26 November 2012

Mr S. Palethorpe
Committee Secretary
Standing Committee on Rural and Regional Affairs and Transport
Australian Senate
PO Box 6100
Parliament House
Canberra 2600

Via email: rrat.sen@aph.gov.au

Dear Mr Palethorpe,

Aviation Accidents Investigation Inquiry

1. I have reviewed the supplementary submission to the Aviation Accidents Investigation Inquiry by the ATSB, dated 20 November 2012, and would like to respond to their comments regarding what they perceive that I had identified as the 'main issues'.
2. To be succinct, I will address only matters that I have previously identified, or have been responded to by the ATSB, and not denominate issues already addressed elsewhere by other parties.
3. Acknowledging the ATSB's response is predominately to technical matters, I shall initially address each in turn. Reference to the ATSB letter may assist the reader.

Fuel loads and calculations

Ten Percent Fuel Variation et al.

4. The data I had used for calculations was from a document identified as:

   Israeli Aircraft Industies Ltd 1124-Westwind Operational Planning Manual, dated January 1978

5. This document was contained in a manual identified as the:

   Pel-Air Flight Operations Department Westwind Cockpit Reference Handbook & Operational Planning Manual

6. This is the manual supplied by Pel-Air to its flight crews, and subsequently provided to me for my submission preparation.

7. Production of the Westwind commenced in 1965. In 1980, deliveries of the Model 1124A commenced. VH-NGA was built as serial number 387 in 1983, and was therefore a Model 1124A.

   Note that the date of the Operational Planning Manual supplied to Pel-Air crew is 1978, and precedes the production of the 1124A by two years.

8. Heed that the ATSB stated in its report that its performance figures were based on:

   "The application of that temperature to the available aircraft performance figures and the PIC-anticipated 50 kts headwind to the relevant cruise speed from the AFM to the distance from Apia to Norfolk Island of 1,450 NM (2,688 km)…"

   This statement clearly refers to the Aircraft Flight Manual (AFM), and not the document the ATSB has subsequently based its claim for performance figures on in its supplementary submission, being the *IAI Westwind 1124A Operational Planning Manual.* The ATSB is relying on one document in its report, and another in its supplementary submission. Both are different from those supplied to the crew.

9. If the fuel flows I have used generally vary from those contained in the *IAI Westwind 1124A Operational Planning Manual* (as used by the ATSB) by about 10%, as claimed by the ATSB, there is a significant problem with the quality of documentation provided by Pel-Air to its crews; particularly so as the figures I have used are claimed to have higher fuel flows. Ironically this would result in more conservative calculations for diversions, particularly those related to LPSD depressurized (or as the ATSB incorrectly refers to PNR). Alternatively, the ATSB may not have been cognizant that my calculations allowed for the use of a VFR of 10 percent (despite my clear declaration); although this variation would then be apparent in total figures, not fuel flows as claimed by the ATSB.

10. I shall readdress the ten percent variation later in this document.

Cruise Speed

11. With regard to cruise speed calculations, as I previously stated:

    "The thrust setting / cruise technique used by the crew during the accident flight is not reflected in the Operational Planning Manual, however the Constant Speed Cruise M0.72 provides the closest approximation based on available data."

12. The technique used by the crew through the majority of the flight was a constant ITT setting. I based this premise on a direct interview of the pilot in command (PIC). The PIC narrated the initial cruise thrust was set at 849 deg C ITT. After he reviewed the situation some time after top of climb the ITT was reduced to approximately 820 deg C ITT; note that this is not long range cruise (which would equate to an ITT significantly lower). Therefore no data contained in the manuals referred to would accurately reflect the situation.

13. The data contained in the *Israeli Aircraft Industies Ltd 1124-Westwind Operational Planning Manual, dated January 1978* directly correlates the indicated M0.72 to a KTAS in the CSC section, of which my calculation of KTAS

was 5 knots less than the published figure, not more. I used a calculated figure as it would more accurately reflect the conditions encountered.

14. Irrespective, the claimed 5 knot error, be it in either direction, represents a difference of 21 nautical miles over 250 minutes, correlating to approximately 68 lbs of fuel (at FL390 CSC M0.72 ISA+10) and is therefore almost nugatory. However, based on the claim of the ATSB of my figures being 5 kts higher, the fuel situation would have been worse for the crew for diversion possibilities due to the increased time, given that fuel usage is time based.

15. Furthermore, in my original submission the calculations allowed for wind influences that resulted in time intervals between waypoints matching those actually achieved during the flight. ie. They reflected the ground speed of the aircraft. This in combination with fuel flows based on hourly rates makes any claim of TAS errors irrelevant. The time intervals between waypoints were known. The fuel flow rates based on time were known. Ergo, TAS calculations are inconsequential.

Fuel Load

16. In 1980, deliveries of the Model 1124A commenced; modifications included a new wing centre-section and the addition of winglets to the tips. Again, VH-NGA was built as serial number 387 in 1983. The revamped aircraft was called the Westwind II, replacing the original design in production. Therefore (by deductive reasoning) the aircraft VH-NGA was a Westwind II.

17. To quote the Simuflite Westwind Cockpit Reference Handbook (dated December 1999), as supplied by Pel-Air to its crews, with regards to the fuel system:

    "…the two systems have a usable capacity of 1,300 U.S. gallons (Westwind I and S/N 239) or 1.330 U.S. gallons (Westwind 2 except S/N 239)"

    and further on:

    "Tip Tanks
    Each tip tank has a usable capacity of 115 gallons"

18. Therefore, according to the documentation supplied by Pel-Air to its crews the usable capacity of fuel was:

    1330 - (2 x 115) = 1100 USG.

19. Based on ATSB's statement in its supplementary submission, the usable fuel would have been 26 USG less, which equates to 169 lbs at an SG of 0.78. Therefore the situation again would have been worse for the crew with regards to diversion possibilities.

20. Once again, these figures are at variance with the ATSB report, which states:

    The fuselage and wing tanks were interconnected, … and carried about 7,330 lbs (3,324 kg) of usable fuel.

21. The figure of 7,330 lbs is erroneous as it does not consider fuel SG, as detailed in my original submission.

22. Further, the ATSB did not specify what allowances it had made for fuel usage during taxi and approach (as these have subsequently been specified by Pel-Air

in revisions to policy, as accepted by CASA), nor if allowance had been made for performance factor (fuel use variation based on the specific airframe)(the records of which should be held by the Pel-Air Chief Pilot, in accordance with the CAR215 Operations Manual, as accepted by CASA), or usage of the variable fuel reserve.

23. The simplest solution to these vexatious differences would be for the ATSB to publish its calculations, and therefore "*..include factual material of sufficient weight to support the analysis and findings."*

Flight profile

24. The flight profile I based my calculations on was the one narrated to me by the pilot in command. I reiterate from my initial submission:

"The crew reported that a climb to FL390 was undertaken without significant delay. In some instances, due to a combination of altitude and temperature deviation (ISA+10) the parameters required are 'Off the chart' (such as the almost immediate climb to FL390). In this case I have applied the most appropriate charted figure for the calculation"

25. Inconsistencies between an aircrafts actual capability and those identified in (this case the IAI 1124A) Operational Planning Manual are commonplace. This may occur for a multitude of reasons, including for a specific airframe / engine combination. Not all engines perform the same. Not all airframes perform the same. Furthermore, the atmosphere is not homogenous. Temperature ISA +10 conditions may only be ISA at a location nearby. This is perhaps the reason it is called an Operational 'Planning' Manual, and not an Operational 'Actual' Manual. Just because the manual says it can't happen doesn't make it a reality.

Flight plan climb and cruise performance

26. I reiterate, the flight profile I based my calculations on was the one narrated to me by the pilot in command.

Climb to Flight Level 390

27. I acknowledge that:

"The aircraft did not climb directly to 39,000ft" (ATSB Supplementary Submission)

28. It climbed to Flight Level 390, and "*without significant delay*". This delay occurred whilst the aircraft was approaching FL350, during the period that a climb to FL390 was being 'negotiated' rather than a descent to FL270. The ATSB report states:

At 0628, when the aircraft was approaching the intended cruising level of FL350, ATC instructed the flight crew to descend to FL270 by time 0650 in order to maintain separation with crossing traffic. The flight crew later reported to ATC that a descent to that altitude would have increased the aircraft's fuel consumption and requested a climb to a higher flight level. At 0633, ATC issued an amended clearance for the flight crew to climb to FL390 and the aircraft was established at this level at 0644.The flight continued at FL390 until the descent into Norfolk Island.

The delay being less than 5 minutes (after 0628 to 0633), not the 15 minutes claimed in the ATSB supplementary submission.

Time to FL390

29. I do not dispute the aircraft may have reached FL390 59 minutes after departure, and not in *"thirty six minutes after takeoff"* as in my calculations. My calculations are derived from the Climb Performance section of the Operational Planning Manual. It is based on 250 KIAS for sea level to 27,000 ft and M0.65 indicated above 27,000 ft. This does not allow for initial departure maneuvering, the approximate 5 minute delay at approaching FL350 or climb speed variation.

30. The PIC narrated that the climb from FL350 to FL390 was conducted as a 'cruise climb'. Hence, another reason for additional time.

31. If the climb took 59 minutes rather than 36, this implies additional fuel usage due to the extended exposure at lower levels, higher fuel flows, and therefore less favourable diversion implications for the crew later in the flight.

Cruise Speed

32. The pilot in command narrated that his initial cruise thrust setting at FL390 was 849 deg C ITT (following his cruise climb from FL350). After a period of time (of which the ATSB does not claim a specific period), the PIC adjusted the cruise thrust setting to approximately 820 deg C ITT to attain a more efficient cruise profile. This thrust setting was not an approximation of 'long range cruise' as stated by the ATSB in its supplementary submission.

Weather forecast validity

33. I acknowledge ICAO Annex 3 Standard 6.1.2. However, I refer the ATSB to their internal investigator notes for Aviation Occurrence Report 200505107, which should be on file. Critical in this accident was the pilots' awareness of forecast and observed conditions. The investigator notes will indicate an interpretation by CASA that although the PIC did not have the most recent forecast that he met the regulation.

34. If perchance the investigator notes are not available on file, a witness to attest to the situation is available.

35. This contradictory position of claimed adherence with ICAO Annex 3 para 6.1.2 and the interpretation of the situation (as recorded in the investigator notes) with regards to weather services in the AOR 200005107 accident are typical of the contradiction and obfuscation coming from the organizations principally involved in this inquiry.

36. If ICAO Annex 3 Standard 6.1.2 is applied, the LPSD to NFFN calculated by the ATSB is incorrect in its report if based on the TAFs. The ATSB identify shortly after 0839 UTC as the "Approximate Last point of safe Diversion for Nadi" (refer diagram p5).

    Based on a depressurized diversion, and with the TEMPO holding requirement based on the 0430 TAF, which the crew are expected to be aware of, the LPSD is significantly earlier, as 1615 lb of fuel is required at NFFN if no approach fuel is required, or 2015 lb if approach fuel is included.

37. Regardless, one of the main issues is who is responsible for obtaining / passing on updated weather information. TAFs generally occur at periodic intervals, and to a certain extent the updating of awareness by the crew can be planned. Who is responsible for the AMD TAFs whose issue times are not predictable?

Diversion possibilities

38. The ATSB's supplementary submission is incorrect. I do not claim that the aircraft could not have diverted to NWWW at time 0904. I provide a figure for fuel on arrival.

39. The parameters for my calculation of 709 lb remaining are presented in my original submission. I have clearly explained the derivation of the information, and provided the necessary calculations; sufficient to support my analysis and findings. I invite the ATSB to do likewise; which relates to one of the main issues of my submission.

Non Use of Variable Fuel Reserve

40. The 709lb remaining scenario was premised on the use of the 10 percent variable fuel reserve. Based on my calculations, if VFR was not used the fuel remaining at YSNF would be an additional 586 lb, thus deriving a total of 1295 lb. This correlates with the 1300 lb reported, and provides support for my position that less than 7330 lb of fuel was in tanks at takeoff.

41. To continue with the premise of the non-usage of VFR during the flight, at least until the point of diversion, the fuel remaining at DOLSI would then have been 2725 lb.

Time 0904 UTC

42. Time 0904 UTC was 25 minutes after DOLSI, at an average Ground Speed of 352 kts and Fuel Flow of 1326 lb/hr. Therefore, the distance past DOLSI was 146 nm and fuel remaining was 2173 lb (assuming the 10 percent Variable Fuel Reserve had not been used to this point)

    From a position on track 146 nm past DOLSI to NWWW was 436 nm

    Based on a diversion direct to NWWW at that time, at FL390 with a 20 kt headwind component throughout, planning to use 1409 lbs for the subsequent cruise and descent for the segment (assuming the 10 percent Variable Fuel Reserve will be used, as is required to be planned), the aircraft would arrive overhead to commence its approach and landing with 764 lbs ***total*** at time 1014 UTC.

43. However, if we account for the 150 lb that Pel-Air subsequently directed to be planned for taxi, and the 400 lb that they subsequently directed to be planned for approach (as per Pel-Air Operations Notice P09/10), the aircraft will arrive with 314 lb. (286 lb less than FFR)

44. If the diversion is planned with 90 kt headwinds, as per the ATSB statement made to the committee on 21 November, this figure becomes 422 lb; less the taxi and approach fuels of 450 lb, making it a shortfall of 28 lb

45. If further allowance is made for the errors claimed in my calculation by the ATSB, the available fuel would decrease further (169 lb for the reduced fuel tank

capacity, and the claimed TAS error being another 25 lbs) the fuel becomes a shortfall of 222 lb.

Time 0928 UTC

46. Time 0928 UTC was 49 minutes after DOLSI. Based on the previous figures, the distance past DOLSI was 287 nm and fuel remaining was 1644 lb (assuming the 10 percent Variable Fuel Reserve has not been used to this point)

    From a position on track 287 nm past DOLSI to NWWW was 410 nm

    Based on a diversion direct to NWWW at that time, at FL390 with no wind component throughout, having used 1198 lbs for the subsequent cruise and descent for the segment (assuming the 10 percent Variable Fuel Reserve has been used, as is required to be planned), the aircraft will arrive with 446 lb.

47. If this figure is corrected as per paragraphs 43 and 45 (but this time ignoring the 90 kt headwind as per the ATSBs statement to the committee, 21 November, as it would be significantly detrimental for the final calculated figure), the aircraft would not complete its diversion as it would run out of fuel, having a shortfall of 198 lbs.

48. To maintain correctness, if similar variations are applied to fuel on arrival at YSNF

    YSNF 1295 lb (if no VFR used), or 1152 lb (if VFR is planned to be used).

    Correcting the VFR used figure of 1152 lb, less the taxi and approach fuel allowances (450 lb), tank capacity correction (169 lb), TAS correction (in this case 21 lb) the landing fuel becomes 512 lb (88 lb less than FFR, but significantly more desirable than fuel exhaustion enroute on the diversion).

Pel-Air Documentation

49. I refer you again to paragraphs 50 to 55 of my original submission (however with due allowance for varied figures in paragraph 50) and in particular paragraph 52 which details the specific instruction to the crew as to which airport to proceed to given the situation.

50. Again from my original submission

    "The ATSB report on page 30 states:
    "… once an aircraft has passed its PNR, the flight crew is unable to divert to an alternate aerodrome with fuel reserves intact. In such cases, if there was a subsequent deterioration in the weather conditions, a crew would be compelled to either continue to its destination in the hope of becoming visual and being able to land, or to divert and arrive at an alternate aerodrome with less than the stipulated fuel reserves."

51. Pel-Air, in their CAR 215 Operations Manual (as accepted by CASA), provide more explicit directives.

    "8.5.2.2 If, as a result of an in-flight fuel check on a flight to a destination aerodrome, the expected fuel remaining at the point of last possible diversion is less than the sum of:
    a) Fuel to divert to an enroute alternate aerodrome; and

b) Variable reserve fuel; and
c) Fixed reserve fuel.

The PIC shall either:
a) Divert; or
b) Proceed to the destination, provided that two separate runways are available and the expected weather conditions at the destination enable a successful approach and landing."

52. I reiterate my subsequent analysis from my original submission

"At 0904 UTC the latest TAF for YSNF was for conditions below alternate minima, but above landing minima. The latest observation (SPECI 0902 UTC) also identified weather conditions below alternate minima, but above landing minima. As such the crew could have a reasonable expectation of becoming 'visual' prior to the completion of an instrument approach and landed."

53. The nuance in this issue is not the varying interpretation of a group of CASA FOI's, nor a group of recent ATPL students; the issue is the crew following instructions in a document provided by Pel-Air, and accepted by CASA as for Pel-Air to comply with the regulations.

Main issues

54. In paragraph 2 of my original submission I clearly state:

"I make this submission as an individual who is concerned regarding the standards and practices of the Australian Transport Safety Bureau (ATSB)…"

55. In paragraph 47 of my submission I state:

As reported (page 7), the crew did not have an awareness and/or appreciation of the 0800 UTC SPECI (observation). Therefore its influence on their decision making process was nugatory. The reason for the lack of awareness and/or appreciation is, in my opinion, inadequately examined in the report.

This is one of the main issues of my submission

56. In paragraph 57 of my submission

The ATSB report (page 24) discusses the requirement

"for the operator to maintain an operations manual that provided guidance to its pilots, and other operational personnel",

and that

"Operations manuals were to include information, procedures and instructions in respect of the safe operation of all the operators aircraft types."

This is one of the main issues of my submission

57. I reiterate paragraph 77 of my original submission:

The ATSB report on page viii states

"… an investigation report must include factual material of sufficient weight to support the analysis and findings."

In paragraph 16 I state

The ATSB Report had a paucity of information regarding their methods of calculations.

And further in paragraph 79

As is apparent from … above, the ATSB report contains insufficient factual material to support its analysis and findings.

There is nothing in the ATSB report or its submissions to the Committee that negates this statement. This is one of the main issues of my submission.

58. Fundamentally, the ATSB has misconstrued the main issues identified in my original submission. They have chosen to focus on technical nuances, which although important, are subordinate to the necessity for adequate factual information of sufficient weight to support the analysis and findings to be included in any report, the supply and use of outdated and incorrect manuals to crew members (and the responsibility for such, be it Pel-Air or CASA oversight), the responsibility for obtaining or providing updated weather information, and the lack of examination of the crews awareness / appreciation of significant weather changes.

59. I am not privy to the extensive resources and time afforded to the ATSB in this investigation (nor do I have a pecuniary interest), and as I have stated:

"I address a limited range of issues regarding the accident based on the information provided to me by various persons or documentary sources that would have been available to CASA and the ATSB throughout their enquiries. I have attempted to source the most accurate information available to me within the short period I have been involved, and without undue imposition or demands…"

60. The ATSB had taken over 1000 days to finalise their report, whereas my involvement from initiation to initial submission was approximately 14 days.

61. Is this the level of service and attention to detail that is acceptable from Australia's expert independent transport investigative body? Is the tergiversation displayed by the ATSB acceptable? That is the main issue of my submission.

With Regards

Richard Davies