

Performance Based Statement of Work

Teaching OA3602 Search Theory and Detection

Naval Postgraduate School Department of Operations Research

1.0 Background/Introduction

Operations Research (OR) originated during World War II as a response to tactical problems relating to the effective and efficient operation of weapon systems, and to operational problems relating to the deployment and employment of military forces. Since then, OR has evolved into a full-scale, scientific discipline that is practiced widely by analysts in industry, government, and the military.

OR is the science of helping people and organizations make better decisions. More formally, it is the development and application of mathematical models, statistical analyses, simulations, analytical reasoning, and common sense to the understanding and improvement of real-world operations. Improvement can be measured by the minimization of cost, maximization of efficiency, or optimization of other relevant measures of effectiveness.

The military uses OR at the strategic, operational, and tactical levels. OR improves decision making and facilitates insights into the phenomena of combat. OR applications cover the gamut of military activities including: national policy analysis, resource allocation, force composition and modernization, logistics, human resources (recruiting, retention, promotion, training, and personnel assignment), battle planning, flight operations scheduling, intelligence, command and control, weapon selection (weapon system effectiveness, cost, compatibility, and operability), engagement tactics (fire control, maneuver, target selection, and battle damage assessment), maintenance and replenishment, and search and rescue.

Searching and detecting enemy movement on land, at sea, under sea, and within air and space is an obvious critical element in the support and defense of our nation. Search and detection presents challenging efforts, relying heavily on Math models to pinpoint enemy assets. Math models are the tools of the trade, and to search and detect enemy assets one must understand the relationships among data, data collection, math models, and interpreting and analyzing of the results.

OA3602 presents students with “Search Theory and Detection” as a set of stochastic processes. Students are introduced to characterization detection devices and uses, and interpretations of sweep widths, lateral range curves, and true range curves. Data collection is assessed. Measures of effectiveness of search-detection systems are developed and analyzed. Techniques in allocating search efforts and sequential searches are also presented, developed, and analyzed. Students are introduced to the statistical theory of signal detection, in addition to models of surveillance fields, barriers, tracking, and trailing.

2.0 Scope

The Department of Operations Research at the Naval Postgraduate School (NPS) has an immediate requirement for contractual services to deliver one section of OA3602 in the Spring Quarter of Academic Year 2016.

3.0 Tasks

The contractor shall perform the following tasks:

- 3.1** The contractor shall update a government-provided course syllabus that articulates the learning objectives, the enabling objectives, and the grading criteria and deliver it to the OR Department Technical Point of Contract (TPOC) by 15 March 2016.
- 3.2** The contractor shall update government-provided lecture materials and store them on a Sakai site for student access by 15 March 2016.
- 3.3** The contractor shall lecture for four hours per week and conduct one 1-hour lab, as assigned by the NPS Scheduler.

- 3.4 The contractor shall develop homework assignments and solutions and/or projects to support the learning environment.
- 3.5 The contractor shall periodically evaluate student progress through a series of homework assignments, quizzes, and/or exams.
- 3.6 The contractor shall develop a final, comprehensive examination that will be issued to the students during final exam week.
- 3.7 The contractor shall maintain a minimum of four hours of “office hours” per week for students to receive additional one-on-one assistance.
- 3.8 The contractor shall submit student grade recommendations to the OR Department TPOC by 24 June 2016.

4.0 Deliverables

The contractor shall be responsible for preparing the following deliverables in support of the tasks identified in this PBSW.

- 4.1 Course syllabus
- 4.2 Reviewed and updated course materials
- 4.3 Contractor-developed homework assignments, quizzes, and/or exams
- 4.4 Contractor-developed final exam
- 4.5 Course student grade recommendations

Performance Work Summary – Quality Assurance Surveillance Plan

Task	What will be inspected	Acceptable Quality Level (AQL)	Method	Frequency
3.1	Course Syllabus	Contains appropriate learning and enabling objectives. Must establish weekly learning topics, homework assignments, and grading criteria. To be delivered to the Operations Research Department TPOC by 15 March 2016.	100% Inspection	Once prior to beginning of the course.
3.2	Updated and Reviewed Lecture Materials	Course materials must be uploaded onto the designated Sakai site by 15 March 2016.	100% Inspection	Once prior to beginning of the course and/or as materials become updated or changed
3.3	Teach the class	Lecture for four hours per week and conduct one 1-hour lab, as assigned by the NPS Scheduler.	Observe class	Randomly inspect. Assess Student Opinion Form at the end of the course.
3.4-3.6	Homework, Quizzes, and/or, Exams and Final Exam Results	Academic quality in editable format to be reviewed by OR TPOC before uploaded to Sakai	100% Inspection	As developed before upload to Sakai
3.3-3.7	Student Status	Notification of any student who has not successfully passed an exam or project to the Academic Associate or the Program Officer. Instructor must provide grades to the	100% Inspection	During the entire course

3.8	Suggested Recommended Grades	Department Chair by 24 June 2016.	100% Inspection	End of course
-----	------------------------------	-----------------------------------	-----------------	---------------

The surveillance method for the deliverables listed above will be personal observation at NPS. If performance falls below the AQL defined above, the Contracting Officer's Representative (COR) shall document the instance(s), coordinate with the Contracting Officer and advise the Contractor. The Contractor will be requested to review the documentation and provide a written response on how performance will be corrected in the future. Re-performance of any work for failure to perform in accordance with the specified AQL or task requirement shall be completed at the Contractor's own expense and at no additional cost to the Government.

5.0 Minimum Technical Requirements

- The contractor must have a minimum of a Ph.D. in Operations Research or a closely related academic field, with a strong emphasis on probability and statistics.
- The contractor must have three years of operational experience in a Search and Detection environment.
- The contractor must have three years of academic experience with search and detection theory, techniques and processes, including sonar models, convergence zones, and sensor models.
- The contractor must have three years of experience creating and assessing mathematical models including Markov chains, game theory, regression, multiple regression, non-linear regression, and non-Homogenous Poisson Processes.
- The contractor must have five years of experience teaching technical courses in a graduate, resident environment.

6.0 Period of Performance

15 March 2016 through 24 June 2016.

7.0 Place of Performance

Glasgow Hall, Naval Postgraduate School.

8.0 Government Furnished Property

The contractor will be given an office in which to work and maintain office hours. The office will contain an appropriate computer, telephone, internet access, desks, chairs, and bookshelves to support teaching.

9.0 Work Week and Hours of Operation:

The Contractor shall provide services during normal working hours excluding federal holidays. Normal working hours are 0730-1630, Monday through Friday, unless requirements dictate otherwise. Exceptions can be permitted by the COR upon request and at the COR's discretion.

Following is a list of holidays observed by the Government.

<u>Name of Holiday</u>	<u>Time of Observance</u>
New Year's Day	1 January
Martin Luther King Jr. Day	Third Monday in January
President's Day	Third Monday in February
Memorial Day	Last Monday in May
Independence Day	4 July
Labor Day	First Monday in September

Columbus Day	Second Monday in October
Veteran's Day	11 November
Thanksgiving Day	Fourth Thursday in November
Christmas Day	25 December

If any of the above holidays occur on a Saturday or a Sunday, then such holiday shall be observed by the Contractor in accordance with the practice as observed by the assigned Government employees at the using activity

10.0 Travel: Not required or authorized.

11.0 Security Requirements:

Contractor Key Personnel must be U.S. Citizens or possess a SECNAV waiver.

12.0 Privacy Act Statement:

“Pursuant to Title 5 United States Code 552a(m)(1), the contractor and all employees of the contractor working under this contract are required to comply with the requirements of 5 U.S.C. 552a (“The Privacy Act of 1974”).”

13.0 Identification of Contractor Employees:

In accordance with DFAR 211.106, there shall be a clear distinction between Government employees and service contractor employees. Service contractor employees shall identify themselves as contractor personnel by introducing themselves or being introduced as contractor personnel. Contractor personnel will be required to obtain and wear badges or other visible identification for meetings with Government personnel to provide a clear distinction between service contractor employees and Government personnel. In addition, contractor personnel shall appropriately identify themselves as contractor employees in telephone conversations and in formal and informal written correspondence. They must also ensure that all documents or reports produced by contractors are suitably marked as contractor products or that contractor participation is appropriately disclosed.

14.0 Non-Personal Services Statement:

Contractor employees performing services under this order will be controlled, directed, and supervised at all times by management personnel of the contractor. Contractor management will insure that employees properly comply with the performance work standards outlined in the SOW. Contractor employees will perform their duties independent of, and without the supervision of, any Government official or other Defense Contractor. The tasks, duties, and responsibilities set forth in the task order may not be interpreted or implemented in any manner that results in any contractor employee creating or modifying Federal policy, obligating the appropriated funds of the United States Government, overseeing the work of Federal employees, or otherwise violating the prohibitions set forth in Parts 7.5 and 37.1 of the Federal Acquisition Regulation (FAR). The Government will control access to the facility and will perform the inspection and acceptance of the completed work.