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| **DoD Modeling and Simulation Competencies**  |
|  | **Competency** | **Behavioral Indicators** | **Description (Knowledge, Skills, & Abilities)**  |
| **1** | **Analyze, Evaluate, Instruct, Train, or Experiment**  | Analyze, evaluate, instruct, train, or experiment with models, simulations and/or decision support tools. | Knowledge to know which models, simulations, or decision support tools can be used to support analysis, evaluation, instruction, training or experiment. The skill to operate the tools needed to meet the needs and ability to interpret the output and apply it in a meaningful way. |
| **2** | **Apply, Develop and/or Integrate Models or Simulations**  | Apply, develop and /or integrate models or simulations to include tools used in: offices; analysis-of-alternatives; systems analysis; engineering (design, systems, computer, electronic, electrical, mechanical and aerospace); systems-of-systems engineering and analysis; physics-of-failure modeling; the acquisition life-cycle; cost analysis; scientific research; competency and combat training; information technology (computer programming and system administration, network support, coordination of technical requirements, validation); operations research systems analysis (ORSA); medical research and training; developmental and operational test and evaluation; collaborative environments; reliability, availability and maintainability (RAM); or Command, Control Communications and Computers (C4) networking. | Knowledge to know when a new model or simulation (M&S) is needed, or how to apply or integrate existing (M&S) to a requirement. Skill to apply the tools or develop new ones to meet your specific needs and the ability to use the output in a meaningful way. |
|  | **Competency** | **Behavioral Indicators** | **Description (Knowledge, Skills, & Abilities)**  |
| **3** | **Artificial Intelligence (AI) Systems**  | Design, develop, apply, and manage computer controlled human behavior models that consist of perception of the environment, cognitive understanding of the state of the world, decision selection techniques, and orders implementation within the context of a kinetic and non-kinetic mix of live and synthetic natural environments. | Knowledge of agent based modeling, artificial intelligent systems, genetic algorithm techniques, machine learning, AI based search algorithms, and complex adaptive systems. The skill to select and apply the correct AI technique to gain insight or solve a question in the military domain. Ability to analyze, craft, and code software to implement any of the required AI techniques. |
| **4** | **Battle Command Knowledge Management**  | Integrate, incorporate, and facilitate Battle Command Knowledge Management people, processes, and technology across all levels of the Services as they apply to modeling and simulation. | Knowledge of knowledge management and the skill to integrate it with models and simulations. |
| **5** | **Computer Programming** | Design, program, analyze, and test M&S software applications with human system interface requirements in the model, view, controller paradigm to meet a software specification using object oriented programming, standard military integrated development environments (IDEs), and common application programming interfaces (APIs). | Knowledge of military programming languages, production coding techniques, developmental testing procedures, and human interface technologies. The skills to write, compile, execute, analyze, test, and debug small and large software applications needed for military M&S supported events that can include non-traditional human interface devices, such as augmented reality. Ability to perform as a technical contributor or a manager of geographically dispersed software development teams working in version controlled collaborative programming environments. |
| **6** | **Conceptualize, Develop, Implement, Integrate and Evaluate**  | Conceptualize, develop, implement, integrate and/or evaluate techniques for software modeling, simulation and wargaming. | Knowledge of conceptual modeling. Skill to evolve a conceptual model to develop a model or simulation (M&S). Ability to develop a M&S that meets the needs of the conceptual model. |
|  | **Competency** | **Behavioral Indicators** | **Description (Knowledge, Skills, & Abilities)**  |
| **7** | **Cyber Security for DoD C4I and M&S Concerns** | Provide expert technical advice on the cyber security of models or simulations and connection requirements to DoD C4I systems in a net centric environment by adhering to and applying approved cyber security best practices. | Knowledge of DoD cyber security organizations, policies, roles, and responsibilities. The skill to conduct and document cyber security in accordance with the above during the entire life cycle of an M&S application or system, including designing cyber security from the conception stage and receiving an authority to operate (ATO) or authority to connect (ATC). The ability to understand the capabilities, limitations, and impacts of the rapidly changing and highly interconnected cyber security environment on models and simulations. |
| **8** | **Data Generation**  | Apply models, emulators, prototypes, simulators, and stimulators, to generate data as a basis for making managerial or technical decisions. | Knowledge of M&S and the output it provides. Skill to operate M&S to generate required data. Ability to interpret data output and understand its limitations and how the data can be used. |
| **9** | **Decision Support Tools** | Work with decision support tools/systems, models and/or simulations. | Knowledge of decision support tools, models, or simulations that are applicable to a job. Skill to run or operate those applicable tools and the ability to apply the outcome of those tools to make recommendations to decision makers. |
| **10** | **Design, Develop, and Apply Live, Virtual and Constructive (LVC)** **Simulations**  | Design, develop, and apply live, virtual and constructive (LVC) simulations, Hardware-in-the-Loop (HWIL), and/or digital simulations in the application of experimentation, analysis, training, exercises, operations; acquisition; logistics; testing, wargaming and/or research environments. | Knowledge of systems, components, M&S, and architectures associated with constructing live, virtual, & constructive (LVC) environments. Skill to integrate all needed components to create a LVC environment. Ability to create and provide a LVC environment to meet user needs.  |
|  | **Competency** | **Behavioral Indicators** | **Description (Knowledge, Skills, & Abilities)**  |
| **11** | **Discrete Event Simulation (DES) Techniques** | Design, develop, manage, analyze, and test DES applications for military modeling and simulation using standardized theories and procedures (such as event graphs and queuing theory) for common DoD APIs (such as SimKit). | Knowledge of DES theories and procedures used in military DES applications. The skills to design and implement DES conceptual models that accurately represent the issue, process, or behavior. The ability to use DES applications within military M&S domains. |
| **12** | **Doctrinal and Operational Knowledge**  | Apply doctrinal and operational knowledge during simulation driven events. | Knowledge of doctrine, operating procedures, and equipment capabilities. Skills to incorporate doctrinal and operational knowledge as learning objectives in simulation driven events. Ability to identify lessons learned to update simulation driven events or to identify needed changes to doctrine and operating procedures. |
| **13** | **Game-Supported Training Environments**  | Integrate C4ISR; Training Aids, Devices, Simulators and Simulations (TADSS); and Knowledge Management tools into live, virtual, and constructive simulations and game-supported training environments. | Knowledge of command and control systems; Training Aids, Devices, Simulators & Simulations; and knowledge management tools. Skill to integrate systems hardware, training devices, and models & simulation. Ability to bring the needed components together into a live, virtual, & constructive environment. |
| **14** | **Integrate Models and/or Simulations**  | Develop, apply, manage, and/or integrate models and/or simulations in support of the mission.  | Knowledge of various models & simulations and when it is beneficial to integrating them. Technical skill to integrate those tools and the ability apply the output in a realistic and meaningful way.  |
|  | **Competency** | **Behavioral Indicators** | **Description (Knowledge, Skills, & Abilities)**  |
| **15** | **Lifecycle Management**  | Implement, manage, and oversee, all activities associated with the acquisition, development, production, fielding, sustainment, and disposal of a model or simulation across its lifecycle.  | Knowledge of lifecycle management and program management activities. Skill to apply lifecycle management tools and practices with an early emphasis on sustainment requirements and skill to regularly assess the sustainment requirements are in full compliance with applicable statutory requirements in Title 10, United States Code.  |
| **16** | **Manage, Develop, and Execute**  | Manage, develop, oversee and execute models and/or simulations and modeling and simulation programs. | Knowledge of a single model or simulation (M&S) or suite of (M&S) needed to accomplish the mission. Leadership skills to manage, develop, supervise and execute those tools. Ability to ensure the tools are accurate representations and apply them to support the mission. Identify and include ROI to demonstrate how M&S is providing benefits to programs such as risk reductions, cost savings, reduced cycle time and as a need to increase readiness.  |
| **17** | **Model and Simulation Architectures**  | Provide expert technical advice on model or simulation architectures (including Distributive Interactive Simulation (DIS), High Level Architecture (HLA), and Test and Training Enabling Architecture (TENA)) and the Information Technology (IT) infrastructure that is required (including OSI layers, TCP/IP, UDP, multicasting, routers and switches) to design, develop, manage, and use M&S hardware and software on isolated and operational networks that can be connected to C4ISR assets. | Knowledge of capabilities and limitations of existing M&S architectures, interoperability and integration standards, prominent IT infrastructures, operational C4ISR protocols, and the DoD Architecture Framework (DoDAF) policies and procedures. The skill to incorporate M&S into an appropriate architecture and coordinate IT infrastructure requirements. The ability to advise on the appropriate architecture to use based on federation objectives. |
|  | **Competency** | **Behavioral Indicators** | **Description (Knowledge, Skills, & Abilities)**  |
| **18** | **Models and Simulations and the Soft Sciences**  | Apply models or simulations to the soft sciences to include social science, economics, political science, international relations, human factors, and irregular warfare. | Knowledge of M&S tools that can be used to provide insight into the soft sciences and their limitations. The skill to apply M&S to the soft sciences in a meaningful way. Ability to determine a level of confidence of M&S output that has been applied to inexact sciences. |
| **19** | **Operations Research and Analysis**  | Apply the rigor of scientific inquiry and operations research and analysis. | Knowledge of the scientific method and the skills needed to conduct operations research. The skills to effective apply the rigor of the above and the ability to used the skills to provide insight and make recommendations. |
| **20** | **Physical, Mathematical or Logical Representations**  | Utilize physical, mathematical or logical representations of a system, entity, phenomenon, or process.  | Knowledge of when to apply a physical, mathematical or logical representations of a system. Skill to incorporate the above to provide insight toward stated objectives. Ability to understand the limitations and contributions of any of the above when analyzing output and making recommendations.  |
| **21** | **Real-World Data**  | Apply real-world data in models or simulations for computer generated forces, mathematical modeling, physical modeling, scientific research, and statistical analysis. | Knowledge of real world data requirements to initialize models and simulations and where to obtain it. Skills to populate M&S with realistic data and ability to obtain real world data.  |
| **22** | **Requirements**  | Determine operational requirements, functional requirements, and technical requirements for the application of models and/or simulations. | Knowledge of requirements and the skill to apply models or simulations (M&S) to address the operational requirements, functional requirements and technical requirements. Ability to know when M&S is an appropriate and cost effective way addressing the need.  |
|  | **Competency** | **Behavioral Indicators** | **Description (Knowledge, Skills, & Abilities)**  |
| **23** | **Simulation Driven Exercises**  | Plan and execute models or simulations to drive exercises. | Knowledge of models and simulations (M&S) appropriate for augmenting or driving exercises. Skills to seamlessly integrate M&S to provide realistic exercises. Ability to augment or drive an exercise with M&S to provide enhanced training.  |
| **24** | **Standards, Policy, Guidance and Directives**  | Develop, review, and update modeling and simulation standards, policy, and guidance. | Knowledge of existing DoD and Service policy and guidance and government and commercial standards. Skills to review, evaluate, and update from a technical perspective all of the above. Ability to identify and establish needed standards, policy, and guidance. |
| **25** | **Synthetic Natural Environments (SNEs)**  | Develop, execute, integrate, and manage models and/or simulations, terrain databases; synthetic natural environments (SNEs); human terrain; kinetic & non-kinetic environment representations; physics-based modeling; human-system interfaces with SNEs; collaborative environments, and computer generated forces in the application of experimentation; analysis; training; exercises; operations; acquisition; environmental modeling; logistics; testing; and/or research environments. | Knowledge of synthetic natural environments, terrain databases, and collaborative environments and the value they bring to modeling and simulation. Skills to integrate and execute models and simulation in synthetic environments. Ability to leverage the above integration to gain additional insight into the studies, analyses, training, exercise, operations, acquisition, logistics, testing and/or research environments.  |
| **26** | **Training Aids, Devices, Simulators and Simulations**  | Provide expert technical advice on Training Aids, Devices, Simulators and Simulations (TADSS). | Knowledge of training aids, devices, simulators and simulations. The ability to use those tools. |
| **27** | **Understand DoD and Service M&S Roles and Responsibilities**  | Apply knowledge of organizational roles, responsibilities and linkages of various M&S organizations to support M&S desired outcomes. | Knowledge and the skill to navigate the Service M&S organizational structure to achieve desired outcome. The ability coordinate with appropriate M&S equities to achieve desired outcome. |
|  | **Competency** | **Behavioral Indicators** | **Description (Knowledge, Skills, & Abilities)**  |
| **28** | **Use Models or Simulations**  | Use models or simulations to improve scientific research, systems engineering, acquisition, costing, analysis, training, operational planning, testing, experimentation, medical, and/or logistics functions. | Knowledge of the right model or simulation to meet specific needs. The skill to initialize the tools and the ability to run and interpret the output to provide insight or training to real world situations. |
| **29** | **Verification, Validation and Accreditation**  | Conduct or provide expert technical advice on the verification, validation and accreditation (VV&A) of models or simulations and to ensure accurate representations of models or simulations by adhering to and applying sounds VV&A practices. | Knowledge of DoDI 5000.61 and MIL-STD 3022. The skill to conduct and document VV&A in accordance with the above. The ability to understand the appropriate uses and limitations of models and simulations on which VV&A has been documented. |