

**BY ORDER OF THE COMMANDER  
AIR FORCE GLOBAL STRIKE COMMAND**

**AIR FORCE GLOBAL STRIKE COMMAND  
INSTRUCTION 21-152**



**24 FEBRUARY 2025**

***Maintenance***

***ENGINE TRENDING & DIAGNOSTIC  
(ET&D) PROGRAM***

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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OPR: AFGSC/A4M

Certified by: AFGSC/A4M

Supersedes: AFGSCI21-152, 30 March 2021

Pages: 7

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This instruction implements Department of the Air Force Policy Directive (DAFPD) 21-1, *Maintenance of Military Materiel*. It prescribes policies and procedures for monitoring jet engine internal performance and supplements Air Force Global Strike Command (AFGSC) units' responsibilities to include program requirements IAW TO 00-25-257, *Engine Health Management (EHM+) General Information User's Manual*. This publication applies to all AFGSC units and is applicable to the Air National Guard (ANG) and the Air Force Reserve Command (AFRC) Classic Associations. It does not apply to the United States Space Force. Ensure all records generated as a result of processes prescribed in this publication adhere to Air Force Instruction (AFI) 33-322, *Records Management and Information Governance Program*, and are disposed in accordance with the Air Force Records Disposition Schedule, which is located in the Air Force Records Information Management System. Refer recommended changes and questions about this publication to the office of primary responsibility (OPR) using the DAF Form 847, *Recommendation for Change of Publication*; route DAF Forms 847 from the field through the appropriate functional chain of command. Send comments and suggested improvements to [AFGSC.A4MX.workflow@us.af.mil](mailto:AFGSC.A4MX.workflow@us.af.mil). AFGSC/A4MQ reviews and then forwards to the appropriate OCR for review and necessary action. The authorities to waive wing, unit, or delta level requirements in this publication are identified with a Tier ("T-0, T-2, T-3") number following the compliance statement. See Department of the Air Force Manual (DAFMAN) 90-161, *Publishing Processes and Procedures* for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority utilizing guidance identified in DAFMAN 90-161, or alternately, to the Publication OPR for non-tiered compliance items. This publication may be supplemented at any level. AFGSC/A4 is the Tier 2 waiver authority for this publication.

## ***SUMMARY OF CHANGES***

This document has been substantially revised and must be completely reviewed. Major changes include ensuring Aircrew files a completed AFGSC Form 264, *In-Flight Data* (IFD) or AFGSC Form 73, *Engine Condition Sheet* (ECS) at the debrief of their sortie and that a locally established ET&D training plan is developed.

### **1. Purpose.**

1.1. The ET&D program is intended to further the safe operation, performance reliability, and lower maintenance operating costs of installed gas turbine engines. The program analyzes trends in all available engine parameters to detect the onset of internal engine failures and shifts in instrumentation calibration or accuracy. When properly administered, this is an effective management tool that allows maintenance personnel to take corrective actions before an engine failure or expensive secondary damage occurs.

### **2. AFGSC/A4MA Responsibilities.**

2.1. AFGSC/A4MA is designated as the AFGSC Office of Primary Responsibility. **(T-2)**  
AFGSC/A4MA will:

2.1.1. Participate in major ET&D conferences, meetings, and committees to identify and discuss relevant ET&D issues and policies. **(T-2)**

2.1.2. Identify specific requirements to assist the ET&D programs through all available technology channels and processes. **(T-2)**

2.1.3. Ensure units operating ET&D programs have sufficient manning positions and appoint qualified, experienced persons as ET&D Project Managers at each operating base. Identify this position with Special Experience Identifier (SEI) code of 600 (B-1), 604 (B-2), 612 (B-52) or 639 (E-4) on the Unit Manning Document (UMD). **(T-2)**

2.1.4. Ensure owning units submit accurate and timely quality deficiency reports to the applicable engine program offices on all equipment requiring any maintenance activity due to an ET&D recommendation and on all ET&D component failures where no ET&D maintenance recommendation was made. **(T-2)**

2.1.5. Ensure each unit provides timely and accurate metrics to the Comprehensive Engine Management System/Comprehensive Engine Trending and Diagnostics System (CEMS /CETADS) database. **(T-2)**

2.1.6. Ensure Units allocate appropriate resources to effectively execute ET&D program. **(T-2)**

2.1.7. Coordinate all proposed changes to this publication with appropriate AFGSC staff. **(T-2)**

2.1.8. Coordinate between Air Force Materiel Command (AFMC) and other MAJCOMs on matters concerning ET&D. **(T-2)**

**3. Operations Group Commander (OG/CC) Responsibilities.** OG/CC (or civilian equivalent) will:

**3.1. [2 BW and 5 BW only] Establish specific aircrew responsibilities for the ET&D program and ensure compliance. (T-2)**

3.1.1. Ensure aircrew correctly fill out AFGSC Form 264, *In-Flight Data* (IFD) or AFGSC Form 73, *Engine Condition Sheet* (ECS) as applicable per instructions on back of IFD or ECS sheet. (T-2)

3.1.1.1. Ensure Aircrew files a completed AFGSC Form 264, or AFGSC Form 73 at the debrief of their sortie.

**4. Maintenance Group Commander (MXG/CC) Responsibilities.** The MXG/CC is responsible for managing the ET&D program. (T-2) MXG/CC (or civilian equivalent) will:

4.1. Publish a local Wing Instruction or capture the required information in applicable Wing DAFI 21-101, *Aircraft and Equipment Maintenance Management*, supplement outlining administrative procedures to be used in conjunction with this AFGSCI. (T-2)

4.2. Appoint an Engine Management (EM) Non-Commissioned Officer (NCO) (or civilian equivalent) as ET&D Project NCO IAW DAFI 21-101, paragraph 14.4. See **Section 7** of this instruction for Project NCO specific duties. Identify this position with an SEI code of 600 (B-1), 604 (B-2), 612 (B-52) or 639 (E-4) on the UMD. (T-2)

4.3. Appoint a primary and alternate ET&D Monitor. The alternate position should be considered an additional duty for appointed individual. See **Section 8** of this instruction for specific ET&D Monitor duties. (T-2)

4.4. Ensure the primary and alternate ET&D Monitors receive the ET&D training within 3 months of assignment of duty. (T-2)

4.4.1. Ensure there is a locally established ET&D training plan. (T-2)

4.5. Ensure ET&D computers are not modified or used for non-ET&D applications unless authorized by AFGSC/A4MA. (T-2)

4.6. Units will follow the specific instructions for each engine type as detailed in the respective engine supplements of TO 00-25-257, *Engine Health Management (EHM+) General Information User's Manual*. (T-2)

**5. Aircraft Maintenance Squadron Commander/Bomber Generation Squadron Commander (AMXS/CC)/(BGS/CC) Responsibilities.** AMXS/CC BGS/CC (or civilian equivalent) will:

5.1. Ensure a propulsion system Point of Contact (POC) is designated (minimum 7-level) for each Bomber Generation Squadron (BGS) or equivalent. (T-2)

5.2. Ensure discrepancies on "watch" or ET&D problem engines are corrected. (T-2)

5.3. [2 BW, 5 BW, and 595 C2G only] **Ensure accurate, complete, and timely data is completed by aircrew operating aircraft with engines which do not have onboard diagnostic systems.** The respective Debriefing Section ensures applicable engine data forms are completed for each flight and forwarded to the ET&D Monitor no later than the morning of the next duty day of occurrence. (T-2)

**6. Operations Group POC Responsibilities.** Operations Group POC will:

- 6.1. Provide liaison with the ET&D Project NCO on the ET&D program. (T-2)
- 6.2. Determine appropriate actions to ensure aircrews understand the ET&D program and benefits of an effective program. (T-2)
- 6.3. Advertise results of the ET&D program. (T-2)
- 6.4. [2 BW, 5 BW, and 595 C2G only] **Ensure sufficient quantities of applicable engine data forms are readily available.** (T-2)

**7. ET&D Project NCO Responsibilities.** ET&D Project NCO (or civilian equivalent) will:

- 7.1. Advise, manage, coordinate, and maintain the ET&D program for the MXG/CC and OG/CC. (T-2)
- 7.2. Administer the ET&D program in accordance with this instruction and applicable technical orders. (T-2)
- 7.3. Establish a visible program through continual coordination between operations and maintenance, thus providing a closed loop system for information and maintenance repair actions. (T-2)
- 7.4. Provide feedback from the ET&D program to aircrew and the operations staff. (T-2)
- 7.5. Act as the single POC in each wing for all recommended changes to this instruction. (T-2)
- 7.6. Manage the ET&D workload, schedule, and ET&D data management and analysis to ensure continual evaluation and daily flow of ET&D data. (T-2)
- 7.7. Validate the ET&D Monitor's recommendations for engine maintenance as a result of program trending or analysis. (T-2)
- 7.8. Submit program software improvement recommendations to AFGSC/A4MA and coordinate with appropriate agencies to resolve problems with the ET&D program. (T-2)
- 7.9. Perform a Field Service Evaluation (FSE) to determine the effectiveness of a program and/or current software configuration, as required. Obtain FSE requirement through AFGSC/A4MA. (T-2)
- 7.10. Maintain a register of ET&D equipment locations. (T-2)

**8. ET&D Program Monitor(s) Responsibilities.** ET&D Program Monitor will:

- 8.1. Have a 2A671 AFSC or civilian equivalence. (T-3)
- 8.2. Locally obtain a suitable computer for ET&D use. Initial provision of CEMS /CETADS software is from the CEMS/CETADS Project Manager at the Oklahoma City Air Logistics Complex (OC-ALC). (T-2)
  - 8.2.1. For F103 engines, the Project NCO will have "view only" access to the General Electrics (GE) website. All inputs and trending will be conducted through the GE website by the Boeing FSR. (T-2)
- 8.3. Enter engine performance data in the ET&D computer no later than the end of the next flying day. (T-2)
- 8.4. Ensure engines categorized as "watch" engines will have the following entry made in AFTO Form 781A, *Maintenance Discrepancy and Work Document*, identifying the "watch",

and placed on a red dash. Each entry will begin: "Engine position/serial number \_\_\_ - \_\_\_ on ET&D watch status". Also, ensure the reason for "watch" status is entered in sufficient detail to explain the basis for this action. The AFTO Form 781A entries will be amended after each review, and action taken noted in the "corrective action" block. If an engine is continued in "watch" status, a new entry will be made and begin with: "Engine position/serial number \_\_\_ - \_\_\_ continued on "watch" status". Enter reason in sufficient detail to explain basis for this action.

8.4.1. Ensure "watch" engine discrepancies will not be transferred to AFTO Form 781K, *Aerospace Vehicle Inspection, Engine Data, Calendar Item Inspection and Delayed Discrepancy Document*. (T-2)

8.4.2. Ensure corrective actions on "watch" or ET&D problem engines are accomplished. (T-2)

8.5. Submit and monitor Deficiency Reports (DRs) on parts replaced to correct ET&D discrepancies. If a deficiency has been previously identified through a local unit DR system, and the respective Air Logistics Center (ALC) is addressing the issue, then no DR is required. (T-2)

8.6. Ensure appropriate work orders are provided and scheduled. When the engine trend plot indicates maintenance or engine removal is required, coordinate with the project NCO, Maintenance Operation Center, and Wing Plans & Scheduling. (T-2)

8.7. Submit aircraft engine instrument maintenance and check requests through Wing Plans & Scheduling or Maintenance Information System (MIS). (T-2)

8.8. Forward trend data to ALCs when requested. (T-2)

8.9. Issue an automated MIS product against the probable engine or related system malfunction after notification by the ET&D Project NCO or ET&D Monitor. (T-2)

8.10. Monitor the return of IFD forms by aircrews to maintenance debrief and ensure all IFD forms are returned to the ET&D Monitor (as applicable). (T-2)

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**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

DAFPD 21-1, *Maintenance of Military Materiel*, 21 February 2024

DAFI 21-101, *Aircraft and Equipment Maintenance Management*, 16 January 2020

AFI 33-322, *Records Management and Information Governance Program* 23 March 2020

DAFMAN 90-161, *Publications and Forms Management*, 18 October 2023

TO 00-25-257, *Engine Health Management (EHM+) General Information User's Manual*, 01 July 2021

***Prescribed Forms***

AFGSC 264, *B-52 In-Flight Data (IFD)*

AFGSC 73, *Engine Condition Sheet (ECS)*

***Adopted Forms***

DAF Form 847, *Recommendation for Change of Publication*

AFTO Form 781A, *Maintenance Discrepancy and Work Document*

AFTO Form 781K, *Aerospace Vehicle Inspection, Engine Data, Calendar Item Inspection and Delayed Discrepancy Document*

***Abbreviations and Acronyms***

**AFGSC**—Air Force Global Strike Command

**AFGSCI**—Air Force Global Strike Command Instruction

**AFI**—Air Force Instruction

**AFMC**—Air Force Materiel Command

**AFPD**—Air Force Policy Directive

**AFRC**—Air Force Reserve Command

**AFRIMS**—Air Force Records Information Management System

**AFTO**—Air Force Technical Order

**ALC**—Air Logistics Center

**AMXS**—Aircraft Maintenance Squadron

**ANG**—Air National Guard

**BGS**—Bomber Generation Squadron

**C2G**—Command and Control Group

**CEMS**—Comprehensive Engine Management System

**CETADS**—Comprehensive Engine Trending and Diagnostics System

**DR**—Deficiency Report

**ECS**—Engine Condition Sheet

**EHM**—Engine Health Management

**EM**—Engine Manager

**ET&D**—Engine Trending & Diagnostic

**FSE**—Field Service Evaluation

**IAW**—In Accordance With

**IFD**—In-Flight Data

**MAJCOM**—Major Command

**MIS**—Maintenance Information System

**MXG**—Maintenance Group

**OC-ALC**—Oklahoma City Air Logistics Complex

**OG**—Operations Group

**OPR**—Office of Primary Responsibility

**POC**—Point of Contact

**RDS**—Records Disposition Schedule

**SEI**—Special Experience Identifier

**UMD**—Unit Manning Document