Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

AVIATION INVESTIGATION REPORT

A01W0015

LOSS OF SEPARATION

NAV CANADA

EDMONTON AREA CONTROL CENTRE

EDMONTON INTERNATIONAL AIRPORT, ALBERTA, 15nm E

24 JANUARY 2001

Canada

Aviation Investigation Report

Loss of Separation

Nav Canada
Edmonton Area Control Centre
Edmonton International Airport, Alberta, 15 nm E
24 January 2001

Report Number A01W0015

Summary

Northwest Airlines Flight 11 (NWA11), a Boeing 747-400 aircraft, was en route from Detroit Metropolitan Wayne County Airport, Michigan, to New Tokyo International Airport, Japan, and was initially assigned flight level (FL) 310. While in Winnipeg Area Control Centre (ACC) airspace, NWA11 was cleared to FL350. This altitude was passed to the Edmonton ACC and to a La Biche controller, who annotated the flight progress strip with the new assigned altitude. Subsequently, the same controller, in error, changed the altitude on the strip back to FL310. A Syncrude Citation 560 (SYN21) was en route from Calgary International Airport, Alberta, to Fort McMurray Airport, Alberta, and was assigned FL350. Both aircraft were handed off to and accepted by a second and shortly thereafter a third La Biche controller at FL350. Both aircraft communicated with this controller, identifying themselves in the appropriate manner with their call signs and flight level. When NWA11 initially called the La Biche controller, the controller did not verify the strip and make the appropriate check next to the altitude in the altitude box. At about 1409 mountain standard time, both aircraft received and reacted to a traffic alert and collision-avoidance system resolution advisory. SYN21 descended, and NWA11 climbed. Separation was reduced to less than 2000 feet vertically and less than ½ nautical mile horizontally.

Ce rapport est également disponible en français.

Other Factual Information

The first La Biche sector controller (controller No. 1[1]) had medium traffic level and workload. He was working the sector by himself and did not have the data position staffed. About 30 minutes before ending his shift, controller No. 1 received eight estimates in less than 10 minutes and two requests for altitude changes, including an Edmonton VOR (very high frequency omni-directional radio range) estimate on NWA11 at FL310. During this time, while he was attempting to establish a mental picture of the traffic flow, he was advised that NWA11 was cleared from FL310 to FL350. He annotated the flight progress strip (FPS) with the appropriate change of altitude.

United Airlines Flight 881 (UAL881) had also requested FL350. This request required a rerouting and coordination with the Whitecourt sector. Since the Whitecourt sector did not have an FPS on UAL881, controller No. 1 elected to coordinate face-to-face with the Whitecourt controller. He received approval for the route change, made the revision on the FPS, and handed the FPS for UAL881 to the Whitecourt controller. Controller No. 1 then waited for new FPSs to be printed by the computer system. Shortly after returning to the La Biche sector position with the new FPSs, controller No. 1 became uncertain as to which aircraft had been cleared at FL350. He concluded that he had written FL350 on the NWA11 FPS in error and crossed that figure out and wrote in the original altitude of FL310.

Controller No. 1 had also received an estimate from the Red Deer sector controller for SYN21. SYN21 was estimating a position 30 nautical miles (nm) east of the Edmonton VOR at 1412 mountain standard time at FL350.[2] This position was at the approximate point at which SYN21 would cross the flight path for NWA11. The NWA11 estimate was for the Edmonton VOR at 1412. Because controller No. 1 had earlier re-entered FL310 in place of FL350 on the NWA11 FPS, he was unaware of a possible conflict and advised the Red Deer sector that the assigned altitude for SYN21 was acceptable. When relieved at 1400, controller No. 1 briefed his relief (controller No. 2) concerning the traffic situation and commented on SYN21 and a southbound Aeroflot aircraft at FL350, but advised that there was no conflict. No specific comment was made during the handover briefing regarding NWA11.

Controller No. 2 was on duty for about three minutes when, because of a supervisory decision, he was relieved by another controller (controller No. 3). The handover briefing concentrated on the Aeroflot flight at FL350 and on SYN21 coming into the sector at FL350. Although the controllers did not consider this to be a conflict, they saw a need to monitor progress of the two aircraft until lateral separation was achieved.

A short time later, controller No. 3 accepted the handoff of NWA11 and then SYN21. Both aircraft reported to controller No. 3 with their call signs and clearly stated their altitude of FL350. Controller No. 3 did not read back the altitudes, nor did he make the required checkmark on the FPS beside the altitude box. At 1409 (see Figure 1), SYN21 advised controller No. 3 that their

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[1] For better understanding, the La Biche controllers have been designated Nos. 1, 2, and 3.

[2] All times are mountain standard time (Coordinated Universal Time minus seven hours).

traffic alert and collision-avoidance system (TCAS) showed converging traffic at the same altitude about eight nm away. Controller No. 3 gave SYN21 an emergency descent to FL330 and directed NWA11 to turn right 90°. Traffic at the time, and just before the loss of separation, was light with a light-to-moderate workload.

The installation of a radar conflict-alerting system can provide a final ground-based line of defence. The TSB has made several recommendations regarding conflict-alerting systems to Transport Canada and Nav Canada. Implementation has been delayed several times and is not yet operational throughout Canada.

Edmonton ACC management regularly conducts controller checks. However, FPSs are not routinely recovered and assessed to ensure that they are being properly annotated. Thus, if controllers are not following established procedures, no mechanism exists to identify and correct practices that do not conform to unit or *Air Traffic Control Manual of Operations* practices and standards.

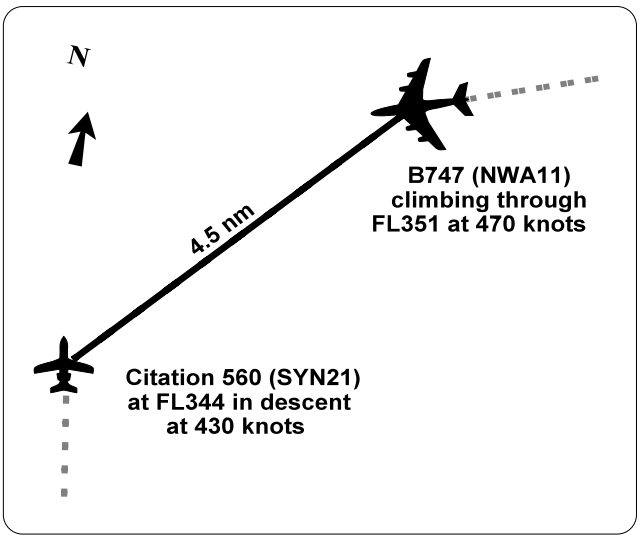

Figure 1. Start of evasive action as a result of TCAS alerts at 1409 MST

Analysis

In order to effectively coordinate a reroute and altitude change with a sector that had not been included in the original FPS distribution, controller No. 1 left his workstation to discuss the situation with the Whitecourt sector controller. On completing the coordination, controller No.1 became confused as to which aircraft had been assigned FL350. He concluded, without performing any other checks, that he had erroneously written FL350 on the FPS for NWA11 and re-entered the original altitude of FL310. This action eliminated an early opportunity for this and subsequent controllers in the La Biche sector to detect an impending conflict with SYN21. During handover briefings to the second and third La Biche controllers, there was no realization that a conflict existed. Neither NWA11 nor SYN21 was in radio contact with the La Biche sector when controller No. 3 took over.

When NWA11 contacted controller No. 3, he did not check the FPS to ensure that the altitude provided matched the assigned altitude on the FPS. By not taking this action, controller No. 3 bypassed an available line of defence. Targets on the radar display have a tag that includes actual altitude of aircraft. As aircraft targets converged at a 90° angle, the final line of defence was negated when controller No. 3 did not monitor the radar targets and information shown on the associated data tags to ensure that the minimum required vertical spacing of 2000 feet was provided. With no ground-based conflict-alerting software available to the controllers, it was only the on-board TCAS equipment that alerted the two aircraft crews.

The rapid changeover of controllers at the La Biche sector within a few minutes might have contributed to their lack of situational awareness. It is likely that neither controller No. 2 nor controller No. 3 had sufficient time to scan all FPSs on the data board and compare that information with information presented on the radar display. Even though SYN21 and NWA11 were not in contact with the La Biche sector until after the second handover, controllers can view flight data on aircraft outside the sector. The La Biche sector was only staffed by one controller at a time of moderate traffic. As a result, in order to accomplish other control-related tasks, less time was available for full-time flight monitoring.

Findings as to Causes and Contributing Factors

1. Controller No. 1 changed the altitude on a flight progress strip from flight level (FL) 350 to the incorrect altitude of FL310. This change reduced any opportunity for subsequent controllers to detect the impending conflict and develop a plan to ensure that required separation was established.

2. When initially contacted by NWA11, controller No. 3 did not compare the altitude on the flight progress strip or the aircraft's data tag on the radar display with the altitude reported by the flight crew. As a result, controller No. 3 did not detect that SYN21 and NWA11, on converging tracks, were at the same altitude.

Findings as to Risk

1. Edmonton ACC does not have an effective method of monitoring lapses in controller practices in areas such as adherence to standard strip-marking procedures.

2. The Nav Canada radar processing system did not have conflict-alerting capability.

3. Successive rapid controller changes at operating sectors could result in errors going undetected, because a controller may not have time to become fully familiar with the current operation before being relieved.

Safety Action

Transport Canada conducted an audit of the Edmonton ACC from 30 April to 02 May 2001. The audit identified lapses in controller practices in areas such as adherence to standard stip-marking procedures in day-to-day operations. In response to the audit finding, Nav Canada informed staff of the deficiency and added related information to the 2001/2002 annual Recurrence Training course.

As of July 2002, automated conflict prediction and alerting capability has been implemented in both Moncton and Edmonton ACCs, and is being implemented in the Winnipeg ACC.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 27 August 2002.