

**PART 1.1 – COVERING NOTE**

3 Oct 14

DG MAA

**SERVICE INQUIRY INVESTIGATION INTO AN INCIDENT INVOLVING VOYAGER ZZ333  
ON 9 FEB 14**

1. The Service Inquiry (SI) Panel assembled at MilAAIB Farnborough, on the 14 Feb 14 by order of the DG MAA for the purpose of investigating the incident involving Voyager ZZ333 on 9 Feb 14 and to make recommendations in order to prevent recurrence. The Panel has concluded its inquiries and submits the provisional report for the Convening Authority's consideration.

**PRESIDENT**

██████████  
Wing Commander  
President  
ZZ333 SI

**MEMBERS**

██████████  
Lieutenant Commander  
Air Member  
ZZ333 SI

██████████  
Squadron Leader  
Engineering Member  
ZZ333 SI

2. The following inquiry papers are enclosed:

- Part 1 (The Report)
- Part 1.1 Covering Note
- Part 1.2 Convening Orders & TORs
- Part 1.3 Narrative of Events
- Part 1.4 Findings
- Part 1.5 Recommendations
- Part 1.6 Convening Authority Comments

- Part 2 (The Record of Proceedings)
- Part 2.1 Diary of Events
- Part 2.2 List of Witnesses
- Part 2.3 Witnesses Statements
- Part 2.4 List of Attendees
- Part 2.5 List of Exhibits



~~OFFICIAL - SERVICE INQUIRY~~

- Part 2.6 Exhibits
- Part 2.7 List of Annexes
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- Part 2.9 Schedule of Matters Not Germane to the Inquiry
- Part 2.10 Master Schedule



# OFFICIAL SENSITIVE

## GLOSSARY

Acronym/ Abbreviation	Explanation
A4	Air Logistics
AAIB	Air Accident Investigation Branch (Civil)
AAR	Air-to-Air Refuelling
ACDS (Log Ops)	Assistant Chief of Defence Staff Logistics Operations
ADIRU	Air Data and Inertial Reference Units
AEA	Aircrew Equipment Assemblies
AGE	Aircraft Ground Engineer
Air Tanker Services	ATrS
agl	Above Ground Level
ALARP	As Low As Reasonably Practicable
AOA	Aircraft Operating Authority
AOC	Air Officer Commanding
AP	Autopilot
APOD	Air Point of Disembarkation
ASIMS	Air Safety Information Management System
ASMP	Air Safety Management Plan.
ASMS	Air Safety Management System
ASOs	Air Staff Orders
ATC	Air Traffic Control
ATSB	Australian Transport Safety Board
BMI	British Midland International
BSW	Base Support Wing
BZAOs	RAF Brize Norton Air Orders
CAA	Civil Aviation Authority
CAM	Continuing Airworthiness Manager
Cat	Category
CAR	Civil Aircraft Register
CDS	Chief of Defence Staff
CDSDO	Chief of the Defence Staff Duty Officer
CJO	Chief of Joint Operations
CT	X Ray Computed Tomography
CVR	Cockpit Voice Recorder
D-SLR	Digital Single Lens Reflex Camera
DA	Duty Authoriser
DAOS	Design Approved Organization Scheme
DASOR	Defence Air Safety Occurrence Report
DCA Psych	Defence Consultant Advisor in Psychiatry
DDH	Delivery Duty Holder
DE&S	Defence Equipment and Support
DEX	Duty Executive
DFDR	Digital Flight Data Recorder
DO	Design Organisation
DSCOM	Defence Supply Chain and Operational Movements
DSS	Duty Senior Supervisor
EASA	European Air Safety Agency
ECAM	Electronic Centralized Aircraft Monitoring
Eng	Engineering



## OFFICIAL SENSITIVE

EPC	Error Promoting Condition
FCTM	Flight Crew Training Manual
FDM	Flight Data Monitoring
FL	Flight Level (Altitude based on Standard Pressure Setting of 1013hPa)
FOB	Forward Operating Base
Flt Lt	Flight Lieutenant (OF2 Rank)
FMHT	Field Mental Health Team
FRC	Flight Reference Cards
ft	Feet
Gp	Group
Gp Capt	Group Captain (OF5 rank)
GPS	Global Positioning System
HF	Human Factors
HQ 22(Trg) Gp	Headquarters 22 (Training) Group
hrs	Hours
IFF	Identification Friend or Foe
IFR	Instrument Flight Rules
INTA	Spanish National Institute of Aerospace Technology
J1	Joint Administration
J3	Joint Operations
JARTS	Joint Aircraft Recovery and Transportation Squadron
JCCC	Joint Compassionate and Casualty Cell
JFSp(A)	Joint Force Support Afghanistan
JSP	Joint Service Publication
kg	Kilograms.
KIAS	Indicated Air Speed in Knots
Km	Kilometres
MAA	Military Aviation Authority
MAOS	Maintenance Approved Organization Scheme
MAR	Military Aircraft Register
MIG	Materials Integrity Group
MilAAIB	Military Air Accident Investigation Branch
min	Minute
Mk	Mark
MPCM	Manual of Post Crash Management
MRP	Military Aviation Authority Regulatory Publication
MOD	Ministry of Defence
MSN	Mission Serial Number
MSO	Mission System Operator
NAS	Naval Air Squadron
NHP	Non-Handling Pilot
nm	Nautical Mile
OAT	Outside Air Temperature
OC	Officer Commanding
ODH	Operational Duty Holder



## OFFICIAL SENSITIVE

OEM	Original Equipment Manufacturer
Ops	Operations
OPCOM	Operational Command
OPCON	Operational Control
OR-9	Other Rank Level 9
OSI	Occurrence Safety Investigation
PA	Public Announcement
PCMIO	Post Crash Management Incident Officer
PCM	Post Crash Management
PMS	Personnel Management Squadron
PJHQ	Permanent Joint Headquarters
PT	Project Team
QFI	Qualified Flying Instructor
RA	Regulatory Article
RAF	Royal Air Force
RAFCAM	Royal Air Force Centre of Aviation Medicine
RAFLO	Royal Air Force Liaison Officer
RR	Risk Register
RtL	Risk to Life
RTS	Release To Service
secs	Seconds
SFSO	Station Flight Safety Officer
SI	Service Inquiry
SID	Standard Instrument Departure
SME	Subject Matter Expert
SMO	Station Medical Officer
SO	Senior Operator
SOP	Standard Operating Procedure
SQEP	Suitably Qualified and Experienced Person
Sqn	Squadron
Sqn Ldr	Squadron Leader (OF3 rank)
STANEVAL	Standards and Evaluation
Stn	Station
Stn Cdr	Station Commander
SUTTO	Start Up, Taxi and Take Off
TAA	Type Airworthiness Authority
TCAS	Traffic Collision Avoidance System
TMW	Tactical Medical Wing
TOGA	Take-Off Go Around
TRANSOP	Transport Operation Order
TRiM	Trauma Risk Management
USAF	United States Air Force
UTC	Universal Time Constant
VFR	Visual Flight Rules
VOM	Voyager Operations Manual
Wg Cdr	Wing Commander (OF4 Rank)



# MAA SI Convening Order



13 Feb 14

SI President  
SI Members

Hd MilAAIB  
MAA-Legad 1

Copy to:  
PSO/CAS  
DComOps

CofM (Air)  
AOC 2 Gp  
Stn Cdr Brize Norton  
Air Tanker Director of Fight Ops

## MAA DG/SI/01/14 – CONVENING ORDER FOR SERVICE INQUIRY INTO AIRCRAFT OCCURRENCE INVOLVING VOYAGER ZZ333 ON 9 FEB 14 AT 1549Z

1. A Service Inquiry (SI) is to be held under Section 343 of Armed Forces Act 2006 and in accordance with JSP 832 – Guide To Service Inquiries (Issue 1.0 Oct 08).
2. The purpose of this SI is to investigate the circumstances surrounding the subject aviation occurrence and to make recommendations in order to prevent recurrence.
3. The SI Panel is to assemble at the MilAAIB Farnborough<sup>2</sup> on 13 Feb 14 at 1600Z.
4. The SI Panel comprises:
  - President: [REDACTED]
  - Members: **Air Member:** [REDACTED]  
**Eng Member:** [REDACTED]
5. The legal advisor to the SI is [REDACTED] and technical investigation/assistance is to be provided by the Military Air Accident Investigation Branch (MilAAIB).
6. The SI is to investigate and report on the facts relating to the matters specified in its Terms of Reference (TOR) and otherwise to comply with those TOR (at Annex). It is to record all evidence and express opinions as directed in the TOR.
7. Attendance at the SI by advisors/observers is limited to the following:

**Hd MilAAIB / DepHd MilAAIB– Unrestricted Attendance.**

**MilAAIB investigators in their capacity as advisors to the SI Panel – Unrestricted Attendance<sup>3</sup>.**

<sup>2</sup> Or via VTC in extremis.

<sup>3</sup> On a case by case basis as authorised by Hd MilAAIB.



**OFFICIAL SENSITIVE – SERVICE INQUIRY**

**██████████, RAFCAM HF Accident Investigator – Unrestricted Attendance.**

8. The Panel will initially work from Farnborough facilities, equipment and assistance suitable for the nature and duration of the SI, as requested by the SI President will be requested in due course.

9. Reasonable costs will be borne by DG MAA under UIN D0456A.

*Original Signed*

R F Garwood  
AM  
DG MAA – Convening Authority

Annex:

A. Terms of Reference for SI into Aviation Occurrence Involving Voyager ZZ333 on 9 Feb 14 over the Black Sea.



**TERMS OF REFERENCE FOR SI INTO AVIATION OCCURRENCE INVOLVING VOYAGER  
ZZ333 ON 9 FEB 14 AT 1549Z OVER THE BLACK SEA.**

1. As the nominated Inquiry Panel for the subject SI, you are to:
  - a. Investigate and, if possible, determine the cause of the occurrence, together with any contributory, aggravating and other factors and observations.
  - b. *Ascertain whether Service personnel involved were acting in the course of their duties.*
  - c. *Examine what policies, orders and instructions were applicable and whether they were complied with.*
  - d. *Determine the state of serviceability of the aircraft and relevant equipment.*
  - e. *Establish the level of training, relevant competencies, qualifications and currency of the individuals involved in the accident.*
  - f. *Review the levels of authority and supervision covering the task during which the incident occurred.*
  - g. *Identify if the levels of planning and preparation were commensurate with the activities' objectives.*
  - h. *Investigate and comment on relevant fatigue implications of individuals' activities prior to the matter under investigation.*
  - i. *Ascertain if aircrew escape and survival facilities were fully utilized and functioned correctly.*
  - j. *If appropriate, investigate the level of any injury sustained and whether such injury will be the exciting cause of later disability, as established from expert testimony.*
  - k. *Determine any relevant equipment deficiencies.*
  - l. *Confirm that the Aircraft Post-occurrence Management procedures were carried out correctly and that they were adequate.*
  - m. Determine and comment on any broader organizational and/or resource factors.
  - n. *Assess whether the security of personnel, equipment or information was compromised and if so to what degree.*
  - o. *Ascertain value of loss/damage to the Service and/or extent (and, if readily available, the value) of loss/damage to civilian property.*
  - p. *Assess any Health and Safety at Work and Environmental Protection implications in line with JSP 375 and JSP 418.*



**OFFICIAL SENSITIVE — SERVICE INQUIRY**

- q. Report and make appropriate recommendations to DG MAA.*
- r. Produce an Aircraft occurrence Summary, to be completed within 2 wks of DG MAA signing off the SI.*

2. You are to ensure that any material provided to the Inquiry by the United States, or any other foreign state, is properly identified as such, and is marked and handled in accordance with MOD security guidance. This material continues to belong to those nations throughout the SI process. Before the SI report is released to a third party, authorization should be sought from the relevant authorities in those nations to release, whether in full or redacted form, any of their material included in the SI report, or amongst the documents supporting it<sup>3</sup>. You are not to make a judgement on the origin of any classified material<sup>4</sup>. In addition, the relevant PDR directorate should be informed early when dealing with the US or other foreign state material, and should be engaged in the process where doubt exists.

3. During the course of your investigations, should you identify a potential conflict of interest between the CA and the Inquiry, you are to pause work and take advice from your MAA Legal Advisor, Hd MilAAIB and DG MAA. Following that advice it may be necessary to reconvene reporting directly to MOD PUS.

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<sup>3</sup> For intellectual intelligence material this should be done through DIS (DICSD-SEC).

<sup>4</sup> If you are unable to positively identify the origin of the material, you must contact INFO-ACCESS DPAD or, for intelligence material, DIS (DI CSD-SEC).



**PART 1.3 – NARRATIVE OF EVENTS**

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    Mon 10 Feb ..... 2

    Tue 11 Feb ..... 2

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**Synopsis**

1.3.1 On Sun 9 Feb 14, the crew of ZZ333 briefed at 0925 UTC (Co-ordinated Universal Time) for a non-stop air transport flight from RAF Brize Norton (BZZ) to Camp Bastion Airfield (QOZ), Afghanistan. ZZ333 taxied approx 20 minutes late with a total flight crew of 9, plus 189 passengers. The departure was delayed slightly by a transponder Electronic Centralized Aircraft Monitoring (ECAM) warning just prior to line-up which was quickly resolved. With a call-sign of ISF 63JW, ZZ333 departed BZZ at 1200 UTC for an anticipated 8hr 20min leg to QOZ.

Witnesses 1 & 2

1.3.2 Initially the flight progressed without incident, with the exception of at least one instance of turbulence, significant enough to warrant the illumination of the seat belt signs. At 1549 UTC (night time), with the aircraft in the cruise at Flight Level (FL)330 and autopilot 1 engaged, the Co-pilot had left his seat and was in the forward galley in the vicinity of the forward left passenger door. The Captain (occupying the left-hand flight deck seat) suddenly felt a sensation of weightlessness and being restrained by his harness, accompanied by a rapid pitching down of the aircraft. He attempted to take control by pulling back on his side-stick controller and pressing the autopilot disconnect button but these actions were ineffective.

Witnesses 1 & 2

1.3.3 Immediately prior to the pitch-down, the Co-pilot felt a sensation similar to turbulence. Other crew in the cabin reported a similar sensation, describing it as a 'jolt'. The Co-pilot then experienced weightlessness and struck the cabin roof but was able to re-enter the flight deck through the open door. He reported a disorderly scene with audio alarms sounding and a violent shaking of the aircraft. He reached down to pull back on the side-stick control. Both pilots report hearing a 'dual input' audio warning, indicating simultaneous inputs by both pilots on their respective side-sticks. As the aircraft began to recover from the dive, excessive speed was building. The thrust levers were selected to idle and as the aircraft re-established a climb, the speed rapidly reduced. The Captain set Take-off and Go-around (TOGA) power and subsequently re-established a power attitude combination for straight and level flight at FL310.

Witnesses 1, 2 & 3

1.3.4 The aircraft had lost 4,400 feet in 27 seconds, registering a maximum rate-of-descent of approximately 15,800 feet per minute, before recovering to straight and level flight. The speed had reached 358 knots Indicated Air Speed (KIAS), or Mach 0.9, and 'g' forces had ranged from minus 0.58 'g' (at the onset of the dive), to plus 2.06 'g' during the recovery. The aircraft was diverted to Incirlik Airbase in southern Turkey without further incident.

Exhibit 1  
Exhibit 2

1.3.5 The resulting negative 'g' forces were sufficient for a significant number of passengers and crew to be thrown towards the cabin roof. Twenty-five passengers and 7 crew reported injuries, and were attended in flight by medical personnel travelling as passengers, and subsequently at the on-base medical facilities. No major injuries were reported at the time of the incident.

Exhibit 3

**Background**

1.3.6 Voyager is a modified Airbus A330-243, procured under a comprehensive service delivery contract with AirTanker Ltd which owns the aircraft.

Exhibit 4



AirTanker is a joint venture made up of Cobham, Airbus Group, Rolls-Royce, Thales and Babcock. AirTanker Ltd holds the contract with the Ministry of Defence and contracts AirTanker Services Ltd to deliver the programme. Airbus Group is also contracted by AirTanker Ltd to deliver the aircraft through its business unit Airbus Defence and Space, supported by Cobham, Rolls Royce and Thales<sup>1</sup>.

1.3.7 The commercial service provides for aircraft, infrastructure, inventory, certain manpower and training. The supporting structure and personnel are accommodated in a purpose-built AirTanker Services Hub, owned by industry and located at RAF Brize Norton. The contract was signed in Mar 08 and will expire in Mar 35. Exhibit 4

1.3.8 The aircraft must be able to switch between the Civil Aircraft Register (CAR) and the Military Aircraft Register (MAR). Thus, each aircraft must be maintained to civilian standards by an appropriately licensed organisation and using licensed staff. Accordingly, the service is administered by AirTanker Services in the military role and controlled by them in the civil environment. Exhibit 4

1.3.9 A considerable proportion of operating personnel are military, and around 75% of deployable manpower (engineers and operations personnel) are military staff placed with AirTanker Services Ltd (the remaining 25% are civilian Sponsored Reserves). Operational Control (OPCON) of RAF personnel working within AirTanker Services lies with the Company. Operational Command (OPCOM) remains within the military chain-of-command. Aircrew are assigned to either 10 Sqn or 101 Sqn and are entirely within the military chain-of-command. Exhibit 4

1.3.10 The Voyager's key capabilities include probe and drogue air-to-air refuelling (AAR) for all RAF receiver aircraft, plus a carriage capacity of up to 291 passengers and 8 NATO freight pallets. The initial conversion and modification work of aircraft ZZ333 (Airbus Manufacturers Serial Number (MSN) 1312) was conducted by Airbus between 25 May 12 and 13 Mar 13. The aircraft entered service with the RAF on 15 Aug 13 and by 9 Feb it had completed 417 flying hours and 133 flight cycles. Exhibit 5  
Exhibit 6

1.3.11 **Crew composition**

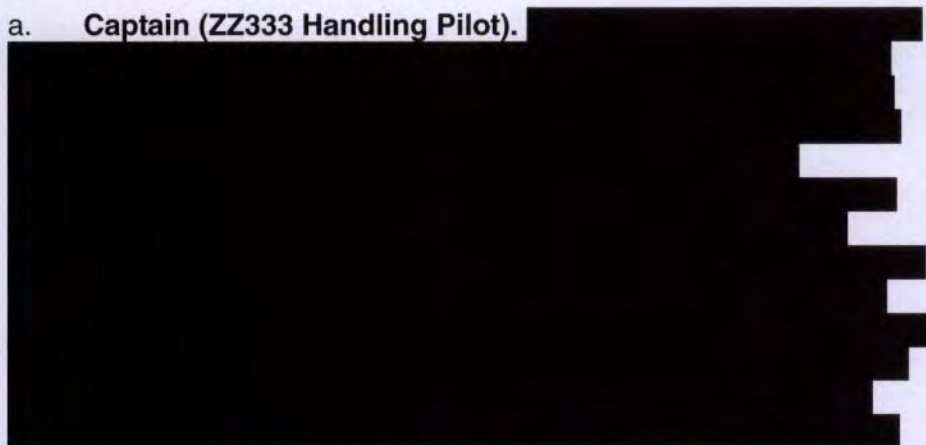
a. **Captain (ZZ333 Handling Pilot).** 

Exhibit 7

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<sup>1</sup> AirTanker, Corporate Information, <http://www.airtanker.co.uk/corporate-information> (accessed 16 Jun 14), and Airbus Group, <http://www.airbus-group.com/airbusgroup/int/en/our-company/What-we-do.html> (accessed 16 Jun 14).



[REDACTED]

Exhibit 8

Co-Pilot (ZZ333 Non-handling Pilot). [REDACTED]

c. Purser: Total hours: [REDACTED]

Exhibit 9  
Exhibit 10

Exhibit 11

d. **Cabin Crew:** All the Cabin Crew completed the A330 Cabin Crew conversion course with either British Airways or British Midland International (BMI) prior to conducting Voyager training with AirTanker Services.

Exhibit 12

1.3.12 **Flight planning and authorization.** The flight on 9 Feb was in support of the Operation HERRICK air-bridge, which provides the military air link between the UK and Afghanistan. The task was assigned by Defence Supply Chain & Operational Movements (DSCOM) HQ under Transport Operation Order (TRANSOP) 201402002. The flight was authorized on Fri 7 Feb 14 by the 10 Sqn Duty Executive with the authorization sheet (F1575B) signed by the Authorizer and the Captain. The scheduled departure time was 1125 UTC on 9 Feb and the flight was expected to last approximately 8 hours.

Exhibit 13

Exhibit 14

Exhibit 15



1.3.13 The crew of two pilots and eight Cabin Crew members were scheduled to check in at 0925 UTC on 9 Feb. Accompanying the flight were two Aircraft Ground Engineers (AGE), who would be responsible for ground maintenance on arrival at QOZ. At approximately 0900 UTC, the Captain arrived at Voyager operations to complete some additional flight planning, prior to the rest of the crew arriving. At 0915 UTC, a member of the Cabin Crew rang in sick. Operating with less than eight Cabin Crew members would require one Cabin Crew member to cover two emergency exits, for which dispensation was sought. This was subsequently approved by phone at 0955 UTC by Officer Commanding (OC) 10 Sqn. Reviewing the weather information and the Jetplan<sup>2</sup> for the route, the Captain assessed that the required fuel load would cause the aircraft's weight limit to be exceeded. In order to reduce the required fuel load, the Captain requested the use of Kandahar Airfield in Afghanistan as a destination alternate airfield, instead of Minhad in the UAE. This was approved at 1030 UTC by ASCOT Operations at RAF Brize Norton, who were acting for the tasking authority. A combination of issues with crew transport, missing freight paperwork and in-flight catering led to a delay to engine start of approximately 20 minutes.

Witness 1  
Exhibit 16

**Pre-event**

1.3.14 **Start-up and taxi.** The aircraft start was normal, including the standard wait for the LAIRCM<sup>3</sup> system to reach operating temperature in order to have its serviceability checked. On taxi out, the ECAM System displayed a failure of the Identification Friend or Foe 1 (IFF1) transponder. The crew informed Air Traffic Control (ATC) that they would hold short of the main runway while they addressed the fault. While following the procedure for an IFF reset, the ECAM indicated that IFF2 had also failed. Several resets of both transponders did not remedy the faults and the AGEs were called forward to the flight deck to provide advice. The pilots were informed by the AGEs that nothing could be done to resolve the faults without taxiing back to the stand and shutting down. While preparing to return to the stand the IFF1 fault cleared, thus satisfying the crew that they could proceed with the flight. Take-off clearance was obtained from ATC.

Exhibit 17

Witness 1 & 2

1.3.15 **Take-off.** The aircraft was only 0.7 Tonnes below its Maximum Take-Off Weight (MTOW) and thus required the full length of Runway 26 for take-off. Adopting a standard technique for improving the aircraft's take-off performance, the crew switched off the air conditioning packs and selected the thrust levers to TOGA power. The take-off roll was normal and, as the aircraft climbed through 300 ft above ground level, the autopilot was engaged. The rest of the departure was uneventful, following the Standard Instrument Departure (SID) from RAF Brize Norton, before conducting a relatively unrestricted climb to cruising altitude (Flight Level (FL) 330) with London ATC.

Witness 1 & 2

1.3.16 **The cruise.** Initially the flight progressed without incident, with the exception of at least one instance of turbulence, significant enough to warrant the switching on of the seatbelt signs. A meal service was conducted, cleared away and followed by an in-flight movie which was being shown on the in-flight entertainment system.

Witness 3

<sup>2</sup> Jetplan is a commercial software planning aid (produced by a Boeing subsidiary known as Jeppesen) which assists the crew in determining the fuel requirements for the flight.

<sup>3</sup> Large Aircraft Infrared Counter Measures.



1.3.17 At 1532 UTC, around 18 minutes before the incident, the Co-pilot left his seat for a break. Approximately two and a half minutes later, he returned briefly to the flight deck to deliver refreshment to the Captain before adjourning to the forward galley in the vicinity of the L1 station (forward left passenger door). He remained at this location until the incident took place, talking to the Purser and a former colleague who was on board as a passenger.

Witness 2 & 8  
Exhibit 2

1.3.18 While on his own and in his seat, the Captain was taking photographs of the flight deck with his Nikon digital SLR camera. The last photograph was taken at 1546:38 UTC, three minutes and twenty seconds before the incident, and co-incident with the Purser entering the flight deck. The Purser and the Captain had a brief conversation about the progress of the flight, before the Purser left the flight deck at 1548:04 UTC, one minute and 54 seconds before the incident.

Exhibit 18  
Exhibit 19

### The event

1.3.19 At 1549:58 UTC, the Captain felt a sensation of weightlessness and being restrained by his harness, accompanied by a rapid pitching down of the aircraft. He attempted to take control by pulling back on his side-stick and pressing the autopilot disconnect button, but these actions were ineffective. The Captain was unaware of any alarms but reported an increase in cabin ambient noise and a sensation similar to being under water. In less than ten seconds the aircraft had pitched to 17 degrees nose-down, was descending at 15,800 feet per minute, and was accelerating rapidly through 300 KIAS.

Witness 1  
Exhibit 20

1.3.20 Immediately prior to the nose-down attitude, the Co-pilot felt a sensation similar to turbulence. The Purser also reported a similar sensation, describing it as a 'jolt'. As the aircraft pitched down, the Co-pilot was lifted to the cabin roof and, while experiencing weightlessness, re-entered the flight deck through the open door. He described a confusing scene with audio alarms and flashing lights, as well as a violent shaking of the aircraft. The Captain shouted repeatedly that he could not disengage the autopilot. With his feet on the flight deck roof, the Co-pilot reached down and attempted to disengage the autopilot by pulling back on his side-stick; an action which appeared to have no effect. As he resumed his seat and pulled back again on his side-stick, the aircraft began to pitch up. As the aircraft pitched up, 'dual input' audio warnings were heard, indicating simultaneous side-stick inputs by both pilots. By now (around 14 seconds into the incident), excessive speed had built, leading the pilots to reduce the thrust levers to idle. The aircraft began pitching upwards, and as it did so the speed decreased. The Co-pilot warned the Captain of the decaying speed, who consequently set TOGA power as straight and level flight was re-established at FL310. The crew then re-engaged autopilot 1.

Witness 1, 2 & 3  
Exhibit 2  
Exhibit 20

1.3.21 Meanwhile, in the cabin a large number of passengers and crew had been thrown towards the ceiling. A significant volume of loose articles, including bags, personal effects, teapots, paper cups and bins were flying around the cabin, while some passengers were shouting. As the negative 'g' force from the initial pitch-down subsided, and as the aircraft accelerated in the dive, some of the unrestrained passengers and crew were able to find their way towards vacant seats and strap in. As the aircraft recovered to straight and level flight, the Purser made a brief check of the flight deck, before beginning a survey of the situation

Witness 3  
Exhibit 21



throughout the cabin.

1.3.22 The aircraft had lost 4,400 feet in 27 seconds, registering a maximum rate-of-descent of approximately 15,800 feet per minute, before recovering to straight and level flight. The speed had reached 358 knots IAS, and 'g' forces had ranged from minus 0.58 'g' (at the onset of the dive), to plus 2.06 'g' during the recovery.

Exhibit 20 Exhibit  
1

### **Post Event**

1.3.23 Once in level flight the Captain decided to land the aircraft as soon as possible. An initial Mayday call, transmitted by the Co-pilot during the event, was followed by another call in which he requested a diversion 'to a suitable airfield of our choice'. On the advice of Turkish ATC, the aircraft was turned towards Trabzon, a civilian airfield approximately 60nm away. The Captain judged that the close proximity of Trabzon would not allow enough time to descend in good order, and was unsure as to its suitability. Instead, he elected to divert to Istanbul International Airport, some 500nm away. After a few more minutes however, ATC suggested that they should divert to Incirlik Airbase in southern Turkey, some 340nm from the aircraft's position at the time. The Captain agreed and the aircraft was turned south.

Exhibit 19

Exhibit 20

1.3.24 During the diversion the Captain and Purser addressed the passengers a number of times using the Public Announcement (PA) system, repeating seat belt instructions, advising on timings and informing them before large attitude or configuration changes. In the immediate aftermath of the incident, the Captain used the PA system to inform passengers that the reason for the incident was unknown and that the aircraft was being diverted. He asked all passengers to remain seated with seat belts fastened. The Purser informed the flight deck crew that all passengers had their seatbelts fastened. During the Purser's assessment of the rear cabin, it became apparent that one of the passengers was suffering from an acute stress reaction. The Purser made a PA announcement asking for any doctor to make himself known to the Cabin Crew, before informing the pilots of the situation. From amongst the passengers, a doctor attended to the distressed individual, administering breathing Oxygen which had been provided by the Cabin Crew. Members of the Cabin Crew sought to calm down the remaining passengers before beginning a clear-up of the cabin. The Cabin Crew member at position R1 had been hyperventilating, but was being assisted by another crew member. The Purser re-assured this crew member and checked that they were fit to continue with their duties. The Purser conducted a second survey of the cabin with one of the AGEs to review damage to ceiling panels and to inspect a visible void for any obvious signs of structural damage. No external damage could be seen and an update was provided to the pilots. The Purser made a PA announcement, re-assuring passengers and explaining that the Cabin Crew would be removing loose panels in preparation for landing. The Purser made a further PA announcement, informing passengers that the aircraft was back under control, providing details of the diversion and thanking them for remaining calm. Finally, the Purser visited the flight deck to check for any further instructions before making a PA announcement preparing passengers for landing.

Exhibit 2

Witness 1 & 3

1.3.25 Both pilots remained in their seats and guarded the controls at all times. A passenger, a Tornado Weapon Systems Operator (WSO), was brought onto the flight deck to assist with retrieving in-flight documents from the flight deck

1.3 - 7



bags. The aircraft landed at Incirlik Airbase from a straight-in approach without further incident. The aircraft was taxied to an aircraft parking bay and a normal disembarkation was conducted with the emergency services present.

Witness 1, 2 & 3  
Exhibit 19

### Damage to aircraft

1.3.26 The damage to the aircraft comprised: 50 in-flight entertainment sockets broken or headphone pins sheared inside; seven ceiling panels dented; five florescent light tubes broken; five hand rails damaged; two seat belt brackets bent and one emergency exit sign broken (adjacent to door 2R). Initially, the rear facing lens of the exit sign at door 2R was missing (Figure 1), but it was subsequently found and put back in place for landing. Its cracked frame was sufficiently stable to accept and hold the replaced lens in order that the emergency function was not compromised for the landing.

Exhibit 22

Exhibit 23



**Figure 1: Internal damage to ZZ333.**

1.3.27 There was no reported damage to the flight deck. During a post-occurrence review by Airbus, it was assessed that the forces placed upon the side-stick during the recovery from the incident were beyond its design specification; therefore, the side-stick was deemed unserviceable.

Annex A

1.3.28 There was no reported damage to the external structure of the aircraft.

Annex A

### Post Occurrence Management

1.3.29 **Context.** Incirlik Airbase in southern Turkey is the home of the 39th Air Base Wing of the USAF and combat elements of the Turkish Air Force. The base is well found with a range of support facilities, and has been used by the RAF in recent years for a variety of operational purposes. Currently, a permanent RAF Liaison Officer (RAFLO) is based there to facilitate RAF C-17s which use the base to transit between the UK and Afghanistan. At RAF Brize Norton, the Post Occurrence Management of Voyager incidents depends on whether the aircraft in question is civilian registered or military registered. In this case, as a military

Witness 9



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aircraft incident, the station lead for Post Occurrence Management rested with the military chain-of-command, as distinct from AirTanker Services' own emergency response cell.

Witness 7

1.3.30 **Sun 9 Feb.** The first notification that ZZ333 was diverting to Incirlik came when the RAFLO was contacted by USAF Operations (Ops) staff at Incirlik approximately 15 minutes before the aircraft landed. This notification included a warning that there were casualties on board the aircraft. The RAFLO contacted ASCOT operations (acting for the tasking authority) who, in turn, notified the staff of OC Ops, RAF Brize Norton. After the aircraft landed, the sequence of events was as follows:

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a. **Incirlik.** The aircraft was met by the USAF Passenger Service Supervisor and the passengers were attended on the aircraft by USAF medics. One passenger, who had suffered an acute stress reaction, was taken to the nearby Acibadem Hospital. In the meantime, passengers without NATO Travel Orders were required by the Turkish authorities to pay £10 cash for a visa before being permitted to pass through immigration. Credit cards were not accepted, and many individuals were not in possession of sufficient cash. In an effort to obtain cash, the RAFLO contacted the British Embassy in Ankara. The Embassy was unable to conduct a funds transfer that evening, and it would take six hours by road for them to deliver cash in person. The USAF was also unable to assist. Eventually, the passengers managed to pool enough money between them to purchase visas for those who required them.

Witness 3

Witness 9

Witness 5

Witness 15

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the RAFLO had organised accommodation, food and continued medical support for those who needed it. During the evening the passengers were briefed by the Purser on the need to preserve operational security, particularly with respect to personal communications and the use of social media.

b. **UK.** On receiving the initial notification of the incident, OC Ops, RAF Brize Norton began calling in a number of key executive Station (Stn) personnel, comprising the Stn Cdr, OC Base Support Wing (BSW) and OC 10 Sqn. The executive team was joined by an RAF Brize Norton Media and Communications officer. Simultaneously, Voyager Ops in the AirTanker Services Hub had received an electronic message from the aircraft which indicated it had made an unscheduled landing in Incirlik; they established contact with the aircraft Captain by satellite phone to ascertain the details. Soon, all parties at RAF Brize Norton were exchanging information with each other about the diversion of the aircraft, with the primary external channel of communication now established between the Incirlik RAFLO and the small executive team which had convened in the OC Ops' office. The executive team embarked on a process of information gathering and providing support for the crew and passengers of ZZ333. Stn personnel were placed on stand-by to potentially deploy to Incirlik. The Joint Compassionate and Casualty Cell (JCCC) at Innsworth was notified of the incident and

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Witness 6

Witness 7

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informed that there may be casualties. JCCC had, in fact, already been contacted by AirTanker Services' own emergency response cell, which had now stood up in order to provide support. RAF Brize Norton also notified the HQ Air Command Duty Officer, the MAA Duty Officer and the MOD Directorate of Media and Communications. A phone call subsequently took place between OC Personnel Management Sqn (PMS), for the executive team, and Permanent Joint Head Quarters (PJHQ) Joint 3 (J3), during which it was decided that RAF Brize Norton would be in the lead for the ongoing management of the situation; this was relayed to PJHQ J1/J4. The Stn Cdr spoke by phone throughout the evening to Air Officer Commanding (AOC) 2 Group. By now, the executive team was already considering options for the launching of a TriStar to either recover the passengers or move them onwards to theatre. Based on their assessment of the developing situation in Incirlik, the executive team decided that a small team of the Stn's personnel would deploy to Incirlik as soon as possible to provide basic administrative and welfare support to the crew and passengers of ZZ333. The executive team also asked the RAFLO to convey restraint amongst the passengers regarding personal communications and the use of social media.

Witness 5

Witness 13

Witness 5

Witness 5

1.3.31 **Mon 10 Feb.** By Mon morning, the incident had been briefed to all domains at PJHQ and the Brize Norton support team was en-route to Incirlik.

a. **UK.** Responding to reports of acute stress reactions amongst the passengers, PJHQ J4 Medical contacted HQ Air A4 Medical Ops to discuss the situation. HQ Air A4 Medical Ops was not aware of the incident but, following a call to RAF Brize Norton, agreed with PJHQ J4 Medical that any support team deploying to Incirlik should include mental health professionals. Two mental health nurses from RAF Brize Norton were duly deployed to Incirlik, following behind the lead element of the RAF Brize Norton support team. PJHQ J4 Medical informed the Defence Consultant Advisor in Psychiatry (DCA Psych) and SO1 Mental Health Nursing at the Defence Primary Healthcare Service. Meanwhile, OC BSW RAF Brize Norton was liaising with PJHQ J1 regarding Brize Norton's plan for the passengers, the composition of the support team and the possibility that some passengers may no longer be fit to travel by air. PJHQ J1/J4 embarked on contingency planning for the event that passengers needed to return to the UK by surface means.

Witness 21

Witness 21

Witness 6

Witness 16

Witness 18

b. **Incirlik.** The passenger who had been admitted to Acibadem Hospital was discharged during the afternoon of 10 Feb. Deploying by commercial air, the lead element of four RAF Brize Norton personnel arrived at Incirlik by the early evening. Headed by OC PMS (OF3 rank) and carrying a cash imprest, the team included a Trauma Risk Management (TRiM) practitioner and a padre. On the same flight, two Voyager aircraft engineers had travelled separately from AirTanker Services. OC PMS convened a meeting with all passengers during the evening to provide a stress awareness brief, explaining how to look for the early signs of stress/trauma and what support was available to the passengers. The crew was not included in the initial briefing. Aware by now of RAF Brize Norton's plan to deploy a TriStar to recover the passengers, the support team set about evaluating the suitability of each

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Witness 13

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passenger to fly. With the assistance of three medical professionals and three TRiM practitioners from amongst the passengers, the team conducted one-to-one assessments of each passenger to establish: whether there were any reasons, physical or otherwise, why the individual would not be able to fly in the next 24-48 hours; whether the individual felt able to deploy to Afghanistan; whether the individual might require follow-on support (medical or pastoral) on returning to the UK. This was logged and sent back to the executive team at RAF Brize Norton. Separately, the British Embassy Defence Section had spoken to the Captain of ZZ333 and the RAFLO to check if any assistance was required.

Witness 13  
Exhibit 3

Witness 15

1.3.32 **Tue 11 Feb.** By Tue 11 Feb, RAF Brize Norton had scheduled a TriStar to arrive in Turkey, while the mental health nurses from RAF Brize Norton and representatives from the Military Air Accident Investigation Branch (MilAAIB) had arrived in Incirlik.

a. **UK.** On board the TriStar from the UK were a number of additional RAF Brize Norton personnel, including the Senior Medical Officer (OF4 rank) and other medical staff. By now, a decision had been made at RAF Brize Norton that the aircraft would recover the passengers to the UK and not proceed to Afghanistan; it transpired that a single onwards move of all passengers to Afghanistan would not have been possible, since diplomatic clearances were not in place for a reserve TriStar task to Theatre. The crew of ZZ333 would remain in Incirlik for the time being.

Witness 20  
Witness 6

Witness 20

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b. **Incirlik.** The British Embassy Defence Section again contacted the RAFLO to offer support. Investigators from the MilAAIB began interviewing the crew in order to inform an assessment by DG MAA on the need for a Service Inquiry. Following a stress awareness brief with the crew, the support team refined its assessment of who was fit to fly by means of individual consultations with the RAF Brize Norton mental health nurses and USAF medics; this included some 18 personnel who were reluctant to fly. By the time of boarding at around 1700 hrs (local time) several passengers were exhibiting signs of distress, with some requiring counselling from the mental health nurses or medication from the Brize Norton medical staff. Under the close supervision of the support team and medical staff, all of ZZ333's passengers boarded the TriStar and completed the flight back to the UK.

Witness 15

Witness 13

c. **Return of passengers to the UK.** On arrival back in the UK, the passengers of ZZ333 were met by RAF Brize Norton staff. Based on the assessment of the Incirlik support team, a number of passengers (assessed to be less than ten, but no precise record was kept) had been earmarked for a return to their home unit, from where transport had been despatched to collect them (arranged through PJHQ J1). Meanwhile, the rest of the passengers were transferred to transit accommodation pending a re-scheduling of their flight to Afghanistan.

Witness 6



1.3.33 **Wed 12 Feb and Thu 13 Feb.**

a. **UK.** Ten passengers returned to their home unit because their chain-of-command stated there was no longer a requirement for them to deploy. Some passengers elected to spend a night at home before reporting for the re-scheduled flight. Over the next 48 hours, a programme of welfare activities was provided for the remaining passengers by staff at RAF Brize Norton, during which Stn personnel (ranging from padres and TRiM practitioners to medical staff) monitored the passengers to assess their continuing suitability to fly to Theatre. As a result, some personnel were classified as being unsuitable to fly and were sent back to their home unit. This included personnel who, owing to their physical or emotional state, were removed from the re-scheduled flight to Theatre on 13 Feb at the point of check-in (these were passengers willing to fly, but for whom RAF Brize Norton staff assessed that there was a risk these passengers might have a detrimental effect on cabin atmospherics). The remaining passengers deployed to Theatre. By 1600 UTC on 13 Feb, the ZZ333 Service Inquiry Panel had been convened.

Witness 6

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Witness 13

b. **Incirlik.** All crew members were offered a TRiM interview. OC PMS conducted three formal TRiM interventions with crew members, all of which resulted in a recommendation for a follow-up intervention after 28 days. The remainder of the crew were directed to the mental health nurses for individual consultations. On 13 Feb the support team, the mental health nurses and the crew returned to RAF Brize Norton by a specially scheduled TriStar. The medical team arranged for those passengers who they had concerns about to be seated at the front of the TriStar with the medical personnel. On arrival in the UK they were met by the Stn Cdr RAF Brize Norton and OC BSW.

Exhibit 26

Witness 6

Witness 4

Witness 5

Witness 7

1.3.34 **Post occurrence safety decisions.** The RAF Brize Norton executive team included the Delivery Duty Holder (DDH) and the RAF Brize Norton Senior Operator (SO). On the evening of 9 Feb, as well as managing the situation in Incirlik, one of the team's primary considerations was to assess the extent of any safety decisions which should be made in response to the incident and to convey that assessment to the Operational Duty Holder (ODH). A civil registered Voyager was due to depart RAF Brize Norton later that evening carrying Service personnel to the Falkland Islands. The next military registered flight was scheduled for the following morning in support of the Afghanistan air-bridge. Amongst the factors for the DDH was the extent to which the military modified variant of the aircraft was different to the civilian version. On the basis of a discussion with the Brize Norton SO and information gleaned from AirTanker Services' Head of Flight Operations, it was assessed by the DDH that a cause relating to the specific modifications on the military variant could not be ruled out. Furthermore, given the available information at that time, the DDH could not guarantee that the incident would not happen again on the military registered aircraft. This was conveyed to the ODH, which informed a decision to pause flying on the military registered aircraft. Simultaneously, in the AirTanker Services Hub a meeting of key engineering and maintenance personnel had been convened which brought together the Voyager senior RAF engineering representative (OF3 rank), a number of AirTanker Services duty engineering staff and the AirTanker Services Engineering Post Holder, who had dialled in by telephone from a remote location. The aircraft's post-flight engineering report was

Witness 22



clear of faults and the Captain’s oral report alluded only to a possible fault with the autopilot. AirTanker Services lodged a request for technical advice with the Design Organisation (Airbus Defence and Space) in Madrid, but it would be several hours before a response was received. By the end of the meeting however, word was received that flying on the military registered aircraft had already been paused, pending the receipt of further information. A brief response received shortly after 2300 UTC from the Design Organisation recommended that the data from ZZ333 should be further analysed before an assessment on its airworthiness could be made, but stated also that they saw no evidence to recommend a restriction on the rest of the fleet (either civil or military). Flying on the civil registered aircraft continued.

Exhibit 27

**Injuries**

1.3.35 On landing in Incirlik, the following injuries were identified (see Table 1): the Co-pilot and seven Cabin Crew received minor injuries but were able to conduct their duties; one crew member had suffered a stress reaction but recovered within a few minutes and was able to carry out their duties; 24 passengers received minor injuries and one passenger had suffered an acute stress reaction which resulted in his admission to hospital. Injury definitions are in accordance with JSP 375 Volume 2, Leaflet 14, Annex B; Accident/Incident Reporting and Investigation.

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Exhibit 24

Injury Level	Crew	Passengers	Total
<b>Reported injuries</b>	<b>8</b>	<b>25</b>	<b>33</b>
- Minor Physical	8	24	32
- Minor Mental	-	1	1
- Serious	-	-	-
- Major	-	-	-
<b>Not injured or not reported as injured</b>	<b>1</b>	<b>164</b>	<b>165</b>
<b>Total occupants</b>	<b>9</b>	<b>189</b>	<b>198</b>

**Table 1: Injuries identified on landing at Incirlik.**

1.3.36 Following the initial incident, 15 passengers required medication to board the aircraft that returned to the UK. On return to the UK, twelve passengers were returned to their home unit for either medical or pastoral reasons as well as an additional ten passengers who were no longer required for duty. A number of further injuries emerged after the incident, which are addressed in the analysis contained in Section 1.4.

Exhibit 26

Exhibit 3