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**MINISTÉRIO DAS OBRAS PÚBLICAS, TRANSPORTES E COMUNICAÇÕES
GABINETE DE PREVENÇÃO E INVESTIGAÇÃO DE ACIDENTES COM AERONAVES****AIRCRAFT INCIDENT SUMMARY REPORT**

In accordance with Annex 13 to the International Civil Aviation Organisation Convention, Chicago 1944, Council Directive 94/56/EC, 21st NOV 1994, and article 11th n° 3 of Decree-Law n° 318/99, 11th AUG 1999, the sole purpose of this investigation is to prevent aviation accidents. It is not the purpose of any such incident investigation and the associated investigation report to apportion blame or liability.

Date/Time: 2010 / 04 / 12 @ 18:52 UTC ¹	Proc. Nr.: 04 / SUM / 2010
Operator: TAP Portugal / RYANAIR	Type of Incid.: ATM - AIRPROX
Id. of aircraft: Airbus A-319 / Boeing B-737/800	
Local: Porto (LPPR) airport	
Type of flight: Transport - Passengers	Phase of flight: Approach
People on board: Unknown / 181	Injuries: Nil
Aircraft Damage: Nil	
Other Damage: Nil	
Synopsys: TAP-1580 (A-319) was flying from Madeira (LPMA) to Oporto (LPPR) and RYR-69VN (B-737) was flying from Birmingham (EGBB) to Oporto (LPPR). In contact with Oporto Approach Control, flights TAP-1580 was cleared for a direct entry to a VOR/DME approach to runway 35, with an initial approach altitude of 3000ft over XAPIM, while RYR-69VN has been cleared to 4000ft, on course to PR633 point and then proceed on heading until instructed to turn left for base. As TAP-1580 was keeping high speed, approaching initial fix, he had to reduce his descent rate, in order to reduce speed and configured the aircraft for approach. This caused a TCAS/TA alert on RYR-69VN, forcing him to keep above assigned altitude, to avoid a TCAS/RA, becoming 800ft above opposite traffic, when they crossed (\pm 7NM before XAPIM). Because this event configured a lack of separation between aircrafts, according ICAO Annex 13, Attachment "C", nr 2, it was classified as a Serious Incident and an investigation process was started, as per Portuguese Law (Dec. Law Nr 318/99, art. 11 th , nr 1).	

ESTÁ CONFORME O ORIGINAL

GPIAAHomologo nos termos do n°
3 do art° 26° do D.L. 318/99,
de 11/08/1999

17.AGO.2010

O Director,

Fernando Ferreira dos Reis

¹ - All times in this report, unless other specified, are UTC time (Universal Coordinated Time). By that date, local time in mainland Portugal and Madeira was equal to UTC + 1 hour.

1. Factual Information

1,1 History of the Flight

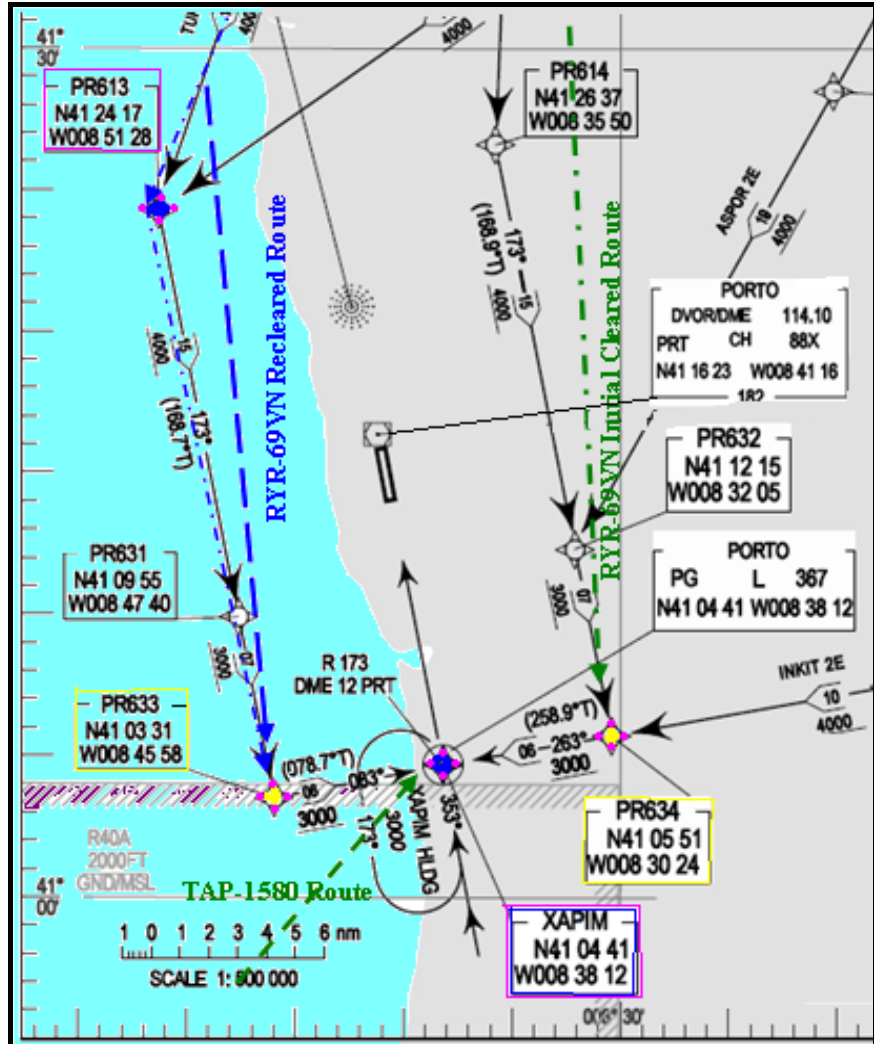
Irish Company Ryanair flight RYR-69VN departed Birmingham (EGBB), in United Kingdom, with destination Oporto (LPPR), in Portugal. At 18:29:01, Santiago TMA Controller coordinated the flight with Oporto APP Controller in order he could fly direct to PR634 point and descend to FL130.

Portuguese Company TAP Portugal flight TAP-1580 was operating a domestic flight from Madeira (LPMA) international airport to Oporto (LPPR).

At 18:29:40, Lisbon ACC North sector Controller coordinated with Oporto APP Controller for him to proceed direct to XAPIM point, from a position ABM Lisbon, descending to FL 100.

TAP-1580 established his first contact with Oporto APP by 18:36:56 and has been cleared to descend to FL080.

At 18:40:59, Oporto APP Controller contacted Santiago Controller for flight RYR-69VN to be cleared to fly direct to PR613 point (picture nr 1).



Picture Nr 1

Flight RYR-69VN established his first contact with Oporto APP at 18:43:52 and has been instructed to continue his descent to FL060, direct to PR613.

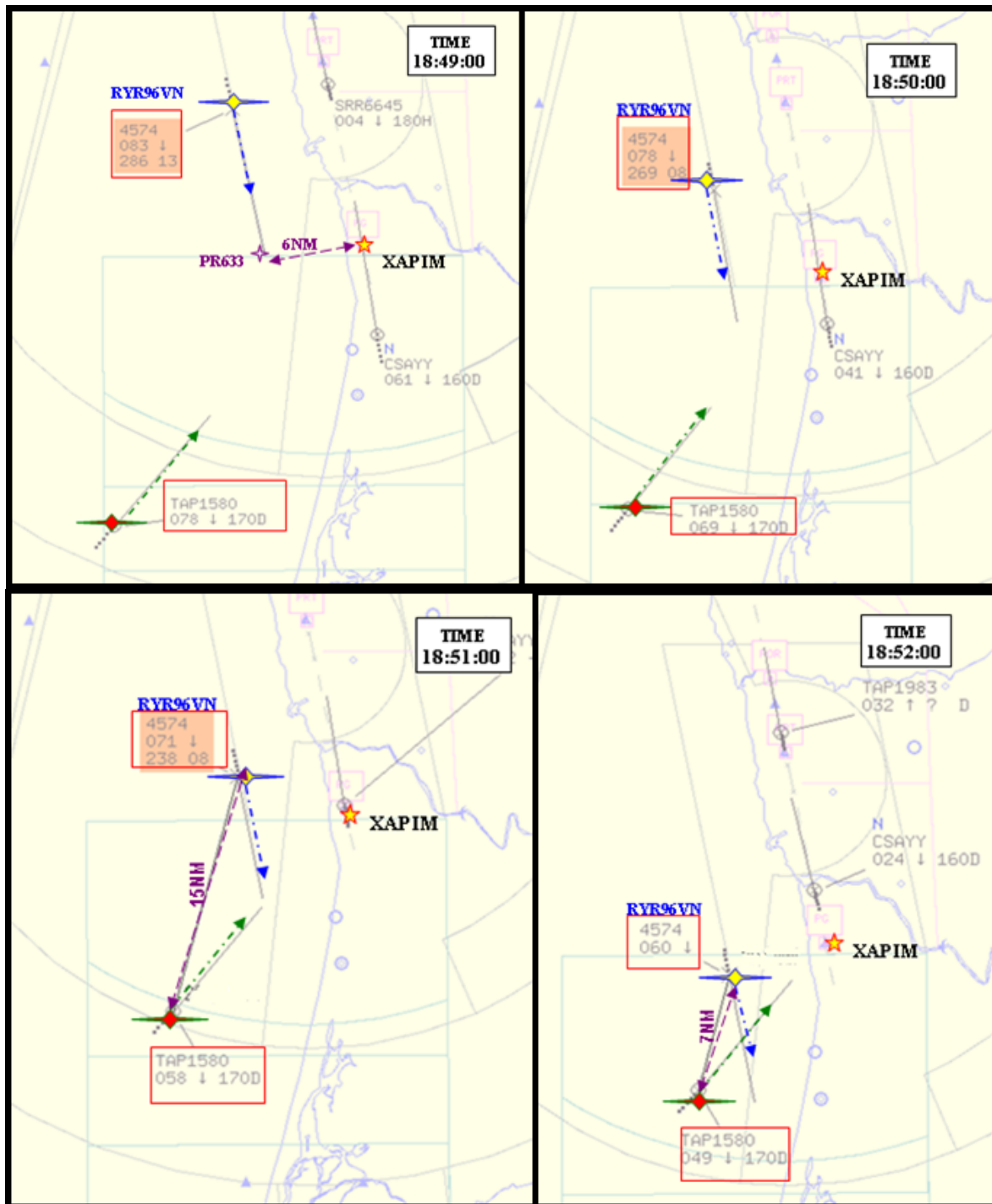
By 18:46:19, RYR-69VN questioned about the route to be followed after PR613 and approach controller (APP CTA) informed that after PR613 he must proceed to PR633 and cleared him to descend to 4000ft, on QNH 1005hPc. After pilot readback the flight was re-cleared to fly direct to PR633.

By 18:47:18, TAP-1580 was cleared to descend to FL060, heading to XAPIM.

Expecting RYR-69VN would arrive first than TAP-1580, by 18:48:21, Oporto APP CTA asked RYR-69VN if he could, after PR633, fly direct to XAPIM, to which the pilot answered he needed to fly 3NM more, after PR633, before turning left to base, in order to loose altitude, due traffic restrictions in Spanish airspace that delayed his descent.

After that answer the CTA decided to give priority for landing to TAP-1580 and, following both flights progress on radar screen (picture nr 2), he issued the following instructions:

Time	To RYR-69VN	Time	To TAP-1580
18:48:52	- To stop descent at FL070 and reduce to minimum clean speed.	18:49:39	- To continue descent to 3000ft, on QNH 1005hPc.
18:50:13	- To continue descent to FL060.	18:50:38	- Cleared for a VOR/DME approach to runway 35.
18:50:48	- To maintain present heading after PR633.		
18:51:38	- To descend to 4000ft, on QNH 1005hPc.		



Picture Nr 2

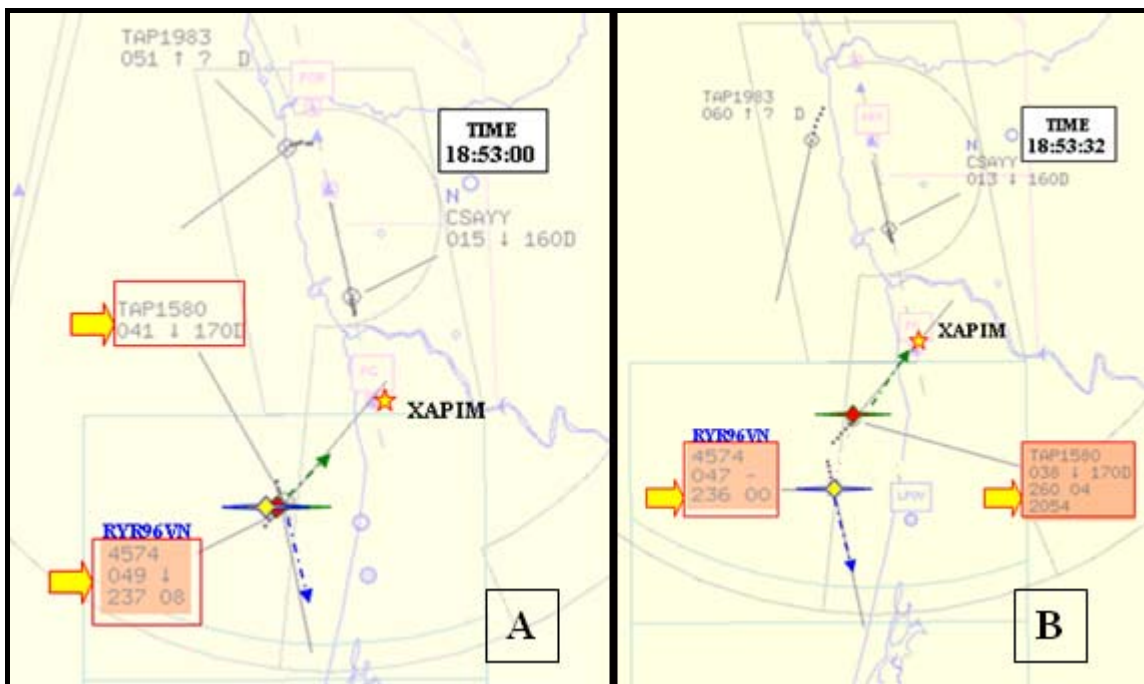
Traffic continued on a convergent course with RYR-69VN descending at $\pm 500\text{ft/m}$, while reducing speed to $\pm 238\text{kt}$ and TAP-1580 descending at a rate of $\pm 1000\text{ft/m}$ and sustaining high speed ($\geq 260\text{kt}$).

At 18:52:25, with a normal descent rate (1100ft/m), approaching 5000ft and TCAS showing an amber TA, RYR-69VN reduced his rate of descent to 400ft/m and questioned CTA about traffic 800ft bellow, from right to left, if it was the aircraft expected to land in front of him (*picture nr 3*). The CTA confirmed and informed he would call him in a minute, to turn left.

RYR-69VN referred (18:52:54) the other aircraft was 800ft bellow (*picture nr 4A*), being answered that he was 1000ft bellow. Almost immediately there came a voice, in the frequency, saying (in Portuguese): "... uhuuhmm ... it continues descending ... the traffic ...".



Picture Nr 3



Picture Nr 4

At 18:53:18, CTA informed RYR-69VN to expect further descent as soon as TAP-1580 reached 3000ft. By that time TAP-1580 was passing 3900ft and reduced descent rate (400ft/m), in order to reduce speed (*picture nr 4B*).

RYR-69VN replied that traffic seemed to be at 4000ft and questioned if the crew had forgotten to introduce QNH. As an answer the CTA instructed RYR-69VN to turn left, heading 080° , for base. By 18:54:06, RYR-69VN was told to head 030° , to XAPIM. After the read-back he was cleared to descend to 3000ft.

Traffic was transferred to TWR frequency by 18:54:53 (TAP-1580) and 18:56:58 (RYR-69VN).

2. Analysis

2.1 Routing Options

TAP-1580 was approaching from Southwest and had been cleared to proceed direct to Initial Approach Fix (IAF) for runway 35 (XAPIM) where he was expected to arrive at an altitude of 3000ft and a speed not greater than 210/230kt (minimum clean speed).

RYR-69VN was expected to perform "TURON 2E" Standard Arrival (STAR), flying East of the field and approaching from an opposite direction of TAP-1580.

For traffic reasons RYR-69VN arrival was changed to "TURON 2W" STAR, flying over the sea and performing a left circuit to initial approach fix (XAPIM).

Facing the need to extend down wind, RYR-69VN track would intercept TAP-1580 track. This situation required a precise coordination to keep aircraft separation.

2.2 Traffic Separation

Oporto APP Controller (CTA) coordinated RYR-69VN descent with Santiago and was estimating its arrival some minutes ahead of TAP-1580. However, the presence of other conflicting traffic (in Spanish airspace) caused a delay on RYR-69VN descent and put the aircraft slightly above normal descent profile.

CTA cleared RYR-69VN for 4000ft to PR633, expecting to direct him from that point to XAPIM. When the pilot requested to continue for 3NM more, from PR633, which implied an increase of ± 6 NM on distance to go, spacing between RYR-69VN and TAP-1580 became shorter. Even so, it can be estimated that RYR-69VN track would be ± 5 NM shorter than TAP-1580.

Considering the convenience of reducing the speed of one of the aircrafts, the CTA, using his powers, opted to change approach priority and put the lowest one (TAP-1580 at 7800ft) landing ahead of the highest one (RYR-69VN at 8300ft).

For that reason, TAP-1580 was cleared to descend to 3000ft and RYR-69VN was re-cleared to FL070 (first) and FL060 (later), being instructed to reduce speed to minimum clean speed. By 18:51:38 RYR-68VN was cleared to descend to 4000ft.

In spite of TAP-1580 to keep normal speed (≈ 260 kt) and RYR-69VN to reduce to ≈ 238 kts, they finished to cross at about 8NM Southwest of XAPIM, as speed difference was not enough for recovering extra track distance and RYR-69VN had to be keeping heading for more than 3NM (initially expected) from PR633.

Being cleared to descend to 4000ft, when TAP-1580 (about 10NM far) was crossing 5400ft, RYR-69VN crossed the traffic 800ft above because **the crew got a TCAS/TA and reduced vertical speed to avoid a TCAS/RA**. Had RYR-69VN maintain his descent rate, both aircrafts would encounter at 4100ft, ± 6 NM South of PR633 (*picture nr 4A*), unless any safety device was timely activated. It looks strange the STCA being not activated, with aircrafts in a convergent track and a separation of 800ft at ± 5 NM.

CTA never issued any instruction to avoid loss of separation minima, be it a vertical speed/altitude change or heading change.

3. Conclusions

3.1 Findings

- 1st RYR-69VN flight had a route change and got some restrictions for his descent, in Spanish airspace, which put him slightly above normal descent profile;
- 2nd When transferred to Oporto APP he received priority over TAP-1580 and descent & approach instructions were delivered accordingly;
- 3rd Being questioned about possibility of direct flying from PR633 to XAPIM, the captain declared the need to fly 3NM further out of PR633, before turn, in order to loose altitude, due previous descent restrictions;
- 4th Faced with this new situation, APP Controller decided to invert landing priority, issuing necessary clearance's changes for both flights and ordering a speed reduction for RYR-69VN;
- 5th TAP-1580 was cleared to descend to 3000ft and fly direct to initial approach fix of runway 35 (XAPIM), for a VOR/DME approach procedure;
- 6th RYR-69VN was recleared to 4000ft, on QNH 1005hPc, maintaining present heading until further advice;
- 7th The aircrafts crossed each other about 8NM Southwest of XAPIM with a vertical separation of 800ft (4100ft for TAP-1580 and 4900ft for RYR-69VN);
- 8th That separation has been achieved because RYR-69VN reduced his descent rate, in order to avoid a TCAS/RA;
- 9th Neither CTA nor TAP-1580 took any action to grant separation.

3.2 Causes of the Incident

Due RYR-69VN track change and landing priority given to TAP-1580, the aircrafts were positioned on a convergent course and a crossing should be expected, before reaching XAPIM.

In order to reduce his speed to configure for approach, TAP-1580 reduced his descent rate, before reaching cleared altitude and without any notice to APP Controller, positioning the aircraft in a conflicting course with RYR-69VN, who had been cleared to 4000ft. Aircrafts would cross at 4100ft, with TAP-1580 being 1100ft above cleared altitude and 100ft above RYR-69VN cleared altitude.

CTA overestimated TAP-1580 manoeuvring capability, believing he would keep vertical speed until levelled at 3000ft, and never issued any instruction to alert for the conflict or to avoid loss of separation minima, which has been only achieved, **MOST PROBABLY**, due RYR-69VN crew timely action.



4. Preventive Action Proposals

Once it was detected a misjudgement when dealing with speed and altitude management of aircrafts involved;

Considering that conditions were developed, allowing the occurrence of a separation conflict between aircrafts in flight, only averted by RYR-69VN crew taking evasive action, after a TCAS/TA, to avoid a TCAS/RA;

It's suggested:

To NAV Portugal, E.P.E.,

“To include in its Controller’s refreshment training the analysis and discussion of this and similar situations, to sensitise controllers for the need to advanced detection of crew reactions and to be alert to altitude and vertical speed changes, in order to avoid the issuance of clearances and instructions that could potentiate the occurrence of loss of separation between aircrafts.” (PAP Nr 10/2010)

Lisbon, 17-AUG-2010

The Investigator In Charge,



A. A. Alves

ACRONYMS

The expressions, abbreviations and acronyms, herein referred and used in this report, have the following meanings:

ABM	Abeam
ACC	Area Control Centre
APP	Approach Control
ATM	Air Traffic Management
CTA	Air Traffic Controller
DME	Distance Measuring Equipment
EGBB	Birmingham Airport (ICAO designation)
FL	Flight Level
ft	Feet, foot
ft/m	Feet per minute
hPc	Hectopascal
ICAO	International Civil Aviation Organization
kt	Knot(s)
LPMA	Madeira Airport (ICAO designation)
LPPR	Oporto Airport (ICAO designation)
NM	Nautical Miles
QNH	Actual Atmospheric Pressure (referred to sea level)
RA	Resolution Advisory
STCA	Short Term Conflict Alert
TA	Traffic Alert
TCAS	Traffic Alert & Collision Avoidance System
TMA	Terminal Control Area
TWR	Tower Control
UTC	Universal Time Coordinated
VHF	Very High Frequency
VOR	VHF Omni Range