

## **PART 1.3 – NARRATIVE OF EVENTS**

### **Definition of Terms:**

- A. All times Local.
- B. All heights are based on the altimeter reading zero on the threshold (QFE) taken from the Accident Data Recorder (ADR) which measured height in 41 ft increments.
- C. All speeds are Indicated Air Speed (knots); however, damage sustained to both pitot tubes after the aircraft touched down may have degraded accuracy thereafter.

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**Synopsis**

1.3.1. At 1105 hrs on 8 Jan 13, a Tucano T Mk1 ZF349, callsign LOP19, of Number 1 Flying Training School (1FTS) departed RAF Linton-on-Ouse with a crew of 2 on a routine Partial Test Flight (PTF). The Handling Pilot (HP) who occupied the front cockpit was an experienced Qualified Flying Instructor (QFI) and Unit Test Pilot (UTP); the Non-Handling Pilot (NHP), a Basic Fast Jet Training (BFJT) course student acting as a 'scribe'<sup>1</sup>, sat in the rear cockpit. The sortie was being flown following rectification work after an over-temperature of the Exhaust Gas Temperature (EGT) on the previous flight. The sortie profile followed that of the Tucano Flight Test Schedule (FTS), which included a check of engine performance and control in both Engine Electronic Control (EEC) Normal and EEC Manual modes. One element of the test was to confirm that, once the EEC was isolated in Manual mode, the engine response and power levels were satisfactory.

Exhibit 1

Exhibit 2  
Exhibit 3

Exhibit 4

Exhibit 5

1.3.2. Whilst conducting power checks in EEC Manual in the RAF Linton-on-Ouse overhead, the HP observed torque abnormalities and elected to curtail the sortie. After approximately 7 mins of flight and having completed various stages of the EEC checks, the HP selected the EEC switch from Manual to Normal in accordance with the FTS. The crew immediately experienced a loss of thrust coupled with a large increase in drag, felt the aircraft pulse and observed that the 'Igniter On' indicator on the Engine Start panel was lit; additionally, the NHP noted that the torque gauge needle indicated zero.

Witness 8 A61  
Witness 3 A52

Witness 3 A69

1.3.3. Suspecting an engine failure, the HP selected the Emergency Shut Down Lever (ESDL) to Off/Feather and manoeuvred the aircraft to position for an Actual Forced Landing on Rwy 21. With the aircraft already in the descent the HP transmitted a brief Mayday call and selected the landing gear down on the normal system. Subsequently, she instructed the NHP to lower the landing gear on the standby system and selected flaps to the fully down position. The crew completed a controlled emergency landing onto the runway approximately 2300 ft beyond the threshold. The aircraft landed wheels up, travelling approximately 3700 ft along the centreline before the HP steered it off the runway onto the grass beyond the overrun where it came to rest.

Witness 8 A5

1.3.4. The NHP opened the canopy and observed white/grey wispy smoke coming from between the front and rear cockpits. The NHP conducted an emergency ground egress without inserting the ejection seat pin and exited onto the left wing to check that the HP was uninjured. The HP made 2 radio transmissions to Linton Tower stating that the crew were uninjured, selected the electrics off and exited the aircraft having made her seat safe. Both aircrew moved away from the aircraft to await the emergency services. No injuries resulted from the incident. Fig 1 shows the accident site.

Witness 3 A1

Exhibit 6  
Witness 8 A8

Exhibit 7

<sup>1</sup> Unofficial term describing the role of a crew-member who records information for the pilot during a test flight.



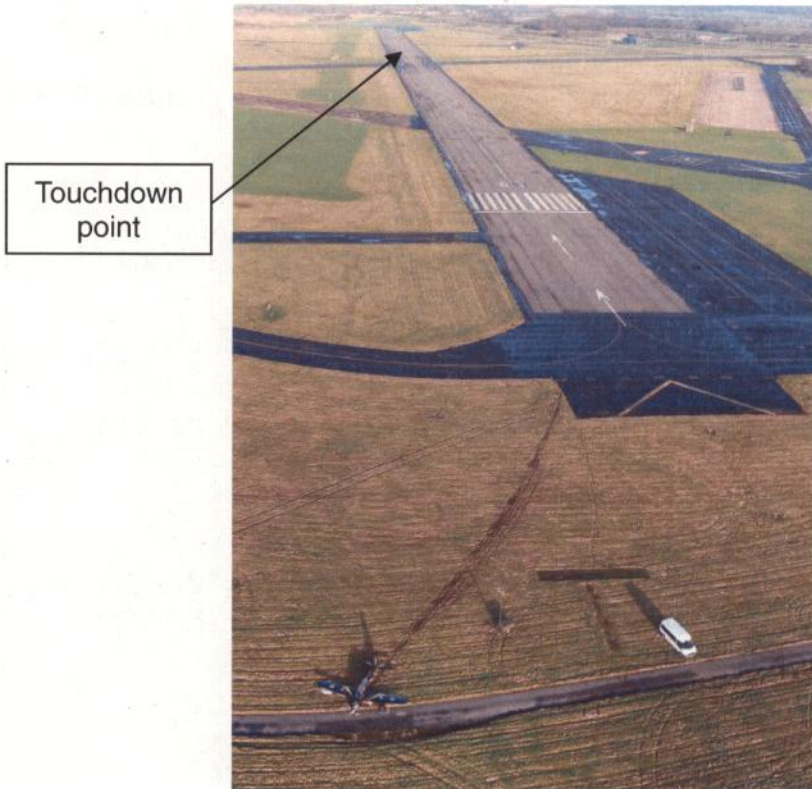


Fig 1 – ZF349 Accident Site.

### Aircraft Information

1.3.5. ZF349 is a Tucano T Mk1 basic fast jet training aircraft under the Aircraft Operating Authority of No 1 FTS at RAF Linton-on-Ouse. At the time of the accident the aircraft was based at RAF Linton-on-Ouse.

1.3.6. The last significant scheduled maintenance on ZF349 was an engine change completed on 21 Nov 12 by Babcock, the in-service engineering contractor. Following this servicing, normal procedures were carried out to return ZF349 to an airworthy condition, including engine ground runs and flight testing. At the start of the accident sortie the replacement Engine Change Unit (ECU) had been run for 17 hours since installation and the aircraft had flown for a total of 3705 hrs.

1.3.7. On the previous sortie on 7 Jan 13, the aircraft had been placed unserviceable due to an over-temperature of the EGT. In accordance with extant procedures, adjustments were made to the maximum power and temperature settings to ensure the engine would not exceed the temperature limit at full power in EEC Normal. Static checks and engine ground runs were conducted following these adjustments. The aircraft was cleared for unrestricted flight subject to a satisfactory PTF conducted by a UTP.

### Crew Composition

1.3.8. **Handling Pilot.** The 45-year old aircraft captain, an experienced A2 QFI, occupied the front seat. She completed instructor training at the Central Flying School (CFS), RAF Scampton, in Dec 93 and re-categorised to A2 QFI in Oct 95 before conducting 2 tours on Jaguar aircraft at RAF Lossiemouth and RAF Coltishall. On returning to the Tucano after a period of absence, she was awarded a Certified to Instruct accreditation in Jul 07,

Exhibit 8

Exhibit 9

Exhibit 4

Exhibit 3  
Exhibit 10



achieved a UTP qualification in Nov 08 and re-confirmed her A2 QFI qualification in Mar 09. At the time of the accident she was the CFS Tucano Examiner. Following the Christmas stand-down, she flew a simulator and a PTF on 3 Jan 13 and an Instrument Rating Test on 4 Jan. She had flown 2.35 hrs in the last 7 days and 30.50 hrs in the last 90 days. She had a total of 2762 hrs, of which 1680.55 hrs were on Tucano.

Witness 8 A1

Exhibit 11

**1.3.9. Non-Handling Pilot.** The 26-year old student pilot occupied the rear-seat and acted as a scribe for the purpose of the sortie; she had flown 2 other test flight sorties, including a PTF. Throughout the accident sortie she was a NHP. She was on Christmas leave for 2 weeks prior to the accident. She had flown 30.40 hrs in the last 90 days and 4.00 hrs in the last 7 days, one of which was a PTF sortie immediately prior to the accident with the same crew composition. She had a total of 142.05 hrs, 31.10 hrs on type and was qualified 1st pilot day only.

Exhibit 12

Exhibit 12

Exhibit 13

### **Previous 24 Hours**

**1.3.10.** On 7 Jan 13, the HP was on leave and the NHP flew a dual sortie for currency which cleared her to fly a solo sortie on the day of the accident; this dual instructional sortie included general handling and a practice engine mechanical failure. Her instructor also demonstrated engine flameout symptoms and relight drills. The crew were within prescribed crew rest periods and neither reported any reason why fatigue might have been an issue leading up to the accident sortie.

Witness 8 A183

Exhibit 14

### **Sortie Details and Preparation**

**1.3.11.** On 8 Jan 13, the HP arrived at work at around 0800 hrs and attended the 0815 hrs Met Brief. Although not on the flying programme the HP was aware that there were 5 test flights which needed to be flown. The NHP was programmed to fly a solo sortie and also attended the 0815 hrs Met Brief. The weather was briefed to be unfit for students at their stage in the course and, with the weather deteriorating throughout the afternoon, the sortie was cancelled.

Witness 8 A5

Witness 3 A1

Exhibit 15

**1.3.12.** With the day's flying programme being re-organised due to weather, the HP went to the Squadron Ops room to place herself onto the flying programme with the intent to fly 2 of the 5 test flights that morning. The HP met another of the Squadron's UTPs at the Ops desk, discussed the 5 test flights and then went to the Flight Line to examine the PTF requirements with the engineers to see which sortie would best suit the weather and her currency requirements. The NHP also went to the Squadron Ops room and, seeing that the HP was planning to conduct 2 PTFs, volunteered to act as a scribe on both sorties. The HP and NHP had previously flown together on a PTF the week prior.

Witness 8 A5

Witness 3 A1

Exhibit 11

Exhibit 12

**1.3.13.** The HP decided on a short first sortie in aircraft ZF140, which required spin checks at FL200 to complete the PTF flown the day before. At approximately 0900 hrs the crew out-briefed with the Duty Authoriser (DA), the HP self-authorising the flight, and departed for the PTF. This 35 min sortie was uneventful.

Witness 8 A5

Exhibit 2

**1.3.14.** The crew landed from this PTF at 1000 hrs and took refreshment before reconvening in the Squadron Ops room at approximately 1030 hrs for the second of the 2 planned sorties; the PTF for ZF349, which the HP would

Exhibit 2



again self-authorise. The HP 'warned out' with Air Traffic and the crew were then out-briefed by the DA using the standard Squadron format before walking to Flight Line Control. Here, the HP briefed the NHP on the content of the PTF, including the format of the EEC checks. The HP then telephoned the Met Office to get the Outside Air Temperature required for the PTF schedule and signed the F700.

### **Sortie Execution**

1.3.15. At approximately 1045 hrs, the crew walked to the aircraft which had been fuelled to 500 kgs. The HP then carried out the external walk round of the aircraft whilst the NHP carried out the rear cockpit and ejection seat checks, and strapped in. The HP carried out her checks, strapped into the front cockpit and proceeded to start the aircraft. Nothing unusual was noted during the crew-in, start up and taxi to Rwy 21. The HP gave the pre-take off emergencies brief, which was an abridged version to that normally given as the crew had briefed similarly an hour earlier.

1.3.16. The aircraft departed from Rwy 21RH (right hand circuit pattern) at 1105 hrs into a busy circuit of mixed types with a planned climb to 1500 ft QFE in the overhead to conduct the EEC checks as per the FTS. After take-off in the upwind turn, the NHP informed the HP of a smell in the rear cockpit similar to that experienced when conducting an engine start. She was in the process of selecting 100% oxygen when the HP instructed her to do so. Both pilots selected 100% oxygen on their demand regulators.

1.3.17. Once established downwind in the circuit the HP started recording engine parameters in accordance with the FTS. The HP estimated that cloud structure was as expected - FEW at 1300 ft in the circuit – but that the visibility was 6 km rather than the forecast 12 km. The HP elected to adjust the flight profile to remain below cloud and closer to the airfield. The HP completed the maximum power check in EEC Normal downwind at approximately 1500 ft and 200 kts before descending to approximately 1200 ft, turning inside the Initial Point ('Initials', 3 nm on the extended centreline) where she heard the NHP select air/oxygen mixture on her demand regulator. At that point the crew dismissed the earlier 'fumes' event as the smell had dissipated. Approaching the dead side the HP set 20% torque, then selected EEC Manual and noted the corresponding EEC caption on the CWP.

1.3.18. As the aircraft was flown dead side, the HP advanced the throttle to achieve a steady state of 560°C EGT. Both crew observed that the torque needle was 'wandering' between 80% and 100%, which the HP considered abnormal. The HP attempted to achieve normal torque indications with the EGT at 560°C on 2 further occasions and, having been unable to do so, decided to curtail the sortie. She adjusted her plan, cancelling her IFR climb and informed the Tower of her intent to land. However, in order to assist the engineering personnel to fault-find, the HP advanced the throttle once more and depressed the Pilot Initiated Event button to mark the Accident Data Recorder (ADR).

1.3.19. At 1111 hrs, as the aircraft was positioned inside Initials for the recovery, the HP decided to complete the last elements of Test Reference Point (TRP) E8 of the PTF and retarded the throttle to flight idle as per the FTS. She then selected 20% torque ready to select EEC from Manual to Normal. The aircraft was 0.91 nm from the threshold of Rwy 21, heading approximately 210° at 994 ft and 171 kts.

Witness 8 A5  
Exhibit 16  
Witness 3 A23  
Witness 8 A5

Exhibit 17  
Witness 8 A5  
Witness 3 A31

Witness 8 A5  
Witness 3 A120  
Exhibit 1

Exhibit 1  
Witness 8 A5

Witness 8 A5

Witness 8 A61  
Witness 3 A1

Exhibit 18

Exhibit 1

Exhibit 1  
Witness 8 A8



## Accident Events

1.3.20. The HP informed the NHP that she was about to move the EEC switch from Manual to Normal. On re-selection of EEC Normal at 1111:59 hrs, 32 secs prior to touchdown, the HP noted an immediate marked increase in drag, observed the Negative Torque Sensing system operating and felt the aircraft pulse. The NHP felt the aircraft lurch, which prompted her to look at the torque gauge; it read zero.

Witness 8 A8  
Exhibit 1  
Witness 8 A133

1.3.21. The HP suspected an engine failure and lowered the nose to counter the drag. Rwy 21 was ahead and slightly to the right of the aircraft and the HP decided to make an approach to it. 23 secs before touchdown at a height of 828 ft and 152 kts, the HP selected the ESDL to Off/Feather whilst manoeuvring for an Actual Forced Landing on Rwy 21. At 1112:11 hrs, 20 secs prior to touchdown, with the aircraft at 704 ft and 158 kts, the HP transmitted a brief Mayday call to Linton Tower then selected the normal landing gear down. 14 secs prior to touchdown, she instructed the NHP to lower the landing gear using the standby system and then selected the flaps straight to the down position.

Witness 3 A1  
  
Witness 8 A70  
Exhibit 1

1.3.22. The NHP recalled moving the landing gear Standby Selector Lever (SSL) rearward as instructed and looked at it to confirm that she had the correct lever. She observed that the gear position indicators showed 2 reds (main wheels) and a black (nose wheel). The NHP stated that she held the SSL aft for a count of 5 secs until just after touchdown.

Witness 8 A8  
  
Witness 3 A76  
Witness 3 RFI

1.3.23. The HP noted the same gear position indications as the NHP just prior to the flare and recalled that the round-out seemed very normal. The aircraft touched down on the runway centreline, wheels up, at 1112:31 hrs at a speed of 146 kts, 2340 ft in from Rwy 21 threshold where it skidded along the remaining length of the runway; the HP managed to maintain directional control using rudder throughout.

Witness 8 A8  
Exhibit 1

1.3.24. The airfield boundary is marked by a wooden fence approximately 450 ft directly beyond the overrun. Immediately beyond this is a public road that lies approximately 2 m below airfield level. Aware that the aircraft was still travelling at speed, and to position for an area with a longer overrun, the HP realised that she required a large input of right rudder. Not wanting to alarm the NHP, and risk a double ejection, with a sudden application of yaw that might be misconstrued as a loss of control, she informed the NHP of her decision to turn the aircraft to the right and run off onto the grass. The aircraft skidded onto the grass approximately 17 secs after touchdown at 65 kts and came to rest approximately 6 secs later at 1112:53 hrs. The total elapsed time from selecting EEC Normal to being at rest was 55 secs.

Witness 8 A8  
  
Exhibit 1

## Post-Accident Events

1.3.25. The NHP saw smoke coming from the left side between the front and rear cockpits. She conducted an emergency ground egress without inserting her seat pin into the ejection seat, opened the canopy as normal and vacated the aircraft onto the left wing. Concerned for the welfare of the HP who was still sitting in her seat, she moved forward to the front cockpit to make sure that the HP was uninjured.

Witness 3 A1  
  
Witness 3 A150

1.3.26. Once stationary, the HP replaced her seat pin into the ejection seat and instructed the NHP to make her seat safe and vacate the aircraft. The HP

Witness 8 A8



contacted Linton Tower to inform them that they were vacating the aircraft. She then shut down the aircraft, isolated the electrical system, and exited the aircraft.

1.3.27. The NHP remained on the left wing until the HP started to egress the aircraft. Both pilots then stepped off the left wing and moved approximately 100 ft to the rear of the aircraft. A Rapid Intervention Vehicle (RIV), Crash 1, was parked on the west corner of 1 Hangar (adjacent to the northern end of the flight line) and observed the aircraft impact the runway. The RIV was en-route to the aircraft before it came to rest and was first on the scene. They were subsequently joined by the Major Foam Vehicle (MFV) and a station ambulance crew who provided immediate medical care and transported the aircrew to the Station Medical Centre.

Witness 3 A93  
Witness 8 A8  
Witness 1

### **Injuries to Persons**

1.3.28. The crew were taken to the Station Medical Centre by ambulance following the accident; neither of them reported any injury or discomfort to the medical team. The Station Medical Officer conducted physical and psychological health checks on the pilots and found them both to be physically and mentally fit. Aware that there might be a requirement for Post Incident Drug and Alcohol Testing (PIDAT) both aircrew gave a urine sample. However, PIDAT was not conducted.

Exhibit 7  
Witness 8 A84  
Witness 3 A143

Witness 11 A24

### **Damage to Aircraft**

1.3.29. The aircraft's final resting position was approximately 30° off runway heading, Fig 2 shows the final position post egress. The aircraft sustained significant deformation and wear to the propellers (Fig 3) and exhaust eductors as it skidded down the runway and, as the aircraft travelled over the grass, the left-hand side main landing gear door and hydraulic pipe work was torn from the aircraft. The left-hand main landing gear door was found on the grass near to the overrun and the canopy was left open. The aircraft was assessed as Cat 4 (works).

Exhibit 19



Fig 2 – Aircraft After Egress.



Fig 3 – Close-up of Damaged Propeller.

### Other Damage

1.3.30. **Public.** There was no damage to public property.

Exhibit 20

1.3.31. **Environmental.** A small amount of hydraulic fluid was lost as the aircraft crossed the grass and the right-hand side fuel tanks vented some fuel overnight.

### Meteorological Information.

1.3.32. The crew attended the morning Met Brief at 0815 hrs and, following their first flight of the day, the HP telephoned the RAF Linton-on-Ouse Met Office at approximately 1040 hrs to prepare for the next PTF sortie.

Witness 8 A5  
Witness 3 A1

1.3.33. The Met report at 1050 hrs was given as:

Exhibit 21

Surface wind: 170°T at 7 kts.  
Prevailing visibility: 12 km.  
Cloud: FEW at 1300 ft, OVERCAST at 2200 ft.  
Temperature: dry bulb PS 10°C, dew point PS 8°C.  
Pressure: QNH 1020.7 hPa, QFE 1018.8 hPa.  
Colour: WHITE.  
Other information: Estimated 2000ft wind was 260°T at 20 kts.

1.3.34. The Met report at 1124 hrs (post-accident) was given as:

Exhibit 22

Surface wind: 160°T at 6 kts.  
Prevailing visibility: 12 km.  
Cloud: FEW at 1400 ft, BROKEN at 2000 ft.  
Temperature: dry bulb PS 10°C, dew point PS 8°C.  
Pressure: QNH 1020.6 hPa, QFE 1018.6 hPa.  
Colour: BLACKWHITE.  
Other information: Estimated 2000 ft wind was 260°T at 20 kts.

### Communications

1.3.35. The aircraft was equipped with UHF and VHF transceivers, and a standby UHF system. Radio exchanges with Linton Ground were successful

Exhibit 23



on start up and taxi; communications with Linton Tower in the circuit, and post accident, were all received with the exception of the brief Mayday Call made by the HP. This transmission was unintelligible to the Tower.

Witness 26

### **Airfield Information**

1.3.36. RAF Linton-on-Ouse has 2 runways available for fixed wing operations. The long runway (03/21) is approximately 6000 ft in length, whilst the short (10/28) is approximately 4400 ft. The airfield TACAN reads 0.4 nm at the threshold of Rwy 21.

Exhibit 24

1.3.37. The aircraft landed on Rwy 21 (211° True), which is a 150 ft-wide asphalt runway with a Landing Distance Available of 6017 ft. It is flown as a right hand circuit. The elevation at the threshold is 50 ft and is lit by high intensity runway threshold lights. The runway has no slope and is lit by high intensity runway edge lights. Angle of Approach lighting is given by Precision Approach Path Indicators set at 3°. The Tucano is not cleared to take a barrier and therefore there are no barrier arresting systems at RAF Linton-on-Ouse.

Exhibit 24

### **Flight Recorders**

1.3.38. The aircraft was fitted with an ADR and associated Data Acquisition and Processing Unit that together formed an integrated Flight Data Recorder that collected data and audio tracks, as well as discrete events, onto a continuous loop tape. The Military Air Accident Investigation Branch (MilAAIB) technical report provides particulars for each flight recorder and other recording devices within Part 2.

Annex A

### **Wreckage and Impact Information**

1.3.39. The accident took place within the airfield boundary of RAF Linton-on-Ouse and was contained therein. The MilAAIB conducted a sweep of the accident site the following morning which identified small items of debris on the grass near the edge of the runway adjacent to the touchdown point. Scratch marks from the engine eductors and propeller blades were visible along the runway centreline (see Fig 4) for the duration of the skid, as were some minor marks where the wings touched the ground. The change in surface from runway to grass resulted in the loss of a small length of hydraulic pipe and an actuator from the undercarriage system, as well as the left-hand main landing gear door. The MilAAIB's search yielded small fragments of aircraft skin and structure; no significant loss of material occurred.

Exhibit 24

Annex A



Fig 4 – Scrape Marks on Runway.



## Post Crash Management

1.3.40. **Immediate Actions.** Linton ATC declared a 'State 1' as the aircraft touched down wheels up and the Station initiated their Contingency Plan (CP1). The Station Fire Service initiated Post Crash Management (PCM) and controlled access until the arrival of a military guard force. Two fire vehicles attended the scene of the accident: a RIV (Crash 1) and a MFV containing the Watch Leader who acted as the on-scene Incident Officer (IO). Shortly after, the Station ambulance arrived and took the crew to the medical centre. The fire crews conducted their initial actions and checked for evidence of fire. Finding none, they made the rear ejection seat safe and ensured that the battery switches were off in the front cockpit. At approximately 1135 hrs, the MFV was redeployed from the accident site in order to enable the reinstatement of a Crash Category to facilitate the recovery of Linton-based aircraft. The IO left the RIV Crew Manager in temporary charge of the site.

Witness 16  
Witness 1  
Exhibit 25

1.3.41. **Subsequent Actions.** CP1 was initiated at 1116 hrs and the role of Incident Coordinator (IC) was assumed by OC Ops Wg in Station Ops. The ERT stood up, consisting of the Stn Cdr, OC 72(R) Sqn, OC Ops Wg, OC Spt Wg and the Babcock Contract Manager. Having heard the tannoy, the Post Crash Management Incident Officer (PCMIO) arrived at Station Ops to be briefed by the ERT and then moved to the accident site accompanied by the Station Health, Safety and Environment Advisor (HSEA) and the Station Photographer. They arrived on scene at approximately 1300 hrs whereupon the PCMIO initiated formal PCM procedures and placed the aircraft under guard; thereafter he controlled access to the site.

Witness 11 A13  
  
Exhibit 26

1.3.42. **Recovery of Linton-based Aircraft.** There were 5 Linton-based aircraft that remained of concern to the command chain: 3 aircraft were airborne in the local area and were due to recover shortly; and 2 aircraft had landed at other RAF stations as part of the routine flying programme, one at RAF Benson and one at RAF Cranwell:

Exhibit 25  
  
Exhibit 27  
Exhibit 2

a. The Duty Senior Supervisor (DSS) and the Air Traffic Supervisor were able to contact the aircraft conducting Low Level training. It, along with the 2 local aircraft, were held to the north-east of the airfield once their fuel state was known whilst the status of the airfield was ascertained. After a visual assessment of the short runway by ATC personnel, the IC acting within the ERT made the decision to re-open Rwy 28 and recover these aircraft rather than divert them to RAF Church Fenton, the nominated Crash Diversion. At 1230 hrs the Stn Cdr instigated an 'operational pause' before the 2 land away aircraft were programmed to fly.

Witness 11 A22  
  
Witness 19 A6

b. The aircraft at RAF Benson had pre-positioned in order to conduct a flypast for a graduation at RAF Halton. When crewing-in at 1230 hrs the crew were aware that an incident had taken place at RAF Linton-on-Ouse but were unaware of the operational pause being declared. They were notified that they may not be able to recover back to RAF Linton-on-Ouse. At 1305 hrs when calling for taxi, the crew were informed by Benson ATC that they had been cleared to conduct the flypast. The crew continued with the sortie as planned with an expectation that any messages to cancel their sortie, to divert to RAF Church Fenton post flypast, or to recover back to RAF Benson would be sent through RAF Benson ATC. On

Witness 17



completion of the flypast at 1330 hrs they were instructed to land at RAF Benson and landed at approximately 1350 hrs.

c. The RAF Cranwell aircraft was not due to return until the late afternoon. The DSS contacted the aircraft captain and instructed him to hold at RAF Cranwell until cleared to recover. The crew subsequently returned to RAF Linton-on-Ouse by road. This aircraft remained at RAF Cranwell until RAF Linton-on-Ouse recommenced flying.

Witness 14

1.3.43. **Other Actions.** Relevant documents and publications were impounded and the Station Flight Safety Officer arranged for witness statements to be taken in the immediate aftermath of the accident. On 9 Jan 13, a 9 Regt AAC Lynx helicopter from Dishforth provided assistance to enable the Station Photographer to take aerial pictures of the accident site. On 10 Jan 13, screens were erected to prevent further public viewing of the accident site and a FOD sweep was carried out under the supervision of the MilAAIB to recover pieces of wreckage.

Exhibit 26

### **Aircraft Recovery and Salvage Operations**

1.3.44. MilAAIB investigators deployed to RAF Linton-on-Ouse on the day of the accident and were on site at first light the following day (9 Jan 13). They recovered the ADR that morning and downloaded it using Babcock's specialist equipment. The ADR was then despatched to MOD Boscombe Down for further in-depth analysis.

Annex A

1.3.45. A Joint Aircraft Recovery and Transportation Squadron (JARTS) team deployed from MOD Boscombe Down on 8 Jan 13, arriving at RAF Linton-on-Ouse late that night. They recovered the aircraft on the morning of 11 Jan 13, once the Service Inquiry Panel had been convened and viewed the accident site. The aircraft was moved to secure storage in 1 Hangar at RAF Linton-on-Ouse where it was screened off and left under the jurisdiction of the MilAAIB investigators. The engine and propellers were removed from the aircraft and sent for testing and further investigation.

Annex A

Exhibit 28

1.3.46. Consultation between the Station HSEA, JARTS and the PCMIO ascertained that the site did not contain any significant hazards. The site was handed back to the Station by JARTS on completion of the recovery process on 11 Jan 13, and the Aircraft Clearance Certificate was signed in the presence of the Station HSEA.

Exhibit 20

### **Fire**

1.3.47. Both pilots were aware of smoke emanating between the front and rear cockpits as they egressed from the aircraft, although the Station Fire Service saw no evidence of fire.

Witness 8 A8  
Witness 3 A1  
Witness 1 A28

### **Survival Aspects**

1.3.48. **Search and Rescue.** No Search and Rescue resources were required as the aircraft remained predominantly intact within the airfield boundary and the crew exited the aircraft independently without aid.

1.3.49. **Escape/Egress Systems.** The crew were able to open the canopy and vacate the aircraft unhindered.

Witness 8 A8  
Witness 3 A1



1.3.50. **Aircrew Equipment Assemblies.** Aircrew survival equipment assemblies were not activated during this accident.

### Tests and Research

1.3.51. MilAAIB investigators removed the ADR for analysis by MOD Boscombe Down, which provided a clear timeline of events throughout the flight.

Annex A  
Exhibit 1

1.3.52. Two specific areas of the aircraft were analysed in depth: the engine ancillaries, particularly the Fuel Control Unit, which were removed for testing at the Original Equipment Manufacturer's site; and the landing gear, which was tested in situ.

Annex A

1.3.53. The Panel conducted flights in the Tucano Simulator at RAF Linton-on-Ouse and 2 airborne sorties with a Tucano QFI. This work provided appropriate awareness of the circumstances of the accident from an airmanship perspective.

### Organisation and Management Information

1.3.54. RAF Linton-on-Ouse is commanded by a Gp Capt within which 1FTS is an element of No 22 (Training) Group. The Station consists of one flying training squadron (72(R) Sqn), an Operations Wing and Support Wing each commanded by a Wg Cdr, and other lodger units. Aircraft maintenance is delivered on site under contract by Babcock. The Project Team (PT) for Tucano, the Tucano Glider Support Authority (TGSA), is also on the Station, led by a Wg Cdr (who is the deputy Type Airworthiness Authority) and is exclusive of the RAF Linton-on-Ouse chain of command. For the purposes of PCM, as a nominated subsidiary unit, RAF Linton-on-Ouse has 4 qualified PCMIOS.

Exhibit 29

Exhibit 30

Exhibit 31

1.3.55. Tucano aircraft are operated at RAF Linton-on-Ouse, RAF Cranwell and MOD Boscombe Down. The Stn Cdr is the Delivery Duty Holder (DDH) for Tucano aircraft operating from RAF Linton-on-Ouse and RAF Cranwell, and is the Suitably Qualified Experienced Person (SQEP) legally responsible and accountable for airworthiness, maintenance and safe use of the air systems at RAF Linton-on-Ouse. The DDH at RAF Linton-on-Ouse is supported by a SQEP Senior Operator to provide specialist support in delivering his air safety responsibilities. This role is assigned to OC Ops Wg to provide internal assurance of operating procedures, standards and flight safety, operating advice on Risks to Life and, where appropriate, advice on operating issues associated with the acquisition of new air systems. Engineering support to the DDH is provided by a newly formed Continuing Airworthiness Management Organisation, which is co-located with the UK Military Flying Training System PT (UK MFTS) based at MOD Abbeywood, Bristol. The DDH for the Tucano operating from MOD Boscombe Down is the Chief Test Pilot of the Air Warfare Centre.

Witness 19 A1  
Exhibit 32

Exhibit 30

1.3.56. Babcock is contracted to provide a wide variety of services at RAF Linton-on-Ouse, including engineering support to 72(R) Sqn. The company provides the following workforce:

Exhibit 33

a. Flight-line personnel.

b. A Forward Engineering Maintenance (FEM) team working an early or late shift Monday to Friday, rotating on a weekly basis.

Witness 4 A3



- c. A Depth Engineering Maintenance (DEM) team working days only.

**Additional Information**

1.3.57. **Media.** The aircraft came to rest a short distance from the public road and a known informal public viewing point. Photographs appeared on internet sites later that day through various local and national media organisations. A statement was released by the Defence Media Centre, through the Station Media Communications Officer, on 8 Jan 13.

Exhibit 34