

# THE CONTROLLER

March 2007

Journal of Air Traffic Control

## ➔ BRAZILIAN COLLISION SPECIAL



Also in this issue:

➔ CISM

➔ Legal issues

➔ Interview Prof. S. Dekker





**Photos:**  
Legacy jet: Embraer  
B737 Gol: Andres Contador  
Radar picture: C. Gilgen  
Label: VEJA

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# Foreword from the Executive Board



Photo: DC



by Doug Churchill,  
EVP Professional IFATCA

## The "Professional" Pie

This edition of The Controller magazine has been dedicated primarily to issues of a Professional nature. When we think of professional topics as they relate to us in the air traffic control world, more than likely some "time-honoured" issues will come immediately to mind: working conditions, industrial relations, hours-of-work, medical requirements, human factors and critical incident stress management among others.

I mention these particular ones because they form the backbone of much of our professional policy and will continue to do so into the future. However important, they are merely pieces of the professional pie. Section Four of the IFATCA Manual lists five principle categories relating to professional policy: Working Conditions, Medical Matters, ATC Training, Legal Matters and Collection and Dissemination of Information on Professional Matters. Consider these the "crusts" of the pie because within them lies the filling - the meat - the best and most important part!

On the occasion of this special professional edition of the magazine, I thought it

appropriate to provide an "in a nutshell" account of what we in the professional domain have been up to over the preceding twelve months. You will read of some of our activities in this edition, but there are many more. If we look back to the five main professional categories in the Manual, we see they are further broken down into twenty-two sub-groups containing a total of some eighty individual subject items. The distribution of topics within the groups is: Working Conditions - 32 items; Medical Matters - 10 items; Training - 25 items; Legal Matters - 12 and Collection & Dissemination of Information - 1 item (IHB). Of these 80 different subjects, we have been active in addressing nearly 50% of them within the past 12 to 15 months or so. They include: Single Person Operations, Four Eyes Principle, Performance Indicators, Social and Labour Aspects, Management/Controller Relationships, Working Environments, ATC Systems, Automation - Human Factors, ATC and Public Relations, Short Term Conflict Alert - Human Factors, Duty Rosters, Work and Rest Scheme, Extra Duty, Remuneration, Language Issue, Retirement and Pension, Extended duty, Loss of Licence, Regulatory Framework in ATM, Normal Operations Safety Survey (NOSS), Safety Management Systems, Stress & Stress Management, Fatigue in ATC, Substance abuse in ATC and Critical Incident Stress

Management. By far, issues in the Working Conditions category have demanded the most time and effort, with 21 items requiring some degree of IFATCA professional attention. Many times we are able to address concerns by way of direct correspondence through the Executive Board, i.e.: letter, telephone call or e-mail, but there are times when nothing but direct face-to-face contact is required. We are very fortunate to have within the Professional domain representatives who act on our behalf throughout the year attending meetings, submitting working papers/reports and expressing the IFATCA view to the wider audience.

We are grateful to our representatives of the Airport Ops Team, Aerodrome Panel, Human Performance Focus Group, HRT, our Human Factors Specialist and Single European Sky & Social Dialogue "experts". They contribute greatly to our success.

Of the remaining four categories, none had more than six issues where our involvement was needed or requested. Six topics are the subject of Committee C working papers at Conference 2007 in Istanbul, further illustrating our continued involvement with, and influence in, a very good cross-section of our professional domain. ☺

**We are very fortunate to have within the Professional domain representatives who act on our behalf throughout the year**

## New Controller Layout:

You have all noticed a new format and a new layout of the magazine.

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We have changed printer and design firm and the magazine is now produced in Mannheim, Germany, by the same firm that also produces "der flugleiter", the German MA magazine. The lady in charge of the layout is Melanie Fliess, and she brings a refreshing look into the Controller magazine.



# Editorial

## About mid-air collisions

 **by Philippe Domogala, Editor**

Photo: DP

**This is not doomsday, this is wake up day I would say ...**

This issue is a special about the recent Brazilian collision and CISM. You will also find some legal issues covered and an interview with Professor Sidney Dekker, the very famous aviation human factor specialist. This issue is an attempt to record and document what happened but also, and probably foremost, to act as an educative process for us all. What can we learn from events such as this, and how can we better prepare ourselves for the next one?

We should not hide our heads in the sand, accidents and collisions are likely to occur at a more frequent rate that what we have been used to in the past. Simple mathematics if one takes into account the tremendous increase in air travel and current aircraft orders (Boeing and Airbus have between them over 2000 new aircraft orders this past year alone and I do not include the other 1000 or so regional, business jets, and the new tendency for the future: pocket jets)

All of these, or nearly all of these, will fly IFR and therefore add constraints to our ATC systems. Some naively thought that technology such as TCAS or CDTIs (cockpit display of surrounding traffic) using ADS-B will take care of the last minute anti-collision resort.

But as this collision in Brazil showed us: a transponder, a small piece of 1950's technology, can fail (or be disconnected) and

then all this "last minute collision avoidance high tech" no longer works.

Aircraft can today continue to fly for days in the busiest class A airspace and major airport TMAs, with a defective or inoperative TCAS. Failure in TCAS is not a no-go item. This is not doomsday, this is wake-up day, I would say....

One of the roles of IFATCA and this magazine in particular, is perhaps to act as an alarm clock for this wake up call. It is after all our business, because it is we controllers, who ultimately and generally will win the "legal first prize" distributed by the judges a few years later. Just culture is important there and there is also an article about this in this issue.

How to deal with the posttraumatic effects of such an accident for the controllers involved is another important issue. We have CISM and now we have IFATCA-

delivered-CISM. All of this is explained in this issue as well.

In my archives, is an article that I wrote in 1981 for the Controller, after a fact-finding

visit to Brazil. It is striking to see, that 25 years later, in fact not many things have changed with regard to the controllers' situation.

For those interested, this 1981 article is available on our web site: [www.the-controller.net](http://www.the-controller.net)

I used to end my editorials by saying "Enjoy this issue" or "Happy reading" but this time that is not appropriate. "Be very, very careful" is probably more accurate.

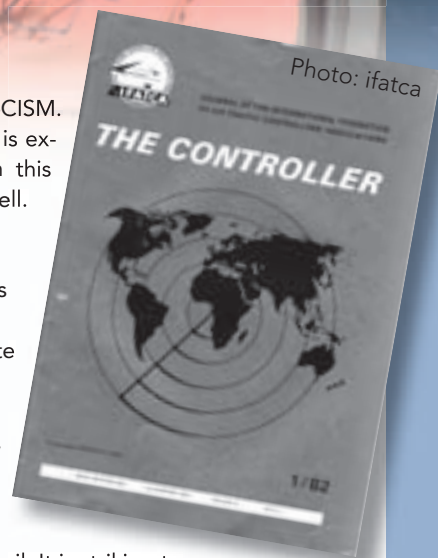


Photo: ifatca

### READER'S LETTERS to the Editor

Reference the collision between a glider and a Business jet reported in your last Editorial (Dec 06) , although the NTSB report said the glider was an ASW27, it was in fact an ASG29, the very last 18m model from Schleicher, a brand new aircraft.

Jean-Luc Gassmann , Controller Geneva ACC

Photo: Alexander Schleicher/M. Münch



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# Brazil Collision Special Feature

The views expressed in the following articles are those of the authors, and not necessarily IFATCA's official position.

LEGACY

**What really happened on 29 September 2006 over the Amazon?**

How come, on a beautiful sunny day, could two brand new aircraft equipped with the latest technology and under surveillance of a relatively modern radar ATC system (or so we were told) collide in 2006 like they would have in the 1950's?

**Why are the controllers and the pilots involved almost always suffering from the media frenzy looking for someone to blame?**

How can IFATCA help the controllers involved?

**In the next 18 pages, you will find some attempts to answers those questions.**

Photo: Embraer

# Accident Preliminary Report



**On November 22, 2006. The NTSB issued a PRELIMINARY REPORT (called UPDATE) on the accident:**

The September 29, 2006, midair collision over the Amazon jungle between a Boeing 737-800 (PR-GTD) and an Embraer Legacy 600 business jet (N600XL).

The accident occurred at 4:57 Brasilia standard time. The Boeing 737 was destroyed, all 154 occupants died. The Legacy sustained damage to its left wing and left horizontal stabilizer and performed an emergency landing at Cachimbo Air Base, approximately 60 miles NW of the collision site.

Both aircraft were operating IFR but in VMC Conditions. The B737 was a scheduled domestic flight from Manaus to Brasilia. The Legacy was from, San Jose dos Campos, to Manaus, and eventually continuing to the U.S. This was a delivery flight from the Embraer factory.

The Legacy N600XL departed SBSJ at 2:51. The filed flight plan included a routing via OREN to POCOS, then UW2 to Brasilia VOR (BRS), UZ6 to Manaus. The cruise altitude filed was FL370, with a planned change to FL360 at BRS, and to FL380 at TERES, 282 miles north of BRS.

After takeoff, N600XL was issued a number of interim altitudes. The flight was cleared to proceed direct to ARAXA VOR (on UW2), and at 3:11 was cleared to climb to FL370. At 3:33, the airplane leveled at FL370.

The B737 departed at 3:35, requesting FL370 as a cruise altitude, and a routing via UZ6 to BRS. The airplane reached FL370 at 3:58. There were no anomalies in communications or radar surveillance of the Boeing 737 throughout the flight.

At 3:51, a controller from Brasilia ACC instructed N600XL to change frequencies to the next sector. N600XL crew reported in on the assigned frequency level at FL370. ATC acknowledged and instructed the crew to "squawk ident" Recording show the ident was observed. This was the last two-way communication between N600XL and ATC. At this time the airplane was approximately 40 nautical miles south of BRS.

At 3:56 the Legacy passed BRS at FL370. There is no record of a request from N600XL to the control agencies to conduct a change of altitude, after reaching flight level 370. The airplane made calls, but no communication in which it requested a change of FL. There is also no record of any instruction from Brasilia Center to the aircraft, directing a change of altitude.

When the airplane was 30 NM NW of BRS, at 4:02, the transponder of N600XL was no longer being received by ATC radar. Between 3:51 and 4:26, there were no attempts to establish radio communications from either the crew of N600XL or ATC. At 4:26 Brasilia ACC made a „blind call“ to N600XL. Subsequently until 4:53, the controller made 6 additional radio calls attempting to establish contact. The 4:53 call instructed the crew to change to frequencies 123.32 or 126.45. No replies were received.

There is no indication that the crew of N600XL performed any abnormal maneuvers during the flight. Flight Data Recorder information indicates that the airplane was level at FL370, on course along UZ6, and at a steady speed, until the collision. Primary (non-transponder) radar returns were received corresponding to the estimated position of N600XL until about 4:30. For 2 minutes, no returns were received, then returns reappeared until 4:38. After that time, radar returns were sporadic.

Beginning at 4:48, the crew of N600XL made a series of 12 radio calls to ATC attempting to make contact. At 4:53, the crew heard the call instructing them to change frequencies, but the pilot did not understand all of the digits, and requested a repeat. No reply from ATC was received. The pilot made 7 more attempts to establish contact. At 4:56:54 the collision occurred at FL370, at a point about 460 NM NW of BRS, on UZ6.

There was no indication of any TCAS alert on board either airplane, no evidence of pre-collision visual acquisition by any flight crew member on either aircraft, and no evidence of evasive action by either crew.



Wreckage and damage examination indicates that it is likely the left winglet of the Legacy (which includes a metal spar) contacted the left wing leading edge of the Boeing 737. The impact resulted in damage to a major portion of the left wing structure and lower skin, ultimately rendering the 737 uncontrollable. Flight recorder information ceased at an approximate altitude of 7,887 feet.

After the collision, the crew of N600XL made numerous further calls to ATC declaring an emergency and their intent to make a landing at the Cachimbo air base. At 5:02 pm, the transponder returns from N600XL were received by ATC.

At 5:13 pm, an uninvolved flight crew assisted in relaying communications between N600XL and ATC until the airplane established communication with Cachimbo tower.

The Investigator in Charge estimates a 10-month timeline for the investigation. ☎



Photo: FAB

# The Accident Description by the IFATCA Team

Photo: CG



by **Christoph Gilgen**  
**SKYCONTROL (Swiss ATCA)**

Whenever an accident occurs, in particular involving two controlled flights, controllers ask themselves many questions such as: How could two aircraft be at the same altitude and at the same location in a rather remote geographical spot and in a sector that has a relatively low traffic density?

When the IFATCA team arrived in Brasilia, in October 2006, the members started to observe the control sectors. The more we talked to the controllers of the Brasilia ACC, the clearer our view became. The triggering event was without a shadow of doubt the loss of the Mode A and C returns of the Legacy jet, shortly after its passage over Brasilia VOR. This failure occurred at 19.02 UTC at of roughly 25 NM North of Brasilia. The Legacy, was established at FL 370 on the UZ6 airway to Manaus.

In order to understand the subsequent events, it is necessary to explain the configuration of the ATC ground system and the software in place at Brasilia ACC. The ACC software in Brasilia is designed in such a way that controllers have two levels (or altitudes) indicated on their radar labels:

**Figure 1:**  
**Normal radar label at Brasilia ACC**

In the middle-line of the label are the altitude indications and to the left is the first 390, is the transponder Mode C altitude. The second 390, on the right-hand side shows the system altitude, or "ATC altitude". In Brasilia ACC this is most strangely not the cleared level, but the flight plan level (FPL) of the aircraft. It is a mix between an entry level (e.g. from an adjacent unit or sector), the cleared level of the flight, and finally the "flight plan level" that is displayed to the controllers. The controllers have the ability to change this level if they clear an aircraft to a different flight level (controller input). There are some oc-

casions, however when the ATC-system automatically updates and changes this level. For example, if the aircraft passes a waypoint where the FPL in question requires a level change. This was exactly the accident scenario when, due to a change of airway direction, the flight had to change according to the FPL from an odd to an even level. This automatic level change in the system happens without any direct controller input.

Additionally, this automatic change is not shown in any prominent warning colour or special feature, just the "normal colour and fonts". It is, therefore, rather difficult to see immediately that the ATC-system has changed something. Most ACCs and modern ATC-systems in the world have only one level shown to the controllers working the system (except the Mode C indication) and this is the so-called "cleared FL", most of the time referred to as "CFL". This information is very relevant as it is the guarantee that the controllers, the ATM-system on ground, and the crews in the air are working with the same levels and possess the same information.

For the Brasilia ACC, this particular software operation does not normally cause a problem when all runs well, and when Mode C is received by the system. The automatic level changes of the system are sooner or later caught up by the controllers when they scan the flights and detect the discrepancy between the left- and right-hand levels in the aircraft label.

On the 29<sup>th</sup> of September 2006, however, the situation did not end as described above. As the Legacy continued to be cleared and fly at FL 370 and passed the Brasilia VOR, the automatic level change feature was activated. From this moment, the radar label of the Legacy now showed two different levels, albeit for a short while: FL 370 (Mode C) to the left and FL 360 (system level) to the right as the Legacy's FPL-level. Unfortunately the Legacy transponder disappeared at 19.02Z. It appears that the normal "mitigation" of such a discrepancy, however, did not work this time, and from then on



**Figure 1:**  
Normal radar  
label at Brasilia  
ACC

**An airborne failure started a fatal chain of events that couldn't be stopped by a badly designed and weak ATC-system**

Photo: CG

there was a difference of 1000 feet between the level shown by the ATC-system and the aircraft's actual and cleared flight level.

Due to the loss of the transponder reply, another unusual feature of the Brasilia ACC radar system was activated: the unit's military primary radar. This is a special radar that specialists call "3-D". It is not only able to show the geographical position of a blip as all primary radars do (range and azimuth), but has a special feature that permits a calculation of the altitude of the targets. The height detection is based on the measurement of the angle of elevation of the target. This, however, is a rather imprecise process and, as for the azimuth detection, the further the target is away from the radar site the more inaccurate the result will be. Radar specialists have indicated that variations and errors of 4000, or even 5000 feet, at a range of 200 NM from the radar site, are normal.

Shortly after 19.02Z when the Brasilia ACC stopped receiving the Legacy's SSR-transponder replies, the Brasilia military 3-D radar took over. Based on what we were shown, the call-sign correlation was only lost for a few seconds as a valid primary track was displayed shortly afterwards with full correlation of the call-sign (based on the SSR-track that was previously there). There are, in fact, only two small differences that can be noted on the Legacy's track indicating that the radar returns of the Legacy are only detected by primary radar. Firstly, the symbol of the radar blip is no longer a + surrounded by a o, but only a +. This symbol (+) indicates to the Brasilia ACC controllers that this is a primary radar blip only.

The following changes in altitude indication then occurred to the Legacy target. Where the Mode C should be shown (to the left) a calculated primary radar altitude is now displayed (the 3-D indication). Next to it, to the right, the erroneous FPL altitude of the label remains the same, at FL360. Between the two numbers, however, there is now a Z shown, meaning Mode C report missing. Under normal circumstances with a SSR-track present there would be a = (which would mean "maintaining level"). The rest of the label continued to be shown to the control-

lers with the same colour scheme and the same fonts. One of the major problems, also very confusing, is that at several stages of the tracking of N600XL (without SSR-replies) the calculated primary 3-D altitude displayed by the system to the controllers indicated exactly 360. This would indicate, therefore, no discrepancy to the ATM-system FPL-altitude shown to the right of the label.

**Figure 2:**  
Reconstructed radar picture  
(time shown is local)

Shortly after the picture was taken, around 19.10 a change of controllers took place at the ACC and a new controller took over. We are still almost 45 minutes before the collision and the Legacy flight is about 40 miles North of Brasilia. It is still established at FL 370, but shown on the labels at FL 360. There was now a period of about 20 minutes where no communication, or attempts to communicate, took place between ATC and the Legacy. The intermediate accident report (see page 7) indicates that as from 19.26 ATC tried to contact N600XL numerous times. From 19.48 the Legacy crew had also started to make various attempts to contact ATC. There are strong indications that the Legacy was at that moment at the limits, or even outside the VHF-coverage of Brasilia-ACC.

At the boundary between Manaus ACC and the ACC-Brasilia both Centres were aware that the Boeing 737-800 of Gol-Airlines was approaching the Legacy-jet in the opposite direction. According to the indications of their ATC-system, however, and the exchanged estimates of the flights a vertical separation of 1000 feet existed. IFATCA team's observation indicated that for the controllers of both Aera Control Centres the losses of two-way communication and the bad intermittent radar returns are "normal and frequent occurrences". We were told that all the operators working the relevant sectors were apparently aware of these difficulties.

The two aircraft, both established on the centreline of Airway UZ 6, hit each other at FL 370 at 19.56.54 UTC in the airspace of Manaus ACC, just North of the line of jurisdiction with Brasilia ACC and close to the waypoint „NABOL“. ⊕



**Figure 2:**  
Reconstructed radar picture  
(time shown is local)



Photo: VEJA

**There was now a difference of 1000 feet between the level shown by the ATC-system, and the aircraft's actual and cleared flight level.**



Photo: DP

# The Collision as reported by the Brazilian Media



by Philippe Domogala,  
Editor

Photo: WR



**The media [was] looking for and finding someone to blame for the accident**



Photos: W.Rodrigues

It is always difficult after a catastrophic event such as this one for the media to remain silent and wait for the official reports to be released. They want immediate answers. The Brazilian media, (at least the one that we know of, (and was available on line), reported the news like all media do in this situation: with sensationalism and drama –for effect- as well as looking for and finding someone to blame for the accident. We saw this approach clearly in another instance too - the Ueberlingen collision. At first, the focus to find someone to blame was on the Russian pilots, then a few days later it diverted to the controller, and finally concentrated on the Air Navigation Service Provider. (Skyguide in that case).

We are probably seeing a similar pattern here in Brazil. The first thing that the press reported almost immediately after the September collision, was the fact that the Legacy pilots may have voluntarily disconnected their transponder in order to perform some “manoeuvres or stunts” to test their new aircraft. This suggestion of reckless flying put the “blame” of the collision squarely on the two US pilots ...


These “stunts”, it was reported, were apparently documented by some “radar pictures” showing the Legacy altitude varying from FL310 to 410. Very soon afterward, when the Legacy Flight Data Recorder was analyzed in Canada, the media reported that the FDR apparently showed that the Legacy was steady at FL 370 the whole time it was under Brasilia ACC area control. (This was confirmed in the preliminary report issued on 22 Nov. (see page 7 of this issue)


There was very little information relating to or about the Gol B737 from either the media or the preliminary report from the National Transportation Safety Board ( see again page 7 )The media did report that the aircraft was normally in contact with CINDACTA-4 (i.e. Manaus ACC) both on R/T VHF and on radar but they continued to report in such a way that led one to believe that the whole cause of the collision lies with the Legacy and perhaps ATC, but not the Gol B737. Then, at the end of November media attention diverted to ATC and the controllers. An article appeared in *Brazil magazine* titled: “Don’t Blame Us, But Blind Spots and the Americans, Say Brazil’s Air Controllers”

In that article, published 22 November 2006, we learn that some controllers allegedly involved in the collision reported a “black hole” in the interface area between Brasilia and Manaus ACC, exactly where the two aircraft collided. The article which quoted an unidentified lawyer, intimates that controllers were induced to error by defective equipment, and that the issue of a “black hole” or “blind zone” was an old problem that has been presented in the past to the Brazilian air authorities, and that controllers had already told the Air Force about it.

Then on 25 November a Brasília ACC controller gave an interview on Brazilian TV. ([o Fantastico](#) / [Globo TV](#)). This controller, with more than 20 years of experience, apparently also confirmed the existence of a “blind area” in the region where the collision occurred. The controller also alluded to “flawed” radar and system failures.

Then, two days later on 28 November, we learned that the president of Brazil replaced

the chief of the country's Air Traffic Management System. According to Brazil's largest newspaper, **O Globo**,  "The removal was one of the ways for alleviating the tense relationship between the Air Force and military and civilian controllers." [...]

On 2 December, two ATCOs who controlled the Legacy in Brasilia ACC gave an interview to Brazil's weekly magazine **Época**.  Both men expressly mentioned a "blind zone" over the Amazon, along with faulty software and communication problems that day due to the fact that VHF transmitter antennas in the Amazon forest do not work properly due to interference.

On 10 December, the two Legacy pilots were back in the USA, and on 17 December they gave an interview to **FOLHA DE S. PAULO** a newspaper in Sao Paulo. In that interview the pilots said the Legacy VHF was working very well at all times, as they could hear transmissions in Portuguese from Brasilia ACC. They indicated they did try to contact Brasilia about 30 times, but could not, and did not attempt contact on other frequencies. It was suggested in this article that the Legacy cockpit voice recorder showed dialogue between the two pilots that would indicate they knew the transponder

was off, but their answer was to the effect that everything was working well.

These articles show a progression of "blaming" that goes from the pilots who were first targeted as being at fault, (held in detention and then released back to the USA), to Air Traffic Control where public opinion then seemed to have shifted its focus, and then to the system itself after controllers have expressed themselves openly to the media and are blaming the system. The next step has yet to materialize.

What we may be witnessing here once again is a high-profile aviation event running a media gauntlet. Many people in many ways for many reasons say many things. The media has a responsibility to provide accurate, factual information to the public but it must also "sell papers", so a word of caution is advisable. Another episode of "trial by public opinion" is not what we want to see. We must be patient, un-biased and let the official accident investigation process run its course before reaching conclusions. Sadly, we have already learned the hard way how the mere hint of blame or shadow of doubt cast in a certain direction can have a devastating influence on people and their actions. ☹



EUROCONTROL, the European Organisation for the Safety of Air Navigation, has as its primary objective the development of a seamless, pan-European air traffic management system that fully copes with the constant growth in air traffic, while maintaining a high level of safety, reducing costs and respecting the environment.



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# IFATCA provides CISM to Brazilian Colleagues

Photo: CG



→ Christoph Gilgen

**Within hours after the news was received, a first direct contact with the Brazilian MA was established.**



→ Virgilio Belo

Photo: VB



by Christoph Gilgen  
**SKYCONTROL (Swiss ATCA)**  
 Member IFATCA CISM Team to Brazil

**The collision occurred on September 29, 2006, at exactly 17.56 Brasilia time**

After many hours of confusing and often contradictory news reports the completely destroyed Boeing could finally be located being widely scattered over a large field and almost completely hidden below the dense canopy of the tropical forest. This accident was the worst air-disaster in Brazil history. This explains why the emotional shockwave of the tragic loss of this aircraft and its occupants was so strongly felt throughout the largest South American country. The Brazilian aviation authorities, actually the Ministry of Defence who is responsible for civil and military aviation in Brazil, finally confirmed about 2 days later that a mid-air collision had occurred.

As always when the word "mid-air collision" is heard within IFATCA the whole-wide controller family starts to gather together and makes immediate preparations to help and support the colleagues and controller friends directly involved in this terrible tragedy. The Brazilian mid-air was in this respect no exception. Within hours of the news being received, a first direct contact with the Brazilian MA was established. It was a little bit more difficult to establish direct links with the association representing the military controllers immediately involved in the ATC-sectors where the terrible collision occurred. But finally this was achieved and IFATCA was able to speak to the Executive Board of ABCTA (Associação Brasileira dos Controladores do Tráfego Aéreo). This association, founded in 2001, represents the majority of the military air traffic controllers of Brasilia ACC. It's a fact that they are not yet fully affiliated to our Federation as some legal issues and problems must be solved beforehand. But this is only a question of weeks and, as our official Brazilian MA has always made clear that they desire that IFATCA comes in and tries to help the colleagues in need and distress.

Brasilia ACC, sometimes also called ACC-BS, and in Brazil and in Portuguese it's named CINDACTA – 1 (Centro Integrado de Defesa Aérea e Controle do Tráfego Aéreo), is traffic-wise amongst the most busiest ACCs of the

world. It controls a large chunk of airspace that is about 6 times the size of France and more than 7 times as big as the territory of the United Kingdom. The ACC and the APP of Brasilia (collocated at the same site) are managed by the FAB (Força Aérea do Brasil) and the Aeronautica, which are both sub-divisions of the Ministry of Defence. They are controlling roughly about 70% of the Brazilian air traffic in three distinct control regions and sectors. These sectors, staffed by controllers having distinct ratings and validations are: the Rio de Janeiro sector, the São Paulo sector and the Northern sector, called "Brasilia sector". It was in this latter, but already a little bit North of the line jurisdiction (transfer point) with Centro Amazônico, situated in Manaus, where the terrible collision on September 29, 2006 occurred.

Nevertheless it was at ACC-BS where the private Legacy jet was last in contact with ATC before the collision happened. This is also where several Air Traffic controllers were severely affected by the collision, suffering from emotional distress that such an event triggers on those directly involved into an aviation disaster. It became rapidly evident to IFATCA and the EB that the situation was very grave and that our Brazilian friends needed quickly help and support. This was why IFATCA started, in the early days of October, to plan and assess the means and possibilities we had of bring rapidly and efficiently support to Brazil. The initial needs were clearly identified by all: provide professional and technical help, and most of all bring in psychological and professional support to perform CISM (Critical Incident Stress Management) for the operators of Brasilia ACC, and maybe also at Manaus ACC (with whom the Boeing 738 was in contact at the moment it fell).

As language skills and excellent direct verbal communication with the persons involved was deemed to be a crucial factor for the success of this mission, IFATCA immediately decided to ask APCTA, our Portuguese MA, for support. Most luckily this call for help was immediately accepted and two Portuguese operational staff were dispatched within days for a three-person IFATCA mission to Brazil. The Portuguese staff consisted of the CISM-specialist Dr Isabel

Photo: Bruno Puliafito

→ Brasilia City

Cambráia from Lisbon and the active Lisbon approach controller and part-time incident investigator of NAV-Portugal, Virgílio Belo. It was a very lucky coincidence that those two very highly qualified personalities could be readied on short notice and were able to join me for this emergency mission to Brazil. IFATCA and the Brazilian controllers are not only grateful to the two Portuguese controllers for their effort and support given, but also would like to acknowledge the Portuguese airline Air Portugal for having graciously provided two sponsored airfares to Brazil for Isabel and Virgílio. Muito obrigado!

On request of the Executive Board of IFATCA I joined my two Portuguese team members and I left home on the 8<sup>th</sup> of October 2006 bound for Brazil. Our mission was to assess the local situation there and to provide CISM and technical and operational support to the Brazilian controllers friends. Upon arrival in Brazil the gravity of the situation became immediately evident to us: 9 ACC controllers (a whole sector team) had been taken off the control roster and were requiring urgent psychological support by professionals. Moreover, the whole working shift (of the two remaining CINDATCA-1 sectors), present and witness to the tragedy were also deeply shocked and needed as well close monitoring and psychological attention. In general the whole Brasilia ACC staff was clearly in need of intensive CISM-care as the support offered by the Brazilian Air Force was not at all adapted and adequate for the degree of distress felt by the operators involved.

During five consecutive days Isabel Cambráia performed dozens of CISM-sessions, either individually (for the more severe cases) or in group sessions according to the personal needs and the gravity of the situation. This work is very taxing, I would even say a very exhausting activity, and everybody that could see and observe Isabel performing her work was awed and stunned by the dedication and effort invested into the tasks. Isabel performed this vital task for several days without any interruption and these were very long days.

The IFATCA delegation established through ABCTA contacts to the very high ranking military authorities of the Brazilian Air Force, the owners of the ACCs in Brasilia and Manaus. A request for full access and a close cooperation was formulated by the Brazilian association on our behalf to perform our mission. After a cautious first contact on the first day the sky cleared on the second day, on the 10<sup>th</sup> of October 2006, when I had the honour to be personally received and greeted by the



Brazilian Air Force Chief. He expressed his gratitude and the FAB's appreciation for the gesture of IFATCA to come in to Brazil and help and support the controllers and the FAB in this very grave and difficult moment. From then on a frank and very cooperative spirit reigned between the Brazilian Air Force and the IFATCA and we three delegates were granted free and unlimited access in the ACC-facilities of Brasilia (except the defence part).

During the time Isabel performed her CISM-sessions Virgílio Belo and I used the time available to speak to a lot of air traffic controllers in the ACC of Brasilia. Long sessions of observation at the control sectors were made and a lot of facts and points were observed and noted. It's always very pleasing to see how controllers from different background and different culture are gathering and speaking about their work and the problems at hand and it was more than interesting to speak with the controllers at the sectors and more than one in the rest break rooms where informal gatherings occurred. Of course the collision and the perceived problems of the ATC-system in Brazil were the main topics we have discussed.

There is a full report about the technical and operational circumstances or as it is commonly referred to as the "chain events" that led to the terrible and mid-air of September 29, 2006 is described in this special edition of the Controller. To my Brazilian friends we would like to say "thanks a lot" for your friendship and your warm reception and may we meet again soon in better times and join together forces and to disseminate the lesson learnt within IFATCA! ☺



Photo: IC

→ Isabel Cambráia

**Isabel performed this vital [CISM] task for several days without any interruption and these were very long days.**

# Brazilian ATC in Turmoil



Photo: Flavio Guerra

Photo: CG



→ Passengers queuing in terminal



by **Christoph Gilgen,**  
**SKYCONTROL (Swiss ATCA)**

After the accident the two American pilots of the Legacy jet had their passports confiscated by Brazilian authorities. They were held in a hotel in Rio de Janeiro until the beginning of December when they were finally allowed to leave Brazil. Many international organizations, including IFATCA, pressured the Brazilian authorities to release them immediately after the accident and so to adhere to the "no blame" culture. Furthermore we pressed for a neutral and independent accident investigation so that all facts will come out and that a "lessons learned" process would start. Before the pilots were allowed to leave Brazilian soil, they were officially charged with "endangering of public safety", and may face trial in the near future and risk a long imprisonment.

At the end of October, just before the prolonged weekend of "finados", All Souls Day, the Brazilian controllers, in particular at the Brasilia ACC, started a work to rule action. This action was called "normal operations" by some or a full strike, depending on who you talked to in Brazil. The fact is that the Brazilian controllers, before the collision, controlled many more aircraft in their sectors than what was determined to be safe by the builders of their ATM-system. In Brasilia ACC the maximum number of aircraft a controller could have safely at the same time per sector is limited to fourteen. Before the accident, however, they were working many more than that. In order to get over the shock of the collision and to guarantee the safety of the

ATC operations, it was decided to adhere strictly to the official limit of 14 aircraft controlled at the same time. This resulted in huge disruptions as all the national airlines schedules fell out of planning. Sometimes the last flights of the day had to be cancelled and this resulted in hours, sometimes even days of delay.

The Brazilian military authorities overseeing the Air Traffic Management System of Brazil reacted as Military normally do, they gave orders and used military discipline to "control the problem". They ordered the military controllers (all en-route controllers of Brazil still form part of the military) to report to the military quarters and they also cancelled all their leave. They restricted absences severely, even for a justified medical reason and we have seen evidence that they actually prohibited medical absences by ordering military doctors not to issue any sick leave certificates. They started to transfer into Brasilia ACC controllers from other Brazilian locations and let them work alone, at busy and complex ACC-sectors, after only 6 or 7 days of OJT-training.

The press then started to report more and more details of what was wrong with the Brazilian ATC system: miss-management, old equipment lacking sufficient redundancy, poorly trained controllers, many near-misses unreported or not investigated, insufficient staffing levels, low salaries and complete lack of planning. The ATC crisis started to have its own first victims: The chief of Brasilia ACC was replaced and the chief of the Civil Air-space entity DECEA had to leave as well.

**Brazilian controllers, in particular at the Brasilia ACC, started a work to rule action ... This resulted in huge disruptions.**

The political debate about the demilitarization of Brazil's ATC system started to make the headlines of the newspapers and IFATCA became a very active player in the media to "discuss this option". So far IFATCA had remained silent as it had only written to the President of Brazil, Lula da Silva, offering the help and expertise of the Federation to solve the problems of the national ATC-system, after the accident.

The IFATCA President gave a long interview to a Brazilian periodical where he criticized the fact that all of the ATM in Brazil is managed within the hands of the FAB (Brazilian Air Force) and the Aeronautica (Ministry of Defence). According to IFATCA it is essential that the regulator and the ATC-provision be clearly and functionally segregated. The accident and incident investigation body must also be independent. In Brazil this is currently all done under the Ministry of Defence and this is of serious concern to all.

The turmoil entered a new stage on November 21, 2006 when the Commander in Chief of the Brazilian Air Force, and so the Chief of Brazilian ATC declared in a meeting in the Brazilian congress that there had been an ATC-control error on September 29, 2006 (when the accident happened). He said that: "two air traffic controllers assumed erroneously that the jet was at FL 360 according to the computer flight plan. But in reality the jet was at FL 370 but I believe they were induced to the conclusions that the flight was at 360 in such a way that the controller passed it at hand-over at that level, and also Manaus was advised of that level. The controller believed that the aircraft was at FL 360. This was false information but he believed that it wasn't wrong".

This triggered a long and detailed IFATCA statement released on November 24, 2006 and where a logical accident scenario was described and where the Federation speaks of "non error tolerant system design" and of "system traps in the air and on the ground". (See page 21 for a longer extract of the IFATCA Statement)

This statement was very well received and many articles and blogs were written quoting IFATCA (including 2 articles in Flight International). Several television documentary companies have since contacted IFATCA to conduct interviews in order to contribute to their films. The echo is much less evident in Brazil where the press is still very much controlled by



Photo: Flavio Guerra

Military and so rather scared to make open attacks without having firm evidence. Things are changing quickly, however, and in early 2007 all leading ATC-figures of Brazil are expected to be retired from duty, or substituted.

The Brazilian ATC-system is not yet fully demilitarized but legal texts are currently under discussion in Brasilia, and the President has now a firm proposal in his office to study and decide upon. The military fraction of Brazil still resists this move, as they fear a loss of power and influence. Some structural changes are urgently needed to the Brazilian ATC-system and this appears to be accepted now by the vast majority. The remaining question is just how long the process will take and how far it will go? This depends largely on the decisions that are taken in the coming months, but the transfer to a civilian entity will probably be a rather longer process, lasting many years.

It is therefore more than likely that the Brazilian ATC system will be in a difficult situation for the coming three or four years, i.e. before the structural changes are having their positive effects. What the tragic collision between Gol Flight 1907 and N600XL has again clearly demonstrated is that, for a mid-air to occur, a chain of events is required, where long-standing problems may come to light. They must align in such an unlucky way that, at the end, all layers of the ATM-system are crossed. This was similar to the Ueberlingen mid-air, that occurred in 2002, another collision that I had experienced firsthand as a Swiss controller. Comparing it today, in 2006, to the Amazon mid-air, it is simply amazing to note that despite many differences and other underlying factors, both collisions can be compared structurally and technically, as basically they are so much alike.

I think the Amazon mid-air has also seen a new IFATCA, growing and acting much more decisively than before. Despite the fact that it is certainly too early to draw quick conclusions, we must start to think how our Federation can contribute, if required. We need to offer our help, experience and support more systematically to our controller colleagues who are facing such dramatic events and most probably are completely unprepared. Our Federation should also be more active in press education and information and in offering our expertise to the accident investigation teams. IFATCA has a lot to offer in order that a wider audience gets a full understanding of what contributes to an ATM system and how it functions and, more importantly, to show why it failed at the end.

Unfortunately, seen the current traffic growth, similar accidents are likely to occur again. We just don't know when and where and we should get prepared to go in again and help if needed. ☹

**The Brazilian ATC-system is not yet fully demilitarized but legal texts are currently under discussion in Brasilia.**



# The Collision as seen by the Brazilian Controllers



Photo: WR



by Wellington Rodrigues President of ABCTA  
(Brazilian Controllers Association)

The 29<sup>th</sup> of September should have been a normal day, but it will be remembered, forever, in the life of thousands of people as the day of Brazil's worst air disaster.

Ironically, earlier that month, our association (ABCTA or Associação Brasileira dos Controladores de Tráfego Aéreo) issued in its bi-weekly internal publication a warning about the risk of a possible collision, but we could not have known that the nightmare of all Air Traffic Controllers would become reality a few days later.

"Where is the Gol?" This sentence is what started the fears of the Brasília ACC controllers that day. Once the INCERFA phase had elapsed, the RCC-BR took over to start the search and rescue actions for flight GOL 1907.

The ACC of Manaus, called Amazônico Control, informed us that N600XL, a Legacy-jet, had made an emergency landing at Cachimbo Air Force base and that the pilot in command of that Legacy had said that they had „hit something“ in flight.

It was requested that another off duty controller team should be brought in to replace those that were controlling the flight, and it was also determined that psychological support was needed for those that were most affected. The controller team on duty was finally released in the very early hours of the 30<sup>th</sup> of September, but had to return the next morning to fill-out the official reports regarding the accident.

We gratefully accepted the technical and psychological support offered by IFATCA as we were totally lost within this completely unusual situation. Two weeks after the accident the IFATCA team with Christoph, Virgílio and Isabel (CISM) arrived.

The psychological support that was offered to the controllers beforehand was deficient: for example there was no particular attention given to those that continued to work the traffic as the management tried to pass the message that all was OK and that life had to continue. Isabel could see firsthand in what a bad psychological shape the Brazilian Air Traffic controllers were: loss of self-esteem, disillusion, fear, etc.

The situation got worse with time due to staff shortages. There were suddenly a high number of medical absences, in addition to

the unavailability of the whole controller team that was on duty on the day of the accident. Sectors that were normally manned by a team of 12 controllers had now to be operated by a maximum of 6, and even sometimes the number went down to 4 controllers.

This brought a lot of confusion to the whole Brazilian ATC-system as the Brasília ACC controls 75% of the national air traffic. There were simply not enough controllers to meet the traffic demand and those that continued to work, completely disillusioned by the lack of recognition by their management, were encountering serious difficulties in performing their job without having to impose severe flow control restrictions.

We were suddenly called "strikers" and "mutineers" without somebody standing up and defending us. At this very moment ABCTA broke the silence and went public by defending the controllers and decided to tell the truth by explaining to the whole country the real situation of the Air Traffic Controllers in Brazil.

We never asked for anything, it was just a cry for help to the society and the Brazilian authorities. The posture adopted by ABCTA made many controllers start to believe that positive changes to the structure of the Brazilian Air Traffic Control system were possible. In particular the end of the military career that could make a very old dream become true; that ATC in Brazil would become civilian.

The military high command took the actions of ABCTA as a rebellion and therefore put the President of ABCTA, the Director of Mobilization, and the President of FEBRACTA, (our Brazilian controllers federation) under official inquiry and threatened to fire them.

Another important factor in what was happening at that time in Brazil was the press frenzy surrounding the collision. As expected, they were in search of any information and keen to publish it. But what they did to the controllers that were directly involved in the accident was very ruthless and made us deeply upset, as there were pictures taken without permission, stories of their private life told in a very sensational manner and worse even, some media declared them guilty without allowing the accused to defend themselves. There were only a few journalists really interested in investigating

**We were suddenly called "strikers" and "mutineers" without somebody standing up and defending us**



**“Where is the Gol?”**

and publishing the real facts. In the middle of the Air Traffic Control System crisis the system started to show its deficiencies through various system failures that occurred. There was a failure of the radar visualization, followed by an outage of radio frequencies and also the computer software. A big storm in Southern Brazil cut an optical cable of CINDATCA-2 (ACC-CW) disabling all frequencies of the Curitiba ACC. In addition, only one week later, a lightning strike in Campo Grande incapacitated a busy sector of the same ACC. Finally, on December 5th, 2006 a major communication failure oc-

curred in the Brasilia ACC (a system made by SITTI of Italy) which created the worst traffic collapse in the history of Brazil.

On top of the physical and psychological stress that we went through, we were suddenly now also called „equipment saboteurs“. We asked our management to issue an official denial of the alleged controller sabotage, and it was later found out that human error by a technician responsible for that equipment led to the failure.

After the first storms had passed, we went through many days uncertain as to what would happen to the Brazilian Air Traffic Control system, and most importantly, as to the future of our friends that were involved in the tragedy of flight 1907.

For ABCTA this will be remembered as a big and hard lesson of how to manage a major crisis that hit us unexpectedly. We will also keep a never ending gratitude to our European friends that crossed the Atlantic to help us, and continued to support us from far away, so that we can keep on fighting as strong and focused as possible. Thanks a lot to the big IFATCA family, and we look forward to becoming part of you very soon!



Photo: CG

→ A Brasilia ACC Sector

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# Which role did the transponder play in this collision?

Photo: Embraer

 by Christoph Gilgen,  
Skycontrol (Swiss ATCA)

At the end of 2003 and the start of 2004 the Swiss Air Navigation Service Provider, Skyguide, noted an emergence of many lost SSR-tracks and aircraft radar replies that disappeared for several minutes. One particularly worrying case was an Embraer E-145 of a major European carrier, that, after a Mode A change, remained invisible for more than 45 minutes before it was identified as an "unknown target" by French military control and the first steps of intercepting the target were initiated. The worrying fact was that this aircraft flew for a prolonged period through busy sectors and airspace without being un-

der positive control and provided with the required degree of safety .

After a long and tedious inquiry by the technical and operational departments of Skyguide the problem was tracked down to a particular transponder type. A PRIMUS transponder was identified to have a software problem that lead to a complete switch-off in flight and therefore also of the TCAS. In a safety message published by Eurocontrol on the 13<sup>th</sup> of April 2004 it was written that:

If the flight crew take longer than 5 seconds to complete a Mode A code change, the transponder will revert to "Standby" mode. This will cause the track to be dropped by radars, and the TCAS II on board the aircraft will fail"

**If the flight crew take longer than 5 seconds to complete a Mode A code change, the transponder will revert to "Standby" mode. This will cause the track to be dropped by radars, and the TCAS II on board the aircraft will fail" (Eurocontrol safety bulletin)**

Further it was written that the operational consequences are high with safety critical impact:

- temporary loss of radar contact
- degradation of the ACAS-safety net - the aircraft's TCAS will fail"

Authors comment: The word: "degradation" is used, but in reality the consequence is that the ACAS safety net is no longer there.

## „Fixing“ the first PRIMUS problem

After many controllers had persistently insisted on getting the problem fixed at the source, stiff warning letters were sent by IFALPA, IFATCA, the JAA, and the European National Supervisory Authorities to EASA (European Aircraft Safety Agency). EASA then took action and issued an AD (Airworthiness Directive) in August 2005 requiring to fix all transponder units affected within 9 months from the date of issuance (deadline May 2006).

What was rather worrying was that this directive was only applicable for all European registered aircraft and so airframes registered in other countries and continents were not affected by this requirement. It is true that several other States, such as Australia and New Zealand had issued similar requirements at a later stage, but the biggest State with the most aircraft affected, the United States (the FAA was the initial certifier of the transponder), only published a directive in October 2006 (less than one month after the Brazil mid-air). There remains, possibly, still many of those units flying with this "defect". But that does not seem to be the case in this collision, as this particular Legacy/ transponder, was a newly manufactured unit with modifications.

## Brazil: possibly a new PRIMUS problem?

But when sifting through the short intermediate accident report (see page 7) we see that the Brasilia-ACC failed to receive any SSR/Mode-S transponder replies from the Legacy-jet for approximately the last 50 minutes of the flight

before the collision. We also know from the same intermediate report that there were no TCAS alarms displayed in either of the cockpits. This indicates that the transponder of N600XL, the Legacy jet, was most probably not operating when the collision occurred. This also coincided with the ATC radar picture that the IFATCA delegation was able to view in Brazil in October 2006.

A Mode-S is a basic requirement for any TCAS-equipped aircraft. Each aircraft carrying TCAS II must have a functioning Mode-S transponder fitted as part of the TCAS system. This capability permits the sending and receiving of short data link messages and is essential in order to perform the required TCAS-TCAS co-ordinations (where evasive RA-maneuvres are managed so that complementary RAs are emitted and displayed in the cockpit). Each TCAS unit with its antennas fitted along the fuselage work in a similar way to a ground SSR-radar station. A short and coded **active surveillance** message is emitted on 1030 MHz in order to detect surrounding traffic. Replies are received on 1090 MHz. If there is an aircraft in the area that is not fitted with a transponder, or has its transponder selected off or on stand-by, the system simply cannot detect the intruder, as no replies are received and therefore no TCAS warnings will be generated.

To fly with the TCAS-unit off or on stand-by is at the very least worrying. It renders level 3 of conflict management (the anti-collision layer) almost completely ineffective, as not only TCAS is ineffective but also the safety nets on ground, such as STCA (Short Term Conflict Alert) are not able to function as designed. This fact was known before and was widely discussed and commented, notably when the PRIMUS cases were discussed 2004 and 2005 in Europe. Although the phenomena were considered to be very worrying, the authorities thought, as the source of the problem was clearly identified, and "strong mitigation measures were put in place." The ATM-system was deemed to have the required degree of safety and redundancy.

Photo: Graf Consulting



➔ Legacy RMU with transponder on.

**ACC-Brasilia didn't receive any SSR/Mode-S transponder replies from the Legacy-jet for the last 50 minutes before the collision.**

➔ Legacy transponder on stand-by.



➔ Legacy TCAS display with transponder on.



Photos: Graf Consulting

## How can a transponder be turned off or put on stand-by and so disable TCAS?

When the IFATCA delegation was in Brasilia in early October 2006, some 2 weeks after the collision, the theory of the US-crew having switched off their transponder was still widely debated by the press. It was also discussed at the top-level of the Brazilian Air Force as it's commanding officer made remarks to the IFATCA delegation along these lines. First doubts about the theory started to come when we saw the radar recordings and saw the wildly fluctuating altitude indications, but with a steady track flown by the Legacy jet. We started to get the utmost conviction that the aircraft was continuously flying at FL 370 as cleared by ATC. We thought from then on that it simply could not be possible that a professional crew would willingly switch off such an important piece of equipment.

In early November I had a crucial meeting somewhere in Europe where I met a person that had been in Brazil and wanted to talk to me about this mid-air collision. He asked to check and compare our notes and to show me something important. I was shown by him how, with one unintentional key-stroke on the RMU (Radio Management Unit) of the avionics fitted on Embraer aircraft, it is possible to put the transponder on stand-by, and disable it.



→ TCAS display showing TCAS off and transponder on stand-by on the RMU.

Photo: Graf consulting

This is compounded by the fact that the indications in the cockpit that the transponder is currently switched off or on stand-by (and as a consequence that TCAS is disabled) are extremely difficult to spot and are not indicated in the standard failure colours:

- there is a small indication in yellow (just underneath the transponder code selected) saying STANDBY on the RMU (Radio Management Unit)
- on the PFD (Primary Flight Display) to the left there is a message in white and small letters indicating TCAS OFF
- on the right of the MFD (Multi Flight Display) the same message is repeated in small white colours (see above photo)
- the Vertical Speed Indicator, also used to fly the vertical RA escape manoeuvres, continues to remain green, despite the fact that the TCAS is not functional.

What is even more worrying to me, is that back in 2005, when AD-2005-0021 was issued by EASA it was written as note in European NOTAM backing issuance of the AD for transponders that "When this reversion to standby mode occurs, the ATC/TCAS standby mode is indicated on the RMU and Cockpit Displays (PFD/MFD), **however these indications may not be apparent to pilots**, especially during periods of high workload".

## Outlook

Of course the fact that a transponder ceases to function or is disabled in flight (being either voluntarily or involuntarily) is not yet sufficient to explain a mid-air collision in itself. It is "just a contributing factor" but may well

be the start of a chain of events. There must be more failures or underlying problems occurring simultaneously before this can actually become so critical that the worst must be feared, including a mid-air collision.

But we have now indications and hints that point to the fact that this transponder loss may very well have been at the start of the fatal chain of events. It is therefore urgent to eradicate this problem at the source, as this will reduce significantly the risk and the probability that a similar chain of events will be started again. This is not at all a defence for a weak or badly designed ATC-system on the ground, where a lot of decisive actions are needed as well, but those remedial actions must be undertaken in parallel.

For me, there are mainly two issues that need to be addressed with urgency by the regulators and by the transponder manufacturers:

- the ability to disable the transponder in flight by one single key stroke is unacceptable
- the indications that the transponder is off or stand-by are not visible enough (the visibility and warning must be improved significantly)

Let us hope that this accident will finally bring the required strong and decisive actions by the stakeholders and regulators. The manufacturers might be restricted in this matter as they are currently under threat of several law-suits in US courts that allege their legal liability for this collision. But common sense should prevail. ☺

**Transponder loss was at the start of the fatal chain of events.**

# IFATCA Statement after the Collision Issued on 24 November 2006 (Extracts) Gol Flight 1907



The International Federation of Air Traffic Controllers' Associations (IFATCA) has noted recent statements attributed to the Chief Commander of the Brazilian Air Force, and Commander of the Aeronautica Tenente-Brigadierio-do-Ar, Senor Luiz Carlos da Silva Bueno. IFATCA is surprised and disheartened to learn that statements to the effect that an air traffic controller from Brasilia ACC made an error when controlling the Legacy flight so that it collided with the Boeing 737-80 of GOL over the Amazon, were made in front of the Brazilian Congress. Senor Bueno allegedly said that 'the controller thought that the aircraft was at FL 360, which was erroneous information, but the air traffic controller believed this wrong information'.

IFATCA believes that Commander Bueno is not well informed and therefore is making incorrect, or only partially correct statements. Facts will show that the Air Traffic Management system in place in the airspace of Brasilia did not register nor correctly detect the true altitude of the American-registered aircraft. [...]

IFATCA believes that operators in the air (the pilots), and on ground (the controllers), fell victim to unacceptable systems traps brought on by 'non-error tolerant', and 'bad system design' of air traffic control and flight equipment in use. We are confident that our statements concerning this equipment are accurate, and said equipment is responsible for starting the fatal chain of events of September 29, 2006, and therefore, contributed to the mid-air collision.

IFATCA urges Brazilian authorities not to engage in a 'counterproductive' blame game, but to invest their energies to the undertaking of immediate and decisive remedial actions to eliminate these dangerous safety 'traps'. If swift action is not forthcoming, the probability of incidents or, a similar type second accident occurring remain high.

END OF STATEMENT

**IFATCA believes that the pilots, and the controllers, fell victim to unacceptable systems traps brought on by 'non-error tolerant', and 'bad system design' of both air traffic control and flight equipment in use**

## Observations and Areas of Concern (extracts)

1. The software of ACC Brasilia is badly designed in the opinion of IFATCA, and therefore is a major contributor to an unsafe and dangerous ATC system.
2. The Legacy needed to change from an odd level (FL 370) to an even level, being FL 360. When passing over Brasilia VOR, the Brasilia ACC software did automatically change the coordinated altitude indication to 360 (from 370) on the aircraft label shown on the radar screen. However, the flight was still flying at FL 370 and was not cleared down by ATC to FL 360 as shown on the label.
3. Once a flight is "lost" by SSR in Brasilia ACC (i.e when the transponder shuts off, or goes to 'stand-by' mode) , the Brazilian military primary radar kicks in. It continues to show the 'lost' flight almost immediately in a very similar way as before the failure.
4. A special feature of the Brasilia military radar is that it calculates altitudes (or flight levels) in a 3D-mode. And display this on the label, There is only a small Z between both 360 indicating the missing Mode C report, but this can be easily overseen and not noted.
5. To date IFATCA has not received a convincing explanation of why the software of ACC- Brasilia is tuned in such a strange way. We are also at a loss to understand why the very unreliable 3D-altitude calculations of military primary (3D radars) are shown to civilian controllers.
6. The Embraer Legacy cockpit can be a dangerous trap for pilots. The Legacy with its Honeywell custom-built avionics panel can be a hazard in the air. To inadvertently switch off the safety-essential transponder (or to put it on stand-by) in this aircraft is very easy.

## Final remarks

IFATCA is of the opinion that this accident investigation must remain neutral and completely un-biased. The focus should be to bring to light all relevant facts and actions that have led to this terrible tragedy. We must permit the aviation system to learn from this accident and to correct the identified weaknesses in order to strengthen the ATM system.

IFATCA has concerns regarding some of the content appearing in the intermediate report published by the Centro de Prevenção e Investigação de Acidentes Aeronáuticos (CENIPA) We believe a certain 'tone' of language used and points mentioned in the intermediate report are not indicative of a neutral stance, and are an early indication of a certain view and position held by the accident investigation commission.

IFATCA urges the CENIPA and the Brazilian government to report neutrally and consistently, without any distortion, the relevant facts and factors that have led to this terrible accident. Full disclosure is paramount so that we may learn from this tragedy. The Full statement is available on IFATCA web site at [www.ifatca.org](http://www.ifatca.org)



Photo: VEJA

# What can IFATCA learn from the Brazilian experience?



Photo: DP



by **Marc Baumgartner,**  
President & CEO on behalf of the Executive Board

On the 29<sup>th</sup> of September a mid-air collision occurred over Brazil. The Executive Board (EB) learned about this unfortunate accident on the 30<sup>th</sup> of September 2006. This is the second mid-air collision within four years, and we as an organization representing the controllers around the globe decided that we needed to respond. The EB discussed how best to react to this tragic fatal accident. IFATCA has a Member Association in Brazil and we were able to contact them quite rapidly. Getting to the people concerned was a different story. Our Member Association declares 15 members, however in Brazil there are some 2900 air traffic controllers, most of them are military personnel. Previously IFATCA had tried to find ways of how all the ATCOs could join IFATCA. We had established contacts with the existing Federation of Air Traffic Controller Association of Brazil (FEBRACTA). This association was created in order to give all air traffic controllers (civil and military personnel) the opportunity to join IFATCA in the future. Once we had established the contacts, soon it became very clear, that due to the particular nature of providing ATC in Brazil some support in situ would be required.

With exceptional effort, within a limited time-frame of one week we were able to create, a team of three people capable and willing to give support to our colleagues in Brazil. IFATCA has never done this before. The challenge to create a team (a mental health professional for the Critical Incident Stress Management, a trained accident and incident investigator and an IFATCA ICAO Panel representative who had been involved in the internal Skyguide investigation board after Überlingen) was huge. The team had to be unhindered by unnecessary bureaucracy, knowledgeable with our policies and all this combined with a suf-

ficient level of experience. Within one week after the collision IFATCA had written mission orders, co-ordinated with the individuals and their employers, and our delegation was on its way to Brazil. This would not have been possible without a lot of personal sacrifice by the three individuals, big support from their national member associations, their employers and TAP (Air Portugal). During their visit we needed to consolidate our contacts and obtain feedback. For the EB, the concept of this „crisis intervention team“ was new and therefore a lot of creativity and flexibility was required.

The team acted very professionally and the feedback from the concerned controllers was great and continues to be very positive. The Brazilian ATCOs were not prepared for such a tragic accident and the support the three individuals have given was outstanding. The EB would like to express its deepest gratitude to them.

After their return we entered a new phase. What would we do with the debriefing of the team? The information gathered and the feedback received, showed clearly that there were new challenges we were to face, be it on the communication level or optimization of our support to our colleagues in Brazil. The situation in Brazil was evolving fast and similarities of reactions with other accidents (like Ueberlingen for instance) were very striking. This was (and is) mainly driven by the press and can in general be broken down into three main phases. Theory on crisis communication lists describes this as: <sup>(1)</sup>

**Phase one – Consternation:**

**Phase two – Further elaborations:**

**Phase three – Accusation:**

**Within one week after the collision IFATCA had written mission orders, coordinated with the individuals and their employers, and our delegation was on its way to Brazil**

**IFATCA's continuous support for the Member association in Brazil will be further strengthened once all Brazilian controllers finally become members of the Federation.**



Particularly in phase three, the similarities of reaction were very striking: first the focus of blame the pilots, then the individual ATCOs, then the system (Brazilian Air Force), and then the politicians. During all these phases, the press is omni-present and is asking for improvements in the system and provides the necessary external pressure so that they are implemented.

IFATCA decided to send a letter to the President of Brazil highlighting some of the system deficiencies our team was able to observe during their visit. The letter also addressed the urgent need for improvement of the safety of the traveling public and the economic means required to achieve these goals without delay.

The press got hold of this letter, and as could be expected, the individual ATCOs started being accused by their superiors. After discussion within the EB, we decided to give support but to limit it to professional issues. The reaction of the military authorities was very heavy-handed. The military personnel were placed in barracks and guarded whilst at work. In addition, people that had never worked in the units involved in the mid-air collision were forced to work there. This was clearly a reaction we did not expect to happen. From a professional point of view we thought these actions were completely unacceptable, and would increase the risks taken within the ATM system. The military reaction originated from the reduction of the number of flights handled by the sectors to the number that was actually foreseen at the design stage of the system. This inevitably led to huge delays at all Brazilian airports.

This fact and the intermediate accident report made us go one step further – a new experience in IFATCA history. IFATCA published a statement with some detailed information on the system and its breakdown. We gave up our natural reservations regarding ongoing accident investigation and took a big risk by publishing the statement. The outcome, however, was very positive as the press and other international organizations<sup>12</sup> were able to better understand how ATM works and what could lead to an accident when the ATM system breaks down.

The next step in Brazil which can be envisaged by IFATCA, will be the start of the legal investigation once the final accident report is published. This will be (as we have seen in other aircraft accidents), a very challenging phase for the ATCOs involved. The EB has written to the Brazilian ATCOs in order they join forces with IFATCA so that we are able to give support as well during this phase.

IFATCA will have to carefully analyse this event with all the parties involved and decide if it can play a proactive role when things do go wrong and to give consideration to the experience used in Brazil. One of the main challenges we have learned from the practice so far is to find

the correct balance between giving real support (psychological, technical and professional) to the controllers, while keeping the doors open to the Federation to act as a respected stakeholder and interlocutor for Governments, other aviation stakeholder and press.

IFATCA's continuous support for the Member association in Brazil will be further strengthened once all Brazilian controllers finally become members of the Federation. ☺

## Crisis communication basic rules:

After a serious crisis, these are generally the questions, various players and actors (i.e.: ATC management, Airlines, Politicians, the media... etc.)

### Phase one

**Consternation:** The first phase is dealing with the facts. What has happened? Any impact (collateral damage)? How many deaths? How many injured? Are they being treated? Is there anything that should be feared? Has rescue been organized? Etc.

### Phase two

**Further elaborations:** Anything new? One is aware of the facts, what happened and which impact the event had, now starts the research phase? How could something like this have happened? Have some security or safety measures not been dealt with correctly or failed? Could there be any actions to avoid this? Was everything in place to avoid such a situation?

### Phase three

**Accusation:** Who is responsible? Which consequences will this have? Can somebody be fired or imprisoned? Press starts to judge rapidly and play more and more the role of the judicial system.