2012-02-01

Research Naval Postgraduate School, v.4, no. 5, February 2012

Monterey, California, Research and Sponsored Programs, Office of the Vice President and Dean of Research, Naval Postgraduate School (U.S.)

https://hdl.handle.net/10945/15500

Downloaded from NPS Archive: Calhoun
RESEARCH AT NPS

Indirect costs at NPS have been a focus of discussion in many faculty forums as we work through our new guidance. Often there are questions about “who pays” and “who receives.” The simple pie charts display: 1) the amount of indirect costs recovered by each school, and 2) the distribution of the indirect recovery to the recipients. The charts show FY11 data. Details are at http://intranet.nps.edu/ResAdmin/IndirectCostSummaryReport_093011.pdf and http://www.nps.edu/research/BoardReports.html.

SPONSORED PROGRAMS STATUS, JANUARY 2011

Funds Available: $163.2M

By Type of Activity
- Research $133.0M (81%)
- Service $16.1M (10%)
- CRADA $1.3M (1%)
- Education and Professional Development $12.7M (8%)

By Sponsor
- Navy $27.0M (16%)
- NSF $18.5M (11%)
- Other $709K (1%)
- Other-Fed $7.8M (5%)
- Joint $2.6M (2%)
- Air Force $48.8M (30%)
- Army $5.4M (3%)
- CRADA $1.3M (1%)

By School
- Institutes & Other $27.9M (17%)
- SIGS $12.1M (8%)
- Academic Affairs $10.4M (6%)
- GSBPP $8.4M (5%)
- GSEAS $32.4M (20%)
- GSOIS $71.4M (44%)

BROWN-BAG SEMINAR SERIES

WA-302, 1200-1300
- Tuesday, 14 February, Research Safety at NPS
- Tuesday, 13 March, Intergovernmental Personnel Act Agreements

RESEARCH UPDATES

- The Naval Postgraduate School (NPS) seeks qualified candidates for vice president and dean of research (VP/DoR). The candidate is expected to be selected from the faculty of NPS. Please review the posting at http://intranet.nps.edu/Message-Files/VPDOR_Ad_and_Job_Description_Finalv10.pdf
- Faculty Budget Committee (FBC) Recommendations on Guidelines for Appropriate Indirect Expenditures: In 2011, the faculty chair established an expanded Faculty Budget Committee (FBC) to work with the provost and the VP/F&A to provide input on topics related to budgeting, indirect expenditures and other matters that affect faculty and PIs. The committee is composed of the elected members of the Budget Committee of the Faculty Council and other faculty representatives to provide broad representation and input. The FBC has just completed a report of recommendations for guidelines for appropriate indirect expenditures, including bid and proposal considerations. The report is in response to a specific request made by the VP/F&A, as NPS responds institutionally to new guidance in this area. The committee reported out on February 1, 2012. The report was submitted to the VP/F&A and provost, via the faculty chair and with the concurrence of the Research Board. This report is at http://intranet.nps.edu/ResAdmin/ResearchBoard/Reports/2012-01-31_Allowable_Indirect_Expenses.docx.

...continued on page 8
SPONSORED PROGRAM STATISTICS

Graduate School of Engineering and Applied Sciences

Funds available to date: $32.4M

By Sponsor

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Projects Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Force</td>
<td>$3.5M, 11%</td>
</tr>
<tr>
<td>Army</td>
<td>$180K, &lt;1%</td>
</tr>
<tr>
<td>CRADA</td>
<td>$276K, 1%</td>
</tr>
<tr>
<td>DoD</td>
<td>$7.2M, 22%</td>
</tr>
<tr>
<td>DHS</td>
<td>$75K, &lt;1%</td>
</tr>
<tr>
<td>Joint</td>
<td>$991K, 3%</td>
</tr>
<tr>
<td>Navy</td>
<td>$12.1M, 37%</td>
</tr>
<tr>
<td>NSF</td>
<td>$4.7M, 15%</td>
</tr>
<tr>
<td>Other-Fed</td>
<td>$3.2M, 10%</td>
</tr>
</tbody>
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By Department

<table>
<thead>
<tr>
<th>Department</th>
<th>Projects Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Force</td>
<td>$45.2M, 63%</td>
</tr>
<tr>
<td>Army</td>
<td>$1.7M, 2%</td>
</tr>
<tr>
<td>CRADA</td>
<td>$375K, 1%</td>
</tr>
<tr>
<td>DoD</td>
<td>$12.1M, 17%</td>
</tr>
<tr>
<td>DHS</td>
<td>$260K, 1%</td>
</tr>
<tr>
<td>Joint</td>
<td>$946K, 1%</td>
</tr>
<tr>
<td>Navy</td>
<td>$5.7M, 8%</td>
</tr>
<tr>
<td>NSF</td>
<td>$2.4M, 3%</td>
</tr>
<tr>
<td>Other</td>
<td>$228K, &lt;1%</td>
</tr>
<tr>
<td>Other-Fed</td>
<td>$2.5M, 4%</td>
</tr>
</tbody>
</table>

Projects funded in January

- IR and Missile Defense Radar Power Conversion Module Modeling, Bob Ashton, EC (NAVSEA)
- Passive Low-Resolution Imagery, Frank Kragh, EC (SAF)
- Configurable Fault-Tolerant Architectures and Algorithms for Reliable Space-Based Computing, Hersch Loomis, EC (SAF)
- JTWS Threat Signals Projection and Research, John McEachen, EC (USSOCOM)
- Gallium Nitride HEMT Reliability, Todd Weatherford, EC (AFRL)
- Ground Vehicle Survivability, Chris Adams, MAE (DOT&E)
- Fault-Tolerant Control Moment Gyroscope Array for Spacecraft Slew Maneuvers, Brij Agrawal, MAE (SAF)
- Constant Volume Combustion Technology Development, Chris Brophy, MAE (AFRL)
- Accuracy Model Improvement, Morris Driels, MAE (USAASC)
- A Probabilistic Parameter Estimation Framework with Spatial Analysis of Variance, Josh Hacker, MR (ONR)
- Tropical Cyclone Formation and Structure Change and TCS08 Experiment Support, Patrick Harr, MR (ONR)
- Tropical Cyclone Formation, Structure Change and Predictability in Western North Pacific, Mike Montgomery, MR (ONR)
- Modeling Wind Wave Evolution from Deep to Shallow Water,
- Other-Military, 10%

Graduate School of Operational and Information Sciences

Funds available to date: $71.4M

By Sponsor

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Projects Funded</th>
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<tbody>
<tr>
<td>Air Force</td>
<td>$12.1M, 17%</td>
</tr>
<tr>
<td>Army</td>
<td>$1.7M, 2%</td>
</tr>
<tr>
<td>CRADA</td>
<td>$276K, 1%</td>
</tr>
<tr>
<td>DoD</td>
<td>$7.2M, 22%</td>
</tr>
<tr>
<td>DHS</td>
<td>$75K, &lt;1%</td>
</tr>
<tr>
<td>Joint</td>
<td>$991K, 3%</td>
</tr>
<tr>
<td>Navy</td>
<td>$12.1M, 37%</td>
</tr>
<tr>
<td>NSF</td>
<td>$2.4M, 3%</td>
</tr>
<tr>
<td>Other</td>
<td>$228K, &lt;1%</td>
</tr>
</tbody>
</table>

By Department

<table>
<thead>
<tr>
<th>Department</th>
<th>Projects Funded</th>
</tr>
</thead>
</table>
| DARPA Insider Project | Simson Garfinkel, CS (DARPA)
| Counterterrorism Technology/Special Operations Technology | Nancy Ann Budden, DA (OSD)
| Axis of More Trouble: 21st Century Cultures of War | Anna Simons, DA (OSD)
| Management Support for Human, Performance, Training, and Education Program | Sue Hutchins, IS (ONR)

Projects funded in January

- DARPA Insider Project, Simson Garfinkel, CS (DARPA)
- Counterterrorism Technology/Special Operations Technology, Nancy Ann Budden, DA (OSD)
- Axis of More Trouble: 21st Century Cultures of War, Anna Simons, DA (OSD)
- Management Support for Human, Performance, Training, and Education Program, Sue Hutchins, IS (ONR)
SPONSORED PROGRAM STATISTICS

Research and Education Institutes, Centers, and Other

By Department

- MOVES: $4.6M (12%)
- CIRPAS: $12.9M (33%)
- Cebrowski: $2.4M (6%)
- Meyer: $2.0M (5%)
- Global Public Policy: $1.0M (3%)
- Other: $2.1M (5%)
- Academic Affairs: $10.0M (26%)

By Sponsor

- NSF: $11.4M (29%)
- Navy: $5.8M (15%)
- Joint: $400K (1%)
- Army: $2.3M (6%)
- Air Force: $1.9M (5%)
- Other-Fed: $245K (1%)
- Other: $962K (2%)
- CRADA: $671K (2%)
- DoD: $15.3M (39%)

Projects funded in January

- Infrastructure Liaison Officer Program, Alan Jaeger, NSI (FBI)
- Energy and Behavior, Sue Higgins, Cebrowski (NDU)
- Radio-Communications Interference in an Ancillary Satellite Component Environment, Brian Steckler, Cebrowski (INMAR-SAT)
- Demonstration of Exterior Insulation & Finishing Systems at DoN Facilities, Fernand Marquis, Meyer (NAVAC)
- Critical Experiments in Condensed Matter Nuclear Science, FY12: Performance Assessment of LENR Boilers, Mike Melich, Meyer (DTRA)
- Data Visualization Tool, Arnold Buss, MOVES (TRAC-Monterey)
- Advanced Human Systems Initiatives, Paul Chatelier, MOVES (ONR)
- Computer Vision Algorithm Collection, Matthias Kolsh, MOVES (DARPA)
- Examining Tools and Methods for Assessment of Network Security and Interoperability, CDR Joe Sullivan, USN, MOVES (DOT&E)
- Strategic and Transitional Working Group Virtual Training Simulation Program, CDR Joe Sullivan, USN, MOVES (DHS)
- Military Training & Energy Infrastructure Compatatability and Mission Sustainment, CDR Joe Sullivan, USN, MOVES (OSD)
- Northrop Grumman Systems Corporation, Bob Bluth, CIRPAS (Northrop Grumman)
- Flight Test of EO/IR Camera-System Demonstration, Bob Bluth, CIRPAS (VT Griffin)
- NSWG 4 Scan Eagle Operations at Camp Roberts Project, Bob Bluth, CIRPAS (NSWG FOUR)
- Small UAS Demonstration, Test and Evaluation, Bob Bluth, CIRPAS (Lockheed Martin)
- Center for Educational Design, Development and Distribution, Tom Mastre, CED3 (Defense Language Office)
- Open-DIS Support for High-Performance Simulation Testing Don Brutzman, MOVES (NAWC-China Lake)

Graduate School of Business and Public Policy

By Department

- NPS-SOCOM FX: $546K (1%)
- NSI: $3.4M (9%)
- Other: $2.1M (5%)

By Sponsor

- NSF: $245K (1%)
- Navy: $1.9M (5%)
- Army: $1.7M (20%)
- Air Force: $500K (4%)
- Other: $2K (<1%)
- Other-Fed: $762K (6%)
- CRADA: $671K (2%)
- DoD: $10.7M (89%)

Projects funded in January

- AMS in Contract Management Distance Learning, Wally Owen, (Various)
- NAVSEA Chair of Acquisition and Research Program, Keith Snider, NAVSEA
- FY12 Sponsored Acquisition Research Program, Keith Snider, OSD

School of International Graduate Studies

By Department

- CIRPAS: $12.9M (33%)
- Cebrowski: $2.4M (6%)
- Meyer: $2.0M (5%)
- Global Public Policy: $1.0M (3%)
- Other: $2.1M (5%)
- Academic Affairs: $10.0M (26%)

By Sponsor

- NSF: $11.4M (29%)
- Navy: $5.8M (15%)
- Joint: $400K (1%)
- Army: $2.3M (6%)
- Air Force: $1.9M (5%)
- Other-Fed: $245K (1%)
- Other: $962K (2%)
- CRADA: $671K (2%)
- DoD: $15.3M (39%)

Projects funded in January

- Nuclear Strategy Forum, Anne Clunan, NS (DTRA)
- Project on Advanced Systems and Concepts for Combating WMDs Studies and Dialogues, Anne Clunan, NS (DTRA)
The NPS Center for Joint Services Electronic Warfare (CJSEW) sponsored an international, three-week, technical short course, “Technologies for Information Operations (TIO)” on October 31–November 18 at NPS. The CJSEW is a major focal point for both industrial and Department of Defense information and electronic warfare research and provides a host of simulation and modeling tools and hardware research to support the U.S. national warfighting strategy.

The CJSEW also directly supports the sensor-systems engineering curriculum within the Department of Electrical and Computer Engineering at NPS. With over sixteen participating faculty and staff members and support from more than fifteen sponsors, the CJSEW provides a wide variety of state-of-the-art research and educational resources.

The CJSEW developed the 2011 TIO course based on recent research and development in associated information-operations technologies. This year’s program is significant in that it marks the fifteenth year the course has been conducted. Ten faculty from across campus presented lectures on a variety of topics related to their research. As the TIO students are among the top individuals in their fields, the faculty were pleased to have the opportunity to provide a platform for exchanging information and sharing common experiences.

Professor Phillip Pace from the CJSEW (director) and the Department of Electrical and Computer Engineering presented research results on a new photonic analog-to-digital converter that uses a unique encoding process to minimize encoding errors. The device uses three wideband Mach-Zehnder interferometers to efficiently incept a radio-frequency-antenna signal into the optical domain and a distributed-feedback laser to sample the signal. Experimental results were shown and a tour was given of device operation in the optical-electronics laboratory. Professor Pace also presented research on a new sensor-network algorithm that can quantify the ability of a network-enabled operation through integration of the physical domain (node hardware, wireless networks), the information domain, and the cognitive, decision-making domain. Example calculations were shown to demonstrate the utility of the algorithm for an electronic-warfare application involving the suppression of an integrated enemy air-defense network.

Professors John McEachen and Murali Tummala, both from the Department of Electrical and Computer Engineering, discussed trends in networking technologies, specifically those related to mobile phones and wireless technologies, including social networking and cloud computing. They also had extensive discussions on cyber warfare and unclassified research being conducted by the NPS Center for Cyber Warfare. Their section included several laboratory components to give the students hands-on exposure to the issues discussed in the classroom.

In accordance with the DoD emphasis on increased use of design of experiments (DOE) and modeling and simulation (M&S) in the testing and evaluation of weapons systems, Senior Lecturer CAPT Thomas Hoivik, USN (Ret.), Department of Operations Research, has been focusing on the application of nearly orthogonal Latin hypercube (NOLH) experimental designs for evaluating the myriad factors that could affect weapon-system combat effectiveness. Through the use of NOLH designs in robust simulations, the...continued on page 7
APPLIED MATHEMATICS

Visiting Research Professor Margaret Cheney will receive an honorary degree this May from her alma mater, Oberlin College. Cheney is visiting from Rensselaer Polytechnic Institute.

Professor Pante Stanica lectured at the Indian Statistical Institute in Delhi, the Indian Institute of Technology in Roorkee and the Indian Statistical Institute in Kolkata in January 2012 while on sabbatical. Topics were number theory and cryptogenic boolean functions.


CENTER FOR DECISION, RISK, CONTROLS AND SIGNALS INTELLIGENCE (DRCSI)
Sri Sritharan will give a talk, “An Invitation to Large Deviation Theory,” at Tata Institute of Fundamental Research, Center for Applicable Mathematics, Yelahanka, New Town, February 23, 2012.

COMPUTER SCIENCE

DEFENSE ANALYSIS

DEFENSE RESOURCES MANAGEMENT INSTITUTE


SIMONS PUBLISHES NEW BOOK ON FOREIGN POLICY
In The Sovereignty Solution (Naval Institute Press, 2011) Professor Anna Simons, Department of Defense Analysis, and NPS graduates LTC Joe McGraw, USA, and LTC Duane Lauchengco, USA, propose a foreign policy emphasizing every nation’s responsibility—including America’s—to control security and the social fabric within its own borders.

Simons and her Special Forces coauthors argue that the U.S. has never articulated the clear position on national defense, “respect our sovereignty and we will respect yours.” The Sovereignty Solution is a radical, yet sensible, approach to global security and world order without global policing or nation building.

The book cites disconnects between what the U.S. says and does, how it wants to be seen and is seen. The authors hope to initiate debate that forces Washington to rethink what it sends servicemen abroad to do. The book grew out of the Long Term Strategy Seminar at NPS (2006), sponsored by Andrew W. Marshall and the Office of Net Assessment. Ten officers in the DA department participated in the study and were instrumental in pulling the overall argument together.

ELECTRICAL AND COMPUTER ENGINEERING

GRADUATE SCHOOL OF BUSINESS AND PUBLIC POLICY
Brook, D. A., & King, C. L. (2011). “Enactment and
implementation of the national security personnel system: Policy made and policy unmade.” Public Administration Review, 71(6), 900-908.

INFORMATION SCIENCES


NATIONAL SECURITY AFFAIRS


Sophal Ear, “A Refugee’s Journey”, keynote talk, Historically Black Institution Visitation Program, Purdue University, 9 November 2011.


Sophal Ear, “A McNair Scholar’s Journey,” keystone speech at Faculty and Directors Dinner, Faculty Club, UC Berkeley, 4 August 2011.


OCEANOGRAPHY


OPERATIONS RESEARCH


**PHYSICS**


**SYSTEMS ENGINEERING**


**TIO, continued from page 4**

then be controlled in live operational testing to help determine the true combat effectiveness of a weapons system.

**Associate Professor Giovanna Oriti**, Department of Electrical and Computer Engineering, presented the energy-conversion hardware laboratories that have been recently set up for resident and distance-learning students within the NPS power laboratories. She explained how the power electronics are controlled by digital electronics that communicate with a web server. The remote access to the laboratories is accomplished through a standard web browser. Oriti illustrated this remote access in her lectures, which included live demos of a DC motor drive and a doubly fed induction machine (DFIM) drive for windpower and ship propulsion.

**Senior Lecturer William Maier** from the Department of Physics described the potential uses, design, and outstanding technical issues for railguns as weapons of the future. The session closed with a tour of the NPS railgun laboratory and a demonstration firing of a railgun.

**Distinguished Professor Emeritus Alan Washburn** from the Department of Operations Research gave several lectures on decision-making, risk assessment, and the value of information, including lectures on the problem of making decisions when other hostile decision makers are involved.

**Senior Lecturer CAPT Wayne Hughes**, USN (Ret.), from the Department of Operations Research gave four lectures on modern naval tactics. He emphasized the importance of coastal combat and how we must learn from countries like Sweden that have been thinking incisively about fighting in restricted waters longer than has the American navy. He described the tactics and results of battles with missiles with comprehensive data on missile engagements. He said we have moved from the “carrier age” of warfare at sea to the missile age and predicted that unmanned and autonomous vehicles will play an increasing role. He also said that a collateral component of future naval warfare is cyber operations, targeting, and delivery of accurate attacks with missiles and torpedoes and to confound enemy attempts.

**Assistant Professor Ric Romero** from the Department of Electrical and Computer Engineering presented recent research results on target recognition in signal-dependent interference, of which there are two types: target identification and target classification. To perform recognition, he proposed to maximize two metrics, signal-to-interference and noise ratio (SNIR) and mutual information (MI). The framework is via mutual hypotheses testing (MHT). The concept can be extended to cognitive radar (CR) via the Bayesian paradigm.

Students also toured the Center for Interdisciplinary Remotely-Piloted Aircraft Studies (CIRPAS). Bob Bluth, director of CIRPAS, presented UAV technology, and Paul Buczynski, radar and electronic warfare director in the Department of Electrical and Computer Engineering, presented the MWR-05XP mobile weather-radar truck. To provide this capability, an Army forward-area defense radar was refitted as a civilian, mobile weather radar for severe storm research (tornado chasing) with the University of Oklahoma. The truck has been supporting severe storm research in the Midwest for five years and supported the national experiment VORTEX 2 in 2009 and 2010.

**TIO short-course participants view the MWR-05XP radar truck used in storm chasing.**

Please submit your faculty and research news (published articles, conference proceedings, conference presentations, books, honors received, accomplishments, milestones, etc.) to research@nps.edu.
MEMORANDA OF UNDERSTANDING/AGREEMENT (MOU/ MOA)

Title: Defense Language Institute Foreign Language Center IT support from NPS
Partner: Defense Language Institute Foreign Language Center (DLIFLC)
NPS Contact: Christine Haska, Information Resources and Chief Information Officer
Summary: The purpose of this agreement is to establish the general parameters by which the Naval Postgraduate School will provide Information Technology support and experience to the Defense Language Institute Foreign Language Center. Additionally, the agreement will provide a framework to facilitate future collaborative efforts.

Title: The National Security Agency/Central Security Service Associate Directorate for Education and Training and the Naval Postgraduate School Regarding Training and Education Initiatives between the Institutions
Partner: The National Security Agency/Central Security Service Associate Directorate for Education and Training
NPS Contact: Professor Cynthia Irvine, Department of Computer Science
Summary: This MOA documents a personnel exchange between NPS and ADET and establishment of academic programs at NSA/CSS to further teaching and research activities. NPS will offer ungraded short courses, graded graduate courses, multiservice certificate programs, and master’s and PhD programs. These activities will focus on cyber-related studies, particularly those associated with cyber systems and operations, either in existing certificates and degree programs or in new interdisciplinary degrees.

TECHNICAL SERVICES AGREEMENTS (TSAs)

Title: VT Griffin, Flight Test of EO/IR Camera System Demonstration
Partner: VT Griffin
PI: Robert Bluth, Director of CIRPAS
Summary: NPS/CIRPAS will provide pre-flight coordination, flight coordination, range management, flight safety and facility management of VT Griffin’s testing activities at the CIRPAS facility.

Title: Lockheed Martin, SUAV Demonstration, Test and Evaluation
Partner: Lockheed Martin
PI: Robert Bluth, Director of CIRPAS
Summary: NPS/CIRPAS will provide pre-flight coordination, flight coordination, range management, flight safety and facility management of customer’s testing activities at the CIRPAS facility.

PATENT APPLICATIONS FILED

“Method For Radar Detection Of Persons Wearing Wires,” Navy case no. 20110002
Inventor: Professor William Fox, Department of Defense Analysis

“Bimaterial Microelectromechanical System (MEMS) Solar Power Generator,” Navy case no. 201110003
Inventor: Assistant Professor Dragoslav Grbovic, Department of Physics

“Automatic Clock Synchronization and Distribution Circuit for Counter Clock Flow Pipelined Systems,” Navy case no. 97012D1
Inventor: CDR Brian Luke, USN

TECHNICAL REPORTS PUBLISHED

NPS- CS-11-009 Leveraging the Cloud to Support Communications in the Tactical Environment
J. B. Michael, G. Dinolt, et al.

NPS- GSBPP-10-009 Small-Business Contracting in the United States and Europe: A Comparative Assessment
M. Kidalov

NPS- PH-11-005 The Legacy of Manfred Held with Critique
F. Bouvenot

NPS- PH-11-006 Development of Techniques for Investigating Energy Contributions to Target Deformation and Penetration During Reactive Projectile Hypervelocity Impact
M. Peters

NPS- SE-11-011 Pirate Mother Ship Warning and Reporting System (Capstone Project)

NPS- SE-11-014 Network Centric Communications for Expeditionary or Carrier Strike Groups (Capstone Project)
A. Deguzman, J. Ebken, N. Ho, et al.

NPS- SE-11-015 Ship-to-Shore Data Communication and Prioritization (Capstone Project)

Technical reports may be obtained at http://www.nps.edu/Research/TechReports.html

Update, continued from page 1

- **Who Can Be A PI/PM?** The final draft of the proposed policy was approved by the Research Board and presented to the Provost’s Council on 3 February, but is not yet approved. See final at http://intranet.nps.edu/ResAdmin/Research-Board/Reports/Who_Can_Be_a_PI_Final.docx.
- **Indirect Costs for Sponsors:** A memo has been signed by President Oliver that provides information on FY12 Indirect Cost policy, provided for PIs to use if sponsors have questions. The memo is online at http://intranet.nps.edu/ResAdmin/FY12/FY12_Indirect_Rate_and_Policy_at_NPS.pdf.
- **Defense Budget Priorities and Choices:** This document moves from “strategic guidance” to “budget choices.” See www.nps.edu/Research/BoardReports.html.