Acoustic Zooplankton Fish *Profiler* ™

Glider and AUV Mounted AZFP

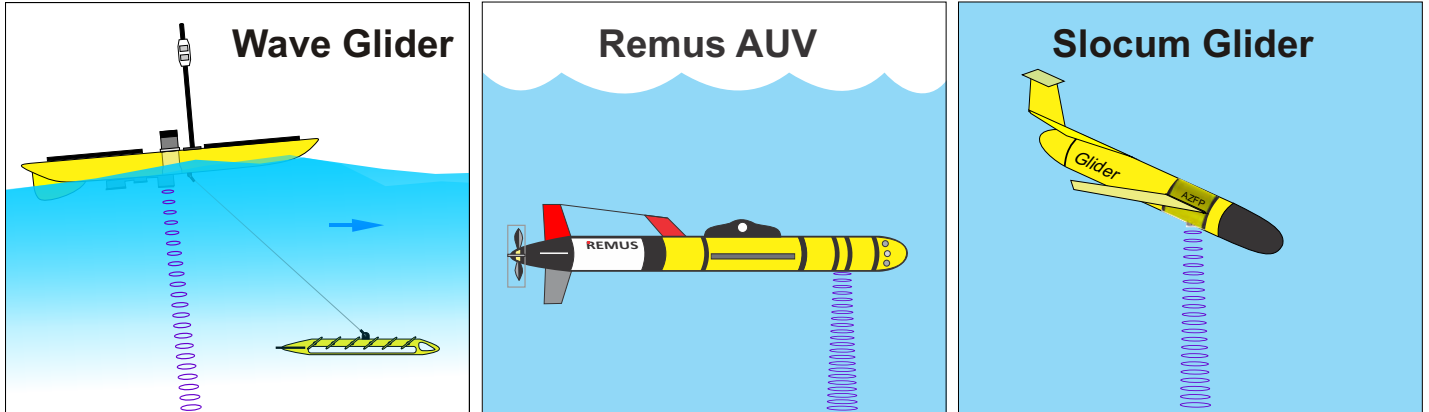| Wave Glider | Remus AUV | Slocum Glider |

Commercially available platforms for which the AZFP instrument packages would be suitable

Applications

ASL can design and supply single, dual, three and four frequency Acoustic Zooplankton and Fish Profiler (AZFP) scientific echo-sounder electronics packages with transducer housings to mount on a variety of platforms. ASL can assist the customer with the instrument integration into the glider or AUV.

ASL is an industry leader in autonomous, low-power, calibrated sonar systems for scientific use. The AZFP instrument is a compact, (multi frequency) single-beam, scientific echo sounder capable of extended deployments that can be readily adapted for use on gliders and AUVs. (See examples on page 3)

Operational Features

With an on-board battery or DC-to-DC convertor, the vehicle system electronics can provide power to the AZFP instrument and turn it on and off for specific sampling periods. During the time the instrument is on, it will run through a specific operating sequence (a phase) utilizing detailed sampling parameters entered into the AZFP instrument for each frequency channel and save data before the power is removed.

Several AZFP firmware and hardware options allow for different combinations of operating modes:

- Powered continuously by vehicle only
- Power applied / removed by vehicle
- Powered from dedicated battery
- Streaming of profiles via RS232
- Streaming of condensed / average profiles
- Hardware or software pause / go
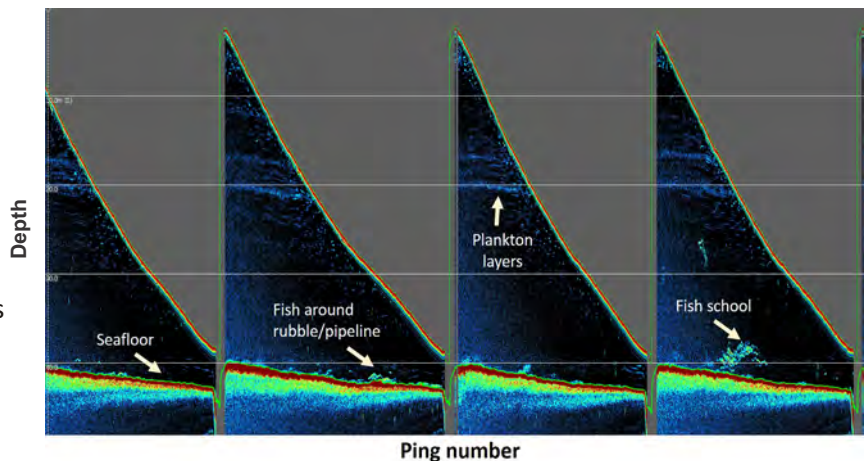
AZFP 200kHz Echogram collected by a Teledyne Webb Slocum Glider

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A detailed power consumption model is available (AZFPLink) for estimating AZFP power requirements during a cruise. For example, a single-frequency AZFP recording data at a range of 100m: Estimated Energy Consumption 165Wh / 1,000,000 pings. Four-frequency package recording data over 100m: Estimated Energy Consumption 275Wh / 1,000,000 pings.

Size and weight

The electronics package measures approximately 185x125x65mm x 675 grams for the vehicle powered version. For the autonomously powered version with dedicated 45Wh battery, the dimensions are: 185x125x65mm (electronics) & 0.5 litre (battery) with a mass of 1450 grams. Size and weight of the acoustic transducer(s) depends on the frequency and beam angle.

Data output:

The AZFPLink software outputs data in two formats: Binary and a comma delimited ASCII format. Sonar5, Echoview and Matlab can readily read the binary format.

Standard Transducer Acoustic Properties: (See AZFP Brochure for Standard Frequency Channels)

Custom Compact Housings

Frequency: 38 kHz
Beam angle (-3 dB): 33° (±3°)
Nominal source Level: 206 dB

	Estimated Minimum Detectable Level (38 kHz x 33°)						
Range (m)	5	10	20	50	100	200	300
Sv (dB)	-115	-109	-103	-93	-88	-80	-72
TS (dB)	-115	-104	-92	-76	-63	-49	-35

Frequency: 67.5 kHz
Beam angle (-3 dB): 18° (±1°)
Nominal source Level: 205 dB

	Estimated Minimum Detectable Level (67.5 kHz x 18°)						
Range (m)	5	10	20	50	100	200	300
Sv (dB)	-116	-110	-104	-94	-86	-77	-69
TS (dB)	-120	-118	-95	-78	-64	-49	-38

# ASL can provide the following engineering services:

- As necessary, enter into a Non-Disclosure Agreement with vehicle vendor and/or customer.
- Design appropriate transducer housings and fairings.
- Make drawings available to the customer for review and acceptance.
- Software adaptation to allow AUV mode of operation.
- Supply equipment according to drawings.
- Provide integration assistance.

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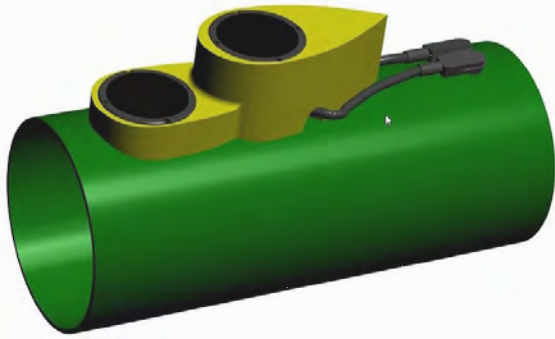
200 kHz and 38 kHz transducers with stream lined fairing shown on an 8" (203mm) diam. AUV body
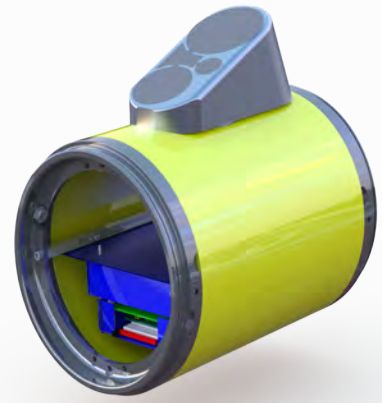
200kHz, 455kHz and 38kHz transducers in the ECO Puck housing for the Teledyne Webb glider with AZFP Electronics package. 22.5° angle with respect to vehicle centreline
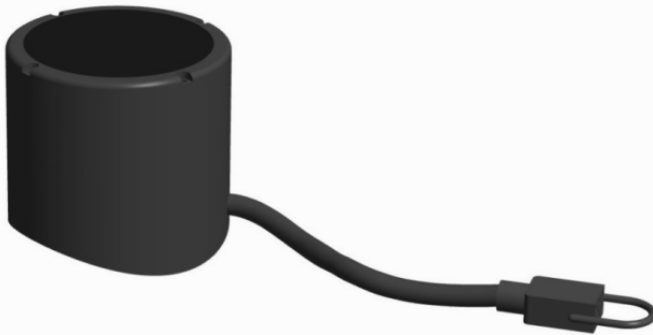
38 kHz transducer in surface mount housing with short cable and underwater connector

200kHz transducer in O-ring style housing
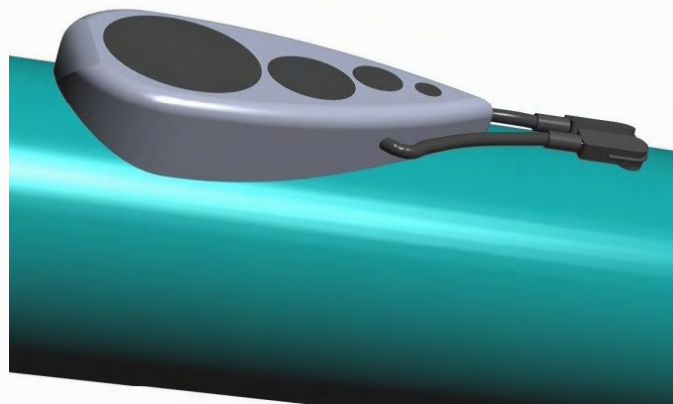
4-frequency (125, 200, 455 and 769 kHz) transducer stream-lined CPVC housing shown on a glider body