NAVSEA
WARFARE CENTERS
CRANE

Naval Surface Warfare Center, Crane Division

Annual Naval Technology Exercise

2017 Innovation and Sensor Fusion Experimentation Exhibit and Technical Interchange Meeting

Call for Experiment Proposals & Call for Abstracts

August 2017

NAVSEA
WARFARE CENTERS
CRANE

Annual Naval Technology Exercise

2017 Innovation and Sensor Fusion Experimentation Exhibit and Technical Interchange Meeting (TIM)

As the Technical Director of the Naval Surface Warfare Center, Crane Division (NSWC Crane) I want to invite you to participate in collaborative experimentation and a technical interchange meeting focused on innovation and sensor fusion.

The Naval Research and Development Establishment (NR&DE) is developing a plethora of cutting edge solutions and solving operational gaps. However, those solutions are often developed in an isolated environment. This event allows the NR&DE to collaborate by integrating systems and components together to showcase collective innovations that will likely take our designs to a new level allowing us to solve current gaps sooner. This event will also allow us to exchange ideas, information, and knowledge about solutions and methods being developed across the NR&DE.

The 2016 Innovation and Sensor Fusion Experimentation Exhibit bequeathed many successes. We created an environment that enabled innovation; established the networked environment providing an avenue for more complex experimentations; expanded relationships with other government labs; and developed rapid prototype solutions that led to several patent applications.

In 2017 we are expanding the event to include our academic partners and will offer our sister NR&DE labs more time to submit proposals to include the experiments and presentations.

Our continued goal is to provide an environment that promotes and supports innovation and collaboration through experimentation and demonstration for networked sensors, weapons, data fusion, data diffusion, processing, exploitation, and dissemination. We hope that you will join us in this endeavor.

The experimentation exhibit will be at the Muscatatuck Urban Training Center (MUTC) and Camp Atterbury, while the Technical Interchange Meeting will be at NSWC Crane.

I encourage you to respond to both the call for experiment proposals and call for abstracts as we work together to create the best capabilities for our Warfighters.

Please contact CRAN_EXPERIMENTS@navy.mil if you have any questions or need additional information.

Dr. Brett Seidle, SES
Division Technical Director
NSWC Crane

NR&DE RPED Endorsement

Government and academic proposals submitted to the NR&DE Rapid Prototype Experimentation and Demonstration (RPED) Counter-small Unmanned Aerial System (C-sUAS) call that are approved by the NR&DE leadership will be encouraged to participate in the exercise. Participation in the exercise will be contingent upon obtaining any necessary approvals (RF, airworthiness, safety, etc). All data obtained from this event will be used to inform continued decisions and assessments for the C-sUAS RPED.

Ms. June Drake
Director of Prototyping
Surface Warfare
NSWC Dahlgren

2017 Innovation and Sensor Fusion Experimentation Exhibit and Technical Interchange Meeting

The 2017 Innovation and Senor Fusion Experimentation Exhibit and Technical Interchange Meeting solicits experiments and abstracts on a wide range of sensor fusion applications and topics of practical value to anyone developing, evaluating, or managing complex systems of systems or focusing on high-level sensor data fusion and weapon control. Non-commercial experiments and papers from government labs and academia will be selected for inclusion in the technical program on the basis of relevance and quality of data, technical importance, integration readiness level, and interpretation of results. The audience for the 2017 Innovation and Sensor Fusion Experimentation Exhibit and Technical Interchange Meeting will be composed of Academia, SETA Contractors, and Government personnel. All non-government personnel will have a signed non-disclosure agreement on file. All experiments and abstracts will be considered for inclusion in the proceedings regardless of whether or not they are selected for presentation. Acceptance is based entirely on the information included in the experiment or abstract submissions.

Funding

Each organization will be responsible for their expenses to plan, prepare, and participate in the event.

Security

All 2017 registrants will be required to submit security clearance credentials to NSWC Crane. The Innovation and Sensor Fusion Experiment Exhibit (ISFEE) venue will be at the Muscatatuck Urban Training Center (MUTC) and Camp Atterbury. This venue will support experiments and discussion up to SECRET//COLLATERAL. The Innovation and Sensor Fusion Technical Interchange Meeting (ISFTIM) will be at the NSWC Crane will support abstracts and discussion up to TOP SECRET//SCI. Details for submitting security clearances will be provided during event pre-registration.

Experimentation and Technical Interchange Dates

Week of 13 March 2017 – Initial Integration Planning Event
Week of 24 April 2017 – Middle Planning Meeting
Week of 19 June 2017 – Final Planning Meeting
7-25 August 2017 (Tentative) – Experimentation Exhibit Integration and pre-experimentation
28 August – 1 Sept 2017 (Tentative) – ANTX: FY17 Innovation and Sensor Fusion Experimentation Exhibit and Technical Interchange Meeting

Frequency Requirements

If the submission proposes radiating electromagnetic energy, the submitter must provide transmitter characteristics with the proposal. NSWC Crane will work with local frequency managers to obtain approval to use necessary frequency bands or will work with frequency manager and principal investigator to find alternatives prior to the experiment.

Classified Experiments and Abstracts

Submitters are responsible for clearly and appropriately marking classified supplements and/or submissions. Classified submissions must be transmitted per the classification guidance provided by the DoD Information Security Manual (DoDM 5200.1, Volumes 1-4) and the National Industrial Security Program Operating Manual (DoDM 5220.22-M).

International Traffic in Arms Regulations/Export Administration Regulations

Submitters are responsible for clearly and appropriately marking information that is restricted by the Arms Export Control Act (Title 22, U.S. C. Sec 2751, et seq.) or the Export Administration Act of 1979, as amended, Title 50, U.S. C., App. 2401 et seq. Submissions containing ITAR/EAR restricted information must have the cover page and each page containing such information clearly marked.

Safety Requirements

Upon selection, submitters will be asked to submit a Risk Assessment Worksheet. The submitter shall also provide instructions that describe the safe operation of the system(s)/sub-system(s). Respondents wishing to conduct experiments of a kinetic or energetic nature are responsible for ammunition and/or explosives shipments to include an Interim Hazard Classification (IHC) or Final Hazard Classification (FHC) and coordination for receipt and storage at MUTC, Camp Atterbury or NSWC Crane. A safety point of contact will be provided to submitters along with notice of selection. The Government may identify other safety related and any other unique approval procedures to the submitting organization as the need becomes evident.

Environmental Compliance

Participation in the exercise will require participants to adhere to the environmental approvals, authorizations, standard operating procedures, and protective measures outlined in existing environmental impact statements and associated permits. The government may identify additional environmental or other unique approval procedures to the submitting organization as the need becomes evident.

Cooperative Research and Development Agreements

Selected academic participants will be required to enter into either a Standard Cooperative Research and Development Agreement (CRADA) or a Limited Purpose (LP) CRADA with NSWC Crane. A Standard CRADA will be used when there is specified research and development of a collaborative nature that will occur between the selected participant and NSWC Crane. A Limited Purpose (LP-CRADA) will be used in situations when only an equipment/material transfer between the selected participant and NSWC Crane is required to support the exercise and there is no expectation of specified research and development of a collaborative nature.

Flight Clearances & Airworthiness Certifications

Flight clearances and airworthiness certification for any proposals are the responsibility of the proposing organization. NSWC Crane will work with agencies to obtain flight clearances for threat systems provided by NSWC Crane.

Additional Information

Additional information, including registration details, can be found at found at http://www.navsea.navy.mil/Home/Warfare-Centers/NSWC-Crane/Partnerships/Events/Experiments/ as it becomes available. You are welcome to contact CRAN_EXPERIMENTS@navy.mil if you have any questions.

Call for Experimentation Proposals

We are currently seeking proposals for systems and components that can be rapidly integrated together for experimentation during the scenarios below.

Experimentation proposals can be for full systems or for components (e.g. sensors; kinetic or non-kinetic weapons; detection identification, or tracking algorithms; cyber defense; Live, Virtual, Constructive (LVC)) that could be used in a system. Proposals can also be systems or components that can be used to support the scenario-based experimentation (e.g. electronic attack systems, Unmanned Aerial Systems (UAS) to protect against). In sum, proposals can be components or systems that support red or blue operations for each of the scenarios below.

1. Jailbreak in a Communication and GPS Denied environment
    a. MUTC serves as an enemy command and control (C2) and prison node in a host nation. The city has a civilian population of roughly 19,000 spread throughout the infrastructure and surrounding farmlands.
    b. Friendly forces are being detained in the enemy jailhouse. The area around the jailhouse has communication and GPS jammers.
    c. Special Operations Forces (SOF) plans a jailbreak to free the friendly forces being detained. They will be required to use alternative methods of communication or to neutralize the RF/GPS jammer prior to entering the jail compound.
2. Counter UAS (C-UAS)
    a. MUTC serves as a critical U.S. Army command and control (AC2) and medical treatment node in a host nation. The city has a civilian population of roughly 19,000 spread throughout the infrastructure and surrounding farmlands.
    b. AC2 building (Target 1) currently houses both U.S. Department of State and SOF personnel and is a restricted access site for operational security and force protection reasons.
    c. Human Intelligence sources inside the host nation have confirmed that the new C2 site and its activities have been compromised, largely due to helicopter medical evacuation flight route observations and apparent VIP traffic.
    d. Threat is expected to attempt to identify critical C2 locations, equipment and personnel as a precursor to Group 4 UAS Threat drone strikes, and to disrupt SOF operations and/or render useless those infrastructure elements (including communications) and military assets (including C-UAS) needed to continue effective U.S. forces support.
3. Counter UAS (C-UAS)
    a. Camp Atterbury scenario for kinetic defeat of Class 1 and Class 2 UAS is being developed. The range is capable of fires at a distance up to 3.2 kilometers.

Experiment Proposal Submission Requirements

Experimentation submissions should consist of a quad chart and a white paper with a maximum of five pages. The white paper can include representative images, figure, references, and potential vignettes to include in the scenario. Please include sufficient detail to allow for fair evaluation of the experiment discussed. Submissions must include the following information:

- Experiment title
- Principal Investigator (PI) complete name, title, and affiliation
- PI telephone number, email address (NIPR, SIPR, and/or JWICS)
- System/component classification & storage requirements
- Applicable scenario (If your experiment can be performed during any of the scenarios, please submit a separate submission for each of the scenarios)
- Experimentation concept – How will the system/component be used in the scenario
- Integration Readiness Level (IRL)
- Technology Readiness Level (TRL)
- List of hardware, software, software version, and network ports required or a copy of Certification & Accreditation (C&A) package (It is okay if a C&A package does not exist)
- Radio Frequency (RF) characteristics for any RF transmitters
- Ordnance requirements as applicable
- List of items required to support experimentation (e.g. Power, Fuel)
- Network requirements (Unclassified, classified, JIOR, etc)
- NSWC Crane proposals should include any unfunded costs that would need to be funded
- Airworthiness certification as applicable (Must be submitted prior to execution of event)
- Flight clearance requirements as applicable (Must be submitted prior to execution of event)

Any abstract that is missing any of the above information will be subject to disqualification.

Experimentation Submission Timetable

31 January 2017 3:00pm ET (firm) – Experiment submissions due
14 February 2017 - Notifications of acceptance

NR&DE RPED Collaboration

Government and academic proposals submitted to the NR&DE Rapid Prototype Experimentation and Demonstration (RPED) C-sUAS call that are approved by the NR&DE leadership will be encouraged to participate in the exercise. Participation in the exercise will be contingent upon obtaining any necessary approvals (RF, airworthiness, safety, etc).

Call for Abstracts Submissions

We are currently seeking abstracts on, but not limited to, the topics below. Authors of selected abstracts will be able to present their research during the ISFTIM. Presenters will be allotted time based on the amount of time requested and the number of abstracts accepted.

Sensor Fusion / Data Fusion / Distributed Weapon Control

- Artificial Intelligence
- Robotics
- Sensors
- Human Systems Interface
- Test and Evaluation

Innovation

- NR&DE & Academic Lab overview and Innovation Efforts
- Rapid Prototyping Methodologies and/or Examples

Technical Interchange Meeting Abstract Submission Requirements

Abstract submissions should consist of a white paper with a maximum of three pages. The abstract can include representative images, figures, and references. Please include sufficient detail to allow for fair evaluation of the work discussed. The author should state in the abstract the intended classification of the presentation. Submissions must include the following information:

- Author's complete name, title, and affiliation
- If multiple authors, list the individual that will be presenting the topic
- Telephone number, fax number, email address
- Classification
- Minimum amount of time for presentation
- Ideal amount of time for presentation (try to limit to 30 minutes)
- Could this be included in a poster session or "elevator speech" session?

Any abstract that is missing any of the above information will be subject to disqualification.

Abstract Submission Timetable

15 March 2017 3:00pm ET (firm) – Abstract submissions due
13 April 2017 - Notifications of acceptance
14 August 2017 – Presentations and Papers due

Electronic Submission Details

Subject Line requirements

For experimentation submissions, please State “Experimentation Submission for the 2017 ISFEE” as the subject email.

For abstract submissions, please state “Abstract Submission for the 2017 ISFTIM” as the subject email.

Email Body requirements

Please be sure that the contact information for the person/organization submitting the abstract is included within the body of the email.

Email address

Send **UNCLASSIFIED** submissions to: CRAN_EXPERIMENTS@navy.mil

Send **UNCLASSIFIED//FOUO** submissions to: NATHAN.L.THOMAS@navy.mil via encrypted email Encryption certificates will be provided upon request.

Send **SECRET** submissions to: CRAN_EXPERIMENTS@navy.smil.mil

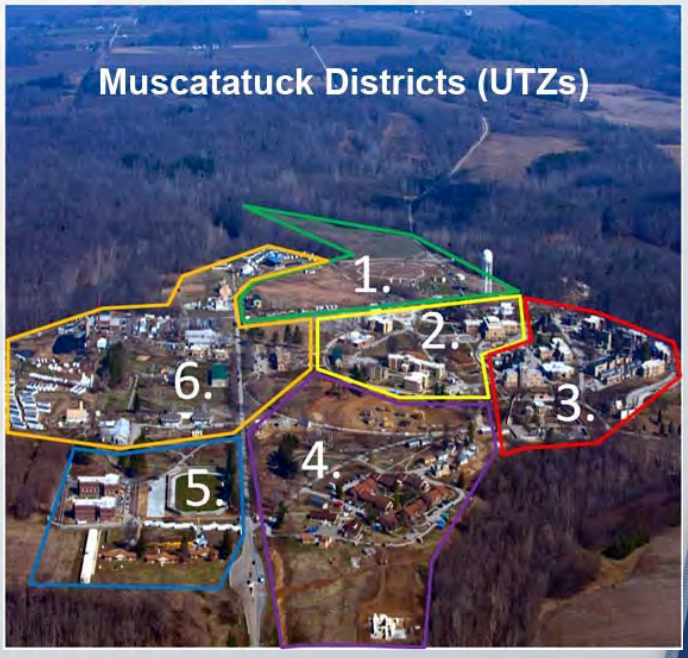
Send **TOP SECRET//SCI** submissions to: NATHAN.L.THOMAS@coe.ic.gov

MUTC Overview

Muscatatuck Urban Training Center (MUTC), a range of Camp Atterbury, is a secluded, self-contained community, once home to the Muscatatuck State Developmental Center. The 1,000 acre site was turned over to the Indiana National Guard in July of 2005 and since has been continually evolving into a full-immersion contemporary urban training environment. Those utilizing MUTC will find:

- 180-acre reservoir
- Flooded community
- 68 major buildings covering 850,000 square feet of floor space, including:
  - School structure
  - Religious structure
  - Hospital
  - Light industrial structures
  - Single-family and dormitory-type dwellings
  - Administrative buildings
- Extensive searchable/maneuverable and instrumented utility tunnel system
- 9+ miles of roads and streets
- Engineered rubble pile
- ½ mile cave complex
- 1 mile walk, ½ mile crawl tunnels

MUTC is a consortium of governmental, public and private entities that are pooling their unique capabilities in order to provide the most realistic training and pre-operational testing experience possible. These can be interwoven, layered and leveraged to provide the best value-added and costed exercises. Replication of both foreign and domestic scenarios is available, with further customization according to customer needs.



MUTC Districts

1. Rural (Farm + Slums)
2. Educational (Univ + Dorms)
3. Urban Core (Urban Canyon + Hosp + Embassy)
4. Residential
5. Rule of Law
6. Industrial/Municipal

More information about MUTC can be found at: http://www.atterburymuscatatuck.in.ng.mil/Ranges/MuscatatuckUrbanTrainingCenter/MUTCOverview.aspx

TRL Definitions

TRL 9	**Actual system "proven" through successful mission operations**
TRL 8	**Actual system completed and "qualified" through test and demonstration**
TRL 7	**System prototype demonstration in operational environment**
TRL 6	**System/subsystem model or prototype demonstration in relevant environment**
TRL 5	**Component and/or breadboard validation in relevant environment**
TRL 4	**Component and/or breadboard validation in laboratory environment**
TRL 3	**Analytical and experimental critical function and/or characteristic proof of concept**
TRL 2	**Technology concept and/or application formulated**
TRL 1	**Basic principles observed and reported**

IRL Definitions

IRL 9	**Integration is Mission Proven through successful mission operations**
IRL 8	**Actual integration completed and Mission Qualified through test and demonstration, in the system environment**
IRL 7	**The integration of technologies has been verified and validated with sufficient detail to be actionable**
IRL 6	**The integrating technologies can accept, translate, and structure information for its intended application**
IRL 5	**There is sufficient control between technologies necessary to establish, manage, and terminate the integration**
IRL 4	**There is sufficient detail in the quality and assurance of the integration between technologies**
IRL 3	**There is compatibility between technologies to orderly and efficiently integrate and interact**
IRL 2	**There is some level of specificity to characterize the interaction between technologies through their interface**
IRL 1	**An interface between technologies has been identified with sufficient detail to allow characterization of the relationship**