CEROS Project Description

Project: **Soft Rail Launch and Recovery System** [1]

Contractor: **Creative Technology Applications, Inc., Kailua HI**

Summary: The launching and recovery of small craft typically used by SEAL teams has traditionally been done with the large vessel hove to; the inflatable craft are hoisted on and off using davits and cranes. This procedure is time consuming and hazardous even in optimal sea conditions. The Soft Rail project is intended to provider Special Operations Forces the ability to quickly, safely, and easily launch and recover small watercraft from large ships while underway during day or night operations.

Description: The Soft Rail concept (illustrated in Figure 1) uses a tow body deployed astern of a vessel while the ship is underway; the body is towed by two cables that form a "soft rail" that is used to launch and recover rigid-hull inflatable boats (RIBs). The concept is amenable for use with other vehicles such as UUVs, personal watercraft, oceanographic and surveillance buoys, and others.

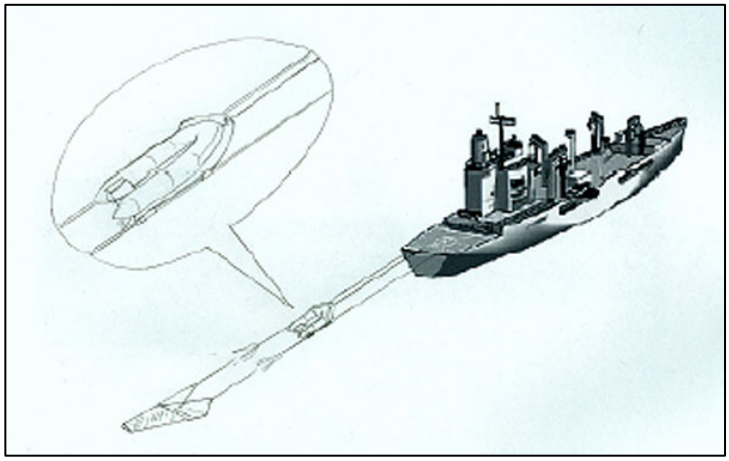

Figure 1. Operational concept of the Soft Rail launch and recovery system.

The tow body (Figure 2) consists of (1) a mesh drogue similar to a 10m long commercial trawl net, (2) a 3m wide wing-shaped steel depressor to impart downward force, and (3) a towing bridle connected to the tow cables. The RIB or other vehicle slides down from deck level to the water's surface suspended on a sling ride assembly between the two taut cables spaced 3m apart (Figure 3); the entry point is in wake of the larger vessel's where short-period surface waves have been dampened by the passage of the ship.

The tow cables are expected to be high-strength synthetic braided rope (ultra high molecular weight polyethylene, or UHMWPE) of approximate 50mm diameter. Tension is maintained in the cables by the ship's forward movement in concert with the drag induced by the tow body. The small craft is automatically released from the tow bridle and then operates under its own power. During recovery operations, the small craft advances between the soft rails and hooks onto the sling ride assemble, and is then winched aboard the ship.

[1] CEROS FY04 contract 53798, initiated 23 August 2005.

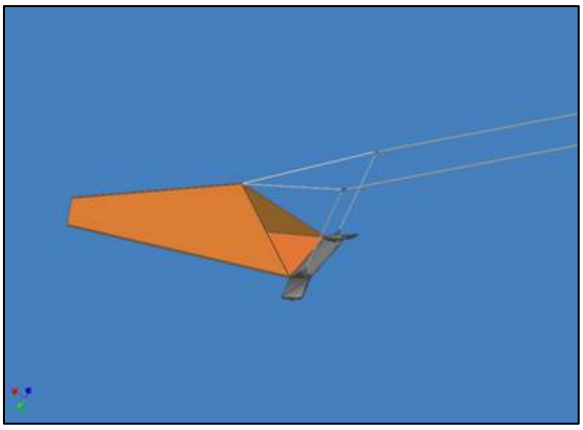

Figure 3. The towed body comprises a drogue, a depressor, and a pair of tow cables.

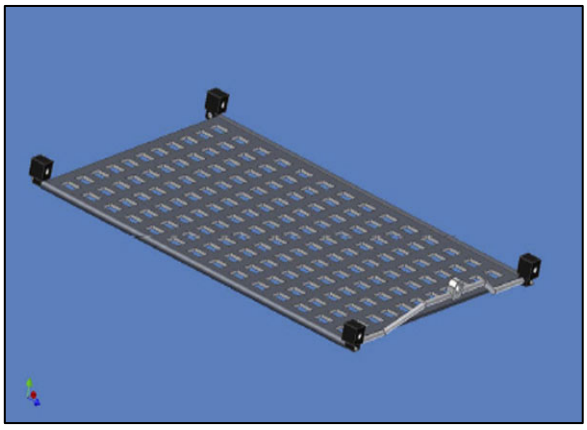

Figure 3. The sling ride assembly in the dual-rail configuration, showing four roller blocks that attach to the soft rails and a central tow point.

The deck support hardware will be modular and adaptable to a variety of launch platforms, launch craft, and deck elevations. The deck gear will comprise a base structure, an elevating A-frame with pulleys for the cables, and a winch assembly. The overall dimensions of the deck unit is expected to be approximately 2.75m high by 3.7m wide by 14.4m long.

The project began with a concept of operation and scenario definitions, and advanced through preliminary system design, cable requirements and selection, drogue and depressor design and performance analysis, and system deployment analysis. A performance estimate was made under simulated conditions; the input variables and results are shown in the following table:

INPUT VARIABLES		
Pay Load Weight in Air	lbs	**5000**
Distance of Launch Point above water surface	ft	**15**
Pre-Launch Scope Angle of Soft Rail Lines	deg	**15**
Drogue Depth below water surface	ft	**30**

SIMULATION RESULTS						
Soft Line Length to weight or Dive wing	ft	174				
Payload/Drag Ratio		**0.50**	**0.40**	**0.30**	**0.20**	**0.10**
Combined Drag of depressor and drogue	lbs	10000	12500	16667	25000	50000
Dive Force from wing or Dead Weight	lbs	2679	3349	4466	6699	13397
Pre-Launch Scope Angle	deg	15	15	15	15	15
Payload Launch Angle	deg	**37.5**	**33.7**	**29.6**	**25.1**	**20.2**
Steady State Single Soft Rail Line Tension during launch	lbs	12609	15032	19167	27602	53277
Steady State Double Soft Rail Line Tension during launch	lbs	6304	7516	9584	13801	26639
Distance behind stern payload hits the water	ft	20	22	26	32	41

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