

**BY ORDER OF THE  
SECRETARY OF THE AIR FORCE**

**AIR FORCE INSTRUCTION 99-151**

**10 AUGUST 2005**



**Test and Evaluation**

**AIR LAUNCHED MUNITION ANALYSIS  
GROUP (ALMAG)**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This Air Force Instruction (AFI) implements Air Force Policy Directive (AFPD) 99-1, *Test and Evaluation*. It establishes policies, procedures, and responsibilities for using the Air-Launched Munition Analysis Group (ALMAG) to investigate air-launched guided munition, missile, and subscale aerial target mishaps and incidents occurring during force development evaluation (FDE). This AFI applies only to units, organizations, and members of the Combat Air Forces (CAF) who are involved in major command (MAJCOM)-conducted FDE of guided weapons and subscale aerial targets. For purposes of this AFI, the definition of CAF in **Attachment 1** applies. This instruction is not applicable if the convening authority mandates a safety investigation in accordance with AFI 91-204, *Safety Investigations and Reports*, and Air Force Manual (AFMAN) 91-221, *Weapons Safety Investigations and Reports*. CAF test centers may supplement this instruction; however, draft supplements must be submitted to HQ ACC/DRP for coordination and HQ USAF/TEP approval. Send proposed supplements or changes (using AF Form 847) to this publication to HQ ACC/DRP, 204 Dodd Blvd, Suite 226, Langley AFB VA 23665-2777, or [acc.drp@langley.af.mil](mailto:acc.drp@langley.af.mil). Ensure all records created as a result of this AFI are according to AFPD 37-1, *Information Management*, and AFMAN 37-123, *Management of Records*, and disposed of according to Air Force Records Disposition Schedule located at <https://webrims.amc.af.mil>.

**SUMMARY OF REVISIONS**

AFI 99-151 was revised to mesh with revisions to AFI 91-204 and AFMAN 91-221. AFMAN 91-221 now authorizes use of ALMAG investigation procedures. The scope of ALMAG investigation and reporting was expanded to include mishaps with all guided munitions, missiles, and subscale aerial targets. Additionally, at the convening authority's discretion, ALMAG investigation and reporting may be used for other incidents not classified as mishaps. The term "MAJCOM Program Manager" was changed to "MAJCOM representative" for clarity. The ALMAG final report timeline was extended to 90 days, and recommended reporting formats were added at **Attachment 2**, Reporting Formats, for ready reference. Formal reporting was clarified.

Chapter 1

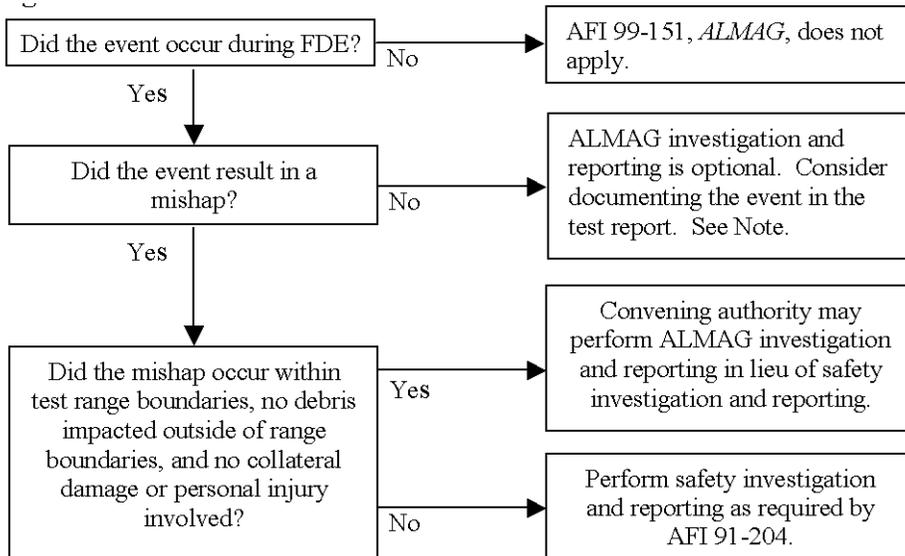
GENERAL POLICY AND PROCEDURES

**1.1. General Policy.** This AFI outlines Air Force policy on investigating in-flight guided munition, missile, and subscale aerial target mishaps and incidents that occur during force development evaluation (FDE) activities conducted during the sustainment portion of the system life cycle. The Air-Launched Munition Analysis Group (ALMAG) will conduct appropriate investigations to determine the cause(s) of failure. ALMAGs are not conducted under the umbrella of privileged safety information, and promises of confidentiality will not be given.

**1.2. Purpose of the ALMAG.** The ALMAG is a mechanism for performing timely and thorough failure analysis and investigations when a formal safety investigation is not required. It is an ad hoc group convened at the direction of the appropriate test center commander or appropriate MAJCOM Director of Operations (DO) or Director of Requirements (DR). The ALMAG investigates specific types of in-flight mishaps to determine system deficiencies and report results.

**1.3. Requirements for an ALMAG.** The requirement for convening an ALMAG is dependent on the circumstances of each particular in-flight mishap or incident. The convening authority will determine if an ALMAG is appropriate according to **Figure 1.1., ALMAG Decision Tree**. Generally, an ALMAG investigation will be convened when a safety investigation would otherwise be required, but the mishap occurred within test range boundaries, no debris impacted outside of range boundaries, and no collateral damage or personal injury was involved.

**Figure 1.1. ALMAG Decision Tree.**



**NOTE:** The event may require reporting as a safety Class E event. See AFI 91-204, **paragraph 1.8.5**.

## Chapter 2

### ALMAG MEMBERSHIP AND RESPONSIBILITIES

**2.1. ALMAG Membership.** Each ALMAG is composed of experts chosen by the ALMAG chairperson to conduct each specific investigation. Exact ALMAG membership will be determined on a case-by-case basis. ALMAG members are responsible for their own travel, lodging, and per diem costs. ALMAG membership ends upon completion of each investigation.

**2.2. ALMAG Convening Authority.** The lead test center commander or higher MAJCOM authority will convene an ALMAG when required. The convening authority will appoint the ALMAG chairperson in writing. Initial ALMAG appointments must be made within 24 hours after the mishap is discovered or verified.

**2.3. ALMAG Chairperson.** The chairperson must be a major or above whose selection is based on experience, expertise, maturity, and impartiality. In certain cases, the chairperson should be chosen from an outside organization to ensure a more independent investigation is accomplished. The ALMAG chairperson will:

- 2.3.1. Nominate members from critical support agencies and functional areas to serve on the ALMAG.
- 2.3.2. Add technical experts and supplemental members to the ALMAG as required for the particular investigation.
- 2.3.3. Advise the convening authority of the final ALMAG membership, and provide an estimated time frame for completing the investigation.
- 2.3.4. Convene and chair the ALMAG.
- 2.3.5. Assume all responsibilities for successful conduct of the ALMAG.
- 2.3.6. Arrange for facilities, transportation, communications, equipment, and other support for the investigation.
- 2.3.7. Secure all test data and technical information for the investigation.
- 2.3.8. Coordinate through the FDE point of contact (POC) in obtaining any additional or outside technical expertise.
- 2.3.9. Submit reports and briefings as described in **Chapter 3** of this AFI.
- 2.3.10. Submit an extension waiver request to the convening authority, and provide an information copy to the Air Force Safety Center (AFSC), if sufficient data is not available to allow for the investigation and report to be completed as required (i.e., within 90 days).
- 2.3.11. Disband the ALMAG after all analysis and recommendations for further investigations or fixes, if any, have been reported. Convening authority concurrence is required.

**2.4. Primary ALMAG Members.** The following specialists will normally be present on each ALMAG convened:

2.4.1. **Operations, Analytical, Engineering, or Maintenance Specialists.** The munition/aerial target launch unit, MAJCOM, and the weapon system program manager provide government representative(s) who are operations, analytical, engineering, and maintenance expert(s) as required by the ALMAG chairperson. These personnel should be drawn from system program offices and system item manager offices, test and evaluation organizations, analytical agencies, and operational organizations. Other fields or disciplines may be selected for the ALMAG as needed.

2.4.2. **Safety Specialist.** A qualified flight safety officer or weapons safety non-commissioned officer. The safety specialist will advise the ALMAG chairperson on safety issues and guidelines according to AFI 91-204 after the ALMAG is convened, and will advise the adjournment of the ALMAG if the incident falls under the purview of the 91-series safety instructions.

2.4.3. **Appropriate Air Force Materiel Command (AFMC) Specialists.** Government specialists from AFMC will be selected for the ALMAG as required. These specialists will:

2.4.3.1. Provide the ALMAG with technical and historical data about the system under investigation.

2.4.3.2. Arrange for or acquire technical data or laboratory analysis from the system contractor.

2.4.4. **FDE POC.** The test center FDE POC responsible for the overall management of the specific weapon system evaluation will:

2.4.4.1. Coordinate the tasking of other USAF agencies, functional areas, military services, or contractors for technical support, as required, at the direction of the ALMAG chairperson.

2.4.4.2. Ensure all relevant test and instrumentation data is made available to the ALMAG.

2.4.4.3. Advise the ALMAG about all FDE and test matters.

2.4.5. **MAJCOM Representative.** The MAJCOM representative will provide any coordination required between the ALMAG and the MAJCOM headquarters.

**2.5. Optional ALMAG Members.** The following optional experts should be considered for ALMAG participation as required:

2.5.1. Operations expert(s).

2.5.2. Weapon or aircraft maintenance expert(s).

2.5.3. Weapons or aircraft safety expert(s).

2.5.4. Continental United States (CONUS) test range safety expert(s).

2.5.5. Non-CONUS test range representative(s).

2.5.6. Test instrumentation expert(s).

2.5.7. Recovery specialist(s).

2.5.8. Mission software expert(s).

2.5.9. Mission planning expert(s).

2.5.10. System contractor engineering specialist(s) for the weapon system being investigated.

## Chapter 3

### ALMAG PROCEDURES

**3.1. Convening the ALMAG.** The convening authority determines if an ALMAG is necessary based on the advice of the lead test center and this instruction. If an ALMAG is appropriate (see [Figure 1.1.](#)), the convening authority appoints an ALMAG chairperson in writing. If any conflicts of interest are identified, the convening authority should appoint an ALMAG chairperson from outside the test center.

**3.2. Reporting Requirements.** All ALMAG members will participate in preparing required reports and messages to ensure clarity and technical accuracy. All reports are restricted to agencies on a "need to know" basis. The reporting requirements in this AFI are exempt from licensing according to AFI 33-324, *The Information Collections and Reports Management Program; Controlling Internal, Public, and Inter-agency Air Force Information Collections*, [paragraph 2.11.4](#). The ALMAG chairperson will be the final approval authority for all reports and messages which will be submitted according to the following guidelines:

**3.2.1. Message Reports.** For standardization, see [Attachment 2](#), Reporting Formats, for recommended ALMAG message report formats.

**3.2.1.1. Preliminary Message.** A preliminary message will be sent to the testing MAJCOM and HQ AFSC within 8 hours (when possible, but no later than 24 hours), and will provide the time of the occurrence and a brief factual narrative of the incident.

**3.2.1.2. Progress Report Message.** Provide periodic progress reports by message to the convening authority on the investigation's status as additional information becomes available, or no later than 30 days following the incident. Provide information copies to the FDE POC, HQ AFMC/DO, and appropriate Air Force safety agencies.

**3.2.1.3. Final Report Message.** A final report message will be sent no later than 90 days after the convening of the ALMAG, unless an extension has been requested and approved.

**3.2.2. Final Report Briefing.** A final report briefing to the ALMAG convening authority will summarize the information in the final report message. The convening authority may waive the briefing when appropriate.

**3.2.3. Written Formal Report.** If directed by the convening authority, the ALMAG chairperson will submit a written formal report documenting evidence, engineering analysis, and findings. For the formal report format, use AFMAN 91-221, [paragraphs 6.10](#) through [6.12](#) as a guide, but tailor the tabs as appropriate. No items in the ALMAG formal report are privileged safety information, but the types of information listed in AFMAN 91-221 privileged information tabs should be considered for inclusion. As a minimum, the formal report will cover findings, causes, a summary of the engineering analysis, and recommended corrective actions. If sufficient data is not available to complete the

investigation and formal report within 90 days, the ALMAG chairperson will request an extension from the convening authority.

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Director, Test and Evaluation

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

AFI 31-401, *Information Security Program Management*

AFI 33-324, *The Information Collections and Reports Management Program: Controlling Internal, Public, and Interagency Air Force Information Collections*

AFPD 37-1, *Information Management*

AFMAN 37-123, *Management of Records*

AFI 91-204, *Safety Investigations and Reports*

AFMAN 91-221, *Weapons Safety Investigations and Reports*

AFPD 99-1, *Test and Evaluation*

AFI 99-103, *Capabilities Based Test and Evaluation*

***Abbreviations and Acronyms***

**ACC**—Air Combat Command

**AFI**—Air Force Instruction

**AFMAN**—Air Force Manual

**AFSC**—Air Force Safety Center

**AFMC**—Air Force Materiel Command

**AFPD**—Air Force Policy Directive

**AFRC**—Air Force Reserve Command

**ALMAG**—Air-Launched Missile Analysis Group

**ANG**—Air National Guard

**CAF**—Combat Air Forces

**CBU**—Cluster Bomb Unit

**CONUS**—Continental United States

**DO**—Director of Operations

**DOD**—Department of Defense

**DR**—Director of Requirements

**EOA**—Early Operational Assessment

**FDE**—Force Development Evaluation

**GPS**—Global Positioning System

**HQ**—Headquarters

**MAJCOM**—Major Command

**MDS**—Mission-Design-Series

**NAF**—Numbered Air Force

**OA**—Operational Assessment

**OUE**—Operational Utility Evaluation

**PACAF**—Pacific Air Force

**POC**—Point of Contact

**TD&E**—Tactics Development and Evaluation

**USAFE**—United States Air Force Europe

**WSEP**—Weapon System Evaluation Program

**www**—World-Wide Web

### *Terms*

**Combat Air Forces (CAF)**—The CAF is a grouping of MAJCOMs comprised of ACC, ANG, AFRC, USAFE, and PACAF.

**Force Development Evaluation (FDE)**—The operational test and evaluation of fielded, operational systems during the sustainment portion of the system life cycle after acceptance for operational use. The focus is on maintaining or upgrading operational systems after the initial acquisition process is complete. An FDE also supports acquisition of MAJCOM-managed systems. FDE includes Tactics Development and Evaluation (TD&E), Weapon System Evaluation Program (WSEP), and MAJCOM-conducted Operational Utility Evaluation (OUE), Operational Assessment (OA), and Early Operational Assessment (EOA). (AFI 99-103)

**MAJCOM Representative**—A member of the ALMAG appointed by the MAJCOM division chief that is the staff point of contact for the system involved in the mishap. The MAJCOM representative is normally the system's MAJCOM program element monitor.

**Mishap**—An unplanned occurrence, or series of occurrences, that results in damage or injury and meets Class A, B, C, or D mishap reporting criteria according to AFI 91-204, **paragraph 1.8**. Damage or injury includes: damage to DOD property; occupational illness to DOD military or civilian personnel; injury to DOD military personnel on- or off-duty; injury to on-duty DOD civilian personnel; damage to public or private property, or injury or illness to non-DOD personnel caused by Air Force operations.

## Attachment 2

### REPORTING FORMATS

**A2.1. Format for Preliminary Message Reports.** The message report format in [Figure A2.1](#) will be used for reporting guided munition, missile, and aerial target mishaps within 8 hours, but not later than 24 hours after the incident according to [paragraph 3.2.1.1](#).

#### **Figure A2.1. Format for Preliminary Message Reports.**

FROM: Originator.

TO: Mandatory addressees include HQ AFSC, HQ ACC/SE/DR/DO, HQ PACAF/SE, HQ USAFE/SE, HQ ANG/XOSW, HQ AFRC/SE, and HQ ACC/DRP. For subscale targets, add HQ ACC/PMS. Include appropriate addressees from AFMAN 91-221, [Table 6.3](#).

CLASSIFICATION: Use the proper security markings prescribed by AFI 31-401, *Information Security Program Management*, for classified messages.

SUBJECT: Report type and system type (e.g., PRELIMINARY, ALMAG, BQM-167A).

Special Markings, if applicable (e.g., FOR OFFICIAL USE ONLY).

**NOTE:** For classified messages, omit the quotation “FOR OFFICIAL USE ONLY.”

1. Nature of mishap (e.g., damage, loss of system).
2. Nomenclature and name, weapon carrier mission-design-series (MDS), serial number, building number and purpose, national stock number, part number, manufacturer’s name, as applicable.
3. Date (DD MMM YYYY), time (HHMM), and weather conditions (if pertinent) of mishap (e.g., 03 MAR 2005/1900/FOGGY, NIGHT).
4. Clear text name of base submitting report.
5. Location of the mishap. If on a military installation, give the name of the installation, specific location on base, and general function of the location or facility. If the event occurred on the range, use street and highway references as well as the distance and compass direction from the nearest US military installation. GPS coordinates (DDD-MM.MM) may be used in place of street and highway references for remote locations.
6. Owning MAJCOM, Numbered Air Force (NAF), Center/Wing (wing-equivalent Groups), and Squadron/Unit.
7. NARRATIVE. Give brief description of mishap. Provide strictly abbreviated, factual information. Do not include information implying cause or containing material gained through testimony from crewmembers or other witnesses. Describe extent of damage (e.g., “MISSILE DESTROYED”). Include mission information.
8. ADDITIONAL DETAILS. Include an initial cost estimate, status of on-going recovery operations, hazard containment and security, and information on the level of media interest.
9. Interim cognizant official, telephone numbers (DSN and commercial), and e-mail address.

**A2.2. Format for Progress and Final Message Reports.** The message report format in **Figure A2.2.** will be used for reporting guided munition, missile, and aerial target mishaps according to **paragraphs 3.2.1.2.** and **3.2.1.3.**

**Figure A2.2. Format for Message Reports.**

FROM: Originator.

TO: Mandatory addressees include HQ AFSC, HQ ACC/SE/DR/DO, HQ PACAF/SE, HQ USAFE/SE, HQ ANG/XOSW, HQ AFRC/SE, and HQ ACC/DRP. For subscale targets, add HQ ACC/PMS. Include appropriate addressees from AFMAN 91-221, **Table 6.3.**

CLASSIFICATION: Use the proper security markings prescribed by AFI 31-401 for classified messages.

SUBJECT: Report type and system type (e.g., FINAL, ALMAG, BQM-167A).

Special Markings, if applicable (e.g., FOR OFFICIAL USE ONLY).

**NOTE:** For classified messages, omit the quotation “FOR OFFICIAL USE ONLY.”

1. LOCATION OF MISHAP:

1.1. Name of base or military property (such as Utah Test and Training Range) on which mishap occurred.

1.2. State and country of mishap.

1.3. Location of the mishap. If on a military installation, give the name of the installation, specific location on base, and general function of the location or facility. If the event occurred on the range, use street and highway references as well as the distance and compass direction from the nearest US military installation. GPS coordinates (DDD-MM.MM) may be used in place of street and highway references for remote locations.

1.4. Date (DD MMM YYYY) of mishap (e.g., 3 MAR 2005).

1.5. Local time (HHMM) of mishap (e.g., 1900).

2. Owning MAJCOM, NAF, Center/Wing (wing-equivalent Groups), and Squadron/Unit.

3. Environmental factors:

3.1. If weather was a factor, describe pertinent conditions. Otherwise state, “WEATHER WAS NOT A FACTOR.”

3.2. Day or night.

3.3. If the mishap involved fire or explosion, describe pertinent details. Otherwise state, “NO EXPLOSION OR FIRE.”

4. Damage and cost estimates:

4.1. Mishap cost NONAF: Estimate of damage to non-Air Force property, including other DOD and non-DOD property.

4.2. Air Force cost damage: Cost of damage to Air Force property, including labor and material.

4.3. Total mishap cost (sum of costs in items 4.1. and 4.2.).

5. PROPERTY DATA.

5.X.1. Item name. Give the following data on each piece of property (munition or other equipment) involved. Number as 5.1.1 through 5.X.8.

5.X.1.1. Vehicle or equipment serial number.

5.X.1.2. Object or vehicle activity at time of mishap.

5.X.1.3. Was object destroyed (Y or N)?

5.X.1.4. Mission-design-series (MDS).

5.X.1.5. Mishap within 10 miles of base (Y or N)?

5.X.1.6. Major system failing.

5.X.1.7. FAILED PART INFORMATION. Repeat entries 5.X.1.7.1 through 5.X.1.7.5 as required for all failed parts. Number as 5.X.1.7.1 through 5.X.1.7.Y.

5.X.1.7.Y. Failed part description.

5.X.1.7.Y.1. Failed part number.

5.X.1.7.Y.2. Failed part manufacturer.

5.X.1.7.Y.3. Mishap event number from deficiency report.

5.X.1.7.Y.4. Lot number (if applicable).

6. NARRATIVE. Give a concise, chronological description of the facts and circumstances leading to the mishap. For areas not factors in the mishap, give details in narrative not included elsewhere in the report. Include enough information in final reports to show investigating officer reasoning in reaching findings and recommendations. In all cases, continue the sequence through point of occurrence (or discovery) for all damage and/or until the end of the mishap. For technical assistance on this item, contact HQ AFSC/SEW, DSN 246-6059, commercial (505) 846-6059. Specify in the narrative if an accident investigation was or was not convened and is being conducted.

7. FINDINGS AND CAUSES. Repeat entries 7.1 through 7.X for the required number of findings and causes. Findings must not address new information that was not previously discussed in the narrative. Identify and document hazards that played a role in the mishap sequence. Hazards are defined as "any real or potential condition that can cause injury or occupational illness to personnel; damage to or loss of a system, equipment or property; or damage to the environment." Determine whether individuals or management addressed these hazards during preparation and execution of the mishap sequence. Assess the risk based upon the tables of probability and severity from AFI 91-204.

8. Preventive action(s) recommended or taken. Repeat entries 8.1 through 8.X as necessary.

9. Cognizant official, unit, office symbol, telephone number (DSN and commercial) and e-mail address.