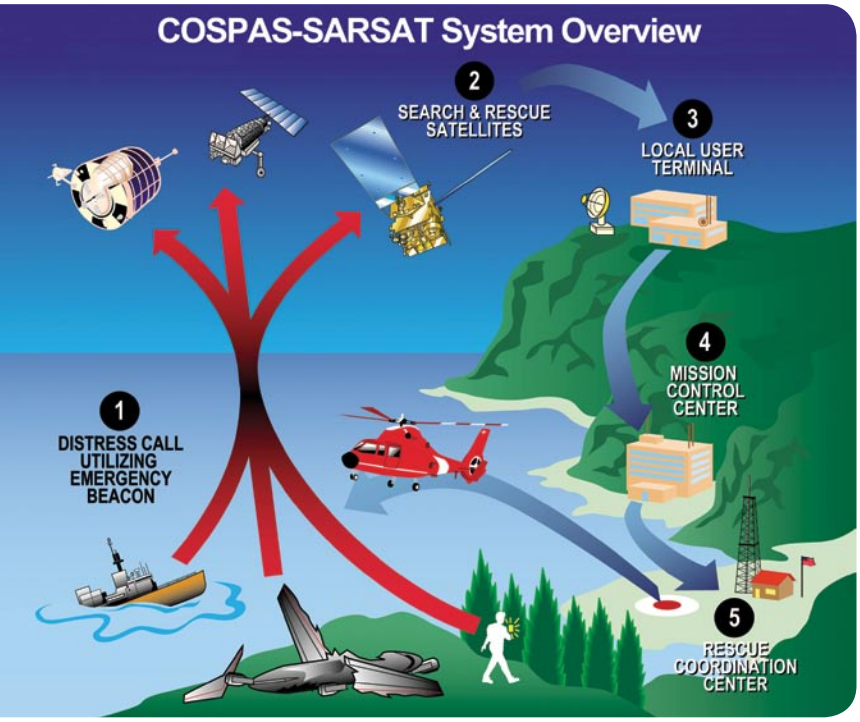
TICK, TICK, TICK...

THE END IS NEAR FOR 121.5 MHZ

BY DAVE HIGDON

Working as an aviation journalist sometimes gets a person called upon for knowledge not necessarily in his possession. For example, the "What-should-I-fly" question is so personal, it always begs a counter question: "What kind of flying do you want to do?"

Recently, a handful of maintenance technicians and pilots — aircraft owners, mostly — began asking about a surprising topic, considering the publicity and impact of the root story.



In a few weeks, the operators of the Search-and-Rescue Satellite-Aided Tracking System intend to turn off monitoring of 121.5 MHz — the ELT frequency.

Although this cut-off date has been known for a long time, it still seems to generate confusion and concern among pilots, owners and some shop technicians who have approached me for information about what to do.

The simplest, shortest answer to the root question of what do to could be, "Nothing."

Owners, pilots and technicians alike do not have to do anything except continue to meet the ELT requirements of FAR 91.207.

Simple, right? Well, yes and no. "Yes," if your flying never takes you to where search-and-rescue (SAR) might struggle to find you — but you do not need to be that far from the home field to be difficult to find under the right circumstances.

For many, "No" is less acceptable once they understand the implications of the do-nothing approach. And despite the widespread publicity given this topic, many still seem unsure of the details, the ramifications and their options to make a better decision than the do-nothing conclusion.

So, with this continuing confusion in mind, the editors thought it wise to visit the topic one more time before the cut-off date arrives, recognizing this is a horse beaten many times before in other ways and pieces.

HOW WE GOT HERE FROM THERE

For more than three decades, the simple little 121.5 MHz ELT carried the standard for aviation SAR.

Once triggered — maybe by crash impact, maybe manually — the descending "whoop-whoop" oscillating tone of the beacon announced an aircraft was down. If a nearby FAA facility — ATC or FSS — didn't pick up the beacon, a passing pilot might, if the pilot actually was monitoring 121.5 MHz and flew by close enough.

Barring that, a smattering of search-and-rescue satellite-aided tracking (SARSAT) birds operated by the National Oceanic and Atmospheric Administration might pick up the beacon.

In the ensuing years, tremendous growth in other devices using the same radio frequency spectrum drove up the number of false alarms — as if the little ELTs didn't produce enough of their own from hard landings, improper or careless testing, and the like.

Years ago, the global SAR community adopted a new standard for emergency beacons after years of increasing frustration with the growing number of false-positive signals on 121.5 MHz.

The new frequency, 406 MHz, delivers many advantages, among them a cleaner, clearer spectrum and greater accuracy with less potential for false positives.

International operations already employ 406 MHz, per regulations governing inter-country travel.

Otherwise, nations participating in this global network each get to decide how to handle the change in their domestic environments; here, too, most countries require aircraft to carry ELTs employing the new frequency.

So, on Feb. 1, 2009, only FAA facilities and a few pilots will continue to monitor 121.5 MHz; the SARSAT birds won't be listening anymore.

NO MORE OVERHEAD HELP

While current regulations require nothing different in the way of ELT equipage of the owner or pilot, the end of SARSAT monitoring has tremendous implications for them.

Search-and-rescue operations will continue to employ 121.5 MHz homers to search for downed aircraft, according to a variety of agencies from the U.S. Coast Guard to the Civil Air Patrol.

Flight Service Stations will continue to monitor 121.5 MHz, and aircraft pilots are technically still required to monitor this frequency at all times if it's possible with installed equipment. After all, 121.5 MHz still remains the GARD frequency for airborne emergencies.

The only change coming on Feb. 1, 2009, is the end of satellite monitoring.

This change alone is significant when you understand the limitations of 121.5 MHz ELTs and some basic facts about the 406 MHz replacements.

The biggest problem for the old ELTs stems from the loss of the satellite's dual ability to serve as both an early detection system and to narrow the search focus.

Assuming optimal signal conditions, an active ELT can transmit its beacon for as long as a couple of hours before a satellite pass exposes the bird to the signal, providing an initial focus for searchers; subsequent passes — about every two hours — serve to narrow the search area a bit more.

From that point, successful search-and-rescue depends on the aerial and ground units detecting and triangulating the signal, then focusing on the resulting area.

But even in good conditions — and we know how often conditions are not good — the satellite-defined search area can span from a 10-mile radius and up, which is not exactly a pinpoint location. Working such a large area can be an exhausting effort for searchers.

Now, imagine trying to narrow down the search area without the benefit of the satellite's initial targeting. The search radius can extend miles farther at the start, complicating the process and extending the time needed to find the crash site. A SAR crew could be looking in an area exceeding 100 square miles.

Even on their best days, the old-technology ELTs had a spotty record for leading in the searchers. And this doesn't even address the issues of false alarms from hard landings, inadvertent manual activations and badly conducted tests.

Speaking solely of the reception/signal strength and satellite detection issues, the new-generation 406 MHz ELTs offer aircraft owners many potential benefits compared to the old gear.

The 121.5 MHz ELT transmits with about 0.5 watts of power; the 406 MHz ELT transmits a full 5 watts, which means searchers can "hear" the 406 MHz beacon 100 miles away. By comparison, a SAR crew might need to stray within four or five miles of a 121.5 MHz beacon before getting a sufficient signal to track.

When presented properly and accurately, these benefits seem to sway savvy aviators who look at investments in safety-oriented gear as wise steps — as long as the costs are reasonable.

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QUANTIFIABLE BENEFITS: Accuracy, Speed, Security

Where the old 121.5 MHz units struggle to be heard, the 406 MHz units veritably shout their location by comparison.

Thanks to satellite sensitivity and the strength of their signal, the 406 MHz ELTs typically are heard and generating a response within a couple of minutes.

This difference in detection time alone is significant for survivors of an air crash — a time when minutes can make the difference between life and death.

The 406 MHz signal and the satellites also produce a higher degree of precision in providing an initial search area — as little as a square mile at the start — without GPS data. Some better, up-line 406 MHz ELTs also offer the ability to relay to the satellite's GPS position data. Again, time and search patterns benefit.

The satellite-generated position report from a non-GPS-informed 406 MHz ELT cuts the search area as much as 90 percent from the start. And remember, the start can be anywhere from a few minutes to a couple of hours faster.

OTHER BENEFITS: Fewer False Alarms, More Search Information

Another benefit available from some of these new GPS-equipped or GPS-enabled 406 MHz ELTs is the additional data they can broadcast.

Each 406 MHz ELT must be registered, and in this registration is information about the owner — name, address, phone number — as well as data on the aircraft type and color.

For authorities, this ownership information is invaluable in quickly acting on alarms. They can look up the ownership data and call the owner to confirm the alarm is not a false one, eliminating the frequent hours of frustration Civil Air Patrol searchers often endure tracking down an errant aircraft ELT, only to find the airplane sitting tied at an airport, where the last driver left it after a hard landing triggered the ELT — or worse, from some non-ELT source.

THE NEW FREQUENCY, 406 MHZ, DELIVERS MANY ADVANTAGES, AMONG THEM A CLEANER, CLEARER SPECTRUM AND GREATER ACCURACY WITH LESS POTENTIAL FOR FALSE POSITIVES.

With GPS-generated position data, the initial search area can be narrowed to the size of an athletic field. Finding a needle in a haystack gets much easier and faster when you eliminate 99 percent of the hay.

However, even without the GPS-generated position information, authorities say the 406 MHz ELT alone is significantly better than the 121.5/243 MHz units in accuracy, signal strength and the ability to be heard.

In fact, thanks to the accuracy and ownership information, the SARSAT people know almost instantly whether to notify the CAP or the Coast Guard to start a search, depending on whether the location is on land or water.

Additionally, ownership and aircraft data can be checked with FAA Air Traffic Service to confirm the aircraft was in the system when the signal started.

And the ability to relay to searchers a description of the airplane serves to enhance searchers' mental state — they'll actually know from the start what type of airplane they seek as well as its paint colors.

Taken together, this type of data has been the salvation of numerous hikers, backcountry campers, mountain climbers and other outdoors aficionados who triggered a search using one of the many emergency personal locator beacons employing 406 MHz and GPS data.

EPIRBS & PLBS: Not the Same, But Not a Bad Idea

For those who are reluctant to invest in an onboard 406 MHz ELT to replace their old 121.5/243 MHz, one of those emergency position-indicating radio beacons might seem like a suitable option. Others, known as personal locator beacons, also can serve the search-and-rescue purpose.

An excellent report on these units and details about the benefits of the 406 MHz beacons can be found in an extensive report produced by pilot Doug Ritter and the foundation he leads, Equipped to Survive, at the foundation's website at www.equipped.org.

As an alternate to an installed aircraft ELT, however, an EPIRB comes with some shortcomings. First, an aircraft's 406 MHz ELT is coded with information that tells authorities instantly the signal is from an aircraft; EPIRBs for marine vessels do the same, telling authorities a boat or ship is involved.

The biggest shortcoming to these alternatives stems from how they work: EPIRBs require human action to activate. They're generally not designed to activate auto

matically, save for some designed to activate when immersed in water. This means a pilot needs to be conscious and capable of finding and activating the EPIRB.

And neither alternative allows for the removal of the 121.5 MHz ELT.

Conversely, aviation 406 MHz ELTs are legal alternatives to the old ELTs.

Equipped with improved impact triggers and external antenna, they offer a higher probability of a signal reaching the satellite regardless of the aircraft occupants' ability to intervene on their own behalf.

However, in an accident that would fail to trigger the old-style switches of 121.5 MHz ELTs, the new 406 MHz ELT also might not trigger.

REGISTER YOUR 406 MHZ ELT — IT COULD SAVE YOUR LIFE

Sitting in the middle of nowhere is not the time to suddenly remember you didn't take the five minutes needed to register your new 406 MHz ELT with NOAA.

The difference between search-and-rescue reacting to the distress signal received by a registered ELT and a non-registered ELT can be measured in hours.

To register your 406 MHz ELT, visit www.beaconregistration.noaa.gov or call 888-212-SAVE (7283).

Q&A: What to Tell Owners and Operators

Factories already are turning to the new ELTs. Not only is the price difference a minor issue in a six-figure transaction, but planemakers delivering state-of-the-art panels also want the rest of their aircrafts' systems to match — and that means GPS-enabled 406 MHz ELTs.

With this information as background, don't be surprised if you experience an increase in traffic during the next several weeks as the masters and mistresses of the general aviation fleet suddenly awake to the fact that the go-deaf date of those SARSAT birds is upon them and their old ELTs.

Some operators might want to yank out a perfectly functional ELT — well, as perfect as it ever was — to save weight, eliminate a maintenance item and gain a little space. As you know, they can't do that because an ELT or an approved replacement is still required.

Some operators also might express concern about the legality of their continuing to fly with the 121.5 MHz ELT or fretting they missed the deadline to upgrade. No worries here. To repeat: No requirement to upgrade currently exists, in part because of efforts by pilot groups to prevent the FAA from mandating replacement.

The groups, AOPA among them, fought to avoid an FAA regulatory change forcing pilots into a replacement deadline with its potential to artificially inflate prices of a piece of gear already more pricey than what it replaces.

Converse to the requirement issue, questions might arise about the viability, even the wisdom, of continuing with nothing but the old-school ELT. Considering the practical benefits, the savvy owner or operator should wonder whether it's time to upgrade.

Shops and dealers likely will field more than a few complaints about the cost of replacing the old with the new.

The last time my aircraft needed a battery replacement for an old 1980s ELT, we opted to buy a new-generation 121.5/243 MHz ELT for less than the cost of the needed replacement battery — about $200. That ELT offered the benefits of portability and an accessory microphone input so a user could transmit voice to SAR crews. It also used six dated Duracell D-cell batteries, which made the biennial ritual replacement cost about $8.

In contrast, basic 406 MHz ELTs start at about $1,000 and go up with GPS-enabling to nearly $2,000. Installation costs also might be an issue, as is can be more expensive than an old-style 121.5/243 MHz unit installation if the aircraft never had a new one with a panel-mounted activation/test switch.

Substituting a new 406 MHz ELT in an aircraft already employing the panel control and an external antenna is pretty much an unplug-swap-plug-in process.

Making a connection to the panel-mounted GPS also drives up the costs.

The goal is to get people thinking and talking about ELT technologies beyond the abstract of the coming cut-off date and toward what's next and what you can tell those anxious aircraft owners.

Opportunities to upgrade to better technologies are numerous — if not

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FOR AVIATORS: A Few 406 MHz ELTs Options

Because makers of new aircraft already are shipping their products with new 406 MHz ELTs, it should help nudge some owners and operators of older aircraft to upgrade.

The Aircraft Owners and Pilots Association installed a new Kannad 406 MHz ELT in the association's current sweepstakes aircraft, a Piper Archer.

Kannad makes a variety of 406 MHz ELTs for the general aviation market, including those with basic ELT functions and others offering GPS-position reporting, which can dramatically improve search-and-rescue accuracy. Most Kannad models transmit on all three SAR frequencies: 121.5MHz, 243 MHz and 406 MHz.

Some models can be used portably with an accessory antenna and microphone.

The battery life of these units is six years — eliminating two battery-change cycles in the process. However, replacement batteries are not much more expensive than those proprietary batteries for the old 121.5 MHz ELTs.

Kannad's ELTs carry retail prices from less than $1,000 to a little more than $2,000; GPS input modules are additional and require another harness connection between the GPS and the ELT, a factor in installation costs.

Artex Aircraft Supplies also offers 406 MHz ELTs.

The Artex ME406 broadcasts 406 MHz and 121.5 MHz only, employs a five-year battery, can be installed using the same mounting holes as several other old ELTs, and costs less than $1,000. The ME406 does not offer an option for GPS input.

The Artex ME406/P, a more robust, portable version of the ME406, uses a more flexible crash switch; the cost is about $2,300. This unit cannot use a position-input module.

To employ the module requires something like the Artex G406-4.

Regardless of the price point, with the rapid arrival of help desired, many a pilot should be open to the idea of improving their odds for about the same price as a top-line hand-held GPS navigator.

For me, the decision ranks right up there with retrofitting shoulder harnesses, upgrading anti-collision lighting or installing stand-by suction. Any of these could come down to a matter of life and death. And this point alone should be a strong enough to relay to aircraft owners the next time their ELTs needs service. ❑

If you have comments or questions about this article, send e-mails to avionicsnews@aea.net.