1975-04

Naval Postgraduate School O.R. News, 1975-04

Monterey, California, Naval Postgraduate School

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O.R. CONTINUING EDUCATION PROGRAM BEGINS

SCHOOL-WIDE PROGRAM

The continuing education program at the Naval Postgraduate School was established in May 1974 with Professor Max Woods as Dean of Educational Development and Executive Director of Continuing Education. The basic activities of the program are the development and delivery of short courses both on and off campus, and the delivery of NPS approved credit courses off campus. Academic transcripts for these credit courses will be maintained at NPS in the same manner as for resident students.

In addition to course delivery, the CE program will provide an educational counseling service designed to assist officers in planning their educational needs on a timely basis throughout their careers. This counseling activity will be coordinated with BuPers and the Navy Campus for Achievement (NCFA) counseling programs.

DEPARTMENT PROGRAM

The Department of Operations Research and Administrative Sciences is an active participant in this program of continuing education. The department coordinator is Associate Professor Glenn Lindsay.

Full-length courses from the current NPS catalog are offered for academic credit to military personnel and DOD civilian employees. Most of these courses will be taught by an OR/AS faculty member on site rather than in the self-instructional mode of usual correspondence type courses. During FY75 four full-length courses were given at the Naval Missile Center at Point Mugu, California; they included systems engineering, probability and statistics, design of experiments, and OR survey, and were taught by Professors Melvin Kline, Alvin Andrus, and Glenn Lindsay.

A few courses will be offered in a (continued on page 2)
DEPT. C.E. PROGRAM  
(continued from page 1)  
modified version of the correspondence mode called the "Personalized System of Instruction (PSI)." These courses are primarily preparatory courses in mathematics and probability theory and are designed to bring potential students up to speed before they come to NPS with the result of shortening the duration of their tour in the OR/SA curriculum at NPS. Alumni will be needed as on-site tutors in the Fleet and at shore installations to check the progress of students taking these predominately self-taught courses.

Short courses offered by the Department do not carry academic credit, although DOD employees completing these courses may receive continuous education units based on the length of the course. The Department currently offers more than 30 short courses in OR and Management ranging in length from one week to six weeks (see listings on page 2). These are given on the Monterey campus or at the sponsor's facility. The short courses can be structured to meet the special needs of the sponsoring agency.

Both the full-length courses and the short courses are being given on a reimbursable basis. Costs to sponsoring agencies vary according to course length, content, materials, and location.

Alumni interested in becoming tutors or in obtaining information about the Department's continuing education courses should contact Mary Cross (Autovon 479-2471) or Professor Glenn Lindsay (Autovon 479-2688). A catalog of school-wide short courses can be obtained by contacting the NPS Office of Continuing Education (Autovon 479-2558).

CONTINUING EDUCATION  
SHORT COURSES

The short courses currently being offered for 1975-76 are listed below along with their numbers as they will appear in the forthcoming NPS Continuing Education catalog. Those with prefix letters OA are operations research oriented courses; the prefix SM is associated with systems acquisition management oriented courses, the prefix CT with computer systems management courses, and the prefix MN with general management courses.

<table>
<thead>
<tr>
<th>Number</th>
<th>Course Title</th>
<th>Nominal Length in Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>OA S101</td>
<td>Maintainability Engineering and Management</td>
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<tr>
<td>OA S201</td>
<td>Human Factors and Safety in Man Machine Systems</td>
<td>2</td>
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<tr>
<td>OA S202</td>
<td>Optimization with Defense Applications</td>
<td>2</td>
</tr>
<tr>
<td>OA S203</td>
<td>Combat Modelling</td>
<td>2</td>
</tr>
<tr>
<td>OA S204</td>
<td>Search, Detection, and Localization Models</td>
<td>2</td>
</tr>
<tr>
<td>OA S205</td>
<td>Quantitative Methods of Project Administration</td>
<td>2</td>
</tr>
<tr>
<td>OA S300</td>
<td>Technical Update: Operations Research</td>
<td>3</td>
</tr>
<tr>
<td>OA S401</td>
<td>Operational Test and Evaluation</td>
<td>4</td>
</tr>
<tr>
<td>OA S402</td>
<td>OPS Research Applications for Scientists &amp; Engineers</td>
<td>4</td>
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<tr>
<td>OA S403</td>
<td>Simulation</td>
<td>4</td>
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<tr>
<td>OA S404</td>
<td>Applied Nonparametric Stat and Experimental Design</td>
<td>4</td>
</tr>
<tr>
<td>OA S601</td>
<td>Defense Management Overview of Military Ops Research</td>
<td>6</td>
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<tr>
<td>OA S602</td>
<td>Data Analysis</td>
<td>6</td>
</tr>
<tr>
<td>SM S201</td>
<td>Systems Engineering and its Management</td>
<td>2</td>
</tr>
<tr>
<td>SM S202</td>
<td>Systems Acquisition Management Simulation</td>
<td>2</td>
</tr>
<tr>
<td>SM S203</td>
<td>Systems Acquisition Management</td>
<td>2</td>
</tr>
<tr>
<td>SM S301</td>
<td>Government Procurement</td>
<td>3</td>
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</tbody>
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(continued on page 4)
The annual CNO Program Analysis Memorandum (CPAM) process—dividing all of the Navy's resources and programs into ten analytical piles—drew to a close in early March with the Summary CPAM. From my vantage point as sponsor for the OR/SA community and Director of the Systems Analysis Division, I have watched OR/SA graduates working at the very center of this vital portion of the programming and budgeting cycle and I am impressed with their versatility and the practicality of their graduate education. They conducted analyses and made recommendations ranging from force level trade-offs to support requirements to alternative systems configurations to enlisted end strength, drawing on both long term studies and quick analyses of data to respond to specific questions.

OR/SA is very much a part of the Washington scene. Graduates also serve in challenging P-coded billets with the operational forces and within the shore establishment, as well as in various joint and OSD billets.

During the last year the need for a Naval Postgraduate School, and graduate education for officers in general, came under intense scrutiny from outside the Navy. One result has been a reduction in the number of officers enrolled in funded graduate education. However, the Navy's commitment to the Postgraduate School is strong on the basis of Navy-oriented education not available elsewhere. The costs of equivalent curricula in civilian schools would be prohibitive, even if feasible. We can maintain this stance as long as the quality of education at Monterey remains high and the bulk of the course material is oriented toward defense areas. On my visit to Monterey last December, I was again struck by the professional pride and the special interest in things Navy that Dave Schrady has bred in his OR/SA faculty.

During the next several years the USN input to the OR/SA curriculum may be reduced considerably to bring the inventory-to-billet ratio into a better balance. We are pressing for a smooth transition to the steady state input of 20-30 officers per year which should be achieved by FY-79. Incidentally, an interactive parametric model developed by Professor Kneale Marshall is being used by BUPERS to model the input requirements for all subspecialties.

You might note that a recently proposed change to the P-coding system would have subspecialists in OR/SA coded in one of the following five major fields: Command Support, Plans and Programs, Political-Military Strategic Planning, Material Support, or Manpower and Personnel.

In June of this year, a selection board will convene to designate as proven subspecialists those officers who are top performers and have recent significant OR/SA experience. Proven subspecialists are assigned to particularly challenging jobs within the subspecialty, when not in operational billets required for career development. It is my conviction that the Navy's finest OR/SA subspecialists are those who have stayed current in the fleet, while maintaining their analyst's eye.

M. S. HOLCOMB
Rear Admiral, USN

Editor's Note: Admiral M. Staser Holcomb graduated from the U.S. Naval Academy in 1949. He received a Master of Science degree in physics from NPS in 1960. He was a member of the Systems Analysis Staff in OSD from 1964 to 1967; was Deputy Director of the Systems Analysis Division (OP-96) from May 1972 to June 1973, and commanded the USS GUAM (LPH-9), the Interim Sea Control Ship from July 1973 to May 1974. He was selected for flag rank in January 1974 and reported to the Office of the Chief of Naval Operations as Director of the Systems Analysis Division in May 1974.
MARDAC COMES TO NPS

The DOD Manpower Research and Data Analysis Center (MARDAC) was established in late FY 74 and its main office is located at NPS to take advantage of the School's computer and research capability. A branch office is located in Alexandria, Virginia to maintain direct contact with the major users. The mission of MARDAC is to (a) provide a facility within the DOD for the collection and analysis of manpower data extracted from files maintained by DOD Components and other government agencies, and (b) furnish advice and assistance of manpower data analysis matters to the Office of the Secretary of Defense, the Military Departments, and other DOD Components.

MARDAC has provided funding and justification for the addition of the necessary hardware to both allow MARDAC needed computer resources and prevent adverse impact on NPS programs. The intent is to be operational on 1 April 1975 and fully staffed by the end of the summer. Modifications of the IBM 360 system at NPS were initiated during the Christmas break. The current plans call for increased hardware capabilities through addition of a 256 K core box, eight disc storage drives, and five tape drives. In the future it may be necessary to further augment the NPS system with such equipment as additional printer/card readers, selector channels, or teleprocessing gear as MARDAC personnel gain experience with the NPS system and NPS personnel become more familiar with MARDAC requirements.

MARDAC is also providing research funds for NPS faculty and students to conduct manpower research on such topics as:

a. Reenlistment Intent,
b. Skill Utilization, Job Satisfaction, and Retention,
c. Personnel Policies and Retention.

It is anticipated that the location of MARDAC at NPS will provide increased computer capabilities to better serve the NPS graduate education program as well as the total manpower research program of DOD.

MANAGEMENT SHORT COURSES

(continued from page 2)

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<thead>
<tr>
<th>Number</th>
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<tr>
<td>CT S101</td>
<td>Data Base Systems</td>
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<td>CT S102</td>
<td>Computer Evaluation &amp; Selection</td>
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<td>CT S103</td>
<td>EDP Auditing</td>
<td>1</td>
</tr>
<tr>
<td>CT S200</td>
<td>Technical Update: Computer Systems Management</td>
<td>2</td>
</tr>
<tr>
<td>CT S201</td>
<td>Management Information Systems</td>
<td>2</td>
</tr>
<tr>
<td>CT S202</td>
<td>Computer Facilities Management</td>
<td>2</td>
</tr>
<tr>
<td>MN S101</td>
<td>Economic Analysis of Capital Investment Decisions</td>
<td>1</td>
</tr>
<tr>
<td>MN S102</td>
<td>Minorities in Military Organizations</td>
<td>1</td>
</tr>
<tr>
<td>MN S103</td>
<td>Auditing</td>
<td>1</td>
</tr>
<tr>
<td>MN S200</td>
<td>Technical Update: Public Sector</td>
<td></td>
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<tr>
<td>MN S201</td>
<td>Navy Programming Procedures in the DOD Planning, Programming, and Budgeting Systems</td>
<td>2</td>
</tr>
<tr>
<td>MN S202</td>
<td>Systems Analysis of Problems in the Military Health Care Delivery System</td>
<td>2</td>
</tr>
<tr>
<td>MN S203</td>
<td>Financial Analysis for Budgeting and Decision Making</td>
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<tr>
<td>MN S204</td>
<td>Cost Accounting Standards for Negotiated Defense Procurement Contracts</td>
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<tr>
<td>MN S205</td>
<td>Internal Control</td>
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<td>MN S301</td>
<td>Integrated Logistics Support Management</td>
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<td>MN S401</td>
<td>Management by Objectives</td>
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<td>MN S601</td>
<td>Financial Management</td>
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<td>MN S602</td>
<td>Military Systems Costing</td>
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<td>MN S603</td>
<td>Defense Economic Analysis</td>
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<tr>
<td>MN S604</td>
<td>Human Problems in Government Organizations</td>
<td>6</td>
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</tbody>
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LINDER, NEW SUPERINTENDENT

On 28 June 1974, RADM Isham W. Linder, USN, relieved RADM M. Freeman as Superintendent of NPS upon RADM Freeman's retirement. RADM Linder is the first NPS graduate to return as Superintendent.

Linder spent most of his younger years in Boulder, Colorado and entered the U.S. Naval Academy, Annapolis on appointment by the Secretary of the Navy in 1943. Following graduation from the Naval Academy in 1946, he reported on board the USS Springfield (CL-66) then attached to the Pacific Fleet. Designated a Naval Aviator in 1950, his fleet duties have included assignments with Patrol Squadron Twenty-One, Aviation Plans Officer on the staff of Commander Amphibious Group Two, and successively as Operations Officer, Executive Officer and Commanding Officer, of Air Anti-Submarine Squadron Twenty-Five. He has served as Executive Officer of USS Enterprise (CVAN-65) and has commanded USS Cleveland (LPS-7) and USS Intrepid (CVS-11). After promotion to flag rank he was assigned as Commander Cruiser Destroyer Flotilla Two and from 1971-1974 RADM Linder served in the Office of the Chief of Naval Operations as Head of CVA(N) Coordination.

Education beyond the Naval Academy has included the Massachusetts Institute of Technology (BS(EE)-1949), Naval Postgraduate School (MS(EE)-1956) and the University of California at Berkeley (Ph.D. (Eng. Sci.) 1961).

His awards include the Bronze Star medal and Navy Commendation medal for service with the USS Enterprise and a Gold Star in lieu of a second Bronze Star medal for operations performed while Commanding Officer of the USS Cleveland.

NEW DEAN OF RESEARCH

Dr. Robert R. Fossum has been named the new Dean of Research Administration. He will replace Dr. John M. Wozencraft who resigned in order to return to Lincoln Laboratories at MIT. Dr. Fossum comes to NPS from the Electromagnetic Systems Laboratories in Sunnyvale, Ca., where he was vice president and general manager.

He has published in the areas of atmospheric acoustic propagation, intelligence analysis, statistical meteorology, and the design of electronic reconnaissance systems. He is an associate member of the Scientific Advisory Committee of the Defense Intelligence Agency. He is a member of the Advanced Research Projects Agency/Defense Nuclear Agency Long Range R&D Planning Program (Advanced Technology Panel) and has been an observer on the Defense Science Board Net Technical Assessment Task Force. He has also been a member of the software coordinating group, WEMA.

BROWN AND WALDEISEN
JOIN OR/SA FACULTY

Ensign Gerald (Jerry) Brown, USN, came to NPS for his three year active duty tour as an assistant professor in July of 1973. His teaching abilities and broad background in computer programming, statistical analysis, and OR methodology have made him an outstanding addition to the OR faculty.

He earned a Ph.D. in operations research with minors in computer science, mathematics, and statistics from UCLA. He has coauthored nine papers which have been accepted for publication in technical journals. Currently he is working with Associate Professor Gordon Bradley on the development of large scale network flow algorithms.

LCDR Lewis E. Waldeisen joined the OR/AS faculty as an Assistant Professor in July 1974. He brings to NPS a wealth of military experience in the area of Human Factors.

His most recent tour prior to coming to NPS was as the Human Factors Project Engineering Program Manager for the LAMPS MK III Helicopter Development Program at the Naval Air Development Center in Warminster, Pennsylvania.

He earned his Ph.D. in human factors engineering psychology from Texas Tech University and has the designation of Navy Aerospace Experimental Psychologist.
NEW PH.D.'S

Six Ph.D. degrees in Operations Research were awarded during this past year. Recipients at the June 1974 graduation were LT James R. Capra, LCDR Richard D. Haskell, and LCDR William J. Hayne. Recipients at the September 1974 graduation were LCDR John Y. Schrader and LCDR Robert D. Rantschler. The recipient at the December 1974 graduation was KKPT Harold Ziehms (Federal German Navy).

In addition, four officers were advanced to candidacy for the degree after successfully passing their comprehensive exams. They are LT Dennis A. Altergott, LCDR Merlin G. Bell, LCDR William E. Daeschner, and LT David W. Robinson.

New students in the Ph.D. program include LTjg John D. Finnerty, George R. Humfeld (civilian) and CDR T. J. Lo (Republic of China).

OR THESES TOPICS

Since publication of the last issue of "O.R. NEWS," eighty theses have been written by officers receiving the Master of Science degree in Operations Research. The following partial list contains titles of unclassified theses written by U.S. officers. Fourteen classified theses were also written.

SEPTEMBER 1974

Bosworth, Paul Raymond, LCDR, USN (SC) Small Purchase (Under $2500) Processing Model for Naval Supply Centers.

Branum, Richard Cline, LT, USN A Cost-Effectiveness Comparison of a Fossil-Fueled versus a Low-Specific-Weight Nuclear Powered 2000-Ton SES.

Burin, James Michael, LT, USN A Risk and Comparative Analysis of Aircraft Accident Data.

Crews, Jeffrey Wiley, ENS, USN, and Cummings, Jeffrey Williams, ENS, USN Personality and Performance.
OPTIMIZING TACTICAL DECISIONS

Associate Professor James Taylor, has been doing research for ONR (Naval Analyses Programs) on optimal time-sequential firesupport allocation. This work has sought to develop insights into optimal firesupport strategies (i.e. the structure of optimal strategies and their dependence on factors in the tactical decision problem such as combatant objectives, model of combat dynamics, model of conflict termination, etc.) by combining combat modelling theory with optimization theory. In order to get a handle on time-sequential aspects, Taylor has been considering Lanchester-type models of warfare in this work (in much the same fashion as previous research reported in Naval Research Logistics Quarterly issues of September 1972, December 1973, March 1974, and December 1974). Consequently, time-sequential tactical decision problems, such as distribution of supporting fires or target engagement, have been considered within the framework of optimal control/ differential game theory.

Taylor recently presented a tutorial entitled "Lanchester-Type Models of Warfare" (invited by the Military Applications Section of ORSA) at the San Juan ORSA meeting and has been invited to repeat the presentation at the 35th Military Operations Research Symposium to be held at the U.S. Naval Academy. Taylor will be working group chairman at a future ONR conference on fire support to be held at NPS in August 1975.

ENVIRONMENTAL PROJECT

Assistant Professor Marlin Thomas has been actively involved with the Naval Facilities Engineering Command Research and Development Program in their efforts to improve existing methods of removing and recovering harbor oil spills. A large scale effort commenced in 1971 to develop removal/recovery systems capable of dealing with small to moderate spills typically occurring in the coastal environments of Navy harbors. This work, consisting primarily of hardware, has been coordinated by the Naval Civil Engineering Laboratory at Port Hueneme, California. Professor Thomas has been working with NAVFAC to identify program gaps and develop an overall program evaluation model to assist decision makers in environmental planning. Associate Professor Gary Poock has assisted in this project by conducting a man-machine analysis of the various harbor oil skimmers used by the Navy to remove oil spills, identifying human and safety factors involved.

Professor Thomas is also involved with the Construction Program of NAVFAC. Along with Assistant Professor Russell Richards and Associate Professor James Hartman, he is working on a workload planning model to assist engineering field divisions in making allocations of manpower and related resources to meet project requirements at work centers.

BIORHYTHMS RESEARCH

Assistant Professors Douglas Neil and Thomas Wyatt are receiving international attention for their studies of a controversial theory on human biorhythms. The theory with which they are working is now being looked into by airlines and other branches of industry in hopes of cutting accident rates.

The theory was developed in Europe between 1900 and 1920 and was based entirely on subjective interpretations of observations of human behavior according to Professor Wyatt. Neil and Wyatt are trying to appraise the validity of the theory by making objective observations.

The theory suggests that each person has three distinct life rhythms: physical, intellectual, and emotional, with cycles of 23, 28 and 33 days, respectively. These cyclical ups and downs begin at birth (when all start upward) and continue throughout life. Positive and negative phases of each cycle correspond to ups and downs in performance potential. In addition, there are critical days when the system shifts from positive to negative or negative to positive on each cycle. When crossovers on two or three cycles come on the same day, it might be dangerous for a person to undertake a task involving the safety of others.

(continued on page 8)
BIORHYTHMS RESEARCH

(continued from page 7)

Apparently a Japanese railroad has been scheduling its engineers based on critical day information, and their accident rate seems to be going down. United Airlines at National Airport in Washington, D.C., has reportedly cut its accident rate in half since it began a program one year ago of cautioning ground crew people on their critical days. Allegheny, Pan American, Transworld and Continental Airlines are also said to be looking into biorhythms in an effort to make air travel safer.

At NPS a series of tasks relating to intellectual or emotional activity have been devised by Navy Lieutenants Francis Sink (OR graduate, September 1974) and William Cobb (OR student), whose subjects repeat the tasks over periods of time under controlled circumstances. On the physiological level, studies are being made of EEG, heart-rate and diary data. Subjects are keeping diaries showing hours of sleep, weight, dream activity, digestion, etc. Following a statistical technique developed by LT Louis Giannotti (OR graduate, September 1974), they process the data by computer. From these experiments a pattern is emerging. It shows a picture of human performance varying with a definite periodicity. These periods correspond to a significant degree with the postulated 23, 28 and 33-day cycles of the theory.

Studies of accident data have also been productive. In one study involving 66 accidents in a Canadian pulp plant, Professor Neil and LT Giannotti found that twice as many accidents occurred in negative phases of the physical cycle as in positive phases. In the same study, only one lost-time accident occurred in the positive phase, whereas 11 took place in the negative phase. Such proportions are far out of line with mere chance.

Another study was made of 127 industrial accidents with all three biorhythms being considered. It was found that, while accident days definitely correlated with physical and intellectual rhythm phases, they appeared surprisingly unrelated to the emotional rhythm.

With aircraft accident data there is a particular difficulty, Neil says. "It's often hard to tell for sure where design error enters the picture; you have to be very careful about that in sorting out your statistics." Other accident-causing factors, such as weather, equipment failure, and errors on the part of other crew members, must also be screened out.

Wyatt and Neil hasten to point out that the biorhythm theory is still just that, a theory. In a paper presented at the National Safety Congress in Chicago last October, Neil concluded: "If it does turn out to be correct, it isn't going to be a panacea that will end all aircraft crashes and other accidents. This can be considered just one of the sources of day-to-day variation in performance. Any program directed at reducing accidents and increasing productivity must not restrict itself to the consideration of a single factor."

If the theory can be confirmed the implications to the military are many. Accident-free operation of aircraft and other equipment is but one potential area of application.

NATIONAL MEETINGS IN CY'75

ORSA/TIMS Joint Meetings
30 April-2 May Chicago, Illinois
17-19 November Las Vegas, Nevada

Military Operations Research Society (MORS)
1-3 July Naval Academy, Annapolis, Md.

Human Factors Society (HFS)
14-16 October Dallas, Texas

American Institute of Industrial Engineering (AIIE)
21-23 May Washington, D.C.
19-21 November Las Vegas, Nevada
FACULTY TOURS AT NAVTELCOMM

Approximately three years ago a resident professorship program was set up between the Naval Postgraduate School and the Naval Telecommunications Command in Washington, D. C. by Admiral Gravely. A professor from the NPS spends one or more quarters at COMNAVTELCOMM learning about Navy telecommunications problems by working on a specific telecommunications problem. The faculty are able to contribute in their areas of expertise. The recent resident professors have been working with the Naval Telecommunications Architecture Group (NTSA).

Professor Alan McMasters from the OR/AS Department of NPS was the most recent visitor in this program. He spent the fall quarter as a member of the architecture group and found the visit to be very educational. He plans to offer an elective course at NPS in communications network flows to the Information Systems (TELECOMMUNICATIONS) students as a consequence of his visit and his teaching of OA 4633 (Network Flows and Graphs) to second year OR students.

During his visit at NTSA, Professor McMasters and a member of NTSA conducted two cost analyses. The first examined the impact of secure voice bit rate on life cycle costs for telecommunication hardware planned for the 1980 to 1990 time frame by the Naval Telecommunications System (NTS), by the Defense Communication System (DCS), and by the all-service tactical communications system (TRI-TAC). The results of the analysis were then used to cost out five options representing varying degrees of interoperability between the three systems. McMasters hopes that the cost analysis of these five options will allow military decision makers to appraise the trade-offs between each system's secure voice bit rate and the extent to which they want secure voice interoperability between the three systems.

Other NPS faculty that have spent a quarter at COMNAVTELCOMM or with the Naval Telecommunications Architecture Group are: Rusty Baycura (E.E.), Gil Howard (OR/AS), Jim Hynes (OR/AS), Jim Jolly (OR/AS), Fred Klamm (E.E.), Art Schoenstadt (Math), Al Washburn (OR/AS), and Hans Zweig (OR/AS).

PARTICIPANTS AT ORSA MEETINGS

The Western Section of ORSA held their most recent meeting at NPS on 6-7 March 1975. Session chairmen included Professors Gordon Bradley, James Esary, Alan McMasters, James Taylor, and Marlin Thomas. Papers were presented by Professors Gerald Brown and Norman Schneidewind. The meeting committee consisted of Professors Richard Butterworth, Kneale Marshall, and Robert Stephan. In the election held just prior to the meeting Professor David A. Schrady was elected Secretary-Treasurer of the Western Section.

The spring national meeting of ORSA/TIMS will be held on 30 April, 1-2 May 1975 in Chicago, Illinois. Professor Gordon Bradley will chair the session on integer programming and Professor Donald Gaver will chair the session on OR applied to computer systems. Papers will be presented by Professors Bradley, Gerald Brown, Gaver, Norman Schneidewind, James Taylor, Marlin Thomas and Donald Barr. Professor David Schrady will be a panelist in the session on current trends in military operations research.

The program for the fall meeting of ORSA/TIMS to be held on 17-19 November 1975 in Las Vegas will have MAJ James F. Lloyd, Jr., USMC (ROL-9, now at HQMC, Washington, D.C.) chairing the session on gaming and simulation in support of studies, analysis, test, and evaluation, Professor Gaver chairing the session on queueing systems, Professor Neagle Forrest and Professor Stephan Pollock (now at the University of Michigan) chairing the session on search and detection. In addition, a panel discussion on education in operations research and management science will be cochaired by Professor David Schrady and Professor Richard Burton (now at Duke University).
BURNETT, VISITING PROF
AT ANNAPOLIS

Professor Tom Burnett is spending this fiscal year at the Naval Academy as a Visiting Research Professor in the Department of Management Science (OA Study Group). His position is sponsored by OP-095 (ASW and Ocean Surveillance Programs). Professor Burnett is teaching courses in statistics and OR methodology and is directing projects of the senior midshipmen.

PROMOTIONS AND TENURE

During this past spring Kneale Marshall was promoted from Associate Professor to Professor; Tom Burnett, Russell Richards, Marlin Thomas, and Alan Washburn were promoted from Assistant Professor to Associate Professor.

Tenure was awarded this past year to Associate Professors Bruno Shubert and James Taylor.

SCHOLARSHIP FUND

A fund has been established by the Naval Postgraduate School Foundation, Inc., to award scholarships to dependents of onboard NPS students and staff. A total of $3,050 in scholarships was awarded last year. These awards are designed to encourage good scholarship, and are awarded strictly on the basis of the student's achievement and potential for success in college.

Contributions are tax deductible, and are welcome from alumni and other friends of NPS. Checks should be made to the NPS Scholarship Fund, and may be mailed to the Dependents' Scholarship Fund, Code 006, Naval Postgraduate School, Monterey, California 93940.

QUESTIONNAIRE RESPONSE

The last newsletter (April 1974) contained a questionnaire soliciting responses from the alumni about the course content of the OR curriculum. The responses from such questionnaires are extremely helpful as the OR curriculum is continuously changed to meet the needs of the services. A total of 788 alumni received the newsletter and, of these, 172 responded (21.5% of the population). A majority of the responses came from those graduating since 1968 although there were responses from as far back as 1955.

In the category of the course taken which was considered most useful since graduation, the basic probability and statistics courses were considered most useful by 63 respondendes (36% of 172). Courses in advanced modelling rated second with a total response of 49 (29%). In this category the courses receiving the most responses were stochastic modelling, inventory, reliability, and networks. Courses in computer programming and simulation rated third with a response of 29 (17%) and courses in economics and systems analysis rated fourth with a response of 24 (12%). Applied statistics, mathematical programming, and others (game theory, underwater acoustics, human factors, and physics) received responses of 18 (10%), 13 (7%), and 15 (9%) respectively.

The response to the question of increased or decreased emphasis in certain areas is summarized in the following table:

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Finally, more emphasis on the use of case studies and actual "real world" problems was recommended.
CURRICULAR OFFICER'S NOTES

On-Board Count

January 75 saw the OR/SA on-board count to be 87 USN, 24 USA, 1 USMC, 3 USCG, and 34 International students--a small enrollment compared to past years. Some of the reasons are shortage of USN LT's, budget constraints, and current large inventory of USN analysts.

Program Changes

Among the more significant changes to the curriculum this past year are:

1. Development of a "Campaign Analysis" course in response to a need identified by OP-96. This elective course is intended to enable the student officer to use his analytical skills to productively participate in military campaign analysis/force level studies without prolonged on-the-job indoctrination.

2. The course, "Search Theory and Detection," is now required for all USN line officers. Previously, it was only required for students in the Operations Evaluation (Navy) option.

3. Requirement for each OR/SA student to present a seminar consisting of a 30-minute briefing on his thesis, followed by 20 minutes of discussion. These seminars are attended by the thesis advisors, curricular officer, academic associate, and are open to all students and faculty.

Curricular Brochures

You can catch up on School activities through the new pocket-size brochures now in the mail to ships and shore stations, giving the latest information on some eighteen different curricula in the School's regular program offerings. Your copy of the OR/SA brochure is included with this newsletter. If you are not up-to-date with the School, you'll be surprised at some of the changes and the diversity of curricula. Look for them in ready rooms, information centers, libraries, etc., or write for copies. The brochures are intended to spread wider knowledge of the opportunities for postgraduate education among eligible officers; you can help by making the existence of these brochures known to them.

Army Experience Tours

U.S. Army students in the OR/SA curriculum continue to make significant contributions while on experience tour. CPT Rich Adkins (INF) developed the conceptual design for operational test of the STINGER Man-Portable Air Defense System during his experience tour at the Operational Test and Evaluation Agency, Ft. Belvoir. CPT Chan McKeen (ARMOR) worked with the Tank Special Study Group at the U.S. Armor Agency, Ft. Knox, in specifying requirements for the new main battle tank. CPT Pat Toffler's (INF) experience tour was with the Office of the Deputy Undersecretary of the Army for Operations Research. While there he did analysis which suggested significant simplifications to the current system of measuring weapon effectiveness indices.

Coleman and Mackey Win CNO Awards

The Chief of Naval Operations Award for excellence in Operations Research is presented semi-annually to an outstanding U.S. Navy or Marine Corps graduate of the Operations Research curriculum. The award is made on the basis of academic record, performance during a student's experience tour, and faculty recommendations. This year's recipients were LT Richard L. Coleman (September 1974) and LT William C. Mackey, III (March 1975).

LT Mike Jordan, CVW-7 in the News

LT Mike Jordan, currently an OR student, made the August 1974 issue of Naval Aviation News in an article entitled "LT Jordan, CVW-7 Paddles." The five page pictorial article describes his activities as the LSO on the carrier USS Independence, just prior to his entering the OR curriculum in September of 1973.

J. CYR
Curricular Officer
EDITOR'S MEMO

EDUCATION PAYOFF

Has your OR education payed off in savings, direct or indirect to your military service? If so, we would like to hear about your work. This type of information is extremely important to the future of the curriculum and NPS in general in these times of budget cut-backs. Since this information would also be of interest to other alumni, we would like to print any such reports in future newsletters.

THE MARINES HAVE BEEN FOUND

Thanks to the efforts of MAJ Marshall Carter (1969) who is now at HQMC in Washington, D.C., we now have a file of the names and addresses of most of our Marine alumni. If any of you that we might have missed with previous mailings of our newsletter would like back issues, just drop me a card.

ARMY ADDRESSES NEEDED

A reminder is appropriate to all Army alumni that you must notify us of address changes since your personnel people have asked not to be involved. The addresses of the following nineteen alumni are not known (many failed to notify us after leaving the Command and General Staff College at Ft. Leavenworth). We would appreciate receiving their current addresses if they are known to any recipients of this edition of O.R. NEWS.

Major Carlton E. Bacon
Captain James H. Capps
Lt. Col. Alton H. Coleman
Lt. Col. Robert V. Dennis
Major R. E. Douglas
Major Daniel M. Eggleston, Jr.
Captain Gene R. Farmelo
Captain G. A. Fisher
Major Craig A. Hagan
Major Jan V. Harvey
Lt. Col. Kenneth K. Ikeda
Major George D. Lenhart
Major Richard V. Oehrlein
Major David S. Price
Major John P. Riceman

OR THESES TOPICS

(continued from page 6)

Van Asdlen, David Lester; LT, USN, and Wahlig, Leonard Otto, LT, USN
A Numerical Solution for Time Dependent, Multi-Channel Queues and an Application to the Acute Minor Illness Clinic, Silas B. Hays Hospital, Fort Ord, California.

MARCH 1975

Adkins, Richard C., CAPT, USA
Analysis of Unit Breakpoints in Land Combat.

Clark, David Robert, CAPT, USA
An Integrated Model of a Representative Defense Contractor.

Corsey, John William, Jr., LT, USN
An Analysis of Enlisted Recruit Processing Flows.

Leonhart, Richard John, LCDR, USN and Schlegelmilch, Charles Robert, LCDR, USN

Moore, Raymond Edward III, LT, USN

Peck, David Lyman, LT, USN
Verification of the Exponential Approximation of First Passage Times in a Birth/Death Model for Dynamic Surveillance in ASW.

Robbins, Alan Richard, LT, USN
Causal Factors of Collisions at Sea.

Shields, Charles Daniel, Jr., LCDR, USN
Supply versus Demand as a Tool for Recruitment of U.S. Naval Officers.

Wood, Stephen Carl, LT, USN
Modelling Congressional Decision Making for Defense Spending.
"OUTSIDE THE CLASSROOM"

During their courses of study at NPS, OR students have often sought to apply knowledge gained to both military and non-military problems. In the latter category, three students have been successful in entering contests of the type involving guessing the number of objects contained in a specified area or volume. LCDR Angelo Cicolani (OR graduate, September 1969) began the tradition several years ago by guessing the number of beans in a huge treasure chest at the Monterey County Fair. He was the winner and walked off with a number of prizes contributed by local merchants. More recently, LT Dietmar Sacher, Federal German Navy (OR graduate, September 1974), won a $50 third prize in a contest to guess the number of Christmas lights adorning the roofs of the buildings in Del Monte shopping center.

The latest winner, and recipient of the largest benefits to date, is LT Dave Peck, who graduated this past March. The following contents of a memorandum circulated among the faculty by Assistant Professor Gerald Brown describes the typical winning analytical techniques of the contest winners.

"LT Dave Peck, USN, supplied me with the following description of his recent practical experience:

'Shasta cola just offered a contest to guess 'the number of 12-oz Shasta cans required to fill the inside of an AMC Gremlin' with ten 1975 Gremlin automobiles and a year's supply of Shasta as first prizes. The number of entries per individual was unlimited, with the closest guesses received being the winners.

I visited a local AMC dealer and calculated the volume of a Gremlin by estimating the sideview area, less seats, and multiplying by the average interior width. (The rectangular design of this car doubtless helped reduce the variance of my estimate.)

Next, an experiment was conducted to estimate the volume per 12-oz Shasta can. Since contestants were not told whether cans were to be neatly stacked or simply thrown into the car, a box of known volume was used with both packing schemes. A sample mean and variance for volume per can was thus determined, and used to construct a '3σ' confidence interval. The 'constant' car volume was then divided by the mean and end points of this confidence interval to give an interval for the number of cans required to fill a Gremlin. (Note: \( \mu = 3300 \) cans.)

Finally, I submitted a range of entries spread over the confidence interval in a unimodal, symmetric fashion. $15 was thus invested for 150 stamps.'

When presented with Mr. Peck's analysis, I immediately (instinctively) interrupted to point out several of the more obvious theoretical weaknesses in his design—for instance, his analysis of the ratio of two highly biased estimators (?) with the strong, if not explicit, assertion of normality for the quotient.

Mr. Peck, after politely hearing me out, reluctantly presented his registered letter of congratulations from Shasta.

Unfettered by the nuances of statistical transformations, incognizant of the robustness of theorems misapplied, and unworried by the vagaries of physical measurement, Mr. Peck had submitted a winning entry which was exact."

EDITORIAL STAFF

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Associate Professor and OR/SA Academic Associate

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OR/SA Curricular Officer
CHANGE OF ADDRESS NOTICE

Name _______________________________ Rank _____ Service ______

New Address ____________________________________________

_____________________________________________________

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Editor's Note: To send us your change of address, just remove this page, fold it in thirds as you would a letter (with the Superintendent's address and the blank third on the outside), staple it together, and drop it in the mail.
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