



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

R1: 26 Sep 12
12 Sep 11

RDMR-AEV

AWR MQ-5B20110912R1

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

SUBJECT: Airworthiness Release (AWR) Qualification Level 3 for the MQ-5B Hunter
Unmanned Aircraft System (UAS) at Cochise College Airport (AWR MQ-5B20110912R1)
(Task Number 101565A).

1. Scope: This memorandum constitutes an AWR Qualification Level 3 authorizing operation of the MQ-5B Hunter UAS within a Federal Aviation Administration (FAA) approved Certificate of Waiver or Authorization (COA) area at Cochise College Airport.

2. Validity: This AWR is a revision of AWR MQ-5B20110912 and terminates on May 6, 2013, upon changes in configuration of the subject equipment, or upon issuance of a later AWR of same subject, whichever occurs first. This AWR is valid only for operation of the MQ-5B Hunter UAS within a FAA approved COA area at Cochise College Airport near Douglas, Arizona. Weapons carrying and firing are NOT authorized. Laser designation is NOT authorized.

3. Appendices: This AWR with all appendices shall be carried in the logbook, controlling One System Ground Control Station (OSGCS), and 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) for this action is (b) (6) commercial
(256) 313-5347, or E-mail: (b) (6) Alternate POC is (b) (6)

(b) (6) commercial (256) 876-4947, or E-mail: (b) (6)

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Aviation Engineering



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Appendix A: Restrictions and Operating Information

WARNING

The MQ-5B Hunter 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 MQ-5B Hunter UAS outside of the FAA COA area at Cochise College Airport shall be immediately reported to Air Traffic Control (ATC). The operator shall make immediate risk identification and take actions to correct the flight path and/or follow ATC direction.

WARNING

The MQ-5B Hunter UAS has not undergone complete Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC) testing. Flight into high intensity EMI areas may result in erroneous data reports and/or loss of control of aircraft. Operators shall avoid known high intensity EMI areas.

WARNING

The MQ-5B Hunter UAS does not have a sense and avoid system. Mid-air collision is a risk. All flight operations shall be conducted in a manner to ensure that manned and unmanned aircraft maintain safe separation.

WARNING

The man-machine interfaces in the OSGCS have not been evaluated. The design and functionality details of the human performance of the MQ-5B Hunter UAS are unknown. The system shall be used with extreme caution.

CAUTION

The MQ-5B Hunter aircraft has not been fully tested for the effects of lightning. Aircraft flight operations shall be restricted to no less than 25 nautical miles from lightning activity. Local procedures should be followed for the GCS operations during inclement weather.

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NOTE

The MQ-5B Hunter UAS OSGCS has undergone neither formal Human Factors review or evaluation nor formal airworthiness qualification testing. The performance of the OSGCS cannot be guaranteed to be accurate, and the workload in the OSGCS may not be acceptable for the various mission scenarios.

1. The aircraft operating instructions, procedures, and limitations shall be in accordance with (IAW) Operator's Procedures (Appendix D, Reference 1), Operator and Crewmember's Checklist (Appendix D, Reference 2), Flight and Ground Operating Procedures (Appendix D, Reference 3), and this AWR. In the event of conflict between these documents, the information in this AWR shall prevail.
2. Flight of the MQ-5B Hunter UAS is restricted to Visual Meteorological Conditions (VMC).

WARNING

The MQ-5B Hunter UAS (to include the OSGCS, data link and supporting subsystems) has not undergone explosive atmosphere testing. A serious fire or explosion may result if the equipment is powered while flammable vapors are present during ground or flight operations.

3. Due to lack of explosive atmosphere testing, the following precautions shall be observed in order to ensure safe flight:
 - a. The MQ-5B Hunter UAS shall maintain the greatest distance practical from all other aircraft and fuel depots consistent with existing range operating procedures for unqualified aircraft. Whenever possible, the minimum distance allowed shall never be less than 50 feet.
 - b. When the MQ-5B Hunter UAS are powered during ground operations, the crew shall assure that sufficient ventilation and airflow exists around the aircraft to prevent accumulation of hazardous/flammable vapors. Forced ventilation shall be used during all hangar operations.
 - c. The aircraft shall be grounded at all times during refueling operations. The aircraft shall be un-powered and physically disconnected from the primary power source during refueling operations.
4. In the event of a single engine failure, the operator shall initiate a Return to Base (RTB) prior to attempting to restart the engine IAW Operator's Procedures (Appendix D, Reference 1).
5. Data link frequencies shall be de-conflicted through the local frequency manager/coordinator before any operation.

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6. The auto return home function shall be set for no more than 15 seconds of lost data link.
7. The return home waypoint shall be over an approved impact area.
8. In the event of dual engine failure or other catastrophic failure, ATC will be notified immediately. The Mission Commander (MC) and/or External Pilot (EP) shall determine if landing is possible. If landing is possible, land as soon as possible. If landing is not possible, the aircraft shall be ditched over the return home waypoint. If it is not possible to make the return home waypoint, every effort shall be made to visually inspect the impact area with the payload prior to impact.
9. Mission profiles should be planned to minimize flight operations that are outside of the 4:1 glide ratio to the ditch point. If mission planning identifies flight outside of the 4:1 glide slope, additional ditch points shall be identified, planned, and briefed during the mission briefing.
10. In case of loss of communications between the aircraft operator and ATC, the aircraft shall be directed to the return home waypoint.
11. The aircraft shall not be flown at altitudes below 2000 feet Above Ground Level (AGL) except for launch and recovery activities.
12. ATC shall be briefed before each flight with expected mission duration to aid in airspace de-confliction.
13. During preflight, a member of the crew other than the Aerial Vehicle Operator (AVO) shall verify that the return home waypoint is entered correctly.
14. If a non-cooperative aircraft enters the FAA COA area at Cochise College Airport while occupied by the MQ-5B Hunter UAS, ground observers and/or chase plane shall alert the AVO who shall direct the Hunter UAS to a safe position.
15. Verified loss of any aircraft or OSGCS sub-system shall require RTB per Operator and Crewmember's Checklist (Appendix D, Reference 2). Degraded flight is not authorized.
16. Any unexplained anomaly shall initiate RTB per Operator and Crewmember's Checklist (Appendix D, Reference 2).
17. There shall be a minimum of one controlling OSGCS and one back-up OSGCS for all flight operations.
18. Flight over populated areas is prohibited.

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19. A qualitative EMC test shall be performed when any newly installed or relocated equipment not previously EMC tested on this aircraft with the exact electrical/electronic configuration are incorporated into the aircraft configuration.

20. 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.

21. A single MQ-5B Hunter AV (or system simulator) shall be operated from the OSGCS at any given time.

22. Commander's Corner:

The MQ-5B Hunter UAS has been issued an Airworthiness Qualification Level (AQL) 3 AWR in accordance with (IAW) Aviation Engineering Directorate (AED) Standing Operating Procedure (SOP) 70-62-1-UAS and has not met full airworthiness qualification or reliability demonstration requirements. An AQL 3 AWR is not based on traditional airworthiness substantiation from test data or analyses and is issued for expendable UAS that are intended to regularly operate in Restricted Airspace and small UAS that intend to operate in combat zones. These UAS are not designed to accepted engineering standards and/or do not possess adequate engineering data to determine their compliance with accepted standards. The data requirements for AQL 3 directly correlate to the proposed operational restrictions, area of operation, and allowed usage of the UAS. These systems have undergone a system level safety assessment that identifies the hazards for the intended operations. The AQL 3 AWR applies restrictions to mitigate the hazards identified in the system safety documentation. If the hazards cannot be mitigated through restrictions, the associated risk must be accepted at the appropriate level before the AWR is issued IAW AR 70-62.

No High Intensity Radio Transmission Area (HIRTA) messages exist for this aircraft, payload, or OSGCS. Exercise extreme caution when operating in the vicinity of high intensity electronic emitters. A consideration in mission planning should be that flight into high intensity EMI areas may result in erroneous data reports and/or loss of control of aircraft. Operators should avoid flying within a 1 kilometer (km) radius cylinder around the emitter.

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Appendix B – Configuration and Installation Detail:

1. Configuration: This aircraft is an operational configuration MQ-5B Hunter UAS as identified in the Operator's Procedures (Appendix D, Reference 1). Any deviations to this configuration shall be approved in writing by the Aviation Engineering Directorate (POC in cover memorandum paragraph 4) for this AWR to be valid.
2. Ensure all new cables have been routed and clamped to assure protection from physical abuse, such as being stepped on, door slammed on, or used as a hold. Ensure the cables are adequately protected from vibration, shafting, or stretching. Cables shall not be clamped to control tubes or cables, fuel lines, hydraulic lines, or other electrical or electronic cables.

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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 Department of the Army (DA) Form 2408-13-1, 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 memorandum paragraph 4.

2. Aircraft Logbook Entries:

In accordance with 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” in the STATUS block of the form. In the FAULT/REMARKS block, make the following entry: “Operate within limitations and restrictions specified in the enclosed airworthiness release AWR MQ-5B20110912R1 dated 26 Sep 12.”

b. On DA form 2408-13-1, as required by Appendix A paragraph 19, enter a dash “-” in the STATUS block of the form and the following in the FAULT/REMARKS block: “EMC test required IAW the enclosed AWR MQ-5B20110912R1 dated 26 Sep 12.” Upon successful completion of the required EMC test, this entry shall be removed. Adjust DA form 2408-13-1 as appropriate.

c. A weight and balance DD Form 365-4 shall be maintained on file in each aircraft’s log book and weight and balance book maintained at the Hunter Northrop-Grumman Depot in Sierra Vista, AZ or by the operating unit.

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Appendix D - Reference List:

1. Operator's Procedures:

a. Technical Manual, 1-1550-692-10, latest revision, subject: Operator's Procedures for the Hunter MQ-5B Unmanned Air Vehicle System.

b. Technical Manual, 1-1550-TCDL-10 (DRAFT), latest revision, subject: Operator's Procedures for the Hunter MQ-5B TCDL Unmanned Air Vehicle System.

2. Operator's Checklist:

a. Technical Manual, 1-1550-692-CL, latest revision, subject: Technical Manual Operator's and Crewmember's Checklist, Drone Aircraft: MQ-5B Hunter Unmanned Air Vehicle.

b. Technical Manual, 1-1550-TCDL-CL (DRAFT), latest revision, subject: Technical Manual Operator's and Crewmember's Checklist, Drone Aircraft: MQ-5B Hunter Unmanned Air Vehicle.

3. Technical Manual, SDM-SV-3401, Northrop Grumman, 22 September 2010 or latest revision, subject: Flight and Ground Operating Procedures.