Armor in the Drone Age:

Integrating C-UAS Training Into Combined Arms Doctrine, Formation Design, and Crew Standards for the Armored Force

ASSESSMENT SCOPE

This paper examines C-UAS training requirements across the Armored Force: the doctrinal, organizational, training, and materiel dimensions of integrating counter-drone capability into the combined arms team at every echelon from crew to corps. It draws on the operational evidence from Ukraine, the Army's Transforming in Contact 2.0 program, the revised Armor platform manuals, and the CALL NTC analysis to assess the gap between current C-UAS training integration and the standard required for armored formations to survive and fight effectively in drone-saturated large-scale combat operations.

PRIMARY SOURCES

CALL No. 25-1093 (NTC C-UAS, Sep 2025) | CRS R48477 (C-UAS, Mar 2025) | Task and Purpose: Army Tank Manual Drones (Jul 2025) | AUSA Land Warfare Paper: Kinetic Drones in Combined Arms Battalion (Apr 2025) | Army.mil: Driving Change, ABCT Transformation, BG Chalfont (Sep 2025) | Army.mil / 1st Cav Division: Pegasus Charge, TiC 2.0 (Apr-Dec 2025) | DVIDS: 1st Cavalry Division C-sUAS Equipment (Aug 2023) | DefenseScoop: Transforming in Contact Armored (Apr 2025) | Army Recognition: 2nd BCT, 1st Cav NTC Rotation 26-02 (Nov 2025) | Small Wars Journal: Adapting the CTCs (Jan 2026) | NGIC Drone Vehicle Strike Data 2022-2024 | FM 3-0 (2022 and Mar 2025 revision) | TC 3-20.20 Maneuver Platoon Training (Apr 2025) | TC 3-20.31 Tank Gunnery (2025) | Maneuver Center of Excellence / Fort Benning SUAS Master Trainer Program | Fort Benning Maneuver Innovation Lab (Feb 2025) | Hudson Institute: Drones on the Battlefield, French Perspective (Nov 2025) | Modern War Institute: Beyond FPVs (Oct 2025) | AUSA Global Force Symposium (Mar 2026) | M1E3 Abrams Program: National Security Journal (Nov-Dec 2025)

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This paper draws exclusively on publicly available and officially released sources. No classified information is referenced.

Executive Summary

Armor is in crisis. Not because of technology, funding, or industrial capacity, but because the premier combined arms capability of the U.S. Army has been forced to confront a fundamental truth that Ukraine has written in destroyed vehicles: the armored formation that cannot protect itself from drones cannot fight. From February 2022 through July 2024, drone strikes accounted for 42.47 percent of all combat-damaged vehicles in Ukraine, according to the National Ground Intelligence Center, making unmanned aerial systems the single most lethal anti-armor weapon on the modern battlefield. By early June 2025, of the 31 U.S.-supplied tanks lost by Ukraine, 27 were destroyed by drones. A $500 FPV drone destroyed what a $3 million tank could not defend against.

The Army's armored force has recognized this reality and is responding. The Tank Platoon manual, revised in 2025, mentions unmanned systems over 100 times and designates C-UAS as one of 12 Critical Tactical Tasks for armored crews. The Maneuver Center of Excellence at Fort Benning conducts a SUAS Master Trainer course and has opened the Maneuver Innovation Lab. Transforming in Contact 2.0 is restructuring two Armored Brigade Combat Teams, the 2nd BCT 1st Cavalry Division and the 2nd BCT 3rd Infantry Division, to fight with integrated drones, counter-UAS, and electronic warfare. The 1st Cavalry Division's Pegasus Charge working groups have convened the Armor School Commandant and Maneuver Center of Excellence leadership to redesign the ABCT around the drone-saturated battlefield.

But the training architecture has not kept pace with the doctrinal and organizational recognition. The Center for Army Lessons Learned documented in September 2025 that C-UAS training is relegated to a secondary priority at NTC rotations even for armored formations. Gunnery tables and crew qualification standards have been revised in TC 3-20.31, but no equivalent mandatory C-UAS crew qualification standard exists for the defeat side of the engagement. Air guard doctrine exists on paper; dedicated C-UAS engagement drills are in immediate action format only. Crew-level defeat of Group 1 drones, the $500 FPVs that destroyed 27 of 31 U.S. tanks provided to Ukraine, has no formal qualification program equivalent to Table VI or Table XII gunnery.

This paper argues that the Armored Force stands at the same doctrinal inflection point that the introduction of shaped-charge anti-tank weapons created in the 1970s. The response then was not incremental adjustment; it was a fundamental redesign of crew training, platform survivability, and combined arms integration. The drone threat requires the same response: formal crew-level C-UAS qualification standards, integration of C-UAS defeat into gunnery tables, combined arms C-UAS training at every echelon from crew to corps, and a revised ABCT organizational design that embeds C-UAS protection as an organic capability rather than a borrowed or specialized asset.

CENTRAL FINDING

The Armored Force's training system has updated doctrine, manuals, and organizational concepts faster than it has updated formal qualification standards. C-UAS is now a Critical Tactical Task in the tank manual but does not yet carry a crew qualification table equivalent to the gunnery standards that define armored crew readiness. Closing this gap, between recognized requirement and formal qualification standard, is the most urgent C-UAS training action the Armor community can take.

1. The Threat Evidence: Why Armor Cannot Ignore the Drone

1.1 The Data from Ukraine: Drones Are the Premier Anti-Armor Weapon

The National Ground Intelligence Center's analysis of vehicle damage data from the Russo-Ukrainian conflict, covering February 2022 through July 2024, documents a finding that should define every Army armor training discussion for the foreseeable future: kinetic drone strikes, including dropped munitions and loitering munitions, accounted for 42.47 percent of all combat-damaged vehicles in that period. Artillery accounted for 24.28 percent. Tank main gun fire was responsible for hits on 78 vehicles. Unmanned aerial systems were responsible for 3,028 strikes. The AUSA Land Warfare Paper published April 2025 describes July 2024 as having the highest monthly total of observed vehicles damaged by drones since the conflict began.

The implications are specific, not general. Loitering munitions alone, led by the Russian Lancet, accounted for 3,045 vehicle strikes, compared to 584 for FPV dropped munitions. The Lancet, designed as a precision loitering weapon optimized for armored target defeat, strikes moving vehicles and is almost certainly growing in capability and confidence according to NGIC analysis. By early June 2025, of the 31 U.S.-supplied M1 Abrams tanks delivered to Ukraine, 27 had been destroyed by drones. This ratio, 87 percent of losses to drone strikes on the most survivable Western main battle tank in inventory, is the operational baseline for U.S. Armor's survivability planning.

The cost asymmetry that the AUSA paper and Hudson Institute analysis describe is not simply a budget problem. It is a tactical problem: a $500 FPV drone operated by a trained operator can destroy or immobilize a $10 million armored vehicle system. Ukraine's own estimate, cited in Small Wars Journal analysis, is that it now takes seven drones, up from three earlier in the conflict, to destroy a modern tank, but FPV precision allows operators to immobilize armor by targeting guns and critical components. The result is that armored vehicles are increasingly held far behind the zero line rather than advancing as the cutting edge of combined arms maneuver. The defining operational effect of the drone on armor is not destruction but immobilization: if the Armored Force cannot fight through the drone threat, it cannot fulfill its doctrinal mission.

1.2 The Transparency Problem: Armor Cannot Hide

The FPV drone has created what analysts at Defence Ukraine describe as a transparent battlefield, where constant surveillance and the ever-present threat of attack from above have fundamentally broken the traditional model of combined arms maneuver that armor doctrine depends on. The passive defenses available to armored crews, including mud on headlights for light discipline, camouflage, decoys, and dispersion, address the visibility component but do not resolve the surveillance-saturation problem: if an adversary employs hundreds of FPV drones and dozens of ISR drones across a brigade frontage, passive measures reduce detection probability but cannot eliminate it.

French Chief of Staff General Pierre Schill's April 2025 order of the day, calling on the cavalry to reinvent itself in response to drone warfare, captures the institutional recognition that the drone threat is not an adaptation challenge but a force design challenge. The Hudson Institute's French perspective paper notes that a growing gap is emerging between the costly sophistication of combat vehicles and the inexpensive, rugged means available to destroy them, and asks directly whether drones should remain limited to optimizing existing forces or integrated as an organic tool of maneuver, as in Ukraine. For the U.S. Armored Force, the answer

implicit in the Transforming in Contact 2.0 program is the latter, but the training system has not yet fully operationalized that answer.

2. The Doctrinal Response: What the Armored Force Has Already Done

2.1 The Revised Tank Manual: C-UAS as a Critical Tactical Task

The most significant doctrinal development in the armored force's response to the drone threat is the revised Tank Platoon manual, analyzed in Task and Purpose reporting from July 2025. The revision is comprehensive: unmanned systems are mentioned over 100 times, and C-UAS is designated as one of the 12 Critical Tactical Tasks that define armored crew competency, placing it alongside fundamentals such as field maintenance and casualty care and evacuation. This elevation of C-UAS to a Critical Tactical Task is doctrinally significant because it establishes the baseline expectation that every tank platoon will be evaluated on its C-UAS performance, not merely briefed on it.

The manual's doctrinal treatment is specific about the two-category framework for armored C-UAS: active measures, including manual and automated systems designed to shoot drones out of the sky as they approach, and passive measures, encompassing limiting damage, avoiding detection, and employing decoys. The active measures section covers the air guard role, which the manual assigns to the loader, establishing 360-degree security against aerial threats. The air guard doctrine is direct: the platoon should assume it is being observed by enemy reconnaissance and targeting systems and not assume it is under a protective umbrella of friendly air and missile defense units. The platoon must react quickly and appropriately respond and report when recognizing signs of possible enemy observation or attack.

The manual also addresses the crew-level immediate action drill for engaging drones with main gun fire using M1028 120mm canister rounds, a suppressive munition designed to scatter over 1,000 tungsten projectiles across a wide field. The Task and Purpose analysis is appropriately cautious about the optimism of simple diagrams showing tank-vs-drone encounters, given Ukraine's evidence on the complexity of such engagements. The manual represents the Army's first rewrite of armor procedures to address the drone threat in dedicated sections rather than incidental references.

2.2 FM 3-0 and the Operational Doctrine Update

The March 2025 revision of FM 3-0 introduced operational imperatives directly relevant to the Armored Force's C-UAS integration requirement. The two most consequential for armor are protect against constant observation and make contact with sensors, unmanned systems, or the smallest element possible. These imperatives restructure the armored formation's approach to maneuver: advance the sensors and unmanned systems first, not the tanks. The tank platoon that sends FPV and ISR drones ahead of its advance before committing M1 Abrams to a movement corridor replicates the operational model that Ukraine's most effective armored formations have adopted.

The doctrinal connection between the offense, defense, and stability doctrine in FM 3-0 and the specific crew-level C-UAS requirements in TC 3-20.31 is the critical link that training program development must close. FM 3-0 establishes the requirement for drone-first maneuver. TC 3-20.31 establishes the crew-level active and

passive defense tasks. What the training architecture still lacks is the connecting training program: the collective exercise that practices the crew-level C-UAS tasks within the context of the FM 3-0 operational imperatives at platoon, company, and battalion echelon.

2.3 TC 3-20.20 and the Maneuver Platoon Training Standard

TC 3-20.20, Training: Maneuver Platoon, published April 2025, provides the integrated weapons training strategy for all platoon-size formations in Armored, Infantry, and Stryker Brigade Combat Teams. The manual governs how units build fire and maneuver proficiency at home station. Its publication alongside TC 3-20.31 creates the doctrinal framework for platoon-level C-UAS training that did not previously exist in a consolidated form.

BG Chad Chalfont's September 2025 article on ABCT transformation in Army professional military publications documents that establishing UAS, C-UAS, and emissions control training standards for tactical units and doctrine is an active Armor Training Systems Integration effort. This acknowledgment from the Armor School's senior leadership that C-UAS training standards are still being established, rather than already established, confirms the gap between doctrinal recognition and formal training standard development.

3. Transforming in Contact 2.0: The Organizational Laboratory

3.1 The Program Structure and C-UAS Integration

The Army's Transforming in Contact 2.0 program is the most consequential current laboratory for C-UAS integration in the armored force. The program, championed by Army Chief of Staff General Randy George, uses designated brigade combat teams and their NTC rotations to test, evaluate, and develop the doctrine, organization, training, materiel, and facilities that will define the future ABCT. Four ABCTs have been designated as TiC ABCTs for NTC rotations: the 2nd BCT 1st Cavalry Division (Rotation 26-02, Fall 2025), the 2nd BCT 3rd Infantry Division (early Summer 2026), the 1st BCT 1st Cavalry Division (2027), and the 2nd BCT 3rd Infantry Division (also 2027).

DefenseScoop and Army Times reporting confirm that TiC 2.0 has three primary technology infusion focus areas: unmanned aerial systems, counter-UAS, and electronic warfare. This triad is not accidental. It mirrors the interconnected nature of the drone problem on the modern battlefield: you need organic UAS to see, you need C-UAS to survive, and you need EW to degrade adversary C2 over both offensive and defensive drones. The 2nd BCT 1st Cavalry Division's Rotation 26-02 at NTC Fort Irwin in November 2025 was the first armored TiC 2.0 rotation, integrating M1A2 SEPv3 Abrams, M2A4 Bradley vehicles, and Paladin howitzers with drone, counter-drone, and cyber-electronic capability.

3.2 The Black Jack Brigade Rotation: What Was Learned

The 2nd BCT 1st Cavalry Division's November 2025 NTC rotation documented what armored TiC integration looks like in practice and what gaps remain. Army Recognition reporting describes brigade leaders transitioning to smaller, modular groupings at company level, integrating counter-UAS, electronic warfare, and real-time intelligence fusion. The Mastodon Beast+, a deployable system that detects, tracks, and disrupts

enemy drones and communications, provided armored units with electromagnetic maneuver warfare capability during the rotation.

The rotation also confirmed the training deficit that CALL No. 25-1093 documented for lighter formations: drone integration and C-UAS integration require Soldiers who understand both the technology and the tactical employment context, and who have practiced the drills, SOPs, and collective tasks before arriving at the CTC. Army Futures Command and TRADOC are expected to incorporate feedback from the rotation into doctrinal updates and force design evaluations throughout 2026.

A particularly significant 2025 exercise, reported by Inside Unmanned Systems drawing on Wall Street Journal and Ukrainian military sources, demonstrated the severity of the C-UAS training gap for armored formations. In a simulated mechanized assault, a British brigade and Estonian units were mauled by ten Ukrainian drone operators. Over 12 hours, 30 drone strikes using dummy rounds knocked out 17 armored vehicles, rendering two NATO battalions combat ineffective. The Ukrainian pilots located NATO columns using VTOL ISR drones to populate their battle management systems while remaining undetected themselves. The exercise outcome is a direct preview of what inadequately C-UAS-trained armored formations will face in large-scale combat operations.

3.3 The Pegasus Charge Working Groups: Defining the Future ABCT

The 1st Cavalry Division's Pegasus Charge working groups, convened at Fort Cavazos in April 2025, represent the most structured effort to redesign the ABCT around the drone-saturated battlefield. The working groups, attended by the Armor School Commandant, the Maneuver Center of Excellence leadership, Army Futures Command, and DEVCOM experts, focused on five organizational options under DOTMLPF review.

The most consequential C-UAS-relevant organizational decisions under consideration are the Multi-Functional Reconnaissance Company at brigade level, designed as the brigade's primary sense-and-strike arm, and the multi-purpose company at battalion level, providing the same integrated capability one echelon lower. Both formations integrate UAS, C-UAS, EW, and fires in a combined package that keeps the sensor-to-shooter chain inside the battalion or brigade rather than relying on tasked higher-echelon C-UAS assets. The division's cavalry squadron is being redesigned with human-machine interface platoons featuring autonomous robots, sensors, and UAS for technical reconnaissance.

MG Thomas Feltey's published statements on Pegasus Charge identify the core training challenge for these new organizational designs: they require Soldiers and leaders who can operate, maintain, plan, and integrate capabilities that have no established training pipeline within the ABCT. The division expects company-level training with new assets to begin in early 2026 and battalion-level training in Summer 2026, building to the culminating NTC rotation in 2027. That timeline is the training development window: the doctrine and organization are being designed now, and the training programs that make them effective must be built in parallel.

4. The Training Gaps: Five Requirements the Armored Force Has Not Yet Met

4.1 Gap 1: No Formal C-UAS Crew Qualification Standard

The most consequential training gap in the Armored Force's C-UAS integration is the absence of a formal crew qualification standard equivalent to the gunnery qualification tables that define armored crew readiness. A tank crew's certification to operate in combat depends on demonstrated proficiency across Tables VI through XII of the gunnery program, covering crew qualification, advanced qualification, and collective engagement. There is no equivalent table for C-UAS crew qualification: no demonstrated standard for air guard employment, for immediate action drill execution against drone threats, for passive air defense measure implementation, or for reporting in accordance with the C-UAS ROE framework applicable to the operational environment.

The revised TC 3-20.31 establishes C-UAS as a Critical Tactical Task, but elevating a task to the Critical Tactical Task list does not by itself create a qualification program. It creates the doctrinal foundation for one. The Armor Training Systems Integration (ATSI) work acknowledged by BG Chalfont as establishing UAS, C-UAS, and emissions control training standards is the effort that must deliver this qualification program. Until it does, C-UAS crew competency in armored formations will remain unverified and un-standardized.

4.2 Gap 2: No Integrated Gunnery Table for C-UAS Engagement

The gunnery table model that governs armor crew qualification provides the most effective training integration framework available to the Armor community. Each table is a discrete qualification event with defined conditions, tasks, performance standards, and observer-evaluator criteria. Adding a C-UAS engagement table, or integrating C-UAS scenarios into existing tables, would create the formal crew qualification pressure that makes training persistent rather than episodic.

The specific content of a C-UAS gunnery integration would include air guard drills executed during standard gunnery tables under conditions where drone threats are introduced by an opposing force controller, immediate action engagement of Group 1 threats using canister rounds or assigned defeat systems, and passive air defense measure compliance verified by observer evaluators. The combination of live-fire gunnery with drone threat introduction addresses the core deficiency identified at NTC: crews cannot simultaneously develop gunnery proficiency and C-UAS proficiency if they are treated as separate, sequential training events.

4.3 Gap 3: C-UAS Underrepresented in Home-Station Collective Training

CALL No. 25-1093's finding that armored units arrive at NTC rotations without foundational C-UAS preparation applies to heavy forces as directly as it does to lighter formations. The 1st Cavalry Division's June 2023 C-sUAS equipment fielding report documented that over 80 Soldiers and leaders across all brigades received initial new equipment training on the Bal Chatri detection device, Modi jamming system, Smart Shooter fire control computer, and DroneBuster. The training format, two days classroom and one day range operations, and the requirement for all brigades to send additional operators through home-station training, represents a start. It does not represent the collective training integration that makes C-UAS a practiced combined arms task rather than a new equipment briefing.

TC 3-20.20's integrated weapons training strategy provides the home-station training framework for maneuver platoons. C-UAS must be explicitly integrated into the home-station training plan sequence prescribed by TC 3-20.20, with dedicated training events, conditions, and standards for each echelon. Without this explicit integration, C-UAS training competes for time against gunnery qualification, maintenance, physical training, and administrative requirements, and loses that competition at the unit level every time.

4.4 Gap 4: The Organic C-UAS Platform Problem

The Armored Force's C-UAS capability mix is evolving rapidly but unevenly. At the organic crew level, the M1028 canister round, the DroneBuster, and the Smart Shooter system provide active defeat options. At formation level, the M-LIDS provides EW and kinetic defeat. The C-UAS DE Stryker prototype, developed by Leonardo DRS with BlueHalo, Northrop Grumman, BAE Systems, and partners, provides a directed energy-plus-rocket-plus-cannon capability in a Stryker chassis with a 26-kilowatt LOCUST laser. The M-SHORAD provides kinetic defeat at range.

The training challenge created by this diverse capability mix is the absence of a standardized crew qualification program for each system. M-LIDS crews train on emplacement drills, weapons acquisition, drone acquisition, and live fire, as the First Army reporting on Fort Bliss pre-deployment training documents. But M-LIDS training is conducted by PM C-UAS contractors for deploying units, not by the Armor School as part of the Armored Force's training architecture. C-UAS DE Stryker training does not yet exist as a formal program of record. The Armor community is fielding C-UAS capability faster than it is developing the crew training programs that make that capability operationally effective.

4.5 Gap 5: The MCoE-JCU Disconnect

The Maneuver Center of Excellence at Fort Benning operates the SUAS Master Trainer course, qualifying brigade-level UAS master trainers to certify Group 1 UAS operators across the armored force. The Maneuver Battle Lab's Uncrewed Systems Experimentation Facility, opened at the Maneuver Innovation Lab in February 2025, provides a controlled environment for experimentation with small UAS and unmanned ground systems. The JCU at Fort Sill provides the primary C-UAS operator and planner courses across the joint force.

These two institutional nodes, MCoE and JCU, are not currently connected by a formal shared curriculum development process. The MCoE develops UAS offensive employment doctrine and training for the maneuver force; the JCU develops C-UAS defensive training for the joint force. The combined arms requirement, training armored crews to both employ organic UAS as reconnaissance and first-strike capability and defeat adversary UAS with organic C-UAS systems, requires a curriculum that integrates both sides. That integration has not been formally established through a joint MCoE-JCU curriculum development program.

Exhibit 1 | Armored Force C-UAS Training Gap Matrix

Training Gap	Current State	Operational Consequence	Required Action
No formal C-UAS crew qualification standard	C-UAS is a Critical Tactical Task in TC 3-20.31 but has no qualification table or demonstrated proficiency standard	Crew C-UAS competency unverified; no consistent standard across force	Develop C-UAS crew qualification table under TC 3-20.31 / TC 3-20.20; ATSI lead
No integrated C-UAS gunnery table	Air guard and immediate action drills exist as doctrine; not integrated into formal gunnery table sequence	Gunnery qualification and C-UAS competency remain separate, episodic training events	Add C-UAS engagement scenarios to gunnery tables; integrate drone threat replication into Table VI through XII sequence
C-UAS underrepresented	New equipment training conducted; no	Units arrive at NTC without collective C-UAS	Explicit C-UAS integration into TC 3-20.20 home-station sequence; C-

Training Gap	Current State	Operational Consequence	Required Action
in home-station collective training	formal home-station C-UAS training plan integration in TC 3-20.20 sequence	proficiency; CTC time consumed by individual skill development	UAS training plan required element of unit annual training guidance
No crew qualification program for organic C-UAS platforms	M-LIDS training conducted by PM C-UAS contractors for deploying units; C-UAS DE Stryker training not yet programmed	Fielding outpaces crew training; capability exists without qualification standard	Establish formal crew qualification programs for each fielded C-UAS platform through MCoE / Armor School proponency
MCoE-JCU curriculum disconnect	MCoE owns UAS offensive employment; JCU owns C-UAS defensive training; no formal joint curriculum process	Combined arms C-UAS training requires both sides; neither institution alone covers the armored force requirement	Establish formal joint MCoE-JCU curriculum development program for combined arms UAS and C-UAS training

5. The Future State: A C-UAS Training Architecture for the Armored Force

5.1 Crew-Level: The C-UAS Qualification Table

The Maneuver Center of Excellence, as the proponent for Armor and Infantry training and doctrine, should direct development of a formal C-UAS crew qualification table under TC 3-20.31 authority. The qualification table should follow the structure of existing gunnery tables: defined conditions, standardized threat sets (Group 1 FPV, Group 1 ISR, loitering munition), required tasks (air guard employment, immediate action drill execution, passive measure compliance), performance standards with passing criteria, and observer-evaluator roles and responsibilities.

The qualification table should be integrated into the existing gunnery progression rather than created as a separate stand-alone event, so that C-UAS qualification becomes a prerequisite for gunnery advancement rather than a competing training requirement. A tank crew that cannot demonstrate air guard proficiency and immediate action drill execution under drone threat conditions should not be certified for advanced collective gunnery, just as a crew that cannot zero the main gun should not proceed to Table VI.

5.2 Platoon and Company Level: Collective Training Integration

TC 3-20.20's integrated weapons training strategy should be revised to include mandatory C-UAS collective training events at platoon and company level as part of the home-station training plan sequence. These events should mirror the structure of the existing combined arms live fire exercise (CALFEX) model: defined threat scenarios, assigned C-UAS defeat capabilities, collective tasks including air guard distribution, reporting, ROE application, and defeat sequence execution, and observer-controller evaluation against defined standards.

The 3D-printed target drone program developed by the JCU, which reduced the cost of training targets by 91 percent, should be adopted by armor units for home-station C-UAS training. The JCU's distribution of 3D-printing schematics to other Centers of Excellence including Fort Benning creates the supply chain for armored unit home-station C-UAS target production. Armored units conducting gunnery table progressions should incorporate drone targets produced through the JCU-MCoE shared schematics program, enabling live-fire C-UAS engagement training without requiring dedicated armored unit procurement budgets for commercial target drones.

5.3 Battalion and Brigade Level: Combined Arms C-UAS Integration

The Transforming in Contact 2.0 organizational designs, specifically the Multi-Functional Reconnaissance Company and the multi-purpose company concepts, require combined arms training programs that do not yet exist. Once organizational designs are finalized through the Pegasus Charge working groups and subsequent TiC rotations, TRADOC must develop a Mission-Essential Task List for the new organizations that incorporates C-UAS as a primary assessed mission task rather than a supporting element.

At NTC rotations, the armored force requires the same C-UAS training assessment integration that CALL No. 25-1093 recommended for the broader force: C-UAS as a primary assessed training objective with observer-controller capacity to administer realistic drone engagements and provide post-action review against established performance standards. The 2027 culminating TiC ABCT rotations provide the assessment vehicle; the training standards that define success in those rotations must be developed in 2026.

5.4 Platform Development: Training Designed with the System

The M1E3 Abrams development program, which is expected to include integrated C-UAS capabilities including kinetic interceptor options, active protection system adaptation for drone defeat, and AI-enabled threat detection, must include a concurrent training development effort. The historical pattern of fielding systems without concurrent training development, documented for cyber and EW capabilities in GAO reports on Army workforce gaps, cannot be repeated for the M1E3 C-UAS capability.

PM C-UAS, working with the Armor School and MCoE, should establish a formal training development requirement in the M1E3 program's capabilities development document that mandates concurrent development of crew training programs, qualification tables, and initial cadre training before fielding. The C-UAS DE Stryker acquisition program, if it proceeds to program of record status, should carry the same requirement. Training development funded alongside system development is the model that prevents the gap the armored force currently faces with DroneBuster, LIDS, and Coyote.

6. The MCoE-JCU Partnership: Building the Institutional Bridge

The Maneuver Center of Excellence and the Joint Counter-small UAS University represent the two institutional nodes that must coordinate to deliver a complete combined arms C-UAS training architecture for the armored force. Neither institution alone spans the full training requirement: MCoE owns the combined arms maneuver doctrine and crew training standards; JCU owns the C-UAS operator training and equipment-specific instruction.

A formal MCoE-JCU Partnership Agreement should establish three shared programs. First, a combined arms C-UAS curriculum track within the JCU's existing course structure, specifically designed for armor-branch and cavalry students, that integrates C-UAS defensive training with the organic UAS offensive employment and combined arms fires planning context in which armored C-UAS operates. Second, a JCU faculty exchange program that embeds JCU C-UAS instructors at Fort Benning's Armor and Infantry schools for curriculum review and student instruction, and reciprocally brings MCoE armor doctrine experts to Fort Sill to ensure JCU training reflects combined arms employment realities. Third, a shared doctrine development program that produces C-UAS training and employment doctrine for the armored force under joint MCoE-JCU authorship, drawing on both institutions' operational feedback mechanisms.

The Maneuver Innovation Lab at Fort Benning, opened February 2025 in partnership with DEVCOM Army Research Laboratory and Columbus State University, provides the experimental infrastructure for this partnership. The lab's Uncrewed Systems Experimentation Facility supports experimentation with both UAS and counter-drone systems. JCU instructors participating in MIL experiments would gain exposure to the combined arms environment; MIL experimentation results would inform JCU curriculum development on a faster cycle than formal doctrine revision allows.

7. Implementation Roadmap

Exhibit 2 | Armored Force C-UAS Training Implementation Roadmap

Initiative	Timeline	Lead	Authority / Resource
Develop C-UAS crew qualification table under TC 3-20.31; integrate into gunnery table progression sequence as prerequisite for advanced collective gunnery	0 to 12 months	MCoE / Armor School / ATSI	MCoE proponent authority; TC 3-20.31 revision; TRADOC FORCE DESIGN
Revise TC 3-20.20 to include mandatory C-UAS collective training events at platoon and company level in home-station training plan sequence	0 to 12 months	MCoE / TRADOC	TC 3-20.20 revision cycle; connection to ABCT METL update
Adopt JCU 3D-printed target drone schematics at Fort Benning and armored unit home stations; integrate live-fly C-UAS targets into gunnery table progressions	0 to 6 months	MCoE / JCU partnership	JCU schematic distribution; unit-level 3D printing capability funding
Establish formal MCoE-JCU Partnership Agreement; combined arms C-UAS curriculum track, faculty	0 to 9 months	MCoE Commandant / JCU Director	TRADOC partnership agreement authority; JCU implementing directive

Initiative	Timeline	Lead	Authority / Resource
exchange, and shared doctrine development program			
Develop combined arms C-UAS METL tasks for Multi-Functional Reconnaissance Company and multi-purpose company organizational designs from Pegasus Charge	6 to 18 months	1st Cav Division / TRADOC / MCoE	Pegasus Charge working group outcomes; TRADOC METL development process
Establish C-UAS as a primary assessed training objective at NTC with OC-T capacity and automated adjudication for armored TiC rotations	6 to 18 months	TRADOC / NTC / MCoE	TRADOC CTC directive; NTC training device funding
Establish crew qualification programs for M-LIDS, DroneBuster, Smart Shooter, and Mastodon Beast+ under MCoE / Armor School proponency; separate from PM C-UAS contractor-led fielding training	6 to 18 months	Armor School / PM C-UAS	MCoE proponent designation; JIATF 401 system TADSS requirements connection
Mandate concurrent C-UAS training development in M1E3 Abrams and C-UAS DE Stryker CDDs; fund training development alongside system development	12 to 24 months	PM C-UAS / PM Armor / MCoE	CDD revision; PEO GCS / PEO Missiles program requirements
Complete TiC 2.0 ABCT NTC rotations (2026-2027) with explicit C-UAS integration assessment; incorporate lessons into permanent ABCT METL and TC 3-20.20 revision	18 to 30 months	TRADOC / 1st Cav / 3rd ID / MCoE	TiC 2.0 program; TRADOC post-rotation lessons integration cycle
Develop combined arms C-UAS course for Reserve Component ABCT formations; establish RC C-UAS training pipeline through ARNG Readiness Centers and First Army pre-deployment training	18 to 36 months	First Army / NGB / MCoE	FY2028 NDAA; First Army mission assignment; NGB ARNG training funds

8. Conclusion

Armor has reinvented itself before. The transition from horse cavalry to mechanized forces in the 1930s and 1940s was not an incremental update; it was a fundamental redesign of doctrine, organization, and training that preserved the cavalry's core mission of shock, exploitation, and pursuit while completely replacing the means of executing it. The introduction of anti-tank guided missiles in the 1970s required the same fundamental redesign: new active protection concepts, revised gunnery doctrine, and a reorganized combined arms team.

The drone threat is the third inflection point for Armor. The evidence from Ukraine is unambiguous: 42.47 percent of vehicle losses to drone strikes, 27 of 31 U.S. Abrams destroyed by drones, and the transparent battlefield that has forced armored vehicles behind the zero line rather than into the combined arms assault. The armored force that does not solve the drone problem cannot fulfill its operational mission, regardless of platform capability, crew skill in conventional gunnery, or doctrinal sophistication.

The Army's response, through Transforming in Contact 2.0, the revised TC 3-20.31, the Pegasus Charge organizational redesign, and the Maneuver Innovation Lab, reflects genuine institutional urgency. The gap that remains is between recognized requirement and formal training standard. C-UAS is a Critical Tactical Task. It must become a qualified task, with a crew qualification table, a home-station training program, and a combined arms collective training event that tests it in conditions approximating the drone-saturated environment the armored force will face.

The 2027 TiC 2.0 culminating ABCT NTC rotations are the deadline. Units that arrive at those rotations without formal C-UAS crew qualification, without home-station collective C-UAS training, and without the combined arms doctrine that integrates organic UAS and C-UAS into the maneuver plan will replicate the NATO exercise outcome: two battalions rendered combat ineffective in 12 hours by ten drone operators. The Armor community has the doctrine, the organizational designs, and the institutional partners to prevent that outcome. It needs the formal training architecture to do so.

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