

AVIATION OCCURRENCE REPORT

RISK OF COLLISION

BETWEEN

MARTINAIR HOLLAND

BOEING 767 P-HMCL

AND

AIR FRANCE

BOEING 747 F-BPVS

STEPHEVILLE, NEWFOUNDLAND 45 nm NW

27 JULY 1996

REPORT NUMBER A96A0138

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

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and
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Summary

Martinair 806 (MPH806), a Boeing 767, was eastbound at flight level (FL) 330 from Newark to Amsterdam via EBONY and DOTTY. Air France 055 (AFR055), a Boeing 747, was eastbound at FL330 from Chicago to Paris via Killaloe VOR, Gander. The routing of the two aircraft placed them on converging tracks. (See Appendix A.)

The Gander area control centre (ACC) controller assumed responsibility of MPH806 and AFR055 after the radar hand-offs from Moncton ACC. Shortly after, he instructed AFR055 to proceed direct to St John's, Newfoundland, a heading change of about 20° toward the track of MPH806. The two aircraft continued converging at the same altitude until they were about three miles apart. At that time, the crews of both aircraft received and reacted to traffic collision avoidance system (TCAS) resolution advisories (RA), MPH806 climbing and AFR055 descending. The two aircraft crossed with about 1,200 feet vertical separation and 1/4 mile lateral separation when the required separation between the two aircraft was 2,000 feet vertically or five miles laterally.

Ce rapport est également disponible en français.

Other Factual Information

Following two days off, the Gander controller worked an overtime shift from 2045 to 0200 Newfoundland daylight time (NDT1) the night before the occurrence. The occurrence shift was scheduled from 1545 to 2400. At the time of the occurrence, the controller had been working for one hour and thirty-five minutes since his last break.

The most basic form of controlling air traffic consists of monitoring a flight data board displaying flight progress strips, a paper strip for each aircraft's data. The flight progress strip is received by the controller well before the aircraft enters the controller's sector.

The flight progress strip for AFR055, depicting its route of flight, was marked by the Gander controller to indicate that the aircraft would be crossing other aircraft tracks, thereby requiring controller action to maintain the required separation. AFR055 is a regular scheduled flight from Chicago to Paris that often crosses other tracks.

On the evening of the occurrence, the Gander west radar was divided into three sectors to handle the peak period of eastbound traffic flow. The controller had taken over the northern sector about an hour and a half prior to the occurrence. With the traffic volume decreasing in his sector, the controller suggested to the shift supervisor that his sector could be combined with the next one south of his. The supervisor observed the traffic situation in the two sectors and, at about 2310, gave his permission to combine the sectors. The traffic volume was assessed as moderate with moderate complexity.

At 2312, the Gander controller received a hotline call from a Moncton ACC controller who asked him if AFR055, still in Moncton airspace, could be sent direct to the geographic fix of 50°00'N 50°00'W, because "he's real close there with Martinair 806". While the Moncton controller was giving this warning, the Gander controller cut him off with an acknowledgement that he would mark AFR055 at 50°N 50°W. The Gander controller later reported that he had not been aware of the Moncton controller's warning. Review of the Air Traffic Control (ATC) communications tape revealed several instances where the Gander controller had cut off the hotline conversation before the Moncton controller was finished.

At 2315:47, MPH806 and AFR055 were handed off to the Gander controller, who, at 2318:30, instructed AFR055 to proceed direct to St. John's. This re-routing of AFR055 produced about a 20° change in the aircraft's heading and established the final point of convergence with MPH806. The controller was later unable to explain why he was unaware of the conflict between the two aircraft. A controller can put a range bearing line (RBL) between two aircraft that are converging to determine the exact distance between the aircraft and to serve as another reminder of a potential conflict. The controller did not have an RBL established

¹ All times are NDT (Coordinated Universal Time minus two-and-a-half hours) unless otherwise noted.

between AFR055 and MPH806.

Section 401.1 of the *ATC Manual Of Operations* (MANOPS) states that the objective of the instrument flight rules (IFR) control service is to maintain a safe, orderly, and expeditious flow of air traffic under the control of an IFR unit. When the Gander controller re-routed AFR055 without detecting and resolving the conflict with MPH806, the safety of the aircraft under his control was compromised.

MANOPS section 502.1 instructs controllers to display and monitor a controller jurisdiction symbol (CJS) for each aircraft. The Gander controller did not have the CJSs selected on his radar display during this occurrence.

From 2323:16 to 2324:58, just prior to the controller being relieved, there were no transmissions on the controller's radio frequency. During his next transmission, the controller handed off two aircraft to the east radar sector, observed MPH806 and AFR055 converging at the same altitude, and instructed MPH806 to begin a descent. The pilot of MPH806 advised the controller that they were climbing in response to a TCAS/RA. The relieving controller arrived at the sector position about the time the conflict between the two aircraft was detected.

The controller had been involved in two other incidents during the previous 17 months. These two incidents were losses of separation which were investigated internally by the management staff at Gander ACC. The internal investigation reports were reviewed during the Board's investigations, and it was concluded that the deficiencies seen in this incident were not similar to those seen in the previous two incidents, and do not reflect a trend.

A performance review of the controller's proficiency was conducted by a Gander ACC supervisor after this incident. The review mentioned that the controller is regarded by his peers and supervisors to be a good controller. It also determined that his overall performance was at or above the Gander ACC unit standard and that he was ready to continue his duties without the requirement of further training.

The original performance specifications for the ATC radar data processing system (RDPS) software, issued during the 1970s, included provisions for aircraft conflict alert detection. After RDPS detected a traffic conflict, the controller watching the radar display would see a blinking three-letter mnemonic and the aircraft present position symbols would become stars. During testing in the 1980s, the RDPS conflict alert function was found to have several faults and was not considered acceptable for operational use. This function is still not in operational use today.

There were 502 crew and passengers on board the two incident aircraft. The pilot of AFR055 had initiated an abrupt descent in response to the aircraft's TCAS/RA, and the company captured the data from the flight data recorder (FDR) after the aircraft's return to France. The FDR data indicated that a 6,000-feet-per-minute descent had been achieved with g-load decrease to 0.36. The company reported that most of the passengers had been asleep with their seat-belts fastened and there had been no injuries.

Analysis

The controller is considered to be a proficient and good controller, well regarded in the Gander ACC, even though this was his third incident in 17 months. Considering his abilities and the traffic situation, the controller should have detected and resolved the conflict between AFR055 and MPH806 well before the risk of collision occurred. Had the controller been aware of a possible conflict because of the converging tracks, he probably would have placed a range bearing line (RBL) between the two aircraft to determine the exact distance between them.

Despite the frequency of incidents involving this controller (3 in 17 months), the controller's reputation and demonstrated ability during performance reviews suggest that the incidents do not reflect a problem of ability. Rather, the incidents stem from human errors that can be corrected by a controller awareness program. The Gander ACC management put a disciplinary letter in the controller's file as a corrective action and to make the controller more aware of his job responsibilities in the future.

The controller had marked the AFR055 flight progress strip to indicate that it would be crossing other air traffic. If the controller had heard the Moncton controller's warning, he would have been alerted to the crossing traffic situation. In this case, important information in a hotline conversation was missed because the controller did not listen completely.

The controller was inattentive to the radar display and the traffic situation or he would have detected the conflict between MPH806 and AFR055 earlier and resolved it. When he re-routed AFR055 direct to St. John's, he should have looked at the radar display where he could have detected the conflict with MPH806 at that time. The minute and forty-two seconds of radio silence prior to his detection of the conflict suggests that the controller was not scanning the radar display during this time.

The controller was not aware of the conflict between MPH806 and AFR055. TCAS equipment on board the two aircraft and the quick response of the flight crews possibly prevented a mid-air collision. An operational conflict alert function as part of the RDPS software would also provide a safety alert for a degradation of radar service which could result in a loss of separation or risk of collision not otherwise detected by controllers.

Findings

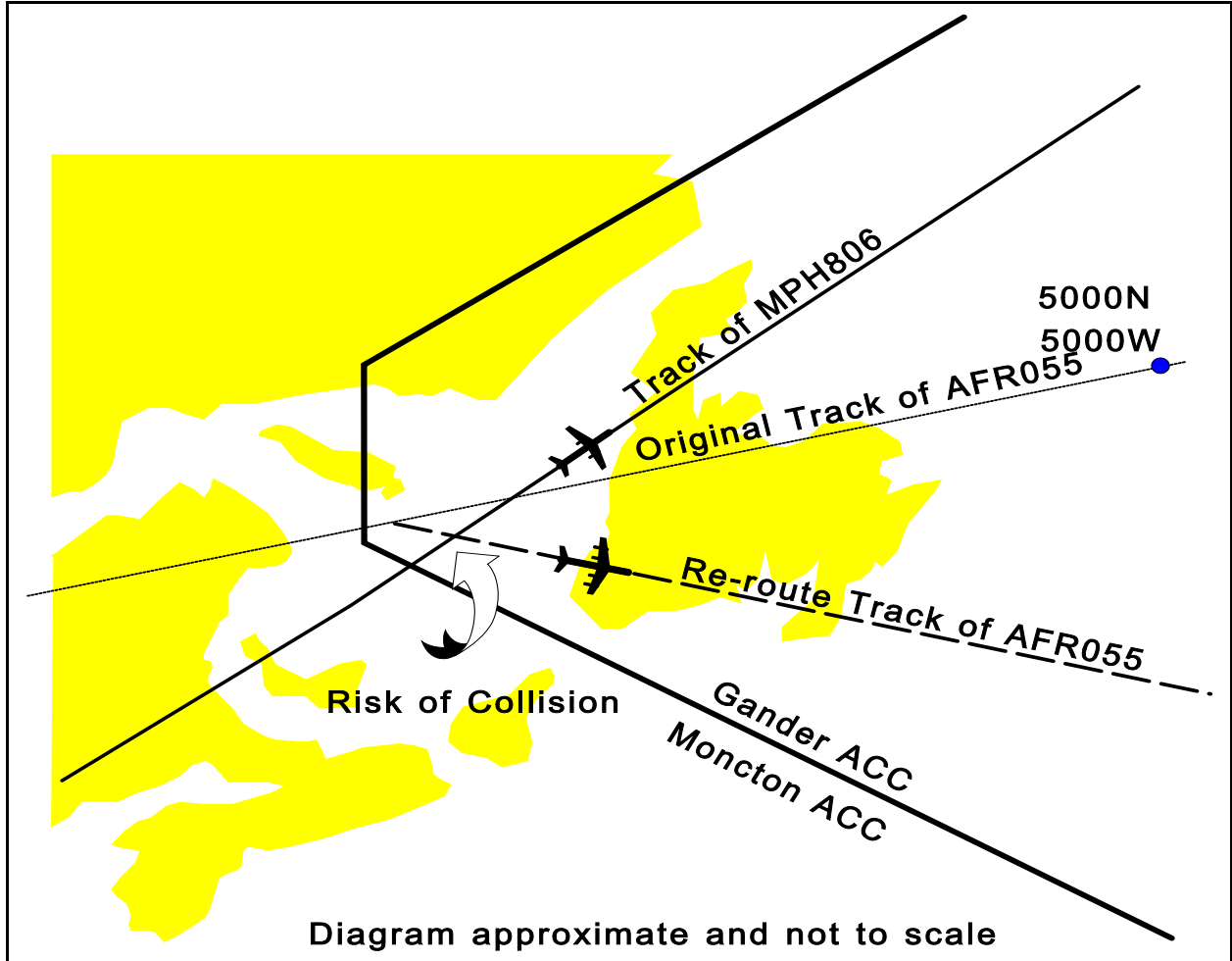
1. The Gander controller missed a warning from a Moncton controller that a conflict was developing between MPH806 and AFR055.
2. When the controller re-routed AFR055 direct to St. John's, he did not confirm whether the turn would create a conflict with other traffic.
3. The controller did not have CJSs displayed for the aircraft for which he was responsible.

4. Although the controller was involved in two prior incidents during the previous 17 months, the deficiencies seen in this incident were not similar to those seen previously and do not reflect a trend.
5. The controller's demonstrated ability during performance reviews suggests that the incidents involving the controller (3 in 17 months) were due to human error rather than limitations in ability.
6. TCAS equipment on board the two aircraft prevented a more serious risk of collision.
7. An operational conflict alert function as part of the RDPS software would help to detect risks of collision that otherwise go undetected.

Causes and Contributing Factors

A risk of collision between the two aircraft occurred because the controller was inattentive to the radar display and the traffic situation and did not detect and resolve the developing conflict.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail, Charles Simpson and W.A. Tadros, authorized the release of this report on 03 April 1997.



Appendix A - Flight Path Diagram