



**Final Report
of the Aircraft Accident
Investigation Bureau**

concerning the incident (Airprox)

between THY1944 , BAG4608, IBE3514 and AZA467

on 13th September 2000

UIR Switzerland near TRA

FINAL REPORT
AIR TRAFFIC INCIDENT REPORT (ATIR)
AIRPROX (NEAR COLLISION)

THIS REPORT HAS BEEN PREPARED FOR THE PURPOSE OF ACCIDENT/INCIDENT PREVENTION. THE LEGAL ASSESSMENT OF ACCIDENT/INCIDENT CAUSES AND CIRCUMSTANCES IS NO CONCERN OF THE PRESENT INVESTIGATION
(ART. 24 OF THE AIR NAVIGATION LAW)

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|------------------------|--|
| PLACE/DATE/TIME | UIR Switzerland near TRA, 13 September 2000, 11:14 UTC |
| AIRCRAFT | 1. THY 1944, Airbus A310, TC-JDD, Turkish Airlines Basle - Istanbul 2. BAG 4608, Boeing B733, D-ADBR, Deutsche BA Munich – Madrid 3. IBE 3514, Airbus A320, EC-FIA, Iberia Madrid – Frankfurt 4. AZA 467, Boeing (Douglas) MD80, I-DAVJ, Alitalia Düsseldorf – Milan Malpensa |

| | |
|-----------------|----------------------------|
| ATC UNIT | Area Control Centre Zurich |
|-----------------|----------------------------|

| | |
|--------------------------------|-------------------------|
| AIR TRAFFIC CONTROLLERS | RE-U1 (Radarcontroller) |
| | RE-U2 (Radarcontroller) |
| | RE-U3 (Radarcontroller) |

| | |
|-----------------|---|
| AIRSPACE | C |
|-----------------|---|

HISTORY

Four aircraft were involved in this incident:

- THY 1944, an A310 arriving from Basle, flying in the easterly direction via abeam from TRA (Trasadingen).
- BAG 4608, a B733 arriving from the east, flying via TRA in a south-westerly direction.
- IBE 3514, an A320 arriving from the south-west, flying in a north-easterly direction via abeam from TRA.
- AZA 467, an MD80 arriving from the north, flying towards the south via TRA.

These four aircraft crossed near the TRA VOR within approximately 60 seconds, BAG 4608 and IBE 3514 simultaneously, almost to the second, and THY 1944 and the AZA both flew over TRA approximately 30 seconds later. The air traffic control had previously made the necessary arrangements in order to ensure vertical separation for this crossing manoeuvre.

The Turkish aircraft, as the lowest of these four aircraft, reached the cleared FL (flight level) 260 by TRA, a noteworthy feature being the relatively high rate of climb of up to 3000 FPM (feet per minute) in the final phase before reaching FL 260. After this, THY 1944 maintained a steady FL 260.

Until approximately 5 NM before flying over TRA, BAG 4608 maintained the cleared FL 270 and subsequently climbed briefly as far as FL 272, following a TCAS-RA (Traffic Collision Avoidance System – Resolution Advisory).

Initially, IBE 3514 likewise maintained the cleared FL 280 and, shortly before TRA, climbed with a high rate of climb, up to 3500 FPM, to FL 291. This climb likewise took place following a TCAS recommendation.

AZA 467, which was the last aircraft to fly into the conflict zone, initially maintained the cleared FL 290 until approximately 7 NM to the north of TRA and subsequently climbed, following a TCAS-RA, at up to 2500 FPM to FL 295.

The separation fell below that required because of these TCAS-RAs, which were initiated by the TCAS equipment of the affected aircraft and which the respective crews followed. The minimum separation attained by the two aircraft, IBE 3514 and AZA 467, flying at the highest levels was some 400 FT vertical and, simultaneously, 2.9 NM horizontal. The two aircraft were flying towards one another.

FINDINGS

- The incident occurred in controlled airspace class C.
- All four of the participating aircraft flew according to IFR (instrument flight rules) and were initially in uninterrupted radio contact with the radar controller of sector U1 of the Area Control Centre Zurich.
- The arrangements by the responsible air traffic controllers for ensuring the vertical separation necessary for the crossing manoeuvres of the four aircraft were made correctly and in good time.

- All the level authorisations allocated by the air traffic control were correctly acknowledged by the four aircraft.
- At 11:14:14, the Turkish aircraft was the first to give an indication of an incipient conflict with the report "THY 1944, we have traffic alert". The aircraft was immediately informed by the ATC that BAG 4608 coming towards it was maintaining FL 270. At this moment, THY 1944 passed FL 255, approximately, climbing to FL 260. In what followed, it steadily maintained this FL.
- At 11:14:46, BAG 4608 reported: "BAG 4608, TCAS climb". At this moment, it was already at FL 272. It was immediately informed by the air traffic controller that there was another aircraft at FL 280 on a crossing heading and the controller instructed BAG 4608 to descend immediately back to FL 270. BAG 4608 immediately complied with this instruction.
- A good minute before the beginning of the conflict phase, IBE 3514 was instructed by the responsible air traffic controller of sector U1 to make contact with "Rhine Control". Approximately 90 seconds later at 11:14:54, however, the aircraft reported to sector U3 of the ACC Zurich and, on this frequency, reported: "IBE 3514, we have a TCAS advise, we just ...". At this moment, IBE 3514 was already passing FL 287 and climbed on up to FL 291. The Spanish aircraft was immediately informed by the air traffic controller that the aircraft (AZA 467) flying towards it was above it with a separation of 1000 FT.
- In the subsequent dialogue between the Spanish aircraft and the air traffic controller, the latter explained the traffic situation while IBE 3514 indicated an "air miss" with an aircraft flying to the right of it (obviously BAG 4608) which had initially caused their TCAS climb. A short time later, however, they have had to descend again in order to avoid a further aircraft (obviously AZA 467).
- In his "Incident Report" on this incident, the Iberia CMD stated that they had followed exactly the instructions of the TCAS with respect to their climb. They had first become aware of an intruder from the right at the same level (BAG 4608) and, a short time later, opposite traffic at FL 290 (AZA 467), which later flew by them on their left.
- In the meantime, at 11:15:23, AZA 467 reported, again on the frequency of sector U1: "AZA 467, TCAS climb, AZA 467, TCAS climb". Their attention was immediately drawn by the air traffic controller to the opposite traffic IBE 3514, which had already reached FL 291. At this moment, AZA 467 had in turn reached FL 295.

ANALYSIS

The present situation appears to be a chain reaction which occurred because the crews of the three aircraft BAG 4608, IBE 3514 and AZA 467 followed TCAS-RAs. The actual initiator of this chain reaction was BAG 4608. The TCAS of this aircraft instructed the crew to climb, even though THY 1944 flying at least 1000 FT below did not represent a danger. It can, however, be assumed that the high climb rate, of up to 3000 FPM, of THY 1944 during the last 1000 FT before reaching the cleared flight level very probably provoked the false alarm on BAG 4608. Knowledge (which may

be assumed) of the mode of operation of TCAS equipment, however, demands from the pilots apportioned application, matched to the circumstances, of the climb performance of the aircraft. The subsequent reaction of IBE 3514 to the fact that the cleared FL 270 was slightly exceeded (FL 272) by BAG 4608 was extraordinarily violent. The rapid 1100 FT climb manoeuvre by IBE 3514 caused the separation between IBE 3514 and AZA 467 to be substantially less than the minimum required and this appeared even more dangerous because the two aircraft were flying towards one another.

Although the pilots of the participating aircraft rapidly informed the air traffic control about the initiation of a TCAS climb, this occurred in every case after the initiation of the manoeuvre or, indeed, after the avoidance flight level had been reached. The responsible air traffic controllers reacted to the circumstances, in an appropriately optimum manner, by immediately informing the crews affected about the actual traffic position.

The change in frequency of IBE 3514 from sector U1 to sector U3 of the Area Control Centre Zurich (instead of to "Rhine Control") obviously took place erroneously because of the similarly sounding channel (U3: 133.405 MHZ; "Rhine Control", 132.405 MHZ).

CAUSE

The incident may be attributed to the fact that the TCAS equipment of BAG 4608 initiated an erroneous alarm in the form of an RA "climb" due to the excessively high rate of climb of THY 1944, which was flying below it and in the final phase before reaching the authorised flight level (FL 260).

MEASURES TAKEN

The Federal Office for Civil Aviation has published AIC 15/01 (Aeronautical Information Circular) under the date of July 19, 2001, stating guidelines for rates of descent and rates of climb to be observed.



Flugsicherungsbetrieb Zürich
CH-8058 Zürich-Flughafen

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Zürich-Flughafen, 4.10.2000
ZZD/sn

Transcript of Original Tape Recording

No. of pages 4

Subject **ATIR AZA467 of September 13, 2000**

| | | | | | |
|---------------------------------|-------|---|-----------------------------|---|----------|
| Abbreviations and Call Signs | 467 | → | AZA467 | → | Alitalia |
| | 4608 | → | BAG4608 | → | Speedway |
| | 1944 | → | THY1944 | → | Turkair |
| | 3514 | → | IBE3514 | → | Iberia |
| | UAC1 | → | Zurich Radar Upper Sector 1 | | |
| | UAC 3 | → | Zurich Radar Upper Sector 3 | | |

Frequency Zurich Radar Upper Sector 1 133,050 MHz
Zurich Radar Upper Sector 3 133,405 MHz

The signer certifies the completeness and correctness of the present transcript.

swisscontrol
Flugsicherungsbetrieb Zürich

Nicky Scherrer

| From | To | Time UTC | Communications | Observations |
|---------------------------|------|----------|--|--------------|
| 3514 | UAC1 | 11:04:02 | Zurich, IBE3514, good afternoon | |
| UAC1 | 3514 | :06 | IBE3514, good afternoon, you are identified, maintain flight level 280, after KORED, proceed direct to LADOL, then NELLI | |
| 3514 | UAC1 | :16 | KORED, LADOL, then NELLI, IBE3514 | |
| UAC1 | | :20 | (mike click) | |
| - 1 aircraft in between - | | | | |
| 4608 | UAC1 | :05:00 | „Zürich Radar, grüezi,“ BAG4608, level 260, inbound NEGRA | |
| UAC1 | 4608 | :06 | BAG4608, „Zürich, guten Tag,“ squawk 7516 | |
| 4608 | UAC1 | :11 | 7516, BAG4608 | |
| 4608 | UAC1 | :58 | And Zurich, BAG4608, standing by for higher anytime | |
| UAC1 | 4608 | :06:02 | BAG4608, „use“ slot allocation, you may expect two seven within Zurich area; and expect higher with Geneva later on, I call you back | |
| 4608 | UAC1 | :10 | „alles klar, dank schön“ | |
| - 2 aircraft in between - | | | | |
| UAC1 | 4608 | :46 | BAG4608, identified, climb to flight level 270, proceed Trasadingen, BENOT | |
| 4608 | UAC1 | :52 | Trasa, BENOT, then climbing level 270, BAG4608, „dank schön“ | |
| 3514 | UAC1 | :09:12 | Control, IBE341, correction, IBE3514..... | |
| UAC1 | 3514 | :18 | I read you five | |
| 3514 | UAC1 | :20 | Okay, thank you, maintaining three, äh, 280 to LADOL, thank you | |
| UAC1 | 3514 | :25 | Roger | |
| - 2 aircraft in between - | | | | |
| 1944 | UAC1 | :11:55 | ZHY1944, good afternoon | |
| UAC1 | 1944 | :58 | THY1944, good afternoon, climb to flight level 250 | |
| 1944 | UAC1 | :12:02 | Climbing 250, „proceed“ direct to ALGOI? | |
| UAC1 | 1944 | :06 | Roger, standby short | |
| 1944 | UAC1 | :08 | Thank you | |

| From | To | Time UTC | Communications | Observations |
|------|------|----------|--|--------------|
| 1944 | UAC1 | :08 | Thank you | |
| | | | - 2 aircraft in between - | |
| 467 | UAC1 | 11:13:07 | Zurich, good afternoon, AZA467, maintaining flight level 290 to Trasa | |
| UAC1 | 467 | :12 | AZA467, good afternoon, roger | |
| UAC1 | 1944 | :16 | THY1944, direct ALGOI | |
| 1944 | UAC1 | :18 | Thank you, Sir | |
| UAC1 | 3514 | :31 | IBE3514, contact Rhine 132405, good bye | |
| 3514 | UAC1 | :36 | 132 point 405, good bye | |
| UAC1 | 1944 | :48 | THY1944, climb to flight level 260 | |
| 1944 | UAC1 | :51 | 260 climbing, 1944 | |
| | | | - 1 aircraft in between - | |
| 1944 | UAC1 | :14:14 | THY1944, we have traffic alert | |
| UAC1 | 1944 | :26 | Yes, he is maintaining 270 | |
| 1944 | UAC1 | :30 | Roger, we are maintaining 260 | |
| UAC1 | 1944 | :32 | Roger, higher in half a minute | |
| | | | - 1 aircraft in between - | |
| 4608 | UAC1 | :46 | BAG4608, TCAS climb | |
| UAC1 | 4608 | :48 | Yes, traffic crossing at 280, descend immediately to 270 again | |
| 4608 | UAC1 | :54 | Now clear of traffic, now descend back to 270, BAG4608 | |
| UAC1 | 4608 | :58 | Jä, there is a traffic on your twelve o'clock, two miles, now, thousand feet above | |
| 4608 | UAC1 | :15:04 | Roger, we have him on TCAS | |
| UAC1 | 1944 | :14 | THY1944, climb to flight level 270 | |
| 1944 | UAC1 | :18 | Climbing 270, 1944 | |
| 467 | UAC1 | :23 | AZA467, TCAS climb, AZA467, TCAS climb | |
| UAC1 | 467 | :29 | Jä, AZA467, I see a traffic on your twelve o'clock at 290 | |
| 467 | UAC1 | :42 | Yes, but he is at the same level | |
| | | | - 1 aircraft in between - | |

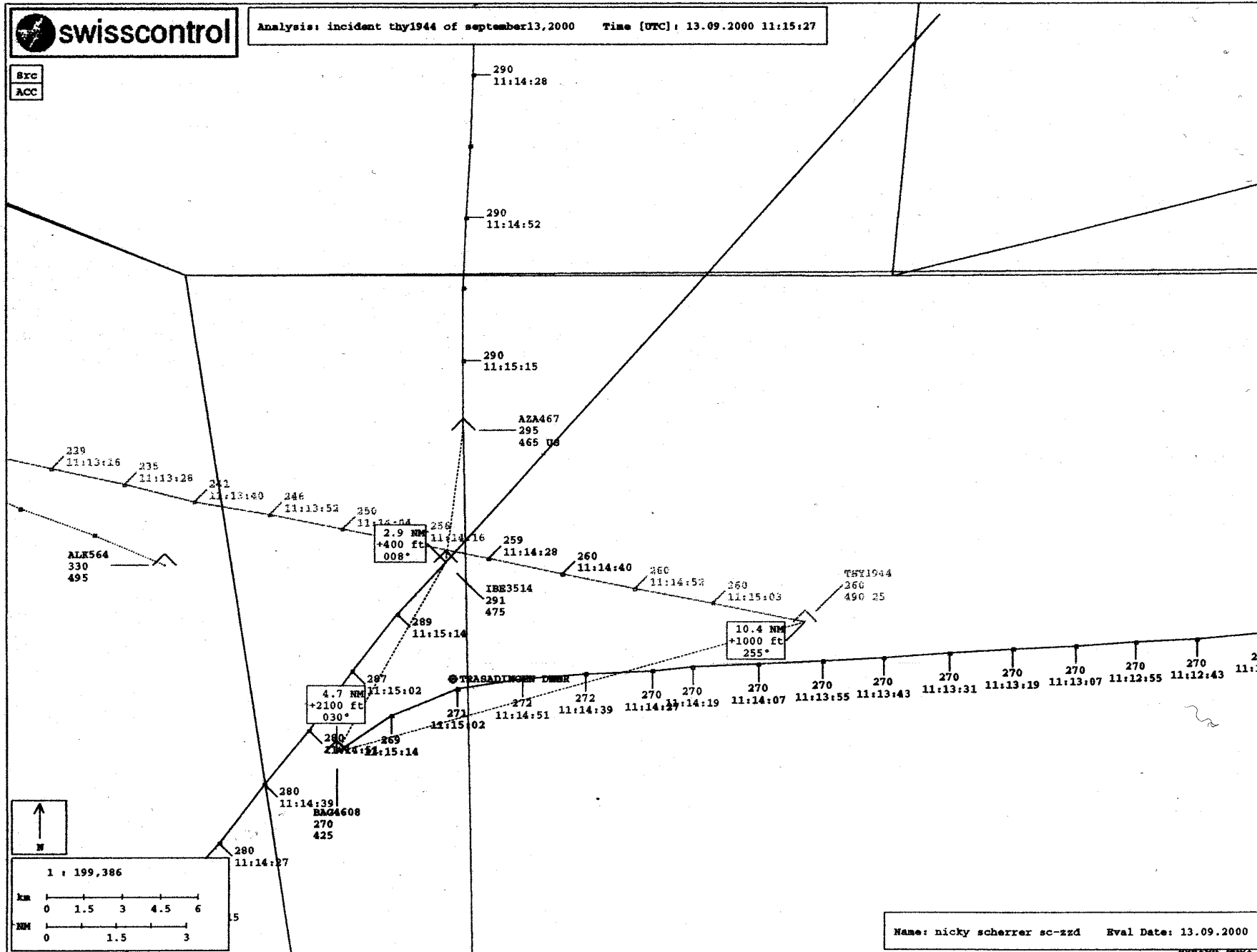
| From | To | Time UTC | Communications | Observations |
|---------------------------|------|----------|---|--------------|
| - 2 aircraft in between - | | | | |
| UAC3 | 3514 | :54 | IBE3514, change to Rhine on 132405 | |
| 3514 | UAC3 | 11:15:05 | IBE3514, we have a TCAS advice, we just | |
| UAC3 | 3514 | :16 | Opposite traffic is one thousand feet above | |
| UAC3 | 3514 | :28 | IBE3514 ? | |
| 3514 | UAC3 | :32 | Control, IBE3514, we had one airmiss with an airtraffic by the right | |
| UAC3 | 3514 | :39 | 3514, roger, stand by | |
| UAC3 | 3514 | :49 | IBE3514, confirm, you were maintaining 280 before ? | |
| 3514 | UAC3 | :54 | Okay, we were maintaining flight level 350, but we, äh, - okay, we are maintaining now 280, we were maintaining 280, but we have had an äh, airmiss with a traffic by the right and we have been forced to climb to avoid and then to descend to avoid the other one, IBE3514 | |
| UAC3 | 3514 | :16:18 | Yes, that must be a problem with the TCAS, the opposite traffic was at 270 | |
| 3514 | UAC3 | :26 | Okay, that wasn't an information that you have received here in the TCAS, it was climbing and he was crossing with the other traffic by the right, just at the same altitude | |
| UAC3 | 3514 | :41 | Yes, there was a traffic at 270 opposite and about five miles behind there was a traffic at 290 opposite and the resolution was a false alarm obviously | |
| 3514 | UAC3 | :55 | Well, anyway, thank you, but we are going to file an airmiss report just upon arrival, IBE3514 | |
| UAC3 | 3514 | :17:03 | Okay, 3514, yes, we take that as well, and change now to Thine on 132 decimal 405 | |
| 3514 | UAC3 | :12 | 132 point 405, confirm ? | |
| UAC3 | 3514 | :16 | 32405 | |
| 3514 | UAC3 | :18 | Okay, 405 | |

- end -



Analysis: incident thy1944 of september13,2000 Time [UTC]: 13.09.2000 11:15:27

Src
ACC



Name: nicky scherrer sc-zzd Eval Date: 13.09.2000