

Low Frequency Acoustic Beacon (LF-ULD)

Rulemaking Background

In accordance with New ICAO requirements, all aircraft with a maximum take-off mass of over 27,000 kg operating over oceanic areas are to be fitted with the low frequency underwater locator beacon (ULB) by January 2018. The long range over water distance corresponds to 120 min at cruise speed or 400 NM whichever is the lesser.

According to TSO-C200a the ULB will be mounted directly to the airframe and will be operating for 90 days after activation.

EASA Air-OPS CAT.IDE.285 requirements states that by January 1st 2019 Passenger aircraft flying long range over water with a MTOW > 27,000 kg and cargo aircraft with MTOW > 45,500kg must be equipped with a LF-ULD. Long range over water is determined by a distance > 180 NM from shore.

The LF-ULD is a low-frequency underwater locator beacon for aviation. Aircraft in service today are equipped with flight recorders with underwater locating beacons (ULBs) attached. The detectable acoustic range of the ULBs currently in use is limited due to their transmission frequency of 37.5 kHz. A low-frequency ULD transmitting at 8.8 kHz has a far longer detection range due to its lower frequency and therefore offers a perfect means of long-range underwater localisation.

Note that the LF-ULD is not to be confused with the Underwater Locator Beacons (ULB) as installed on the CVR and FDRs. The LF-ULD is complementary to the ULB and is mounted to the aircraft structure.

Solution Highlights

The solution ATL offers includes EASA Approved Minor Change to Type Certificate and a Mod Kit, containing the LF-ULD, Mounting Bracket, Adapter Plates and fixing features.

The technical content of the Minor Change is approved under the authority of DOA ref. EASA.21J.016.

The LF-ULD will be mounted on the aircraft structure, free of sound absorbent materials and not in wing sections or empennage. The installation is in accordance with ARINC specification 677, which describes the removal, installation and maintenance aspects of the LF-ULD installation. The LF-ULD low frequency (8.8kHz) technology is used to increase the range at which aircraft submerged wreckage can be located.

Installation requirements for LF-ULD are:

- Attached to aircraft structure
- Easily accessible for maintenance and test
- Battery test every 2 or 3 years based on option selected
- Battery replacement every 6 years
- Simple tooling

Benefits

- 8.8kHz transmission frequency
- 90 day minimum of transmission time
- Increased detection range
- Detection by additional receivers

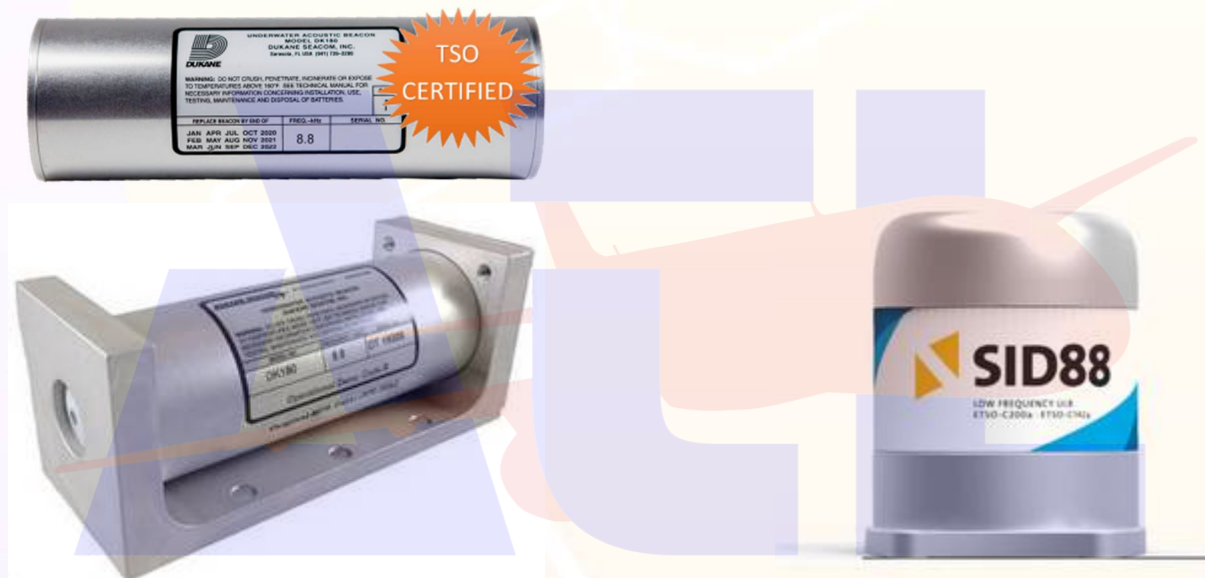
System Operations

The LF-ULD is a battery operated underwater acoustic pulse generator (beacon / pinger) that is activated when the water switch is immersed in either fresh or salt water.

The water switch is part of a low current triggering circuit, which when closed will initiate normal pulsing of the beacon oscillator circuit. The output voltage of the oscillator is coupled to the piezo-ceramic transducer ring.

The resultant mechanical motion is transmitted to the metal case of the beacon, which in turn radiates acoustic energy into the surrounding water at 8.8 kHz

Images



Option 1. Dukane DK180 LF-ULD

Option 2. Novega SID88 LF-ULD