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Büro für Flugunfalluntersuchungen BFU  
Bureau d'enquête sur les accidents d'aviation BEAA  
Ufficio d'inchiesta sugli infortuni aeronautici UIIA  
Uffizi d'inquisiziun per accidents d'aviatica UIAA  
Aircraft Accident Investigation Bureau AAIB

# **Final Report No. 1974 by the Aircraft Accident Investigation Bureau**

concerning the serious incident (AIRPROX)  
involving CFG 444, B757-300, D-ABOB  
operated by Condor Flugdienst GmbH  
and AZA 9117, B747-200, N536MC  
operated by Atlas Air for Alitalia,  
on 28 February 2005  
at waypoint PERAK  
17 NM south-west of the GVA DVOR

## General remarks concerning this report

This report contains the AAIB's conclusions on the circumstances and causes of the serious incident which is the subject of the investigation.

In accordance with Annex 13 of the Convention on International Civil Aviation of 7 December 1944 and article 24 of the Federal Air Navigation Law, the sole purpose of the investigation of an aircraft accident or serious incident is to prevent future accidents or serious incidents. It is therefore not the purpose of this investigation to determine blame or clarify questions of liability. The legal assessment of accident/incident causes and circumstances is no concern of the incident investigation (art. 24 of the Air Navigation Law).

If this report is used for purposes other than accident prevention, due consideration shall be given to this circumstance.

The definitive version of this report is the original in the French language

All times in this report, unless otherwise indicated, follow the coordinated universal time (UTC) format. At the time of the accident, Central European Time (CET) applied as local time (LT) in Switzerland. The relation between LT, CET and UTC is:  $LT = CET = UTC + 1 \text{ hour}$ .

For reasons of protection of privacy, the masculine form is used in this report for all natural persons, regardless of their gender.

## Final Report

**Aircraft** CFG 444, D-ABOB, B757-300  
Condor Flugdienst GmbH  
Munich (EDDM) – Palma de Majorca (LEPA)

IFR commercial flight

AZA 9117, N536MC, B747-200  
Atlas Air for Alitalia  
New York Kennedy (KJFK) – Milan Malpensa (LIMC)

IFR commercial flight

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**Crews** CFG 444  
Commander  
Copilot

AZA 9117  
Commander  
Copilot  
Flight engineer

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**Location** Waypoint PERAK,  
17 NM south-west of the GVA DVOR

**Date and time** 28 February 2005, 09:44 UTC

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**ATS unit** Swiss Radar Upper Area West, UAC

**Controllers** Radar controller sector K3/L3  
Radar coordinator (coach) sector K3/L3  
Radar coordinator (trainee) sector K3/L3  
Radar controller sector L2  
Radar coordinator sector L2

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**Airspace** A

## 1 Basic information

### 1.1 History

On Monday 28 February 2005 at 09:30:32 UTC, the flight crew of the Condor B757-300 aircraft making commercial flight CFG 444 from Munich to Palma de Majorca called on the 134.315 MHz frequency of sector K3/L3. It was at flight level FL 330. The radar controller identified it and cleared it at this level on the route BENOT-BALSI.

At 09:34:46 UTC, the flight crew of the Atlas Air B747-200 aircraft making flight AZA 9117 from New York John F. Kennedy to Milan Malpensa for the Alitalia company called on the 124.030 MHz frequency coupled to the same sector. The aircraft was also at flight level FL 330; the radar controller identified it and cleared it at this level on the route GVA – TOP (Geneva-Turin). Approximately 7 minutes later, he instructed it to descend to flight level FL 320; the clearance was read back correctly. The radar controller then imposed a rate of descent of at least 1000 ft/min and informed it of traffic crossing within the next two minutes.

At 09:42:37 UTC, the radar controller instructed the pilot of flight AZA 9117 to maintain flight level FL 320 and handed it over to the L2 frequency of 126.050 MHz.

At 09:43:00 UTC, the pilot of flight AZA 9117 called on the L2 sector frequency of 126.050 MHz, stating that they were maintaining flight level FL 320. The radar controller replied that his aircraft was identified and instructed him to descend to flight level FL 250 (exit level coordinated with the Milan Control Centre). The clearance was read back correctly.

At 09:43:29 UTC the radar plots show that aircraft AZA 9117 suddenly started to climb, passing flight level FL 324 and from that point becoming a potential threat to minimum safety separation from the converging flight CFG 444. The K3/L3 radar controller immediately detected this danger and instructed the pilot of CFG 444, the only one of the aircraft on conflicting trajectories which he had on his frequency, to climb to flight level FL 340. The latter replied: *"already on TCAS climb now climbing level three four zero, we have the traffic in sight"*. At this time the two aircraft were almost 5 NM from the crossing point of their routes, with an altitude difference of approximately 600 feet.

At 09:43:40 UTC, the Short Term Conflict Alert (STCA) indicated a proximity alert to the radar controller. The two aircraft were then 3 NM from the crossing point of their routes, with an altitude difference of 500 ft.

At 09:43:43 UTC, the L2 radar controller called flight AZA 9117 as he noted that the aircraft was passing flight level FL 325 in a climb instead of descending as instructed. The pilot replied that he had had a traffic advisory (TA) <sup>1</sup>. The radar controller instructed him to descend to flight level FL 250 and asked him if he had the traffic in sight. The pilot answered in the negative.

The radar controller informed the flight crew that he did not understand why their Traffic Alert and Collision Avoidance System (TCAS) was asking them to climb, whereas the conflicting traffic was above them at flight level FL 330. The pilot replied that apparently he had traffic below him and on his right and added:

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<sup>1</sup> For terms relating to the airborne collision-avoidance system, see the glossary at the end of the report.

*"Heu..., well it could be our TCAS ????? something, you know, this is a, one of those Jurassic jets".*

The incident took place when the commander of flight AZA 9117 had left the cockpit to relieve himself; at this time he was close to the cockpit and heard the spoken alerts concerning the traffic and resolution advisories.

When he resumed his seat, he saw the end of the indications of a corrective descent resolution advisory on his variometer. He remembered then seeing the threat in red at +1800 feet, making visual contact a little later and indicated that the copilot's altimeter was functioning "a bit erratically".

The flight engineer's report mentions that during the descent to Milan Malpensa the flight crew reacted to an erroneous resolution advisory which was probably triggered by the "malfunction of the copilot's altimeter": the instrument was sticking and oscillating slightly during the descent. In his report, the commander was of the same opinion as to the cause of the RA.

At 09:44:04 UTC, the two aircraft crossed with an altitude difference of 1700 ft. The K3/L3 radar controller informed the pilot of flight CFG 444 that the conflicting traffic was again at flight level FL 320 and that he could descend back to flight level FL 330. The pilot replied that he was currently passing over the aircraft and that he wanted to wait for another 30 seconds. At 09:44:17 UTC, he stated that he was climbing again to flight level FL 330.

The minimum distances shown on the radar plots between aircraft AZA 9117 and CFG 444 were a lateral separation of 4.1 NM and an altitude difference of 500 ft.

The K3/L3 radar controller and the pilot of flight CFG 444 stated that they would be submitting an incident report.

At 09:47:06 UTC, flight AZA 9117 was handed over to the Milan control frequency, 125.27 MHz.

## 1.2 Weather conditions

The following weather conditions were transmitted by Skyguide

At the time of the incident, the wind forecasts at altitude were as follows:

*QAO-A1 : 09Z-15Z FL100 070/010 FL180 300/010 FL240 020/010  
FL300 310/020 FL340310/030 FL390 310/035*

The Geneva weather conditions at the time of the accident were as follows:

*QAM LSGG 0920Z 28.02.2005  
040 DEG 19 KT. MAX 31 KT. VRB BTN 340 AND 070 DEG  
VIS 10 KM*

*SCT 3500 FT  
-06/-11  
QNH 1014 ONE FOUR  
QFE THR 05 963  
QFE THR 23 965*

*NOSIG*

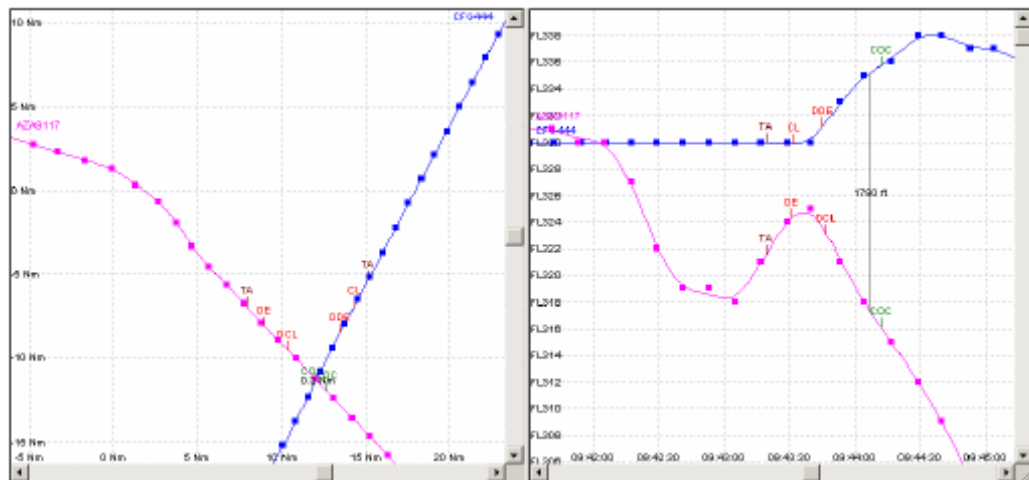
### 1.3 Additional information

#### Letter of agreement between Geneva and Milan

According to the Geneva Air Traffic Manual (ATM), section 4-6, aircraft with Milan as their destination (Malpensa, Linate) must be at a maximum flight level of FL 250 at waypoint VEROB located 30 NM north-west of VOR TOP.

#### Eurocontrol InCAS simulation

Using Eurocontrol's InCAS simulation tool, it was possible to reconstruct the trajectories of the two aircraft involved in the incident and to reconstruct the alerts which were probably issued by their airborne collision-avoidance systems.

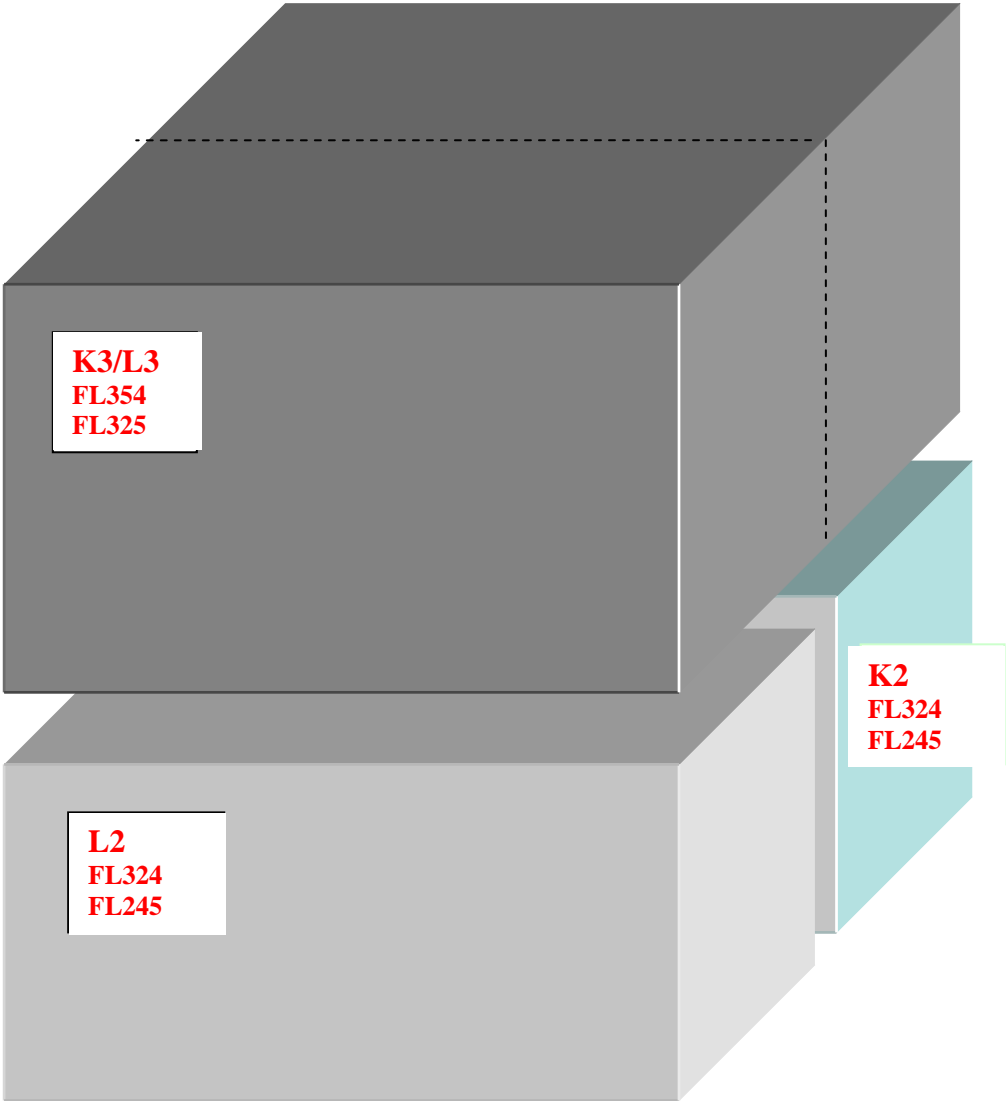


#### FOCA technical communication, CT-I no. F 20.100-20

In technical communication "CT-I no. F 20.100-20" issued by the aviation equipment division of the Federal Office for Civil Aviation (FOCA) concerning the periodic checking of transponders, it is stipulated under point 3.6 that:

*"During the performance of transponder tests which simultaneously requires verification of the full range of the altitude coding system it is appropriate to avoid the high-frequency transmission (use "Dummy Loads"). If this is not possible, inform the security authorities concerned of the performance of the tests (avoid ACAS avoiding manoeuvres due to false alerts)."*

Sector configuration at the time of the incident



## 2 Analysis

### 2.1 Air traffic control aspects

#### 2.1.1 The conflict

The two aircraft involved in the incident were initially at flight level FL 330 and were on converging routes, virtually at right angles, with the crossing point close to waypoint PERAK. They were under the control of the same sector K3/L3 on coupled frequencies 134.315 and 124.030 MHz.

AZA 9117 was flying to Milan Malpensa and according to the LoA (Letter of Agreement) between Geneva and Milan should have passed waypoint VEROB at a maximum flight level of FL 250. In order to ensure the necessary vertical separation from CFG 444, the radar controller decided to make the latter descend to flight level FL 320. Once this level was reached, he handed AZA 9117 over to sector L2 for its continued descent.

The climb of aircraft AZA 9117 which took place a few seconds later was very quickly noticed by the sector K3/L3 radar controller; since he now had only one of the two aircraft involved in the conflict generated by this unexpected change in level on his frequency, he decided to resolve this problem by immediately instructing CFG 444 to climb to flight level FL 340. The change in altitude of this aircraft, recorded on the radar plots during this phase of the conflict, as well as the pilot's response to the climb instruction, show that this solution corresponded exactly to the resolution advisory ("climb") issued by the collision-avoidance system on the Boeing 757.

At control sector L2, the radar controller reacted to the STCA alert by first gaining the AZA 9117 flight crew's attention and then instructing them to descend to flight level FL 250. The radar plots show that this clearance was obeyed; given the simultaneous gain in altitude of aircraft CFG 444 at this time, the two aircraft crossed with a lateral separation of 0.5 NM and an altitude difference of 1700 ft.

#### 2.1.2 Traffic information

When airborne collision-avoidance systems issue a traffic advisory (TA) –reported by flight crew of AZA 9117 – one of the pilots is expected to attempt to make visual contact with the intruder aircraft; the traffic information provided by air traffic controllers can be of valuable assistance to this end. In the case of a resolution advisory, however, – the case of CFG 444 – pilots must obey the avoiding instructions indicated by the TCAS, even if they think they have visual contact with the intruder aircraft.

The transcriptions of the radiotelephone communications show that when they read back the instruction to climb to flight level FL 340, the flight crew of flight CFG 444 immediately stated that they had "the traffic in sight"; the duty radar controller then immediately provided information on the vertical progress of the conflicting traffic, specifying in particular the time at which the latter was back at flight level FL 320.

At the time of his intervention concerning flight AZA 9117, the L2 sector radar controller provided essential traffic information on the conflicting aircraft but obtained a negative response from the pilot concerning visual contact.



The origin of the incident does not therefore lie with air traffic control; the radar controllers for sectors K3/L3 quickly identified it and reacted correctly.

## 2.2 Flight management aspects

### 2.2.1 Vertical trajectories and TCAS alerts on flights AZA 9117 and CFG 444 – InCAS simulation

The dynamic of the conflict was analysed using radar plots, flight crew reports and the Eurocontrol InCAS simulation tool, which makes it possible to reconstruct the trajectories of the aircraft involved in the incident and to reconstruct the alerts which were probably issued by their airborne collision-avoidance systems. The coherence of the results of this simulation must be verified with, among other things, information sources such as the flight crews' reports, the recording of the TCAS parameters and the S mode data. Within the framework of this investigation, only the reports of the commanders of the aircraft involved in the incident and that of AZA 9117's flight engineer could be obtained.

Observing the radar plot for AZA 9117, it is apparent that as it was cruising at flight level FL 330, the actual flight level varied between FL 330 and FL 331, for a period of approximately 90 seconds. Aircraft CFG 444 remained stable at flight level FL 330 until the TCAS climb.

At 09:42:37 UTC, flight AZA 9117 reached the cleared flight level FL 320 and was handed over to sector L2 and then instructed to descend to flight level FL 250. During the approximately 30-second duration of these radiotelephone communications, the radar plots show that the aircraft maintained its level to within an accuracy of -200 and +100 feet.

At 09:43:05 and 09:43:17 UTC, the data show AZA 9117 at flight levels FL 318 and FL 321 respectively, corresponding to the aircraft climbing for about ten seconds, at an average rate of climb of 1500 ft/min. This climb took place when CFG 444 was converging with AZA 9117 which was cruising 1000 feet higher at a distance of less than 7 NM. The InCAS simulation carried out using the same radar data indicates that this instantaneous dynamic met the conditions for a traffic advisory (TA) to be issued.

Twelve seconds later (09:43:29 UTC), the aircraft was at flight level FL 324; at 09:43:40 it reached flight level FL 325 and then descended again normally to flight level FL 250. During this latter unexpected climb phase, the InCAS simulation reconstructs corrective resolution advisories – "descend" for AZA 9117 and "climb" for CFG 444.

This sequence of alerts issued by the airborne collision-avoidance systems was confirmed by the radiotelephone exchanges between controllers and flight crews and in the incident reports by the pilots and the flight engineer involved; the following elements are particularly worthy of note:

#### AZA 9117

At the time of the events, the pilot of AZA 9117 explained on the frequency that the issue of a traffic advisory (TA) was the reason for his unexpected climb. However, this type of information from the airborne collision-avoidance system merely constitutes an indication to the flight crew that a particular intruder represents a potential threat; it does not recommend any action or inaction, as is the case with a resolution advisory (RA). At the level of allocation of tasks, a TA

is intended to prepare pilots for the possibility of imminent avoiding action and to help them establish visual contact with a potentially threatening aircraft; the traffic advisory does not therefore justify an increase in altitude of 500 feet.

It is the incident report by the commander of flight AZA 9117 which provides the key elements to an understanding of the way events developed:

- the incident took place when the commander had left the cockpit to relieve himself; at this time he was close to the cockpit and stated that he heard the spoken alerts concerning the traffic and resolution advisories.
- he then stated that when he returned to his seat he saw the end of the indications of a corrective descent resolution advisory on his variometer: first of all the red symbol of the threat "with no data" at the top of the instrument and an indicated strength of less than 500 feet per minute, descending; he recalled then seeing the threat in red at +1800 feet and shortly afterwards making visual contact.
- he stated that at the time of the incident the copilot's altimeter was functioning "a bit erratically"; more specifically, he indicated that the instrument subsequently indicated variations and instantaneous jumps of  $\pm 3$ -400 feet four or five times in succession during the approach, down to an altitude of 10,000 feet. He added that this phenomenon had already occurred once during the climb but that the instrument had then functioned normally for the rest of the flight, including during RVSM level checks.

Less precisely, the flight engineer's report mentions that during the descent to Milan Malpensa the flight crew reacted to an erroneous resolution advisory which was probably triggered by the "malfunction of the copilot's altimeter": the instrument was sticking and oscillating slightly during the descent. In his report, the commander was of the same opinion as to the cause of the RA.

#### CFG 444

A comparison of the radar plots with the transcript of radiotelephony communication tape recordings shows that the "climb" corrective resolution advisory (RA) was issued at virtually the same time as the ATC instruction to climb to flight level FL 340. The avoiding action consisted of a climb at an average rate of 1500 ft/min and was communicated on the frequency by the flight crew.

The commander's report gives a detailed description of the sequence of TCAS alerts and of the change in trajectory made in response to the "climb" corrective resolution advisory: first a traffic advisory (TA) was issued, followed by a "climb" corrective resolution advisory which was then attenuated to a preventive advisory "Monitor Vertical Speed!" at flight level FL 338.

The TCAS simulation returned the same sequence of alerts, except that when it was downgraded the advisory remained corrective, of the type "adjust vertical speed". The average vertical speeds of the aircraft shown on the radar plots (1300 ft/min between 09:43:40 and 09:44:04 UTC, 500 ft/min between 09:44:04 and 09:44:17 UTC) are compatible with the strength of these two types of resolution advisory and it is probable that the commander mentioned the preventive advisory inadvertently, as the spoken alerts for these two degrees of alerts are very similar ("*adjust vertical speed*", "*monitor vertical speed*").

### 2.2.2 Conflict sequence

Combining the elements expounded above makes it possible to understand the sequence of facts which led to the incident:

The two aircraft were flying on converging routes, at a standard RVSM separation of 1000 feet. As a result of problems probably associated with the Air Data Computer (ADC), expressed by occasionally erratic indications on the copilot's altimeter, aircraft AZA 9117 oscillated at -200 and +100 feet around its flight level FL 320. When it approached aircraft CFG 444, these variations were the origin of a climb by aircraft AZA 9117, for about ten seconds, at an average rate of 1500 ft/min. The conditions for the issue of a traffic advisory were then met and this alert disturbed the copilot, who was at that time alone at the controls, as the commander had left the cockpit. He reacted inappropriately to this alert and continued to climb until the radar controller instructed him to descend to flight level FL 250. This increase in altitude caused coordinated issues of corrective resolution advisories onboard the two conflicting aircraft: for AZA 9117, a "descend" advisory, which corresponded to the ATC instruction to descend; and for CFG 444 a "climb" advisory, which the flight crew correctly obeyed.

The traffic advisories (TA) and resolution advisories (RA) issued by the airborne collision-avoidance systems are correct since they were generated by the conflicting trajectories of the aircraft involved in the incident.

### 2.2.3 Erroneous resolution advisories (RA)

In their incident report, the commander and flight engineer on flight AZA 9117 consider that the resolution advisories they had were erroneous, probably as a result of the "malfunction of the copilot's altimeter". This cause and effect relationship is not unreasonable, as the aircraft's altitude information, used by the airborne collision-avoidance system through the S mode transponder originate from the same source as the one supplying the altimeters, i.e. the Air Data Computer (ADC). However, TCAS equipment is normally protected from this type of error by a system which compares the two sources of barometric data and which switches off the onboard collision-avoidance system if the difference between the two altitudes is greater than 500 feet. The Boeing 747-200 was equipped with an ACSS (formerly Honeywell) transponder, model XS-950, and a 2000 ACSS TCAS, model RT-950, in relation to which the AAIB has no knowledge of prior faults causing the issue of erroneous resolution advisories.

There is one case of loss of separation between two aircraft which was caused solely by a defective barometric data comparator and which was the subject of an airworthiness directive issued in 1998 by the Australian civil aviation supervisory authority. Comparison with the AZA 9117/CFG 444 incident, however, is not valid, since it was clearly established that these two aircraft were on conflicting trajectories.

Erroneous resolution advisories may also be generated onboard aircraft flying in the vicinity of a location where a transponder is being tested on the ground. In technical communication "CT-I no. F 20.100-20" issued by the aviation equipment division of the Federal Office for Civil Aviation (FOCA), concerning the periodic checking of transponders, it is stipulated under point 3.6 that:

*"During the performance of transponder tests which simultaneously requires verification of the full range of the altitude coding system it is appropriate to avoid the high-frequency transmission (use "Dummy Loads"). If this is not*

*possible, inform the security authorities concerned of the performance of the tests (avoid ACAS avoiding manoeuvres due to false alerts)."*

Such tests may be the cause of erroneous TCAS advisories and are notified by a notice to airmen (NOTAM). The incident occurred in the Geneva airport region but no notification of this type was announced in Switzerland on the date of the events.

Finally, the possibility that a "climb" corrective resolution advisory was triggered onboard AZA 9117 by ghost traffic flying lower is not plausible: if this had been the case, the event would have been detected and recorded by Eurocontrol via the "mode S downlink".

### **3 Conclusions**

#### **3.1 Findings**

##### **3.1.1 Technical aspects**

- The incident reports by the commander and flight engineer on flight AZA 9117 indicate that the copilot's altimeter was intermittently subject to erratic operation, notably at the time of the incident.
- The AZA 9117 Boeing 747-200 was equipped with an ACSS (formerly Honeywell) transponder, model XS-950, and a 2000 ACSS TCAS, model RT-950, in relation to which the AAIB has no knowledge of prior faults causing the issue of erroneous resolution advisories.
- No NOTAM mentioning ground transponder tests at Swiss airports was in force on the day of the incident.
- At the time of this incident, Eurocontrol did not record any ghost resolution advisory via the "mode S downlink".

##### **3.1.2 Air traffic controllers**

- The controllers as well as the coordinators were in possession of an appropriate licence.
- The sector K3/L3 duty radar controller was in training and working under the direct supervision of a coach. He was in possession of an appropriate licence for Zurich ACC (Area Control Centre).

##### **3.1.3 History**

- Before the incident, flights AZA 9117 and CFG 444 were correctly separated by 1000 ft.
- At the start of the incident, the commander of flight AZA 9117 was not in the cockpit, which he had left in order to relieve himself.
- At 09:43:05 and 09:43:17 UTC, the data show AZA 9117 at flight levels FL 318 and FL 321 respectively, corresponding to the aircraft climbing for about ten seconds, at an average rate of climb of 1500 ft/min.
- At 09:43:38, the pilot of CFG 444 reported a TCAS climb on the frequency. In his incident report, he confirmed that he had received a "climb" resolution advisory.

- At 09:43:40 UTC, the Short Term Conflict Alert (STCA) indicated a proximity alert to the radar controller. The two aircraft were then 3 NM from the crossing point of their routes, with an altitude difference of 500 ft.
- At 09:43:46, the pilot of AZA 9117 explained on the frequency that the issue of a traffic advisory (TA) was the reason for his unexpected climb. In his incident report, the commander, however, mentioned that there was a “descend” resolution advisory.
- At 09:44:04, the two aircraft crossed with a lateral separation of 0.5 NM and an altitude difference of 1700 ft.
- The minimum distances shown on the radar plots between aircraft AZA 9117 and CFG 444 were a lateral separation of 4.1 NM and an altitude difference of 500 ft.

#### 3.1.4 General framework

- At the time of the incident, sectors K3 (frequency 134.315 MHz) and L3 (124.030 MHz) were combined.
- At the time of the incident, flight CFG 444 was in contact with and under radar control of sector K3/L3 and flight AZA 9117 was in contact with and under radar control of sector L2.

### 3.2 Cause

The serious incident was caused by aircraft AZA 9117 climbing to a level higher than its cleared flight level of FL 320, following an inappropriate reaction to a traffic advisory (TA) by the pilot at the controls.

Factor which played a part in the incident:

Problems probably associated with malfunctioning of the Air Data Computer (ADC).

Berne, 26 February 2008

Aircraft Accident Investigation Bureau

This report contains the AAIB's conclusions on the circumstances and causes of the accident/serious incident which is the subject of the investigation.

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If this report is used for purposes other than accident prevention, due consideration shall be given to this circumstance.

## GLOSSARY RELATING TO AIRBORNE COLLISION AVOIDANCE SYSTEM

(ref.: ICAO, Annex 10, Aeronautical Telecommunications, Volume IV – Surveillance Radar and Collision Avoidance Systems)

**ACAS (Airborne collision avoidance system):** an aircraft system based on secondary surveillance radar (SSR) transponder signals which operates independently of ground based equipment to provide advice to the pilot on potential conflicting aircraft that are equipped with SSR transponder.

**Climb RA:** a positive RA recommending a climb but not an increased climb.

**Coordination:** the process by which two ACAS-equipped aircraft select compatible resolution advisories (RAs) by the exchange of resolution advisories complements (RACs).

**Descend RA:** a positive RA recommending a descend but not an increased descend.

**Established track:** a track generated by ACAS air-air surveillance that is treated as the track of an actual aircraft.

**Intruder:** an SSR transponder-equipped aircraft within the surveillance range of ACAS for which ACAS has an established track.

**Positive RA:** a resolution advisory that advises the pilot either to climb or to descend.

**Potential threat:** an intruder deserving special attention either because of its close proximity to own aircraft or because successive range and altitude measurements indicate that it could be on a collision or near-collision course with own aircraft. The warning time provided against a potential threat is sufficiently small that a traffic advisory (TA) is justified but not so small that a resolution advisory (RA) would be justified.

**Preventive RA:** a resolution advisory that advises the pilot to avoid certain deviations from the current flight path but does not require any change in the current flight path.

**Own aircraft:** The aircraft fitted with the ACAS that is the subject of the discourse, which ACAS is to protect against possible collision, and which may enter a manoeuvre in response to an ACAS indication.

**RA sense:** The sense of an ACAS II RA is "upward" if it requires climb or limitation of descent rate and "downward" descent or limitation of climb rate. It can be both upward and downward simultaneously if it requires limitation of the vertical rate to a specified range.

**Resolution advisory (RA):** an indication given to the flight crew recommending:

- a) a manoeuvre intended to provide separation from all threats; or
- b) a manoeuvre restriction intended to maintain existing separation.

**Resolution advisory complements (RACs):** information provided by one ACAS to another via a Mode S interrogation in order to ensure complementary manoeuvres by restricting the choice of manoeuvres available to the ACAS receiving the RAC.

**Resolution advisory strength:** the magnitude of the manoeuvre indicated by the RA. An RA may take on several successive strengths before being cancelled. Once a new RA strength is issued, the previous one automatically becomes void.

**Traffic advisory (TA):** an indication given to the flight crew that a certain intruder is a potential threat.

**Threat:** an intruder deserving special attention either because of its close proximity to own aircraft or because successive range and altitude measurements indicate that it could be on a collision or near-collision course with own aircraft. The warning time provided against a threat is sufficiently small than a RA is justified.

**Track:** a sequence of at least three measurements representing positions that could be reasonably have been occupied by an aircraft.

**TRANSCRIPT OF TELEPHONY  
OR RADIOTELEPHONY COMMUNICATION TAPE-RECORDINGS**

Investigation into the **incident** that occurred on **28.02.2005**

- Subject of transcript: **CFG444 / AZA9117**
- Centre concerned: Swiss Radar Area West
- Designation of unit: Upper Area Control, sectors K3 / L3 & L2
- Frequency / Channel: 134.315 MHz / 124.030 MHz & 126.050 MHz
- Date and period (UTC) covered by attached extract: 28.02.2005  
09:30 - 09:47 UTC
- Date of transcript: 07 March 2005
- Name of official in charge of transcription:

- Certificate by official in charge of transcription:

I hereby certify:

- That the accompanying transcript of the telephony or radiotelephony communication tape-recordings, retained at the present time in the premises of the Analysis Department, has been made, examined and checked by me.
- That no changes have been made to the entries in columns 2, 3 and 4, which contain only clearly understood indications in their original form.

Geneva, 07 March 2005





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Abbreviations

Sector                      Designation of sector

KL3            -    Swiss Radar Area West, Upper Area Control, sector K3 / L3  
 L2             -    Swiss Radar Area West, Upper Area Control, sector L2

<u>Aircraft</u>	-	<u>Callsign</u>	<u>Type of acft</u>	<u>Flight rules</u>	<u>ADEP</u>	-	<u>ADES</u>
<b>444</b>	-	<b>Condor 444</b>	<b>B753</b>	<b>IFR</b>	<b>EDDM</b>	-	<b>LEPA</b>
<b>9117</b>	-	<b>Alitalia 9117</b>	<b>B742</b>	<b>IFR</b>	<b>KJFK</b>	-	<b>LIMC</b>

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DMO / 07 March 2005

TRANSCRIPT SHEET

Occurrence: CFG444 / AZA9117 of 28.02.2005



To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
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**Coupled Channels: 134.315 MHz & 124.030 MHz, Swiss Radar**

KL3	444	09:30:32	Swiss, grüezi, Condor ... triple four, level three three zero.
444	KL3	38	Condor five four four, bonjour identified, cleared BENOT – BALSI, level... three three zero.
KL3	444	47	That was Condor <u>four</u> four four calling, maintaining level three three zero.
444	KL3	52	Condor four four four, affirm..., BENOT – BALSI, level three three zero.
KL3	444	57	BENOT – BALSI and flight level three three zero, Condor triple four.

Sector in contact with :  
 - DLH72T  
 - BAW2560  
 - CFG742  
 - AZA227

KL3	9117	09:34:46	<b>XXXXX, Alitalia nine one one seven, flight level three three zero.</b>
9117	KL3	50	<b>Alitalia nine one one seven, bonjour, identified, cleared Geneva – Torino, level three three zero.</b>
KL3	9117	57	<b>Geneva – Torino, three three zero for nine one one seven.</b>

Could be "Swiss Radar"

Sector in contact with :  
 - BAW2560  
 - AZA227  
 - JKK052  
 - AFR2203  
 - AFR2178  
 - AZA227  
 - AFR2203  
 - AZA227  
 - AAF143

9117	KL3	09:41:23	<b>Alitalia nine one one seven, descend now to level three <u>two</u> zero.</b>
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Signature of person in charge of transcription :

TRANSCRIPT SHEET

Occurrence: CFG444 / AZA9117 of 28.02.2005



To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
KL3	9117	09:41:28	Roger, descending to three two zero, Alitalia nine one one seven.	
9117	KL3	55	Alitalia nine one one seven, rate one thousand minimum, crossing traffic in two minutes.	
KL3	9117	09:42:00	Roger.	
				Sector in contact with : - AFR2203 - AZA156
9117	KL3	09:42:37	Alitalia nine one one seven, maintain level three two zero and contact now Radar on one two six zero five, goodbye.	
KL3	9117	44	Two six zero five and maintaining three two zero, Alitalia nine one one seven.	
				Sector in contact with : - JKK052
444	KL3	09:43:35	Condor triple four, climb to level three four zero.	
KL3	444	38	Condor triple four, already on TCAS climb, now climbing level three four zero, we have the traffic in sight.	
444	KL3	44	Roger, this traffic was descending before to level three two zero, I don't know what happened.	No reply
444	KL3	56	Ha..., he's again at level three twenty, you may descend to level three three zero, Condor triple four.	
KL3	444	09:44:02	Heu..., we are right above, we wait another ... thirty seconds.	
444	KL3	06	Roger, triple four, heu..., sorry about that..., it was an Alitalia which had to descend to three two zero, it was reaching three two zero and report it one minute ago.	
KL3	444	17	Okay, Condor triple four is now clear of traffic, descending flight level three three zero.	

Signature of person in charge of transcription :

TRANSCRIPT SHEET

Occurrence: CFG444 / AZA9117 of 28.02.2005



To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
444	KL3	09:44:22	Roger.	
				Sector in contact with : - DLH71E
444	KL3	09:44:57	Condor triple four..., we'll have to file a... report for... this incident, anyway we'll check what happened... with the other sector below.	
KL3	444	09:45:08	Heu..., triple four, it is copied. Do you require a report from our side?	
444	KL3	12	Heu..., it's up to you, but we, if we have... RA, RA climb..., we have to do a report... every time and... the, Eurocontrol is studying the case.	
KL3	444	25	Okay, we'll do either flight report too.	
444	KL3	27	Roger, thank you.	
				Sector in contact with : - GWI2604 - AAF143
444	KL3	09:46:33	Heu..., Condor triple four..., we got... an explication from the Alitalia which was climbing again, he had a... TCAS alert... from... non existing traffic, that's the reason why he climb at, again to level three two five and in, and in this c, case he was... generating an... RA for you.	
KL3	444	58	Okay, copied.	
444	KL3	09:47:06	And Condor triple four, contact now Marseilles on one three two decimal zero zero five, goodbye and... thank you.	
KL3	444	13	Three two zero zero five, Condor triple four, goodbye.	

**Channel: 126.050 MHz, Swiss Radar**

L2      9117      09:43:00      *And Radar, Alitalia nine one one seven is... maintaining flight level three two zero.*

Signature of person in charge of transcription :

TRANSCRIPT SHEET

Occurrence: CFG444 / AZA9117 of 28.02.2005



To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
9117	L2	09:43:05	<i>Alitalia niner one one seven, bonjour, identified, descend to flight level two five zero.</i>	
L2	9117	10	<i>Roger, descending to flight level two five zero, Alitalia nine one one seven.</i>	
				Sector in contact with : - TAP920
9117	L2	09:43:43	<i>Alitalia niner one one seven?</i>	
L2	9117	46	<i>Heu..., yes, Sir, we had a... traffic advisory.</i>	
9117	L2	49	<i>Roger, descend to flight level two five zero.</i>	
L2	9117	52	<i>Heu..., descending flight level two five zero, but... we had a traffic advisory, for Alitalia nine one one seven.</i>	
9117	L2	57	<i>Roger.</i>	
9117	L2	59	<i>You have the traffic in ... contact?</i>	
L2	9117	09:44:03	<i>Heu..., negative, Sir.</i>	
9117	L2	05	<i>He should be at ... overhead..., one thousand feet... above.</i>	
L2	9117	10	<i>Roger..., Alitalia nine one one seven.</i>	
				Sector in contact with : - AFR213T - PGA452
9117	L2	09:44:52	<i>Alitalia niner one one seven?</i>	
L2	9117	54	<i>Heu..., go ahead, Sir.</i>	
9117	L2	56	<i>Yes, I don't understand why the TCAS told you to climb, because the traffic was steady flight level <u>three three zero</u>.</i>	
L2	9117	09:45:02	<i>Heu..., actually we had apparently some traffic that was below onto our right.</i>	

Signature of person in charge of transcription :

TRANSCRIPT SHEET

Occurrence: CFG444 / AZA9117 of 28.02.2005



To Col.1	From Col.2	Time Col.3	Communications Col.4	Observations Col.5
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9117	L2	09:45:08	<i>I've no traffic.</i>	
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L2	9117	11	<i>Heu..., well, it could be our TCAS ?????? something, you know, this is a, one of those jurassic jets.</i>	Unreadable
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9117	L2	18	<i>Roger.</i>	
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Sector in contact with :

- RA417PM
- OAL135
- AFR585
- OAL135
- BRT526
- AAW900

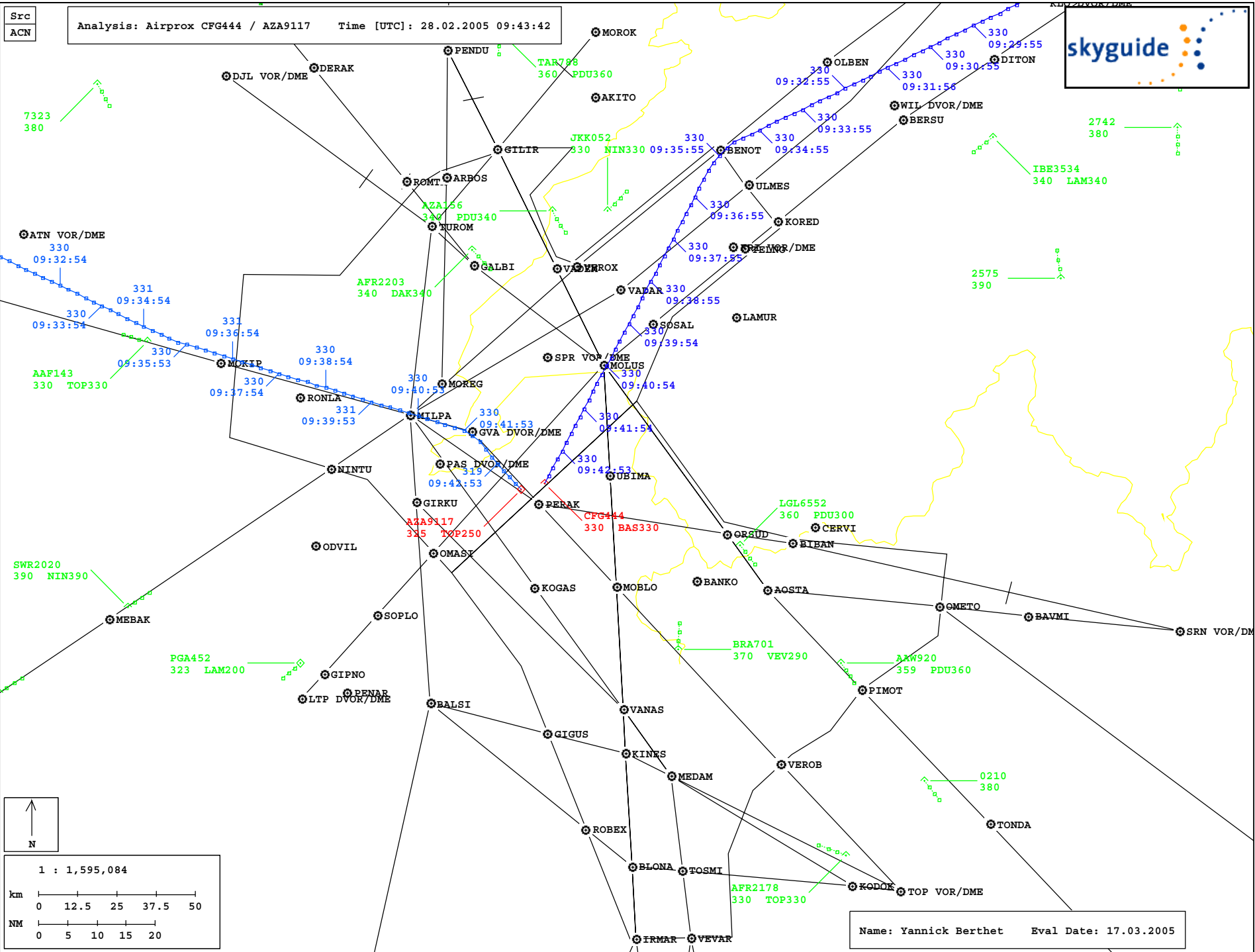
9117	L2	09:47:06	<i>Alitalia niner one one seven, contact Milano, one two five two seven, au revoir.</i>	
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L2	9117	11	<i>One two five two seven, nine one one seven.</i>	
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Signature of person  
in charge of transcription :

Src  
ACN

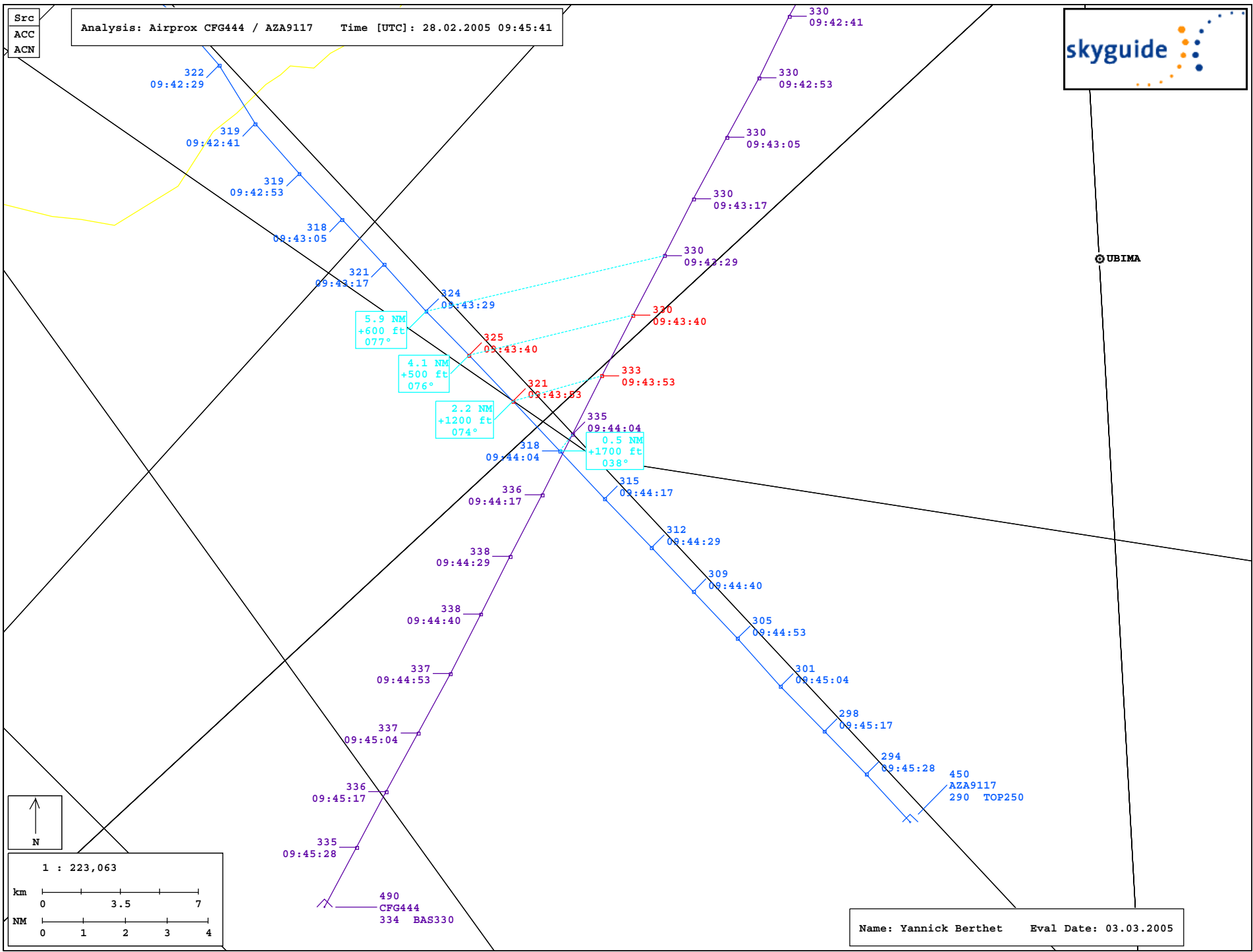
Analysis: Airprox CFG444 / AZA9117 Time [UTC]: 28.02.2005 09:43:42



Name: Yannick Berthet Eval Date: 17.03.2005

Src  
ACC  
ACN

Analysis: Airprox CFG444 / AZA9117 Time [UTC]: 28.02.2005 09:45:41



Name: Yannick Berthet Eval Date: 03.03.2005

