Larval Billfish Research:

Development and testing of the CANON (Continuous Access Neuston Observation Net)

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Background

Atlantic billfishes (marlin, spearfish and sailfish). Marlins and sailfish have high-value catch-and-release recreational fisheries. Marlins heavily overfished (bycatch of commerical swordfish and tuna fisheries).

Larval abundance data have potential as recruitment and/or spawning stock biomass indices. Little progress on defining essential fish habitat (e.g., spawning and nursery areas).

Early life stages of the billfishes are top predators of the neuston layer (air-sea interface to ~1 meter) – a layer conducive to characterization via remote sensing.

Most larval billfish sampling conducted using conventional nets – research has focused on preserved specimens (e.g., age and growth, diet).

Mostly uncharted territory are linkages among:

Oceanography
Larval physiology
Larval behavior

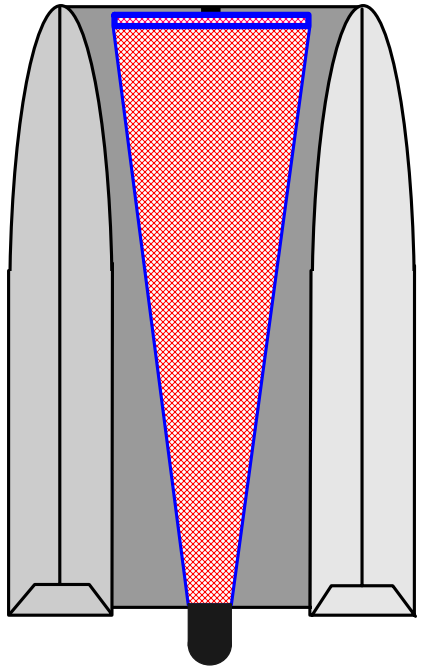
Desired Features

Rapid, high resolution,“gentle” neuston collection to permit:

Adaptive sampling

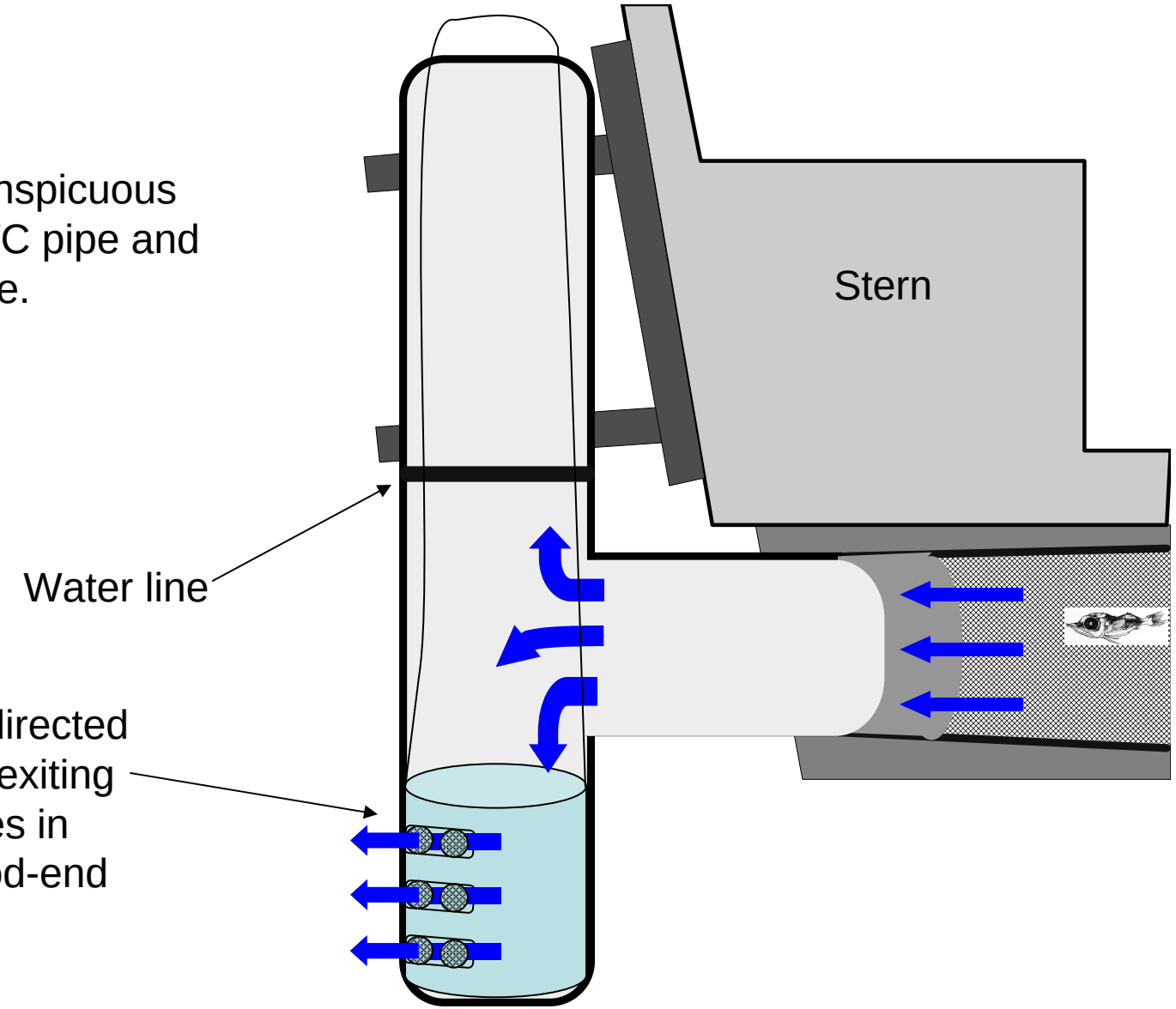
Live collection (for shipboard or laboratory physiology/behavior studies)

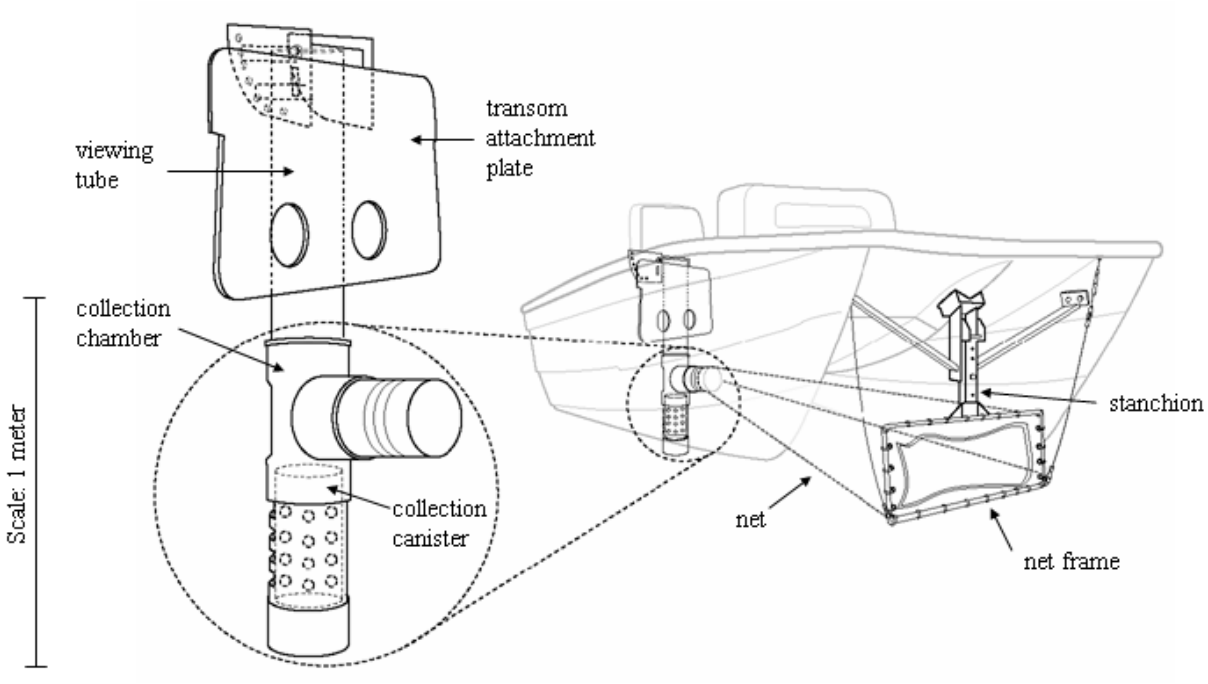
Scaleable to larger RV

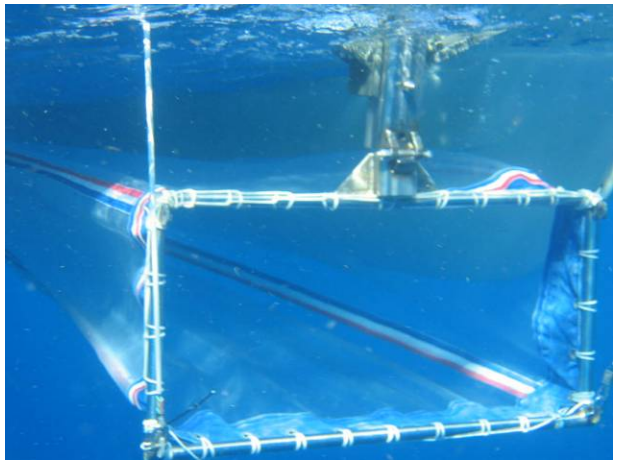


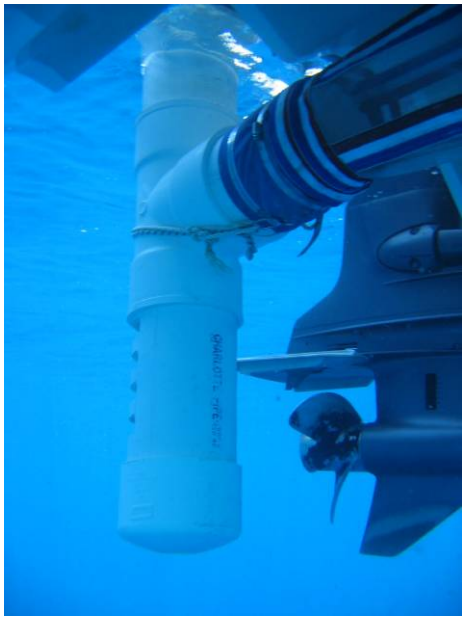
CANON Components (Observation/Collection)

Billfish larvae conspicuous against white PVC pipe and rapidly accessible.







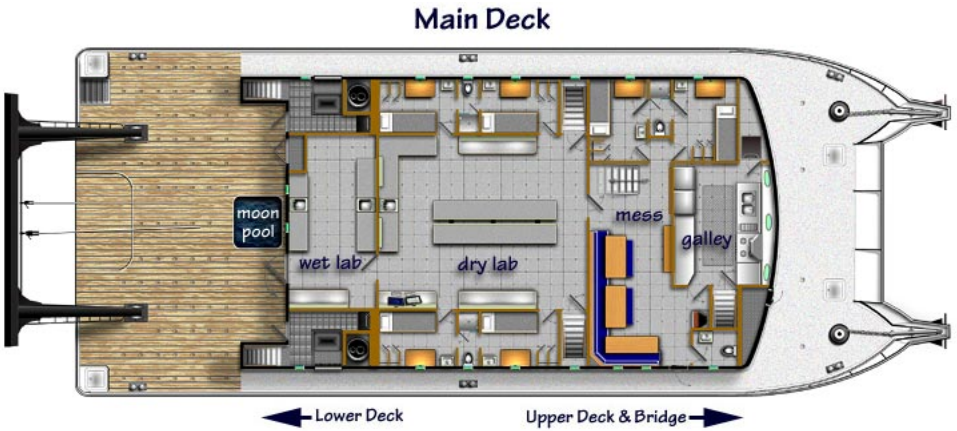


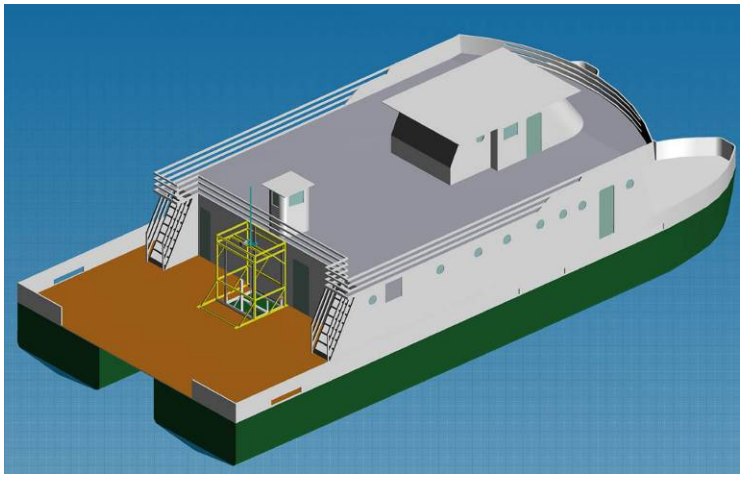
Relative to conventional neuston net the CANON produced:

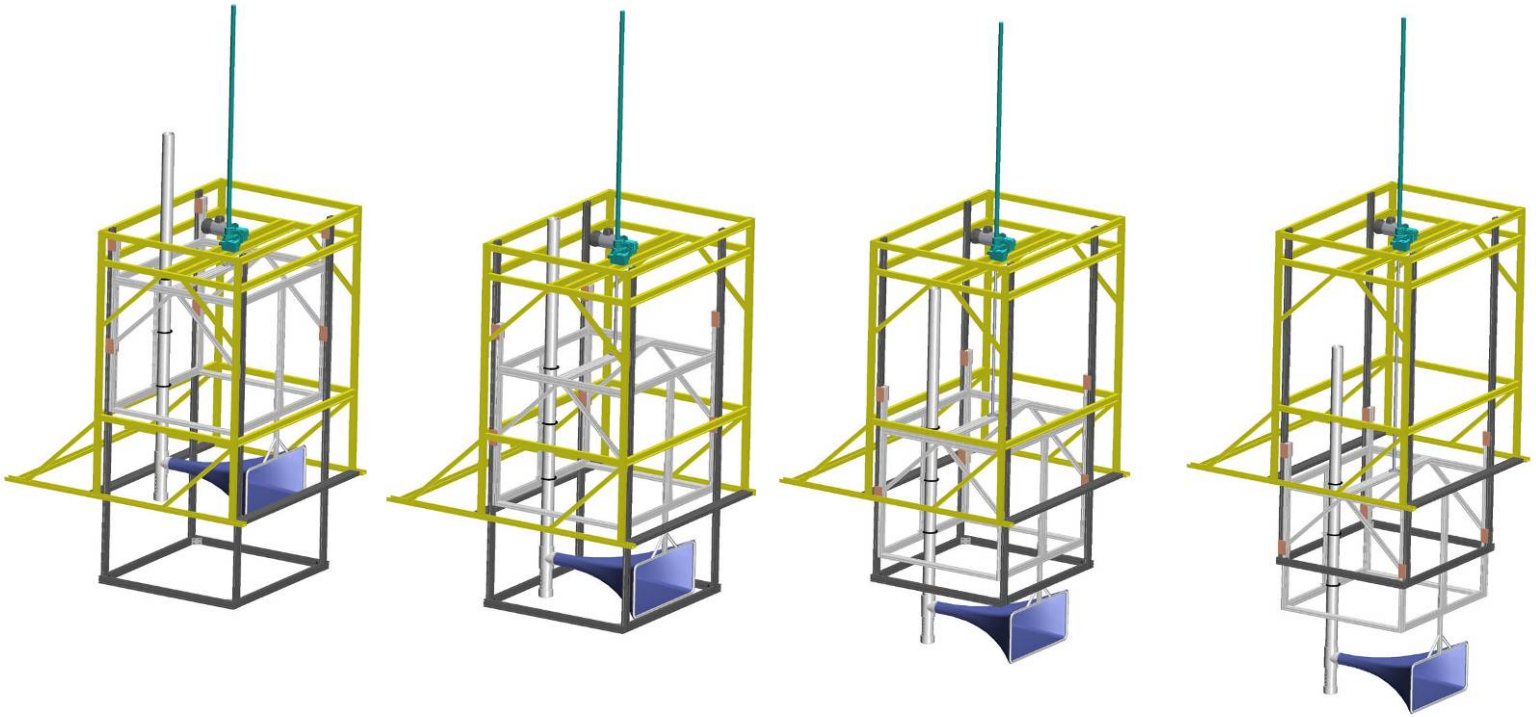
- 2.5-fold higher larval istiophorid catch/vol
- 2.4-fold higher proportion alive
- 4.9-fold higher live larval catch/vol.

Serafy, J.E., T.R. Capo and C.R. Kelble. 2006. Live capture of larval billfishes: design and field testing of the Continuous Access Neuston Observation Net (CANON). Bulletin of Marine Science 79: 853-858.

Serafy, J.E., C.R. Kelble, T.R. Capo, S.A. Luthy, and P.B. Ortner. 2008. Vertical movement rates of captive larval billfishes (Istiophoridae) collected from the Straits of Florida. Florida Scientist 71(1): 23-30.

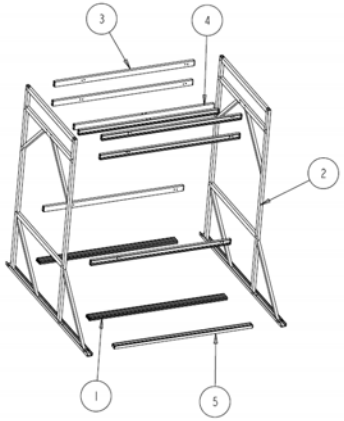

Main Deck
moon pool
wet lab
dry lab
mess
galley
Lower Deck
Upper Deck & Bridge



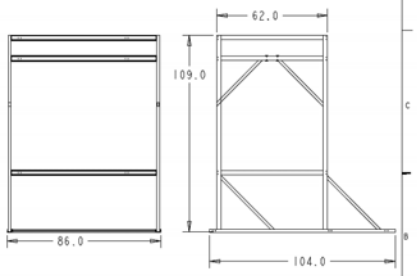


ASSEMBLY CANON-F-TOWER BOM

PART NO.	DESCRIPTION	QTY	ITEM
CHANNEL-3-300	DECK ATTACHMENT CROSS BEAM	1	5
CHANNEL-3-200	ACTUATOR MOUNTING BEAM	2	4
CHANNEL-3-100	MID SECTION CROSS BRACE	6	3
CANON-F-TOWER-000	SUPPORTING TOWER SIDE WELDMENT	2	2
CANON-F-RTS	T-SLOTTED ALUMINUM EXTRUSION 47" LONG, 8020 1545	2	1



CROSS MEMBERS ARE BOLTED TO SIDE FRAME WELDMENT



APPROXIMATE WEIGHT: 275 Lbs

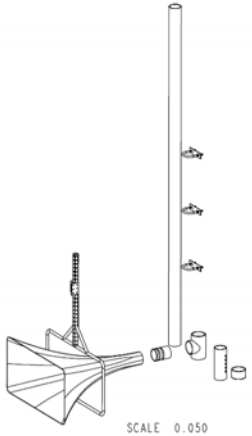
BELLAMARE LLC

CANON
SUPPORTING TOWER

DWG NO. CANON-F-TOWER

ASSEMBLY CANON-NET-000 BOM

PART NO.	DESCRIPTION	QTY	ITEM
CANON-NET-009	NEUSTON NET	1	7
CANON-NET-003	NET FRAME BRACKET	2	6
CANON-NET-002	ALUMINUM RT TUBING	1	5
CANON-NET-001	NET FRAME	1	4
CANON-COD-000	PVC COD END WELL	1	3
8020-4415	MOUNTING BRACKET, 8020 4415	2	2
8020-3202	MOUNTING PLATE, 8020 3320	1	1



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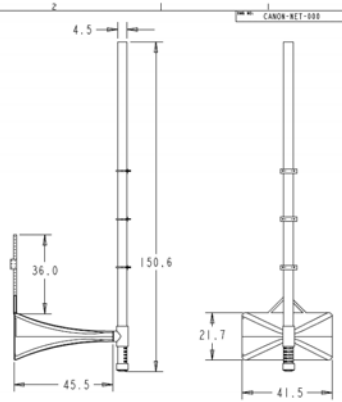


APPROXIMATE WEIGHT: 45 Lbs

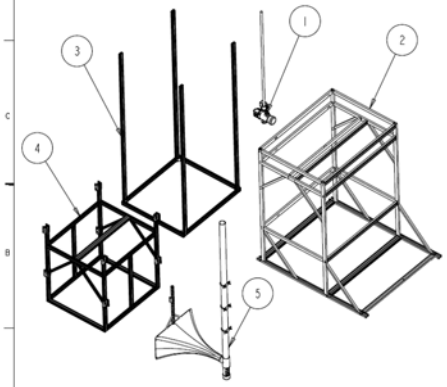
BELLAMARE LLC

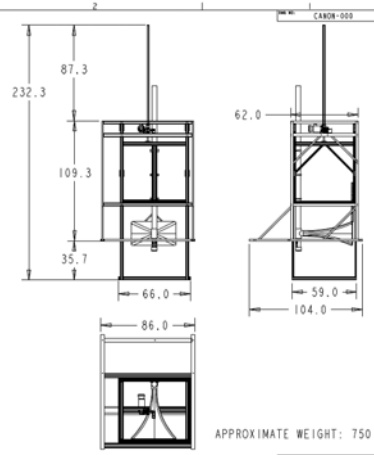
CANON
NEUSTON NET ASSEMBLY

DWG NO. CANON-NET-000

ASSEMBLY CANON-000 BOM

PART NO.	DESCRIPTION	QTY	ITEM
CANON-NET-000	NEUSTON NET ASSEMBLY	1	5
CANON-F-TRAVELER	ELEVATOR CART ASSEMBLY	1	4
CANON-F-TRACKS-000	ELEVATOR TRACKS ASSEMBLY	1	3
CANON-F-TOWER	SUPPORTING TOWER	1	2
ACTUATOR	ACTUATOR C08427Z5-099.00-L181-P2AA-B-N2	1	1



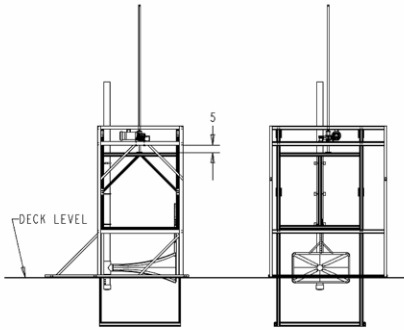


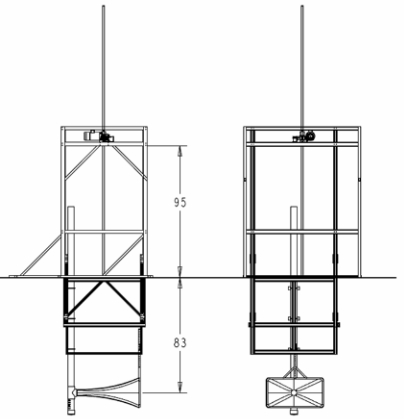
APPROXIMATE WEIGHT: 750 Lbs

BELLAMARE LLC

CANON
ELEVATOR SYSTEM

DWG NO. CANON-000





DWG NO. CANON-000