

**BY ORDER OF THE COMMANDER
AIR COMBAT COMMAND**

AIR COMBAT COMMAND INSTRUCTION 21-152



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Maintenance*

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

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFPD 21-1, Managing Aerospace Equipment Maintenance. It prescribes policies and procedures for monitoring jet engine internal performance and supplements ACC units responsibilities IAW TO 00-25-257, Engine Trending and Diagnostic Users Manual. This program applies to all ACC units, and is applicable to ACC-gained Reserve associate maintenance units, and applicable Air National Guard (ANG) units. Program requirement is referenced in AFI 21-132, Air Force Engine Trending And Diagnostic Program, and must be administered IAW TO 00-25-257. Supplements to this instruction must be approved by HQ ACC/XRSP, then issued according to AFI 37-160, volume 1, The Air Force Publications and Forms Management Programs - Developing and Processing Publications. Specific procedures for waiver requests and proposed changes to this instruction are provided in Section 8. Reporting here is exempt from licensing according to AFI 37-124, The Information Collections and Reports Management Program; Controlling Internal, Public, and Interagency Air Force Information Collections, paragraph 2.11.10. Send comments and suggested improvements to this publication on AF Form 847, Recommendation for Change of Publication, through channels, to HQ ACC/XRSP, 216 Hunting Ave, Langley AFB VA 23665

SUMMARY OF CHANGES

This is the initial publication of ACCI 21-152. This instruction deletes ACCR 66-23 Engine Conditioning and Monitoring Program (ECMP) and establishes policies and procedures to be followed by applicable ACC units.

1. Purpose.

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

2. ACC Headquarters Responsibilities.

2.1. The Directorate of Combat Weapon Systems, Systems Support Division, Propulsion Branch (HQ ACC/XRSP), is designated as the ACC office of primary responsibility (OPR) for this program. The OPR will:

2.1.1. Establish a headquarters OPR for ET&D responsibilities.

2.1.2. Participate in major ET&D conferences, meetings, and committees to identify and discuss relevant ET&D issues and policies.

2.1.3. Identify specific requirements to assist the ET&D programs through all available technology channels and processes.

2.1.4. Ensure Units operating ET&D programs have sufficient manning positions and appoint qualified, experienced persons as ET&D Project Managers at each operating base.

2.1.5. 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.

2.1.6. Ensure that each unit provides timely and accurate metrics to the CEMS IV/CETADS database.

2.2. In addition, ACC/XRSP is to:

2.2.1. Ensure that all applicable programming documents (budget, facilities, manpower, maintenance, etc.) include the need for ET&D support.

2.2.2. Co-ordinate all proposed changes to this publication with appropriate ACC staff.

2.2.3. Co-ordinate between ACC, AFMC and the other MAJCOMs on matters concerning ET&D.

3. Wings.

3.1. The Logistics Group Commander is responsible for managing the ET&D program, and will publish a local Wing Instruction outlining administrative procedures to be used in conjunction with this ACCI.

3.2. The Operations Group Commander will ensure aircrew responsibilities for the program are applied. (Applicable to B52 and -135 Wings only).

4. Procedures.

4.1. Units are to follow the specific instructions for each engine type as detailed in the respective engine supplements of TO 00-25-257, the Engine Trending and Diagnostic Users Manual.

5. Logistics Group Commander (LG/CC). The LG/CC is to:

5.1. Appoint a Senior NCO Propulsion system supervisor as ET&D Project NCO. The specific duties of the Project NCO are at Section 8.

5.2. Appoint a primary and alternate ET&D Monitor. The alternate position should be considered additional duty for appointed individual. The specific duties of the ET&D Monitor are at Section 9.

5.3. Ensure the primary ET&D Monitor receives the ET&D training course within 6 months of assignment of duty.

5.4. Ensure ET&D computers obtained from SA-ALC are not modified or used for non-ET&D applications without permission from HQ ACC/XRSP.

6. Operations Group Commander (OG/CC). The OG/CC will ensure that:

6.1. A 7-level or 9-level (9-level preferred) propulsion system Point of Contact (POC) is designated for each flying squadron. The POC will assist the LG Project NCO in resolving all "On-Wing" issues.

6.2. Ensure corrective actions on "watch" or ET&D problem engines are corrected as soon as possible.

6.3. Ensure that accurate, complete, and timely data is completed by aircrew operating aircraft with engines which do not have onboard diagnostic systems. The respective Flying Squadron Debriefing Section ensures In-flight Data (IFD) forms are completed for each flight and forwarded to the ET&D Monitor in a timely manner. (Applicable to B52 and -135 Wings only).

7. Operations Group Point of Contact (OG POC). The OG POC will:

7.1. Provide liaison with the ET&D Project NCO on the ET&D program.

7.1.1. Determine appropriate actions to ensure that aircrews have an understanding of the ET&D program and benefits of an effective program.

7.1.2. Advertise results of the ET&D program at aircrew briefings and safety meetings.

7.1.3. Ensure sufficient quantities of In-Flight Data (IFD) forms are available as a standard part of the aircrew trip kit/mission folder. (Applicable to B52 and -135 Wings only).

7.1.4. Attend quarterly ET&D Project NCO review meeting.

8. ET&D Project NCO. The Project NCO will:

8.1. Manage and coordinate the ET&D program for the Logistics and Operations Group Commanders.

8.2. Administer the ET&D program in accordance with this ACCI and applicable technical orders.

- 8.3. Establish a visible program through continual co-ordination between operations and maintenance, thus providing a close loop system for information and maintenance repair actions. (Applicable to engines not utilizing an onboard diagnostic system)
- 8.4. Provide feedback from the ET&D program to aircrew and the operations staff.
- 8.5. Act as the single POC in each wing for all recommended changes to this instruction.
- 8.6. Be the primary technical advisor on the ET&D program for the LG/OG CC.
- 8.7. Conduct quarterly review of engine performance worksheets and computer data.
- 8.8. As a minimum, the LG ET&D Project NCO (Chairperson), ET&D Monitors, and OG squadron POCs will form a panel to review program status/results on a quarterly basis.
- 8.9. Maintain engine data and advise Logistics and Operations Group Commanders on program issues requiring their attention.
- 8.10. Manage the ET&D workload, schedule, and ET&D data management and analysis to ensure continual evaluation and daily flow of ET&D data.
- 8.11. Validate the ET&D Monitor's recommendations for engine maintenance as a result of program trending or analysis.
- 8.12. Submit program software improvement recommendations to HQ ACC/XRSP and coordinate with appropriate agencies to resolve problems with the ET&D program.
- 8.13. If necessary, perform a Field Service Evaluation (FSE) to determine the effectiveness of a program and/or current software configuration. Obtain FSE requirement through HQ ACC/XRSP.
- 8.14. Maintain a register of where the ET&D equipment is located.
- 8.15. Submit narrative of actual events in which ET&D successfully or unsuccessfully prevented engine failure. This narrative should be registered on the CEMS IV/CETAD Web Page and should include cost savings data where appropriate.

9. ET&D Program Monitor(s). The ET&D Program Monitor at each unit is to:

- 9.1. Be a Propulsion technician, AFSC (minimum 2A651A or civilian equivalent). These individuals must be knowledgeable about engine operation, troubleshooting, and repair procedures. LG/CC can appoint individuals who do not meet the AFSC requirement but possess the expertise and knowledge of the engine as ET&D Monitors.
- 9.2. Obtain a suitable desktop PC. Initial provision of IT equipment is from the CEMS IV/CETADS Project Manager at SA-ALC.
- 9.3. Enter engine performance data in the ET&D computer no later than the end of the next flying day.
- 9.4. An engine categorized as a "watch" engine 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, enter the reason for "watch" status 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: "Engine position/serial number ____ - ____ continued on watch status". Enter reason in sufficient detail to explain basis for this action. "watch" engine discrepancies will not be transferred to AFTO Form 781K, Aerospace Vehicle Inspection, Engine Data, Calendar Item Inspection and Delayed Discrepancy Document.

9.4.1. Ensure corrective actions on "watch" or ET&D problem engines are accomplished as soon as possible.

9.4.2. Submits (IAW 00-35D-54 "USAF Deficiency Reporting (DR) and Investigating System) and monitors 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 Logistic Center (ALC) is addressing the issue, then no DR is required.

9.5. When the engine trend plot indicates maintenance or engine removal is required, coordinate with the project NCO, Maintenance Operation Center (MOC), and Flying Squadron scheduling to assure the appropriate work orders are provided and scheduled as soon as practical.

9.6. Submit aircraft engine instrument maintenance and check requests through Flying Squadron scheduling or Core Automated Maintenance System (CAMS).

9.7. Forward trend data to ALCs when requested.

9.8. Issue an AFTO Form 349, Maintenance Data Collection Record, maintenance request or automated CAMS product against the probable engine or related system malfunction after notification by the ET&D Project NCO or ET&D Monitor.

9.9. Schedule maintenance as soon as practical within mission requirements and consistent with the severity of the anticipated unserviceability; the Propulsion Flight Chief, or assistant, is to make this judgement.

9.10. Monitor the return of IFD forms by aircrews to maintenance debriefings and ensure that all IFD forms are returned to the ET&D Monitor. (Applicable to B-52 and -135 Wings only).

10. Forms Prescribes. ACC 259, TF 33 Equipped - 135 Aircraft Cruise Based In-Flight Data Sheet; ACC 264, B-52 In-Flight Data (IFD); ACC 266, B-52G In-Flight Data (IFD); ACC 267, Aircraft Instrument Checkout Data; ACC 270, J-57 Equipped - 135 Aircraft In-Flight Data (IFD); ACC 273, KC-135 In-Flight Data Sheet (TDY) and TEMS Inoperable.

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