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Final Report No. 1977 by the Aircraft Accident Investigation Bureau

concerning the serious incident (AIRPROX)

between EZY 9VM, B737-700, registration G-EZJG

operated by Easyjet

and PTI 747, B737 BBJ, registration HB-IIO

operated by Privat Air

on 11 May 2006

Geneva airport

Federal Palace North, CH-3003 Berne

General remarks concerning this report

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

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

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

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

All times in this report, unless otherwise indicated, follow the coordinated universal time (UTC) format. The local time (LT) in force in Switzerland at the time of the accident was Central European Summer Time (CEST). The relation between LT, CEST and UTC is: LT = CEST = UTC + 2 h.

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

Final Report

Airspace	D
	Aerodrome controller trainee
	Aerodrome controller coach
Controllers	Arrival controller
ATC unit	Terminal Control Geneva; Arrival Control and Aerodrome Control
Date and time	11 May 2006, 15:30 UTC
Location	Geneva airport
	PTI747 CMDR FO
Crews	EZY9VM CMDR FO
	Ferry flight, IFR
	Kasos (LGKV) – Geneva (LSGG)
	PTI747, B737 BBJ registration HB-IIO Privat Air
	Commercial flight, IFR
	Geneva (LSGG) – London Luton (EGGW)
Aircraft	EZY9VM, B737-700 registration G-EZJG Easyjet U.K.

1 Basic information

1.1 History of the flight

On Thursday 11 May 2006, aircraft PTI 747, type B737 BBJ, en route from Kasos (Greece) to Geneva, was making a ferry flight with three cabin crew members and one mechanic on board.

At the controls of the Privat Air Boeing 737 were two pilots qualified as commanders; the one exercising responsibility was the Pilot Flying (PF). He occupied the left-hand seat in the cockpit.

At 15:24:00 UTC, the pilot called Geneva Arrival on frequency 136.25 MHz. He was descending to flight level FL 140. Arrival Control cleared him to flight level FL 100 and allocated him heading 270 degrees for vectoring, proposing that he carry out a VOR DME visual approach on runway 05, as the ILS was out of service because of technical work.

At 15:24:55, the Arrival controller asked the pilot if he was able to make a visual approach. The pilot acquiesced and accepted this type of approach. He was then cleared to make a visual approach via Passeiry (PAS VOR/DME), as number one in the sequence.

Aircraft PTI 747 was descending on a westerly heading at an indicated speed of approximately 270 kt. It continued its flight for a distance of 4.5 NM before commencing a right turn of approximately 25 degrees. Throughout this approach phase, its speed was practically constant. The aircraft passed flight level FL 100 and its speed increased to 300 kt. On a heading of approximately 295 degrees, its speed continued to increase to approximately 320 kt.

At 15:26:41 UTC, the Arrival controller asked the pilot to reduce his speed to 200 kt as soon as possible, to which the pilot replied that he would do so when he was able to.

At 15:26:43 UTC, aircraft EZY 9VM, type B737-700, making a flight from Geneva to London Luton, called Aerodrome Control and stated that it was taxiing to the holding point of runway 5. Aerodrome Control asked it to call back when it was ready to depart.

Aerodrome Control was being provided by an on-the-job-training (OJT) trainee under the direct supervision of an Aerodrome controller (coach).

At 15:27:37 UTC, aircraft PTI 747 began a right turn onto the approach axis for runway 05. Its altitude was 6700 ft and it was 3.5 NM south of the Passeiry VOR/DME (PAS). During the turn, it was transferred by Arrival Control to the Aerodrome Control frequency, without any comment on its speed and altitude. The flight crew does not apply the speed restriction to 250 kt which is compulsory below flight level FL100.

At 15:27:52 UTC, aircraft EZY 9VM reported that it was ready for take-off on standard instrument departure route (SID) SIROD2N, the clearance limit of which is flight level FL 090. It was cleared by Aerodrome Control to line up on the runway and hold.

At 15:28:22 UTC, aircraft EZY 9VM was cleared to take off from runway 05.

At 15:28:29 UTC, aircraft PTI 747 had not yet made contact on the Control Tower frequency and Aerodrome Control called it. The pilot replied and reported that he was on final on the approach axis of runway 05. His speed was 300 kt and he was 5 NM on final, at an altitude of 5000 ft and descending. Control asked him to reduce his speed immediately because of the departing traffic. Control immediately requested aircraft EZY 9VM to take off quickly, informing it of traffic at 4 NM on final approach.

At 15:29:23 UTC, the crew of aircraft PTI 747 informed Aerodrome Control that it could not continue its approach and that it would have to go around. Aerodrome Control instructed it to go around and to climb at its maximum rate. It informed the aircraft that traffic had just taken off. The pilot reported to Control that he had the traffic in sight.

Aircraft PTI 747 followed the published go-around procedure which limits the initial climb to 4000 ft, before flying the prescribed distance, i.e. D1.0 after GVA, which clears it to continue to an altitude of 7000 ft.

Aerodrome Control instructed aircraft EZY 9VM to turn left immediately onto heading 010 degrees because of the traffic which was going around behind it. It instructed the aircraft to climb at a reduced rate.

According to the radar recordings, aircraft PTI 747 was rapidly converging on the aircraft preceding it, with a convergence speed of 100 kt. Aerodrome Control issued PTI 747 with essential traffic information when EZY 9VM was approximately 1 NM in front of it and slightly to its left. It erroneously reported EZY 9VM on its right at one o'clock. At 15:30:04, aircraft PTI 747 was on the runway extended centreline at a distance of 0.9 NM from the GVA VOR/DME at an altitude of 2700 ft and climbing, and aircraft EZY 9VM was commencing its left turn at a lateral distance of approximately 0.15 NM abeam of the GVA VOR, at an altitude of 2900 ft and climbing.

The routes followed thereafter diverged and the separation, both vertical and lateral, between the two aircraft increased rapidly, thereby reducing the potential risk of collision.

The minimum separation between the two aircraft, measured on the radar recordings, indicated a lateral separation of 0.9 NM and an altitude difference of 100 ft.

1.2 Weather conditions

Weather: Infonet Data ATIS Geneva NOVEMBER

QAM LSGG 1450Z 11.05.2006 090 DEG 5 KT. VRB BTN 030 AND 160 DEG VIS 10 KM CLOUD FEW 3500 FT +17/+09 QNH 1017 ONE SEVEN QFE THR 05 966 QFE THR 23 968 NOSIG ILS 05 ON MAINTENANCE. EXPECT VOR DME APP

Weather: Infonet Data ATIS Geneva OSCAR

QAM LSGG 1520Z 11.05.2006 080 DEG 5 KT. VRB BTN 030 AND 150 DEG VIS 10 KM CLOUD FEW 3500 FT FEW CB 4000 FT +18/+09 QNH 1017 ONE SEVEN QFE THR 05 966 QFE THR 23 968 NOSIG ILS 05 ON MAINTENANCE. EXPECT VOR DME APP

1.3 Additional information

1.3.1 Visual Approach (Ref.: ATM GENEVA / APP)

PANS-ATM 4444 rules apply, i.e. essentially visual approaches are authorised:

- at the request of the pilot or on a proposal from ATC;
- *if the ceiling is at least 7000 ft QNH (overcast/broken), or if the pilot reports that he is able to make a visual approach;*
- the trajectory is at the pilot's discretion, subject to noise abatement measures.
- pilots are instructed to joint the approach axis (not necessarily the ILS) at PAS (05) or 10 NM (23) / PETAL minimum 4000 ft.
- 1.3.2 Standard Instrument Departure

SIROD THREE NOVEMBER DEPARTURE

Climb on R046 GVA. When passing 7000 ft but not before D8 GVA, turn left. Establish TR360 to intercept R130 DJL. Proceed to SIROD. INITIAL CLIMB CLEARANCE FL90

1.3.3 Speed restriction

Règles de l'air Chapitre 3, art. 9 : Vitesse maximale

Sauf autorisation de l'Office ou de l'organe compétent des services de la circulation aérienne, la vitesse indiquée pour les vols effectués au-dessous du niveau de vol 100 ne dépassera pas 460 km/h (250 kt IAS).

Les aéronefs qui doivent voler à une vitesse plus élevée en raison de leurs performances maintiendront la vitesse la plus basse possible pour chacune des configurations de vol; le pilote commandant de bord en informera l'organe compétent des services de la circulation aérienne. AIP ENR 1.1-5

In order to prevent hazards to the safety of air navigation, civil flights below FL 100 shall not exceed the maximum speed of 250 kt IAS (Réf: AIP ENR 1.1-5).

1.3.4 Final Approach (Ref.: ATM GENEVA / APP)

When an aircraft is vectored or cleared outside the published (radar or visual) STARS, alignment on the final approach axis must be complete by a fixed point at the latest:

on 23, at 10 NM TD (PETAL), minimum 4000ft QNH on 05, at 5.6 NM TD (PAS VOR)

1.3.5 Coordination between Approach Control APP and Aerodrome Control ADC

Collaboration avec le contrôle d'aérodrome (Réf. : ATM GENEVA/APP)

La pénétration de la CTR ne peut s'effectuer qu'après annonce du mouvement à environ 20 NM/TD sur TID TAR.

Lors du transfert de contrôle à ADC, l'espacement entre les aéronefs à l'arrivée doit être garanti par des vitesses prescrites et stabilisées.

1.3.6 Noise abatement protection zone (Ref. ATM GENEVA/APP)

This zone, intended to reduce noise in the region around the airport, extends: over a distance between 5.6 NM TD 05 (PAS VOR) and 8 NM TD23, over a width of 6 NM either side of the runway centre lines, vertically from the ground to 6400 ft QNH

The following are authorised within this zone:

- established flights on published routes,
- *downwind traffic or vectored traffic towards this,*
- departure from 05 on the diversion route

The following are excluded from this zone:

- visual approaches,
- missed approaches with diversion from the centre line or 360°.
- 1.3.7 Missed Approaches

Procedure (Ref. AIP LSGG AD 2.24.10-13 GENEVA VOR RWY 05)

Climb straight ahead on R046 GVA. Proceed to SPR. Initial climb 4000 ft. At D1 GVA past the station, continue climb to 7000 ft. Cross D9.5 GVA past the station at 4000 ft or above.

1.3.8 VFR overflying altitude (Ref: ATMM TCG TWR/Arrivals IFR D.2)

CFR is not provided for VFR transit flights; consequently, overflights from and to Annemasse must be specified at a minimum of 5000ft.

...In the event of a go-around, ADC clears the flight carrying out the missed approach to climb to 1000 ft below the coordinated transit flight and transfers it to PRE.

If no such transits have been reported, ADC clears flights going around to climb directly to 7000 ft and transfers them to PRE.

The limitation of the missed approach procedure at 4000 ft initially is intended to mitigate an unacceptable risk existing when two events would occur simultaneously : an IFR flight going around and a VFR flight overflying at 5000 ft.

1.3.9 Runway 05 diversion route (Ref. ATM GVA / APP / IFR DEPARTURES)

(Use to be avoided for noisy aircraft and/or aircraft with a low rate of climb)

If an 05 departure has to take place when there is a risk of conflict with the preceding traffic or traffic arriving on 23, the narrow limits of art. 27 OSIA (Ordonnance sur l'infrastructure aéronautique – Ordinance on Aviation Infrastructure) allow the outgoing traffic to be diverted, if necessary:

- *left turn above GVA VOR (noise abatement measure);*
- heading between 020° and 045°.

Since this trajectory is not in compliance with the PANS-OPS standards, it is appropriate to assign it only in the form of a visual climb: "visual climb until passing 4000 ft", as a function of the MVA from this altitude.

2 Analysis

2.1 Flight management aspects

At the time the pilot of aircraft PTI 747 accepted a visual approach, the aircraft was 16 NM SE of PAS, at flight level FL 155 and descending to flight level FL 100 and its indicated airspeed (AIS) was close to 270 kt.

When the Arrival controller asked the pilot to reduce to 200 kt, the aircraft was flying at an indicated airspeed of approximately 300 kt and this subsequently increased further, according to the radar recordings, reaching its final value of 323 kt, across PAS.

The maximum allowed speed below flight level FL100 which is 250 kt IAS was not implemented by the crew of the flight PTI 747.

When commencing its final turn, the aircraft's high speed and its proximity to the extended runway centreline did not allow it to line up correctly or to fly over the PAS VOR as it was cleared to do. In fact, the aircraft crossed the beacon about 1 NM away on the Jura side. At this location, the aircraft was passing 5000 ft and its speed was 300 kt.

The decision to go around was taken by the crew when the aircraft was 1.5 NM from the runway threshold and when its indicated speed was approximately 250 kt.

Between the time when the Arrival controller requested the speed reduction to 200 kt and the time the aircraft passed PAS, almost two minutes had elapsed and the PTI 747's speed had not decreased but increased. The speed reduction ordered by ATC was never implemented.

It should be noted that the overflight of the PAS VOR should take place at an altitude of 3180 ft for an ideal slope of 3° (ILS). According to the radar recordings, the Privat Air aircraft was at approximately 5000 ft.

From that point on, it was clear that the pilot could not make a landing and that the only possible outcome was a go-around. Despite this evidence, the pilot, according to the radar recordings and the radiotelephone exchanges, waited for a further 50 seconds before taking this decision.

We note that, according to the weather information and the statements of the two pilots, a visual approach was entirely possible. However, it did require a flying tactic enabling either a rapid reduction in the aircraft's speed or an appreciable extension of the downwind stage in order to prolong the distance up to the landing. The pilot flying opted for a marked increase in the rate of descent and the consequence of this was an increase in airspeed and the impossibility of configuring the aircraft for landing. In parallel, he opted for a short approach. The combination of these two factors, i.e. the increase in speed and the reduction in the flying distance, counteracted each other and led to an unstabilised approach in terms of both the flight profile and speed and in terms of the adequate configuration of the aircraft for the landing.

According to his statements, the commander switched off his autopilot as soon as the visual approach clearance was given. This choice, given the distance of the aircraft from the airport, its altitude and its speed, did not facilitate management of his approach.

The go-around profile was implemented in accordance with the prescribed procedure and the control directives. According to the statements of the Privat Air crew, visual contact with the Easyjet aircraft was constantly maintained. Consequently, they did not consider the incident as dangerous. Only a TA was issued by their TCAS. A detailed explanation of these circumstances is given below in the section relating to the TCAS.

In conclusion, from the time the pilot accepted a visual approach, he lost situational awareness as well as the overall control of this type of approach.

It is surprising that, faced with the evidence of an unstabilised approach, the pilot not flying did not intervene with his colleague at an opportune moment.

2.2 ATC aspects

A succession of failings led to a dangerous convergence of the two aircraft involved.

Approach Control had noted that when the visual approach was cleared, the aircraft's speed and altitude were high. At 15:27:54 UTC, the Aerodrome controller cleared flight EZY 9VM to line up on runway 05. The Privat Air 747 was already in the visual approach phase, 9 NM from runway 05. The Aerodrome controllers could have noted on their radar monitor that the high speed of the Privat Air 747 compromised the alignment and take-off of the EZY 9VM aircraft. At the time of the transfer of communication to Aerodrome Control ADC, the Approach controller did not judge it necessary to inform the ADC controller of the high speed and altitude of the aircraft. Aircraft PTI 747's visual approach at an excessive speed and its incorrect line-up with the centre line of runway 05 surprised the Aerodrome controllers (trainee and coach). Aerodrome Control tried, unsuccessfully, to resolve the problem by requesting the PTI 747 aircraft to reduce its speed immediately and by requesting the EZY 9VM aircraft to activate its departure, informing it of the arriving traffic.

Aerodrome Control instructed the EZY 9VM aircraft to turn left onto heading 010° and to continue climbing at a reduced rate when it was cleared to flight level FL 090. It did not specify that it was to do this in the form of a visual climb despite the configuration of the terrain towards which the aircraft was heading.

Aerodrome Control instructed the crew of the PTI 747 aircraft to climb at a high rate, allowing them to apply the published procedure which restricted it to an altitude of 4000 ft. Given that there was no VFR transit traffic above the CTR control zone, an altitude of 7000 ft could therefore have been assigned to it directly, in coordination with Approach Control.

The crew of aircraft PTI 747 then applied the published go-around procedure which limited the initial climb to 4000 ft, before flying the prescribed distance which authorised it to continue to an altitude of 7000 ft.

It should be noted that the go-around procedure as designed compromises flight safety in the case of a simultaneous take-off by an aircraft from runway 05.

2.3 TCAS aspect

As indicated in section 2.1, the crews of the two aircraft involved received a traffic advisory (TA). However, they did not register a resolution advisory (RA), which is normal, given the altitudes at which the two aircraft were positioned at the time of the incident.

When an aircraft is flying at a height of 1000 ft AGL \pm 100 ft (reading given by the radio altimeter), the TCAS automatically modifies its sensitivity level and resolution advisories (RA) are no longer generated. In view of the tolerance of \pm 100 ft, it is possible for an RA type advisory to be issued at a height of 900 ft. In such a case, the pilot is instructed to ignore this instruction, which, moreover, will be deactivated below 900 foot.

The TCAS is designed in such a way that the following resolution advisories (RA) are not issued:

- "INCREASE DESCENT, INCREASE DESCENT" below 1450 ft AGL.
- "DESCENT, DESCENT" below 1100 ft AGL.

Furthermore a ground proximity warning has priority over a resolution advisory (RA).

3 Conclusions

3.1 Findings

- Runway 05 was in service.
- The runway 05 ILS was out of service because of technical work.
- The type of approach noted in the ATIS was of the VOR/DME type.
- The Aerodrome controller (coach) was in possession of an appropriate licence.
- The Arrival radar controller was in possession of an appropriate licence.
- At 15:24:55, the Arrival controller asked the pilot if he would agree to a visual approach on runway 05. The pilot accepted this type of approach.
- The weather conditions permitted this type of approach.
- At 15:25:06 UTC, the Arrival controller issued clearance for a visual approach via Passeiry, number one in the sequence.
- At 15:26:41 UTC, the Arrival controller asked the pilot to reduce his speed to 200 kt. This reduction was not implemented.
- At 15:28:04 UTC, the Arrival controller transferred the PTI 747 aircraft to the Aerodrome Control frequency 118.7 MHz. According to the recording of the radar plots, the aircraft was 8 NM on final, 1.7 NM south-west of the Passeiry VOR, at an altitude of 5600 ft. Its speed was approximately 310 kt.
- At 15:28:22, the Aerodrome controller cleared aircraft EZY 9VM to take off from runway 05.
- At 15:28:35, the Aerodrome controller requested the pilot of the PTI 747 aircraft to reduce his speed immediately. According to the radar recording, the aircraft was then 5 NM on final, just north of the PAS VOR, at an altitude of 4700 ft and at a speed of approximately 300 kt.
- At 15:29:23 UTC, the pilot of the PTI 747 aircraft reported that he was unable to continue the approach and that he would have to go around.
- Aerodrome Control read back this message and issued essential traffic information concerning the EZY 9VM aircraft which had just taken off. It

requested the pilot of the PTI 747 aircraft to climb at its maximum rate. The pilot informed Aerodrome Control that he visual contact with the traffic.

- Aerodrome Control instructed the pilot of the EZY 9VM aircraft to turn left immediately onto a heading of 010°. It requested him to climb at a reduced rate.
- At 15:29:38, according to the radar recordings, the minimum separation between the two aircraft indicated a lateral separation of 0.9 NM and an altitude difference of 100 ft.

3.2 Cause

The serious incident is due to the fact that ATC cleared an aircraft to line up and then to take off whilst an aircraft on final approach was making an unstabilised visual approach, the outcome of which would clearly be a go-around.

Factors affecting the incident sequence:

- lack of cooperation within the flight crew of the PTI 747 aircraft
- lack of cooperation between the Approach unit and ADC
- inadequate avoiding action by ATC

Berne, 26 February 2008

Aircraft Accident Investigation Bureau

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