

Educational Skill Requirements (ESR)

Monterey, September 2009

Modeling, Virtual Environments, and Simulation (MOVES) - Curriculum 399

Subspecialty Code: 6202P

6202 Subspecialists are the Department of Defense's (DoD) experts in Modeling, Virtual Environments and Simulation. Modeling and Simulation (M&S) is a discipline that uses models – including emulators, prototypes, simulators, and stimulators – either statically or over time, to develop the data needed for making managerial or technical decisions. Such data and phenomena are often visualized in virtual and augmented environments, facilitating efficient data manipulation and the users' perceptual immersion, all essential for effective analysis, training and operation.

All 6202 Subspecialists can design, build, manage and apply Modeling, Virtual Environments, and Simulation best practices and tools in support of training, analysis, acquisition, testing and operational capabilities. The Subspecialists have highly developed analytical and critical thinking skills, and the ability to innovate and solve domain problems. They have also completed a program of original research, culminating in a Masters Thesis. 6202 Subspecialists are proficient in the general principles of M&S and have acquired in-depth knowledge about select areas of concentration.

6202 Subspecialists can, for example:

- manage virtual environment technology and help solve human-machine interaction problems;
- employ virtual environments for treating post-traumatic stress disorders;
- define and apply next-generation combat models to real-world problems;
- apply modeling and simulation to facilitate the DoD acquisition process;
- evaluate operational and training effectiveness and human performance in virtual environments and apply this to performance in real environments.

All subspecialists earning an advanced degree in compliance with the 6202 subspecialty code obtain skills and competencies in the following areas:

1. **History and fundamentals of M&S:** The officer will have competence in the history and fundamental concepts of Modeling and Simulation (M&S), with a focus on DoD M&S.
2. **Applied mathematics:** The officer will have a practical understanding of linear algebra, discrete mathematics, statistics, data analysis, stochastic modeling and experimental design, as well as their effective application in the domain of M&S.
3. **Computer systems:** The officer will have a sound understanding of computer programming, software development, networks, and distributed simulations.
4. **Virtual environments:** The officer will be knowledgeable in computer graphics, virtual and augmented reality, visualization, and simulation systems.
5. **Training and human systems:** The officer will have a sound understanding of human systems engineering, training systems, human behavior modeling and human performance evaluation.
6. **M&S systems lifecycle management:** The officer will be knowledgeable in systems engineering management, requirements analysis, program management and policy, and acquisition.
7. **Modeling:** The officer will be knowledgeable in system modeling, combat modeling and modeling physical phenomena, including verification, validation and accreditation (VV&A).
8. **Joint Professional Military Education (JPME)** per community requirements: The officer will develop an understanding of warfighting within the context of operational art, to include: national military capabilities and command structure, joint and service doctrine, joint planning and execution, and joint and multinational forces and systems integration at the operational level of war. This requirement is fulfilled by completing the Naval War College four-course series leading to Service Intermediate-level Professional Military Education and Phase I JPME credit.

Specialization: Each 6202 Subspecialist will select a number of areas of specialization that integrate Modeling, Simulation, and Virtual Environments in DoD systems, practices and operations. These specializations require further emphasis in particular areas of study, both through completing the appropriate sequences of courses and conducting original research for a Masters thesis.

Area specializations might include:

- Environmental models, 3D modeling, and web-based technologies;
- Game-based systems, computer animation and computer vision;
- Discrete event simulation;
- Advanced combat modeling, including social, cultural and behavioral modeling;
- Training systems and human factors.