Department of the Navy SBIR/STTR Transition Program

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Topic # N221-024
Communications with Operational Context and Knowledge for Target Audio Identification Learning (COCKTAIL)
Charles River Analytics Inc.

WHO

SYSCOM: NAVAIR

Sponsoring Program: Naval Air Warfare Center Training Systems Division (NAWCTSD)

Transition Target: DoD Schoolhouses and Simulation Programs

TPOC: (407) 380-4751

Other Transition Opportunities: Any training simulator requiring speech and/or chat data

Notes: Navy training applications can benefit from realistic, automatically generated speech and chat. For example, simulations may include background radio and chat communications to make the training scenarios realistic and to teach trainees how to monitor multiple communications channels.

Currently, instructors spend hours recording these communications but trainees learn to recognize the specific recordings—reducing the effectiveness of the training.

COCKTAIL enables instructors to automatically generate realistic speech and chat dialogs for training simulations. The COCKTAIL interface allows instructors to specify only the properties of the data they need, without having to script the entire dialog or record the audio.
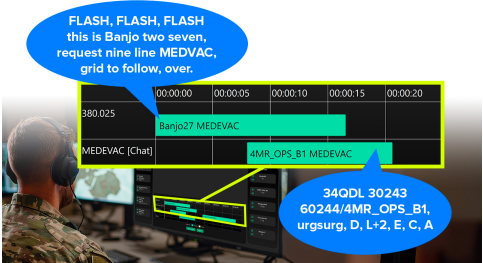

Image courtesy of Charles River Analytics Inc.

WHAT

Operational Need and Improvement: Naval operational environments require an operator to listen and filter through a large number of communications (voice and/or text) in order to complete their objectives. During training, the quality of the "non-target" communications, or "noise" is lacking, or does not exist, due to technological or instructor workload limitations. Calls that are replayed on a loop can alert the student to the normal pattern and allow them to pick out the target communications more easily than they would in an operational environment. This limitation decreases the training fidelity of the environment and can cause a lack of trainee skill.

Specifications Required: NAWCTSD seeks a software solution for enhancing communications-based training systems through development of a capability to deliver intelligent, autonomous, and realistic background calls and text chat (i.e., not scripted) to increase training fidelity. Instructors must be able to modify the environment of the scenarios, to include certain amounts and types of aircraft (and other calls) in order to simulate different mission sets, and difficulty levels.

Technology Developed: COCKTAIL enables instructors to automatically generate realistic speech and chat dialogs for training simulations. The COCKTAIL interface allows instructors to specify only the properties of the data they need, including the names of entities in the conversation, the topic of conversation, as well as audio-specific properties (e.g., voice, background noise). The audio is generated using state-of-the-art text-to-speech models, ensuring the speech is human-like and not robotic.

Instructors can place the speech and chat utterances on a timeline widget that enables them to control the degree to which the communications overlap. For example, an instructor may want to overlap several different conversations to challenge trainees' ability to monitor several communication channels at once and direct their attention toward the channels which are relevant to their mission. Because the data is generated quickly and automatically, instructors can generate new data for each training session with different voices and phrasing, preventing trainees from recognizing specific utterances from previous sessions.

Warfighter Value: COCKTAIL's ability to generate diverse, realistic speech and chat data will prevent students from memorizing prerecorded non-target communications. This will bring the training environment closer to the operational environment, enhancing students' training and preparation for the operational environment.

WHEN

Contract Number: N68335-23-C-0300   **Ending on:** May 12, 2025

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Design linguistic models for dialog generation	N/A	Verify correctness of dialog generation with SME.	3	1st QTR FY25
Integrate components of COCKTAIL into an end-to-end prototype	N/A	All major COCKTAIL components (e.g., dialog generation, text-to-speech generation, user interface) were created and integrated, supporting initial stakeholder evaluation.	5	2nd QTR FY25
Initial demonstration of prototype to instructors at Naval Air Station Fallon	N/A	Demonstrate ability to automatically create speech and chat content and export to training simulator software.	5	2nd QTR FY25
During Option, develop a hands-on demonstration for NAVAIR	Medium	Conduct stakeholder evaluation with instructors at Naval Air Station Fallon; refine the COCKTAIL prototype based on their feedback.	6	3rd QTR FY26

HOW

Projected Business Model: We see two approaches to transitioning and commercializing COCKTAIL. First, COCKTAIL can be used directly as a standalone application for creating speech and chat data for training simulations. Second, COCKTAIL can be integrated into other applications as a backend service for speech and chat generation, communicating with other components via an established API.

Company Objectives: Charles River Analytics has a proven track record of applying cutting edge research to problems of critical importance to the DoD. Charles River Analytics' mission is to develop innovative solutions to complex human-systems challenges in Unmanned Systems, Decision Support, Human Behavior, and Advanced Training Platforms by leveraging our expertise in Natural Language Processing, Information Fusion, and Human-Computer Interaction.

Potential Commercial Applications: COCKTAIL is being integrated into Charles River's Knows What You Need (KWYN™) training suite. KWYN™ is a large and diverse suite of training technologies that are loosely integrated so they can be combined as necessary for specific applications. Simulations and verbal instructions are used by KWYN products and will be supported by COCKTAIL. We are also exploring the possibility of licensing COCKTAIL to third parties whose business is to support military and commercial training.

Contact: Mike Giancola, PhD, AI Scientist
mgiancola@cra.com (617) 234-1569