Correspondence Concerning American Airlines Flight 903 Accident of May 12, 1997

AIRBUS

December 2, 2002

The Honorable Carol Carmody
Acting Chairman
National Transportation Safety Board
490 L'Enfant Plaza, SW
Washington, D.C., 20594

Dear Chairman Carmody:

During the Public Hearing on the AAL 587 accident, you requested a chronology and description of information exchanged among and between the parties to the investigation and the NTSB relating to the May 1997 incident involving AAL 903. To assist the Board staff in its understanding of the history of the AAL 903 investigation, Airbus provides the attached chronology and description based on a thorough review of our files on this event. We believe this information will complement what the Board staff has determined from its internal review of this matter.

We believe that the following conclusions can be reached from a careful review of this chronology:

- The NTSB initially responded to the May 12, 1997 AAL 903 event as a Field Investigation managed by the Miami Regional Office. Although Airbus does not know precisely when American Airlines notified the NTSB of the event, we do know that both the NTSB and Airbus were notified of a "turbulence encounter" on the 13th of May. Airbus was not a "party" nor was it invited to participate in the field investigation.

- On June 6, Airbus received a faxed list of participants in a June 3 meeting involving American Airlines personnel, NTSB staff, and representatives of the Allied Pilots Association. Airbus was not invited to participate in this meeting, nor was any information from that meeting shared with Airbus.

- Sometime after the June 3 meeting, NTSB headquarters took over the AAL 903 investigation from its Miami field office, and formed Operations, DFDR, Performance, and Systems groups. The NTSB called the first meeting to include Airbus as a party on June 26. By this point, the loads / stresses issues had long been fully developed and discussed between Airbus and American Airlines as part of the "return to service" process, much of which was discussed at the AAL 587 Public Hearing. The aircraft had been inspected, repaired, and cleared for further operation. The focus of the NTSB investigation was on the precipitating events.

- Airbus alone raised the issue of abusive rudder use as taught by AAMP on numerous occasions in several fora throughout the investigation of AAL 903. This

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WITH BAE SYSTEMS

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information was made known to all parties, including American Airlines, Allied Pilots Association, FAA, and the NTSB.

- Airbus understood from American Airlines (and APA) that the relevant parts of AAMP training would be changed and believed that those changes would take place in a timely fashion.

Airbus believes that a thorough review of the timeline of critical events as described above clearly reveals that Airbus exercised good faith in sharing with the Board and all parties to the investigation all pertinent information at its disposal regarding the 903 event, once a formal investigation was initiated. Incidentally, we will be happy to provide supporting documentation for each item listed in the attachment should this be requested.

We look forward to continuing to assist NTSB in its efforts to determine the probable cause of the American Airlines 587 accident. The traveling public deserves our best collective efforts to ensure that such an accident will not happen again. Please contact me with any questions or concerns.

Sincerely,

John K. Lauber via email

John K. Lauber
Vice President Safety and Technical Affairs

cc: Members Black, Goglia, and Hammerschmidt; John Clark

Attachment: AAL 903 Chronology

Chronology of Significant Events related to AAL 903
Compiled by Airbus
December 2, 2002

- 12 May 1997: AAL 903 event

- 13 May 1997: Airbus and NTSB Miami field office receive notice of what American Airlines describes as a "turbulence encounter." The NTSB initiates a Field Investigation managed by the Miami Regional Office. Airbus was not a party to, nor did it participate in this field investigation.

- 22 May 1997 (Public Hearing Exhibit 2S): American Airlines Captain David Tribout writes a letter to Airbus' Captain William Wainwright expressing his concern on the emphasis on use of rudder in the AAMP program.

- 23 May 1997 (Public Hearing Exhibit 2S): Captain Wainwright affirms that he shares the concern expressed by Captain Tribout and agrees to a later teleconference.

- 29-30 May 1997: Larry Rockliff attends the American Airlines AAMP conference in DFW at the invitation of AAL. At this conference, he has side discussions with Ken Higgins of Boeing and Tom Melody of McDonnell Douglas. All share the concern about the emphasis in AAMP on the use of rudder in inappropriate situations and the use of simulators to validate maneuvers well outside the flight envelope.

- 4 June 1997: After discussions with Boeing, MD, and the FAA on the side of the AAMP conference and Airbus officials in Toulouse, Airbus Vice-President for safety Larry Rockliff writes the first draft of the joint letter that was ultimately sent to Captain Cecil Ewell of American Airlines on 20 August 1997 (Public Hearing Exhibit 2C). He sent the draft to Ken Higgins (Boeing), Tom Melody (McDonnell Douglas), and Airbus internal training and flight test personnel. The draft states, "Excessive emphasis on [the rudder's] superior effectiveness over aileron/roll spoiler in high alpha environments is the focus of concern ... artificially manipulating a simulator into an environment which is way beyond data package reference is not conducive to substantiated learning ... the net result is high potential for negative learning experience ... my concerns form only a small part of the AAMP program, however they have the most dramatic and controversial results."

- 5 June 1997 (Proposed and Rejected Public Hearing Exhibit): Captain Ken Higgins of Boeing Flight Test writes to Cecil Ewell to criticize the AAMP program's emphasis on use of rudder in upset recovery training. This draft incorporates the same ideas discussed with Larry Rockliff and Tom Melody at the DFW conference.

- 6 June 1997: Airbus Miami training center receives faxed list of participants in 3 June 1997 meeting called by NTSB to discuss AAL 903. NTSB representatives include Paul Misencik, Corky Smith, and Evan Byrne. Attendees include Warren Vanderburgh, Joe Oyler, Tom McBroom, and Dave Tribout (all of American Airlines) as well as other employees of American and members of the Allied Pilots Association. No one from Airbus was invited to attend this meeting. The information discussed at that meeting was not shared with Airbus.

- 11 June 1997: NTSB apparently generates DFDR plot marked "Revised June 11, 1997" that shows lateral acceleration levels up to 0.7g. The NTSB traces contained the same information as used by Airbus to estimate the loads to which the aircraft had been subject.

- 11 June 1997 (Public Hearing Exhibit 2S): William Wainwright records the telephone advice he gave to the Technical Group of American Airlines, including David Tribout, Chief Technical Pilot on AAMP's recommendations on rudder use. The Exhibit states, "Although rudder becomes more effective for roll control as speed is reduced, the normal lateral control (aileron + spoilers) is effective down to the stall on a/c such as the A300/310. ...rudder is used as necessary (to avoid sideslip) it is not the primary source of roll. ... simulators are not accurate in non-linear parts of the flight envelope. They are particularly inaccurate for large sideslip angles, & a pilot may draw the wrong conclusion from maneuvers involving use of rudder at low speeds."

- 19 June 1997 (Public Hearing Exhibit 7LL): Internal Airbus report states that "the DFDR was given to AIB for analysis and the study confirms high load factors for longitudinal and lateral aspects. Although these actual load factors are lower than previously announced, it appears that for some areas of the airplane limit design loads have been exceeded and for some others such as rear fuselage, fin and empennage the ultimate design loads could have been reached. In such conditions, it is necessary to require a closer inspection of the A/C. This inspection has to be done as early as possible. "

- 19 June 1997 (Public Hearing Exhibit 7LL): E-mail 942.6272/97 from AI/SE to AAL stating that "the aircraft have sustained very high loads, in particular in the aft part ... [and] ... require the aircraft to be deeply inspected."

- 20 June 1997: American Airlines fax providing details of inspections performed. All inspections of vertical stabilizer elements indicated "OK". The American Airlines inspection report lists substantial damage to the aircraft in the form of sheared fasteners, deformed nacelles, and engine

component damage. This would suggest that the engine pylons and wing roots were overloaded (sheared bolts). Internal American Airlines documents state that both engines were later replaced.

- 20 June 1997 (Public Hearing Exhibit 7LL): E-mail from head of Airbus customer support to several members of Airbus internal investigation team not including loads engineers stating that, "AAL were informed about our serious concern in this issue and that we refrained from putting the a/c on the ground only because of the inspection results received from them today."

- 20 June 1997 (Public Hearing Exhibit 7LL): E-mail from customer support to heads of Airbus internal teams involved in investigation and Airbus flight safety department summarizing for internal group the results of "our conference call today". The e-mail states, "further to inspection report and results provided by AAL, it has been decided not to recommend grounding of the A/C as it was previously considered, but to performed (sic) some additional inspections at the next opportunity, no later than the next A Check if external visual. ... AAL is aware that additional inspections will be required and they agree to do them as requested." Finally, the message requests all recipients to provide details of all further inspections to be requested ASAP.

- Sometime after the June 3 meeting, NTSB headquarters took over the AAL 903 investigation from its Miami field office, and formed Operations, DFDR, Performance, and Systems groups. The NTSB called the first meeting to include Airbus as a party on June 26. By this point, the loads / stresses issues had long been fully developed and discussed between Airbus and American Airlines as part of the "return to service" process, much of which was discussed at the AAL 587 Public Hearing. The aircraft had been inspected, repaired, and cleared for further operation. The focus of the NTSB investigation was on the precipitating events.

- 27 June 1997: AAL forwards results of additional inspection tasks to Airbus. Though some damage is noted to wing areas and engine nacelles, inspection report describes no damage on vertical stabilizer or fittings

- 30 June 1997: Ike Bullamore writes to customer support department, stating "the inspection [additional tasks requested of AAL in Exhibit 48-49 and clarified in Exhibit 54-55] was completed on 27 June with AAL structural engineering Tom Forsberg on site and there were no findings."

- 23 July 1997: NTSB letter requests that American Airlines provide records of all inspections and maintenance done on the aircraft subsequent to the

903 event. Airbus is not aware of whether American Airlines fulfilled this request.

- 20 August 1997 (Public Hearing Exhibit 2C): Boeing, Boeing's Douglas Products Division, Airbus, and the FAA write to Cecil Ewell to comment and warn about the AAMP program's emphasis on use of rudder and simulator training of upset recovery.

- 22 September 1997 (NTSB Document Number DCA97MA049): The NTSB Operations/Human Performance Group Chairman's factual report makes no mention of rudder inputs or loads on the fin, though the topic of "Approach to Stall and Recovery Training" is a topic of the report.

- 6 October 1997 (Public Hearing Exhibit 2C): American Airlines writes to Boeing, Boeing's Douglas Products Division, Airbus, and the FAA to reject the advice given in the 20 August 1997 letter. AAL initially hesitates to send the letter, and the intended recipients do not receive this letter until 20 January 1998.

- 12 August 1998 (Public Hearing Exhibit 2V): The Airbus Industrie Submission on AAL 903 highlights the incorrect nature of the crew's upset recovery response, stating, "Techniques that attempt to maintain a nose-high attitude while controlling bank angle with large rudder and wheel inputs result in secondary stalls and large lateral/directional oscillations experienced by AA903. ... Rudder reversals such as those that might be involved in dynamic manoeuvres created by using too much rudder in a recovery attempt can lead to structural loads that exceed the design strength of the fin and other associated airframe components." All parties and technical advisors to the NTSB investigation are copied on the Airbus submission to the NTSB. Copied parties include American Airlines, the Allied Pilots Associations, and the FAA.

- The 2000 NTSB Accident Synopsis (NTSB Document Number DCA97MA049) "determines the probable cause(s) of this accident as . . . [t]he flight crew's failure to maintain adequate airspeed during leveloff which led to an inadvertent stall, and their subsequent failure to use proper stall recovery techniques."

From: John Lauber [jlauber@ix.netcom.com]
Sent: Wednesday, December 18, 2002 1:57 PM
To: 'Clark John'
Cc: 'Carmody Carol'; John J. Goglia; 'Black George'; John Hammerschmidt
Subject: RE: Chronology of events related to AAL 903

John: I assume that Thierry Thoreau gave you the information below when he was in DC last week. But just to make sure you got the answers to your questions, here they are:

When did Airbus first receive any information or data for the event?

* 13 May 1997, 9:51 PM Toulouse time: Ike Bullamore (AI representative at AAL maintenance center in Tulsa, Oklahoma) receives notification of an event involving an Airbus A300-600 and sends first notice of the event to Y Benoist. Mr. Bullamore's E-mail describes the event as "severe turbulence" and describes the dramatic changes in attitude experienced by the aircraft in a short time. Bullamore states, "AAL Flight Safety will not release the DFDR at this time." The report refers to an inspection in progress but lists most parameters of flight and aircraft condition as "unknown".

* 14 May 1997: Basic information communicated in Bullamore's message is relayed to engineering and customer support departments within Airbus.

* 15 May 1997: Ike Bullamore sends a further e-mail explaining that AAL is refusing to provide the DFDR from the aircraft, discuss the event with him, or return his phone calls. According to Bullamore's message, AAL is citing Airbus's alleged use of DFDR data in a pending lawsuit to attack AAL in court to support its position and is insisting on Airbus signature on a non-disclosure agreement that would prevent Airbus form discussing analyses of the DFDR with any third party. Bullamore suggests that, "Airbus Flight Safety discuss this situation directly with AAL Flight Safety."

When did Airbus first receive FDR data specifically?

* 21 May 1997 or 5 June 1997: E-mail from the Airbus Customer Support Department Department confirms that DFDR data was received and decoded 21 May 1997. (Note: It is unclear at this point whether Airbus has actually itself decoded the data or whether AAL provided only its de-coding of the data. The earliest Airbus-peformed decoding found or referenced in the files is that of 5 June 1997). The preliminary de-coding done 21 May 1997 does not seem to give any indication of lateral forces to to which a/c was subject during the event. Discussions with AAL about allowing Airbus access to the complete raw DFDR data also continue until 5 June 1997, when it it is clear that Airbus has receied the data sufficient to allow it to run its own DFDR traces on that date.

When did you first become involved with BEA either informally or as an accredited rep.?

* Airbus policy would ordinarily require that Airbus notify the BEA of the "turbulence" incident when Airbus learned of it due to the occurence of an injury on on the flight. We believe that this policy was followed, and that the BEA was informed on 15 May 1997 (Airbus Toulouse did not receive Ike Bullamore's notification of the event until 9:51 PM Toulouse time on 13 May 1997, so it is likely that notification occurred the following day). It is not unusual that the files contain no written record of this occurrence, because such notification is

often done by telephone. The earliest written record of contact between the BEA and and Airbus found in the Airbus file regarding the 903 event is a fax received from the BEA on 17 June 2002. The fax contains two documents:

(1) a 16 June 1997 letter from the NTSB's R G Rodriguez to Dan Cohen-Nir of the BEA BEA stating that Mr. Rodriguez would take charge of the investigation and that Mr. Rodriguez would like to invite Airbus to accept full Party status in the investigation. Airbus did not receive this letter from the NTSB. A letter of 1 July 1997 from Tom Haueter of the NTSB to Claude Azibane of the BEA confirms that Airbus Industrie is not a "Party" but rather only a technical advisor to the accredited representative of the BEA, Dan Cohen-Nir. Yves Benoist of AIrbus is copied on this letter.

(2) A letter from the BEA's Dan Cohen-Nir to the NTSB's Corky Smith dated 13 June 1997 addressing particular factual questions raised by the NTSB field investigation co-ordinator. This letter references a BEA meeting with Airbus in Toulouse on 11 June 1997. The letter also observes that "load factors seem to have surpassed acceptable values during the event." Airbus did not actually become directly involved with the NTSB major accident investigation as a party until 26 June 1997, when the NTSB held a "kick-off" meeting in Washington with Airbus in attendance.

This can be considered as an amendment or addendum to the AAL903 Chronology previously sent to you.

Cheers,

jkl

John K. Lauber
Vice President Safety and Technical Affairs
Airbus North America
1909 K St, NW Suite 720
Washington, DC 20006
202 467 5480

-----Original Message-----
From: Clark John [mailto:clarkj@ntsb.gov]
Sent: Friday, December 06, 2002 8:15 AM
To: Clark John; 'jlauber@ix.netcom.com'
Cc: Carmody Carol
Subject: RE: Chronology of events related to AAL 903

John, I meant to say when did Airbus become involved informally or as an advisor to BEA, the accredited rep. John.

-----Original Message-----
From: Clark John
Sent: Friday, December 06, 2002 8:12 AM
To: 'jlauber@ix.netcom.com'
Cc: Carmody Carol
Subject: RE: Chronology of events related to AAL 903

John, I have several other questions. When did Airbus first receive any information or data for the event? and FDR data specifically? When did you first become involved with BEA either informally or as an accredited rep. Thanks in advance. John.

-----Original Message-----
From: John Lauber [mailto:jlauber@ix.netcom.com]
Sent: Monday, December 02, 2002 2:51 PM
To: 'Carol Carmody'
Cc: George Black; John J. Goglia; John Hammerschmidt; 'Clark John'

Subject: Chronology of events related to AAL 903

Please see/print letter and attachment. Hardcopy will follow.

Thanks,

jkl

John K. Lauber
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AmericanAirlines®

December 20, 2002

Mr. John Clark
Director of Aviation Safety
National Transportation Safety Board
490 L'Enfant Plaza, SW
Washington, D.C. 20594-003

Re: American Airlines Flight 587
November 12, 2001

Dear Mr. Clark:

The following is in response to your letter dated December 17, 2002 to Gerard Arpey, in which you requested that American Airlines provide documents relating to the accident involving American Airlines Flight 903 on May 12, 1997. During the recent Flight 587 public hearing, Chairman Carmody also had requested that the parties to the investigation provide detailed information regarding the Flight 903 investigation and we were already in the process of assembling information in response to that request when Mr. Arpey received your letter. Please consider this letter as being in response to Chairman Carmody's request and as a preliminary response to the requests set forth in your December 17, 2002 letter to Mr. Arpey. Also, I encourage you to share this letter with Airbus. In return, I would like a copy of the letter submitted by Airbus in response to the Acting Chairman's request during the hearing.

In an effort to provide the NTSB with as much information as possible at this time, we have prepared the following timeline of key events related to the Flight 903 accident. Copies of all documents referenced in our timeline will be forwarded to you under a separate cover letter. We share the Safety Board's interest in further investigating the Flight 903 accident insofar as it relates to the Flight 587 investigation. It seems critical to us that what Airbus knew about Flight 903 and the other high load events, and whether that information was shared with A300/310 operators and the regulatory authorities, are issues that require further investigation by the Safety Board. Many of the documents upon which the following timeline is based were recently provided to us by Airbus for the first time in October 2002 during the litigation discovery process, but to our knowledge were not disclosed to the NTSB either during the Flight 903 investigation or in the Flight 587 investigation. Airbus produced over 300,000 pages of documents in the litigation and we are doing out best to isolate the documents related to Flight 903. It appears that Airbus may possess additional documents and reports related to the analyses

done by the "three partner companies" of Airbus in June 1997. Based on our review of the Airbus litigation documents, some of these documents may not have been provided to us. Thus, other material facts not addressed below may be forthcoming.

Please bear in mind that our timeline makes reference to documents that were marked as "Confidential" by Airbus' attorneys and that these documents are subject to a "Confidentiality Agreement and Protective Order" in the Flight 587 litigation. (Such documents are identified below by their "Bates numbers," designated as "AIB _____." American Airlines' documents are identified below as "AA _____.") We are providing the information requested by the Safety Board pursuant to based on our obligations as a party to the official investigation. We respectfully request that the Safety Board obtain Airbus' approval before releasing this information to anyone outside the Safety Board.

Flight 903 Timeline Events

Date	Description
May 12, 1997	Flight 903 accident occurs.
May 12-14, 1997	American conducts inspections of 070 in MIA, including inspection for "flight in excessive turbulence," per Airbus Maintenance Manual. (AA 0117829-0117835; 0117850-0117851).
May 14, 1997	American ferries the aircraft to JFK for repair per Airbus Maintenance Manual. (AA 0117850-0117851).
May 16, 1997	Airbus receives the DFDR data from American (AIB 0295652; AIB 0019421-0019424). Airbus states that American is "very interested" in Airbus' analysis of the data since the aircraft experienced high g loads, extreme pitch angles, roll angles and rates and heading changes. (AIB 0295652).
May 21, 1997	Airbus Flight Guidance Systems Manager Olivier Illes acknowledges in an email that the "DFDR data have been well received and decoded today." (AIB 0017850-0017851). Mr. Illes also provides a summary of the data.
May 28, 1997	Airbus's technical representative in Tulsa, Ike Bullamore, reports that American has invited Airbus to come to DFW to review the original DFDR tape and receive an explanation of the data correlation. (AIB 0019403).

June 3, 1997 — The NTSB Operational Factors Group conducts the initial Flight 903 interviews. (AIB 0017725-0017739).

June 4, 1997 — John Schade of the NTSB meets with BEA and Airbus to discuss the FDR data from Flight 903. (AA 0117761-0117762).

June 5, 1997 — Gilles Robert of Airbus attends a meeting at the NTSB in Washington, D.C. (AIB 0295638-0295639).

June 5, 1997 — NTSB Operations Group issues its Field Notes from the June 3 interviews. (AIB 0017725-0017739).

June 6, 1997 — NTSB holds a teleconference with BEA's Accredited Representative Daniel Cohen-Nir regarding the Flight 903 investigation. The Safety Board requests the BEA's assistance in the Flight 903 investigation. (AIB 0017779-0017781).

June 9, 1997 — Arnaud Blanc-Nikolaitchouk of Airbus asks Thierry Delest of "AS A/BTE/EG/CA" and Dieter Quast of DA Hamburg to investigate "[w]hether this aircraft could have exceeded certified loads and what would be the inspections to be performed?" (AIB 0019400). This same day, Airbus forwards the Flight 903 DFDR data to Marie Pierre of Airbus, Duncan Patrick of BAE and Dieter Quast of DA Hamburg (See Public Hearing Exhibit 7-LL, page 7; AIB 0295509-0295510). American was unaware of these internal Airbus communications until their recent production in the litigation.

June 12, 1997 — Dieter Quast of DA Hamburg advises Mr. Blanc-Nikolaitchouk and four others that he "urgently recommends an inspection of this A/C [aircraft] . . . due to the promised relevant exceedance of Design Limit Loads A300-600R." He asks that this be sent via the "AS/DA FLT-Emergency Line" (AIB 0019399). American was unaware of this internal Airbus communication until its recent production in the litigation.

June 12, 1997 — NTSB formally transfers control of the investigation from their Miami office to the Washington, D.C. office. Richard Rodriguez is named IIC.

June 13, 1997 — Arnaud Blanc-Nikolaitchouk advises Jean Daney and Yannick Malinge of Airbus Flight Safety (with a copy to Airbus's Michel Curbillon) that DA Hamburg loads engineers have "clear concerns" about the rear part of the aircraft "which could have encountered loads higher than the design limit loads.... Additional investigation is currently under process within each

partner company." (AIB 0295512). American was unaware of this internal Airbus communication until its recent production in the litigation.

June 16, 1997 — T. Thuernagel and C.L. Tanck of Daimler-Benz Aerospace transmitted a three-page document entitled "Preliminary Investigation on A300-600R, American Airlines, MSN 513 Rudder Movement vs. Rudder Travel Limiter." This report stated that six times during the Flight 903 event the actual rudder travel exceeded the design limit of the RTL, including one event involving a 63% exceedance. The document also stated, "From former development flight test and from our Design maneuver simulations, we have learned, that rudder movement from one side to the other, also with small amplitudes, generate high loads on fin and rear fuselage. . . . Rudder movement from left limit to right limit will produce loads on fin/rear fuselage **above ultimate design load**. (Emphasis in original.)" The document states that these high load factors and their combination "are not covered by loads design maneuvers according to JAR/FAR 25." (AIB 0295493-0295498). American was unaware of this internal Airbus communication until its recent production in the litigation.

June 17, 1997 — NTSB Vehicle Performance Engineer, John O'Callaghan, advises the BEA's Accredited Representative that the Safety Board is forming the Flight 903 Performance Group and asks BEA to provide data to form the basis of a technical study of the flight characteristics of the A300-600. (AIB 0018788-0018790). Mr. O'Callaghan invited Airbus to become a formal member of the group. He also noted that "earlier this month" members of the FDR Group (including BEA and Airbus) had met to discuss the preliminary FDR readout.

June 18, 1997 — Airbus provides American with its analysis of the DFDR data. (AIB 0017853-0017860).

June 19, 1997 — Bernard Heciak of Aerospatiale Toulouse sends an email to Jean Daney in the Airbus Safety Department (with a copy to Gennaro Squeglia, Genevieve Superville, Georges Mousquet and Bernard Bissey) stating that "it appears that for some reason the airplane limit design loads have been exceeded and for some others such as the rear fuselage, fin and empennage, the ultimate design loads could have been reached." (AIB 0017902). American was unaware of this internal Airbus communication until its recent production in the litigation. [To our knowledge, Airbus has not provided copies of any reports or calculations containing the analysis, which led to Mr. Heciak's communication.]

June 19, 1997	Thomas Grotsky of Airbus informs American that "some areas of the aircraft have sustained very high loads, in particular the aft part of the aircraft," and requests the results from American inspection of 070. (AIB 0017903). Grotsky does not disclose to American that Airbus believes that the 070 tail was exposed to lateral loads at or exceeding the "ultimate load" or that RTL limits were exceeded several times.
June 19, 1997	American provides the initial inspection results to Airbus. (AIB 0017907-0017921).
June 20, 1997	Based on the inspection results, Airbus states that, "it has been decided not to recommend grounding of the aircraft as it was previously considered." (AIB 0295587-0295588).
June 23-25, 1997	Airbus provides additional recommended inspection tasks. (AIB 0295576-0295577); (AA 0047911-0047912; AA 0047925-0047926). American and Airbus confer and agree on the final inspections.
June 24, 1997	Richard Rodriguez of the Safety Board requests documentation of the inspections conducted following the Flight 903 accident. (AA 0117862).
June 25, 1997	John Darbo sends an email to Mr. Rodriguez with a compilation of maintenance performed prior to and after the Flight 903 accident. (AA 0117888-0117889).
June 26, 1997	American takes 070 out of service.
June 27, 1997	American completes the additional inspections as per Airbus instructions and returns the aircraft to service. (AA 0049713-0049720).
June 30, 1997	Airbus's technical representative in Tulsa sends all inspection data to Airbus in Toulouse.
July 1, 1997	NTSB Systems Group asks all parties if there are "any additional issues/questions that the systems group should be addressing." (AIB 0017788-0017790).
November 7, 1997	NTSB Systems Group Chairman John Delisi circulated the draft Systems Group Factual Report. This report contained no discussion of the multiple failures of the RTL system that permitted rudder movements in excess of the design limit by as much as 63% in an incident in which the pilots were criticized for having overcontrolled the aircraft during a stall recovery or

that this was not the first such event on Airbus aircraft. (As shown above by the June 16, 1997 Daimler-Benz Aerospace document, Airbus was aware, but did not disclose to the Safety Board or the parties, the multiple RTL exceedances.)

November 13, 1997 — Airbus submits its response to the draft Systems Group Factual Report. Again, no mention is made of RTL system's failure to contain the rudder within design limits or the loads incurred by the vertical stabilizer.

May 15, 1998 — Group Chairman John O'Callaghan circulates the first draft of the Aircraft Performance Study and requests comments from all parties. (AA 0116952-0117048).

June 10, 1998 — Airbus submits its comments to the draft Aircraft Performance Study.

June 30, 1998 — The Flight 903 Performance Group issues its final Aircraft Performance Study. (AA 0118958-0119051).

August 12, 1998 — Airbus provides its formal Submission to the NTSB (AA 0119058-0119059; 0119065-0119070):

- Airbus states, "The factual reports of the various Groups show that the pertinent events were thoroughly examined and the significant factors associated with these events were fully understood, considering the limitation of the information available."

- Airbus is aware, but its submission does not disclose, that:

  - The vertical fin was exposed to loads that exceeded ultimate load.

  - The A300-600 rudder travel limiter system failed and allowed the rudder to exceed its limits by as much as 63%. (AIB 0295497).

- Airbus's submission also fails to disclose:

  - The 1991 Interflug event in which an A310, also recovering from a stall, incurred lateral loads on its tail that exceeded ultimate load as a result of rudder reversals.

  - Any of the other A300/310 high load events listed in public hearing Exhibit 7Q.

- Airbus's submission agrees with the Performance Group report that "careful use of the rudder to recover the bank angle when the lateral controls are ineffective is appropriate." Airbus further notes that rudder use may be appropriate if the aircraft is not responding appropriately to full aileron inputs. [As shown in the video at the NTSB public hearing, AAMP taught the same principles.]

- Airbus's recommended corrective action was limited to issuing a March 1998 Temporary Revision to the A300-600 Flight Crew Operating Manual ("FCOM") and the Quick Reference Handbook, alerting flight crews that the A300 primary flight display could momentarily blank out during recovery from unusual upsets.

February 11, 2000 — NTSB issues the probable cause finding with respect to Flight 903.

November 12, 2001 — Flight 587 accident.

Late-November 2001 — American orally recommends that the Safety Board evaluate other events involving rudder reversals, including Flight 903.

February 8, 2002 — NTSB issues Safety Recommendations resulting from Flight 587.

February 22, 2002 — NTSB and Airbus participate in a telephone conference and agree to recommend that the vertical stabilizer undergo NDT. (AA 0047771).

February 28, 2002 — Airbus Customer Support Director sends a letter to American's Vice President Engineering and Quality Assurance stating, "the experience gained through the investigation of the accident of MSN 420 has led us to review the event, which occurred on MSN 513 during the summer of 1997. The result is that this aircraft sustained high lateral loads which are clearly exceeding the loads envelope for which this a/c is certified." This is the first time that Airbus told American that the Flight 903 tail saw loads in excess of the certified loads. Airbus recommends for the first time removal of the vertical stabilizer for non-destructive testing.

March 4-11, 2002 — Airbus NDT inspectors inspect the removed vertical stabilizer from aircraft 070 and uncover minor delamination around the right rear lug of the vertical stabilizer and notify American of the finding. (AA 0040310-0040358). American receives conflicting messages from Airbus on the significance of the findings. Airbus on-site personnel orally inform American that the delamination found on the vertical stabilizer would be

considered within factory repair limits. However, others within Airbus are recommending that American replace the vertical stabilizer.

March 11, 2002 — Airbus issues press release concerning Flight 587 stating that it is "aware of only one event that involves loads approaching the severity of those encountered in the accident of flight 587 – one having occurred in Florida in 1997 and also involving an American Airlines aircraft." (AIB 0100948). No mention was made of the 1991 Interflug incident or any of the other high load events.

March 15, 2002 — FAA issued AD 2002-06-09, amendment 39-12686, which applied to all A300, A300-600 and A310 airplanes. The AD required inspections of the airplane vertical stabilizer and other components following in-flight incidents resulting in extreme lateral loading.

March 18, 2002 — Airbus sends American an Operators Information Telex discussing lateral loads on the vertical stabilizer and states that the Flight 903 event has been "reanalyzed" and the loads "recalculated using the latest available tools and methods. As a result, higher lateral load on the vertical stabilizer than those established in 1997 were generated during that event. In fact, the level of loads is evaluated to be beyond ultimate loads." (AIB 0017386).

June 6, 2002 — Ernie Bracken of Airbus sent a follow up letter to American's VP Engineering and Quality Assurance. The letter states that Airbus had used an "enhanced analysis process" to confirm that the loads experienced by the Flight 903 tail "far exceeded the maximum loads currently considered in the framework of the initial certification." Airbus stated that the 070 fin "must be replaced before further operation of the aircraft" because the tail was "exposed to loads above ultimate load". (AA 0040563).

July 9, 2002 — Airbus (Marc Rolin, Ernie Bracken, and Jacques Leborgne) gave a Flight 903 presentation, designed to explain the need to scrap rather than repair the vertical stabilizer, to American engineers in Tulsa. (I attended this presentation.) Based on the Airbus presentation, it appeared that the rudder exceeded the RTL limits numerous times. When asked about this, the Airbus presenter confirmed this fact, explaining, that "the rudder load limiter is very slow," it is "not meant at all to react in this situation" and that the system has a "very big problem if speed increases quickly." They also reported this had been a long-term known problem with the RTL. This makes me question why Airbus did not either correct the deficiency or notify operators of the limitation. When asked when Airbus had discovered that the RTL had failed to work as designed, the Airbus

representative replied that in 1997 they knew the loads were at or near 1.5 times limit load, but that they did not have the ability to do an accurate calculation until new techniques were developed after the American 587 accident. This was the first time American was advised that the Flight 903 rudder movements exceeded the limits of the rudder travel limiter system. In an effort to justify the need to replace the tail, Airbus explained that once they determined that the loads exceeded 1.5 times limit load they did not know how much load it would be able to sustain without failing. Therefore, it was not the degree of damage found during the inspection that dictated the tail replacement, it was the determination that the loads exceeded ultimate. (This raises the question of why the tail from the Interflug event in 1991 was not replaced.)

Summary

The preceding factual chronology leads to two obvious conclusions: (1) Airbus and BEA were active participants throughout the Flight 903 investigation and had access to the DFDR and other information at a very early stage of the investigation; and (2) Airbus knew, but did not disclose to the Safety Board or American, important information concerning the performance of the aircraft, including the fact that the aircraft's vertical stabilizer exceeded ultimate load and that the RTL failed to keep the rudder within the design limits by as much as 63%. This last point is particularly telling, since Airbus argued in the Flight 903 investigation that the pilots, as a result of their AAMP training, overcontrolled with the use of rudder. They made no mention of the fact that the aircraft allowed rudder deflections well beyond limits, therefore making aircraft recovery in an extremely dynamic event significantly more difficult. The Airbus presenters were asked on July 9, 2002 if Flight 903 would have exceeded ultimate load if the RTL would have limited rudder travel as designed. They said they did not know but would get back to us with the answer. We have not heard from them to date. It appears to us that the rudder reversals during the Flight 903 recovery were not caused by "overcontrolling" because the rudder movements were the result of a flight control design that is conducive to aircraft pilot coupling. Furthermore, it appears that evidence of this design issue may have been known to Airbus at least as early as the 1991 Interflug event.

Proposed Additional Investigation Activity

As stated in our November 21, 2002, letter to you and Tom Haueter, we strongly recommend that the NTSB schedule interviews of the pertinent DA Hamburg, BAE and Airbus loads engineers and safety personnel in order to determine what additional information exists with respect to loads analysis on the vertical tails of the Flight 903 and Interflug aircraft and why this information was not provided to the Safety Board, FAA and other parties to the investigation

in 1997. As a starting point, American suggests that the following individuals undergo formal party group interviews:

Jean Daney
Bernard Heciak
Dieter Quast
Arnaud Blanc-Nikolaitchouk
Yannick Malinge
Eberhard Gest
Thomas Grotzky
Pierre Cambon
Duncan Patrick
Marc Hockenhull
Jacques Leborgne

We also strongly urge the Safety Board to interview the crews of the 1991 Interflug flight and all other high load event flights involving full rudder movement in order to evaluate the human performance and flight control systems issues associated with these events. All associated DFDR records of these events also should be reviewed to assess whether the crews were able to precisely modulate the rudder.

The only party interviews to date have been witnesses concerning AAMP, and some of those interviews have been conducted twice. We encourage the Safety Board to put the same effort into understanding Flight 903, the 1991 Interflug event, and other high load events. The investigation should determine if the A300 and A310 have a disproportionate number of high load events, whether pilots of these aircraft are consistently pushing the rudder to the stops at higher speeds and/or are surprised by the aircraft's reaction because of excessive rudder pedal sensitivity, and whether Airbus has adequately conveyed relevant information to the airlines, pilots, and regulatory authorities.

We look forward to the opportunity to discuss these issues with you further. In addition to this letter we would like to discuss your response to our letter to you and Tom Haueter dated November 21, 2002. Once the holidays have passed I will contact your office to arrange a meeting.

Sincerely yours,

Tommy McFall
Director – Safety Review and
Accident Investigation

cc: Acting Chairman Carol Carmody
Safety Board Members: George Black, John Goglia, and John Hammerschmidt
Mr. Thomas Haueter
Mr. Bud Donner

Docket No. SA-522

Exhibit No. 7-LL

NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C.

Structures
Various Airbus Communications
Referencing American Airlines
Flight 903

(22 Pages)

1

Telefax / Telecopy

Daimler-Benz Aerospace
Airbus

Fax an/to No.: [redacted]

Firma/firm: [redacted]

Name/name: Mr. C. Curbillon.

Abt./dept.:

Fax von/from No.: [redacted]

Name/name: Quast

Abt./dept.: EDA

Tel./phone: [redacted]

E-Mail: [redacted]

Ref./No.: EDA-1436/97

Datum/date: 12.06.97

cc: Mr. A. Blano-Nikolaitchouk, Mr. Rasenke, DA BWT
Mr. Dr. Schröder DA EM, Mr. Th. Celest, AS/A/BTE/EG/CA
Mr. G. Squeglia, DA EDE, DA EDC

Subject: A300-600 R AAL turbulence
Ref.: 443.0128/97

In the shortness of time DA ED-Loads gives a general order from Loads point of view (lateral motion).
Due to your information of time histories DA Loads urgently recommends an inspection of this A/C (MSN 513).
Following A/C components have to be inspected due to the promised relevant exceedance of Design Limit Loads A300-600R.
Inspection of A/C components:

- Complete Vertical Tail
- Rudder and Rudder attachments
- Vertical Tail Attachments
- Rear Fuselage incl. C91
- Horizontal Tailplane Attachments.

Ai/EE-L Incoming mail
12 JUIN 1997
SEC | REC | VR | A/N | HH
LEAD
ACTION
INFO
COPY TO

Note: To give a complete statement additional information is needed:
Time history of roll rate, yaw angle β
Yaw-, pitch rate $\dot{\beta}$, omega x
Spoiler deflections

We are also missing the weight/mass of A/C.

Please send these data via AS/DA FLT-Emergency line.

Unterschrift/
signature

[redacted]

Seite/page 1 von/of 1

Daimler-Benz Aerospace
Airbus GmbH
Postfach 95 01 09

(2)

M E M O A I R B U S I N D U S T R I E

Airbus Electronic Mail System
Arnaud BLANC-NIKOLAITCHOUK
AI/EE-L
Ext: [redacted]

Blagnac, 13-Jun-1997 09:38 TLS
Ref: 443.0135/97

TO: Jean DANEY AI/E-FS (DANEY)
TO: Yannick MALINGE AI/E-FS (MALINGE)

CC: Michel CURBILLON AI/EE-L (CURBILLON)

Subject: AAL A300-600R turbulence : load investigation.

Attached: DA fax EDA-1436/97.

Please find hereafter a preliminary assessment from DA loads, responsible for lateral loads. They have clear concerns on the overall rear part of the aircraft which could have encountered loads higher than the design limit loads. DA request urgent inspection of the aircraft to be performed.

Additional investigation is currently under process within each partner company.

Best regards.

Arnaud Blanc-Nikolaitchouk

[redacted]

3

M E M O A E R O S P A T I A L E T O U L O U S E

Airbus Electronic Mail System
BERNARD HECIAK
Ext:

St Martin, 19-Jun-1997 06:13pm TLS
Ref: NONE

TO: AI:DANEY Jean [redacted]

CC: GENNARO SQUEGLIA [redacted]
CC: GENEVIEVE CAZET SUPERVIELLE [redacted]
CC: GEORGES MOUSQUET [redacted]
CC: BERNARD BISSEY [redacted]

Subject: A300-600R MSN 513

1/ Considering the high load factors encountered by A/C MSN 513, the procedure as described by AMM chapter 05.51.17 should have been followed and corrective actions taken in case of findings.

2/ reporting to AIB would also be of great interest.

3/ Meanwhile, the DFDR was given to AIB for analysis and the study confirms high load factors both for longitudinal and lateral aspects.
Although these actual load factors are lower than previously announced, it appears that for some areas of the airplane limit design loads have been exceeded and for some others such as rear fuselage, fin and empennage the ultimate design loads could have been reached.

In such conditions, it is necessary to require a closer inspection of the A/C.
This inspection has to be done as early as possible.

Regards.

B. HECIAK

(4)

MEMO

AIRBUS INDUSTRIE

Airbus Electronic Mail *System* , 15-May-1997 09:56pm TLS
AAL/TUL Ref: NONE
Airbus Industrie
Ext :

TO: See Below

Subject: A300-600 MSN 513 TURBULENCE ENCOUNTER

AIRBUS TXT 2
O/Ref: AAL/TUL/000383/97 Date: 1997/05/15
Y/Ref:

Reply Requested: NR

Subject : A300-600 MSN 513 TURBULENCE ENCOUNTER

FROM: MR. I. BULLAMORE - ACS-R/AAL/TUL

TO: MR. Y. BENOIST - AI/E-FS

GENTLEMEN,

AAL FLIGHT SAFETY HAS INFORMED ME THAT THEY WILL NOT GIVE ME THE DFDR FROM THE SUBJECT INCIDENT. FURTHER, AAL FLIGHT SAFETY INFORMED ME THAT THEY WILL PROBABLY NEVER AGAIN RELEASE THE DFDR TO AIRBUS.

THE REASON IS....APPARENTLY AIRBUS AND AAL ARE INVOLVED IN A LAW SUIT OVER AP REVIOUS TURBULENCE INCIDENT. APPARENTLY THE AIRBUS LAWYERS ARE USING THE DATA FROM THE DFDR FROM THE PREVIOUS INCIDENT AGAINST AAL. THEREFORE, AAL WILL NOT SUBJECT THEM SELVES TO POSSIBLE INCRIMINATION AGAIN.

ALSO, THIS PUTS ME IN A VERY DELICATE SITUATION. EVERY TIME AAL GIVES ME A DFDR I SIGN A NON-DISCLOSURE AGREEMENT. THIS AGREEMENT HAS SEVERAL PARA'S, ONE OF WHICH SPECIFICLY STATES THAT I (AIRBUS) WILL NOT USE THE INFORMATION "FOR DISCLOSEE'S OWN BENEFIT OR OTHERWISE EXPLOIT THE DFDR INFORMATION". I HAVE A COPY OF A BLANK DISCLOSURE AGREEMENT FOR ANY OF YOU WHO MIGHT WANT TO SEE IT.

FURTHER, AT THIS TIME, *NO* ONE WITHIN AAL WILL EVEN DISCUSS THE INCIDENT WITH ME. AAL FLIGHT SAFETY WILL NOT EVEN RETURN MY CALLS REGARDING THE INCIDENT.

I SUGGEST THAT AIRBUS FLIGHT SAFETY DISCUSS THIS SITUATION DIRECTLY WITH AAL FLIGHT SAFETY.

NR
BRGDS,
IKE BULLAMORE
AAL/TUL

Distribution:

TO: BENOIST Yves, AI/E-FS [redacted]

CC: BRACKEN Ernie, ACS-C2 ([redacted]
CC: DERISSON Jean-michel, AI/SE-A12 ([redacted]

5

CC: GILLET Jean-Pierre, AI/SE-E4 ([redacted])
CC: LECOMTE Roger, AI/SE ([redacted])
CC: MALINGE Yannick, AI/E-FS ([redacted])
CC: RECEPTION AIs, AI/SG-K ([redacted])
CC: VAN DER HEYDEN Thierry, ACS ([redacted])

TELEFAX **AIRBUS INDUSTRIE**

FROM : AIRBUS INDUSTRIE DERISSON Jean-Miche 13-Jun-1997 05:40pm
1 Rond Point Maurice Bellonte
F 31707 Blagnac Cedex France
DEPT : AI/SE-A12
TELEX: 530526F AIRBU *2116
SITA : TLSBU7X
PHONE: (33)(0)[redacted]
FAX : (33)(0)[redacted]
OUR REF : NONE
YOUR REF:
SUBJ : A300-600 MSN513/AAL ACTIONS FURTHER TO TURBULENCES

CC : DASA/HAM (FAX [redacted])

As you may already be aware, subject A/C suffered heavy turbulences during approach on May the 12th.

After long dicussion and arguments with AAL, a workable DFDR read out related to this incident was finally given to AIB.

DFDR data were forwarded on June the 9th as follows:
- in AS to Marie Pierre JOLY A/BTE/EG/CA
- in BAe to Duncan PATTRICK B63
- in DASA/HAM to Dieter QUAST EDA (Tel. [redacted] (Fax. [redacted])

We have contacted again AAL to request feed back about the inspections they performed and the related findings if any. We nevertheless assume that they carried out the AMM 05 51 17 inspections required after excessive turbulence.

Considering all the above, can you please confirm on Monday June the 16th:

1/ If there is a need for inspections to be performed in addition to AMM 05 51 17

2/ If additional inspections are required, can they be postponed at a later maintenance opportunity or are they required urgently.

In case additional inspections are confirmed to be necessary, definition of the inspection tasks will of course be required. The urgency will depend on how soon the inspections have to be carried out.

Should you require any additional info on this subject, please do not hesitate to contact us.

best regards,
Jean Michel DERISSON

AAL Vorfall mit Folge
"Manöver"

H. Boden BWT
Akt. ⇐ H. Arndt, EMA
H. Thürnagel, EDC
H. [illegible] EDA

7

Customer Support Services Division

AIRBUS INDUSTRIE

Date: 19/06/97
References: 652.3453/97

From Olivier ILLES
To: ARCS:AALTUL
Cc: Marilou EVRARD AI/SE-E4
Cc: Emis BRACKEN AOS-C2

Subject: A300-600 MSN 513 TURBULENCE ENCOUNTER

Ike,

Please find hereunder the report of the incident of MSN 513.
Please distribute it to all people interested in AAL.

Olivier.

Attached file(s): D:\AIRBUS\ARCS\dbiattachs\-msp0523.txt
D:\AIRBUS\ARCS\dbiattachs\-msp0534.zip

(8)

YOUR REF 1 : AAL/TUL/000370/97
YOUR REF 2 : AAL/TUL/000386/97
YOUR REF 3 : AAL/TUL/000412/97
YOUR REF 4 : AAL/TUL/000424/97
OUR PREV REF 1 : 952.2915/97
OUR PREV REF 2 : 952.2933/97
OUR PREV REF 3 : 952.3315/97

Please find hereunder the sequence of events issued from DFDR data extracted from the tape decoded on 5 June. These new data are far less garbled than the previous ones on diskette.

NOTA : The following factual statements have been made based on available data only. Any of these statements could be modified, should new information be available.

For a better understanding, please refer to the attached compressed file AAL513.ZIP containing the WORD file AAL513.DOC, including :
- Figure 1 : List and characteristics of the longitudinal parameters. The vertical acceleration is expressed in g number, positive when A/C is accelerating upwards.
- Figure 2 : List and characteristics of the lateral parameters. The lateral acceleration is expressed in g number, positive when A/C is accelerating on the left.
- Figure 3 : DFDR curves of longitudinal parameters evolution.
- Figure 4 : DFDR curves of lateral parameters evolution.
The complete batch of curves is also sent by normal mail.

The following expressions are used in this report :
- ANU : A/C Nose Up
- AND : A/C Nose Down
- RWD : Right Wing Down
- LWD : Left Wing Down

From the available data, the following can be stated :

A- Sequence of events

1- GMT 19.27.00 :

A/C is descending towards FL 160 with an airspeed of 250 kts and a heading 220. A/P 1 is engaged. The throttles are on idle thrust position (TRA 37.5 deg which corresponds to TLA 0).

The A/THR is not engaged. This is evidenced by the following facts :
- With A/THR engaged, the speed would have never dropped (see after) below selected 210 kt speed (according to crew report).
- Even in case of wrong speed input by the crew, the speed is anyway limited by the ATS to VLS (in that case about 193 kts), which is not the case in the following of this report.
- When the A/THR is engaged, it cannot lead the throttles to go below 5 degrees TLA (42 degrees TRA) or above 48.3

(9)

degrees TLA (79.5 degrees TRA) whereas during the event they actually reach 37.5 degrees TRA and 84 degrees TRA.

2- GMT 19.27.00 to 19.28.20 :

Airspeed is decreasing and passes 215 kts. A/C stabilizes at FL 160. Heading is increasing and stabilizes at 230.

3- GMT 19.28.20 to 19.28.52 :

Airspeed is going on dropping down to 180 kts (VLS estimated to 193 kts at that time). Heading changes to 240 and begins to increase towards 270.

4- GMT 19.28.52 to 19.29.01 :

A/C roll attitude begins to increase (R/H turn). Pitch attitude and AOA are 4.5 degrees ANU and begin to increase. RWD (R/H) roll is commanded by the ailerons during this period.

5- GMT 19.29.01 :

The AOA is at 6.5 deg ANU, the roll angle at 17 deg RWD and the ailerons begin to go LWD (the A/P tries to limit the roll angle). Airspeed is at 179 kts.

6- GMT 19.29.01 to 19.29.06 :

A/P 1 is still engaged. Vertical G-load is increasing to +1.2 g. Pitch and AOA to 8 degrees ANU and roll to 35 degrees RWD. Airspeed hits a low at 177 kts. Heading is 270 at that time. RWD (R/H) roll excursion is counteracted by the ailerons during this period, up to their stop (19 deg down reached on R/H aileron).

During periods 4-, 5- and 6-, full power is applied to the engines in two phases :
- From GMT 19.28.58 to 19.29.02 : From idle to climb power at about 10 deg/sec TLA.
- From GMT 19.29.05 to 19.29.06 : From climb to full power rapidly.
Therefore the throttle increase from idle to full power is most probably manual.

7- GMT 19.29.06 :

Stall warning is activated. AOA at this time is 10 degrees ANU going on increasing; pitch is 10.5 degrees ANU going on increasing; roll is 45 degrees RWD going on increasing. A/P 1 disconnects. Ailerons are full left turn deflected. Vertical G-load begins to decrease. Rudder is deflected on the left (above 20 degrees).

Stall warning has been triggered in the FWC because AOA overshot the 8.5 degree ANU threshold in clean configuration.

Concerning the A/P disconnection, the BITE records all non

voluntary disconnections, including a force higher than 15 dan. Only the voluntary disconnections through the lever or the instinctive disconnect switches are not recorded. During the incident flight, the BITE did not record any abnormal A/P disconnection. Therefore we can conclude that the A/P 1 most probably disconnected by action on the instinctive disconnect switch.

8- GMT 19.29.06 to 19.29.08 :

. Pitch angle reaches : 16 degrees ANU,
. True AOA : 13.5 degrees ANU,
. Roll angle reaches : 55 degrees RWD,
. Vertical G-load reaches : +0.6 g,
. Lateral acceleration reaches : +0.41 g.

9- GMT 19.29.08 to 19.29.13 :

Under the combined effect of the full left turn aileron deflection and the more than 20 degree left rudder deflection, the roll attitude quickly reverses to the LWD direction. The roll rate is estimated having reached 30 deg/sec (assessment made on the roll angle value).

. Pitch angle reaches : 9.2 degrees AND,
. True AOA : 2.5 degrees ANU,
. Roll angle reaches : 43 degrees LWD,
. Vertical G-load reaches : +1.83 g,
. Lateral acceleration reaches : -0.47 g.

Speed begins to increase.

10- GMT 19.29.13 to 19.29.18 :

Same phenomenon as in 9- is highlighted but the evolution in roll is reversed on the RWD side. Roll rate reaches 50 deg/sec. Stall warning is activated.

. Pitch angle reaches : 14 degrees ANU,
. True AOA : 15.2 degrees ANU,
. Roll angle reaches : 64.5 degrees RWD,
. Vertical G-load reaches : -0.22 g,
. Lateral acceleration reaches : +0.54 g.

11- GMT 19.29.18 to 19.29.40

The severe and oscillating excursions in roll, pitch and accelerations (vertical and lateral) are repeated under the same scenario : the ailerons are alternately deflected on the full left and right stop, associated to alternative actions on the rudder pedals and the elevators. Stall warning is activated two more times.

. Roll rates values reached are : 30 deg/sec LWD, 55 deg/sec RWD, 30 deg/sec LWD.
. Pitch angle reaches, successively : 22 deg ANU, 0 deg, 22.8 deg AND, 7 deg ANU.
. True AOA reaches, successively : 3 deg AND, 14 deg ANU, 4.5 deg AND, 15.2 deg ANU.

. Roll angle reaches, successively : 25 deg LWD, unknown (loss of signal), 70 deg LWD, 54 deg RWD, 50 deg LWD.
. Vertical G-load reaches, successively : +2.25 g, -0.17 g, +2.61 g, -0.45 g, +2.84 g.
. Lateral acceleration reaches, successively : -0.66 g, unknown (loss of signal), -0.74 g, +0.54 g, -0.54 g.

During this lapse of time, the altitude looses 3050 ft. Airspeed has increased up to 270 kts.

12- GMT 19.29.40 to 19.30.25

During this phase, the A/C gains altitude from 13100 ft at an initial airspeed of 270 kts to 17900 ft where the airspeed bottoms out at 171 kts.

B- Summary

While flying at FL 160, turning right to heading 270, the airspeed dropped 16 kts below VLS, which, combined with the turbulence, led the A/C to over-roll on the R/H side, despite the counteraction of the ailerons. Full power was applied on the engines at that time.

The combination of the low speed and the turbulence at that time led the AOA to increase and the stall warning to be activated.

The first reaction of the crew seeing the A/C rolling to the R/H side with full yoke deflection on the left was to apply left rudder pedal order.

The A/C then experienced severe excursions in roll and pitch during the following 35 seconds with three activations of the stall warning. the manual control of the A/C during this period was performed by successive and alternate deflections of the rudder, the ailerons (to the stop) and the elevators. The A/C lost approximately 3000 ft during this period before overshooting the FL 160 by around 1800 feet and loosing speed again.

There was no evidence of aircraft or systems malfunction during the whole event.

Best regards
Olivier ILLES
Flight Guidance Systems Group Manager

* FIGURE X-1 : GENERALE CROISIERE (LONGI) - (Mot. GE ou CPM) *

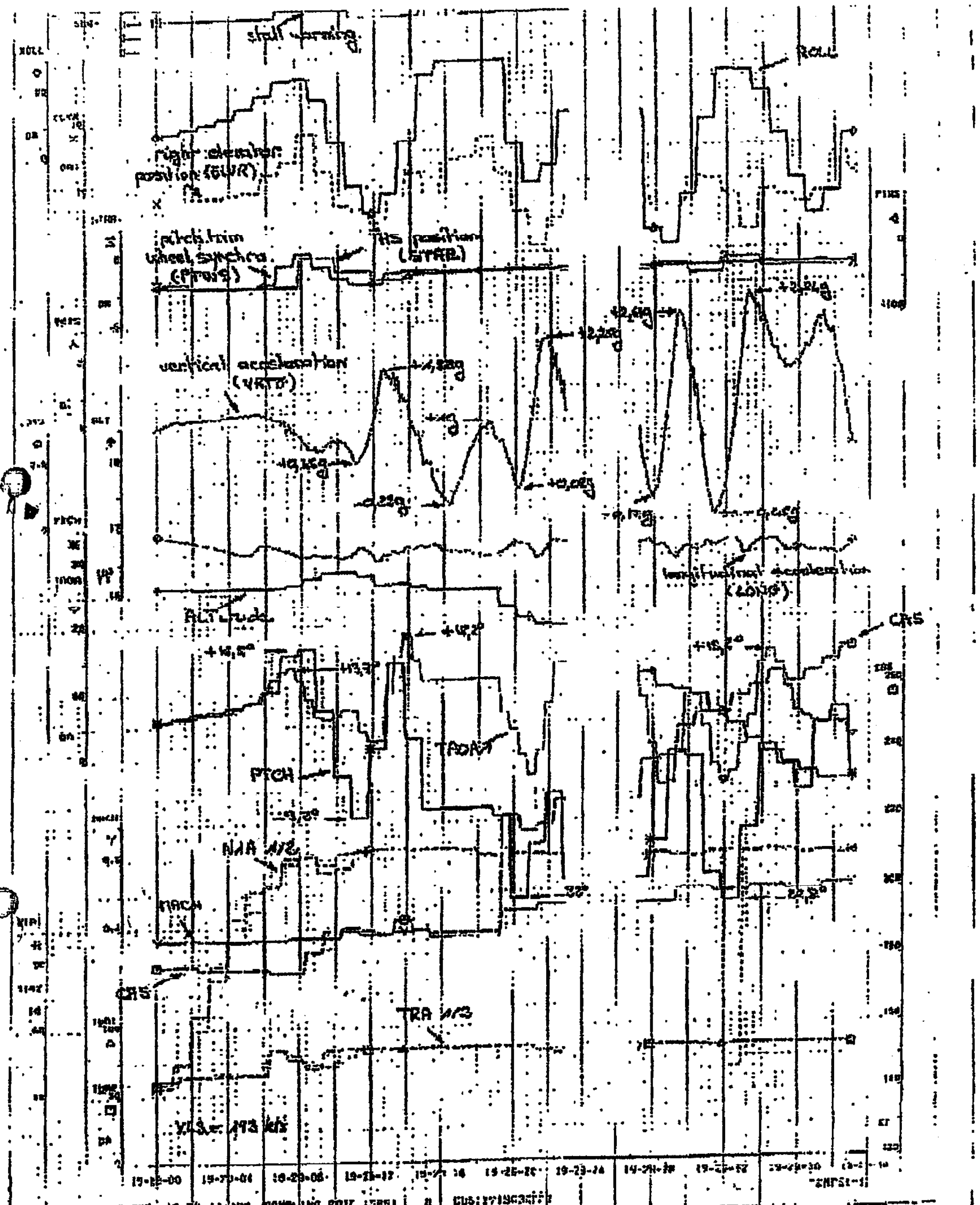
MNEMONIC	DEFINITION (FRAME : 4 m.)	UNIT	SIGN CONVENTION	SPS.	RESOL.	SOURCE(S)	LABEL/BIT	WORD
				1	0.000			5
ALT	ALTITUDE COMBINATED BITS 12/29	(FT)		1	0.062			60
N1A1	N1 ENGINE 1 (FMC)	(%)		1	0.062			62
N1A2	N1 ENGINE 2 (FMC)	(%)		1	0.125			12
THA1	THRUST RESOLVER ANGLE ENG.1 (FROM EEC)	(DA)		1	0.125			21
THA2	THRUST RESOLVER ANGLE ENG.2 (FROM EEC)	(DA)		1	0.352			17
ROLL	ROLL ANGLE	(DA)	>0= RH WING DOWN	1	0.176			31
PTCH	PITCH ANGLE	(DA)	>0= NOSE UP	1	0.088			11
TACAL	TRUE LH ANGLE OF ATTACK (Const)	(DA)	0= UP	1	1.000			10
STALL	STALL WARNING		1= STALL	1	1.000			2
LONG	BODY LONGITUDINAL ACCELERATION	(G)		4	0.000			4
VERT	BODY NORMAL ACC.WORDS 4/12 COMBINATED	(G)		8	0.000			25
STAB	STABILIZER POSITION	(DA)	>0= NOSE DOWN	1/ 2	0.350			10
PTWS	PITCH TRIM WHEEL SYNCH.		>0= NOSE DOWN	1	0.085			41
ELVR	ELEVATOR POSITION RH	(DA)	>0= NOSE DOWN	1	0.353			19
CAS	COMPUTED AIRSPEED	(KT)		1	0.250			21
MACH	MACH NUMBER			1/ 2	0.001			6
CG	CENTER OF GRAVITY CGCC	(%)		1	0.040			11
APLE	CMD MODE A/P.1		1= CMD MODE	1	1.000			51
APZE	CMD MODE A/P.2		1= CMD MODE	1	1.000			54
ATHRE	A/THR MODE ENGAGED		1= ENGAGED	1	1.000			23
GW	GROSS WEIGHT ELAB.			1/64	0.000			

FIGURE 1

* FIGURE X-2 : GENERALE CROISIERE (LATERAL) *

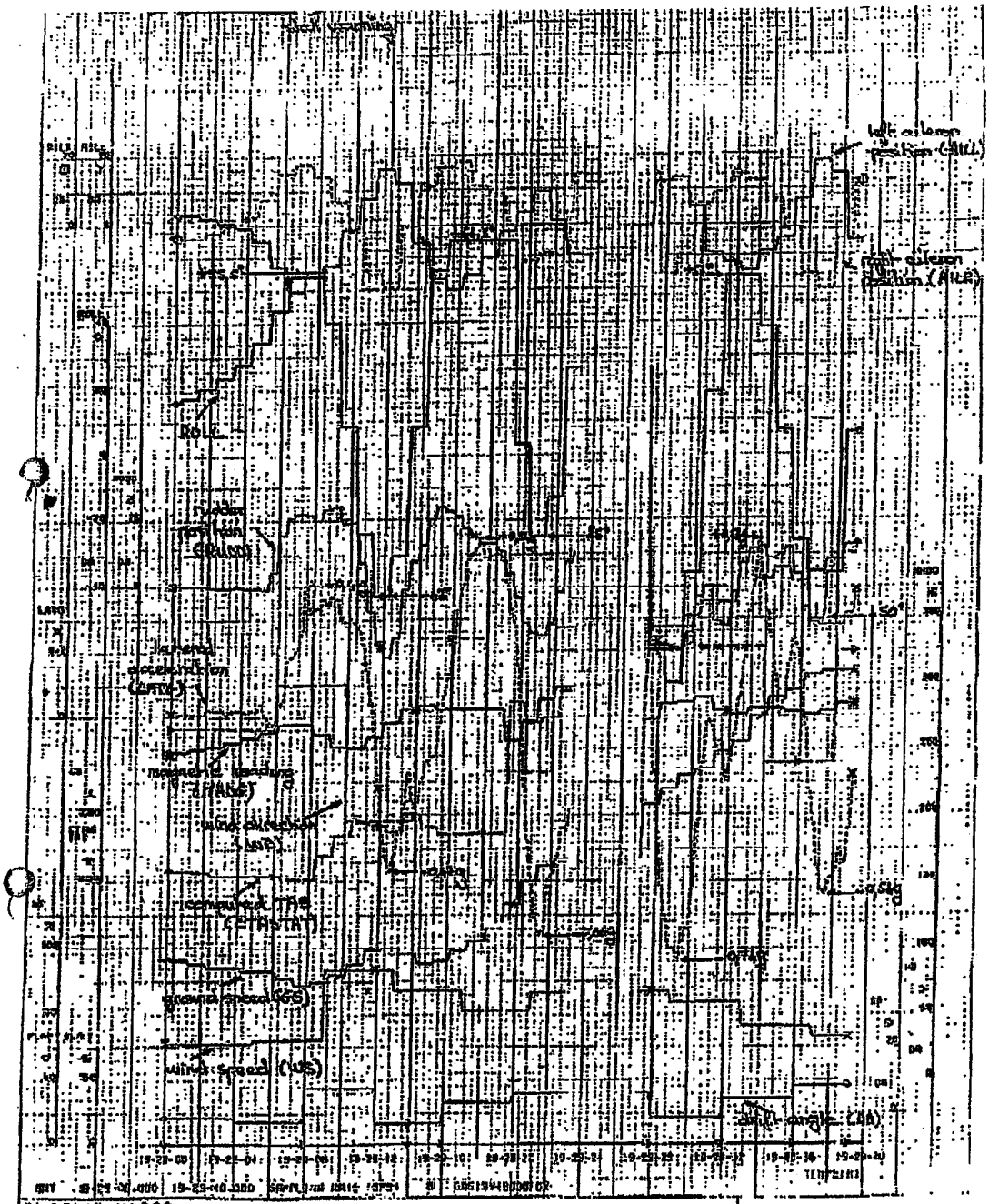
MNEMONIC	DEFINITION (FRAME : 4 m.)	UNIT	SIGN CONVENTION	SPS.	RESOL.	SOURCE(S)	LABEL/BIT	WORD
				1	0.352			3
MHDG	MAGNETIC HEADING	(DA)		1/ 4	0.062			58
WS	WIND SPEED	(KT)		1/ 4	0.088			58
WD	WIND DIRECTION	(DA)		1/ 4	0.088			58
DA	DRIFT ANGLE	(DA)		1	0.352			17
ROLL	ROLL ANGLE	(DA)	>0= RH WING DOWN	1	1.000			10
STALL	STALL WARNING		1= STALL	4	0.000			15
LATG	BODY LATERAL ACCELERATION	(G)		2	0.353			27
RUDD	RUDDER POSITION	(DA)	>0= TURN LEFT	1	0.351			9
AILL	ALL SPEED AILERON LH	(DA)	>0= TURN RIGHT	1	0.351			40
AILR	ALL SPEED AILERON RH	(DA)	>0= TURN LEFT	1/ 2	0.000			39
FLAP	FLAPS POSITION	(DA)		1/ 2	0.052			39
SLAT	SLATS POSITION	(DA)		1	1.000			14
GS	GROUND SPEED	(KT)		1	0.000			19
CTAS*ZAT	CALCULATED TRUE AIRSPEED **********			1	0.040			6
CG	CENTER OF GRAVITY CGCC	(%)		1	1.000			31
APLE	CMD MODE A/P.1		1= CMD MODE	1	1.000			51
APZE	CMD MODE A/P.2		1= CMD MODE					

FIGURE 2



FLIGHT V1903 TURBULENCE - AMERICAN AIRLINES

CRUISE (LONGITUDINAL AXIS)



FLIGHT V1903 TURBULENCE - AMERICAN AIRLINES 3E

CRUISE (LATERAL AXIS)

MEMO

AIRBUS INDUSTRIE

Airbus Electronic Mail System
Pierre CAMBON
AI/SE-A11
Ext: [redacted]

Blagnac, 18-Jun-1997 11:49am TLS
Ref: 942.6185/97

TO: See Below

Subject: A300-600,AAL,MSN0513,N90070 ACTIONS FURTHER TO TURBULENCES

Customer Services Directorate
Pierre CAMBON
AI/SE-A11
Ext: (33) (0) [redacted]

Blagnac, 18-Jun-1997
Ref: 942.6185/97

TO: SEE DIST. LIST

Subject : A300-600,AAL,MSN0513,N90070 ACTIONS FURTHER TO TURBULENCES

Our previous ref: 942.6168/97

Please find hereafter feed back we received from AAL. As you can see, AAL will not provide us with the list of findings from the inspections performed !

Quote:

YES, AAL PERFORMED AMM 05.51.17 PLUS 05.51.27 PYLON SIDE LOAD INSPECTION.
BOTH WERE DONE IN MIA AFTER THE INCIDENT. THE AAL STRUCTURAL ENGINEER "WILL NOT" - REPEAT "WILL NOT" GIVE ME THE LIST OF FINDINGS FROM THE INSPECTIONS.
HE SAID SOME FASTENERS IN THE WING WERE SHEARED BUT WILL NOT GIVE ME DETAILS.
NOTE, THERE WERE NO FUEL LEAKS.

Unquote

Could you please coordinate all necessary actions with loads/stress/others department involved, in order to provide AAL with list of inspection tasks and when these tasks will have to be performed. (Refer to our previous mail 942.6023/97 DATED 13/06/97)

Ugent reply requested before 3.00PM today.

REGARDS,

URGENT

Pierre CAMBON
MIRG COORDINATOR
AI/SE-A11

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M E M O

A I R B U S I N D U S T R I E

Airbus Electronic Mail System
Thomas GROTZKY
AI/SE-A1
Ext: [redacted]

Blagnac, 19-Jun-1997 08:29pm TLS
Ref: 942.6272/97

TO: See Below

Subject: A300-600, MSN513, AAL, FLIGHT IN TURBULENCE

Dear Mr.Zepf,

with reference to our telephone conversation concerning the flight through turbulence of MSN513 please note as follows.

Further to the analysis of the DFDR readings, Airbus Industrie confirms that some areas of the aircraft have sustained very high loads, in particular in the aft part of the aircraft. These loads require the aircraft to be deeply inspected after the event.

However, we are aware that some inspections as per the applicable AMM chapter 05 have been performed. We kindly ask you to send to Airbus Industrie urgently the details of the inspections performed and the associated findings. This will allow Airbus Industrie to determine additional requirements, if any. Top priority should be given to data on the rear part of the aircraft.

Best regards,

Thomas Grotzky for J.M.Gaillardon
Director
Structure Engineering

Distribution:

TO:	MR.A.W.ZEPF Mgr.Airframe, Systems		(FAX_000[redacted])
	ARCS:AALTUL		(
	[redacted]		)
CC:	Jean-Michel GAILLARDON	AI/SE-A	(GAILLARDON)
CC:	Roger LECOMTE	AI/SE	(LECOMTE)
CC:	Yves BENOIST	AI/E-FS	(BENOIST)
CC:	Eberhard GEST	AI/SE-W	(GEST)
CC:	FILING	AI/SE-A1	([redacted])
CC:	REFERENCE AI/SE-A1 942.6272/97		([redacted])
CC:	Pierre CAMBON	AI/SE-A11	([redacted])

17

M E M O

A I R B U S I N D U S T R I E

Airbus Electronic Mail System
Eberhard GEST
AI/SE-W
Ext: [redacted]

Blagnac, 20-Jun-1997 04:38pm TLS
Ref: 940.1875/97

TO: See Below

Subject: A300-600 MSN 513 AAL - EXPOSURE TO VERY HIGH LOADS

David,

subject aircraft was reported to have encountered severe turbulence during approach.

AAL initially reluctant to release the DFDR as well as any inspection results did so recently.

Based on this information the corresponding responsible of our partners saw no reason to ground the a/c. However they will transmit additional inspection requirements to AAL early next week which AAL were very much willing to perform within the time constraints provided (next A-check). AAL were informed about our serious concern in this issue and that we refrained putting the a/c on ground only because of the inspection results received from them today.

Another concern I would like to raise is that if this a/c forms part of the batch being AIB property we should retain carefully the evidence to claim compensation if this a/c will show damage which was not discovered now and inform AAL accordingly. Since I don't know exactly who would be responsible for that I am addressing myself to you.

Best regards

Eberhard Gest

Distribution:

TO:	David BAUSOR	AI/BW	([redacted])
CC:	Roger LECOMTE	AI/SE	(LECOMTE)
CC:	Jean-Michel GAILLARDON	AI/SE-A	(GAILLARDON)
CC:	Thomas GROTZKY	AI/SE-A1	(GROTZKY)
CC:	REFERENCE AI/SE-W 940.1875/97		([redacted])
CC:	Thierry VAN DER HEYDEN	ACS	(VANDERHEYDEN)
CC:	Ernie BRACKEN	ACS-C2	(BRACKEN)
CC:	Cornelius BRONDER	AINA/C	(BRONDER)
CC:	David BRADLEY	AI/SP	(BRADLEY)
CC:	Patrice ROGER	AI/EE-I	([redacted])

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E E X O

Post-it® Fax Note 7671	Date 6/24/1	# of pages ▸ 1
To D. Zepf	From Ike	
Co./Dept.	Co. Airbus	
Phone #	Phone #	
Fax #	Fax #	

Airbus Electronic Mail System
Pierre CAMBON
AI/SE-A11
Ext: 34711

TO: See Below

Subject: A300-600,AAL,MSN0513,N90070 ACTIONS FURTHER TO TURBULENCES

Customer Services Directorate
Pierre CAMBON
AI/SE-A11
Ext: (33) (0) [redacted]

Blagnac, 24-Jun-1997
Ref: 942.6408/97

TO: ARCS:AALTUL CC:

Subject : A300-600,AAL,MSN0513,N90070 ACTIONS FURTHER TO TURBULENCES

Your ref: ACS-R/AAL/TUL/000468/97
Our previous ref: 942.6371/97 DATED 23/06/97

THIS MAIL SUPERSEDE PREVIOUS MAIL IN REFERENCE ABOVE.

Further to the inspection report and results provided by AAL for above mentioned subject and after investigation with our stress office, please find hereafter additional inspection tasks that we recommend to perform at the next opportunity, not later than the next A Check.

<u>List of inspection tasks to be performed:</u>

All structural inspections are visual.

Total A/C:	Levelling and measurement check at the earliest as per AMM05-56-00 para.8 and 9 only * must show no permanent deformations of the A/C (Stabilizer !)
Fuselage (inside):	FR 84 up to FR 87 above stringer 23 included FR 91 all areas
Fuselage (outside):	all corners at the door cutouts area between FR54 and FR58 below stringer 38
Vertical stabilizer:	RIB 7 rear frame-work strut (inside) RIB 12 front frame-work strut (inside) Skin panels near fuselage attachment

24.JUN.1997 17:58 AIB STRUCT REPAIR 33 [redacted] NO.889 P.1

06/24/97 10:39 TX/RX NO.8118 P.001

fittings (inside and outside):
- between rear spar and stringer 5 and 4
- between stringer 8 and 15 up to rib 3
- between stringer 21 and front spar up to rib 2

Horiz. stabilizer : General inspection of THS and Elevator skins looking for deformations, misalignments
Detection of Elevators by hand to check misalignements or deformations of hinge fittings
Rear support and screw jack fittings
THS skin joints
Spar joints

Wings:

We recommand to extend the inspection according to AMM to Rib 29.

Please provide us with inspection results and comments.

In addition to, please provide us with sketch showing location of sheared fasteners and action performed

REGARDS.

Pierre CAMBON
MING COORDINATOR
AI/SE-A11
TEL (33) [redacted]

Distribution:

TO: ARCS:AALSTVL [redacted]

CC:	REFERENCE AI/SE-A11 942.6408/97	..	([redacted]
CC:	Eberhard GEST	AI/SE-W	(GEST)
CC:	Jean-Michel GAILLARDON	AI/SE-A	(GAILLARDON)
CC:	Thomas GROTZKY	AI/SE-A1	(GROTZKY)
CC:	Prosper KULIJPERS	AI/SE-A11	(KULIJPERS)
CC:	Jacques LEBORGNE	AI/SE-A2	(LEBORGNE)
CC:	Marie-France BOUSQUET	AI/SE-A1	([redacted]
CC:	Jean DANEY	AI/X-FE	(DANEY)

-MEMO · AIRBUS INDUSTRIE

Airbus Electronic Mail System
Pierre CAMBON
AI/SE-A11
Ext: [redacted]

Blagnac, 25-Jun-1997 06:12pm TLS
Ref: 942.6455/97

Post-it® Fax Note 7671	Date 6/25	# of pages ▶ 2
To [illegible]	From [illegible]	
Co./Dept. [illegible]	Co.	
Phone #	Phone #	
Fax #	Fax #	

TO: See Below

Subject: A300-600,AAL,MSN0513,N90070

Customer Services Directorate
Pierre CAMBON
AI/SE-A11
TEL: (33) (0) [redacted]

Blagnac, 25 Jun 1997
REF: 942.6455/97

TO: SEE DIST. LIST

Subject : A300-600,AAL,MSN0513,N90070

Your ref: N.TUL.0476

Further to your mail in reference and our phone call, please note the following

1) Levelling and measurement check for stabilizer is not required for application during this check. Inspection result will confirm if this action has to be done (at next AAL check)

2) Scuff plate removal not necessary for fuselage inspection (outside)

3) Wings inspection:
Extended inspections up to Rib 29

Phase 1. External inspection only, if no damage is apparent then no further action is required. If damage is present, in principle phase 2 must be carried out. We would however advise AAL to report any phase 1 findings in order to consider possibility to postpone phase 2 till a more convenient opportunity or propose alternative inspections (avoiding to access the wing).

Phase 2. Close visual inspection of internal structure for distortion, cracks, pulling or tearing of fasteners and for damaged paint work.

4) inspection has to be performed during this check (Inspection are simple and no time consuming checks)

5) Refer to point 1)

Hope this clarify the situation. Do not hesitate to contact us if further assistance is required. (STANDBY PROCEDURE)

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M E M O A I R B U S I N D U S T R I E

Airbus Electronic Mail System , 30-Jun-1997 06:40pm TLS
AALTUL Ref: NONE
Airbus Industrie
Ext:

TO: See Below

Subject: A300-600 ATA53 MSN513 TURBULENCE INSPECTION

AIRBUS TXT 2
O/Ref: AAL/TUL/000489/97 Date: 1997/06/30
Y/Ref:

Reply Requested: NR

Subject : A300-600 ATA53 MSN513 TURBULENCE INSPECTION

FROM: MR. I. BULLAMORE - ACS-R/AAL/TUL

TO: MR. P. CAMBON - AI/SE-A11

PIERRE,

AAL HAS COMPLETED THE INSPECTION AS OUTLINED IN Y/REF 942.6455/97. THE INSPECTION WAS COMPLETED ON 27 JUNE WITH AAL STRUCTURAL ENGINEERING TOM FORSBERG ON SITE AND THERE WERE NO FINDINGS.

I AM MAILING YOU THE FORMS USED DURING THIS INSPECTON PLUS COPIES OF ALL THE FORMS USED DURING THE INSPECTION ON 13 MAY. YOU SHOULD EXPECT TO RECEIVE EVERYTHING BY THURSDAY THIS WEEK.

NR
BRGDS,
IKE BULLAMORE
AAL/TUL

Distribution:
TO: CAMBON Pierre, AI/SE-A11 ([redacted])

CC: BOUSQUET Marie-france, AI/SE-A1 ([redacted])
CC: BRACKEN Ernie, ACS-C2 ([redacted])
CC: GAILLARDON Jean-Michel, AI/SE-A ([redacted])
CC: GEST Eberhard, AI/SE-W ([redacted])
CC: GROTZKY Thomas, AI/SE-A1 ([redacted])
CC: RECEPTION Ais, AI/SG-R ([redacted])

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INSPECTION GENERALE DE L'AVIATION CIVILE
ET DE LA METEOROLOGIE

BUREAU ENQUETES-ACCIDENTS
Bâtiment 153 - Aéroport du Bourget
93352 Le Bourget Cedex

Téléphone : **33 (0) 1.49.92.72.00**
Télécopieur/Fax : **33 (0) 1.49.92.72.03**
Téléx : **BEA 230070 F**
RSFTA/(AFTN) : **LFPSYLYX**
Nombre de pages : 25

Le Bourget, le 13 juin 1997

DESTINATAIRES (TO) :
Mr. Carrol A. Smith
Investigator-In-Charge
NTSB - SERA
Fax : 00 1 305 597 4614

DE LA PART (FROM) :
Dan Cohen-Nir
Accredited Representative
Phone : 33 1 49 92 72 52
Fax : 33 1 49 92 72 03

June 12 - with
17 - ultimate

Subject : Accident to American Airlines flight 903 on 12 May, 1997
A 300 B4-605 R registered N90070

Dear Corky,

We have studied the questions from John Shade (ref. fax of 6 June) and received the fax from John DeLisi on 10 June, 1997. We worked on these questions with Airbus Industrie on Wednesday in Toulouse.

We have already been provided with data by Airbus Industrie regarding the parameters that are recorded, their physical values and the threshold values that trigger the flight systems (α_{floor} for instance). You will find hereafter the data available for the time being. However, the values will have to be commented on and interpreted with regard to the parameters provided by the DFDR. In fact, in order to perform a reliable analysis, we will have to make the link between those values and thresholds, the recorded parameters, which depend on each other, and with the crew procedures that were carried out. You will be provided with this information as soon as available.

1 - John Shade's fax (flight recorders group)

1-1 « *A copy of the common and unique conversion grid that Airbus supplied to AAL* » :
See hereafter in appendix 1
A check of the parameters available and readable will be carried out as soon as you provide us with the raw data file. See § 3-1.

1-2 « *The conversion from vane angle of attack to true angle of attack* » :
See paragraph © first alinea on the AMM page provided in appendix 2

1-3 « *Any explanation for the cause of power interruptions to the recorder...* »
We have observed several losses of frames and losses of synchronization in the RAPS file we have been provided with. According to the read-out made by Airbus Industrie, several losses of data and non reliable data were also observed. In first analysis, losses of data, desynchronisation and unreliable values seem to be related to a failure of the DFDR recording process. Further study is under way.

1-4 « *Stall speeds : Vs mini and Vs 1G* »
$V_{s\ mini}$ = 148 knots ;
V_{LS} = 193 knots
$V_{green\ dot}$ = 204/208 knots
V_{S1G} and $V_{stick\ Shaker}$ given later

All the values will be confirmed.

1-5 « *A confirmation of whether or not auto-throttles were recorded* »
The TLA 1 and TLA 2 are recorded on the DFDR. Moreover five modes of the A/THR are recorded : mode A/THR engaged, mode A/THR N1, mode A/THR SPEED, mode A/THR MACH and the mode A/THR RETARD. See appendix 1.

1-6 Comments on the « « *fixed values* » *of parameters during the interval [3280-3290]* »:
We have also observed that only few parameters remain at fixed values. The preliminary explanation consists of the following :

When the Symbol Generator Unit (SGU) detects parameters evolution rate above a given threshold (to be forwarded) during a certain time, an auto-test process is triggered. The parameters are frozen just for a few seconds during the auto-test. Simultaneously, the Symbol Generator Unit sends a signal to the EFIS's, and produces a white slash on a black display. The order sent by the SGU is given to avoid misleading indications about possible unreliable data which could be displayed on the EFIS's.

2 - John DeLisi 's fax (systems group)

2-1 « *Please provide a description of the stall warning system...* »
You will be provided with the description of the stall warning system. The stall warning system activates at a true AOA of 8, 5° in clean configuration and 15° with slats extended. The stall warning system generates an aural warning : the cricket, visual warnings : master caution and master warning, and the stick shaker warning. We have requested that Airbus Industrie provide us with a complete memorandum about the warning priorities, including of course the Flight Warning Computer priorities' logic.

2-2 « *Please provide descriptions of the autopilot and auto-throttle systems...* »
You will be provided with the description of the autopilot and auto-throttle systems and α_{floor} protection, with a focus on the different manners to disconnect the autopilot and the auto-throttles. However, a preliminary assertion regarding the autopilot system is that disconnection is possible through either the AP lever on the FCU panel, or the control column wheel with a force exceeding 15 daN or disconnection press button on the control column wheel. The α_{floor} protection is available if the auto-throttles are armed.

2-3 « *What is indicated by a diagonal slash mark...* »
See § 1-6. As you can see above, diagonal slash mark is not a display failure. Criteria of diagonal slash appearance can depend on the technical features of the computers installed on the simulator and on the aircraft.

2-4 « *During the upset, there are periods of data dropouts...* »
See §§ 1-3 and 1-6.

2-5 « *The accident airplane appears to be wired...* »
Airbus Industrie will forwarded a memorandum of A 300's standards for parameters record capability.

3 BEA questions

3-1 Aircraft inspection
We have observed that load factors seem to have surpassed acceptable values during the event. Based on our knowledge, such load factors seem to be similar to those experienced in severe turbulence conditions. For information, Airbus Industrie provides all the airlines with severe turbulence inspection programs and attached procedures.
In the light of the above, what kind of structural inspection was undertaken ?

3-2 Crew training reports
Data provided is encoded and therefore is difficult to read. Could you us give the key to translate it into comprehensible language ?

3-3 MIPS
From the preliminary data collected it turns out that the accident flight seems to be labeled as FLIGHT LEG MINUS 14. Could you confirm this with American Airlines ? Furthermore, the paper you gave me is not complete. Did you receive the full download sheets provided by American Airlines and Sextant Avionique ? I would be very grateful to have a copy of the full download.

3-4 DFDR tapes
We would very much appreciate if you could provide us with a software copy of the contents of the original tape.

3-5 TCAS
Documentation provided mentions that a Boeing 757 experienced a TCAS Traffic Alert shortly after the A 300-605R departed his roll movement. In addition to the complete crew report that you proposed to send to me, we would appreciate to be also provided with the Boeing 757 crew report.

3-6 American Airlines Flight Crew Operating Manual
Airbus Industrie has confirmed that American Airlines developed its own Operating Manual, based of course on the Aircraft Flight Manual of the manufacturer. As you may know, Airbus Industrie also provides airlines with his own FCOM, including Standard Operating Procedures. Thus, it would be helpful to compare both FCOM's.

Could you provide us with a copy from the American Airlines FCOM of the following chapters :

- forecast or expected turbulence and encountered turbulence procedures
- AP and A/THR system description and engagement procedures
- aural and visual warnings description and procedures in such cases
- holding patterns procedures
- TCAS procedures (level 1 to 3)
- descent briefs and check-lists according to hold or approach legs
- speed management and selection according to hold and approach legs (thresholds, minimum and maximum speeds)
- EFIS description and operation

Again, thank you for your welcome in Miami and the assistance you provided me. I would be very grateful if you could pass on the above to the group specialists.

I look forward to reading from you.

Best regards,

Dan Cohen-Nir
Accredited Representative

Lopatkiewicz Ted

From: McConnell, Clay [clay.mcconnell@airbus.com]
Sent: Tuesday, May 27, 2003 3:38 PM
To: 'Ted Lopatkiewicz (E-mail) '
Subject: working statement

Hey Ted:

Here's what we're saying if asked...

Best from the suburbs,

Clay McConnell
Communications, Airbus North America
703/834-3554

==========

Contrary to the assertions in the USA Today article, Airbus did not know in 1997 that loads on the American Airlines flight 903 aircraft tail had exceeded the "ultimate" level. In fact, a loads calculation was not conducted until 2002. Nonetheless, Airbus had many concerns about the improper use of rudder, and these concerns were communicated widely by Airbus to the entire aviation community beginning in 1997.

In 1997, Airbus made numerous requests for the information necessary to conduct a proper loads calculation on AA flight 903. That information was very late in coming and, in fact, did not come in a form necessary for loads calculations until after an inspection of the tail had revealed no findings.

Airbus received some initial data in June 1997 (not sufficient at that time for a loads calculation) and conducted an engineering analysis. This engineering analysis raised a concern with Airbus about possible damage that could have resulted in the tail section of the aircraft due to the aggressive use of the rudder during the flight. Based on the concerns, Airbus advised American to "deeply inspect" the vertical tail fin on the flight 903 aircraft. At this time, Airbus was not a party to the NTSB investigation, so Airbus' recommendations were made to the airline.

Once American reported to Airbus that there were no findings of damage on the tail of the aircraft, Airbus was satisfied that this particular aircraft was still airworthy.

Nonetheless, the flight 903 incident underscored Airbus's concerns about the dangerous use of rudder and the fact that such use could result in loss of controlled flight or damage to aircraft structures. As a result, Airbus along with other manufacturers expressed its concerns in a number of extraordinary ways throughout 1997 and 1998 about the dangers of such maneuvers and about components of training programs that stressed such maneuvers.