



Thunderstorm Program Overview



Updated: 01 March 2021





Background



- **Rapid Reaction Technology Office (RRTO)**
 - Develops prototypes and hosts technology demonstrations and experimentations to counter emerging and anticipated threats in order to accelerate the delivery of resilient solutions leading to affordable Warfighter capabilities.
 - The model for developing and demonstrating less mature, high-reward technologies that produce game-changing capabilities by leveraging non-traditional sources of innovation, interagency partnerships, and rapid prototyping.
- **Thunderstorm Demonstrations and Experimentations**
 - An enduring venue sponsored by RRTO for new technologies to be integrated, evaluated and assessed under real world conditions.
 - Focus areas are developed through partnerships with DoD entities to determine current deficiencies and areas of interest.





Why Thunderstorm?

Inform and accelerate DoD modernization through innovation discovery, demonstration and experimentation

- Venue for the Science & Technology, Acquisition, and User communities to identify and transition new Joint mission capabilities that address key modernization gaps
- Enable technology demonstration venues and experiments to explore new and emerging technologies, CONOPS and red team capabilities
- Foster collaboration for addressing shared gaps and challenges across DoD and other communities
- Facilitate the exploration of lower maturity, higher risk/higher reward alternatives and technology collaborations in operationally relevant environments
- Engage and leverage non-traditional, small business and allied technologies to accelerate the transition of innovative solutions

Accelerating the transition of emerging capabilities to the Warfighter



Methodology and Venues



Strategic Steering

- Guidance based on overarching objectives of the Under Secretary of Defense (Research and Engineering), Director of Defense Research and Engineering, Deputy Director, Developmental Test, Evaluation, & Prototyping

Analytical Gaming Workshop

- Think Tank Forum for SME's to develop future Thunderstorm Concepts
- Creates a joint working group environment to share technologies and ideas
- Forum for analyzing new and emerging threats

Tabletop Experiment (TTX)

- Scenarios are used to focus on process, procedures and potential capabilities
- SMEs attend from various DoD agencies and operational partners from across the government
- Capability gaps are selected and prioritized in order to be considered for technology demonstrations

Technology Innovation Discovery Event (TIDE)

- Introduces end users to a wide breadth of new cutting edge technologies
- Interactive hands-on experience that allows end users to provide instant feedback to the vendor
- End user feedback will aid in the technology selection for the follow-on Field Demonstration and Experimentation

Technology Field Demonstration and Experimentation

- Platform for pairing technologies with potential end users
- Minimal cost to vendor, attractive to startup companies with minimum financial backing
- Uses operational environment to assess prototype technology capabilities with operational partners being readily available for feedback



Benefits the Government Stakeholders



- Collaboration for addressing operational environment challenges
- Opportunity to brainstorm and war-game in a controlled setting
- Venue to observe new and emerging technologies
- Opportunity to pair technologies for improving overall effectiveness





Benefits the Demonstrators



- Kicking the tires
- Scenario driven event (Red, Blue, White cells)
- Feedback that improves outcomes
- Accelerated development and fielding
- Creation of new opportunities
- Exploring tech across the TRL continuum
- Non-traditional and small business exposure



A Safe Space for Technological Exploration



Previous Events



Focus Area	Operational Partners	Event	Location	Technologies Demonstrated
FY-09: Maritime Domain Awareness	JIATF-S	Field Demonstration	JIATF-S AOR; US SOUTHCOM AOR	10
FY-10: Maritime Domain Awareness	JIATF-S	Field Demonstration	JIATF-S AOR; US SOUTHCOM AOR	10
FY-11: Border Security	CBP, JIATF-S	Field Demonstration	Southern AZ; CBP, Tucson Sector	4
FY-12: Border Security	CBP, USCG, JIATF-S	Field Demonstration	Southern TX; CBP, RGV Sector	6
FY-13: Border Security	10 Operational Partners	Two Field Demonstrations	Southern TX; CBP, RGV Sector	29
FY-14: Identifying Future Focusses	25 Organizations Participated	Analytical Panel	Reston, VA	N/A
C/B WMD via US SE Maritime Pathways	18 Operational Partners	Tabletop Experiment and Two Field Demonstrations	Florida USCG AOR; and Edgewood, MD	36
FY-15: Arctic Challenges	20 Operational Partners	Tabletop Experiment and Field Demonstration	US NORTHCOM; and Army CRREL, Hanover, NH	17
C/B Sensor UAS & C-UAS (WMD)	35 Operational Partners	Field Demonstration	Camp Shelby, MS	11
Ground Area Denial	12 Operational Partners	Tabletop Experiment	Fort Leonard Wood, MO	N/A
FY-16: Arctic Challenges	7 Organizations Participated	Field Demonstration	Fort Wainwright ; USCG Cutter Hickory, Homer, AK	16
Dense Urban and Subterranean	23 Operational Partners	Field Demonstration	Fort A.P. Hill, VA, Joint Base Anacostia-Bolling, DC	22
Protection of Key Assets and Facility Security	22 Operational Partners	Field Demonstration	Kings Bay, GA	29



Previous Events



Focus Area	Key Operational Partners	Event	Location	Technologies Demonstrated
FY-17: Dense Urban/ Subterranean	55 Operational Partners (Organizations Represented)	Field Demonstration	New York City, NY	20
Protection of Government Infrastructure and Facility Security	36 Operational Partners (Organizations Represented)	Field Demonstration	Blossom Point, MD	22
FY-18: Small Unit Operations	60 Operational Partners (Organizations Represented)	Technology Discovery and Demonstration	Adjacent to Fort Bragg, NC	54
Dense Urban & Subterranean Challenges	73 Operational Partners (Organizations Represented)	Field Demonstration	New York, NY	28
Sense Through the Wall and Color Night Vision	27 Operational Partners (Organizations Represented)	Limited Objective Field Demonstration	Adjacent to Fort Bragg, NC	10
FY-19: Port & Harbor Security Swimmer/Diver Detection, Tracking and Identification	30 Operational Partners (Organizations Represented)	Field Demonstration and Experiment	Truman Annex Key West, FL	9
Multi-Domain Operations	62 Operational Partners (Organizations Represented)	Field Demonstration and Experiment	New York, NY	27
Sense Through the Wall	23 Operational Partners (Organizations Represented)	Field Demonstration and Experiment	Maryland Fire and Rescue Institute, MD	9



Previous Events



Focus Area	Key Operational Partners	Event	Location	Technologies Demonstrated
FY-20: OUSD R&E Technology Focus Areas	100+ Govt. Organizations Represented	Technology Innovation Discovery and Demonstration	Chantilly, VA	76
Autonomy & AI/ML Enabled Technologies for Enhanced SA	30+ Govt. Organizations Represented	Virtual & Field Demonstration	Zoom for Gov't & Fredericksburg, VA	22
Cyber Resiliency executed in partnership with Stiletto & JVAB	5+ Gov't Organizations Represented	Field Demonstration	JEB Little Creek, VA	4
FY-21: VR Technologies to Enable Training Modernization and Enhance Combat Lethality	30+ Govt. Organizations Represented	Virtual Technology Demonstration	Zoom for Gov't	9

Copies of event Final Reports are available upon request, please email thunderstorm@arl.psu.edu



Summary



- **Since inception Thunderstorm has introduced 476 new and emerging technologies to over 1,689 DoD, IC, and other government representatives.**
- **Results have included:**
 - **Vendors:**
 - **Invited for additional testing at a government site**
 - **Invited to participate in future field events**
 - **Transitioned to the end-user**
 - **Government:**
 - **Introduced to new & emerging technologies**
 - **Introduced to non-traditional vendors**
 - **Discover DoD applicability of existing commercial products**
 - **Informed investment decisions**
 - **Formation of official Working Groups**



Upcoming Events



■ ***Thunderstorm 20-3: Soldier Survivability**

– Thunderstorm 20-3 is a virtual technology demonstration and experimentation event focused soldier survivability with increased mobility and automated operations with a goal of reducing or eliminating operator workload requirements, limiting/reducing size, weight, power, and reducing cost.

– Event is scheduled is for 20-21 April 2021

– Please email Thunderstorm@gtri.gatech.edu for more details

*** Pushed from FY20 due to COVID**



Recently Completed Event



■ ***Thunderstorm 20-4: Cyber Resiliency**

– Thunderstorm 20-4 was a RRTO joint venue demonstration and experimentation event that was led by both ARL/PSU and Stiletto, with technical support from the Joint Vulnerability Assessment Branch (JVAB). This event assessed prototype technologies related to increasing the cyber resiliency of surface vessels to enable the continuity of operations.

– Event was conducted 22 – 26 February 2021

– Please email Thunderstorm@arl.psu.edu for more details

*** Pushed from FY20 due to COVID**



Upcoming Events



- **Thunderstorm 21-2: Domestically Sourced Microelectronics that Enable USD R&E Modernization Priorities**
- This virtual event will focus on discovering emerging capabilities that align with the US R&E Modernization focus areas, which include:
 - Biotechnology
 - Autonomy
 - Cyber
 - Directed Energy
 - Fully Networked Command, Control and Communications (FNC3)
 - Microelectronics
 - Quantum Science
 - Hypersonics
 - Space
 - 5G
- Event scheduled for the April/May timeframe

Please email Thunderstorm@arl.psu.edu for more details



Upcoming Events



- **Thunderstorm 22-1: Modernizing Combat Planning and Operations by Leveraging AI/ML enabled Extended Reality (XR) Technologies**
- This event will focus on identifying emerging XR and accompanying technologies capable of providing the operator with ways to improve decision making and efficiency; reduce cost, workload, and risk; improve safety of the operator and operating equipment, and enhance situational awareness in both the rapid response planning and execution of combat operations.
 - **Collection** capabilities that may include AI/ML and autonomous operations of air and ground systems: UAS, UGV operating alone, as part of a group/swarm, or as a manned/unmanned team and capable of 3-Dimensional data collection (tactical photogrammetry, LIDAR, etc.) and MASINT collection to develop three-dimensional products (interior/exterior) in support of a platoon sized objective.
 - **Time Critical Processing** of data collected under field conditions to provide XR products in support a platoon level mission, including Denied, Disrupted, Intermittent, and Limited (DDIL) bandwidth considerations
 - **XR application/experience** that may enhance a platoon or other small unit's ability to rapidly gain situational awareness, provide command and control of assets, complete their planning process and conduct mission rehearsals.
- Event scheduled for the Sep/Oct timeframe
- Please email Thunderstorm@arl.psu.edu for more details



Vendors with relevant technologies and capabilities are encouraged to respond to the Thunderstorm beta.SAM.gov postings.

For more information on the program and how to engage, please contact the:

Rapid Reaction Technology Office

osd.pentagon.ousd-atl.list.rrto-poc@mail.mil