NAVAL RESEARCH WORKING GROUP
THESIS RESEARCH WORKING GROUP
MEETING 15-1

PROGRAM
30 MARCH - 3 APRIL 2015

NAVAL POSTGRADUATE SCHOOL
Monterey, CA

For more information about the Naval Research Program and Events, visit: NPS.edu/research/NRP
or email the NPS Naval Research Program Office at NPS_NRP_POC@nps.edu
**NOTES**

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**NAVAL RESEARCH PROGRAM OFFICE**

Dean of Research
Dr. Jeffrey Paduan

Program Manager
Mr. Rodman Abbott, CAPT (Ret.)

Associate Dean of Research
Col Mitch McCarthy, USMC

Deputy Program Manager
LtCol Mark Raffetto, USMC

NPS NRP National Capital Representative
Mr. Bob Osterhoudt, CAPT (Ret.)

Operations Manager
Cecelia Davis

Integration Lead
Lois Hazard

Business Development and Strategic Planner
Tera Yoder

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**PURPOSE**

**Mission**
The Working Group Meeting is a forum for research Topic Sponsors to communicate their research and analysis needs directly to Naval Postgraduate School faculty and students. In-progress reviews are also conducted.

**Intent**
Provide a single, standard mechanism that allows the Navy and Marine Corps to interface and leverage a cost-efficient organic research asset.

**End State**
A systematic, repeatable, and enduring partnership to support Navy and Marine Corps research objectives and make NPS research directly relevant to the warfighter.

**Working Group Input**
Topic Sponsor and NPS faculty research needs

**Working Group Output**
- Draft Initial Research Estimate Form (IREF)
- Faculty and student relationships with Topic Sponsors
- Partnerships for research work
### AGENDA

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<thead>
<tr>
<th>Time</th>
<th>Speaker/Panel</th>
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<tbody>
<tr>
<td>9:00</td>
<td>Check-In/Welcome</td>
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<tr>
<td>10:00</td>
<td>Panel: Topic Sponsor</td>
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<td>11:00</td>
<td>Lunch Break</td>
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<tr>
<td>12:00</td>
<td>Panel: N281 Cybersecurity and COTS IT Product End of Life (EOL) Challenges</td>
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<td>13:00</td>
<td>Lunch Break</td>
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<tr>
<td>14:00</td>
<td>Panel: N282 Cybersecurity and ICS</td>
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<td>15:00</td>
<td>Lunch Break</td>
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<tr>
<td>16:00</td>
<td>Panel: SSP-OT1 Trident II (D5) Service Life Prediction Strategies</td>
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<td>17:00</td>
<td>Lunch Break</td>
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<tr>
<td>18:00</td>
<td>Panel: SSP-PN2 Missile Gas Venting Effects During Underwater Launch</td>
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<td>19:00</td>
<td>Lunch Break</td>
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<tr>
<td>20:00</td>
<td>Panel: SSP-PN1 Rocket Motor Deflagration Effects</td>
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<td>21:00</td>
<td>Lunch Break</td>
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<tr>
<td>22:00</td>
<td>Panel: SSP-NW2 Human-Machine Interface With Nuclear Weapons Security Systems</td>
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<td>23:00</td>
<td>Lunch Break</td>
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<tr>
<td>24:00</td>
<td>Panel: SSP-SW6 Tolerances in CAD</td>
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<td>25:00</td>
<td>Lunch Break</td>
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<tr>
<td>26:00</td>
<td>Panel: SSP-SW5 Artificial Intelligence</td>
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<td>27:00</td>
<td>Lunch Break</td>
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<tr>
<td>28:00</td>
<td>Panel: SSP-SW4 Optimizing the 3D Environment for Fast Rendering</td>
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<td>29:00</td>
<td>Lunch Break</td>
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<tr>
<td>30:00</td>
<td>Panel: SSP-SW3 Avatar Implementation Using Open Source</td>
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<td>31:00</td>
<td>Lunch Break</td>
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<tr>
<td>32:00</td>
<td>Panel: SSP-SW2 3D Modeling Submarine Missile Compartment</td>
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<td>33:00</td>
<td>Lunch Break</td>
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<tr>
<td>34:00</td>
<td>Panel: SSP-ME1 Trident II (D5) Missile Nose Fairing Construction</td>
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<td>35:00</td>
<td>Lunch Break</td>
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<tr>
<td>36:00</td>
<td>Panel: SSP-MA3 Acoustics and Submarine Ranging</td>
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<td>37:00</td>
<td>Lunch Break</td>
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<tr>
<td>38:00</td>
<td>Panel: SSP-MA2 Mathematical Free Flight Missile Probability of Success</td>
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<td>39:00</td>
<td>Lunch Break</td>
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<tr>
<td>40:00</td>
<td>Panel: SSP-MA1 Mathematical In-Tube Missile Probability of Success</td>
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<td>41:00</td>
<td>Lunch Break</td>
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<tr>
<td>42:00</td>
<td>Panel: SSP-EC5 Moore’s Law and Wireless Interference</td>
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<td>43:00</td>
<td>Lunch Break</td>
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<tr>
<td>44:00</td>
<td>Panel: SSP-EC4 Missile Tube Wireless Interference</td>
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### ATTENDING TOPIC SPONSORS AND PLENARY SESSION TOPICS

**Space and Naval Warfare Systems Command (SPAWAR), CDR Brian Erickson**
- N116 Cybersecurity Figure of Merit
- N280 Cybersecurity and Patching Periodicity as it Applies to System of Systems (SOS) Risk
- N281 Cybersecurity and Commercial Off The Shelf (COTS) IT Product End of Life (EOL) Challenges
- N282 Cybersecurity and Industrial Control Systems (ICS)

**Strategic Systems Programs (SSP), CAPT Jim Melvin**
- N214 Trident II (D5) Service Life Prediction Strategies (SSP-OT1)
- N215 Missile Gas Venting Effects During Underwater Launch (SSP-PN2)
- N216 Rocket Motor Deflagration Effects (SSP-PN1)
- N217 Human-Machine Interface With Nuclear Weapons Security Systems (SSP-NW2)
- N218 Tolerances in CAD (SSP-SW6)
- N219 Artificial Intelligence (SSP-SW5)
- N220 Optimizing the 3D Environment for Fast Rendering (SSP-SW4)
- N221 Avatar Implementation Using Open Source (SSP-SW3)
- N223 3D Modeling Submarine Missile Compartment (SSP-SW2)
- N225 Trident II (D5) Missile Nose Fairing Construction (SSP-ME1)
- N226 Acoustics and Submarine Ranging (SSP-MA3)
- N228 Mathematical Free Flight Missile Probability of Success (SSP-MA2)
- N229 Mathematical In-Tube Missile Probability of Success (SSP-MA1)
- N231 Moore’s Law and Wireless Interference (SSP-EC5)
- N232 Missile Tube Wireless Interference (SSP-EC4)
- N234 Missile Tube Wireless Interference
ATTENDING TOPIC SPONSORS AND PLENARY SESSION TOPICS

N9 - Warfare Systems, Mr. Christopher Marsh
N145 Transition of Mine Countermeasures (MCM) Responsibility from MCM-1 Avenger Class to Littoral Combat Ship (LCS) Class
N205 Extending Open Systems Architecture (OSA) with ACDM Open-Source Java for Liquid Robotics WaveGlider SV-3
N206 Propagating Uncertainty in Hierarchical Combat Models
N263 Unmanned Undersea Systems
N264 Transition of Naval Mine Countermeasures (MCM) from current MCM Forces to the Littoral Combat Ship (LCS) MCM Mission Package
N265 Absence of Networks
N345 Reserve Manning in Operational Aviation Squadrons
N347 Boundary Layer Turbulence Over Apertures in High Speed Flight
N349 Representing the Value of Carrier Aviation Presence
N354 Comprehensive logistics management for the Sea Base
N366 LCS Crew Swap Optimization Through NUFEA

Naval Satellite Operations Center, CAPT Jeffrey Marshall
N124 Network Performance Measurement & Analysis
N125 Satellite Operations in A2AD environment
N126 Defensive Space Tactics, Techniques & Procedures
N127 Satellite Operations Mission Planning Process

NAVSEA 05T, CDR Jason Fox
N112 Electromagnetic Railgun

NUWC Division, Keyport, Mr. David Mortimore
N184 Cybersecurity for USW Test Vehicles and UUVs/UMSs
N185 Future Communication Technologies for UUVs/UMSs and USW Ranges
N186 Multi-Event Multi-Scenario Capability for USW Ranges
N188 Technical Health Assessment Methods and Technology
N192 UUV/UMS Propulsion Energy Systems
N194 Test and Evaluation Cyber Range
N195 USW Range Event Planning System

EVENT DESCRIPTION

Plenary Session
During the Plenary Session, Topic Sponsors briefly introduce their organization and research topics. The intent is to provide NPS faculty and students an introduction to the topics and Topic Sponsors, with discussions to continue during individual Breakout Sessions and the scheduled Revolving Panel Sessions.

Revolving Panel Sessions
During the Revolving Panel Sessions, Topic Sponsors will have an assigned window to brief their topics in a small audience format. The intent is to provide NPS faculty and students with a greater in-depth discussion of topic details.

Breakout Sessions
Each Topic Sponsor presenting has an assigned break-out location, as specified on the program insert. NPS faculty and students are invited to meet with Topic Sponsors during Breakout Sessions to discuss topics and begin scoping research. Topic Sponsors manage their own Breakout Session schedules.

Topic Sponsor Outbriefs and Hotwash
Topic Sponsor Outbriefs provide a formal opportunity for Topic Sponsors to give feedback of metric outcomes from the event to the NPS Dean of Research. The Topic Sponsor Hotwash is an informal discussion of the event, including suggestions for improvement.
Lieutenant General Richard P. Mills is a native of Huntington, New York.

He currently serves as the Commander, U.S. Marine Corps Forces Reserve and Marine Forces Northern Command.

Prior to this assignment, Lieutenant General Mills served as the Commanding General Marine Corps Combat Development Command, Quantico, VA, Deputy Commandant for Combat Development and Integration, Headquarters U.S. Marine Corps, and Commander of Marine Corps Forces Cyberspace Command. During this tour, he signed the original Charter that established the Marine Corps’ Thesis Research Working Group (the predecessor to the Naval Research Working Group).

Lieutenant General Mills is a highly decorated combat leader and the first Marine Corps General Officer to command NATO forces in combat.

He is an avid New York Giants football fan, and a friend of the Naval Postgraduate School.
ATTENDING TOPIC SPONSORS AND PLENARY SESSION TOPICS

Marine Corps Systems Command (MCSC), Mr. C. Scott Bey
M147 Cost Analysis – Broad Area Study
M268 CYBER Acquisition
M285 Centralized Operating Forces Support Center
M286 Amphibious Vehicle Test Branch – Human Factors
M287 Expeditionary Fire Support System Futures Study
M288 Amphibious Vehicle Test Branch – Surf Zone Characterization
M289 Amphibious Vehicle Test Branch – Sequential Testing
M290 Anti-access/Anti-ship Capability of Artillery Fired Projectiles from Shore
M291 "Big Data" – Logistics Master Data Management Within the Context of a Fully Integrated Logistics IT Portfolio
M292 GCSS-MC – Enterprise Systems Network Quality of Service (QoS)
M293 Utilization of Intermittent Acoustics in a Networked Environment
M296 Low Power Wireless Networks
M297 Training & Readiness (T&R) and Live, Virtual and Constructive (LVC) Training
M298 PEO-LS: Non-Traditional Repair of Armor Steels on Tactical Wheeled Vehicles
M299 Framework for HSI analyses and modeling and simulation of the human components to reduce risks
M301 An Analysis of the Lifecycle Management of Marine Corps Material Handling Equipment/Construction Equipment (MHE/CE)
M329 Fusion of Wireless Attack Ontology Points
M330 PEO-LS: ACV 2.0 HIGH WATER SPEED

Marine Forces Cyberspace Command (MFCC), Maj Cameron Grams
M148 CSSAC – A Broad Study
M170 Patch and Log Management in a Bandwidth Constrained Environment
M175 Attaining I&W in Cyberspace
M176 Future Threats/Threat Environment in Cyberspace
M350 CEWCC, Structural Adaptations for MAGTF Contemporary and Future Operating Environments
M352 COIN in Cyberspace
M353 Command and Control for the New Norm
M356 Cyber Acquisitions Integration
M358 Electronic Warfare and Cyberspace Convergence
M361 Extension of Cyberspace Platform Capabilities

WALTER F. JONES, Ph.D. EXECUTIVE DIRECTOR

Dr. Walter F. Jones joined the Office of Naval Research in September 2007, as executive director. He is the senior civilian manager at ONR, and provides executive, technical, and scientific direction in the performance of ONRs mission of planning and managing science and technology research for the Department of the Navy. He works closely with ONRs Directorate leads in the identification, prioritization, and support of specific areas of science and technology development.

Jones most recently was director, Plans and Programs, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. He was responsible for developing and managing the processes that defined AFRLs $3-billion annual investment in technologies for future Air Force systems. These systems include space, weapons, aeronautics, and command, control, communications, computers, intelligence, surveillance and reconnaissance.

Jones has held a wide variety of positions in government and academia. He has served as director, Aerospace and Materials Sciences, Air Force Office of Scientific Research, Arlington, Va. In this capacity, he planned, coordinated, and executed a $55-million basic research program, including solid mechanics, fluid mechanics, materials science, and propulsion. He has also served as a senior program analyst with the Office of the Deputy Director of Central Intelligence for Community Management. He has held several positions with the Air Force, including deputy for Research Sciences with the Office of the Assistant Secretary of the Air Force (Acquisition), and deputy for Science and Technology with the Office of the National Security Space Architect. In addition, Jones has held faculty positions at the University of Florida, University of Tennessee, and Clemson University.

He received his Ph.D. and M.S. in engineering mechanics and a B.S. in mechanical engineering from Clemson University. He also has an M.S. in national resource strategy from the Industrial College of the Armed Forces at Ft. Lesley J. McNair in Washington, D.C.
ATTENDING TOPIC SPONSORS AND PLENARY SESSION TOPICS

This program lists research topics being briefed at the plenary sessions. A comprehensive list of all available research topics and specific Topic Sponsor point of contact information can be found on the Naval Research Program Topic Submission Site at https://my.npd.edu/web/naval-research-program/.

CENTCOM, LCDR Walter Kulzy
N248 Decision Support for Irregular Warfare: New Wargame Insights via Post-Wargame Experimentation and Analysis

College of Distance Education & Training (CDET), Maj Mike Gavin
M303 Integrating xAPI Standards to Support eLearning
M304 BYOD Strategies to Support eLearning
M057 Metrics for Courseware Performance
M058 Self-Authoring Tools and Rule Sets for Developing User-Generated Content
M059 Business Process Reengineering for Implementation of Remedy
M060 MCEITTS Migration – Challenges and Opportunities
M061 Virtualization as a Practical Solution for Browser Agnosticism
M062 eLearning Measures of Effectiveness
M063 Click to Finish Distance Learning Courseware – Legitimate Education & Training vice Simple Completion

Commander, Naval Surface Forces (COMNAVSURFOR), CDR Jerry Olin
N227 Improving Surface Warfare Officer Retention
N233 Improving the Fleet’s Distributed Lethality Capability
N235 Logistics in Support of the Fleet’s Distributed Lethality Concept
N236 Surface Navy Basic Phase Training Customization
N237 Modeling and Analysis of Surface Navy Shipboard and Intermediate Maintenance Processes
N240 Modeling and Analysis of Surface Navy Availability Maintenance Processes

Expeditionary Energy Office (E2O), Capt Anthony Ripley
M109 Ship to Shore Fuel Systems
M110 Energy and Behavioral Factors
M252 Naval Force Fuel Mixture – Operational Reach Analysis
M255 Connector Availability for Fuel Movement

ATTENDING TOPIC SPONSORS AND PLENARY SESSION TOPICS

HQMC Aviation (HQMC AVN), Maj Chris Larson
M139 USMC Air Traffic Control (ATC) Training Database (fleet wide). Identify Success Criteria Early on in a Marines’ Career.
M342 USMC Next Generation UAS
M343 USMC Aviation Digital Interoperability
M362 HQMC Avn – ALIMS MOS 6694
M363 HQMC Avn – Historical vs. Future Pilot Retention
M364 HQMC Avn – Officer MOS Contract Length
M365 HQMC Avn – USMC Aviation Maintenance

HQMC C4, Mr. Kenneth Bible
M187 Posturing the MCEN to Better Support Deployed USMC Operations

Installations & Logistics, LtCol Dan Reber
M101 Mobile Support for GCSS-MC Using Handheld Devices

Manpower and Reserve Affairs (M&RA), LtCol Anthony Licari
M107 Optimizing Reserve Individual Mobilization Augmentee (IMA) Support to the Active Component (AC)
M108 Chronically Short MOSs in the Reserve Component
M161 A Blended Retirement Plan: Can it sustain Marine mid-career retention?
M162 USMC Manpower Quality, Recruit to MOS match, Defining Success
M164 Scenario Analysis, Policy Evaluation, and Forecasting Marine Corps Manpower Using Agent-Based Simulation Modeling JAVA Code
M167 Manpower Process Improvements, High Quality People

MARFORPAC, Ms. Nicole Griffin
M160 Pacific Islands Coastal Marine Spatial Planning

Marine Corps Combat Development Command (MCCDC), Dr. George Akst
M163 Exploring Potential Alternatives Using Simulation and Evolutionary Algorithms
M199 Developing analytic capability in Combat XXI

Marine Corps Modeling and Simulation Management Office (MCMSMO), Dr. George Akst
M157 Education and Training Continuum in the 21st Century
M158 Live-Virtual-Constructive (LVC) Planning
M159 Commercial Gaming Industry Best Practices