AVIATION INVESTIGATION REPORT
A98P0164

LOSS OF SEPARATION
BETWEEN
PIPER AIRCRAFT COMANCHE PA-24 N6857P AND
PIPER AIRCRAFT TWIN COMANCHE PA-30 C-FFMW
AND
OPERATING IRREGULARITY
BETWEEN
PIPER AIRCRAFT COMANCHE PA-24 N6857P AND
FAIRCHILD INDUSTRIES MERLIN 3 SA-226-TC C-GMET
VICTORIA, BRITISH COLUMBIA
20 JUNE 1998

Aviation Investigation Report

Loss of Separation Between Piper Aircraft Comanche PA-24 N6857P and Piper Aircraft Twin Comanche PA-30 C-FFMW and Operating Irregularity Between Piper Aircraft Comanche PA-24 N6857P and Fairchild Industries Merlin 3 SA-226-TC C-GMET Victoria, British Columbia 20 June 1998

Report Number A98P0164

Summary

A Skys Un-Limited Air Service Limited aircraft, C-FFMW, a Piper Twin Comanche, was on an instrument flight rules training flight that originated from Pitt Meadows, British Columbia. At 1039 Pacific daylight saving time, the aircraft was cleared to the Victoria airport for a straight in instrument landing system / distance-measuring equipment 27 approach, via the IMPOR STAR, the standard terminal arrival route. N6857P, a Piper PA-24 Comanche, which departed Aurora, Oregon, was flying instrument flight rules inbound to Victoria airport from the south. The controller had cleared N6857P to fly a heading of 360 degrees for radar vectors for runway 27 and to maintain an altitude of 3000 feet. N6857P and C-FFMW closed to 1.87 nautical miles laterally and 300 feet vertically in an area where 3 nautical miles or 1000 feet is the minimum required radar separation. To re-establish the proper spacing, C-FFMW was vectored south through the localizer and N6857P was vectored north and then parallel to the localizer for a visual approach to runway 27.

A Navair Charter Inc. aircraft, C-GMET, a Fairchild Merlin 3 on left downwind for runway 27, had been cleared by the Victoria airport controller to turn onto left base. At the same time, the pilot of N6857P had acquired the airport visually and manoeuvred his aircraft onto right base for runway 27; the two aircraft were now converging. The Victoria airport controller gave instructions to C-GMET to turn directly toward the button of runway 27; N6857P elected to fly an orbit (360 degree turn). Spacing was re-established, and all three aircraft landed without further incident. At the time of this occurrence, on-the-job training was being conducted in the Victoria terminal specialty within the Vancouver Area Control Centre. The weather at the time was 3800 feet overcast, with 20 nautical miles visibility.

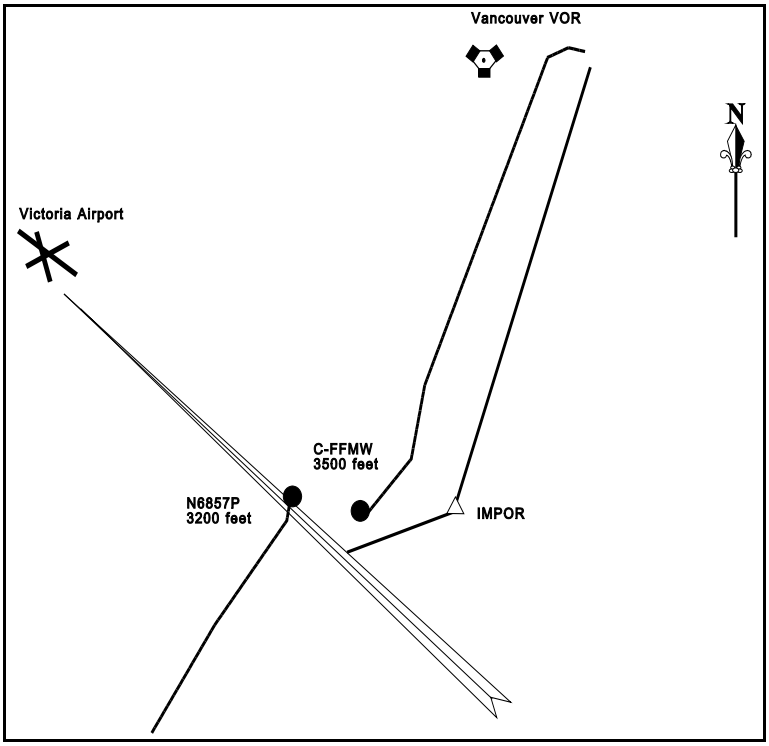
Ce rapport est également disponible en français.

Other Factual Information

Loss of Separation

C-FFMW was cleared by the trainee terminal controller to the Victoria airport for a straight in instrument landing system / distance-measuring equipment (ILS/DME) 27 approach, via the IMPOR STAR. As there were a number of arrivals to the Victoria airport, the trainee planned to sequence this aircraft as number three in the approach sequence. At 1043:54 Pacific daylight saving time (PDT),[1] the trainee controller instructed C-FFMW to reduce airspeed to 110 knots, if practicable. One minute later he directed C-FFMW to descend to 3000 feet,[2] adding the imperative "now" to the instruction.

A review of the recorded radar information showed that the aircraft was not tracking the Vancouver VOR (very high frequency omnidirectional radio range) 157 degree radial toward the IMPOR intersection accurately, but was consistently west of track by as much as 2 nautical miles (nm). The trainee controller did not take any action to advise the aircraft of the observed deviation. This resulted in the aircraft turning inbound earlier than normal to intercept the localizer, which resulted in an unexpected decrease in spacing with the aircraft ahead. During a previous conversation, the on-the-job instructor (OJI) had cautioned the trainee about the possibility of C-FFMW turning in on a tighter track if no correction was initiated. The OJI did not intervene at this point.



The trainee had cleared N6857P to fly a heading of 360 degrees and to maintain an altitude of 3000 feet. The trainee had informed the pilot of N6857P that the flight was to be number four, behind C-FFMW, for landing at Victoria. At 1041:45, the trainee advised the airport controller in Victoria tower during a 14-second exchange that he had rearranged the arrival sequence to place N6857P as number two, behind an instrument flight rules (IFR) arrival already established on the ILS approach and ahead of C-FFMW. However, at 1045:11, the trainee notified N6857P that the sequencing plan would not work, and he instructed the pilot of N6857P to climb to 4000 feet and to turn left to a heading of 340 degrees. Six seconds later, while still at his position at the adjacent console and without coordinating with the trainee, the OJI took over control of the arrival traffic. He instructed N6857P to turn further left to a heading of 300 degrees and to descend to 3000 feet. Shortly

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1 All times are PDT (Coordinated Universal Time (UTC) minus seven hours) unless otherwise noted.

2 All altitudes are above sea level unless otherwise noted.

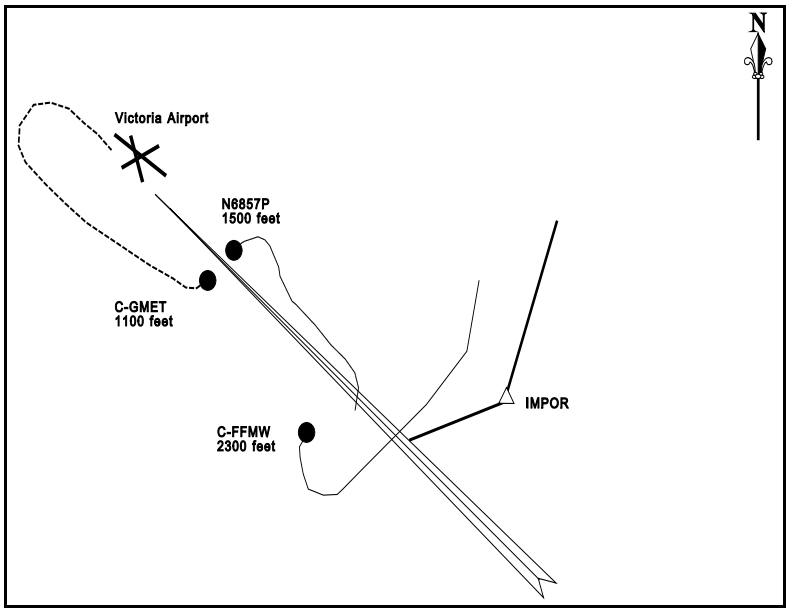
thereafter, he instructed N6857P to turn left to a heading of 280 degrees to intercept the final approach course. At the same time, he instructed C-FFMW to turn left onto a heading of 170 degrees and to descend to an altitude of 2500 feet. He advised the pilot that he was going to vector the aircraft through the localizer for spacing.

At 1047:21, the pilot of N6857P reported visual contact with the aircraft ahead, which was also on an IFR approach but in communication with the Victoria tower. The OJI then cleared N6857P for a visual approach to runway 27, following the aircraft ahead. N6857P was within 4 nm of the airport.

Operating Irregularity

At the time N6857P received the visual approach clearance, C-GMET, flying under visual flight rules (VFR), was established in the left-hand circuit pattern for runway 27 and was in communication with the Victoria tower. At 1046:38, the Victoria tower airport controller had instructed C-GMET to extend the downwind leg because there were several IFR aircraft on final for runway 27. At 1047:08, C-GMET was assigned the number three position for landing behind N6857P. When the airport controller saw that N6857P was being vectored north of the approach, he became uncertain as to the terminal controller's intention with respect to N6857P. As a result, the airport controller instructed C-GMET to continue downwind, and stated that he would advise the aircraft when to turn to base leg.

At 1047:37, the airport controller queried Victoria terminal on the hotline as to whether N6857P was definitely out of the approach sequence, but he received no response. Seven seconds later, having observed N6857P turning away from the approach course, he cleared C-GMET to turn onto base leg. Eight seconds later, upon seeing N6857P turning toward the approach course for runway 27, the airport controller again called Victoria terminal on the hotline and asked what they were going to do with N6857P. The trainee controller replied that N6857P was visual and was following the traffic ahead that was just crossing the threshold of runway 27. However, this traffic was another IFR aircraft on approach to runway 27 and not C-GMET in the circuit. Moments later, at 1048:04, N6857P checked in on the tower frequency. The airport controller immediately realized that there would be a conflict between the two aircraft and instructed C-GMET to turn directly toward the button of runway 27. When queried as to whether there was sufficient spacing behind C-GMET, the pilot of N6857P replied that an orbit was preferred to increase the spacing with the traffic ahead and that he had the traffic in sight. Both aircraft landed without further incident.



The OJI was a licensed controller with 28 years of air traffic control (ATC) experience and was trained as an OJI in January 1994. The trainee had 2.5 years of ATC experience. The trainee was sitting in front of the radar indicator module (IM) normally used by Victoria terminal controllers. The OJI, who was monitoring the trainee's activities, was sitting in front of a vacant IM about 10 feet to the left of the trainee's position but with his headset plugged into the communication jack immediately beside the trainee's jack.

On-the-Job Training (OJT)

It was not an unusual practice for OJIs to sit back, away from their trainee, in order to provide a sense of independence and instill confidence in the trainee. Although this OJI was not the regular instructor for this trainee, he had worked with the trainee on a number of occasions and was familiar with the trainee's capabilities. As a result, he chose to monitor the trainee's actions from an adjacent vacant console. The *ATC Manual of Operations (MANOPS)* states that the OJI must be able to assume operation of the position at any time without requiring the trainee to provide any details of the sector operation. Furthermore, the ATC MANOPS states that the position used for OJT must provide the OJI with the capability of monitoring all land lines and monitoring and overriding all radiotelephony frequencies. The OJI was capable of monitoring all communications but could not override the trainee's transmissions or access the hotlines and landlines in order to communicate with other Air Traffic Services (ATS) positions.

Two communication jacks are provided at each controller position, one for the OJI and one for the trainee, enabling both to listen to all radio, hotline, and landline communications, and to transmit on the selected radio frequencies. However, only the trainee is able to select and talk on a hotline or landline. Should OJIs have to use the hotline or landline circuits, they must first depress an override button on the panel located above the integrated communication control system (ICCS). Such action cuts the trainee off from using either hotline or landline communications. By selecting a second button on the same panel, the trainee is also prevented from transmitting on the radio frequencies. The normal procedure for controllers in the Area Control Centre (ACC) is to push both of these buttons if the OJI requires control of the communication. In this occurrence, the OJI was too far away from the circuit transfer and pre-empt buttons to quickly assume control.

In order to qualify as an OJI, a controller must pass the basic OJI course and receive refresher training every three years. This refresher training requirement for all ATC personnel was instituted in May 1998. The OJI involved in this occurrence had not as yet completed the refresher training.

Supervision

The supervisor in the Victoria terminal specialty in the ACC was monitoring the developing situation from the data position, beside the trainee. The supervisor did not have direct access to the hotline to the Victoria airport controller from his position, but he could use the landline. In an effort to assist the OJI, who was now controlling the traffic without the benefit of the hotline, the supervisor passed information to the Victoria tower that the terminal controller was vectoring N6857P north of the approach until the pilot was visual with the IFR traffic ahead. The supervisor did not know specifically with what position in the Victoria tower he was coordinating, and he did not get a confirmation that the information was understood, nor that it should be passed immediately to the airport controller.

The workload and complexity at the Vancouver ACC were considered moderate; the staffing was judged to be adequate. The supervisor was working as data controller for the Nanaimo sector. All required equipment was working satisfactorily.

The workload at Victoria tower was considered moderate to heavy, the complexity was assessed as complicated, and staffing was adequate for the workload. The tower supervisor was working in the airport radar position at the time of the occurrence and was not aware of the developing problem until after all the aircraft involved had landed. Due to high traffic levels, the four control positions in the tower—clearance delivery, ground control, airport position, and tower radar—are required to be staffed almost continually during the day shift. The supervisor is the only person available to sit in a position while a controller takes a break. This results in the supervisor working in a control position 70 to 80 percent of the time during a shift. The supervisor, airport, and ground controllers were removed from duty after the operating irregularity, in accordance with established procedures; however, this took some time as there were no relief controllers available immediately to take over these positions.

Unbeknownst to the airport controller, the ground controller at Victoria was informed at 1047:00 by the Victoria terminal supervisor working at the data position that Victoria terminal would retain control of N6857P. The aircraft was to be vectored to the north of the localizer for a visual approach as soon as the pilot reported the traffic ahead in sight. The dial feature on the landline to Victoria tower is set to automatically ring at all consoles in the tower; however, it is the normal practice for the ground controller to answer that line, not the airport controller. The ground controller did not clearly understand the content and importance of the information regarding the type of approach and sequencing being passed by the data controller; the terminal and airport controllers normally coordinated airborne traffic on the direct hotline. The ground controller advised the airport controller only that the terminal was taking some traffic to the north. The airport controller interpreted this to mean that N6857P was being taken out of the approach sequence.

Sections C.1.2 and C.2 of a letter of agreement between the Victoria tower and Vancouver ACC stipulates that, wherever possible, the ACC will provide Victoria tower with an arrival sequence, ensure the sequence remains valid, and pass any changes in the sequence before the aircraft involved reaches 10 miles from touchdown. In addition, communications are to be transferred when an arriving aircraft is between 6 and ten miles from touchdown. This procedure was not followed.
Both the loss of separation (N6857P and C-FFMW) and the operating irregularity (N6857P and C-GMET) are classed as air proximity—safety not ensured.

Analysis

On-the-Job Training

The OJI took over control of the air traffic from the trainee without prior coordination or consultation. The need to solve the conflict between N6857P and C-FFMW required immediate action, which did not leave time for communications with the trainee. Once the conflict was resolved, the OJI made the decision to continue vectoring N6857P toward the airport for an approach. However, the OJI was unable to issue a clearance to N6857P until the pilot had visual contact with the aircraft ahead. This necessitated vectoring the aircraft north of course and eventually away from the approach course until the pilot visually sighted the aircraft ahead. The OJI also had to retain the aircraft on his frequency, well inside the normal communications transfer point specified in local procedures. After clearing N6857P for the approach, the OJI instructed the pilot to contact Victoria tower.

The pilot turned the aircraft sharply toward the southwest to align it with the final approach course. With respect to N6857P, the OJI did not coordinate his actions with the airport controller at any time, nor was he able to respond to the airport controller's queries regarding N6857P. Without access to communication and in the rush to fit N6857P back into the traffic flow, the OJI did not have access to all the required data to ensure a safe and efficient approach sequence. The OJI was unaware of the airport circuit traffic and the effect his actions were having on tower operations.

OJIs must have immediate and unrestricted access to all communications resources required to safely carry out all control responsibilities specified in ATC MANOPS. In this situation, the OJI was monitoring the activity of the trainee while sitting in front of a unoccupied IM located approximately 10 feet to the left of the trainee's IM. However, the OJI's headset was plugged into the communication jack immediately beside the trainee. The OJI was comfortable with the trainee's ability and with monitoring the trainee from a distance. Since no standards specify how close OJIs must be to the trainee, it was acceptable practice for OJIs to establish their own criteria. No additional procedures were developed for situations where OJIs felt it advantageous to remove themselves from a close monitoring situation. There is also no specific information for controllers outlining the hazards of restricted access to communications.

There is no formal policy on the best method for assuming control of a position between an OJI and a trainee. It is left to each controller's discretion how the transfer takes place and how formal the changeover should be. The procedure can be as simple as the trainee ceasing to talk when the OJI starts, or as formal as saying "I have control". (For example, formal procedures have been established for the handover of control in the multi-crew cockpit of an aircraft.) A formal procedure between the trainee and the OJI, using such wording as "I have control" or "You have control", would be an effective practice and leave no doubt as to who is to do the controlling and communicating.

Although OJIs have full responsibility for maintaining safe and efficient control of their traffic, whether working alone or monitoring a trainee, there are occasions where a loss of separation is imminent or has already occurred. Recovery from this type of situation usually takes extraordinary and sometimes extreme measures to rectify quickly. Such measures may involve requests for an aircraft to rapidly climb, descend, or turn. The pilot must be immediately informed that a rapid response is required to ensure a situation does not worsen. Controllers are not provided with training to help them respond appropriately to this type of situation, whether as a trainee or an OJI. Teaching and practising the most efficient techniques to re-establish separation once it is lost (potentially or actually) would provide controllers the tools necessary to recover quickly from what could be a very dangerous situation. For example, pilots are taught how to recognize and recover from unusual aircraft attitudes, recognizing that they may find themselves in this situation unintentionally. Similar training would benefit controllers who find themselves in an unfortunate event, such as a loss of separation, in order to enable them to re-establish the required separation more effectively and quickly.

Coordination

The Victoria terminal data controller attempted to assist the OJI by passing information concerning N6857P from his position to Victoria tower. No direct voice hotline circuit is available to the data controller, only a landline circuit. The landline circuit is normally used to pass flight information concerning aircraft still on the ground at Victoria airport and is normally answered by the ground controller. The terminal data controller did not take into account how his unexpected information may be perceived by the individual answering the line, and he did not convey the relative importance of the information that needed to be relayed to the airport controller. When a non-standard method for relaying information is used, controllers must use extra caution to ensure that the information is accorded the required priority and to confirm that the information has been properly understood. This was not done; thus, important information was missed during its onward transmission. Direct access by the data controller to the Victoria airport controller may have resulted in more complete and timely coordination. With all the required information at hand, the Victoria airport controller would have been in a better position to sequence his own traffic with that of the inbound IFR traffic.

Supervision

The Victoria tower supervisor's duties include replacing controllers when they take breaks and conducting preliminary investigations when an operating irregularity occurs. At the time of the occurrence, the supervisor was replacing the tower radar controller; therefore, he was unable to provide proper supervision. In order to complete a preliminary investigation after this occurrence and ensure the involved controllers were removed from duty, the tower staffing was reduced below the minimum required to fill all four control positions.

Findings as to Causes and Contributing Factors

1. The trainee did not correct the flight path of C-FFMW, which was consistently west of the Vancouver VOR 157 degree radial flying toward the IMPOR intersection, and the OJI did not intervene.

2. The OJI was unable to access the landline communications panel from his position at the adjacent console. This would have enabled him to communicate with other control agencies, such as the Victoria airport controller.

3. The OJI and the trainee did not establish an action plan specifying the process and circumstances under which the OJI would intervene.

4. The trainee did not prevent C-FFMW from turning early to intercept the localizer, even though the OJI had cautioned him.

5. With N6857P and C-FFMW on converging tracks, the trainee cleared both aircraft to the same altitude (3000 feet).

6. The trainee changed the approach sequence of N6857P ahead of C-FFMW on the approach to runway 27 at Victoria without communicating this plan to the OJI.

7. The OJI did not inform the Victoria airport controller regarding his plan of action for N6857P.

8. The Victoria terminal data/supervisor did not ensure that information passed to Victoria tower regarding the arrival controller's intention for N6857P was correctly understood.

9. The Victoria ground controller did not correctly understand the information regarding N6857P, nor did he seek clarification.

10. The Victoria ground controller did not correctly relay to the Victoria airport controller the information that N6857P would be continuing with a visual approach to runway 27.

11. The Victoria airport controller was unable to communicate with the arrival controller to confirm the arrival sequence and intentions of N6857P.

12. The arrival controller did not switch N6857P to the Victoria tower frequency until the aircraft was well within the Victoria airport controller's airspace.

Other Findings

1. At the Victoria terminal specialty, the workload and complexity were moderate, and the staffing was within the norms established for the traffic level.

2. At Victoria tower, the workload was moderate to heavy, the complexity was high, and the staffing was within the norms established for the workload.

3. Although trained as an OJI in January 1994, the OJI had not received the triennial OJI refresher course.

Safety Action

Following the occurrence, the Vancouver ACC's Manager of Operations issued *Operations Bulletin 98-171* (File: 5410-2-7) to all control staff, explaining the operation of the integrated communication control system (ICCS) circuit transferring and pre-empt controls. A self-administered OJI refresher study course was also instituted.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 24 May 2000.