National Aeronautics and Space Administration

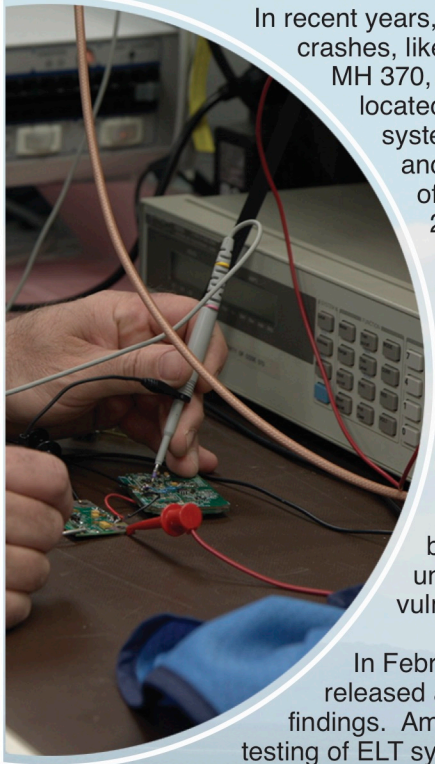
NASA's Taking the "Search" out of Search and Rescue

NASA's Search and Rescue office, located at Goddard Space Flight Center in Greenbelt, Maryland, is an important player in both national and international efforts to locate and rescue people in distress. The office is one of four organizations that make up the U.S. Search and Rescue Satellite Aided Tracking (SARSAT) program. It is also one of the key components of the international Cospas-Sarsat program, which was formed in 1979 and currently consists of more than 40 countries and organizations. Within both these efforts, the NASA SAR office serves as a major hub of research and development, generating ideas for, and implementing, cutting-edge technologies to save lives.

The SAR office conducted three controlled airplane crashes at NASA's Langley Research Center. Pictured here, one of the airplanes is suspended above the Landing and Impact Research Facility prior to being crashed.

The SAR office is currently working on numerous technologies, one of which is an emergency locator transmitter (ELT) system for airplanes. ELTs are beacons placed on aircraft that send a distress signal to satellites in the event of an emergency.

The systems are triggered to begin transmitting based on the gravity force of the plane hitting the ground. The signal helps emergency services find and respond to the crash.



In recent years, several high-profile plane crashes, like that of Malaysian Airlines MH 370, which still has not been located, demonstrated that ELT systems need to be more robust and effective. NASA's SAR office took the initiative in 2014 to begin a two-year study of ELT efficacy.

As part of the study, they analyzed records of historic ELT failures and performed three controlled airplane crashes at NASA's Langley Research Center in Hampton, Virginia, to better understand ELTs' vulnerabilities.

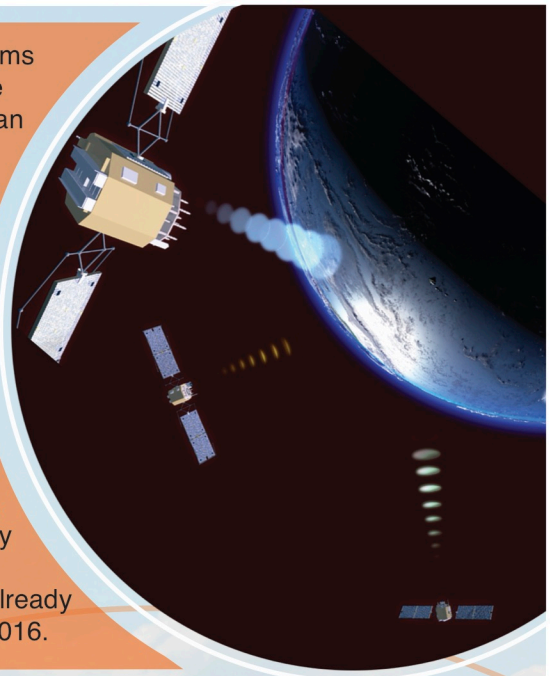
In February 2017, the SAR office released a report detailing their findings. Among them are improved testing of ELT systems by beacon manufacturers, and requirements for fire protection, vibration robustness, beacon mounting, and cable/antenna installation that will ensure ELT system survivability and reliable activation and transmission of the distress signal. They also recommended that new ELT systems take advantage of the smaller, lighter, more accurate second-generation beacons the SAR office is currently developing.

For more information about the SAR office's work, please visit:
https://sar.gsfc.nasa.gov

LG-2017-6-019-GSFC

Second-generation beacons (SGBs) will replace systems originally developed in the 1980s, which are still in use today. While the original beacons have saved more than 40,000 lives worldwide to date – including about 300 lives a year in the U.S. – the NASA SAR office knows they can be improved with more modern technology.

Moving from a narrow-band frequency to a spread-spectrum signal will make the signal more robust and reduce interference, making it more likely to be found. Additionally, the SAR office is working with national and international counterparts to develop a medium-Earth-orbit global positioning satellite system to support the beacons, providing more continuous monitoring than the previous system. Together, these changes will improve location accuracy from about two kilometers to about 100 meters and significantly reduce rescue time. The SAR office has already seen these improvements in preliminary tests in late 2016.



NASA Search and Rescue

Not only can these new beacons be used in ELTs for aircraft, but the SAR team intends to place them on astronauts' suits for the Orion missions so that Mission Control can track astronauts once the capsule splashes down at the end of the mission. They will also be released commercially for use on ships, and they will be available at outdoors stores for recreational enthusiasts at an affordable price. Plus, the office is developing a SGB direction-finding receiver prototype that will be flown onboard unmanned aerial vehicles to take the human element out of some search-and-rescue situations.