



DEPARTMENT OF THE ARMY
US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND
AVIATION AND MISSILE RESEARCH, DEVELOPMENT, AND ENGINEERING CENTER
5400 FOWLER RD
REDSTONE ARSENAL, AL 35898-5000

REPLY TO
ATTENTION OF

RDMR-AEV

RMAX20090305R1

R1: 21 May 2009
5 March 2009

MEMORANDUM FOR U. S. ARMY, Night Vision and Electronics Sensors Directorate,
(NVESD) (b) (6) Project Manager, RMAX UAV Operations, Fort Belvoir, VA
22060-5806

SUBJECT: Airworthiness Release (AWR) Qualification Level 3 for Operation RMAX
Model G0-1 Unmanned Aircraft System (UAS), TN (68494-A), AWR (RMAX20090305R1)

1. Scope: This memorandum constitutes an Airworthiness Release Qualification Level 3 AWR authorizing operation of the RMAX Unmanned Aircraft System with 1.) standard manufactures configuration with no payloads and 2.) with GPS radio and antenna mounted inside the existing side pod within active restricted airspace and within the Federal Aviation Administration (FAA) approved Certificate of Authorization (COA) area at Ft. AP Hill, VA. This AWR is approved for NVESD aircrafts tail numbers 742 and 743.

2. Validity: This AWR is new and terminates 2 years after issuance, upon changes in configuration of the subject equipment, issuance of a later AWR, or NVESD discontinues operation and ownership of the system, whichever occurs first. This AWR is valid only for operations within active restricted airspace (R-6601) and within the Federal Aviation Administration (FAA) approved Certificate of Authorization (COA) area at Ft. AP Hill, VA.

3. Appendices: This memorandum and appendix A shall be carried in the logbook and a complete AWR copy with all appendices kept in the 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 point of contact (POC) is (b) (6) DSN 897-8951, Commercial
(256) 313-8951, E-Mail: (b) (6) @us.army.mil (b) (6) DSN 897-8455,
Commercial (256) 313-8455-3403, or E-mail: (b) (6)

(b) (6) of Aviation Engineering

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Appendix A: Restrictions and Operating Information

WARNING

The RMAX 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 RMAX 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 take immediate actions to correct the flight path and/or follow ATC/Range Control direction.

WARNING

The RMAX UAS has not undergone complete Electromagnetic Environmental Effects (E3) testing. The aircraft may experience erroneous data reports, and/or loss of control of aircraft and/or payload. Operators shall avoid sources of electromagnetic fields such as but not limited to transmitters, power lines, and cell towers.

WARNING

The RMAX UAS has not undergone SOF Explosive Atmosphere Testing, a serious fire or explosion may result if the aircraft is powered in the presence of flammable vapors during ground or flight operations. The precautions in paragraph 3 of appendix A shall be observed in order to ensure safe operations.

WARNING

The RMAX 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 RMAX UAS will rely on ground observers to provide airspace de-confliction. If radio contact between the ground observers and the Ground Control Station (GCS) Operator is lost; the GCS operator shall return the aircraft to the return home waypoint/return to base (RTB) and loiter until communications are re-established.

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WARNING

RMAX UAS is a rotary wing vehicle and has no ability to auto-rotate. In the event of catastrophic engine or other failure, the AV will fall to earth. The area immediately below the AV shall be kept clear of all obstacles, personnel and any other property to preclude damage and injury during launch and recovery operation.

CAUTION

The RMAX UAS (to include GCS and supporting subsystems) has not been tested for lightning. Flight operations shall be restricted to no less than 25 nautical miles from lightning activity.

CAUTION

Noise characterization testing has not been completed on this system. Prolonged exposure to engine noise at close proximity may contribute to hearing loss. It is recommended that ear plugs be worn while launching/recovering the air vehicle.

CAUTION

Maximum wind speed for flight is 30 knots. Take-off should not be attempted if crosswind components exceed 15 knots.

CAUTION

The RMAX UAS has not been qualified for effects of icing. Flights operations shall be restricted from flight into known icing conditions. The aircraft will return to base if any icing is detected on the aircraft by visual observation, by ice detection system, or if other aircraft operating within 25 nautical miles report icing conditions.

1. The aircraft operating instructions, procedures, and limitations shall be in accordance with the reference D1 – D4, and this AWR. In the event of conflict between these documents, the information in this AWR shall prevail.
2. Flight of the RMAX UAS is restricted to Visual Flight Rules (VFR), Visual Meteorological Conditions (VMC), and 500 feet maximum AGL and 1500 meters maximum distance from the ground control station operator and within area described in approved FAA COA.
3. Due to lack of SOF Explosive Atmosphere testing, the following precautions shall be observed in order to ensure safe flight:

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- a. The aircraft shall be un-powered and properly grounded during refueling operations IAW reference D2.
 - b. While on the ground the aircraft shall maintain the greatest distance practical from all other aircraft and fuel depots, while achieving mission objectives.
4. Data link frequencies shall be de-conflicted through Director of Plans, Training, Mobilization and Security (DPTMS) and Ft. AP HILL Aviation officer and references D3.
 5. The auto return home function acts immediately when data link is lost. AV shall be monitored constantly by the GCS operator during all aspects of the flight operations and shall not be fully autonomous at any time.
 6. The return home waypoint shall be inside proposed Ft. AP HILL airspace as described in approved FAA COA, reference D3, and over an approved impact area.
 7. With each installation of a new or different test package, the Center of Gravity (CG) shall be calculated and maintained within limits and Aviation Engineering Directorate shall be contacted (POCs in cover memorandum paragraph 4) to determine if a new AWR is required.
 8. Ground observers shall maintain positive visual contact with the aircraft at all times.
 9. Flight over populated areas is prohibited.
 10. All UAS flight operations, to include planned flight profiles, shall be coordinated with Director of Plans, Training, Mobilization and Security (DPTMS) and Ft. AP HILL Aviation officer to ensure that the RMAX UAS remains on the ground or returns immediately to start point if any other non co-operative aircraft or ground personnel enters the proposed Ft. AP HILL airspace as described in approved FAA COA.
 11. During preflight someone other than the operator shall verify that the return home waypoint is entered correctly.
 12. As a minimum there shall be a crew consisting of a qualified RMAX Operator (RO)/ Pilot Operator (PO), Safety Observer (SO), Maintenance Operator (MO) and Ground Control Operator (GCO) for each planned flight plus nominal ground observers.
 13. Director of Plans, Training, Mobilization and Security (DPTMS) and Ft. AP HILL Aviation officer shall be briefed before each flight with expected mission duration to aid in deconfliction.
 14. Verified, complete and non-recoverable loss of any AV or Ground Control Station (GCS) sub-system shall require RTB. Degraded flight is not authorized.

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15. With any unexplained anomaly RO/PO shall initiate return to base (RTB).
16. Any Procedural deficiencies or flight anomalies detected during operations shall be corrected, annotated, and reported to the POCs listed in paragraph 4 of this AWR prior to proceeding to the next flight.
17. Commander's Corner:

The RMAX Unmanned Aircraft Systems (UAS) has not completed full airworthiness qualification testing. Strict adherence to the Operators Manuals and this AWR will minimize the hazards of operation.

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Appendix B - Configuration and Installation Detail:

1. Configuration- This aircraft is a production configuration RMAX UAS as identified in references D1-D3. Any deviation to production configuration shall be approved in writing by Aviation Engineering Directorate (POCs 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. Any incident or malfunction of the aircraft suspected of being related to these configuration modifications shall be reported immediately to the POC in cover memorandum paragraph 4.

2. Aircraft Logbook Entries:

In accordance with Department of the Army (DA) Pamphlet 738-751, the following entries shall be made on the DA Form 2408-13-1 and shall be perpetuated on each form during the period of installation, until superseded by another AWR, or until reason for limitation is removed.

- a. Place a circled "X" on the form IAW DA Pamphlet 738-751. In the Fault Information Block, make the following entry: Operate within limitations and restrictions specified in the enclosed AWR.
- b. 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 operation unit.

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Appendix D - Reference List:

1. YAMAHA Autonomous RMAX G0-1 FMS2+forG0-1 (Operator's manual), Dated July 2004
2. YAMAHA Autonomous RMAX G0-1, Instruction Manual (Maintenance and troubleshooting), Dated July 2004
3. RMAX SOP, RMAX Flight Operations and Pilot Selection/Training
4. Army Regulation 95-2, Airspace, Airfield/Heliports, Flight Activities, Air Traffic Control, and Navigational Aids 10May 2007 and USARC Regulation 350-2 Training, Intelligence Training in the US Army Reserve Command.