

AIRWORTHINESS ADVISORY

New or Modified Stores on Mission Design Series (MDS)

ATTACHMENTS:

- (1) Glossary of References and Supporting Information
- (2) Preliminary Stores Evaluation Letter Template
- (3) Military Flight Release (MFR) Template

PURPOSE:

This advisory describes the upfront tools to enhance and expedite Delegated Technical Authority (DTA) AW determinations and associated AW flight authorizations for testing and deploying new or modified stores on a Mission Design Series (MDS). This advisory clarifies interaction between Platform and Store Program Offices in order to harmonize processes for store-platform AW coordination with existing AW processes used by platforms. AFLCMC OI 62-601, *USAF AW processes for Delegated Technical Authorities*, is unaffected by this Advisory. Additionally, non-AW flight authorizations may be required by the MDS Program Manager (PM)/Chief Engineer (CE) (e.g. for configuration control); this Advisory does not affect the processes for stakeholders to satisfy additional Operational Safety, Suitability, and Effectiveness (OSS&E) requirements beyond AW to release an MDS for flight.

SCOPE:

This advisory applies to all USAF air systems testing or deploying new or modified stores.

CANCELLATIONS:

NONE.

DISCUSSION:

This section provides details on the tools/forms which will enhance the Director of Engineering (DOE) and MDS Chief Engineer (CE) DTA's ability to perform an AW determination on a new or modified store for testing or operations; and clarify the initial deliverables that the MDS DTA will obtain from the store program offices. Throughout the document DTA refers to the DOE and MDS CE authorities for the aircraft.

For any new or modified store, the DTA is required to make an AW determination. However the DTA determination can apply to a series of development/flight test activities as long as the DTA is given that information upfront.

Distribution Statement A – Approved for public release; distribution unlimited

- **Preliminary Evaluation:** The Store Program Office will make a preliminary evaluation of AW impact. This should be accomplished as early as the new or modified store is understood. Initial information concerning the new or modified store will be delivered to the MDS CE DTA as early as possible. The content of initial store information should include:
 - Store (or Store Modification) Description (hardware and software)
 - Estimated Program Schedule (Start/End dates, Flight Test schedule as available & ensure data collection timeframe is identified)
 - New or changed interface/integration between aircraft and store
 - New or changed interface/integration between stores
 - Recommendation on AW impact from Store Chief/Lead Engineer

A template for a preliminary store evaluation letter is provided in Attachment 2.

- **DTA Airworthiness Determination:** In accordance with AFLCMC OI 62-601, the MDS CE DTA will use the information from the Store Program Office to develop the Airworthiness Determination Form (ADF) for the new or modified store. Any incremental development strategies should be documented as part of the Airworthiness Plan in the ADF. Using the process in AFLCMC OI 62-601, the MDS CE DTA determines whether a new or modified program has no AW impact or has an AW impact, and the MDS DOE DTA determines whether a program is either reportable or non-reportable. Upon determination by the MDS DOE DTA, the MDS CE DTA will provide the Store Chief/Lead Engineer with a copy of their determination, regardless of AW finding.
 - If the determination is “No AW impact,” no new airworthiness flight authorization will be required. A non-AW configuration memorandum identifying the hardware and software configuration authorized for flight test may be required to satisfy OSS&E; details are subject to the MDS PM/CE. The MDS CE DTA will identify the parent flight authorization (MTC or MFR), upon which the Store Program Office will be executing their work.
 - If the determination is AW impact, the MDS CE DTA will complete a Certification Basis with Store Program Office awareness.
- **DTA Certification Basis and Compliance Report:** For reportable or non-reportable AW impact, a certification basis will need to be developed (in accordance with AFLCMC OI 62-601). It is important for all stakeholders to understand the data needed to “show compliance” and have an opportunity to affect their contracts if necessary. If data will not be available within some areas of MIL-HDBK-516, the MDS and Store Program Offices can begin identifying the risk associated with flights. In support of a flight test program, the certification basis should clearly identify the necessary data to issue an AW flight authorization which covers execution of the flight test program. When the flight test program will be accomplished incrementally, the certification basis shall clearly indicate the applicable criteria which must be addressed for each increment.

Upon review of the compliance report, the TAA or DOE DTA will identify the risks of any non-compliance along with recommendations of limitations and mitigations. Upon concurrence and appropriate documentation of limitations/mitigations and acceptance of risk, a flight authorization will be issued.

➤ **Flight Authorization:** The TAA or DOE DTA (or MDS CE DTA if delegated), depending upon reportability level, will issue the flight authorization (Attachment 3 MFR template). Key aspects are:

- Expiration date: If the flight authorization is granted for the entire flight test program, the expiration date will be in accordance with the end of the flight test program; but should not exceed more than 2 years (without re-review). This aligns with risk acceptance requirements.
- Configuration: Identify the store/aircraft configuration (hardware and software) to be on the MDS.
- Terms and conditions: The MFR should identify the authorized test configuration, but should also include a statement to facilitate minor store configuration changes (hardware and/or software) which do not impact airworthiness. In general, these would be changes that meet the following criteria, which can be tailored by the DTA as needed:
 - For aircraft integration:
 - No change to the aircraft hardware or software
 - No change to physical (including electrical) or logical interface between aircraft and store
 - For aircraft/store compatibility:
 - No change to structural loads induced on the aircraft or within the store itself (Structural Impacts)
 - No change to store external shape or store mass properties which affect aircraft flutter, aircraft stability and control, aircraft-store strength, store separations, ballistics, or safe escape/separation engineering disciplines
 - No change to radiated energy (EMC/EMI, HERO impacts)
 - No change to captive carry, jettison, or launch control
 - No change to store flight characteristics within the vicinity of the aircraft (safe separation)
 - No addition or modification of Electrically Initiate Devices (EIDs)

The MFR should reference a companion MDS SPO configuration document which details each authorized configuration. This process allows the MDS CE DTA to quickly assess and authorize new flight test configurations via standard configuration management processes without generating a new MFR or invoking the full airworthiness process for each iteration.

- Risk elevation: A statement similar to the following should be included in the MFR: “If risks during program execution elevate above Low or the store configuration does not meet the conditions above, the MDS CE DTA must be notified within 24 hours or prior to the next flight, whichever comes first.”
- Supporting documents: The list shall include store/aircraft data such as TOs, flight test program plans, compliance report, documents of flight limitations or aircrew procedures.

RECOMMENDATIONS:

AFLCMC/EN-EZ recommends DTAs utilize the tools discussed above for airworthiness technical assessment and flight authorization of new or modified stores on MDS.

POINTS OF CONTACT:

The USAF Airworthiness Office, Air Force Life Cycle Management Center/Engineering (AFLCMC/EN-EZ) is the Office of Primary Responsibility. Comments, suggestions, or questions on this advisory should be emailed to the USAF Airworthiness Office mailbox at USAF.Airworthiness.Office@us.af.mil.



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USAF Technical Airworthiness Authority
Director, Engineering & Technical Management/Services
Air Force Life Cycle Management Center (AFLCMC)

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFPD 62-6, *USAF Airworthiness*

AFI 62-601, *USAF Airworthiness*

AFLCMC OI 62-601, *USAF AW processes for Delegated Technical Authorities*

AWB-003, *TACC/MACC Document Submittal and Review Process*

AWB-005, *TACC/MACC Document Construction and Format*

MIL-HDBK-516, *Airworthiness Certification Criteria*

AWB-007, *Determining Reportability of Modifications*

AWB-013, *Risk Identification and Acceptance for Airworthiness Determinations*

USAF Airworthiness SharePoint website,

<https://cs.eis.afmc.af.mil/sites/AeroEngDisciplines/Systems/Airworthiness/default.aspx>

Abbreviations and Acronyms

ADF- Airworthiness Determination Form

AW- Airworthiness

CE – Chief Engineer

DOE – Director of Engineering

DTA – Delegated Technical Authority

EID – Electrically Initiated Device

EMC – Electromagnetic Compatibility

EMI – Electromagnetic Interference

HERO – Hazards of Electromagnetic Radiation to Ordnance

MDS – Mission Design Series

MFR – Military Flight Release

MTC – Military Type Certificate

OSS&E – Operational Safety, Suitability, & Effectiveness

PM – Program Manager

TAA – Technical Airworthiness Authority

Terms

Aircraft – the most basic (or simplest) configuration of an air vehicle authorized for flight. It is designed to be supported by air, being borne up either by the dynamic action of the air upon the surfaces of the vehicle, or by its own buoyancy. The term includes fixed and movable winged airplanes, helicopters, gliders, and airships but excludes air-launched missiles and flying bombs.

Air System – the combination of the aircraft and store or multiple stores

Configuration Memorandum – a flight authorization that does not impact airworthiness. This is the CE's testament of the approved air system configuration

Store – any device, excluding air cargo, intended for external or internal carriage, mounted at aircraft suspension equipment locations, which may or may not be intended for release from the aircraft in flight. Stores include bombs (conventional and nuclear), missiles (conventional and nuclear), rockets, pods, mines, fuel tanks, spray tanks, torpedoes, sonobuoys, signal underwater sound devices, dispensers, targets, flares, chaff, decoys, and suspension equipment, if the suspension equipment is not part of the aircraft.

Suspension Equipment – Any devices, such as pylons, racks, adaptors, launchers, and countermeasure dispensers used to carry and release stores or just carry stores. (Not all suspension equipment has the capability to release stores). They are considered stores unless they are part of the aircraft.

Attachment 2

PRELIMINARY STORES EVALUATION LETTER TEMPLATE

MEMORANDUM FOR [Aircraft Program Offices]

FROM: [Store Program Office]

SUBJECT: [Store] Military Flight Release (MFR) Request

REFERENCES:

(a) Performance Specification for [Store], dated DD MMM YYYY

1. BACKGROUND:

- a. [Store and Software X] is the next iteration of [XX Program (XXP)]. {Background information example: Software for this store is slated for fielding in FYXX. XX Program improves performance against the baseline over a broad spectrum... Advances will be made to}
- b. The Store Development Branch anticipates a XXP Operational Flight Software (OFS) fielding in FYXX. Flight testing is scheduled from early FYXX through FYXX. Periodic engineering software releases are planned during the flight test program. A software Version Description Document (VDD) will be provided for each release along with a software certification letter from the program office.

2. AIRWORTHINESS ASSESSMENT FOR MILITARY FLIGHT RELEASE. The XXP program is a ... change and is expected to have [an airworthiness impact / no airworthiness impact]. Although XXP will incorporate ...for [Store Name], using the same approach as prior program XXX, no other interface changes are anticipated. The XXP will/will not:

- a. Impact physical characteristics (external shape, mass properties, etc.).
- b. Modify guidance / autopilot software or any elements associated with safe separation, captive carry, jettison, or launch control
- c. Modify safety critical functions.
- d. Change MDS aircraft hardware or software, nor the physical or logical interfaces between aircraft and store
- e. Change structural loads induced on aircraft or within the store itself (Structural Impacts)
- f. Change radiated energy (EMC/EMI, HERO impacts)

3. MILITARY FLIGHT RELEASE REQUEST. The store program office requests the platform program office staff an Airworthiness package culminating in a Military Flight Release prior to XXP flight test in early FYXX. This XXP MFR is anticipated to remain valid for the duration of the XXP flight test program as long as the criteria in Paragraph 2 remain valid for all XXP software releases.

4. Primary point of contact is [Name], DSN [Phone].

SIGNED

[Name]

[Title]

Attachment 3

MFR TEMPLATE AND INSTRUCTIONS



DEPARTMENT OF DEFENSE
UNITED STATES AIR FORCE

MILITARY FLIGHT RELEASE No. MDS-R####

1. MANUFACTURER / MDS (Program Office): 2. ISSUE DATE: <p align="center">DD-MMM-YYYY</p> 3. EXPIRATION DATE: <p align="center">(Date and/or Flight Hours)</p>	4. SERIAL/TAIL NUMBER(S)/CONFIGURATION:
5. TERMS AND CONDITIONS: This flight release is issued pursuant to United States Air Force Policy Directive 62-6 and Air Force Instruction 62-601. It authorizes flight in accordance with approved operating limits and test plans or Technical Orders, AEOLs, and USAF Flight Clearances unless rescinded by the Technical Airworthiness Authority (TAA). The following limitations shall be followed: (Identify any additional terms/conditions required by this MFR) Section 8 references the limitations, restrictions, authorized configuration, and approved operational and maintenance technical orders. All System Safety risks have been accepted by the appropriate authorities in accordance with AFI 62-601.	
6. SIGNATURE <p align="center" style="font-size: 2em;">X</p> <hr style="width: 30%; margin: auto;"/> <p>Jorge F. Gonzalez Technical Airworthiness Authority</p>	7. ORGANIZATION <p align="center">AFLCMC/EN-EZ</p>

<p>DISTRIBUTION STATEMENT D: Distribution authorized to the Department of Defense and U.S. DoD contractors only; Administrative and Operational Use, 30 January 2015. Other requests shall be referred to the Program Office identified in Block 1.</p>
<p>DESTRUCTION NOTICE—Destroy by any method that will prevent disclosure of contents or reconstruction of the data.</p>

8. SUPPORTING DOCUMENTATION:

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DESTRUCTION NOTICE—Destroy by any method that will prevent disclosure of contents or reconstruction of the data.

Directions for completing MTC / MFR form are as follows:

MILITARY TYPE CERTIFICATE / MILITARY FLIGHT RELEASE No: This number is a unique number that identifies the specific flight release and will be obtained from USAF Airworthiness Office for Reportable projects, or the Program Office Configuration Manager for Airworthiness for Non-Reportable projects.

1. **MANUFACTURER / MDS (Program Office):** Airframe prime contractor model type and/or the designated Mission Design Series (MDS).
2. **ISSUE DATE:** The date of issuance of the flight release.
3. **EXPIRATION:** The Expiration date of the MTC / MFR for the aircraft(s) or Number of Flight hours allowed. This should be the length of time required by the flight/operational test to complete, or a period not to exceed a year (generally), unless approved by the TAA
4. **SERIAL/TAIL NUMBER(S)/CONFIGURATION:** Provide information identifying the aircraft authorized for flight in accordance with this MTC / MFR and the pertinent configuration change, if applicable.
5. **TERMS AND CONDITIONS:** As stated above. Additional conditions may be defined by the Technical Airworthiness Authority (TAA) Director of Engineering/Delegated Technical Authority (DoE/DTA), or Chief Engineer/DTA (CE/DTA).
6. **SIGNATURE:** Signature, name, and title of the Technical Airworthiness Authority, TAA, or Delegated DOE/DTA or CE/DTA. Electronic signature is acceptable.
7. **ORGANIZATION:** Enter the signer's organization.
8. **SUPPORTING DOCUMENTATION:** Include the list of documents that support this Military Type Certificate / Military Flight Release.

Mandatory

1. Approved Certification Basis
2. Compliance or Assessment Report
3. Signed Airworthiness Risk Acceptance Letter(s) with System Safety Risk Assessments (SSRAs)
4. As-Built Configuration Description Package

As applicable

1. Flight Envelope and Aircraft Operating Limitations
2. Engineering Inspection Requirements
3. Operator and Maintenance Technical Data
4. Other technical data, restrictions, and operational limitations as required
5. Special operating appendices as required

DISTRIBUTION STATEMENT: The distribution statement for this document IAW DODD 5230.24 is on the template; but might need to be modified by the Program Office.