



**Cleared  
for take-off**





The new  
low-frequency  
underwater  
locator beacon  
for aviation



# Built for extreme requirements

Aviation is safer than any other means of transport in the mobility industry. This is owed to a culture of systematic and continuous improvement in which the flight recorder plays a central role. It is only through the analysis of the stored data that the cause of the accident can be clearly identified and thus largely excluded in the future.

Black boxes are therefore built to withstand any accident and must still be locatable at a depth of several thousand metres. How is this possible? With the aid of the newly developed Low-Frequency Underwater Locator Beacons (LF-ULBs) such as the new SID88 by Novega.

## SID88 highlights

- ▶ It transmits an 8.8-kHz low-frequency signal for a significantly greater range of underwater detection compared to conventional ULBs with 37.5 kHz
- ▶ Automatic activation upon immersion into fresh or salt water
- ▶ Operating depth up to 6,096 m (20,000 ft)
- ▶ Minimum transmission time of 90 days

## Water-sensitive switch buttons

- ▶ SID88 has an intelligent activation and starts emitting the signal upon immersion into fresh or salt water. The actuation starts automatically and the beacon transmits an LF-signal of 8.8 kHz.

## High-performance battery

- ▶ The capacity of the easily replaceable high-performance battery is sufficient for a minimum transmission time of 90 days – even though the battery has a low lithium content. The lithium content is below 1 gram, which significantly facilitates shipment of the beacon. For comparison: other common products contain between 1.7 to 1.8 g of lithium.

## High-protection case

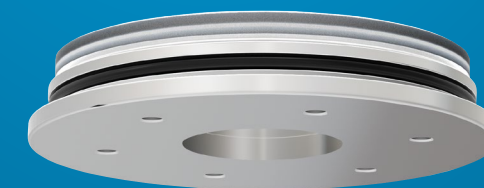
- ▶ The case withstands pressure down to a water depth of 6,096 m (20,000 ft) and can absorb extreme impact forces without damage. The SID88 is absolutely waterproof and is also resistant to chemicals thanks to its special surface coating.

## Design and mounting

- ▶ By integrating the attachment points directly into the beacon design, there is no need for an additional mounting bracket, and the SID88 can be fixed directly to the airframe. In addition, the beacon is lighter in weight and easier to attach. But above all, this design ensures maximum performance of the beacon signal, and compared with traditional tube-type beacons in a bracket, the radiation pattern is much more spherical and therefore more efficient.

## Maintenance-friendly

- ▶ The battery cap is guaranteed to be watertight to a depth of 6,096 m (20,000 ft). It is easy to open for battery replacement. To assist easy opening, a smart tool to safely remove the battery cap was developed.



# The new SAE Standard comes into force in 2018

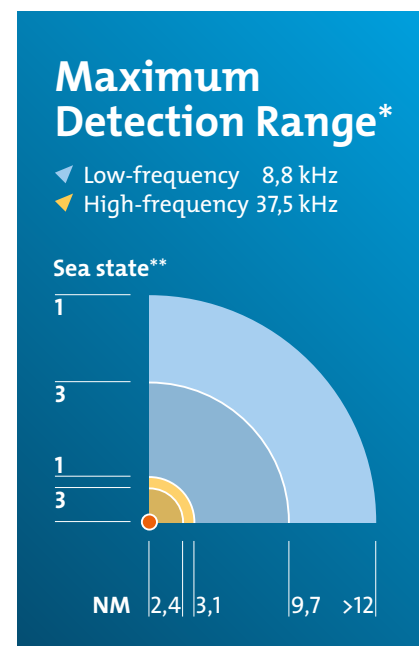
With their signals of 37.5 kHz, the range of the acoustic beacons currently in use in the aviation industry is very limited. Underwater detection is only possible within a range of about 3 NM (Nautical Miles). If the wreck is located in the unknown depths of the vast ocean, detection efforts resemble the proverbial search for a needle in a haystack.

For this reason, international committees and teams of experts have been working for many years on new technologies and implementation recommendations. Novega has been a part of the standardisation work group right from the start and with SID88, has developed a solution which not only fulfils but also surpasses every requirement set by SAE International and ICAO.

## The new standard at a glance:

- ▶ Valid from 1 January 2018
- ▶ Mandates airlines and aircraft manufacturers to integrate 8.8-kHz low-frequency ULBs into all aircraft with a take-off mass of over 27 tonnes.

Thanks to this new standard and the SID88, SAR teams will no longer need to search for the needle in a haystack in future, but only for the haystack.



\* Based on 3,500 m depth and DI = 0 dB. Range is for sea states 1–3.  
\*\* 1 = calm sea, 3 = rough sea



## 1. The problem: limited range of 37.5-kHz ULBs

Aircraft in service today are equipped with flight recording devices with underwater locator beacons (ULBs) attached. The detectable acoustic range of the currently used ULBs is limited due to the transmission frequency of 37.5 kHz.



## 2. The recommendation of experts: 8.8 kHz

An initiative was launched to fully investigate wreckage localisation technology where an LF-ULB transmitting on a frequency of 8.8 kHz was recommended. The device is intended to be installed on the aircraft structure.



## 3. The minimum requirement: SAE AS6254A

SAE International has published Aerospace Standard SAE AS6254A to cover the minimum performance standard for low-frequency underwater locator beacons transmitting at 8.8 kHz.



## 4. The ICAO: for aircraft from 27,000kg LF ULBs

ICAO Annex 6, Amendment 36, published November 2012, states that an LF-ULB shall be installed on all aircraft with a take-off mass of over 27,000 kg, operating over water at specific distances to land suitable for making an emergency landing.



## 5. The time limit: LF-ULBs from January 1, 2018

ICAO Annex 6, Amendment 36: at the earliest not later than January 1, 2018, a securely attached underwater locator beacon operating at a frequency of 8.8 kHz is required.



## 6. The future: locating with SID88

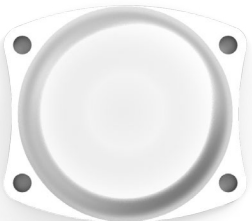
An LF-ULB transmitting at 8.8 kHz is essential to improve the range of underwater detection. With SID88, a set of circumstances and ideas turns into reality.

# Compact, lightweight and smart

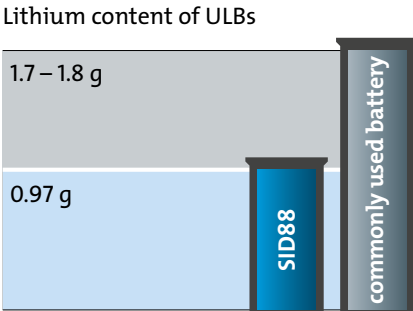
SID88 meets or exceeds the latest performance standards. In addition, it provides benefits and technical features to facilitate transport, maintenance and documentation. Features you will benefit from.



**Optimised design**  
► At less than 10 cm (3.78 in.) in height and only 8 cm (2.99 in.) in diameter, the SID88 weighs just 890 g (31.4 oz). Moreover, the SID88 does not even need an additional mounting bracket, so less costs, parts, part numbers, stock and installation efforts are the logical consequence.



**Integrated micro-controller**  
► It is not just about the external design but also the inner values. SID88 has a micro-controller with memory capability. The controller collects all data relevant for analysis and maintenance and saves them automatically. Data such as:  
► Date of manufacture  
► Serial number  
► Battery voltage  
► Acoustic operation  
The data can be read out and archived with the ULD test and analysing device Ulyser.



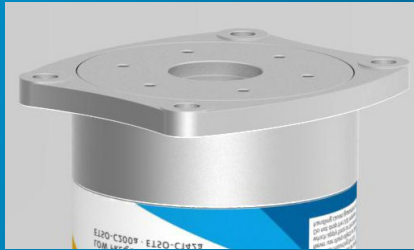
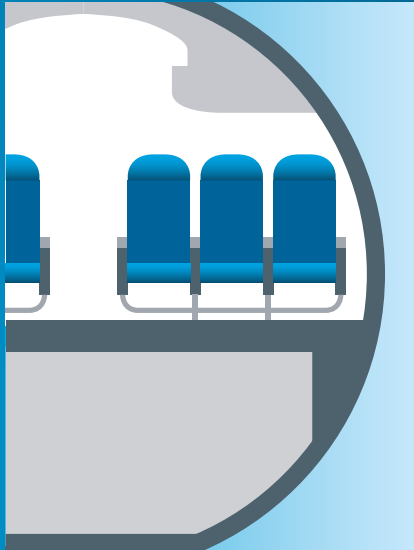
**Intelligent power management**  
► The SID88 is an energy saver. Its low power consumption enables the use of a non-rechargeable battery with less than 1 gram of lithium. This system allows for non-restricted transport, providing hassle-free shipping and cost savings. The battery meets the performance specifications of ETSO-C142a.



## SID88 Minimum performance standards

Diameter	76 mm (2.99 in.)
Height	96 mm (3.78 in.)
Weight	890 g (31.4 oz)
Operating frequency	8.8 kHz +/- 1 kHz
Operating depth	6,096 m (~ 20,000 ft)
Pulse permanence	10 ms (Minimum)
Pulse repetition rate	0.1 pulses/s (Minimum)
Operating life	90 days
Life cycle ULD	6 years
Acoustic output, initial	100 N/m rms pressure @ 1m (160 dB)
Acoustic output after 30 days	70.8 N/m rms pressure @ 1m (157 dB)
Operating temperature range	-2°C (28°F) to +38°C (100°F)
Storage temperature range	18°C ± 5°C (65°F ± 10°F)
Transport temperature	-55°C (-67°F) to +70°C (158°F)
Activation	Fresh water or salt water
Radiation pattern	80% of a sphere

**Safe and space-saving**  
► Mounting directly on the airframe is unbeatably easy with the aid of only 4 screws. The SID88 can be mounted at any location - either horizontally or vertically to suit requirements.



**Fixing in accordance with ARINC**  
► The housing base of the SID88 has four drilled holes. The hole pattern for the screws corresponds to the ARINC specification 677.



# Easy handling and maintenance

Aircraft contain a lot of different systems. An everyday challenge for airlines and their maintenance crews. To assist our customers in reducing the overall time for maintenance and documentation, we designed the SID88 to be low-maintenance and in doing so expanded the service interval to three years. Several user-friendly tools were developed to enable quick and safe maintenance, battery replacement and documentation.

## Battery replacement tools



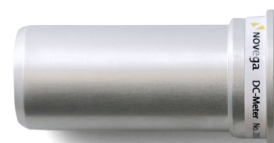
### Matching: fixture device

► The fixture device holds the SID88 firmly in place during the battery replacement.



### Practical: torque wrench adapter

► With this practical torque wrench to hand, maintenance technicians always have the right tool to enable opening and closing the SID88 safely.



### Easy measurement: DC-Meter

► With the DC-Meter, the sleep-mode current can be easily measured during battery exchange.



### Complete: battery replacement kit

► Everything for a professional battery change in one package: the new battery, a pre-greased O-ring and the date sticker.

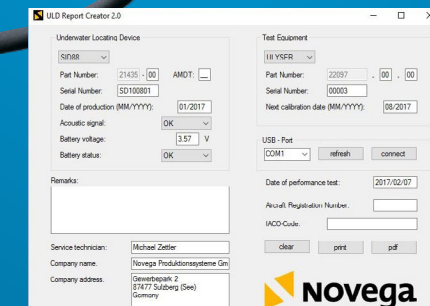


## ULYSER & ULD Report Creator



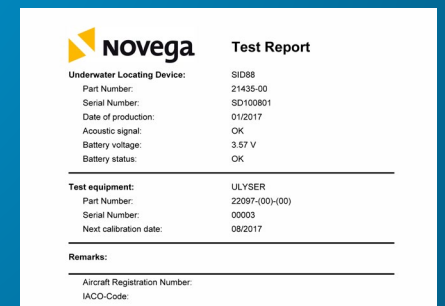
### Simply ingenious

► All necessary functional tests and date polling tasks are performed quickly and easily with the Ulyser. For activation and interfacing with the SID88, Ulyser simply uses the two water-sensitive contacts.



### Automated testing

► When SID88 and Ulyser are connected, the automated test sequence starts. During the sequence, the battery voltage, date of manufacture and SID88 serial number will be read out. In addition, the emitted acoustic signal will be detected by the Ulyser internal microphone. A marked checkbox indicates a successful test.



### Quickly logged

► The analyser can be connected to a PC or laptop computer via the Ulyser USB interface. For final test documentation, simply transfer the logged test data into the Novega software tool »ULD Report Creator« and print, store or transmit your document as usual.

# Top quality and service

Novega's quality is not created by chance, but is the result of a systematic and consistently implemented quality process. In this way, we comply with the highest global standards set by maritime and aviation safety authorities, as documented by numerous certificates, as well as regular quality and safety audits. In addition, we offer you a service that truly deserves this name – without any ifs and buts, including personal availability and proximity.



► Following the commands, each acoustic beacon is programmed and tested individually. Accuracy and calibration – a must to meet the requirements.



► Novega stands for excellent quality. We achieve this with qualified staff and reliable manufacturing processes as well as systematic monitoring.



► An automated production line with a series of linked workstations – efficient manufacturing and a stable process.

► We develop our range of products strictly in accordance with this philosophy and create additional value for customers.



# SID88 certification standards

## ETSO-C200a

- ▶ Low-Frequency Underwater Locating Devices (acoustic, self-powered)

## ETSO-C142a

- ▶ Non-Rechargeable Lithium Cells and Batteries

## SAE AS6254a

- ▶ Minimum Performance Standard for Low-Frequency Underwater Locating Devices (acoustic, self-powered)

## RTCA DO-347

- ▶ Test Guidance for Small- and Medium-Sized Rechargeable Lithium Batteries and Battery Systems

## RTCA DO-227

- ▶ Minimum Operational Performance Standards (MOPS) for Lithium Batteries

## RTCA DO-160G

- ▶ ED14G/DO-160G Environmental Conditions and Test Procedures for Airborne Equipment

## ARINC Specification 677

- ▶ Installation Standards for Low-Frequency Underwater Locator Beacon (LF-ULB)





# Locate the difference

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