mesg #1   STD LOC
Homing: 121.5 MHz
BCH: 19A1D7   VALID

VERIFY HOMING FREQUENCY

PAGE 7 (VIEW MODE)

↑ ↓ ← → F L Q   EP
Mesg #1   Other info:
Long Mesg.

VERIFY LONG MESSAGE

PAGE 8 (VIEW MODE)

↑ ↓ ← → F L Q   EP
Mesg #1   Other info:
Lat: 45N23.4
Long: 122W15.1

VERIFY LATITUDE AND LONGITUDE OF 45DEGREES 23.4 MINUTES NORTH, 122 DEGREES 15.1 MINUTES WEST

PAGE 9 (MENU OPTIONS)

SARSAT BEACON TESTER
Recv    View    Quit
Erase   Setup   Output

PRESS "Q" TO RETURN TO MAIN SCREEN PAGE

EFFECTIVITY
Post ELT STC ST03081AT

Figure 2B
23-24-00
3) Page 3 is a frequency and country code page. The frequency must read between 406.030 and 406.020 MHz to pass. The programmed country code must be the same country as the aircraft’s home base. Verify that the second line of the display reads PASSE. Verify that the country code is the same as the aircraft’s home base.

4) Page 4 contains the complete message in Hexadecimal notation. The third line is an ID string that is unique to the beacon being tested. Verify that ID string on the third line matches the ID printed on the product label of the 406 ELT.

NOTE: For ELT’s installed with an ELT/NAV Interface where the Interface is used to encode the 24 bit aircraft address, the ELT will be automatically re-programmed by the Interface and will need to be relabeled with the new 15 digit hex ID string.

5) Page 5 describes the protocol type, the type of beacon, and the aircraft ID or unit serial number. Verify that the aircraft ID matches the 24 bit address of the aircraft (you will need to convert the aircraft’s Octal code to Hex).

6) Page 6 contains information on the homing transmitter and error checking.

7) Page 7 contains information confirming that the long message (position data) is present.

8) Page 8 contains the position data as received from the navigation system. Verify that the position data is present for latitude and longitude if using ELT/NAV Interface.

9) Page 9 is the main menu screen which is reached by pressing “Q”.

(g) Serialized Protocol (Long Message)

1) For ELT’s that are programmed with serialized protocol verify that “S TEST OK” is displayed on page 2, verify on page 3 that the frequency passes and that the correct country is displayed.

2) Verify that the 15 digit hex code displayed on the bottom line of page 4 matches the 15 digit hex code printed on the ELT product label.

3) If verifying received latitude/longitude, check page 8.

4) All other information displayed may be disregarded.

(h) Short Message Programmed ELT’s

1) For ELT’s that have been programmed for a Short Message protocol verify that “S TEST OK” is displayed on page 2, verify on page 3 that the frequencies passes and that the correct country is displayed.

2) Verify that the 15 digit hex code displayed on the bottom line of page 4 matches the 15 digit hex code printed on the ELT product label.

3) All other information displayed may be disregarded.
(14) Reset ELT
   (a) To "RESET" the ELT, move the switch to the ON position then back to the OFF position.

(15) Reinstall ELT
   (a) Reinstall the ELT into aircraft as follows:
      1) Insert the ELT into the mounting tray at an angle so that the locking ears at the end opposite the direction-of-flight arrow fit into the mounting tray locking slots.
      2) Fit the protective top cover onto the ELT.
      3) Ensure that the slots at the end of the cover fit over the locking ears on the ELT prior to fitting cover into place at the connector end.
      4) Feed the two coax cables through the holes in the end cap and connect them to their respective connections on the ELT.
      5) Position the end cap and connector assembly onto the ELT and tighten the two thumbscrews securely.
      6) Visually inspect connections ensuring that they are seated properly.

(16) Installed Transmitter Test (Self Test)
   (a) Perform the transmitter tests by activating the ELT and listening on 121.5 MHz. Be sure to follow the procedures as outlined in the Adjustment & Test section of this Aircraft Maintenance Manual supplement.

(17) Antenna Test
   (a) Action Notice A 8150.3 advises that:
      1) “A low quality AM broadcast receiver should be used to determine if energy is being transmitted from the antenna. When the antenna of the radio (tuning dial on any setting) is held about 6 inches from the activated ELT antenna, the ELT aural tone will be heard on the AM broadcast receiver. This is not a measured check, but it does provide confidence that the antenna is radiating sufficiently power to aid search and rescue. The aircraft’s VHF receiver, tuned to 121.5 MHZ, may also be used. This receiver, however, is more sensitive and could pick up a weak signal even if the radiator ELT’s antenna is disconnect. Thus it does not check the integrity of the ELT system or provide the same level of confidence as does an AM radio”.

(18) Logbook Entry
   (a) Enter the date the test technician’s initial s and whether the ELT passed or failed into the aircraft logbook.

(19) ELT battery Pack Replacement

**NOTE:** The battery pack contains static sensitive parts, take ESD precautions before handling. Remove the four screws from the battery pack before proceeding further, read the following advisory to avoid damage to the ELT. Also refer to Figure 3.
WARNING: The battery pack is connected to the ELT via short interconnect harnesses which limit the distance of separation between the two components prior to disconnecting the harnesses. Proceed as follows:

Figure 3
(a) Lay the ELT on its side.

(b) Carefully lift the battery pack away from the ELT and lay along side the ELT.

(c) Carefully disconnect the harness from the 8-pin connector on the small circuit board in the battery pack. Do not short connector pins.

(d) Disconnect 2-pin harness.

(e) Inspect the battery pack and underside of ELT.

(f) Battery cells, components and connectors should be corrosion free. The underside of ELT should be corrosion free.

(g) Inspect for any broken wires or connections.

(h) Ensure the battery housing is free of cracks or other visible damage.

(i) The battery pack must be replaced with a new one:
   1) After use in an emergency;
   2) After an inadvertent activation of unknown duration;
   3) When the total of all known transmissions exceeds one hour;
   4) On or before the battery replacement (expiration) date.

**NOTE:** The battery pack (452-0133) expires 5 years from the date (month) it is shipped from ARTEX.

(j) When installing a new battery pack, remove the paper backing from the rubber seal at the connector end of the battery pack.

(k) It is recommended that this seal be coated with a non-petroleum based silicone grease (i.e. GE G-635) to provide a moisture resistant seal once the battery is installed.

(l) To replace/reinstall the battery pack, connect the 8-pin connector to the header on the circuit board in the battery pack.

(m) Connect 2-pin connector to the recessed connector inside the ELT body. This step will cause the ELT to activate.

(n) Reset the ELT by toggling the ON/OFF switch in the ELT from ON to OFF.

(o) Reseat the battery pack on the ELT, dressing the harness wires away from the standoffs to avoid pinching the wires between the battery pack and the standoffs.

(p) Connect the SARSAT Beacon Test Set, through a 30 dB (minimum) attenuator, to the ELT's BNC connector.

(q) Activate the ELT and allow the ELT to transmit 3 to 4 406.025 MHz bursts. Thereupon, verify that there is not a "BAD FRAME" or "NORMAL BAD" message on the test set display which would include a problem with the battery pack (i.e. a bad IC on the battery circuit board).

(r) Install the four Phillips head screw and tighten securely. Do not over torque the screws.
(s) Once the ELT has been tested, as applicable, and reinstalled in the aircraft as described in this Aircraft Maintenance Manual supplement, apply the battery expiration date label provided with the battery pack to the exterior of the ELT (i.e. on the end cap or other visible location).

(t) Enter the pertinent battery replacement information in the aircraft log book and fill out any other documentation required by local authority.

(u) If you have any questions regarding the Battery Pack Replacement Procedures, please contact ARTEX Aircraft Supplies at 1-800-547-8901.
1. General
   A. This section provides instructions for removing and installing each of the ARTEX C406-1 ELT system LRU’s.

   **CAUTION:** SHOULD ANY INSTALLATION CRITICAL CASES ARISE WITH THE REINSTALLATION OF ANY UNIT, YOU MUST COMPLY 100 PERCENT WITH THE INSTRUCTIONS.

   B. When removing or installing any ARTEX C406-1 ELT LRU, prepare the aircraft for safe ground maintenance. Open and tag all applicable system circuit breakers.

2. Equipment and Materials
   A. No special equipment or materials, other than those commonly used in the shop, are required to install the units in existing trays and clamps. Do not over tighten mounting screws.

3. ELT Transmitter Removal and Installation Procedure
   A. Removal and Installation Procedure
      (1) Remove the ELT Transmitter.
         (a) Gain access to the ELT Transmitter.
         (b) Loosen the thumbscrews on the end cap.
         (c) Pull the end cap away from the ELT. Lift up the Protective Top Cover and push away from the connector end of the ELT to remove. Lay Protective Top Cover aside.
         (d) Remove all interconnections to the ELT unit and ELT antenna.
         (e) Lift the ELT up from the connector end (careful use of a flat blade screw driver as a lever makes this step easier) to remove the ELT unit from its mounting tray.
         (f) Place electrostatic protective covers on the ELT Transmitter and the electrical connectors.
      (2) Install the ELT Transmitter.
         (a) Remove electrostatic protective covers from the aircraft connectors. Remove electrostatic protective covers from the ELT Transmitter electrical connectors.

   **CAUTION:** EXAMINE THE CONNECTOR FOR PINS THAT ARE BENT OR OUT OF ALIGNMENT. DO NOT FORCE FIT IF MATING IS DIFFICULT.

         (b) Insert the ELT into the mounting tray at an angle so that the locking ears at the end opposite the direction-of-flight arrow fit into the mounting tray locking slots.
         (c) Fit the protective top cover onto the ELT.
         (d) Ensure that the slots at the end of cover fit over the locking ears on the ELT prior to fitting cover into place at the connector end.
(e) Feed the two coax cables through the holes in the end cap and connect them to their respective connections on the ELT.

(f) Position the end cap and connector assembly onto the ELT and tighten the two thumbscrews securely.

(g) Visually inspect connections ensuring that they are seated properly.

B. Adjustment Procedure
Not Applicable

C. Repair Procedure
Any repair procedures should accomplish by manufacturer approved facility in accordance with the manufacture’s repair instructions.

D. Return to Service Procedures
Do the Operational Tests specified in the Adjustment & Test section of this maintenance manual supplement.

4. ELT Antenna Removal and Installation Procedure

A. Removal and Installation Procedure

(1) Remove the ELT antenna.

(a) If required, use a phenolic scraper to remove aerodynamic sealant around periphery of antenna.

(b) Remove six non-Torx drive screws used to attach antenna to fuselage.

(c) Carefully lift antenna from fuselage avoiding any damage to the coaxial cable.

(d) Disconnect the coaxial cable from the antenna connector.

(e) Put protective covers on the aircraft coaxial cable connector and the antenna coax connector.

(2) Install the ELT antenna.

(a) If required, ant existing aerodynamic sealant from antenna and clean antenna mounting area.

(b) Put supplied o-ring in the antenna o-ring groove. If antenna is supplied with a Teflon gasket, install gasket between antenna and fuselage.

(c) Remove protective covers from the antenna and aircraft coaxial mating connector.

(d) Examine antenna and coaxial mating connectors to make sure they are clean and secure.

(e) Orient antenna with respect to airframe. Connect aircraft coaxial cable to the antenna.

**NOTE:** Do not apply sealant between antenna base and fuselage. Application of a sealant will reduce lighting protection.
(f) Align antenna mounting holes with holes in fuselage (note the non-symmetric hole pattern).

(g) Attach antenna to fuselage with six non-Torx drive screws and flat washers. Apply sealant to the screw threads before installing them. Torque mounting screws to 22 ± 3 inch pounds (2.5 ± 0.2 Newton-meters).

(h) Ensure a maximum resistance of 0.05 ohms between the antenna and airframe.

(i) Apply an aerodynamic sealant around periphery of the antenna base to prevent seepage of water and condensation and to preclude corrosion.

B. Adjustment Procedure
   Not Applicable

C. Repair Procedure
   The ELT antenna is a non-repairable item. If the antenna is damaged or determined to be faulty, it must be replaced with a new antenna.

D. Return to Service Procedures
   Do the Operational Tests specified in the Adjustment & Test section of this maintenance manual supplement.

5. Remote Switch Removal and Installation Procedure

A. Removal and Installation Procedure
   (1) Remove the Remote Switch
      (a) Remove Remote Switch mounting screws.
      (b) Pull switch out of aircraft mounting location and disconnect electrical connector.
      (c) Put electrostatic protective covers on the switch and aircraft mating electrical connector.

   (2) Reinstall the Remote Switch
      (a) Remove protective covers from the switch and aircraft mating electrical connector.
      (b) Connect aircraft mating connector to the Remote Switch connector.
      (c) Insert the Remote Switch into mounting location.
      (d) Install and tighten Remote Switch mounting screws.

B. Adjustment Procedure
   Not Applicable

C. Repair Procedure
   Any repair procedures should accomplish by manufacturer approved facility in accordance with the manufacturer’s repair instructions.

D. Return to Service Procedures
   Do the Operational Tests specified in the Adjustment & Test section of this maintenance manual supplement.
1. General
   A. This section describes procedures for periodic testing of the ELT system. Any obvious damage to any ELT system component should be rectified before proceeding.

2. ELT operation Tests
   A. The system test is an operational test used to test the basic functionality of the ELT system. This test does not give specific levels of performance for any of the functions of the ELT but it does indicate that the system is functioning in a satisfactory manner. The system test is detailed below:

   (1) Always perform the test within the first five minutes of the hour (UTC) as required by AC 43.13-1B, 12.21 and 12.22 Note 3. Be sure to notify any nearby control tower of your intentions.

   WARNING: DO NOT ALLOW TEST DURATION TO EXCEED 5 SECONDS. The ELT will transmit a 406.025 MHz signal after the ELT is active approximately 47 seconds; the satellite system considers the transmission to be a valid signal.

   (2) Ensure ELT system circuit breakers are closed.

   (3) Tune a VHF receiver to 121.5 MHz.

   (4) Turn the ELT remote switch panel ON, wait for 3 sweeps of the receiver, which takes about 1 second, and then turn the switch back to ARM (OFF) position while paying attention to the LED activity upon entering the ARM (OFF) condition.

   B. De-energize the A?C electrical systems, if no longer required; refer to the Aircraft maintenance Manual Chapter 24.

   C. Return aircraft to serviceable condition.