

Title

Improving Cooperation among Nations in Irregular Warfare Analysis

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Introduction

The 2005 National Defense Strategy (NDS) identified the complex array of security challenges facing the United States as traditional, irregular, catastrophic, and disruptive challenges. The 2006 Quadrennial Defense Review (QDR) reinforced the shift of emphasis in US defense planning from major conventional combat operations to multiple irregular, asymmetric operations. The QDR emphasized that US military forces are not as well organized, trained, educated, or equipped to conduct protracted Irregular Warfare (IW).

The US is beginning to address these shortcomings. The President recently directed that the Army and Marine Corps grow by 95,000 personnel, in part to better meet the demands of IW. The IW Joint Operating Concept (JOC) has been published to provide the framework for a holistic US government and partner nation approach to IW. The IW JOC defines IW as a violent struggle among state and non-state actors for legitimacy and influence over the relevant populations.

Many analytical organizations are attempting to improve their capability to conduct IW assessments. Currently, the state of IW analysis is where traditional warfare analysis was decades ago. Analysts have a responsibility to support senior leaders in the military and interagency with rigorous analysis to inform decision making. We are now developing tools, methods, algorithms, and data needed for IW analysis. Collaboration among analysts within the Department of Defense, other government agencies, and other nations can assist the progress of IW analysis.

Overview

The MORS workshop *Improving Cooperation among Nations in Irregular Warfare* (IW Workshop) at the Naval Postgraduate School (NPS) in Monterey California, December 11-13 2007 provided an opportunity for a comprehensive assessment of IW data, tools, and analysis. Attendance at the conference totaled 165 participants, including twenty NPS students and faculty, and forty international representatives from twenty-one countries.¹

The purpose of this workshop was to enhance collaboration and improve analysis of IW among U.S., ally and partner military and interagency analysts. Many Allies and partners have rich histories in IW operations. Some have developed analytical tools and techniques to address operational issues. The *IW Workshop* was the first MORS workshop that focused on broad international participation as a means of increasing the transfer of information and know how among allies and coalition partners.

A second focus of the workshop was on the use of analytically-supported wargames. This emphasis recognizes that the analytical community is a long way from having rigorous models to assess IW. In the near term, we may be better able to assist senior leaders by providing analytical support to wargames that enlist the support of subject matter experts (SMEs). This approach marries the operational experience of SMEs with the tools and methods of operations research. Analytically-supported wargames offer a means to improve decision making in the near term while the analytical community builds the data, tools, and methods needed for more rigorous methods. In this respect, the *IW Workshop* continued the work of the *MORS Wargaming and Analysis* workshop, which was held October 16-18, 2007. The October workshop focused generally on the benefits of wargaming to the analytical community. At the *IW Workshop*, participants had the opportunity to participate in wargames specifically focused on IW, including counterinsurgency (COIN) and stability operations.

Workshop Format

The *IW Workshop* began with a pre-session meeting on Monday, December 10 of the Pythagoras Users Group, hosted by the US Army TRADOC Analysis Center in Monterey and the US Marine Corps Combat Development Command (MCCDC), Operations Analysis Division. Approximately 40 people attended. Pythagoras is a first generation agent-based model with potential application to IW analysis due to its ability to represent a wide range of factors in military operations. Pythagoras is open source software originally developed under Project Albert sponsorship. The purpose of the meeting was to share ideas within the user community and solicit ideas for the future of Pythagoras. Mr. Edd Bitinas of Northrop Grumman Mission Systems, who leads the Pythagoras development team, gave a presentation on Pythagoras including its history and capabilities. Dr. Bob Sheldon, FS led a session where users shared current and recent uses of Pythagoras for analysis. Major Todd Ferris, NPS, Mr. David Holdsworth, USSOCOM, and others presented summaries of recent analysis using Pythagoras. The final discussions centered on the Pythagoras business model, organization of a formal Pythagoras Users Community and the potential future of Pythagoras. The NPS Simulation Experiments & Efficient Design (SEED) Center will host a user community forum and provide a mechanism to distribute Pythagoras and related data.

Tuesday, the *IW Workshop* formally opened with a keynote address by Dr. Conrad Crane, Director of the U. S. Army Military History Institute at the Army War College. Dr. Crane was the lead editor of the Army FM 3-24/USMC MCWP 3- 33.5, *Counterinsurgency Operations*. His talk described the historical context of US COIN operations, the key roles played in the development of this document by GENs Petraeus and Mattis, its theoretical underpinnings, and some of the significant guidance for the conduct of these operations. Based on historical analysis, Dr. Crane highlighted the “will gap” that can prevent successful COIN operations. In his analysis, nation states are successful in COIN in campaigns lasting less than 5 years or more than ten years. Insurgents tend to be successful in campaigns of 5-10 years, when a nation-state is unable to sustain the will to continue the campaign. Another major point highlighted by Dr. Crane is that success in a COIN campaign requires the synchronized application of all the elements of national power.² He quoted the military theorist David Galula, whose work provided much of the theoretical underpinning of the manual that the military component of a counterinsurgent campaign should only be 20% of the total effort. The balance of the COIN effort should reflect the synchronized application of other elements of national power.

The plenary continued with a talk by COL Joe Osborne, Director of the Irregular Warfare Directorate (J10), US Special Operations Command (USSOCOM). His organization has a role of educating, influencing, informing, and embedding IW concepts and doctrine into DoD training and programs. COL Osborne emphasized that IW provides the larger framework for the Global War on Terror, which he sees as a long term generational struggle, similar to the Cold War. US IW operations can help prevent failed states, which provide a hospitable environment for terrorist organizations. He reinforced Dr. Crane's view that success in IW requires coordinated efforts across a range of activities and governmental agencies. He then described USSOCOM's regional campaign planning process that synchronizes IW activities in each theater of operations. In support of these activities, USSOCOM conducts over forty video conferences per month.

Mr. Ted Smyth, FS, of the Johns Hopkins University Applied Physics Laboratory (JHU/APL) then summarized the Wargaming and Analysis MORS workshop held October 16-18, 2007, which he chaired. Wargaming, using analytical tools and SMEs, offers potential in the near term to support the assessment of IW issues, until more rigorous methods are developed. "Human-in-the-loop" wargaming also offers a means to incorporate a key feature of IW conflict: adversaries who continually adapt and learn in pursuit of their objectives.

The opening plenary concluded with a panel discussion by international participants from eight countries. The panel members represented countries having a wide range of experience in IW, from Japan, with little IW experience, to Israel, which has been more or less continually engaged in IW operations from its foundation almost sixty years ago. Panel members included Mr. Anthony Ween (Australia), Dr. Dean Haslip (Canada), Lt Col Luis Cote (Colombia), Lt Col (Dr.) Eitan Israeli (Israel), Ms. Izumi Kobayashi (Japan), Mr. Robertus Barbier (Netherlands), Mr. Tiah Yao Ming (Singapore) and Dr. George Rose (the United Kingdom). The goal of the panel was to describe their country's IW experiences, as well as their IW analytical tools, methods, and data sources. One common theme from the panel members was the lack of solid tools for the analysis of IW. In fact, a recurring theme was that IW covered such a large number of analytical areas that many different methods were needed. Other consistent challenges for IW analysis included the availability of data and proven algorithms.

WG 1 – Insurgency/counterinsurgency (COIN): Dr Bob Sheldon, FS, MCCDC OAD, chaired WG1. Within WG 1, Mr. Andrew Caldwell, OSD PA&E UK Exchange Analyst for IW chaired the *Deliberations Working Group*, which discussed COIN analysis questions and methods. Mr. Mike Ottenberg (AT&T) chaired the WG1 *Wargame Working Group* which assessed the utility of wargaming to a COIN scenario.

The consensus of WG 1 was that much progress has been made in recent years on COIN analysis in gaining a greater understanding of important COIN analytical issues and in developing new methods to evaluate those questions. WG 1 brought these two areas together and set out to identify how questions can be matched to methods to design COIN studies.

The initial efforts of the *Deliberations Working Group* focused on reducing large complex questions, such as 'what capabilities do we need to win in COIN?' to more tractable issues. For example, rather than "how do we win?" maybe we should ask "what are an acceptable set of

conditions that would facilitate an enduring international commitment?” or “what is an acceptable military situation to maintain an enduring US commitment?” IW analysis, like any other analytical effort, demands that great care be invested in defining appropriate research questions. The *Deliberations Working Group* then identified 23 methods and documented the strengths and weaknesses for 13 of them. Then the group identified which combinations of methods they would apply to answer a range of possible research questions.

The *Deliberations Working Group* concluded that there are a wide range of methods to scope and understand study questions. However, there are few methods that permit detailed operational analysis. Historical analysis and seminars are useful for scoping issues. Agent-based models and wargames, supported by analytical tools, could support more rigorous analysis, depending on the availability of appropriate data. Cost benefit analysis or other risk assessment methods would also be required to assess the inherently complex decision space associated with IW.

Several briefers helped illuminate the issues discussed, including:

- Dr Andrew Hossack (UK Defense Science and Technology Lab MoD) “Strategic Success Factors in COIN Campaign”
- Dr Deborah Duong (OSD PA&E SAC) “Gaps, Tools and Evaluation Methodologies”
- Mr. Dean Haslip (Defence R&D, Canada) “Counter-Insurgency Research at DRDC CORA”
- Mr. Edd Bitinas (Northrop Grumman) “Pythagoras Overview”
- Dr Pauline Baker (The Fund for Peace) “Measuring Progress in COIN Operations”
- Mr. David Holdsworth (USSOCOM) “Use of Pythagoras in MCO-1”

The WG 1 *Wargame Working Group* examined the applicability of wargaming to COIN through the use of the automated wargame *Algernon*. Wargame participants included Mr. Brian Train, creator of the commercial wargame “Algeria: The War for Independence 1954-1962,” which supported the development of *Algernon*.

The group applied *Algernon* to a fictitious COIN scenario “Ginger Junction”. This scenario was originally developed by the US Special Operations Pacific Command to support unclassified exercises with regional partner nations. The group played a series of four wargames; each examining a different set of Green and Red strategic approaches. The games were administered by a game controller, with a “Green Team” represented the government forces and a “Red Team” representing the insurgents.

In each wargame, the consensus of participants was that the outcome was less important than the discussion of issues stimulated by game. The games provided a means to:

- Identify and understand the operational context of the scenario
- Understand issues affecting Green and Red decision-making
- Understand how the asymmetry of information between Green and Red affected perceptions, decisions, and operations
- Explore alternative courses of action for both Green and Red
- Identify questions for further analysis
- Identify factors to further enhance the game’s fidelity to real world operations

The group developed the following recommendations for the process of employing wargames in the analysis of COIN scenarios:

- Begin by conducting research of similar historical cases to define key questions for analysis
- Establish a pre-game seminar that provides the cultural, economic, political, military background to game participants
- Design an experimental approach to systematically assess key variables associated with the scenario
 - Apply a range of government and insurgency approaches
 - Apply a range of social behavior theories
- Play the game with multiple groups, especially some completely outside the boundaries of the organization conducting the analysis to prevent Groupthink
- Establish a set of questions beforehand to evaluate each game, such as:
 - Which strategies lead to success or failure for each side?
 - What are the similarities and differences across these strategies?
 - How would changes to the scenario context affect these strategies and their outcome?
- Time permitting, conduct additional wargames applying information learned from the initial set of games

The group concluded that:

- When augmented by other analytical techniques, wargames provide insights on operational issues associated with COIN scenarios
- Algernon is a useful tool for wargaming COIN, particularly because it represents the inherent asymmetry of information between government forces and the insurgents

Working Group 2 – Combating Terrorism. This group was chaired by LTC Neil Fitzpatrick from US Special Operations Command (USSOCOM) and co-chaired by Mr. Preston Dunlap from OSD Program Analysis and Evaluation (OSD/PA&E). The working group set out to enhance collaboration and improve capabilities among US, ally, and partner nation counterterrorism (CT) operators and analysts. Objectives were to: identify CT problems facing participating nations; identify analytic strengths and challenges (tools, methods, data); and suggest potential solutions. The working group mix was roughly one-third operators and two-thirds analysts.

Discussion divided into three main sessions. In the first session, briefs from OSD and the National Counter Terrorism Center generated fruitful debate on defining the CT problem space. In the second session, nine international special operators presented their perspective as a panel discussion on the CT challenges facing their respective nations and identified areas where analysis can provide support. In the third session, analysts presented tools, methods, and data to examine CT operations and programs, including some of the problem areas identified in the previous session.

The group identified a few key opportunities for future collaboration involving model development and cross-fertilization of knowledge. Specific opportunities identified were:

- Sharing US Air Force Special Operations School search methods
- Sharing gaming methods and historical scenarios

- Collaboratively developing representations of country operational environments within models
- Partnering in CT analyses and metric development.

Working group findings included:

- The Diplomatic, Information, Military, Economic, Financial, Intelligence, Law Enforcement / Political, Military, Economic, Social, Infrastructure, Information (DIMEFIL/PMESII) is a useful framework for CT analysis
- Social science analysis and data must mature further to analyze the indirect approach to CT
- Tools, methods, data, and metrics are insufficient at this time – but slowly improving
- CT must be looked at through both a local and a regional lens
- International collaboration in CT analysis is necessary to enable successfully combating terrorism

WG 3 – Stability Operations. WG 3 was chaired by COL “Shep” Barge, Joint Staff J8 Warfighting Analysis Division (WAD) with co-chair Dr Mike Baranick, National Defense University and wargame lead CDR Brett Pierson, J8 WAD. WG 3 benefited from having a varied mix of participants from US government civilians, US military personnel, contractors, representatives of Federally Funded Research and Development Centers (FFRDCs), and international participants from the United Kingdom, Singapore, Netherlands, and Canada. Additionally, Ms. Patricia Taft, from the Fund for Peace, provided a much-needed non-governmental organization (NGO) perspective. In fact, the disparate backgrounds of the participants matched the dominant theme of the discussion that an integrated, collaborative approach, including all elements of government, allies and NGOs is needed for the success in any stability operation. The consensus of WG 3 participants is that identifying each individual organization’s contribution to the overall effort is a major challenge. Examples of issues discussed include:

- What sort of task decomposition and distribution should exist between the military and other organizations?
- How does the entire government synchronize training, planning, and execution of stability operations?
- How is the terminology of stability operations understood and applied across military, civilian, international, and NGOs?

WG 3 also discussed analytical tools for stability operations, including Systems Dynamics and Systemic Operational Design, used to develop a planning framework. In a thought-provoking brief, Skip Cole from the US Institute for Peace issued the question and challenge to workshop participants, “How many people, particularly from other agencies, are linked to your *Facebook* page?” His point is that analysts should establish a broad collaborative network across a range of organizations to support the inherently collaborative analysis and operations associated with stability operation.

WG 3 also provided the opportunity for a ‘hands-on’ experience with a maturing stability operations wargaming model called the Peace Support Operations Model (PSOM – pronounced “Possum”). PSOM is a pseudo agent-based model written in Visual Basic that allows interactive

deterministic and stochastic turns to measure comprehensive, whole-of-government effects-based approaches in IW scenarios.

PSOM was introduced to workshop participants through an initial briefing by the UK Defense Science and Technology Laboratory development team, reviewing the model's design philosophy and concepts. This was followed by a hands-on demonstration by members of the J-8 WAD. WG 3 members were then divided into groups representing different factions (government, military, NGOs, and terrorist/rebels) in the same "Ginger Junction" scenario used in the WG 1 wargame. To begin play, each team was led through a scripted "turn zero," followed by six subsequent "free-play" turns. Despite some initial skepticism, most of the players felt PSOM offers significant potential. During the course of play, feedback was captured which will be used to improve the model following initial VV&A this spring. J-8 WAD has offered to assist DoD organizations with more information on PSOM.

Working Group 4 – Maritime Security Operations (MSO). WG 4 was chaired by Ms. Robbin Beall, US Navy N81, and co-chaired by Mr. Don Theune, USPACOM J8, and had the unique advantage of exploring common analytical ground in a small group setting with representatives of the US, UK, Australia, Japan, Singapore and Colombia. Overview presentations and/or case studies in each area were followed by group discussion focused on identifying coalition perspectives, metrics, data, tools, and opportunities for future collaborative analysis. The discussion was focused on three areas:

- (1) Maritime Theater Security Cooperation (TSC): collective security efforts that focus on common threat and mutual interests
- (2) Protection of Shipping and Critical Infrastructure such as anti-piracy initiatives and measures to ensure the flow of oil to the global economy
- (3) Humanitarian Assistance (HA) and its ability to not only help those in need but also positively influence perceptions

Some of the group's significant insights include:

- Search theory, kinetic effects modeling, and capability analysis techniques associated with analysis of conventional operations can be adapted to MSO, but may not be sufficient to assess the full range of issues in all cases.
- Emerging concepts for TSC and HA, in particular, require characterization of effects to be achieved by maritime forces
- An amalgamation of data from a variety of sources may be necessary to understand the MSO environment and understand the effectiveness of operations, how security decays over time without additional action, and the required frequency of actions to maintain security
- Analysts need to apply social science theory to understand the effects of activities on a population. In this respect, understanding of MSO will benefit from development of DIME-PMESII modeling in other IW areas (COIN, stability operations, Foreign Internal Defense)
- Significant effort is needed in defining MSO model requirements and developing consensus on assumptions

WG 4 identified a number of venues for future collaborative efforts with allies and partners, such as the Asia-Pacific Military Operations Research Symposia (AMORS), various CENTCOM and PACOM initiatives, NATO symposia, and the Technology Cooperation Panel (TTCP) panel.

Optional Plenary Sessions. In addition to working groups, the conference included several optional plenary sessions. One of these was a presentation by Mr. Pete Corpac on the Defense Advanced Research Projects Agency's (DARPA) Conflict Modeling, Planning and Outcomes Experimentation Program (COMPOEX) project. COMPOEX is intended to support the design and conduct of combined, interagency, IW campaigns. It provides a planning environment to synchronize and integrate the full range of actions. It leverages a suite of supporting models to project the broad spectrum of possible effects that result from employing a whole-of-government approach to IW operations.³

Mr. Joe Miranda and Mr. Jon Compton presented a newly designed commercially-available wargame, "Battle for Baghdad." Battle for Baghdad provides an environment for examining alternative strategies in the context of the current conflict in Iraq. The game portrays a multi-sided environment, including the US military, the Iraqi Government, NGOs, and the major warring factions (Shiites, Sunnis, and Jihadists). In the game, each of the factions has a different victory condition, and many of these conditions overlap. Through a variety of activities, each faction accumulates and expends political points. During the presentation, a member of the audience asked why "Battle for Baghdad" is a board game instead of a computer simulation. Mr. Compton asserted, "War is a social event – and a board wargame enables better interactions among participants – and thus a better representation of the actual situation in Baghdad today."

Mr. John Benedict, JHU/APL presented the 3rd optional plenary presentation. At a recent JHU/APL seminar, there was consensus that DoD needs a whole new business enterprise associated with modeling and analysis, as well as additional funding for a new modeling and analysis enterprise. However, participants at this seminar also expressed skepticism that DoD is going to make the investments necessary unless senior leaders in the analytical community develop enterprise-wide agreement on the need for new IW tools and methods. The briefing then provided a survey of the current state of IW models and tools, noting that, in general, qualitative approaches involving SMEs are more mature than quantitative approaches when assessing complex problems involving multiple elements of power and components within the DIMEFIL/PMESII paradigm.

The Synthesis Panel was led by Dr. Stu Starr from the National Defense University. This group was charged with developing an overall assessment of the *IW Workshop*. In support of this task, they developed perspectives on the workshop activities and conducted a formal survey of wargame participants. The Synthesis Panel developed four overall findings and recommendations.

First, IW adversaries have demonstrated an extraordinary ability to respond to changes in equipment, as well as tactics, techniques, and procedures (TTPs). The US recent experience with attempts to defeat improvised explosive devices (IEDs) has amply demonstrated this. IW analysis, therefore, requires tools and methods that reflect adaptation and learning. In a larger sense, analytical organizations must also become adaptive, learning organizations to reflect the evolving nature of conflict in their analysis.

Second, the analytical community must take a whole-of-government approach to IW assessments, both in terms of substance and process. In IW conflicts, successful operations synchronize many elements of national power (diplomatic, information, military, economic, financial, intelligence, and law enforcement). Therefore, tools, data, and methods for analysis must reflect the appropriate roles of interagency players, allies, host nations, civilians (e.g., NGOs), and international organizations.

Third, the current state of our analytical tools suggests that a mix of tools and methods are needed; there is no comprehensive tool to assess all aspects of IW. Hybrid approaches (e.g., wargame - model - wargame) appear to offer a promising means to conduct analysis in the near term. A suite of tools can capitalize on individual model strengths and compensate for weaknesses.

Finally, international collaboration among organizations conducting IW analysis is essential and should increase. IW conflicts typically involve a coalition of international participants. Many smaller countries, while they lack significant capabilities for conventional warfare, have extensive experience and capability for IW. The availability of data and ability to invest in the development of tools and methods varies widely. International collaboration offers the possibility of a more rapid path to the development of useful data, tools, and methods than would be possible by each nation's individual efforts.

There was agreement on several aspects of the two wargames. Participants strongly felt that wargames helped facilitate collaboration among analysts from different backgrounds (e.g., Services, countries). Essential to the analytical utility of wargames is the opportunity to examine and understand the basis for the underlying algorithms that adjudicate game events. Highly developed graphical interfaces and map displays, such as those used in the tools supporting the IW Workshop's games, were viewed by participations as adding significant value

The Synthesis Panel concluded its deliberations by identifying five challenges for organizations conducting IW analysis. First, there is a need to build a fundamental understanding of IW to enable the development of tools and methods. Second, tools and methods must enable the representation of adaptive, opportunistic adversaries. These adversaries are characterized by structurally fluid organizations and TTPs. Third, it is critical that the IW analyst model the "Human Terrain" of the operating environment, that is, the unique characteristics of the demographic groups involved in the conflict. Aspects of human terrain include modeling social change; representing social networks; integrating individual, group, society-level actions and effects; and understanding the non-military effects that IW operations can produce. Fourth, it is vital for analysts to rigorously address Verification, Validation, & Accreditation (VV&A) of IW models. Without VV&A, there is no way to assess the value of IW analysis. Finally, the analytical community must address the data challenges associated with IW. Steps must be taken to structure social environment data and to collect critical "on the ground" HUMINT data, including information from NGOs and the intelligence community.

Summary and Recommendations

The day after the *IW Workshop* concluded, the organizing committee held an after action review to capture some key lessons of the workshop. There was consensus that the high level of

international participation, including both analysts and operators, provided tremendous benefit to the quality of the discussion. The workshops two wargames provided a rich environment to discuss IW operations and analysis. Prior to the conference, there had been concerns about the feasibility of conducting wargames in a workshop environment, because of the difficulty in training participants on the scenario and the rules of each game. The wargame leads overcame this through scripted turns at the beginning of the game, which introduced participants to the scenario and rules. In terms of areas for improvement, the organizing committee felt greater participation from other federal agencies would have improved the quality of the discussion. Although there were representatives from the Central Intelligence Agency and the National Center for Counter-Terrorism, there was no representation from the State Department, USAID, and other branches of the US government. This highlights a consistent challenge in IW operations and analysis, overemphasis on military means vice political, economic, and informational approaches. Within the US military, JFCOM's absence was noted as a concern, given their leadership role in DoD experimentation. There was some debate within the organizing committee about the workshop's adoption of an unclassified forum for discussion. While this was of significant benefit in terms of expanding participation, it also limited discussion of issues and capabilities. Finally, the high level of US and international participation created at least one adverse impact, classrooms allocated to several of the working groups were completely filled.

The organizing committee offers these recommendations for future efforts:

- Continue to promote international partnerships and collaborative IW analysis. The US analytical community has much to share as well as to learn from our partner's experience.
- Continue unclassified workshops like this but consider allocating a day or so at the end for classified discussions.
- The participation of National Defense University Counter-Terrorism students added immensely to the quality of the workshop discussions. Seek opportunities to integrate them in future events.
- Consider sponsoring a competition like DARPA's "Desert Challenge" to solicit the development of IW simulation tools from a range of developers, including universities and wargamers.

¹ Participating countries included the Algeria (1), Australia (2), Bangladesh (1), Canada (4), Colombia (3), El Salvador (1), Germany (1), Guyana (1), India (2), Israel (1), Japan (1), Kenya (1), Morocco (1), Netherlands (1), Nigeria (1), Pakistan (3), Saudi Arabia (1), Serbia (1), Singapore (2), UK (11), US (125).

² Typically referred to as DIMEFIL (Diplomatic, Informational, Military, Economic, Financial, Intelligence, and Law Enforcement).

³ Effects include Political, Military, Economic, Social, Information, and Infrastructure (PMESII).

Encl 1. MORS IW Workshop – Attendees by Organization

Organization	Total by Org
AF/A9I (Contractor)	1
Air Force Research Lab	1
Alion Science & Technology	1
Applied Systems Intelligence, Inc.	1
Argonne National Lab	1
Armada Republica de Colombia	2
AT&T	1
AT&T Government Solutions, Inc.	1
Barcroft Research Institute	1
Bundeswehr Center for Transformation	1
Center for Army Analysis	6
Chief of Naval Operations (N816)	1
CIA	1
Combating Terrorism Fellowship Program Director	1
COMPACFLT	1
CTTSO (Contractor)	1
CTTSO/IWSP (Contractor)	1
DDRC CORA (Canada), 6CBS	1
Defence Science & Technology Laboratory (UK)	1
Defence Science and Technology Organisation (Australia)	2
Department of National Defence (Canada)	1
DRDC CORA (Canada)	1
DSO National Laboratories (Singapore)	2
DSTL (UK)	3
Dstl Farnborough (UK)	5
General Dynamics	1
Group W Inc.	1
HQ TRADOC , ARCIC, JAMSD	1
HQ US Pacific Command	1
HQ USAF/A9	1
HQ USSOCOM	1
HQ USSOCOM/SORR-J8-S	1
IDF (Israel)	1
Institute for Defense Analyses	1
JHU/APL	7
Joint Special Operations University	2
Joint Special Ops University	1
Joint Staff (J8/WAD)	2
Joint Staff (J-8/WAD)	1
Lockheed Martin	1
MCCDC	1
MCCDC Operations Analysis Division	1
MCCDC-OAD	1

Encl 1. MORS IW Workshop – Attendees by Organization

MCCDC-Operations Analysis Division	1
Military Operations Research Society	2
Ministry of Defense (Japan)	1
Modern Conflict Studies Group	2
MOVES Institute	1
National Defense University	11
National Defense University/CTNSP	1
National Ground Intelligence Center	1
Naval Postgraduate School	17
Naval Postgraduate School (retired)	1
Naval Postgraduate School/DA	1
NCTC	1
NDU -SNSEE Staff	1
None Listed	1
Northrop Grumman	2
Northrop Grumman IT	2
NSWC-Carderock	1
OASD (NII)/DoD CIO/IIS Directorate	1
OASD/HA/Force Health Protection R&P	1
Office of Naval Research	1
OPNAV N81	1
OSD PA&E (Contractor)	1
OSD PA&E (UK Exchange Analyst)	1
OSD PA&E Joint Data Support (Contractor)	1
OSD PA&E/SAC	3
OSD, PAE, Joint Data Support	1
OSD/PA&E	2
PA Consulting Group	1
Peace Keeping and Stability Ops Inc.	1
Praevius Group	1
Private Consultant (Canada)	1
SAIC	4
Science and Technology Associates, Inc.	1
Simulex Inc.	1
SIT-SA OA (P&P) AD (UK)	1
The Boeing Company	1
The Fund for Peace	2
The MITRE Corporation	1
TNO Defence, Security and Safety (Netherlands)	1
TRAC - Monterey	2
TRAC-FLVN	4
TRAC-FLVN-JOD	1
Unisys Corporation	1
US Army Military History Institute	1
US Army TRADOC Analysis Center (TRAC)-Monterey	1
US Army TRADOC Analysis Center TRAC-Monterey	1

Encl 1. MORS IW Workshop – Attendees by Organization

US Central Command	1
US Naval Mission to Colombia	1
USAF HQ	1
USAF Special Operations School	1
USCENTAF Combined Air Operations Center	2
USCENTCOM	1
USIP	1
USPACOM/J84	1
USSOCOM SOKF	1
V.E. Middleton Enterprises, LLC	1
Virginia Modeling, Analysis and Simulation Center	1
Visco Consulting	1
TOTAL:	165