Log 2263

National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: February 22, 1991
In reply refer to: A-91-21 and -22

Honorable Donald B. Rice
Secretary, Department of the Air Force
The Pentagon
Washington, DC 20330-1000

On April 8, 1987, at 1031 eastern daylight time, a DeHavilland DHC-7, operating as Ransome Airlines flight 444, in scheduled passenger service from Philadelphia, Pennsylvania, to New York's JFK International Airport, passed within 300 feet of a U.S. Air Force (USAF) Lockheed C-141, operating with the callsign GLEEK41. The near midair collision (NMAC) occurred about 6 miles north of McGuire Air Force Base (AFB), Wrightstown, New Jersey, at approximately 5,000 feet MSL. At the time of the incident, Ransome flight 444 was operating in accordance with instrument flight rules (IFR). The C-141 was operating in accordance with visual flight rules (VFR), and visual meteorological conditions (VMC) prevailed.

Ransome flight 444 was under the control of the McGuire AFB Radar Approach Control (RAPCON) North Radar Arrival/Departure (NAD) controller. The flight was outbound on the North Philadelphia VOR 100 degree radial when the first officer advised the captain that a C-141 was climbing toward their aircraft. The captain observed the C-141 and executed evasive action, which included retarding the power levers and performing a descending right turn. A collision was averted but, as a result of the evasive maneuver, one passenger and the flight attendant aboard the DHC-7 received minor injuries. The DHC-7 sustained very minor damage to several internal overhead cabin panels.

The crew of the C-141 had flown a Combat Aircrew Training (CAT) approach and had commenced the departure/climbout phase of the maneuver, which called for a very rapid/steep climb rate coupled with a left turn to the south from its previous northerly track. The crew of the C-141 was receiving VFR traffic advisory service from the McGuire RAPCON South Arrival Radar (SAR) controller. Shortly after crossing the north airport boundary, the C-141 commenced a climbing left turn, and the SAR controller issued the first of three advisories to the C-141 regarding Ransome flight 444. When the C-141 failed to report the traffic in sight, the SAR controller instructed the flight to turn right to a heading of 090 degrees. At the time these instructions were issued to the C-141, it had already completed about 90 degrees of turn through a heading of 270 degrees. Upon receipt of the instructions to turn to the right, the C-141 stopped its turn to the left and commenced a right turn to the new assigned heading of 090 degrees while continuing a steep climb angle. The crew of the C-141 was unable to establish visual contact with the DHC-7 due, in part, to the C-141's steep climb and bank angle. Additionally, the crew of the C-141 was unaware of the near

midair collision until after returning to McGuire AFB at the termination of the flight.

The NAD controller handling Ransome 444 was not aware that the C-141 was a CAT flight although the SAR controller had informed the RAPCON Flow Controller/ Coordinator (FCC) that GLEEK41 was such a flight. The FCC controller was unfamiliar with the term CAT and therefore did not associate any sense of priority or special handling regarding GLEEK41.

The investigation revealed that RAPCON's controllers were unfamiliar with CAT procedures and therefore were unaware of the flight dynamics associated with CAT training flights. Additionally, it was determined that the RAPCON's senior staff had received a briefing on CAT training flights but failed to advise the operating staff. The Safety Board believes that this failure contributed to the operation of the C-141 in close proximity to the Ransome flight.

All RAPCON equipment was operational at the time of the incident. However, the Programmable Indicator Data Processor (PIDP) tracking computer associated with the RAPCON's surveillance radar system did not have a conflict alert feature. This feature, when available to the tracking computer, provides controllers with an aural and visual alarm when tracked aircraft are predicted to be on a conflicting course. At the time of the incident, no conflict alert capability was available on USAF terminal ATC radar systems. The lack of such a feature had been identified by senior USAF ATC management within the Air Force Communications Command (AFCC) as a USAF-wide deficiency. The Safety Board believes that had the RAPCON PIDP tracking computer been equipped with a conflict alert feature, both controllers would have received more timely warning that a conflicting traffic situation was developing and would have issued appropriate instructions to the respective aircraft.

The National Transportation Safety Board determined that the probable cause of this incident was: (1) inadequate radar traffic information service; (2) inadequate visual lookout on the part of the C-141 flightcrew. Factors contributing to the incident were: (1) improper use of procedures and inadequate training on the part of the RAPCON staff; (2) RAPCON facility inadequate equipment (lack of conflict alert capability).

The Safety Board is aware that as a result of this incident, AFCC directed that a higher priority be assigned to the development and installation of a conflict alert feature on the PIDP computer. Between mid-1987 and November 1990, our staff has monitored the development of this conflict alert feature by the Command Communications System Center (CCSC) at Tinker AFB, Oklahoma.

The Safety Board has learned that the first conflict alert hardware systems installation took place at Sheppard AFB, Wichita Falls, Texas, between December 1989 and January 1990. After initial testing to establish a stable baseline for hardware (equipment), the first field test of the conflict alert (software) feature commenced in May 1990. The installation of the equipment at Sheppard AFB RAPCON upgraded that facility's PIDP tracking

computer to a level 2 (PIDPII) system. Testing of the PIDPII providing aural and visual warnings to controllers when two aircraft were in full track status was completed in late May 1990. The Safety Board is aware that Sheppard RAPCON personnel responded quite favorably to the conflict alert feature and that some minor problems were noted with false alarms. The false alarms were attributed to unique situations whereby USAF aircraft operating in a loose formation, on separate transponder codes, would continually indicate an alarm against each other.

Based on the otherwise positive results from the Sheppard tests, CCSC personnel modified the conflict alert program to reduce the occurrences of false alarms. The program was modified further to allow for receipt of conflict alert warnings between a full tracked and an untracked target on the first production kit installation. In essence, this modification added an effective mode "C" intruder alert function to the already proven conflict alert capability. Installation of the first production system was completed at the Eglin AFB, Florida, RAPCON in May 1990 to assess hardware compatibility and to establish a stable equipment baseline. Testing of the advanced PIDPII conflict and mode "C" intruder alert software (Program Load 29P30VPS1) began in October 1990. On November 13, 1990, Eglin AFB RAPCON personnel sent a telegraphic message to CCSC which stated, in part, "Eglin AFB has been testing the conflict alert program change and is currently satisfied with program load 29P30VPS1. We do feel it has enhanced the system and made a safer environment for the flying community."

The Safety Board is aware that the USAF procured a total of 54 production units of the PIDPII hardware and associated software. Of this total, 38 PIDPII systems with the conflict and mode "C" intruder alert features were procured for installation at bases located within the Continental United States (CONUS), and the remaining 16 systems are being allocated for installation at overseas locations. Initial delivery of the 54 systems was to have been at a rate of 12 units per month beginning in September 1990. However, the manufacturer accelerated the delivery rate substantially, and the final unit was delivered to USAF custody in mid-November 1990. Installation of the PIDPII systems was originally scheduled to commence in November 1990 and continue at a rate of 3 systems per month until completion.

However, on November 13, 1990, the Safety Board learned that although all 54 PIDPII systems were in USAF custody, the original installation schedule had been slipped to reflect first unit installation in the November-December 1991 time frame. The Safety Board also learned that the delay in installation of the units was attributed to a lack of contract logistic support for system maintenance. Moreover, since installation would be delayed for approximately 1 calendar year, funding previously allocated for the original installation schedule was reallocated by AFCC for other purposes.

Although pleased to learn of the success of the PIDPII system test, the Safety Board is concerned about the delay in the installation of the systems. Additionally, the Safety Board is concerned that since an adequate contract logistic support program has not been established and original installation

funding has been redirected to other USAF/AFCC efforts, sufficient funding may not be available to meet the modified installation schedules.

The Safety Board believes that installation of the PIDPII systems will greatly enhance safety within the areas of the National Airspace System under Air Force control. Installation of the PIDPII systems will provide an added level of safety in such areas as the heavily traveled northeast corridor and southern California where USAF/AFCC terminal ATC facilities play a major role in the control of civilian air traffic. Further, the military aviation user would be provided a higher margin of safety by the ability of USAF air traffic control personnel to issue PIDPII system conflict alert information because USAF aircraft are not equipped with Traffic Alert and Collision Avoidance Systems.

Since all 54 systems have been delivered and are in USAF custody, the Safety Board believes that the U. S. Air Force should expedite the establishment of a contract logistic support program for the PIDPII systems. The Safety Board also believes that sufficient funding should be made available on a priority basis to ensure that installation of the systems can commence as soon as contract logistic support requirements have been met.

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

> Take appropriate action to expedite the establishment of a contract logistic support program to ensure that the 54 PIDPII systems currently in USAF custody receive adequate maintenance support after installation at designated USAF RAPCON locations. (Class II, Priority Action) (A-91-21)
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> Accomplish all necessary actions to obtain adequate/appropriate funding to ensure that the 54 upgraded PIDPII systems currently in USAF custody are installed at designated USAF RAPCON locations as soon as the contract logistic support program is established. (Class II, Priority Action) (A-91-22)

KOLSTAD, Chairman, COUGHLIN, Vice Chairman, and LAUBER, BURNETT, and HART, Members, concurred in these recommendations.

By: James L. Kolstad
Chairman