



Log-2464 A ~~Log-2464 A~~  
Adopted 6-28  
National Transportation Safety Board

Washington, D.C. 20594  
Safety Recommendation

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Date: July 7, 1994  
In reply refer to: A-94-129 and -130

Honorable William J. Perry  
Secretary of Defense  
The Pentagon  
Washington, D.C. 20301

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On April 14, 1993, at 1524 Pacific daylight time, a US Navy A-6E airplane on a training flight and a Grumman G-164A Ag-Cat on an aerial application mission collided in visual meteorological conditions (VMC) near Steptoe, Washington, at an elevation of approximately 200 feet above ground level (agl). The A-6E was operating in military training route (MTR) VR1354<sup>1</sup> and was tracking approximately 033° magnetic at a ground speed of about 468 knots. The pilot of the Ag-Cat had departed the Colfax Airport, which is located 1 mile outside the southeast boundary of VR1354, and was en route to a field located 1 mile outside the northwest boundary of the MTR to dispense a load of fertilizer. The Ag-Cat was tracking approximately 334° magnetic at an estimated ground speed of 96 knots. The special operating procedures for VR1354, contained in the Area Planning (AP/1B) booklet (DOD Flight Information Publication - FLIP), included directions to climb to not less than 5,500 feet mean sea level (msl) 10 nautical miles (nmi) prior to Foxtrot, the end of the route. The collision site was approximately on the centerline of the MTR, 9 miles from Foxtrot. Had the pilot of the A-6E climbed in accordance with the procedures, he would have been above the flightpath of the Ag-Cat and the collision would not have occurred. As a result of the accident, two persons received serious injuries, one person received minor injuries, and both aircraft were destroyed. The Safety Board determined that the probable cause of the accident was "the inherent limitations of the see-and-avoid concept of separation of aircraft operating under visual flight rules [VFR] that precluded the crew of the A-6E and the pilot of the Ag-Cat

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<sup>1</sup>Indicates a visual flight rules military training route with no segment above 1,500 feet agl.

from recognizing a collision hazard and taking actions to avoid a midair collision."<sup>2</sup>

Accident investigation experience and near-midair collision reports indicate that many general aviation pilots may not be aware of the location and usage of MTRs, nor the extent to which the "see and avoid" concept for collision avoidance may be degraded during VFR flight in areas containing such operations. Also, general aviation pilots may not be aware of the need for correspondingly greater pilot precautions and vigilance when operating in MTRs. Accordingly, the Safety Board has recommended that the Federal Aviation Administration initiate action to increase general aviation pilot awareness of the location and active status of MTRs and of the inadequacies of the "see and avoid" concept while operating within MTRs.

Based on this accident and other mishaps, the Safety Board is also concerned that military pilots are not adequately informed about the importance of rigorous adherence to the special operating procedures for MTRs. The Board believes that a directed safety awareness program is warranted for all military pilots who use MTRs to emphasize the importance of reviewing and adhering to the special operating procedures for MTRs.

The FAA has provided excellent information for the purpose of alerting pilots to the hazards of midair collisions or near-midair collisions in Advisory Circular (AC) 90-48C, "Pilots' Role in Collision Avoidance," issued March 18, 1983. Appendix 1 of the AC indicates that for a situation in which two aircraft are on a collision course, a time of 12.5 seconds is required from initial target acquisition to the completion of a successful avoidance maneuver. By applying information from Appendix 1 to the geometry and dynamics of the previously cited A-6E/Ag-Cat collision, it was determined that the Ag-Cat airplane would have become visible to the A-6E flightcrew approximately 8.5 seconds before impact. And, had the Ag-Cat pilot been looking over his left shoulder, at the horizon, he could have first seen the A-6E approximately 3.5 seconds before impact. This example illustrates the severe limitations of the "see and avoid" concept to ensure traffic separation under the conditions of conflict that may exist in MTR operations. In light of this information, the Safety Board believes that the Department of Defense should reemphasize to military pilots the need for special precautions and vigilance while operating in MTRs in order to avoid midair conflicts.

Therefore, the National Transportation Safety Board recommends that the Department of Defense:

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<sup>2</sup>For more detailed information, read Field Accident Brief 0474 (attached).


Develop and implement a safety awareness program for all military pilots who use military training routes (MTRs) emphasizing the importance of reviewing and adhering to the special operating procedures for MTRs. (Class II, Priority Action) (A-94-129).

Reemphasize to military pilots who fly in military training routes the need for special precautions and vigilance in order to avoid midair conflicts. (Class II, Priority Action) (A-94-130).

Also as a result of its investigation, the Safety Board issued Safety Recommendations A-94-125 through -128 to the Federal Aviation Administration.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendations A-94-129 and -130 in your reply.

Acting Chairman HALL and Members LAUBER, HAMMERSCHMIDT, and VOGT concurred in these recommendations.

By:   
Jim Hall  
Acting Chairman



Brief of Accident

File No. - 0474      4/14/93      STEPTOE, WA      A/C Reg. No. N8630H      Time (Lcl) - 1524 PDT

---Basic Information---  
 Type Operating Certificate-AGRICULTURAL AIRCRAFT      Aircraft Damage DESTROYED      Fatal 0      Serious 1      Minor 0      Injuries None  
 Type of Operation -AERIAL APPLICATION      Fire ON GROUND      Crew 0      Pass 0      Other 0      None  
 Flight Conducted Under -14 CFR 137  
 Accident Occurred During -CRUISE

---Aircraft Information---  
 Make/Model - GRUMMAN/SCHWEIZER G-164A      Eng Make/Model - P & W R-1340      ELT Installed/Activated - NO -N/A  
 Landing Gear - TAILWHEEL-ALL FIXED      Number Engines - 1      Stall Warning System - YES  
 Max Gross Wt - 5391      Engine Type - RECIPROCATING-CARBURETOR  
 No. of Seats - 1      Rated Power - 600 HP

---Environment/Operations Information---  
 Weather Data      Wx Briefing - NO RECORD OF BRIEFING      Itinerary      Last Departure Point      Airport Proximity      OFF AIRPORT/STRIP  
 Method - N/A      Destination      LOCAL      Runway Ident - N/A  
 Completeness - N/A      ATC/Airspace      Type of Flight Plan - NONE      Runway Lth/Wid - N/A  
 Basic Weather - VMC      Type of Clearance - NONE      Runway Surface - N/A  
 Wind Dir/Speed- CALM      Type Apch/Lndg      Runway Status - N/A  
 Visibility - 20.0 SM      Age - 40      Medical Certificate - VALID MEDICAL-WAIVERS/LIMIT  
 Lowest Sky/Clouds - 2500 FT BROKEN      Biennial Flight Review      Flight Time (Hours)      Last 24 Hrs - 4  
 Lowest Ceiling - NONE      Current - YES      Total - 2231      Last 30 Days- 50  
 Obstructions to Vision- NONE      Months Since - 22      Make/Model- 1460      Last 90 Days- 50  
 Precipitation - NONE      Aircraft Type - AC100      Instrument- 10      Rotorcraft - UNK/NR  
 Condition of Light - DAYLIGHT

---Personnel Information---  
 Pilot-In-Command      Age - 40      Medical Certificate - VALID MEDICAL-WAIVERS/LIMIT  
 Certificate(s)/Rating(s)      Biennial Flight Review      Flight Time (Hours)      Last 24 Hrs - 4  
 COMMERCIAL      Current - YES      Total - 2231      Last 30 Days- 50  
 SE LAND      Months Since - 22      Make/Model- 1460      Last 90 Days- 50  
 Instrument Rating(s) - NONE      Aircraft Type - AC100      Instrument- 10      Rotorcraft - UNK/NR

---Narrative---  
 THE A6E WAS TRACKING 033 DEG LEVEL AT 200 FT AGL AT 468 KTS VFR IN PUBLISHED ROUTE VR-1354. THE AGCAT WAS TRACKING 334 DEG LEVEL AT 200 FT AGL AT 96 KTS VFR ACROSS THE ROUTE TO HIS DESTINATION SPRAY FIELD. THE TWO AIRCRAFT CONVERGED ON A 59 DEG COLLISION ANGLE WITH A CLOSURE SPEED OF 429 KTS. THE AGE NOTIFIED FSS THAT HE WAS ENTERING THE ROUTE LATE AND PROJECTED EXITING 8 MINUTES AFTER THE PUBLISHED CLOSURE OF THE ROUTE. THE AGCAT PILOT REPORTED HE WAS UNAWARE OF ANY INFORMATION/PUBLICATIONS REGARDING THE OPERATION OF MILITARY AIRCRAFT IN THE AREA. THE LOCAL FSS WAS IN THE HABIT OF REPORTING THE ROUTE "HOT" 24 HRS A DAY RATHER THAN THE PRECISE SCHEDULE. THE CONVERGENCE ANGLE OF THE A6E WAS 111 DEG (8 O'CLOCK POSITION & BEHIND THE AGCAT'S LEFT WING). THE CONVERGENCE ANGLE OF THE AGCAT WAS 10 DEG. AT THE PROJECTED CLOSURE SPEED THE AGCAT WOULD HAVE SUBTENDED AN ANGLE OF 0.2 DEG 8.6 SECS BEFORE IMPACT; THE A6E 19.2 SECS.

Brief of Accident (Continued)

Time (Lcl) - 1524 PDT

File No. - 0474      4/14/93      STEPTOE, WA      A/C Reg. No. N8630H

Occurrence #1      MIDAIR COLLISION  
Phase of Operation      CRUISE

- Finding(s)  
1. VISUAL SEPARATION - NOT POSSIBLE - PILOT IN COMMAND  
2. VISUAL SEPARATION - NOT POSSIBLE - PILOT OF OTHER AIRCRAFT

-----Probable Cause-----

The National Transportation Safety Board determines that the Probable Cause(s) of this accident was:  
THE INHERENT LIMITATIONS OF THE SEE-AND-AVOID CONCEPT OF SEPARATION OF AIRCRAFT OPERATING UNDER VISUAL FLIGHT RULES  
THAT PRECLUDED THE CREW OF THE A6E AND THE PILOT OF THE AGCAT FROM RECOGNIZING A COLLISION HAZARD AND TAKING ACTIONS TO  
AVOID A MIDAIR COLLISION.