UXXI Expertise and Capabilities

Background: University XXI was founded in 1999. It is a joint partnership between The University of Texas at Austin and Texas A&M University.

The UXXI sponsors full time researchers, graduate students, professors, industry, and interdisciplinary groups at the University of Texas at Austin and Texas A&M University to explore and develop novel applications of simulation, training, and instrumentation for the military. UXXI also addresses a variety of uncharacteristic issues for the operational user, such as providing support to the First Cavalry Division in development of the Baghdad Economic Development Plan, and support Ft. Hood with a report on process improvements for manufacturing and integration in support of armor and wheeled vehicles. In addition, we have assisted other services with a variety of projects that have Joint Service implications and benefits.

Project nomination: The Joint Future Directorate exercises program and process control by defining the research focus, and soliciting and selecting proposals from Army agencies. Project selection is conducted on an annual basis. Once projects are selected, the Program Executive Office Simulation Training and Instrumentation Command (PEO STRICOM) provides contract administration for the projects. After receiving the projects, the Universities apply academic resources to solve complex issues related to digitization, transformation, and enabling technologies.

Projects selected since inception of the UXXI Program are summarized below.

FY 08 Projects

1. **Corps G3 Data Fusion**

    - Investigate approaches for visual display of data and information in a timely manner and capable of being tailored to the Staff Officers' needs. This effort will be conducted in partnership with members of the G3 Staff.

2. **Air Education Training Command MyBase Air Force Future Learning**

    - Conduct an academic study and research on mix of Live Virtual and Constructive learning in support of Education and Training. Subsequently develop a model to facilitate development of the proper mix of Live Virtual and Constructive courseware to educate and train the force.

3. **Operational Test Command Knowledge Management**

- In collaboration with Operational Test Command, develop a proposed data base to capture knowledge of retiring Baby Boomer generation with intent of making this knowledge and experience available to the new work force. The goal is to leverage the experience and knowledge of the current work force for current and future workforce.

4. 9thSC/Networthiness Electronic Digital Threat Counter-Measures

- In collaboration with 9th Signal Command and Networthiness, develop concepts and notional architecture to identify and prevent threats to the network.

FY 07 Projects

5. Crime Prevention

- In support of the Air Force Security Force Center at Lackland AFB (HQ AFSFC), the UXXI team is updating and recreating a functional prototype of the Crime Prevention and Resource Protection course. The interactive virtual learning tool will train airmen and soldiers to reduce the threat of crime and enhance the sense of safety and security within society.
- The UXXI team will deliver a report and final courseware.

6. Field Artillery Reset

- This project is in collaboration with the Field Artillery School at Ft Sill, OK. As Field Artillerymen return from duty assignments that expand beyond their core competencies, these soldiers need to refresh their original Military Occupational Specialty skill sets in Field Artillery safety procedures.
- The UXXI team will provide interactive courseware to reset the soldier's ability to perform Cannon and Multi-Launch Rocket System safety calculation procedures, as well as use the supplementary SDC (Safety Data Calculator) and Centaurs (LWTFD) applications.

FY 06 Projects

7. Digital System Trainer

- The UXXI team collaborated with III Corp in Ft. Hood, TX, to provide design documents, tools, infrastructure, scenarios, and tested software to train officers and Noncommissioned Officers in Command, Control, Communication, and Computer (C4) skills. The initial training was

developed for the BCS3 system with an extension to the other ABCS systems.

8. Joint Force Learning

- This project was in collaboration with the Air Force Security Force Center at Lackland AFB, San Antonio, TX. The Joint Force Learning addressed a joint service issue related to correction and security issues among the services. The UXXI team provided technical evaluation and updates of the existing course.
- The deliverable is a report with courseware using latest multimedia.

FY 05 Projects

9. Joint Wargaming Trainer Extension (JWTE)

- The UXXI analyzed the current state of senior medical noncommissioned officers' training on C4ISR digital systems at Ft. Sam Houston, and developed a potential solution to create domain-specific content and modifications to emerging technology and simulation tools.
- In collaboration with Army Medical Department Noncommissioned Officer (AMEDD NCO) Academy, the UXXI team developed a functional learning object that provides rapid and effective training on FBCB2 digital skills pertaining to medical soldiers.

10. Joint Expeditionary Force Learning Environment – Virtual (JEFLE-V)

- The UXXI team collaborated with the Air Force's Air Educational Training Command (AETEC) in the creation of a virtual environment accessible anytime/anywhere to military and government civilians. The UXXI Team conducted research, and designed and built a representation of an interactive virtual learning environment. The intent of the project was to train airmen and soldiers on those tasks that were not taught in schools or other traditional training environments. JEFLE-V focuses on the expeditionary force with a real-world tactical and operational scenario to include all interlinks.
- The deliverable was a virtual learning environment with the scenarios on Tactical Automated Security System (TASS).

11. Design of Experiments (DOE)

- This project was in collaboration with U.S. Army Operational Test Command (USAOTC) Methodology & Analysis Directorate (MAD). The UXXI team worked on the knowledge acquisition of current DOE across

services. The UXXI team analyzed current testing procedures at OTC to establish a baseline from which to measure potential efficiencies to optimize data collection, testing time and cost.
- The deliverable was a report on optimizing the testing procedures at OTC.

FY 04 Projects

12. Leveraging Digital Distance Training Environments (III Corps BCTC) (Follow-on from FY 03)

- The UXXI Team worked on applying state of the art and near term technologies to develop a working ABCS Distance Learning Prototype which is focused on the brigade level battle staff and a commander. The architecture was designed to be SCORM-conformant. The prototype included fully functional and deployable back-end and front-end architectures with a testable content module(s) for field validation. The DL prototype included a low-overhead user manipulation capability and link to a Learning Management System (LMS).

13. Modeling Future Force Decision Making Process (sponsored by Army Research Laboratory – ARL)

- The UXXI Team has investigated operational and technological issues, assessed current best practices, and developed and analyzed potential solutions in order to develop a quantitative algorithmic model to support research of future force tactical decision making under uncertainty.
- The deliverable was a quantitative algorithm model in support of the BCS research program. It was the technical report containing, but not limited to: description of the field investigation and interviews, the reduction analysis of the data, and the development of the actual algorithmic model of the DMP under uncertainty.

FY 03 Projects

14. Leveraging Digital Distance Training Environments (sponsored by III Corps Battle Command Training Center at Ft. Hood) (cont. in FY 04)

- The UXXI Team performed the following tasks: provided the Army with (1) an examination of a web-enabled C4ISR digital distance training environment system, (2) an assessment of state-of-the-art "best practices," and (3) a recommended system prototype and final report addressing the

operational requirements of the BCTC digital distance training environment and its impact on training.

15. Intelligent Agent (IA) Application for C3 Driver (sponsored by Program Executive Office Simulation, Training and Instrumentation - PEO STRI)

- The UXXI Team attempted to leverage existing capability within the UXXI program to assist the Command, Control and Communication (C3) Driver team in the definition and development of applicable Intelligent Agent technology. The UXXI team applied their past 3 years of experience in developing Intelligent Agent technology toward the C3 Driver software development effort, working closely with the C3 Driver team onsite at the Central Test Support Facility (CTSF) to define, derive, and allocate Intelligent Agent requirements to meet the C3 Driver functional capability desired.
- The deliverable was the report and SME support to the Simulation to C4I Interoperability IPT.

FY 02 Projects

16. Power Management On The Digital Battlefield (sponsored by Communications Electronics Command - CECOM)

- The UXXI Team conducted investigation and modeling of electric power generation, storage, management, and consumption on the tactical battlefield to provide a strategy and prototype methodology for addressing these issues. The goal of this project was to build a comprehensive body of knowledge regarding electric power generation and consumption on the battlefield, together with its impact on the design and operation of tactical C4ISR systems and platform.
- The final deliverable was a web-accessible repository that consolidated Subject Matter Experts' contact information and the latest information on the "state-of-the art."

17. ABCS Software Change Analysis Tool (sponsored by Central Technical Support Facility (CTSF)) (joint with A&M)

- The UXXI Team developed a tool composed of a software interface to a confederation of databases (including ABCS specific LISI, CTSF configuration management database) to predict the impact of changes in one ABCS BAS on the other components of the ABCS (the 11 primary systems: ASAS, AFATDS, AMDWS, CSSCS, DTSS, FBCB2, GCCS-A, IMETS, ISYSCON, MCS, and TAIS).

- The outcome was recommendation on the future development of an ABC Software Change Analysis Tool.

18. Extending the Range of EPLRS (sponsored by Space and Missile Defense Command - SMDC)

- The UXXI Team conducted initial research and development of concept(s) which will result in extending the range of EPLRS network communications.
- The following deliverables were provided: technical report on feasible alternatives for EPLRS range extension; comparison of the alternatives with regard to selected metrics (cost, schedule, performance, and risk); recommendation of an alternative or recommendation for further research and focus areas.

FY 01 Projects

19. Embedded Training Design Support, Digitized Division 2 through N (DD2-N) (joint with A&M)

- The UXXI Team provided support to the DD2-N Workgroup and researched and recommended suitable technologies to support the Army Training Systems Architecture.
- The deliverable was providing direct support to DD2-N Workgroup and subgroups.

20. Staff Behaviors model for OneSaf Test Bed (OTB) (joint with A&M)

- The UXXI Team documented current task reference language and behavior sets; documented OTB-ABCS interface and data interchange mechanisms, and initiated high level function decomposition of ABCS 7.0 in preparation to support decomposition and linkages of requirements for C3 Test Driver Phase 2 and 3.
- The deliverable was documented staff agent behaviors and the C4I-OTB interfaces.

21. Training & Operational Data Synchronizer (TODS) (joint with A&M) (Follow on from FY 00)

- The UXXI Team developed an initial data repository and associated tool to maintain the data repository, and also developed specific scenario data sets.
- The final product was a prototype tool for use in building start exercise databases for ABCS.

22. Digitization Value Added Methodology

- The UXXI Team determined a methodology applicable to Army warfighting units that quantified the value added by digitization. This methodology incorporated ABCS information from the PEO-C3S and key concepts from Network Centric Warfare.
- The deliverable was a proposed methodology applicable to Army warfighting units that quantified the value added by digitization.

23. HMMWV Electrical Load Simulation

- The UXXI Team developed an analytical capability to conduct an analysis related to the power generation for the Scout HMMWV
- The final deliverable was the simulation tool for designing solutions to electrical power issues, specifically to the current Scout HMMWV dilemma.

FY00 Projects

24. Embedded Training (ET) Design – National Simulation Center (NSA) (joint with A&M)

- The UXXI Team provided ET design support (technical and training expertise to DD2-N Workgroup, prototype EI and IETM development) and simulation technologies to support ET.
- The deliverable was participation per governmental guidance and reports.

25. Support to Simulation C4I-NCS/STRICOM

- The UXXI Team created database Population & Data, support data and object modeling, and sustained a C4I "state of the art" data repository website.
- The final deliverable was toolkit support, training recommendations, and administration of the website.

26. Training and Operational Data Synchronizer (TODS) (cont. in FY 01)

FY99 Projects

27. Mission Essential Task List (METL)Task Alignment (joint with A&M)

- The UXXI Team examined digital training needs and technical courses of action to meet these needs.

- The deliverable was a report identifying digital training deficiencies.

28. Simulation to C4I Interface (joint with A&M)

- The UXXI task was to develop a migration plan, simulation migration tools, and a Simulation to C4I (SIMCI) certification design.
- The final outcome was a list of SIMCI recommendations.

29. Information Flow Management (joint with A&M)

- The UXXI Team was tasked to perform upper/lower Tactical Internet radio modeling, and C2 analogue message characterization. Additionally, the team analyzed and planned battlefield information flow, assessed ability of situational awareness, and provided Netcracker security enhancements.
- The software package was a deliverable.

30. Prototype Command Behaviors for SAF (joint)

- The UXXI Team explored the use of intelligent agents (IA), developed a prototype model, validated this model and produced a demonstration linking OTB with AFATDS.
- The prototype IA demonstration and code were the deliverables.