

Topic: N122-124

Charles River Analytics Inc.

Advanced Mission Planning Tools (AMPT)

Charles River Analytics, a leading customer-focused provider of innovative R&D solutions for increasingly complex and important human-systems challenges, is developing Advanced Mission Display and Planning Tools (AMPT) providing operators of a multi-vehicle (manned and unmanned), multi-domain (air, ground and sea) common control station with decision support for real-time re-tasking and re-planning of multiple assets. Formal analysis efforts have identified task and information requirements for manned-unmanned teaming, which has driven the design of a set of display concepts and a prototyping and demonstration environment used to validate AMPT technology. We seek to fully integrate software into the PMA-281 Common Control System (CCS) for testing and performance validation and verification.

Technology Category Alignment:

Fixed Wing Vehicles (includes UAS)

Human/Autonomous System Interaction and Collaboration

Scalable Teaming of Autonomous Systems

System Interfaces & Cognitive Processes

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SYSCOM: NAVAIR

Contract: N68335-16-C-0241

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68335-16-C-0241

Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2017-720

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WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA-281
Unmanned System Common
Control System (CCS)

Transition Target: PMA-281
Common Control System (CCS)

TPOC:
(301)757-1884

Other transition opportunities:
AMPT analysis and design efforts
will help to shape the future of
teaming concepts and mission
displays for platforms such as the
MQ-4C Triton, MQ-8 Fire Scout, and
MQ-25 Stingray.

Notes: As an example of an
alternate SBIR transition path
successfully pursued on another
program, Charles River developed a
tool to guide the war-fighter through a formalized approach to assessing, analyzing, and forecasting
human behavior (Contract Number FA8650-04-C-6403). The tool eventually underwent a successful
Military Utility Assessment in 2008 and an Extended User Assessment with a Joint agency; it is now in
use by DoD warfighters worldwide.



<http://www.navy.mil/management/photodb/webphoto/web-N-DX365-165.JPG>

WHAT

Operational Need and Improvement: When teaming with unmanned vehicles, decision making processes are impeded by current state-of-the-art capabilities to display pertinent information. Limitations are inherent in current control systems during re-planning and re-tasking of vehicles in situations when target priorities change, a vehicle experiences a malfunction or encounters fuel limitations or inclement weather conditions and other situations. Decision making must be made in real-time and many scenarios increase the complexity of decision making to a point which makes it nearly impossible for an operator to make the necessary changes.

Specifications Required: Operators need more effective and efficient human machine interfaces and mission displays for manned/unmanned teaming operations. Simplicity of visualization will be required to allow operators fluid control of multi-vehicle, multi-domain operations. Software development of these human-machine interfaces should be conducted within an open architecture.

Technology Developed: Advanced Mission Display and Planning Tools (AMPT) provides effective decision support interfaces that intuitively convey complex behavior-shaping events and operational constraints, enabling operators to efficiently perceive system status, identify response requirements, and direct autonomy, thereby enabling efficient teaming between manned and unmanned vehicles.

Warfighter Value: Software tools, driven by formal requirements analysis, with the capability to provide operators of a multi-vehicle, multi-domain (air, ground and sea) common control station with decision support will enable real-time re-tasking and re-planning of unmanned teammates.

WHEN

Contract Number: N68335-16-C-0241 **Ending on:** December 27, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Prototypes of displays for targeted manned/unmanned teaming	Low	Proof-of-concept demonstration of software prototype approach	4	December 2017
Extended prototypes of manned/unmanned teaming displays	Med	Driven by representative data	5	December 2018
Proof-of-concept demonstration	Med	Limited integration in a supervisory control station	6	June 2020

HOW

Projected Business Model: Charles River has over 30 years of steady growth providing innovative, cost-effective solutions through intelligent systems R&D. Over 100 Charles River projects have produced a wealth of advanced-technology prototype software that can facilitate the rapid integration of critical technology into operational systems. Charles River Analytics plans to develop the software and pursue either direct development for the government or license agreements with a Prime Integrator for the Program of Record. We would also need to work with the Navy as well as 3rd party suppliers who develop unmanned systems and components.

Company Objectives: The ultimate goal is to integrate and transition this technology into government and prime contractor mission systems for unmanned vehicles, such as those for MQ-25 Stingray, Broad Area Maritime Surveillance (BAMS), or the Navy's Common Control System (CCS). Other applications include mission planning systems such as the Theater Battle Management Core Systems (TBMCS) and the Distributed Common Ground/Surface System (DCGS).

Potential Commercial Applications: This capability is suitable for a broad range of government missions, (e.g. homeland security, border security, coastal patrol, fighting forest fires, and some industrial & commercial applications).

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