DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, DC 20314-100

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CECW-EC

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Engineering and Design
ACQUISITION AND OPERATION OF UNMANNED AIRCRAFT SYSTEMS (UAS) TECHNOLOGY

1. Purpose. This engineering circular (EC) provides guidance for the acquisition and operation of Unmanned Aircraft Systems (UAS) within the National Airspace System (NAS) and the current regulatory framework. This circular also provides guidance on the use of UAS by the public or commercial organizations and by other Federal, state and local governments and law enforcement agencies at water resources development projects administered by U.S. Army Corps of Engineers (USACE). USACE organizations will use UAS only to support authorized USACE missions. Under no circumstances will USACE organizations use UAS to conduct surveillance on U.S. persons. Section 1124 of the Water Infrastructure Improvements for the Nation Act authorizes the appointment of an Aviation Program Manager (APM). The APM is the commander's representative and acts as the USACE Aircrew Training Program Manager (ATPM). The APM is primarily charged with ensuring safe execution of the USACE aviation mission. Until the full implementation of section 1124 occurs, this EC will continue to serve as the primary guidance for acquisition and operation of all UAS.

2. Applicability. This circular applies to all USACE elements planning to assign, bail, borrow, loan, lease, own, or otherwise authorize UAS for operation. USACE elements are defined as Headquarters USACE (HQUSACE), with all subordinate commands, districts, centers and field operating activities having Civil Works (CW) and Military Programs (MP) responsibilities. USACE elements also include all parts of Engineer Research Development Center (ERDC). This EC applies to activities related to contracting UAS services to support CW, MP or work for others' missions.

3. Distribution Statement. Approved for public release; distribution is unlimited.

4. References.

a. United States Code (U.S.C.) Title 10 Subtitle B—Army (§§ 3001 - 4842). http://uscode.house.gov/view.xhtml?path=/prelim@title10/subtitleB&edition=prelim

b. U.S.C. Title 49 § 40103. https://www.gpo.gov/fdsys/granule/USCODE-2011-title49/USCODE-2011-title49-subtitleVII-partA-subparti-chap401-sec40103/content-detail.html

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This circular supersedes EC 1110-1-106, dated 28 April 2017.

c. Water Infrastructure Improvements for the Nation Act of 2016, Public Law 114-322, Section 1124. https://www.congress.gov/114/plaws/publ322/PLAW-114publ322.pdf

d. Code of Federal Regulations (CFR), Title 14, Chapter I, Part 91.113, General Operating and Flight Rules, Right-of-way rules: Except water operations. https://www.gpo.gov/fdsys/pkg/CFR-2014-title14-vol2/pdf/CFR-2014-title14-vol2-sec91-113.pdf

e. 36 CFR, Chapter III, Part 327, Rules and Regulations Governing Public Use of Corps of Engineers Water Resources Development Projects Administered by the Chief of Engineers (Title 36). https://www.gpo.gov/fdsys/pkg/CFR-2011-title36-vol3/pdf/CFR-2011-title36-vol3-part327.pdf

f. Army Regulation 70-62, Airworthiness Qualification of Aircraft Systems. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/r70_62_FINAL.pdf

g. Army Regulation 95-20, Contractor's Flight and Ground Operations. http://usahec.contentdm.oclc.org/cdm/ref/collection/p16635coll11/id/870

h. Army Regulation 95-1, Flight Regulations. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN5966_AR_95-1_WEB_FINAL.pdf

i. Office of Management and Budget (OMB) Circular No. A-126, Improving the Management and Use of Government Aircraft. https://www.gsa.gov/cdnstatic/OMB_Circular_A-126.pdf

j. Memorandum of Agreement Concerning the Operation of Department of Defense Unmanned Aircraft Systems in the National Airspace System, 16 September 2013. http://www.usaasa.tradoc.army.mil/docs/br_Airspace/DoDFAA_MOA_OpsinNAS_16Sep2013.pdf

k. Memorandum 15-002, Deputy Secretary of Defense, 17 February 2015, Subject "Guidance for the Domestic Use of Unmanned Aircraft Systems." https://www.defense.gov/Portals/1/Documents/Policy%20Memorandum%2015-002%20_Guidance%20for%20the%20Domestic%20Use%20of%20Unmanned%20Aircraft%20Systems_.pdf

l. MIL-STD-882E, Standard Practice for System Safety. https://www.system-safety.org/Documents/MIL-STD-882E.pdf

m. Army Techniques Publication 5-19, Risk Management. https://www.bliss.army.mil/safety/Documents/ATP%205_19_c1.pdf

n. USACE Operation Order 2014-32, (Integrated Protection) Annex R: Reports: Information and Intelligence Flow.

5. Overview. This document provides guidance for the acquisition and operation of UAS by USACE elements by summarizing the major policies and regulations that relate to the use of this applied technology. Section 6 describes the coordination with HQUSACE prior to purchasing a UAS. Section 7 explains external coordination requirements. Sections 8 through 10 describe each Army group's role related to UAS operation. Sections 11 and 12 describe operating UAS consistent with USACE policy. Sections 13 through 15 discuss the use of UAS by non-USACE personnel on USACE managed lands and reporting requirements. Section 16 contains guidance on contractor-operated UAS. Key updates to the guidance in this document include:

a. For the purpose of this document an Unmanned Air Vehicle (UAV) is defined as a remotely piloted/operated, semi-autonomous, or autonomous air vehicle and its onboard operating system. This does not include air vehicles designed for one-time use as weapons (e.g., cruise missile). A UAS is comprised of individual elements consisting of the UAV, the control station, and any other support elements necessary to enable operation including, but not limited to data links, communications systems/links, and UAV-unique launch and recovery equipment. There may be multiple unmanned aircraft, control stations, and support elements within a UAS. The control station may be located on the ground (stationary or mobile), on a ship, submarine, aircraft, etc.

b. Reference e. prohibits the operation of aircraft on project lands at locations other than those designated by the District Commander. These operations include UAS operations. District Commanders should consider designating areas for UAS operations that are greater than 500 feet away from operational areas, including areas where project operational structures are located (i.e., dams, hydropower plants, administrative and maintenance buildings, visitor centers and associated support facilities). Ref. e. further prohibits the operation of aircraft on project lands in a careless, negligent, or reckless manner so as to endanger any person, property or environmental feature.

c. Regardless of locations designated for UAS operations under 36 CFR 327.4(b), UAS operations should be restricted on project lands when force protection condition (FPCON) level rises to FPCON CHARLIE OR DELTA.

d. Aircraft operations also must comply with Federal Aviation Administration (FAA) regulations, including FAA designations of restricted airspace. USACE elements that require airspace restrictions over project lands must apply, in coordination with the APM, to FAA for the appropriate restriction.

e. USACE must comply with all federal regulations and Department of Defense (DoD) and Army requirements, as applicable to any particular operation or acquisition. Figure 1 contains a schematic illustrating of the different groups that USACE will interact with to acquire and operate a UAS.

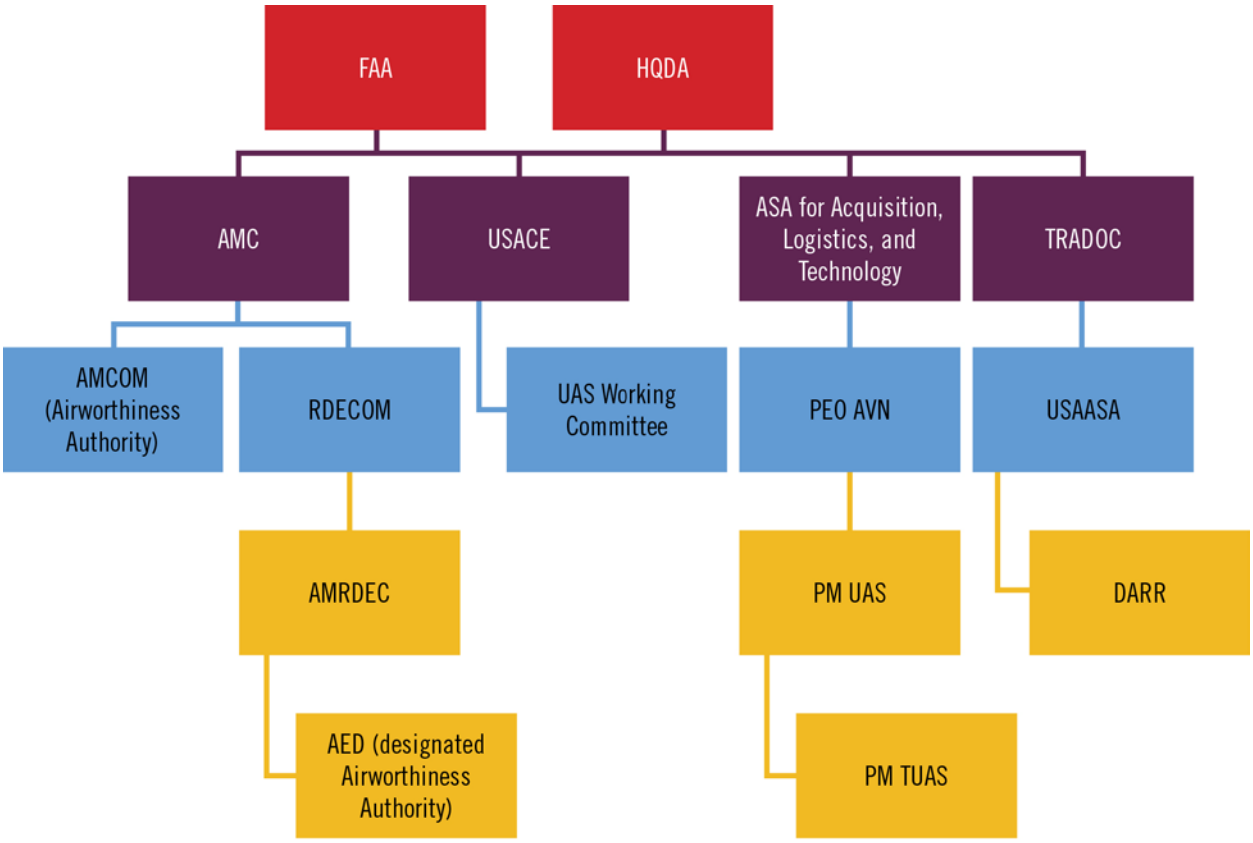


Figure 1. Army organizational structure relevant to UAS operations.

f. Key UAS coordination bodies and organizations relevant to USACE UAS operations are described below and in Figure 1.

(1) Program Executive Officer, Aviation (PEO AVN). PEO AVN is an aviation combat weapons platform developer/purchaser and system sustainer of systems for the Warfighter. Current Army policy directs that procurement and sustainment must be managed in consultation with PEO AVN; this includes the procurement and sustainment of UAS assets in support of Civil Works activities.

(2) Army Aviation Engineering Directorate (AED). AED is the Air Worthiness Authority (AWR) for Army UAS. This group makes Airworthiness determinations for UAS that are Army owned, operated, leased, bailed, etc. AED performs this function on a reimbursable basis; consequently, funding is required to process AWR applications.

(3) United States Army Aeronautical Services Agency (USAASA) and the Department of Army Regional Representative (DARR). The DARR determines whether proposed UAS

operations are governed by the Memorandum of Agreement (MOA) between the DoD and the FAA, and interfaces with the FAA for access to unrestricted airspace. USAASA and the DARR are the mechanisms USACE will use to coordinate with Army, DoD and FAA.

(4) FAA. FAA is the Federal agency responsible for managing and regulating the NAS.

(5) USACE UAS Working Committee. The UAS Working Committee develops UAS policy, reviews UAS acquisition business cases and helps determine whether there are available UAS assets within USACE to meet mission requirements.

(6) USACE APM. The primary role of the APM is to ensure the safe, effective use of aviation assets by USACE to maximize potential for civil works, military programs and emergency response. The APM is the principle approving official for establishing policy, standards, training and oversight for aviation operations in USACE. The APM is further tasked to provide material solutions to field requirements for current and future operations.

6. HQ USACE UAS Acquisition Requirements. Prior to purchasing a UAS, a Command must document a business case justifying the need for the equipment, and obtain written approval from the USACE UAS Working Committee. The business case will include a cover letter, signed by the district Commander or lab director, and be submitted to the USACE UAS Working Committee for approval. It is in the best interest of the Command to notify the APM before the business case is submitted and initiate coordination early in the process to ensure the equipment being proposed to acquire is not prohibited by DoD and/or Army. Coordination with APM should begin prior to submitting the business case.

a. The business case prepared by the district will address the following elements:

(1) Identify that private industry or existing resources cannot meet the requirement in a cost-effective means such as directed in OMB Circular A-126.

(2) Identify proposed mission(s) and technical need.

(3) Document annualized system cost over operational life. At a minimum include repair, replacement, maintenance, and initial Airworthiness Review costs.

(4) Information regarding the strategy to maintain, repair, and update the system as necessary.

(5) Include a system description with salient characteristics (dimensions, weight, speed, etc.)

(6) Identify how the operators will be trained to use the system.

(7) Identify how the system operations will comply with reference 4.n. of this circular.

(8) Identify where (specific country) the system you are requesting to purchase is manufactured. If it is not manufactured in the United States, provide a complete justification as to why a system manufactured in the United States does not meet your requirements.

b. The USACE UAS Working Committee, co-chaired by Geospatial Community of Practice (CoP) Lead and the USACE APM, will review the business case and work with the Command to determine whether there are available assets within USACE to meet the requirements. PEO AVN (PM Tactical Unmanned Aircraft System (TUAS)) will participate in the USACE UAS Working Committee. The USACE UAS Working Committee will meet quarterly or as necessary. If the USACE UAS Working Committee determines that existing UAS assets or contracts are not available to meet the technical requirements, the district can develop an acquisition strategy for a new UAS acquisition to meet the needs. Figure 2 contains an illustration of the process. Whenever possible to meet mission requirements, USACE elements will acquire only UAS systems that have existing system AWR issued by AED. The USACE Working Committee will be comprised of the following participants:

(1) APM, Co-Chair (CELD)

(2) Geospatial CoP Lead, Co-Chair (CECW-CE)

(3) PEO AVN Product Management Office Tactical Unmanned Aircraft Systems (PM TUAS)

(4) Army Aviation Engineering Directorate (AED) Special Projects

(5) Emergency Management (CECO-HS)

(6) Jacksonville District UAS Section (CESAJ-OD-HU)

(7) Remote Sensing/GIS Director (ERDC CRREL RRC)

(8) Operations and Regulatory Division (CECW-CO)

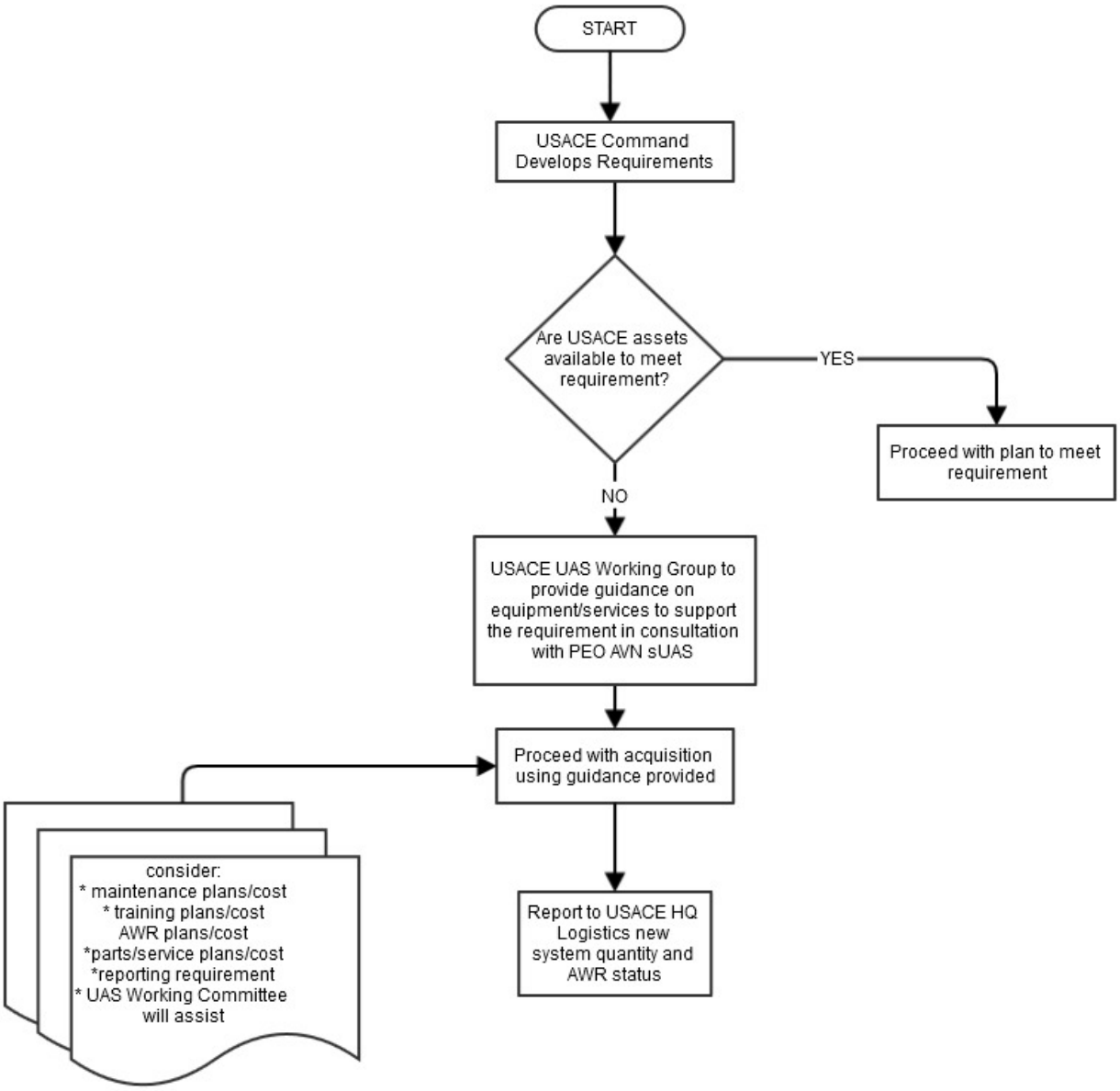


Figure 2. Summary of the business case flowchart for proposed UAS acquisition.

c. AR 700-138, Army Logistics Readiness and Sustainability, prescribes policy and provides procedures for collecting and reporting the physical condition of Army materiel. This regulation requires Commanders at all levels to determine the causes of equipment readiness deficiencies, take corrective action within their areas of responsibility, and provide feedback on systemic readiness problems to the next higher headquarters. To support this requirement, the Directive of Logistics (DOL) HQ requires USACE Aviation Fleet Reporting for all USACE aviation assets. USACE elements are required to report their aviation assets to USACE HQ DOL. The USACE HQ DOL also has the following acquisition guidance for USACE elements that want to own, operate, or contract UAS to support their missions:

(1) Use established standard policies and procedures for defining requirements.

(2) Perform a survey of internal available resources to meet requirements (existing UAS fleet, contracting options, etc.). Determine capability, availability, and cost to meet the mission requirements. Assuming that the business or technical case does not support the use of existing fleet or contracting options to meet the requirement, develop an acquisition strategy to meet the requirement. Once an acquisition strategy has been developed, use the USACE UAS Working Committee as a resource to determine if existing UAS contracts within USACE or PEO AVN can satisfy the acquisition strategy.

(3) If existing contracts for UAS cannot meet the acquisition strategy, a new procurement may be initiated. The procurement will be coordinated with CELD via the APM. After the acquisition has been completed, the district will ensure that the required metrics are reported to CELD by sending an email to HQAviation@usace.army.mil.

(4) Maintain property accountability according to established procedures such as the Automated Personal Property Management System (APPMIS), CATALOGING, etc. Property accountability will be coordinated with CELD via the APM.

7. Army Requirements and Coordination.

a. An AWR is required to operate any Army aviation asset and access the NAS.

(1) The AWR authorizes operation for a combination of a specific system type and configuration, geographically defined location(s), and the group operating the system using specific operational procedures. The AWR is not transferable to other USACE elements or groups. AED is the Airworthiness Authority for UAS operated by any group. The prerequisites for submitting for an initial AWR for a specific system are described in sections 7.a and 7.b. A flowchart showing the general process to obtain an AWR and access to NAS to operate UAS is provided in Figure 3 and Figure 4.

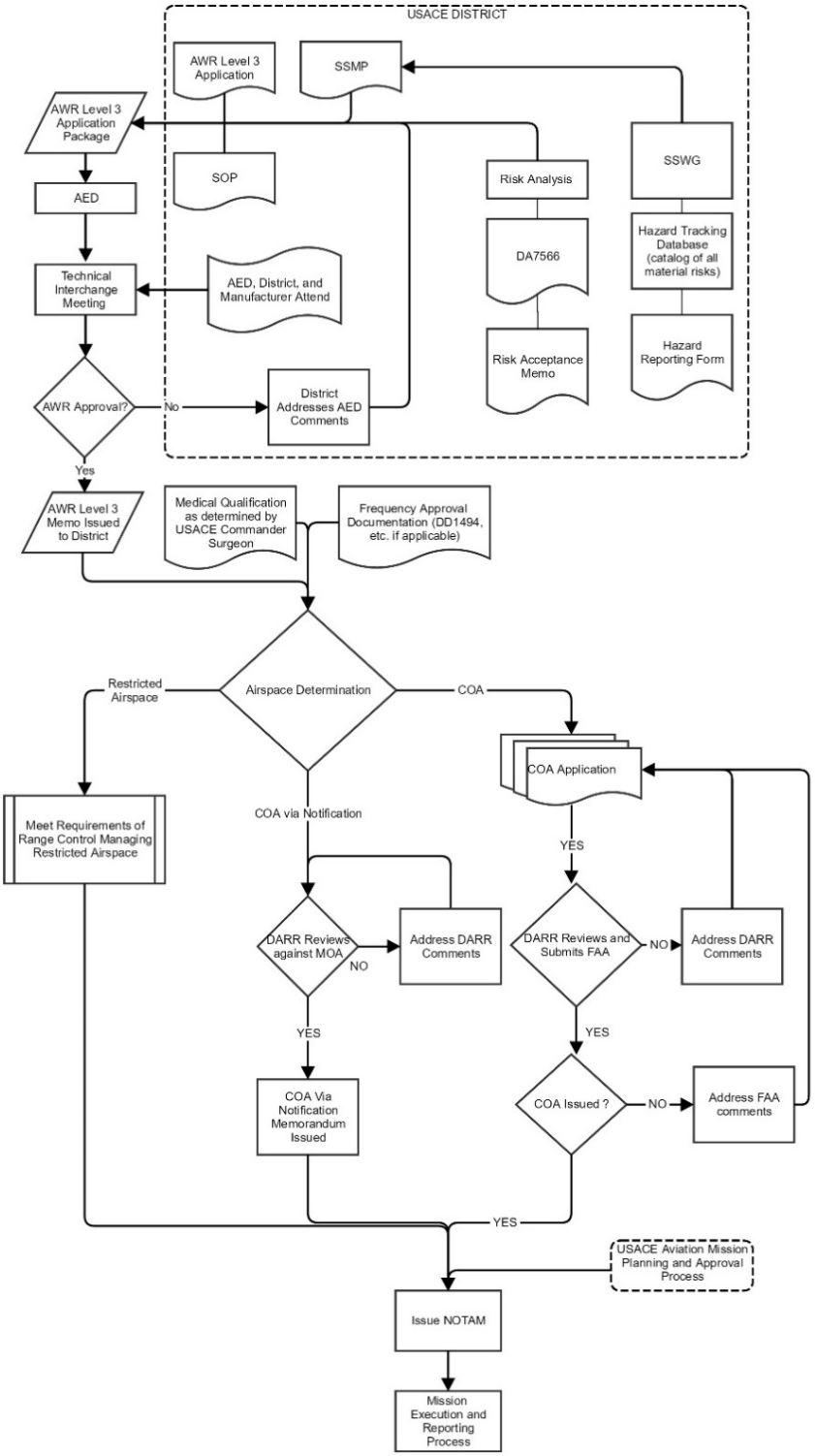


Figure 3. Flowchart outlining the process to obtain an AWR and access the NAS to operate a UAS.

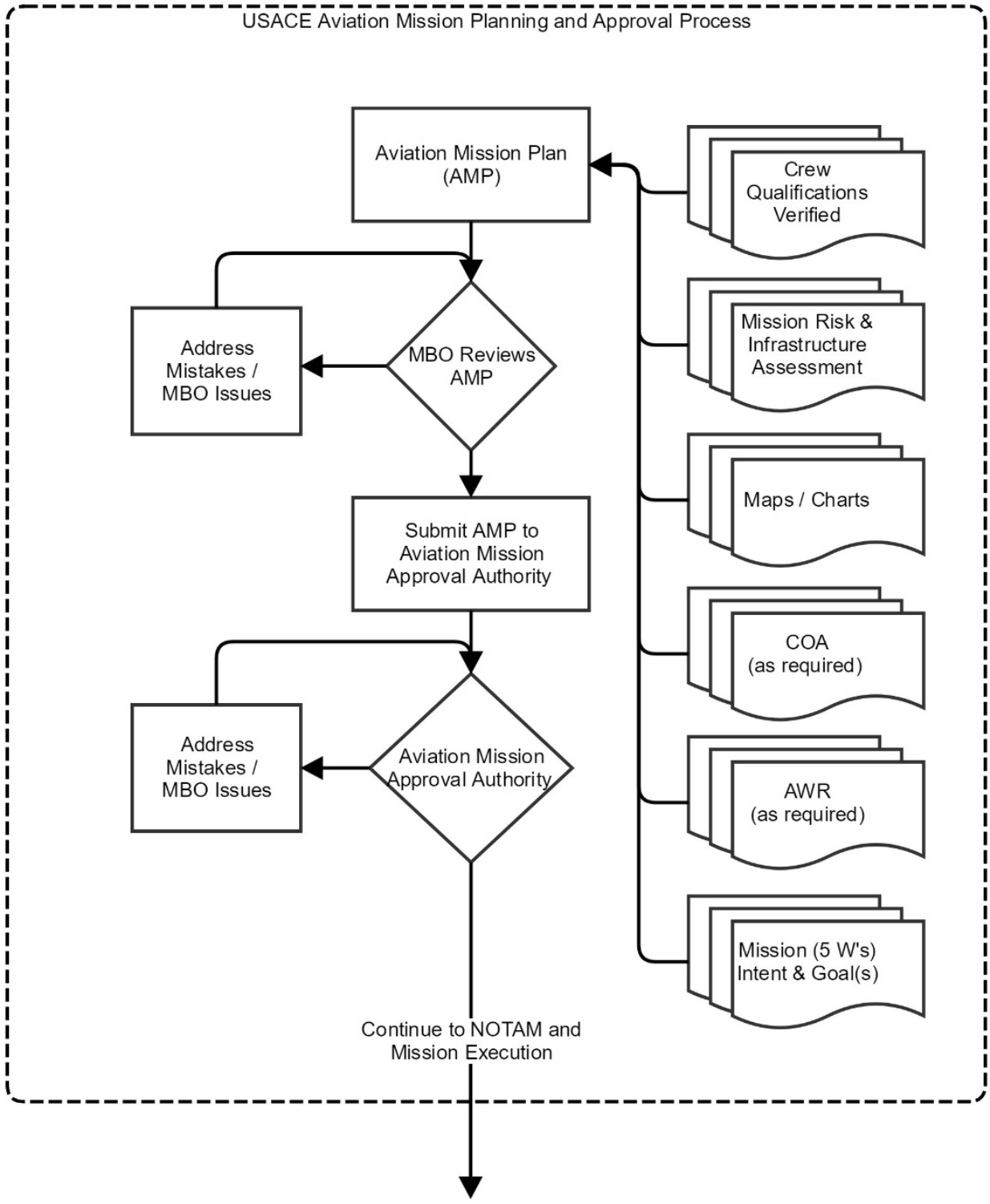


Figure 4. Aviation mission planning process.

(2) As part of the AWR application for a particular system and unless notified otherwise by the APM, a district must establish a System Safety Management Plan (SSMP), a System Safety Working Group (SSWG) as part of the SSMP, and a Standard Operating Procedure (SOP) to operate the UAS. See Figure 5 for the relationships between processes and structures that AED requires to obtain a Level 3 AWR for a particular UAS family. Section 9 describes the Level 3 AWR and its limitations.

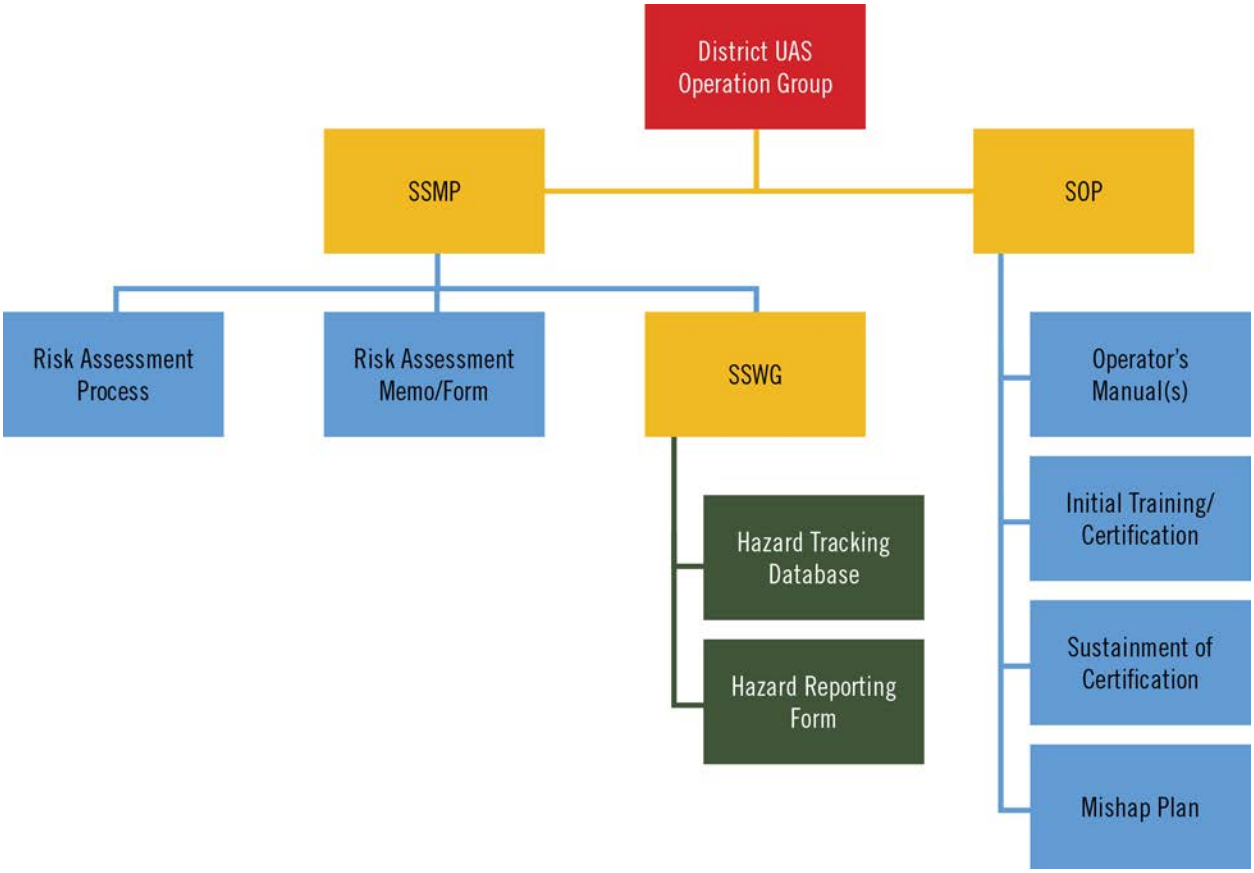


Figure 5. Diagram of the relationships between SSMP, SSWG and SOP that is part of the required structure for district to operate UAS.

b. USACE elements will coordinate Safety Management with the HQUSACE APM. The salient requirements for the SSMP, SSWG and SOP are described as follows:

(1) The SSMP defines a Material Risk Assessment Process used to evaluate and quantify risks. Having a SSMP complies with MIL-STD-882E, Standard Practice for System Safety, and is evidence that the risks of the system have been considered and appropriate controls are in place to mitigate these risks. The SSMP contains a risk acceptance matrix based on the consequence and probability of the risks and the appropriate command authority for difference levels of risk defined. A Composite Risk Management Form (DA7566 recommended) documents the risk assessment for each location. A Risk Acceptance Memo for each mission

location will be signed by an appropriate command authority as defined in the SSMP for each location and required for the AWR process.

(2) The SSWG is formed as part of the SSMP with the task of tracking system safety for the lifecycle of the system. The group periodically meets to address safety issues, monitor risks, and address reported risks. The SSWG maintains a Hazard Tracking Database to monitor risks. Generally, a Hazard Reporting Form for new hazards identified is used to report risks to the SSWG. Hazards are tracked until corrective actions or mitigations are in place. Once the hazard is mitigated, the SSWG can close that hazard.

(3) The SOP defines the proponent's operational plan for the UAS and is defined locally. The SOP will include a process for training, certification and sustainment for qualifications of UAS operators regarding a specific system. The SOP will include standard checklists, the Mishap Plan, the Operators Manual, and other documentation and processes necessary to operate the UAS safely. PEO AVN recommends that the SOP conform to Technical Circular 3-04.46.

8. PEO AVN. PEO AVN is an aviation combat weapons platform developer/purchaser and sustainer of systems for the Warfighter. The PM TUAS, a subgroup of PEO AVN, has contract mechanisms for TUAS systems and services that are designed to meet requirements developed in support of their mission. Under references 4.j. and 4.k. of this EC, all contracts for UAS will be coordinated with PEO AVN (PM TUAS) to include acquisitions in support of Civil Works activities.

9. AED and AWR. AR 70-62 requires that all Army aircraft have an AWR prior to operation. AED has authority to provide an AWR for respective systems. AED operates on a reimbursable basis and will require funding to review AWR applications and participate in ongoing SSWG meetings. To support continued UAS operations and comply with AR 70-62, the AED-UAS Division developed the three levels of airworthiness approach. Level 3 covers aircraft with no airworthiness pedigree, an unknown reliability and is expected to have a higher mishap rate. This process is safety case based, and considerations encompass all safety aspects of operating the UAS including, but not limited to, who the operator is, where the UAS is operated, and how it is operated. Level 3 AWRs are location-specific, configuration-specific, and organization-specific authorizations to operate UAS within specified limits that include who, where, and how the aircraft is operated. An application for an AWR from AED consists of the following items:

a. AWR Level 3 Application. The Application requests information on the following items: manufacturer, system characteristics, components, flight controls software block diagram, flight control system component layout and analysis, avionics block diagram, autopilot functional block diagram, propulsion system(s), navigation system, software, control station, payloads, frequency management, safety considerations and operational data.

b. All airworthiness efforts will be coordinated with the APM. Required documents to include with the application are as follows:

(1) Operators Manual.

(2) Configuration Management Document.

(3) COA Criteria Checklist (when applicable).

(4) System Safety Assessment, Risk Assessment, and/or Safety Assessment Report (required for larger fielding).

(5) Agency Standard Operating Procedure (SOP).

(6) Material Risk Acceptance Memo (for each mission and/or location).

(7) Proponent System Safety Management Plan (SSMP).

c. Initial AWR applications take approximately 20 business days for review. Also, AED will require a Technical Interface Meeting to examine the UAS and the proponents' operational procedures. Subsequent applications to access additional locations for systems with an existing AWR take approximately 10 business days. Review times are highly dependent on AED workload, completeness of applications, and the complexity of the UAS system and missions being evaluated.

d. New AWRs will be reported to the USACE UAS Working Committee. At a minimum, the reporting requirement is the area covered by the AWR defined in a GIS digital file, with the attributes describing it, district Point of Contact (POC), AED POC, system type(s), effective date, expiration date and copy of the AWR once it is issued by AED.

10. United States Army Aeronautical Services Agency (USAASA), the Department of Army Regional (DAR) Representative and Accessing the NAS. All airspace in the United States is regulated by the FAA. Restricted Airspace is delegated within the NAS to the respective service (see reference b.). Operations outside of restricted airspace require Certificate of Authorization or Waiver (COA) from the FAA. The DoD and FAA have a Memorandum of Agreement (DoD-FAA MOA) that prescribes expedited processes to access certain classes of airspace by "COA via Notification" for UAS under 55 lbs. USAASA represents Headquarters Department of Army at the national and international levels for airspace and aeronautical matters and provides Army representatives to the FAA's national headquarters three service centers. The DAR reviews requests to access the NAS to ensure conformance with the DoD and FAA MOA in addition to Army policies, regulations, and guidance. Requests to access the NAS are submitted to the FAA by the DAR on behalf of the USACE proponent operating the UAS. In some cases, the local DAR may establish an account with the FAA UAS COA Online System for USACE districts to input their requests to access the airspace; however, the DAR must review the application before submitting the case to the FAA review. Requests to access the air space under "COA via notification" as described in the DoD and FAA MOA take approximately 10 business days. In cases where a standard COA is required, requests take up to 60 business days for review by the FAA once the case is submitted by the DAR.

11. UAS Operation by USACE Personnel.

a. Each USACE element (district, lab, center) must appoint a UAS ATPM to assist in implementation of the USACE program. Commanders will appoint ATPMs in writing and provide copies of appointments (see Appendix A, Example ATPM Appointment Memo) to USACE HQ, ATTN: CELD (Aviation).

b. The Minimum Qualification Standard for USACE UAS Operators is a valid FAA Remote Pilot Certificate (Part 107 Qualification). ATPMs will advise the USACE APM of any personnel lacking FAA Part 107 Qualification and the planned dates each UAS operator will meet this requirement. Commanders are encouraged to reimburse, under 5 U.S.C. section 5757, the cost of one test for operators to obtain a valid FAA Commercial UAS certification. USACE personnel operating UAS systems supporting federal, state, and local missions must have appropriate training certification and must adhere to mandatory UAS safety operation procedures defined in Appendix B.

12. USACE UAS Mission Planning, Operation and Reporting Requirements.

a. Small UAS mission planning, approval and reporting will be conducted according to reference 4.o.

b. The USACE APM is the USACE approval authority for USACE air missions. ATPMs will submit all UAS air mission briefings to the APM for approval unless and until this authority is further delegated.

c. Risk Management and Limiting Risk Exposure. USACE will implement mitigation strategies to eliminate or reduce spillage or compromise of data through the following procedures:

(1) Location sensitivity. USACE sUAS will operate only over non-critical infrastructure. USACE will implement a mission planning requirement to assess sensitivity of each mission area. All missions, regardless of location, will require a documented terrain analysis of the surrounding area within 5 miles. Critical Infrastructure is defined using a three-tiered criticality index based on Department of Homeland Security (DHS) and other federal agency definitions. The criticality of nearby infrastructure will be documented as a part of the Mission Risk Assessment. The Mission Risk Assessment will be approved at the appropriate level based on the mission risk exposure.

(2) Task Sensitivity. Employment of Commercial Off the Shelf (COTS) sUAS for assessments of security-related tasks, mission reconnaissance or mission rehearsal for military missions in USACE or in support of other military services will be assessed as HIGH risk and therefore require General Officer mission approval. USACE elements performing such missions should coordinate with the APM for further guidance.

(3) Platform Vulnerabilities. All COTS sUAS are considered vulnerable systems: they must be acquired from an approved (U.S. domestic) manufacturer and will be operated only in a closed network. All USACE users will initialize these systems by coordinating with the USACE APM or his designee. DO NOT begin use of a new UAS system without specific authorization from the USACE APM. Every system must be specifically authorized. COTS sUAS will be managed in this manner until further guidance is approved by G-3/5/7 DAMO-CY. Specific measures include the following:

(a) Initial firmware updates (if required) will be conducted IAW USACE guidance approved by DAMO-CY. Contact the USACE APM to obtain guidance. The requirements exist to ensure the procedures will be conducted on a non-government network. A standard, non-descript, non-government registration identity will be used for any required update. Once updated, the system will never be connected to the Internet again. The system will only be connected to closed, restricted networks without Internet connections.

(b) USACE will operate with standalone ground control stations (GCSs) by approved manufacturers only. These tablets or computers will follow the same protocol as the AV and will remain disconnected from networks after initialization (regardless of manufacturer or type).

(c) All data created or collected by interaction with the AV or GCS will be "air gapped." Air gapping is the process of passing data to removable media and conducting cyber-security scans of that media before moving the data to a government controlled network. No data will be removed from a government network and then applied back to the AV or GCS.

(d) All assets will require 100% accountability.

(e) Operators will plan and execute missions outside the range within which potential intrusion on USACE AVs may occur.

(f) USACE will delete AV removable media before and after each mission. All onboard cache files will be deleted before and after each mission.

(g) All UAS cameras will be covered when not in flight.

(4) Datalink security. Whenever possible, USACE will employ encrypted up/down linkages for communications occurring within the UAV system and will limit data communications to mission-essential tasks.

(5) Data Collection Protocols. USACE protocols will eliminate network (wireless/wired) exposure concerning inadvertent contacts to ensure security of stored data. Air Vehicles (AVs) and Ground Control Stations (GCSs) will remain isolated from Internet connectivity. No communication with the vendor will be provided. All data created or collected by interaction with the AV or GCS will be processed on a standalone computer, copied to removable media and must be passed through cybersecurity scanning before moving to a government-controlled network. The intent is to prevent metadata and/or code from entering government networks.

(6) Procurement/Disposal Discipline. USACE COTS UAS procurement is regulated by strict procedures of Mission Analysis, Commercial Viability and Headquarters, USACE approval. USACE standards for procurement will include a focus on U.S.-manufactured hardware and a requirement for U.S.-produced software controllers. In the unlikely event of an unauthorized procurement, USACE will report the issue to DAMO-CY and appropriate disciplinary measures will be implemented by USACE command. All systems (test/training/damaged) will be maintained in 100% accountability. This includes assets that are damaged/destroyed. All unrecoverable systems will be verified as destroyed by the first General Officer or SES in the chain of command.

(7) UAS Software Management Application. All UAS control software must be acquired from an approved U.S. manufacturer or, for software not manufactured in the United States, must receive a waiver (coordinated with the APM).

13. Planning for non-USACE UAS Operations by the Public. Each USACE element should consider the potential presence of non-USACE UAS in their plans and planning meetings to correctly and quickly address situations when they develop. USACE Operations Project Managers, Park Rangers or employees should develop plans and procedures, and consult legal counsel, to prepare for any adverse actions that might need to be taken against a UAS or its operator, whether the UAS is in flight or grounded. Some actions that Commanders and Directors should take to address UAS operations within their areas of responsibility and to ensure the safety and security of annual visitors, the workforce, and critical infrastructure, are:

a. Know the air domain around the facility and who has authority to take action to enhance security.

b. Coordinate with local law enforcement and USACE counsel to determine laws and ordinances governing the use of UAS/RCMAs in the jurisdiction. Develop plans of action for dealing with UAS/RCMA encounters when aircraft are outside of designated areas or otherwise in violation of established restrictions. Examples of restrictions include but are not limited to:

(1) The District Commander may establish a schedule of visiting hours and/or restrictions on the public use of a project or portion of a project.

(2) Obtain the appropriate FAA designations to restrict airspace over project lands.

(3) Maintain quiet hours in all public use areas between the hours of 22:00 and 06:00, or those hours designated by the District Commander. Excessive noise during such times which unreasonably disturbs persons is prohibited.

(4) Any acts or conduct by any person that interferes with, impedes or disrupts the use of the project or impairs the safety of any person is prohibited.

c. Update Emergency/Incident Action Plans to include UAS security and response strategies.

d. Provide UAS/RCMA awareness information to the USACE workforce where UAS/RCMA usage is authorized.

e. Develop public awareness messaging on the use of UAS/RCMAs. Post signage and/or notices at appropriate locations explaining that UAS operations on Corps property are prohibited other than at those areas designated by the District Commander per 36 CFR 327.4. At USACE projects where areas may be designated for hobbyists to fly UAS and other model aircraft, outline those locations to visitors and highlight off-limit flyover locations.

f. Encourage hobbyists to make contact with the appropriate site office (visitor center, ranger station, security office, etc.) to ensure they are operating their UAS or model aircraft legally on the site and the designated locations and restriction for UAS use.

g. Hobbyists should be informed if there are any additional restrictions associated with UAS or model aircraft that have integrated or attached cameras.

h. Commanders and Directors can continue or initiate a public outreach program offering information and regulations on UAS operations on USACE property. This can be accomplished in person, by printed material or by posted notices explaining UAS operations on Corps lands.

i. USACE representatives should direct UAS operators to the FAA rules for proper operation and provide a copy of 36 CFR 327 to ensure understanding of all pertinent rules and restrictions. The FAA customer service phone number is (866) 835-5322 to direct any questions on licensing or tail number requirements.

14. UAS Incident Reporting.

a. Across the globe, USACE operations are executed in a variety of communities. Familiarity with our environment can often lull us to take for granted the routine moments in our day-to-day lives —going to work, doing our job, grabbing lunch, or driving home. USACE employees apply a high level of discretion, but when you see something you know shouldn't be there—or someone's behavior that doesn't seem quite right—say something. An informed, alert USACE community plays a critical role in keeping our organization and our nation safe. Remember the DHS and Army iWatch Program's motto: "If You See Something, Say Something." Nefarious actors have demonstrated the ability to conduct surveillance of government personnel and facilities, weaponize UAS with either small arms or explosive payloads, and harass or distract individuals, drivers, or boat operators. DoD Guidance and the National Suspicious Activity Reporting Initiative provide a framework for reporting and sharing information between federal, state, local, tribal, and territorial partners to enhance the overall safety of the United States and counter the threat of terrorism and criminal activity.

b. Reporting of UAS Incidents. Incidents involving UAS operations must be reported when one or more of the following conditions is satisfied: 1) criminal activity (including terrorism) has occurred or is reasonably suspected; 2) the operation poses a significant threat or security concern to project features, or to the safety of the public or government employees; 3) a mishap involving a USACE-operated UAS occurs, to include accidents, collisions, and like events. This reporting requirement applies to both CONUS and OCONUS locations. Reportable incidents include circumstances such as when a USACE employee receives a report of the above types of UAS activity from a visitor, from another agency or from within USACE, or from state or local law enforcement personnel. The recreational or hobby use of UAS equipment, including the operation of traditional model aircraft by aero-modelers and other hobbyists, will not be reported unless one of the above conditions is satisfied. Likewise, UAS operations on project lands, even when outside of areas designated under 36 CFR 327.4(b), will not be reported unless one of the above conditions is satisfied.

c. Reporting format. UAS incident reports are Commander Critical Information Requirements (CCIR) and will be reported to the USACE Operations Center (UOC) as follows:

(1) After notifying any necessary law enforcement or other necessary emergency service as applicable, the USACE employee will submit a report with the Essential Elements of Information (EEIs) provided for below to the UOC, Staff Duty Officer at 202-761-1001, or ce-uoc@usace.army.mil. This information will be reported as soon as possible (or otherwise within one hour of an incident). In no event will a report contain personally identifiable information concerning any individual, of the type provided for by section 552a of Title 5, United States Code (U.S.C.), also known as “The Privacy Act of 1974.”

(2) Essential Elements of Information (EEIs). The individual submitting the report should gather as much information as possible about the incident, to include: 1) high definition pictures or a description of the aerial object or device, color, identifying markings, actual size, manufacturer, and type (rotary, quad-copter, fixed wing, etc.); 2) distance from observer, direction or flight path, loiter activity; 3) payload, observable camera, or other device; and 4) any actions taken, to include interactions with local/national/international law enforcement or other agencies. Follow the “Blackbird Notification” Guide to identify key information requirements.

(3) Reports of any UAS that poses a threat to personnel or equipment must be reported to local law enforcement immediately.

(4) Additional (follow-up) reporting will occur as directed by the UOC and as appropriate based on the type of incident.

15. The Use of UAS Systems by the Public or Commercial Organizations and Other Federal, State and Local Governments and Law Enforcement Agencies at USACE Projects.

a. The USACE regulation regarding the public and commercial operation of aircraft, including UAS, is contained in 36 CFR, Chapter III, Part 327.4, Aircraft, which states in part, "The operation of aircraft on project lands at locations other than those designated by the District Commander is prohibited. … No person will operate any aircraft while on or above project waters or project lands in a careless, negligent or reckless manner so as to endanger any person, property or environmental feature." This regulation applies to individuals operating UAS equipment at USACE water resources development projects.

b. To restrict airspace above USACE project lands, the FAA must designate the airspace as a "no fly zone." Requesting that airspace be restricted and establishing no fly zones over USACE project lands through the FAA must be coordinated with the APM. USACE may regulate UAS operations while an individual is physically on USACE property; the mechanism to restrict or allow UAS operations on USACE property is by designating areas appropriate for operation under 36 CFR 327.4. Otherwise, the FAA has jurisdiction over the airspace including over USACE-managed property. USACE is responsible to enforce 36 CFR Part 327 concerning individuals present on project lands, but is not otherwise responsible to enforce UAS operations in the FAA regulated airspace over USACE-managed property. To restrict UAS "flyovers" of airspace above USACE-managed property, the USACE element must obtain an airspace restriction from the FAA.

c. Under 36 CFR, Part 327.1, the authority to determine the specific locations and/or specific conditions at a USACE water resources development project where the public can safely operate a UAS, can be delegated from the District Commander through the District Chief of Operations for General District Policy Guidance to the Operations Project Managers who can act as authorized representatives of the District Commander. Specific conditions will be posted consistent with 36 CFR 327.12, Restrictions. A special use permit, consistent with EC 1130-2-550, Chapter 9, and 36 CFR, Chapter III, Part 327.18, will be issued for commercial UAS operation and may be required at the District Commander's discretion for private recreational/hobby operation.

d. UAS will be operated consistent with applicable state and local laws and FAA and USACE regulations. Specifically:

(1) Commercial use must be consistent with 14 CFR Part 107 as enforced by the entity authorized to enforce 14 CFR.

(2) Recreational use must be consistent with Section 336 of Public Law 112-95 as enforced by the entity authorized to enforce this Public Law.

e. UAS operators may be held liable for damage to any public property, including USACE property, resulting from operating their UAS or any other activity associated with operating their UAS.

f. Violations of enforceable regulations can be cited under 36 CFR, Chapter III, Part 327.4, Aircraft or Part 327.12, Restrictions, by USACE persons authorized to issue such citations.

g. The restriction in 36 CFR 327(b) does not apply to aircraft engage on official business of Federal, state or local governments or law enforcement agencies, aircraft used in emergency rescue consistent with the directions of the District Commander, or aircraft forced to land due to circumstances beyond the control of the operator.

16. USACE Contractors Deploying UAS Technology.

a. Contractors may not fly UAS on USACE project sites unless the UAS is approved by USACE under the procedures in this EC. USACE contractors operating UAS on USACE properties will adhere to the policy contained in this Section. All contractor UAS must be approved regardless of mission type as defined in 16.b.

b. Mission Types.

(1) Deliverable Missions. Deliverable missions are missions involving the use of UAS technology to support contract deliverables (e.g., geospatial data and imagery) when the mission has not been directed by USACE. USACE contractors performing deliverable missions must operate only those systems approved by the USACE APM, and will adhere to all FAA and other applicable Federal, state, or local rules and regulations. However, these missions do not require further USACE oversight (i.e. mission approval). The contractor is responsible for the conduct of the mission and for compliance with applicable, Federal, state and local regulations.

(2) Directed Missions. Directed missions are defined as missions flown at the direction of the government based on the contract language. The USACE APM must approve all directed missions. USACE contractors operating USACE-owned UAS, or USACE contractors using UAS technology in support of a military contingency, emergency response, civil authorities, or other operation conducted by USACE, will comply with all rules and regulations applicable to operating Army aircraft.

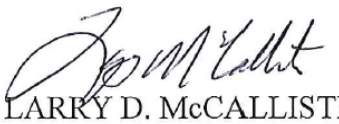
c. For contractor-operated UAS where the Government has or will accept some or all of the risks involved in the aircraft's operation via the process described in paragraph 16.b(2), additional requirements apply under the Federal Acquisition Regulation (FAR) (e.g., "Ground and Flight Risk Clause") and Army Regulation 95-20, Contractor's Flight and Ground Operations.

17. UAS Revolving Fund Account. HQ RM has established a revolving fund account for UAS, RF-5026: Unmanned Aircraft System (UAS), to record and distribute the cost of UAS operations. Costs will be distributed on a monthly basis. District offices are encouraged to charge costs to the RF-5026 account arising from the district's UAS program, which would include incremental costs such as equipment, maintenance, hardware, software or other costs associated with the operation of the UAS. While offices can use traditional accounts (such as survey equipment accounts) to purchase UAS equipment, they must resource the RF-5026 account with funds intended for AED's AWR processing. HQ will annually identify each office's AWR costs and those funds need to be placed in the RF-5026 account.

18. Example Documents. Examples of the regulations, memorandums, required documents and references are available on the Small UAS (SUAS) Community of Practice SharePoint site at the following link under "Shared Documents":
https://cops.usace.army.mil/sites/GEO/SUAS/default.aspx .

19. Proponent. The HQUSACE proponents for this interim guidance is Director of Logistics and the Engineering and Construction Division, Directorate of Civil Works.

FOR THE COMMANDER:



LARRY D. McCALLISTER, PhD, PE, PMP
Chief, Engineering and Construction
Directorate of Civil Works

APPENDIX A–ATPM Memo Template
APPENDIX B–Mission Approval SOP
GLOSSARY–Terms and Abbreviations

APPENDIX A

MEMORANDUM FOR
SUBJECT: Appointment as Unmanned Aircraft Systems (UAS) Aircrew Training Program Manager (ATPM) for

1. Effective immediately, you are appointed, authorized and directed to execute the duties of ATPM for this command, as provided for in this memorandum and in any forthcoming USACE guidance. You will assist me in the development and execution of UAS safety programs, standardization programs, and the ATP, as required. You will identify and request the required resources and develop and execute training plans that result in proficient individuals, leaders, and organizations.

2. As ATPM, you will maintain community outreach, liaise with higher HQ ATPM/APM in all UAS matters, maintain proficiency and understanding in UAS related matters and represent the command at conferences, workshops or seminars as required.

3. You are to manage the ATP for the programs and areas within my responsibility and integrate the UAS operation into our overall mission. You will be my primary director of UAS activities. You will act as the administrative authority IAW Civil, DoD, Army and USACE guidance. I delegate to you the authority to appoint and revoke appointments for subordinate instructors, standardization personnel, mission briefing officers and other aviation positions to ensure crews are properly trained at the individual, crew and organizational level.

4. You will work with subordinate commanders or directors to identify suitable subordinate ATPMs or consolidate ATPs under your management where appropriate. Subordinate ATPMs will be appointed by their commander or me as appropriate and will ensure their programs are conducted IAW their operators' training and USACE UAS Guidance including applicable OPORDs.

5. Subordinate ATPMs will report their activities to you and will ensure all flights are planned, executed and reported IAW USACE Guidance.

6. POC for this action is

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APPENDIX B

USACE Aviation Mission Planning, Approval and Reporting Process

1. Overview.

a. USACE Commanders/Directors (herein after referred to as Commanders) are responsible for safety programs, standardization programs and development of an effective Aircrew Training Program (ATP). The commander ensures training programs are resourced to maintain proficiency within the band of excellence. Through thoughtful delegation, the commander ensures all UAS operations are planned, approved and reported in a manner that embodies the high standards of the USACE aviation program.

b. The key individuals involved in aviation mission planning are the crew who will fly the mission, the mission briefing officers (MBO), the aviation mission approval authority and the commander who designates them for these positions and grants the authority to execute the program.

c. Commanders and ATPMs will use these policies and procedures for the UAS mission approval process for their organizations. Commanders will designate an Aircrew Training Program Manager (ATPM), in writing, within their organization with authority to conduct the aviation mission, including the issuing and revocation of aircrew positions and responsibilities. Request to adjust this requirement will be made to HQUSACE, APM. Adjustment authorities granted throughout this paragraph will not be delegated beyond the APM.

d. All USACE UAS acquisitions and operations must continue to comply with EC 1110-1-109, Acquisition and Operation of Unmanned Aircraft Systems (UAS) Technology, and any superseding guidance. Furthermore, USACE will not conduct any UAS operations involving COTS UAS except by submission of the mission plan to the APM and approval by HQUSACE, as provided for in this Annex.

2. Mission Planning.

a. Initial Aviation Mission Acceptance. Commanders or their designated representatives will determine the aviation mission feasibility and either accept or reject the mission for the command.

b. Aviation Mission Planning. Aviation Mission Planners are the Commander's designated representative that work as part of an integrated team to identify, assess, and mitigate risk for the specific mission. An Aviation Mission Planner should be a knowledgeable, qualified or current Pilot in Command (PIC) in the mission profile as determined and designated by the ATPM. ATPMs will select Aviation Mission Planners based on their experience, maturity, judgment, and ability to effectively mitigate risk to the aircrew, other aircraft and bystanders. Mission Planners will be designated by name and in writing. Aviation Mission Planners are authorized to plan missions regardless of risk level.

(1) Aviation mission plans will include the following products:

(a) Mission Statement – Concise statement of the activity and objective of mission.

(b) Crew Names, UAS Qualifications, Statement of Currency and Medical Fitness for UAS Duty. Include contact information to resolve minor issues for approval.

(c) Date(s) of planned mission(s) (Blanket Mission Plans will not be approved)

(d) Beginning and End Times of Operations (Local Time)

(e) Location (Map and address if available)

(f) UAV to be used (Make, Model and Tail/Serial Number) List Backup(s)

(g) Type of Airspace (include sectional chart of airspace with location indicated, such as the map page of the AWR or COA Packet even if AWR/COA is attached)

(h) Certificate of Authorization Documents (if required) (if not attached, certify possession and validity) (if pending, certify mission will not fly without completed COA)

(i) Airworthiness Release (if not attached, certify possession and validity)

(j) Land Use Agreement(s) if applicable

(k) NOTAM number and effective dates/times

(l) List of nearby airports, environmentally sensitive areas, high consequence structures (schools, malls, roadways or other gathering places) (List on map page with description, direction and distance)

(m) Hazard Analysis (Use DD Form 2977)

(2) The crew or planner will brief mission plans to a MBO separate from those individuals who planned the mission. The MBO will review the plan for completeness and confirm all crew members are current and qualified for the mission, all authorizations (AWRs, COAs, Land Use Agreements, etc. are valid and up to date or noted as pending) and that all equipment is reported as mission capable. Whenever possible the MBO will review the individual hazards with the PIC to ensure completeness of the assessment. The MBO will direct any adjustments necessary for their approval. When satisfied, the MBO will sign the mission plan to indicate suitability. The PIC will sign the plan to indicate suitability and that the requirements of the mission are within the scope of the training and qualifications of the crew and UAS.

(3) The PIC will submit the plan to the mission approval authority for approval.

3. Mission Approval.

a. Aviation Mission Approval Authority. Individuals responsible for aviation mission approval are members of the chain of command who are responsible for accepting risk and approving aviation operations within their organization. They approve missions for a specific risk level. Aviation mission approval authorities may only approve those missions whose assessed risk level is commensurate with their appointed risk acceptance level. A DD Form 2977 will be used to determine the level of risk and the corresponding approval authority. The Commanding General (CG), USACE, has delegated Air Mission Approval Authority to the USACE APM for Low and Medium Risk UAS Missions. High and Extremely High risk mission approval remains with the CG and Deputy Commanding General (DCG). The APM is authorized and directed to delegate Air Mission Approval Authority to subordinate commands when the scope of the USACE UAS activity is well defined and when training and policies are in place to ensure appropriate rigor in the USACE UAS program.

b. Aviation Mission Approval. Based on the resulting mitigated risk, the appropriate approval authority reviews the mission validity, planning, risk mitigation, and authorizes or denies the flight and/or operation consistent with the commander's policy. Indicating approval by signing the DD Form 2977 is preferred, however, initialing, signing, or documenting oral approval on the Mission Briefing Packet and/or DD Form 2977 are all acceptable methods of recording approval of the appropriate authority in the mission approval process. Mission Planners (Briefing Officers) and approval authorities may give oral approval if necessary. If a crewmember changes or a mission parameter changes which increases the resultant risk, the mission pilot-in-command will be re-briefed by the mission briefing officer, and the mission will be reapproved by the aviation mission approval authority prior to flight. Whenever possible, the original MBO and mission approval authority will be used.

c. Prohibited Missions. UASCE aircraft will not be used to conduct flights for personal use and will not be used for transportation of personnel or equipment to any place or event in an unofficial capacity.

4. Mission Execution.

a. Crews will execute missions within the scope of the mission plan and within risk accepted by the Approval Authority.

b. At the time of execution, the crew will complete a Daily Mission Risk Assessment Worksheet (RAW) to document evaluation of the current conditions prior to launch. (See paragraph 7. Daily Mission Risk Assessment Worksheet (RAW) below).

c. Flights will be conducted consistent with applicable training and regulations with a primary focus on safe operations. If successful completion of the mission is in doubt, the crew will cease operations until completion can be reasonably assured.

d. Crews will log actual flight times and durations, number of sorties (take-off to landing = 1 sortie), results of the mission and any deviations from the aviation mission plan.

5. Mission Reporting.

a. After mission completion, but within one business day, crews will debrief the mission with planners and/or the approval authority. This can be done in person, telephonically or by email.

b. Regardless of debrief method, the crew will annotate the mission debrief on the mission planning documents and submit an electronic copy of the debrief to the HQUSACE APM.

6. Mishap Reporting and Investigation.

a. All aviation mishaps will be reported, investigated and analyzed consistent with ER 385-1-99 and EM 385-1-1.

b. Report mishaps IAW state and federal laws, military regulations or host nation rules as appropriate. Submit CCIR IAW command guidance. Forward a report of the mishap to HQAviation@usace.army.mil within 12 hours.

7. Daily Mission Risk Assessment Worksheet (RAW). (See below)

Daily Mission Risk Assessment Worksheet (RAW)

Date: _____ Mission Approver (Name): _____

Hazard	Notes	Range	Score
		PIC up > 12 hours of rest <5 hours = NO-GO	
Crew Rest		<6 hours = 5	
(Per crew		6-8 hours = 3	
Member: PIC, VO1, VO2, etc)		>8 hours = 0	_____
Crew Experience		Trainee = 5	
(Per crew		Low = 3	
Member PIC, VO1, VO2, etc)		High = 0	_____
Planning		<12 hours = 5	
(Notification to		12-48 hours = 3	
Execution)		>48 hours = 0	_____
Aviation		< 3 miles vis or <1,000 ceiling = NO-GO	
Weather		< 5 miles vis or <2,000 ceiling = 5	
		< 7 miles vis or <3,000 ceiling = 3	
		> 7 miles vis and > 3K ceiling = 0	_____

Winds (>UAV limits = NO-GO)	> 15 knots = 5 > 10 knots = 3 < 10 knots = 0	_____
Wildlife (Birds, Bugs Or Biters)	Unsafe = NO-GO Highly Distracting = 5 Annoying = 3 Clear = 0	_____
Weather Effects (Wind Chill, Heat, Sun Wind, General misery)	Extreme Misery = 5 Moderate Misery = 3 Comfortable = 0	_____
General Concerns/Distractions		_____
Total (0–18 = Minimal / 18–30 Mitigate / >30 Change Conditions & Heighten Vigilance		_____

Mitigations _____

GO _____ or **NO-GO** _____ **PIC Signature** _____

Date: _____ PIC (Name): _____

State Mission Result: (Brief statement of mission execution in relation to original plan).
Flight Times / Sorties by name

_____
_____
_____

Hazards that were unforeseen: _____
_____

Unusual Circumstances: _____

_____

Other Notes or Lessons Learned: _____
_____

Phone/Email of PIC: _____
Follow up requested: YES NO From Whom: _____

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GLOSSARY

Terms and Abbreviations

AED	Army Aviation Engineering Directorate
APM	Aviation Program Manager
AWR	Airworthiness Release
CELD	Corps of Engineers Logistics Division
COTS	Commercial-Off-The-Shelf
COA	Certificate of Authorization or Waiver
CW	Civil Works
DAR	Department of the Army Regional Representative
DHS	Department of Homeland Security
EC	Engineering Circular
FAA	Federal Aviation Administration
MP	Military Programs
MOA	Memorandum of Agreement
NAS	National Airspace System
OMB	Office of Management and Budget
PEO AVN	Program Executive Officer, Aviation
PM TUAS	Product Manager, Tactical Unmanned Aircraft Systems
SOP	Standard Operating Procedures
SSMP	System Safety Management Plan
SSWG	System Safety Working Group
SUAS	Small Unmanned Aircraft Systems
UAS	Unmanned Aircraft Systems
UOC	USACE Operations Center
USAASA	U.S. Army Aeronautical Services Agency
USACE HQ DOL	U.S. Army Corps of Engineers Directorate of Logistics
USACE HQ	U.S. Army Corps of Engineers Headquarters
USACE	U.S. Army Corps of Engineers

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