

Transition

An example of Air Force supported SBIR/STTR technology that has been transitioned into an Air Force or other DoD system or subsystem or used by Air Force test ranges and facilities or maintenance depots.

SBIR Topic Number:
OSD02-CR12

SBIR Title:
Application of Culturally Specific Aspects of Human Behavior to Adversarial Decision-Making

Contract Number:
FA8650-04-C-6403

SBIR Company Name:
Charles River Analytics, Inc., Cambridge, MA

Technical Project Office:
AFRL Human Effectiveness Directorate, Wright-Patterson AFB, OH

The screenshot shows a 'Research Folders' window with a list of news items. One item, 'ICE intercepts drug shipment', is highlighted. An arrow points from this item to a diagram on the right. The diagram shows a flowchart where 'ICE intercepts drug shipment' leads to 'R. Langton', which then leads to 'Northside Gang'. 'O. Harvey' also has arrows pointing to 'R. Langton' and 'Northside Gang'.

OCCAM's Research Folder Example for Modeling Gang Behavior

Organizational and Cultural Criteria for Adversary Modeling (OCCAM)

- The Air Force has a requirement to enable warfighters to reason more quickly, effectively, and reliably about human behavior and its complex influence on mission success
- Major OCCAM enhancements, partly funded by the AF Commercialization Pilot Program (CPP), evolved into the Susceptibility and Vulnerability Analysis Tool (SAVANT)
- Charles River Analytics, Inc. has developed the OCCAM tool to guide the warfighter through a formalized approach to assessing, analyzing, and forecasting human behavior
- SAVANT 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

SBIR Requirement

In Asymmetric Warfare and Operations Other than War, strategists and operational-level warfighters must not only interact with non-traditional adversaries, but also with friendly and neutral populations in the area of operation. Understanding and reasoning about all of these populations, and the social, political, economic, and cultural influences on their behaviors, is increasingly critical to mission success. Currently, this reasoning is typically performed ad hoc, based on the individual warfighter's expertise and experience. In some cases, doctrine may provide some guidelines for the systematic analysis of human behaviors, yet doctrine does not (and cannot) support the warfighter facing a specific situation with complex interactions among socio-cultural factors. Therefore, the Air Force needs technology that enables warfighters to reason more quickly, effectively, and reliably about human behavior and its complex influence on mission success.

SBIR Technology

Under this OSD SBIR project, Charles River Analytics developed the Organizational and Cultural Criteria for Adversary Modeling (OCCAM) tool to support warfighter analysis and reasoning about human behavior. OCCAM allows a warfighter to create a computational model of an adversary, friendly, or neutral population, which can then be linked to a variety of data sources to help the warfighter with the following:

- Assess and verify his own causal reasoning
- Collaborate with others to validate the group's understanding of the situation
- Communicate their reasoning to the Commander and/or domain experts
- Forecast future behaviors and trends
- Analyze the consequences (intended and unintended) of particular courses of action

The computational modeling technology in OCCAM uses a number of patented and patent-pending algorithms developed as part of Charles River's commercially available BNet® Bayesian belief network software (www.cra.com/bnet). In OCCAM, these unique modeling capabilities were customized and deployed as a key component of an innovative work process that guides the warfighter through a formalized approach to assessing, analyzing, and forecasting human behavior. OCCAM represents a highly novel approach to behavior modeling that brings many of the potential (and formerly unrealized) benefits of computational behavioral and social science to the warfighter to address their mission-specific needs.

Transition Impact

In the course of developing OCCAM under this SBIR project, the benefits of our approach and the maturity of our technology were recognized by a number of other agencies. This led to major enhancements of OCCAM functionality through investments by other Government sources, including the Air Force Commercialization Pilot Program (CPP). With this additional support, Charles River customized OCCAM for a specific Joint community interested in planning, analyzing, and executing non-kinetic operations at a range of strategic-to-tactical levels.

The enhanced version of OCCAM created for this community is called the Susceptibility and Vulnerability Analysis Tool (SAVANT). SAVANT went through a successful Military Utility Assessment in 2008, and has since been undergoing an Extended User Evaluation (EUE) with a Joint agency. As a result, this OCCAM-developed technology is now in use by the Air Force and other DoD warfighters worldwide, with more requests coming from nearly all Combatant Commands (COCOMs).

Company Impact

This SBIR project enabled Charles River Analytics to develop a number of ground-breaking technologies that we successfully applied to a specific operational problem. SAVANT continues to receive support for further enhancement from several sources (total revenue on the enhanced effort has already exceeded six million dollars). Both OCCAM and SAVANT continue to generate a substantial amount of interest across the DoD, leading to additional customization efforts for other operational communities. This work also created considerable synergy with Charles River's commercial products division, where the demands of the OCCAM effort and our own internal funding resulted in numerous and highly marketable enhancements to our BNet® Software suite.

The OCCAM effort continues to showcase Charles River's considerable expertise in user-centered software design and our market-leading ability to design and implement innovative solutions using best-of-breed computational intelligence methods. This effort clearly demonstrated our ability to bring cutting-edge concepts from the drawing board, through a full-scope software development process, and into the hands of the warfighter.



U.S. AIR FORCE

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