NAVAL AIR WARFARE CENTER
TRAINING SYSTEMS DIVISION

BROAD AGENCY ANNOUNCEMENT

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1.0 INTRODUCTION

1.1 AUTHORITY

The Research and Engineering Competency of the Naval Air Warfare Center Training Systems Division (NAWCTSD) issues this Broad Agency Announcement (BAA) under the provisions of paragraphs 35.016 and 6.102(d)(2) of the Federal Acquisition Regulation (FAR), which provides for the competitive selection of research proposals. Contract(s) based on responses to this BAA are in full compliance with the provisions of The Competition in Contracting Act of 1984 (PL 98-369) as codified in 10 USC 2304.

NAWCTSD contracts with educational institutions, nonprofit organizations, and private industry for research and development (R&D) in those areas covered in Section 2.0 of this BAA. This BAA is intended to cover, in general, all R&D areas of interest to NAWCTSD and its customers relating to simulation and training technology.

1.2 RECOMMENDED PROCESS

The following four-step sequence is recommended for offerors contemplating submission of a proposal under this BAA. This sequence allows for an early determination of the potential for interest and funding, and limits offeror and Government expenditure of effort to prepare and review formal proposals for research that may have little chance of being supported.

1.2.1 Step 1 - Technical Dialog (Email Communication)

This step initiates a technical dialog between the Government and the potential offeror. The initial point of contact may direct interest to a specific scientific point of contact, based on the topic area and specifics of the proposed research project. The initial contact points for each area of research interest identified in Section 2.0 are shown below:

Research Area	Point of Contact	Email
2.1 Training Technology and Methodology	Mr. John Hodak	John.c.hodak.civ@us.navy.mil
2.2 Simulation Systems	Mr. Edward Nowlin	Edward.j.nowlin.civ@us.navy.mil
2.3 Computer Applications	Ms. Courtney McNamara	Courtney.k.mcnamara.civ@us.navy.mil
2.4 Science, Technology, Engineering and Mathematics (STEM) Education	Ms. Emily Sherkow	Emily.m.sherkow.civ@us.navy.mil

1.2.2 Step 2 - Technical Dialog (Informal White Paper)

This step is a continuation of the technical dialog for projects of interest. The scientific point of contact may request submission of an informal white paper to facilitate understanding of the scientific and technical aspects of the proposed research project. Although there are no restrictions or formal requirements, use of the white paper is intended to determine which efforts are of sufficient scientific and technical merit preparatory to submission of a formal research proposal as described in Section 3.0; therefore, white papers should not be so lengthy or detailed as to constitute a formal proposal. White papers may contain a bottom-line cost estimate.

1.2.3 Step 3 - Submission of Formal Research Proposal

This step ends the technical dialog. If there is sufficient interest in a proposed research project, the Contract Specialist will issue a written Request for Proposal to the offeror. Once the Contracting Office receives a formal research proposal, communication between scientific personnel and the offeror is permitted only as authorized by the Contracting Officer.

1.2.4 Step 4 - Contract Award for Selected Projects

Regardless of whether the four-step process is used, all proposals will receive an initial review (see Section 4.1) and the Contracting Officer will notify the offeror, in writing, whether the proposal will be processed for award. The primary basis for selecting proposals for award shall be scientific/technical merit, importance to agency programs, funds availability, and cost (to include realism and reasonableness to the extent appropriate). See Section 4.2 for specific evaluation criteria.

1.3 GOVERNMENT OBLIGATION

PERSONS SUBMITTING PROPOSALS ARE CAUTIONED THAT ONLY A CONTRACTING OFFICER MAY OBLIGATE THE GOVERNMENT TO ANY AGREEMENT INVOLVING EXPENDITURE OF GOVERNMENT FUNDS.

2.0 RESEARCH AREAS AND TOPICS

NAWCTSD has comprehensive simulation and training systems responsibilities ranging from research and technology base development through system acquisition and life cycle support. The Research and Engineering Competency is NAWCTSD's arm of the laboratory system. Its mission is to plan and perform a full range of directed R&D in support of Naval training systems. The work covers the broad spectrum of training simulation technology as applied across mission areas and all stages of training. It is intended that programs under the BAA include Fundamental research related to this mission. "Fundamental Research" means basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons.

Collaborative arrangements between universities and industrial companies are encouraged. Projects should take maximum advantage of existing university and industry research and engineering programs and facilities. Capabilities are needed to promote and conduct multi-disciplinary (e.g., engineer, psychologist, instructional specialists) research in training and simulation technology; enhance the development of training devices; foster productive working relationships with NAWCTSD scientists; and be a source of innovation for the application of instructional principles in training systems.

The requirement for R&D conducted under this BAA is to explore unique training techniques incorporating innovative behavioral and engineering technologies, which are needed for more effective and/or less expensive training systems. Technology products may include empirical research, software and computer models, test beds and proof of concept demonstrations. Projects should provide insight to NAWCTSD personnel to optimize the use of training systems. Research areas that are described in the remainder of this chapter are important, but other R&D topics supporting training systems may also be considered. The following research areas and topics are not intended to be mutually exclusive but rather are often interdependent and may be exercised in various combinations at any time. In fact, proposals that involve interdisciplinary teams are especially encouraged.

2.1 TRAINING TECHNOLOGY AND METHODOLOGY RESEARCH AREA

Research is sought for the following topics:

2.1.1 Adaptive, Simulation-Based Training and Assessment

Modern simulations afford a wide variety of capabilities for personnel training and assessment in complex task domains, such as the ability to customize instructional content to an individual learner's needs. Accurate skill assessment during simulation-based training provides the foundation for identifying and correcting skill deficiencies via adaptive training. Potential topics of research for the adaptive, simulation-based training research and development topic include: (1) innovative, simulation-based assessment strategies; (2) task analysis methodologies in support of adaptive training; (3) development of methodologies and associated hardware and software requirements (e.g., intelligent agents) driving the real-time customization of training content; (4) adaptive feedback/after-action review strategies; (5) the development of measurement frameworks (e.g., Bayesian networks, data mining algorithms) supporting performance measurement and adaptive training; and (6) training effectiveness evaluation research with respect to adaptive training tools

2.1.2 Advanced Distributed Learning (ADL)

The Navy, the other services, the Department of Defense, the Federal Government, academia, and private industry have made the commitment to develop capabilities in ADL. The goal of ADL is to deliver instructional and job performance aiding information anytime, anywhere, to anyone who needs it. Potential topics of research include: (1) learner-centric, adaptive instructional techniques; (2) effective use of web-unique instructional and performance aiding techniques; (3) design of effective ADL resource centers; (4) design and use of learning management systems; (5) effective use of sharable content objects; (6) techniques for performance measurement and feedback; (7) use of intelligent tutoring systems and intelligent agents; (8) techniques for continuous, career-long learning; (9) student motivational techniques; (10) techniques for configuration management of ADL; (11) role of the instructor or facilitator in ADL; (12) tradeoff analyses between instructional approaches and organizational constraints (e.g., firewalls); (13) tools and techniques for ADL-specific front-end analysis; and (14) tools and techniques for evaluation of ADL systems.

2.1.3 Human Social Cultural and Behavioral Modeling (HSCB)

Irregular Warfare missions require the Navy to increasingly operate in joint and coalition operations (e.g., stability, security, transition, and reconstruction or SSTR). These expanded missions require developing effective and integrated collaborative multi-team decision making processes that range from identification of adversarial intent, to establishing trust and conducting negotiations. Research is needed to develop: 1) valid methods for developing and analyzing behavioral signatures in culturally embedded contexts; 2) formal mathematical models to incorporate behavioral signatures into Human Behavior Representations (HBRs); 3) effective, adaptive training regimes, and 4) real-time decision aids to facilitate on-the-job performance of operational personnel.

2.1.4 Advanced Instructional Technology

Numerous instructional features have been implemented and proposed for use in simulators and other training devices. Because of the changes in Navy training policies, some features need to be reexamined and/or explored. Examples include (a) scenario management features; (b) instructor on-line, help and tutorials; (c) automated performance measurement; (d) instructorless training features; (e) management of multiple warfare areas and management of Semi-Automated Forces (SAFORs); (f) augmented reality; and (g) instructor communications. Research is required to determine: (1) optimal applications of instructional features; (2) optimal display methodologies for instructional information; (3) training effectiveness of features; and (4) development of new features that take advantage of emerging technologies, such as virtual environment, distributed training systems, and the use of video, audio and animation in instructor training.

2.1.5 Automated Systems

Future systems are growing increasingly complex and becoming highly automated. Experiences in other industries have identified a number of problems associated with human operators working in an environment with a significant amount of automation. Research is needed to help identify effective design and training strategies that will minimize problems associated with loss of situation awareness, under- and over-reliance on automation, etc.

2.1.6 Coalition Warfare

Coalition warfare is proving to be an effective means of dealing with hostile nations and terrorist threats. However, despite the political, financial, and military advantages coalition warfare represents, it also poses significant logistical problems, specifically in the domains of training and readiness. Each individual nation thoroughly trains its armed services to pre-specified customs and standards, and routinely participates in coalition exercises. Advances in Network-Centric Operations (NCOs) are expected to enhance coalition operations; however, more research is needed to understand the human systems integration and training requirements. The objective of this effort is to apply recent developments in decision theory, individual and team training, leadership and commander's intent, multi-cultural diversity, and collaborative support technologies to enhance coalition warfare in a NCO. To accomplish this objective, research is required that addresses: (1) the developmental stages of culturally diverse leaders and teams who are working over networks; (2) adaptive team and leader performance; and (3) training and collaborative support tools for distributed decision making.

2.1.7 Decision-Making Under Stress

Conflicts today continue to be characterized by rapidly unfolding ambiguous and stressful situations that impact individual and team decision-making in combat. The objective of this effort, therefore, is to apply recent developments in decision theory, individual and team training, and collaborative technologies to enhance decision quality under stressful conditions. To accomplish this objective, research is required in the following three areas: (1) performance measurement; (2) stress; and (3) training for complex team decision making in face-to-face and distributed environments.

2.1.8 Deployable Training Support Technologies

Advances in weapon system complexities have significantly increased the demand on human operators and teams. One of the main problems with deployable training systems is a lack of support or training for instructors. What is needed are systems that provide training support tools for individuals and teams of individuals who are responsible for training in deployed contexts; for example, to support crucial instructor functions at sea. Potential areas of research include: (1) automated performance measurement; (2) integration of observational measures with automated performance measures; (3) human performance modeling technologies; (4) instructor training technologies (i.e., interpretation of automated performance measures, debriefing skills); (5) techniques for automated instruction; and (6) techniques and tools for delivering feedback and debrief.

2.1.9 Distance Learning

More than any other service branch, the Navy is depending on e-learning to train and educate its personnel. One of the greatest challenges for distance learning developers and designers is how to create courseware that is engaging and effective; in short, how to avoid churning out page-turning, passive material that fails to fully captivate the learner. More emphasis is being placed on a wide array of active learning activities, such as team mission rehearsal at a distance, joint training, embedded simulations, game-based learning, and job performance aids. Research is needed to determine how to maximize these approaches, to exploit or adapt available groupware products, and how to address the social/human issues associated with collaborative training and education over networks.

2.1.10 Distributed Debrief and After Action Review Systems

Debriefing and after action review is critical to the training effectiveness of distributed training exercises. Currently, debrief technologies are focused on single simulation systems, and are not readily available to address distributed simulation-based exercises with multiple teams. The content and formation of information, as well as instructional

features, are not responsive to the needs of multiple team and cross team debriefs. Research needs to focus on the application of debrief systems to multi-platform debriefing and after action review, and should include: (1) identification and implementation of optimal information content and format; (2) identification and development of instructional features; (3) techniques for the transfer of data from the training device to the debrief station; and (4) design and development of a repository of debrief data and information.

2.1.11 Embedded Training Technology

Embedded training systems include training capabilities that are resident on operational deployed equipment or are interfaced with it. Embedded training ranges from single equipment operator training up to full system team training. Embedded training maximizes fidelity and accessibility by putting the training site on board deployed weapon platforms. Four instruction technologies that have been identified as appropriate for embedded training R&D are: (1) performance measurement (dynamic assessment) and explicit feedback; (2) missing team/team member simulation; (3) automatic intelligent platforms; and (4) automated adaptive instruction. Other technologies may be appropriate as well, including application of eye tracking, speech recognition, latent semantic analysis, adaptive training technologies, and intelligent tutoring to embedded training systems.

2.1.12 Games and Gaming

The use of games is aggressively pursued for its instructional value in today's society and military; however, it is a relatively new instructional technology that has limited empirical support. Theoretically, if built properly, these training games have the potential to improve skill acquisition, recall of facts, increase situation awareness, and improve ability to effectively multi-task, for example. The question is how can games be developed to ensure they meet specific training objectives. Potential topics of research include: how to identify the essential characteristics of effective games, how to implement these characteristics into a training game, how games engage users in game play, and how this engagement of users improves training.

2.1.13 Graphical User Interface (GUI) Design and Information Visualization

Future training systems and network centric environments generate exponential increases in workload for operators and leadership due to heightened levels of incoming data that require logging, monitoring, integration and interpretation. The complexity of information management in multi-team training and operations is further complicated by distribution and asynchrony. Intelligent graphic and multimodal interface design solutions are critical to support future Network Centric Warfare (NCW) and training environments where team members and decision makers are separated geographically and temporally. Research should address how to support the team as well as the individual. Potential research areas include: (1) information visualizations to support shared cognition and/or decision making; (2) common collaboration tools; (3) multi-modal and intuitive user interfaces and their respective combinations; and (4) usability methodologies. This list is not exhaustive and additional approaches are likely to emerge as science and technology advances.

2.1.14 Human Systems Integration (HSI)

In order to meet the challenges of developing systems that meet required mission capabilities at the lowest lifecycle cost, it is crucial that human operators and maintainers are considered at all phases of the acquisition lifecycle from early concept development to disposal of the system. HSI is a systems engineering approach to optimize cost, schedule, and performance of designed systems through insuring that these human considerations, which include manpower, personnel, training, and human engineering, are included within the systems acquisition process along with hardware and software considerations. The development of tools, technologies, and processes to support HSI practitioners is necessary to effectively achieve these goals. Potential research and development opportunities in this area include: (1) tools and technologies to support task analysis, human performance modeling and simulation-based acquisition; (2) validated approaches of measuring, assessing, analyzing, and evaluating human performance within the context of military systems; (3) planning and decision support tools for acquisition program managers; (4) methods for the prudent application of automation and decision support to include considerations of operator and team workload and situational awareness; and (5) tools to support the sharing of data across program management, engineering, and HSI disciplines

2.1.15 Individual and Team Small Arms Training Systems

Small arms training is inherent in the military. However, in addition to basic weapons handling and marksmanship, this training must also include as a significant component opportunities to train correct tactics, procedures, teamwork, and decision-making. The wide range of environments, adaptability of hostile forces, and the increasing variety of mission objectives, coupled with longer or more numerous deployment cycles, has increased the need for training alternatives in this domain. Research areas include: (1) analysis of training requirements; (2) creation of databases; (3) weapon modeling and simulation; (4) computer controlled hostiles and neutrals; (5) instructional features; (6) networking; (7) computer generated graphics; (8) deployability issues (e.g., foot print, instructor support, simulation sickness); and (9) the development, demonstration, and evaluation of training approaches.

2.1.16 Innovative Submarine Systems Training

Submarine systems have unique requirements for shore-based as well as on-board training. Submarine piloting and navigation places unusual demands as compared with surface ships. Tactical operations involve particularly complex data gathering and analysis techniques. Potential areas of training research for such submarine capabilities include: (1) innovative on-board computer-based training system design; (2) training requirements measurement techniques capable of discriminating between requirements for on-board vs. shore-based training; (3) fidelity requirements measurement techniques; (4) analysis and display of measures of effectiveness and performance for at-sea, on-board, and classroom; (5) cost reduction techniques for operator, sub-team, and full-team training; (6) techniques to motivate students, especially on-board, to engage in training; and (7) virtual environment technology to provide on-board “presence” to classroom instruction. Other submarine-specific training research may be appropriate as well.

2.1.17 Instructional Strategies and Team Modeling

Researchers and developers of Intelligent Tutoring Systems (ITSs) have demonstrated improvements in learning in traditional academic, static domains. ITSs apply advanced cognitive modeling and diagnosis to develop objective-based instructional materials “on-the-fly” that are tailored and adaptive to each student. Research is necessary to extend these types of technologies and approaches to support objective-based training in dynamic, team contexts. An extension of a traditional ITS that is capable of supporting military team training could include components such as: automated performance measurement and diagnosis at the individual and team level for teamwork and taskwork, adaptive scenario modification, simulated teammates, and intelligent selection of instructional strategies (i.e., normative feedback, process feedback, scaffolding, on-line feedback, off-line feedback). In order to extend traditional ITSs, fundamental differences between academic and operational domains must be addressed. Some of these differences include scenario-driven versus student-driven pacing of decision-making and problem-solving activities and the existence of multiple expert models of problem-solving approaches. Given these differences, significant research is essential in determining effective way(s) to choose, develop, and provide instructional strategies in order to minimize cognitive disruptions and maximize learning in a scenario-based, team training environment.

2.1.18 Intelligent Tutoring and Expert Systems

As the technological complexity of Naval weapon systems has increased, there has been a corresponding increase in the number of jobs in the Navy that are classified as technical or highly technical. Although research indicates that one-on-one tutoring is the best way to teach complex skills, it is an economic impossibility. The student-to-teacher ratio is too high to allow an instructor to provide one-on-one tutoring for each student. Intelligent tutors based upon intelligent agents, expert systems, and other methods and technologies can provide individualized instruction by tailoring pace, sequence, content, presentation style, and feedback for individual learners. Reductions in instructor workload and training time, and increases in the student motivation and level of learning, will result in direct readiness and economic benefits. Potential topics of research include: (1) individual tutors and job aid experts embedded in devices, "in the pocket," or residing in distributed systems; (2) natural language interfaces and other innovative interface designs for tutors and job aids; (3) model-based diagnostic and feedback systems; (4) methods and tools for automatic explanation generation;(5) knowledge engineering tools for capturing subject matter and instructional expertise; and (6) tools for automatic generation of instructional content and job aids.

2.1.19 Knowledge Presentation Formats

Complex tactical decision making performance requires decision-makers to harness and apply large quantities of declarative and procedural knowledge. Research is needed to determine optimal methods for presenting this knowledge to trainees so that they learn and encode it in a manner that is consistent with cognitive processing requirements. In particular, the relative merits of various multi-media formats must be determined, and issues such as authoring multi-media instructional systems must be addressed. Research is also needed in the application of cognitive task analysis techniques to the authoring of multimedia instruction and the translation of such analysis into appropriate presentation strategies.

2.1.20 Leadership Development

Network-centric warfare initiatives have placed significant challenges on leaders. Leadership responsibilities have been pushed further down the chain of command then ever before. Additionally, leaders in this environment are forced to cope with leading ad hoc rotating teams at a distance in complex multi-team systems. Situations such as this outstrip the current theories of research. Potential areas of research include: (1) the role of the leader in a multi-team, distributed system; (2) methods, strategies and tools to facilitate the development of leadership expertise earlier in the career pipeline; (3) leaders' communication and dissemination of information in a Network Centric Warfare (NCW) environment; (4) effective issuance of command intent in a NCW environment; (5) systems to aid leaders in obtaining and maintaining situational awareness in a networked environment; (6) the leaders role in creating conditions for team effectiveness in a networked environment; (7) the impact of leadership style/skill in distributed, multicultural teams; and (8) technologies to facilitate distributed team leadership.

2.1.21 Maintenance Training and Support

As the complexity of modern military systems increases, there is a strong need to exploit existing and emerging technologies to provide effective training and performance support strategies and systems for maintainers and maintenance related operations. Potential areas for research include: (1) intelligent tutoring for maintainers; (2) embedded assessment capabilities to track maintainer performance in operational equipment; (3) distance learning capabilities to allow for remote training of maintainers and remote performance support; (4) training for conditioned based maintenance; and (5) integrated Interactive Electronic Technical Manuals (IETMs). Other technologies may be appropriate as well, including application of augmented reality, speech recognition and eye tracking to embedded training or performance aiding systems.

2.1.22 Manpower and Personnel Selection Research

Essential to maximizing Fleet readiness is the recruitment, assessment, selection, and retention of qualified Navy personnel. Applied manpower and personnel selection R&D training technology is necessary to identify and meet current Navy manpower requirements, and to develop innovative, research-based solutions for the future Fleet. This BAA research topic covers areas including: (1) job/task analytic strategies (e.g., job analysis methods applied to training, cognitive task analyses); (2) personnel assessment and test development (e.g., cognitive and noncognitive test development, knowledge testing, problem-based learning assessment, computer-based and adaptive testing, psychometric theory); (3) performance criterion development (e.g., simulation-based performance measurement; training performance measurement; portable, practical, or embedded measurement devices); (4) test validation strategies (e.g., innovative validation approaches drawing from advances in psychometric theory); and (5) personnel attraction, recruitment, and retention research.

2.1.23 Mobile Training Technologies

One of the current trends in workforce training and education is the transition from eLearning to mLearning. mLearning refers to mobile learning content to support the growing mobile and remote workforce independent of location in time or space. mLearning is the intersection of mobile computing and eLearning: accessible resources wherever you are, strong search capabilities, rich interaction, powerful support for effective learning, and performance-based assessment. Basically it can be thought of as eLearning through mobile computational devices: Palms, Windows CE machines, even your digital cell phone.

Many entities (including the Advanced Distributed Learning (ADL) Labs) are researching the technological aspects and challenges associated with mLearning. However, the pedagogical research on what types of learning and what strategies are best suited to this unique delivery methodology is limited. Research is needed to determine optimal methods for presenting knowledge to learners to maximize the effectiveness of learning and encoding content consistent with cognitive processing requirements.

2.1.24 Performance Measurement

The NAVAIR training systems community requires basic and applied research and development in a variety of areas related to the measurement of human performance at the individual, team, and multi-team level. Increased reliance of simulation to meet mission-level training requirements has created an urgent requirement to develop measurement capabilities in this environment. Specific areas of research that require attention include, but are not limited to: (1) improved data collection technologies in both live and simulation-based environments; (2) diagnosis of the root causes of performance deficits; (3) rapid and efficient creation of accurate human performance models; (4) creation and validation of mathematical algorithms to compute higher-order integration of automated performance measurement systems with human observer/evaluator data; (5) technologies and strategies to enhance the capabilities and offset the limitations of human observers and raters; (6) valid and reliable methods for aggregating or integrating multiple observations to produce evaluations at the team and multi-team levels; (7) data presentation formats and strategies for effective debriefing preparation and delivery; (8) linking observed performance to specific individual, team, and multi-team competencies; (9) technologies and strategies for measuring performance in distributed, simulation based training exercises; and (10) technical solutions for effectively sharing training data over simulation networks.

2.1.25 Simulator and Virtual Environment Sickness (Cybersickness)

Numerous reports have documented the occurrence of psycho-physiological disturbances, balance problems, visual illusions, and sickness of trainees following the use of some simulators and Virtual Environments (VEs). The result has been compromised training, decreased simulator use, and aftereffects that may occur as long as 8 to 24 hours after training. Potential areas of research include: (1) survey the frequency of “simulator sickness” or “cybersickness;” (2) isolate the design and operating characteristics which contribute to sickness; (3) develop human factors design and procedure guidelines to minimize simulator or VE sickness; and (4) develop instrumentation to test and accept simulations based on system parameters correlated with simulator and VE sickness."

2.1.26 Team Training and Performance Measurement

The training community places a high priority on R&D for team performance, emphasizing the need for systematic analysis and design of team training technology. Still, methodological and practical problems for individual and multiple teams continue to exist. Potential areas of interest should be applied to the individual and distributed team problem, to include: (1) performance measurement techniques; (2) debriefing feedback procedures and tools; (3) team training design; (4) measures of effectiveness (to include process and outcome measures) and criterion development; (5) design, development and evaluation of team training approaches; (6) team modeling; (7) instructional strategies; (8) applications of learning principles to team performance; (9) hierarchical and distributed team performance measurement; and (10) specific and general measurement criteria and techniques for distributed training operations ranging from small to large scale exercises.

2.1.27 The Cognitive Science of Learning: Implications for Instruction and Modeling

Human learning, just like other human activities, takes place at the multiple levels described by Allan Newell in his 1990 book, *Unified Theories of Cognition*: biological (milliseconds), cognitive (seconds), rational (minutes – days), and social/organizational (week – decades). A comprehensive cognitive science of learning must address the relevant variables, processes and relationships at all of these levels. As theoretical advances are made in these areas, additional work is needed to translate this progress into useful results. Two fields of interest to the military that are ripe for practicable infusions from a cognitive science of learning are education/training and human behavioral modeling. Both applications are growing increasingly complex as military technology, operations and teaming arrangements continue to expand, and both have the capability to significantly impact our mission readiness.

Research should advance our knowledge in the cognitive science of learning and demonstrate applicability to the design of effective instruction and/or the development of valid human behavioral models.

2.1.28 Training Effectiveness Research

Training theories and applications suggest that training effectiveness is a complex, multi-dimensional construct. Therefore, in order to assess readiness, training performance, and other important outcomes, research is needed to: (1) define categories of Measures of Effectiveness (MOEs) and Measures of Performance (MOPs) for a wide range of training systems; (2) develop multi-component approaches to training evaluations; and (3) specify the relationship among training requirements, knowledge, skills and attitudes, and MOPs. In addition, methods to forecast knowledge, skills and attitude requirements with associated MOEs/MOPs for evolving and newly developed systems are required.

2.1.29 Training Technology for Distributed and Joint Systems

Distributed interactive simulation provides unique opportunities for a coordinated training environment via networked simulations. There are multiple simulators and associated systems capabilities needed to support the life cycle of a distributed simulation-based training exercise. There is a strong need to exploit existing and emerging training technologies to identify effective training strategies for these distributed teams. Potential areas for research include: (1) specifications of distributed training requirements; (2) distributed performance measurement procedures and techniques; (3) identification of techniques and tools for delivering distributed feedback and conducting distributed debriefs; (4) distributed scenario generation; (5) instructional strategies for distributed missions; and (6) evaluation procedures for distributed training systems. Research is also needed to apply findings to specific operational areas and across the full spectrum of Service, joint, interagency, intergovernmental, and multinational operations.

2.1.30 Medical Team Performance and Simulation Training

Patient safety in the medical environment continues to be a serious concern for medical providers. Reducing medical errors is the number one issue in patient safety. The objective of this effort is to apply and leverage existing and emergent technologies in team performance assessment, team development and training, the enhanced use of simulations in individual and team training, distributive training, medical training (team and individual) efficacy and knowledge management. Therefore, potential research that will ultimately reduce medical errors and enhance patient safety is desirable and fall in the following areas: (1) team performance, (2) team development, (3) distributed team instruction and performance, (4) simulation training efficacy, (5) performance assessment and (6) knowledge management across medical disciplines for patient care.

2.2 SIMULATION SYSTEMS RESEARCH AREA

Research is sought for the following topics:

2.2.1 Display Projector Technology

Displays are frequently one of the key performance-limiting critical elements in simulator training devices. Research is needed to advance the state-of-the-art in projection and display devices while keeping costs affordable. Advanced projectors and optics of all types can be considered; e.g., laser projectors, LED, LCOS, DLP, and other display technologies. Research efforts shall be directed at increased resolution, contrast brightness and reliability, at reduced life cycle costs for both narrow and wide fixed fields of view and for area of interest eye or head tracked displays.

2.2.2 Helmet-Mounted Displays

Deployable flight simulation and mission rehearsal capabilities are rapidly becoming high priority in the flight training community. However, these high technology training requirements cannot be satisfied without a low cost

and compact display system that provides realistic, high detail out-the-window scenery while being compatible with heads up display (HUD) graphics and real or "glass" cockpit imagery. The helmet-mounted display (HMD), which represents the most promising technology to satisfy these requirements, must be developed and evaluated rapidly if these high priority training requirements are to be satisfied. Research associated with HMDs should emphasize increased field-of-view, reduction of weight and inertia of the helmet and optics for more realistic comfort and fit, improvements in display resolution and brightness, and capacity to simulate both day and night operations. Another area of interest for HMDs is the Next Generation of Operational HMDs and how to simulate or stimulate the Operational HMDs in a traditional flight simulator.

2.2.3 Live/Virtual/Constructive (VLC) Integration

LVC integration provides enhanced warfighter mission preparation capabilities. Research is needed to further leverage LVC integration to support warfighter mission planning, training and rehearsal and decision support requirements. Proposed research projects should leverage current and emerging LVC capabilities to provide enhanced mission readiness and combat capability. Key research goals include linking current and future weapons systems with high fidelity simulators, constructive simulations and command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) systems, and multi-source ISR data to: (1) create an interactive operational environment to support the full spectrum of mission planning and preparation activities; and (2) allow warfighters to train as they would expect to fight—at home station or deployed.

2.2.4 Sensor Simulation Technology

Modern aircraft, ship and land vehicle sensors have capabilities that are difficult to simulate in a training mode. Research is required to reduce costs of complex and extensive databases and large processors to simulate radar, SAR, ISAR, FLIR, night vision goggles, and images of other advanced sensors. In addition, displays of sensor imagery that include fusion of processed multi-sensor data need to be developed for future training and simulator applications.

2.2.5 Vehicle Dynamic Simulation Technology

Real-time simulation of vehicle dynamics can be implemented on various types of computers with a wide variety of modeling approaches. The identification and presentation of cues significant to vehicle operators, especially pilots, with respect to vehicle motion, control feel, sound generation, and cockpit displays are significant issues for every human-in-the-loop training system. Therefore, research issues relevant to simulation dynamics include: (1) Math modeling of single and multiple vehicle training problems and their environmental interaction, to include unmanned air/ground/undersea/and sea vehicles; (2) Math modeling of Computer Generated Force entities and Semi-Automated Forces (CGF/SAF) for virtual and constructive simulations; (3) Innovative simulation computer system design including low-cost/PC-based flight simulation; (4) Real-time software architecture; (5) Cue synchronization and transport delay; (6) Motion hardware and associated driven algorithms, including secondary motion cueing devices such as G-seats, seat shakers, and cockpit shakers; (7) Control loading systems; (8) Human operator controlled system characteristics; (9) Fixed and rotary wing aerodynamics; (10) Floating platform dynamics; (11) Ground vehicle dynamics; (12) Test Verification, Validation, and Qualification/Accreditation technology associated with dynamic systems; and (13) Research to determine levels of simulation fidelity and appropriate criteria/standards for training.

2.2.6 Visual Simulation Technology

Visual simulation provides military trainees with a real-time interactive environment in which they can learn and exercise the skills they need to effectively operate weapon systems, platforms and equipment. Visual simulation comprises two technology areas: image generation technology (which processes an environment model or database to create image information) and display technology (which presents the imagery to the trainee). The primary research issue in visual simulation is the cost vs. fidelity trade-off. The parameters associated with fidelity in an image generator are scene feature fidelity, feature density and processing update rate. The parameters associated with displays are field of view, resolution, luminance, color, contrast, distortion, and refresh rate. Visual simulation research areas are: (1) to determine the level of fidelity which is adequate to allow effective training of specific skills; (2) to investigate visual simulation techniques and/or system components which can provide the required

level(s) of fidelity at an affordable cost relative to the criticality of the skills being trained; (3) to develop training scenarios which effectively utilize visual simulation system performance capabilities; (4) to develop techniques and procedures for rapidly and cost-effectively creating visual environment models off-line which can then be processed and displayed in real-time; and (5) to develop evaluation tools and techniques which allow quantitative and qualitative assessment of performance, cost and training effectiveness of visual simulation systems.

2.3 COMPUTER APPLICATIONS RESEARCH AREA

Research is sought for the following topics:

2.3.1 Advanced Human Behavioral Representation

Combined efforts in engineering, instructional systems design, and psychology are needed to generate realistic human behavioral models. See the Topic entitled "Advanced Human Behavioral Representation Techniques" in Area 1 for details.

2.3.2 Anti-Submarine Warfare (ASW) and Submarine Operations

ASW: Innovations are needed for efficient reconfigurable representations and processing of acoustic ocean propagation, target noise generation, weapon delivery models, environmental effects, target sensing and object recognition. Display of acoustic information must be accurate and occur in real time to meet training objectives when using computer-based instructional simulations.

Submarine Operations: Accurate and reconfigurable hydrodynamic modeling is needed for training perceptual and motor skills of ship handling for both surfaced and sub-surfaced conditions.

2.3.3 Asymmetric Entities

Research interest in this area includes the building of predictive, preventive and response models for individuals and organizations likely to engage in asymmetric warfare, and application of computer engineering/science technology to these models to create war gaming simulations for training. Employment of commercial off-the-shelf tools and methods wherever possible is desired.

2.3.4 Capability Maturity Model Integration (CMMI)

Simplifications and efficiencies are sought to standardize processes at the project, division, and organizational levels.

2.3.5 Embedded Training

Cost effective approaches are needed to provide embedded training as an alternative to traditional schoolhouse training. Optimal embedded training would be considered in advance of weapon system procurement and ideally would be designed in advance of weapon system development. Standardizations of approaches are sought to enable embedded training to be interoperable so that embedded training can be considered. Embedded training includes the integration with mission planning and mission rehearsal processes. Simplification and standardization for mission planning, mission rehearsal and after-action-review is desired.

2.3.6 Expert Systems for Training

Expert systems are needed to provide: (1) real-time decision support; (2) training scenario preparation; and (3) tactical information filtering.

2.3.7 Fidelity for Training Devices

Metrics are needed to determine the optimal fidelity for attaining training objectives while operating within the boundaries of current technologies, human perception, schedule and cost.

2.3.8 High Performance Computing

Affordable high performance computing is needed for research in the following areas: synthetic natural environments, ocean modeling for training devices, simulation based acquisition, real-time computation of forces

and moments, scenario perturbations, human behavioral modeling, language understanding, and next generation graphics processing units (GPU).

2.3.9 Information Management for Support of Modeling and Simulation

Ideally, models implemented in weapon systems would be identical to those used in training devices. Models are typically procured and updated separately for the weapon system and its companion training device. These redundant efforts are costly and time consuming. It is necessary to understand both the weapon and training system software to correlate models. Correlation between the weapon system and the training device is sought to provide consistent and accurate modeling for training.

2.3.10 Reusable Software

NAWCTSD seeks software development methods that are reusable to provide commonality and maintainability for training devices. Standardizations in design patterns, identification, collection, cataloguing, assessing and dissemination of reusable software are needed. Automated methods are sought to simulate the behavior of executable software.

2.3.11 Simulation Networking

Advanced simulation is needed to research self-organizing, robust, and self-healing networks for interoperable distributed team training. Research in networking shall be generally limited to using methods described by current industry standards, or shall be used to develop new standards. Research shall be focused on solutions to improve distributed training, to disclose weaknesses and to determine limitations. Where possible, research under this topic shall be to advance topics in this area currently under investigation. Research under this topic can be used to provide analytical models and tools for describing, analyzing, predicting, and controlling the behavior of networks.

2.3.12 Speech Recognition Technology

Research in speech recognition technology is focused in the following areas: (1) improvement of speaker independent recognition; (2) language understanding; (3) language modeling; (4) the ability to separate multiple speech sources; (5) acoustic modeling; (6) simplification of speech recognition development; (7) automatic separation of phraseologies; (8) speech recognition in noisy environments; (9) the ability to adapt to varying prosody; (10) natural language processing, and (11) speech recognition under stress.

2.4 Science, Technology, Engineering and Mathematics (STEM) Education

The objective of the Department of Defense (DOD) STEM program, in accordance with Title 10, Subtitle A, Part III, Chapter 111, Section 2192, is to establish a successful, sustainable, and affordable long-term DOD-wide program to invigorate the science and mathematics curriculum at the elementary and secondary school levels, to enhance the teaching skills of science and mathematics teachers to deliver that curriculum and to increase the level of awareness, interest and active participation of students in STEM activities, projects, academics and, eventually, career opportunities. The Navy supports this objective through STEM related educational outreach to schools in areas around Navy laboratories and installations. Proposed efforts should address support for areas such as the following:

(1) Local K-12 teachers working with DoD laboratory scientists and engineers to provide assistance in teaching scientific concepts through real-world applications and activities;
(2) Teacher involvement in development of new engaging K-12 STEM learning modules or classroom curriculum, such as Gaming, Modeling and Simulation, etc.;
(3) STEM related K-12 school activities (such as Math Counts, FIRST Robotics Teams, Odyssey of the Mind, summer camps/academies, etc.).
(4) Innovative programs and methods to include curriculum, activities and methods of delivery that can be used to inspire and develop students in STEM fields that are relevant to the DoD mission.

3.0 PROPOSAL PREPARATION AND SUBMISSION

3.1 GENERAL INFORMATION

This Section is intended to provide information needed in preparing research proposals for submission to NAWCTSD. Proposals submitted under this BAA should contain technical, administrative, cost, and other supporting information as described in Subsection 3.2 below.

Most of the information needed to prepare a proposal will be found in Subsection 3.2. Blank proposal forms, included in Section 6.0, are designed to provide the required information needed for contracting purposes. Use of the enclosed proposal forms (Attachment 1 and 2) will expedite award of the research contract, but are not required to be filled in; Contractor's proposal formatting is acceptable.

All proposals should include the information specified in this announcement in order to avoid delays in evaluation.

NAWCTSD encourages nonprofit organizations, educational institutions, small business, and small disadvantaged business concerns to submit research proposals for consideration.

Any questions concerning the preparation or content of the research proposal should be directed to the NAWCTSD Procurement Competency:

Name	Position	Phone	E-Mail
Ms. Allison Laera	Procuring Contracting Officer	(904) 969-2136	allison.m.laera.civ@us.navy.mil
Mr. Wyatt Nunes	Contract Specialist	(904) 969-2350	wyatt.k.nunes2.civ@us.navy.mil

3.1.1 Eligibility

To be eligible for award of a contract, a prospective contractor must meet certain minimum standards pertaining to financial resources, ability to comply with the performance schedule, integrity, organization, operational controls, technical skills, facilities, and equipment.

3.1.2 Post-Employment Conflict of Interest

There are certain post-employment restrictions on former federal officers and employees, including special Government employees (Section 207 of Title 18, United States Code). If a prospective offeror believes that a conflict of interest may exist, the situation should be brought to the attention of the NAWCTSD Procurement Competency before time and effort is expended in preparing a proposal.

3.1.3 Restrictive Markings on Proposals

Offerors that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall mark each sheet of data it wishes to restrict with the following legend:
"Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal."

All offerors shall complete or provide information substantially the same as requested under the Research Proposal Cover Page (Attachment (1)) and the statements of Attachment (2) indicating their preference for release of information contained in proposals and their understanding of the policy regarding evaluation of the proposals.

The offeror is cautioned, however, that portions of the proposal may be subject to release pursuant to the Freedom of Information Act, 5 U.S.C. 552, as amended.

3.1.4 Data and Software Clauses

Based on responses to DFARS 252.227-7017 and 252.227-7028, the appropriate DFARS clauses will be included in the resultant contract, such as but not limited to:

252.227-7013 Rights in Technical Data-Other Than Commercial Products and Commercial Services
252.227-7014 Rights in Other Than Commercial Computer Software and Other Than Commercial Computer Software Documentation
252.227-7016 Rights in Bid or Proposal Information
252.227-7020 Rights in Special Works
252.227-7025 Limitations on the Use or Disclosure of Government Furnished Information Marked With Restrictive Legends
252.227-7027 Deferred Ordering of Technical Data or Computer Software
252.227-7030 Technical Data--Withholding of Payment
252.227-7037 Validation of Asserted Restrictions on Technical Data

3.1.5 Reporting Requirements

The number and types of reports will be specified in the contractual document. The reports will be prepared and submitted in accordance with the procedures contained in the contract, which will be based on the reporting requirements contained in the contractor's proposal and mutually agreed on before award. NAWCTSD requires the delivery of a final report at the conclusion of each contract, notwithstanding the fact that the research may be continued under a follow-on contract.

Reports shall be prepared in accordance with the "Manual of Style for Naval Air Warfare Center Training System Division Technical Publications," available upon request. In addition to the required reporting format, this document also covers distribution statements and their use. If reports are to be formally published, the Government will release such publications in accordance with NAWCTSD internal procedures as documented in Director of Research and Engineering Memorandum (DOREM) 3915.1A, "Policy on Research Project Publications."

The Data Item Descriptions most frequently used for the delivery of data under this announcement are DI-MGMT-80227 (Contractor's Progress, Status and Management Report), DI-MCCR-80700 (Computer Software Product End Items), DI-MGMT-81117 (Technical and Management Work Plan) and DI-MISC-80711A (Scientific and Technical Report).

3.1.6 Facilities

In accordance with FAR 45.102, the offeror shall furnish all the facilities required to perform the proposed effort, unless it is determined that all conditions set forth in FAR 45.102(b) are met. Facilities (provided under other than a facilities contract) are those properties used for production, maintenance, research, development, or testing. It includes plant equipment and real property (including office furnishings and **computer resources**). Facilities do not include material, special test equipment, special tooling, or agency-peculiar property. However, **all** property provided under a facilities contract (including facilities use agreements) are considered facilities.

Agency-peculiar property, as used in DoD, means military property and includes end items and integral components of military weapons systems (e.g., electronic "black boxes") along with related peculiar support equipment that is not readily available as a commercial item. It does not include government-furnished equipment.

3.1.7 Period of Performance

Proposals submitted in response to this BAA may be for a period of performance up to five (5) years. Such long-term proposals shall contain a brief summary of the work contemplated for each 12-month period, so contracts may be negotiated for an entire five-year program or for individual one-year increments of the total program. Proposals for periods of less than 12 months will also be favorably considered.

3.1.8 Contract Types

The determination to use either a fixed price or cost reimbursement contract will be based upon the complexity and risk of each action.

3.1.9 Proposal Submission Cut-Off Date

Proposals may be submitted at any time, but no later than the BAA expiration date (25 January 2031).

3.1.10 Follow-On Contracts

A proposal for continuation of a given research project will be considered on the same basis as proposals for new research. The proposal should be submitted sufficiently in advance of the termination of the existing contract so that if it is accepted, support may be continued without interruption.

3.1.11 Proposal Copies

Unless requested otherwise, Offerors shall submit copies of their proposal electronically via email to the Contract Specialist (see paragraph 3.1). Each volume of the proposal must contain any restrictive markings. The electronic copies must be compatible with Microsoft Word 2016 and Excel 2016 or as Adobe Acrobat files.

3.1.12 Mailing Address

The preferred method for all correspondence is via email. If necessary, written communications or documentation concerning this BAA can be submitted to the address shown in Block 1 of Attachment (1).

3.1.13 Non-U.S. Citizen Participation

If the proposed research (or a portion of the proposed research) contains critical technology, sensitive unclassified information, For Official Use Only material, intelligence materials or classified information (i.e., confidential or secret), non-U.S. citizens shall not participate in the research.

If the proposed research can be performed using information that is accessible within the public domain i.e. does not contain critical technology, sensitive unclassified information, For Official Use Only material, intelligence materials or classified information (i.e., confidential or secret), non-U.S. citizens may participate in the resultant contract (or portion of the resultant contract).

Offerors are required to comply with FAR 52.204-2, where applicable.

3.2 RESEARCH PROPOSAL CONTENTS

Each proposal shall be submitted under cover of Attachment (1) and shall contain three distinct sections as described in paragraphs 3.2.1, 3.2.2 and 3.2.3 below. The first section shall contain the technical discussion. The second section shall contain administrative contractual information, certifications and other documentation. The last section shall contain a breakdown of the anticipated costs.

3.2.1 Technical Section

The nature of the effort to be performed will determine its acceptability for award under this BAA. Proposed efforts shall be investigative in nature and explore innovative technology concepts. Development of specific hardware systems shall not be allowed. The technical section shall contain the following:

3.2.1.1 PROPOSED RESEARCH

Details of the scientific and/or technical aspects of the proposed effort, including:

- An opening statement that clearly describes the unique, creative and innovative nature of the proposed technical approach,
- A description of the proposed research scope, including overall program objectives and specific program goals,
- A description of the current level of state-of-the-art technology being explored by the proposed effort,
- Identification of the technical approach that will be used to meet the program objectives and overcome technical challenges, and rationale and supporting information that gives confidence that the technical approach will be effective, and
- A milestone chart for the proposed effort.

3.2.1.2 POTENTIAL CONTRIBUTION

Discuss the potential contribution to research programs relating to training systems, devices and technology, including:

- Benefits that the technology will provide,
- Identification of advancements that will be achieved,
- Identification of opportunities for transition of the technology into existing and future systems, and
- Identification of the specific areas of understanding and knowledge that are lacking that the proposed effort will address, the specific areas of investigation necessary to advance understanding and knowledge for the purpose of meeting the program objectives, and the current level of understanding and knowledge in the area of investigation.

3.2.1.3 OFFEROR'S QUALIFICATIONS

Detail the offeror's (and any proposed subcontractor's) capabilities, related experience, facilities, and techniques that will be utilized, including:

- Identification of prediction or modeling techniques, test programs and data analysis programs that are key elements in the technical approach (with a discussion on the adequacy and effectiveness of each), and
- Information on the facilities and equipment that will be used to accomplish the proposed effort and an explanation of why they are adequate to conduct a successful program.

3.2.1.4 PERSONNEL

Provide information regarding the qualifications, capabilities and experience of the proposed key personnel (the use of resumes is encouraged). Key personnel are those skilled, experienced, professional and technical personnel essential for successful accomplishment of the proposal objectives, such as the principal investigator, team leader, etc.

3.2.1.5 PAST PERFORMANCE

Provide recent (within the past three (3) years) and relevant past performance information for previous work or experience in the field being proposed for both the offeror and any subcontractors. For each contract and subcontract, provide the following (please ensure all information provided is current):

- Contract Number
- Name of Contracting Agency
- Program Manager (or point of contact familiar with performance) and Telephone Number
- Contracting Officer and Telephone Number
- Synopsis of Work Performed
- Contract Type
- Total Contract Value

3.2.2 Administrative Section

This portion of the proposal shall contain the completed certifications and applicable forms contained in this BAA and shall include the following:

3.2.2.1 CONTRACT TYPE

Identify the type of completion contract proposed. (Note: Offers proposed on a cost-reimbursement basis must contain evidence that the offeror's accounting system is approved for such type contracting; i.e., provide identification of audit agency and dates last accounting and estimating system audits were performed.)

3.2.2.2 ENVIRONMENTAL CONSIDERATIONS

Discuss all applicable environmental and energy conservation objectives associated with the acquisition (see FAR Part 23), the applicability of an environmental assessment or environmental impact statement (see 40 CFR 1502), the proposed resolution of environmental issues, and any environmentally-related requirements to be included in the resultant contract.

3.2.2.3 ORGANIZATIONAL CONFLICTS OF INTEREST

Identify any members of the offeror's organization or team with potential conflicts of interest. Possible conflicts of interest include any people with prior federal employment, including employment of the Principal Investigator as a special Government employee (duties, agency with whom employed, dates of employment) within two years from the date of proposal submission. If none, so state.

3.2.2.4 SECURITY ISSUES

If the offeror is proposing to perform research in a classified area, indicate the level of classification of the research and the level of clearance of the proposed facility, as well as the level of clearance of the potential principal investigator and all other proposed personnel. Also, indicate the Government agency that issued the clearances.

3.2.2.5 DISCLOSURE PREFERENCE

The offeror must indicate on Attachment (2) any limitation to be placed on disclosure of information contained in the proposal.

3.2.2.6 UNDERSTANDING OF EVALUATION POLICY

Completion of Attachment (2) is prerequisite to evaluation of the proposal under this BAA.

3.2.2.7 REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS OR QUOTERS

Completion of Representations, Certifications, and Other Statements via SAM.Gov is prerequisite to award under this BAA. For purposes of completing FAR 52.219-1, Small Business Program Representations – Alternate I, the North American Industry Classification System (NAICS) code for this acquisition is 541720; the small business size standard is $28.0M.

3.2.2.8 SUBCONTRACTING PLAN

If the total amount of the proposal exceeds $900,000 and the offeror is a large business, the offeror shall prepare and submit a Subcontracting Plan in accordance with FAR 19.704. A mutually agreeable Subcontracting Plan will be included in and made a part of the resultant contract. The contract cannot be executed unless the Contracting Officer determines that the Subcontracting Plan complies with FAR 19.704. Should the offeror's Subcontracting Plan be determined acceptable and should the offeror fail to comply with the terms of the Subcontracting Plan, noncompliance will be considered to be a material breach of the contract.

3.2.3 Cost Section

In accordance with FAR 15.403-3, a detailed cost proposal shall be submitted with the research proposal and shall include, as a minimum, the following information (contractor's format is acceptable):

3.2.3.1 PERIOD OF PERFORMANCE

Identify the proposed duration of the effort.

3.2.3.2 DIRECT LABOR

Provide a list of participants, by category (and name, if appropriate), showing the hours and labor rates to be charged for each and the total amount per year proposed to be paid for each. For proposals from universities, the time and amounts to be charged should be identified by academic year and summer effort. Disclose and explain the basis of any escalation factors utilized.

3.2.3.3 MATERIALS

Provide an itemized list of permanent equipment showing the cost of each item and the basis for the proposed cost. Provide a general description and total estimated cost of expendable equipment and supplies. Permanent equipment is any article of non-expendable tangible personal property having a useful life of more than two (2) years and an acquisition cost of $500 or more per unit. Permanent equipment costs shall not be fee/profit bearing.

3.2.3.4 OTHER DIRECT COSTS

3.2.3.4.1 Travel

Include contemplated expenditures for travel with explanations for each trip and its proposed length and number of participants. The breakdown of these costs shall show the airfare, per diem rates, car rental rate, and any other travel expenses (such as parking fees, etc.) and shall be in accordance with the Joint Travel Regulations (JTR).

3.2.3.4.2 Subcontracts

Subcontractor cost proposals shall meet all of the requirements stated herein for the prime contractor. Subcontractor cost breakdowns may be submitted under separate cover.

3.2.3.4.3 Consultants

Provide a breakdown of any costs for consulting services showing number of days, daily rates, and estimated travel/per diem costs to the level of detail described in 3.2.3.4.1. The need for consulting services must be explained and the basis for the daily rates must be provided.

3.2.3.4.4 Miscellaneous

Miscellaneous costs may include such items as publication charges, copying, subscriptions, photography, graphics, etc., only if they are consistent with and allowable under the offeror's approved cost accounting system.

3.2.3.5 INDIRECT COSTS

Indirect rates (overhead, fringe benefits, G&A, etc.) utilized must be disclosed. Indicate whether any indirect rates used are fixed or provisional and the time frames to which they are applicable (e.g., a fixed rate may apply until a specified date, after which the rate becomes provisional). Proposals for contracts subject to FAR Subpart 30.2 shall complete DD Form 1841 Contractor Facilities Capital Cost of Money. Facilities capital cost of money (FCCM) will not be an allowable cost in any resulting contract if the offeror fails to identify or propose FCCM (see FAR 15.408(i)).

3.2.3.6 FEE/PROFIT

The proposed fee or profit, if any, that the organization proposes to assess the research project and how the fee/profit was derived. Reminder: Permanent equipment costs and the cost of facilities when purchased for the account of the Government (i.e., charged as a direct cost) shall not be fee/profit bearing.

4.0 PROPOSAL EVALUATION

4.1 INITIAL REVIEW

Upon receipt of a proposal, the Government will perform an initial review of the proposal's scientific/technical merit and potential contribution to the Navy mission. The Government will also determine if funds are expected to be available based on the proposed cost for the effort. Proposals not considered having sufficient scientific/technical merit or relevance to the Navy's needs, or those in areas for which funds are not expected to be available, may be declined without being subject to the detailed peer review described below. At this stage, scientific/technical merit, relevance to the Navy's needs, and availability of funding are of equal importance.

4.2 PEER REVIEW

Proposals not declined as a result of the initial review will be subject to a detailed peer review by qualified personnel from within the Government. This evaluation will be conducted in accordance with the following criteria, which are listed in descending order of importance:

4.2.1 Proposed Research

The overall scientific and/or technical merits of the proposed research, including the adequacy and effectiveness of any analysis and/or testing required to substantiate the technology being developed.

4.2.2 Potential Contribution

The potential contributions of the effort to the Navy mission and the extent to which the research effort will contribute to balancing the overall NAWCTSD research program relating to training systems, devices and technology.

4.2.3 Offeror's Qualifications

The offeror's capabilities, related experience, facilities, techniques, or unique combinations of these which are integral factors for achieving the proposal objectives.

4.2.4 Personnel

The qualifications, capabilities, and experience of the proposed key personnel, such as the principal investigator, team leader, etc. Key personnel are those skilled, experienced, professional and technical personnel essential for successful accomplishment of the proposal objectives.

4.2.5 Past Performance

The offeror's record of past performance on similar efforts, including the quality of the product or service provided, timeliness of performance, and the offeror's ability to control costs. The Government may contact references other than those identified by the offeror.

4.2.6 Cost Realism

The reasonableness and realism of proposed costs and fees (if any).

5.0 ASSISTANCE INSTRUMENTS

Title 10 of the United States Code, Section 2358, provides authority to the Secretary of the Navy to engage in basic research, applied research, advanced research, and development projects through the use of cooperative agreements or grants.

Subsection 2192(a) of Title 10, United States Code authorizes the Secretary of Defense, in consultation with the Secretary of Education, to: 1) identify actions which may be taken to improve education in the science, technology, engineering, and mathematics skills for the purpose of meeting the United States' (U.S) long-term national defense need for personnel proficient in such fields; and 2) establish and conduct programs to carry out such actions (i.e. STEM Education Program). Subsection 2192(b) of Title 10, United States Code further authorizes the Secretary of Defense to enter into contracts, grants, and cooperative agreements in support the STEM Education Program.

These assistance instruments are used where the primary purpose of the relationship is to transfer a thing of value to an entity to carry out a public purpose of support or stimulation as authorized by law. Generally, a grant is used where there is expected to be minimal involvement between the executive agency and the recipient; a cooperative agreement is used when substantial involvement by the executive agency is expected.

By law, neither profit nor fee is allowable under assistance instruments and generally the recipient is required to share in the project costs. The recipient benefits from a common interest in the project, such as development of potential commercial products or promoting education in the fields of science, technology, engineering, and mathematics. FAR/DFARS do not apply to assistance instruments; the DoD Grants and Agreements Regulations (DODGARS) is the governing regulation.

Technical questions regarding submission of white papers or formal research proposals that may be candidates for assistance instruments (e.g. contracts, grants, and cooperative agreements) should be addressed to Mr. John Hodak at john.c.hodak.civ@us.navy.mil. Contractual questions should be addressed to Ms. Allison Laera at allison.m.laera.civ@us.navy.mil.

6.0 FORMAL PROPOSAL FORMS

List of Attachments — Number of Pages

(1) Research Proposal Cover Page 1

(2) Disclosure Preference and Evaluation Policy Understanding: Policy Statement, Statement of Disclosure Preference, and Statement of Understanding of Evaluation Policy 2

RESEARCH PROPOSAL COVER PAGE

1. To: Naval Air Warfare Center Training Systems Division (NAWCTSD) Attn: Code GT25000, BAA Contracting Officer Ms. Allison Laera 12211 Science Drive, Orlando, FL 32826-3224 ***(see paragraph 3.1.11 for number and types of copies to be submitted)***	2. Research Area ☐ Training Technology & Methodology Research – Topic 2.1.__ ☐ Simulation Systems Research – Topic 2.2.__ ☐ Computer Applications Research – Topic 2.3.__ ☐ STEM Education – Topic 2.4.__ 3. Government Point of Contact During Technical Dialog
4. From *(name and address of offeror):*	5. Type and Size of Business: ☐ Large ☐ Small Business ☐ Individual ☐ SDB ☐ Partnership ☐ Women-Owned SB ☐ Corporation, incorporated in state of:

6. CAGE:	7. DUNS:	8. Total Proposed Contract Value:
9. Proposal Title:	10. Requested Start Date:	
	11. Requested Duration:	12. Proposal Valid Until (*minimum six months*):

13. Type of Contract Proposed: ☐ Firm Fixed Price ☐ Cost Plus Fixed Fee ☐ Cost, No Fee ☐ Cost Sharing	14. Proposal Also Being Submitted to:

15. Offeror's technical representative authorized to conduct negotiations (Principal Investigator):		16. Offeror's administrative representative authorized to conduct negotiations:	
Name	Telephone No.	Name	Telephone No.
Primary		Primary	
Alternate		Alternate	

17. Proposal Contents (*if not applicable, enter "N/A" under Page*):

Page	Technical Section	Page	Administrative Section	Page	Cost Section
	Proposed Research		Contract Type		Detailed Cost Estimate Breakdown
	Potential Contribution		Environmental Considerations		
	Offeror's Qualifications		Organizational Conflicts of Interest		DD Form 1861, Contract Facilities Capital Cost of Money
	Personnel		Security Issues		
	Past Performance		Disclosure Requirement and Evaluation Policy Understanding: Policy Statement, Statement of Disclosure Concurrence, and Statement of Eval-uation Policy Understanding (see Attachment (2))		DD Form 1547 Weighted Guidelines
	Draft Statement of Work				
			Representations, Certifications and Other Statements of Offerors or Quoters (SAM.Gov)		
			Subcontracting Plan		

18. Authorized Representative:

Typed Name: _____ Signature: _____

Title: _____ Date signed: _____

DISCLOSURE PREFERENCE
AND
EVALUATION POLICY UNDERSTANDING

POLICY STATEMENT

The Navy has a continuing interest in receiving and evaluating proposals containing new ideas, suggestions, and inventive concepts for weapons, supplies, facilities, devices and equipment. However, Government personnel and contractors are constantly engaged in R&D activities, and the substance of your proposal may already be known to Government employees or contractors, or may even be in the public domain. For such reasons it is desirable, when receiving proposals for evaluation, to insure that the persons submitting them are aware of the conditions under which the Navy will consider them.

It must be understood that the receipt and evaluation of the proposal by NAWCTSD does not imply a promise to pay, a recognition of novelty or originality, or any relationship which might require the Government to pay for use of information to which it is otherwise lawfully entitled.

Due care will be exercised to ensure that, in addition to technical design or concept data submitted, administrative and cost data will not be used by the Government for any purpose other than evaluation of the proposal. Additionally, such data will not be disclosed outside the Government or be duplicated, used or disclosed in whole or in part by the Government, except for record purposes or to evaluate the proposal. This restriction does not limit the Government's right to use information contained in such data if it is obtained from another source, or is in the public domain.

All research proposals will be treated as privileged information before award and contents will only be disclosed for purposes of evaluation. Your voluntary submission will be handled in accordance with established Government procedures for safeguarding such articles or information against unauthorized disclosure.

Qualified Government personnel normally perform the technical evaluation of these proposals. All reviewers are made aware that proposals sent to them are not to be duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate the proposal, without the written permission of the offeror.

You should be aware that, despite all precautions, we may be able to protect the confidentiality of proposal only to the extent that it is exempt from disclosure under the Freedom of Information Act (see FAR Subpart 24.2).

Upon receipt, your proposal will be submitted to the appropriate technical experts for evaluation. Your proposal will undergo initial review within sixty (60) days after receipt. If additional time for this review is required, you will be notified in writing. Processing of proposals not declined as a result of the initial review may require as much as 120 days.

Having read and understood the above policy, please execute and submit the following statements:

STATEMENT OF DISCLOSURE PREFERENCE	STATEMENT OF UNDERSTANDING OF EVALUATION POLICY
☐ This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed -- in whole or in part -- for any purpose other than to evaluate this proposal. If, however, if a contract is awarded to this offeror as a result of – or in connection with -- the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. ☐ The data subject to this restriction are contained in sheets [insert numbers or other identification of sheets]: _____ _____ _____. ☐ All data contained in this proposal are subject to this restriction. ☐ Permission is hereby granted to NAWCTSD to evaluate this proposal, which may include evaluation by evaluators both within and outside the Government, with the understanding that written agreement not to disclose this information shall be obtained from any non-Government evaluator.	It is understood that the Department of the Navy has accepted the above proposal for the purpose of evaluating it and advising of any possible Navy interest. It is further understood that such acceptance does not imply or create a promise to pay; an obligation to give up any legal right or to assume any duty; a recognition of novelty, originality or priority; or any relationship, contractual or otherwise, such as would render the Government liable to pay for or give up any legal right or assume any obligation for disclosure or use of any information in the proposal to which the Government would otherwise lawfully be entitled.

Company or Corporation Name:	
Proposal Title:	
Signature:	
Name of Authorized Rep Signing:	
Title/Position of Authorized Rep:	
Date:	
BAA Number:	N61340-26-S-0001