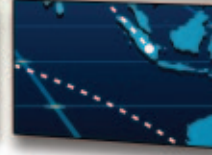
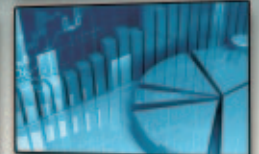
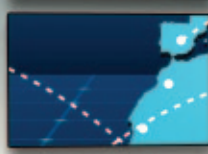




HSCB



HUMAN SOCIAL CULTURE BEHAVIOR MODELING PROGRAM



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FEATURE

HSCB MODELING PROGRAM OVERVIEW

By John Boiney, PhD and Gary L. Klein, PhD

Overview

In 2006, the Strategic Planning Guidance (SPG) (2008-2013) tasked the Director, Defense Research and Engineering (DDR&E) to conduct a thorough analysis regarding the state of research and development (R&D) for the modeling of human social cultural behavior. The resulting SPG study identified major capability gaps and recommended the Department of Defense increase investment to support research and development with an emphasis on product maturation and transition. Ultimately that study led to the establishment of the Office of the Secretary of Defense (OSD) Human Social Culture Behavior (HSCB) Modeling Program in 2008. In this article, we review activities and accomplishments in the Program's first two phases, look ahead to Phase Three, and discuss metrics for gauging the Program's impact.

Progress in the HSCB Domain

Phase One of the HSCB Program (FY08 – 09) focused on establishing the Program, including planning the technical objectives, building a management and operations infrastructure, growing

a portfolio of research and development efforts, and facilitating exchange within the community of HSCB stakeholders. In Phase Two (FY2010–2011), the HSCB Modeling Program has begun vigorously to select and mature technologies and can cite some noteworthy successes:

- Transitioned HSCB data ingestion and modeling capabilities to US Special Operations Command
- Transitioned HSCB behavioral modeling capabilities to United States Army Training and Doctrine Command (TRADOC) Analysis Center (TRAC) to support their cultural geography model and wargame
- Transitioned geospatial and social network analysis HSCB capabilities to US Special Operations Command, Pacific
- Prototyped use of automated techniques to rapidly extract persons, events, and sentiments in support of US Africa Command
- Supporting International Security Agency Forces (ISAF) Joint Command (IJC) Headquarters in Kabul, Afghanistan



WELCOME

Welcome to the 8th edition of the HSCB Modeling Program newsletter. This is a special edition published just in advance of our Focus 2011 conference. As we congregate this February at the Focus 2011 conference in northern Virginia and continue to advance the Program forward, we reflect on the accomplishments of the Human Social Culture Behavior Modeling Program, and look at the challenges ahead. This newsletter discusses the Program-level metrics currently being established for each of the HSCB technical investment areas, which are detailed on page one. It also highlights the important work of Federally Funded Research and Development Centers (FFRDCs) across the breadth of the program.

We begin this issue with a special focus on transitioning technologies to the warfighter. In the first article, Dr. Jennifer Mathieu explains the Social Network Analysis Reachback Capability (SNARC) project, which is developing and integrating a transition-focused technical integration capability between HSCB Program funded work and the International Security Assistance Force Joint Command in Afghanistan. Mr. Joseph Watts describes how HSCB supports the current fight by deploying capabilities to DoD combatant commands (COCOMs) and how, through this technical and programmatic engagement process, the HSCB Program is able to transition sustainable and enduring capabilities to meet critical COCOM mandates. One of the remaining challenges to the transition of HSCB capabilities is the relatively small number of Programs of Record that address socio-cultural analysis; this article describes the challenges that lie in the acquisition arena.

This edition of the newsletter also includes a new section that provides short summaries on what is new in the HSCB realm. This section highlights what is being done at the Office of Naval Research, Defense Advanced Research Projects Agency, MINERVA Initiative, Army Research Laboratory, U.S. Army Engineer Research and Development Center, Army Research Institute, Air Force Office of Scientific Research, Strategic Multi-Layer Assessment program, Combating Terrorism Technical Support Office. I am leading the Social Cultural Action Group (SCAG) in developing official responses to requests posed by two Congressional committees in the FY11 National Defense Authorization Act (NDAA): the Senate Armed Services Committee (SASC) and the House Armed Services Committee (HASC). Further information on the SCAG is detailed on page ten.

This newsletter also highlights the work being done by several of our performers: Dr. Ian Davidson, Dr. Peter Walker, Mr. Clay Fink, Dr. Nathan Bos, Dr. Jonathon Kopecky, and Dr. John Horgan. LCDR Joseph Cohn also provides an update on the DoD's Small Business Innovative Research (SBIRs) which have been highlighted in earlier editions of this newsletter.

I look forward to seeing you at the Focus 2011 conference and working together to achieve our Program goals in 2011.

CAPT Dylan Schmorrow, MSC, USN, PhD

*Deputy Director, Human Performance, Training and BioSystems Research Directorate
Office of the Assistant Secretary of Defense (Research and Engineering)*

By Jennifer Mathieu, PhD

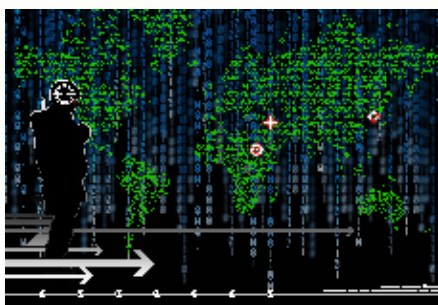
The social cultural analysis and modeling domain represents a substantial portion of Department of Defense research. There is strong technical leadership of both DoD research (e.g., Office of the Secretary of Defense (OSD) Office of the Director, Assistant Secretary of Defense for Research and Engineering (ASD(R&E)) and analysis (e.g., Undersecretary of Defense for Intelligence, OSD Capability Assessment and Program Evaluation (OSD CAPE), and Army Training and Doctrine Command (TRADOC) Analysis Center (TRAC)). However, the domain is characterized by a lengthy set of technical challenges. Spanning all of these challenges is the need for more research and integration across all of the DoD social cultural analysis and modeling efforts to develop the methods, models, and technologies necessary to more effectively focus the Department's work and provide needed capabilities to the warfighter. As stated elsewhere in this issue, it remains quite challenging to develop and transition technology to those deeply engaged in the current fight. Therefore, while the HSCB Modeling Program continues to have several models of transition, the Program has developed a strong hybrid transition approach with a Federally Funded Research and Development Center (FFRDC) with respect to the International Security Assistance Force (ISAF) Joint Command (IJC) in a project called Social Network Analysis Reachback Capability (SNARC).

The MITRE Corporation, one of HSCB's FFRDC partners, has been providing direct support to the IJC headquarters in Kabul, Afghanistan since November 2009. Based on the hypothesis that employing reachback cells, advanced analytic tools, open source data, and social network analysis techniques will enhance analytic effectiveness, MITRE came to the conclusion that the IJC needed "Expeditionary Enterprise Systems Engineering" to help them: describe their needs; develop, implement, and refine their systems architectures; and bring systems and tools to bear. Based on this interaction with the IJC, the need for the SNARC effort was identified, namely, to support the Information Dominance Center (IDC) Network Effects Cell's (NEC) collection, processing, and analysis of information on Afghanistan social networks. However, important analytic tools and processes were not yet in place to fully support that mission. Given MITRE's knowledge of the operational environment and relevant technologies in this domain, they (in their role as DoD's Command, Control, Communications, and Intelligence FFRDC) established an effort with the goal of developing and integrating the tools, models, processes, and skills necessary to implement and operate such a reachback capability.

MITRE knew that much of the technology needed to support the effort was being developed as part of the HSCB Program, and

after discussion between MITRE and both ASD(R&E) and the Office of Naval Research (ONR), the HSCB Program brought to bear world-renowned researchers and a subset of the relevant technologies from a substantial portfolio of DoD investment in the domain. Specific HSCB Program research efforts have included those by Northeastern University, Milcord, Los Alamos National Laboratory, University of California-Davis, and Carnegie Mellon University.

Leveraging world-class research from the four HSCB performers, SNARC is developing and integrating a transition-focused technical integration capability that includes a combination of OSD and select other research efforts, as well as accompanying analysis to demonstrate the usefulness of the prototypes. SNARC is working closely with the NEC analysts to establish a social network analysis capability that will support their ongoing efforts to identify the network and, in time, to perform second- and third-order effects analyses.



Thus far, the SNARC effort has responded to multiple sets of Requests for Information (RFIs) from across Afghanistan, provided by the NEC. The technical approach is to generate social networks using all available open source data to help shed light on the RFIs. The team developed procedures to study the robustness of one centrality measure as the network is randomized (uncertainty analysis). For individual survey data, a Bayesian influence model computes

relations among survey answers to get a better understanding of the population sentiment. Adversarial event analyses (of Improvised Explosive Device (IED) activity) focus on key drivers (e.g. coalition activity). Relationships to socio-economic signatures are conducted, and an analytical framework for embedded economic exchanges (e.g. power relations) is used to assess key players in provinces and analyze the narcotics industry in the area. Integration of the analyses is currently done at the levels of data input/output, insights, and findings.

This SNARC effort is enabling the HSCB Program to apply ongoing research directly toward the ASD (R&E) imperative to "accelerate delivery of technical capabilities to win the current fight." The effort has also advanced social network analysis in support of MG Flynn's (Chief, CJ2, International Security Assistance Force) intelligence transformation in Afghanistan; provided the IJC with an understanding of SNA capabilities; provided products that help in the current fight; and provided a model for sustained transition, innovation, and responsiveness. Finally, the effort is providing the HSCB Program with valuable insight into the capabilities needed to move forward; enterprise level data strategies; operationally effective methods, models, and tools; a demonstrated effective transition model for operational situations; and strategies needed for training. ♦

FEATURE

ACQUISITION PROGRAM, SUPPORT OVERVIEW AND SUMMARY

By Joseph Watts

A significant challenge in the course of responding to the Congressional mandate of the OSD HSCB Program to transition program capabilities to programs of record (PORs) is still the relative scarcity of programs that incorporate socio-cultural analytic and modeling requirements. The HSCB Program received its initial program guidance from the 2006 Quadrennial Defense Review and DoD Directive 3000.05 (Military Support for Stability, Security, Transition and Reconstruction Operations). These policy documents led to a Strategic Planning Guidance study which identified the following gaps: lack of a military technical socio-cultural behavior core capability; limited 'reuse' of data and software, and no life-cycle management plan for products; absence of data and collection methods to support understanding, models, and valid tool development; limitation of models in scope and scale; limited domain and inter-domain (DIME/PMESII) knowledge & experience; and no current general use of science or technology to achieve the "language-agile, cultural chameleon" soldier. These are serious deficiencies that the HSCB Program addresses from a science and technology perspective, and while the Program can and does transition prototypes, it must rely on programs of record for sustainment of these technologies. While the user's needs are still increasing it does take some time for the formal DoD acquisition community to formally codify these requirements and create the programs of record necessary to field and sustain the required cultural analysis capability.

One of the primary programs of record partnering with the HSCB Program is managed the United States Special Operations Command (USSOCOM), Special Operations Research Development and Acquisition Center (SORDAC), Program Manager Military Information Support Operations (PM MISO). PM MISO manages PORs intended for the Special Operations Civil Affairs and MISO communities (see Spring 2009 HSCB

... THE HSCB PROGRAM HAS BUILT A DIVERSIFIED AND SUSTAINABLE TRANSITION PORTFOLIO THAT WILL BE AUGMENTED AS MORE PROGRAMS OF RECORD COME ON-LINE.

newsletter (Issue 1)). The HSCB Program has also initiated a dialogue with the US Joint Forces Command's Virtual Integrated Support for Information Operations Environment (VISION) system, which will provide situational awareness and mission planning capabilities for information operations across all US military commands as well as with a few other PORs. The capabilities being transitioned to PM MISO and potentially PM VISION address influence networks, key leader assessments, sentiment analysis, and social network analysis. The HSCB Program also partners with significant programs which, while not currently PORs, have significant operational, technical, and political momentum. Included in these programs are the Human Terrain System and associated Cultural Knowledge Consortium managed by US Army Training and Doctrine Command (TRADOC) and the Serengeti program originating out of the US Africa Command. In addition to PORs and large quick response capabilities (QRCs), the HSCB Program currently collaborates with, and transitions technology to, military service and defense organizations with budgeted base sustainment and execution funds. The partners include the TRADOC Analysis Center (TRAC) (see Spring 2010 HSCB newsletter (Issue 5)), specifically its Irregular Warfare Tactical Wargame activity, the Defense Intelligence Agency's Integrated Modeling and Simulation Capability and the US Army Center for Army Analysis. By working with the PORs in the socio-cultural space, significant QRCs, and institutional partners who are addressing human behavior understanding and forecasting, the HSCB Program has built a diversified and sustainable transition portfolio that will be augmented as more programs of record come on-line. ♦

FEATURE

HSCB PROGRAM SUPPORT TO DOD COMBATANT COMMANDS

By Joseph Watts

The OSD HSCB Modeling Program has a Congressional mandate to transition program capabilities to programs of record for enduring sustainment. In addition, the HSCB Program has been given the challenge to support the current fight by deploying capabilities to DoD Combatant Commands (COCOMs). Within the COCOMs, the primary socio-cultural focus areas largely reside within the military intelligence directorates ("J2 shops"). Much of this capability has been catalyzed by investment by the Under Secretary of Defense for Intelligence (USDI) under

its Social Science Research and Analysis (SSRA) initiative. The HSCB Program has been partnering with the USDI-led Defense Intelligence Socio-Cultural Capabilities Council (DISCCC) which is pursuing the establishment of effective socio-cultural capabilities that meet the requirements of commanders, staffs, and policymakers at all levels of the Department of Defense. The HSCB Program also engages with COCOM elements outside of the Defense intelligence enterprise in operational, planning, and civil-military operations mission areas. A key technique used in the HSCB Program to document and guide capability transfer is the establishment of Technology Transition and

FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDCS)

By Barry Costa

Part of the success of the HSCB Program involves the creation and sustainment of multi-disciplinary teams from academia, industry, government, our national laboratories, and Federally Funded Research and Development Centers (FFRDCs). FFRDCs are not for profit organizations that assist the United States government in addressing long-term problems of considerable complexity, analysis of technical questions with a high degree of objectivity, and provide creative and cost-effective solutions to government problems. Just recently, Dr. Ash Carter, the Undersecretary of Defense for Acquisition, Technology, and Logistics (USD AT&L) stated,

“As we implement the Secretary’s efficiencies...I believe the single most important enabler of the improvements we seek is to increase the competence, quality, and performance of the acquisition workforce. At the same time, we need to continue to make effective use of the other two important sources of technical, acquisition, and logistics expertise available to the Department: DoD’s FFRDCs and industry contractors. In particular, FFRDCs were established to provide the Department with unique analytical, engineering, and research capabilities in many areas where the government cannot attract and retain personnel in sufficient depth and numbers. They also operate in the public interest free from the organizational conflicts of interest and can therefore assist us in ways that industry contractors cannot. Our FFRDCs maintain core competencies in domains that continue to be of great importance to the Department. These are immensely valuable capabilities, and the Department should use all means to preserve and strengthen them.”

The HSCB Modeling Program is supported by FFRDCs including the RAND Corporation, the Institute for Defense Analyses (IDA), Los Alamos National Laboratory (LANL), and The MITRE Corporation. In support of HSCB, RAND conducts strategic analyses in areas relevant to irregular warfare, counterterrorism, and related activities that help guide the program, while IDA has most recently focused on guiding the development of the HSCB Pathways portfolio of programs, a particularly challenging mix of technology research and transition. LANL’s efforts focus on developing agent-based models of the opium supply chain, while MITRE continues in a systems engineering, technology assessment, and transition-focused role. Both MITRE and LANL are supporting the SNARC effort, more fully described on page three of this newsletter issue.

Each FFRDC supports specifically prescribed government customers and types of work. For example, RAND’s and IDA’s FFRDCs are principally categorized as study and analysis centers, the majority of MITRE’s four FFRDCs are categorized as systems engineering and integration centers, and LANL is a research and development laboratory.

The RAND Corporation’s three FFRDCs “help improve policy and decision-making through research and analysis...and focus on the issues that matter most such as health, education, national security, international affairs, law and business, the environment, and more.” IDA “operates three FFRDCs to assist the United States Government in addressing important national security issues, particularly those requiring scientific and technical expertise.” The MITRE Corporation is chartered to work in the public interest, applying its expertise in systems engineering, information technology, operational concepts, and enterprise modernization to address critical needs. MITRE manages four FFRDCs: one for the Department of Defense, one for the Federal Aviation Administration, one for the Internal Revenue Service and U.S. Department of Veterans Affairs, and one for the Department of Homeland Security. Finally, Los Alamos National Laboratory is a “premier national security research institution, delivering scientific and engineering solutions for the nation’s most crucial and complex problems. [Their] primary responsibility is ensuring the safety, security, and reliability of the nation’s nuclear deterrent mission...[their] work advances bioscience, chemistry, computer science, earth and environmental sciences, materials science, and physics disciplines.”

While FFRDCs do not replace academia, government, or industry efforts, their role as long-term strategic partners with a deep understanding of the government’s, and the nation’s, evolving roles, issues, and challenges makes them an important complement to the team. ♦

FEATURE

OSD'S HSCB SBIR PROJECTS—UPDATE

**By LCDR Joseph Cohn, PhD, Military Deputy
Office of Naval Research**

The Office of the Secretary of Defense's Small Business Innovative Research (SBIR) program provides a unique way for small, research-oriented companies to quickly make a large impact on the Department of Defense's mission. Unlike other research and development (R&D) programs, SBIR projects typically have a very short cycle—six months to complete Phase 1 and two years to complete Phase 2—with the added requirement that commercialization and transition are a key metric against which each project's success is measured. Within the Human Social Culture Behavior Modeling Program, additional care and scrutiny are provided at the end of Phase 1 to identify those projects that have secured transition support going into Phase 2, ensuring that Defense dollars are being targeted on R&D efforts that will produce technologies which will be used by our warfighters.

Within the HSCB Program, there are multiple research tracks focused on enabling our warfighters to operate in complex, dynamic and unfamiliar sociocultural environments. These tracks include: collecting sociocultural data; analyzing and visualizing these data; developing models based on these data to forecast future actions; and sociocultural training. As the HSCB Program progresses, successful advances in each of these tracks, and others, will ultimately transition to Defense customers.

Two previous rounds of OSD SBIR topic calls provide nice illustrations of how effective SBIRs can be at enhancing existing program efforts. OSD Topic call 9.2 highlighted three HSCB related topics: 'A Cultural Architecture Generator for Immersion Training in Virtual Environments,' 'Algorithmic Behavior Forecasting,' and 'Using Serious Games for Socio-Cultural Scenario Training.' These efforts provide an additional infusion of innovative technology to the 'Data Analysis' and 'Training' tracks. The Cultural Architecture topic focuses on developing architecture for instantiating culturally relevant behaviors within semi-autonomous/computer generated forces, while the Serious Games topic focuses on reducing overall training costs by placing scenario generation in the hands of the warfighter. The Algorithmic Forecasting topic, motivated by the observation that military forces that can anticipate human behavior and use it wisely have a distinct advantage, focuses on developing a modeling capability that can forecast how a population may respond to a proposed military action.

More recently, OSD SBIR topic call 10.2 provided another opportunity to infuse the HSCB Program with innovative research through two new HSCB related topics: 'In Situ Collection of HSCB Data' and 'Neuromorphic Models of HSCB.' The *In Situ* topic, which addresses the 'Collecting social cultural data' track, will provide technologies for collecting, storing and making available HSCB data for a range of applications – from forecasting to training. In a similar way, the Neuromorphic Models

topic, which addresses the 'developing models' track, will leverage recent developments in cognitive neuroscience and machine learning to create representations that more faithfully reflect human behavior than current capabilities allow. Specific efforts under these two topics have only recently been selected, with funding anticipated for early FY 2011 to be followed closely by a jointly held kickoff meeting, including representatives from potential program sponsor offices. Stay tuned!

The numerous projects falling under these five topic areas represent a collective investment of almost \$3M for Phase 1 efforts alone. To ensure that these Phase 1 efforts will transition to effective and in-use technologies, one of the critical gates that a project must pass to be considered for Phase 2 funding is demonstrating a viable transition pathway prior to Phase 2 selection. These pathways include, but are not limited to: from a SBIR project to a larger effort working toward a transition objective with a government partner; through commercialization; and (the gold standard) transition to programs of record (or to a warfighter in need). Projects under two of these topics, Serious Games and Algorithmic Forecasting, have already identified their own unique transition paths, securing both operational and funding support at the Service and DoD levels. However, since negotiations are ongoing, details on these topics cannot be provided at this time.

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OUR NATION'S WARFIGHTERS.**

These numbers, though, hide a very important aspect of the SBIR program in general. Namely, that these projects represent a unique investment not only in DoD research but in the future of our country as a whole. A significant and growing portion of our workforce is channeling its efforts into small business, either building businesses from scratch to experience the American Dream firsthand or making the jump to established (or becoming established) businesses to experience the thrill of being that much closer to the action. Through the SBIR program, it is possible for DoD to be a part of, as well as leverage, the combined energy of these researcher-entrepreneurs, to the decided benefit of our nation's warfighters. ♦

FEATURE

HSCB MODELING PROGRAM OVERVIEW

If we step back from the HSCB Program and look more broadly across the Department, the progress is also encouraging, as shown in Figure 1.

While there has been significant progress, major challenges still remain. To meet these challenges, planning has begun for Phase Three (FY2012–FY2014), which will focus on the following:

- Continue maturing Phase Two investments
- Emphasize new 6.4 investments
- Move technology developed at all levels of investment into acquisition
- Demonstrate an end-to-end application of HSCB modeling to intelligence analysis, operations planning, operations analysis, and training
- Lead R&D coordination working closely with US Department of Defense partners

The Assessment Challenge

From its inception, the HSCB Program has emphasized technical rigor. In Phases One and Two, assessment focused on the internal performance of the projects. Technical Assessments and Technical Performance Evaluations were conducted to characterize the social science, computer science, architecture, and other technical aspects of the projects. With the increasing emphasis on transition entering Phase Three, assessment will now also be focused on the effectiveness of the projects – whether projects can deliver useful enhancements to analysts’ and warfighters’ capabilities. To that end, program-level metrics are being established for each of the technical investment areas. A detailed description of these metrics is beyond the scope of this article; instead, this article will provide a general description of each of the technical investment areas.

For data collection, dissemination, and interoperability, there are industry standards for assessing completeness and precision.

WITH THE INCREASING EMPHASIS ON TRANSITION ENTERING PHASE THREE, ASSESSMENT WILL NOW ALSO BE FOCUSED ON THE EFFECTIVENESS OF THE PROJECTS – WHETHER PROJECTS CAN DELIVER USEFUL ENHANCEMENTS TO ANALYSTS’ AND WARFIGHTERS’ CAPABILITIES.

	Then	Now
Core Sociocultural Capability	Technical sociocultural behavior capability drawn from academia, labs, industry	OSD, Army TRAC, SOCOM, AFRICOM, EUCOM, and others have programs
Data and Tools Transference	No investment in resources to port or extend relevant data, knowledge, and tools	Increased DOD investments in data collection, storage, and transference
Data and Collection Methods	No data and collection methods to support understanding, models, tool development	Data collection tools and methods emerging along with models and tools
Models Scope and Scale	Models not broad enough to cover full range of military operations, nor detailed enough to forecast behaviors at scale	Strong progress being made in hybrid modeling and integration of model output
Model Integration Across Levels	Limited capacity to support integrated modeling of strategic/operational/tactical planning and operations	Requirement for integrated modeling not often articulated, but progress on numerous fronts
Gap at Individual Soldier Level	No general use S&T to achieve the ‘language agile cultural chameleon’ soldier	Progress being made, but general use S&T solutions for individual soldier remain long-term
Governance of Sociocultural R&D	Sociocultural behavior R&D highly distributed with limited coordination and few DOD-wide solutions	Increasingly coordinated governance through major programs (HSCB, Minerva, SMA)

Figure 1. Summary of progress since 2006 SPG Study

Completeness (or recall) assesses how much of all the relevant data available a system retrieves. Precision assesses how much irrelevant data (noise) is also retrieved. The goal is to collect or disseminate as much relevant data as possible while keeping noise to a minimum. We are expecting systems attuned to HSCB data to ultimately match the best of breed data systems available in other domains. Corpora of data will need to be developed to assess these systems.

Program level metrics for the computational modeling technical investment area fall into two categories: those applied to models that assess the socio-cultural state of an area of interest, and those for models that forecast the landscape of plausible outcomes of courses of action. Examples of the former are models that assess the affinity among social groups in an area of interest. Such models can be evaluated much like the data systems, in terms of completeness and precision. Do they accurately identify a criterion-percentage of the related groups? How often do they identify specious relationships? Again, corpora of social data will need to be developed for assessment.

Metrics for forecasting models must be handled quite differently. Take a model that simulates the generation of ethnic tension among social groups in order to test the likely impacts of alternative courses of action. For such models, there is no “industrial” benchmark standard that will allow us to estimate the accuracy, precision and recall in the same way that we

FEATURE

HSCB PROGRAM SUPPORT TO DOD COMBATANT COMMANDS

Support Agreements (TTAs/TSAs). These agreements capture OSD guidance, and require transition partners to mature and sustain capabilities which originate in HSCB Program research and development projects.

To date, the HSCB Program has focused on geographic combatant commands rather than functional combatant commands (though Special Operations Command is the exception). The Program’s most current collaborations center on the US European Command (USEUCOM) and the US Africa Command (USAFRICOM). Future collaborations with other geographic commands, specifically the US Southern Command (USSOUTHCOM), US Central Command (USCENTCOM), and additional engagement with US Pacific Command (USPACOM) are anticipated. A challenging and vital component of these collaborations is to match capabilities supporting HSCB Program goals to COCOM operational missions and tasks. As a science and technology program, the HSCB Program is chartered to grow an applied DoD socio-cultural science base, develop computational models, integrate models into software tools, and support sustainable transition. COCOMs, on the other hand, have specific problem sets, as illustrated by the following key threat drivers identified by USEUCOM: fragile/failing democracies, global economic downturn, corruption, organized crime, human trafficking, political instability, foreign policy counter to US and European-Atlantic interests and positions, population decrease/aging, immigration/economic migrants, persistent and unresolved regional conflict, wealth inequity; particularly as related to natural resources, domestic terrorism, violent extremism, and Arctic activity/disputed border issues. Making many-to-many connections between HSCB Program investments against its Program goals and the diverse set of end user requirements is the essence of the HSCB Program’s transition management activities carried out by the US Army Geospatial Center (AGC), Office of Naval Research (ONR), and Combating Terrorism Technical Support Office (CTTSO). The roadmaps resulting from such capability mapping exercises inform daily management of on-going HSCB Program projects and guide future investments in HSCB Program-sponsored Broad Agency Announcements (BAAs).

HSCB Program support to USEUCOM and USAFRICOM are examples of transition support to the COCOMs. USEUCOM and USAFRICOM, like other COCOMs, must analyze, track, and counter the spread of violent extremism. As previously documented in the Fall 2009 issue of the HSCB newsletter (Issue 3), ONR is sponsoring Arizona State University (ASU) to track extremist narratives in three regions, build a theory of narrative for strategic communication, define

and populate a narrative database, and develop a model that will provide information to operators, allowing them to assess which particular narratives are “heating up” or gaining traction in a particular community. The assumption is that the narratives that are spread widely are those that function to convey and reproduce particular ideologies, including extremist ideologies. From the user perspective, Information Strategy Planners and Military Intelligence Analysts at the COCOMs need such a capability to develop communication campaigns for effect in support of their mission to counter violent extremist ideology. Significant partnering is currently underway to transition the ASU capability to both USEUCOM and USAFRICOM to support this critical need. This partnering addresses specific technical solutions as well as the application of published counter narrative strategies and involves multiple staff elements within both commands. There are several other specific transition pathways in the areas of knowledge management, geospatial analysis and visualization, and data mining/sentiment analysis in progress as well.

Transition engagement between the HSCB Program and the COCOMs does not stop with identifying and documenting transition pathways in Technology Transition Agreements. Rather, in keeping with the widely-employed military Doctrine, Organization, Training, Materiel, Leadership and education, Personnel, and Facilities (DOTMLPF) process, AGC works with the transition partners, program managers, and HSCB Program performers to address capability training requirements, Use Case documentation via workflow analyses, and leadership education. In terms of materiel solutions (hardware, software, data), HSCB Program system engineers work closely with their COCOM counterparts to develop data and user interface integration strategies as well as network certification and accreditation packages. Finally, the HSCB Program also engages in the assessment of transitioned capabilities by the COCOMs, both during prototype production efforts and Joint Exercises and Experiments. Only through such a comprehensive technical and programmatic engagement process can the HSCB Program succeed in transitioning sustainable and enduring capabilities to meet critical COCOM mandates. ♦



Office of Naval Research (ONR)

The ONR Expeditionary Maneuver Warfare and Combating Terrorism Department (Code 30) HSCB Program emphasizes research and development of theoretically based methods and tools for data collection; methods and models to support course of action decisions and operational planning; and theory-based training and education tools. In the last quarter of CY2010, the Program kicked off several new projects: Spatiotemporal Description of Group Formation in Social Systems (Northeastern University); Enhanced HSCB Visualization and Operational Decision Support (Charles River Analytics); Turning Text into Behavioral Processes and Public Support (Strategic Analysis Enterprises); and Automatic Bias Detection and Ranking (Raytheon).

POC: Ivy Estabrooke

Ivy.Estabrooke@navy.mil

DARPA-ICEWS

The DARPA Integrated Crisis Early Warning System (ICEWS) program is conducting Phase 3 (test and evaluation) concurrently with Phase 2 (research and development) across all four system components—iTRACE, for near real-time automated events tracking and analysis; iCAST, an automated crisis monitoring and forecasting capability; iSENT, automated sentiment analysis system to measure effects on population attitudes; and iDIME, a decision support system that maps DIME resources to factors driving crises. This approach has enabled rolling transition of capabilities to combatant commands. Successful transition of iTRACE and iCAST is expected to occur in FY11.

POC: Sean O'Brien

Sean.P.O'Brien@darpa.mil

Minerva Initiative

In December 2010, a Minerva-funded research team led by Arizona State University helped organize a workshop sponsored by SOCOM and the University of South Florida on the influence of Al-Qaeda and its affiliates on tribal dynamics in the Maghreb and AF-PAK regions. Upcoming events include a conference on "Africa in World Politics" hosted by the University of Texas at Austin in which Minerva-funded research on climate change will be featured (March 2011), and a training seminar for members of DoD and the USG

on Chinese science, technology and innovation, hosted by University of California-San Diego (June 19-1 July). For more information go to https://defensemetawiki.cape.osd.mil/DAC/index.php?title=The_Minerva_Initiative.

POC: Minerva@osd.mil

U.S. Army Research Laboratory (ARL)

The ARL Human Research and Engineering Directorate (ARL HRED) recently launched an applied research effort focused on understanding and modeling the cognitive aspects of socio-cultural influences on soldier/commander decision making and communication. Over the next five years, ARL HRED will work to identify socio-cultural influences on decision making/communication and build a cognitive framework representing them, and then develop and validate guiding principles and concepts for effective depiction and understanding of relevant socio-cultural information. This research will improve the design of decision support tools and aids for conducting Joint, Inter-agency, International, and Multinational (JIIM) operations. ARL HRED is partnered with the US Army Research Institute and the Engineer Research and Development Center.

POC: Charneta Samms

charneta.samms@us.army.mil

U.S. Army Engineer Research and Development Center (ERDC)

ERDC has a history of applied socio-cultural research supporting cultural resources management, understanding the impacts of social and cultural factors, and developing models to support planning and analysis. Current projects include: Rapid model prototyping for Infrastructure and Essential Services, which will develop rapid, exploratory modeling tools and provide demographically accurate representations of populations; GRAPEVINE, designed to improve search and retrieval of social and cultural data and information from text, map, audio and video data; and Cultural Reasoning and Ethnographic Analysis for the Tactical Environment (CREATE), which will develop an analytical framework oriented toward pre-intervention planning for civil-military operations (CMO).

POC: Kirk McGraw

kirk.d.mcgraw@usace.army.mil

U.S. Army Research Institute (ARI)

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) has a new program of research on measures and methods to enhance cultural capability for stability, security, reconstruction, and transition missions. The goal of this program, Learning and Operating in Culturally Unfamiliar Settings (LOCUS), is to identify, assess, and develop the knowledge, skills, and abilities that enable soldiers to perform their missions in diverse socio-cultural settings. LOCUS builds on previous research at ARI funded by the HSCB Modeling Program and by the Small Business Innovation Research (SBIR) Program.

POC: Allison Abbe

Allison.Abbe@us.army.mil

Air Force Office of Scientific Research (AFOSR)

The socio-cultural research and development portfolio at AFOSR specializes in basic research focused on: key elements of effective influence, radicalization and deradicalization, and external/internal leverage points of cultural influence. AFOSR invests in multi-disciplinary approaches combining micro-level data with econometric, neuro-metric and computational analyses. Innovative mathematics is also applied to gain analytical insight from incomplete, raw socio-cultural data. Recent AFOSR-supported field studies have yielded groundbreaking insights from real-world data taken from small to medium sized communities influenced and shaped by violent extremism.

POC: Stephanie A. Bruce

Stephanie.Bruce@afosr.af.mil

Strategic Multi-Layer Assessment (SMA)

The Assistant Secretary of Defense for Research and Engineering (ASD R&E) SMA program provides planning support to commands with complex operational imperatives requiring multi-agency, multi-disciplinary solutions that are not within core Service/Agency competency. Currently SMA is providing support to the operational community in two areas: New Generation Nuclear Deterrence, a project examining

FEATURE

SOCIAL CULTURAL ACTION GROUP (SCAG)

By Jill Egeth, PhD

In October, the Social Cultural Action Group (SCAG) held its inaugural meeting. The group, created and led by CAPT Dylan Schmorrow (Acting Director Human Performance, Training, and BioSystems; Program Manager of the HSCB Modeling Program), is tasked with developing official responses to requests posed by two Congressional committees in the FY11 National Defense Authorization Act (NDAA): the Senate Armed Services Committee (SASC) and the House Armed Services Committee (HASC).

SASC

The SASC requests the Assistant Secretary of Defense for Research and Engineering (ASD (R&E)) to describe coordinating mechanisms and plans for application of research results to counterterrorism and counterinsurgency strategies, psychological operations and other counter influence plans, and efforts to counter violent extremism for three research programs focusing on social and cultural activities - the Minerva Initiative, the Human Social Culture Behavior Modeling Program, and the Strategic Multi-Layer Assessment effort. Each of these three programs has a different guiding mission and research focus, but all three fall under the auspices of ASD (R&E) – because of this shared connection, the three research programs have a history of regular coordination with one another.

For example, the Minerva Initiative funds basic research (6.1) and its efforts focus on improving DoD's foundational understanding of the social, cultural, behavioral, and political forces that shape regions of the world of strategic importance to the United States. The HSCB Modeling Program, on the other hand, does not fund basic research but *does* fund applied research (6.2), advanced technology development (6.3), and demonstration and validation (6.4). The HSCB Program works to research, develop, and transition technologies, tools, and systems that will help intelligence analysts, operations analysts, operations planners, and wargamers represent, understand, and forecast

socio-cultural behavior at the strategic, operational and tactical level. Minerva's focus on basic research positions such as Minerva-funded work to transition into the more applied and advanced efforts funded by programs like HSCB. Efforts to enhance transition and coordination are accomplished in many ways, for example, Dr. Ivy Estabrooke, Deputy Program Manager for the HSCB Program, both participates in the Minerva review process and is a project manager for one of the Minerva-funded projects.

Representatives for each of the programs named in the SASC request are active participants in the SCAG and are working together to formulate the formal ASD (R&E) response to the Committee's inquiries.

HASC

The HASC asks for the development of an investment review process, to include a reviewing and decision-making body, for the Department's programs associated with human dynamics activities. SCAG members are working together to gain a shared understanding of current investment review processes, reviewing bodies, and decision-making forums used across the Department for human dynamics activities. There are currently a number of these formal reviewing bodies and decision-making forums in the Department, such as the Irregular Warfare Modeling and Simulation Senior Coordinating Group (IW M&S SCG), a senior leadership group that focuses on supporting the development of theory, data, methods, applications, and validation and that also serves as the official HSCB Modeling Program User's Group.

While much of the human dynamics-related reviewing and decision-making takes place under formally prescribed mechanisms, a certain portion of it takes place more informally, in the form of working group meetings, discussions amongst stakeholder communities, and inter- and intra- organizational communication. Over the course of the next few months, the SCAG will be working to gauge the full extent of the formal and informal investment review processes already in place and to develop an actionable response for the HASC. ♦

FEATURE

NATIONAL RESEARCH COUNCIL WORKSHOP SUMMARY: UNIFYING SOCIAL FRAMEWORKS

By Cherie Chauvin

On August 16-17, 2010, the National Research Council (NRC) hosted a public workshop, entitled "Unifying Social Frameworks: Sociocultural Data to Accomplish Department of Defense Missions." The workshop was sponsored by the Office of Naval Research (ONR), planned by the Committee on Unifying Social Frameworks,

and overseen by the NRC Board on Human-Systems Integration. The event attracted over 100 participants, who represented a great breadth and depth of interdisciplinary expertise from practitioners, academics, and researchers. Presenters and participants addressed the variables and complex interaction of social and cultural factors that influence



Q&A

INTERVIEW WITH CAPT DYLAN SCHMORROW



ISSUE No 8 WINTER 2011

The HSCB Program has been in place for over two years now. From your perspective, what have been the biggest successes to date?

Some of these are already characterized in several of the articles in this newsletter but I think that our balance of applied and transition-focused research; our ability to work with and provide solutions to the warfighter; our outreach across DoD, the US Government, and our Allies; and our success in building incredible multi-disciplinary teams across academic fields, warfighter domains, and organizations have been key successes. If you consider the complexity of the challenge of both doing great research and transitioning it to warfighters and programs of record, and then you take a look at some of our successes, you can see what a great team we really have.

What do you feel have been the most challenging scientific and technical aspects of the Program?

There is a lot of complexity in the social and behavioral sciences and there is still a great deal of fundamental and basic research to be done. When one considers the challenge of predicting human behavior, it is truly daunting. I think that the most challenging aspect is both the creation of those seeds that will lead to long-term revolutions in the area and then knowing which of the technologies is “good enough” to transition to operational use.

The HSCB Program has done an outstanding job in executing the

FY09 and FY10 budgets. What is your impression on the health of this program with regards to funding in FY11 and beyond?

That’s a difficult question to answer. While I haven’t heard any bad news and the QDR demonstrates a lot of interest in this area that would typically indicate a potential funding increase, this era of declining budgets and the effects of the ongoing war work against such an increase. I think we need to continue to make the case that this research is pertinent to the warfighter and transition what we can. Success is our best approach to get more money and avoid cuts.

What do you believe are the remaining gaps in this Program that need to be closed?

I think that we have just begun to scratch the surface in the domain so I still see plenty of gaps, but the whole area of predictive modeling is certainly one that will remain challenging for years to come. While nothing is trivial, I can see how we can collect, process, and present data to users in ways that really help reduce their time and increase their effectiveness. I see how models and automation can help extract things like sentiment, but then the real challenge remains in determining what to do and then in measuring how well we did it.

How have priorities for FY11 and FY12 changed (if at all) from the past two years? How will Phase 3 of the Program differ from what has been done in the past?

Again, Joseph Watts, John Boiney and Gary Klein have provided most of the answers to this question in their newsletter articles but I would emphasize that the word *transition* is critical. While I am not diminishing the need for applied research, and am in fact promoting it, HSCB must focus on getting technology that’s ready into the hands of the warfighter. Even if it’s modest, the warfighter needs capabilities now and I am planning to provide them to the warfighter. I like the SNARC approach, in which we take an organization that knows the warfighter and team them with world-class researchers and technologies—I plan to do more of that in the future.

Do you anticipate any further funding opportunities on this Program and what would be the approximate timeframe?

The timing of your question is excellent. A Broad Agency Announcement (BAA) has recently been issued from the Office of Naval Research for the HSCB Program. The BAA, titled “HSCB Applied Research and Advanced Technology Development,” includes the following topics of interest: Data collection and management; Multi-scale and hybrid modeling of regional and subregional stability; Analysis and modeling of non-kinetic COA; and Training methodologies. White Papers are due on 24 February 2011 with full proposals due 12 April 2011. The solicitation can be downloaded from the ONR Contracts & Grants website: <http://www.onr.navy.mil/en/Contracts-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx>.

HSCB NEWS

WHAT’S NEW IN THE WORLD OF HSCB

CONTINUED FROM PAGE 9

the utility of alternative analytic techniques for assessing the implications of reduced numbers and alternative roles for nuclear weapons for strategic deterrence, assurance, and stability; and Deterrence of Violent Extremists Organizations (VEOs), a project examining the causes of “deterrence surprises” as well as the secondary effects of efforts to deter attack from extremist organizations.

POC: Hriar Cabayan
Hriar.Cabayan@osd.mil

Combating Terrorism Technical Support Office (CTTSO)

The Irregular Warfare Support Program (IWSP) supports Defense, interagency, and international partners who conduct or counter irregular warfare through indirect and asymmetric approaches to erode an adversary’s power, influence, and will. CTTSO/IWSP solutions are primarily non-materiel but often leverage cutting-edge materiel solutions and involve operational analysis,

concept development, and field experimentation. Amongst other projects, CTTSO/IWSP will be co-hosting the COCOM Health Security Forum 12-14 April 2011 in Hawaii. This forum is focused on analyzing and developing health assets and capabilities as enablers for planners and operators from the COCOM J5/J3 to the military element on the ground supporting the US country team.

POC: Guermantes Lailari
lailarig@iwsp.cttso.gov

SPOTLIGHT

IAN DAVIDSON, PHD AND PETER WALKER, PHD

Dr. Ian Davidson met Dr. Peter Walker (a cognitive psychologist) when Peter was a student in Dr. Davidson's machine learning course. Dr. Walker immediately noticed the similarities (and differences) between the algorithms in this course with the theories of human information processing. Dr. Davidson became a tenured Professor in the Computer Science department at the University of California at Davis and Dr. Walker was commissioned with the United States Navy as an Aerospace Experimental Psychologist and was recently selected for promotion to Lieutenant Commander.

Both Davidson and Walker realized there was an immediate need for a more interdisciplinary approach in order to more accurately predict and explain adversarial behavior. To accomplish this they sought to incorporate the latest innovations from a wide range of academic disciplines including cognitive psychology, sociology, and computer science. Their aim was to build a reusable approach to automated explanation and discovery of adversarial behavior by identifying patterns of when and where types of adversarial events might occur. In particular, the research would focus on developing an automated process closely related to the manner in which humans might attempt to solve a similar problem, therefore making the process more humanly comprehensible and enabling subject matter experts (SMEs) to easily incorporate their expertise and interpret the results.

From Raw Data to Understanding

The Automated Behavioral Analysis Tool (ABAT) program is an attempt to create an automated reusable process to build a knowledge-base of HSCB variables that predict and explain adversarial activity in the surrounding areas. To allow SMEs to easily encode existing knowledge and interpret the results of the analysis, ABAT allows them to input and view data in the form of a network. This allows the operational user to create from raw data a complete picture of what variables predict adversarial behaviors. These discovered predictive relationships will aid in operational and tactical decision making. Figure 1 provides an

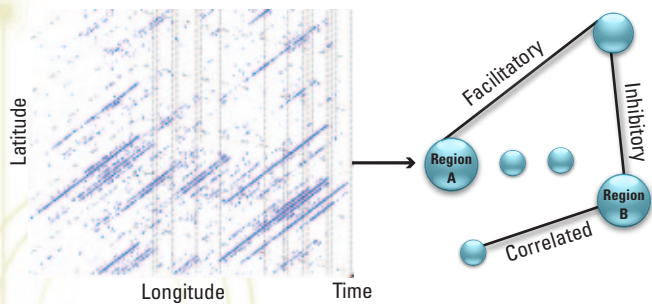


Figure 1. Automated discovery of high-level underlying networks of adversarial behavior (IED activity) from low-level event data in Kandahar Province, Afghanistan. Note: not all entities and relationship names are shown.



example for Improvised Explosive Device (IED) activity, which enables the analyst to quickly experiment with changes of the time period, location and type of activity.

First, ABAT efficiently analyzes the behavior between many (in excess of tens of thousands) heterogeneous low-level events over time, shown in Figure 1 as dots in time-space. The aim is to identify complex relationships that may exist between the high level entities, which ABAT does by automatically identifying and visualizing stable and predictive behavioral networks. A behavioral network contains a collection of nodes where each node represents a high-level entity (such as a city) where a type of behavior can occur and also represents the relationships (which include classes such as correlated, inhibitory and facilitative) between high-level entities.

Once this behavioral network is discovered from low-level events, it can be related to more descriptive HSCB data. This profiling can then be used for prediction or explanation tasks such as determining whether there are signatures of human factors that are more indicative of adversarial behavior in neighborhoods. Given a fully populated data set, ABAT can: group entities and their relationships; discover entities with unusual outlier behavior; identify entities whose behavior is descriptive or important to the network; and postulate relationship explanations with respect to the human terrain. After each relationship is found, ABAT will visually present the relationship to the analyst in the form of a network.

The Road Ahead

Though still in a preliminary stage, ABAT has been part of the MITRE SNARC effort to analyze data in support of International Security Agency Forces in Afghanistan. In addition, ABAT is being used to generate realistic simulated data for TRADOC's Irregular Warfare Tactical Wargame as part of the Army TRAC program. Dr. Davidson and Dr. Walker hope to use this current work as a basis to continue to integrate both computer and cognitive science. ♦



Dr. John Horgan discovered early in his career that the extreme acts carried out by terrorists are often committed by people without any previously extreme tendencies or beliefs. That this could be true turned the traditional view of terrorist motivation on its head and has positioned Dr. Horgan as a unique expert studying the minds of terrorists.

Dr. Horgan met another expert in the psychology of terrorism at University College, Cork, in Ireland. Professor Max Taylor would become Dr. Horgan's mentor and collaborator, and it was Professor Taylor who encouraged Horgan to interview former terrorists to glean the qualitative and quantitative evidence that has become the hallmark of Horgan's research. Though he did not meet his first militant until well into his graduate studies, Dr. Horgan has since interviewed hundreds of former terrorists across the globe. His forthcoming book "Divided We Stand: The Strategy and Psychology of Ireland's Dissident Terrorists" (Oxford University Press) will showcase profiles of over 500 terrorists on whom Horgan has collected data for the past 10 years.

Dr. Horgan was chosen from the University of St. Andrews in Scotland to head the burgeoning International Center for the Study of Terrorism (ICST) at the Pennsylvania State University. As its Director, Horgan has assembled a team of psychologists, political scientists, history and religious studies scholars, computer scientists, software developers, and even the occasional entomologist to conduct innovative, cross-disciplinary research to help prevent, reduce, and control terrorism and its consequences.

Dr. Horgan is Principal Investigator on the HSCB-sponsored project "Competitive Adaptation in Terrorist Networks." The project marks an exciting multidisciplinary and interdisciplinary collaboration between Penn State and Carnegie Mellon University. Dr. Horgan has brought together a team of social scientists and ethnographers at PSU (including terrorism experts Dr. Michael Kenney and Dr. Mia Bloom) with a team of computer scientists led by CMU's Professor Kathleen Carley.

The background to the collaboration lies in a growing recognition among scholars and practitioners that counterterrorism analysis suffers from a lack of primary-source field research. This shortcoming is largely due to a failure to integrate ethnographic research into modeling efforts, as well as a failure more broadly to appreciate the significance of ethnographically valid data in human, social, cultural, and behavioral studies in a systematic investigation of adversarial behavior. Much of our knowledge and understanding about terrorist movements comes from news reports and other secondary sources. According to Dr. Horgan and his team, the consequence of this is systematic bias in data analysis and skewed findings that do not correlate strongly with the reality of terrorist behavior; these lead to the development of vague and impractical policy recommendations.

"Competitive adaptation" provides a comparative organizational framework for understanding how adversaries, such as terrorist networks and government counterterrorism agencies, learn from each other in complex adaptive systems. Dr. Michael Kenney has written extensively on the framework in his celebrated book "From Pablo to Osama" (Penn State Press). Significantly, competitive adaptation facilitates theoretical and empirical inter-operability between ethnographic field researchers and computer modelers. Working together at all stages of conceptualization, data collection, and analysis, Dr. Horgan and his collaborators are developing a meso-level model of militant networks. This model will combine insights from organization theory, social psychology, network analysis, and agent-based modeling into a platform that counterterrorism practitioners can use to aid decision-making, prioritize and evaluate the impact of specific interventions, and forecast future developments in terrorist activity. This model, and the shared ontology that will emerge from the collaboration between the social scientists and computational modelers, will provide a pathway for further research on these issues.

Kenney and Bloom have conducted interviews with dozens of militants and counterterrorism officials in an ongoing effort to understand how militant networks learn and adapt, as well as how those tasked with defeating extremist networks do the same. The field data being collected is already providing an extraordinary insight into the internal culture and organizational climate of extremist movements. The data will be transcribed and analyzed using CMU's social network and agent-based models, including AutoMap, DyNet, DyNetML, and Organizational Risk Analyzer.

Dr. Horgan received his doctorate in applied psychology. Reaching beyond his academic audience, his mission is to dispel misconceptions about terrorist motivations and behaviors. He is convinced that there is not yet and likely never will be an accurate or useful terrorist profile and that the quest for easy answers is fundamentally flawed. Instead, his focus is on delivering data-driven, policy-relevant knowledge to underpin multi-faceted counter-terrorism strategies.

John Horgan can be reached at horganjohn@psu.edu. More information about the International Center for the Study of Terrorism and all of its research projects can be found at www.icst.psu.edu. ♦

SPOTLIGHT

CLAY FINK, NATHAN BOS, PHD, AND
JONATHON KOPECKY, PHD**Opinion at a Distance: Using Social Media to Gauge Political Sentiment**

Clay Fink is a senior software engineer at the Johns Hopkins University Applied Physics Laboratory. He obtained a B.S. in Computer Science from the University of Kentucky and an M.S. in Computer Science from Johns Hopkins University. His current research interests are in developing approaches for analyzing online user generated text for understanding psychological, social and cultural phenomena.

Nathan Bos is a senior research associate at the Johns Hopkins University Applied Physics Laboratory. He received his PhD in Psychology from the University of Michigan in 1998. His expertise is in behavior modeling, computer-supported cooperative work, and educational technology. He is leading the APL SILAS research project modeling social identity-based conflicts, focused on Nigerian ethnic, religious, and political conflicts.

Jonathon J. Kopecky is a senior research associate at the Johns Hopkins University Applied Physics Laboratory. He received his PhD in Cognitive Psychology from the University of Michigan in 2008. A key aspect of his research is how culture can influence cognition and thus behavior, and he has worked on socio-cultural models and cognitive models exploring this issue.

There is a critical need to obtain timely social-cultural data from the developing world. Often, countries for which there is the greatest need for up-to-date data have poor census information and little to no available polling data. Collecting such data is an involved and expensive process and may not always be possible because of unrest, war, or other factors that put populations out of reach of traditional collection methods. Thus, obtaining measures of public opinion at a distance would be a valuable tool for policymakers and researchers. This may now be possible, due to the growing use in the developing world of mobile technology to access the Internet³ and social networking sites such as Twitter and Facebook, allowing people to share their opinions and reactions to events. We ask whether this user-generated content may allow for remote, near real-time monitoring of opinion in a particular country, Nigeria.

Nigeria, in West Africa, is a large, diverse country of strategic interest. It is the most populous nation in Africa with 158 million people, has the second largest economy on the continent, and is the fourth largest source of oil for the United States. There are ongoing conflicts in Nigeria based on religious and ethnic divisions, as well as public dissatisfaction with the state of its democracy, endemic corruption, and the unequal distribution of revenue from its energy resources. All of these issues are of concern to policymakers, as is, by extension, Nigerian public opinion.

There has been a substantial investment in telecommunications infrastructure in Nigeria and the country has seen substantial growth in the use of the Internet and social media. Internet

usage there increased 83% from 2008 to 2009² and the number of Facebook users in Nigeria doubled in 2010 to more than 2 million⁴. Timely public opinion data from the country is also available, providing a source of baseline data to test against when evaluating opinion extracted from social media.

We have collected publicly available text data from Nigerian authors from Twitter, Facebook, a Nigeria-focused online forum, and Nigerian media sources that allow user comments. Although access to the Internet is increasing, usage is still skewed by location, age and socioeconomic factors, with educated, southern, and young Nigerians being overrepresented. Skewed samples are traditionally adjusted via weighting techniques if the nature of the skew can be determined and if there are enough data from underrepresented groups to compensate. To identify and compensate for skew in our data, we are developing automated techniques to infer location, ethnicity, and other demographic characteristics and are developing data collection techniques to maximize data obtained from underrepresented groups.

Initial efforts have focused on identifying the location of Nigerian Twitter users to develop a picture of the distribution of users in the country. We determine the location of users from the coordinates provided by some mobile client applications and from user-entered profile information. Additional Nigerian users are discovered by accessing the social networks of users we have already established as being in the country. We show the distribution of Twitter users we have identified in Nigeria by state in Figure 1. While we found users in every state, the user distribution had the largest concentrations in Lagos State in the southwest, and in the Abuja Federal Capital Territory in the center of the country, and lower concentrations in the north and in rural states.

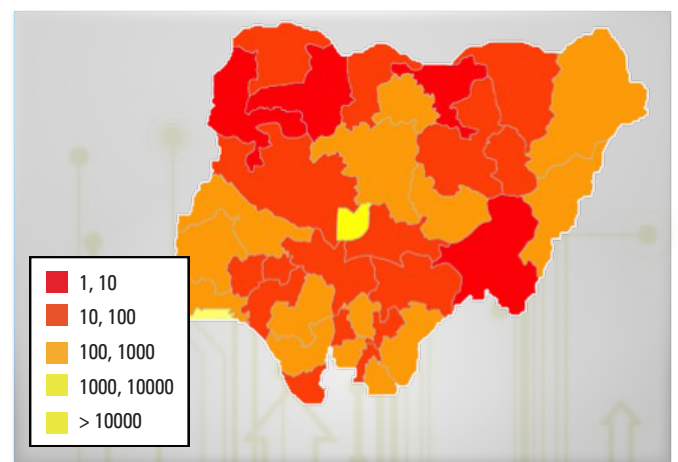


Figure 1. Distribution of Twitter Users in Nigeria by State

Using the Twitter data we have collected, we examined approval toward Nigerian President Goodluck Jonathan and compared

that with an NOI poll¹ that examined a related question, namely whether Jonathan should be allowed to run for the presidency in 2011. Although it is likely some people feel he should be allowed to run even if they do not support him, we hypothesized that the two questions should be correlated. We collected tweets that mentioned President Jonathan and scored each tweet as positive or negative based on the relative number of positive or negative words taken from a standard sentiment lexicon². We then normalized the positive and negative tweets by each user's status (tweet) count. These initial results appear promising with a correlation of .51 across regions (Figure 2).

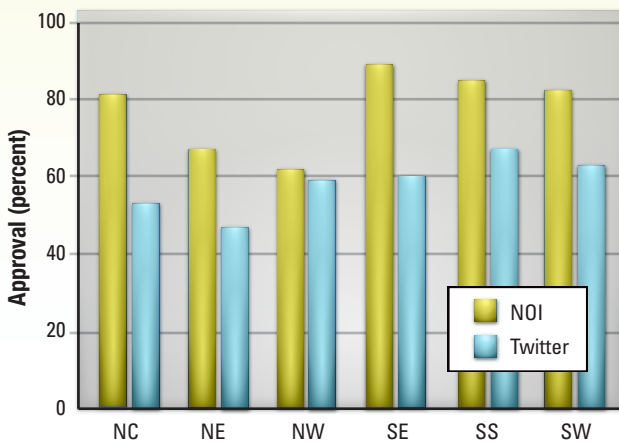


Figure 2. Approval of President Jonathan on Twitter Compared With NOI Poll by Region ($r = .51$)

Our work suggests that user-generated text can be collected from a given country, curated for location, and used to gauge opinion. Future work will include developing more robust sentiment extraction techniques and curating for other demographic categories. Ethnicity, for example, may be inferable from a user's name and social network, and we plan to investigate this hypothesis as one of our next steps. ♦

References

1. *August 2010 Snap Poll: Should Goodluck Contest, confidence in INEC.* Retrieved from <http://www.noi-polls.net/Poll-Results/august-2010-snap-poll-should-goodluck-contest-confidence-in-inec.html>
2. *International Telecommunications Union.* Retrieved from <http://www.itu.int/ITU-D/ICTEYE/Reports.aspx#>
3. *Measuring the information society 2010.* Retrieved from <http://www.itu.int/ITU-D/ict/publications/idi/2010/index.html>
4. *Nigeria Facebook statistics.* Retrieved from <http://www.facebakers.com/facebook-statistics/nigeria>
5. Wilson, T., Ruppenhofer, J., & Wiebe, J. (2008). *Documentation for MPQA Opinion Corpus Version 2.0.* Retrieved from <http://www.cs.pitt.edu/mpqa/database/release/>

human behavior, focusing on potential applications to the full spectrum of military operations.

The workshop's keynote address from Major General Michael T. Flynn (U.S. Army, Chief, CJ2, International Security Assistance Force) provided critical context about the cultural situation and needs of operating in Afghanistan. MG Flynn's address was a candid discussion of his experiences, lessons learned, and current and future initiatives for mission success.

Additional presentations were divided into four panels to address diverse missions the US military encounters worldwide. The panel topics and presenters included:

1. *Conflict is Local: Mapping the Sociocultural Terrain*
David Kennedy, Hsinchun Chen, and Kerry Patton
2. *Bridging Sociocultural Gaps in Cooperative Relationships*
Robert Rubinstein, Alan Fiske, and Donal Carbaugh
3. *Building Partner Capacity with Sociocultural Awareness*
Jeffrey Sanchez-Burks and Shinobu Kitayama
4. *The Art of Sociocultural Persuasion*
Jeanne Brett, James Dillard, and Brant R. Burleson

The final workshop panel, "Tools, Methods, Frameworks, and Models" featured a discussion with panelists who prepared papers in advance. This panel discussed the strengths and weaknesses of different methods for acquiring and utilizing relevant data and knowledge.



In early February 2011, a summary of the workshop's proceedings will be published. The summary will be available as a paperback for purchase and as a free PDF download through the National Academies Press at www.nap.edu Questions about the workshop or summary publication should be directed to Cherie Chauvin, Study Director, cchauvin@nas.edu or 202-334-2096. ♦

Date	Event	Location	Sponsor	Website
February 8–10, 2011	HSCB Focus 2011: Integrating Social Science Theory and Analytic Methods for Operational Use	Westfields Marriott Hotel, Chantilly, Virginia	OSD HSCB Modeling Program	www.sa-meetings.com/hscbfocus2011
March 21–24, 2011	Behavior Representation in Modeling & Simulation (BRIMS) Conference 2011	Sundance Resort, Sundance, Utah		http://brimsconference.org/current/
April 4–8, 2011	2011 Spring Simulation Interoperability Workshop	Marriott Long Wharf Hotel, Boston, Massachusetts	The Society for Modeling and Simulation International (SCS)	http://www.sisostds.org/Workshops/2011SpringSIW.aspx
June 20–23, 2011	79th Military Operations Research Society Symposium—“Developing the Next Generation of National Security Analysts”	Naval Post Graduate School, Monterey, California		https://morss2011.wingateweb.com/portal/cfp/login.wv
July 9–14, 2011	Human Computer Interaction Conference	Hilton Orlando Bonnet Creek, Orlando, Florida		www.hcii2011.org

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FEATURE

HSCB MODELING PROGRAM OVERVIEW

can with assessment models. Historical data will be unlikely to match future HSCB environments or future military courses of action, and experts are imprecise and inaccurate at forecasting in complex, uncertain environments (as is everybody else). Fortunately, experts are good at evaluating the forecasts of others, especially at assessing whether the principles and rationale underlying the forecast are sound. There are established unbiased procedures for gathering such expert assessments by which we can determine the effectiveness of these forecast models.

A third technical investment area is visualization. The visualization of model outputs is similar to other data dissemination – the goal is to convey information effectively to system users. Because we know what information a visualization is to convey, we can test its effectiveness in the same way as data systems. Of the relevant information on the screen, how much did the user perceive? Visualizations should go further, enabling not just the perception of elements on a monitor, but also conveying the meaning of such elements by the way they are displayed. Thus, we can also test users to determine whether this meaning is conveyed, and how precisely it is conveyed – that is, the degree to which users correctly or mistakenly interpret visualizations.

The final HSCB Program technical investment area is cultural training. Program level metrics for training assessment fall into two categories: those applied to interpersonal behavior

training and those applied to training cultural understanding for intelligence analysis, operations planning, and operations analysis. For example, some training systems focus on culturally correct verbal and non-verbal behavior for interacting with the local population. Such systems need to meet criteria similar to language training systems. Basic cross-cultural interpersonal skills can be tested during defined interactions. After training, can the trainee conduct himself in a polite manner? Are they able to satisfy routine social demands and limited work requirements? Other training systems focus on conveying the values of the local culture so that trainees can learn to evaluate actions and outcomes in terms of these local values. Here the assessment would evaluate not only improvement in the trainee’s abilities to identify these values but also to apply these socio-cultural factors to the Military Decision Making Process.

Conclusion

With these program metrics in mind, the HSCB Program portfolio is being shaped to ensure focus on operational priorities while continuing its broad investment in applied research. In doing so, the Program will continue to emphasize innovation, speed, and agility and satisfy some of the needs of our warfighters, all the while keeping research quality and technical rigor high. ♦