

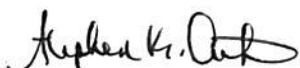
Headquarters, Fort Knox
US Army Garrison Command
Fort Knox, Kentucky 40121-5719

*Fort Knox Regulation 95-23

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Aviation

UNMANNED AIRCRAFT SYSTEM FLIGHT RULES



STEPHEN K. AITON
COL, US Army
Commanding

History. This publication is a major revision.

Summary. This regulation outlines safety and standardization policies and procedures for Unmanned Aircraft System operations at Godman Army Airfield and within Special Use Airspace (Restricted Area 3704). It is to be used in conjunction with Army Regulations 95-23, Unmanned Aircraft System Flight Regulations, and Army Regulation 95-2, Airspace, Airfields/Heliports, Flight Activities, Air Traffic Control (ATC), and Navigational Aids.

Applicability. This regulation applies to Department of Defense organizational elements, activities, and agencies (military or civilian) using the Fort Knox airspace for Unmanned Aerial Systems operations. This includes, but is not limited to, the Shadow Tactical Unmanned Aerial System and Raven Small Unmanned Aerial System. Updates to this regulation will be written to address future systems as required.

Restrictions. Approved for public release to Department of Defense organizational elements, activities, and agencies (military or civilian) using the Fort Knox airspace for Unmanned Aircraft System operations. Local reproduction is authorized.

Proponent and Exception Authority. The proponent for this regulation is the USACC Deputy Chief of Staff, G-6. The proponent has the authority to approve exceptions or waivers to this regulation that are consistent with controlling laws, regulations, and USACC policies. Activities may request a waiver to this regulation by providing justification that includes a full analysis of the expected benefits and must include formal review by the activity's senior legal officer. All waiver requests will be endorsed by the commander or senior leader of the requesting activity and forwarded through their higher headquarters to the policy proponent.

*This regulation supersedes Fort Knox Reg 95-23, Unmanned Aircraft System (UAS) Flight Rules, 3 May 2013.

Army Management Control Process. This regulation does not contain management control provisions.

Supplementation. Supplementation of this regulation is not permitted by subordinate commands of USACC.

Suggested Improvements. Users are invited to send comments and suggested improvements on Department of the Army Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Directorate of Plans, Training, Mobilization and Security: Airfield Division (IMKN-PLA), 283 Pilot Street, Bldg 5220, Suite 217, Fort Knox, Kentucky 40121-8113.

Distribution. Distribution of this regulation is intended for Department of Defense organizational elements, activities, and agencies (military or civilian) using the Fort Knox airspace for Unmanned Aircraft System operations. Distribution is in electronic format only.

Summary of Change

Fort Knox Regulation 95-23
Unmanned Aircraft System Flight Rules

This is a major revision dated, 25 March 2016--

- Adds minor administrative changes (throughout).
- Changes Special Use Airspace Restricted Area labels from R3704 A & B to R3704 (throughout).
- Renames Unmanned Aerial Vehicle to Unmanned Aircraft System (throughout).
- Renames Range Control to Range Branch (throughout).
- Updates paragraph 1-4(e) with current notice to airmen procedure (page 7).
- Updates paragraph 2-1 for local flying area (page 8).
- Combines old paragraph 2-3 and 2-4 to list all Special Use Airspace R3704 areas together. Paragraph numbers changed accordingly to paragraph 2-3 (page 7).
- Updates paragraph 2-4 and added paragraphs b and c with specific launch instructions (page 9).
- Modifies paragraph 2-7 for current lost communications procedures (page 10).

- Updates paragraphs 2-8(b)-(d) with lost link procedures (page 11).
- Updates paragraph 2-9(a) with current form information (page 11).
- Updates paragraph 3-1(c) and (d) with current operating area changes (page 16).
- Updates paragraph 3-2(d) for small Unmanned Aircraft System operators (page 17).
- Updates paragraph 3-3(c) with current forms (page 18).
- Updates chapter 4 with downed Unmanned Aircraft System information (page 21).
- Format changes throughout appendixes.
- Modifies Appendix B, removes restricted operation zone Baker; adds restricted operation zones Blair and Chappel. Updates Unmanned Aircraft Systems operating areas (page 24).
- Modifies Appendix C, removes restricted operation zone Baker; adds restricted operation zones Blair and Chappel. Updates procedures accordingly (page 25-29).
- Inserts Appendix D–GAAF Launch Path for unit use for mapping.
- Updates Appendix E with required Federal Aviation Administration reporting requirements (page 30).

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Glossary

Chapter 1

Introduction

1-1. Purpose

The purpose of this regulation is to establish procedures and assign responsibilities governing Unmanned Aircraft System (UAS) operations within Godman Army Airfield (GAAF) Class D Airspace and the Fort Knox Range and Training Complex, Special Use Airspace - Restricted Area 3704 (SUA R3704).

1-2. References

References are listed in appendix A.

1-3. Explanation of Terms

Acronyms and special terms used in this regulation are explained in the Glossary.

1-4. Responsibilities

a. Commanders, directors, activity chiefs, and project officers/managers are responsible for ensuring personnel are properly briefed prior to the execution of UAS missions on Fort Knox. When units are participating in training exercises or joint maneuvers, the primary responsibility lies with the unit commander to promote safety and ensure proper mission coordination is conducted. Compliance is essential to safety and continued use of Fort Knox airspace and training facilities. Non-compliance will result in curtailment of UAS operations until issues/problems are corrected. Each service, agency, and unit will operate UAS per Department of Defense (DoD) and appropriate service regulations, directives, guidelines, and manuals.

b. The Air Traffic and Airspace (AT&A) Officer is responsible for coordinating airspace usage and reporting to the Federal Aviation Administration (FAA) and Department of the Army Representative (DAR) for UAS operations on Fort Knox; (502) 624-5737 (DSN 464-5737).

c. Godman Air Traffic Control Tower is responsible for providing control of airspace activities, enforcing established procedures, separation standards between UAS and manned aircraft while inside the Class Delta airspace, and information advisories for UAS. Operations may be conducted by UAS in Class D airspace provided a Certificate of Authorization (COA) has been approved by the FAA through DAR for the specific type of UAS to perform the mission.

d. Fort Knox Range Branch is responsible for providing control of all UAS training within SUA R3704; (502) 624-2125 or (DSN 464-2125).

e. Commanders of each activity operating UAS will:

(1) Ensure UAS operations, procedures, and training are IAW Army Regulation 95-23, Unmanned Aircraft System Flight Regulations (for Army UAS) and/or appropriate service regulations, directives, guidelines, and manuals and this regulation.

(2) Define the responsibilities of the UAS Mission Coordinators/unmanned Aircraft Operator (AO) and delegate decision-making authority to act decisively in case of an emergency or deviation of the UAS from the programmed flight path.

(3) Ensure the UASs are flown within assigned airspace boundaries (R3704) or Godman Class D airspace and do not deviate from approved altitudes or times of operation.

(4) Ensure Godman Operations is notified **NLT 48 hours prior** to the UAS flights in Godman Class D airspace in order to allow ample time to issue a Notice to Airmen (NOTAM).

(5) Ensure the NOTAM for scheduled UAS flight is published by Godman Operations **NLT 24 hours prior** to the UAS mission.

(6) Ensure each unmanned AO receives aviation and range briefings prior to conducting UAS operations. Godman Operations (502) 624-5545 or (DSN 464-5545) and Fort Knox Range Branch (502) 624-2125 or (DSN 464-2125).

(7) Ensure a FK Form 8175, Fort Knox Local Flight Plan/SUA R3704 Air Mission Request (AMR) is approved and a mission number issued before the UAS mission is flown.

(8) Ensure that all personnel are familiar with the reporting procedures. All incidents/accidents will be reported, especially those found in paragraphs 2-8, 2-11, and chapter 4. Reporting is required to ensure proper compliance is maintained for reporting from the AT&A to the DAR and FAA.

(9) Develop and maintain written Pre-Accident and Recovery Plans. The unit Pre-Accident Plan should supplement and not duplicate the Fort Knox Aviation Pre-Accident Plan. (See Field Manual 3-04.155, Army Unmanned Aircraft System Operations, for additional information.)

(10) Ensure a unit Safety Officer/Non-Commissioned Officer (NCO) assists with the planning and operations of UAS missions.

(11) Develop a Risk Management (RM) Plan IAW ATP 5-19, AR 95-23, or appropriate service regulation and ensure a RM briefing is conducted for each participating unmanned AO prior to each UAS mission, including maintenance test flights.

1-5. Operations in Public Use Airspace

All large UAS operations in Public Use Airspace require a COA from the FAA coordinated through the DAR office to the FAA. Additionally, all DoD UAS units will complete the appropriate coordination IAW DoD Policy Memorandum 15-002. Public Use Airspace is defined as airspace that is not restricted or specified for sole use.

Chapter 2

Local Flying Rules

2-1. Local Flying Area

Fort Knox airspace is managed by the Fort Knox AT&A Officer. Fort Knox Class D airspace is controlled by Godman Tower. When Godman Tower is closed, Class D airspace reverts to Class E airspace. UAS operations are not authorized in Class E airspace at this time.

2-2. Special Use Airspace

a. Special Use Airspace (SUA) R3704. The range complex is designated as SUA R3704. It is controlled, on a daily basis, by Range Branch as the "Using Agency" during range firing and training operations.

b. Louisville Tower is the FAA "Controlling Agency" for SUA R3704.

2-3. Operations within Special Use Airspace R3704

a. Operations for UAS will be within the Fort Knox SUA (R3704). All operations require detailed planning and scheduling coordination with Range Branch (502) 624-2125 to ensure no conflict will arise with existing airspace usage. Scheduling will normally be 14 or more days in advance and for a specific time period. Airspace reservations will be given on a priority basis with use of the airspace not to begin prior to or extended beyond the scheduled time period without Range Branch's approval.

b. Additionally, operations that originate at Godman Army Airfield require prior coordination from Airfield Operations (502) 624-5545/6047 and Range Branch (502) 624-2125. A minimum of 14 days advanced notice is required and the unit must have an assigned/designated area of operation approved by Range Branch. Training areas for the UAS are coordinated directly with Range Branch.

c. The approval and scheduling of the Fort Knox airspace does not indicate sole occupancy of the airspace. Sole or exclusive use of these areas will be authorized only for emergencies, safety, and/or lack of compatibility of the scheduled operations with other airspace users. Requirements for sole occupancy of the airspace must be fully justified when scheduling is coordinated.

d. Commanders will review all requests to use Fort Knox airspace to ensure operational, safety, and risk management factors have been considered.

e. When approved to operate within R3704, UAS must not fly outside designated boundaries or exceed the altitude limitations approved for the flight.

f. Use of R3704, for the purpose of UAS operations, does not restrict manned aircraft from entering R3704; therefore, airspace coordination is a must between all parties (unmanned AO, Range Branch Firing Desk, and Airfield Division) to ensure lateral and/or vertical distance separation as outlined in para 2-5b.

2-4. Operations within Godman Airfield Class D Airspace

a. Flights in Class D airspace must be scheduled and coordinated with Airfield Operations, NLT 14 days prior to operations. A COA must be approved for each type of UAS prior to operations within Class D airspace. Class D airspace extends from the surface to 2500 feet Above Ground Level (AGL) (3300 feet Mean Sea Level (MSL)) and within a 5 Statute Miles (SM) (4.3 Nautical Miles (NM)) radius of Godman Airfield. When SUA R3704 is in use, Class D airspace ends at the western boundary of SUA R3704. All operations will be conducted IAW FAA separation procedures as referenced in AR 95-23 para 2-8.

b. Operations for UAS will be on Runway 05/23 for departure/arrival (see Appendix A & B).

c. Class D airspace operations are only authorized when the tower is open and during daylight hours IAW the approved COA. Daylight is official sunrise until 1 hour prior to official sunset.

d. Launches will be conducted with a 230° to 005° heading. This has been established as the safe heading to avoid trees and the cantonment area during launch procedures.

e. Units are required to operate within the limits of the Letter of Agreement (LOA) established for the Godman Airfield Class D airspace.

f. Units will be given a compact disc with established overlays for operations within the Class D airspace and SUA R3704. Specified routes and checkpoints will be used to ensure unit personnel know established checkpoints to be used for UAS transitioning to SUA R3704 airspace.

g. Traffic pattern operations are authorized for UAS within the Class D airspace on a case by case basis. Traffic pattern operations will only be considered when manned aircraft will not be delayed by UAS operations.

h. Upon completion of daily operations, the using unit shall remove all equipment from the runway environment and store as follows: arresting cable/net will be de-rigged, external pilot stands and recovery net will be de-rigged (arresting gears/drums may remain in place along the edge of the runway). Additionally, a foreign object debris (FOD) walk of the operational site will be completed to ensure that all hazards have been removed. Any equipment left on the airfield, which may be considered as obstruction, shall be lighted with red bean bags or chemical lights.

i. Units are responsible for providing reportable information. (See appendix E for required information.)

2-5. General Safety Procedures

a. The Mission Coordinator will be present during all UAS missions to monitor the effectiveness of the Risk Management Plan, to include maintenance test flights.

b. Separation standards between UAS and manned aircraft will have the following altitude restrictions:

(1) Small UAS, operating in R3704, will normally be cleared to fly at a maximum altitude of 1000 feet AGL (1800 feet MSL) unless otherwise approved by Range Branch and manned aircraft will operate no lower than 200 feet above the maximum altitude assigned to the UAS.

(2) Large UAS, operating in R3704, will normally operate at an assigned altitude between 3500 feet AGL (4300 feet MSL) to 9100 feet AGL (9900 feet MSL). Manned aircraft will operate no lower than 500 feet above or at least 1000 feet below the assigned UAS altitude, unless otherwise approved by Range Branch.

2-6. Communication Procedures

a. When operating at GAAF, Shadow AO will have positive communication on very high frequency (VHF) 133.35 or ultra high frequency (UHF) 233.7 with Godman Tower and via frequency modulation (FM) 38.90 with Range Branch prior to execution of the mission. A dedicated telephone back up will be at the launch/recovery site. Positive communications will be established 10 minutes prior to launcher pressurization and communications maintained until the termination of flight operations and recovery.

b. When operating at GAAF and communications cannot be established, the mission will be delayed until positive communications are established. The Mission Commander assumes the responsibility for direct telephonic communications with Godman Tower at

(502) 624-1717/7513, and/or Range Branch Firing Desk at (502) 624-2125, when radio communications are lost during a mission.

c. When operating in the Range Complex, the unmanned AO will maintain radio communication with Range Branch during the UAS mission while operating within SUA R3704 and must make a communication check every 30 minutes.

2-7. Lost Communication Procedures

If radio communication is lost within SUA, the unmanned AO will call Range Branch (502) 624-2125 to report lost radio communications. If the UAS originated from GAAF and radio communications are lost, the unmanned AO will also call Godman Tower at (502) 624-1717/7513 to report lost radio communication. The phone contact will be maintained with Range Branch or Godman Tower and the UAS will be recovered via the approved recovery route, altitude, and location. A lost communications event requires immediate recovery of the UAS for landing per Range Branch or Godman Tower instructions and termination of UAS operations until all communications are reestablished. Lost Communications Recovery/Holding Points: Cedar Creek, Chappel and Blair, as outlined below in Lost Link/Mission Procedures.

2-8. Lost Link/Mission Procedures

All lost link incidents will be reported to Range Branch/Godman Tower as soon as possible. The AT&A Officer must report all incidents to the DAR within 24 hours.

a. Lost Link in SUA R3704 - Small UAS: The unit must notify the Range Branch Firing Desk immediately and report the location and altitude (MSL) of the pre-programmed lost link location. These aircraft should be programmed to return to their launch position at mission altitude and orbit there within the confines of their assigned UAS area until such time as the link is re-established or the aircraft runs out of fuel.

b. Lost link in SUA R3704 - Large UAS: The unit must notify the Range Branch Firing Desk and Godman Tower immediately and report the last known location and which previously established lost link location is to be used. UAS should be programmed to proceed *at mission altitude* to one of the following lost link points and then spiral to 4300 feet MSL. Point Blair (if operating from GAAF) located at grid coordinate EG 94495 97442/latitude and longitude 37° 55' 10.640" N 85° 55' 29.649" W, Point Cedar (if operating from Cedar Creek Airstrip) located at grid coordinate FG 00019 85753/latitude and longitude 37° 48' 49.311" N 85° 51' 49.263" W or Point Chappel (if operating from Chappel Ridge Airstrip) located at grid coordinate FH 00645 03105/latitude and longitude 37° 58' 11.972" N 85° 51' 14.948" W. UAS will remain in orbit at that point at 4300 feet MSL in an attempt to regain the signal. In the event of lost link, operators are equipped with VHF/UHF communications or cell phone and will maintain contact with Godman Tower (502) 624-1717/7513. Unit will also inform Range Branch and Godman Tower upon recovery of the UAS. Position reports will be relayed upon request.

c. Lost link in Godman Class D Airspace: UAS should be programmed to make a climbing right turn to 2000 feet MSL while proceeding to Point Blair located at grid coordinate EG 94495 97442/latitude and longitude 37° 55' 10.640" N 85° 55' 29.649" W. Once the UAS reaches Point Blair it will be programmed to climb to 4300 feet MSL in an attempt to regain the signal. In the event of lost link, operators are equipped with

VHF/UHF communications or cell phone and will maintain contact with Godman Tower (502) 624-1717/7513. Unit will also inform Range Branch and Godman Tower upon recovery of the UAS. Position reports will be relayed upon request.

d. During dual operations, the second UAS will use a lost link altitude of 5300 feet MSL.

2-9. Flight Planning

a. Flight Plans: UAS will not be flown unless the appropriate documents have been filed and approved.

(1) Operating within SUA R3704: Unit will submit FK Form 8175 (AMR) to Range Branch for coordination and approval.

(2) Operating from GAAF: Unit will submit FK Form 8175 (AMR) to Range Branch for coordination and approval of R3704 operating area. Daily, the unit will submit a flight plan (DD Form 175) or Mission Schedule/Brief (DA Form 5484) to Godman Operations. When DD Form 175 is used, the form will be filed according to DoD Flight Information Publications. Local commanders will establish policies specifying the flight plan or operations log to be used.

b. Weather Briefings and Current Observations are as follows:

(1) Flight Weather Briefing, DD Form 175-1, obtained from the United States Air Force (USAF) Weather Forecaster at Fort Knox Weather Station, in person, at 283 Pilot St, Bldg 5220 or by fax (502) 624-6165.

(2) Mission Execution Forecast can be obtained at the Fort Knox Weather Operations website via the provided link:

<http://www.knox.army.mil/partners/weather/Default.aspx>.

(3) Current observations can be obtained by calling Fort Knox Weather Station at (502) 624-5517/5653.

Note: Weather observations are for GAAF and may not apply to a remote field site or range area where the conditions could be better or worse; therefore, weather forecast must be equal to or greater than visual flight rules (VFR) criteria of 1000 feet AGL ceiling and 3 SM visibility for one hour prior to launch and throughout the mission until one hour after landing. No flight activity should occur if there is any doubt the required minimum ceiling and visibility exists.

2-10. Weather Minimums

a. Weather minimums within R3704 – Small UAS

(1) For tactical training when manned aircraft are participating in the mission are as follows:

(a) Daylight Hours - 500 feet AGL ceiling and 1 SM visibility.

(b) Night Hours – 800 feet AGL ceiling and 1 1/2 SM visibility.

(2) For tactical training when only unmanned aircraft are participating in the mission are as follows:

(a) Daylight Hours – 300 feet AGL ceiling and 1 SM visibility.

(b) Night Hours – 500 feet AGL ceiling and 1 SM visibility.

b. Weather minimums within R3704 – Large UAS: Godman Tower will exercise appropriate control to separate the UAS from other aircraft during weather-related recovery operations. The following weather restrictions apply:

(1) Large UAS will not be flown unless the weather forecast and existing conditions will permit flight under VFR and weather minimums must be met for the entire mission.

(2) At the launch and recovery site, the cloud ceiling must not be lower than 1500 feet AGL and the horizontal visibility must be at least 3 SMs.

(3) During launch, en-route, and recovery, operators must be able to maintain cloud separation of 1000 feet above or below vertically as well as 2000 feet horizontally and have 3 SMs flight visibility at all times.

(4) If the weather deteriorates below established weather minimums during the missions, the UAS will abort the mission and return for recovery.

c. Weather minimums for tactical operations within Godman Airfield Class D airspace with approved COA will be day VFR only (1000 feet AGL ceiling and 3 SM visibility).

2-11. Emergency Procedures

Emergency procedures are situation dependent. All incidents will be reported to Range Branch/Godman Tower as soon as feasible. The AT&A Officer must report all incidents to the DAR within 24 hours.

a. If a mishap occurs during any phase of operation, launch to recovery, the Pilot-in-Command will:

(1) Perform UAS-specific mishap/emergency procedures immediately. Document the sequence of events and preserve any information or evidence.

(2) Inform Godman Tower and/or Range Branch with as much detail as possible and relay information as the situation progresses.

b. If control or link with the UAS is lost, inform Godman Tower and/or Range Branch immediately of last known location, heading, altitude, and maximum remaining flight time/distance.

c. The unmanned AO must continue attempting to regain control of the UAS, if successful, immediately inform Godman Tower and/or Range Branch. Take appropriate actions to recover the UAS – do not enter the Fort Knox impact area without permission from the Range Branch Firing Desk (502) 624-2125.

d. Call Godman Tower and/or Range Branch immediately if the unmanned AO determines that a UAS mishap involves injury to personnel, damage to the UAS, and/or damage to other equipment/property. Report the accident IAW Fort Knox Regulation 95-1 and Fort Knox Regulation 385-22 along with the unit Pre-Accident Plan.

(1) Depending on the nature of the mishap reported by the unmanned AO, Godman Tower may activate the Fort Knox Aviation Pre-Accident Plan IAW DA Pam 385-90 and Fort Knox Regulation 95-1.

(2) Fire and Emergency Services will respond IAW Fort Knox Regulation 95-1 and Fort Knox Aviation Pre-Accident Plan.

(3) Outside of SUA R3704, the UAS will be visually tracked by ground observers while in communication with the unmanned AO flying the UAS. Emergency protocol requires that Godman Tower will be notified immediately of any abnormalities.

2-12. Inadvertent Instrument Meteorological Conditions Recovery

a. The existence of an Inadvertent Instrument Meteorological Condition (IIMC) recovery plan in no way implies command approval of flights into Instrument

Meteorological Conditions (IMC) without meeting Army (or other service) and FAA requirements for such flights.

b. Each UAS operator is reminded that no single procedure or recovery plan can cover all circumstances that may be encountered on a flight that enters IIMC. Communication, good judgment, and common sense must be used in conjunction with the established recovery procedures.

c. Mission Coordinator will ensure IIMC procedures are briefed prior to the mission when weather conditions are forecasted to be less than 1000 feet AGL ceiling and 3 SM visibility (VFR). The following procedures apply upon recognizing the UAS is IIMC:

(1) The Operator will immediately contact Godman Tower or Range Branch to request recovery procedures.

(2) The Operator will inform Godman Tower or Range Branch if lost communications or lost link occurs during IIMC recovery procedures.

d. The Operator will notify Godman Tower and/or Range Branch when the UAS is recovered.

2-13. Range Incursion Notification Procedures

a. Range Branch will notify and relay range incursion information to UAS units operating in R3704 upon receiving details from Louisville Approach Control.

b. UAS unit will acknowledge receipt of information from Range Branch and relay UAS altitude, heading, and state intentions to mitigate potential mid-air collision with incursion aircraft.

Chapter 3

Unmanned Aircraft System Operations

3-1. Unmanned Aircraft Systems Training Areas

a. Fort Knox UAS training areas are located in SUA R3704 and are designated by Range Branch. These facilities are intended for UAS launch and recovery operations; however, helicopter operations may be performed in the areas if the UAS Mission Coordinator has Range Branch's approval, and the flight is conducted IAW Fort Knox Regulations 95-1 and 385-22.

b. Small UAS, operating in conjunction with a live fire event on a range, are confined to the airspace immediately above the facility to the assigned altitude the unit has pre-coordinated with Range Branch for use. De-confliction with the event is solely the responsibility of the unit mission planners. Use of these areas and launch/recovery points require approved coordination through Range Scheduling.

c. In addition to the live fire facilities, each of the training areas located within SUA R3704 (2,3,4,5,6,7,15,16, the southern portions of 17 and 18- as depicted on the current edition of the Fort Knox Military Installation Map) also define the small UAS operating areas. One or more of these areas may be scheduled through Range Branch.

d. Large UAS, operating areas, indicated in appendix B (North, Central, and South) must be coordinated through Range Branch via the AMR process.

- e. No one may enter the UAS training/ launch area or runway unless cleared to do so by the UAS Mission Commander.
- f. No UAS may launch from a training area unless radio communications exists between the unmanned AO and Range Branch from launch until recovery.
- g. The UAS will climb to mission altitude as quickly as possible and proceed to the mission area by the approved route, altitude and flight plan. If an established Restricted Operating Zone (ROZ) has been activated during the launch procedures outlined in appendix C, units will report at mission altitude promptly so as to facilitate the deactivation of the ROZ and return the airspace to normal air traffic.
- h. When small UAS operations are in progress, a temporary ROZ will be activated.

3-2. Small Unmanned Aerial Systems Field Site Operations

- a. All field sites are located within SUA R3704. Use of Fort Knox training areas as small UAS launch and recovery sites, within SUA R3704 requires coordination and scheduling with Range Branch. Multiple launches and recoveries may be performed during the approved time frames. During coordination, contact Range Branch for the most current launch/recovery procedures.
- b. Small UAS will normally be cleared to fly at a maximum altitude of 1000 feet AGL (1800 feet MSL) unless otherwise approved by Range Branch. UAS launches and recoveries will remain within the SUA R3704 boundaries.
- c. Small UAS may **not** launch from a field site location unless radio communications exist between the Range Firing Desk and the field/launch site during the duration of the mission/training. Radio communications will be established **30 minutes prior to launch** and until termination of flight operations and recovery.
- d. Small UAS Operators will:
 - (1) File FK Form 8175 with Range Branch for approval 14 days prior to training. Units will obtain a Mission Execution Forecast from the USAF Weather Forecaster by calling the Fort Knox Weather Station at (502) 624-5517/5653. Obtain current weather at launch by contacting the Range Branch Firing Desk at (502) 624-2125 or the Fort Knox Weather Station.
 - (2) It is the responsibility of the Mission Commander to maintain radio communications with the Range Branch Firing Desk at all times. In the event radio communications are lost and attempts to restore are unsuccessful, begin UAS recovery operations immediately via approved recovery route/altitude and contact Range Branch Firing Desk via telephone at (502) 624-2125, to request further instructions.
- e. The unit will conduct a thorough site survey prior to conducting flight operations. The survey will include, but is not limited to:
 - (1) Hazards which may affect the UAS operation
 - (2) Suitability of the area.
- f. The using unit will not make any training site improvements.

3-3. Large Unmanned Aerial Systems Field Site Operations

- a. All field sites are located within SUA R3704. Use of Fort Knox training areas as large UAS launch and recovery sites requires coordination and scheduling with Range Branch. Multiple launches and recoveries may be performed during the approved time

frames. During coordination, contact Range Branch for the most current launch/recovery procedures.

b. Large UAS may **not** launch from a field site unless radio communications exists between the unmanned AO and Range Branch from launch until recovery. Radio communication will be established **30 minutes prior to launch** and until termination of flight operations and recovery.

c. Large UAS operators will:

(1) File FK Form 8175 with Range Branch for approval 14 days prior to training. Units will obtain a current Weather Briefing, DD Form 175-1 and a Mission Execution Forecast from the USAF Weather Forecaster at the Fort Knox Weather Station, in person at 283 Pilot St, Bldg 5220 or by fax to (502) 624-6156. When operating from Cedar Creek Airstrip or Chappel Ridge Airstrip, units will maintain a flight operations log to track aircraft/missions.

(2) Operate at an assigned altitude between 3500 feet AGL (4300 feet MSL) to 9200 feet AGL (10000 feet MSL). Large UAS will not operate below 4300 feet MSL except during launch and recovery. Large UAS launches and recoveries will remain within the SUA R3704 boundaries.

(3) Maintain radio communications with Range Branch during the UAS mission and must make communication checks every 30 minutes or as directed. If radio communications with Range Branch is lost, the Air Mission Coordinator will call Range Branch. Phone contact will be maintained and the UAS will be recovered via the approved recovery route and altitude.

(4) Ensure transponder equipped UAS have an operational transponder and set code to 4000 for operating in SUA R3704. Godman Tower can request and issue a special transponder code prior to launch if conflicts are expected. If the transponder fails to function after launch, the UAS will be recovered immediately via the approved recovery route and altitude.

d. Operations by large UAS may be conducted in conjunction with artillery/mortar and/ or close air support within SUA R3704, provided advanced separation coordination has been approved by Range Branch and the unmanned AO assumes responsibility for separation from artillery/mortar and/or the close air support activities.

e. Receive an Officer-in-Charge/Range Safety Officer Certification Briefing prior to conducting UAS missions. An annual refresher briefing is required for each supervisor in charge of UAS operations.

3-4. Multi-Platoon UAS Operations

Multiple UAS platoons may conduct training using the same launch and recovery area and SUA if the following minimum conditions are met:

a. The UAS platoons must coordinate and agree on site location(s), frequency usage and other standards and procedures deemed appropriate for safe operations.

Frequencies must be coordinated with the Fort Knox installation frequency manager (502) 624-2208.

b. The UAS platoons will not conduct launches and recoveries within 10 minutes of the other platoon at the same site (i.e., if a platoon launches at 0800, then next platoon must wait until 0810 before launching the next UAS; this provides the time separation at the launch and recovery sites).

- c. The UAS platoons will maintain at least 1000 feet horizontal and/or 500 feet vertical separation from each other during the mission.
- d. Prior to conducting a climb or descent, the UAS platoon will radio the other platoon(s) to ensure designated climb/descent routes are clear.
- e. Prior to conducting recoveries, the UAS platoon will radio the other platoon(s) to coordinate separate recovery operations.

3-5. Surveillance Requirements

- a. Methods of surveillance for all UAS operations (i.e., radar, visual, or manned aircraft) will be provided to the maximum extent possible. The type of surveillance will depend on the mission and type aircraft flown.
- b. Information obtained from surveillance such as position, speed, altitude, and heading will be made available upon request. Where manual plotting (i.e. visual reporting is opposed to radar) or surveillance information is necessary, the time between plots must be as short as possible.
- c. If at any time, the position of a UAS becomes unknown, or the UAS fails to respond to the programmed lost link instructions, the flight will be terminated in time to preclude the possibility of impact outside the approved flight area.

3-6. Operational Planning Safety Factors

- a. Operational plans for UAS test and training flights must take into consideration the type of aircraft, results to be achieved, and the area in which operations have been approved.
- b. The unit must maintain a written Airspace Safety Plan. Each Airspace Safety Plan must take the following into consideration:
 - (1) Capability of UAS, such as the altitude, range, speed, wind factors, and amount of guidance which may be commanded to the vehicle (programmed or other), deviations allowable from assigned headings the UAS may take due to malfunctions and type of launch.
 - (2) System for flight termination and recovery (i.e., parachute and/or other functions which would affect flight safety).
 - (3) The methods for obtaining real-time position of the UAS in flight, such as visual, manned chase airplane, radar, telemetry, etc.
 - (4) Aerodynamic data used to determine flight safety grids which will include, but not be limited to, glide ratio of the UAS, detailed performance data (including system time delays), location of launch site, intended recovery site, parameters of the flight area, and method of area surveillance (such as, visual, manned aircraft, or radar).

3-7. Laser and Other Directed Energy Hazards

- a. Laser operations must be coordinated with Range Branch prior to mission execution. Fort Knox Regulation 385-22 provides information for safe laser operations.
- b. Commanders will ensure Air Mission Coordinators are briefed on laser-directed energy hazards (L/DEH), approved areas of operation, IAW the current Unmanned Aircraft Systems Commander's Guide & Aircrew Training Manual (ATM) standards/procedures, and established unit procedures for safe operation of L/DEH on Fort Knox.

c. The Air Mission Coordinator will ensure UAS Operators are briefed on range procedures and complies with the safety requirements when operating L/DEH on ranges.

d. Use of an external laser at Godman Airfield is not authorized. Use of an external laser is restricted to approved ranges and facilities within the range complex with approval by Range Branch.

Chapter 4

Recovery of Downed Unmanned Aircraft

a. Recovery of downed unmanned aircraft (UA) will be accomplished IAW Field Manual 3-04.155, Unmanned Aircraft System Operations and Field Manual 3-04.513, Aircraft Recovery Operations or other service equivalent regulation. The unit should develop an UAS Pre-Accident Plan, which is designed to prepare the unit should an accident/incident occur.

b. A Pre-Accident Plan is designed to ensure that each unmanned AO will know what actions to take should an accident occur. Practicing the plan will ensure UA recovery is completed in a safe and timely manner.

c. Safety risk management by all participating recovery personnel is the foremost consideration, as most UA have one or more items that are classified hazardous materials (i.e., fuel, batteries, parts of the sensor payload, etc.). Commanders should ensure a comprehensive recovery plan is created, documented, and trained on a regular interval.

d. A technique to aid in the recovery of any UA is to mark the UA with instructions for return to US Army military personnel.

e. If an UA lands anywhere within the Fort Knox Range and Training Complex, UAS units will coordinate the recovery of the aircraft with Fort Knox Range Branch before proceeding into the impact area.

f. All incidents will be reported to Range Branch/Godman Tower as soon as possible. The AT&A Officer must report all incidents to the DAR within 24 hours.

APPENDIX A

Section I – References

AR 95-1, Flight Regulations, 12 Nov 08.

AR 95-2, Airspace, Airfields/Heliports, Flight Activities, Air Traffic Control (ATC), and Navigational Aids, 10 Apr 07 (with RAR 001, 16 Oct 08).

AR 95-23, Unmanned Aircraft System Flight Regulations, 7 Aug 06.

Fort Knox Regulation 385-22, Range Regulation (Training/Impact Areas), 1 Dec 00.

Field Manual 3-04.155, Army Unmanned Aircraft System Operations, 29 Jul 09.

Field Manual 3-04.513, Army Recovery Operations, 21 Jul 08.

ATP 5-19, Risk Management, 08 Sep 14.

TC 3-04-61, Unmanned Aircraft Systems Commander's Guide and Aircrew Training Manual, 10 Jan 14.

TC 1-611, Small Unmanned Aircraft System Aircrew Training Manual, 2 Aug 06.

Joint Pub 3-55.1, Joint Tactics, Techniques, and Procedures for Unmanned Aerial Vehicles, 27 Aug 93.

Godman Airfield Operations Manual, 24 Jul 12.

Section II – Prescribed Forms

FK Form 8175, Fort Knox Local Flight Plan/SUA R3704 Air Mission Request, Aug 12.

Section III – Referenced Forms

DA Form 2028, Recommended Changes to Publications and Blank Forms, 1 Feb 74.

DA Form 5484, Mission Schedule/Brief, Jan 06.

DD Form 175, Flight Plan, Military, 1 May 86.

DD Form 175-1, Flight Weather Briefing, 1 Oct 02.

APPENDIX B

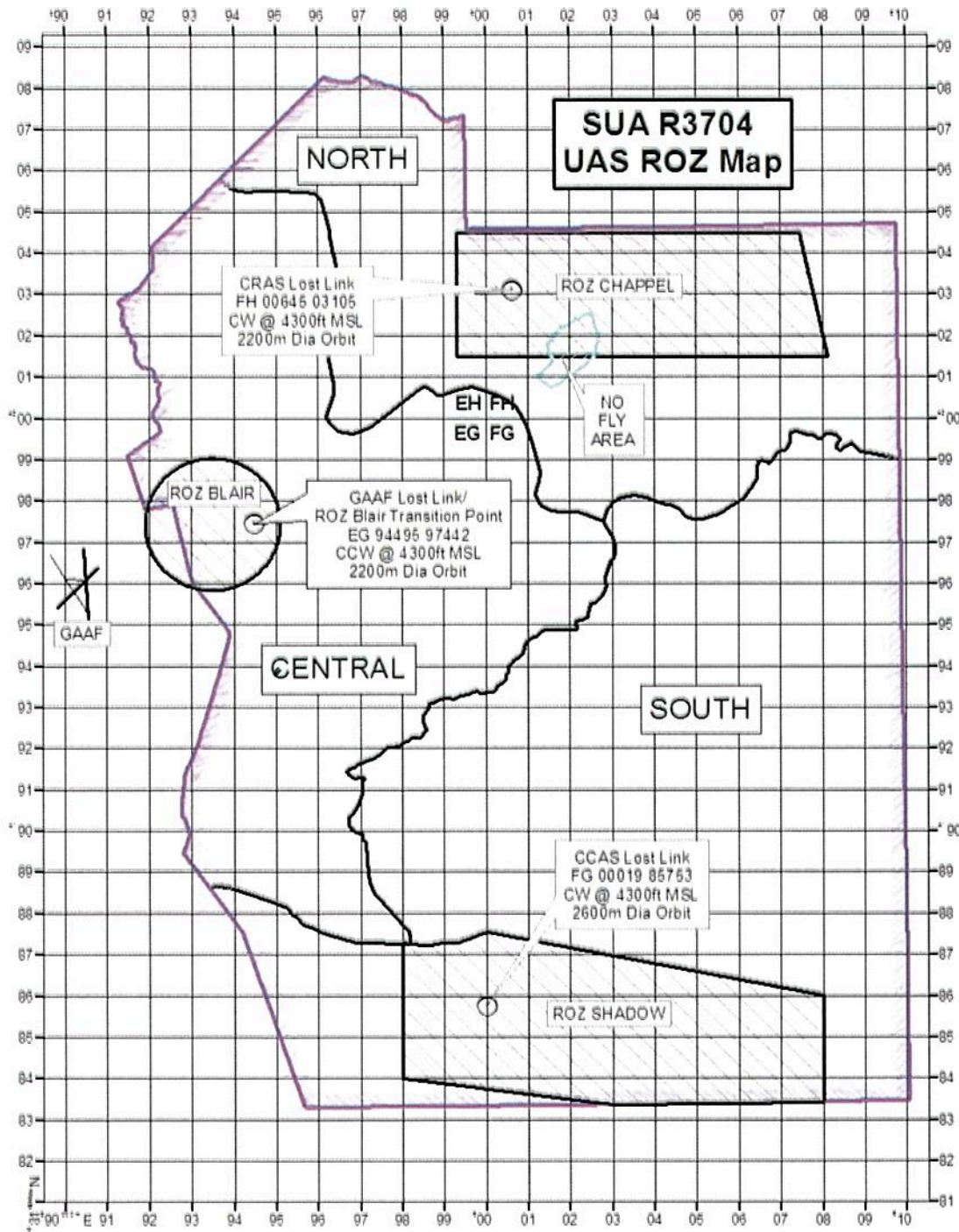


Figure B-1. SUA R3704 UAS ROZ Map

APPENDIX C

The following figures will be used by small and large UAS units to provide concise communications responsibilities with Range Branch and/or Godman Tower during launch and recovery procedures. Figures C-1 and C-2 are used for large UAS operating from Cedar Creek Airstrip (CCAS) or Chappel Ridge Airstrip (CRAS). Figures C-3 and C-4 are used for large UAS operating from Godman Army Airfield (GAAF). Figure C-5 is used for small/medium UAS operations.

Item	UAS Unit Actions	Range Branch Firing Desk Actions	
1	(NLT launch time -30 min) - Contact Range Branch Firing Desk and provide AMR number - Request updated/verify weather minimums - Request Permission to begin Pre-Launch Activities from (specify airstrip - Cedar Creek or Chappel Ridge).	a	Acknowledge request/review AMR/Provide weather data IAW JET/verify within launch standards of FK Reg 95-23.
		b	Grant permission for pre-launch activities if mission is authorized and weather minimums are met.
		c	Confirm corresponding airspace is scheduled and active.
		d	Determine what ranges/TAs/FPs (if any) are affected by the coming launch (see below*)
		e	Issue WARNO to affected units within ROZ SHADOW (BLAIR) to prep for temp CF because of UAS launch (as applicable/required).
		f	Warn all aircraft (if any) operating within R3704 of the pending UAS launch (provide UAS area and mission altitude) and direct them to depart the area of the ROZ and report when clear.
2	(At launch time -5 minutes or once Pre-Launch Activities are complete - as applicable) Request permission to pressurize launcher (if applicable) / or to make final preparations for launch.	a	Tell UAS unit to standby.
		b	Place affected units identified in item 1c above into a temp CF.
		c	Confirm all other aircraft are clear of the ROZ.
		d	Make net call on RGCTRL1 & FM 38.900 that, " ROZ SHADOW (CHAPPEL) IS NOW ACTIVE. " (REPEAT) . (annotate 1594)
		e	Contact UAS unit and grant permission to pressurize / make final preparations and to launch when ready and to report launch.
3	Launch UAS/Report successful launch	a	Acknowledge launch report
4	Report when UAS has reached mission altitude (minimum 4300' MSL or other altitude stated on AMR).	a	Acknowledge mission altitude report
		b	Make net call on RGCTRL1 & FM 38.900 and announce, " ROZ SHADOW (CHAPPEL) IS NOW DEACTIVATED " (REPEAT) . (annotate 1594)
		c	Update UAS tracking on board.
		d	Inform any units placed into a temp CF that they may request to return to live fire status.

Facilities Affected by Use of This Procedure - Cedar Creek Airstrip (CCAS)
FP 2D, E, F, G, H, I, J, K FP 3A, B, C, D, E, F, G, H, I, J TA 2,3

Facilities Affected by Use of This Procedure - Chappel Ridge Airstrip (CRAS)
Raridan, Wilcox, TA 17, 18

Figure C-1: Large UAS Procedure – CCAS/CRAS – Launch

Item	UAS Unit Actions	Range Branch Firing Desk Actions	
1	Contact Range Branch Firing Desk - Request to commence recovery operations at (specify airstrip - Cedar Creek or Chappel Ridge)	a	Tell UAS unit to standby.
		b	Place affected units within the appropriate ROZ into a temp CF status (if necessary).
		c	Direct all other aircraft to exit the affected ROZ and report when clear
		d	Once all are confirmed CF/clear, make net call on RGCTRL1 & FM 38.900 " ROZ SHADOW (CHAPPEL) IS NOW ACTIVE (REPEAT) ". (annotate 1594)
		e	Contact UAS unit and grant permission to commence recovery operations.
2	Descend from mission altitude and land UAS (Report landing assured) and inform Range Branch Firing Desk of the next anticipated launch time or mission complete for the training day (Report total number of sorties flown if mission complete).	a	Acknowledge reports.
		b	Make net call on RGCTRL1 & FM 38.900 that " ROZ SHADOW (CHAPPEL) IS NOW DEACTIVATED (REPEAT) ". (annotate 1594)
		c	Inform any units placed into a temp CF that they may request to return to live fire status.
		d	Deactivate Class B airspace (if applicable) if mission complete.
		e	Update UAS tracking on board.

Facilities Affected by Use of This Procedure - Cedar Creek Airstrip (CCAS)
FP 2D, E, F, G, H, I, J, K FP 3A, B, C, D, E, F, G, H, I, J TA 2,3

Facilities Affected by Use of This Procedure - Chappel Ridge Airstrip (CRAS)
Raridan Wilcox TA 17, 18

Figure C-2: Large UAS Procedure – CCAS/CRAS – Recovery

Item	UAS Unit Actions		GAAF Tower Actions	Range Branch Firing Desk Actions
1	(NLT launch -30 minutes) Contact Godman Tower - provide AMR number - request permission to begin pre-launch activities.	a	Acknowledge request and grant permission to begin pre-launch activities if able. Issue wind and altimeter.	
		b	Notify Range Firing Desk and SDF of Pre-launch activities.	Review AMR. Confirm corresponding airspace is scheduled and active.
		c		Warn all aircraft (if any) operating within R3704 of the pending UAS launch (provide UAS area and mission altitude)
2	(When pre-launch activities are complete and UAS unit is prepared to pressurize launcher) Contact Godman Tower to Request permission to pressurize launcher/ make final preparations for launch	a	Tell UAS unit to standby.	
		b	Check traffic conditions to see if launch able to complete in 12 min. Verify IFR inbound status with SDF (aircraft within 25 mi will have priority)	
		c	Inform Range Firing Desk that UAS is ready to begin pressurization.	Acknowledge pending launch and respond to Godman Tower (Annotate 1594)
		d	Grant permission to UAS unit to proceed with launch.	
3	(Once launcher is pressurized) Request permission to launch		Clear the aircraft for takeoff. Report Water Tower outbound for frequency change to Range Control.	
4	Launch UAS/Contact GAAF Tower and Range Branch Firing Desk (FM 38.900) to report successful launch	a	Acknowledge launch report	Acknowledge launch report
		b		Update UAS tracking on board.
5	Report clear of Class "D" and frequency change to Range Control at Water Tower.		Resume normal operations.	
6	(UAS enters ROZ Blair/spins up to mission altitude - min 4300ft MSL or altitude specified on AMR prior to entering SUA R3704)			
7	(When UAS has reached mission altitude) Contact Range Branch Firing Desk to report mission altitude and enter assigned UAS area(s).			Acknowledge report

Facilities Affected by Use of This Procedure: None

Figure C-3: Large UAS Procedure – GAAF – Launch

Item	UAS Unit Actions		GAAF Tower Actions	Range Branch Firing Desk Actions
1	Contact Range Ops to request commencement of recovery operations.	a		Acknowledge request; Inform UAS unit to proceed to GAAF recovery point at current mission altitude.
		b		Clear ROZ Blair/ACP3 area of all other aircraft.
2	Contact GAAF Tower to request commencement of recovery operations.	a	Acknowledge and then alert aircraft in the traffic pattern of inbound UAS	
		b	Contact Range Branch Firing Desk to "REQUEST ROZ BLAIR"	Confirm ROZ Blair/ACP3 area clear of other aircraft and respond to GAAF Tower, "ROZ BLAIR IS RELEASED TO YOU" (Annotate 1594)
		c		Make net call on RGCTRL1 & FM 38.900 "ROZ BLAIR IS NOW ACTIVE" (REPEAT).
3	Report arrival at Recovery Holding Point. Request Runway 05 or 23. UAS will remain at or above 4,300 ft MSL until ROZ Blair is released for descent	a	Tower will separate aircraft from requested runway pattern. Check status of IFR inbounds with SDF (aircraft within 25 mi will have priority)	
		b	Notify UAS of ROZ Blair release. Issue "Report at 2,000 ft. AGL"	
4	Report at 2,000 ft AGL.		Once aircraft have been de-conflicted instruct UAS to proceed inbound. Runway 23: Issue "Report Water Tower inbound". Runway 05: Issue "Report Snow Mountain Outbound."	
5	For Rwy 05 recovery only: Report Snow Mountain Outbound.		Issue "Report TALS acquisition"	
6	Rwy 05: Report TALS acquisition. RWY 23: Report water tower inbound.		Clear to land or option.	
7	Once UAS has landed report successful landing/inform Godman Tower and Range Ops of the next anticipated launch time OR mission complete for the training day (Report to Range Control total number of sorties flown).	a	Report "UAS arrival and release ROZ Blair to you" to Range Branch Firing Desk	Acknowledge report.
		b	Resume normal operations.	Make net call on RGCTRL1 & FM 38.900 that "ROZ BLAIR IS NOW DEACTIVATED" (REPEAT). (annotate 1594) Resume normal operations.

Facilities Affected by Use of This Procedure
NONE

Figure C-4: Large UAS Procedure – GAAF – Recovery

Item	UAS Unit Actions	Range Branch Firing Desk Actions	
1	(NLT launch time -30 min) - Contact Range Branch Firing Desk and provide AMR number - Request updated/verify weather minimums - Request Permission to begin Pre-Launch Activities.	a	Acknowledge request/review AMR/Provide weather data IAW JET/verify within launch standards of FK Reg 95-23.
		b	Grant permission for pre-launch activities if mission is authorized and weather minimums are met.
		c	Confirm corresponding airspace is scheduled and active.
		d	Warn all aircraft (if any) operating within R3704 of the coming UAS launch (provide UAS area and mission altitude) and direct them to depart the UAS operating area(s) and report clear.
2	(At launch time -5 minutes or once Pre-Launch Activities are complete) Request permission to make final preparations for launch.	a	Tell UAS unit to standby.
		b	Confirm all other aircraft are clear of the UAS area(s) of operation
		c	Contact UAS unit and grant permission to make final preparations and launch when ready.
3	Launch UAS/Report successful launch	a	Acknowledge launch report
		b	Inform GAAF UAS are operating within R3704
		c	Update UAS tracking on board.
4	Once launched, it is assumed continuous UAS operations within the defined operational area. When unit recovers final UAS mission, report completion of training to Range Branch Firing Desk and number of sorties flown for the training day.	a	Update UAS tracking on board.
		b	Inform GAAF of the cessation of UAS operations within R3704

Facilities Affected by Use of This Procedure
NONE

Figure C-5: Small/Medium UAS Procedure – Launch and Recovery

APPENDIX E

The following table will be used to report UAS operations and training conducted on GAAF. This reporting is required by the FAA in the Certificate of Authorization for UAS operations at GAAF.

Table E-1: Fort Knox Certificate of Authorization Reporting (Shadow)

1. Total Number of Flights Conducted:	
2. Total Aircraft Operational Hours: (Hours & tenths of hour)	
3. Total Ground Station (GS) Operational Hours includes LRE operations. (Hours & tenths of hour)	
4. Each Flight: Date, Flight # that day, Aircraft Operational Hours, GS Operational Hours, and Pilot Duty time per PIC. Example: Flt 1; 2.0 hours; 3.0 hours; 0.8 hours PIC 1, 1.5 hours PIC 2.	
5. Total # of Deviations from Air Traffic Control Instructions/LOA/Procedures.	
6. Total # of Loss Communication Events: (Loss of communications with Air Traffic Control or observer).	
7. Total Duration of Loss Communication:	
8. Total # of Lost Link Events: (Includes control, aircraft performance & health monitoring, or communications per aircraft, per flight)	
9. Total duration of Lost Link:	
10. # and duration of Loss of Comm and Lost Link Events: (Date, event type, and duration of each event). Example: 9/12/2014; Lost Link; 1 min 45 sec.	
11. Total # of Equipment Malfunctions: (Hardware/software affecting either the aircraft or GCS).	

Note: Report is due monthly to Fort Knox AT&A for operations conducted on Godman Airfield.

Glossary

Section I Acronyms

AGL	above ground level
AMR	Air Mission Request
AO	Aircraft Operator
AR	Army Regulation
AT&A	Air Traffic and Airspace Officer
ATC	air traffic control
ATM	Aircrew Training Manual
ATP	Army Technical Publication
CCAS	Cedar Creek Airstrip
CD	compact disk
COA	Certificate of Authorization
CRAS	Chappel Ridge Airstrip
DA	Department of the Army
DA PAM	Department of the Army Pamphlet
DAR	Department of the Army Regional Representative to the Federal Aviation Administration
DD	Department of Defense
DOD	Department of Defense
DSN	Defense Switching Network
FAA	Federal Aviation Administration
FK	Fort Knox
FM	Frequency Modulation
FOD	Foreign Object Damage
GAAF	Godman Army Airfield
GS	Ground Station
IAW	in accordance with
IMC	instrument meteorological conditions
IIMC	inadvertent instrument meteorological conditions
L/DEH	lasers/directed energy hazards
LOA	letter of agreement
MSL	mean sea level
NCO	Non-Commissioned Officer
NLT	no later than
NM	nautical mile
NOTAM	notice to airmen
OPS	operations
RM	Risk Management
ROZ	restricted operation zone
SM	statute mile
SUA	special use airspace
TA	training area
TALS	Tactical Automated Landing System

UA	unmanned aircraft
UAS	Unmanned Aircraft System
UAV	unmanned aerial vehicles
UHF	ultra-high frequency
USAF	United States Air Force
VFR	visual flight rules
VHF	very high frequency

Section II Special Terms

Small UAS

All UAS weighing 20 pounds or less (i.e., Raven, PUMA, etc.)

Large UAS

All other UAS weighing more than 20 pounds (i.e., Shadow, et al).