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US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND
AVIATION AND MISSILE RESEARCH, DEVELOPMENT, AND ENGINEERING CENTER
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RDMR-AEV

13 AUG 2009

AWR RQ-7B20090813

MEMORANDUM FOR Project Manager, Unmanned Aircraft Systems (SFAE-AV-UAS),
Redstone Arsenal, AL 35898-5000

SUBJECT: Airworthiness Release (AWR) for Operation of RQ-7B Shadow Unmanned
Aircraft System (UAS) (AWR RQ-7B20090813) (TN 73464)

1. Scope: This memorandum constitutes an Airworthiness Release Qualification Level 3 authorizing operation of the RQ-7B Shadow Unmanned Aircraft System within active restricted airspace (R-5802) and the Federal Aviation Administration (FAA) approved Certificate of Authorization (COA) area at Ft. Indiantown Gap, PA.
2. Validity: This AWR terminates 13 AUG 2011, upon changes in configuration of the subject equipment, or upon issuance of a later AWR, whichever occurs first. This AWR is valid only for operations within active restricted airspace (R-5802) and the Federal Aviation Administration (FAA) approved Certificate of Authorization (COA) area at Ft. Indiantown Gap, PA. AWR RQ-7B20060909 is hereby rescinded and replaced by this AWR.
3. Appendices: This memorandum and its appendices shall be carried in the logbook, controlling Ground Control Station (GCS), and aircraft historical record file.

Appendix A - Restrictions and Operating Information
Appendix B - Configuration and Installation Detail
Appendix C - Inspections, Maintenance, and Logbook Instructions
Appendix D - Reference List

4. The points of contact (POC) are (b) (6) commercial (256) 313-5364, or email: (b) (6) @us.army.mil, or (b) (6) commercial (256) 313-5375, or e-mail: (b) (6) @us.army.mil.

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Appendix A - Restrictions and Operating Information:

WARNING

The RQ-7B Shadow UAS has not completed full airworthiness qualification. All flight operations shall be conducted in a manner to minimize exposure to manned aircraft and populated ground areas.

WARNING

Accidental operation of the RQ-7B Shadow UAS outside of active restricted airspace and/or the FAA approved COA shall be immediately reported to Air Traffic Control (ATC) / Range Control. The operator shall make immediate actions to correct the flight path and/or follow ATC/Range Control direction.

WARNING

The RQ-7B Shadow UAS has not undergone testing to determine Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC) or susceptibility to internal or external electromagnetic fields. The aircraft may experience erroneous data reports, and/or loss of control of aircraft, and/or loss of control of laser payload. Operators shall avoid sources of electromagnetic fields such as but not limited to transmitters, power lines, and cell towers.

WARNING

The RQ-7B Shadow UAS has not undergone Explosive Atmosphere testing. A serious fire or explosion may result if the aircraft is powered while flammable vapors are present during ground or flight operations. The precautions in paragraph 3 of this appendix shall be observed in order to ensure safe operations.

WARNING

The RQ-7B Shadow UAS does not have a sense and avoid system. Mid-air collision is a risk. All flight operations shall be conducted to ensure that minimum separation standards are maintained.

WARNING

The RQ-7B Shadow UAS Airborne Computing Equipment (ACE) II may experience erroneous reboots (warm boots) in flight. Multiple warm boots in

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flight have resulted in loss of aircraft control. The precautions in paragraph 19 of this appendix shall be observed in order to ensure safe operations.

CAUTION

The RQ-7B Shadow UAS has not been tested for the effects of lightning. Flight operations shall be restricted to no less than 25 nautical miles from lightning activity.

1. The aircraft operating instructions, procedures, and limitations shall be in accordance with references D-1 through D-6 (as applicable), D-7, D-8, D-9 and this AWR. In the event of conflict between these documents, the information in this AWR shall prevail.
2. Flight of the RQ-7B Shadow UAS is restricted to Visual Meteorological Conditions (VMC).
3. Due to lack of Safety of Flight (SOF) Explosive Atmosphere testing, the following precautions shall be observed in order to ensure safe flight:
 - a. The aircraft shall be un-powered and grounded IAW reference D-1 thru D-4 (as applicable) and D-7 during refueling operations.
 - b. Ground operations of the aircraft shall be conducted at the greatest distance practical (no less than 50 feet) from all other aircraft and fuel depots.
4. Data link frequencies shall be de-conflicted through the local frequency manager/coordinator prior to conducting operations.
5. The Return Home Point shall be inside active restricted airspace, over a suitable ditch point, within range of the omni-antenna.
6. An appropriate Return Home Point shall be set such that the aircraft will not exit the approved operational airspace during lost link flight.
7. In the event of loss of control, local ATC/Range Control and the chase aircraft/observers shall be notified.
8. In the event of an engine failure or other catastrophic failure, local ATC/Range Control and chase aircraft/observer will be notified immediately and the aircraft shall be ditched over the appropriate Return Home Point in active restricted airspace if possible. If not possible to make the Return Home Point, every effort shall be made to visually inspect the probable impact area with the payload prior to parachute deployment.

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9. The flight path of the aircraft shall be within a 4:1 glide ratio of a pre-established ditching point.
10. Flight over populated areas shall be avoided.
11. The aircraft shall not be flown at altitudes below 2000 feet Above Ground Level (AGL) except for launch and recovery activities.
12. During preflight someone other than the operator shall verify that the Return Home Point is entered correctly.
13. Local ATC/Range Control shall be notified with a flight plan or flight strip prior to departure to aid in airspace de-confliction.
14. Verified loss of any aircraft flight critical subsystem or Ground Control Station (GCS) flight critical sub-system shall require Return to Base (RTB).
15. All flight operations shall be conducted with a minimum of one controlling GCS or PGCS and one back-up GCS or PGCS at each launch/recovery site.
16. Airspace de-confliction outside of the restricted airspace shall be IAW the FAA COA.
17. Any unexplained anomaly shall initiate a return to the Return Home Point, or trouble shooting may be performed within the active restricted airspace
18. Any procedural deficiencies or flight anomalies detected during operations shall be corrected, annotated, and reported to the POC listed in paragraph 4 of this AWR.
19. Simultaneous loss of primary and secondary data link, loss of fuel load indication, unexplained loss of Return Home Point, or Rotor Air Temperature (RAT) indication of "-0" may be indicative of an ACE II warm boot. In the event of a warm boot the operator shall initiate RTB, except as needed to meet mission requirements, and report the anomaly to maintenance personnel. In the event of multiple warm boots initiate RTB immediately.
20. Commander's Corner:

The RQ-7B Shadow Unmanned Aircraft System (UAS) has not completed full airworthiness qualification testing. Strict adherence to the Operators Manual and this AWR will minimize the hazards of operation. The RQ-7B aircraft may report a flight altitude +/- 200ft of actual altitude, flight altitude should be planned accordingly.

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Appendix B - Configuration and Installation Detail:

Configuration- This aircraft is a production configuration as identified in references D-1 through D-7 (as applicable by system). Any deviation to production configuration shall be approved in writing by the Aviation Engineering Directorate (POC in cover memorandum paragraph 4) for this AWR to be valid.

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Appendix C - Inspections, Maintenance, and Logbook Instructions:

1. In the event any operating limit, or limits established by this release, is exceeded in addition to the normal entry on DA Form 2408-13, appropriate inspections shall be performed prior to next flight.

2. Aircraft Logbook Entries:

a. In accordance with Department of the Army (DA) Pamphlet X-Draft-C1, Functional Users Manual for the Army Maintenance Management System – Unmanned Aerial Vehicle Systems (TAMMS-UAVS), the following entries shall be made on the DA Form 2408-13-1 and shall be perpetuated on each form until superseded by another AWR, or until reason for limitation is removed.

(1). Place a circled "X" on the form IAW TAMMS-UAVS. In the Fault Information Block, make the following entry: "Operate within limitations and restrictions specified in the enclosed airworthiness release dated 13 AUG, 2009."

(2). A weight and balance form DD365 shall be maintained on file in each aircraft's log book and weight and balance book maintained by the operational unit.

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Appendix D - Reference List:

1. Technical Manual 9-5895-XXX-10, Technical Operators Manual for Shadow 200 TUAV System with RQ-7B Air Vehicles, dated 27 August 2004, with latest updates.
2. Technical Manual 9-5895-YYY-10, Technical Operators Manual for Shadow 200 TUAV System with RQ-7B Air Vehicles, dated 22 October 2004, with latest updates.
3. Technical Manual 9-5895-XXX-20, Maintenance Manual Organizational and Direct Support for Shadow 200 TUAV System, dated 27 August 2004, with latest updates.
4. Technical Manual 9-5895-YYY-20, Maintenance Manual Organizational and Direct Support for Shadow 200 TUAV System, dated 22 October 2004, with latest updates.
5. Technical Manual 9-5895-XXX-20P, Unit, Direct Support General Support maintenance Repair Parts and Special Tools List, dated 24 August 2004, with latest updates.
6. Technical Manual 9-5895-YYY-20P, Unit, Direct Support General Support Maintenance Repair Parts and Special Tools List, dated 22 October 2004, with latest updates.
7. Technical Manual 9-5895-681-CL, Shadow 200 Operator's and Crewmember's Checklist, dated 28 February 2006, with latest updates.
8. Fort Indiantown Gap Regulation 95-1, Flight Procedures
9. Fort Indiantown Gap Regulation 350-2, Range Operations