Chelonia Limited
Wildlife Acoustic Monitoring

F-POD Specification November 2025

The F-POD has replaced the C-POD which had become the industry standard for monitoring the level of activity of porpoises and dolphins in coastal seas.

The increasing and widespread use of PODs has developed over 20 years and is due to three main features:

- Data volumes are lower than for other methods. This means running times and servicing intervals can be much longer – 4 months or more.
- Automated data analysis has been developed further for PODs and this gives accurate results, with very low false positive rates, without using very large amounts of expensive and subjective expert analyst time.
- The instruments are robust – many are still functioning as new after over 15 years of continuous use.

F-PODs log very large numbers of clicks that resemble cetacean clicks. Cetacean detection is performed in post-processing in the FPOD app by the detection and classification of coherent sequences – trains – of clicks found within the raw data. The F-POD stores detailed information, at very high time-resolution, on each click. This provides an optimal input to the train detection and species classification algorithms that run on a PC during post-processing.

Acoustics	The F-POD uses the highest sampling rate of any commercial logger at 1million samples per second. This is upsampled in real time to 4million samples per second and time-domain analysis is performed using parallel processing to enable the key features of clicks to be identified and used as the basis for selecting what is worth storing and what details should be stored.
Software app:	The FPOD app (FPOD.exe) carries out fully automated data analysis to find click trains in the data and identify those produced by all echo-locating cetaceans except sperm whales (Baleen whales do not use echo-location and are not detected). It also provides displays, filtering and export of data. Most users analyse their own data using this software, other use external contractors who provide this service. The FPOD app is free, with free upgrades.
Working depth:	At least 100 metres. A single F-POD has been tested to destruction and failed at 220 m. DeepF-POD: At least 2 km.
Autonomous operation time:	Operation time is affected by battery quality/capacity and deployment noise levels. The F-POD has automated adaptation to noise so that it does not often max out even in severe conditions. F-POD D12: 12x Alkaline D-cells: With good quality, high capacity D-cells, 4.5 to 6 months can be expected. F-POD D10: 10x Alkaline D-cells: With good quality, high capacity D-cells, 4 to 5 months can be expected. *Primary (None-rechargeable) Lithium D-cells: With approximately twice the capacity of alkaline cells, these have the potential to enable longer deployment times.* F-POD R25: 25x 21700 rechargeable lithium cells: Using Samsung 58E cells, over 8.5 months can be expected. LF-POD R10: 10x 21700 rechargeable lithium cells: Using Samsung 58E cells, over 4 months can be expected. F-PODs can be set to log 1 minute in every 2, 3, 5 or 10 minutes to further extend deployment time. The F-POD has a real-time clock, so you can set the F-POD's start time, making it is feasible to deploy several F-PODs and set them to switch on consecutively in order to obtain a very long continuous data set from one deployment. This is called "daisy chaining". Selected calendar months can be set to be in sleep mode.

Housing:	F-POD D12, D10, R25, R10: polypropylene. Lid: 2 'O'ring seal, one circumferential. 3 transverse securing holes in lid 10mm ID. Deep F-POD: Aluminium. End seals and pressure release screw in lid.
Dimensions	F-POD D12 and F-POD R25: Length: 745mm, Diameter: 90 mm. F-POD D10: Length 710mm, Diameter: 90 mm. Deep F-POD: Length: 710mm, Diameter: 100 mm LF-POD R10: Length: 380mm, Diameter: 90 mm. (LF-POD D4: Length: 355mm. Diameter: 90mm. now obsolete)
Weight:	F-POD D12: 2.3kg without batteries, 3.85kg with batteries. F-POD R25: 2.35kg without batteries, 4.05kg with batteries. DeepF-POD: 7.15 kg without batteries, 8.6 kg with batteries. LF-POD R10: 1.45kg without batteries, 2.1kg with batteries.
Buoyancy:	F-POD D12: Approximately +0.88 kg with alkaline D-cell batteries. F-POD D10: Approximately +0.95 kg with alkaline D-cell batteries and +1.2 kg with lithium D-cells. F-POD R25: Approximately +0.68 kg with lithium 21700 batteries. LF-POD R10: Approximately +0.44 kg with lithium 21700 batteries. This makes F-PODs self-orientating and increases the chance of recovery if the mooring fails. A web link engraved on the outside has enabled over 150 PODs to be returned to their owners by people who have found them on seashores, sometimes more than 2,500 km from home. DeepF-POD: -3.1 kg, not buoyant.
Mooring:	F-POD: 3 x 10 mm holes in the lid. DeepF-POD: 1 x 12 mm hole in the lid.
Hydrophone:	Compared to the C-POD the F-POD has a hydrophone with less Z-plane variation. The frequency range is 20 kHz to 220 kHz. The housing has a large-diameter to reduce surface noise pick-up. The transducer mounting and housing design gives very high resistance to impact damage.
Memory:	Any blank micro SD card up to 32 GB can be used. Data volumes are typically 2GB in 4 months, or less, pro-rata, if alternate minutes or less are logged. Intermittent logging is typically used to get logging periods of over 1year.
Batteries	F-POD D12 (previously D10) battery packs hold 12 D-cells. The battery housing is sprung in both directions to reduce battery damage from end impacts. F-POD R25 battery pack holds 25 x 21700 Lithium cells. It has diode protection on each series of 5 cells, to protect against insertion of a cell the wrong way round, and fuses on each series to protect against shorting. The cells are charged separately, outside the POD, removing the principal risk to lithium battery packs. Samsung 50E cells are recommended. A robust carrier for lithium packs is available.
Detection range:	Maximum detection range for porpoises is approximately 400 metres. Dolphins may be detected at >1 km.
Standardisation:	The sensitivity of acoustic loggers is a major factor in determining the sea area within which animals are detected. In most studies using them, uniformity of sensitivity is essential and we have a highly developed standardisation procedure which we believe represents the most precise testing process currently available.
Click selection:	Digital time domain waveform analysis is used to select possible cetacean or boat sonar clicks in the range 20-220 kHz. On-board train detection selects clicks in trains so that greater detail of some clicks can be captured.

Cetacean detection:	Coherent click trains are extracted and classified in post-processing by the KERNO-F classifier. Version 1.0 is now in use and will be retained unchanged to give long term uniformity of performance.
Species classification:	Porpoises and other narrow-band high frequency (NBHF) species can be distinguished from broadband species. Some discrimination of groups of species within the broadband species (dolphins) may become possible when enough data is available. Every species tested has given good detection performance.
Sonars:	Runs two independent sonar detectors that detect and filter out up to two different boat sonars frequencies in each minute if required. A record is kept of sonar detections.
Settings:	The default settings cover all species and environments and very rarely require any changes. The F-POD has a dynamic threshold adaptation process to optimise performance during noisy periods. Duty cycling options include: continuous, and 1 minute on in each 2, 5 or 10m periods.
Attitude sensing:	The angle-from-vertical is recorded each minute, enabling the user to check after deployment that the F-POD was deployed in a vertical position, and giving information on currents. A range of angles at which the POD will log can be set. This allows the F-PODs to be set up well in advance and transported in a horizontal attitude saving power and memory.
Temperature sensing:	Temperature is recorded each minute.
Acoustic/timed release	This is available for all except the Deep F-POD. Timed released: any future hour roll-over can selected within the anticipated running time of the POD. Acoustic release (when implemented) is a one-way system i.e. it will release when instructed acoustically but does not enable battery level or other interrogation. On release the POD is tethered by a nylon line with a breaking strain in excess of 100m. A circumferential copper band on each side of the separation line controls biofouling and the release mechanism is internal and not subject to fouling. The release replaces the lid and is has a polypropylene housing 90mm OD and 350mm long. Weight in air 2.3kg
Maintenance:	The external surfaces of the F-POD are simple and tough allowing robust methods of removing biofouling. The lids use a dual O-ring design with grease-free lubricants and these have proved highly reliable.

LF-POD R10, F-POD D10 (replaced by D12), F-POD R25, Deep F-POD

The F-POD and C-POD can be immersed to 100m, Deep PODs can be immersed to 2000m.

The Deep F-POD has a 3mm thick silicone rubber sheath, not shown.

The C-POD is now ‘end-of-life’ as a product. It is still fully supported but is now only supplied to existing C-POD projects.

The acoustic performance of F-PODs is superior to C-PODs. Acoustic performance is not affected by the size of the unit.