

## 406 MHz ELTs continue to demonstrate deficiencies

**By Kevin Psutka, COPA President and CEO**

The Transportation Safety Board of Canada (TSB) issued its investigation report <http://www.tsb.gc.ca/eng/rapports-reports/aviation/2011/a11w0151/a11w0151.asp> on March 20, 2013 into a 2011 accident involving a Cessna 208B Caravan.

Despite having one of the newest Emergency Locator Transmitters (ELT) on board, long promoted by Transport Canada and the Department of National Defence, the ELT failed to alert the authorities or assist in the location of the wreckage.

Instead, a tracking device on board the aircraft (in the words of the TSB) “was instrumental in locating the accident site. This reduced the search time, and allowed for timely rescue of the seriously injured survivors.”

Yet again, it took a tragic accident to illustrate what COPA has been advocating for many years.

COPA has opposed mandatory equipage with these new ELTs since 1998 for precisely the reasons that were demonstrated in this accident and others. The ELT became dislodged from its mount, very similar to a high profile accident in Alaska a few years ago involving Senator Ted Stevens, where the ELT became dislodged and broke away from the antenna cable. In the more recent accident the cable remained intact but the antenna broke off.

The details about the ELT lack of performance are provided below but it is interesting to note that even though the ELT became dislodged, the deceleration forces experienced by the ELT were still sufficient to activate the ELT. However, no alerting signal was received either by the satellite monitoring system (406MHz) or by the rescuers trying to pick up a homing signal (121.5MHz) because the antenna broke off. Fortunately, the owner of the commercial aircraft chose to and could afford to equip with a tracking device, which provides a breadcrumb trail to help lead to the accident site even if it is destroyed in the crash. COPA has maintained for many years that the failure rate of ELTs is unacceptably high. The key advantage of tracking devices, as illustrated very well by this tragic accident, is that information about where the aircraft was before the crash is transmitted and can be, as in this case, instrumental in locating survivors. COPA’s long-standing position remains that we are not opposed to 406 ELTs but they should not be mandated. 406 ELTs are great when they work but they provide absolutely no information until they are activated and since they are prone to exactly the same failures as older ELTs (antenna breakage, inverted wreckage masking signals, crushed or consumed by fire or submerged) it is likely that if aircraft are equipped with only an ELT, there will be no indication of where you may be or where you have been. Newer ELTs are more expensive than their predecessors and so are many of the tracking services. It is unreasonable to expect the non-commercial sector of aviation to equip with both so that is why COPA advocates for a compromise requirement that provides the maximum benefit at minimum cost.

We want the requirement to equip with an ELT to continue. This satisfies the search and rescue folks as well as Transport Canada. If an aircraft owner chooses to retain an older ELT they should carry some other means of alerting that is appropriate for their area of operation. Even if they equip with a newer ELT they should be encouraged but not mandated to carry another device for precisely the reasons illustrated in the Caravan accident.

### **From the Facts portion of the report:**

#### **Emergency locator transmitter**

C-GATV was equipped with a Kannad 406 AF- COMPACT emergency locator transmitter (ELT), part number S184-0501-04, serial number 26214830036. The ELT was connected by cable to an external roof-mounted antenna and to a remote cockpit switch.

During field examination of the wreckage, the ELT was noted to be out of its mounting tray and hanging by the antenna cable. The remote control panel wires were broken near the plug on the ELT. The antenna had been broken off by ground contact, and its cable was continuous from the antenna base to the ELT. Due to loss of the antenna, no 406 MHz signal was recorded by the Joint Rescue Coordination Centre (JRCC), nor was a 121.5 MHz signal received by search and rescue aircraft.

When rescuers arrived on site, they noted that the ELT was operating, as evidenced by an indicator light and audio. During shop testing following the accident, the unit was shown to be capable of producing effective signals.

The ELT had been mounted in the aircraft on the upper right hand-side wall of the tail section, immediately behind the cargo bay. The mounting system consists of a rectangular composite tray affixed to the aircraft.

The ELT rests within a raised box structure around the perimeter of the mounting tray, and is secured by a fabric strap featuring a hook and loop (Velcro) system. When the strap is tight, the ELT is firmly held in the mounting tray box ([Photo 1](#)).



**Photo 1.** Mounted ELT in C-GATV



**Photo 2.** ELT sliding under loose strap

Field examination of the ELT and mounting bracket in C-GATV revealed that the retention strap was loosely fastened and that it was possible to slide the ELT under the strap and back into its mount. The unit could easily be removed in the same manner. After adjusting the strap by shortening it  $\frac{3}{4}$  inch, the strap was tight around the ELT, which was then firmly secured in the bracket. The ELT then could not be manually removed without loosening the strap.

Instructions in the installation manual, directed installers to align the strap buckle with the centre line of the unit, and to "Fasten the self-stripping strap tightly." There was no further definition of the degree of strap tightness required to adequately retain the ELT in the mounting tray.

**From the Analysis portion of the report:**

**ELT**

Due to a loosely fastened hook and loop retention strap on the ELT installation, the ELT was ejected from its mounting tray during the impact. Since instructions do not describe a method for determining the required degree of tightness to retain the ELT in its mount, the installer's own judgment is relied upon to determine this. As a result, a wide variation in the quality of installation of ELTs that are retained by this method could increase the possibility of inadequate retention.

In this accident, in the absence of a transmitted 406 MHz signal, the on-board GPS-based flight-following equipment (SkyTrac) was effective in directing the search party to the accident site and reduced the time for the search and rescue of the survivors.

**From the Findings portion of the report:**

**Findings as to risk**

Installation instructions for the ELT did not provide a means of determining the necessary degree of strap tightness to prevent the ELT from being ejected from its mount during an accident. Resultant damages to the ELT and antenna connections could preclude transmission of an effective signal, affecting search and rescue of the aircraft and occupants.

**Other findings**

With the ELT unable to transmit a useable signal, the SkyTrac system in C GATV was instrumental in locating the accident site. This reduced the search time, and allowed for timely rescue of the seriously injured survivors.