

Joint Test and Evaluation (JT&E)



The Joint Test and Evaluation (JT&E) Program considers emerging technologies and the increasingly complex and dynamic, joint, multi-domain operational environment to plan and execute joint tests intended to deliver non-materiel solutions and enhance the United States' operational effectiveness, suitability, and survivability in combat. The Services and Combatant Commands (CCMD) help identify critical challenges that need to be addressed in their areas of responsibility to maintain superiority across joint,

multi-domain operations. The JT&E Program provides operational test and evaluation management and expertise to develop, test, and validate joint solutions, including agile warfighting tactics, techniques, and procedures (TTP), concepts of employment (CONEMP), and concepts of operations (CONOPS). In turn, Services and CCMDs provide leadership and support to the planning and execution of JT&E projects and their successful transition to the warfighter. Given the increased integration and

dependencies of platform, network, and command and control solutions across the domains, joint all-domain command and control solutions, and the rise of kill-webs, JT&E's mission and unique focus on system of systems testing is becoming increasingly critical to the Department's strategic objectives. JT&E test techniques, workforce talents, and reach-back are essential to the adequate evaluation of the effectiveness, lethality, suitability, and survivability of operational plans across the CCMDs.

In FY22, the JT&E Program managed three Joint Tests and nine Quick Reaction Tests (QRT). A Joint Test averages about two years in duration and is preceded by a six-month Joint Feasibility Study. QRTs provide a quicker response to urgent joint needs but must focus their objectives to execute within the shortened, one-year schedule.

Joint Tests

Joint Integrated Fire Control – Directed Energy Weapons for Air Defense (JIFC-DAD)

The advancement of adversaries' ballistic and cruise missiles threatens U.S. interests. U.S. Indo-Pacific Command (USINDOPACOM) J8 recognized the benefits of emerging technologies, specifically directed energy weapons (DEW), in improving air defense capabilities against such threats for U.S. joint forces and coalition partners. When employed with existing kinetic systems, DEW may enhance area air defense capabilities and enable commanders to effectively, affordably, and rapidly defeat massed attacks. In January 2021, JT&E initiated the JIFC-DAD Joint Test to deliver a validated CONEMP that optimizes the integration of DEW with kinetic weapon systems and provides a layered defense of critical assets against a mix of wartime air threats. The JIFC-DAD field test event was conducted in July 2022. The results and their effect on the USINDOPACOM mission are documented in a classified report.

Joint Interoperability through Data Centricity (JI-DC)

Data centricity represents a paradigm shift in mission partner information sharing that enables operational information sharing of multiple CCMD

missions in one common data-centric environment. Managing a single data-centric environment using attribute-based access control software enables the sharing of information only to authorized users of a specific operation. Not only is this more efficient in resource savings, it supports flexible and timely information sharing with coalition partners to meet dynamic, simultaneous mission requirements. DOD Chief Information Officer recognized the need for more efficient and dynamic information sharing networks at the operational and tactical levels. U.S. Central Command J6 took the lead in developing the hardware and software for the data-centric environment. In parallel, the JI-DC Joint Test focused on developing and testing procedures to administer and operate the environment as a SECRET releasable network with security-enhanced features and data management protocols.

The JI-DC Joint Test conducted three test events with U.S. and coalition warfighters in a simulated target development cycle. These events used a prototype data-centric network to test data sharing procedures and network administration of user permissions and security protocols. Participants distributed across the United States, Canada, Germany, Norway, Sweden, and England used virtual desktops and screen sharing to conduct test trials and collect data for analysis. The results not only demonstrated the ability to access the environment and conduct secure information sharing but also validated the utility and usefulness of the JI-DC TTP to the warfighters and information technology administrators. In October 2021, the JI-DC test products were received by U.S. Central Command for final coordination and distribution. Since project closing, the products have been instrumental in CCMD implementation, network administrator management, and warfighter operation of a data-centric environment called the Collaborative Partner Environment.

Recovery Enhanced by Synchronizing Capabilities to Unify Effects (RESCUE)

Joint forces will face challenges in conducting personnel recovery (PR) in a complex multi-domain, anti-access/area denial (A2/AD) environment without access to employing the full range of all-

domain capabilities in today's arsenal. The Joint Personnel Recovery Agency recognized a gap in existing doctrine and identified the need for integration and synchronization of information-related capabilities (IRC) into PR operations. In August 2019, JT&E initiated the RESCUE Joint Test to develop and test a TTP that integrates and synchronizes IRCs with traditional kinetic fires for support and recovery of isolated personnel. The team used data generated from the U.S. Marine Corps Special Operations Command Raven risk reduction event and field testing at KEEN EDGE 22 along with warfighter input to shape the TTP.

The RESCUE TTP enables PR improvements to reduce risk to isolated personnel and recovery forces as well as addresses information operations collaboration across the DOD. The TTP not only improves operations in an A2/AD environment but also integrates all-domain capabilities into PR operations for complex urban scenarios. The RESCUE test product is already being integrated in CCMD standard operating procedures for mission planning and execution. Ultimately, the RESCUE TTP will influence future revisions to PR and IRC training curriculums; Joint Publication 3-50, Personnel Recovery; and Air Land Sea Application Center multi-Service TTP for PR.

Quick Reaction Tests

Assessment of Joint Maritime Mining on USINDOPACOM Operational Plans (AMMO)

Maritime mining is a low-cost and effective means to deny an adversary access to geographic locations and delay their action. U.S. adversaries have advanced their integrated air defense systems and substantially increased risk to the warfighter when deploying mines. USINDOPACOM J8 recognized the need to develop, test, and validate a joint CONEMP to maximize the wartime effect of legacy and advanced maritime mines given the increased risk in their deployment. In April 2021, JT&E initiated the AMMO QRT to develop a CONEMP for near-term and legacy mine capabilities. The objective was to maximize operational and strategic effect within USINDOPACOM operational plans and minimize risk to U.S. forces and coalition partners. The

AMMO QRT completed two table top exercises, two rounds of modeling and simulation, and two warfighter advisory working groups. These resulted in the successful test and validation of a Maritime Mining CONEMP as the final product delivered to the warfighter at project completion. Additionally, the AMMO QRT continued to provide critical updates to the Office of the Chief of Naval Operations N81 Capabilities Based Analysis for Maritime Mining through project completion in August 2022.

Integration of Joint Optimization for Electromagnetic Spectrum (EMS) Superiority (I-JOES)

Joint forces are critically dependent on the electromagnetic spectrum (EMS) across all domains and functions. To achieve EMS superiority, USINDOPACOM J8 recognized the need for validated cross-functional TTP that integrates intelligence, electromagnetic warfare, and spectrum management at the component level. In April 2021, JT&E initiated the I-JOES QRT to develop component-level TTP that: 1) incorporates EMS targets and collection requirements into joint targeting or collection cycles, 2) integrates EMS operations into the joint air tasking cycle, and 3) develops component EMS operations plans to feed the CCMD and Joint Task Force Joint Electromagnetic Spectrum Operations. The I-JOES QRT executed two test events, which included a field test at KEEN EDGE 22 in January 2022 and a table top exercise in May 2022. Following project completion in August 2022, the I-JOES TTP transitioned to USINDOPACOM J8 and is actively being used by Pacific Air Forces, U.S. Pacific Fleet, and the Joint Electronic Warfare Center.

Joint Basin-Scale Communications (J-BASC)

U.S. Strategic Command recognized an emerging communications technology that could be integrated within the existing architecture to meet a critical joint force need. In April 2021, JT&E initiated the J-BASC QRT to develop, test, and evaluate the new communications CONOPS that considers this technology. J-BASC QRT conducted field testing in March and May 2022. The results and their effect on the U.S. Strategic Command mission are documented in a classified report.

Joint Discreet Adversary Strategy Defeat (J-DASD)

U.S. Strategic Command J8 recognized the need to apply tailored deterrent strategies for specific adversaries by integrating the full spectrum of U.S. military capabilities, both nuclear and conventional, with elements of U.S. national power. In April 2021, JT&E initiated the J-DASD QRT to develop and test CONOPS that specifically addresses the following areas: 1) integration of strategic deterrence action, 2) development of deterrence options, 3) degrading potential impact of threat actors, 4) executing deterrence operations in a timely manner, and 5) reducing the risk of deterrence failure. The J-DASD QRT conducted a field test at the Power Game event in June 2022 to collect measurements for messaging processes.

Joint Integrated Network – Korea (JIN-K)

U.S. Forces Korea are updating their near real-time, joint/coalition integrated air-ground common operational picture (COP). The update will enhance integration and distribution of sensor and targeting data to mobile and command post sites throughout the theater of operations. Joint Staff J6 recognized the need to develop new TTPs that optimize the benefits of this update and deliver the required joint capabilities within the Combined Enterprise Regional Information Exchange System - Korea network. This will assist modernization of mobile and command post sites throughout the Republic of Korea based on upgraded capabilities to integrate data feeds and targeting sensors into a COP. The TTPs will also include sensor-to-shooter integration guidelines through tactical datalinks to various air/land/sea strike platforms and mobile/command post sites. In January 2021, JT&E initiated the JIN-K QRT to develop, test, and validate such TTPs. The JIN-K QRT conducted field tests in Spring 2022. The validated TTPs will enable warfighters to effectively utilize available data within a COP and retain real-time situational awareness from the tactical through strategic levels. Further, the TTPs will reduce bandwidth consumption and directly contribute to projection of combat power.

Joint Interagency – 5G Radar Altimeter Interference (JI-FRAI)

The Federal Communications Commission reallocated the 3.7–3.98 GHz frequency spectrum to 5G C-band applications in March 2020. Later that year, the Radio Technical Commission for Aeronautics assessed that 5G out-of-band emissions could interfere with civil aircraft radar altimeters (RADALT) operating in the 4.2–4.4 GHz C-band spectrum range. Cellular technology companies disputed the assessment citing discrepancies in bench test models and a lack of operationally realistic live testing. In 2021, the Federal Aviation Administration imposed restrictions on the aviation communities and cellular providers based on the Radio Technical Commission for Aeronautics report findings. The Office of the USD(A&S) and U.S. Transportation Command recognized the need to assess these potential impacts on military systems and develop a test methodology for evaluating 5G C-band interference on military and civil aircraft avionics. In April 2021, JT&E initiated the JI-FRAI QRT to develop and test a combined test methodology for evaluating 5G interference and to provide an initial assessment of 5G interference on selected military RADALT systems.

The JI-FRAI QRT executed a phased test strategy comprised of enhanced bench testing, radio frequency over-the-air testing, and operational flight tests in a real 5G environment. These test activities brought together participants from across the federal government, the commercial aviation community, major cellular service providers, RADALT manufacturers, and government partners. The cooperative nature of the project led to a rapid initial assessment of potential 5G interference on 80 percent of currently used RADALT models onboard manned fixed wing and rotary aircraft. Upon completion in FY22, JI-FRAI delivered a combined test methodology summarizing best practices, lessons learned, operational considerations, resource requirements, and mitigation strategies. The test product will enable expanded testing of 5G interference on other manned and unmanned aircraft avionic systems. The findings and conclusions of the JI-FRAI project enabled DOD to address an issue of national interest and

establish a position for ensuring the safety of military aircraft within 5G areas of operation.

Joint Interagency Net-Centric Cross-Domain Risk to Operational Cyber Systems (JINX ROCS)

The Eastern Air Defense Sector (EADS) and Western Air Defense Sector (WADS) rely on a range of radars, interrogators, aircraft transponder systems, and associated datalinks. These are used to generate and transport the operational data underpinning the battlespace situational awareness critical to providing air defense and control in support of the homeland defense mission. DOT&E recognized the need to evaluate cyber risks to EADS/WADS architecture, system, and information for mission assurance. In April 2021, JT&E initiated the JINX ROCS QRT to develop, test, and validate a time-critical TTP enabling detection, response to, and recovery from cyber interference within the data stream and architecture. Additionally, the TTP provides an operational framework and supporting instructions to optimize available sensors to support these activities.

The JINX ROCS QRT implemented a “test-fix-test” approach with the first field test series occurring at EADS/224th Air Defense Group Battle Control Center from December 2021 through February 2022. The project conducted the second field test in May 2022. Analysis of field test data validated that the JINX ROCS-developed TTP improved performance of air defense sector operations and cyberspace personnel detection, response to, and recovery from cyber interference of operational missions. The integrated and enhanced performance gained using the JINX ROCS TTP further enabled air defense sector operators to maintain battlespace situational awareness and “fight through” cyber-contested environments.

Joint Littoral Fire Support Coordination (J-LIFE)

The joint warfighter requires doctrine to deconflict, coordinate, and integrate attacks that include newly fielded capabilities and emerging technologies. USINDOPACOM J8 recognized the need for effective doctrine that minimizes the risk of fratricide, reduces duplication of effort, and assists in shaping the operating environment for land-based fires into the

maritime domain. In January 2021, JT&E initiated the J-LIFE QRT to develop and validate TTPs to update existing joint and Service doctrine. These will support the U.S. Marine Corps’s Expeditionary Advanced Base Operations and U.S. Army’s Multi-Domain Task Force. To meet these objectives, the J-LIFE QRT conducted two field tests. In March 2022, the first field test served to validate the employment of the TTP by fires elements at the tactical level during SPARTAN FURY 22.1. In August 2022, the J-LIFE test team conducted a second field test to monitor identification of hostile maritime tracks through Naval Strike Group planning and coordination in order to execute operational-level land-to-maritime fires during PACIFIC DRAGON 22.

Joint Sustainment in the Littorals – Fuel and Water Distribution (JSL-FWD)

Expeditionary Advanced Base Operations require forces to continue to distribute fuel and water in an evolving A2/AD environment. USINDOPACOM J8 recognized the need for joint CONOPS to enable flexible and resilient logistical supply and sustainment to maintain operations in such an increasingly complex and dynamic environment. In January 2021, JT&E initiated the JSL-FWD QRT to develop, test, and validate a joint CONOPS for agile and scalable expeditionary fuel and water distribution. The focus is on connecting the existing tactical fuel and water distribution systems ashore to locations beyond the high water mark via an over-the-shore connection. The JSL-FWD QRT executed three field test events, which included two table top exercises in March and June 2022 and a live demonstration event in May 2022. Following project completion in August 2022, the CONOPS transitioned to USINDOPACOM J8. It is actively being used by U.S. Marine Corps Forces, Pacific; U.S. Pacific Fleet; and Naval Facilities Engineering and Expeditionary Warfare Center.