

Strategic Multilayer Assessment (SMA)

5th Annual Conference

29-30 NOVEMBER 2011

Prepared for:
JS/J-3/DDGO
OSD/ASD (R&E)/RFD

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EXECUTIVE SUMMARY

The 5th Annual Strategic Multi-layer Assessment (SMA) Conference was held at the National Institutes of Health in Bethesda, Maryland from 29-30 November 2011. The SMA program is prioritized by the Joint Staff (JS/J-3/DDGO) and executed by ASD (R&E) RFD. The focus of the SMA Conference was on influence strategies of state and non-state actors as well as the impact of the social and neurobiological sciences on key aspects of national security. The conference also hosted special sessions on geospatial applications, influence and deterrence in cyber space, and complex adaptive systems. Each session was designed to draw on diverse perspectives and insights from across the United States Government (USG), industry, and academia as well as from around the globe.

The Joint Staff, in partnership with the Office of the Secretary of Defense (OSD), has developed a proven methodology merging multi-agency expertise and information to address complex operational requirements that call for multi-disciplinary approaches utilizing skill sets not normally present within any one service/agency. The SMA process uses robust multi-agency collaboration leveraging intellectual/analytical rigor to examine factual/empirical evidence with the focus on synthesizing existing knowledge. The end product consists of actionable strategies and recommendations, which can then be used by planners to support Course of Action (COA) Development.

LTG Michael Flynn, Assistant Director for National Intelligence, provided the keynote speech that covered the changing threat environment, which is creating new demands on the intelligence community and requiring a critical look at the many dimensions of the complex, human-dominated world. He provided four core insights into this complex environment.

1. The threat environment is highly asymmetric, amorphous, complex, rapidly changing, and uncertain.
2. There is a greater need for speed and flexibility in US intelligence gathering and decision making
3. Current analytic deficiencies arise from the Cold War structure and insularity of the intelligence community, complexity of the environment, and how we currently think about threats
4. New thinking needs to consider populations as important actors (e.g., mobilization via social media, etc.) and the social and resource inequities and grievances that spawn conflict

A significant portion of the conference focused on soliciting and discussing the needs of the Combatant Commands (COCOMS) to inform how the SMA program can best support the operational community. The panel was moderated by BG Mike Nagata, JS J37 DDSO, and drew on the experiences and insights of various representatives from across the Combatant Commands. The panelists are listed below.

- BG Mike Nagata, JS, J37, DDSO (moderator)
- COL Carl Trout, JS, J7
- Mr. Aaron Meyer, PACOM
- CAPT Todd Veazie, SOCOM
- Mr. Marty Drake, CENTCOM

- LTC Gerald Scott, JS, J3
- Mr. Roger Baty, NORTHCOM
- LtCol Scott Tielemans, CENTCOM
- Mr. Juan Hurtado, SOUTHCOM
- Master Chief Dave Cooper, SOCOM
- LtCol (Dr.) Rob Renfro, CENTCOM

Several key themes emerged from the panel discussion.

1. Issues and questions from the operational community must be well framed to ensure analytic responses meet the COCOMs' needs. Answers are only as good as the question asked.
2. The operation community needs tools and models to aid complex planning and decision-making. These tools and models need to be able to
 - a. Deal with complexity and uncertainty;
 - b. Incorporate various perspectives;
 - c. Operate dynamically and across multiple dimensions;
 - d. Be easily and quickly learned;
 - e. Focus left of boom;
 - f. Help operators to better understand others as well as ourselves; and
 - g. Make information more digestible through better visualization.
3. Officers need to be trained how to use social science tools so that they will feel comfortable employing these decisions and planning aids to maximize operational success.
4. Solutions to complex national security issues, particularly with regard to population-centric challenges, should be sought from a broad community of potential contributors including academia, industry, think tanks, and other non-traditional sources. A community, or communities, of interest must be built and sustained.
5. Cyber threats have the potential to alter the types of problems the operational community faces in the future. They are a potential game changer.
6. Building and fostering personal relationships across militaries and governments is the key to success when operating left of boom.

The panelists agreed that programs, like SMA, that seek solutions to the nation's complex strategic issues using rigorous, diverse analytic methods drawn from a large community of government and non-government contributors provide a template for 21st Century strategic thinking.

The *Influencing State and Non-State Actors* session consisted of a two-part introduction followed by three panels. The session's objective was to explore and discuss the fundamentals of analytic approaches for deriving and assessing actions to influence and deterring state and non-state actors. The first part of the introduction explored the methodological and conceptual challenges of tackling an extraordinarily complex dynamic problem space that consists of a wide range of actors (e.g., nuclear powers, failing states, non-state organizations, virtual actors), U.S. objectives (deterrence, assurance, defeat, counter-terror, non-proliferation), competing interests, and anticipated and unanticipated effects. Maj. Gen. Joseph Reynes, AJFC, Netherlands, supplemented this conceptual discussion with a view of the real world practicalities of thinking about and conducting deterrence and influence operations.

[Panel One](#), moderated by Mr. Pat McKenna, STRATCOM, reviewed recent efforts on behalf of various COCOMs to envision the complex system of state and non-state actors and their interests that must be considered in nearly any analysis in support of deterrence or influence operations. Discussion centered around critical, but often inadequately defined, basic concepts and language of deterrence and influence. [Panel Two](#), moderated by Mr. Dan Flynn, ODNI, focused on the practical questions of generating sufficient relevant data and the use of appropriate, creative analytic techniques (e.g., crowdsourcing, war gaming, simulation and computer-based modeling) for developing influence and deterrence operations COAs. [Panel Three](#), moderated by Dr. Allison Astorino-Courtois, NSI, discussed the prospects for developing readily accessible tools and models to help operators tackle the dynamic threat environments faced by the U.S. while avoiding unfavorable and unintended consequences. Further discussion touched upon the real-world impediments to including modeling and other multi-input analyses in (non-kinetic) effects planning.

Mr. Pat McKenna summarized the key insights from Panels One, Two, and Three.

- The nation can prepare for the future, but it cannot predict it.
- Operational environments are much more complex today than they were in the past.
- The threat is constantly evolving and the threat environment is becoming more complex.
- The U.S. needs to be agile.
- No single model can capture all of the complexities; there is no universal method.
- Analysts are trying to provide insights not solutions.
- Ultimately, analysts, modelers, and planners are providing information to enhance decision-making.

Mr. McKenna then noted the challenges that arose throughout the discussions. These challenges are listed below.

- There is a need to focus on being left of boom.
- It is important to determine how to balance agility versus comprehensiveness.
- Investments need to be made in the analytic community even with shrinking budgets.
- It is crucial to have critical thinking people and utilizing multi-disciplinary approaches.
- There is a need to obtain more complete data and determine how to know if it is authoritative and unbiased.
- Authoritative data must be incorporated into models.
- Techniques that are not singularly focused must continue to be used.
- Deterrence must be balanced in terms of other forms of influence.
- The integration of multiple tools must occur.
- There is a need to determine if tools are valid and the proper ways to deal with uncertainty within these tools.

A [session](#) on *Geospatial Applications for Population Centric Assessments*, moderated by Ms. Elizabeth Lyon, OSD, and Dr. Bert Davis, United States Army Corps of Engineers (USACE), examined geospatial data, geospatial methods (including data collection), and geospatial applications for defining place including elements such as the physical and social environments and factors leading to understand stability and security in places that are either currently stable, transitioning, or in conflict.

Additional panels were held throughout the conference to provide further perspectives and insights. The [panel](#) on *Implications of Recent Advances in Social, Cognitive, and Neurobiological Sciences to National Security*, moderated by Dr. Diane DiEuliis, NIH and the Department of Health and Human Services (HHS), discussed cutting edge scientific research in the areas of political violence, radicalization, and deterrence. The panel examined how recent scientific discoveries might inform our understanding of violence in general and, more specifically, issues of national security relating to political violence. Dr. Bill Casebeer summarized the key findings and insights from the Neurobiology panel.

- Neurobiological research helps the operational community understand the mechanisms that underlie higher order phenomena
- The amygdala plays a key role in response to threats
 - Emotional triggers can be subconscious
 - Out-group members trigger more amygdala activation than in-group members
- Disinhibition contagion is a neurobiological process, which can result in friendly fire
 - Leader fires first and releases the inhibition of others to use force
 - Understanding neurobiological processes will help the DoD formulate Tactics, Techniques, and Procedures (TTPs) to limit collateral damage
- Narratives and stories are important psychologically and neurobiologically; they...
 - Influence how one remembers things and helps humans make judgments about who it is permissible to kill
 - Could have implications for influence campaigns

The [panel](#) on *Influencing Violent Extremist Organizations (IVEO) Neurobiology Pilot Effort*, moderated by Ms. Abigail Chapman, NSI, discussed results from the quick turnaround effort designed to provide a multi-method, multi-disciplinary exploration of al-Qaeda in the Arabian Peninsula (AQAP). The [panel](#) on *Influence and Deterrence in Cyber Space*, moderated by Dr. William Casebeer, DARPA, addressed the core questions facing the operational community today with regard to influence and deterrence in cyberspace. The [panel](#) on *Complex Adaptive Systems*, moderated by Lt Col David Lyle, United States Air Force (USAF), examined the importance of understanding human complexity in the operational environment. The panel further discussed ways in which visualizations inspired by complex science innovations could help to combine and present vast amounts of complex data in new formats, helping the observer intuitively understand the key nodes, linkages, and dynamics of complex systems of all kinds.

The proceedings with all slides and videos will be posted on the SMA SharePoint site (https://nsiteam.net/x_sma/default.aspx). If you do not have an account, you can register for one by going to <https://nsiteam.net/newAcct>. If you already have an account and cannot recall your password, please visit this URL: <https://nsiteam.net/reset>.¹

¹ Unfortunately, users cannot automatically request their username if they have forgotten. Usernames are typically <first initial> <lastname> (e.g. nsuarez, achapman, scanna, etc.).

OPENING REMARKS

WELCOME (DR. DIANE DIEULIIS)

Dr. Diane DiEuliis, National Institutes of Health (NIH) and Department of Health and Human Services (HHS), welcomed participants to the NIH Conference Center. She described how she met Dr. Hriar Cabayan through the Influencing Violent Extremist Organization (I-VEO) effort, which has a neurobiology component. The effort is keenly interested in how to leverage innovative research in cognitive, social, and behavioral sciences and apply those findings to real world VEO challenges. It is very exciting to have a neurobiology component to the 5th Annual SMA Conference.

SMA OVERVIEW (DR. HRIAR CABAYAN)

Dr. Hriar Cabayan, OSD SMA, welcomed the participants to the 5th Annual SMA Conference and thanked Dr. DiEuliis for hosting the meeting at the NIH.

SMA's mission is to provide planning support to the Combatant Commands (COCOMs). SMA takes on complex operational imperatives requiring multi-agency, multi-disciplinary solutions that are NOT within core Service/Agency competency. SMA seeks solutions and participants are sought across United States Government (USG) and beyond including USG agencies, the intelligence community, services, academia, industry, Federally Funded Research and Development Centers (FFRDCs), and Department of Energy (DOE) National Laboratories. SMA focus areas include counter-terrorism; counter-WMD (state and non-state); global and regional socio-cultural assessments; and individual, state, and national-level deterrence studies.

The SMA program is different from many other Department of Defense (DoD) efforts. Its objective is to inform the decision maker, but does not get involved in direct planning and execution, intelligence assessments, or make policy recommendations. SMA products and recommendations are unconstrained by policy, legal, or other considerations. Furthermore, SMA also does not sponsor science and technology (S&T) development; it invests in "brains" not "things."

Some examples of recently completed SMA efforts include:

- Sudan Strategic Assessment (CENTCOM)
- Deterrence in the 21st Century (STRATCOM)
- Global WMD-Terrorism Joint Intelligence Preparation of the Operational Environment (SOCOM)
- PAKAF Rich Contextual Understanding (ISAF)
- Counter-proliferation (CENTCOM)
- Concepts & Analysis of Nuclear Strategy (CANS) (STRATCOM)
- Influencing Violent Extremist Organizations (CENTCOM)

The SMA team has two efforts lined up for 2012, which will run simultaneously. The first is the *Assessment of Influence Options for Geo-Political & Nuclear Stability in South Asia* for CENTCOM, PACOM, and STRATCOM. The effort will treat the South Asia area as a region. Furthermore, it will establish a baseline reflecting current conditions and assess future conditions. The second effort will focus on developing U.S. influence and deterrence strategies via cyber-based social media for

the Joint Staff and STRATCOM. The effort will seek to answer three questions: How does communication via social media differ physiologically from other forms of interaction (e.g., email, telephone, text)? How does social media communication factor into political radicalization and mobilization? How can operational analysts and planners best employ social media?

GUEST SPEAKERS

BRIG GEN JOHN "JACK" SHANAHAN, JS J3 DDGO

Brig Gen Jack Shanahan, Deputy Director for Global Operations (DDGO), welcomed participants on behalf of the Joint Staff J3. What is most impressive about SMA conferences is not just the number of people who attend, but also the credentials of the attendees and the level of discourse. The panels comprise remarkable talent from diverse communities across DoD, industry, academia, and think tanks.

Participants stand to gain significant knowledge and insight during the two-day conference. The J39 DDGO shares oversight and advocacy responsibilities for the SMA program, along with Ben Riley's Rapid Reaction Technology Office (RRTO). Brig Gen Shanahan emphasized the importance of the SMA program to the Combatant Commands, who value SMA's independence and creativity. J39 DDGO plays a role in prioritizing SMA efforts, based on Combatant Command priorities and competing demands from other organizations.

One of SMA's most important strengths, and its real strategic value, derives from Dr. Cabayan's ability to pull together a team of experts in almost any field, who are able to devote impressive amounts of time focusing on some of our military's most complex and seemingly intractable problem sets—time that most of the rest of us across DoD do not have due to dealing with day-to-day issues. The results from their studies feed directly to senior DoD decision makers. SMA draws on its extensive network of contributors and takes a whole-of-government approach unconstrained by policy, pre-ordained conclusions, or prescribed approach. Those who participate in SMA studies represent the ultimate "independent actors and thinkers."

SMA projects, particularly the recent IVEO and CANS initiatives,² have had extremely important, real-world applications. It is remarkable to see how the work the SMA team has accomplished has correlated with great fidelity to current events, particularly with respect to I-VEOs in South Asia. There is great relevance in terms of the Haqqani network and events unfolding in Pakistan (the so-called "red lines" the SMA team presented). The SMA team's focus on Pakistan could not come at a better time. SMA analysis offers cogent, well-respected insights and recommendations; the work produced goes far beyond 'thought pieces' and helps DoD leaders frame key decisions that have strategic, operational, and tactical implications. Brig Gen Shanahan stated that he could not be more pleased with SMA products and is looking forward to the next two projects in 2012, which will prove to be equally valuable to DoD senior leaders given the relevance of these initiatives to events currently unfolding across the globe.

² Influencing Violent Extremist Organizations (IVEO) and Concepts and Analysis of Nuclear Strategy (CANS)

MR. BEN RILEY, OSD, ASD (R&E)/RFD

Mr. Ben Riley, Principal Deputy, Deputy Assistant Secretary of Defense for Rapid Fielding in the office of the Assistant Secretary of Defense, Research and Engineering, spoke about the Rapid Fielding Office and the SMA program. The RFD office funds many programs across a variety of areas with a focus on small, short-term programs. The benefit of supporting multiple projects is to look for confluence in unexpected areas that may serve operational needs. The SMA program is funded by RFD but would not work effectively without coordination from the Joint Staff and Brig Gen Shanahan.

In 2004, the baseline for understanding and engaging with populations was reliant on individual subject matter experts. In 2007, TRADOC developed the Human Terrain Teams (HTTs), which were sponsored by RFD. Originally, it was a 12-month effort that included personnel and tool development. The program received rave reviews and transition to JIEDDO as it grew. The RFD office seeks to test new programs to see if they gain traction. Its programs emphasize the employment of social sciences at the tactical level. It is incumbent upon the representatives of military commands to talk about why the SMA program is so important so those benefits can be communicated up the chain of command.

KEY NOTE SPEAKER

LTG MICHAEL FLYNN, ASSISTANT DIRECTOR FOR NATIONAL INTELLIGENCE

LTG Michael Flynn, Assistant Director for National Intelligence, thanked Dr. Cabayan and the SMA office for hosting the conference. Dr. Cabayan is the original crowdsourcer; he has been doing it his whole life. There is a book called *The Wisdom of Crowds*³ and it describes the things that he and the SMA team does. LTG Flynn stated that he appreciates the work the SMA team did on the PAKAF RCU effort. He thanked Dr. Allison Astorino-Courtois, NSI, who was a big supporter and interlocutor. One of SMA's benefits is the huge bevy of SMEs it brings in to inform its efforts. SMA brings together SMEs to solve some of the nation's most difficult problems. They use analytic methods to dissect the human domain in which globalization has linked the nation inextricably.

When he returned from Afghanistan, the RRTO office and Mr. Ben Riley, was one of the first places LTG Flynn came back to thank. People in rapid fielding do not get a lot of credit compared to big programs, but wars are not won by big programs; they are won by the rapid fielding of new ideas and technologies. The Human Terrain Teams are only one example of such a success. Commanders demand programs and technologies that work in the moment and do not care whether the tool is part of a big system that may have benefits five or ten years down the line. LTG Flynn supports significantly increasing funding for RRTO over time because of the complex, rapidly changing environment U.S. forces are in.

LTG Flynn shared some of his perspectives on the complex world environment and offered some key thoughts.

³ Surowiecki, J. (2005). *The Wisdom of Crowds*. Anchor: New York.

First, the world environment is ever changing and uncertain. The world is in an era of persistent conflict. The old concepts of peace war no longer exist, nor does the East/West divide exist anymore.

Second, the future is impossible to predict, but it is important to prepare for it. One problem prohibiting preparation for this complex world is that while the U.S. is in the second decade of the 21st century, many people are stuck in turn-of-the-century thinking.

Third, the success of nation's open and free markets and social programs have accelerated globalization. Globalization has opened doors to many people across the globe and has intensified the dangers the USG faces. The construct of threat is evolving rapidly. The major threats affecting the U.S. include nuclear powers, failing states, virtual actors, and non-state actors. The nation's next conflict is not likely to be a full-scale war, but a highly asymmetric threat, which is what it wants to avoid. These threats exist today. They exist globally and transnationally. They are so amorphous and complex that our intelligence community does not grasp them fully.

Fourth, the aggregation of these threats is resulting in the erosion of our economy and national resources. The cost of responding to these threats continues to be tremendous, which is something the nation cannot afford, yet the threats facing the United States are complex and multi-modal. The USG is still organized along East/West lines, which no longer makes sense. The U.S.'s intelligence structure was designed to contain communism, but the threat and environment have changed. The USG must also change. If the USG has learned anything these last ten years, it is that it must organize toward the purpose it is trying to achieve faster than the environment that surrounds it.

Fifth, COCOMs should evolve from a physical domain to an organizational map that allows for cross-functional capabilities and forums to quickly address issues. The COCOMs should be agile enough to make these connections quickly to address emerging issues. This would also require the reorganization and reprioritization of the intelligence community. In a multi-modal world, adversaries operate in a business construct. Our nation's adversaries do not remain in the categorical confines that we impose upon them. They operate at the points of convergence. The nation's own categorization of the threat impedes it from addressing these threats effectively. Furthermore, the explosion of information and increase in intelligence requirements outpace the intelligence community's ability to respond to them.

Sixth, the USG is regularly surprised by events. It needs to consider integrating other information gatherers like polling companies, social media organizations, and academia to contribute to intelligence collection. Not all intelligence has to be bought or stolen. The USG has to get left of boom, which will prevent the incidence of armed conflict and the depletion of our resources. Actions to mitigate crises need to include economic, diplomatic, and ecological components, not just military solutions. When conducting analysis, it used to be that all the decision maker needed was to know about were the elites in a state. However, the world is now a human-dominated domain. The world's population has exploded. As jobs and resources plateau, the individuals affected will be drawn into illicit activities. Instead of focusing on war, the nation needs to focus on the precursors of war.

The nation should use its intelligence apparatus to help the world deal with hunger, disaster, as well as prevent populations from falling into catastrophe. In a recent Economist edition, the Chief Operating Officer of Facebook argued that globalization is changing the way people think, learn, socialize, and develop relationships. We are virtually connected. This is important because the USG

needs to learn how to operate in this strange new world where connection does not result in disaffection, but unites people. Technology is bringing the world together in obvious and surprising ways. Facebook is equivalent to the third largest country in the world. Relationships that used to be intangible have become tangible. The Arab uprising used social technologies to amplify their voices to a government that was not listening. They are giving a name to a face of those who were previously invisible. U.S. forces cannot wait for doctrine to tell it what to do in this complex, rapidly evolving environment. Even counterinsurgency (COIN) doctrine was written during the war and it is still to be determined whether it is correct.

LTG Flynn asked how the USG gets left of boom. The USG needs to address this problem before committing huge national treasure. One thing it needs to do is to engage populations before starting a counterinsurgency campaign. There have been 32 counterinsurgencies since 1960 and in 22 of the cases, the insurgent forces were the victors. Irregular warfare should be the template for future battlefields so the USG never has to declare war if it prepares correctly.

There is an inherent tension between comprehensiveness and agility. U.S. forces are challenged to be comprehensive, and end up requiring much greater agility; however, if forces focus on a few things, they will fail. So how can U.S. forces balance the two? The answer is through partnerships. This conference represents a huge consortium of partnerships. Ten years ago, when LTG Flynn served as an Army Corps G-2, 80% of critical information was gathered through traditional intelligence. One year ago as ISAF J2, he relied on 80% open source information for campaign planning and 20% on intelligence to provide richness and depth to the open source material. This was possible because of ISAF's population centric strategy that was not capture/kill oriented. The USG needs to build, leverage, and nurture partnerships. LTG Flynn embraces engagement. A nation is made more secure through intelligence integration. Partner engagement is important because the United States cannot do it all alone. The Director of National Intelligence's goal is for analysts to identify themselves as part of the intelligence community, not as part of a three-letter acronym. Intelligence organizations need to work with local, tribal, and law enforcement agencies as well as the private sector. Strategic alliances are vital to the preservation of the American way of life and its national security. He encouraged the workshop participants to be aggressive in their participation to help move ideas forward. One measure of success is when battalion commanders are screaming for a product or tool, not senior decision makers.

The challenges that we face are daunting. In this new complex environment, U.S. forces must deal with globalization, demand for resources, rapid urbanization, weak economies, and a burgeoning world population.

The amount of information on Facebook doubles every six months. This underscores the nation's need to understand what is happening on a human scale. The world is changing and the United States National Security System must figure out how to communicate and share. The nation needs to extend its aperture beyond the enemy and look at the environment behind him. The intelligence community and the USG need to consider how to best operate in an open world. This requires a new mindset that focuses on the precursors of war, not war itself. The nation needs to invest in the analytic community—they are the nation's brains and thinkers. Advanced analytics and critical thinking are the two most important components of the analytic workforce. The best analysts are those that can solve complex problems. Another change that has to be made is to start bringing data to the analyst and not make the analysts spend time finding data. The nation cannot afford the numerous analysts that we employ today. The focus needs to be on making analysts more efficient.

Finally, the intelligence community needs to visualize data faster and from a broader aperture. Decision makers often only see data presented in 1-2 dimensions. The ability to visualize data is important. Other dimensions that need to be considered include the impact of the environment and the effect of globalization. A flat map no longer provides sufficient information. This kind of visualization can reduce risk and cost to the nation. The nation needs to look beyond its current conflicts and invest in capabilities that support the requirements of the future. The nation's prosperity is linked to globalization; similarly, the nation's security is linked to global security.

Discussion:

Dr. Tawfik Hamid, Potomac Institute, stated that it is best to be more proactive in the war on terror instead of reactive in order to better direct the outcome of events. If the United States had responded to radical Islam at an earlier stage, it would have yielded a better outcome. He asked LTG Flynn how he sees the U.S. becoming more proactive. LTG Flynn responded in reference to al Qaeda, which has a strategic plan and are executing it. The USG understands the plan, but the method by which it is countering the strategy can be debated and is evolving. The way the nation perceives itself is not how America is perceived in the rest of the world. The problems the nation faces goes beyond al Qaeda. There are transnational criminal entities that also have a strategy, so the nation has to develop a strategy to counter that. The nation's strategy of containing communism, as costly as it was, was relatively easy to think about. It was the West against communism, not just the United States alone. The nation needs to develop and prioritize strategies. What the SMA PAKAF Rich Contextual Understanding (RCU) project tried to do was to get an understanding of the population at the district or provincial level, which was extremely helpful. It helped LTG Flynn know where to place priorities. The nation needs additional people to help think about these problems and it should not only come from the intelligence community.

INFLUENCE OF STATE AND NON-STATE ACTORS SESSION

INTRODUCTION (MR. PAT MCKENNA & DR. ALLISON ASTORINO-COURTOIS)

Mr. Pat McKenna, STRATCOM, and Dr. Allison Astorino-Courtois, NSI, introduced the *Influence of State and Non-State Actors* session. Mr. McKenna stated that the panel discussions throughout the day aimed to define the problem space, analyze the problem, and provide a comprehensive analysis of practical real world applications of integrated influence and effects analyses techniques.

Dr. Astorino-Courtois emphasized the importance of using multi-dimension, multi-source, and multi-method techniques to provide a comprehensive, integrative analysis and to broaden the scope of examination for any problem the Department of Defense (DoD) may face. The conference will consider the clashes that may arise from the transition from comprehensive analysis to real world application.

OPERATIONAL PERSPECTIVE ON INFLUENCE AND DETERRENCE (MAJ. GEN. JOSEPH REYNES)

Maj. Gen. Joseph Reynes, AJFC, Netherlands, spoke about strategic engagement with violent extremist organizations (VEOs) through his experience in Iraq. He focused specifically on the importance of re-integration and reconciliation. The FSEC Mission Statement is to facilitate and expedite reconciliation and political accommodation on the national, regional, and local levels between the Government of Iraq and armed groups operating outside the extant political system. The goal is to foster a stable, secure, prosperous, and democratic Iraq and thus isolate and expose irreconcilable elements. Maj. Gen. Reynes emphasized that there is no future without reconciliation.

Strategic engagement aims to reduce violence, promote national unity and political accommodation, and isolate violent extremists. Strategic engagement is accomplished through opening dialogue, cessation of violence, normalizing relations, re-integration, and finally national reconciliation. Maj. Gen. Reynes explained that the strategic engagement in Iraq was done with a short-term focus while in Afghanistan it is being done with a focus on the long-term.

Strategic engagement can result in strategic effects, which include mitigating influence; marginalizing or maximizing leaders; minimizing or maximizing impact and opportunity; neutralizing if required; the mediation of grievances, motivation, messaging; and managing expectations.

Maj. Gen. Reynes then presented the National Reconciliation Process Model, which can be seen in Figure 1.

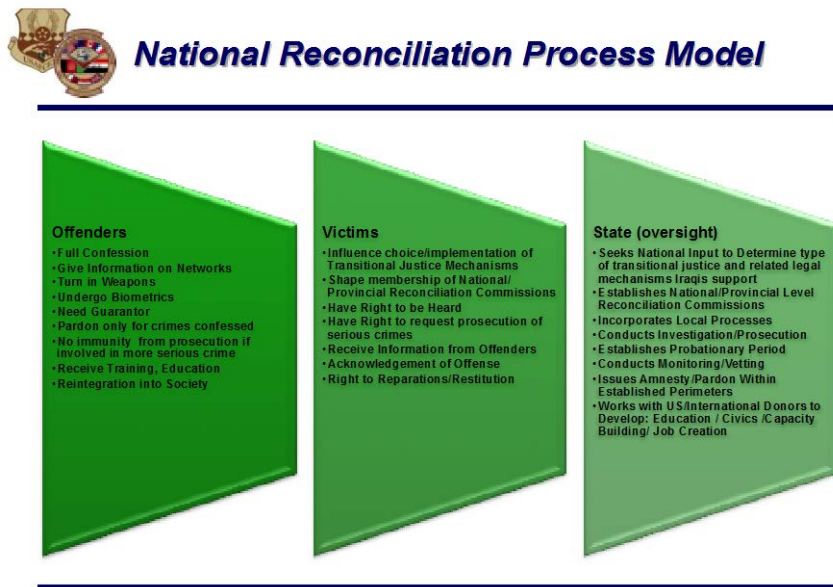


FIGURE 1. NATIONAL RECONCILIATION PROCESS MODEL

Maj. Gen. Reynes's team utilized the National Unity Process Framework with the objective of providing people with an alternative method of transitioning from the battlefield back into society. The framework uses *justice with accountability* as the transitional justice mechanism because of non-political and all-inclusive advantages. The goal is to achieve the re-integration of low-level insurgents who assisted for economic reasons, those who wish to declare

themselves as Iraqi citizens, and others who wish to rejoin legitimate political, economic, and social processes. Maj. Gen. Reynes added that his team never negotiated with anybody, instead asked people about their goals, desires, and potential ways they saw themselves re-integrating back into society. An example of this can be seen in the Sons of Iraq project during which close to 125,000

potential insurgents were taken off the battlefield in four-to-six months. The types of actors that the team came across during the reconciliation process include people with the following characteristics: committed ideologues, committed followers, personal grievances, tribal/family grievances, economic motivations, patriotism, and accidental/momentary reasons.

Maj. Gen. Reynes pointed out that it is crucial to develop an understanding of and relationship with the people of an area for effective change to occur. From an intelligence point of view, the people on the ground often have some of the best information, but this information is unobtainable unless relationships have been developed for the information to be transferred. Without solid relationships, long-term reconciliation will not occur. Maj. Gen. Reynes added that often times the U.S. does not have a solid understanding of the operational environment into which it moves. Language barriers are a major cause of this lack of understanding. Ninety percent of officers do not speak another language, but the U.S. often forces others to understand English. It is hard to develop strong relationships when the U.S. is not willing to learn other languages.

Maj. Gen. Reynes emphasized that developing trust is the most critical factor when creating relationships in foreign environments. He concluded that reconciliation and re-integration are successful and effective tools for removing people from the battlefield.

PANEL ONE: ELEMENTS OF INFLUENCE & EFFECTS ANALYSIS FOR STATE AND NON-STATE ACTORS (MODERATOR: MR. PAT MCKENNA)

Mr. Pat McKenna, STRATCOM, welcomed the panelists and explained that the objective of this panel is to review recent efforts on behalf of various COCOMs to envision the complex system of state and non-state actors and their interests that must be considered in nearly any analysis in support of deterrence or influence operations. The discussion will center on critical, but often inadequately defined basic concepts and language of deterrence and influence. The areas of focus for this panel include:

- Are dissuasion, deterrence, and defeat best conceived as points along an influence continuum or as distinct efforts?
- Given an extraordinarily complex dynamic problem space, what are the key elements of influence/deterrence strategies that should be fostered as we move forward?
- Do these concepts mean the same when the target is a state or a non-state actor? How should we treat both state and cohabitating non-state actors at the same time and try to flush out their patterns of simultaneous competition and cooperation? How accountable do we hold the nation states that either tolerate destructive non-state actors, or deliberately use them as proxies?
- How does the approach laid out in the Deterrence Operations Joint Operating Concept (DOJOC) fit in? What does it help us understand and what does it not?

Dr. Jeff Knopf, Naval Postgraduate School (NPS), presented a case for thinking comprehensively when seeking and achieving influence. Three dimensions of a comprehensive approach towards influence include recognizing the existence of numerous influence strategies, a number of means to implement the strategy, and different causal mechanisms or influence levers.

The spectrum of strategies can be categorized into control, consensual, or influence strategies. Control strategies aim to completely dominate a situation or adversary. These strategies are attractive, but are often not realistic and are very high risk. Consensual strategies aim to reach an agreement between the players. These strategies are attractive, but are not always possible because of conflicting interests among the parties. Influence strategies leave the final decision up to the other side. Influence strategies tend to be less attractive because of the lack of control. Influence strategies are rarely preferred, but are often the most realistic option.

Dr. Knopf pointed out that deterrence is a type of influence strategy. Influence strategies can have either positive/negative and material/ideational aspects. Deterrence is a strategy that emphasizes negative incentives based on material costs and benefits. Dr. Knopf added that when thinking about deterrence, there are multiple deterrence options and there are many options other than deterrence.

There are different means for implementing influence strategies. It is important not to confuse ways and means of implementation. The military can be a non-coercive tool while non-military means can be coercive. Combination strategies often make sense, but not all combinations work because some are mutually incompatible.

When thinking about deterrence, it is important to realize that the situation today is very different than it was during the Cold War. Occasional deterrence failures do not threaten national survival today; unlike during the Cold War when even one failure might have led to nuclear Armageddon. This means the measurement of effectiveness of deterrence is different today than it was during the Cold War. The goal should be to get as much leverage from deterrence as possible at the margins. Deterrence might be working as well as it can even with some failures; one failure does not mean deterrence is not working.

Historically, Rational Actor Models (RAMs) and Strategic Culture Models (SCMs) have been the dominant approaches for understanding deterrence. These approaches provide good insights, but are clearly limited. RAMs make point predictions assuming every actor is the same and SCMs make point predictions assuming every actor is different. An improved model would recognize that actors are partly the same and at the same time partly different. It would also eliminate point predictions to allow for a range of internal debates in target actors.

Deterrence can be thought about as being socially constructed. What really matters is that there is enough commonality between actors to allow for successful and legitimate communication. Having shared knowledge and norms is an important factor for creating this commonality. Thinking about deterrence as a commonality creates a role for strategic dialogue, diplomacy, track 2's and arms control talks.

Thinking about domestic politics provides another way of planning for influence. Here, the goal becomes to weaken the position of hardliners and bolster the position of moderates on the other

side. Neuroscience and psychology also provide numerous insights toward understanding influence. Emotions play a major role in influence planning. Fairness considerations are also very important for achieving influence.

Dr. Knopf then offered pointers for influence planning and understanding influence. It is important to have realistic goals for red lines and expected success rates. Influencing non-state actors is harder than influencing states, but the same strategic options, means, and influence mechanisms apply. Alternatives to deterrence need to be considered. He encouraged analysts and planners to “open the black box” and learn about other areas of concern that can inform the influence planning process. Make use of social science and draw on generic knowledge to improve possible effects of influence actions. Dr. Knopf concluded that influence is more than “putting warheads on foreheads.”

DR. DAVID CHAMPAGNE

Dr. David Champagne, 4th Military Information Support Group (MISG(A)), spoke about the importance of understanding cultures. Dr. Champagne began by noting that the most important issue is providing the necessary information and intelligence to the soldier in the field. Dr. Champagne has spent his career in the trenches as an intelligence analyst. He is not convinced that any database will allow for more effective communication with human beings in the Middle East and Southwest Asia. Human beings are complex, emotional, and capable of making either rational or irrational decisions dependent on their own perceptions of their interests. . Understanding human beings cannot be left to formulas. In this age of all-seeing global media, the differences in miscommunications between human beings can immediately be seen worldwide.

In order to influence another person or country, the U.S. must sometimes be willing to change its own perceptions and be influenced by others. . The U.S. must more effectively listen and understand other people through face-to-face interactions. The U.S. needs to start to understand the forces in these people’s lives that cause them to behave the way they do. These forces include history, culture, economics, sociology, and psychological traumas. A more complete understanding of these people’s hopes must also be developed. It is crucial for the U.S. to understand the realities of people in other environments. For this to occur, the U.S. needs to approach interactions with a sense of open-mindedness and humility to ultimately understand each other.

To effectively develop long-term relationship, the right people must be chosen for the right jobs. To effectively communicate, U.S. forces must have the capacity for empathy. Language acquisitions will also be beneficial for the U.S. in improving these personal relationships. The ability to understand others will make influencing other cultures significantly easier. In the process of understanding others, the U.S. might be forced to change its own behaviors in order to change the behaviors of others. In a global world, we must learn to examine our own culture to communicate effectively.

Dr. Champagne concluded by emphasizing a few key points. First, the U.S. must be able to use new technology for data collection and analysis. Second, the U.S. must continue to develop people with cultural intelligence and maintain them as part of the government structure. This work cannot simply be contracted out. One goes to war with the analysts one has. Third, increased importance needs to be placed on providing accurate and reliable information. Decision makers must be provided with accurate information that can lead to attainable and reachable policies. Fourth, there must be an increased respect for the global art of diplomacy. Finally, we all must remember that numbers can be misleading and data can easily be manipulated. Dr. Champagne noted that we need

to maintain a healthy skepticism of short-term statistical information telling us that we are winning a conflict put together on a weekly or monthly basis. Dr. Champagne added that sociological change does not happen quickly. A long-term approach needs to be taken for effective sociological changes to occur.

MR. JONATHAN TREXEL

Mr. Jonathan Trexel, SAIC, spoke about the need for a comprehensive approach to be taken for understanding deterrence. He noted how crosscutting the issue of deterrence could be, which makes it necessary to embrace a comprehensive approach towards deterrence.

Deterrence today is very different from Cold War deterrence. Deterrence can no longer be interpreted by the Cold War era. Mr. Trexel noted that the U.S. has had a difficult time adjusting to today's international security environment.

Mr. Trexel described a conceptual framework (Figure 2) for deterrence operations crafted by STRATCOM in 2004 in order to bring clarity to deterrence policy and planning.

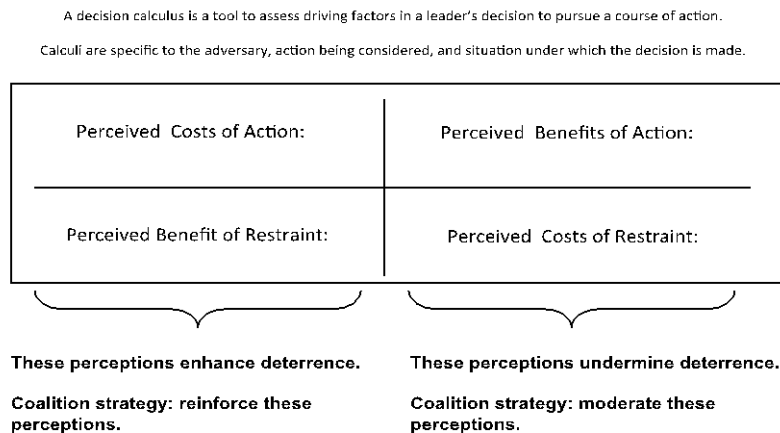


FIGURE 2. CONCEPTUAL FRAMEWORK FOR DETERRENCE OPERATIONS

assumes the adversary to be rational. This framework rates the adversary based on what is reasonable given the adversary's value system, identity, and culture. This requires a deep analytic dive into adversary systems to identify the decision factors of the adversary and to determine the importance of these decisions. Having the necessary information to provide a complete understanding of the adversary is crucial. This complete understanding includes comprehending leadership, interpretations of U.S. actions, identities, and environmental factors.

The framework was designed to be simple and broad to include numerous actor types. This allows for the examination of different deterrence strategies on different actor types. The current

deterrence theory to more completely understand the adversary and understand deterrence decisions. This framework focuses on affecting the adversary decision calculus. Decision calculus is derived from cost/benefits of taking actions or not taking actions. Adversary perceptions can undermine deterrence or enhance deterrence. The framework

Deterrence Operations Joint Operating Concept (DOJOC) framework explores deterrence strategy through a simple pursuit of adversary restraint. This deterrence framework suggests that deterrence practitioners have a single decision to make. The current DOJOC framework does not explore situations where numerous decisions must be made. The current DOJOC framework is also limited to the short-run and immediate threats.

Mr. Trexel concluded that better deterrence-oriented information is needed. Deterrence analysis must be sound, supportive, and robust, but at the same time simple and explanative. At this moment, deterrence organizational capacity is lacking. Mr. Trexel recommended that a consideration be made for investing in a National Deterrence Center that could create comprehensive deterrence strategy.

PANEL TWO: DISCUSSION OF ANALYTICAL TECHNIQUES (MODERATOR: MR. DAN FLYNN)

MR. DAN FLYNN

Mr. Dan Flynn, DNI, moderated the *Discussion of Analytic Techniques* panel. Mr. Flynn stated that LTG Flynn did a good job of setting the stage for this panel's discussion. The future environment is an evolving strategic context with less predictability than the present. However, just because analysts cannot predict the future does not mean the analysts cannot anticipate it. Prior to World War II, the Navy conducted so many war games in preparation for entering the war that Admiral Nimitz was known to later say that nothing surprised the Navy during the war except for the Japanese's use of kamikazes. This highlights the importance of gaming and simulation for strategic planning and the need to understand the socio-cultural context of our adversaries.

DR. RITA PARHAD

Dr. Rita Parhad, Monitor 360, stated that one of the benefits of the SMA program is that no one methodology is conducted in isolation; SMA tries to fit together many kinds of analytic methodologies.

In order to plan and conduct effective influence operations, the USG needs to understand the **socio-cultural context** in which it is operating. Doing so enables planners, analysts, communicators, and decision-makers to understand the motivations, interpret the actions, and ultimately influence the behavior of foreign actors (both state and non-state). In SMA efforts, Monitor 360 has used SME elicitation and crowdsourcing as analytic techniques to gather non-U.S. perspectives and insights (related to nuclear strategy, regional security, or operational support efforts).

Example: Findings from SME Crowdsourcing for CANS



On June 1, 2011, Monitor 360 delivered **Findings from SME Crowdsourcing in East Asia** for the SMA's Concepts and Analysis for Nuclear Strategy (CANS) effort. This report contains detailed country findings on Japan, South Korea, and China across the following elements:

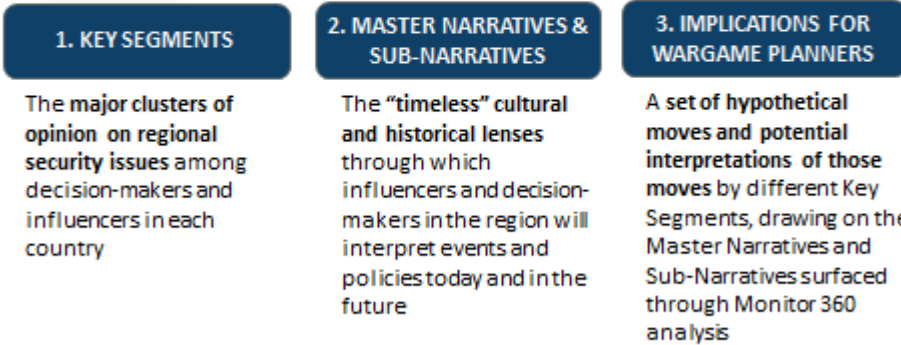


FIGURE 3. FINDINGS FROM SME CROWDSOURCING FOR CANS

The Monitor 360 elicitation and crowdsourcing approach typically includes a **multi-stage process** to engage dozens of SMEs. First, they conduct initial SME interviews and open-source research to sketch out the landscape of opinion on relevant security issues. Second, they conduct in-depth interviews with regional SMEs (including academic and policy experts, former officials,

thought leaders, and influencers) aimed at developing hypotheses (e.g., about the clusters of key beliefs and opinions). A Final set of “validation interviews” are held with SMEs to test and refine these hypotheses and to develop the underlying narratives that capture the various perspectives in each country. The approach may also include a working session with a group of SMEs, in a structured environment to work through key issues. An example of key components of a typical report is illustrated in Figure 3.

There are at least three opportunities for integrating socio-cultural insights from SME elicitation/crowdsourcing into other analytic techniques: a tool for scoping and designing (particularly well suited for wargaming), a real time feedback loop for testing findings and hypotheses, and an alternative approach for comparative results.

MR. HOWARD LEE

Mr. Howard Lee, TRADOC G2 Intelligence Support Activity, Operational Environment Laboratory, presented a briefing on the Athena Simulation tool. TRADOC was tasked to use Athena to execute a series of use cases that explore the impact of conducting U.S. military operations against VEOs. The tool will evaluate the political, economic, social, and military impact on local populations, VEOs, and government organizations.

Athena is a simulation tool that focuses on modeling non-kinetic (DIME/PMESII)⁴ factors. Its objective is to anticipate force activity consequences—the second and third order effects upon noncombatant groups and those groups’ potential responses. It incorporates social science

⁴ DIME: Diplomatic, Information, Military, and Economic; PMESII: Political, Military, Economic, Social, Infrastructure, and Information

“universals” into course of action (COA) analysis and campaign planning. Athena can compute changes in moods, attitudes, satisfaction; volatility and stability within neighborhoods; relationships between various noncombatant groups and leaders (actors); and quantifies the

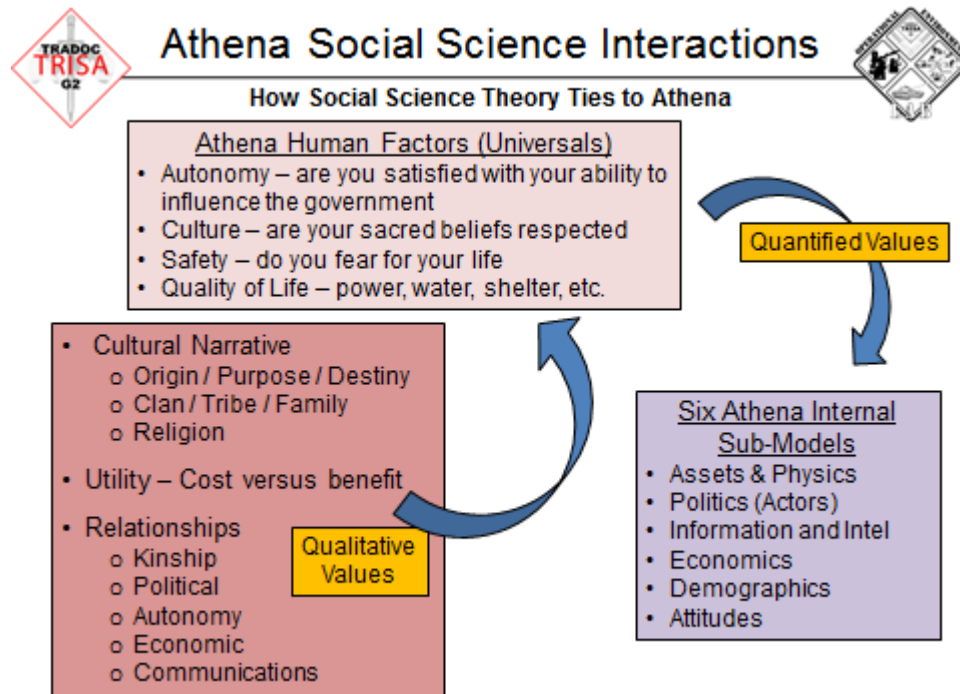


FIGURE 4. ATHENA SOCIAL SCIENCE INTERACTIONS

distribution of political, economic, cultural, and informational power and control. A conceptual map of the tool is shown in Figure 4.

Athena is an evolution of the Joint Non-Kinetic Effects Model (JNEM) that also looks at political, economic, and informational factors including assets and physics, economics, politics, information and intelligence, attitudes, and demographics.

DR. ALEX LEVIS

Dr. Alex Levis, George Mason University (GMU), presented a brief on multi-modeling. Multi-modeling uses multiple interoperating models to address complex questions.

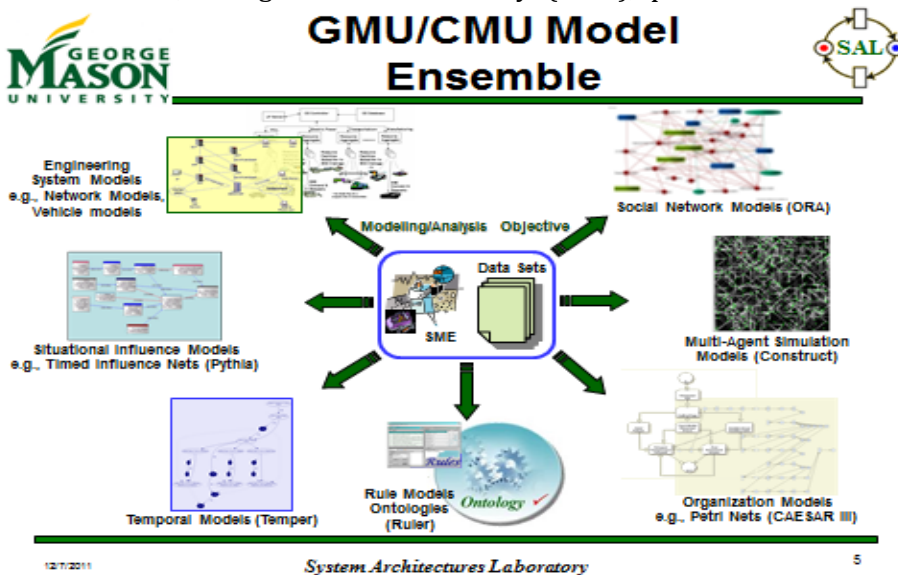


FIGURE 5. GMU/CMU MODEL ENSEMBLE

Multi-modeling is based on different theories and uses different analytical techniques. It is implemented in different modeling languages, but the tools use the same data.

GMU’s multi-modeling suite (see Figure 5) was used during SMA’s Concepts and Analysis

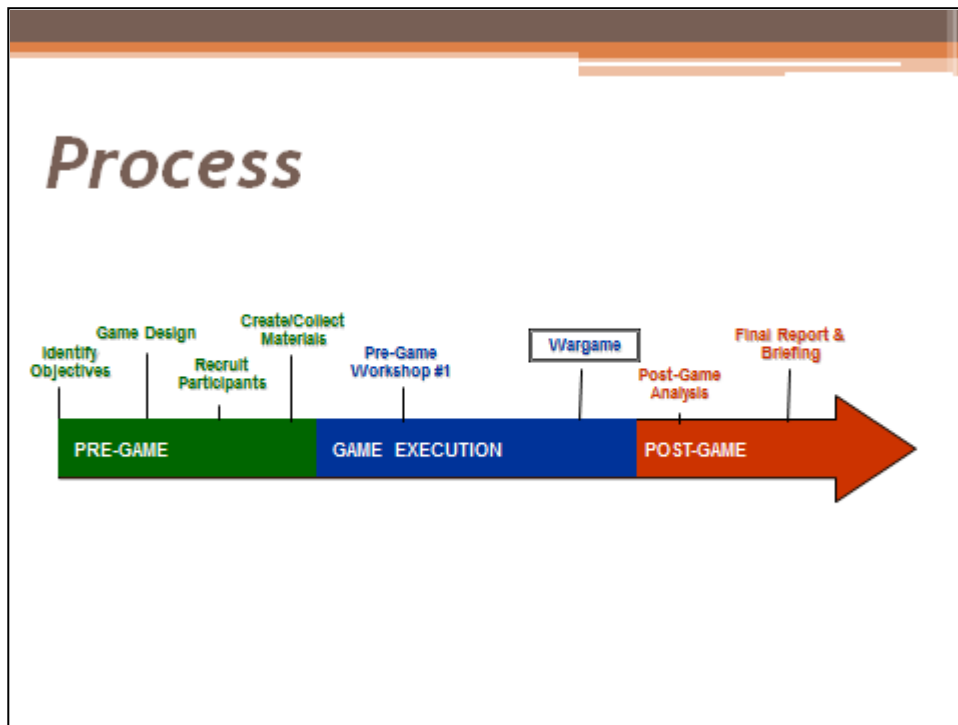
of Nuclear Strategy (CANS) effort for STRATCOM. Given STRATCOM's mission to deter, assure, defend, and defeat, no single analytical methodology can capture the complexities of even one of these missions from behavioral analysis (Deter, Assure) all the way to combat models (Defend, Defeat).

Dr. Levis described how GMU and CMU's multi-modeling tool was used during the CANS effort. First, Influence Net Modeling was used to develop a generic model for analyzing nuclear deterrence strategies. Second, the generic model was specialized twice to address regional issues as described by Navy and Air Force wargames. Third, Social Network Analysis and Agent-based Modeling were used to analyze a regional issue. Finally, the data analyses and results obtained from each modeling methodology were used to improve/enhance the individual models

MR. RON ST. MARTIN

Mr. Ron St. Martin, SAIC, provided a brief on analytic gaming or wargaming. Analytic gaming is the process of conducting a collaborative structured event, in a non-threatening environment, where expert teams can answer the "what if" and "then what" questions for generating insights for the policy maker.

One form of analytic gaming, the tabletop exercise, is usually held at the strategic or operational level.



Gaming requires clearly defined objectives, two or more teams plus a control team, tension among teams (adversaries, competitors, scenario), and questions for players to address. A typical game process timeline is illustrated in Figure 6.

FIGURE 6. ANALYTIC GAMING PROCESS

Analytic gaming provides a number of advantages to decision makers, some of which are listed below.

- Brings disparate expertise together to leverage collective knowledge and intellect to build powerful solutions

- Allows junior analysts to gain exposure to accomplished policymakers and analysts in a collaborative environment
- Identifies key implementation issues and builds consensus among stakeholders
- Evaluates alternative courses of action
- Supports for or questions untested policy ideas
- Educates participants and interested observers
- Focuses on exploration of the human decision making process
- Addresses the “What happens if...?” questions

DISCUSSION

One participant noted that it was his impression that the groups of individuals that have engaged with nuclear policy in the three Asian countries Monitor 360 looked at is small, and wondered how Monitor 360 accounted for the fact that not many SMEs were available. Dr. Parhad responded that from the small community of people who are decision makers, we looked beyond conventional deterrence issues and looked at SMEs with broader regional expertise. We defined key segments as not just the decision makers but also their circle of influence. For the Japan analysis, we have various segments, including one we did not think was very influential—the pacifist public, which is important to be aware of. In the current environment, they are not influential, but they have the potential to exert influence.

Dr. Derek Ruths, McGill University, stated that the multi-modeling suite presented by Dr. Levis is very complex. He asked what kind of data the models used. He wondered if there is enough data to model real world scenarios or even to test and develop the tools. Dr. Levis responded that there is enough data for some aspects. The influence net model relied on SME input. GMU did not conduct formal validation because the questions we ask are about the future and those questions have not been resolved and, therefore, cannot be validated. Dr. Levis uses the concept of plausibility to validate the findings. The models have been running since 2002 and some predicted outcomes have occurred.

Dr. Ruths asked to what extent does using SMEs introduce bias or benefit to the model? SMEs can introduce bias that may not be present in the real data. Dr. Levis responded that GMU addresses this concern by using many SMEs balanced with crowdsourcing results.

Mr. Lailari, Combatting Terrorism Technical Support Office (CTTSO), stated that he was struck by how many assumptions the Athena model uses. He asked how the model accounts for deception or political warfare. Mr. Lee responded that the sheer complexity of reality is impractical to accomplish. The modeling team does the best it can by defining those things we can get our hands around. Perception is one of the things the team has been working on.

PANEL THREE: BRINGING IT ALL TOGETHER-INTEGRATED
INFLUENCE & EFFECTS ANALYSES FOR USE IN THE REAL WORLD
(MODERATOR: DR. ALLISON ASTORINO-COURTOIS)

DR. ALLISON ASTORINO-COURTOIS

Dr. Allison Astorino-Courtois, NSI, moderated the *Bringing it all Together, Integrating Influence & Effects Analyses* panel. The objective of the panel is to discuss the prospects for developing readily accessible tools and models to help operators tackle the dynamic threat environments faced by the U.S. while avoiding unfavorable and unintended consequences. Dr. Astorino-Courtois pointed out that the Consequence Planning Framework offers a method for planners and analysts to account for intended and unintended consequences of an action. The Consequence Planning Framework was created for the *Influencing Violent Extremists (IVEO)* effort and is primarily intended to aid planners and analysts to identify and consider added and unintended effects early in the planning process, design branches and sequels for mitigating/exploiting action effects, and identify indicators of plan success and which data should be captured for that assessment.

During the session, Dr. Astorino-Courtois challenged panelists and audience members to consider the following questions: What are the main real world impediments to modeling and other multi-input analyses in (non-kinetic) effects planning? Can these be overcome (e.g., with education and training or with time and money)? What else is needed?

DR. ROBERT ELDER

Dr. Robert Elder, George Mason University (GMU), presented GMU's Timed Influence Network (TIN) model developed for the CANS effort. CANS participants were challenged to find comprehensive approaches that nuclear policy analysts could employ to inform decisions on nuclear policy and strategy.

GMU developed a multi-dimensional TIN model to look at cause and effect relationships. The model focuses on enduring strategic objectives through ensuring strategic stability with major global powers, encouraging regional stability, and preventing proliferation and use of nuclear technology to ultimately protect the nation and promote its global interests.

Dr. Elder emphasized that Timed Influence Network, Multi-Agent Dynamic Network Analysis, and Dynamic Organization Analysis multi-models can inform nuclear policy analyses addressing the CANS 5-Dimensional Framework and CANS Vortex nuclear policy and strategy questions. The generic TIN model developed for the CANS wargames was used to assess the effects of different courses of action (COA) on key CANS objectives (nuclear weapon use, regional stability, and strategic stability) in two different regional settings and a range of operational phases. Sensitivity analyses suggested opportunities to improve conditional probabilities of the overall decision calculus and individual CANS objectives of interest and were used to refine COAs. Neither game leveraged the TIN model's temporal capabilities; however, its value was recognized in the post-game assessments. Dr. Elder concluded that military planners and analysts familiar with the use of effects-based approaches to planning could easily develop and use TIN models.

DR. NINA BERRY

Dr. Nina Berry, Joint Improvised Explosive Device Defeat Organization (JIEDDO) Counter-IED Operations Integration Center (COIC), stated that JIEDDO's mission is to answer requests for services from theater. JIEDDO works at the tactical operational level and traditionally provides intelligence requests. The COIC has a modeling and simulation team to provide modeling at the geospatial level. The Mission Integration Division (MID) is JIEDDO's analytic division. The MID is made up of comprehensive look teams, a network analysis cell, a law enforcement cell, red teams, a wargaming section, alternative analysis teams, and an operations division.

Some of the different areas JIEDDO analysts have worked on include supply chain analysis, crime pattern analysis, developing a methodology analysts can use to track a certain area over a long period of time, geospatial analysis, and psychological analysis. Recently, JIEDDO has developed a Strategic Interplay Exploration (SIE) game that allows different scenarios to be played out in city environments through video play. This SIE game is also capable of being held in an apartment environment. During the game, a player's actions are recorded and then analyzed following the game. This process allows for quick analysis of live play of real life scenarios.

Dr. Berry emphasized that complex problems are best approached in a hybrid manner. Using multi-methods provides the best analysis and results that lead to discovery. Dr. Berry concluded with a few takeaway points. First, one hundred percent answers are not what the warfighters actually wants. Second, having analysts using multi-method and multi-background approaches to a question provides a more holistic view to the problem and more reliable solutions. Third, the "what if" question is a major concern for the warfighter. Finally, providing different perspectives to the warfighter is very beneficial.

COL CARL TROUT

COL Carl Trout, Joint Staff J7, spoke about the Assessing Deterrence Operations Experiment (ADOE).

The ADOE project seeks to address the following problem: The Joint Force lacks adequate methodology and tools to assess the implications/results of deterrence actions both before and after actions are taken. Current doctrine lacks sufficient guidance on how to assess whole-of-government deterrence operations. We aim to develop a methodology that assesses the ability of deterrence operations to influence and adversary's decision calculus. This work will also inform the deterrence operations joint concept and incorporates insights from the CANS and I-VEO projects.

The project team developed a proposed methodology and conducted an initial limited objective experiment (LOE) to begin examination. Informed by insights from the experiment and research, the team recently published a draft guide for Assessing Deterrence Operations. The next step is to conduct a second limited objective experiment to fully evaluate the methodology and publish an updated ADO Guide for the Joint Force.

Assessments must remain within the bounds of reality. The assessments aim to inform the commander of progress in accomplishing desired deterrence objectives and include recommendations when adjustments to operations are necessary. Deterrence operations are likely more effective when employed as part of a comprehensive approach with other instruments of

power and broader influence efforts. COL Trout pointed out that research illustrates that there is no universal method for assessing deterrence. A particular challenge with deterrence remains identification and collection of appropriate indicators to measure effectiveness and performance. COL Trout suggested a triad of assessment working groups, an independent red team, and the outreach to subject matter experts in government and academia may enable more effective assessment of deterrence operations. Models and simulations have limitations, but there is a place for these tools to contribute to assessment. For example, synthetic cognitive modeling is a tool that may offer potential during planning to estimate possible adversary reactions to operational actions.

COL Trout concluded that it is important to have an understanding of possible unintended consequences that could arise from an action. We must remain mindful that when aiming to deter, provoking an adversary is an undesirable result that must be considered.

DISCUSSION

Dr. Astorino-Courtois wondered what the main real world impediments to modeling and other multi-input analyses in (non-kinetic) effects planning are and questioned how it is possible to move forward with the information and tools discussed during the first sessions of the conference. Dr. Elder responded that the benefits of these models are that they are able to implement SME knowledge into the model to show inconsistencies in the data. The models are also very useful in providing COA analysis. The models are useful for analysts and decision makers who can use the models to inform themselves and their decisions. The main impediment is that it is impossible to fully implement all SME knowledge into a model. Dr. Berry added that models are great for helping analysts think through their problems. The problem is that often times we do not have the necessary data to feed the models. An additional problem is determining how the models deal with uncertainty. COL Trout added that models can be useful in providing information, but it is important to be cautious when working with models. Judgments must be made by the decision makers, not the models.

A member of the audience questioned where analysts and modelers should look for comprehensive, authoritative data. Dr. Astorino-Courtois noted that data is often incomplete, which makes it crucial to utilize multi-method and multi-model techniques to make up for the missing data. Dr. Berry added that there is currently a study being conducted that is searching for determining how open-source data can be used to provide an authoritative source of data. Open-source wise, there is a vast amount of information available, but the question is how the data can be utilized.

Mr. Tom Rieger, NSI, stated that collaboration across agencies is crucial. He wondered what the main barriers stopping the collaboration are. COL Trout responded that dwindling fiscal resources have historically acted as a barrier to collaboration in the past, but that the Joint Force and other agencies should work together in a manner that is in the best national interest.

SESSION WRAP UP (MR. PAT MCKENNA)

Mr. Pat McKenna provided a wrap up of the discussion throughout the day. The day started with Brig Gen Shanahan, LTG Flynn, and Maj. Gen. Reynes providing an operational context and foundation for the discussions. Discussion then moved to a theoretical conversation about influence and analytic techniques that have been used for SMA and other projects. All of these topics have

provided the foundation for a number of themes that arose throughout the day. These themes are listed below.

- The nation can prepare for the future, but it cannot predict it.
- Operational environments are much more complex today than they were in the past.
- The threat is constantly evolving and the threat environment is becoming more complex.
- The U.S. needs to be agile.
- No single model can capture all of the complexities; there is no universal method.
- Analysts are trying to provide insights not solutions.
- Ultimately, analysts, modelers, and planners are providing information to enhance decision-making.

Mr. McKenna then noted the challenges that arose throughout the discussions. These challenges are listed below.

- There is a need to focus on being left of boom.
- It is important to determine how to balance agility versus comprehensiveness.
- Investments need to be made in the analytic community even with shrinking budgets.
- It is crucial to have critical thinking people and utilizing multi-disciplinary approaches.
- There is a need to obtain more complete data and determine how to know if it is authoritative and unbiased.
- Authoritative data must be incorporated into models.
- Techniques that are not singularly focused must continue to be used.
- Deterrence must be balanced in terms of other forms of influence.
- The integration of multiple tools must occur.
- There is a need to determine if tools are valid and the proper ways to deal with uncertainty within these tools.

SESSION ON GEOSPATIAL APPLICATIONS FOR POPULATION CENTRIC ASSESSMENT (MODERATORS: DR. BERT DAVIS & MS. ELIZABETH LYON)

DR. BERT DAVIS & MS. ELIZABETH LYON

Dr. Bert Davis, U.S. Army Engineer Research and Development Center (ERDC), and Ms. Elizabeth Lyon, OSD AT&L, moderated the Session on Geospatial Applications for Population Centric Assessment. This panel examined geospatial data, geospatial methods (including data collection), and geospatial applications for defining place including elements such as the physical and social environments and factors leading to understanding stability and security in places that are either currently stable, transitional, or are in conflict.

Dr. Davis stated that the term human terrain was originally coined as a term to describe military suitability on the landscape. Now, the world environment is a population-based landscape and so the old concept of human terrain (latitude, longitude, dynamic and status attributes, etc.) no longer applies. In a multi-modal environment, operators have many ways of obtaining information to provide the context for the actions. Having the right context to determine the best course of action

enhances overall performance. So how does one provide the right amount of contextual information to the right people at the right time?

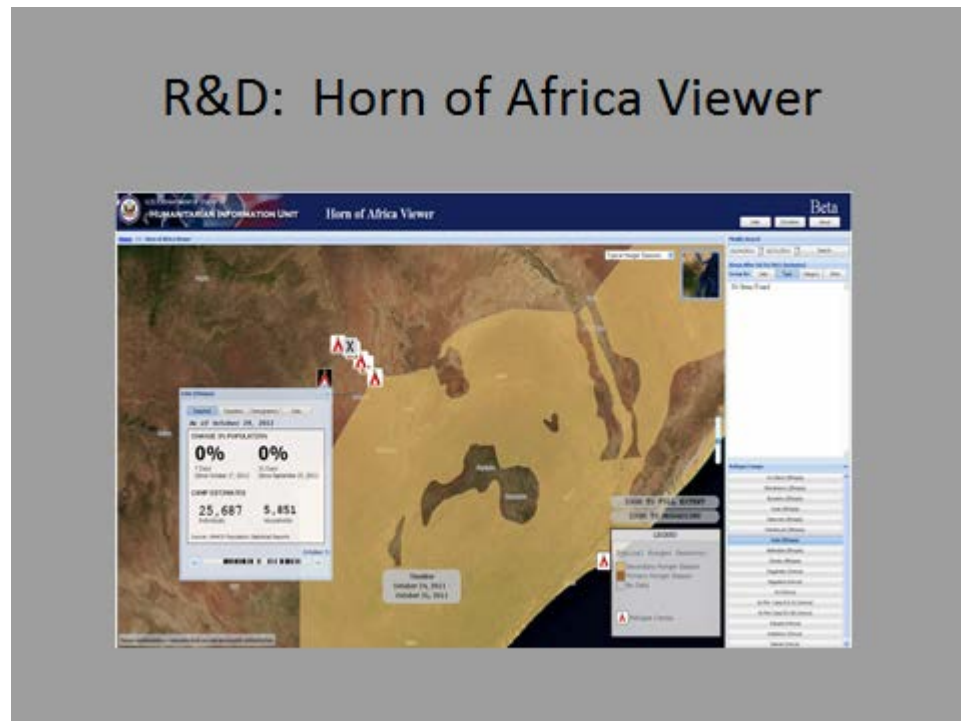
Ms. Lyon showed a video (Episode 3, Chapter 2, Waging Modern War) created by Penn State to illustrate how geospatial data can be visualized. The links to the videos are available <http://geospatialrevolution.psu.edu/>. The video addresses the need to view data across multiple dimensions that LTG Flynn spoke about during the morning session.

LTC LAUREN KULINSKI

LTC Lauren Kulinski, Humanitarian Information Unit (HIU), Department of State (DOS), presented a brief called, *Diplomacy: Geospatial and Human Geography Data*. LTC Kulinski is a civilian affairs officer assigned to the geography office in the HIU. DOS looks at human geography from a broader perspective than the DoD as it looks internally to determine what changes need to be made to bring about stability.

The first ever Quadrennial Diplomacy and Development Review (QDDR) was produced by the DOS to “provide a blueprint for elevating American ‘civilian power’ to better advance our national interests and to be a better partner to the U.S. military.” The report identifies human security as an area of focus that requires a soft power approach. This is where human geography intersects with diplomacy and defense.

LTC Kulinski spoke about the need to develop an international response framework that does not depend on individual embassies, that works with the military to resolve conflict, and that creates secure environments. The framework would integrate assistance between foreign militaries, law enforcement agencies, etc. to anticipate mass atrocities and conflicts. This requires a whole of government approach and an interoperable system to share data. This requires integrative thinking.



Digital Diplomacy is another focus of the HIU. A new department at DOS has been stood up to address these issues called E-diplomacy. There is a list of upcoming seminars including using social media to create real-time awareness that can be found when you Google Tech@state.

HIU was established to be the Intelligence and Research office's

FIGURE 7. HIU'S HORN OF AFRICA VIEWER

SME on complex humanitarian information. The HIU promotes the use of open source data and works with partners such as the United Nations (UN) and the U.S. Census Bureau. HIU attempts to harvest data while adding a geospatial component. An example of the melding of traditional and geospatial data can be seen in Figure 7, the Horn of Africa Viewer.

DR. BUDHENDRA BHADURI

Dr. Budhendra Bhaduri, Oak Ridge National Laboratory, Geographic Information Science & Technology (ORNL GIST), presented a brief on *Emerging Trends in Assessing Population Dynamics*. Collecting data is one of the hardest things to do. Analysts often are at a loss to conduct analysis because the lack sufficient data. However, perfect datasets are elusive in reality. In the majority of instances, people make decisions with imperfect and incomplete datasets.

Advances have been made in geospatial data collection over the last several years. There are increasing resolutions in spatial, temporal, and socioeconomic dimensions for population data. There has been a shift in focus from how people alter places to how places alter people to help understand why people do the things they do. Geospatial data collection has moved beyond observing and is focused more on sensing. Geospatial technology, cyber infrastructure, and the open source data horizon have enhanced the development of novel data and analytical techniques as well as access and delivery mechanisms.

ORNL developed LandScan to improve the knowledge of population dynamics. It collects information about the population, road surfaces, railroads, land use, slope, academic institutions, prisons, hospitals, employment, and imagery.

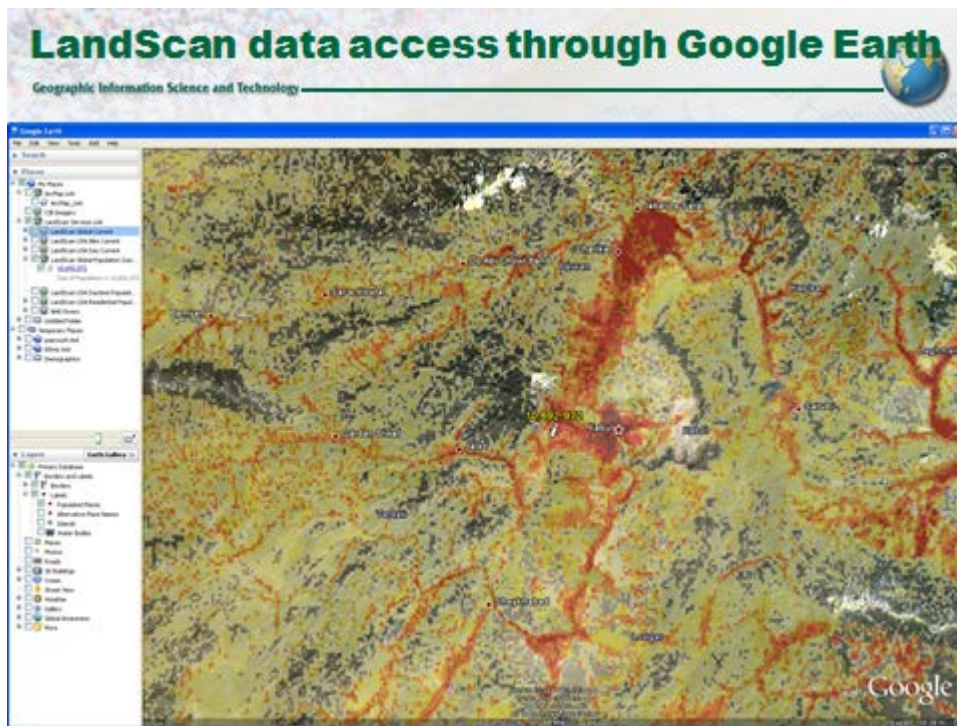


FIGURE 8. LANDSCAN DATA ACCESS THROUGH GOOGLE EARTH

LandScan data is stored in a database that can be accessed with a Google Earth network services link (see Figure 8).

ORNL is working on developing Population Density Tables (PDTs) to support the COCOMs. The tables will represent socio-economic characteristics of a population linked to geospatial data. The tables will be available as a web service on SIPR in summer 2011.

Dr. Ehlschlaeger, U.S. Army Corps of Engineers, Engineering Research and Development Center (USACE ERDC), presented a brief called *Rapid Model Prototyping with Neighborhood Scale Demography*. He initially discussed the need to integrate knowledge from both the physical and social sciences in inform stability operations’ decision makers, analysts, and planners.

Dr. Ehlschlaeger spoke about the Digital Populations (see Figure 9) effort whose goal is understanding the human terrain. The program attempts to repeatedly simulate every person in areas of interest representing known errors and uncertainties from attributes and geographic information. All social, cultural, economic, and political attributes are tagged to persons or households. The aim is that all households are geographically represented based on the best geographic information from many sources. The tool allows any source of attributes to seamlessly integrate information into Digital Populations’ database.

Another tool under development at ERDC is the Rapid Model Prototyping System (RaMPS). Its purpose is to develop the capability to rapidly assemble simulation models to analyze socio-cultural dynamics related to military intervention for Infrastructure and Essential Services. It uses Digital Populations’ rich contextual knowledge to derive agents in simulation models. It will build libraries of macro- to micro-knowledge modules to rapidly construct agent-based simulations. The resulting simulation models will be based on Civil-Military Operator mission requirements. Finally, the models will be placed in the hands of decision makers and are not designed for the exclusive use of

scientists or contractors.

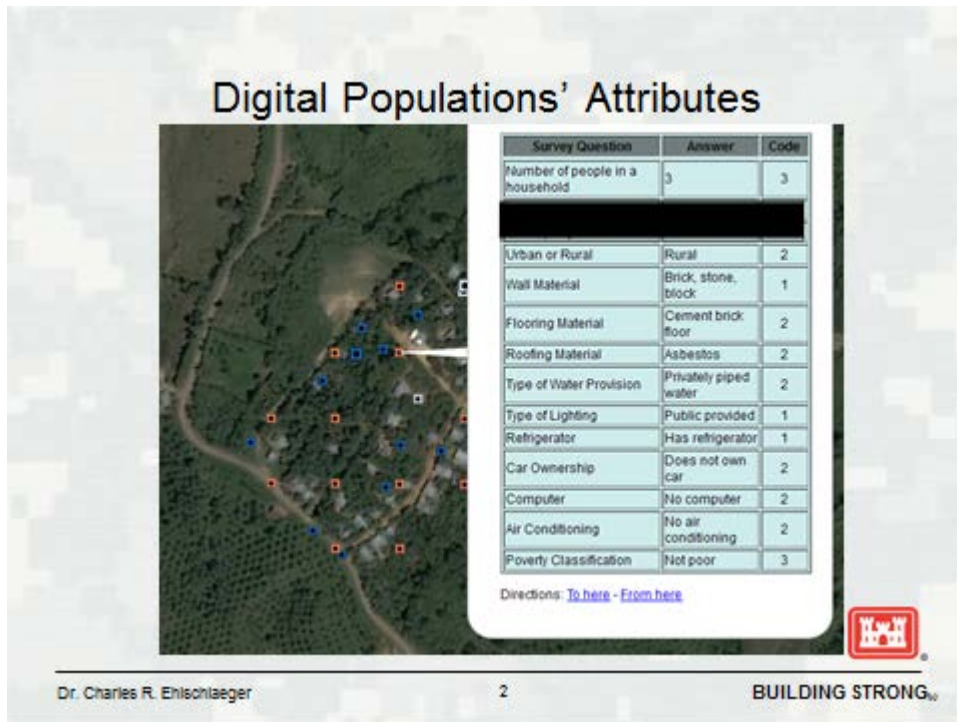


FIGURE 9. DIGITAL POPULATIONS' ATTRIBUTES

Another ERDC capability under development is the Low Governance Cluster Detection Analysis tool. It performs “Cold Spot” Cluster Detection Analysis using human intelligence (HUMINT), social media discussion intensity, and media mood analysis to determine where governance is low. The tool can help planners understand where health, educational,

or economic development is not happening. Research results are expected in early 2012.

DISCUSSION

Dr. Davis stated that this panel addressed one of the original questions posed by Dr. Astorino-Courtois in her introduction: What are the impediments to bringing academic contributions into information operations. He hoped that he showed participants that there is a viable route for this kind of collaboration. There are interesting data approaches and tools that share a common framework to work on complex socio-cultural problems from the strategic to the tactical level. This panel's objective was to open the hood on what geography has to offer the operational planner and analyst.

Ms. Lyon added that one of the most exciting things in Geospatial Intelligence (GEOINT) is that so many federal agencies are coming together to find solutions that meet multiple needs while pursuing a single objective.

One participant asked how the tools presented know what kind of data to collect. As a human, one knows intuitively what needs to be communicated about ourselves in a certain context. How can tools replicate this understanding? Dr. Bhaduri responded that Human Geography has always focused on demographic attributes, but it really focuses on the nodes of a society—why societies do what they do. For example, when looking at migration, it is interesting to know who makes the decision to move—an elder, the head of family, etc.? That is the kind of dataset that policy makers would like to have, but does not exist. Collecting data will always be the challenge. Furthermore, planners and analysts have to decide whether to trust the data collected.

Mr. Nigel Oakes, SCL stated that in the last several years, SCL has conducted research in high threat areas. It is usually an influence program to determine what message/audience to target. Recently, clients have asked the company to GIS data of where the interview took place. Clients also want attitudinal data. However, there is a concern that the confluence of this kind of data crosses a questionable line. He asked the panelists whether any of them have had to address this issue. Dr. Bhaduri stated that privacy is a huge barrier for GIS data. Even the U.S. Census has errors that were deliberately introduced to protect privacy.

COMMAND DISCUSSIONS

FEEDBACK FROM COMMANDS (MODERATOR: BG MIKE NAGATA)

BG MIKE NAGATA, JS, J37, DDSO

BG Mike Nagata, JS, J37, DDSO, moderated the panel seeking feedback from the Combatant Commands and the operational community. He asked each of the panelists to describe their pressing needs.

BG Nagata spoke about his recent 26-month tour in Pakistan. The situation in the country has changed significantly over that time due to current events and the recent challenging relations between the United States and Pakistan. He stated that the biggest takeaway from his time in Pakistan was that he does not understand Pakistan. Without having lived one's whole life in Pakistan, it is hard to understand the people and culture just as Pakistani cannot fundamentally understand Americans without living or being raised in the United States. The reality of not truly

being able to understand another should inform decision makers' approach to international challenges. He tries to approach conversations on Pakistan with a dose of humility.

MR. AARON MEYER, PACOM

Mr. Aaron Meyer, PACOM, stated that PACOM was pleased with the work from the most recent SMA on Influencing Violent Extremist Organizations (IVEO) and would like to use the SMA process in the future in a number of topic areas such as: 1) preventing strategic escalation between India and Pakistan; 2) deterring North Korean aggression; 3) managing relations with China and our Northeast Asian allies; and 4) reducing tensions in the South China Sea.

Mr. Meyer stated that PACOM, working from the results of the IVEO SMA, would like a better understanding of the driving and mitigating factors in strategic escalation between Pakistan and India, especially any escalation that might result from VEO attacks in India. PACOM also seeks a broader understanding of deterrence on the Korean peninsula that goes beyond nuclear deterrence and focuses on deterring the cycle of the Democratic People's Republic of Korea (DPRK) conventional provocations. Furthermore, PACOM would benefit from gaining deeper insight into potential future tools of state power that China might leverage beyond its military forces to achieve its strategic goals in Northeast Asia, just as China used Rare Earth Metal exports to Japan as a lever. Finally, the PACOM staff would like to explore more broadly the factors beyond resource competition that are driving the growing conflict over the South China Sea, as well as factors or strategies that could mitigate and diminish that potential flash point.

CAPT TODD VEAZIE, SOCOM

CAPT Todd Veazie, SOCOM, stated that one thing that would help SOCOM is a new 'National Security Act of 2012.' U.S. forces are fighting under a construct that was created in 1947. Inter-agency involvement is essential, but it is hard to execute in practice. Having an overarching framework to guide cooperation would be very helpful. The USG needs a new construct for interagency communications.

There is a generation of leaders that have been trained in this outdated concept of binary decision-making. U.S. forces find themselves operating in a complex situation and senior leaders need to change the expectations of the intelligence community. A 100 percent solution is not necessary for the warfighter. Additionally, there is a role for models in the decision making process.

The U.S. forces cannot predict the future, but it has to make decision in spite of this uncertainty. Programs like SMA help the decision maker deal with uncertainty. Modeling and simulation tools that build in uncertainty are necessary to help the planner and analyst find the necessary information from amongst the plethora of data.

CAPT Veazie asked what it means to not be able to predict the future. There is plenty of doctrine to guide war fighting, but there is not a lot of doctrine to guide actions left of boom and U.S. forces should be focused on preventing the sound of guns.

CAPT Veazie stated that a lot of effort at SOCOM is being devoted to helping the warfighter think in terms of four dimensions.

Military leaders need to simplify the complexity of conflict for the warfighters. He asked whether complex adaptive systems could be simplified for the average warfighter.

CAPT Veazie also addressed advances in war fighting. U.S. forces are at a point where decision makers have always valued the physical strength of fighters, but now decision makers are beginning to appreciate the value of the cognitive aspects of war fighting.

People are always looking for and investing in the development of the next technological advance, like the ray gun. Where is the special “ray gun” for solving these issues?

MR. MARTY DRAKE, CENTCOM

Mr. Marty Drake, CENTCOM, emphasized the importance of SMA programs in supporting the COCOMS through providing a rich contextual understanding of operational environments. CENTCOM has embraced and supported SMA, which has provided CENTCOM with multi-perspective and multi-dimensional analysis.

Mr. Drake added that CENTCOM needs to use these multidisciplinary methods and perspectives to enhance knowledge and understanding. This knowledge must then be transferred into wisdom. This wisdom will allow appropriate decisions to be made by decision makers and planners.

Mr. Drake concluded that using a whole of government approach is crucial when facing difficult situations.

LTC GERALD SCOTT, JS, J3

LTC Gerald Scott, JS, J3, spoke about influence planning and the information environment. The information environment consists of three dimensions: cognitive, physical, and informational. These information environments transform into human-centric, brick and mortar-centric, and data-centric methods of influence.

LTC Scott emphasized that the challenge we face today is that there is a lack of time to fully understand a problem and develop effective strategic recommendations. This challenge generates problems with staff focus and creates barriers to collaboration. Further, the challenge results in the seeking of quick, “good-enough” answers. This time challenge can also result in analysts and developers finding themselves “thinking by building the product,” which limits the thinking process for generating information. Ultimately, this creates the need for a mechanism to make information more available and portable.

LTC Scott concluded that planners must be provided with more dynamic, multi-dimensional tools that can be easily and quickly learned, but are also still very adaptable.

MR. ROGER BATY, NORTHCOM

Mr. Roger Baty, NORTHCOM, stated that they are currently facing the issue of transnational criminal organizations. The J5 is contemplating working on developing a rich contextual understanding of the operational environment of these transnational criminal organizations in order to more completely comprehend the current situation. In addition to the operational environments of these

transnational criminal organizations, Mr. Baty expressed an interest in specifically understanding the most effective approach for countering these organizations and the identification of the factors that result in a breakdown of the rule of law in the areas where transnational criminal organizations flourish.

Mr. Baty emphasized that there is a major interest in determining and understanding which metrics truly measure the success of an action or decision against transnational criminal organizations.

LTCOL SCOTT TIELEMANS, CENTCOM

LtCol Scott Tielemans, CENTCOM, stated that SMA has been an important element to help planners develop a complete understanding of strategic situations. He added that the ability to visualize the complexity of the operational environments is crucial for planners and decision makers and that SMA has been able to help achieve this visualization.

LtCol Tielemans noted the importance of approaching problems in a collaborative manner. Collaboration provides a more complete understanding of operational environments and the potential impact of actions taken in these environments. He emphasized that decision makers must be aware of possible unintended consequences that could result from a decision or action.

LtCol Tielemans concluded that the SMA project enables better understanding about very complex phenomena by doing detailed research on the actors, relationships, tendencies, and potentials within the problem. Often, the reality is that the military planners will not have the requisite time and freedom to conduct the research that SMA can provide. The bottom line is that SMA products are informative and useful to planners at CENTCOM.

LT COL (DR.) ROB RENFRO, CENTCOM

Lt Col (Dr.) Rob Renfro, CENTCOM, stated that U.S. forces need tools to better understand populations along the lines of the PAKAF Rich Contextual Understanding (RCU) effort. U.S. forces need to understand patterns of life for individual people and need to evaluate the consequences of its actions. Furthermore, U.S. forces need to recognize the potential of systems and populations to evolve and need tools to determine how to ensure long-term positive outcomes.

Many times, the questions CENTCOM has for the SMA team are unrealistic to answer. Perhaps CENTCOM needs to reframe how it asks questions and understand what questions can realistically be answered.

Models are useful for decision makers when they add value that is proportional to the time, effort, and cost of achieving these answers. Decision makers need sufficient information to make decisions. They try to eliminate risk, but risk is simply uncertainty. To reduce uncertainty, we can change the environment.

With regard to data for models, if a modeler needs data, they need to figure out how to get people to tell you the information you require. However, people do not share information freely with US forces because they often do not share the same worldview.

MR. JUAN HURTADO, SOUTHCOM

Mr. Juan Hurtado, SOUTHCOM, stated that transnational organized crime is a major concern for SOUTHCOM; specifically, anything that is moved illegally is a target of interest. In addition, humanitarian assistance and disaster response and support to Peacekeeping Operations are other areas of focus for SOUTHCOM.

Mr. Hurtado emphasized that it is critical to improve and maintain inter-agency connections. Problems cannot always be solved by the military, which makes inter-agency collaboration crucial to ensure regional security and stability.

Mr. Hurtado added that SMA could enhance engagement with academia and other governmental organizations in the theater. In turn, these engagements would be beneficial to build long-term relationships that are crucial for whole of government approach.

Mr. Hurtado expressed the desire for SOUTHCOM and SMA to work together to improve some of SOUTHCOM's capability gaps.

MASTER CHIEF DAVE COOPER, SOCOM

Master Chief Dave Cooper, SOCOM, stated that there have been numerous advances in capabilities including geospatial and sociocultural, but there have not been major improvements in human decision-making capabilities. Master Chief Cooper emphasized that work must be done to improve and evolve human decision-making capabilities.

To portray how important human decision-making capabilities are, Master Chief Cooper provided a real world example. When he was in Afghanistan, he was in a helicopter that was sent to interdict a convoy heading towards the Pakistani border. Inside the convoy was a tall man dressed in a white robe who appeared to resemble Osama Bin Laden. Human decision-making led to the convoy being bombed because rational led the decision makers to believe Bin Laden inside the convoy. It turns out that the man inside the convoy was not Bin Laden and appeared to be tall because he was surrounded by women and children. This is a clear example of imperfect human decision-making and validates the need for improvements in human decision-making capabilities.

Master Chief Cooper challenged the SMA team to consider possible methods to improving the individual decision making process. He further emphasized the importance of neuroscience in strategic operations and recommended the use of psychologists and neuroscientists in aiding soldiers before going to war instead of when they come back.

DISCUSSION

BG Mike Nagata, JS J37 DDSO, concluded the panel by emphasizing the importance of developing strong personal relationships in areas of operation. He stated that without creating concrete personal relationships, it is impossible to achieve long-term success in a foreign area. BG Nagata added that we often daunt ourselves with how complex the world is and become enamored with chasing tools to eliminate that complexity and make solutions more obvious, but he strongly believes that building sincere personal relationships in our operational environments will make our desired solutions more clear and actions more effective.

LTC Scott pointed out the need for shareable and moveable data that provides access to tools and information that can easily be accessed in a time efficient manner. LT COL Renfro added that density of knowledge is needed, but this density needs to be distilled down to ensure answers are compact. LTC Scott added that improvements must be made to ensure the absorption, understanding, and transfer of information.

BG Nagata noted that a lesson we have failed to learn is that the frequency in which we rotate our military personnel in and out of areas invites repeated mistakes to occur over time.

LtCol Renfro added that decision makers need to start carefully thinking about the military eventually leaving areas of current operation and the State Department becoming the leaders in these areas.

BG Nagata emphasized that the U.S. needs to stop basing its relationship decisions on the question of what the USG is getting out of this relationship. Unfortunately, the U.S. has a tendency to build relationship solely upon personal needs. Improvements need to be made to relationship building methods and the interests and concerns of the other half of the relationship must be considered.

BG Nagata stated that our ability to predict what our adversary is going to do is fundamentally undermined by our failure to understand our effect on them.

LtCol Scott stated that in the era of reducing resources and tight fiscal constraints, inter-agency collaboration is crucial.

Dr. Ron Taylor, Associate Executive Officer, NAS NRC, stated that SMA is a gem that needs to be protected. If we do not continue to protect this asset, we run the risk of losing the value that this program provides.

SOCIAL SCIENCE SUPPORT TO THE OPERATIONAL COMMUNITY (MODERATOR: MR. BEN RILEY)

MR. BEN RILEY, OSD ASD (R&E) RFD

Mr. Ben Riley, OSD ASD (R&E) RFD, moderated the panel on Social Science Support to the Operational Community. Mr. Riley noted the difficult funding times the Department of Defense is in. Dr. Roy, who is a Congressional staffer, has been a tremendous supporter of SMA. He values the depth of the program. The previous panel regarding operational needs emphasized the criticality of support for innovative programs like SMA. It is important to articulate the benefits of this program. The SMA office should work with BG Nagata to describe the SMA's utilities on paper.

Mr. Riley stated that it is important to provide a context for how SMA programs might be used to inform and support operational needs. He spoke about three scenarios where SMA might have been called upon to provide support to operational users given sufficient funding. First, what kind of support might SMA have provided the operational community about Libya? Second, what support could SMA provide to Special Forces for their efforts against the Lord's Resistance Army in central Africa? Third, what support could SMA provide in helping to understand the dynamics in Syria as the crisis unfolds? It is important to know and be able to describe what kind of support SMA can and does provide.

To help the DoD think through these complex issues, Mr. Riley sat down with David Kilcullen earlier this year to brainstorm ideas. What came out of the meeting was an idea for a war game called “Evolved Regular Theater.” The game takes place in 2025 in an island state called Cambia. During the game, U.S. forces had to evacuate U.S. citizens in 96 hours. The island had two groups of non-state actors: Dardalas, which were like Hezbollah today with regard to the provisions of social services, and the Jobani Brigade, which was similar to the Liberation Tigers of Tamil Eelam (LTTE). U.S. forces had to deal with both groups. In this future, more than half of the world’s population lives in cities. The cities have problems with ethnic tensions, power, food, water, and chaotic development. Kilcullen says that war involves people and people live in cities; therefore, war will be in cities in the future.

Mr. Riley asked that given the tools and capabilities presented during the conference, how the DoD would give the commander the kind of information that is critical for him to achieve his mission—such as evacuating people. The final analysis from the war game showed the key trends of the future include a high degree of interconnectedness, ubiquitous social media, mass migration, virtual diaspora, uneven impact of technology/innovation, etc. In the future, adversaries will be networked, virtual leaders may prevail, all sides will have greater situational awareness, and there will be lower barriers to technical entry. In the game, the adversary was always able to present a quicker story of what was going on to the detriment of U.S. Forces’ ability to effectively respond to messaging.

Mr. Riley suggested two cities that seem like a perfect storm in terms of future conflict based on the findings from the Evolved Regular Theater game: Rio de Janeiro, Brazil and Lagos, Nigeria. He asked conference participants to keep those two locations in mind.

CAPT DYLAN SCHMORROW

CAPT Dylan Schmorrow, OSD, Human Social Culture Behavior Modeling Program, stated that this



FIGURE 10. HSCB PUBLICATION

panel represents a great cross-section of what SMA and other programs are trying to achieve in terms of supporting the operator with comprehensive tools and analysis. He provided participants with an HSCB publication called *Sociocultural Behavior Research and Engineering in the Department of Defense Context* (see Figure 10).⁵ The SMA effort is a flagship DoD effort.

As the Deputy Director, Human Performance, Training, and BioSystems at the Office of the Secretary of Defense, CAPT Schmorrow has two perspectives on social science support to the

⁵ Publicly available on DTIC at: www.dtic.mil/dtic/tr/fulltext/u2/a549230.pdf

DoD. First, he oversees \$3-4 billion of scientific and technical research funds. His job is sometimes similar to a 1920s telephone operator; he has a unique perspective to see the many efforts that are ongoing without directing individual programs what to do. Of the larger budget, CAPT Schmorrow also oversees the \$30 million HSCB program, which is funded through 6-4 money. The program's objective is to take well-developed tools and transition them to the operational user. CAPT Schmorrow showed a short video produced by MITRE illustrating the kind of models the HSCB program supports.

With significant investments in research and engineering on sociocultural behavior, there is an opportunity to connect theories, tools, and technologies into coherent capability packages, oriented to operational challenges across four capability areas:

- **Understand** ~ Capabilities to support thorough perception and comprehension, grounded in social and behavioral science of the sociocultural features and dynamics in an operational environment.
- **Detect** ~ Capabilities to discover, distinguish, and locate operationally relevant sociocultural signatures through the collection, processing, and analysis of sociocultural behavior data.
- **Forecast** ~ Capabilities for tracking and forecasting change in entities and phenomena of interest along multiple dimensions (time, space, social networks, types of behavior...) through persistent sensing and modeling of the environment.
- **Mitigate** ~ Capabilities to develop, order/prioritize, execute, and measure COAs grounded in the social and behavioral sciences that are intended to influence entities and phenomena of interest.

Social science tools have entered a new phase a rigor. Developers of tools now understand the importance of allowing users to defend, explain, and bound conclusions and recommendations and point to the rigor that allowed their formulation.

CAPT Schmorrow outlined a list of areas where social science tools could help support common and tough operational challenges.

- Recognizing narratives that drive behavior, and influence opportunities for successful strategic communications
- Leveraging social media to better forecast instability like that in North Africa 2011
- Effectively blending hard and soft power to prevent or shorten armed conflict
- Understanding the drivers of violent extremism by detecting their indicators and developing countering COA.
- Anticipating whether and how one idea will spread rapidly across social networks, while another fades quickly
- Visualizing information about sociocultural behavior in creative, powerful, and valid ways to support decision making

Ultimately, social science tools should aim to support an integrated 3-prong vision. First, open source and social media data and social sensors should be fused with traditional methods and data. Second, technologies should support behavior modeling and forecasting of plausible outcomes. Third, forecasting and decision support systems with which we can see critical features and explore alternative courses of action should be prioritized.

DR. WILLIAM CASEBEER

Dr. William Casebeer, DARPA, provided four succinct points about social science support to the operational community. First, social scientists have always supported the operational community. With decreasing budgets, the question is not whether there will be decreasing support for social science, but how to make decisions to maintain support for the social sciences. The real issue is not whether or not social scientists should work to support the defense community, but how to instill more rigor into social science tools and how best to meet operational demands.

The second point is those social scientists excel at modeling theoretic explanations, not deterministic prediction. At the end of the day, social scientists will not be able to squeeze equations out of social science lemons. The real result will look like a set of assumptions, contain a forecast, or provide decision aids. The operational community should not expect to get quantitative solutions for complex socio-cultural problems. Social science models provide theoretic explanations that yield insights and forecasting ability.

Third, the brain is the true origin of strategic surprise and it is highly social. Therefore, social science is critical to help frame problems. All advances in warfare that resulted from strategic surprise came from neurons firings. The neurons are the real center of gravity of warfare. What this means is that social science is of critical importance to warfare because social science sits at the intersection of basic behavior and collective human action. They are key to figuring out how environmental variables affect future warfare. Social science should be used not only to understand adversaries but to educate U.S. forces, eliminate bias, and help operators build interpersonal relationships. As was suggested earlier in the conference, it would be beneficial to turn social science on ourselves.

Fourth, social science brings a diversity of methods to the table to solve problems. This is a strength, not a weakness. Social scientists, because of the types of endeavors they engage in, explain multiple phenomena at multiple levels of analysis. The DoD should not point at disagreements in the social science community as a weakness of what social science can bring to bear; it is a strength.

DR. ROBBIN STAFFIN

Dr. Robin Staffin, Director, Basic Research Office of the Assistant Secretary of Defense for Research and Engineering ASD (R&E), introduced Dr. Erin Fitzgerald who spoke about the Minerva project. He explained that his office could be thought of as the academic arm of the DoD. He noted that SMEs are essential for obtaining insight into a whole set of issues that underpin what goes on in the world. He stated that some topics of interest include the shifting patterns of power and learning what drives extra national groups. Other countries are catching up to U.S. science and technology capabilities. It would be interesting to know how other countries' S&T infrastructure develops. It is important to understand the world the nation is facing. Minerva was designed to leverage the strength of expertise in universities to help understand the sources of conflict.

COL CARL TROUT, JS, J7

COL Carl Trout, JS, J7, JCW, JD stated that the aim of joint force development is to create, sustain, and improve capabilities of the current and future force. The goal is to provide value to the Joint

warfighter. We must look beyond current requirements toward 2020. In doing so, the challenge is to make joint concept development and experimentation relevant to building Joint Force 2020.

In an era of increasing fiscal restraints, there is a premium on critical thinking and innovation. As we look toward the future, the intellectual rigor and discourse fostered by SMA can help frame the types of challenges and problems we may face in the future security environment. Analysts and planners should challenge assumptions. SMA fosters the building of partnership between DoD, other government departments, and academia.

The Joint Staff's aim is to build a force that is agile and versatile enough to adapt to the emerging problems in the future security environment. Cyber and space may become more competitive domains in the future. Adversaries have watched and learned and continue to adapt. As we consider future challenges, and strive to develop innovative solutions, the question is how can we be more effective with what we have?

DR. ERIN FITZGERALD

Dr. Erin Fitzgerald is an employee of the Potomac Institutes but works primarily on the Minerva project. Minerva is a potential answer to what BG Nagata said about moving forward to try to predict what behavior will come next. However, what is really needed is an understanding of the motivation fueling actors. Minerva is trying to understand the cultural, social, economic, etc. landscape that is part of the actor's environment (see Figure 11).



Minerva's goal is to improve analysts' and planners' fundamental understanding of social, cultural, and political forces that shape regions of the world of strategic importance to the U.S. It leverages the strengths of the nation's academic research institutions in the social sciences to help DoD define sources of present and future conflict with an eye toward better understanding political trajectories of key regions of the world.

FIGURE 11. HOW TO FIND OUT MORE ABOUT MINERVA

Minerva's core research areas include the following.

- Religious and Cultural Changes in the Islamic World
- Terrorism and Terrorist Ideologies
- Science, Technology, and Military Transformations in China and Developing States
- National Security Implications of Energy and Environmental Stress
- New Theories of Cross-Domain Deterrence
- Regime and Social Dynamics in Failed, Failing, and Fragile Authoritarian States

These “topic thrusts” are updated annually to target the knowledge gaps most critical for the warfighter, the force planner, and national security policy development.

Minerva has yielded some preliminary insights, which are listed below.

- **Elicited innovation drivers and key trends in the Chinese defense economy** based on open source Chinese documents and interviews, helping to better understand the reform and the pace of modernization in China’s defense industry.
- Evaluated **the effect on future violence of civilian casualties by ISAF and insurgents**, briefed to CJCS ADM Mullen and COMISAF GEN McChrystal
- Developed data mining techniques for **identifying groups with counter-radical Islamic discourse**, producing analyses of crusader metaphors in Indonesia, Wahabi colonialism, and discourse regarding the status of women
- Built and publicly released a **database on African social conflict** related to environmental drivers, economic downturns, food security, elections, ethnic tensions, and other issues below national armed conflict levels (e.g., strikes, labor unrest). Rainfall was found to have a surprising impact on social conflict.
- Found that **although small-scale reconstruction projects reduce violence, large-scale ones do not**, briefed to the COMISAF GEN Petraeus
- Producing organizational profiles and dynamic interactive maps of the **architecture of violent and non-violent opposition groups** within a social movement sector or conflict system.

As Minerva continues to develop, it will strive to achieve two goals: the generation of new knowledge and insights relevant to the DoD and the formation of communities of interest (COI) that build relationships and exchange knowledge between the DoD and the academic community.

DISCUSSION

Mr. Ben Riley stated that the topics discussed at the conference show that there are tools, programs, and methods that provide capabilities that might be prized in the operation environment. However, these tools currently require the intellectual curiosity of an officer in the field to use it. Once that commander moves on, frequently the knowledge and use of that tool is lost. The community should look into how to train officers in social science tools and methods.

NEUROBIOLOGICAL OVERVIEW

DR. JEANETTE NORDEN

Dr. Jeanette Norden, Vanderbilt University School of Medicine, provided an overview of the brain and its structure. The brain is the most incredible human organ in the body. Everything a human being does or thinks or feels is the result of neuron activity in the brain. There are 100 billion neurons in the adult human brain connected by 100 trillion synapses!

The brain stem is involved in very basic processes like breathing and heart rate. What really separates human beings from other animals is the development of the hemispheres surrounding the brain stem. These hemispheres control the higher functions of the brain. The “bark” or cortex of the hemispheres represents the outer one to four millimeter layer of nerve cells, which represents the area where the highest order thinking occurs in the brain.

Vision is an incredibly important capability for human beings. Human beings see with their brains, not their eyes. The eye sends a signal deep into the brain where a connection is made with another nerve cell. A subjective experience is then made about what is being seen in the primary visual cortex. The visual cortex provides the complex experience that human beings call vision. Language is another crucial capability for human beings. In the left hemisphere, there is an area that is functionally specific for language. There is hardwiring, in the sense that parts of the left hemisphere of the brain are specifically designed to understand language. Hardwiring is how the brain is organized determined by genetics. The soft wiring in this area allows for the understanding of the language that a human being is exposed to.

The limbic system is a set of brain structures involved in learning and memory, emotion, and executive function (an umbrella term for cognitive processes such as planning, working memory, attention, problem solving, verbal reasoning, etc.). Human beings make decisions that are guided by emotions, which are functions of the limbic system. The hippocampus is a structure of the limbic system that is specifically wired for learning and memory. The hippocampus takes episodes that happen in one’s life and strings them together into a “story” which can be considered a person’s autobiography. This autobiography informs a human being of who they are and what has happened in their life.

Deep below one part of the cortex is a structure called the amygdala. This area of the brain is wired to respond to threats in the environment. The problem in our modern society is that the amygdala does not know how to differentiate something physically threatening from something psychologically threatening. When human beings get into arguments about something, the amygdala causes them to either flee or fight. For soldiers in the military that have post-traumatic stress disorder (PTSD), which arises from being in a situation that has been threatening, the amygdala causes these soldiers to have fear and anxiety when hearing a sound like the backfiring of a car.

The front part of the brain, specifically the prefrontal cortex, is what distinguishes human beings from all other mammals. Areas in the orbitofrontal cortex appear to be critically involved in social relations and matching events with emotions. If a human being were to have some sort of brain damage to the orbitofrontal lobe, they would become a very different person personally and

socially. There are areas on the lateral surface that are more involved in executive function. These areas are where human beings learn to prioritize and make rational decisions.

Human beings are guided through executive decisions by having a feeling that orients them towards a specific decision. Specific areas of the brain are genetically hardwired to do certain things. The limbic system areas are specifically capable of abstracting morals from what a human being has been exposed to within their families or culture.

Dr. Norden then provided a hypothetical example of two people that have grown up with different life experiences resulting in major differences in the soft wiring of brain structures. The first person grew up surrounded by different types of people and cultures. This person then went to college and experienced many different points of view. Because of these interactions with things and ideas that are different, this person's brain is soft-wired based on many different types of experiences. The second person is born into a culture that is very strict where people and cultures are all the same. This person grows up not being exposed to the outside world or any different experiences or ideas. Because of this lack of exposure to different experiences, this person's brain does not develop an open view of the world and ultimately this person believes their way is the only way to view the world.

Dr. Norden concluded that in order to understand how one person becomes a terrorist or humanitarian, it is crucial to examine the genetics that hardwire the brain and the environmental influences that have influenced the soft wiring of the brain.

PANEL ON IMPLICATIONS OF RECENT ADVANCES IN SOCIAL, COGNITIVE & NEUROBIOLOGICAL SCIENCE TO NATIONAL SECURITY (MODERATOR: DR. DIANE DIEULIIS)

DR. DIANE DIEULIIS

Dr. Diane DiEuliis, NIH and the Department of Health and Human Services (HHS), moderated the panel on the implications of recent advances in social, cognitive, and neurobiological science to national security. The panel discussed innovative scientific research in the areas of political violence, radicalization, and deterrence and asked questions regarding how these recent scientific discoveries might inform the nation's understanding of violence in general, and, more specifically, issues of national security relating to political violence.

DR. ARIE KRUGLANKSI

Since World War I, there has been no attempt to bring the scientific community to bear on national security. However, the scientific community has much to offer. First, it brings various disciplines together in order to throw light on problems. This results in the formation of the policy the nation is capable of developing.

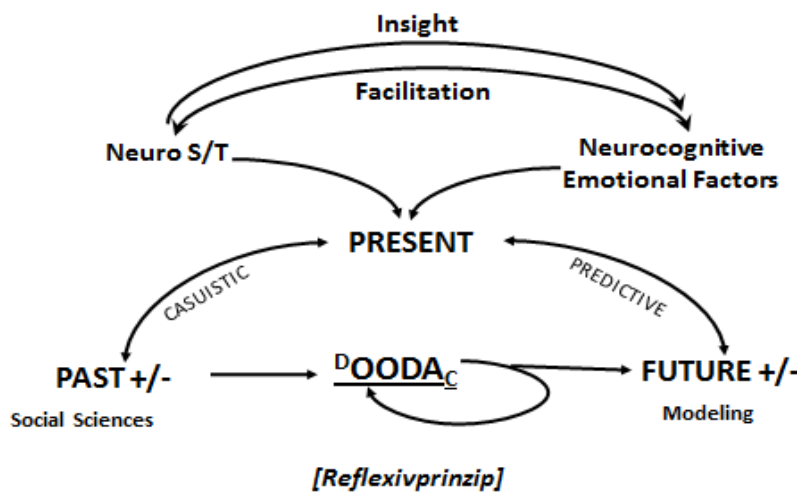
Over two months ago, the world saw the 10th anniversary of the 9/11 attacks and questioned whether it is safer now than before. Some say yes and point to the killing of Osama bin Laden; some say no because the adversary's ability to radicalize has improved.

There is a debate in social science whether ideology is important for radicalization. The conclusion is that ideology is important, but it is not clear how.

DR. JAMES GIORDANO

Dr. James Giordano, Director of the Center for Neurotechnology Studies of the Potomac Institute for Policy Studies, presented a brief called *Neuro-cognitive Science and Technology: Assessing and Affecting Social Behavior and Avoiding Icarus' Folly*. At the Potomac Institute, the Center for Neurotechnology Studies conduct technology assessments to evaluate new and existing technologies for viability for use in a variety of fields including health care, public health, and national security. He cautioned conference participants against committing what he refers to as "Icarus' folly" of investing excessive expectations or inaptly using new (neuro)technology without sufficient evidence to support such use and/or providing adequate practical and ethico-legal infrastructure to reinforce its social effects.

Dr. Giordano stated that neural systems are relational systems. They orient the present moment to the past including experiences and beliefs. The neural system then anticipates the future to



determine what one's future actions can and should be. This can be summarized by a modified neural OODA (Observe, Orient, Decide, Act) Loop. Every observation is biased by the brain's intrinsically Bayesian system where certain beliefs create predispositions toward the nature of sensation, perception, emotions, and cognitions. The individual then is disposed to orient, decide, and act based on this system of bio-culturally established biases. The

FIGURE 12. NEURAL SYSTEM OODA

consequences of any and all decisions and actions then feed back into the loop (thus creating a dOODAc cycle in what is often referred to as a *Reflexivprinzipwirkung* or reflexive feedback effect). This process is illustrated in Figure 12.

Scientists can use forms of neuroscience and technology

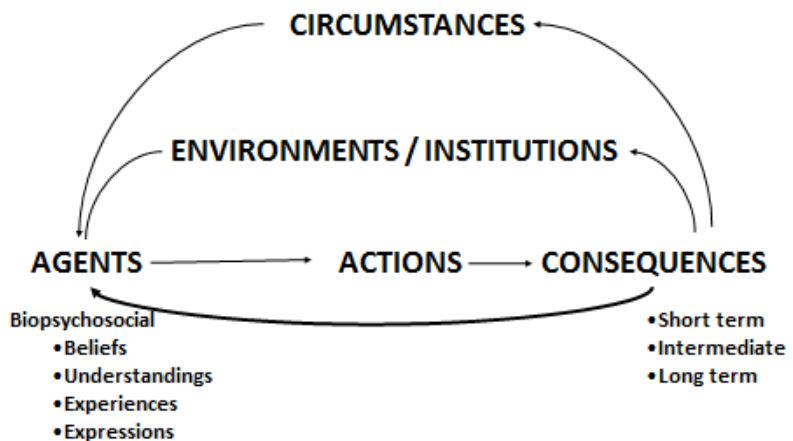


FIGURE 13. NUEROSCIENCE ENVIRONMENT & CIRCUMSTANCES

to provide new insights into how neural systems can be manipulated to affect the perception of the past, present, and future. This may allow us to facilitate how we might utilize neurocognitive advances. What is resulting is a construct of how brains and individuals in which they are embodied work in a psychological-social realm in which they are nested.

Circumstances create many environments comprised of agents, actions, and consequences. Consequences feed back on agents and the environments in which agents find themselves. If we focus neuroscience on agents, it is easier to understand how the brain/mind works in this biosychosocial milieu (see Figure 13).

Neuroscience helps to afford insights to the ways that individuals, groups, and societies might behave. Scientists can leverage the current neuroscientific understanding to develop tools and techniques to assess and access these behaviors.

In this way, the brain can be considered as an opportunistic target for multiple level assessments and interventions. There is a convergence in neuroscience that joins genetics, nanoscience technology, and cyberscience technology in such efforts.

Recent advances in neuroscience that have been technologically-enabled and translationally viable include neuroimaging, neurogenomics and genetics, and neuroproteomics. These provide techniques and tools for anatomo-physiological correlation, population variation and pre-dispositional assessment, and individual and group trajectories of expression.

In this light, there are three domains of neuroscience that are important to this conference: biological, psychological, and social. Relevant biological uses include the assessment, access, and control of biological information and the integration of information to affect/control biology. Relevant psychological uses include effect and use of information to direct cognitions, emotions and behaviors of individuals, groups, and populations. Relevant social uses include constant connectedness, virtual diaspora, discerning the effects of isolative unity and embedded solipsisms, and appreciation of the ways that neuroscience and neurotechnologies are sustaining a “New Global Shift” In the ways that information is developed, acquired and used.

Dr. Giordano recognized that there are profoundly inherent ethical issues in the potential uses and misuses of these neurotechnologies and neuroscientific advances. Thus, he argued for the strong need for neuroscience in national security to maintain a stance of national preparedness on the world stage of emerging technologies, but urged that any and all such efforts be ethically undertaken so as to sustain a clear moral and legal commitment and definitions of what can, should, and should not be done in the research and applications of these techniques and technologies.

DISCUSSION

One participant stated that in his own research on phenotypes, he often gets questions from military historians about ethics. He asked Dr. Giordano if there is a particularly good read on the ethical dimensions of these questions. Dr. Giordano responded that one reference that might help is one of his own publications, *Neuroscience, neurotechnology, and national security: The need for preparedness and ethics of responsible action*.⁶ He also mentioned the he addresses this topic in

⁶ Giordano J, Forsythe C, Olds J. Neuroscience, neurotechnology and national security: The need for preparedness and an ethics of responsible action. *AJOB-Neuroscience*; 2010; 1(2): 35-37.

several chapters of his newest book, *Advances in Neurotechnology: Premises, Potential and Problems* (CRC Press) which will be published in March.

Dr. Cabayan asked, in terms of self- and group-radicalization, has the neuroscience community looked at how to frame the problem set? What are the indicators that people look for and what are the effective ways to influence these groups and individuals? Dr. Giordano responded that there is ongoing research by his group on the viability of neuroscience and anthropology in establishing a meaningful approach to ethno-psychiatry and to look for psychosocial- and bio-markers of change in individuals and groups. Dr. Giordano explained that if one looks at Maslow's Hierarchy of Needs, if fundamental needs are not being met within a group, you would not see progressive action. It is when basic needs are being met, but intermediate needs are deprived and/or taken away, that result in an escalation of activity due to a sense of privation and loss. As yet, definitive biomarkers are not available, but one can identify variables from sociological data and attempt to correlatively match that these variables to activity in the neural and neuroendocrine systems to use as potential markers.

Dr. Anne Speckhard, Georgetown University, stated that ethics are a serious concern and the defense and science community have to think about this. Dr. Giordano agreed. He said that on the one hand, the community can advocate complete abstinence, but is naïve because adversaries will use these advances against the U.S. However, moral, ethical and legal thresholds must be created; his group is dedicated to addressing the ethico-legal implications and developing such guidelines.

PANEL WRAP UP (DR. WILLIAM CASEBEER)

Dr. William Casebeer, DARPA, stated that the panel on neuroscience is important because it helps the operational community understand the mechanisms that undergird higher order phenomena. Right now, the community is limited to pure correlations between inputs and behaviors. That is like trying to understand acceleration by observing what happens to the car when the foot presses on the accelerator—without ever looking under the hood. The objective is to use neuroscience to guide forces in their mission to achieve national objectives.

As Dr. Norden described, when one feels a threat, the amygdala responds. Oftentimes, the feeling can be subconscious so one is not aware of the difference. In addition, it is clear from the research that out-group members trigger more amygdala activation than in-group members. That means that one is more prone to fight in split-second decision making when faced with a member of the out-group. An error in deadly force can result from these responses. U.S. forces sometimes have inappropriate in-group/out-group member definitions, making it more likely to harm out-group members.

Dr. Casebeer spoke about disinhibition contagion, which is what causes friendly fire. This happens when a leader fires first and releases the inhibition of others to use force, which is linked to the social standing of the group members. Understanding neurobiological processes will help the DoD formulate Tactics, Techniques, and Procedures (TTPs) to limit collateral damage. If one believes that harming innocent people is a turning point in counter-insurgency, then these findings are important.

Narratives and stories are important. Stories are important psychologically and neurobiologically. It influences how one remembers things and helps humans make judgments about who it is

permissible to kill. The narrative networks program at DARPA explores the neurobiology behind that process. DARPA looks at a story's impact on trust in one another. A piece of rhetoric can spur oxytocin production. This could have implications for influence campaigns. The narratives network program is advancing quantitative analysis of stories in an attempt to build models, simulations, and sensors to be able to speak truth to power.

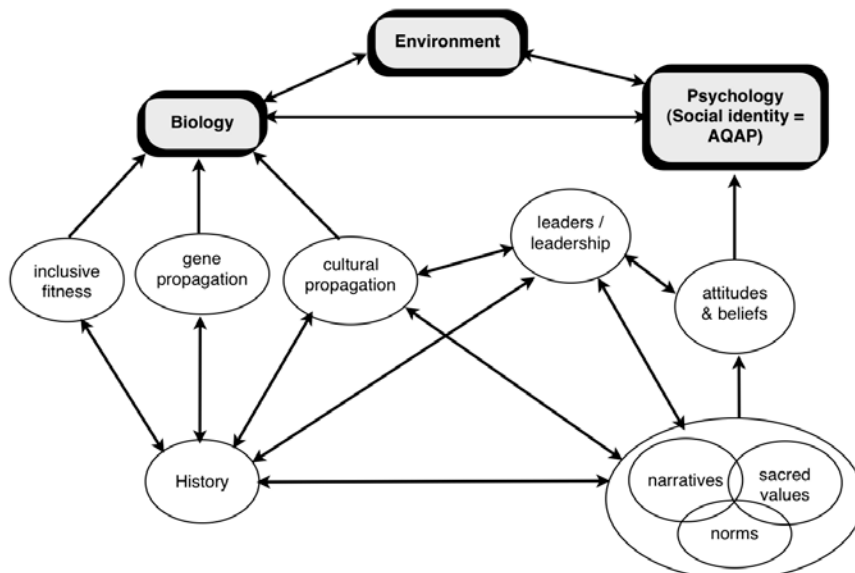
PANEL ON IVEO-NEUROBIOLOGY PILOT EFFORT (MODERATOR: MS. ABIGAIL CHAPMAN)

Ms. ABIGAIL CHAPMAN

Ms. Abigail Chapman, NSI, moderated the panel focused on the Influencing Violent Extremist Organization (IVEO) Neurobiology Pilot Effort. The purpose of the effort was to assess anticipated and unanticipated effects of influence and deterrence of VEOs, inform our understanding of how to effectively influence and apply the findings to al Qaeda in the Arabian Peninsula (AQAP) as a test case. The effort utilized a multi-method, multi-disciplinary approach to explore and identify areas for future research.

DR. WILLIAM CASEBEER

Dr. William Casebeer, DARPA, presented the overarching themes and findings from the IVEO Neurobiology Pilot Effort on AQAP. Dr. Casebeer stated that the environment is influenced by two factors: biology and psychology. Both biology and psychology interact with each other as well as with the environment. Furthermore, there are reciprocal connections with history and inclusive fitness, gene propagation, and cultural propagation on the one hand, as well as reciprocal connections with history, leadership, and cultural worldviews (i.e., norms, sacred values, and narratives) on the other. Figure 14 shows these connections. Social identity is informed by one's attitudes and beliefs, which are, in turn informed by the narratives, sacred values, and norms that groups holding a particular social identity maintain and pass along to other group members. Leaders also play a role insofar as they are informed by history and both utilize existing values and narratives as well as create new ones that relate to the group's worldview and social identity.



Dr. Casebeer noted the general findings of the effort. First, environmental and neurobiological interactions do exist. Second, understanding social identities and context is very important. Social identities are social constructs—they are both created and shaped by society. Social identity provides a framework for

FIGURE 14. CONCEPTUAL DIAGRAM OF ACADEMIC CONTRIBUTIONS

group norms, attitudes, and behaviors. It is also important to keep in mind that social identities are dynamic—they are not stable or fixed. Social identities shift as the situation changes and different groups are brought into awareness. Third, understanding narratives is crucial. Narratives provide the worldviews for groups.

AQAP uses intergroup conflict to garner support by highlighting the differences between Arab culture and Western culture, comparing the righteousness of Islam with the insatiable appetite of the West, particularly America and Israel. AQAP also reaches out to English constituents and provides them with a vision courtesy of Inspire Magazine, representing AQAP's ideas as the embodiment of who they are and what they should want to be. They are shaping what the prototypical Muslim should be. AQAP provides the values and beliefs (the cultural/religious) worldview to which others should subscribe. At home, the Arabic wing of AQAP also does an effective job of trying to portray who the prototypical Yemeni is (AQAP) and who is not (Saleh). The magazines and other narratives from AQAP provide definitive social identity cues regarding prototypical behavior and beliefs, a cohesive group (brothers) with clear guidelines for expected behavior (following the path of Jihad).

U.S. interventions against AQAP expansion should rely on assuasive humanitarian assistance and direct moral support through bottom-up, peer-to-peer grass roots endeavors. Unintended consequences of these endeavors are that there is neither guarantee nor much evidence right now that Arab Spring movements will produce democratic institutions. To better assist the new democrats of the Middle East, the U.S. should minimize overt military involvement and government-to-government aid; side with democratic forces over autocrats; encourage America's creative, productive, and efficient non-governmental groups; and let third parties carry the heavy water. In addition, hype in the U.S. media (i.e., social narratives) may actually drive recruitment for organizations that promote violent extremism.

Dr. Casebeer then concluded by pointing out a number of implications for research. These implications are listed below.

- Focus research efforts on understanding why AQAP provides a welcome and inviting social identity across in Yemen and elsewhere
- Focus on how Yemenis deal with uncertainty in their world—does AQAP tap into this felt uncertainty?
- Investigate how AQAP leadership incorporates social identity principles to their advantage or detriment: Are they representing the group as the group prototype?
- Focus research efforts on understanding the target population
- Conduct survey research regarding Yemeni attitudes toward United States trainers and special ops forces
- Evaluate efficacy of development aid
- Advance science of evolutionary neuro-behavior and empirically test its predictions.
- Explore the impact of media coverage on the U.S. population
- Introduce new narratives that function as devices for counter-radicalization.
- Destabilize exiting narratives that promote radicalization

Dr. Janice Adelman, NSI, provided a theoretical framework grounded in social science literature for understanding why people join groups and specifically AQAP. Without the ability to collect data in such a short period, she presented theoretical constructs of social identity, prototypically, uncertainty, and leadership punctuated by examples from AQAP.

Social identity theory provides a framework that describes the way people seek out similar others with whom they can form connections or groups. A social identity is defined as that knowledge that people have of belonging to a particular group that holds value or meaning. Social identities are social constructions, meaning that they are shaped in part by society. In addition, they are dynamic constructs, meaning that they can change depending upon the situation and which identity is (or which identities are) most salient at any given time. Social identities are important because they provide a sense of who a person is and where he or she fits in with others in the world. Many AQAP communications highlight this, particularly when the communications accentuate similarities that Muslims share as a group (e.g., certain beliefs, goals, and behaviors) while at the same time accentuate differences from non-Muslims. It is worth noting that the truth behind the communication is not important. The point is that analysts can understand the function of such statements in that they attempt to create a shared sense of identity. Joining groups, and belonging to groups, allows people to follow a particular framework for how to live and provides a set of norms to which group members generally subscribe. The stronger a group member feels they belong to a group, the more that group member will act according to group norms.

Prototypicality speaks to the degree to which a group member embodies the group's traits and characteristics. For example, a prototypical member could be the average qat chewing Yemeni in the field, or AQAP leaders, or President Saleh. Holding any of these examples as the group prototype has very different implications for individual or group actions. Individual group members will look to who they think is prototypical as the model example for how to think, feel, and behave. In Yemen, this might mean that individuals will follow the prototypical Yemeni into non-violent protests; or the AQAP leaders into conducting suicide bombings or other attacks; or President Saleh's supporters into attacking protestors. Prototypical group members embody the group norms. Research suggests that they are better liked, are perceived as more charismatic, and appear more trustworthy and influential. There are a number of ways that groups can harness prototypicality to their advantage. In AQAP communications, in one example, leaders suggest that AQAP supporters are prototypical Yemenis.

Dr. Adelman described another potential explanation for why people join groups as a function of their social identities. Based on uncertainty-identity theory, when people feel uncertain about who they are or where they fit in, they will more strongly identify with groups that are important and relevant. Usually, these groups are close-knit with very clear guidelines for who is and is not a member. Identifying more strongly with an important and cohesive group helps to alleviate — or at least lessen — any felt uncertainty. What is more, the more people identify with a group, the more they will endorse behaviors that protect and promote that group. Under greater uncertainty, this could lead to more extreme or violent behavior. Some research has shown that uncertainty increases support for extreme behaviors when group identity is also important. Given current levels of instability and uncertainty in Yemen (regarding Saleh, AQAP, and the prospect of democracy, among other things), AQAP could fill the role of a close-knit group with clear guidelines in which people may feel less uncertain.

Leadership also plays a key role in moving group members toward reaching shared group goals. Effective and successful leaders are able to utilize these social psychological processes regarding social identity to craft an important and relevant group identity for all group members. Moreover, successful leaders are those who are perceived as the prototypical group member who works for the group, and works to embed the group's importance in social reality. AQAP communications implement all of these ideas from bin Laden as the exemplar to follow, to Saleh as the non-prototypical leader out for his own wealth and power. AQAP communications also highlight the strategic importance of the Arabian Peninsula to the group, underpinning the need to protect and defend it against any foreign occupation.

At a basic level, then, people will join AQAP and support the cause because they feel that the group provides an identity with shared common values, a means for achieving common group goals, and a means to alleviate felt uncertainty about the situation and the future. In understanding these processes and what it means for influencing VEOs, Dr. Adelman offered several recommendations:

- Reconsider current default actions, including the use of drones and boots on the ground.

Dr. Adelman referred to an article in *Foreign Affairs* that described the long-term failure of drone attacks using the example of the 2002 strike against al-Harithi, then leader of al Qaeda in Yemen and the mastermind behind the USS Cole bombing. The article points out that some felt this would be the end of al Qaeda in Yemen. However, it is nearly 10 years later and we are still focused on the group in Yemen, now known as AQAP. Not only that, but Dr. Adelman recommended to consider the fact that drone attacks and boots on the ground play into the narrative that AQAP is projecting: they want to rid the Arabian Peninsula — so strategic and important a location to the group identity — from foreign occupiers. Yet the U.S. continues to have a solid presence there. She noted that this recommendation supports General Flynn's comment during the conference that we need to understand how America is perceived by the rest of the world.

- Consider the effects of instilling western democratic values on a non-western society.

Dr. Adelman also referred to General Reynes' comment during the conference that getting people off the battlefield is about their goals and aspirations and not our own agenda. Dr. Adelman suggested that this is a notion that goes hand-in-hand with the theoretical framework provided here, as well as with Drs. Pete Hatemi and Rose McDermott's work for the pilot effort. Essentially, Hatemi and McDermott reported that liberal values are not shared by everyone around the world. What is shared is the universal desire to self-govern.

- Prevent AQAP and tribal unification.

We should try to prevent AQAP and the tribes from uniting against a common enemy, such as the U.S. The more our U.S. actions negatively affect the tribes in the region, the more they will begin to see us as AQAP does — a foreign occupying presence. Groups in conflict tend to form quick connections with others who face a common enemy.

- Conduct further research to focus on who the recruits are.

Future research should assess whether AQAP is targeting Yemeni locals or the Muslim diaspora, or both. Furthermore, are people joining because their Yemeni identity is leading them there or because of their Muslim identity?

- Conduct further research regarding the types of uncertainty that play a role.

Dr. Adelman noted that plenty of empirical evidence from college undergraduates shows an association between self-uncertainty and things like identification, tolerance, and support for radical groups. Other research in Israel, however, shows that uncertainty about the Israeli-Palestinian conflict is more influential in that context than self-uncertainty. More research in the field needs to assess the nuances of uncertainty and how it plays a role in shaping not just college students, but extremist groups around the world.

- Conduct further research on prototypical leadership.

Since you cannot have a leader without followers, it is important to assess the extent to which social identity principles of leadership, including prototypicality, play a role in Yemen and with AQAP. Future research should extend leadership studies that focus on group dynamics rather than individual leader personality traits in more applied settings and in conflict situations.

DR. CLARK MCCAULEY

Dr. Clark McCauley, Bryn Mawr College, used November 2010 polling data from Yemen to speak about radical ideas and radical actions.

The polls show that the Yemeni population is extremely poor and uneducated. People say the greatest problem facing the country is the economy (37%) and unemployment (16%). Combined, nearly 50% of the people are mainly concerned about making a living. The political problems the United States is concerned with (government stability, AQAP, etc.) are not primary concerns for the population.

However, when asked, 83% of respondents feel that al Qaeda is both a serious problem and a threat for the country, but al Qaeda's presence in Yemen is not the only threat to the country. It is just one threat among many. Dr. McCauley described correlations showing that those who do not care enough about Yemen to see other problems or threats to Yemen also do not see problem or threat from al Qaeda.

Polling shows that over half of Yemeni respondents feel negatively toward the United States and oppose any kind of U.S. military presence, even for aid and training. Furthermore, people do not have confidence that the U.S. can deal responsibly with conflicts in the Middle East.

While the USG likes to think that the enemy of our enemy is our friend, in Yemen, some people dislike both the U.S. and AQAP. Others like both the U.S. and AQAP. There is no relation between opinion of the U.S. and opinion of AQAP. Therefore, if the U.S. shapes communication as an us or them proposition, it is likely to fail.

Dr. McCauley then moved on to discussing a Two Pyramids Model of Radicalization in Action and Opinion. Political radicalization is the change in beliefs, feelings, and actions toward increased support of one side of inter-group conflict

Dr. McCauley stated that he used to think of terrorism as a pyramid with terrorists at the top of the apex supported by a base of sympathizers. However, he has changed his opinion. There are two pyramids. There is an action pyramid and an opinion pyramid. In the action pyramid, most people

are doing nothing, some are engaged in legal activism, a few in illegal and violent action, and a very few we call terrorists who attack civilians. In the opinion pyramid, there are people who care nothing about the cause, people who care a little, and people who feel a personal moral obligation to take action. There are two pyramids because the fit between the two is so bad. There are tens of thousands who think that suicide bombing is justified in defense of Islam, but very few are actually conducting attacks.

Polling data help explain the opinion pyramid. Dr. McCauley has done some research on understanding from where radical opinions come from. What distinguishes those who see the war on terrorism as a war on Islam from those who do not? Personal experiences of discrimination, poverty, and unemployment are not good predictors of violence. The best predictor is not liking the war in Iraq or Afghanistan.

Dr. McCauley argued that in order to stop fanning the flames of violence, the United States should carefully consider how it would respond to future attacks. The best solution to minimize further violence is to treat the attack like a criminal justice issue. Criminal justice proceedings do not produce the collateral damage that creates new terrorists.

In the United States, most people are comfortable with discussing emotions, but most political scientists are not. Political scientists prefer a rational choice model with a focus on rewards and punishments to explain actions. However, this model is inadequate. Few people are willing to give their lives up for an abstract utility maximizing principle. Intergroup conflict is full of emotion, and that is what moves people. That is where we need more research, and that is where the neurobiological community can add value. Political emotions include pride, fear, anger, disgust, shame, and humiliation.

However, it is not easy to study intergroup emotions. First, almost all psychological research on emotions is on the individual level; relatively little research has addressed group-level emotions. No research has questioned the assumption that intergroup emotion is the same emotional experience as interpersonal emotion, but this assumption is dubious. Even though our culture uses the same word for interpersonal anger and intergroup anger, it is not a warrant for assuming that these are the same emotional experiences. Dr. McCauley added that another problem is that researchers do not study emotions more than 1-2 minutes after evoking the emotions. However, if emotions are drivers, then emotions have staying power.

Dr. McCauley pointed out that ninety-nine percent of those with radical opinions never act. He emphasized that a mass radicalization of opinion is a different problem than radicalization to action. Deradicalization of opinion is a different problem than desistance/disengagement. The action pyramid and opinion pyramid have to be considered separately, they are different problems; radicalization is not all one thing. Dr. McCauley concluded by asking, when does winning the war of ideas win the war against terrorism? When does liking us more mean liking them less?

DISCUSSION

Ms. Chapman emphasized that this is a very rich body of work and could be used as a pilot for a multi-dimensional approach to complex problems.

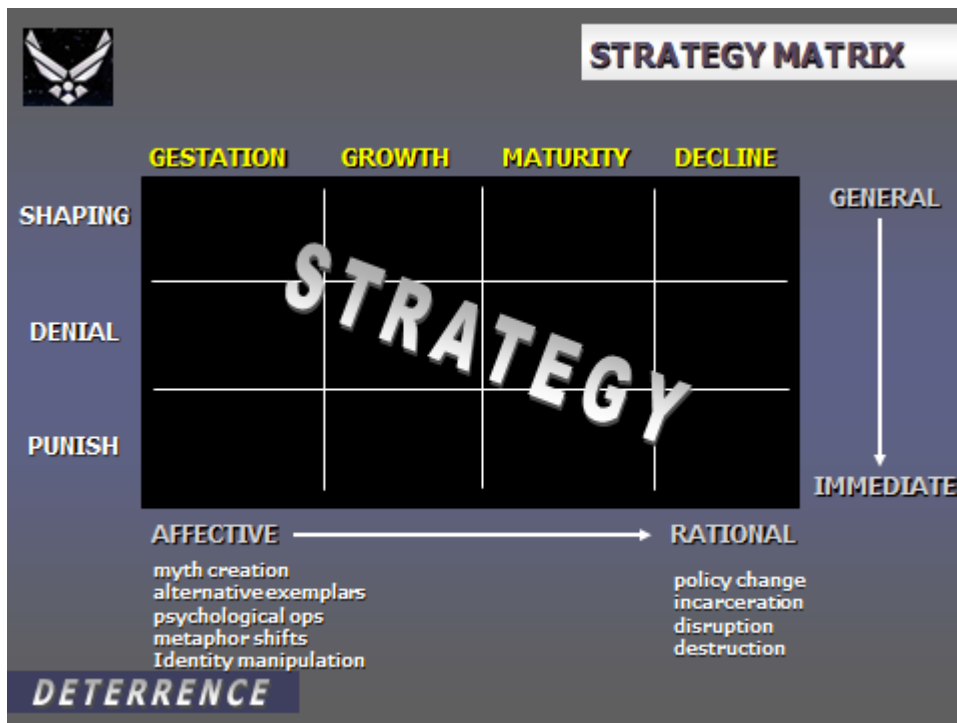
Dr. Claudio Cioffi-Revilla, GMU, asked what the distribution of levels of extremism was in these types of samples. Dr. McCauley responded that a national poll properly conducted means every

adult in the population is polled. While these polls may not have polled everyone in the population, Dr. McCauley believes they were run well enough to be paid attention to and emphasized that attention should be paid to them.

PANEL ON INFLUENCE AND DETERRENCE IN CYBER SPACE (MODERATOR: DR. WILLIAM CASEBEER)

Dr. William Casebeer, DARPA, welcomed the panelists and addressed the core questions facing the operational community today with regard to influence and deterrence in cyberspace.

- How does communication via social media differ physiologically from other forms of interaction (e.g., email, text, telephone)?
- How does social media communication factor into political radicalization and mobilization?
- How can operational analysts and planners best employ social media?



To provide some background understanding of deterrence, Dr. Casebeer presented a slide summarizing the deterrence literature, which he called the Strategy Matrix (Figure 15). As one looks to deter a VEO or adversary, he or she has to recognize that they have life cycles. Adversarial groups do not just come onto the scene; they grow and decline. The far left side of the matrix lists the

FIGURE 15. SUMMARY OF DETERRENCE LITERATURE

traditional mechanisms of deterrence: shaping, denial, and punishment. The right side of the matrix qualified the type of punishment meted out, whether it is an overall program of deterrence or if the deterrence is an immediate response to an action. The bottom part of the matrix illustrates that the United States can respond in a number of ways from the affective to the rational.

MR. DAN KIMMAGE

Mr. Dan Kimmage, Group Director for Digital Presence, Center for Strategic Counterterrorism Communications, Department of State, spoke about how al Qaeda uses online space to spread its message. The State Department's Digital Presence program is unique in that it takes a practical approach to countering al Qaeda's online message; the Digital Outreach Team's intent is to undermine the message whenever they see it. The team engages online in Arabic and Somali. They directly interact in the online environment. They find examples of al Qaeda propaganda and engage and push back where the message is gaining traction. The team often uses video created by the department to counteract messages. The videos are not made professionally; they often use cartoons to mock things like al Qaeda's absence from the Arab Spring or discrepancy between what al Qaeda says and what it does. The videos get tens of thousands of hits.

The literature on social media is very optimistic. It focuses on social media's potential to empower communities. However, Mr. Kimmage said his job is to disempower, disconnect, and destroy community. The department's directive is not to make people feel better about the United States; it is there to short circuit the actions of al Qaeda.

Online, there is a fundamental dilemma about the nature of persuasive media. It is hard sometimes to determine whether a post or a video is there to persuade or to signal each other. Is the presence of a short jihadist movie online part of a recruitment campaign or is it to allow the people who are already part of an endeavor to identify with it? These questions are unresolved, but fundamentally important.

Mr. Kimmage doubted the ability of large dataset to predict things. In his experience, the least convincing work has been done attempting to use all of Twitter. These projects are not useful; it is better to identify small datasets and find ways to glean information from them. Online forums are fascinating in that they provide a lot of data. People who conduct violence against the U.S. are a small subset of all sympathetic social media users.

AMBASSADOR DAVID SMITH

Ambassador David Smith, Potomac Institute for Policy Studies, spoke about social media's influence on revolution and democracy in a brief entitled, *Friending the Enemy: Social Media and Deterrence*. Reaching out to the nation's enemies is not a new concept, nor is social media new. However, it does have implications for deterrence in the 21st Century. Perhaps the best definition of deterrence in this century is "Deterrence is the prevention of action by existence of a credible threat of unacceptable counteraction and/or belief that the cost of action outweighs the perceived benefits." Deterrence should not be limited by Cold War definitions.

The major challenge social media presents is that it allows groups to reach around the government to manipulate what is happening in a country. It is important to keep in mind that anything the nation can do to others, they can do back to the nation.

While social media is not new (symposiums were around in Plato's time), the smartphone is a revolution. Its use is accelerating and it is not going away. The use of smartphones is occurring at a time when a significant portion of the world has access to the Internet in one form or another. Social networking is burning up the Internet.

There are many social media platforms available and there are many ways to manipulate these platforms or commit fraud. It is easy to create an identity and put out a narrative, but frauds tend to get caught very quickly. The exponential growth of social media has enabled people to commit crime, but has also increased the ability of law enforcement agencies to identify and stop cybercrimes.

The first major use of social media by all sides came with Israeli Operation Cast Lead, an Israeli operation to stop rocket fire from Gaza in 2008. All sides used social media to frame the event's narrative. It is important to note that in any conflict, there are often more than two sides.

Russia has comprehensive doctrine on electronic warfare at home and abroad. They are working on how it is used and how it can be used against them.

Social media allots other governments or even groups an unprecedented reach around government to target audiences, groups, military members, and individuals. It is also a means to research demographics and attitudes and tailor messages.

In summary, there are some important key findings on how social media is changing the operational environment.

- Internet, smartphones, social media exploding
- Social media is a significant source of news
- Using social media to reach out is not new, but recent advances in technology have created qualitatively new opportunities
- Social media affords unprecedented reach
- Deterrence is construed in broad terms
- Social media for deterrence could involve two-steps

MR. RICHARD FONTAINE

Mr. Richard Fontaine, Center for a New American Security (CNAS), spoke about influence in cyber space. Social media plays a role in modern dramatic political change. The first time social media tools were used to promote political change was in 2009 when the Twitter revolution in Iran brought issues to the fore government.

Regimes take social media movements quite seriously. President Mubarak pulled the plug on the internet in Egypt. The same thing happened in Libya and Syria considered it. The United States has a series of programs to promote Internet freedom.

There is a growing sense that the Internet matters, but it is not clear how. The debate has been between cyber utopians and cyber skeptics. The debate is too simplistic. Tools do matter for the promotion of democracy; however, they play a role in a variety of ways, which are listed below.

1. Individuals: people can become more politicized by social media in that it alters attitudes or reinforces them; however, it could make them less active (slacktivism) like signing petition to end genocide in Darfur instead of taking to the streets.
2. Intergroup relations: social media generates connections between individuals and groups.
3. Collective action: social media can facilitate organized protest.
4. Technologies are clearly affecting regime policies: governments employ a huge array of techniques (not just censorship and pulling plug, but monitoring communication, regime defenders, planting disrupting information, disabling websites, etc.).
5. Direct external attention: social media can direct external attention to a cause. For example, President Obama was asked about a You Tube video about an Iranian woman killed in streets of Tehran. The ability of an individual to transmit images outside is new phenomenon.
6. Accelerant of political and economic affect: social media may enable regimes to track people down faster than before.

Local politics is critical. Media is global, but how it fosters people to change depends on local variables.

It is very difficult to say precisely what effect these social media tools have had on the political scene, but governments abroad seem to think they play a significant role as they spend many resources to clamp down on it. People are risking jail time to engage in online dissonance. As we go forward, the next step is to develop a sophisticated understanding of technology and foreign policy.

DR. CATHERINE HAVASI

Dr. Catherine Havasi, MIT Media Lab, presented a brief called *Socio-Cultural Understanding Through Language Understanding*. Dr. Havasi works with industry and large companies to understand

customer bases or to deal with adverse situations. She is a computation linguist by training and looks at how computers understand text including from social media sites.

Tweets in Arabic are expanding rapidly. There were 99,000 a day in October 2010 and two million a day in October 2011.

In social media tools, information recommendation

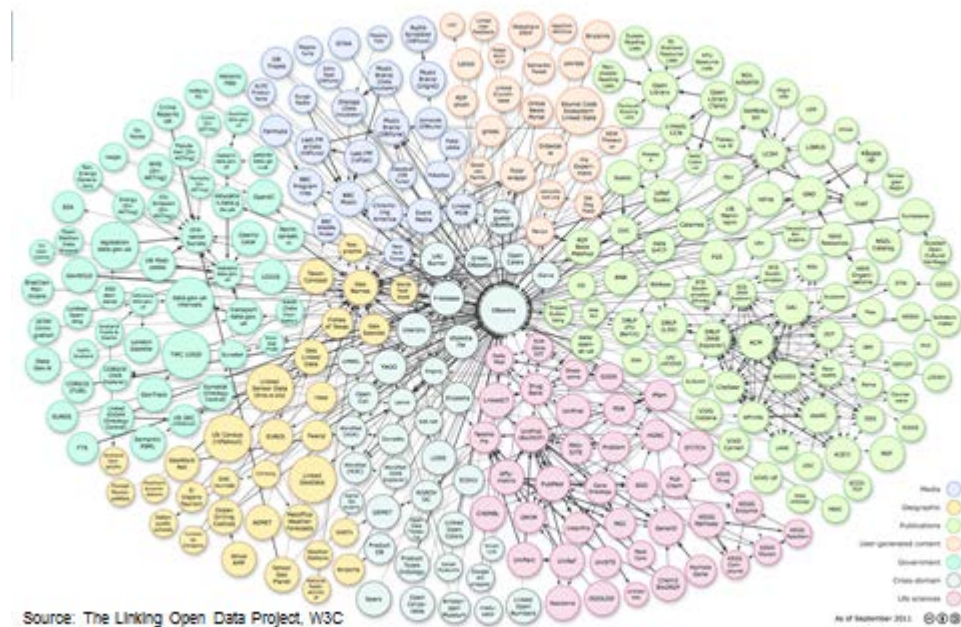


FIGURE 16. VISUALIZATION OF HOW INFORMATION PROPAGATES ONLINE

and filtering is performed by the crowd. In some instances, Twitter can act as an information filter. Twitter is helping people not only talk to friends, but to figure out who should be trusted and what information is important. “Meme” propagation can show influence and information propagation between users in the Middle East and others.

Computational sociolinguistics can be used to indicate who is catering to whom within a particular discussion.

Seventy percent of the Facebook users in these regions are between the ages of 15 and 29.

There is a lot of information on the internet. In order for computers to find words or phrases and put them in context, they must have the right models. MIT Media Lab is working on a project to identify a metric of how people decide to trust another person. However, it requires taking ten million statements and pressing it down to find patterns in how people think about the world.

DR. PAUL ZAK

Dr. Paul Zak, Claremont Graduate University, stated that his lab has been investigating the various ways that humans look at messages. It is fairly well understood what kinds of messages attract attention since responses to messages can be measured psychologically. However, what is interesting to understand is what messages make people take action? Often the response to a call for action is led by fear, anger, or a sense of affiliation. There is a chemical basis for collective action driven by the hormone oxytocin. Oxytocin makes one want to trust or share resources with another person. Collective actions follow the release of oxytocin. There are several forms of collective action that release oxytocin: religious rituals and ROTC cadets marching in formation. Rituals motivate strong in-group biases. Dr. Zak is interested in better understanding the biological pathway in which narratives influence social media. What narratives capture attention and lead others to action?

PANEL ON COMPLEX ADAPTIVE SYSTEMS (MODERATOR: LT COL DAVE LYLE)

Lt Col Dave Lyle welcomed the panelists. The nation’s strategic planning documents mention the increasing complexity of the international security environment and the formidable challenges this presents as we seek to frame problems, program forces, and recommend strategies that can achieve the goals of national policy. Described in 1973 by Rittel and Weber as “wicked problems,” complex problems are ones that defy simple explanations. They are difficult for us to comprehend because they contain many interconnected elements and subsystems reacting to each other simultaneously, making the prediction of specific outcomes practically impossible. When one hears anyone talking about “unanticipated second and third order effects” or “unintended consequences,” they are most likely referring to an encounter with a complex system.

Professor Yaneer Bar Yam, New England Complex Systems Institute (NECSI), spoke about complex systems science and its use for strategy insights and tools. Because the military learns from experience, the military has complex systems built into its systems and structures. Understanding this can help us use these systems more effectively. Complex systems science goes beyond calculus and statistics to characterize the effects of interdependence. A crucial aspect of the insights we gain from the methods is to identify what is important to pay attention to among the many pieces of information we have.

A complexity profile is a way of describing an organizational structure. Complexity profiles aid in evaluating the question “how do we win?”. The traditional way to win is by being bigger, but there is another way to win through being more complex than an adversary, by having more ways to act. Different types of conflict require different approaches and systems for success. The military recognizes this by having different structures for different conditions. Large-scale forces and tank divisions are for relatively simple environments. Forces that can succeed in progressively more complex environments are infantry, marines, and Special Forces. By quantifying scale and complexity, one can better evaluate the ability to succeed and plan for success.

Dr. Bar Yam then noted the importance of understanding patterns of collective behavior. Most of the issues dealt with in the world involve human interaction and people doing things together, so understanding collective behaviors is crucial. Models can be effective in understanding patterns of collective behavior. Dr. Bar Yam then pointed out three examples that portray the importance of understanding collective behaviors.

First, by looking at the prices of food, we can understand the reason for the timing of the Arab Spring after decades of dictatorships. Large food price spikes triggered food riots in 2008 and the Arab Spring in 2010.

Second, we can model the effectiveness or ineffectiveness of interventions to stop poppy farming in Afghanistan using an agent based model of farmer decision-making.

Third, the complex problem of ethnic violence can be better understood if we analyze the geography of ethnic groups. If groups are well mixed there is not likely to be violence. If they are well separated there is not likely to be violence. But if there are groups of a certain size, about 20km in diameter, then there will be violence because they have a sense of dominion, but others interfere with it. Models based upon this can be used to predict the location of ethnic violence and how to intervene. Setting up district boundaries within a country to provide local autonomy can prevent ethnic violence from occurring.

Looking back throughout history, the U.S. must search for patterns of the past that can be learned from. The world is increasingly complex. In order to make rapid and effective decisions in such a complex world, decision-making has to become more decentralized. A situation where a few individuals are in control of the collective behaviors of a system simply cannot cope with multiple complex problems effectively over time. Centrally controlled systems are not going to last over time. As we change our decision making to be distributed, we can think about the decision makers as a network of individuals making decisions collectively. The important issue is determining how to transition from the old system to this new complex network.

In summary, we can develop better understanding of complex systems through understanding patterns and possibilities. Creating complex systems requires understanding the role of evolution and leadership in distributed networks.

DR. VALERIE SITTERLE

Dr. Valerie Sitterle, Georgia Tech Research Institute, spoke about complexity in asymmetric warfare. She focused on the implications of creating models and analysis for certain types of problems found in asymmetric warfare.

Newer doctrine highlighted in terrorist strategies suggests a transition to a highly decentralized autonomous jihad with emphasis on operational security and de-emphasis on formal structure. This poses an interesting modeling challenge: What modeling approaches may effectively take into account autonomously acting elements with little or no known connectivity to a larger hierarchy?

There are a few specific characteristics and needs associated with effective modeling for these problems, especially as those models may lend themselves to analysis suggesting strategic, operational, or tactical actions. Firstly, one must develop a framework for comparative model assessment whereby implicit caveats within a modeling approach and its assumptions may be evaluated and documented. Secondly, these systems are variable in that there are system elements (and their relationships) that may enter or be removed from our defined system in an unpredictable manner. Additionally, environmental factors are not trivial to the actions of system elements and must be coupled in some way to our system as relevant to its behavior; technical resources and constraints must be included.

Dr. Sitterle then presented a framework for a hybrid, data-driven model construction and assessment approach (Figure 17). A modeling algorithm that is driven by data and yet includes theoretical assumptions as necessary is used to create a network representation of a system. Different network representations generated through different data or assumptions can be directly compared using many established mathematical analysis approaches. As new networks may also be created as data changes in time, this enables us to study both dynamics of our system as well as dynamics within certain persisting system structures. The framework allows adaptations to be made of and within the model, it exploits known correlations and constraints, and it provides directly analyzable and comparable representations over time.

Dr. Sitterle then discussed an initial test problem for the approach involving Counter-IED jamming system coordination and operations. This problem was selected because its characteristics fit perfectly with the study focus and because it is directly testable in either high fidelity simulations or test range evaluations. Both the threat systems (and their detected signals) as well as the C-IED jamming systems themselves are manifested as highly variable networks. Threats may be detected in no predictable pattern; C-IED jamming systems themselves may be active or inactive (due to damage, presence of dismount systems, communication lapses, etc.) in an unplanned manner at any point in time. Additionally, both threat and C-IED jamming systems must operate within certain environmental or resource constraints, some of which may be external to a defined system of threats and jammers.

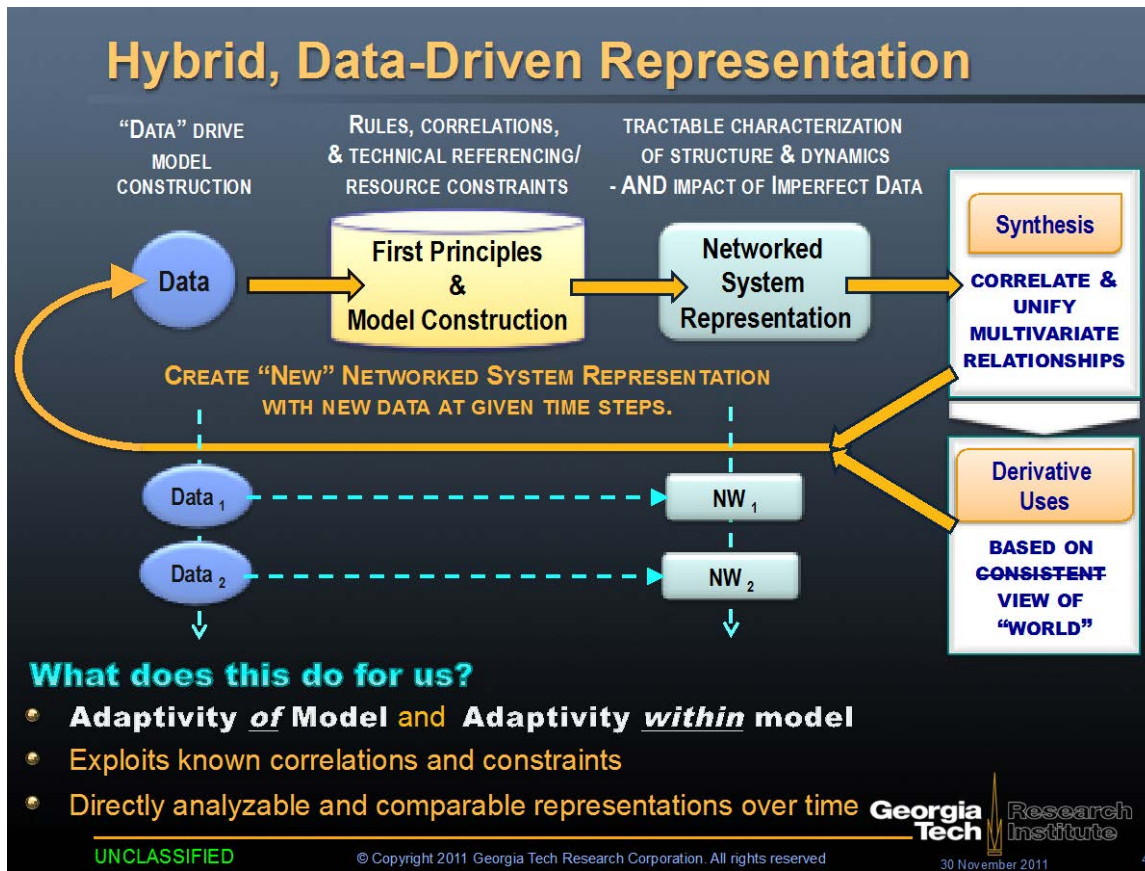


FIGURE 17: MODELING FRAMEWORK FOR VARIABLE COMPLEX SYSTEMS

Using this framework with the C-IED problem provides a platform for us to test its utility as a new approach for “somewhat coordinated” control. If we enable each C-IED jamming system to construct its own network representation of its “view of the world,” then each may use the analysis of its network as a basis for determining action. The goal is to use the micro-level system representations, which may be different for each individual system, to control our macro-level system outcomes. Our question is whether a local, best possible representation of the world, especially given imperfect communications, will be an effective basis from which C-IED components may make decentralized, but still somewhat cooperative, decisions about their behaviors. And, further, whether this approach will be more effective and robust than current operational protocols.

The goals for controlling macro-level performance through guiding local-level behaviors relate directly to concepts of emergence. One view holds emergence to be an innate property of a system. This empirical view is prevalent in natural systems and research focuses on discovering and explaining emergent behaviors. Alternatively, a view of emergence as a result of design holds that behavior emerges from interactions and micro-level rules. This is more of an operational view where emergence is a property designed into a system. This latter perspective is similar to the approach suggested here.

Dr. Alex Ryan, School of Advanced Military Studies, provided a multi-scale, multi-perspective approach to deterrence using complex systems. Complex systems affect the way we think and can be applied to deterrence.

Traditional Cold War analysis of deterrence and assurance is based on a number of simplifying assumptions. First, state actors are the basic unit of analysis and are conceived of as unitary actors. Multinational institutions and organizations are vehicles for the pursuit of national interests. Non-state actors are deterred through their connection to states. Second, actors are rational. The nation or government, conceived as a rational, unitary decision maker, is the agent. This agent is anthropomorphized as if it were an individual person with one set of preferences (a consistent utility function), one set of perceived choices, and a single estimate of the consequences that follow from each alternative. Third, actors are interchangeable. Rational deterrence theory relies on a principle explanatory assumption: the only difference between actors' behaviors stems from differing opportunities, not other influences such as culture or norms.

There have been a number of calls to put an end to the Cold War analysis of deterrence. Iran is a few years away from a nuclear bomb. North Korea has nuclear scientists and technicians willing to do almost anything to escape their oppressive regime. Al Qaeda is a few miles from Pakistan's nuclear bombs. There are 23,000 operational hydrogen bombs in the world today. These threats have grown over the last decade. Current U.S. policies are not working and will not work in the future. Current DOJOC accepts rational deterrence. The central idea of the DOJOC is to decisively influence the adversary's decision-making calculus in order to prevent hostile actions against U.S. vital interests. This is the "end" or objective of joint operations designed to achieve deterrence.

Dr. Ryan emphasized that conflict is much more complex than what current DOJOC accounts for. Two main factors complicate analysis of deterrence and assurance and challenge these current simplifying assumptions. These two factors are complexity and differing worldviews.

The first challenge to traditional deterrence theory is complexity. Complex systems exhibit self-organizing emergent behavior at multiple scales. This complexity can be seen through the diffusion of power across scales. In an information-based world of cyber-insecurity, power diffusion may be a greater threat than power transition. At an even more basic level, what will it mean to wield power in the global information age of the twenty-first century? Aaron Clauset's research has found that casualties from terrorist attacks are consistent with a power law distribution. Lewis Fry Richardson first discovered power law dynamics across all scales of quarrels in 1948. The implications of the complexity challenge are thus: Power laws dramatically alter the assessment of risk, effects that cross multiple scales are generated by the same statistical distribution, and there is no single privileged scale of analysis.

The second challenge to traditional deterrence theory is different worldviews. The same data is interpreted differently by people with different worldviews. Disagreement is not due to incomplete information, but by the way different assumptions and systems of organizing information lead actors to assign different meaning to events. Research has been done to explain the difference in Western versus Eastern worldviews. The Imai and Gentner results indicate that Westerners and Asians literally see different worlds. Like ancient Greek philosophers, modern Westerners see a world of objects—discrete and unconnected things. Like ancient Chinese philosophers, modern Asians are inclined to see a world of substances—continuous masses of matter. The 1973 Yom

Kippur War is an additional example that portrays the difference in worldviews. In 1973, Israel suffered strategic surprise from the simultaneous Egyptian and Syrian attacks on Yom Kippur. Israel failed to appreciate Egyptian President Anwar Sadat's rationale for initiating war from a position of materiel weakness. The implications of different worldviews are as follows: Rationality is not only bounded, but it is culturally conditioned; actions that seem irrational from the perspective of one framework may be rational within another; and there is no single complete perspective for analysis.

Dr. Ryan then moved on to speaking about design methodology. Design is typically talked about in a tangible process, but recently design has become increasingly abstract. The elements of design thinking include empathizing, defining, ideating, prototyping, and evaluating. Design involves iterative framing and reframing (Figure 18).

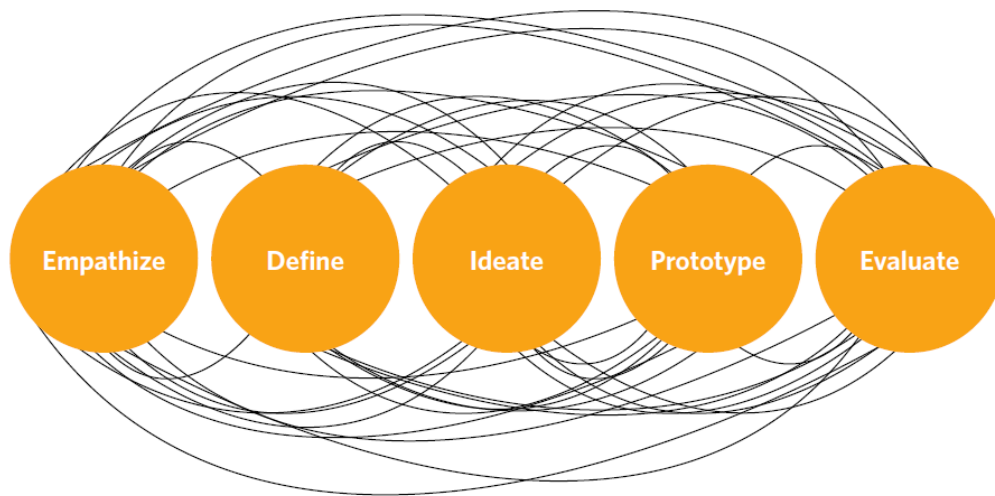


FIGURE 18: ITERATIVE FRAMING AND REFRAMING INVOLVED IN DESIGN

U.S. Army design methodology enables commanders to view a situation from multiple perspectives, draw on varied sources of situational knowledge, and leverage SMEs while formulating their own understanding. Design supports battle command, enabling commanders to develop a thorough understanding of the operational environment and formulate effective solutions to complex, ill-structured problems (Figure 19).

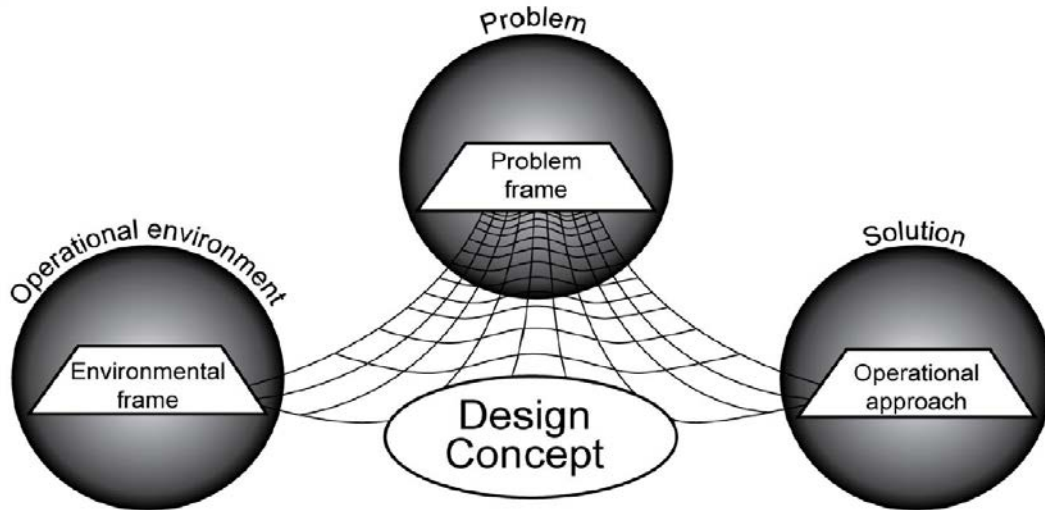


FIGURE 19: U.S. ARMY DESIGN METHODOLOGY

Design shifts the locus of choice. Rational choice theory emphasizes the choice of COA in pursuit of a clear and enduring goal. Design emphasizes choice between perspectives, which reframes problems and may lead to re-evaluation of objectives. Strategic design has been applied at STRATCOM. General Kehler’s design team is using a systemic strategic design methodology to create a STRATCOM learning system and frame a new strategy for deterrence and assurance.

Dr. Ryan concluded that together, complex systems and design provide a multi-scale, multi-perspective approach to deterrence tailored to the unique characteristics of historically and culturally embedded actors.

LT COL DAVID LYLE

Lt Col David Lyle, U.S. Air Force, spoke about complexity science and strategic planning. The implications of complexity are numerous:

- Outcomes are sensitive to specific conditions
- Influence depends on position in the system
- “You can never do just one thing”
- Emergence cannot be fully controlled
- Models always have error
- Correlation does not equal causation
- Prediction of specific outcomes is not feasible.

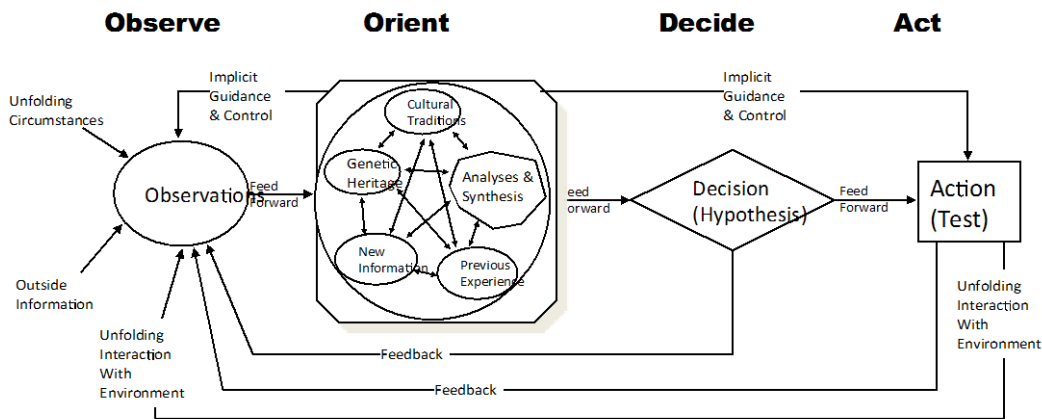
Neuroscience states that human beings tend to avoid complexity and uncertainty. Human beings tend to seek simple explanations to give the illusion of certainty and control. Human beings are much better at creating stories to explain things than they are at finding real causation. As a result, human beings often stop investigating once they believe the story is fitting.

Lt Col Lyle raised the question, how do you choose how complicated a model should be? Simple models can still be useful depending on the question at hand. However, some of the current models have major limitations because of a lack of complexity.

Lt Col Lyle then pointed out the potential effectiveness of Boyd’s OODA (Observe, Orient, Decide, Act) Loop Sketch (Figure 20). The OODA Loop is a way of thinking about organizational behavior. Boyd once called it an “operational scheme for organizational success.” It provides a common framework to help individuals and organizations focus on ways to improve their competitiveness. When leaders talk about the need for more implicit communications or the need to improve re-orientation times, people throughout the organization will know what they are talking about and why.

Essentially, the purpose of the OODA Loop model is to enable organizations to change their environments before opponents can comprehend. In the case of business, this might be restated as the ability to change the market before competitors can offer more alluring products and services. In other words, what is important is not the loop per se, but operating inside opponents’ OODA loops. Another important point about the OODA loop is that you get the quickness you deserve. Your ability to operate inside your opponents’ OODA loops is largely a function of the organizational climate that you instill.

Boyd’s OODA “Loop” Sketch



Note how orientation shapes observation, shapes decision, shapes action, and in turn is shaped by the feedback and other phenomena coming into our sensing or observing window.

Also note how the entire “loop” (not just orientation) is an ongoing many-sided implicit cross-referencing process of projection, empathy, correlation, and rejection.

From “The Essence of Winning and Losing,” John R. Boyd, January 1996.

August 2006

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Defense and the National Interest, <http://www.d-n-i.net>, 2006

FIGURE 20: JOHN R BOYD'S OODA LOOP

Lt Col Lyle noted that the current problems with complexity in planning are determining how to better show the multidimensionality of joint warfare, establishing how to convey vast amounts of data analysis to each other and decision makers in a very short amount of time, and understanding how to overcome the inherent limitations of two-dimensional decision support tools. Lt Col Lyle stated that strategic analysis should seek to discover which connections and relationships are most important in specific contexts. The point of this strategic analysis is not to predict outcomes with

computer models; it is to impart system understanding in our own mental models. There is also a need to discover the potential outliers that arise from analysis and take an iterative approach to identify these outliers in different contexts. This can be accomplished by identifying cases where there are few or no options to influence events, identifying when key sensitivities will emerge, and harnessing the “wisdom of crowds” and SMEs to create better understanding about complex systems that no one person can possibly know everything about.

Lt Col Lyle emphasized that our current methods use linear models, but need more complex approaches. Visualizations are incredibly effective because they activate different pattern recognition portion of the brain. Lt Col Lyle concluded with two takeaway points. First, strategists need to meet the analysts and modelers halfway. There is theory built into the structure of the computer model and strategists need to provide this theory. Second, the theory and assumptions built into the computer models must be made explicit for them to be useful in updating our mental models.

CONFERENCE WRAP UP

Dr. Cabayan thanked the participants and panelists for attending the 5th Annual SMA Conference and making it a success.

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Cabayan	Hriar	OSD, DDRE
Campbell	Mike	Army, ERDC
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Davis	Paul	Rand
Deal	Bruce	Setcorp
Des Lauriers	Art	Lockheed Martin
DiEuliis	Diane	HHS
Dillenschneider	Edward	USACE
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Downs	Cathryn	NDU
Drake	Marty	CENTCOM
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Howard	Lynn	STRATCOM
Hurley	Bill	IDA
Hurtado	Juan	SOUTHCOM
Iadonisi	Jon	White Canvas Group
Jackson	Anda	IESG, Sr Research Fellow
Jackson	Patrick	Joint Staff
Jeannotte	Alexis	ODNI
Jenkins	Neil	OSD, Intelligence
Jenkins	Graham	IDA
Josten	Rick	STRATCOM
Kaul	Rachel	HHS

Kehl	Mark	SOCOM
Kelleher	Patrick	OSD, AT&L
Kendle	Megan	JWAC
Kiefer	Matthew	DOD, IIS
Kiernan	Kathleen	Kiernan Group Holdings
Kimmage	Dan	DOS
Kinder	Bob	VP, Drop Test International
King	James	Joint Staff, J39, DDGO
King	Chris	TRADOC G-2, HTS
Kistner	Ashley	STRATCOM
Klein	John	OSD (R&E) /Rapid Fielding
Knopf	Jeffrey	NPS
Kruglanski	Arie	University of Maryland
Kugler	Jacek	Claremont Graduate Univ
Kulinski	Lauren	DOS
Kuznar	Larry Guermantes	NSI/Indiana University
Lailari	"G-Man"	CTTSO
Lakkaraju	Kiran	Sandia
Lamm	Dave	NDU
Larson	Eric	Joint Staff, J25
Lee	Howard	TRADOC
Lejeune	Peter	International Institute for Non-Proliferation Studies
Leventhal	Todd	DOS
Levis	Alex	GMU
Levitt	Todd	GMU, JIEDDO C4I PM
Limbago	Andera	Berico Technologies
Lincoln	Debbie	SAIC Media Analysis
Lowen	James	OSD, Policy - AFG
Lyle	David	Air Force
Lyon	Elizabeth	OSD, AT&L
Lyons	Joe	AFRL
Mabrey	Dan	University of New Haven
MacPherson	Christopher	OSD, Policy
Mahnken	Tom	JHU
Malyshev	Michael	USAF, A10
Manno	Mark	JIEDDO, J39
Mason	Patrick	OSD
McCauley	Clark	Bryn Mawr
McGee	Anne	Georgetown University
McKenna	Pat	STRATCOM
McQuade	Jill	
McTaque	Robert F.	USCENTCOM

McVicar	Michael	STRATCOM
Milliken	Charlene	DHS
Miranda	Robbin	
Mitchum	Albert "Bull"	Air Force, ACC
Monk	Cody	FBI HQs, Academic Alliance PM
Moon	Hal	Air Force, ISR
Mora	Josh	SCL
Morgan	Larry	PNNL
Muchow	Dana M.	USNORTHCOM
Mullins	Mark	Navy, CNO, N3N5IW
Muraisi	Fatah	CENTCOM, Chief, Extremist Network, North
Murphy	Eric	Air Force, SAASS
Myer	Aaron	PACOM
Nagata	Mike	Joint Staff
Nagleman	Sarah	Army
Nawaz	Shuja	Atlantic Council
Nelson	Scott	NORTHCOM
Newberry	Tim	White Canvas Group
Norden	Jeanette	Vanderbilt, BRET
Northrup	Parker	DTRA, Policy
Oakes	Nigel	SCL
O'Brien	Daniel	Battelle
O'Connor	Tracy	OSD, AT&L
O'Hara III	John J.	PSU
Oie	Kelvin	Army RDECOM
Oldham	Donna	PSU
Olsen	Jennifer	HHS
Olsen	Paul	Office of Economic Adjustment
Pang	Christopher	SCL
Parhad	Rita	Monitor 360
Patterson	James	DTRA
Patton	Kerry	National Security Leadership Foundation
Payne	Michael	Air Force, Studies & Analyses
Perkins	Timothy	Army, ERDC
Perkins	Chuck	OSD & NRO
Petersen	Robert	DOS, CSCC
Pierce	Terry	DHS
Plafcan	Dan	OSD, Intelligence
Popp	Robert	NSI
Prudhomme	Toby	ASG
Purkitt	Helen	Naval Academy
Rasmussen	Bryan	NSI
Reese	Mark	Naval Academy

Reist	Jay	Joint Staff
Renfro	Rob	CENTCOM
Reynes	Joseph	AJFC, Netherlands
Rhem	Sam	SRC, SMA Team
Rice	Christopher	TRADOC
Rich	Bryan	Rendon
Rieger	Tom	NSI
Riesen	Tim	Archimedes Global
Riley	Ben	OSD, DDRE/RFD
Rogers	Jon	Sandia
Rogers	Jonathan	Sandia National Laboratories
Roman	Elmer	OSD, AT&L
Romero	Victoria	Charles River Analytics Inc.
Rose	Mike	JIEDDO
Rubin	Brigitta	MITRE
Ruths	Derek	Rice Univ
Ryan	Alex	Associate, Booz Allen Hamilton
Salwen	Michael	NSI
Samanta Roy	Robie	SASC
Sandberg	Brian	Navy
Saunders	Karen	Pherson Associates
Schmorrow	Dylan	OSD, AT&L
Schoenhaus	Bob	SOCOM
Schoonover	Rodney	DOS
Schulz	Sally	NGA, InnoVision Directorate
Severns	Kristi	JIEDDO
Shanahan	John	Joint Staff
Sharma	Ritu	PA Consulting
Shaw	Tim	PSU
Siegel	Pascale	Glevum Assoc., Research Scientist
Silberfarb	Andrew	MIT, LL
Sims	Brent	Sandia
Sitterle	Valerie	Georgia Tech Research Institute
Slater	Allyson	IJC, Human Terrain
Sloan	Beverly	OSD, AT&L
Smith	Don	IESG, Sr Research Fellow
Smith	Teresita	DIA
Smith	David	Ambassador; Dir, Georgian Security Anlys Ctr
Smith	Jason	4th MISG(A), S3, Operations Officer
Smith	Mark	Navy, N2/N6F31
Smithers	Samuel	OSD, AT&L
Snead	Ned	IDA
Speckhard	Anne	Georgetown Univ Med School, Psychiatry

Speed	Ann	Sandia
Spence	Michael	OSD, Intelligence
St. Martin	Ron	SAIC
Staffin	Robin	OSD
Staffin	Robin	OASD(R&E)
Stahl	Justin	Army Geospatial Center
Stauder	Mike	George Washington University
Staurt	Laura	JWAC
Stech	Frank	MITRE
Strohman	Scott	OSD, AT&L
Sweeney	Brian	SOCOM
Talmage	Daniel	National Academies of Science
Tate	Sharon	DTRA
Taylor	Ron	NAS
Thomas	Jason	CSA
Thomas	Timothy	Foreign Mil Studies, Ft Leavenworth,KS
Tielemans	Stephen	CENTCOM
Timmerman	Tom	DTRA, R&D
Tirman	Matt	Strategic Social Holdings
Tolone	William	UNCC
Tomasi	Marco	ATAC
Trexel	Jonathan	STRATCOM
Trofino	Steffany	Cultural Knowledge Consortium (CKC)
Trout	Carl	Joint Staff
Turner	Jeff	Principal, Drop Test International
Urban	Kim	CIA
Usher	Abe	HumanGeo Group
Valo	Ceinwyn	Monitor 360
Veazie	Todd	SOCOM
Vidan	Andy	MIT Lincoln Laboratory
Voetner	Herman	INSCOM
Volk	Maja	Joint Staff
Walker	Ava	DTRA, J2
Walker	Joseph	SRC
Wall	Joel	DHS, Special Programs
Wanek	Pia	Noetic
Warner	Elizabeth	Booz Allen Hamilton
Watts	Joe	Army Geospatial Center
Watts	Clint	
Wheeler	Tracey	DARPA
White	Devin	NGA
Whitney	Erin	DOS
Whitney	Paul	PNNL

Williams	Laura	DOS
Williams	Richard	NSI
Willis	Ruth	NRL
Wirtz	Jim	NPS
Witter	Elizabeth	SMA
Worrell	Charles	MITRE, ARGUS
Wright	Lewin	OSD, AT&L
Wright	Dominic	IDA
Wyler	Brenda	Army, G3/5/7 DAMO-SSO
Xenakis	Stephen	
Zak	Paul	CGU
Zalesny	Mary	DOE, PNNL

AGENDA

5th Annual Strategic Multi-Layer Assessment (SMA) Conference

Natcher Hall, National Institutes of Health, 29 -30 November 2011

Day One Tuesday, 29 November 2011	
0730 - 0800	Registration and Coffee
0800 - 0805	Welcome: Dr. Diane DiEuliis, NIH/HHS
0805 - 0810	Administrative Remarks: Ms. Margaret Egan, SRC
0810 - 0820	SMA Overview: Dr. Hriar Cabayan, OSD
0820 - 0850	Guest Speakers: Joint Staff: Brig Gen Shanahan, J3 DDGO & Mr. Ben Riley, OSD, ASD (R&E)/RFD
0850 - 0915	Key Note Speaker: LTG Michael Flynn, Assistant Director for National Intelligence
<i>INFLUENCE OF STATE AND NON-STATE ACTORS SESSION</i>	
0915 - 0930	Introduction Mr. Pat McKenna, STRATCOM, J5 and Dr. Allison Astorino-Courtois, NSI
0930 - 0945	Operational Perspective on Influence and Deterrence Major General Joseph Reynes, Director of Operations, Allied Joint Force Command Headquarters, Brunssum, the Netherlands
0945 - 1000	Break
1000 - 1100	Panel One Elements of Influence & Effects Analysis for State and non-State Actors Moderator: Mr. Pat McKenna, STRATCOM, J5

	Panelists: Dr. Jeff Knopf, NPS; Dr. David Champagne, 4 th MISG(A); Mr. Jonathan Trexel, SAIC
1100 - 1200	<p>Panel Two</p> <p>Discussion of Analytical Techniques</p> <p>Moderator: Mr. Dan Flynn, ODNI</p> <p>Panelists: Dr. Rita Parhad, Monitor 360; Mr. Howard Lee, TRADOC; Mr. Ron St. Martin, SAIC; Mr. Alex Levis, GMU</p>
1200 - 1300	Lunch
1300 - 1415	<p>Panel Three</p> <p>Bringing it all Together—Integrated Influence & Effects Analyses for Use in the Real World</p> <p>Moderator: Dr. Allison Astorino-Courtois, NSI</p> <p>Panelists: Lt Gen (ret.) Dr. Robert Elder, GMU; Dr. Nina Berry, JIEDDO; COL Carl Trout, Joint Staff, J7</p>
1415 - 1430	<p>Session Wrap Up</p> <p>Mr. Pat McKenna, STRATCOM</p>
1430 - 1500	Break
SPECIAL SESSION	
1500 - 1600	<p>Session on Geospatial Applications for Population Centric Assessments</p> <p>Moderators: Ms Elizabeth Lyon, OSD and Dr. Bert Davis, U.S. Army, ERDC</p> <p>Panelists: Dr. Budhendra Bhaduri (ORNL GIST); Dr. Charles Ehlschlaeger, USACE; LTC Lauren Kulinski, DOS</p>

5th Annual Strategic Multi-Layer Assessment (SMA) Conference

Natcher Hall, National Institutes of Health, 29 -30 November 2011

Day Two	
Wednesday, 30 November 2011	
0730 - 0800	Registration and Coffee

COMMAND DISCUSSIONS	
0800 - 0930	<p>Feedback from Commands: What are the pressing needs in your Commands?</p> <p>Moderator: BG Mike Nagata, JS, J37, DDSO</p> <p>Panelists: COL Carl Trout, JS, J7; LTC Gerald Scott, JS J3; Mr Roger Baty, NORTHCOM; Mr. Marty Drake, CENTCOM; LtCol Scott Tielemans, CENTCOM; Lt Col (Dr.) Rob Renfro, CENTCOM; Mr. Juan Hurtado, SOUTHCOM; CAPT Todd Veazie, SOCOM; Mr. Aaron Meyer, PACOM</p>
0930 - 1030	<p>Social Science Support to the Operational Community</p> <p>Moderator: Mr. Ben Riley, OSD ATL</p> <p>Panelists: CAPT Dylan Schmorow, HSCB; Dr. Erin Fitzgerald, MINERVA; Dr. William Casebeer, DARPA</p>
1030 - 1045	Break
PANEL DISCUSSIONS	
1045 - 1050	Panel Overview: Dr. Diane DiEuliis, NIH/HHS
1050 - 1115	<p>Guest Speaker: Neurobiological Overview</p> <p>Dr. Jeanette Norden, Vanderbilt University</p>
1115 - 1215	<p>Panel on Implications of Recent Advances in Social, Cognitive & Neurobiological Sciences to National Security</p> <p>Moderator: Dr. Diane DiEuliis, NIH/HHS</p> <p>Panelists: Dr. Arie Kruglanski, University of Maryland, START; Dr. James Giordano, Potomac Institute; Dr. Jeanette Norden, Vanderbilt University</p>
1215 - 1245	Panel Wrap Up: Dr. William Casebeer, DARPA
1245 - 1345	Lunch
1345 - 1445	Panel on IVEO – Neurobiology Pilot Effort on AQAP

	<p>Moderator: Ms. Abi Chapman, NSI</p> <p>Panelists: Dr. William Casebeer, DARPA; Dr. Janice Adelman, NSI; Dr. Clark McCauley, Bryn Mawr</p>
1445 - 1545	<p>Panel on Influence and Deterrence in Cyber Space</p> <p>Moderator: Dr. William Casebeer, DARPA</p> <p>Panelists: Mr. Dan Kimmage, DOS; Ambassador David Smith; Mr. Richard Fontaine, CNAS; Dr. Catherine Havasi, MIT Media Lab; Dr. Paul Zak, Claremont Graduate University (T)</p>
1545 - 1600	Break
1600 - 1700	<p>Panel on Complex Adaptive Systems</p> <p>Moderator: Lt Col David Lyle, LtCol, USAF</p> <p>Panelists: Dr. Yaneer Bar Yam, President, New England Complex Systems Institute; Dr. Alex Ryan, School of Advanced Military Studies; Dr. Valerie B. Sitterle, Georgia Tech Research Institute</p>
CONCLUSION	
1700 - 1730	Conference Summary & Closing Remarks: Dr. Hriar Cabayan, OSD

GLOSSARY

AQAP	Al Qaeda in the Arabian Peninsula
ASD (R&E)	Assistant Secretary of Defense (Research & Engineering)
CANS	Concept and Analysis of Nuclear Strategy
CENTCOM	Central Command
C-IED	Counter-IED
COA	Course of Action
COCOM	Combatant Command
COI	Community of Interest
COIN	Counter Insurgency
DARPA	Defense Advanced Research Projects Agency
DDGO	Joint Staff Deputy Director for Global Operations
DDRE	Department of Defense Research & Engineering Enterprise
DIME	Diplomatic, Information, Military, and Economic
DoD	Department of Defense
DOJOC	Deterrence Operations Joint Operating Concept
DOS	Department of State
GMU	George Mason University
HHS	Department of Health and Human Services
HIU	Humanitarian Information Unit
ISAF	International Security Assistance Force
I-VEO	Influencing Violent Extremist Organizations
JIEDOO	Joint Improvised Explosive Device Defeat Organization
JS	Joint Staff
NIH	National Institutes of Health
NORTHCOM	Northern Command
ODNI	Office of the Director of National Intelligence
OODA	Observe, Orient, Decide, Act
OSD	Office of the Secretary of Defense
PACOM	Pacific Command
PAKAF	Pakistan and Afghanistan
PMESII	Political, Military, Economic, Social, Infrastructure, and Information
RAM	Rational Actor Model
RCU	Rich Contextual Understanding
RFD	Rapid Fielding Directorate
SCM	Strategic Culture Model
SMA	Strategic Multilayer Assessment
SME	Subject Matter Expert
SOCOM	Special Operations Command
SOUTHCOM	Southern Command
STRATCOM	US Strategic Command
TIN	Timed Influence Network

TRADOC	Training and Doctrine Command
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USG	US Government
VEO	Violent Extremist Organizations
WMD	Weapons of Mass Destruction