

## THE ZAGREB COLLISION REVISITED

*What have we learned?*

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Many controllers today were not even born in the 1970's. But the period was a very dramatic one. The first mid-air collision caused by ATC occurred over Nantes in France in March 1973 amid a strike by the French civil controllers who were locked out and replaced by the military. Sixty-eight people were killed when a Spantax Coronado collided with an Iberia DC-9 at FL 280. (I will one day tell the whole story).

This collision traumatised a lot of controllers at the time and caused many discussions. Three years later another collision hit us: this time over Zagreb, (Yugoslavia at the time), when a British Airways Trident collided with an Inex Adria DC-9 at FL330 in September 1976, killing 176 persons. This was followed 6 months later by the collision on the runway at Tenerife North, between two Boeing 747s belonging to KLM and Pan Am leaving 560 dead...

The 1976 Zagreb collision is probably better known to many controllers because it has been dramatised in a TV movie called "Collision Course" that most of us has seen. It is even part of some training syllabus in the Eurocontrol Institute in Luxemburg today.

Now almost 25 years later to the day, I found myself in Zagreb, attending the IFATCA European Regional meeting, walking through that same Ops room in the same building. The sector layout has not changed since that time.

One of the controllers involved at the time of the collision is still working in Zagreb. With the help of the Croatian Association a meeting was arranged. The aim is not to look for sensationalism, reopen old wounds or to blame anyone, but merely to see if there is something to be learned from history, and if such horrific events are just items from the past...

The facts as reported by the two accident investigation reports are public domain. For those of you not familiar with the case or who would like to refresh your memory here is a resume of the facts:

(Taken from the accident report published on 9/1982)

### September 1976:

A British European Airways Trident 3 on a flight from London to Istanbul cruising at FL330 estimating ZAG VOR at 10.14 carrying 54 pax + 9 crew callsign BE476.

The other aircraft was an Inex Adria DC-9 which departed Split for Cologne climbing to FL 350 also estimating ZAG VOR at 10.14. It carried 108 pax + 5 crew, callsign JP550.

Both aircraft collided above ZAG VOR at time 10.14.41.

The R/T between BE476 and Zagreb ACC was very simple: BE476 reported to the Zagreb ACC upper sector (frequency 134,45) at FL330, estimating ZAG 14, controller replied: roger, call me passing ZAG, squawk A2312.

That was all the R/T exchange with BE476 prior to the collision.

The R/T exchange with the JP550 was first with the middle sector.

JP 550 arrived on this sector at FL260 requesting higher (the requested FL on the flight plan was 310). The middle controller told the pilot that both 310 and 280 were not available and asked if it could take 350. Pilot replied "affirmative with pleasure".

What happens next is the subject of differences. Normally the middle controller should have initiated co-ordination with the Upper Sector as 350 is not in his

sector. Also as the FPL was for FL310 max, no strip was made for the Upper Sector and the local procedures said that it was the responsibility of the middle controller assistant to make that strip. Investigation proved no strip was made and the receiving (Upper) controller said later he had not understood that the aircraft was climbing. Also, the Upper controller was alone at his position at the time of the coordination and of the collision, with 11 other aircraft on his frequency, the situation was described as very busy. Normally the procedures require 2 controllers at all times, but the radar assistant had left the position 4 minutes earlier.

1 min 50 seconds later, the middle controller recleared the JP550 to climb to FL350, and the pilot was asked to report passing FL310. At 10.12, the following R/T exchange took place:

10.12.03 JP: Zagreb Adria 550 out of 310.

10.12.06 MID: 550, for further Zagreb 134.45, squawk Stand-by and good day sir...

10.12.12 JP: Squawking Stand-by, 134.45, good day.

The procedure to squawk stand-by on transfer from one sector to another was normal procedure in Zagreb, as each sector had its own limited series of codes and one had to "release" the code before transfer. This procedure was not documented, nor was it an international standard, but was common practice in the Centre.

The consequence of this was that the altitude block and identity disappeared from the Radar.

The Adria crew then waited nearly 2 minutes to call the upper sector.

The following is the R/T exchange between JP550 (JP) and the Upper controller (H1):

10.14.04 JP: Good morning Zagreb Adria 550

10.14.07 HI: Adria 550, Zagreb, good morning go ahead

10.14.10 JP: 325, crossing ZAG at 14

10.14.14 HI: What is your present level?

10.14.17 JP: 327

All previous communications were in English, now the controller switches to serbo-croat: (Translation)

10.14.22 HI: ...e...maintain now on that level and report passing ZAG.

10.14.27 JP: What level?

10.14.29 HI: At which you are now climbing because ...e...you have an aircraft in front of you at... (unreadable)... 335 from left to right.

10.14.38 JP: OK maintaining precisely 330.

The collision occurred at 10.14.41, 37 seconds after the first R/T call on the sector and 3 seconds after the last transmission.

Now back in 2001: 25 years later, the bar of a luxurious Hotel in downtown Zagreb. The man in front of me has grey hair, a few years left before retirement, but the eyes are still full of energy. It is difficult for him to talk about the collision, even after all those years.

«The collision was probably 10% human error but for 90% it was caused by the system. Can you imagine today, climbing an aircraft at the sector boundary and switching its transponder off before transferring it to the next frequency? But that is what we did routinely in Zagreb in those days. In the ACC, we were stunned by the collision. Could not believe it at first. You know we were only 40 or 45 controllers in Zagreb at the time. We were very busy, controlling 1000 to 1200 aircraft per day. In comparison, Vienna, our Austrian neighbour, they had 200 controllers for 1400 aircraft a day. After the collision we all stuck together as no help whatsoever was given to us by our management. They just pointed fingers. Five of us were arrested

by the police and sent to preventive jail. Not one of our bosses was. Not even one resigned.

Last month (September 2001) in Zagreb, 21 people died in a hospital because of an error in dialysis, probably caused by a faulty product made in USA. Anyway the Health Minister resigned and heads will fall. Back in 1976, even after 176 dead, mostly foreigners, not one of them was disturbed! So 5 of us ended in jail. But in fact, only Tasic and the middle sector assistant were directly involved with the collision. And both were accusing each other. But only they knew which one of the two was lying and what was really said during the coordination. Tasic was trying to put the blame on others. Perhaps this is a common human reaction.

Anyway, we stayed in this preventive jail for 2 months, except to our great surprise, one of us, the assistant in the middle sector, was released after one month. The rumour was that it was because he had some good relations with the police and in political circles. Anyway that left only Tasic to be blamed, and after another month in jail (for what, we will never know) the rest of us except Tasic were set free. Tasic remained in custody until the trial.

Back at work nothing changed. The procedures, the technology used, and the management, all remained in place for the next 2 to 3 years. Everyone knew that the system was to blame, but changing it would have been, in the eyes of some, a sort of admission that something was wrong with the system. ZAG VOR was one of the busiest European VOR at the time. Many airways converged to it and contributed to many problems. Yet the route structure was kept as in 1976 for another 7 or 8 years.

After 6 months in Jail, Tasic lost his salary. In the Ops room, we all collected money and made sure Tasic's wife received the money. The group was united and strong. We had more stress because of the reactions of our family and friends than from our colleagues. The reaction from outside was definitively the worst. The controllers were tough. You had to be tough to be a controller in Yugoslavia in those days. We had no idea of what was happening outside Yugoslavia. For instance, not one of us had ever seen an ICAO document. Doc 4444 was a classified document and was kept secret in Belgrade. We only had parts of it translated into Serbo-Croat by the military (it was full of military jargon) and was never updated for 15 years. So we had no way of questioning the procedures we made ourselves and used everyday. Squawking stand-by on transfer looked awkward, but no-one questioned the procedure. Every sector had its own SSR codes. You had too few codes available and had to release them for the next sectors. So we told aircraft to squawk stand by. Secondary radar was relatively new in 1976.

The fact that Tasic was in jail was not right but in those days if you made a mistake you were punished. For instance if a TWR controller ordered an overshoot because the runway was still occupied, this was considered a mistake and you could be disciplined! Not very good for safety, but those were the days.

When the trial came, we expected the worst. Long sentences for everyone were our fear. We were however partially lucky because we got a relatively good judge, who took his time and considered all the facts and went deep into the case. He could have easily blamed everyone and sent most of the team to jail. Instead he singled out Tasic. This was unfortunate, but there were 176 dead and someone had to pay so he imprisoned for 7 years. This was a blow to us. Tasic was probably partially responsible, but he took all the blame. No chief, no management was questioned or held even partially responsible. There were in fact very few witnesses at the trial. After the trial we tried to forget and went on.

A British lawyer, Richard Weston, wrote a book called "Zagreb one four" and later Granada TV made a movie about it called "Collision Course". The Zagreb controllers did not like either of the two and did not consider them accurate. They did not reflect what actually happened, especially as far as the social environment and the characters were described. Tasic is described as loner and some kind of martyr. This was definitively not the case; he was happily married at the time and his wife was pregnant and he was looking forward to his kid (the fact that he saw his daughter only one year later was very sad indeed). But he knew himself what mistakes he did and we all knew that. End of the story. The tensions and the problems between controllers described in the book and movie were not there. Probably exaggerated dramatisation to make the book and the movie more interesting, more sensational.»

After three and a half years, a second investigation was completed with some little additions. They tried to blame the pilots of both aircraft for not looking out! Anyway they used this excuse to pardon Tasic and he was set free at half his sentence. He was sent back to Belgrade and joined the Technical department. He stayed there and never returned to Zagreb. He died of a cancer a few years ago. The middle sector assistant, did not continue as a controller, he also joined the Technical dept here in Zagreb. He also died some years ago. Of the 3 others jailed, one went to management in Belgrade, the other manages a small airport in an island and only one remained as a radar controller in Zagreb.

What lessons can we learn from this collision?

First that nothing, but nothing in a collision can be forgotten. One has to live with it always. Whether you had something to do with it or not. Whether today a controller in similar circumstances will also be jailed for three and a half years is questionable but not unthinkable. It is still happening, albeit for other reasons. Our colleagues in Italy and in Greece, and recently Mexico, can confirm this.

Of course today, procedures are published by ICAO and Eurocontrol and are widely available. No controller, in Europe at least can be unaware of what is going on outside his own ATC unit in other countries. So the SSR procedure that contributed to the collision will probably be spotted in time by others and corrected...

Of course we have now TCAS, but VFR traffic still does not have always a transponder and procedures are still an important accident barrier...

But the rest; the missing strip?

The climb at a sector boundary?

The unrecorded verbal co-ordinations?

The busy controller alone on his sector with no assistant?

The assistant coming late?

The inadequate airway structure?

Are we so sure this does not still happen today even briefly in any ACC in Europe?

This is probably the saddest conclusion of this tragic story: Have we really learned all of what was to be learned from this tragic event?

**Probably not.**