

Fort Hood Regulation 95-23

Aviation

**Unmanned
Aircraft Systems
Local Flying Rules**

7 June 2011

SUMMARY of CHANGE

Fort Hood Regulation 95-23

Unmanned Aircraft Systems Local Flying Rules, 7 June 2011

This administrative revision, dated 7 June 2011—

- Makes administrative corrections and/or changes (throughout)
- Changes the size of Cold Springs unmanned aircraft systems restricted operating zone (Table 3-2)
- Changes the size of Cold Springs unmanned aircraft systems restricted operating zone (Figure 3-2)
- Changes the size of LS-50 unmanned aircraft systems restricted operating zone (Table 3-3)
- Adds the requirement to report unmanned aircraft systems activity to the Air Traffic and Airspace Officer (para 4-4)

**Aviation
Unmanned Aircraft Systems (UAS) Local Flying Rules**

History. This administrative change updates unmanned aircraft systems (UAS) throughout.

Summary. This regulation establishes policies and procedures governing control, scheduling and use of UAS in Fort Hood's special use airspace (SUA).

Applicability. This regulation applies to operators and UAS assigned, attached, tenant, or transient to Fort Hood while performing UAS flight operations in the Fort Hood SUA.

Supplementation. Users may not supplement this regulation without approval of the Directorate of Aviation Operations (DAO).

Suggested Improvements. The proponent of this regulation is the Fort Hood Directorate of Aviation Operations (DAO). Send comments and suggested improvements to: Commander, III Corps and Fort Hood, ATTN: IMWE-HOD-PLA, Fort Hood, Texas 76544-5032.

FOR THE COMMANDER:

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Chapter 1

General

1-1. Purpose

This regulation establishes procedures, rules, and responsibilities for operator training, standardization, and operation of all unmanned aircraft systems (UAS) assigned or attached to Fort Hood.

1-2. References

Appendix A lists required and related publications and prescribed and referenced forms.

1-3. Explanation of abbreviations and terms

The glossary explains abbreviations and special terms.

1-4. Deviations

Individuals or organizations requesting deviations from this regulation must coordinate with the Directorate of Aviation Operations (DAO).

1-5. Waivers

- a. Process waiver request in accordance with (IAW) United States Army Forces Command (FORSCOM) Supplement to AR 95-23 (Unmanned Aircraft System [UAS] Flight Regulations).
- b. Non-divisional units not assigned to a brigade will send waiver requests to the III Corps Aviation Officer.
- c. Divisional units not assigned to a brigade will send waiver requirements to the division aviation officer or III Corps Aviation Officer.
- d. Waivers will be available for aviation resource management survey review.

1-6. Distances and altitudes

All distances and altitudes are expressed throughout this document in feet (ft), meters (m), kilometer (km), statute miles (sm), nautical miles (nm), or flight levels (FL).

Chapter 2

Unmanned Aircraft Systems (UAS) Flight Operations

2-1. Personnel authorized to operate unmanned aircraft systems (UAS)

To operate a UAS in Fort Hood special use airspace (SUA), the operator must have completed an applicable US Army-approved qualification course, or be a student in the course.

2-2. Requesting maneuver space for unmanned aircraft systems (UAS) operations

- a. The Brigade and/or Regiment Aviation Element (BAE/RAE) or designated representatives are the only personnel authorized to request airspace for UAS operations. The request must include ground and airspace maneuver areas.

- b. Flight of a UAS at Fort Hood requires approval from:
 - (1) Range Control for land group (LG) or ranges.
 - (2) Range Control for airspace if outside the redline.
 - (3) Air traffic and airspace (AT&A) officer for local notice to airmen (L-NOTAM) to establish a restricted operating zone (ROZ(s)) if outside the redline.

2-3. Unmanned aircraft systems (UAS) operator currency

a. Operators will maintain currency IAW AR 95-23, and TC 1-600 (Unmanned Aircraft Systems Commander's Guide and Aircrew Training Manual) or TC 1-611 (Small Unmanned Aircraft System Aircrew Training Manual) as appropriate.

b. In addition to the requirements in AR 95-23, TC 1-600, and TC 1-611, operators must complete the Fort Hood UAS Local Area Orientation Course. Each operator must have annual refresher training. TC 1-600 and TC 1-611 list those items covered.

2-4. Definition of terms and responsibilities

a. Unmanned aircraft operator (AO): The AO controls and/or monitors the flight of the air vehicle (AV) from within a ground control station (GCS), launch recovery station, portable GCS, or similar device. This is normally done through the use of a monitor, not by direct visual contact with the AV.

b. External operator (EO): The EO is the UAS crewmember responsible for takeoff and landing of unmanned aircraft not incorporating an automatic takeoff and landing system.

c. Mission commander (MC): The MC is responsible for control over all flight operations from pre-mission planning through debriefing. The UAS unit commander will designate mission commanders in writing.

d. Mission payload operator (PO): The PO is responsible for operation of the payload sensor.

e. Instructor operator (IO): The IO will train and evaluate unmanned aircraft crewmembers IAW the appropriate aircrew training manual (ATM). The IO must be qualified and current in the UAS to be flown. The UAS unit commander will designate the IO in writing IAW AR 95-23.

f. Standardization instructor operator (SO): The SO will primarily train and evaluate IOs and other SOs. SOs have technical supervision of the unit's standardization program as specified by the unit commander. The SO is the commander's technical advisor who advises the commander on all levels of UAS standardization within the command, and assists the commander with development, implementation, evaluation, and management of the unit's aircrew training program. IOs will be designated in writing as SOs by the unit commander and be qualified and current in the UAS to be flown and/or operated. Commanders may authorize SOs to instruct and evaluate from any designated crew station.

g. Unit trainer (UT): The UAS unit commander may appoint UTs to conduct specialized training to assist in unit training programs. UTs are prohibited from conducting emergency maneuvers or emergency procedures training. UTs are also prohibited from evaluating ATM base and special tasks. Commanders may authorize

UTs to instruct from AO, PO, or, if appropriate, EO stations. They may also authorize UTs to validate successful completion of required training, for example, border and corridor qualifications, local area orientation, and other locally directed requirements. When performing UT duties, the UT must be qualified per the appropriate ATM and current in the UAS being flown and/or operated.

Chapter 3 Airspace

3-1. Special use airspace (SUA) description

a. Fort Hood SUA consist of restricted area 6302 (R- 6302) A, B, C, D, and E and the Hood and Gray Military Operating Areas (MOAs) as published in Federal Aviation Administration (FAA) Joint Order (JO) 7400.8.

b. Table 3-1 lists SUA boundaries, designated altitudes and designated times of use. Figure 3-1 depicts Fort Hood restricted area airspace.

c. UAS operations are limited to vertical and lateral limits of R-6302 A, B, C or D, unless a certificate of authorization (COA) has been granted by the FAA and as stated in the memorandum of agreement between the FAA and DoD in Appendix E. All requests for COA will be submitted through the AT&A Officer.

Table 3-1 Fort Hood special use airspace (SUA)

R-6302A Fort Hood, TX

Boundaries. Beginning at

lat. 31°09'01"N, long. 97°45'01"W; to lat. 31°10'01"N, long. 97°48'01"W; to

lat. 31°14'15"N, long. 97°50'33"W; to lat. 31°18'25"N, long. 97°48'48"W; to

lat. 31°18'23"N, long. 97°45'43"W; to lat. 31°20'00"N, long. 97°45'23"W; to

lat. 31°22'09"N, long. 97°43'27"W; to lat. 31°22'08"N, long. 97°41'56"W; to

lat. 31°21'01"N, long. 97°41'01"W; to lat. 31°20'01"N, long. 97°41'01"W; to

lat. 31°14'01"N, long. 97°33'01"W; to lat. 31°08'01"N, long. 97°37'01"W; to

lat. 31°08'01"N, long. 97°39'01"W; to lat. 31°10'01"N, long. 97°41'01"W; to

lat. 31°09'01"N, long. 97°43'31"W; to the point of beginning.

Designated altitudes: Surface to 9.2km (30,000 feet) MSL

Designated times of use: Continuous

R-6302B Fort Hood, TX

Boundaries. Beginning at

lat. 31°14'01"N, long. 97°33'01"W; to lat. 31°06'01"N, long. 97°33'01"W; to

lat. 31°08'01"N, long. 97°39'01"W; to lat. 31°08'01"N, long. 97°37'01"W; to the point of beginning

Designated altitudes. Surface to 3.4km (11,000 ft) MSL

Designated times of use: 1800-0600 local time, Monday-Saturday; other times by NOTAM

Table 3-1 Fort Hood special use airspace (SUA) (continued)

R-6302C Fort Hood, TX

Boundaries. Beginning at

lat. 31°09'01"N, long. 97°45'01"W; to lat. 31°09'01"N, long. 97°55'01"W; to

lat. 31°16'01"N, long. 97°54'01"W; to lat. 31°19'01"N, long. 97°51'01"W; to

lat. 31°18'25"N, long. 97°48'48"W; to lat. 31°14'15"N, long. 97°50'33"W; to

lat. 31°10'01"N, long. 97°48'01"W; to the point of the beginning

Designated altitudes. Surface to 9.2km (30,000 ft) MSL

Designated times of use: 0700-1900 local time, Monday-Friday; other times by NOTAM

R-6302D Fort Hood, TX

Boundaries. Beginning at

lat. 31°18'25"N, long. 97°48'48"W; to lat. 31°19'01"N, long. 97°51'01"W; to

lat. 31°24'01"N, long. 97°48'01"W; to lat. 31°23'01"N, long. 97°43'01"W; to

lat. 31°22'08"N, long. 97°41'56"W; to lat. 31°22'09"., long. 97°43'27"W; to

lat. 31°20'00"N, long. 97°45'23"W; to lat. 31°18'23"N, long. 97°45'43"W; to the point of the beginning

Designated altitudes. Surface to 9.2km (30,000 ft) MSL

Designated times of use: 0700-1900 local time, Monday-Friday; other times by NOTAM

R-6302E Fort Hood, TX

Boundaries. Beginning at

lat. 31°22'08"N, long. 97°41'56"W; to lat. 31°21'01"N, long. 97°41'01"W; to

lat. 31°20'01"N, long. 97°41'01"W; to lat. 31°14'01"N, long. 97°33'01"W; to

lat. 31°08'01"N, long. 97°39'01"W; to lat. 31°10'01"N, long. 97°41'01"W; to

lat. 31°09'01"N, long. 97°43'01"W; to lat. 31°09'01"N, long. 97°45'01"W; to

lat. 31°10'01"N, long. 97°48'01"W; to lat. 31°14'15"N, long. 97°50'33"W; to

lat. 31°18'25"N, long. 97°48'48"W; to lat. 31°18'23"N, long. 97°45'43"W; to

lat. 31°20'00"N, long. 97°45'23"W; to lat. 31°22'09"N, long. 97°43'27"W; to the point of beginning

Designated altitudes. 9.2km (30,000 ft) MSL to 13.7km (45,000 ft) MSL

Designated times of use: By NOTAM 48 hours in advance

Table 3-1 Fort Hood special use airspace (SUA) (continued)

Hood MOA, TX

Boundaries. Beginning at

lat. 31°30'01"N, long. 98°03'01"W; to lat. 31°30'01"N, long. 97°36'41"W; to

lat. 31°28'01"N, long. 97°34'31"W; to lat. 31°14'01"N, long. 97°33'01"W; to

lat. 31°20'01"N, long. 97°41'01"W; to lat. 31°21'01"N, long. 97°41'01"W; to

lat. 31°22'08"N, long. 97°41'56"W; to lat. 31°23'01"N, long. 97°43'01"W; to

lat. 31°24'01"N, long. 97°48'01"W; to lat. 31°19'01"N, long. 97°51'01"W; to

lat. 31°16'01"N, long. 97°54'01"W; to lat. 31°19'01"N, long. 98°03'01"W; to the point of beginning

Altitudes. 610m (2,000 ft) MSL to and including 3.1km (10,000 ft) MSL

Designated times of use: 0700-1900 local time, Monday-Friday, other times by NOTAM

Gray MOA, TX

Boundaries. Beginning at

lat. 31°19'01"N., long. 98°03'01"W.; to lat. 31°16'01"N., long. 97°54'01"W.; to lat. 31°09'01"N., long. 97°55'01"W.; to the point of beginning.

Altitudes. 610m (2,000 ft) MSL to 3.1km (10,000 ft) MSL.

Designated times of use: 0700-1900 local time, Monday-Friday, other times by NOTAM

Legend:

lat – latitude

ft – foot/feet

kilometers

long - longitude

MSL – mean sea level

MOA: - military operating area

N – north

NOTAM – notice to airmen

R – restricted area

SUA – special use airspace

TX - Texas

W – west

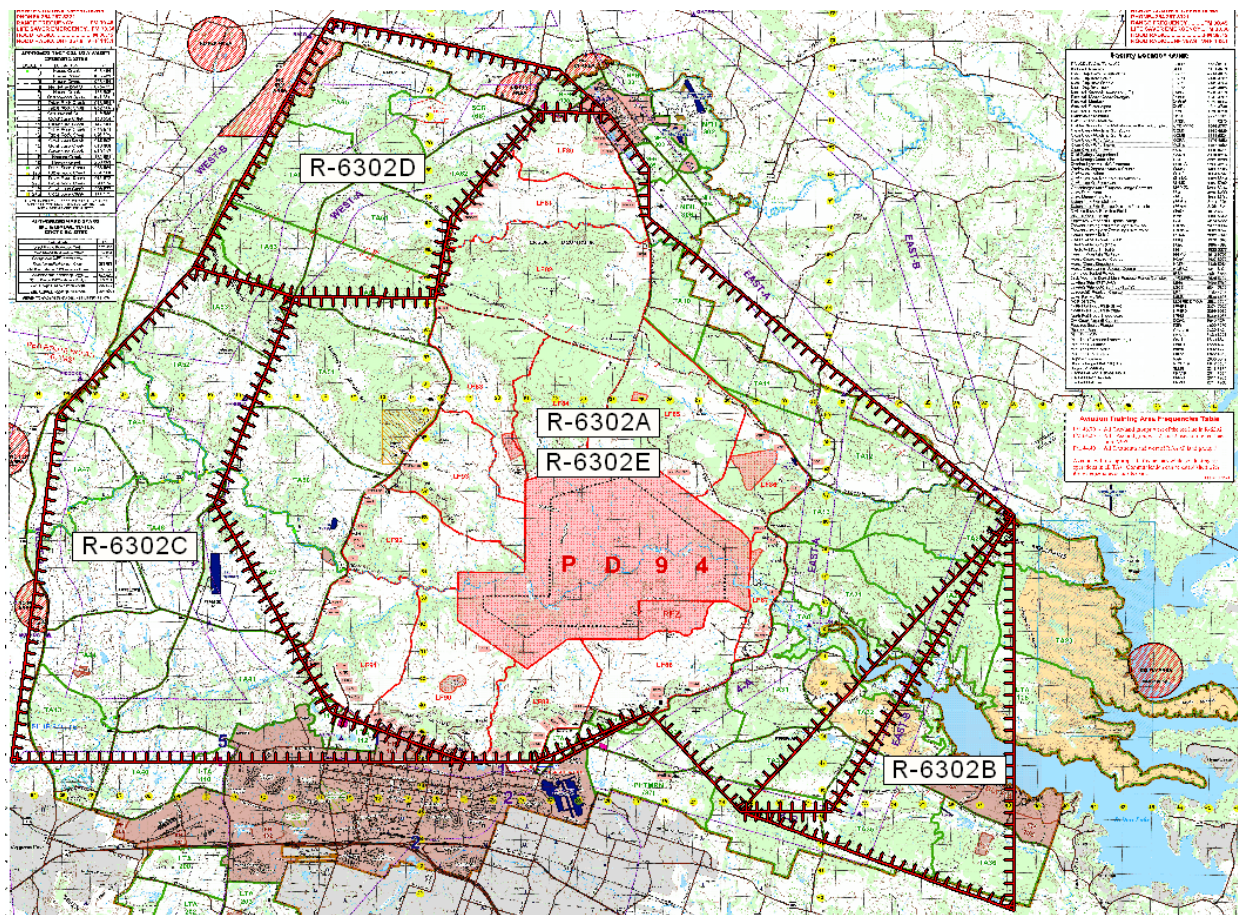


Figure 3-1. Fort Hood restricted airspace (R-6302)

3-2. Temporary unmanned aircraft systems (UAS) restricted operation zone (ROZ)

- a. The Garrison Commander delegates airspace control authority to the AT&A Officer who designates ROZ(s) for a specified operational mission or requirement.
- b. Temporary UAS ROZ(s) are established using the Defense Internet NOTAM System, as an L-NOTAM. The ROZ active times are published in the L-NOTAM. Paragraph 4-3 outlines L-NOTAM procedures. Nonparticipating aircraft will remain clear until the restriction is rescinded or authorization is granted by the user of the ROZ. Authorization to transit through the ROZ can be coordinated with the commander of the ROZ. Point of contact information is published in the L-NOTAM.
- c. Temporary Raven UAS ROZ(s) are established over training areas (TAs) and cover entire TAs except as noted in appendix B.
- d. Temporary ROZ(s) only restrict Fort Hood-based aircraft and do not restrict any other aircraft outside of active restricted airspace, to include civil aircraft.

e. Permanent established ROZs for Shadow UAS are listed in tables 3-2 and 3-3 and are depicted in figures 3-2 and 3-3.

Table 3-2. Cold Springs unmanned aircraft systems (UAS) restricted operating zone (ROZ)

Latitude / Longitude (Lat/Long)	Military Grid Reference System
31°15'41.12"N 97°41'26.23"W	14R PV 24664 59314
31°18'05.80"N 97°38'54.52"W	14R PV 28622 63817
31°14'28.54"N 97°34'13.77"W	14R PV 36131 57221
31°12'03.82"N 97°36'45.46"W	14R PV 32174 52714

Surface to 2.1 km (7,000 ft) MSL

See Figure 3-2

Legend:

lat – latitude N - north
long – longitude W- west
MSL – mean sea level UAS – unmanned aircraft system

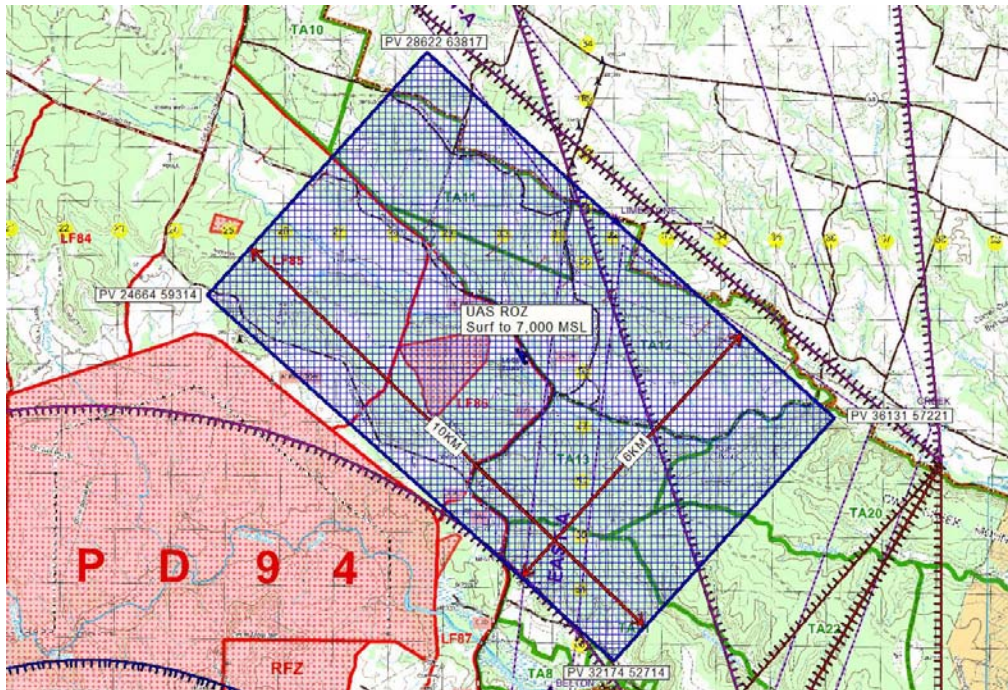


Figure 3-2. Cold Springs unmanned aircraft systems (UAS) restricted operation zone (ROZ) (continued)

Table 3-3. Landing strip 50 (LS-50) unmanned aircraft systems (UAS) restricted operation zone (ROZ)

Latitude / Longitude (Lat/Long)	Military Grid Reference System
31°16'40.50"N 97°49'24.30"W	14R PV 12000 61000
31°16'38.37"N 97°45'37.44"W	14R PV 18000 61000
31°11'13.62"N 97°45'41.67"W	14R PV 18000 51000
31°11'15.23"N 97°48'31.66"W	14R PV 13500 51000
31°12'36.94"N 97°49'27.32"	14R PV 12000 53500
Surface to 2.1km (7,000 ft) MSL	
See Figure 3-3	

Legend:

ft – foot/feet	MSL – mean sea level
km – kilometer	N - north
lat – latitude	UAS – unmanned aircraft systems
LS – landing strip	W - west

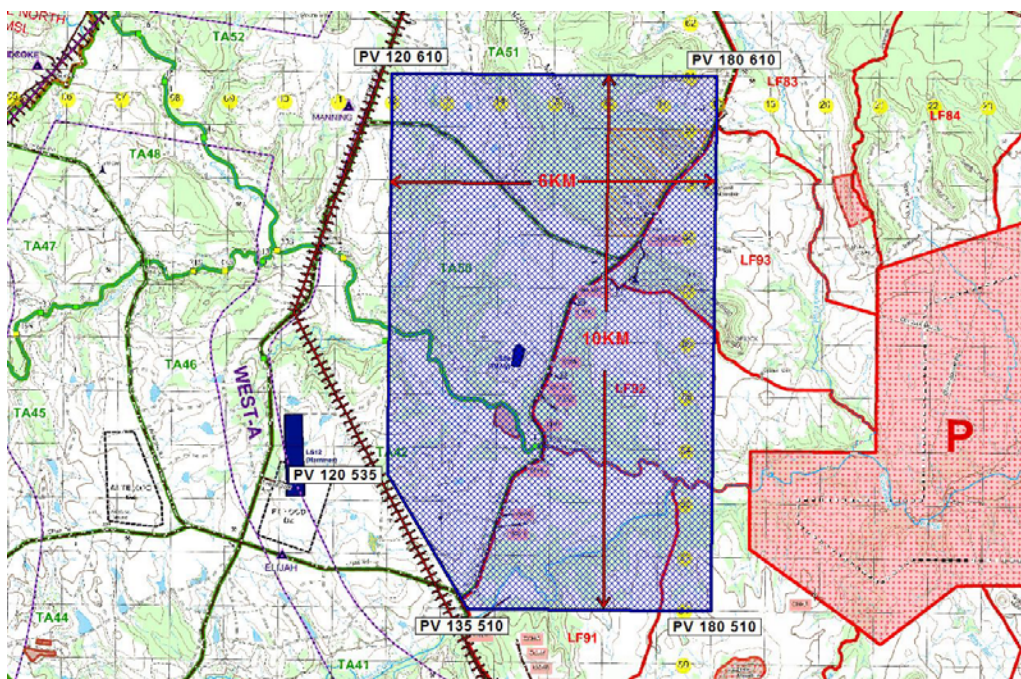


Figure 3-3. Landing strip 50 (LS-50) unmanned aircraft systems (UAS) restricted operation zone (ROZ)

Chapter 4 Unmanned Aircraft Systems (UAS) Procedures

4-1. Unmanned aircraft systems (UAS) procedures

- a. All UAS activity will be conducted within active restricted airspace (R-6302 A, B, C, D) unless a COA has been obtained from the FAA, or operations are conducted under the provisions of the memorandum of agreement between the FAA and DoD. Appendix E contains a copy of the memorandum of agreement. Procedures for obtaining a COA are outlined in Chapter 5.
- b. A temporary ROZ may be established within R-6302, only after coordination with Range Control and the AT&A Officer.
- c. Units will continuously monitor the appropriate air-to-air frequency in table 4-1 during times published in the L-NOTAM while operating within a ROZ.
- d. After coordination with Range Control Scheduling, units will request an L-NOTAM be published IAW paragraph 4-3 below.
- e. Radio communications between the UAS operators and Range Control and/or Hood Radio (HR) is mandatory during flight in R-6302 A, B, C, and D.

f. In the event of an emergency or lost link, HR will be notified immediately (see table F-1), (frequency modulated (FM): 38.75, ultra high frequency (UHF): 357.9, very high frequency [VHF]: 143.1) either directly or through Range Control and provided the following information:

- (1) Type UAS (Shadow, Hunter, Raven, etc.).
- (2) Last known position (using latitude and/or longitude coordinates).
- (3) Last known altitude (MSL).
- (4) Last known heading.
- (5) Programmed lost link procedure: what the AV was programmed to do in the event of lost link (return home coordinates).

g. Units will contact Range Control at numbers specified in table F-1, 30 minutes prior to mission launch.

h. Units will contact Range Control at numbers specified in table F-1 when the last AV is recovered for the mission day.

i. Range Control will notify HR of all launch and recovery notifications.

j. Units will have the AV (if equipped) squawk mode 3/A transponder code "0100" at all times while operating in approved ROZ and while in the R-6302 airspace unless otherwise coordinated with the AT&A officer and/or Air Traffic Control (ATC).

k. Units and/or operators are responsible for ensuring compliance with procedures in this regulation, AR 95-1, AR 95-2, AR 95-23, FORSCOM Supplement 1 to AR 95-1, FORSCOM Supplement 1 to AR 95-23, Fort Hood Regulation 95-1, Fort Hood Regulation 95-2, TC 1-600, TC 1-611, TC 1-210, and the FAA COA when applicable.

l. Units and/or operators will conduct all operations in visual flight rules (VFR) conditions according to Title 14, Code of Federal Regulations (14CFR), Part 91.155. (See figure 4-1 and 4-2)

m. Units and/or operators will have the ability to safely terminate and maintain positive control of the UAS at all times.

n. The following UAS ROZs have been established and specific procedures for each are listed:

(1) Cold Springs UAS ROZ:

(a) Maintain the UAS within the ROZ during launch and recovery operations as defined in table 3-2 and as depicted in figure 3-2.

(b) Ensure collision avoidance with non-participating aircraft and safety of persons or property on the surface with respect to the UAS.

(c) Establish and maintain two-way radio communications with Crittenger Multi-Use Range Complex (CMPRC).

(d) Notify CMPRC prior to all launch and recovery operations.

(e) Coordinate all operations that might interfere with CMPRC with the using unit.

(f) To the extent possible, all UAS operations will be conducted in the southern area of the ROZ to prevent interference with operations at CMPRC.

(g) Monitor the air-to-air frequency for the east side (see table 4-1).

(2) Landing Strip (LS) 50 UAS ROZ:

(a) Maintain the UAS within the ROZ as defined in table 3-3 and as depicted in figure 3-3.

- (b) Ensure collision avoidance with non-participating aircraft and safety of persons or property on the surface with respect to the UAS.
- (c) Establish and maintain two-way radio communications with Clabber Creek Multi- Use Range Complex (CCMU) and Jack Mountain Multi-Use Range Complex (JMMU).
- (d) Notify CCMU and/or JMMU prior to all launch and recovery operations.
- (e) Coordinate all operations that might interfere with CCMU and/or JMMU with the using unit.
- (f) Monitor the appropriate air-to-air frequency (see table 4-1).

Table 4-1. Air-to-air frequencies

Air-to-Air Frequencies	Training Area
46.70	All TAs/LGs 4, 5, and 6, west of the red line
64.35	All TAs/LGs 1, 2, and 3 east of the red line

Legend:

- LG – land group
- TA – training area

4-2. Call signs

Call signs used when flight following consist of the AV name and the last five digits of the tail number. If the AV has fewer than five digits, it will be the full tail number (Hunter 222). The names for each AV type are Hunter, Shadow, Sky Warrior, etc.

4-3. Local notice to airmen (L-NOTAM)

- a. L-NOTAM ROZ procedures:
 - (1) Contact the AT&A to have an L-NOTAM published to create a ROZ over the TA.
 - (2) L-NOTAM must be requested no later than 7 days and no earlier than 30 days prior to activity.
 - (3) ROZ, L-NOTAM request will contain the following information:
 - (a) Unit.
 - (b) Point of contact.
 - (c) Local telephone number.
 - (d) Location.
 - (e) Activity.
 - (f) Altitudes needed for the activity.
 - (g) Time(s) ROZ to be active.
 - (h) Dates of use.
 - (i) Frequency and call sign.

- (4) Example ROZ, L-NOTAM request:
 - (a) Unit: 1-34 Infantry.
 - (b) Point of contact: Corporal Smith.
 - (c) Local telephone number: (254) 555-1234.
 - (d) Location: TA 50.
 - (e) Activity: Raven UAS.
 - (f) Altitudes needed for the activity: Surface to 305m (1,000 ft) above ground level (AGL).
 - (g) Time(s) ROZ to be active: 0800 local (L) to 1100L and 1300L to 1500L, Monday through Friday.
 - (h) Dates of use: 5 Nov to 16 Nov.
 - (i) Frequency and call sign: FM 46.70, RAVEN 06.
- b. The ROZ will only be active during the times published in the L-NOTAM.
- c. All requests for UAS ROZ L-NOTAM will be submitted through the appropriate BAE/RAE or designated representative for submission to the AT&A.
- d. Changes to ROZ(s) L-NOTAM must be made 24 hours in advance (for example, on Friday for a Monday operation).

4-4. Utilization reporting

Units are required to report UAS activity through their BAE to the AT&A Officer. The following information is required to be submitted to the AT&A Officer by the 5th of the following month.

- a. Unit.
- b. Reporting month.
- c. Total number of sorties (sortie – one launch and one recovery is one [1] sortie).

4-5. Weather

a. All UAS flights require a weather briefing from a military or appropriate weather reporting facility. The briefing may be in person, telephonically, or through an automated weather dissemination system or military aviation information system. In all cases, a weather void time of one and one-half hour applies. The weather void time may be extended IAW AR 95-1 (Flight Regulations).

b. UAS VFR cloud clearance and visibility weather minimums for operations in R-6302:

(1) Below 3.1km (10,000 ft) MSL: day or night: 152.4m (500 ft) below, 305m (1,000 ft) above and 610m (2,000 ft) horizontal clearance from the clouds and 5km (3 sm) visibility (see figure 4-1).

(2) Above 3.1km (10,000 ft) MSL: day or night: 305m (1,000 ft) below, 305m (1,000 ft) above and 1.6km (1 sm) horizontal clearance from the clouds and 84km (5 sm) visibility (see figure 4-2).

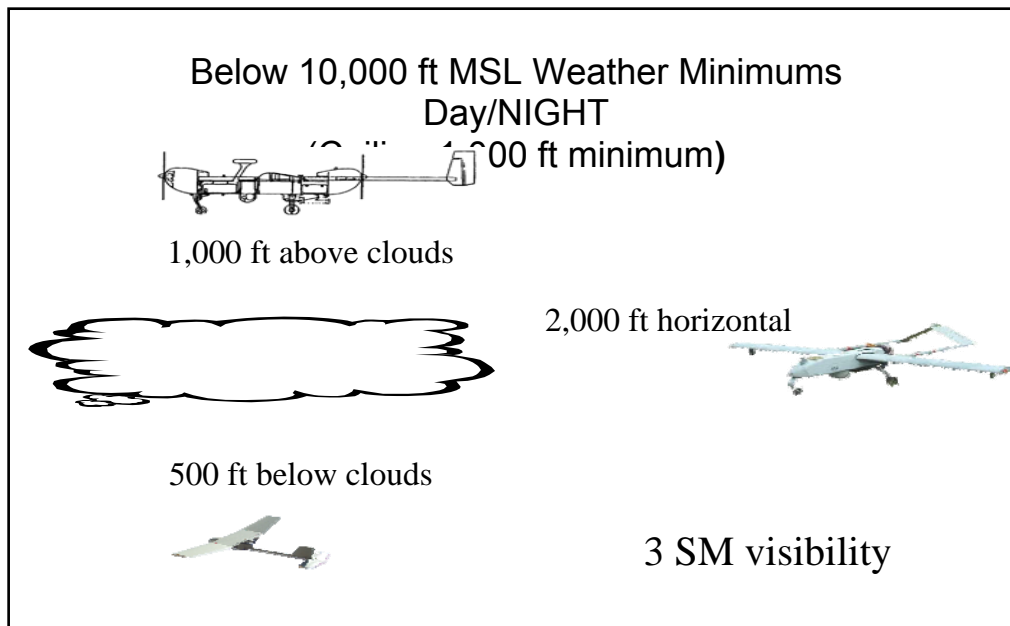


Figure 4-1. Visual flight rules (VFR) weather minimums below 10,000 feet mean sea level (MSL)

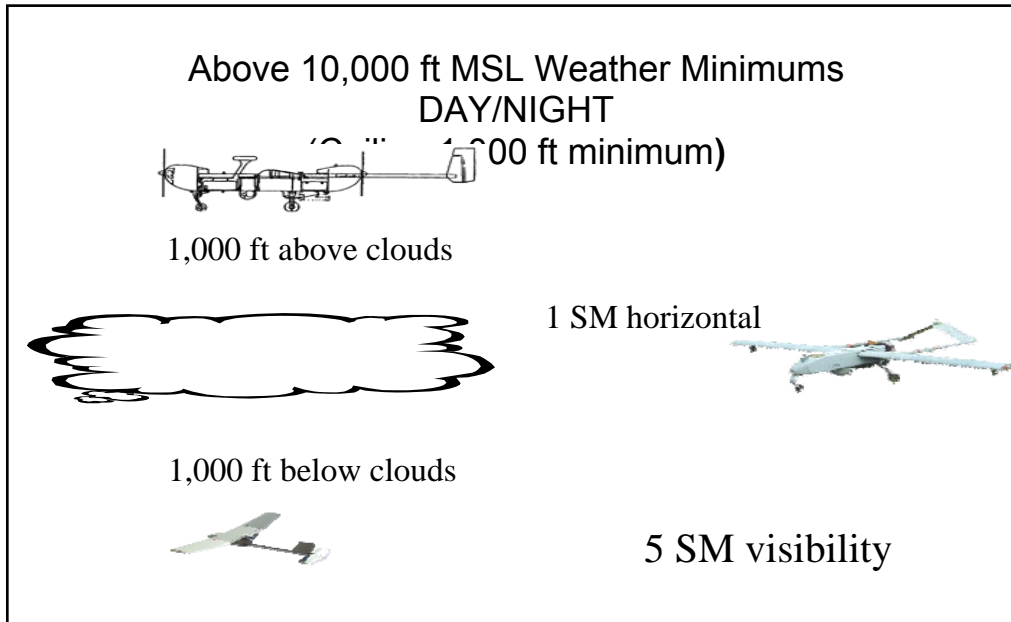


Figure 4-2. Visual flight rules (VFR) weather minimums above 10,000 feet mean sea level (MSL)

4-6. Lost link procedures

- a. All UAS operations will have a preprogrammed lost link recovery point or be set to immediately flight terminate in the event of lost link. This information will be part of the airspace request as an additional remark. In the event of a lost link the operator will immediately inform HR at the number listed in table F-1. Further operations from that GCS will be suspended until the fate of the lost link AV is determined.
- b. The preprogrammed lost link recovery point for operations at Cold Springs will be 14R PV 30200 58200 (31°15'02.77"N 97°37'57.47"W) at AVs approved altitude.
- c. The preprogrammed lost link recovery point for operations at LS 50 will be 14R PV 15550 56100 (31°14'00.15"N 97°47'14.00"W) at AVs approved altitude.
- d. For operations outside of active restricted airspace the preprogrammed lost link recovery point will be IAW the COA.
- e. For UAS operating in "Class G" airspace IAW the FAA/DoD MOA lost link procedures will be developed and submitted to the AT&A officer prior to the mission.

4-7 . Airspace safety procedures for unmanned aircraft systems (UAS) operations

a. Surveillance requirements.

(1) One or more methods of surveillance will be provided for all UAS operations. The type of surveillance will be either visual or electronic, i.e. moving map indicator and /or radar depending on the mission and type vehicle flown.

(2) If, at any time, the position of an AV becomes unknown and the AV fails to respond to programmed lost link instructions, the flight will be terminated in time to preclude the possibility of impact outside the approved designated flight area.

b. Safety factors for operational planning. Operational plans for UAS training flights must take into consideration the type of AV, results to be achieved, and the area in which operations have been approved to be conducted. Operations will not be conducted outside of the boundaries of the Fort Hood restricted area unless approved by the FAA and the Fort Hood AT&A Officer.

c. Each airspace safety plan must take into consideration:

(1) Capability of AV, such as altitude, range, speed, wind factors, and amount of guidance which may be commanded to the AV (programmed or other), deviations allowable from assigned headings that the UAS may take due to malfunctions, and type of launch.

(2) System for flight termination, parachute, or other functions which would affect flight safety.

(3) The methods for obtaining real-time position of the AV in flight, such as, visual, airplane, radar, telemetry, and global positioning system.

(4) The procedures for area surveillance during flight.

(5) Aerodynamic data used to determine flight safety grids will include, but not be limited to, glide ratio of the AV, detailed performance data, intended recovery site, parameters of the flight area, and method of area surveillance such as visual or electronic.

(6) Units will have the AV (if transponder equipped) squawk Mode 3/A transponder code "0100" at all times while operating in approved ROZ and while in the R-6302 airspace unless otherwise directed by ATC.

4-8. Separation criteria

a. Separation between manned and unmanned aircraft within the Fort Hood restricted area is established by the use of ROZs and blocks of altitude. In those incidences where manned and unmanned aircraft are sharing the same airspace the following minimum separation criteria will apply:

(1) Vertical separation between manned and unmanned aircraft will be 305m (1,000 ft).

(2) Lateral separation between manned and unmanned aircraft will be 1km (3,280 ft).

b. Minimum separation criteria unmanned aircraft within the Fort Hood restricted area is as follows:

(1) Vertical separation between unmanned aircraft will be 305m (1,000 ft).

(2) Lateral separation between unmanned aircraft will be 1km (3,280 ft).

Chapter 5

Federal Aviation Administration (FAA) Certificate of Waiver or Authorization (COA)

5-1. Request for certificate of waiver or authorization (COA)

a. Prior to operating an UAS outside of active restricted airspace within the National Airspace System (NAS), a request for a COA must be submitted by the brigade, regiment, or garrison commander or higher (Colonel or higher), to the AT&A Officer for submission to the FAA. The AT&A Officer will review the request and forward it to the Department of the Army representative (DAR) a minimum of 90 days prior to the first proposed flight. Upon completion of the DAR review, submit the request to the FAA for approval.

b. All request will included the following documentation:

(1) IAW AR 95-2, cover letter signed by the responsible brigade, regiment, or garrison commander or higher.

(2) A completed request for FAA COA (FAA Excel spread sheet); contact the AT&A Officer for a copy of this document.

(3) Airworthiness release for each of the UAS to be flown.

(4) Detailed map of the UAS operating area outside of restricted airspace. (1:50,000 scale and VFR sectional chart).

(5) Detailed map of corridors to be used to get from the UAS operating area to restricted airspace (corridors will include vertical and horizontal dimensions).

c. Request to extend a current FAA COA will include all the required information as if requesting a new FAA COA.

5-2. Unmanned aircraft systems (UAS) operator and observers requirements in the national airspace system (NAS)

a. AO: In addition to the requirements stated in AR 95-23, and TC 1-600 or TC 1-611, AOs interacting with ATC will have sufficient expertise to perform that task readily. AOs must understand and comply with FAA and military regulations applicable to the airspace where the UAS will be operated. AOs must have in their possession a current second class (or higher) airman medical certificate that has been issued under 14CFR part 67, Medical Standards and Certification, or a military equivalent (the military Class III Flight Physical meets this requirement). 14CFR part 91.17 applies to UAS operators.

b. Observer qualifications: In addition to the requirements stated in AR 95-23, observers must be trained to communicate clearly to the AO any turning instructions required to stay clear of conflicting traffic. Observers will receive training on rules and responsibilities described in 14CFR part 91.111, and 14CFR part 91.113,. Observers must have in their possession a current second class (or higher) airman medical certificate issued under 14CFR part 67, or a military equivalent (the military Class III flight physical meets this requirement). 14CFR part 91.17 applies to UAS observers.

5-3. Unmanned aircraft operator (AO) air traffic control (ATC) instructions:

The AO will maintain direct two-way communications with ATC and have the ability to maneuver the AV according to their instructions as applicable.

Chapter 6 Safety

6-1. General safety procedures

a. No UAS operations will be conducted within R-6302 A, B, C, and D, unless positive and reliable communications between the AO and Fort Hood Range Control and/or HR has been established. Establishing communications with HR does not relieve the unit from the responsibility of contacting and maintaining communications with Range Control IAW Fort Hood Regulation 350-1 (III Corps and Fort Hood Training). The primary means of communication with Range Control is FM radio frequency 30.45, and HR is FM: 38.75, UHF: 357.9 or VHF: 143.1. Secondary communication can be established with Range Control as listed in table F-1. If the primary and secondary means of communication are lost, the UAS flight activity will cease immediately until communication is restored.

b. Range Control (listed in table F-1) will be notified 30 minutes prior to commencing UAS operations for the day. This notification will be commensurate with published L-NOTAM which will include the location of the proposed activity and the maximum altitude the activity will use. Range Control will also be notified immediately upon completion of activities.

c. Immediately upon notification of impending UAS or other hazardous activity, HR will broadcast the pertinent information on all available frequencies (guard/emergency frequencies exempted), and make any other dissemination of information deemed appropriate. HR will coordinate with Robert Gray Army Radar Approach Control (ARAC) to ensure the area is clear of all known aircraft.

d. A risk assessment will be completed prior to all UAS operations. See Appendix C for an example risk assessment.

6-2. Unmanned aircraft systems (UAS) pre-accident plan

All units that operate UAS must have a pre-accident plan in place prior to operations and will treat all accidents and/or emergencies the same as manned aircraft. Appendix D provides the Installation UAS pre-accident plan. Units may modify their internal unit pre-accident plan to their specific mission, but the modified version must meet minimum requirements as listed in Appendix D. Information as listed in Appendix D must be passed to the appropriate agency upon a UAS incident and/or accident.

Appendix A References

Section I. Required Publications

FORSCOM Supplement 1 to AR 95-1 (Cited in para 4-1)
Flight Regulations

FORSCOM Supplement 1 to AR 95-23 (Cited in para 1-5,4-1)
Unmanned Aircraft Systems Flight Regulations

FORSCOM Regulation 385-1 (Cited in para D-4)
Forces Command Safety Program

AR 95-1 (Cited in para 4-1, 4-5)
Flight Regulations

AR 95-2 (Cited in para 4-1, 5-1)
Airspace, Airfields, Flight Activities, Air Traffic Control, and Navigational Aids

AR 95-23 (Cited in para 1-5, 2-3, 2-4, 4-1, 5-2)
Unmanned Aircraft System Flight Regulations

AR 95-30 (Cited in para D-4)
Participation in a Military or Civil Aircraft Accident Safety Investigation

AR 385-40 (Cited in para D-4, Glossary Section II)
Army Accident Investigations and Reporting

AR 600-8-1 (D-4)
Army Casualty Program

Federal Aviation Administration Joint Order 7400.8 (Cited in para 3-1)
Special Use Airspace

Fort Hood Regulation 95-1 (Cited in para 4-1)
Fort Hood Local Flying Rules

Fort Hood Regulation 95-2 (Cited in para 4-1)
Air Traffic and Airspace Operations Governing Fort Hood Special Use Airspace

Fort Hood Regulation 350-1 (Cited in para 6-1)
III Corps and Fort Hood Training

Training Circular 1-210 (Cited in para 4-1)
Aircrew Training Program Commander's Guide to Individual, Crew, and Collective Training

Training Circular 1-600 (Cited in para 2-3, 4-1, 5-2)
Unmanned Aircraft Systems Commander's Guide and Aircrew Training Manual

Training Circular 1-611 (Cited in para 2-3, 4-1, 5-2)
Small Unmanned Aircraft System Aircrew Training Manual

14CFR part 67 (Cited in para 5-2)
Title 14, Code of Federal Regulations, Part 67, Medical Standards and Certification

14CFR part 91 (Cited in Appendix E, note 2)
Title 14, Code of Federal Regulations, Part 91, General Operating and Flight Rules

14CFR part 91.17 (Cited in para 5-2)
Title 14, Code of Federal Regulations, Part 91.17, General Operating and Flight Rules, Alcohol or Drugs

14CFR part 91.111 (Cited in para 5-2)
Title 14, Code of Federal Regulations, Part 91.111, General Operating and Flight Rules, Operating Near Other Aircraft

14CFR part 91.113 (Cited in para 5-2)
Title 14, Code of Federal Regulations, Part 91.113, General Operating and Flight Rules, Right-Of-Way Rules: Except Water Operations

14CFR part 91.155 (Cited in para 4-1)
Title 14, Code of Federal Regulations, Part 91.155, General Operating and Flight Rules, Basic VFR Weather Minimums

Section II. Related Publications

AR 25-400-2
The Army Records Information Management System (ARIMS)

AR 360-1
The Army Public Affairs Program

AR 385-95
Army Aviation Accident Prevention

Field Manual 5-19
Composite Risk Management

FORSCOM Regulation 350-1

Active Duty Training for FORSCOM Units

Fort Hood Regulation 350-40

Fort Hood Range Division Operating Procedures

Fort Hood Regulation 385-12

III Corps and Fort Hood Aviation Safety Program

Fort Hood Regulation 115-1

Weather Support to III Corps and Fort Hood

14CFR part 91

Title 14, Code of Federal Regulations, Part 91, General Operating and Flight Rules

Section III. Prescribed and referenced forms

DA Form 7305-R

Worksheet for Telephonic Notification of Aviation Accident/Incident

FH Form 1853

Distribution Scheme

**Appendix B
Raven Restricted Operating Zone(s) (ROZ)**

B-1. Temporary ROZ(s) may be established for specified operational missions or requirements.

B-2. Temporary ROZ(s) will be established using the boundaries of the TA, surface to the scheduled altitude.

B-3. Once a ROZ is established, an L-NOTAM will be published with the ROZ location, active times and dates, altitudes and a contact frequency. See paragraph 4-3 for requesting L-NOTAM. Units' will use the air-to-air frequency to the extent possible. Aircraft not on the ROZ mission will remain clear until the L-NOTAM is cancelled or authorization is granted. Get authorization through coordination with the commander of the ROZ.

B-4. To the extent possible, temporary ROZ(s) will not impact the corridor air route structure (CARS). At no time will both CARS (West A and B or East A and B) close at the same time. Only the portion of the CARS route within a given ROZ closes.

B-5. Not all of Fort Hood's TAs are within the Fort Hood SUA. Temporary UAS ROZs will not be established outside of active restricted airspace.

B-6. Table B-1 list TAs ROZs with route closures and other flight restrictions.

Table B-1. Training area (TA) restricted operating zone(s) (ROZ[s])

TA/ROZ	Flight Restrictions and/or Route Closures
TA 8	Excludes CARS
TA 10	Excludes redline flights unless otherwise stated in the L-NOTAM.
TA 11	Excludes CARS and redline flights unless otherwise stated in the L-NOTAM
TA 12	East A closed, excludes redline flights unless otherwise stated in the L-NOTAM
TA 13	East A closed, excludes redline flights unless otherwise stated in the L-NOTAM
TA 20	East B closed. Excludes that portion of the TA outside of active restricted airspace.
TA 21	East A closed, excludes East B and redline flights unless otherwise stated in the L-NOTAM

Table B-1. Training area (TA) restricted operating zone(s) (ROZ[s]) (continued)

TA/ROZ	Flight Restrictions and/or Route Closures
TA 22	East B closed. Excludes that portion of the TA outside of active restricted airspace.
TA 23	No Raven UAS operations allowed.
TA 30	CARS 4A closed, excludes redline flights unless otherwise stated in the L-NOTAM. Excludes that portion of the TA outside of active restricted airspace.
TA 31	CARS 4A closed, excluding redline flights unless otherwise stated in the L-NOTAM.
TA 32	Excludes that portion of the TA outside of active restricted airspace.
TA 33	No flight restrictions
TA 34	CARS 4B closed. Excludes that portion of the TA outside of active restricted airspace.
TA 35	No UAS operation allowed.
TA 36	No UAS operation allowed.
TA 40	No Raven UAS operations allowed.
TA 41	No Raven UAS operations allowed.
TA 42	No Raven UAS operations allowed.
TA 43	No Raven UAS operations allowed.
TA 44	No Raven UAS operations allowed.
TA 45	No Raven UAS operations allowed.
TA 46	No Raven UAS operations allowed.
TA 47	No Raven UAS operations allowed.
TA 48	No Raven UAS operations allowed.
TA 50	Excludes redline flights unless otherwise stated in the L-NOTAM.
TA 51	Excludes redline flights unless otherwise stated in the L-NOTAM.
TA 52	Red Route North closed between Pidcoke and Manning. West A closed. Excludes West B.
TA 53	West A closed. Excludes West B.
TA 60	West A closed. Excludes redline flights unless otherwise stated in the L-NOTAM.
TA 61	West A closed. Excludes redline flights unless otherwise stated in the L-NOTAM.

Table B-1. Training area (TA) restricted operating zone(s) (ROZ[s]) (continued)

TA/ROZ	Flight Restrictions and/or Route Closures
TA 62	West A closed. Excludes redline flights unless otherwise stated in the L-NOTAM.
TA 63	West A closed.
TA 64	West A closed.
TA 65	West A closed. Excludes West B.

Note: All temporary ROZ(s) have the same geographical boundary as the associated TA and start at the surface and extend upward to the scheduled altitude as indicated in the L-NOTAM.

Legend:

CARS – corridor air route structure
L-NOTAM – local notice to airmen
ROZ – restricted operating zone
TA – training area
UAS – unmanned aircraft system

Appendix C
Example: Unmanned Aircraft System (UAS) Risk Assessment

III CORPS UAS RISK ASSESSMENT							
Date:							
DTG:		MSN #:		MC :			
				AVO :			
				MPO :			
	0	1	2	3	Requires Brigade Commander Approval	Limitations Exceeded NO GO	TOTAL
WEATHER							
THUNDERSTORMS	None	Isolated	Few	Scattered		Numerous	
LIGHTNING						<5 nm	
CEILING	>7000 AGL	4000 to 7000	3000 to 4000		<3000	<1000	
WIND SURFACE	<15 knots (kt)		16 -20	20 or G25		>20 G25	
WIND ALOFT						50 kt	
VISIBILITY	> 6 sm	3 to 5sm		2 to 3 sm	< 2sm		
TURBULENCE	None	Light	Moderate			Severe	
ICING/ SNOWING						At or Below flight level	
PRECIPITATION	none	Light				Moderate+	
SURFACE TEMPERATURE	<38C		38C to 49C			<-30C or >+49C	
CREW SELECTION (Worse Case Crew Member)							
CREW MEMBER REST	>12	10- 12		8 -10	<8		
CREW MEMBER EXPERIENCE	>100	50 to 100	<50				
FLIGHT TIME IN AO	> 30	30 to 10	<10				
MISSION COMPLEXITY							
SINGLE AV	Day	Night					
MULTIPLE AV's		Day	Night				
MAINTENANCE (MOC)	Day				Night		
PLANNING TIME	>90 min	<90 min					
RUNWAY SURFACE	Paved	Improved SFC				Unimproved	
EQUIPMENT STATUS	FMC	PMC					
RECOVERY SITE	Back up					No Back up	
FREQUENCY MANAGEMENT	Dedicated	Shared	Suspected Interference			Known Interference	
							TOTAL:
Low: Platoon LDR/ Company Commander	0-15						
Medium: Battalion Commander	16-24					Mission Approval Signature	
High: Brigade Commander	25-30						
Extremely High: General Officer	>30						

Figure C-1. Example: Unmanned Aircraft System (UAS) Risk Assessment

Appendix D Unmanned Aircraft Systems (UAS) Pre-Accident Plan

D-1. General

a. In the event that you are notified of a UAS crash, or vehicle or injury accident, remain calm and get the following information:

b. Type of UAS accident: ground or flight.

c. Model of UAS (Hunter, Shadow, Raven etc.).

d. Type of assistance needed if any: fire department, MEDEVAC or ground ambulance, or full response.

e. Location (military grid/lat long) of accident.

f. Type and severity of injuries (if no injuries, state so).

g. Names and rank of injured (if possible).

h. Date and time of accident and/or notifier's time of arrival at accident site.

i. Civilian personnel or property involved in accident: yes or no.

j. Ammunition/explosives/HAZMAT/fire involved: yes, no, or unknown.

k. Owning unit.

l. Notifiers information:

(1) Name and rank.

(2) Unit or agency.

(3) Telephone number or frequency and/or call sign.

(4) Other known agencies notified or proceeding to the site.

(5) Other information as appropriate.

(6) Contact Robert Gray Base Operations with the above information (see table F-1). If you are unable to contact Robert Gray Base Operations, contact the III Corps Operations Center (COC) (see table F-1): collect calls are accepted. The COC will contact Robert Gray Base Operations and ask that the crash alarm be activated.

D-2. Precautions to give personnel at crash site

a. Keep others away for their own safety due to pyrotechnics and composite material hazards.

b. Render first aid, if possible.

c. Secure and control the accident site to the best of your ability.

d. Advise them help is on the way.

e. Do not answer media questions: politely refer all questions to the Public Affairs Officer.

f. Remain at the accident site until properly relieved.

D-3. Primary crash alarm system

a. Organizations will ensure that personnel are familiar with their responsibilities and properly trained on all aspects of crash rescue operations including health hazards associated with a crash site and the proper personal protective equipment required to enter the site.

(1) Post this plan and any necessary local area maps near the designated station telephone.

(2) The primary crash alarm system consists of stations or units involved in life saving and minimizing injury or property damage.

(3) The appropriate ATC facility will activate the primary crash alarm system when an accident is observed or reported, giving full details of the emergency or accident and assistance needed.

(4) If one of the agencies cannot be reached by closed circuit, the control tower will call the agency by telephone.

(5) Robert Gray Army Airfield (RGAAF) and Hood Army Airfield (HAAF) ATC will test the system daily.

b. Responsibilities:

(1) RGAAF Base Operations will:

(a) Notify the appropriate control tower when a report of an aircraft emergency or accident is received.

(b) Be the point of contact for the collection and dissemination of data.

(c) Contact the Installation Operations Center (IOC) and activate the secondary crash alarm system and notify the DAO and/or installation aviation safety officer (ASO).

(2) RGAAF or HAAF control towers will:

(a) Initiate the primary crash alarm system for a UAS accident and relay information (required assistance; fire, lifesaver, etc.) to primary stations. It is crucial that the type of response requested is relayed over the crash alarm system.

(b) Alert traffic to the emergency and grant traffic priority to rescue aircraft and/or vehicles.

(c) Ensure the runway or airfield is closed, if appropriate, until the emergency terminates, the aircraft is removed, and foreign object damage check is complete.

(d) Notify ARAC of the situation and airfield status.

(e) Notify 3rd Weather Squadron on duty personnel.

(3) Aircraft fire and crash rescue will:

(a) Respond immediately to the alarm for accidents within their response area as directed by the installation fire chief.

(b) Assume command of the incident site until terminated or released to the appropriate ASO.

(c) Advise the IOC if dangerous or hazardous cargo warrants the presence of specialists (for example, ordnance officer, chemical officer, radiation protection officer).

(d) Notify ATC when the emergency has terminated.

(4) Emergency medical service will (if injuries are known or suspected):

(a) Respond immediately to the alarm if response is on the reservation, or notify the appropriate control tower and request assistance from local agencies if an ambulance is unable to respond to the emergency.

(b) Request assistance from the staff physician in the emergency room to dispatch local medical personnel and equipment as needed.

(c) Transport personnel to the appropriate medical facility for treatment or samples.

(d) On order, remove deceased personnel and transport to Darnall Army Medical Center.

(5) Lifesaver will:

(a) Continue on standby until requested to launch. If requested to launch but are unable to do so, they will request assistance from other agencies.

- (b) Radio the preliminary report (if launched) of the crash site and map coordinates to the appropriate ATC tower or HR to aid ground rescue operations.
- (c) Transport injured personnel to the appropriate medical facility.
- (d) On order, remove deceased personnel and transport to Darnall Army Medical Center.
- (6) The Provost Marshal will:
 - (a) Provide crowd control assistance upon request.
 - (b) Dispatch a radio-equipped vehicle to any aircraft accident site with adequate personnel to provide security until unit guards have been given security responsibility.
 - (c) Coordinate with civil law enforcement agencies to obtain assistance for guarding off-post aircraft accident sites.

D-4. Secondary crash alarm system

- a. General. The secondary crash alarm system is composed of units that require notification and may be involved in performing support missions during and after the aircraft emergency or accident.
- b. Responsibilities:
 - (1) The IOC will sequentially notify:
 - (a) III Corps and DAO and/or installation ASO.
 - (b) Garrison Commander.
 - (c) The owning unit Commander.
 - (d) III Corps Command Group.
 - (e) III Corps Adjutant General Casualty branch.
 - (f) Training Aide Support Center photographer.
 - (g) III Corps Public Affairs Office.
 - (h) The III Corps Air Force Air Liaison Office in the event that the mishap involves a U.S. Air Force aircraft.
 - (i) The Killeen Municipal Terminal Operations center as listed in table F-1 (if the accident is on RGAAF).
 - (j) Contact Installation Industrial Hygiene for a site inspection.
 - (2) The owning unit Commander or ASO will:
 - (a) Provide the III Corps ASO with information from the DA FORM 7305-R (Worksheet for Telephonic Notification of Aviation Accident/Incident) immediately. All information is desired, but will not delay notification.
 - (b) Assume command of the accident site after the fire chief and III Corps and/or installation ASO releases it.
 - (c) Provide guards to secure the site and preserve evidence and control access.
 - (d) Secure all aircraft records and crewmember flight records and equipment.
 - (e) Recover the aircraft after its release by the accident Investigation board.
 - (f) Be prepared to brief the Installation Commander, within 48 hours, on all class A accidents.
 - (g) Provide resources and assistance to the accident board as necessary.
 - (3) The III Corps Aviation or DAO and/or Installation Safety Officer will:
 - (a) Notify the United States Army Combat Readiness Center and FORSCOM according to AR 385-40 and FORSCOM Regulation 385-1.

- (b) Proceed to the accident scene, get the necessary information to notify secondary crash alarm units and assist and advise the site commander.
- (c) Establish the aircraft accident investigation board according to AR 385-40 or as directed by the Combat Readiness Center.
- (d) If required, notify the FAA according to AR 95-30 (Participation in a Military or Civil Aircraft Accident Safety Investigation).
 - c. The III Corps Flight Surgeon is the point of contact for medical information regarding injured or deceased personnel, and will provide information to the III Corps or DAO and/or Installation Aviation Safety Office and the aircraft accident board.
 - d. The DAO and/or Installation Safety Officer will respond to emergencies or accidents to provide technical assistance, and serve on accident investigation boards, as required.
 - e. Hood Radio will:
 - (1) Notify Range Control to cease-fire if the accident is near the impact area or firing operations.
 - (2) Advise aircraft to maintain one kilometer from or 915m (3,000 ft) MSL above the accident site, except for accident site support aircraft.
 - g. The Public Affairs Office will proceed to the accident site to coordinate with and escort news media representatives to the aircraft accident site.
 - h. The Adjutant General Casualty Services Branch will:
 - (1) Initiate notification of next-of-kin and other related actions IAW AR 600-8-1 (Army Casualty Operation, Assistance, Insurance).
 - (2) Provide a copy of reports to the accident investigation board.
 - i. The Photographic Laboratory will:
 - (1) Provide a photographer to proceed to the aircraft accident site.
 - (2) Photographer will document the accident site as directed by the ASO in charge.
 - (3) Provide photo compact disk and photo prints to the accident investigation board president within one duty day of the accident.
 - j. The Directorate of Public Works will coordinate engineer support, which may include construction of access roads to the accident site, clearing, earth moving, digging, and environmental evaluations. The Air Force Air Liaison Office will notify the appropriate individuals in the event that the mishap involves a U.S. Air Force aircraft, and be the liaison throughout the accident investigation.
 - k. ATC will:
 - (1) Secure the control tower, flight following, and Army radar approach control (ARAC) tapes.
 - (2) Provide a transcription to the accident investigation board president (if requested).
 - l. The Staff Judge Advocate Claims Office will:
 - (1) Dispatch a claims officer to the aircraft accident scene to get information on damage to civilian property.
 - (2) Provide the aircraft accident investigation board with property damage costs for completing aircraft accident report.
 - m. The 3d Weather Squadron will:
 - (1) Take a local observation for HAAF and RGAAF and radar observation at RGAAF.

(2) Provide a written summary of weather conditions for time spanning one hour prior until one hour after the accident, to the III Corps or DAO/Installation Aviation Safety Office.

(3) If weather is a suspected or known factor, provide a qualified weather forecaster as a member of the aircraft accident investigation board.

n. The Logistics Assistance Office will provide technical assistance to the aircraft accident investigation board, as required.

o. The III Corps Engineers will:

(1) Provide supervision for topographic products and survey support.

(2) Get maps and charts for use in navigation and crash site location.

(3) Direct tasking of engineer units that possess survey teams and global positioning system receivers, and nuclear densometers, conventional survey equipment, and heavy cranes or required recovery equipment.

p. The Fort Hood Industrial Hygiene section will:

(1) Respond to accidents involving aircraft containing advanced composite materials or hazardous waste clean-up to determine if individual protective equipment is required.

(2) Recommend suitable protection equipment for the operation.

(3) Conduct sampling operations as dictated by the aircraft recovery operations.

q. The Installation Radiation Protection Officer will:

(1) Survey the accident site for radioactive aircraft components and parts.

(2) Provide or arrange for the cleanup of all radioactive waste at the accident site.

Memorandum of Agreement
Concerning the
Operation of Department of Defense Unmanned Aircraft Systems
in the
National Airspace System

Introduction On September 28, 2006, the Deputy Secretary of Defense directed the Executive Director, Department of Defense (DoD) Policy Board on Federal Aviation, to pursue an agreement with the Federal Aviation Administration (FAA) to allow ready access to the National Airspace System (NAS) for DoD Unmanned Aircraft Systems (UAS) domestic operations and training. This Memorandum of Agreement (MOA) between the DoD and the FAA sets forth provisions that will allow, in accordance with applicable law, increased access for DoD UAS into the elements of the NAS outside of DoD-managed Restricted Areas or Warning Areas.

To ensure that DoD UAS operations are conducted safely, efficiently, and in accordance with U.S. law and to ensure DoD UAS assets have NAS access for domestic operations, including the War on Terror (WOT), this agreement assigns the DoD and the FAA specific tasks and responsibilities. This guidance applies to all DoD UAS, whether operated by Active, Reserve, National Guard, or other personnel.

It is the DoD's goal that appropriately equipped UAS will have ready access to the NAS for the conduct of domestic operations, exercises, training, and testing.

It is the FAA's goal that DoD UAS operations are conducted safely and expeditiously, present no threat to the general public, and do no harm to other users of the NAS.

To reach these goals, the DoD and FAA must aggressively collaborate toward an incremental approach in overcoming the technical; regulatory and safety hurdles to reaching these common goals. Both departments jointly agree to the following provisions as the initial steps in their pursuit of ready access to the NAS for DoD UAS operations.

**Figure E-1. Memorandum of Agreement
Concerning the Operation of Department of Defense (DoD)
Unmanned Aircraft Systems
in the National Airspace System**

Scope The policies, procedures and operations prescribed in this MOA apply to the operation of DoD UAS within the NAS. This MOA specifically excludes commercial UAS operation for non-DoD applications and other Government Agencies that operate Public Use UAS.

Authority Section 106 of Title 49, United States Code provides the authority of the Federal Aviation Administration to set aviation safety standards and regulate aviation operations in the NAS. Title 10 United States Code provides the authority for the Secretary of Defense to set military aviation standards and direct military aviation operations.

Unmanned Aircraft Systems (UAS) Airworthiness Certification Except where specifically exempted by the FAA, DoD UAS operated outside of Restricted Areas and Warning Areas shall be certified by one of the military departments as airworthy to operate at the appropriate level in accordance with applicable DoD and Military Department standards.

Unmanned Aircraft Systems (UAS) pilot operator/or crewmember qualification Pilots/operators of DoD UAS shall be qualified by the appropriate Military Department activities to fly in the class of airspace in which operations are to be conducted. DoD UAS pilots/operators in qualification training shall be supervised by a qualified UAS pilot/operator until achieving the appropriate qualification level. DoD UAS ground observers will possess the appropriate medical qualification to perform their duties.

Enhanced DoD Unmanned Aircraft Systems (UAS) access to the National Airspace System (NAS) Where the appropriate qualifications listed above are met, the FAA agrees to provide access to the NAS for DoD UAS outside Restricted Areas and Warning Areas as follows:

- All categories of DoD UAS operations conducted wholly within Class D airspace that has an associated DoD-controlled non-joint-use airfield, provided²:
 - Operations are not conducted over populated areas or within airspace covered in Section 91.215 (b)(2) of Title 14, Code of Federal Regulations (14 CFR §91.215(b)(2)).
 - DoD shall develop uniform air traffic control procedures to be applied at all locations. These procedures will be developed in coordination with the FAA prior to implementation and a Certificate of Waiver or Authorization issued to the appropriate DoD Air Traffic facility.

**Figure E-1. Memorandum of Agreement
Concerning the Operation of Department of Defense (DoD)
Unmanned Aircraft Systems
in the National Airspace System (continued)**

DoD UAS that weigh 20 pounds or less, under the following conditions:
Operations are conducted within Class G airspace below 1200' AGL (not applicable to airspace identified by 14 CFR § 91.215 (b)(2)) over military bases, reservations or land protected by purchase, lease or other restriction.

- The UAS remains within clear visual range of the pilot, or a certified observer in ready contact with the pilot, to ensure separation from other aircraft.

¹Note: The term "operator" is a DoD-specific term to describe individuals with the appropriate training and Military Department certification for the type of UAS being operated. and as such, is responsible for the UAS operations & safety. It is used to differentiate from DoD rated pilots of manned weapons systems.

² The DoD, as a service provider for this airspace, does not have the authority to issue waivers to 14 CFR Part 91.

- The DoD will ensure the UAS remains more than 5 miles from any civil use airport or heliport

DoD components operating under this paragraph will notify the FAA of the proposed operation in advance, and publish Notices to Airmen (NOTAMS) as required to alert non-participating aircraft of the operation. For non-recurring operations notification will be accomplished, and Notices to Airmen (NOTAMS) published, no later than 24 hours in advance. For recurring operations (e.g. training) standing "blanket" notifications/standing NOTAMS should be used.

DoD and/or FAA Partnering on Unmanned Aircraft Systems (UAS) Initiatives To the maximum extent practicable the DoD and the FAA will partner on efforts to further UAS research, development, standards, testing and certification initiatives as follows:

- **NAS Integration** The DoD and FAA will coordinate the development of near, mid and long-term UAS standards, procedures, and technical solutions.
- **UAS Research and Development (R&D)** The DoD and the FAA agree to share methodologies, information and results of research and development efforts conducted by their respective organizations. Both organizations agree to, wherever practicable, partner in UAS R&D efforts that show promise for enhancing the safety of DoD UAS operations in the NAS.

**Figure E-1. Memorandum of Agreement
Concerning the Operation of Department of Defense (DoD)
Unmanned Aircraft Systems
in the National Airspace System (continued)**

- **UAS Testing and Certification** The DoD agrees to invite FAA participation in DoD conducted development and testing of UAS components intended to enhance the safety of UAS operations, including detect-and-avoid systems, The FAA agrees to participate in DoD development and testing of said components. and provide input to developing acceptable standards of performance that will allow enhanced DoD UAS NAS access.
- **UAS Safety Data** The DoD, through the Military Department safety organizations, will collect and share data on UAS operations to support FAA UAS safety studies and analyses. The FAA will provide the requested data elements and reporting format for this data. The FAA agrees to release to the DoD all results and findings of studies and analyses conducted using DoD UAS data, and to share UAS safety information gleaned from public and private sources with the DoD.

Waiver Process In those cases where meeting all of the certification provisions of this agreement is not possible, or is cost or mission prohibitive, the FAA will review the specific conditions of DoD requests for UAS operations outside of Restricted, Warning, or other areas outside the scope of this document to determine if a Certificate of Waiver or Authorization (COA) may be issued.

The FAA will strive to process properly-completed DoD COA applications within 60 days of receipt. In the case of urgent and compelling need (such as "non-training" national security missions or "active" natural disaster support), the DoD will notify the FAA of the need and reason for priority action, and the FAA will process DoD COA requests as quickly as possible, but not later than 24 hours from receipt of complete mission requirements.

Implementation plan. The Chairman, DoD Policy Board on Federal Aviation, and the Administrator, Federal Aviation Administration, are charged with formulating policy for their respective organizations to ensure compliance with the provisions of this agreement. The FAA's office of primary responsibility is the Unmanned Aircraft Program Office. This MOA will be reviewed annually or as needed by request of either party and is effective upon the last signature of the Parties.

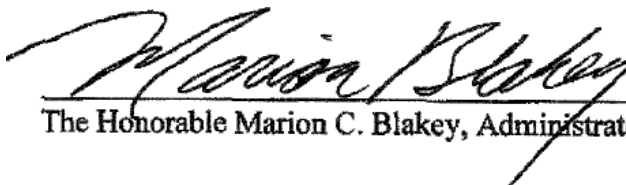
**Figure E-1. Memorandum of Agreement
Concerning the Operation of Department of Defense (DoD)
Unmanned Aircraft Systems
in the National Airspace System (continued)**

For the Department of Defense


The Honorable Gordon England, Deputy Secretary

9/24/07
Date

For the Federal Aviation Administration


The Honorable Marion C. Blakey, Administrator

June 12, 2007
Date

**Figure E-1. Memorandum of Agreement
Concerning the Operation of Department of Defense (DoD)
Unmanned Aircraft Systems
in the National Airspace System (continued)**

Table F-1
Contact numbers

Entity	Telephone Number	Radio frequency
Range Control	254-287-3321/3130	30.45 FM
Hood Radio	254-288-9111	FM 38.75 UHF 357.9 VHF 143.1
III Corps COC	800-531-4654 254-287-2506/2520	
Robert Gray Base Operations	254-288-9200/9209	
Killeen Municipal Terminal Operations	254-501-8750	

Glossary

Section I. Abbreviations

AGL

Above Ground Level

AO

Unmanned aircraft operator

AR

Army Regulation

ARAC

Army Radar Approach Control

ASO

Aviation Safety Officer

AT&A

Air Traffic and Airspace

ATC

Air Traffic Control

ATM

Aircrew Training Manual

AV

Air Vehicle

BAE

Brigade Aviation Element

CARS

Corridor Airspace Route Structure

CCMU

Clabber Creek Multiuse Range Complex

CMPRC

Crittenberger Multi-purpose Range Complex

COA

Certificate of Waiver or Authorization

DAO

Directorate of Aviation Operations

DAR

Department of the Army Representative

DoD

Department of Defense

EO

External Operator

FAA

Federal Aviation Administration

FH

Fort Hood

FL

Flight levels

FM

Frequency Modulated

FORSCOM

United States Army Forces Command

FT

Feet

GCS

Ground Control Station

HAAF

Hood Army Airfield

HR

Hood Radio

IAW

In Accordance With

IO

Instructor Operator

IOC

Installation Operations Center

JMMU

Jack Mountain Multiuse Range Complex

JO

Joint orders

km

kilometers

kt

Knots

L

Local

lat

latitude

LG

Land Group

L-NOTAM

Local Notice to Airmen

Long

Longitude

LS

Landing Strip

MC

Mission Commander

m

meters

MOA

Military Operations Area

MSL

Mean Sea Level

N

North

NAS

National Airspace System

NM

Nautical Mile

NOTAM

Notice to Airmen

PO

Mission Payload Operator

R

Restricted Area

RAE

Regiment Aviation Element

RGAAF

Robert Gray Army Airfield

ROZ

Restricted Operation Zone

SM

Statute Miles

SO

Standardization Instructor Operator

SUA

Special Use Airspace

TA

Training Area

TC

Training Circular

UAS

Unmanned Aircraft Systems

UHF

Ultra High Frequency

UT

Unit Trainer

W

West

VFR

Visual Flight Rules

VHF

Very High Frequency

14CFR

Title 14, Code of Federal Regulations

Section II. Terms**Emergency**

An event for which an individual perceives that a response is essential to prevent or reduce injury or property damage according to AR 385-40 (Accident Reporting and Records). This is a condition or situation one level short of the "May-Day" call when a crashing landing, damage or destruction to the aircraft, and injury or death to personnel is imminent.

Precautionary Landing

A landing resulting from an unplanned event that makes continued flight inadvisable per AR 385-40. This compares to the International Civil Aviation Organization/FAA call of "Pan-Pan".