

Joint Test and Evaluation (JT&E)

The primary objective of the Joint Test and Evaluation (JT&E) Program is to rapidly provide non-materiel solutions to operational deficiencies identified by the joint military community. The program achieves this objective by developing new tactics, techniques, and procedures (TTP) and rigorously measuring the extent to which their use improves operational outcomes. JT&E projects may develop products that have implications beyond TTP. Sponsoring organizations transition these products to the appropriate Service or Combatant Command (CCMD) and submit them as doctrine change requests. Products from JT&E projects have been incorporated into joint and multi-Service documents through the Joint Requirements Oversight Council process, Joint Staff doctrine updates, Service training centers, and coordination with the Air Land Sea Application Center. The JT&E Program also develops operational testing methods that have joint application. The program is complementary to, but not part of, the acquisition process.

The JT&E Program uses two test methods: the Joint Test and the Quick Reaction Test (QRT), which are all focused on the needs of operational forces. The Joint Test is, on average, a 2-year project preceded by a 6-month Joint Feasibility Study. A Joint Test involves an in-depth, methodical test and evaluation of issues and seeks to identify their solutions. DOT&E funds the sponsor-led test team, which provides the customer with periodic feedback and usable, interim test products. The JT&E Program normally charts two new Joint Tests annually.

The JT&E Program managed five Joint Tests in FY20 (those annotated with an asterisk (*) were completed in FY20):

- Joint Hypersonic Strike Planning, Execution, Command and Control (J-HyperSPEC2)*
- Joint Interoperability through Data Centricity (JI-DC)
- Joint Laser Systems Effectiveness (JLaSE)*
- Joint Sense and Warn (J-SAW)*
- Multi (enhanced) Domain Unified Situational Awareness (MeDUSA)*

QRTs are intended to solve urgent issues in less than a year. The JT&E Program managed nine QRTs in FY20 (those annotated with an asterisk (*) were completed in FY20):

- Integration of small Unmanned Aircraft Systems into Joint Airspace (sUAS)*
- Joint Aviation Multi-Ship Integrated Air Defense System (IADS) Survivability Validation (JAMSV)*
- Joint Chemical Biological Radiological Nuclear (CBRN) Tactical Information Management (J-CTIM)*
- Joint Enhanced Emissions Control (EMCON) Procedures (JEEP)*
- Joint Enterprise Data Interoperability (JEDI)*
- Joint/Interagency – Ground/Air Transponder Operational Risk Reduction (JI-GATOR)
- Joint Military Application of the Space Environment (J-MASE)*
- Joint Optimization of Electromagnetic Spectrum (EMS) Superiority (JOES)*
- Situational Positioning of Long Dwell, Long Duration (LD2) Intelligence, Surveillance, and Reconnaissance (ISR) – Concept of Operations (CONOPS) Evolution (SPLICE)*

As directed by DOT&E, the program also conducts Special Projects as a means of executing viable nominations that could not be resourced through the JT&E Program. The sponsor provides the resources to conduct the project following the guidelines of a Joint Test or QRT under the JT&E Program. Special Projects generally address emergent issues that are not addressed by any other DOD agency but that need a rigorously tested solution. The JT&E Program managed one Special Project in FY20:

- Joint Rapid Alerting for Survivability and Endurability (J-RASE)

JOINT TESTS

JOINT HYPERSONIC STRIKE PLANNING, EXECUTION, COMMAND AND CONTROL (J-HYPERSPEC2) (CLOSED SEPTEMBER 2020)

Sponsor/Start Date: U.S. Strategic Command (USSTRATCOM)/August 2018

Purpose: To develop, test, and evaluate command and control (C2) CONOPS that enables warfighters to effectively plan and support hypersonic weapon employment decision-making to fully capitalize on this emerging capability.

Background: Multiple CCMDs require a conventional, long-range standoff capability for holding high priority, heavily defended targets at risk. DOD identified hypersonic strike as a top research and development priority and is moving forward to field a mix of land-, sea-, and air-launched weapons. A flexible mix of capabilities will provide Combatant Commanders with persistent, visible, and credible strike options without

crossing the nuclear threshold. To prepare for the deployment of hypersonic strike weapons (HSW), the J-HyperSPEC2 Joint Test is developing and testing the corresponding C2 CONOPS to leverage existing Combatant Commander decision-making processes and adapt standoff munitions planning practices to seamlessly integrate HSW options into the Joint Targeting Cycle.

Test Activity: In January 2020, J-HyperSPEC2 successfully executed Field Test (FT)-A at exercise Pacific Sentry 20-1/Global Lightning 20-1, which was distributed across Camp Smith and Joint Base Pearl Harbor-Hickam in Hawaii and USSTRATCOM in Nebraska. The coronavirus (COVID-19) pandemic response restrictions severely reduced or canceled theater sponsored exercises and travel leading to the loss of FT-B venues and a reduction in data collection. COVID-19 constraint mandates hindered the test's ability to interact and obtain additional CCMD warfighter input. As a result, the addition of various General Officer non-attributional interviews was needed to assist in CONOPS refinement.

Products/Benefits:

- CONOPS integrates HSW into the joint planning process and provides leadership with necessary information to make decisions that offer the highest probability of success
- CONOPS provides a Combatant Commander with the conceptual framework required when planning, directing, and employing HSW in support of strategic and operational objectives
- Enables effective employment of HSW to provide a highly responsive, long-range, conventional strike option for distant, defended, fleeting, and/or time-critical threats when other military options are denied access, not available, or not preferred

JOINT INTEROPERABILITY THROUGH DATA CENTRICITY (JI-DC)

Sponsor/Start Date: DOD Chief Information Officer/February 2019

Purpose: To develop, test, and evaluate non-materiel products to enable the employment of a data-centric environment for mission commanders at the operational and tactical levels to effectively collaborate and conduct operations with coalition and multi-national partners.

Background: CCMDs are limited in their ability to effectively plan and conduct operations with a dynamic set of coalition partners because they cannot share information easily and securely. CCMDs currently operate more than 40 mission partner networks – each with their own extensive resource requirements as well as constraints on information flow between the networks. A data-centric environment would consolidate operations onto one network using attribute-based access control software to enable authorized users to view and share information while limiting access to that information by unauthorized users on the same network. With U.S. Central Command (USCENTCOM) as the operational lead, the JI-DC Joint Test focuses on collapsing

disparate networks – created to support individual missions – into a single SECRET Releasable network. Instead of network separation, JI-DC separates data at the individual object level.

Test Activity: In November 2019, JI-DC conducted FT-1 at USCENTCOM to test the effectiveness of the procedures for network administrators to establish and manage group and user permissions on the USCENTCOM developed Data-Centric System. The JI-DC Joint Test was able to show that the test procedures enabled dynamic collaboration with an evolving set of mission partners. FT-2A took place at globally distributed locations in June 2020 to test data sharing procedures and capabilities with warfighters and further test network administrator procedures in a simulated target development cycle using U.S. and coalition targeteers as participants. Due to COVID-19 travel restrictions, FT-2A participants and testers worked remotely across the globe using virtual desktops and screen sharing to conduct test trials and allow data collectors to observe.

Products/Benefits:

- Policy and procedures to implement a data-centric environment across all realms of operations that will foster faster and more efficient information flow, collaboration, allocation of resources, and decision-making with allies, partner nations, and U.S. interagency counterparts
- Procedures will employ data-centric technologies that modernize information sharing capabilities to enhance operational effectiveness, enable dynamic multi-national force deployment, and deepen alliances through interoperability
- Data centrality will reduce the need for multiple operational networks each with unique partner sharing policies resulting in reductions in hardware, software, infrastructure, people, and significant savings in information system costs
- Recommendations to evolve policies for information sharing that leverage current technologies

JOINT LASER SYSTEMS EFFECTIVENESS (JLASE) (CLOSED DECEMBER 2019)

Sponsor/Start Date: Naval Surface Warfare Center, Dahlgren Division/April 2017

Purpose: To develop and test targeting procedures that incorporate weaponeering, risk analysis, and mitigation capabilities into the Joint Targeting Cycle that support the operational employment of high energy laser (HEL) weapon systems.

Background: HEL weapon systems continue to make rapid strides in development and demonstrated capabilities to destroy, disable, and degrade threat systems, such as unmanned aircraft systems, small boats, mortars, vehicles, communications, and power generation equipment. The employment of HEL weapons requires a paradigm shift from traditional munitions employment procedures given that HEL weapons rely primarily upon delivering heat to a target surface for the time required to achieve the desired effect. In order to determine the appropriate

irradiance and dwell time on a given target, HEL weaponeering requires more qualitative data on target surface composition.

Test Activity: The JLaSE Joint Test was comprised of two events, FT-A and FT-B. FT-A occurred in March 2019 at the Joint Staff J6, Command, Control, Communications, Computers, Cyber Assessments Division test enclaves in Suffolk, Virginia. The test team used a simulated operational environment to test the effectiveness of the TTP. Participants representing all Service components tested each DOT&E-assigned Use Case and associated engagement. In June 2019, the JLaSE team dispersed to select U.S. Indo-Pacific Command (USINDOPACOM) Headquarters locations to execute FT-B during a command post exercise. This event provided an opportunity for the team to collect data on the Use Cases and validate the effectiveness of the TTP in a realistic testing environment. FT-B required minimal scenario development because it leveraged existing exercise data and established supporting exercise material to provide operator validation of scenarios and targeting data and procedures.

Products/Benefits:

- TTP developed and tested for the integration of HEL systems into joint and Service operations to create battlespace effects in response to the commander’s intent and end-state objectives
- Integrates HEL systems capabilities into Joint Targeting Cycle processes focusing on capabilities analysis for weaponeering and combat risk assessment
- Establishes increased confidence in warfare commanders to select HEL as a viable combat capability to employ scalable lethality effects ranging from degrading sensors to catastrophic destruction
- Development of HEL Joint Munitions Effectiveness Manual lethality data for weaponeers and target planners to determine laser weapons effects on targets
- Recommendations to assist the Services in HEL system development, acquisition, and integration as it applies to their operational employment procedures

**JOINT SENSE AND WARN (J-SAW)
(CLOSED NOVEMBER 2019)**

Sponsor/Start Date: U.S. Air Forces in Europe – Air Forces Africa and USINDOPACOM/August 2018

Purpose: To develop, test, and evaluate a concept of employment (CONEMP) and TTP to integrate a persistent surveillance system into existing U.S. and coalition IADS architecture for use in air defense warning and engagement C2.

Background: CCMDs require timely detection and warning of air and missile threats for friendly forces to react – both in peacetime and wartime. Reliable and redundant connectivity for communications and sensor systems is vital for accurate and timely warning. A combination of air-, space-, and surface-based detection and communication assets should be utilized to maximize detection and warning. To reduce the effectiveness of hostile air threats against friendly forces, U.S. European Command (USEUCOM) and other CCMDs are integrating new

sensors into existing Integrated Air and Missile Defense (IAMD) architectures. The J-SAW Joint Test focused on (1) planning-execution-sustainment considerations and information exchange requirements needed for Air Defense, (2) USEUCOM and sensor unique TTP, and (3) training and reference guides to educate warfighters and leadership on Defensive Counter Air missions.

Test Activity: J-SAW conducted one risk reduction event and one field test to collect information and data related to CONEMP-TTP effectiveness when functioning in various operational environments. The field test allowed refinement and validation of the CONEMP-TTP based on findings and conclusions from analysis. The field test was broken into two parts. FT-A took place in conjunction with Astral Knight 2019 at Aviano Air Base, Italy, from June 3 – 6, 2019. It involved live sensors integrated into an IAMD architecture that detected and reported live air tracks simulating air and missile threats. FT-B was a constructive simulation event at the Warrior Preparation Center at Einsiedlerhof Air Station, Germany, from June 17 – 21, 2019. It consisted of C2 operators that monitored sensors and fed tracks of interest to a Fusion Cell in Phase 1 (deter) operations and a Control and Reporting Center in Phase 2 (seize initiative) operations.

Products/Benefits:

- CONEMP and TTP enable CCMDs to sense low-altitude air threats, integrate tracks into a theater common operational picture (COP), manage track identification and evaluation, and enable passive and active defense responses
- Improves air defense for U.S. and allied forces through earlier sensing and warning in both peacetime and wartime scenarios
- Integrates new sensor capabilities to better detect and track evolving air threats and provide increased response time for defense of critical military assets and warning to protected areas
- Provides a framework for integration of new sensors into existing IAMD architectures with recommended improvements in doctrine, organization, training, leadership, and education

**MULTI (ENHANCED) DOMAIN UNIFIED SITUATIONAL AWARENESS (MEDUSA)
(CLOSED MAY 2020)**

Sponsor/Start Date: USINDOPACOM and U.S. Northern Command (USNORTHCOM)/February 2018

Purpose: To develop, test, and evaluate non-materiel solutions for CCMDs and their various Service components to more effectively coordinate responses to operational or episodic events through increased situational awareness and understanding with unclassified COP information layers displayed together with classified information on the SIPRNET COP.

Background: In 2017, the Deputy SECDEF directed improvements to DOD Unclassified Shared Situational Awareness. This included tying existing systems together to form an unclassified COP and combining data and information

into a synchronized picture to ensure timely and accurate information sharing. The directive from the Deputy SECDEF required USNORTHCOM and USINDOPACOM take the lead in managing and fusing geospatial data and information for use in the full range of military operations to include non-combatant evacuation operations, Defense Support of Civil Authorities, and humanitarian assistance and disaster response. This established a need for information to be generated in a standard displayable format that CCMDs can receive and display on their operational COP. The MeDUSA Joint Test developed a solution for the standardization and migration of unclassified information to the SIPRNET COP.

Test Activity: The MeDUSA Joint Test conducted two separate risk reduction events at USNORTHCOM and U.S. Southern Command (USSOUTHCOM) to exercise the steps of the draft Shared Situational Awareness Tactics, Techniques, and Procedures (SSA TTP) and observe data collection processes. FT-1 occurred in conjunction with USSOUTHCOM Integrated Advance 19. The test team evaluated the COP manager's ability to generate unclassified displayable products in the required formats, transfer those products from NIPRNET to SIPRNET, and display the products on the SIPRNET COP. Additionally, the MeDUSA Joint Test evaluated the level of enhanced situational awareness and understanding for decision-makers. FT-2 took place during USINDOPACOM Pacific Sentry 20-2 in January 2020. The event utilized CCMD and Service component staff planners, unclassified product developers, SIPRNET COP

operators, and command decision-makers to test and evaluate the effectiveness and usefulness of a revised SSA TTP. A final version of the SSA TTP was produced and then transitioned to USINDOPACOM and USNORTHCOM as the product owners.

Products/Benefits: The SSA TTP was evaluated as strongly enabling the processes to generate standardized products and display the products on the SIPRNET COP to enhance both situational awareness and understanding. Operational users of the SSA TTP evaluated it as "Very Useful" to the warfighter. The procedures have been of benefit for DOD tracking and response to COVID-19 while coordinating efforts with non-military U.S. Government agencies, other non-government organizations, multi-national partners, and/or private sector entities that mainly operate in an unclassified information environment. Other benefits include:

- Validated technical processes and procedures for generating standardized unclassified domain products and displaying them on a SIPRNET COP to enhance commanders' situational awareness and understanding within their areas of responsibility
- Best practices and lessons learned for gaining situational awareness utilizing unclassified COP information on a consolidated SIPRNET COP
- Increased situational awareness and understanding through the use of an enhanced comprehensive view of data on a single COP

QUICK REACTION TESTS

INTEGRATION OF SMALL UNMANNED AIRCRAFT SYSTEMS INTO JOINT AIRSPACE (SUAS) (CLOSED AUGUST 2020)

Sponsor/Start Date: Marine Operational Test and Evaluation Squadron One/March 2019

Purpose: To research, develop, and evaluate newly created airspace control TTP to allow sUAS to be integrated into joint airspace. The test focused on meeting the warfighter's requirements by capitalizing on the sUAS's unique capabilities, maximizing freedom of maneuver, and maximizing tactical contributions while balancing the need for safe integration.

Background: Current airspace control procedures and coordination methods do not adequately provide airspace planners, C2 personnel, and airspace users with the adequate TTP to effectively integrate sUAS into the joint airspace on a large scale.

Test Activity: The sUAS QRT included two separate test events conducted near Yuma, Arizona. In December 2019, the test team executed Test Event (TE)-1, which focused on sUAS corridors and integration with manned aircraft at terminal airspace locations, such as a Helicopter Landing Zone. TE-2 focused on testing the TTP related to integration of sUAS during manned aircraft weapons delivery, long range flight corridors, and C2 of sUAS operations. Due to COVID-19 constraints,

TE-2 was a scaled down event conducted with a reduced capacity in May 2020. The contract test team and members of Marine Corps Warfighting Laboratory in Quantico, Virginia, and joint participants from the 5th Special Forces Group, U.S. Army, were not able to attend as a result of DOD travel restrictions. COVID-19 challenges in Yuma, Arizona, also required the team to delay selected analysis activities and deliverables.

Products/Benefits:

- Tactical Standard Operating Procedure (TACSOP) manual for the Marine Air Command and Control System to integrate sUAS into their airspace
- TACSOP will serve as the basis to establish joint sUAS integration TTP practices

JOINT AVIATION MULTI-SHIP INTEGRATED AIR DEFENSE SYSTEM (IADS) SURVIVABILITY VALIDATION (JAMSV) (CLOSED JULY 2020)

Sponsor/Start Date: U.S. Army Aviation Center of Excellence/October 2018

Purpose: To develop and assess rotary-wing multi-ship TTP utilizing joint, large scale combat operations missions and

profiles to defeat anti-access/area denial (A2/AD) and radio frequency (RF) IADS threats.

Background: Limited empirical multi-ship and multi-threat testing data exist to validate aircraft survivability combined with accepted TTP against peer and near-peer adversary's IADS threat systems.

Test Activity: The test team executed engineering, test, and analysis support to develop and evaluate TTP for the joint rotary-wing community. Testing provided validation data for Multi-Ship Large Scale Combat Operations survivability effectiveness against advanced peer and near-peer IADS threats utilizing fielded aircraft survivability equipment. The JAMSV QRT field test was delayed almost 5 months due to an earthquake, which required recalibration of all test equipment and a new tasking for a supporting unit from U.S. Army Forces Command. As a result, FT-1 execution moved from August 2019 to January 2020. Later, COVID-19 restricted work capabilities during FT-1 data analysis and limited access to facilities to no more than two personnel at a time from March through July 2020. Even though the team used parallel efforts at different locations to maximize contractor support, a 60-day extension was required to incorporate test data into the TTP for 3900 Series tasks (Aviation Mission Survivability collective training tasks), a maneuver handbook, and final report. With the extension, the test team completed all test analysis and transitioned the TTP and maneuver handbook.

Products/Benefits:

- Validated rotary-wing multi-ship TTP to defeat A2/AD and RF IADS threats
- Acquired high-fidelity data for future use in modeling and simulation for further TTP development and optimization
- Updated and developed TTP for 3900 Series tasks, a maneuver handbook, and training support package
- Informed aircraft survivability equipment modernization and shaped requirements for future systems

JOINT CHEMICAL BIOLOGICAL RADIOLOGICAL NUCLEAR (CBRN) TACTICAL INFORMATION MANAGEMENT (J-CTIM) (CLOSED DECEMBER 2019)

Sponsor/Start Date: USINDOPACOM/June 2018

Purpose: To identify gaps in current chemical, biological, radiological, and nuclear (CBRN) early warning and reporting processes and develop improved TTP for timely and effective protective posture decision support to friendly forces that enables continuity of operations under situations involving CBRN threats.

Background: DOD lacked standard tested and validated TTP for effective joint warning and reporting in the lead up to a CBRN incident, especially at the tactical level. In addition, Land Maneuver Commanders lacked the ability to make proactive risk-based decisions in a complex CBRN environment. The intelligence community further forecasted an uncertain and rapidly changing world in which the CBRN danger increases in

both scope and scale – primarily due to behaviors of multiple networks of actors who seek, possess, and proliferate CBRN materials.

Test Activity: In September 2019, the test team executed TE-2 as a staff exercise in the Digital Training Facility at the Maneuver Support Center of Excellence at Fort Leonard Wood, Missouri. TE-2 used a two-group experiment model in a controlled constructive simulation to collect data and retest the baseline information requirements and priority intelligence requirements list of indicators from TE-1. The event demonstrated a means by which to exploit information and situational dominance through improved situational understanding of this complex environment.

Products/Benefits:

- TTP supports the joint community to conduct early detection of CBRN agents within the tactical environment
- TTP provides warfighters across all Services with the ability to quickly react to a CBRN attack and reduce its effects
- TTP improves the use of information requirement's development as a link in the development of a functionally integrated CBRN framework

JOINT ENHANCED EMISSIONS CONTROL (EMCON) PROCEDURES (JEEP) (CLOSED NOVEMBER 2019)

Sponsor/Start Date: Naval Information Warfighting Development Center/June 2018

Purpose: To develop TTP to mitigate friendly systems vulnerabilities through determining which friendly RF emissions are detectable by adversary signals intelligence capabilities.

Background: EMCON is a significant concern for joint forces. Detection can leave the emitting force in a position of tactical disadvantage, especially if the detection leads to their geolocation by an adversary. As many potential adversaries field long-range signals intelligence capabilities, it is critical for joint forces to understand and manage their RF emissions.

Test Activity: The test team conducted a three-phased field test over a period of approximately 5 weeks from August through September 2019. Each phase included a scenario that directed operators to use their equipment or system in a manner consistent with the TTP. Phase 1 was a land-based test with Marine Corps systems at Marine Corps Air Station Cherry Point, North Carolina. Phase 2 consisted of a maritime test aboard USS *John C. Stennis* (CVN 74) in Norfolk, Virginia, with a focus on maritime RF emitters. Phase 3 was a land-based test with the U.S. Army during exercise Cyber Blitz at Fort Dix, New Jersey, with a focus on ground-based RF emitters.

Products/Benefits: TTP that includes a matrix for tactical-level guidance that allows friendly forces to better understand the probability that their RF emissions will be detected by an adversary and what information an adversary will likely be able to derive.

JOINT ENTERPRISE DATA INTEROPERABILITY (JEDI) (CLOSED DECEMBER 2019)

Sponsor/Start Date: Department of the Army G-4/March 2018

Purpose: To develop a validated CONOPS to implement logistics data exchange standards among partners required for the Joint Logistics Enterprise to support Globally Integrated Operations as identified in the Chairman, Joint Chiefs of Staff Joint Concept for Logistics, and the Capstone Concept for Joint Operations: Joint Force 2020.

Background: The overall problem examined by the JEDI QRT was the inability for sharing logistics data between the Services, joint organizations, and non-DOD partners. Non-materiel solutions are necessary to implement joint enterprise data interoperability and USEUCOM Mission Partner Environment – Information System capabilities within Service and joint organizations to enhance mutual logistics support across joint and combined operations.

Test Activity: The majority of the JEDI QRT testing was conducted in September 2019 during a field test table top exercise (TTX), which included participants at Fort Belvoir, Virginia, and other remote sites. The distributed method of the test allowed the team to reach a broader, global audience. During the event, the team briefed participants on the three functional areas of the JEDI CONOPS and provided correlated scenarios to demonstrate how the CONOPS could be operationalized. At the conclusion, test participants completed surveys and data collection forms, which the team used to evaluate the JEDI CONOPS.

Products/Benefits:

- CONOPS and Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy change recommendations that addressed logistics information sharing between the U.S. and multi-national forces
- CONOPS that enhanced logistical interoperability with an allied partner (United Kingdom) and provided a greater level of sustainment to forces embedded within the ranks of a U.S. division
- CONOPS provides a mechanism for extraction of logistics data from national systems to a multi-national system within the Logistics Functional Area Services system to enhance the logistics COP across all levels of commands

JOINT/INTERAGENCY – GROUND/AIR TRANSPONDER OPERATIONAL RISK REDUCTION (JI-GATOR)

Sponsor/Start Date: Headquarters, U.S. Air Force A3 and North American Aerospace Defense Command – USNORTHCOM/June 2019

Purpose: To develop, test, and validate joint and interagency TTP packages to mitigate aviation transponder vulnerabilities. In addition, the resulting test data will help inform policy, rulemaking, training, and regulations to allow for the appropriate employment of TTP anywhere in the aviation ecosystem.

Background: Across aviation and ground-based services, multiple transponder systems broadcast data in the clear that

commercial services can collect and display to any end user. Many of these systems are now required to be used by all aircraft. Automatic Dependent Surveillance-Broadcast (ADS-B), a supplement to traditional air field radars, was mandated for use by 2020 in the United States and Europe. Today, aviation is dependent on broadcast modes such as ADS-B for navigation, air traffic control, and flight safety. Operational security is compromised by the distinct lack of confidentiality of data transmitted by these modes.

Test Activity: Field test events took place between May and July 2020. The test team used an innovative “Virtual Test in the Cloud” data collection process to overcome challenges from COVID-19 restrictions. Most of the test team had limited to no access to the planned test sites and completed their roles from a combination of home and government offices scattered across the country. All test aircraft flew from their home stations with no collocation deployments of team members and aircraft as originally planned. The “Virtual Test in the Cloud” used virtual private networks, cloud storage, teleconference and video-teleconference networks, a detailed playbook, and a regularly updated and distributed Air/Ground Test Point Scoreboard that allowed the test team to collaboratively kick-off and control each day’s events. The Ground TTP testing using Federal Aviation Administration automation systems was severely limited due to COVID-19. Analysis of the ground data is still being evaluated.

Products/Benefits:

- TTP to mitigate aviation transponder data confidentiality, integrity, and availability vulnerabilities affecting operational security, air traffic control, and air surveillance missions on the ground and in the air
- TTP to enable operators to configure their systems to restrict unwanted transponder emissions/tracks, interpret the data in the air traffic control environment, and use this data to achieve desired effects
- TTP to address the differences between air traffic control system hardware configurations in DOD and interagency aircraft in varied real-world air traffic control environments

JOINT MILITARY APPLICATION OF THE SPACE ENVIRONMENT (J-MASE) (CLOSED JULY 2020)

Sponsor/Start Date: Space and Missile Systems Center and USINDOPACOM/March 2019

Purpose: To develop, test, and validate standardized TTP for the use of Military Application of the Space Environment (MASE) decision aids during operational- and tactical-level mission planning and execution, providing a repeatable and scalable methodology for countering long-range threats.

Background: The MASE Joint Capability Technology Demonstration delivered a mission support capability resulting in an informal TTP for limited operational use to increase warfighter situational awareness of adversary Over the Horizon Radars

probability of detection. However, additional TTP development and validation through a formal test and evaluation were still required for formal documentation and future applications.

Test Activity: COVID-19 response measures disrupted field test activities scheduled for March through May 2020. As a result, the planned field tests were replaced with limited remote testing. During FT-2/Air TTX, the ability of test participants to complete record runs depended on variable work schedules. Participants from the 96th Bomb Squadron at Barksdale AFB continued to conduct TTP operational planning during quarantine to provide record run data for FT-2/Air TTX. The 82nd Reconnaissance Squadron from Kadena Air Base and the 55th ISR Wing from Offutt AFB separately conducted elements of the airborne TTP execution. To execute FT-2/Maritime TTX, the team reached out to the USS *Grace Hopper* (DDG-70) and the USS *Curtis Wilber* (DDG-54) in the USINDOPACOM area of responsibility. Through secure communications, the team observed operational units employ the tool in real time during real-world missions. FT-2 concluded with the test team executing both Air record runs and Maritime TTX with excellent cooperation and participation from multiple geographically separated organizations.

Products/Benefits:

- Validated TTP utilizing MASE applications
- Enhanced decision-making tools to be used during operational and tactical planning
- Enhanced freedom of maneuver and survivability tools for air and maritime assets

**JOINT OPTIMIZATION OF ELECTROMAGNETIC SPECTRUM (EMS) SUPERIORITY (JOES)
(CLOSED NOVEMBER 2019)**

Sponsor/Start Date: USINDOPACOM/June 2018

Purpose: To develop TTP for the integration of joint electromagnetic spectrum operations (JEMSO) functions into a standing JEMSO Cell for CCMD’s effective use of EMS for assured friendly C2 and to degrade adversary capabilities.

Background: To enable joint force commanders to gain tactical, operational, and strategic advantage against near-peer adversaries, the joint warfighter must win the fight for EMS superiority. Operations within the air, land, sea, space, and cyberspace domains are similar in their EMS-dependence. In fact, EMS is the only physical space shared by every warfighter. JEMSO Cells at the CCMDs provide the processes and focus to effectively prioritize, integrate, synchronize, and deconflict the EMS aspects of operations throughout the operational environment. U.S. platforms and weapon systems rely on EMS – a reliance increasingly challenged by competitors and adversaries.

Test Activity: In August 2019, the test team conducted FT-2 TTP Validation Event (VE) at the Joint Electromagnetic Warfighting Center in San Antonio, Texas. This event allowed the team to validate key areas of the TTP that could not be tested during FT-1

where a functional JEMSO Cell participated in Pacific Sentry 19-3. FT-2 TTP VE was comprised of three portions of the JEMSO process: component EMS operations planning, JEMSO Working Group, and JEMSO Cell planning. During the event, the test team guided and observed the functions of the JEMSO Cell planning cycle, and then administered short surveys to both the component EMS operations planners and the JEMSO Cell participants.

Products/Benefits: TTP to support JEMSO Cell functions to develop an EMS superiority strategy, mitigate adversary’s abilities to contest friendly operations, coordinate authorizations for friendly forces, and tailor EMS signatures to limit friendly vulnerabilities.

**SITUATIONAL POSITIONING OF LONG DWELL, LONG DURATION (LD2) INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR) – CONCEPT OF OPERATIONS (CONOPS) EVOLUTION (SPLICE)
(CLOSED JUNE 2020)**

Sponsor/Start Date: USSOUTHCOM/October 2018

Purpose: To develop TTP and Contingency Operations CONOPS for selecting and setting the initial deployment locations and waypoints of LD2 assets using the LD2 mission management module; executing thin line C2 positioning and navigation of LD2 assets during operations based on real-world conditions and other Joint Interagency Task Force South (JIATF-S) reporting; and deconflicting and executing tasking of unallocated LD2 sensor times.

Background: The LD2 program was developed to address how limited in-theater ISR assets and coverage of maritime trafficking routes can be engaged to enhance USSOUTHCOM and its partner nations’ ability to detect, monitor, exploit, and fully illuminate threat networks. The concept employs systems in near space, airspace, and sea surface working in concert to provide a unified tipping and cueing architecture to vastly expand ISR coverage. The program leverages traditional national and tactical ISR capabilities only. The innovative and contractor-owned, contractor-operated nature of LD2 limits its ability to effectively integrate with existing DOD mission command and ISR frameworks. USSOUTHCOM and JIATF-S lacked the CONOPS and TTP to fully evolve and integrate traditional and non-traditional LD2 assets into a persistent surveillance capability. This has limited the ability to provide a high-performance, persistent surveillance capability across a large coverage area to support USSOUTHCOM’s detection and monitoring mission against illicit drug trafficking.

Test Activity: In March 2020, COVID-19 restrictions went into effect as the test team was about to conduct their final test event. The resulting disruptions to work capabilities hindered operations during TE-2 execution and data analysis. With limited access to facilities, the team employed parallel efforts in multiple locations to maximize contractor support. Despite making

significant progress in meeting test plan goals, the team required an extension to incorporate TE-2 data into the CONOPS and TTP, complete the final report, and transition the test products to JIATF-S.

Products/Benefits:

- TTP will contribute to the critical USSOUTHCOM mission set: detection and monitoring of surface and sub-surface targets of interest engaged in the trafficking of illegal

commodities for U.S. and partner nation interdiction and apprehension

- CONOPS and TTP helped set the conditions for the successful phase-in transition of commercial, autonomous LD2 ISR assets into the USSOUTHCOM area of responsibility during the next 3 years to support the detection and monitoring mission

SPECIAL PROJECTS

JOINT – RAPID ALERTING FOR SURVIVABILITY AND ENDURABILITY (J-RASE)

Sponsor/Start Date: USSTRATCOM/October 2019

Purpose: To develop operationally realistic processes for strategic-to-tactical notifications and tactical-to-strategic status report-back of information to improve the management of strategic command, control, and communications (C3) and logistics processes in a degraded, contested communications environment.

Background: Executive Order 13865, “Coordinating National Resilience to Electromagnetic Pulses,” issued on March 26, 2019, directs a whole-of-government response to electromagnetic pulse (EMP), which is an evolving threat to critical infrastructure to include strategic C3 systems. The previous Joint Pre-/Post-Attack Operations Supporting Survivability and Endurability (J-POSSE) Joint Test emphasized the need for timely notification and protective procedures to prevent damage to critical C3 systems. Building on those findings, the J-RASE Special Project extends beyond the immediate effects of a catastrophic event to provide solutions for the enterprise to endure and sustain operations that support the deterrent capability of the joint force.

Test Activity: In December 2019, J-RASE conducted both a TTP Working Group meeting in Colorado Springs, Colorado, and a Joint Warfighter Advisory Group meeting at Joint Test Unit – Suffolk, Virginia. J-RASE also held a TTP Development Event during exercise Global Lightning 2020 in January 2020. Beginning in March 2020, COVID-19 hindered operational

user familiarization efforts due to travel restrictions, halted work due to lack of access to secure workspaces, and caused the cancellation of the risk reduction event originally scheduled in May 2020. The test team conducted the rescheduled risk reduction event in July 2020. The team followed up that event with a High Frequency test, which was delayed to September 2020 due to equipment fielding. The High Frequency test ensures locations are capable of having adequate and reliable equipment with transmissions that can operate in a degraded environment and that operators are versed in using system redundant communications. Both events served to prepare the team for the field test planned for October 2020 during exercise Global Thunder 2021. Continued setbacks from the pandemic, equipment fielding, and delayed testing and findings determination meant that not all project objectives could be accomplished within the single field test as originally planned. Another field test and subsequent funding to cover a 3-month extension and communications challenges are being addressed.

Products/Benefits:

- Procedures for rapid notification of forces and supporting agencies to initiate actions to enhance the survivability of their C3 systems and manage their unit’s capability to endure and sustain operations in a degraded, contested communications environment
- Improves the joint warfighters’ ability to rapidly prepare for an attack, initiate protective measures, recover smartly, sustain, and endure while continuing to meet current operational requirements