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**PHALANX**

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# 80<sup>th</sup> MORS SYMPOSIUM

Expanding the Boundaries of National Security Analysis | 11-14 June 2012 | US Air Force Academy



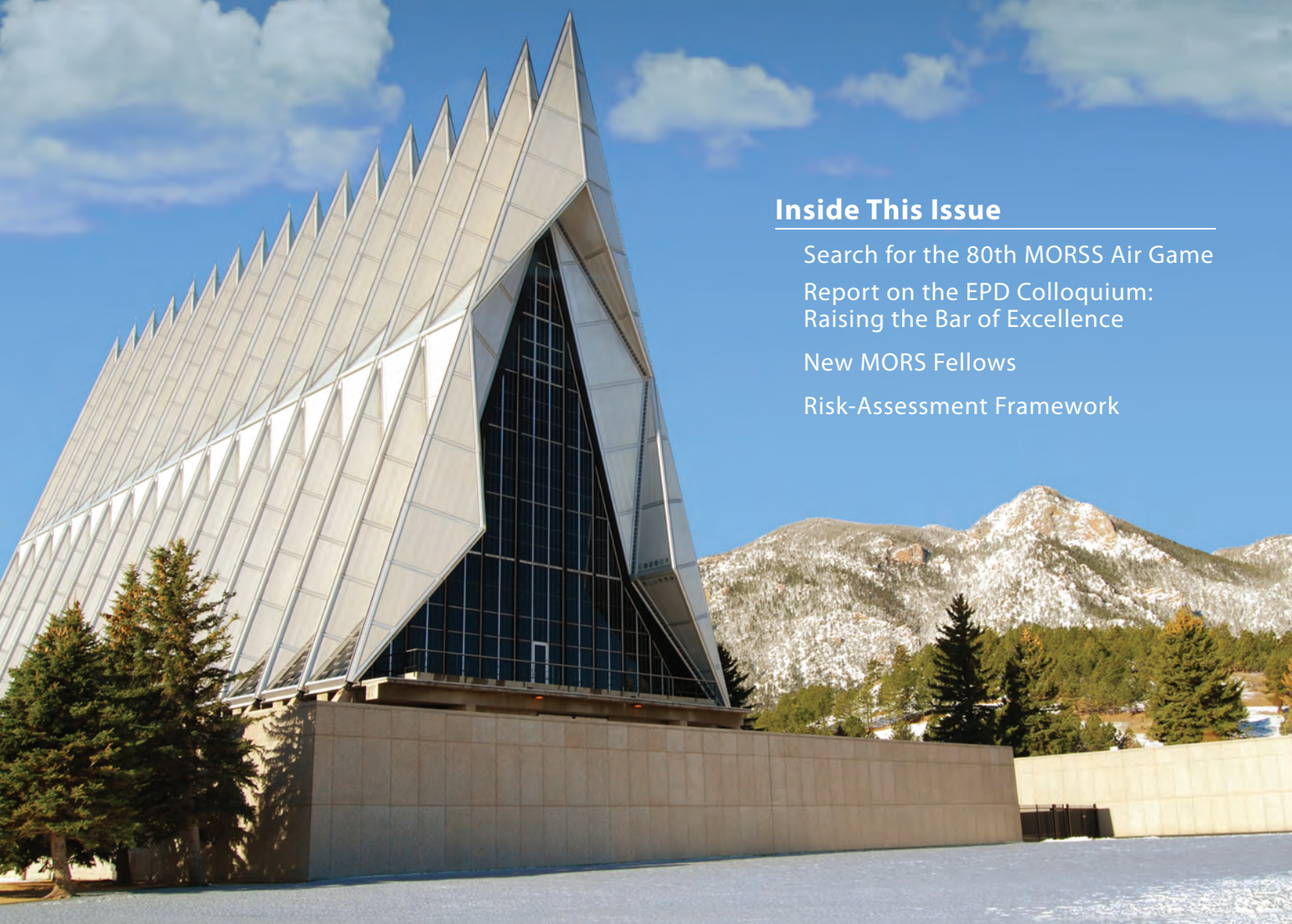
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Risk-Assessment Framework



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# So Much to Do in So Little Time

Trena Lilly, Johns Hopkins University/Applied Physics Laboratories, [Trena.Lilly@jhuapl.edu](mailto:Trena.Lilly@jhuapl.edu)

**I**t is amazing how fast a year can go by! The 80th MORS Symposium is here and my term as President is at an end. We have made a lot of progress this year and are continuing to work on “Expanding the Boundaries of National Security Analysis.” I want to thank you for all the support you have given me throughout this year. It has truly been an honor to serve you and the Society; as well as a humbling experience to be among the ranks of the “notable greats” that have come before me.

The 80th MORS Symposium is here and after months of planning, the 80th MORS Program Staff, led by **Bruce Wyman**, finally gets to execute agendas! The entire Program Staff has done a phenomenal job pulling this event together. I would like to thank our WG/CG Coordinator, **Rochelle Anderson**, for her leadership with the WG/CG chairs. I would also like to thank **Donna Blake** for her work on the Special Sessions, **Lisa Kaiser** for the outstanding line-up of tutorials and the rest of the team of the 80th Symposium Planning staff. I would also like to give a special thank you to **Kathy Denesia** for organizing our first guest program in a number of years.

We have continued to expand our boundaries as a society this year with several outstanding meetings. In the past few months we’ve had several special meetings as well as the Education and Professional Development Colloquium.

I would like to thank **Dr. Clayton Bowen**, AF/A9, and **Pat McKenna**, STRATCOM, for an informative meeting on “Analytic Dynamics of Deterrence and Nonproliferation.” Held March 19–22, 2012 at the Johns Hopkins University Applied Physics Laboratory Crystal City Field Office, Arlington, Virginia, this meeting explored how analysis can play a role in evaluating the range of issues related to prevention, and its subsets of deterrence, nonproliferation, and counter-proliferation. Dr. Bowen’s meeting report article can be found on page 21 in this issue of *Phalanx*.

“The Analytical Approaches to Unmanned Aircraft Systems” meeting was held April 16–19, 2012 at the National

Defense University, Washington, DC. The goal of this meeting was to improve the understanding of the strengths and limitations of current AISR analytic techniques and generate ideas for developing new and/or improved analytic methodologies. More than 100 analysts attended with three distinguished keynote speakers: **Christine Fox**, Director, Cost Assessment and Program Evaluation, OSD; **Dr. Michael Vickers**, Under Secretary of Defense for Intelligence, OSD; and **LTG Michael Flynn**, Assistant Director of National Intelligence for Partner Engagement, ODNI.

The meeting also included an expert panel consisting of several of our MORS sponsors:

- **Mr. Arthur Barber**, Deputy Director of the Assessment Division, Office of the CNO (N81)
- **Dr. Jacqueline Henningsen**, FS, Director for Studies & Analyses, Assessments and Lessons Learned, Headquarters US Air Force
- **Dr. Matthew Schaffer**, Deputy Director, Analysis and Integration, Office of the Secretary of Defense, Cost Assessment and Program Evaluation (CAPE)
- **Dr. Steve Warner**, Director, System Evaluation Division, Institute for Defense Analyses
- **Dr. Igor Mikolic-Torreira**, Special Assistant for Operations Analysis, Office of the Secretary of Defense, Cost Assessment and Program Evaluation (CAPE)
- **Mr. Frank Strickland**, Senior Fellow, IBM Center for the Business of Government, Partner with IBM’s Global Business Services
- **Ms. Pamela Blechinger**, Director of Operations, US Army Training and Doctrine Command Analysis Center, Fort Leavenworth

It was a very successful MORS meeting with a innovative new format for our special meetings. I would like to thank **Mr. James Bexfield** and **Mr. John Orem** for their vision and efforts on this meeting.

Our 2012 Education & Professional Development Colloquium was held April

11–12, 2012 at the United States Military Academy, West Point, New York. **Dr. Julie Seton** put together one of the best MORS colloquiums I have attended. The Education and Professional Development Colloquium is different from our other meetings in that this meeting focuses on our “future”—the students and younger analysts that will eventually lead and contribute to the OR profession. It is a unique opportunity to meet the best and brightest students and see them work during the Rick E. Rosenthal student competition, led by **Kirabeth Therrien**. **Lynda Liptak** organized two “speed mentoring” activities for students and young analysts. There were several presentations from students and well as our first-ever Junior Analyst Panel, organized by **Lisa Kaiser**. It was truly an enjoyable experience and one I hope you will participate in the future.

We are revitalizing our mentorship program, which is chaired by **Dennis Baer** and **Krista Elefante**. The MORS Mentorship program is provided to all members who are seeking a mentor or seeking to become a mentor. We have a diverse cross-section of government, industry, and academia and the chairs will work with you to identify your needs, match you with the appropriate mentee or mentor, and monitor your progress as you reach your goals.

Our Membership Committee, chaired by **Renee Carlucci**, made great strides communicating the value of MORS membership and have introduced MORS/MAS student bundling for our students. Initiated by **Julie Seton** and **CDR Walt DeGrange**, this initiative is an opportunity to reach students studying to be OR analysts earlier. Thank you Julie, Walt, and Renee for your efforts!

As I mentioned in the last issue of *Phalanx*, several 79th MORS Symposium attendees took part in a focused exchange with **Gary Fossett** to provide insight into their perception of the Society. I would again like to thank all of those participants and I would also like to thank Gary Fossett for volunteering his time and effort for this initiative and providing the candid feedback from these interviews to the MORS Board of Directors. A summary of these

See *MORS President* on page 4...



Greg H. Parlier, MAS President, [gparlier@knology.net](mailto:gparlier@knology.net)

First, thanks to all participants in our annual conference at the Monterey Hyatt Regency in late March, program coordinators **Scott Nestler** and **Walt DeGrange**, conference chair **Bill Fox**, and especially to our distinguished keynote speaker, retired Navy Captain and Naval Postgraduate School **Professor Wayne Hughes** (see Figure 1). Captain Hughes is one of our recent Steinhardt Award recipients for lifetime achievement and contributions to military operations research. He also taught many of us in attendance and was kind to participate throughout the entire set of presentations, continuing to challenge us all with his thought provoking comments during each Q&A. . . and a few stories, too. In all, another great conference at a spectacular location with a headcount higher than expected (always a relief), and calls for an encore there next year. For those who could not attend, we have posted most of the briefings on our MAS community website. And in mid-April, INFORMS hosted its second re-branded “OR and Business Analytics” conference, which included several military presentations in the Public Policy track: thanks again to Scott Nestler, and to **Doug Matty, Andrew Fall, and Rob Dees**.

## Events

Please note the earlier date this year for the 2012 INFORMS Annual Conference, October 14–17, in Phoenix, Arizona (<http://meetings2.informs.org/phoenix2012>). In addition to our traditional MAS cluster of sessions, we also have an opportunity to sponsor a new MAS poster session as well. These interactive sessions are competitive and include recognition in the form of plaques and substantial monetary awards. Although May 15 was the abstract submission deadline for papers, we typically have room for some post-deadline flex.

Planning and coordination also continue for an early August MAS co-hosted conference in Huntsville, Alabama extending our previous conferences here, focused on military logistics, operations management, supply chain transformation,

and enterprise system themes. We’ll likely co-host with contributors from several of the 40 Huntsville Association of Technical Societies (HATS, e.g., SOLE), the University of Alabama in Huntsville (UAH), new INFORMS Deep South chapter, and Army Materiel Command organizations. If you would be interested in participating please contact either me or **Professor Chase Murray** ([ccm0022@auburn.edu](mailto:ccm0022@auburn.edu)).

A quick tutorial on international activities you may not be fully aware of. As economic globalization continues to advance, workforce specialization increases, and international security challenges converge, these interacting trends provide expanding opportunities for OR/MS. This is reflected in a growing number of national OR societies, now numbering more than 50, most recently including Nepal and Estonia. Under the umbrella International Federation of Operational Research Societies (IFORS), regional groupings have evolved so far to include North America (INFORMS and the Canadian Operations Research Society—CORS), South America (ALIO—six national societies), Europe (EURO—31 nations), and Asia Pacific (APORS—12 nations). An informative overview of all these international events and activities is contained on the IFORS website

([www.ifors.org](http://www.ifors.org)) and in the March annual report newsletter. Many of these national societies offer publications (e.g., ORiON, the official journal of the South African OR society; Australia’s ASOR Bulletin can be freely downloaded); IFORS also publishes two journals (International Abstracts in OR (IAOR) and International Transactions in OR (ITOR)) and sponsors the IFORS Conference every three years. Last year’s 19th IFORS conference was in Australia, where we inaugurated the MAS-sponsored stream on “Military, Defense, and Security Applications”; the 20th IFORS will be in Barcelona, Spain, July 13–18, 2014. Typically, in off-years INFORMS will jointly host international conferences—this year in late June with the Chinese OR society where we’re continuing the MDSA stream . . . and “planting the MAS flag” in Beijing. A short list of some of these “opportunities” over the summer months includes:

- The 2012 Canadian Operational Research Society (CORS) Annual Conference: Niagara Falls, Ontario, June 11–13, 2012.
- INFORMS International in Beijing, China, June 24–27, 2012.
- 25th European Conference on OR

See *MAS President* on page 4...



Keynote Speaker Wayne Hughes with MAS VP and conference chair Bill Fox (left) and MAS President Greg Parlier (right)

focused exchange interviews is provided on page 26 of this issue of *Phalanx*.

Our Heritage Committee, led by **Tougy Orgeron** and co-chaired by **Deborah Ray**, has been busy with oral histories, documenting our history and being a resource on MORS heritage.

This was certainly a busy year for our prizes and awards. We received a record number of submissions for our awards. The awards committee, led by **Bob Koury**, will announce the winners during the Plenary session the Symposium. Our prize committee, chaired by **COL Simon Georger**, considered the Barchi nominations and selected a winner and also identified the best papers to compete for our prestigious Rist Prize. Thank you, Bob and Simon! I would also like to thank the chair of the audit committee, Jerry Diaz, for his team's efforts

this year in ensuring that MORS remains in compliance with external regulations. We have made significant progress this year keeping MORS relevant for our constituents. None of this progress would have been possible without the support from the board of directors, our sponsors, and the MORS staff.

As I pass the gavel to Mike Garrambone and assume my role as immediate past president, I would like to give a special thanks to the MORS board of directors, especially the executive council, President-Elect **Mike Garrambone**, VP for Finance and Management **Rafael Matos**, VP for Meeting Operations **John Hummel**, VP for Member and Society Services **Steve Riese**, Secretary **Clark Heidelbaugh**, and Immediate Past President **Terry Mckearney**. I would also like to thank the MORS staff who work

diligently behind the scenes: Chief Executive Officer Susan Reardon, Eric Hamp, Jill Clark, Paul Laporte, and Jenna Rowland.

And lastly, we are a society of volunteers. Our members can make contributions in many ways in addition to serving on the board of directors or supporting special meetings and the annual symposium. Get involved, provide feedback, and help to shape our Society.

I thank you for this wonderful opportunity and look forward to continuing to serve our Society! ■

#### ...MAS President from page 3

(EURO XXV): Vilnius, Lithuania, July 8–11, 2012.

- 9th Triennial Conference of the Association of Asia Pacific Operational Research Societies (APORS): Xi'an, China, July 28–30, 2012.
- The 29th International Symposium on Military Operational Research (29 ISMOR): New Place, Southampton, UK, August 28–31, 2012.
- International Conference of the German Operations Research Society: Hanover, Germany, September 4–7, 2012.

### Awards

In addition to our MAS-sponsored awards, which we formally present during our business meeting at the annual Fall conference, we annually recognize top undergraduate OR students at our service academies during their awards ceremonies just prior to graduation each May. Although recipient names have not yet been announced as I write this, special thanks to those who presented awards on behalf of MAS at each of the academies: **Captain Melinda McGurer** at the Coast

Guard Academy; **Colonel John Andrew** at the Air Force Academy; **Commander David Ruth** at the Naval Academy, and **Professor Pat Driscoll** at West Point. Submissions for our other MAS awards (Bonder Scholarship, Koopman, and Steinhart prizes) are now closed for this year, but please scan the INFORMS website for the many other recognition opportunities (prizes, awards, scholarships, lectureships) that are available for student projects and research, teaching, writing, impact, service, and organizational contributions ([www.informs.org/Recognize-Excellence/](http://www.informs.org/Recognize-Excellence/)).

### Elections

Elections via online balloting for our next MAS Vice President will occur over the summer months with induction at our business meeting in mid-October during the Annual INFORMS Conference in Phoenix. So please be on the lookout for your ballot thru our list-serve. And, thanks to the diligent efforts of Walt DeGrange, MORS and MAS have now initiated a Joint Student Membership Bundling program. In addition to enjoying membership ben-

efits from both organizations, students can participate in bimonthly webinars, initially coordinated by Jeff Eaton (thanks Jeff!) which will cover a range of subjects of interest to students conducting research and entering the exciting Operations Research workforce.

Finally, on behalf of our entire MAS membership, congratulations to **Trena Lilly** and best wishes to **Mike Garrambone** as the MORS President's gavel is transferred, and all the best for a productive, record-breaking 80th MORSS this June at that wonderful "resort" in Colorado Springs.

"Veni, Vidi, Duci" ■





## ELECTIONS

# Future MORS Leaders to Be Selected During 80th Symposium

Terry McKearney, The Ranger Group, [terry.mckearney@therangergroup.com](mailto:terry.mckearney@therangergroup.com)

**A** first order of business for the Society's Board of Directors when it gathers in Colorado Springs for the 80th MORS Symposium will be electing officers for the upcoming year. In accordance with our bylaws, the following candidates will vie for the positions of leadership in our Society:

### President Elect

Rafael Matos, WBB  
Steve Riese, Johns Hopkins University  
Applied Physics Laboratory

### Vice President for Finance and Management

Bob Koury, Pricesystems

### Vice President for Meeting Operations

Rene Carlucci,  
Force Strategy Division, CAA  
Tim Hope, WBB

### Vice President for Member and Society Services

Simon Goerger, DRRS Implementation  
Office, Office of the Secretary of Defense  
Julie Seton, Indelible Enterprises  
Arch Turner, Department of Homeland  
Security

### Secretary

Donna Blake, Blue Storm  
Jerry Diaz, Analytic Insight

Each of these dedicated and talented MORSians has served the Society for years in a variety of volunteer positions and all would be tremendous leaders as the Society moves forward in its service to the national security analysis community.

Voting will occur as the Board of Directors convenes on Sunday, June 10. The officers elected will be announced at the Symposium plenary session on Tuesday, June 12. The new officers will formally take office at the conclusion of the Symposium on Thursday, June 14. At the same time, current President elect Mike Garrambone will become President of the Society and President Trena Lilly will become Immediate Past President.



## 80TH MORS SYMPOSIUM

# Tutorial Session at the 80th MORSS

Lisa Kaiser, MORSS Tutorial Coordinator, [lisa.m.kaiser.civ@mail.mil](mailto:lisa.m.kaiser.civ@mail.mil)

**T**his year's tutorials at the 80th MORSS will start the Monday prior to the beginning of the Symposium. The tutorials will be highly informative and instructive. Last year 65 classroom hours of instruction were delivered to the symposium attendees of all ranks and educational levels by an array of outstanding educators, experienced practitioners, and renowned subject matter experts. This year you will find a large number of new presentations on many of the topics that support new techniques and concepts that are now being applied to modern analytical thinking. The tutorials are free to MORS members and \$75 for the day for nonmembers. The longer presentations on Mondays run from one-hour overviews up to eight-hour in-depth classes. During the week, tutorials are one hour during the lunch break. You can find an up-to-date listing on the MORS website. The tutorial schedule listed below is up to date as of Thursday, May 17, 2012. If you have ideas, questions or comments, contact the Tutorial coordinator, Lisa Kaiser ([lisa.m.kaiser.civ@mail.mil](mailto:lisa.m.kaiser.civ@mail.mil)).

### Monday

- Tutorial and Overview of Agent-based Modeling and Simulation and Complex Adaptive Systems
- Visual Data Analysis
- Analyzing Combat Identification
- Guidelines for Spreadsheet Design and Construction
- Wings on War: Wargame Rehearsal
- Linear and Nonlinear Programming
- Introduction to Wings on War: The World War I Air Combat Wargame
- Modern Air Power Wargame: An Introduction to Air Power Campaign Planning and Execution
- An Introduction to the Use of Modeling and Simulation Throughout the System Life Cycle
- Efficient System-Level Cost Estimation Using Process-Based Modeling
- Extendsim & Excel: Bringing Top Quality Simulation Capability onto the Desktops of the Decision Makers

### Tuesday

- Best Practices of Developing Scenarios for Strong Study Foundations
- How to Define the Problem
- Exploring the Changing Environment for Software Estimation
- Wings of War Air Combat Wargame I

### Wednesday

- Database Design in 7 Easy Steps
- Metrics and Return on Investment for Modeling and Simulation Systems
- Irregular Warfare Wargame Development: Insurgency Theory as Applied to the Algernon Wargame
- The Challenges of Modeling Irregular Warfare, Counterinsurgency, and Peace Support Operations
- Wings of War Air Combat Wargame II

### Thursday

- How to Model for Fun and Profit
- Optimized Sensitivity Analysis (OptSA) for Defense Simulations
- Cost vs Risk in Defense Portfolios
- Optimization, Simulation or Both - Selecting the Appropriate Approach ■



# Strong Foundation and Tremendous Opportunities

*Dr. Stephen R. Riese, Johns Hopkins University Applied Physics Laboratory,  
MORS Vice President for Member and Society Services, [stephen.riese@jhuapl.edu](mailto:stephen.riese@jhuapl.edu)*



**I**t is an honor to be nominated to lead our Society—a truly unique organization with the important mission to advance national security analysis. As MORS president, I will serve the Society in a variety of ways, but here I would like to discuss two significant roles: presiding over the Society's activities and positioning the Society for continued success in the future. By way of sports analogy, this roughly equates to coaching through the current schedule and preparing for future seasons.

### Strong Foundation

In presiding over the Society, I will strive to build upon our remarkably strong footing—46 years of footing to be exact. **In doing so, we will develop one or two significant goals for each committee to pursue throughout the year, a few of which are suggested below. I will encourage each chair to look beyond the immediate committee members and seek assistance from others, including other committees, the MORS staff, MORS fellows, past presidents, junior analysts, and members at large.** We have seen imaginative and successful endeavors in recent years; however, in many cases, some of the energy behind the new ideas dissipates with the change in Board and Committee leadership each June. Therefore, in many cases I will pursue goals

that serve to finish, tie together, or build on excellent work that is already underway.

One fascinating part of our foundation is the shared ownership in the Society we have created through active member participation in all activities. In fact, many of us “earned our MORS spurs” as a WG co-chair or chair at annual symposiums. The beauty of what one of our directors recently called “passionate volunteer participation” is that it provides valuable reciprocal benefits to those volunteer members. **As president I will seek to strengthen and better communicate that relationship, and ask the Membership Committee to assist in that effort with analysis, articles, and other promotional materials.** We will reinforce the view that MORS membership is an exceptionally good value and an essential part of the analyst's professional portfolio. For our young analysts in particular, presenting a paper at a MORS meeting or volunteering in some other capacity should continue to be seen by supervisors and senior leaders as important professional rites of passage.

As part of our commitment to professional education, we will build upon the excellent groundwork regarding tutorials laid down over the past several years. **I will ask the Education and Professional Development (EPD) Committee to develop a recording and playback service that will capture suitable presentations and make them available to members via the MORS website.**

Our profession is increasingly mobile. Many analysts will not remain at one organization long enough to collect a 10-year, or even five-year, token of appreciation. Within this changing environment MORS remains constant. Through presentations, publications, awards, and many other forms of exposure, feedback, and reward, MORS provides the reliable and ubiquitous professional interaction necessary to help advance a career. As a shining example, this year's Education Colloquium at West Point brought together students and analysts (junior and not-so-junior) in an energetic program of developmental activities that included the Rosenthal Student Com-

petition, “speed mentoring,” and our first Junior Analyst Panel. **The EPD Committee will build upon the MORS consistency provided by such events and look at long-term, personalized professional development. This will include considering the establishment of a professional certification for national security OR, possibly in concert with the INFORMS initiative.**

Our second important constituency (the first being our members) is the impressive collection of government, industry, and academic offices that conduct OR in the pursuit of national security. **I will seek to expand our understanding of this institutional base through Executive Council communications and a survey of senior leaders from within that base.** We will incorporate direct, individual discussions with a cross-section of managers and executives, some of whom fall outside the traditional MORS population. By learning the needs and expectations of these important stakeholders, we will be better able to meet those needs and thereby strengthen the Society.

One aspect of this solid foundation that requires close attention is our fiscal state. My experiences as Vice President for Finance and Management drove home the fact that we require an operational reserve to conduct the Society's activities and weather the storms of financial uncertainty. Our reserves are about one quarter of where they should be (this is very much an improved situation over where we were several years ago). To reestablish those reserves, we will favor fiscally frugal options wherever possible. The same uncertainty that faces the Society also faces our members and constituents. Thus, significant increases in fees are not an option. Instead we will deliberately seek innovative and economic ways to conduct all of the Society's business. **I will ask the Management Committee to establish reasonable fiscal objectives for each of our major activities.** It may sound simple, but establishing such objectives is a capstone of sorts for the more than three years of difficult work by our CEO and Management Committee to rebuild the MORS budget framework around cost center and accrual accounting models.

By coincidence of the calendar, the president we elect in 2012 will undertake earnest preparations for our celebration of 50 years as a Society: 1966–2016. **I will ask the Heritage and Publications Committees to craft an appropriate set of documents (books, brochures, etc.) so that the presidents we elect in 2013 and 2014 can present them to the Society in 2015 and 2016.**

## **Tremendous Opportunities**

Building upon this solid foundation, we need to look beyond the next few years to ensure the long-term health of the Society. In this section I describe two matters on which MORS should take action soon to achieve enduring benefits: a model for regularly handling urgent analytic requirements; and establishing deeper relationships with nontraditional proponents.

In reviewing our annual survey results, we find that only one in eight current MORS members were members during the Cold War. Fewer than half were members on 9/11. Thus, for many of our members, a constant characteristic of their professional lives has been change—change in terms of mission, roles, focus, and types of analysis. Furthermore, analytic operating conditions change at a variable rate, from weeks and months for certain operational issues, to years or longer for certain acquisition issues. We must be flexible and adapt to new needs as well as service those more established requirements.

As an example of this needed flexibility, in 2007 the MORS sponsors recognized the immediate analytic need concerning the improvised explosive device (IED). At a request from the Joint IED Defeat Organization (JIEDDO), MORS agreed to conduct a sponsor focused colloquium on IEDs in November of that year, outside of the normal special meeting planning cycle. As chair of that special meeting, I saw firsthand how quickly MORS needed to be able to support an urgent need: from concept to execution in less than three months.

We currently have an excellent apparatus in place to support the annual symposium, and we have a dependable template for our planned special meetings. **I will ask the Special Meetings Committee to develop a concept for how we could more regularly anticipate and fulfill urgent analytic requirements.** We should consider options

that have been tried in the past such as virtual meetings or sponsor-focused colloquia, as well as untried options such as distributed meetings or flash meetings in which a smaller group assembles on relatively short notice to tackle some thorny, but focused, aspect of a problem. Regardless of the methods used, having procedures in place will better position MORS to stay at the forefront of the OR community.

The national security environment continues to evolve at an increasing pace. One of the implications of this evolution is the need to accelerate our promotion of the integrated, holistic, and multidisciplinary nature of OR. Toward this end, **I will seek deeper relationships with nontraditional proponents and consumers of OR analysis, beginning with the Intelligence Community (IC) and the Department of Homeland Security (DHS).** While neither of these organizations is new to MORS, both offer enormous potential for societal growth, in term of both intellectual scope and real numbers.

In December 2011, I was privileged to chair the first MORS special meeting hosted within the IC. The Director of National Intelligence, the Honorable James R. Clapper, thought the relationship with the OR community important enough that he delivered our keynote address. As this meeting focused on the analysis of transnational threats, most of the IC participants were from the National Counter-Terrorism Center, the Central Intelligence Agency, and the Office of the Director of National Intelligence. There are 14 other departments and agencies in the IC, all of which use OR in the pursuit of national security and are additional strong candidates for some manner of future relationship.

In 2007–2008, DHS strengthened its affiliation with MORS by becoming a government sponsor—a relationship that lasted for two years. Like the IC, DHS comprises a myriad of offices, agencies, and services, most of which practice OR in the interest of national security. The U.S. Coast Guard and the Transportation Security Administration are but two DHS members with whom we have had interaction in the past. As further evidence of the interconnected analytic environment we find ourselves in, the DHS is itself a member of the IC.

Throughout this article, I have focused

on two significant presidential roles: presiding over the Society's activities and positioning the Society for continued success in the future. In the first role, my approach will be to complete or tie together some of the many successful initiatives we have seen in recent years, thus cementing the value of that impressive body of work. In positioning the Society for a more robust and vibrant future, I will work to make MORS more agile when it comes to meeting urgent constituent needs, and seek deeper relationships with nontraditional proponents, particularly within the IC and DHS. In putting these thoughts on paper, I kept coming back to the phrase "build upon." The hard work of our members and staff over many years has given our Society a strong foundation and has opened the door to some tremendous opportunities.

In closing, it would be a distinct honor to lead the Society in pursuit of the MORS vision of "advancing the national security analytic community." I thank you for listening and look forward to long and continued service to the Society.

## **Biography**

In his 24-year Army career, Steve served as Combat Engineer and ORSA in Germany, Bosnia, and the U.S. He taught Systems Engineering at West Point, helped design the future Army at TRAC, developed methods for analyzing strategic deterrence at USSTRATCOM, and built and employed geospatial forecasting methods for JIEDDO. Steve has been active in MORS since 2000 in the following capacities: Symposium WG Chair, Co-Chair and Advisor (2001–2006); Symposium Focus Session Chair (2007); Symposium Distributed Working Group Chair (2008); Special Meeting Chair (2011); Special Meeting WG Chair (2006, 2007, 2008); Special Meeting WG Recorder (2003); Sponsor-Focused Colloquium Chair (2007); Online Meeting Report Co-Author (2009); Tutorial Instructor (Jan 2007 and Feb 2007); Board of Directors (2009–Present); VP(FM) (20 months); VP(MSS) (12 months); CEO Selection Committee (2011); Rist Finalist (2005, 2010); and Barchi Nominee (2000, 2004).



# Operations Research: Empowering Better National Security Decisions in a Changing World

Rafael E. Matos, WBB Consulting, Inc., MORS Vice-President, Finance and Management

**M**ORS' role in empowering better national security decisions in today's changing world requires focus on the most critical national security priorities, emphasis on professional development and skills improvement, and uncompromising attention to assuring financial stability. To achieve these goals, I will focus on early assessment of key topics of interest for our community; making our special meetings and working groups the most attractive events in which any operations research analyst strives to participate; and continue to invigorate education and professional development initiatives, reaching out to our early career professionals and experienced analysts. All this can be done with the participation of our hard-working membership, taking into consideration fiscal realities while establishing realistic and financially responsible goals.

For the last 10 years, I have followed, and have been honored to be part of, the tremendous growth and evolutionary progress of our society. I became involved with MORS as a presenter in the social sciences working group (WG 33). I then became a co-chair, and have presented multiple highly attended lunchtime tutorials, as well as recent analysis work, in the last five symposia. In 2009 I was honored to be elected to the Board of Directors and was assigned as chair of the Communications and Outreach Committee. This was at a critical time for MORS, as we expanded awareness of our society through new communications tools and social media outlets (a modernized website, Facebook, Twitter, and LinkedIn). In 2010, I had the distinct pleasure to coordinate and chair the Education and Professional Development Colloquium at the Army Logistics University. For this colloquium we were able to reach out to 12 academic institutions, bringing the future of operations research together with our experienced analysts for some great professional interaction. Also in 2010, I was elected Vice-President for Member Services and I devoted my efforts to researching the value

of membership, what our Society offers to its scholar-practitioner members, and what the Society can offer to the young analysts that will follow in our footsteps.

Currently, as Vice-President for Finance and Management, I have been working with the Executive Council to address new challenges and opportunities, while striving to maintain and improve the Society's strong financial condition. The strategy for the next few years shall be one that sustains focus on our mission in a fiscally constrained environment, while maintaining our emphasis on the quality of our work, honoring the legacy of those who preceded us, and opening consideration to the fresh ideas of our newest members and young professionals.

As an organizational psychologist and human behavior scholar, I have observed how this organization was built on a solid foundation of ethical practice, quality assurance, and mentoring those new members who will sustain our profession in years to come. My professional activities, added to the range of responsibilities I have assumed in service to the Society, have prepared me for additional leadership responsibilities. As your president-elect I will apply my skills and experience to analyze our present organizational structure, continue to examine our membership makeup, and with the strategic plan that we are establishing this year, develop an organizational plan that leverages ongoing initiatives and generates actionable strategies for our near and long-term future.

### Operations Research Empowering Better National Security Decisions

In the movie *Moneyball*, a baseball team general manager (GM) must make critical decisions for his team based on his personal experience, the expert judgment of the coaching staff, and the ingenuity of a new, young statistician. The movie portrays the GM's successful attempt to assemble a winning baseball club, constrained by tight budget, using computer-generated statistical analysis to acquire new players. The optimum mix of scientifically based and an-



alytically rigorous analysis, combined with expert judgment, intuition, and experience proved to be a catalyst to the team's success.

Our skills as operations research analysts are similarly employed every day in multiple areas of national security. Our skills—ranging from descriptive statistical evaluation, decision analysis, and regression analysis, to linear programming and optimization, and computational social sciences—are vital to national security. As in *Moneyball*, employing an optimum mix of scientifically based and analytically rigorous methods with expert judgment, intuition, and experience, will continue to enhance the success of our national security team. MORS has been a central enabler to this task with the integration of multiple disciplines in our efforts, including computational social sciences methods, and true consideration of the human element in our skills. I will ensure that we continue to contribute to the improvement of these processes in the near future.

### Best Business Practices and Membership Professional Growth

Fiscal realities dictate that the society continues to apply best business practices to the business of the organization. This will help assure our growth and enhance our

offerings to membership. Our new Chief Executive Officer brings a wealth of financial knowledge and experience in this area to enhance our financial base and build a stable fiscal future. I have had the pleasure of working closely with her, researching and exploring new and innovative, untraditional ideas. In the best interest of the continued growth of our Society, we have the responsibility to evaluate all possible alternatives, identifying those critical elements that will enable our society to carry out its mission. This in turn must keep with the traditions, the essence, and the foundations of military operations research professionalism upon which this society was built.

Through the years, MORS has adapted to meet the challenges of the real world as well as the demands of our membership and our Sponsors. I will continue to address the demands of our organization, responding to the needs and desires of our membership in a fiscally responsible manner, exercising the best practices to continue the growth of our collectivity. I will continue to foster a strong relationship with our military Sponsors, working together to accomplish their missions, objectives, and goals. This is a mutually beneficial relationship, in which our society provides extended resources and opportunities to our Sponsors, while they provide national security direction. My intention is to engage the Sponsors early and regularly with our incoming President Mike Garrambone, to ensure that the Society's themes and events are aligned with those priorities and we establish the continuity required for long-term success.

One of the most dynamic initiatives is our focus on the junior analyst. These early career professionals offer fresh ideas, methods, and ways of thinking about operations research, connecting legacy theories and techniques with modern tools and approaches. I will also continue to enhance this program, focus our attention to continued professional development of all our members, and reinvigorate our mentorship program. I am excited about the proactive strategies we have been building in the last few years to attract young analysts and early career professionals to MORS.

Through the Young Analyst initiative I will propose to bring early career analysts together with MORS Symposium

Working Group Chairpersons, Communities of Practice leaders, and other committee chairs to provide a mechanism for mutual growth. I expect the ideas generated at these meetings to plant the seeds for exciting, new, and stronger directions for the Society as a whole. This effort will help MORS meet its strategic plan of maximizing organizational effectiveness and attracting the next generation of national security analysis leaders.

The inclusion of continued education units (CEUs) in Risk Modeling and Analysis, as part of the tutorials offering at the annual symposium, is just one example of a great step in the right direction to enrich the professional growth of our members. Many exciting new ideas are being developed right now. Our society and our members' expertise and contributions become richer as we continuously develop our professional growth opportunities. This will be a paramount focus for me if I have the privilege to become your next president-elect. When we support the next generation, and provide opportunities for continued professional growth of more experienced researchers, we help ensure that the profession will continue to grow in innovative ways. My experience in these areas, along with my other board responsibilities, has prepared me to do this.

### **Special Meetings and Working Groups**

Our expertly executed special meetings are at the core of our society's most recognized activities. Sponsors' missions and goals continue to be addressed in our meetings, attracting some of the best participants in a set of relevant and timely topics. As president-elect I will concentrate my efforts this year on boosting the attendance to these vital events. My efforts will support wider dissemination of the special meetings schedule, a multidisciplinary focus, and the inclusion of young analysts. I will also engage our membership in requests for the type of special meetings they would like to attend or would be more likely to attend.

MORS' working groups continue to offer an important opportunity to engage our membership through a variety of operations research skill areas. There is evidence that MORS membership longev-

ity is associated with a longer association with a particular area of interest. Although most MORS members do not belong to a particular working group or community of practice, there might be a direct association between working group attendance and length of membership in the society. As president-elect, this is another area I would explore further.

### **A Changing World**

Even as the wars in the Middle East wind down, with corresponding force drawdowns, the demand for the skills of MORS members continues to be at an all-time high. Irregular warfare and the challenges of cyberspace require changes in the application of our skills, and the development of new, adaptive approaches. The need for scientifically based and analytically rigorous analysis is of paramount importance to our national security efforts, as the U.S. Secretary of Defense emphasized in a recent statement. Referring to the U.S. Defense Strategic Guidance report, he stressed that the new defense budget and strategy must be "driven by rigorous analysis—not by numbers alone." Today, although the analysts' toolbox is more robust than ever, it continues to be enhanced by new techniques that help assure that government organizations and industry alike make better-informed decisions. We must ask ourselves, how can MORS continue to contribute to the development of our profession, at all levels, in this changing world?

### **Summary**

With the unplanned loss of our Chief Executive Officer earlier last year, I had the unique opportunity to step in and assist in maintaining the continuity of operations of our organization for a few months until our new CEO was installed. I welcomed the challenge and was grateful for the trust that President Trena Lilly and the Executive Council showed me when asking me to fill this role. This experience solidified my appreciation for the terrific MORS staff, which kept the Society operating without a hitch. Getting further exposure to the inner workings and daily requirements of running this organization increased my understanding of how important our work is, and the impact we are

*See Platform: Matos on the following page ...*

...Platform: Matos from previous page making to our profession and the world of operations research. I would be honored to continue my contributions to our mission as your president-elect.

During my tenure as president-elect, I will continue the work of our current president and president-elect to engage our membership and sponsors on their most pressing issues and interests. My leadership style is founded on open communication and transparency among all levels of the organization. My key interests will be education and professional development, outreach to our early career professionals, and making our special meetings and working groups effective vehicles for research and for enhancing the value of membership and participation. I will do this energetically, understanding our fiscal realities, applying smart business processes to preserve and grow a solid financial foundation. With your help, I intend to honor the

legacy of our rich history, the contributions of the Fellows of the Society, our past presidents, our hard-working board of directors, working group chairs, special meetings chairs, and the daily contributions of our membership at large, to continue to make MORS the premier organization empowering better national security decisions in a changing world. The future is ours. It would be an honor if you join me in leading our Society in this journey.

### Biography

Mr. Rafael E. Matos was born in San Juan, Puerto Rico. He obtained a bachelor of science degree in natural sciences from the University of Puerto Rico, and a master of science degree in operations analysis from the Naval Postgraduate School. Mr. Matos is currently a consultant for Whitney, Bradley & Brown Consulting. He is a key member of the Operational Concepts and Analysis sector, lead

modeler and architect in the modeling and simulation center of excellence, and the lead instructor for the WBB Operations Analysis Training Course. His areas of expertise are statistical analysis, modeling and simulation, decision analysis, and organizational decision support facilitation. Mr. Matos is MORS's Vice-President for Finance and Management. He co-chairs the MORS Human Behavior and Performance Working Group and is a contributor to the Decision Analysis and Computational Social Sciences Working Groups. He is also a member of the American Psychological Association, the Society for Industrial and Organizational Psychology, INFORMS, the Military Officers of America Association (MOAA), and the National Society for Hispanic Professionals (NSHP). Currently Mr. Matos is completing the requirements for a doctoral degree in organizational psychology at Walden University. ■



## 80TH MORS SYMPOSIUM

### The Search for the 80th MORS Symposium Air Game

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**B**ased on the success of the first-ever MORS wargame at the 79th MORS Symposium, a search was begun to find a comparable "Air Game" to be used as a teaching tool, team building mechanism, and media for analytical thinking much like James F. Dunnigan's Drive on Metz (DoM) board game. The DoM game was used to support the wargame tutorials, the simultaneous multigame execution, and the out briefing results that covered the entire gaming process including the lessons learned by all the participants.

The quest for this year's board game has caused some considerable hardships because, while Dunnigan's game was created for teaching game design and game play, many existing games, especially the air-based games, do not have those nicely imbedded learning features. In fact, most air games seem to have added complexities to game learning because of their in-

tricate component construction, extensive doctrine and operations applications, and even different forms of metrics for scoring victory points.

The criteria used to select the games has been honed several times, but the nature of the training and time windows available to learn and play an "off the shelf" wargame controls the size, structure, and sophistication of the game that can be used within the midweek's fast-paced tutorial time span. The criteria below were used to evaluate games that might serve our educational and analytical tutorial objectives.

### Availability and Structure

- The game already exists or a prototype is available.
- A game could be designed and constructed in time for the execution at the event.
- It is a rule based wargame where the outcomes are traceable and easily evident.
- The game is turn-based to account for

time, movement, and combat.

- The rules were simple, reasonable, stochastic, and published for all to see.
- The game board fits on a large table or can be projected to a auditorium size screen.
- Documentation abounds, including possible game scenarios and variations.

### Mechanics of Game Play

- The game has the right level of difficulty of play.
- The game could be learned in less than two hours.
- Number of entities/objects/ units to track is less than 24 per side.
- A reasonable portion of the game could be played in one hour.
- A simple level of logistics exists to account for its importance.
- Preferred two sided, although multi-sides and changing loyalties are permissible.
- Game objectives discernible to both

sides, perhaps through victory points.

- The game is complete in detail and all is covered within the “box.”
- The game is stochastic to the degree needed to reflect possible outcomes.
- No extensive doctrinal understanding is needed for reasonable game play.
- Decrements to attrition, consumption, and capability losses are not too hard to track over time.

## Essential Factors of Consideration

- Apparent intelligence, surveillance, reconnaissance capabilities.
- Imperfect/perfect communications.
- System to system connectivity.
- Discernible networks and movement of information.
- Ample decision making opportunities (movement, alliances, combat).
- Ability and need to forecast OPFOR intentions.
- Operational to tactical levels reflecting operation center or unit command decisions.
- Clear use of resources (e.g., training, speed, mobility, funding, lines of communication).
- Sufficient complexity for white-belt to black-belt players.
- No extensive military or staff college experience needed to play.
- Graphical depiction of terrain, airspace, undersea, and other mediums.
- Requirements for white team control, intelligence agents, and adjudicators.
- A road to war is provided if needed to

initiate D-day planning play.

## Great-to-Have Criteria

- The game was a great commercial seller.
- The game was extensively game tested and proofed for immediate play.
- It is not too expensive to purchase the several games needed to cover an event.
- No nation would be offended by the play of the game.
- The game has a historical based scenario or variation.
- The game provides a researchable event with ample literature to follow up on.
- The game documentation has game-turn description examples.
- The game is amendable to constructing player and execution team aids.
- The game is highly teachable and enjoyable to play.
- A number of alternate scenarios are available.
- It is scalable to easily improve or reduce size, breath, or number of entities.
- The game is made accessible by an amendable world-class author of gaming products.
- It is accessible to players or user groups.

## So What Has Transpired

The selection team has looked at the following commercial, service-developed, and work-in-progress wargames in Table 1 which shows the list of current contenders.

As you can see, the games are all different and have many varied aspects from time

frame to unit size. In the process of applying criteria and gaining experience with the feel of the game, a symposium wargame was chosen. This selection process was a mighty fine and enjoyable task, and included analytical work on evaluating system performance and technological change. Being held fast to the clock standards and being very diligent, the game chosen for this year's Symposium is Wings of War (WoW): World War I. The team has been studying the game, creating learning materials, building formal tutorial lessons, play-testing, practicing game execution, and are ready to join with the remainder of the cadre onsite at the Air Force Academy. The schedule of Wargaming events held in conjunction with other tutorials, special sessions, Working Group 30 Wargaming, and the MORS Wargaming Community of Practice are shown below.

As you can see from the schedule, MORS is providing a full wargaming environment for all Symposium attendees. This includes game directing, technical training, player coaching, two levels of game play (white belt and black belt), and game analysis. Whether seasoned or totally new to gaming, this could be your most enjoyable endeavor to learn about wargaming as an analytical tool. You are invited to come forward and sign up for your own air-to-air combat with the cool miniatures of the famous aces and to command the air vehicles of the First World War. ■

Table 1. Listing of Current Air Battle Wargame Contenders

| Title                                                                     | Company/Organization       | Author/Designers                      |
|---------------------------------------------------------------------------|----------------------------|---------------------------------------|
| Battle of Britain August 1940: The Luftwaffe Attacks                      | TSR, Inc.                  | John Butterfield                      |
| The First Battle of Britain 1918                                          | Decision Games             | Joseph Miranda                        |
| Operation Iron Hammer: Strategic Air Operations on the Eastern Front 1944 | OSS Games                  | Joseph Miranda                        |
| Modern Air Power                                                          | John Tiller Software       | John Tiller                           |
| A Network Centric Warfare Wargame                                         | ASC/XRA (SIMAF)            | Timothy Menke                         |
| RAF The Battle of Britain 1940                                            | Decision Games             | John Butterfield                      |
| Theater Airpower Visualization                                            | John Tiller & Sqdn Off Col | John Tiller & Gary Morgan, AETC       |
| Wings of War: Famous Aces, WWI                                            | NG International Srl       | Andre Angiolino & Piet Giorgio Paglia |
| Flying Fortress 1 & 2                                                     | Poultron Press             | James F. Dunnigan                     |

Table 2. 80th MORS Symposium Wargame Activities

| Activity                     | Timing                    | Location   | Notes                               |
|------------------------------|---------------------------|------------|-------------------------------------|
| Wargame Breakfast            | Mon 11 Jun, 0645 - 0715   | MORS Hotel | Meeting of Wargame Execution Team   |
| WoW Wargame Tutorial         | Mon 11 Jun, 1300-1400     | TBD        | Wings of War Tutorial Class         |
| WoW Wargame Rehearsal        | Mon 11 Jun, 1400-1500     | TBD        | Wargame Team Game Rehearsal         |
| Modern Air Power Wargame     | Mon 11 Jun, 1500-1700     | TBD        | John Tiller's Presentation and Game |
| WG 30, Wargaming Session     | Tue 12 Jun, First Session | TBD        | Working Group 30 Sessions Begin     |
| Wings of War Game Day 1      | Tue 12 Jun, 1215-1315     | TBD WB/BB  | First Day of White/Black Belt Play  |
| Wings of War Game Day 2      | Wed 13 Jun, 1215-1315     | TBD WB/BB  | Second Day of White/Black Belt Play |
| Wargaming CoP Meeting        | Thu 14 Jun, 1400-1500     | TBD        | Sponsored by WG 30, Wargaming       |
| Wings of War Close Out Brief | Thu 14 Jun, 1530-1700     | TBD        | Special Session on WoW Event        |



### New MORS Fellows for 2012

Chris Fossett, FS, [cgfossett@verizon.net](mailto:cgfossett@verizon.net); and Bob Sheldon, FS, [bsheldon@groupw.com](mailto:bsheldon@groupw.com)

Since 1989, the MORS Board of Directors has annually recognized outstanding members of the Society for significant, long-term contributions to the Society and inducted these individuals into the ranks of the MORS Fellows. MORS Fellows are members of the Society elected for life. In December 2011, the MORS Board of Directors selected two members of our Society as 80th MORS Fellows: **Mr. Ervin Kapos** and **Dr. Paul K. Davis**. They will be inducted at the MORS Symposium in June 2012. Mr. Kapos and Dr. Davis have contributed significantly to the Society in a multitude of ways and have provided lasting contributions to MORS. They join the 63 members of our community previously recognized with this honor (50 living and 13 deceased). (See [www.mors.org/about/fellows\\_of\\_the\\_society.aspx](http://www.mors.org/about/fellows_of_the_society.aspx).)

Mr. Ervin Kapos was a Founding Director of MORS when MORS was incorporated in 1966, and he had served on the Board of Directors from 1962–1966 prior to the incorporation of MORS. Mr. Kapos delivered numerous papers during early Symposia from the late 1950s through the mid-1960s and served as MORS Vice President in 1965.

More recently, Mr. Kapos was the MORS Department of Homeland Security (DHS) Science and Technology (S&T) Directorate Sponsor Representative from 2007–2010. He was responsible for bringing the DHS S&T Directorate on as first non-DoD MORS Sponsor.

Between the founding of MORS and his more recent role, Mr. Kapos served the Society in numerous ways. He was Chairman of the Command and Control Working Group in the mid-1960s. He was MORSS General Session Co-Chairman in the mid-1960s. He also spoke at several MORSS Heritage sessions.

In *Operations Research*, January–February 2002, CAPT Wayne Hughes, FS, identifies Mr. Kapos as “one of the best,” “a founding board member and long-standing supporter of MORS, CEO of two companies involved in fleet analysis, a personal mentor to me over many



Mr. Ervin Kapos, MORS Fellow

years, and a trusted advisor to Admiral Isaac Kidd.”

Dr. Paul K. Davis, a RAND Senior Principal Researcher and Professor, Pardee RAND Graduate School, has been a MORS member since the late 1970s. For more than 30 years he has contributed time and expertise to MORS. Currently, he is an associate editor for *Military Operations Research*—providing constructive comments to authors and sound advice to the journal editor. He has helped MORS maintain a high-quality journal not only in terms of its technical content, but its ability to communicate technical information in an understandable manner.

Perhaps you have met Dr. Davis in some of the many MORS meetings in which he has participated. He is often invited to present papers, plenary talks, or tutorials on current issues, concepts, and methods. Examples have included factor-tree conceptual modeling, variable-resolution analysis, portfolio analysis, cognitive models of adversaries, exploratory analysis under great and often deep uncertainty, and—in the 1980s—strategic simulation of multitheater conflict with optional agents representing commanders and governments. Dr. Davis has also contributed to MORS special meetings as a synthesis committee chair or co-chair



Dr. Paul K. Davis, MORS Fellow

and has been key to the success of many annual symposium special sessions and special meetings on such topics as capabilities-based planning, social science of complex operations, verification and validation, and soft factors in military modeling.

In 1997, Dr. Davis was honored with the MORS Wanner Award in recognition of his leadership in providing pivotal analytic thinking and probing questions that have influenced the DoD community, as with the 1994 RAND book, *New Challenges in Defense Planning: Rethinking How Much Is Enough*. He has also given time and energy to stimulating others—not only through his MORS editorial position and analytic presentations, but also by promoting MORS to young (and not so young) analysts, supporting their participation, and influencing analysts now working in the DoD. One can trace many of the DoD analytic and strategic initiatives over the past several decades to Dr. Davis's initiatives. His significant and dedicated service has helped make MORS the stellar professional development organization that it is today.

We thank these outstanding volunteers and operations research professionals of our Society and welcome them as the newest MORS Fellows. ■



# Affordability Analysis: How Do We Do It?

Kirk Michealson, Lockheed Martin Fellow for Operations Research Analysis, [kirk.a.michealson@lmco.com](mailto:kirk.a.michealson@lmco.com)

**G**iven the current budget crisis and complex, uncertain security environment, the Department of Defense is very focused on “affordability.” The previous Under Secretary of Defense for Acquisition Technology & Logistics (USD/ATL) has defined affordability as “cost effective capability.” Even though affordability has been defined, in discussions at the recent MORS Special Meeting on “Risk, Trade Space and Analytics in Acquisition,” the Development Planning (DP) Working Group discovered that affordability analysis was ill-defined. The working group recommended developing and formalizing affordability analysis processes, including recognizing the difference between cost and affordability analyses.

Additionally, the National Defense Industrial Association Systems Engineering (NDIA SE) Division and the Industrial Council of Systems Engineering (INCOSE) have both established affordability working groups. They have spent time determining what affordability is and how it relates to government and industry, but they have not considered the rationale behind making affordability-related decisions—i.e., the analysis necessary to make these decisions. As a result, these two sister societies have approached MORS to work together to define affordability analysis.

As a result of the above, a workshop on “Affordability Analysis: How Do We Do It?” was recommended and approved by the MORS sponsors for the June 2012–June 2013 MORS year. This special meeting is scheduled from October 1–4, 2012 at Lockheed Martin’s Global Vision Center, 2121 Crystal Drive, Arlington, Virginia (in Crystal City). As MORS President Trena Lilly mentioned at the MORS Affordability Analysis Workshop Planning Committee Kick-Off Meeting, “With the current budget environment, the timing is right for a MORS Affordability Analysis workshop. This workshop also has good ties to last September’s Risk, Trade Space, and Analytics in Acquisition Workshop and ties to the QDR Workshop scheduled for next January/February.”

## Background

Some believe affordability is overrated and already oversubscribed, rapidly overtaken by the large impending reductions in the growth of the defense budget. The perception is that the important decisions are being made not on the basis of individual systems importance (value) and cost but on more mundane political factors (e.g., productivity distributed throughout congressional districts). However, per the USD/ATL directives on affordability, others believe DoD wants to move away from what is described as selecting programs for political factors to understanding affordability analyses including should-costs, total ownership costs, and making some affordability considerations across the entire life cycle.

The analytic agenda (AA) provides a validated context for evaluating system capability and performance in an operational environment. The performance of different systems can be compared in the AA context, enabling analytically based system acquisition decisions and requirements generation. However, no analogous context for evaluating and comparing life cycle cost exists, and estimation methods can be ad hoc, subjective, and based on widely varied system scopes. This lack of standards and context prevents consistent evaluation of alternate system solutions proposed by different parties, and thus complicates development of a clear understanding of the relationships between cost, performance, and risk of defense systems. The DoD acquisition community and industrial base would greatly benefit from an affordability analysis agenda that establishes a framework for understanding and comparing system life cycle cost.

This workshop will research and examine the above questions and comments, as well as many others, in how analytical rigor can be applied in affordability analyses. The intent of this meeting is to provide an opportunity to bring a multidisciplinary team of analysts, operators, engineers, academicians, and decision makers from organizations together to share their work, develop

a common view of the state of practice, expose members of the broader analytic community to their needs, and identify shortfalls and potential solutions.

## Goals and Objectives

Many organizations are interested and involved in affordability. The analytic community needs to support the national security environment with analytical rigor as a key component of affordability activities. The community should play a leadership role in creating/refining these needed metrics, processes, methodologies, models and simulations. The community should share efforts, successes, and failures in the key capabilities.

This special meeting will provide a forum for discussing Air Force, Army, Marine Corps, Navy, and Joint approaches to affordability analyses throughout the life cycle. It will provide an opportunity for operators, engineers, decision makers, academicians, and government/military/civilian operations research analysts to examine topics, methodologies, analyses, and innovations pertinent to all aspects of analysis for affordability as a function of total ownership cost and system performance.

In addition to MORS, there are several professional organizations and government working groups collaboratively working together to plan and execute this workshop. They are the National Defense Industrial Association’s System Engineering (NDIA SE) Division’s Affordability Working Group, Life Cycle Cost Committee, and Mission Analysis Committee (the core Industry Development Planning Working Group); the International Council of Systems Engineering (INCOSE) Affordability Working Group; the Government Development Planning Working Group, and the Government Acquisition Modeling & Simulation Working Group (AMSWG). Members from these organizations are spread throughout the planning committee and additional members will participate in the actual workshop.

*See Affordability on following page ...*

During the workshop, there are several overarching issues each working group will consider. They are:

- What is the difference between cost/cost-benefit analyses and affordability analyses?
- What is the state of the practice of affordability analyses?
- What are the key issues and shortfalls?
- What are the examples of how operations analysis analytical rigor has been applied to support affordability analyses?
- What are the future challenges?
- What is needed from the operations analyst to conduct affordability analyses?
- What should be considered for affordability analyses across the life cycle?

The overall objectives of this special meeting on “Affordability Analyses: How Do We Do It?” will be to provide an assessment and a roadmap to revitalize the state of analytical rigor being applied to the practice and to recommend priorities for any initiatives identified.

## Workshop Format

The meeting will commence with tutorials Monday afternoon, October 1. One confirmed topic is a tutorial on “Affordability Thinking.” In this session, an overview of how to infuse affordable behaviors into your daily work will be provided. Discussions will include a sense-making framework that helps to define the context of your problem; considerations for reframing to look at your problem or technology differently; and addressing healthy tensions.

Tuesday morning will continue with a minisymposium format that will include keynotes from senior DoD and industry officials. Following the keynotes, a panel discussion will be held to learn different government and industry perspectives on affordability and affordability analysis, the difference between cost analysis and affordability analysis, and what their organizations would like to learn from the workshop. During lunch, an overview will be presented on the International Symposium on Military Operational Research (ISMOR) meeting in August in the United Kingdom which focused on affordability.

Starting Tuesday afternoon, the minisymposium will be followed by a two-day workshop in which participants will meet in working groups to further examine specific topics, including discussing the overarching issues of the workshop. Working groups will prepare a report on their activities to present to other workshop par-

ticipants Thursday afternoon. To focus the discussion in each of the working groups, a select group of people will be requested to prepare and present papers.

The workshop attendees will be organized into five working groups plus a synthesis group. The working group structure is detailed below.

**Working Group 1:** People, Organizations, Methods and Tools. This working group will identify the state of the art in affordability analysis, and highlight team composition, tools, and methods that contribute to good affordability analysis. Team members may include operations analysts, cost analysts, system engineers, supply chain experts, and others. Discussions in this working group will be associated with affordability analyses people, methodologies, and tools.

**Working Group 2:** Development Planning and the Early Life Cycle. WG 2 will identify the state of the art in affordability analysis during the development planning phase prior to Milestone A. Team members may include operations analysts, government development planning representatives, industry system engineering representatives, and others. Discussions in this working group will be associated with affordability analyses during development planning (pre-Milestone A).

**Working Group 3:** Post-Milestone A and the Remaining Life Cycle. WG 3 will identify the state of the art in affordability analysis after Milestone A. Per the USD/ATL memo on “Should-Cost and Affordability” dated August 24, 2011, “the emphasis prior to Milestone B should be on defining and achieving affordability targets. Past this point, the emphasis shifts to defining and achieving should-cost estimates.” Team members may include operations analysts, cost analysts, acquisition representatives, requirements representatives, operators, and others. Discussions in this working group will be associated with affordability analyses during the remaining life cycle after Milestone A.

**Working Group 4:** Affordability and Logistics/Sustainment Considerations. Logistics and sustainment are huge cost drivers. WG 4 will identify the state of the art in affordability analysis as related to logistics and sustainment, including: What are the logistics and sustainment-related cost models? Are these cost models useable for affordability analyses across the life cycle? If so, how? If not, why not? What are the existing cost metadata standards/specifica-

tions that will support credible and consistent operations and sustainment cost estimations? Is there a need for them? How does this help affordability analyses? Team members may include operations analysts, cost analysts, logistics analysts, acquisition representatives, requirements representatives, operators, and others. Discussions in this working group will be associated with affordability analyses and logistics/sustainment considerations.

**Working Group 5:** Expanding the Affordability Definition and Trade Space: Providing a More Holistic Life Cycle Cost and Operational Outcomes View. This working group will identify the state of the art in affordability analysis and the associated trade spaces. Team members may include operations analysts, cost analysts, acquisition representatives, requirements representatives, operators, and others. Discussions in this working group will be associated with affordability analyses and the associated trade spaces.

## Synthesis Group

The synthesis group will bring together the work of the five working groups and develop an overall assessment and set of recommendations for the analysis community to consider.

## Summary

This should be an exciting and productive workshop. If you are interested in learning more about “Affordability Analysis: How Do We Do It?,” please go to the MORS website ([www.mors.org](http://www.mors.org)) or contact the workshop chair, Kirk Michealson at [kirk.a.michealson@lmco.com](mailto:kirk.a.michealson@lmco.com). A planning committee meeting is planned during the 80th MORSS at the United States Air Force Academy. The committee meeting is scheduled from 0700-0800 on Thursday, June 14 before the symposium working group sessions start for the day. Stay tuned to the MORS website for details. See you in the fall! ■



# Raising the Bar of Excellence: The EPD Colloquium at USMA

*Dr. Julie A. Seton, MORS EPD Committee Chair, 2011–2012; seton\_1@msn.com*

**T**he MORS Education and Professional Development (EPD) Colloquium took this year's MORS theme "Expanding the Boundaries" to new levels. We experimented with twists on traditional events and added pizzazz with the fast-paced speed mentoring activity that eliminated that typically sleepy period just after lunch. Unofficially, 103 people were registered, representing 13 educational institutions, 11 government agencies, and nine private companies. This was one of the largest groups assembled for the MORS colloquium.

As colloquium chair, I had the honor of opening the event with an introduction of the many people who were responsible for putting the event together. Working with this enthusiastic group of volunteers led me to expound on the importance of building relationships. My goal was to have every person who was there looking for a mentor, find one; and every mentor who was there seeking to find a protégé, talk to candidates and find at least one. Although all the data is not collected at the time of printing, I believe this goal was achieved.

Our Society's President **Ms. Trena Lilly** spoke about the importance of the Education and Professional Development Colloquium to the analytic community and introduced **Brigadier General Tim Trainor**, Dean of the United States Military Academy. BG Trainor is an OR by education and experience. It was an honor to have him return to MORS and welcome us to West Point. He proudly announced that we were being hosted in the newly opened Jefferson Hall, the new library serving USMA. He connected the importance of a good education with the acquisition of good jobs and then sent us on our journey through planned events by introducing Dr. Peter Perla, our keynote speaker.

**Dr. Peter Perla**, author of the highly acclaimed book *The Art of Wargaming for the Professional and the Hobbyist* is also the 2009 recipient of the MORS John K. Walker Jr. Award for his article, "So a Wargamer and a Black Swan Walk into a Bar ..." (Phalanx, vol. 41, no. 4, Dec. 2008). Dr. Perla is a giant in the wargaming community and he shared his understanding of wargaming and analysis. He said that wargaming is not analysis, but decision making. Analysis is [often] quantitative and relies on scientific method whereas wargaming is not repeatable, not universally applicable and requires a human element. He offered up the difference between "not predictable" and the "predictability of zero," emphasizing the importance of understanding the difference. He offered some advice to the analysts in the audience: be competent, be honest, and be willing to recommend what we would do if we were making the decision. Finally, he suggested that to really understand the world, we needed to integrate three things: 1) what we know is real, 2) results of a wargame that simulates the reality we perceive, and 3) analysis. These three elements together will produce the best decisions.

Although the audience was eager to engage Dr. Perla in direct conversation immediately after his presentation, their attention was drawn to **Lt Col Kirabeth Therrien** who led and introduced the Richard Rosenthal Analytic Competition. This competition involves assigning students from various schools to teams that are

expected to analyze real-world problems and report back on how they will approach solving the particular problem they are given. The participants do not know what team they will be assigned to nor do they know the problem before they begin their work.

Lt Col Therrien divided up 38 students from eight schools into five teams. Students came from The Citadel, US Coast Guard Academy, US Military Academy, US Naval Academy, US Air Force Academy, Virginia Military Institute, Nova Southeastern University, and New Mexico State University.

Judges evaluated the teams on their approach to solving problems, and their abilities to think, analyze and present their collaborative work. Judges for the competition were **Mr. Kirk Michealson** (lead judge), **Mr. Michael Garrambone**, **Dr. Alla Kammerdine**, **COL Robert Kewley** and **Mr. Tom Denesia**.

The winners were announced at the end of the colloquium. (Yes, you have to read through to the end to find out who won.)

The Rosenthal Competition teams were sent off to work their problems. The remaining attendees were privileged to hear from MORS sponsors regarding the skills needed to succeed as an operations analyst in each of their organizations.

**Dr. George Akst**, Senior Analyst for the Marine Corps Combat Development Command (MCCDC) and MORS sponsor from Marine Corps, spoke extemporaneously about his aversion to using slides, the one-third rule, and advised the audience that when providing results, not to invite questions that the presenter doesn't already have an answer for.

**Dr. Clayton Bowen**, Chief of the Air Force A9 Nuclear Analyses Division and MORS sponsor representative from the Air Force spoke from a few of his slides, but spent his time at the podium enthusiastically describing the work that two young analysts working with him were doing, exemplifying the skill sets needed in the A9 world.

**Mr. Tom Rothwell**, Deputy Chief in the Campaign Analysis Division at the Center for Army Analysis and the MORS sponsor



*Keynote speaker Dr. Peter Perla.*

*See EPD Colloquium on following page ...*

... EPD Colloquium from previous page

representative for the Army described a set of individual organizations that each focuses its attention on different levels of analysis. He reiterated the advice provided by Dr. Perla about telling the truth and said that a good analyst is relevant and seeks to solve problems that really exist. This advice opened up discussions about how to determine “real” problems.

Immediately following these sponsor presentations, the non-competitive student presentation activity began. **MAJ Isaac Faber** organized a presentation schedule for 12 students to present their work in a professional forum. On Wednesday, **MIDN Pastrana** (US Naval Academy) and **CDT Musk** each took 15 minutes to describe their research topics to the audience.

After a short break, **LTC Daniel McCarthy** (US Military Academy) described the procedures for the student poster competition. Six posters were submitted for viewing and evaluation by a team of three judges: **LTC Daniel McCarthy**, **Mr. James Curran** (Transportation Security Agency), and **LTC Paul Evangelista** (TRAC-Monterey). In addition to spending time reading the posters, the judges interviewed each author. The poster competition criteria included creativity and aesthetics of the poster design, problem explanation, solution methodology and expected results, and how well the student responds to questions.

A special luncheon invitation was offered to a limited number of colloquium attendees—a meal in the USMA Mess Hall. A group of about 30 participants was escorted to the USMA Mess Hall (while the rest of us grabbed box lunches filled with delicious sandwiches, chips, fruit, and the ultimate chocolate chip cookie).

Immediately after lunch, **Ms. Lynda Liptak**, our EPD Colloquium Co-Chair, set up tables for the first session of speed mentoring. Eight junior analysts took part as mentees, and were given seven minutes to talk with seasoned analysts before moving to the next table. This event was very popular and the young analysts who participated as mentees the first day were very interested in serving as mentors the second day. The speed mentoring stars were **Dr. Clay Bowen**, **Mr. Ilia Christman**, **Mr. Michael Garrambone**, **Dr. Jennie Jastremski**, **Ms. Lynda Liptak**, **Dr. Andrew Loerch**, **FS**, **Mr. Rafael Matos**, **Mr. Kirk Michealson**, **Dr. Peter Perla**, and **Mr. Tom Rothwell**.

Next, a panel discussion on skills sets that are essential for success as an operations research analyst was led by **Dr. Andrew Loerch**, **FS**. The panelists came from a mix of academic and industry expertise to include **CDR Walt DeGrange** (Naval Postgraduate School); **Dr.**

**Jenny Jastremski** (US Army Training and Doctrine Command); **Dr. Alla Kammerdine** (New Mexico State University); **Mr. Kirk Michealson** (Lockheed-Martin); and **Mr. Britt McNeill** (Systems Planning and Analysis, Inc.). Discussion drew on the advice given earlier in the day as well as additional tips on the importance of a well-rounded education.

A second panel discussion on the use of software programs in curriculum and industry was led by **CDR DeGrange**. Again, panelists were selected from a wide range of experience and the audience participated extensively in the discussion. The subject matter panelists included **Lt Col Leonard Cabrera** (US Air Force Academy), **Mr. Rafael Matos** (WBB, Consulting), **Mr. Britt McNeill** (Systems Planning and Analysis, Inc.) and **CDR Harrison Schramm** (Naval Postgraduate School). **CDR DeGrange** provided some feedback—he liked the panel format and suggested that we poll society members to determine specific topics of interest to be discussed at the EPD colloquia events.

Whew, a jam-packed Colloquium day!

Kudos to **Dr. Michael Kwinn**, former MORS President, and his team at the United States Military Academy at West Point for setting us up in the newly opened Jefferson Hall Library. The gorgeous views of the Hudson River, the parade fields, and of Trophy Point helped create an atmosphere that encouraged extremely productive and relaxed presentations and intellectual discussions. We had exciting experiences of watching skydivers as they practiced hitting their mark and of cadets in formation, honing their skill sets to protect our nation.

But the day wasn't over yet. The rain held off long enough to enjoy an early evening cruise on the Hudson River aboard the USMA's Superintendent's vessel. During the two-hour dinner social, young and seasoned analysts got acquainted in the brisk breeze on the upper deck and found warmth and scrumptious food below deck. Thanks to the vessel's crew for their friendly and exuberant service.

The second day opened with student presentations from **CDT Price** (USMA), **Ms. Kwinn** (Tufts), **CDT McDonnell**, **CDT Pfohman** and **CDT Sexauer**, **CDTs Daly**, **Griffin**, **Cosgrove**, **Wright**, **CDT Normandin**, **CDT Watkins**, **CDT Cleary**, **MIDN Woods**, and **C1C Danielson** and **C1C Ronning** (USFA). Topics covered in these presentations ran a wide gamut from baseball trajectories to predicting the success of government subsidy programs designed to encourage people to maintain their health. A truly fascinating set of briefings by talented and skilled upcoming OR analysts.

Meanwhile, the students involved with the Rosenthal Competition were busy preparing their presentations of their problem and solution approaches, concentrating on brevity and conciseness. A brief analysis of the questions posed by the judges indicated that they were interested in how the teams created boundaries, the conditions they considered for “success” and creativity used to understand the problem.

The Rosenthal Competition presentations went by so fast that there was space to shorten the day. Before lunch, MORS programs that are of particular interest to students and young analysts were presented. This gave the Society the opportunity to launch a new student membership bundling package pilot with the Military Applications Society (MAS). The bundling lets a student pay a single price (\$35) and get benefits from both organizations on a yearly basis. Other MORS programs include the mentorship program, the young analyst initiative, and the Symposia.



*Mr. Thomas Denesia, NORAD-USNORTHCOM; and Ms. Lisa Kaiser, Center for Army Analysis*

The second round of speed mentoring after lunch involved 14 students and 10 mentors. The group of mentees from the previous day's speed mentoring sat together watching the students soak up advice from seasoned analysts. Within an hour, these junior analysts were in the spotlight as participants in the first ever Junior Analyst Panel. **Ms. Lisa Kaiser** (Center for Army Analysis) led the panel that included **Ms. Michelle Adams** (OPNAV), **Ms. Krista Elefante** (WBB Consulting), **MAJ Paul Evangelista** (TRAC-Monterey), **Ms. Angela Severe** (Lockheed-Martin), and **MAJ David Wade** (AF A9). Ms. Kaiser asked questions that prompted these newly minted analysts to describe their path from education to career and provide advice to the audience. Here are some of the highlights from this discussion:

**Question: What can you expect in your first assignment?**

- You can expect to do a lot of reading, learning acronyms and memorizing org charts.
- Take your work seriously. It will come back to haunt you in the future. Your reputation starts on day one.
- You will feel uncertain about your role, your skills and your place in the organization.

**Complete the statement: I wish I would have known...**

- ...that the structure of school is not the chaos of a work environment.
- ...to hang on to my textbooks.
- ...to understand who the experts are and get to know them.

**The most stressful situations are when...**

- ...you are briefing powerful people.
- ...having only an 80% solution.
- ...taking the lead.

By the end of the Junior Panelist session, the judges from both the poster and Rosenthal competitions had made their decisions. Congratulations to the winner of the poster competition, **MIDN 1/C Rebecca Lowe** (US Naval Academy) for her poster entitled, "Predicting the Life Earnings of Race Horses through Linear Regression Modeling."

The Rosenthal Competition winning team, Team 5, dealt with the topic, "Predicting the Threat/Battlespace." Team members were **Kristina Padilla** (New Mexico State University), **MIDN Stephen Perez** (US Naval Academy), **MIDN William Harris** (US Naval Academy), **MIDN Colin Bogdan** (US Naval Academy), **MIDN Scott Stropolis** (US Naval Academy), **CDT Nam Nguyen** (Virginia Military Institute), **CDT Stephen States** (Virginia Military Institute), and **CDT Sam Rinaldi** (US Air Force Academy).



*From left to right: Ms. Trena Lilly; Ms. Lynda Liptak; MIDN 1/C Rebecca Lowe, winner of poster competition; and LTC Daniel McCarthy*

In the end, the atmosphere was relaxed and comfortable. It was clear that attendees were a little weary from their intense discussions and hard work; however, all (if not all) took with them a new contact or budding friendship.

Based on the feedback so far, the favorite activities were speed mentoring and the junior analyst panel. One Rosenthal competition participant said he felt left out of the fun because he was in the competition and could not participate in the other activities. One MORS executive committee member shook his head and said, "This one raised the bar on EPD Colloquia."

Special thanks to **Betty Melick** and **MAJ David Beskow** from USMA. Gratitude and appreciation go out to the MORS staff led by **Susan Reardon**. **Jenna Rowland** served as our coordinator and Eric Hamp was our security and membership representative who supported us at West Point. From the home office, we were supported by **Paul LaPorte**, who put the program together, and **Jill Clark**, who provided general management. We could not do the Society's work without you!

Thank you for the honor of leading this event. ■

# MORS HERITAGE

## 1971–1974

As we begin the countdown to the 50th Anniversary of MORS, we would like to revisit our proud history and highlight the past leaders of the Society and key accomplishments over those years. Each edition of *Phalanx* will provide insight into several years of history. Enjoy reading about these individuals and what they have accomplished. More information on the Past Presidents can be found on the MORS website, including their Oral Histories.

### Significant Events

- 28th MORS Symposium, US Army Logistics Management Center, Fort Lee, Virginia, December 16–18, 1971. “Maintaining Capability with Limited Resources”
- 29th MORS Symposium, US Air Force Academy, Colorado Springs, Colorado, June 27–29, 1972. “Individual Approaches to Managing Problems of Cross Service Interest”
- 30th MORS Symposium, US Army Logistics Management Center, Fort Lee, Virginia, December 12–14, 1972. “Assessment of the State of Military Operations Research”
- 31st MORS Symposium, US Naval Academy, Annapolis, Maryland, June 19–21, 1973. “The Role and Mission of the Defense Department in the New Era”
- 32th MORS Symposium, Naval Postgraduate School, Monterey, California, November 14–16, 1973. “The Department of Defense in the Near Future”
- 33rd MORS Symposium, US Military Academy, West Point, New York, June 25–27, 1974. “Application of Military Operations Research in Low Intensity Conflict”
- 1973: The first MORS monograph, *Mathematical Models of Target Coverage and Missile Allocation*, by A Ross Eckler and Stefan A Carr, was printed and available for sale.
- 1973: A summary of objectives and activities of the Military Operations Research Society was published in *Phalanx*, the MAS newsletter.
- The March 1974 issue of *Phalanx* was an experiment as the first joint ORSA/MAS and MORS newsletter.

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consolidated list 1971-1974

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## MORS Presidents

### Sixth MORS President: Dr. Jack Borsting



Dr. Jack Borsting served as the sixth President of MORS from 1970–1971. Prior to this position, he also served as the Second Vice President from 1969–1970. Dr. Borsting

was awarded the MORS Wanner Award in 1981. He also served as President of ORSA from 1975–1976.

Dr. Borsting received his M.A. and Ph.D. degrees in statistics from the University of Oregon, and his B.A. degree in mathematics from Oregon State University. He has published articles on operations research and statistics.

Dr. Borsting is professor of business administration and dean emeritus, Marshall School of Business, University of Southern California (USC). From 1994 to September 2001, he served as the executive director of the Center for Telecommunications Management (CTM) at USC, as well as the Morgan Stanley Professor of Business Administration. From 1988 to 1994, Dr. Borsting was dean of USC's School of Business Administration and Robert Dockson Professor of Business Administration. From 1983 to 1988, he was dean of the School of Business Administration at the University of Miami.

Previously, Dr. Borsting was assistant secretary of defense (comptroller) for the U.S. Department of Defense, appointed by Presidents Jimmy Carter and Ronald Reagan. As comptroller, he acted as chief financial officer for the Secretary of Defense, with overall responsibility for the department's information and budgeting systems, and was a member of the Defense Resources Board.

Dr. Borsting has served as provost and academic dean at the Naval Postgraduate School in Monterey, California, and has been the visiting distinguished professor at Oregon State University. He served two years with the Air Force as project officer at the Air Force Special Weapons Center in Albuquerque, New Mexico.

*Note: Regrettably, we published Dr. Borsting's biography under the incorrect heading in the March 2012 issue of Phalanx. We apologize for this error and include the full biography here.*

### Seventh MORS President: Robert H. Stevens

Mr. Stevens served as Second Vice President (2nd VP) in 1970–1971 and the seventh MORS President in 1971–1972. Mr. Stevens was Head of the Operations Research Department at Cornell Aeronautical Laboratory, Inc.

### Eighth MORS President: Kenneth Yudowitch



Dr. Yudowitch served as Secretary-Treasurer in 1971–1972 and President in 1972–1973. After receiving his doctorate in physics from the University of

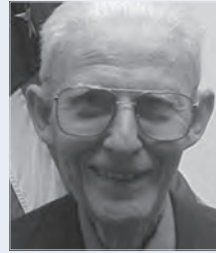
Missouri in 1948, Dr. Yudowitch joined the faculty of Florida State University as an assistant professor of physics. He left FSU in 1952 and took a six-month temporary position at the Johns Hopkins University Operations Research Office (ORO) in Bethesda, Maryland, before joining the Armour Research Foundation in Chicago.

He re-joined the ORO in 1953 and remained there through the disestablishment of the ORO by the Army in August 1961 and the establishment of the replacement institution, the Research Analysis Corporation (RAC). He later served with the Weapons Systems Evaluation Group (predecessor of the Institute for Defense Analyses), Data Dynamics, Inc., and with SRI (once known as the Stanford Research Institute) at the US Army Combat Developments Experimentation Center in Fort Ord, California, before establishing his own operations analysis consulting firm.

Dr. Yudowitch made significant contributions to the US Army's small arms competency, with particular focus on substantial improvements in the hit probability from rifles. He also served with the ORO field teams in Korea, was liaison from RAC and the Army to the Federal Republic of Germany military research and development programs (stationed in Frankfurt, West Germany), chaired NATO conferences on military operational research, and produced a number of books and papers throughout his career. He was elected to the prestigious Cosmos Club in Washington, DC, being nominated by Dr. Ellis Johnson, the only Director of the ORO.

Dr. Kenneth Yudowitch passed away on May 30, 2009.

### Ninth MORS President: Clayton Thomas



Clayton Thomas was elected the ninth President of MORS in 1973. Prior to being elected President, he served as Secretary-Treasurer in 1972–1973. He was one of the Founding

Directors of the Society in 1966.

Among his notable accomplishments, he received the Vance R. Wanner Award in 1988 and was also in the first class of Fellows of the Society, elected in 1989. Mr. Thomas received his bachelor's and master's of science degrees in mathematics from the University of Chicago in 1942 and 1947, respectively. He published numerous articles on operations research and statistics.

Mr. Thomas served in the Army Air Force as a weather officer from 1942–1945. In 1955, Mr. Thomas went to work at the Air Force Operations Analysis Office. In 1971, the Air Force OA Office was merged into a larger office, the Air Force Studies and Analyses Office. Mr. Thomas served as the chief scientist at the Air Force Studies and Analyses Agency and was the MORS Air Force Sponsor's Representative from 1975 until 2000.

In 1999, the Society established the Clayton J. Thomas Award in honor of Mr. Thomas, a respected colleague who gave so much of enduring value to the military operations research community as to merit continuing, dignified recognition. Clayton Thomas passed away on March 16, 2000.



## And Now a Word about ISMOR

Gene Visco, FS, [evisco4@cfl.rr.com](mailto:evisco4@cfl.rr.com)

Over the past few years, MORS has been moving in a new direction—that of analysis in support of national security, as opposed to the somewhat narrower arena of national defense. As part of that growth, a factor of interest is combined and coalition security operations. It is widely agreed that future security operations involving what might be called “out of area” (nondomestic) actions will usually be conducted with forces from allied and friendly nations—whether under long-term agreements (e.g., NATO) or shorter-term associations (temporary coalitions). One facet of MORS’ wider interest involves our international members, presently represented by citizens of the United Kingdom and Canada.

Another link in that wider interest chain is represented by our interest in the annual International Symposia in Military Operational Research. The ISMOR is now in its 29th year. For the past decade plus, I have had the privilege and honor to be the liaison between MORS and ISMOR. A brief history of the ISMOR, as it is going through a transition as we speak, is useful.

In earlier years, NATO sponsored a somewhat irregular series of seminar-symposia-like meetings under the direct leadership of the Advisory Panel on Operational Research, a standing group of NATO. In the early 1980s, the APOR, pleading financial weakness, announced that it would no longer conduct the operational research meetings. Immediately, Professor Ronald W. Shephard (known to his friends as Prof. Ronnie), then on the faculty of the Royal Military College of Science, Shrivenham, UK, took up the torch, announcing that there really must be a continuing international meeting of operations analysts. On his own, with modest support from Royal Ordnance and the RMCS, he chaired the first of what was to become the International Symposia on Military Operational Re-

search, held at Shrivenham in the early fall of 1984. That first symposium was titled International Symposium on Advances in Combat Modeling. [I’ve been told that Prof. Ronnie wanted to designate the meeting as NATO something or other but was informed that only NATO can name things NATO ...] Ronnie continued to work the magic of finding support for the subsequent sequence of annual symposia. In addition, he was supported by a young woman, then a staff member of Royal Ordnance, who took leave to handle the administrative matters of the symposia. That young lady, Trish Follows, is the only person to have participated in all 28 symposia—and she will be managing things for the 29th in late August of this year.

In 1993, recognizing his own mortality, Ronnie convinced the UK Ministry of Defence to act as sponsor of the annual symposia, with no obligation for financial support. In addition, he established a three-person planning group to assist him in reviewing candidate papers and other functions of the symposia. That group consisted of Ronnie himself, David Faddy, another senior UK operations analyst, and me, representing the US. Ronnie, subject to a long-term illness, died on June 20, 1995. David Faddy succeeded him as standing chair of the ISMOR.

In support of the ISMOR, the Deputy Under Secretary of the Army for Operations Research, Mr. Walt Hollis, FS, allowed me to continue to represent the United States to the ISMOR and to distribute the annual announcement and call for papers to a select mailing list in the United States. Trish Follows took care of communicating to the rest of the international OR community. When I retired from the ODUSA(OR) in 1997, MORS took up the US mailing list and appointed me the liaison to the ISMOR. As noted earlier, I continue in that role. This year, in addition to listing the ISMOR on the MORS website, MORS has e-

mailed copies of the announcement, call for papers, and registration form to all MORS members.

A new standing chair, Peter Starkey, another senior UK analyst, has taken over the gavel, on the retirement of David Faddy, who continues to provide advice and guidance to the planning of the ISMOR. Peter, in turn, has organized a larger planning group, which has had a series of meetings this winter and spring to help increase participation in forthcoming symposia. Recent symposia have seen a decrease in attendance from the international OR community, perhaps a function of tighter national security budgets. I sit as a US-MORS representative on that planning committee. Several changes to the upcoming symposium are planned including workshops, opportunities for attendance to selected sessions (at a discounted price), and other enhancing innovations. Contact me (see below) for more detailed information if needed.

The next symposium, 29 ISMOR, is scheduled for August 28–31 this year, at New Place, a fine conference facility in Hampshire, UK. The three-fold themes are affordability (a particular interest of the United States as well); support to operations and conflict prevention; and systems and capability for an uncertain future. Contributed papers are not necessarily limited to the themes. The Prof. Ronnie Shephard Memorial Address (the banquet talk) will be presented by Maj. Gen. (ret) Mungo Melvin, a distinguished strategist and military historian (and great user of analysis).

For information on registering and submitting papers, please contact me via e-mail at [evisco4@cfl.rr.com](mailto:evisco4@cfl.rr.com). Additional information can be found at the ISMOR website, [www.ismor.com](http://www.ismor.com), which includes an archive of papers presented at the previous 28 symposia, a treasure trove of military OR! ■



# Analytic Dynamics of Deterrence and Nonproliferation

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## Workshop Vision

This workshop began with a foundational observation: that although the landscape of deterrence and nonproliferation/counter-proliferation changed dramatically over the previous decade, the subjects were no less important. If anything, as the number of potential nuclear states increases and the level of armaments among the two former nuclear superpowers decreases, the importance of getting deterrence and proliferation challenges right can only increase. And as the issues of deterrence and proliferation become more critical, the challenges to the analytical community, to meaningfully inform decision makers on those issues, is as salient as it was at the dawn of the nuclear age. And whereas 30 to 40 years ago, deterrence thinking was among the most popular topics in economics and political science departments in academia, today they are often relegated to a backwater if present at all. Worse still, the wisdom and experience of a generation of experts is disappearing and we struggle to attract the best and brightest new talent into the field.

## Workshop Overview

The workshop was held on March 19–22, 2012 at APL Crystal City Collaborative Analysis Center, Arlington, Virginia. This was a last-minute change from the Navy Yard. Special thanks go to **Ms. Trena Lilly**, MORS President, for identifying the location and to **Cynthia Kee**, facility manager, for all her efforts to make the meeting a success.

The workshop began the afternoon of Monday, March 19. Instead of a set of tutorials, as is common in other MORS workshops and special meetings, it started with sequential foundational education briefings and discussion. This foundation provided an opportunity to introduce these topics to attendees who are new to the wide expanse of deterrence, prevention, and nuclear stockpile analysis and provide a common starting point for terms and definitions later in the week. **Col Tom Timmerman** from the Defense Threat Reduction Agency led these sessions. Based on the number of times these foundational ideas were quoted during the rest of the workshop, they were a resounding success. The foundational pieces will be part of the workshop formal report, which when completed will be available on the MORS website ([www.mors.org](http://www.mors.org)).

Tuesday morning followed the more traditional schedule for a MORS workshop. Ms Trena Lilly opened the workshop and welcomed all the participants. **Dr. Jacqueline R. Henningsen**, Director for Studies and Analyses, Assessments, and Lessons Learned, U.S. Air Force and primary meeting proponent, provided the MORS sponsor's welcome. **Dr. Ted Warner**, Secretary of Defense Representative to the New Strategic Arms Reduction Treaty (New START) negotiations, provided the keynote address for the workshop. He discussed areas in which operations research has contributed in the past and where it can continue to contribute in

the future. Dr. Warner was followed by **Ms. Amy F. Woolf**, Congressional Research Service, who gave a plenary address. Both Dr. Warner's and Mrs. Woolf's comment energized and focused the workshop attendees efforts over the next two and half days.

## Workshop Objectives and Working Groups

The workshop had four primary objectives:

- Improve analytic approaches and techniques that support sustaining deterrence.
- Improve analytic approaches to prevention, nonproliferation, and counter-proliferation.
- Expand attendee understanding of sources of data/information related to deterrence and prevention.
- Ensure analysts understand the DoD view of deterrence and prevention.

### Working Group 1: Analytic support to arms control: Cecily Glissman, Richard Benson, Rebecca Gibbons

The analytic community should be proactive in developing analysis that will support policymakers in future arms control negotiations. Specifically, the group identified three related areas of research that could benefit negotiators and policymakers: force structure, verification, and negotiation analysis.

All three research areas are becoming increasingly complex as a result of three trends:

- There will continue to be political pressure to decrease the number of nuclear weapons globally.
- Economic constraints will remain a challenge to policymakers.
- "Lesser" nuclear powers around the world will become more prominent over time.

These trends are consistent with a post-cold war context that is becoming increasing multipolar, in which strategic arms control will at some point involve more than the United States and Russia and will likely involve increasingly complex and stringent verification requirements.

The working group developed two analogies regarding analysis. The first analogy involved a boat (the United States) on a smooth and deep lake. As numbers of nuclear weapons decrease, the lake lowers and rocks and other obstacles that were not visible previously begin popping up. The more numbers decrease and the lake lowers, the more potential concerns begin to surface. The second analogy involved a mountain climber with a heavy pack who must discard items before reaching the summit. The question is what could/should be discarded and what shouldn't be and when? For example, would it not be better to discard some things now rather than later to make sure we continue up the mountain?

*See Analytic Dynamics on following page ...*

The working group participants discussed a number of challenges and identified a few key tenets:

- More multidisciplinary teams
- Reduce stovepipes
- Incorporate model—knowledge from other government agencies
- Transparent analysis, concise communication
- Making the assumption clear upfront
- Increase competitive analysis of similar questions with different models, methods, and assumptions
- Take advantage of increasing capabilities in behavioral sciences

**WG 2: Analytics of Nonproliferation and Counter-proliferation: Chairs Justin Anderson, Jody Ibanez, William Kroshl**

This WG focused on ways analysis can provide insights into issues of nonproliferation and counter-proliferation that can better equip policymakers—and policy implementers—to address these challenges. Questions the group considered included:

- For proliferation, how can we best evaluate DoD’s role in preventing the spread of nuclear weapons?
- What analytical level (engagement, mission, campaign, strategic) is most useful in answering proliferation/counter-proliferation questions?
- What tools are most effective for evaluation of nonproliferation initiatives? Counter-proliferation initiatives? Are they the same/different?

The working group developed a visualization framework for the problem space (see Figure 1). For any particular area of interest—such as phase of conflict, actors (US Allies, nuclear aspirants, etc), or resources—the framework is visualized as a two-dimensional matrix, where the level of analysis is on the “Y” axis and the military mission areas are on the “X” axis, as shown in the diagram. The “Z” axis, not shown below, represents the specific problem the analyst is attempting to assess.

The WG participants discussed a number of challenges and identified a few key tenets:

- Given the complexity of the NP/CP problem set, analysts must be prepared to “weave together” both qualitative and quantitative analytic strands.
- Analysts must avoid tunnel vision with regard to data.
- Manpower/training, interdisciplinary approaches are important.
- Collaboration is important (but we lack a complete mapping of the nuclear analyst community).

**WG 3: The Carrots and Sticks of Deterrence—Analyzing What Deters: Col Timmerman and Jeff Todd**

Given the deep uncertainties involved in influencing the decision calculus of the leaders of foreign governments, terrorist and criminal networks, and other nonstate actors, the role of OR analysts in tackling deterrence problems is to derive competitive advantages from superior understanding, and communicate these insights to the decision makers in ways that they can apply them. Point solutions, predictions, and even “answers” are of limited utility and even dangerous, in that they can be misinterpreted or seized on by the busy decision maker who does not retain the caveats and context they depend on. Thus the analysts’ key burdens are understanding this complicated, even “wicked” topic in the new 21st century context, and making their key insights available and relevant to decision makers.

Deterrence analytic problems are generally of two classes. The first is focused on the specific decision being considered by a particular target, and the evaluation of different US options to attempt to influence that decision. Given the US attempt to deter Target X from deciding to do Y, under conditions Z (a Deterrence Operations Joint Operating Concept construct), what will the US options create in terms of perceived costs and benefits across the target’s COAs? How do they compare to the innate pros and cons that the target’s leaders are already weighing, before the US threat is considered? The second class of problems focuses on the simultaneous implications of US options on potential adversaries and partners across a network of security relationships. Extended deterrence and assurance are key pieces of US strategy in managing its foreign relations, and we need to be able to understand the decisions confronting our US Government leaders.

Given the deep uncertainties involved in deterrence’s cognitive domain, here are a few ideas on analytic methodologies that can help steer analysts toward better outcomes.

- Competitive analyses that approach the issue from different perspectives, with different methodologies and tools. Although some might argue that with declining budgets, duplication of effort should be avoided and efficiency is critical, there is a place for necessary, deliberate redundancy.
- Healthy amounts of feedback from decision makers to analysts while they study the problem, especially given the cognitive domain involved, will prove critical to good analysis.
- Cooperative efforts with partner governments and forces who are struggling with their regional security problems is an excellent practice where possible.
- The most important methodological recommendation is to avoid the tyranny of the “best estimate,” that “most likely”

| Levels of analysis (y axis) | Nonproliferation |                                      |                              |                  | Counter-proliferation |                      |                |                 | Consequence management |
|-----------------------------|------------------|--------------------------------------|------------------------------|------------------|-----------------------|----------------------|----------------|-----------------|------------------------|
|                             | National         |                                      |                              |                  |                       |                      |                |                 |                        |
|                             | Strategic        |                                      |                              |                  |                       |                      |                |                 |                        |
|                             | Operational      |                                      |                              |                  |                       |                      |                |                 |                        |
|                             | Tactical         |                                      |                              |                  |                       |                      |                |                 |                        |
|                             |                  | Security cooperation and partnership | Threat reduction cooperation | WMD interdiction | WMD elimination       | Offensive operations | Active defense | Passive defense | Consequence management |
| Mission areas (x axis)      |                  |                                      |                              |                  |                       |                      |                |                 |                        |

Figure 1. Working group 2 analytic framework.

case that is produced through intelligence and staff estimating. We should be explicitly including “best,” “worst,” and “most likely” cases in organizing our analyses.

#### **WG 4: Analytic Support to the U.S. Nuclear Enterprise: Lt Col Laura Garrett**

Based upon the evolving needs of both the DoD and DOE for sustainment of the existing nuclear weapon stockpile and support infrastructures, and requirements for modernization of the nuclear enterprise, this working group sought to identify analytical challenges and elicit best practices from historical perspectives, current efforts and forecasting of emerging strategic needs in the context of New START and broader strategic nuclear policy and guidance. How can analysis inform the challenges to personnel, stockpile stewardship, maintenance, logistics, transportation, DEMIL, and operations at reduced numbers of warheads and delivery vehicles? Discussions evolved in four main areas:

- How can we look at deterrence requirements to help determine what our actual weapon needs are?
- How do we know how well we are deterring and how do we measure that?
- How do we communicate the importance of deterrence to leadership and the US population?
- How do we grow analysts, and other nuclear enterprise members, that are “nuke smart”?

The WG participants discussed a number of challenges and identified a few key tenets:

- Analysts must provide unbiased, accurate reports and hone their skill in communicating analytical results clearly and concisely to senior leaders.
- An “analytic agenda” of sorts would prove beneficial. It should include identifying and optimizing shared analytic capacity; a clear articulation of analytic needs; creation of a cross-reference matrix of priorities, goals, data sources, and metrics across organizations.
- A repository of analysis topics suitable for graduate students would also prove beneficial.

#### **Synthesis Working Group: Dr. Mark Gallagher**

The synthesis Working Group gleaned the following cross cutting aspects from the workshop:

- More types of Weapons of Mass Destruction (WMD) expand the need for deterrence around the world. Further, in the integrated modern world, other types of attacks may result in devastating consequences, such as attacks on space assets or cyber strikes on financial systems.

- Proliferation is increasing the number of countries and other adversaries, such as terrorists, that have or may be able to either develop or acquire WMD. Corresponding to this increase in adversaries is the number of countries that want to be protected by a deterrence regime.
- Balancing deterrence actions with related missions of non-proliferation, counter-proliferation, assurance, and dissuasion. With nearly instantaneous communications and its resulting world visibility through various media, actions intended for one group are much harder to isolate from inciting responses from other groups.
- Viable deterrence responses from the United States have expanded to include deploying missile defense, conventional strikes, and even cyber actions.
- Existing and potential arms control regimes may restrict or reduce the means for some objectives.
- The fiscal environment for the foreseeable future will restrict the resources that can be applied to the ways and means of deterrence.

The combination of these compounding aspects leads to more requests for analysis. Furthermore, the decision makers want more comprehensive analysis that addresses more of these aspects and their interactions. Therefore, the analysis community needs to build on their successes from the past, modifying approaches as necessary for the current and future environments. However, many of these factors require the development of new approaches and tools. Three vectors may improve the analytic community’s ability to deal with this challenge. First, it should focus on maintaining and growing their experts. Second, it should strive to share data, tools, insights, and studies. Third, analysts need to collaborate more while maintaining different perspectives and views. The collective effort and wisdom from government, industry, and academia is likely necessary for addressing today’s deterrence and avoiding its devastating failure.

#### **A Final Word**

The workshop was a success due to the dedicated commitment and energy of all the workshop leadership and participants—thanks to all! For more information, look for the final report to be published soon on the MORS website or contact the workshop co-chairs. ■



# Focused Exchange Interviews

Gary Fossett, [cgfossett@verizon.net](mailto:cgfossett@verizon.net)

**D**uring the period of June 20–24, 2011, Gary Fossett, retired founder and CEO of John Michael Associates, conducted focused exchange interviews with 30 members and nonmembers of the Military Operations Research Society (MORS). These interviews were conducted during the 2011 MORS Symposium held in Monterey, California on the Naval Postgraduate School campus.

The primary purpose of these interviews was to assist the President and Board of MORS to obtain insights toward the structuring of ongoing policies and initiatives. Further, the Board wanted to ensure that any new endeavors would keep in harmony with the aspirations and concerns of its active members and nonmembers.

The instrument used in the focused exchange interviews was designed and structured initially by Gary Fossett and reviewed and enhanced by an advisory committee, which included MORS directors. The instrument was then pretested and piloted. Participants were selected without randomization by the advisory committee. The 30 participants included MORS members and nonmembers and represented three groups. Group 1: one to five years of tenure (36 percent); Group 2: five to 11 years of tenure (30 percent); and, Group 3: 11 to 20+ years of tenure (33 percent).

The actual interview times ranged from 40 to 45 minutes per person. Participant reactions to the focused exchange interview format were, on the whole, quite positive.

The focused exchange interview format is designed to obtain information that is not easily accessed using traditional survey techniques. In a sense, the interview format generates and encourages a dialogue around issues or ideas that are not easily defined through a “yes” or “no.” This particular nuanced format allows the interviewee to: (1) think through his/her conversational responses during an exchange with the interviewer, rather than respond with a yes/no or numerically scaled responses in a survey; (2) probe questions more thoroughly by engaging actively with

the interviewer; (3) offer more nuanced responses when certain issues or insights need to be studied and responded to by carefully phrased answers; and (4) be assured that their responses will be reported under a veil of anonymity.

## Initial Observations on Participants’ Perspectives

Each of the 30 selected individuals who entered into the focused exchange dialogue did so with a sense of purpose and a gravitas that one would find only in an environment that prided itself on its professionalism, its sense of purpose, and its openness to the discipline of the scientific process. Those who participated displayed a keen unspoken loyalty to a Society that has nurtured them, as they have the Society.

The participants involved in each focused exchange interview listened closely and carefully and responded thoughtfully and circumspectly. Overall their intent was constructive as they probed their memories and reflected on experiences that would aid them in understanding and addressing each question. Almost to a person, any criticism or concern was followed by thoughtful suggestions as to how perceived deficiencies could be alleviated. Their comments and questions during the interview were both sincere and unabashedly frank.

Absent in the focused exchange interviews was any attitude of “this is my time to let them know how I feel.” Rather, it was, “I am pleased that I was asked to participate in a dialogue that gives me the opportunity to address short and long term challenges. Further, I am happy to offer my opinions and recommendations for establishing and keeping a centeredness and balance in MORS.”

The results of the interviews show that MORS is truly a Society in evolution—and not just an organization going through motions. The interviewees cumulatively provided a worldview of the MORS persona—i.e., a civil yet professionally competitive forum where like-minded professionals in operations research and security analysis meet and associate to sharpen their

skills, establish shared objectives, carefully mentor and nurture the youngest and most talented, and attempt to do too much with too few resources.

The interviewees made clear that MORS is a vibrant community that sustains its discipline while enhancing its stature through collaborative learning. This bonding has produced a close-knit fellowship of volunteers and members working around a thin core staff to consider, plan, and build a collaborative learning environment. This collaborative milieu continues to serve well the Society, its members, sponsors, and its intersecting constituencies.

Participants also acknowledged that being a member of MORS is a commitment. This means that members might be called upon at any time to volunteer their scarce resource of time to build new analytic bridges or design better roads to operations research to ensure MORS’s positive trajectory forward into the future. For the participants, membership implies a proactive holistic approach to the Society as a whole. In a word, members are expected to thrive, grow, and blossom in their sometimes hectic and turbulent “*multiroles*,” which sometimes overlap, intersect, coincide, and conflict with those of dozens of other member volunteers working to ensure that the symposia, special meetings, and tutorials meet the MORS “gold standard.”

The results of the focused exchange interviews also demonstrated that nothing is sacred or outside the boundaries of discussion. On some of the weightier issues, there was no real consensus reached on specific solutions, but plenty of thoughtful suggestions and aspirations. Nor were interviewees reticent when it came to suggesting fixes, approaches, options, or opinions as to perceived problems and what could be done to address them. Further, each participant understood that one day, either as future Board members or volunteers, they might be asked and given both the mandate and authority to engage these problems.

## Central Themes of the Focused Exchange Interviews

The focused exchange interviews revealed that MORS is a complex but a highly productive Society. Key themes were:

- **The Society is without peer—Sui Generis.** Interviewees view MORS as sui generis in the field of analytical research. In the minds of all, the Society is without peer. They believe that this status should be retained at any cost.
- **The Society is relentless in its adaptive ability to find centeredness.** Interviewees consider the Society to be an evolving entity and acknowledge and welcome that this evolution will require ongoing adaptations and adjustments. In the same regard, there is no naïveté as to the nature and complexity of the strategies for ensuring that this is achieved.
- **The Society is the nucleus of the collaborative learning environment.** Interviewees embrace MORS as a collaborative learning environment with the Symposia as the defining MORS encounter. Most would like to expand

and enhance this collaborative environment by attracting more young analysts and more varied analytical groups outside the military.

- **The Society tends to have a proclivity toward inclusivity and outreach rather than insularity.** Interviewees would like to see MORS attract and work with an expanded array of national and international defense security analysts to establish a more global perspective.
- **The Society is neither wholly democratic nor autocratic.** The Society appears to achieve its cohesion from the fact that like-minded analysts entrust its governance to a select few and its operations, for the most part, to volunteers and a lean staff. Many comments reflected that this is a rather atypical structure yet one that participants hope can be sustained.
- **The Society accepts the catalytic role of the Sponsors.** Interviewees accept and welcome that the Society exists due to the support and funding of the sponsors. In the same vein, they realize that the real driver for meaningful MORS

expansion will derive from increasing societal membership revenues. Further, interviewees voiced a cautious ambivalence regarding the expansion of sponsors, and perhaps their role.

- **The Society, over the years, has tended to operate fairly successfully with a minimal staff.** Interviewees, however, would like MORS to use more of its “in-house” analytical talent and skills in establishing and providing the Society with baseline information, data points, and evaluations on MORS’s issues and concerns.

In summary, the focused exchange interviews provided a “point in time” context to help the President and Board discover and assess the issues and concerns presented by Society members and nonmembers who participated. The President and Board are extremely grateful to those who participated and gave of their time so generously. The interviews are a valuable resource to the President and Board and are now an integral part of its ongoing deliberations and strategic initiatives for 2012 and beyond. ■



## The MOR Journal is Now Online > [www.mors.org/journal-online](http://www.mors.org/journal-online)

The peer-reviewed journal, *Military Operations Research*, is now available online. Members can access the current year and past two years for free. Material from the full 16-volume, 62-issue, 240+ article archive can also be researched and purchased on a subscription or per-article basis. Visit [www.mors.org/journal-online](http://www.mors.org/journal-online) and help build your research on a solid foundation.



Terry McKearney, The Ranger Group, [terry.mckearney@therangergroup.com](mailto:terry.mckearney@therangergroup.com)

Exploring these and other issues associated with evaluating C2 effectiveness was the focus of the MORS workshop held January 24–27, 2012 at the Kossiakoff Center, The Johns Hopkins University Applied Physics Laboratory in Laurel, Maryland. During the course of the three-and-a-half day effort, more than 80 analysts engaged in the study of C2 measures and, representing the US armed forces and several allied nations, discussed and challenged each other on the difficulties of applying analysis to contemporary networked C2 systems. Co-chaired by **Terry McKearney** and **Dr. Lee Lehmkuhl**, the workshop was divided into four working groups and a Synthesis Group under the leadership of **Greg Keethler**. Supporting the planning for the Workshop was “Bulldog” **Sheilah Simberg**.

Figure 1. C2 metrics framework.

**Systems: An Overview of Techniques Used to Design and Assess C2 Networks** was presented by **Dr. Susmit H. Patel**, describing the complexity of C2 networks that analysts must understand relative to the underlying C2 functions and network depiction. **Command and Control Measures of Merit** was presented by **Dan Kroening**, who explored past C2 measures development by NATO and MORS. In particular, he described the roles of measures in the general analysis process, and how to go from the essential elements of analysis to the measures of merit, or from the “what” to the “how.”

Plenary presentations set the tone for working group deliberations by providing background and perspective on the problem of C2 effectiveness measurement. The keynote, **Improving IT Efficiency and Effectiveness in the DoD** delivered by Mr. **Carl Porter**, Deputy Director, C4 and IT Infrastructure, DOD CIO, described how the CIO is moving away from stovepiped systems toward a Joint Information Enterprise Architecture as it pursues information technology (IT) reform. The result will be agile, secure, efficient, and effective IT. This future DOD IT environment will cost less, be faster and more responsive, and be much earlier in adopting commercial IT breakthroughs. It will also yield improved interoperability, higher user satisfaction, and better security. Mr. Porter offered two challenges to the workshop: (1) How has

The workshop began with series of tutorials to provide background and technical information to participants. LTC Gerry Benard described the Army's **Mission Command Measures Framework**, which seeks to capture the contribution of networked information systems to analyze the execution of Mission Command, and the resulting contribution to operational effectiveness. Norm Geddes and Norbou Buchler presented **Warfighter Associate: Decision Aiding and Metrics for Mission Command**, a software package that models tasks and task performance in a complex dynamic environment. **Planning, Design, and Analysis of Networked**

measuring C2 fundamentally changed in the “Information Age?” and (2) How will an “Agile” DoD C2 enterprise impact the decision topology of Defense operations?

In addressing **Measuring Command Control Effectiveness**, **Dr. Richard Hayes** pointed out that historically C2 Effectiveness has been defined in three primary ways: (1) consistency with existing doctrine; (2) consistency with good decision-making processes; and (3) empirical impact on the operating environment. The first two (doctrine and process) are most valuable for training and rely on measures of performance. The third is preferred, but challenging—investment is required in instrumentation, observation and data collection, and validity depends on the soundness of the simulation employed to represent the operating environment (in exercises and experiments) or the quality of the reporting (in case studies). All of these approaches are more difficult in 21st century operations requiring agile C2.

Addressing the workshop with a **Commander’s View of Command and Control**, **Lt Gen Walter E. Buchanan, USAF, Ret**, Former Commander, 9th Air Force and AFCENT, made a series of observations based on his experiences in Southwest Asia. Ironically, despite the vast C2 network at his disposal, he often found a commercial “chat” software package and face-to-face discussion with his boss to be the most useful means of communication. Occasionally, the C2 system enabled “over-involvement” via the “10,000 mile screwdriver” from CONUS. Decision makers need accurate information with timeliness tied to its purpose and a complete understanding of the ramifications of the decision options. The volume of data is too high; it brings accuracy into question, and prioritization and fusion become paramount. Fusion at too high a level can keep needed information from the troop level, however. The general also pointed out that C2 systems need to be robust and flexible—they need to be able to withstand failures and adjust to the organization. They also need to be severable so that compromise of one segment doesn’t take down the whole system.

Finally, **Bob Eberth** presented **C2 Metrics 101 and 201**. In Metrics 101, Mr. Eberth stated that metrics are critical and must be measurable. In defining metrics, one should start with the Goal or Objective, not the Metric itself or what is handily measurable. Indicators of success are objec-

tives or milestones, but not metrics themselves—although a specific value of a metric may be an indicator of success. Everyone thinks they are metrics experts—few are. Metric development is inherently difficult. In Metrics 201, Mr. Eberth provided a list of required and desired properties of metrics: quantitative, measurable, consistent, monotonic, relevant, mission oriented, objective, sensitive, and internally consistent.

With tutorial and plenary sessions complete, the focus of the workshop turned to the individual working groups and their selective foci. Each working group developed an abstract, agenda, and expected outcomes to shape the activities of the working group and maintain a balance between presentations and deliberations. These were consolidated into an abbreviated Terms of Reference (TOR) for each working group.

Working Group 1, **Deriving Operational Metrics for Networked Command and Control (C2)**, focused on the development of a C2 measures framework for military forces conducting operations in a networked environment. The working group was chaired by **LTC Gerry Benard**, co-chaired by **Bruce Gorski**, and **Don Kroening** acted as advisor. For this working group, a “measures framework” including both a set of questions to answer in conducting C2 analysis and a set of measures applied in the analysis was established. The measures framework and specific metrics allow analysts to inform the value of current and future C2 systems. The C2 measures framework and supporting metrics enable disciplined and structured analyses to inform decisions senior leaders will make regarding current and future C2 systems. The working group had three primary objectives: (1) understand the current C2 measures frameworks the different services use today, (2) develop an overarching C2 Measures Framework, and (3) identify and/or develop high-level example metrics that further define the overarching C2 measures framework. Overall, the working group was successful in gaining an understanding of the characteristics of the approaches used by the services and unified action partners and developed a measures framework for the three top-level issues: C2 functions, tasks, and mission. It developed an example for the types of metrics analysts can derive using the measures framework. The group acknowledged there is much work to be done to build out the measures framework to attain consensus with key decision makers for the measures frame-

work approach; to understand and simplify the attributes associated with C2 functions, C2 tasks, mission tasks, and mission effectiveness; and to develop a use case or other application of the measures framework to showcase the importance of the measures framework and its use to analysts and decision makers.

Working Group 2 addressed **measuring C2 effectiveness to inform the acquisition process**. The working group was chaired by **Tylar Temple** and **Christina Shapiro**, with **Dr. Suzanne Beers** advising. The working group’s objectives were to understand the acquisition process as a whole and the methods and tools that enable an analyst to quantify C2 effectiveness. Using these methods and tools as examples, the group sought to develop a general methodology for assessing a C2 system throughout the Joint Capabilities Integration & Development System (JCIDS) process. The working group broke the JCIDS process into four parts with divisions at the Materiel Decision Document (MDD), Milestone (MS) A decision, MS B decision, and MS C decision. After a series of briefings that gave insight on current methodologies and various frameworks, the working group broke up into four groups to discuss what methods, new or current, could be used as a set of best practices for each of the four major decision points. The working group then reformed and discussed the methods and measures developed. The outcome was a framework for performing analyses to support the JCIDS process as well as deriving types of measures to be used by the analyses.

Working Group 3, chaired by **Clyde Smithson**, was charged with the task of examining **Networked C2 in the context of Systems of Systems (SoS)** and exploring approaches for measuring and assessing the effectiveness and behaviors of the network. The scope of working group discussion considered operations research techniques and measures of effectiveness appropriate in the context of a C2 network model that considers physical, information, and cognitive aspects of the problem space. Discussions considered how to measure the effectiveness of the C2 network in achieving the desired C2 mission outcomes based on intended use. Several major themes arose from the discussion:

- The SoS C2 network perspective is different from the system per-

*See C2 Workshop on following page ...*

spective because of how the SoS is planned, developed, integrated and tested, and operated.

- The SoS C2 network conveys C2 information across a variety of media and spectra from highly technical machine-oriented methods and tools to very social human interaction.
- Analysis of a SoS C2 network is different from the analysis of a system.

An additional theme arose during the outbrief session. This was that operations analysis of the C2 network system of systems must include operations research, system engineering, human factors, and acquisition perspectives to determine the value of C2. They are intrinsically linked in determining “how much a pound of C2 is worth.”

Working Group 4, **Analysis of Human Decision Making in a Networked Environment**, chaired by **Dr. Jennifer Ockerman** and co-chaired by **Dr. Sylvia Acchione-Noel**, focused on the analysis techniques needed to understand the dynamics of human decision making in a networked environment. Whereas it is generally accepted that networks applied to C2 result in improved decision making for the commander, successfully and efficiently measuring this improvement remains elusive for a variety of reasons. This working group looked at the challenge associated with the defining and measuring of “better” decision making. The scope of the working group discussion considered the impacts

of methodology, measurement, materials, humans, and environment on the ability to analyze military decision making in the networked environment from the strategic to the tactical level. The discussions also started on the generation and assessment of potential solutions to apply in the development, procurement, test and evaluation, integration, certification and operation of networked C2 systems.

The **Synthesis Group** participated in the deliberations and discussions of the individual working groups and made observations on problems, gaps, linkages, interdependencies, overarching concepts, and other issues that transcended the individual working group perspectives. In this particular workshop, there was a goal of producing a framework for metrics to assess C2 effectiveness, and, as an additional task, it fell to the Synthesis Group to attempt to combine the outputs of the individual working groups in this regard into a single, combined framework. The Synthesis Group was invaluable in taking the individual deliberations of the working groups and melding them into several recommendations for future MORS effort:

- Establish an overarching framework for attributes and metrics necessary to conduct assessment of C2 effectiveness in the current context.
- Develop a set of challenge problems that span the operational and analytic space and identifying appropriate attributes and metrics to populate the framework.

- Review resulting attributes and metrics in the framework, identifying gaps in knowledge and recommending a time phased research plan for needed data and behavioral models that enable the practical use of the metrics.
- Develop a maturity model that identifies feasible levels of assessment with appropriate metrics and methods for different classes of problems. It's likely that feasibility of achieving various levels would vary with the time frames in which the results of the research would be available.

It is clear that the work started at this workshop needs to be seen as the first step in a dialogue on the issue of command and control measures in the contemporary context. This dialogue should be parsed into several themes: acquisition, human behavior and factors, systems. As was evident in this workshop, thinking on C2 measures evolves with the development of C2 systems and military missions; advances in command and control technology as well as changes in command and control processes—many in response to these technological advances—have arguably made past measurement approaches to C2 inadequate. MORS needs to revisit the issues associated with C2 measures on a permanent basis.

The results of the workshop will be discussed at the MORS 80th Symposium in the Composite Group B session.





## Risk-Assessment Framework

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### Introduction

#### Purpose

Senior leaders are best equipped to make decisions regarding risk tradeoffs when provided comparable information, especially when evaluating disparate topics. The Risk-Assessment Framework (RAF) is designed to provide a consistent and standardized approach to assessing, displaying, and discussing risk.<sup>a</sup> When used properly, the RAF provides comparable viability information on disparate activities. By commonly defining thresholds, the reported level of risk consistently indicates the extent of impact to the assessed future activity, where “activity” may represent any specified collection of tasks from a single mission to a mission area. Communicating with consistent risk thresholds in relation to achieving objectives is essential to risk-informed decision making.

The RAF is widely applicable to any activity with identified objectives and planned resource, schedule, and desired performance levels. Simplicity allows for greater success in implementation and ultimately saves valuable resources for use on other priorities. RAF does not change existing assessments processes; it only changes what to report and how to format the data. It allows for varying levels and use of quantitative/objective and qualitative/subjective inputs.

#### Vision

Standardized risk assessment reporting which facilitates senior leader discussion and understanding of potential failures to achieve objectives of assessed activities.

### Assessment Framework

#### Shaping Decisions

Five major decisions shaped the development of this framework. The first decision was to maintain relevance to DoD leadership decisions by aligning the RAF with the CJCS risk matrix (CJCS 2012) and QDR risk categories (DoD 2010).

Compatibility with OSD and Joint Staff adopted standards drove three implications:

- Maintain four levels of risk
- Focus efforts on QDR-defined operational and force management risk (while OSD and Joint Staff mature definitions for institutional and future challenges risk)
- Use QDR definitions of risk as the starting point for USAF terminology and standardization.

The second decision was to not dictate how organizations conduct their risk assessments. Many processes currently exist for analyzing risk and are appropriate for the purposes for which they were created. However, the outputs of these assessments are not standardized for use in senior level decision making. The RAF provides a standardized approach to displaying and communicating risk consistently across the Air Force and to the JS and OSD. The RAF approach focuses on the required components of risk assessments and provides a methodology that bridges current organizational assessments to a format that provides Air Force senior leaders the information they need to better understand and compare key issues across many topic areas. The objective is to provide risk assessments that are defensible, measurable, traceable, and implementable, while incorporating military judgment.

The third decision was to develop a simplified approach for risk assessments. By definition, risk is a function of both probability and consequence. The RAF accounts for both of these aspects by, in essence, reporting the expected consequences. To facilitate widespread implementation, the RAF provides a simplified approach for expressing risk in those cases where analytic capabilities are limited while still being adaptable to more rigorous processes. The RAF draws upon an ends-ways-means-based approach to inform the risk areas where goals/metrics represent means, activities represent ways, and objectives/criteria represent ends.

Although the concept of “weighting” contributing factors may be applied, we chose to use the worse case in our initial application. Additionally, because actual risk distribution functions are often unknown, the methodology provides a risk step function for simplification and consistency, while allowing for more accurate probability distribution functions if known.

The fourth decision was to focus on activities of vital importance. Activities considered vital to successfully achieving an objective should be decided upon at the lowest possible level in the organization. One major purpose of a risk assessment is to highlight issues that are beyond the scope of authority of the subordinate chain of command for leadership attention or resolution. If the consequences of a particular activity are minimal, even though the probability is high, most decision makers would not be overly concerned with that activity; therefore, assessors should include only the most substantial issues that potentially degrade the activity’s performance for senior leader review. This vitality requirement will improve transparency in the assessment process as reported risk must be defended to senior leadership, and assessors will be held accountable for the decisions made on what was considered vital to accomplishing assessed activities.

The fifth and final major shaping decision was the choice to incorporate mitigation into RAF. Changing the planned approach or applying additional resources can often reduce the chance or degree of many adverse consequences. If the process of developing a risk assessment reveals problems, higher management only needs to know if it cannot be corrected at the subordinate level or if the revised plan relies on additional resources that may complicate achievement of other activities. Hence, the RAF facilitates description of risk mitigation approaches.

• See Framework on following page ...

## Basics

Using the RAF, assessors take a top-down ends-ways-means approach for organizing (objectives—activities—goals/metrics) and a bottom-up approach for executing their assessments. For assessors, the top level is their organization's objectives that derive from the assessment context and the bottom level is planned values related to the resources, schedule, and performance associated with executing activities to meet those objectives. For example, in our first major application, RAF assessments inform Air Force responses to the four QDR defined risk areas that compose military risk. To this end, the RAF originates at the highest level from those risk areas on the CJCS risk matrix. Under the operational and force management risk areas, the Air Force has developed a set of criteria to use as top-level objectives for risk assessments. RAF may also be applied to other planned activities (equivalent set of tasks, missions, or area) by specifying the objectives of those activities. The assessor develops the assessment structure with the approval of the appropriate leadership.

The assessment structure is composed of a descending tree of key (or vital) organizational objectives, activities, and goal/metrics that provide indicators of the service's ability to meet the resource, schedule, and performance requirements for assessed scenarios and timeframes. RAF depends on assessors to determine the appropriate level of detail necessary to tell the risk story for their organization. Assessors must provide sufficient information to create leadership confidence that the assessment has not missed important risk drivers. However, assessors should not provide so much detail that leadership time is misused in reviewing unnecessary detail while limited analytic resources are wasted developing and assessing unnecessary metrics.

Organizational objectives and activities provide a conceptual link between the strategic objectives (operational, force management, etc.) embedded in the assessed scenario and the goals/metrics that indicate the level of confidence that those objectives can be achieved (Figure 1). There may be multiple levels of objectives and activities\ provided in an assessment tree if necessary. Once the assessment tree is in place, it is possible to make an assessment for

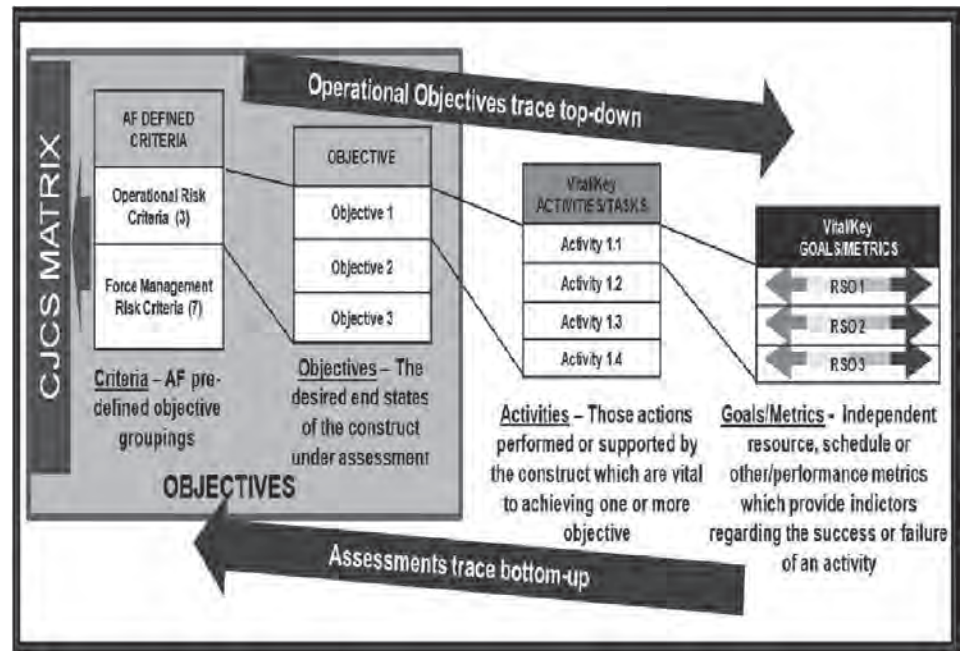


Figure 1. Assessment tree structure.

any point on the tree structure.

The development of goals/metrics should focus on the key parameters that describe what the organization must deliver to enable the planning objectives in the assessed scenario to be achieved. The foundation of the RAF rests on the concept that any activity conducted by the Air Force will have supporting resource, schedule, and other/performance goals/metrics that indicate the likely success or failure of any vital activity. For operational risk, at the highest levels the resource metrics should look at the capabilities and capacities of resources to be provided. Schedule metrics would consider viability of the planning timelines. Similarly, under force management the resource metrics should describe the service's ability to train, equip, maintain, and sustain the force needed for the assessed scenario whereas schedule metrics would explore its ability to deliver fully capable forces in the timeframe assessed. For those instances where it is not possible to fully capture risk with resource and schedule metrics, the framework provides for the use of performance metrics.

## Risk Scaling

To conduct the risk assessment it is necessary to create an understanding of how values on the metric scale relate to risk. For any specific quantifiable metric, the assessor identifies two points on the risk level scale (Figure 2)—preferably the success and failure end points. As-

sessors will develop defensible values for each goal/metric end point, based on data analysis, subject matter expertise, and other analytic capabilities (including modeling and simulation). The values for the two points will then be used to calculate the remainder of the metric risk threshold values using the values from the CJCS matrix. From the CJCS matrix, success represents no (0%) risk whereas certain failure represents full (100%) risk. The thresholds for the transitions between risk levels (low, moderate, significant, high) reside at the 20th, 50th, and 80th percentiles on that scale. For simplicity, the RAF method allows assessors to use a linear step function, based on the CJCS thresholds, to calculate their metric risk thresholds.

If assessors cannot determine a metric value for both success and failure, they must be able to identify a value representing one of the other thresholds. For instance, some organizations may find it difficult to clearly define when a goal has failed, but they should be able to express when they would want leadership to become involved (for example, when they are crossing from significant to high risk). Assessors can use that information to replace an end point as an entry point for calculating the remainder of the risk metric threshold values. Additionally, in some cases the assessors can analytically demonstrate that a linear step function is inappropriate for a given metric. In those cases, assessors should use the 20th, 50th, and 80th percentiles on the

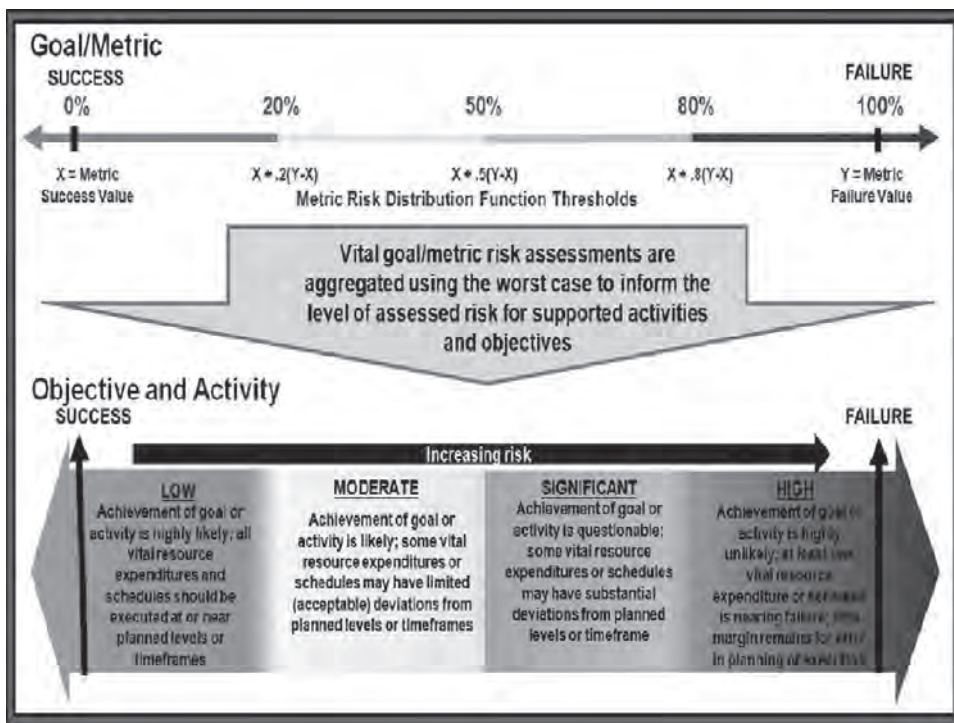


Figure 2. The assessment heuristic.

risk distribution function that they have developed and use those as thresholds for that metric.

For nonquantifiable “other” goals (such as nuclear deterrence), a textual binned/grouped outcome versus risk level scale can be used to assign the level of risk for that goal by identifying the goal outcome that most closely represents the assessed situation.

## Assessments

The goal/metric risk distribution functions, once determined, enable assessment. For any given timeframe, set of scenarios, and force structure, analysis may inform where on the metric scale the particular goal of interest falls. We prefer that assessors use analytic methodologies to identify the most likely or expected value outcomes for the metrics selected. If assessors need to make changes beyond the baseline assumptions (criteria, scenarios, force structures, and timeframes) provided by leadership guidance, they must highlight those changes when discussing their results.

As previously mentioned, assessors have many tools available to inform the assessment, such as data analytics, modeling and simulation, and professional military judgment. This framework does not dictate which tools will be used or how they will be used. Assessors are best

equipped to know which tool will be most effective for assessing the goals supporting their areas of responsibility. Assessors must be prepared to explain the method used should the requestor have questions about assessment outcomes or the goal success/failure points selected.

If an assessed activity is composed of multiple goals or supporting activities, those are first assessed individually using the expected or most likely goal outcomes. Because RAF, as currently configured, assumes assessed goals are considered equally vital, aggregation is done by assigning the highest assessed risk level identified among the supporting goals and/or supporting activities as the overall activity assessment. This aggregation continues until the higher-level activities that are of interest to leadership have been assessed. As the aggregation is conducted, the assessment team will interact with the appropriate levels of the command hierarchy to ensure that mitigation options are explored at each level and integrated into the results. At more aggregate levels, the mitigation may reduce risk if more resources or approaches are available; however, multiple activities relying on the same reserve resources may increase the assessed risk. We prefer RAF assessments to be informed by analysis; however, professional

military judgment may override the recommended assessment results. Assessment leaders are expected to report the assessment as their judgment warrants. However, if the analytical results are set aside, those results should be still presented with the final professional military judgment-based assessment. In this case, the senior leader should consider whether the goal/metric is truly vital to their mission and if the scale has been established correctly. The reasoning behind the decision to override the analytical result should be documented to provide traceable and defensible results.

## Common Format Risk Statement

Once results have been calculated and rolled up to the level of activities of interest to leadership, the assessment team must present their results in a standardized way to senior leaders. To this end, a common format risk statement has been developed. The common format risk statement is composed as follows:

“According to (Organization), the (Type) risk of (Activity) is (Assessment) with an analytic rigor of (Level) for (Context/Time-frame/Force Structure) assuming (Mitigation/Measures/Authority).”

The items in parentheses in the above statement are all required elements to present a complete assessment in the proper context and are further described below:

- **Organization:** The organization accomplishing and responsible for a particular risk assessment.
- **Type:** The two types of QDR risk currently being addressed are operational and force management. Institutional and future challenges risk will be addressed in later spirals (contingent on OSD/JS further development). Other RAF applications will use appropriate risk types such as readiness, acquisition, programmatic, safety.
- **Activity:** The activity is the heart of the risk statement, and it includes the actual function the organization is looking to assess. Examples of activities include mission area, specific capability, service core function, etc.
- **Assessment:** This element sets forth the actual risk level. The defined risk levels are low, moderate, significant, and high and are represented by the

See Framework on following page ...

colors green, yellow, orange, and red, respectively.

- **Level:** A qualitative indicator to leadership regarding the level of RAF implementation and the assessor's confidence in the analytics that support the assessment results. It is intended to give leadership a quick understanding of how well the assessment embodies the desired attributes of defensible, measurable, repeatable, traceable, linkable, implementable, scalable, and incorporates military judgment.
- **Context/Force Structure/Time-frame:** This element provides information needed to specifically frame the environment within which the activity was assessed. It includes amplifying information such as operation plans (OPLANs) considered (for planned operations) or integrated security constructs (ISCs) for future operations; programmed force or programmed force extended (identified force structure level), and near/mid/far time frame (0–6/6–10/10–18 years). To promote consistency of assessment the leadership should provide guidance on the Context/Force Structure/Timeline to be used for each assessment.
- **Mitigation/Measures/Authority:** A key element of a risk assessment is identifying mitigation actions already taken or assumed across the areas of doctrine, organization, training, materiel, leadership, personnel, facilities, and policy (DOTMLPF-P) by the organization to get to the current level of assessed risk. Senior leaders need to know what actions have been taken thus far in order to best evaluate the situation and explore additional risk management options.

The goal is for designated Air Force organizations and application to use the common format risk statement when discussing and/or presenting results of risk assessments to Headquarters Air Force leaders. All common format risk statement required elements must be included to present a complete assessment in the proper context, to include the mitigation. However, the intent of the common format risk statement is not to require presentation of hundreds of these

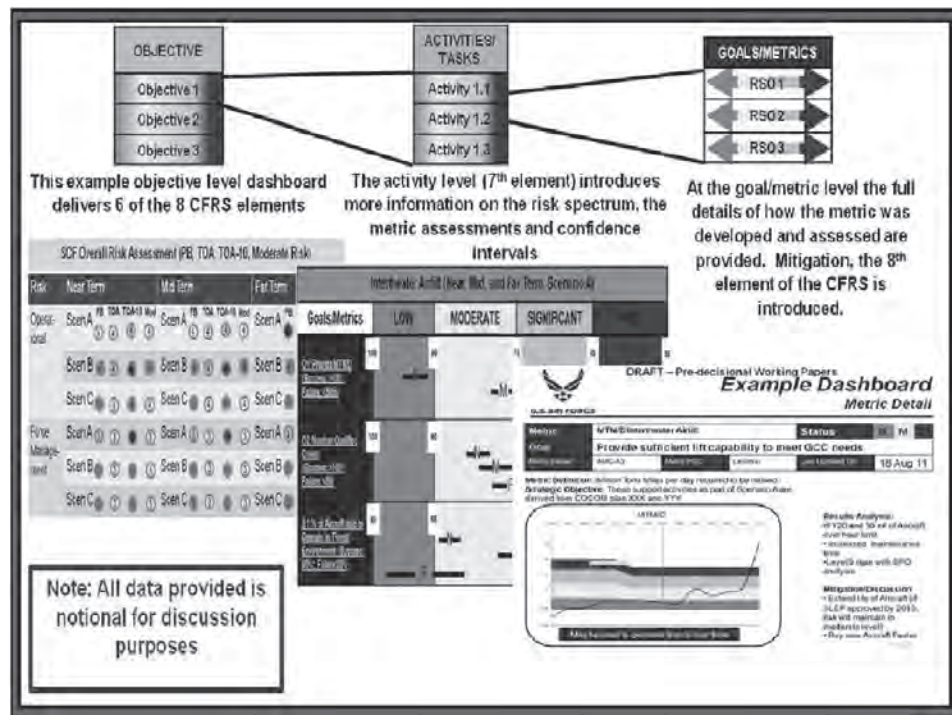


Figure 3. Example assessment dashboards.

risk statements to senior leaders, but rather to ensure that all of the elements in the common format risk statement are included in presentation of risk to senior leaders. Textual or graphical representation of the common format risk statement elements is acceptable as determined by each process owner implementing this RAF.

## Presenting Results

The RAF, due to its structure, generates information that can be easily molded for display to address leadership information needs. Emphasis can be placed upon any element of the common format risk statement as well as any level in the assessment tree structure depending upon the situation and decisions to be made. For example, a cross-section of assessments can be drawn upon to understand the risk to a particular scenario of interest, while the same assessment can also be used to inform resourcing decisions for a particular activity set. The example presentation method shown in Figure 3 provides a dashboard developed for an Air Force risk-assessment process. At the objective level, leadership can gain a quick understanding of the broad-based risk to an organization. Leadership can then focus on the activity-level dashboard to gain a better understanding of the risk drivers. Finally, at the goal/

metric level they can question the analysis and assumptions that went into the assessment if there is disagreement regarding the results. This is but one example of Air Force use of the RAF for presenting all elements of the common risk format statement.

## Summary/Benefits

We developed and implemented this risk-assessment framework within the Air Force to facilitate communication, presentation, and discussion of risk among senior leaders. It expresses risks in a simple, flexible, process-agnostic, analytically rigorous, and standardized method. RAF allows for comparison of disparate activities using similar and complete information, to provide defensible decisions. The purpose for sharing this framework through *Phalanx* is to continue a dialogue on service implementation of the Chairmen's Risk Assessment. Therefore, we welcome input.

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## Note

"This common risk-assessment framework is not intended to replace nor should it be confused with risk analysis as directed in the Risk Management Guide for Department of Defense Acquisitions.

## About our Authors

**Clifford D. Tompkins** was Special Assistant to the Director, Analyses and Assessments, Headquarters US Air Force, A9. He was responsible for illuminating issues for, and providing timely and defensible assessments to, the SECAF, CSAF, and senior Air Staff leaders on current operations and emerging issues regarding the application and effects of air, space, and cyberspace in SAP/SAR, Joint, and/or coalition environments. He was also responsible for establishing partnerships and direct efforts to develop assessment frameworks and apply quantitative and qualitative analyses and assessments to bring a global, cross-domain, Airman's perspective to current and near-term joint/combined force issues. He provided senior Air Force leaders with defensible assessments supported with data in a timely manner in order to make informed decisions across the range of military operations. He transitioned to SAF/MR as Director of Analysis in February 2012.

**Douglas A. Boerman** is an operations research analyst with the US Air Force A9, Studies and Analysis, Assessments, and Lessons Learned Directorate. His responsibilities include the development of conceptual frameworks that provide senior Air Force leaders with defensible assessments supported with data in a timely manner in order to make informed decisions across the range of military operations. Since retiring from the US Navy he has held analyst positions with Booz Allen Hamilton and the Defense Threat Reduction Agency. While on active duty he deployed to multiple areas of responsibility while serving as a P-3C Naval Flight Officer and aboard USS Kitty Hawk (CV-63). He also served as an instructor with the US Military Academy Department of Math Sciences. He is a graduate of the US Naval Academy and the Naval Postgraduate School.

**Major Walter J. Lesinski III** is a mobility pilot assigned to the Headquarters Air Force, A9, Studies & Analyses, Assessments and Lessons Learned in the Pentagon. As a Force Employment Analyst,

he is directly responsible for developing assessment frameworks used in multiple areas of the US Air Force. Major Lesinski is a graduate of Embry-Riddle Aeronautical University with a bachelor degree in engineering physics. He also earned two master's degrees, one in space studies from American Military University and the other in logistics from the Air Force

Institute of Technology. He is a combat veteran flying C-130 and KC-10 mission in multiple areas of responsibility. His previous assignment was as a student within the Advance Study of Air Mobility School at the US Air Force Expeditionary Center, Joint Base McGuire-Dix-Lakehurst, New Jersey. ■



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## Analysis by Blog!

Bringon Themasses

**January 26, 2011**—Today, the Secretary of Defense outlined his recommended major budget decisions. Included were reducing the Army by 72,000 personnel and the Marine Corps by 20,000 personnel, retirement of six Air Force fighter squadrons and some aging C-5 and C-130 aircraft, and retiring six Navy cruisers. The Secretary also outlined delaying certain programs, such as the F-35 fighter and the next-generation ballistic-missile submarine.

—Wiley Rumint, DoD VIRAL Blog Reporter

### Comments (37)

DropTheHAMMER writes: *It's a Plot!!! Were all Dead!!! They Done Went and GIVED it Away!!! Pack up the DOGS, Ma!!! Were Movin to the BOMB Shelter!!! Bring ALL my Andy Griffith VHS TAPES!!!*

DONTTAPTHEGLASS writes: *how will moving to a bomb shelter help? Does Andy Griffith know how to disperse radiation?*

DropTheHAMMER writes: *Listen Boy, I was Doin Economic Nuclear Preemption Games Afore YOU could Handle strained PEAS!!! Goin Below \$525B is Like Wavin a RED Flag in Front of a BULL!! Hope your KIDS don't Mind a FEW extra Arms, if They Don't End up Speakin MOLDAVIAN!!!*

BASEmentDWELLer writes: *Lost in Space is way better for a long stay in a bomb shelter. Danger, Will Robinson!!! Why wouldn't my dad let me buy the mint robot toy? It was only \$550, and it had never been out of the package!*

ClosetClausewitz writes: *this is typical, an undifferentiated dog's breakfast of reductions unrelated by any sort of discernable strategy. This sort of ill-considered nonsense is another prime indicator of the dearth of strategic thinking in the defense establishment. This proposal is dangerous and will cost us our superiority as well as our suzerainty.*

Greaserwithguns writes: *I'm not giving up my Suzerainty! We've only been on a couple of dates, but she is HOT HOT HOT!!! I'll fight anyone over her ...*

ClosetClausewitz writes: *this reply proves my point. Pray tell, how did you find this blog? Did you get lost on your way to the Hollow-Point Bikini web site?*

Greaserwithguns writes: *I bet your squeeze's idea of fun is to study IRS regulations! I'll take my Suzerainty any day!*

PUTUPorSHUTUP writes: *fine, then. What's your proposal? What would you cut?*

ClosetClausewitz writes: *the strategist does not concern himself with such pedestrian, grubby details such as budgets. I deal in the art of matching national ends with military means, discerning the nature of conflict and not confusing it with the character of conflict.*

PUTUPorSHUTUP writes: *... MMM? Dozed off halfway through the first sentence. Me, I'd just nuke a few, just to keep the rest in line.*

jEFFdAVIS writes: *all those fighter squadrons are Guard units – what the \*\*\*\* does he think he's doing? Governors need those A-10s!!!*

Flashgordon writes: *I give up. What the \*\*\*\* will a governor do with an A-10 squadron? Is the Idaho Guard going to strafe somebody if they don't let Boise State into the Bowl Championship Series again?*

jEFFdAVIS writes: *laugh away, you \*\*\*\*! Seen those videos of Dads shooting their kid's laptops? Straightens 'em right up! I could do hundreds in one gun pass!*

MOUTHbreather writes: *Yeah, I've seen those A-10 videos! Cool! That 20mm gun is amazing!*

SPECNUT writes: *wrong, you stupid \*\*\*\*. It's a 30mm rotary cannon.*

uPMANship writes: *be careful here. Using PGU-14/B AP means leaving a lot of depleted uranium lying around. I'd change the standard 4-to-1 mix and go with a full load of PGU-13/B HEI for strafing laptops. It's too bad they changed the 2100 rounds-per-minute low setting to a fixed 3900 rpm – 3900 is OK for desktops or peripherals, but not for smaller machines or netbooks.*

Tacticsyutz writes: *why use the gun? One pass of CBU-87 cluster bombs would do it – if the kid feels lucky, he can walk back in and get his laptop. Do him good to see what the \*\*\*\* unexploded ordnance is like for real!*

Superfan writes: *I have long advocated nuking the proponents of the Bowl Championship Series, as they are all a bunch of \*\*\*\*s. As a matter of fact, you can contribute at my website, [www.vaporizetheBCS.com](http://www.vaporizetheBCS.com), or, if you choose, you can contribute weapons-grade uranium directly.*

R@B1DD!V!S!0N2 writes: *I got some of that – made the dog glow at night, though. Are contributions tax-deductible?*

Superfan writes: *yes, fully tax-deductible. You can join our SuperPAC as well.*

MOUTHBreather writes: *why not use the A-10's the governors have? I've seen the videos! That 20mm gun is amazing!*

SPECNUT writes: *try to stay focused on the topic, you stupid \*\*\*\*.*

Gunny\_Sack writes: *WHAT! WHAT! WHAT! 20000 MARINES! WHAT! WHAT! TARAWA! HALLS OF MONTEZUMA! WHAT! WHAT! WHAT!*

CDRQueeg writes: *relax, without those cruisers, you can't land anywhere anyway.*

Gunny\_Sack writes: *WHAT! NAVY! DRINK COFFEE! FAT GUY! WHAT! WHAT! 20000 FEW PROUD! WHAT!*

CheapSunGlasses writes: *my outfit can use plenty of security guys. Got a contract to occupy Haiti – I hear you dudes are good at that! Call 1-800-GUN-4HIR and we'll set you right up!*

Gunny\_Sack writes: *WHAT! TATTOO DISCOUNT? FULL SLEEVES! WHAT! WHAT!*

CheapSunGlasses writes: *you need serious ink to get a second interview with us, dude – but after you're in, yeah, we'll take care of it.*

BASEmentDWELLer writes: *I got a tattoo on my butt. Don't tell my dad, he'd be mad that I went downtown by myself. Said maybe in two years when I'm 30. Can I apply? I've been on a top 50 Call of Duty team for 3 years running!*

Gunny\_Sack writes: *WHAT! WHAT! WHAT! VIDEO GAMER! PUNK! JOIN NAVY! WHAT! WHAT!*

CDRQueeg writes: *need someone to run your seabase? I'm an experienced SWO – only got relieved twice.*

BigGreenMachine writes: *ejsy'd upitr [tppn';? er hpy joy eoyj 72000! Er'tryjr pmrd fpomh ,pdy pg yjr gohhyomh gpt yjr ;sdy 10 urstd!*

CheapSunGlasses writes: *dude, center your hands on the keyboard.*

Gunny\_Sack writes: *WHAT! WHAT! I UNDERSTOOD HIM! WHAT!*

BigGreenMachine writes: *OK, I think I DIR UR RGUA RUNW – RGW ent KQta fwra rgw agDR UB RGWAW VYSFWR XYRA//////////*

BASEmentDWELLer writes: *does this mean I can't join the Army either? I did a pushup the other day.*

*DoD VIRAL is the premier website on breaking defense news, and we welcome the vibrant debate on important issues from our expert readers! Keep those comments coming!* ■





### Reach for the Peak

John Willis, Augustine Consulting, Inc., [jwillis@aciedge.com](mailto:jwillis@aciedge.com)

As MORS members prepare to gather for their annual symposium at the US Air Force Academy, which lies in the shadow of Pike's Peak, I wanted to offer the story of a little known organization that was a keystone in early defense programs and military research and its connection to Zebulon Montgomery Pike.

In 1802, the US Army Corps of Engineers (USACE) and the US Military Academy (USMA) were organized by law and established at West Point along with the US Military Philosophical Society (USMPS). The USMPS, with the whole Engineer Corps of the Army for a nucleus, had for its objective "the collecting and disseminating of military science" and was in effect the first natural scientific society. USMPS was designed to supplement the educational and scientific activities of USACE and USMA.

Jonathan Williams, grand-nephew of Benjamin Franklin, was founder of the USMPS. Williams had an interest in every phase of military art and natural philosophy, participated in many scientific experiments with Franklin, and published a widely circulated treatise on thermometrical navigation of the Gulf Stream through sea-water temperature measurements (currently in stock on Amazon.com.) On behalf of the USMPS, Williams also translated and published a study of the use of horse artillery written by General Tadeusz Kościuszko, a subject of avid interest by American military men of the day.

The early USMPS membership included John Adams, Thomas Jefferson, James Madison, James Monroe, George Clinton, DeWitt Clinton, Stephen Decatur, Robert Fulton, William H. Harrison, Isaac Hull, Alexander Macomb, David Porter, Arthur St. Clair, Thomas Truxton, James Wilkinson, Eli Whitney, and many other prominent Americans including Zebulon Pike.

When Pike published his "An Account of Expeditions to the Sources of the Mississippi", he asked for and received permission to dedicate the book to the President and members of the USMPS. Major Pike included a reference to his membership in the USMPS on his book's title page. The book became a guide for a westward moving nation.

*"A friend to Science in all its useful Branches, and believing that of the Engineer of great utility, I sincerely approve of the Institution of a Society for its Improvement."*

*- President Thomas Jefferson, December 25, 1802, approving of the creation of the USMPS*

*"Scientia in Bello Pax"*

*("Science in War is a Guarantee of Peace")*

*Motto of the USMPS*

In this issue of *Phalanx*, we feature:

- Information regarding the 80th MORS Symposium at USAFA in Colorado Springs;
- MORS Presidential platform statements from Steve Riese and Rafael Matos;
- Technical/feature articles on the Risk-Assessment Framework (RAF) and the quest for the next Air Game(s);
- A MORS Heritage article that takes a look back at the period of the early 1970s;
- Recognition of MORS newest Fellows of the Society;
- The results of the MORS focused exchange interviews; and
- Meeting reports and upcoming event announcements.

We encourage you to keep reaching for the peak and send us your articles, announcements, letters to the editor, and book reviews for publication in the *Phalanx*—please keep your submissions coming.

This will be my last issue as editor, a position I have held for about six years. I look forward to passing on the spear and shield of the *Phalanx* to a new editor. I offer a very special thanks to the great MORS staff members with whom I have had the pleasure to collaborate on the *Phalanx* including Corrina Ross-Witkowski, Eric Hamp, and Joan Taylor and a great group of column editors and contributors.

### Sources

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# MORS' YOUNG ANALYSTS THE NEXT GENERATION OF LEADERS

The future of operations research and the national security community depends on new analysts taking the helm. MORS' Young Analyst Initiative facilitates this process by providing paths for emerging analysts to engage with MORS through publishing, meeting participation, volunteering, mentorship and recognition.

To highlight the achievements, interests and aspirations of young analysts, we turn the spotlight on one deserving individual in every issue of *Phalanx*.

To learn more about the Young Analyst Initiative, connect with other young analysts, see past featured analysts and learn how you can nominate a deserving analyst, please visit

[WWW.MORS.ORG/YA](http://WWW.MORS.ORG/YA)

## CHRISTINA OBERGFELL, CAPTAIN, USAF ASSISTANT DIRECTOR OF OPERATIONS, AETC STUDIES AND ANALYSIS SQUADRON



- **MORS member since 2009.**
- **My childhood ambition was** to become a math teacher. I admired my teachers and have always enjoyed working with children. I liked some of the challenges teaching provides; especially tailoring teaching techniques to the perspective of students as a means to share knowledge. At the time, I believed teaching math was the venue for which I would have an opportunity to make a difference in the lives of the youth. My dad's example as a Naval submariner (with a math undergraduate degree) later influenced me as I made my decision to pursue both a math degree and the military.
- **I became an operations research analyst** to utilize my math skills and deliver independent, objective analytic solutions that enhance senior leadership decisions. As a military child, I witnessed how it is possible to utilize your skills in service to your country. I was fortunate that the Air Force placed me as an Analytical Scientist based on my background in math and their needs at the time.
- **In five years** I aspire to become a commander, leading teams that will provide senior leaders with vital information to aid their decision making. I would like to make a difference by developing people, so together, we will successfully apply operations research and analysis techniques toward process improvement.
- **MORS** provides a forum where analysts can meet to share analytic experiences achieved through multiple disciplines. It is an analytic community, where members and non-members alike, unite to share their passion for performing analysis with integrity. MORS provides social and other opportunities as well. At the 77th MORS Symposium, I was the winning women runner at the annual 5K run.





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