

Fort Devens Regulation 95-23

Aviation

Unmanned Aircraft Systems Local Flying Rules

1 June 2010

SUMMARY of CHANGE

Fort Devens Regulation 95-23, dated 1 June 2010

This is the first publication for the operation of unmanned systems at Fort Devens

Department of the Army
US Army Garrison Fort Devens
Devens, Massachusetts 01434-4424
1 June 2010

Fort Devens Reg 95-23

Aviation
Unmanned Aircraft Systems (UAS) Local Flying Rules

History. This is the first publication of this regulation governing Unmanned Aircraft Systems (UAS).

Summary. This regulation establishes policies and procedures governing the control, scheduling and use of UAS in Fort Devens Special Use Airspace (SUA).

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

Proponent. The Directorate of Plans, Training and Security (DPTS) AT&A Officer is the proponent of this regulation,

Army Management Control Process. This regulation contains management control provisions, but does not identify key management controls that must be evaluated.

Supplementation. Supplementation of this regulation is prohibited.

Suggested Improvements. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, Fort Devens, ATTN: Directorate of Plans, Training and Security (DPTS), Devens MA 01434-5409.

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Chapter 1 General

1-1. Purpose

This regulation establishes procedures, rules, and responsibilities for operator training, standardization, and the operation of all Unmanned Aircraft Systems (UAS) assigned, attached, or transient to Fort Devens.

1-2. References

Required and related publications and prescribed and referenced forms are listed in Appendix A.

1-3. Explanation of Abbreviations and Terms

Abbreviations and special terms used in this regulation are explained in the glossary.

1-4. Deviations

Individuals or organizations requesting deviations from this regulation must coordinate with the Directorate of Plans Training and Security (DPTS), Air Traffic and Airspace (AT&A) Officer.

1-5. Waivers

a. Process waiver request in Accordance with (IAW) United States Army Forces Command (FORSCOM) Supplement to AR 95-23, Unmanned Aircraft Systems (UAS) flight regulations.

b. Units will send waiver requests to the Fort Devens Air Traffic and Airspace (AT&A) Officer who is co-located with Range Control.

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)

a. The following personnel may fly/operate UAS at Fort Devens:

(1) Unmanned Aircraft Crewmembers who are members of the Active Army, Reserve Component, or Army National Guard or are civilian employees of the U.S. Army and who have complied with qualification, training, evaluation, and currency requirements of AR 95-23, Chapter 4 for the UAS to be flown/operated.

(2) Civilian employees of Government Agencies and Government Contractors who have appropriate military or civilian certifications or ratings in the systems, with written authorization from the owning MACOM, Commander, or civilian equivalent. Civilians must comply with qualification, training, evaluation, and currency requirements of AR 95-23 chapter 4, the provisions of AR 95-20, and the contract and /or statement of work for the UAS to be flown. These personnel will at a minimum have a medical flight physical as stated in AR 95-23, para 2-1b, or an FAA equivalent.

(3) UAS crew members in other U.S. services who have complied with qualification, training, evaluation, and currency requirements of their service or of AR 95-23 chapter 4

for the UAS to be flown; with written authorization from their service and the owning MACOM commander; and at a minimum a medical flight physical as stated in AR 95-23 para. 2-1b.

- b. All personnel acting as the unmanned aircraft operator (AO), mission payload operator (PO), mission commander (MC), or external operator (EO) for any Army UAS will undergo and successfully satisfy the requirements documented in AR 40-501 regardless of assignment. All personnel stated above will undergo and successfully satisfy the requirements of at least a Class III Flight Duty Medical Examination as stated in AR 40-501.

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 Unmanned Aircraft Systems (UAS) operations. Requests must include ground and airspace maneuver areas.

- b. To fly a Unmanned Aircraft System (UAS) at Fort Devens requires approval from:

- (1) Range Control for Training Areas.
- (2) Range Control for airspace.
- (3) Range Control for Local Notice to Airmen (L-NOTAM) to establish Restricted

Airspace.

2-3 UAS Operator Currency

a. Operators will maintain currency IAW AR 95-23, and TC 1-600 or TC 1-611 as appropriate.

b. In addition to the requirements in AR 95-23, TC 1-600 and TC 1-611, operators are required to complete the Fort Devens Range Control Orientation Briefing. TC 1-600 and TC 1-611 list those items to be 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 the 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, see figure F-1 for sample memorandum.

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, see figure F-1 for sample memorandum.

f. Standardization Instructor Operator (SO): The SO will primarily train and evaluate IOs and other SOs. SOs has 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 to develop, implement, evaluate, and manage 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, see figure F-1 for

sample memorandum. 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. While 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 Devens SUA consists of Restricted Area R-4102A and Restricted Area R-4102B as published in FAA Joint Order (JO) 7400.8.

b. The SUA (Restricted Area) boundaries, designated altitudes and times of use are depicted in Table 3-1.

Table 3-1 Fort Devens Special Use Airspace (SUA)

R-4102A Fort Devens, MA

Boundaries. Beginning at:

Lat. 42°31'15"N., long. 71°36'28"W.; to lat. 42°31'00"N., long. 71°39'13"W.; to

Lat. 42°30'45"N., long. 71°39'13"W.; to lat. 42°30'15"N., long. 71°39'58"W.; to

Lat. 42°29'45"N., long. 71°41'13"W.; to lat. 42°28'15"N., long. 71°41'13"W.; to

Lat. 42°28'00"N., long. 71°39'43"W.; to lat. 42°29'45"N., long. 71°37'43"W.; to

Thence to the point of beginning.

Designated altitudes: Surface to but not including 2,000 feet MSL.

Designated times of use: 0800 to 2200 Saturday local time; other times by NOTAM issued 24 hours in advance.

R-4102B Fort Devens, MA

Boundaries. Beginning at:

Lat. 42°31'15"N., long. 71°36'28"W.; to lat. 42°31'00"N., long. 71°39'13"W.; to

Lat. 42°30'45"N., long. 71°39'13"W.; to lat. 42°30'15"N., long. 71°39'58"W.; to

Lat. 42°29'45"N., long. 71°41'13"W.; to lat. 42°28'15"N., long. 71°41'13"W.; to

Lat. 42°28'00"N., long. 71°39'43"W.; to lat. 42°29'45"N., long. 71°37'43"W.; to

Thence to the point of beginning.

Designated altitudes: 2,000 feet MSL to 3,995 feet MSL.

Designated times of use: 0800 to 2200 Saturday local time; other times by NOTAM issued 24 hours in advance.

c. UAS operations are limited to vertical and lateral limits of R-4102A/B, unless a Certificate of Authorization (COA) has been granted by the Federal Aviation Administration (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.

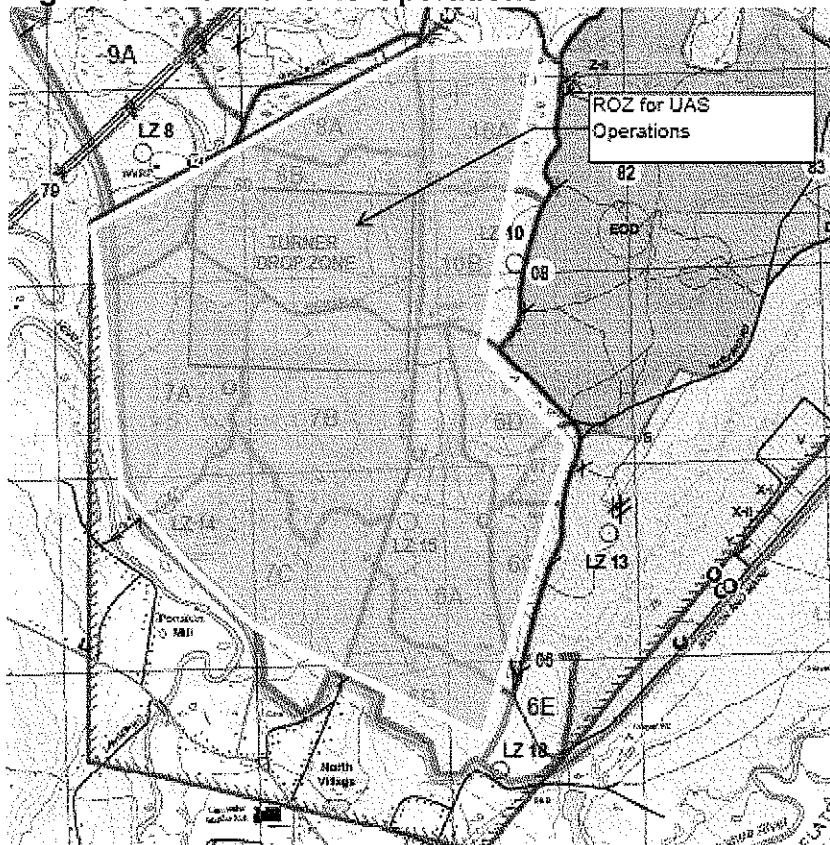
3-2 Temporary Unmanned Aircraft Systems (UAS) Restricted Operation Zone (ROZ)

a. The Garrison Commander delegates airspace control authority to the AT&A officer who designates ROZ(s) for a specific operational mission or requirement.

b. When a temporary UAS ROZ(s) is established, a NOTAM will be posted by Range Control as directed by the AT&A Officer. 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 can be determined by contacting Range Control or the AT&A Officer.

c.. Temporary Raven UAS ROZ(s) are established over training areas (TA(s)) and cover the entire TA except as noted in Appendix B.

Figure 3-1 ROZ for UAS Operations



Chapter 4 Unmanned Aircraft Systems (UAS) Procedures

4-1. Unmanned Aircraft Systems (UAS) Procedures

a. All UAS activity will be conducted within restricted airspace R-4102 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 contained in Chapter 5.

b. A temporary ROZ may be established within R-4102, only after coordination with Range Control and the AT&A Officer.

c. Units will continuously monitor the range safety radio net while operating within a ROZ.

d. After coordination with Range Control Scheduling, units will request a NOTAM be published IAW paragraph 4-3 below.

e. In the event of an emergency or lost link, Range Control will be notified immediately (978-796-2723/2155), FM (38.85 Mhz, or Range Safety NET (Saber), and provide the following information:

- (1) Type UAS (Hunter, Raven, Shadow, etc.)
- (2) Last known position (using latitude/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.)

f. Units will contact Range Control (at 978-796-2723/2155 or FM 38.85 or Range Safety NET {SABER}) 30 minutes prior to mission launch.

g. Units will contact Range Control (at 978-796-2723/2155 or FM 38.85 or Range Safety NET {SABER}) when the last AV is recovered for the mission day.

h. Range Control will notify FAA (Boston TRACON at 603-594-5552/5553) of all launch and recovery notifications.

i. Units/operators are responsible for ensuring compliance with the 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, TC 1-600, TC 1-611, TC 1-210.

j. Units/operators will conduct all operations in visual flight rules (VFR) conditions according to Title 14, Code of Federal Regulations (14CFR), Part 91.155.

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

l. Turner UAS ROZ (Figure 3-1) has been established and specific procedures for its use is listed:

(a) Maintain the UAS within the ROZ during launch and recovery operations, as well as during the entire mission.

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

(c) Establish communications with any ground units on Turner Drop Zone and coordinate all operations that might interfere with Turner Drop Zone.

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 (Raven 234). The names for each AV type are Hunter, Shadow, Raven, etc...

4-3 Local Notice to Airmen (L-NOTAM)

a. L-NOTAM ROZ procedures:

(1) Contact the AT&A or Range Control Operations to have an L-NOTAM published to create a ROZ over the TA.

(2) L-NOTAM must be requested no later than 24 hours and no earlier than 2 weeks prior to activity.

(3) ROZ, L-NOTAM request will contain the following information:

(a) Unit

(b) Point of contact

(c) Local phone number

(d) Location

(e) Activity

(f) Altitudes needed for the activity

(g) Time(s) ROZ to be active

(h) Dates of use

(i) Call sign and frequency

(4) Example ROZ, L-NOTAM request:

- (a) Unit: 1-34 Infantry
 - (b) Point of Contact: CPL Daily
 - (c) Local phone number (978) 796-1234
 - (d) Location: Turner Drop Zone
 - (e) Activity: Raven UAS
 - (f) Altitudes needed for activity: Surface to 305m (1,000ft) above ground level (AGL)
 - (g) Time(s) ROZ to be active: 0800 local (L) to 1100 (L) and 1300 (L) to 1500 (L) daily Monday through Friday.
 - (h) Dates of use 17 May to 21 May
 - (i) Call sign and Frequency: Raven 08, FM 46.70
- 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 Command S-3 designated representative for submission to the AT&A or Range Control Operations.
 - d. Changes to ROZ L-NOTAM must be made 24 hours in advance (for example, on Friday for Monday operation) .

4-4 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.
- b. UAS VFR cloud clearance and visibility weather minimums for operations in R-4102:
Day or Night: 152.4m (500ft) below, 305m (1,000ft) above and 610m (2,000ft) horizontal clearance from the clouds and 5 km (3sm) visibility.

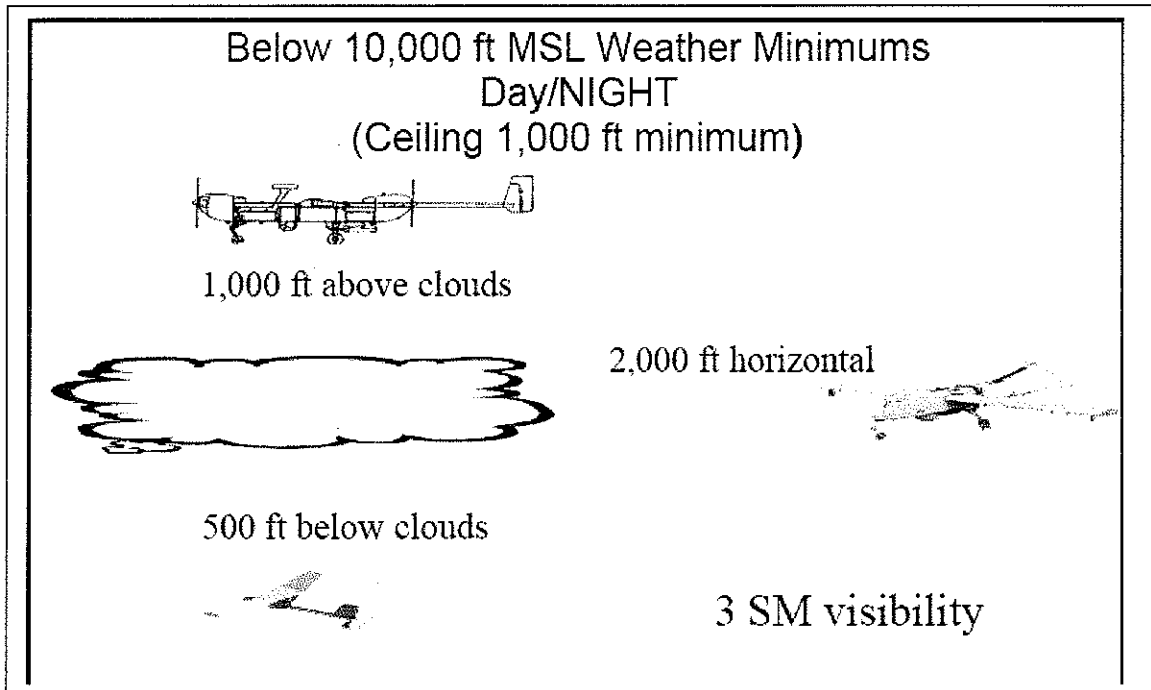


Figure 4-1 Visual Flight Rules (VFR) Weather Minimums below 10,000 ft (MSL)

4-5 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 Range Control (978) 796-2723/2155. 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 Turner ROZ will be 19T BH 80000805 (42°29'36"N, 71°40'37"W) at AV's approved altitude.

c. 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.

4-6 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 the 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 Devens restricted area unless approved by the FAA and the Fort Devens 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 the type of launch.

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

(3) The method 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 Mode3/A transponder code "0100) at all times while operating in approved ROZ and while operating in R-4102 airspace unless otherwise directed by ATC.

4-7 Separation Criteria

a. Separation between manned and unmanned aircraft within the Fort Devens restricted area is established by the use of ROZs and blocks of altitude. In 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 (1,000ft.).

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

b. Minimum separation criteria for unmanned aircraft within Fort Devens restricted area is as follows:

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

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

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 commander 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 requests will include the following information:

(1) IAW AR 95-2, cover letter signed by the responsible brigade/regiment/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 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 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, Alcohol or Drugs, 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, (Operating near Other Aircraft), and 14CFR part 91.113, (Right-of-Way Rules). Observers must have in their possession a current second class (or higher) airman medical certificate 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, Alcohol or Drugs, 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-4102A/B, unless positive and reliable communications between the AO and Fort Devens Range Control has been established and maintained IAW Fort Devens Reg 350-3. The primary means of communication with Range Control is the Range Safety Net (SABER), Secondary communication can be established with Range Control (978) 796-2723/2155. If the primary and secondary means of communications are lost, the UAS flight activity will cease immediately until communication is restored.

b. Range Control (9780796-2723/2155) 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 utilize. Range Control will also be notified immediately upon completion of activities.

c. Immediately upon notification of impending UAS or other hazardous activity Range Control will broadcast the pertinent information on all available frequencies (SABER and FM 38.85 Mhz), and make any other dissemination of information deemed appropriate. Range Control will coordinate with the FAA Boston TRACON 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 are required to have a pre-accident plan prior to operations and will treat all accidents/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

DA Form 7305-R

Worksheet for telephonic Notification of Aviation Accident/Incident

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

Flight Regulations

FORSCOM Supplement 1 to AR 95-23 (Cited in para 4-1k)

Unmanned Aircraft Systems Flight Regulations

FORSCOM Regulation 385-1 (Cited in para D-4b(3)(a))

Forces Command Safety Program

FORSCOM Regulation 350-1

Active Duty Training for FORSCOM Units

AR 95-1 (Cited in para 4-1k, 4-4a)

Flight Regulations

AR 95-2 (Cited in para 4-1k, 5-1b(1))

Air Traffic Control, Airspace, Airfields, Flight Activities, and Navigational Aids

AR 95-23 (Cited in para 1-5a, 2-1, 2-3a, 2-3b, 2-4e, 4-1k, 5-2a 5-2b)

Unmanned Aircraft System Flight Regulations

AR95-30 (Cited in para D-4b(3)(d))

Participation in a Military or Civil Aircraft Accident Safety Investigation

AR 385-40 (Cited in para D-4b(3)(a), D-4b(#)(c), Glossary Section II (Emergency)

(Precautionary Landing)

Accident Reporting and Records

AR 600-8-1 (D-4h(1))

Army Casualty Program

Federal Aviation Administration Joint Order 7400-8 (Cited in para 3-1.a.)

Special Use Airspace

Fort Devens Regulation 350-3 Range Regulation (cited in para 6-1a)

Range Regulation

Training Circular 1-210 (Cited in para 4-1k)

Aircrew Training Program Commander's Guide to Individual, Crew, and Collective Training

Training Circular 1-600 (Cited in para 2-3a, 2-3b, 4-1k, 5-2a)

Unmanned Aircraft Systems Commander's Guide and Aircrew Training Manual

Training Circular 1-611 (Cited in para 2-3a, 2-3b, 4-1k, 5-2a)

Small Unmanned Aircraft System Aircrew training Manual

Section II. Related Publications

AR 25-400-2

The Army Records Information Management System (ARMIS)

AR 360-1

The Army Public Affairs Program

AR 385-95

Army Aviation Accident Prevention

Field Manual 5-19

Composite Risk Management

Section III. Referenced Forms

14CFR part 67 (Cited in para 5-2a, 5-2b)

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 5-2a, 5-2b)

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

14CFR part 91.111 (Cited in para 5-2b)

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 5-2b)

Title 14, Code of Federal Regulations, Part 91.113, General Operating and Flight Rules, Right -Of-Way Rules: Except Water Operations

14CFR part 91.115 (Cited in para 4-1)

Title 14, Code of Federal Regulations, Part 91.115, General Operating and Flight Rules, Basic VFR Weather Minimums

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

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

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

D-3. Once a ROZ is established, an L-NOTAM will be published with the ROZ location, active times and dates, altitudes and the contact frequency (see paragraph 4-3 for requesting L-NOTAM). 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.

D-4. To the extent possible temporary ROZ(s) will not impact the helicopter air routes. (Fort Devens Reg 350-3, appendix J-3).

D-5. Not all of the Fort Devens TAs are within the Fort Devens SUA. Temporary UAS ROZ's will not be established outside of Restricted Airspace R-4102.

D-6. Table B-1 lists TAs with flight restrictions.

Table B-1. Training Area Restricted Operating Zone(s) (ROZ(s))

Training Area	Flight Restrictions
TA 9A	No UAS operations allowed
TA9B	No UAS operations allowed
TA9C	No UAS operations allowed
TA12A	No UAS operations allowed
TA12B	No UAS operations allowed
TA12C	No UAS operations allowed
TA15B	No UAS operations allowed

Appendix C Unmanned Aircraft System Risk Assessment

Fort Devens UAS Risk Assessment							
DTG:	Mission #				Brigade Commander Approval	Limitations Exceeded	TOTAL
	0	1	2	3		NO GO	
WEATHER							
Thunder Storms	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 5 sm		2 to 3 sm	< 2 sm		
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 (WORST 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	<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: Plt Ldr/CO Cdr	0 - 15						
Med: BN Cdr	16 - 24						
High: Brigade Cdr	>30						
Extremely High: GO	>30						
							MISSION APPROVAL SIGNATURE

Unmanned Aircraft Systems (UAS) Pre-Accident Plan

D-1. General

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

- (1) Type of UAS accident: Ground or Flight
- (2) Model of UAS (Hunter, Shadow, Raven, etc.)
- (3) Type of assistance needed if any: Fire Department, MEDEVAC, or full response.
- (4) Location (Military Grid/Lat Long) of accident.
- (5) Type and Severity of Injuries (If no injuries, so state)
- (6) Names and Rank of injured (if possible)
- (7) Date/Time of accident and/or notifiers time of arrival at accident site:
- (8) Civilian personnel or property involved in accident: Yes or No
- (9) Ammunition/Explosives/HAZMAT/Fire involved: Yes? No or unknown
- (10) Owning Unit
- (11) Notifiers Information:
 - (a) Name and Rank:
 - (b) Unit or Agency:
 - (c) Phone Number or Frequency and/or call sign:
 - (d) Other known agencies notified or proceeding to the site.
 - (e) Other information as appropriate

b. Contact Range Control with the above information at (978) 796-2723/2155.

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 personnel involved that help is on it's way.
- e. Do not answer media questions; politely refer all questions to the Public Affairs Officer.
- g. Remain at the accident site until properly relieved.

D-3. Primary Crash Notification System

a. Organizations will ensure that personnel are familiar with their responsibilities and properly trained on all aspects of crash rescue operations including the health hazards associated with a crash site and 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) Range Control will:

(a) Initiate the primary crash notification system for a UAS accident and relay information (required assistance; fire, ambulance) to Devens Dispatch. It is crucial that the type of response requested is relayed accurately.

(b) Alert the DoD Police to the emergency to grant traffic priority to rescue vehicles.

(c) Notify the Air Traffic and Airspace Officer (Range Officer or designated representative) who will immediately notify the Garrison Commander, Deputy Commander, DPTS, Range Safety Officer, Installation Safety Officer and the Department of the Army Representative, FAA Eastern Service Area, Atlanta, Georgia. The DPTS will initiate a Serious Incident Report IAW AR 190-40.

(d) Devens Fire and Ambulance will assume command of the incident site until terminated or released to the appropriate Fort Devens level of command.

(e) The owning unit Commander or ASO will:

1. Provide Range Control with information from DA FORM 7305-R
2. Assume command of the accident site after the Fire Chief and Devens Safety Office releases it.
3. Provide guards to secure the site and preserve evidence and control access.
4. Secure all aircraft records and crewmember flight records and equipment.
5. Recover the aircraft after its release by the accident investigation by the Safety Office.
6. Be prepared to brief the Installation Commander, within 48 hours, on all Class A accidents.
7. Provide resources and assistance to the accident board as necessary.

(f) Installation Safety Office will:

1. Notify the United States Army Combat readiness Center and FORSCOM according to AR 385-40 and FORSCOM Regulation 385-1.
2. Proceed to the accident scene, get the necessary information to notify and advise the site commander.
3. Establish the aircraft accident investigation board according to AR 385-40 or as directed by the Combat Readiness Center.
4. If required, notify the FAA according to AR 95-30 (Participation in a Military or Civil Aircraft Accident Safety Investigation).

Appendix E

Memorandum of Agreement (MOA) concerning the operation of Department of Defense Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS)

**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.

Memorandum of Agreement (MOA) Concerning the Operation of Department of Defense Unmanned Aircraft Systems in the National Airspace System (NAS)

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.

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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.

UAS Pilot/Operator¹/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 UAS Access to the 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.

Memorandum of Agreement (MOA) Concerning the Operation of Department of Defense Unmanned Aircraft Systems in the National Airspace System (NAS)

- 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.

DoD/FAA Partnering on 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.
- 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

Memorandum of Agreement (MOA) Concerning the Operation of Department of Defense Unmanned Aircraft Systems in the National Airspace System (NAS)

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

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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.

For the Department of Defense


The Honorable Gordon England, Deputy Secretary

9/24/07
Date

For the Federal Aviation Administration



June 12, 2007

Memorandum of Agreement (MOA) Concerning the Operation of Department of Defense Unmanned Aircraft Systems in the National Airspace System (NAS)

Appendix F Sample Memorandum

DEPARTMENT OF THE ARMY
 1ST BATTALION 87TH INFANTRY DIVISION
 64 LOBAS ROAD
 PODUNK, WEST VIRGINIA 09927-9999

WVNG-TC-(350)

1 June 2010

MEMORANDUM FOR Range Control, Fort Devens, MA

SUBJECT: Certification and authorization of personnel to conduct UAS operations and positions authorized.

1. References: Fort Devens Regulation 95-23, dtd 1 June 2010; AR 95-23 dtd 7 Aug 2006; TC 1-600, dtd Aug 2007, and TC 1-611, dtd Aug 2006.
2. The below listed personnel of A Company (WB6SAA) 1-87th IN BN have satisfactorily completed all qualification, training, evaluation and currency requirements of AR 95-23 and are certified to serve in the positions indicated.

<u>NAME</u>	<u>RANK</u>	<u>MC</u>	<u>AO</u>	<u>EO</u>	<u>IO</u>	<u>SO</u>	<u>UAS SYSTEM</u>
Mudd, Claude D.	CPT	X	X	X	X		Raven
Smith, Jon B.	SFC		X		X	X	Raven, Shadow
Dolan, Don	SGT			X			Puma, Raven
Friday, Joe	GS07	X		X			Raven
Gannon, William	GS05		X	X			Raven

3. The above listed personnel have undergone and successfully completed the medical requirements as stated in AR 95-23 and AR 40-501.
4. Point of contact at the Battalion Headquarters is the undersigned or the S-3 SGM Gofast at 999-333-5555, or email john.f.gofast@us.army.mil.

JOHN J. FLANAGAN
 LTC, IN
 Commanding

Memorandum for Commanders' Certification of UAS Personnel

Glossary

Section I. Abbreviations

AGL

Above Ground Level

AO

Unmanned aircraft operator

AR

Army Regulation

ARAC

Army Radar Approach

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

COA

Certificate of Waiver or Authorization

DAR

Department of the Army Representative

DoD

Department of Defense

EO

External Operator

FAA

Federal Aviation Administration

FM

Frequency Modulated

FORSCOM

United States Army Forces Command

FT

Feet

GCS

Ground Control Station

IAW

In Accordance With

IO

Instructor Operator

IOC

Installation Operations Center

KT

Knots

L

Local

LG

Land Group

L-NOTAM

Local Notice to Airmen

LS

Landing Strip

MC

Mission Commander

MOA
Military Operations Area

MSL
Mean Sea Level

NAS
Nation Airspace System

NM
Nautical Mile

NOTAM
Notice to Airmen

PO
Mission Payload Operator

R
Restricted Area

RAE
Regiment Aviation Element

ROZ
Restricted Operating Zone

SM
Statute Miles

SO
Standardization Instructor Operator

SUA
Special Use Airspace

TA
Training Area

TC
Training Circular

UAS
Unmanned Aircraft System

UHF

Ultra High Frequency

UT

Unit trainer

VFH

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”.