Andreas Fecker

Alte Marktoberdorfer Str. 14
D-87616 Marktoberdorf
Phone: +49 (8342) 96 95 777
Mobile: +49 (172) 740 3497
Email: andy@fecker.org
Web: www.fecker.org

To whom it may concern

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Invention - Position and Rescue Locator PRL

In the light of the recent loss of a Boeing 777 I would like to revive the realization of a system to facilitate the location of a lost aircraft or an aircraft in distress. This invention has been submitted in 1992 to the German Ministry of Defense and it has been acknowledged by then Minister Volker Rühe as a patent. But so far it has never been realized.

Present systems
Commercial and military aircraft usually have an emergency locator transmitter (ELT), which goes off during a crash and emits a warble tone on international guard frequencies 121.5 and 243.0 Mhz. Additional blackbox locator systems are triggered when under water which will help locate the wreckage within a small (submerged) radius for 30 days.
Secondary transponder emit call sign, position, altitude, velocity, attitude, and when triggered distress codes, visible within the area of coverage of secondary radar.
ACARS transmits health of engines and other technical data via satellite.
As the MH370 disaster unfolds, none of the above could really be put to use. 26 nations are involved in an unprecedented search that may sum up to hundreds of millions of Dollars.

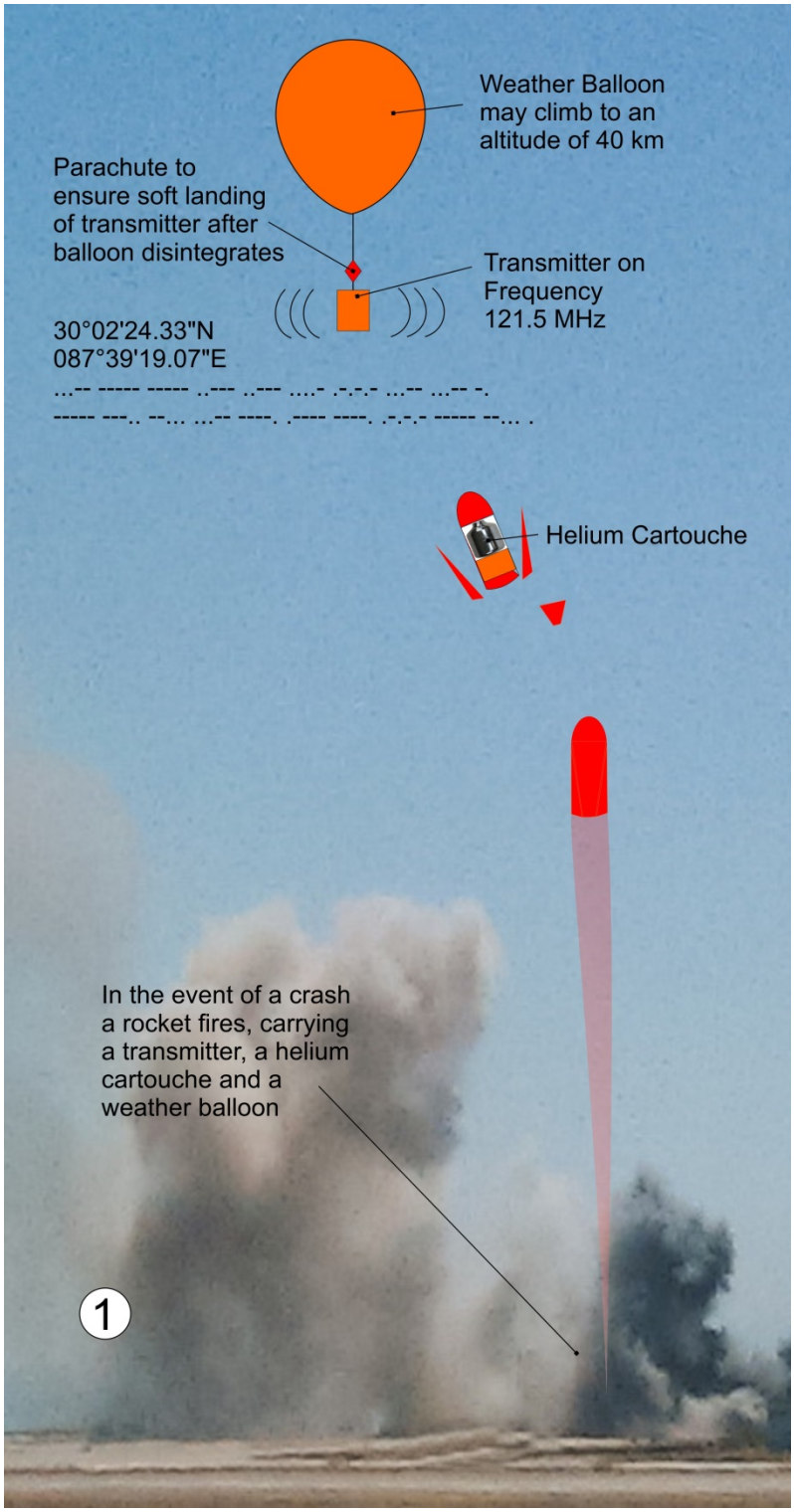
My system
A small rocket-propelled container sits in the upper tail section. It carries a radio transmitter, a battery, an antenna, a deflated balloon similar to a weather balloon, a helium cartouche and an electronic memory module. The latter is connected to the avionic system, from which it receives the ever changing position data. Hence the changing geographic position and altitude will be constantly available in the memory and converted into Morse code, ready for transmission should this be needed.
Alternatively - instead of a rocket - there could also be a small hatch which opens or ejects during impact.

Function

Scenario 1

In the event of a crash, the crash-sensor (as known in an airbag system) will fire the rocket, the balloon will inflate, the radio will transmit the content of the memory in Morse code bursts on international guard frequency. Wherever the balloon drifts, the crash position will continuously be transmitted in intervals of maybe 5 or 10 minutes. It will be recorded on board of ships, other aircraft and on ATC ground stations, not to mention satellites. The Morse code can easily be converted back to an exact coordinate.

When recorded and replayed in slow motion the code can be easily understood and translated in alphanumerical digits.



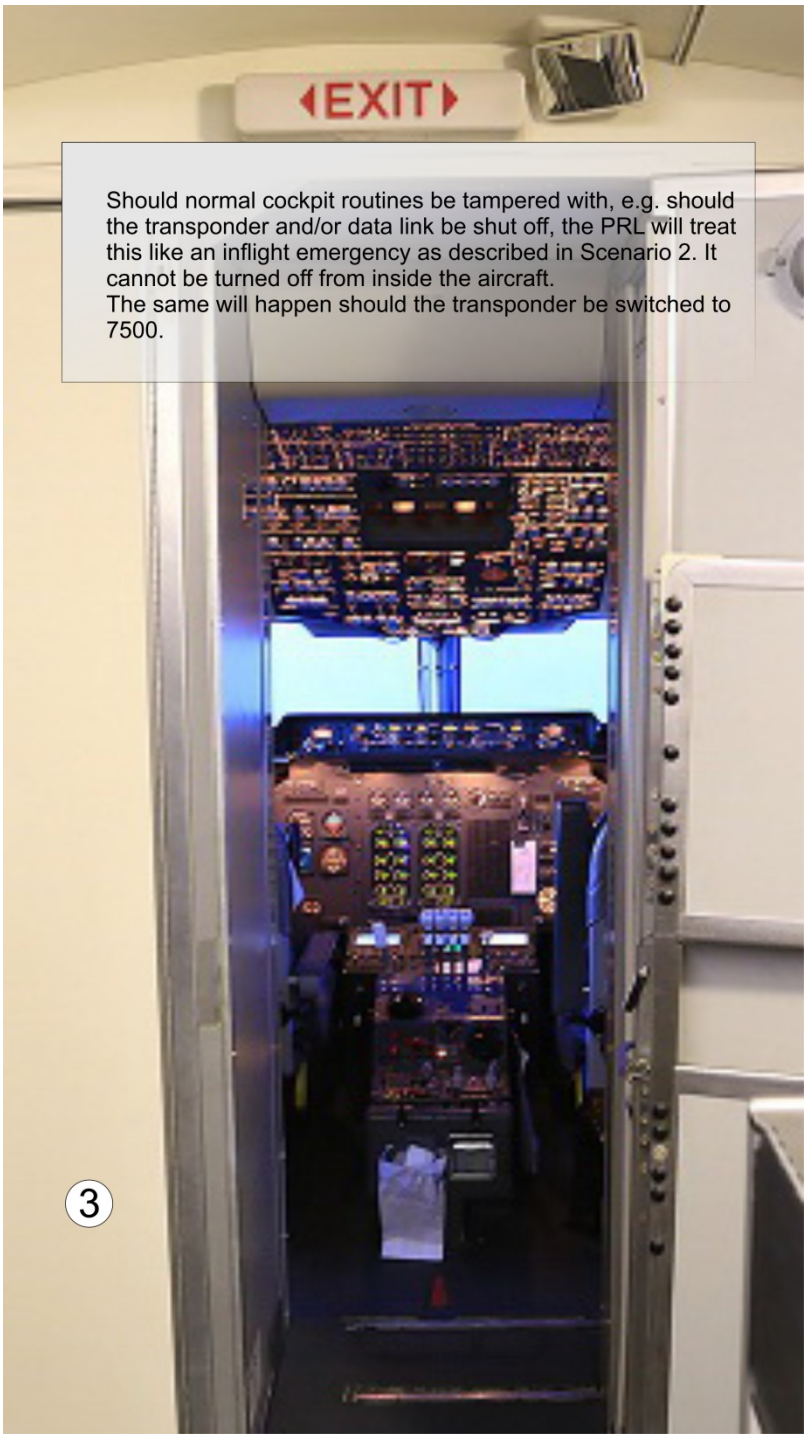
Scenario 2

During a controlled emergency the pilots will normally be in contact with Air Traffic Control. To raise attention and for easy identification they will set the transponder to Code 7700, or if communication fails to 7600. In both cases the PRL will start transmitting the position in form of the Morse Code. To not flood the emergency frequency this will happen in short, compact transmission bursts.
It should also start transmitting during an onboard fire. If this flight ends at an airport with a normal landing, the PRL must be physically defused and reset. If the flight ends with an imact, we are back on scenario 1, where the rocket fires and the balloon is extracted.

Scenario 3

As must have happened on board of MH370 somebody could have tampered with ACARS and the Transponder. The PRL shall therefore be programmed, that it starts operating if transponder or ACARS are shut off while in flight. Obviously Code 7500 will also set it in motion.

In such a case it will remain in its position as long as the aircraft flies. It should not be interruptible from the cockpit and would transmit to ATC and air defense the position and altitude of the aircraft in distress until the aircraft has landed or has crashed.



Summary

Trigger

There must be a variety of triggers:

a) On impact the rocket must fire or the hatch must open
b) If in flight and the Transponder is set to Hijack or Emergency, the system will stay in place but transmit in Morse code bursts the (changing) position
c) If in flight and ACARS or Transponder are being turned off, the system will stay in place but transmit in Morse code bursts the (changing) position
d) After the aircraft has landed the system should stay in place and keep transmitting in bursts.

Mounting

I suggest mounting the system in an area least strained in the event of a crash.

Energy

Rechargeable Lithium battery pack which goes autonomous if the power is cut in flight.

Added Value

- The ELTs I had to deal with during the last decades radioed in a line of sight. If they came to lay in a depression, a dense forest, a canyon or a mountainous region, there was no reception unless a helicopter flew right over it.
- In a remote area like the Indian Ocean reception may be limited by the curvature of the earth.
- Its continuous powerful warbling consumes battery power, especially in cold, snowed in mountains, where quick location of the wreckage is decisive.
- In case of an unintentional operation an ELT may jam the guard frequency, which is especially annoying at airports where many aircraft are close together, so the source may not be easily identified. The PRL instead transmits in bursts, the source is immediately identified.
- It does not work under water, but works on impact. Therefore it could be complemented with the underwater locator.
- The advantage over a floating ELT is the ascent to higher altitudes, so the signal can be received over longer distances. And no matter where it drifts, it always transmits the coordinates of the crash site.
- Even in cases where no direction finding equipment is available, the Morse code will be on ATC-Tape and can be read out.

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