

AIRCRAFT INCIDENT REPORT

(cf. Aircraft Accident Investigation Act, No. 35/2004)

M-04303/AIG-26

**OY-RCA / N46PW
BAe-146 / Piper PA46T
63°N, 028°W
1 August 2003**



This investigation was carried out in accordance with Annex 13 (Aircraft Accident and Incident investigation) to the Convention on International Civil Aviation. The aim of aircraft accident investigation is solely to identify mistakes and/or deficiencies capable of undermining flight safety, whether contributing factors or not to the accident in question, and to prevent further occurrences of similar cause(s). It is not up to the investigation authority to determine or divide blame or responsibility. This report shall not be used for purposes other than preventive ones.

1. FACTUAL INFORMATION

Location: Inside the ACC Low of the Reykjavik Control Area (CTA), at position 63°N, 028°W

Date and time (UTC): 1 August 2003 at 16:10 hrs

Aircraft 1: Piper PA46T, N46PW

- registered owner: N/A
- operator/user: N/A

Aircraft 2: BAe146-200, OY-RCA, operating as FXI235

- registered owner: Atlantic Airways
- operator/user: Owner

Phase of flight: 1) En-route cruise at assigned flight level, FI 230
2) En-route cruise at flight level, FI 230

Persons on board: 1) N/A
2) 39

Injuries: None

ATS-unit involved: Reykjavik Oceanic Area Control Centre (OACC)

Procedures: The ACC Low of the Reykjavik OACC is procedural controlled, radar assisted

Required separation:

- procedural: Longitudinal: - 30 minutes at same level or crossing tracks, or Vertical: - 1000 feet
- radar: Longitudinal: - 5 nm at same level or crossing tracks, or Vertical: - 1000 feet

Actual separation: Two minute prior to the time of the passing, the vertical separation was none, but at the time of the passing it was the required 1000 feet

Circumstances

The aircraft OY-RCA was en-route from Reykjavik, Iceland (BIRK) to Narssarssuaq, Greenland (BGBW). The flight departed BIRK at 15:40 hrs. Air Traffic Control Centre in Reykjavik cleared OY-RCA direct to EMBLA reporting point, direct to 63°N 030°W, direct to 62°N 040°W, direct to Narssarssuaq (NA) None Directional Beacon (NDB) and direct to BGBW. The flight level was FI-240 and airspeed M 0,70.

OY-RCA was being flown on autopilot. The First Officer was the non-flying pilot (PNF) and the Commander performed the duties of the flying pilot (PF). The aircraft was equipped with Traffic Collision and Avoidance System (TCAS).

At the same time the aircraft N46PW was en-route from BGBW to BIRK, cruising at its assigned flight level, FI-230.

The incident occurred within the control area (CTA) of the Reykjavik Oceanic Area Control Centre (OACC). Both aircraft involved were operating on IFR flight plans.

At the time of the incident, both OY-RCA and N46PW were in radio contact with Reykjavik ACC Low, on VHF frequency 119,7 MHz. Both aircraft had been radar identified.

Course of events

After take-off the normal radio communications were established between OY-RCA and Reykjavik Approach Control. At 15:44 hrs or four minutes after departure OY-RCA called Approach Control and requested FI-280, but Approach Control was unable to grant the request due to Gander Oceanic Area Control Centre could not accept the aircraft in their airspace at that level. The flight was changed over to Reykjavik ACC Low and at 15:51 hrs OY-RCA contacts ACC Low and reports "OUT OF 146 FOR 240". Radar contact was confirmed and due to traffic ACC Low recleared the aircraft to FI-220 at 15:53 hrs and OY-RCA replied "CLEARED 220, Fxi235".

According to OY-RCA flight crew the PNF was monitoring the radios at this time. When the aircraft was recleared to FI-220 the PNF responded to ACC Low and then selected the altitude on the Flight Guidance System (AFGS).

N46PW was cruising at this time at FI-230. At 16:05 hrs radar contact with N46PW is confirmed by ACC Low.

Replay of the ATC radar data showed OY-RCA at 16:04:49 level at FI-220 and N46PW level at FI-230. The aircraft were 56.3 nautical miles apart on opposite tracks (see appendix A for radar plot 1). The crew of OY-RCA did not report levelling and was not required to make such a report.

According to the traffic controller he saw OY-RCA level at FI-220 on the radar screen. Few minutes later or at 16:08:47 hrs the air traffic controller noticed on the radar screen that both aircraft were at FI-230 and asked OY-RCA to "CONFIRM ALTITUDE". The crew confirmed with "230 Fxi235". The ATC controller then transmitted "FXI235 YOU WERE CLEARED FL-220 CHECK YOU HAVE OPPOSITE DIRECTION TRAFFIC, SAME LEVEL, TWELVE O'CLOCK, TEN MILES". OY-RCA replied

with "COPIED". At 16:09:08 hrs the air traffic controller transmitted "TWO THREE FIVE DESCENT IMMEDIATELY LEVEL 220" and OY-RCA replied with "FL-220 Fxi235".

The ATC radar data showed OY-RCA descending through FI-226 at 16:09:23 hrs. At that time there were 8.1 nautical miles between the aircraft (see appendix B for radar plot 2).

At 16:09:46 hrs the air traffic controller told OY-RCA "TRAFFIC IS 12 O'CLOCK 4 NAUTICAL MILES ONE THOUSAND FEET ABOVE" and OY-RCA answers with "TCAS CONFIRMS".

The ATC radar data showed the aircraft pass each other with 1000 feet vertical separation at approximately 16:10:06 hrs (see appendix B for radar plot 3).

The commander of OY-RCA submitted a report shortly after the incident. He states that shortly after the aircraft passed "EMBLA" reporting point a target showed up on the TCAS outside the 20 nautical mile range at the same flight level (FI-230). At the same time this was noticed ATC advised "CHECK YOUR ALTITUDE AND DESCEND TO FL-220 AT ONCE". Descend was performed "and the traffic past us 1000 feet above and slightly to the south of our aircraft." The commander noted in the report that the aircraft was under positive radar control, with the transponder on TA/RA and ALT on.

Personnel information

The flight crew of OY-RCA was qualified and current to operate the flight. The commander was 62 years old at the time of the incident. He had approximately 25,000 total flying hours of which approximately 12,400 hours were on type. The first officer was 32 years old at the time of the incident. He had approximately 2,500 total flying hours of which approximately 800 were on type. Both crew members had received required training courses including a two day initial Crew Resource Management (CRM) course.

The air traffic controller was qualified and current to perform his duties. He had received required initial training and completed on the job training and has undertaken radar duties for many years.

Radar services and procedures

Following information is published in the Aeronautical Information Publication, Iceland, on radar services and procedures:

Primary Radar

1.6.1.1 Supplementary services

A part of the Air Traffic Services are the primary and secondary radar services which enhances safety and efficiency to aviation. Primary and secondary radar services are provided in accordance with ICAO rules and regulations but radar coverage, controller workload and equipment capabilities, may affect these services, and the radar controller shall determine whether he is able to provide, or continue to provide radar services in any specific area.

1.6.1.1.2 Radar Coverage

Reykjavik Area Control derives information from SSR radar stations in Iceland and the Faeroe Islands with range varying from 200 NM to 250 NM at flight level 300 and above.

Keflavik and Reykjavik Approach Controls operate terminal area surveillance radar station at Keflavik Airport (635919N 0223513W). The radar coverage for primary radar is 60 NM and for secondary radar 200 NM.

1.6.1.2.1 Radar identification is achieved according to the provisions specified by ICAO.

Radar service is provided within:

- a. Akureyri CTR;
- b. FAXI TMA; and
- c. Reykjavik CTA within radar coverage.

This service may include:

- a. radar separation of arriving, departing and enroute aircraft;
- b. radar monitoring of aircraft in accordance with a. to provide information on any significant deviation from normal flight path;
- c. radar vectoring when required;
- d. assistance to aircraft in emergency;
- e. warning and position information on other aircraft considered to constitute a hazard;
- f. information on observed weather.

The minimum horizontal radar separation are:

- a. 3 NM within 30 NM in FAXI TMA (to be used only by Keflavik and Reykjavik Approach Controls);
- b. 5 NM at or below FL 250;
- c. 10 NM above FL 250.

Warning systems

Short Term Conflict Alert

At the time of the incident Short Term Conflict Alert (STCA) function had not been incorporated in the radar system at Reykjavik OACC. The STCA function is a controller-alerting function that assigns horizontal and vertical prediction templates to aircraft to predict future aircraft positions and send conflict alerts to the controllers three minute prior to imminent conflict.

During the investigation in to the incident STCA function was incorporated in to the radar system at Reykjavik OACC.

Traffic Collision and Avoidance System

OY-RCA was equipped with TCAS. TCAS is a system that through cockpit displays and universally understood symbology provides flight crews with visual awareness of the location, relative altitude and direction of travel of aircraft within a moving 40 mile radius. The system also provides aural warnings and coordinated vertical flight commands in the event of an airborne collision threat. TCAS display symbols can be seen on figure 1.

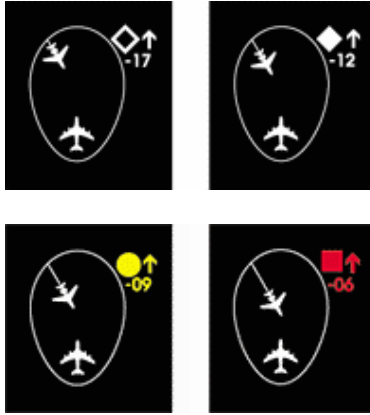


figure 1, TCAS display symbols

The operator (OY-RCA) standard operating procedures

Following information is published in OY-RCA operator Flight Operation Manual (FOM) chapter 0.1.3, description of the operation manual:

Standard Procedure Manual (SPM) contains detailed information concerning the operation of each type of aircraft operated by the operator. The SPM shall, according to the description, be the main reference for daily operation and training.

SPM (BAe 146-200) chapter 5.1.2, crew co-ordination:

When PF is flying manually PNF will make all selections on the AFGS (flight guidance) and course selector and heading. When cleared to a new altitude or level PF must acknowledge PNF's selection on the AFGS. When PF is flying on autopilot he/she will make all selections him/herself.

SPM (BAe 146-200) chapter 5.1.3, use of flight guidance (AFGS):

Normally the aircraft should be operated using the autopilot and flight director as much as possible in order to assure a smooth flight and enabling the crew to manage aircraft systems and navigation and separation to other aircraft.

Crew Resource Management (CRM) training

The operator's (OY-RCA) crew training corresponds to the traditional pattern found in many airlines. The training is organised in modules and subcontractors may present the different modules individually in different locations.

Both crew members of OY-RCA had received a two day initial CRM modular course. The course covers among other topics the operator's standard operating procedures and implications of automation on CRM.

Additional information

During the investigation an investigator from the Icelandic AAIB observed flight crew members from the operator perform their duties during two flights on BAe 146 aircraft. It was noted on several occasions during the flights that PNF made selections on the AFGS while the aircraft was flown by autopilot. It was also noted at those occasions that PF did not acknowledge PNF's selection on the AFGS.

2. ANALYSIS AND CONCLUSIONS

The incident occurred within the CTA of the Reykjavik OACC. Both aircraft involved were operating on IFR flight plans and were in radio contact with Reykjavik ACC Low, on VHF frequency 119,7 MHz. They had both been radar identified.

The aircraft were travelling on opposite tracks. OY-RCA was en-route from BIRK to BGBW and N46PW was en-route from BGBW to BIRK.

OY-RCA was being flown on autopilot. The First Officer was the non-flying pilot (PNF) and the Commander performed the duties of the flying pilot (PF). The aircraft was equipped with Traffic Collision and Avoidance System (TCAS).

At the time of the incident Short Term Conflict Alert (STCA) function had not been incorporated in the radar system at Reykjavik Oceanic Area Control Centre. During the investigation in to the incident STCA function was incorporated in to the radar system.

N46PW was cruising at FI-230. OY-RCA was initially cleared to FI-240 but due to traffic ACC Low recleared the aircraft during its climb to FI-220. The PNF was monitoring the radios at this time. When the aircraft was recleared to FI-220 the PNF read back the clearance correctly to ACC Low and then selected FI-230 on the AFGS. The PF did not notice the discrepancy and subsequently the aircraft was climbed to the incorrect flight level. According to OY-RCA operators SPM the PF shall make all selections on the AFGS when the aircraft is being flown on autopilot.

3. SAFETY RECOMMENDATIONS

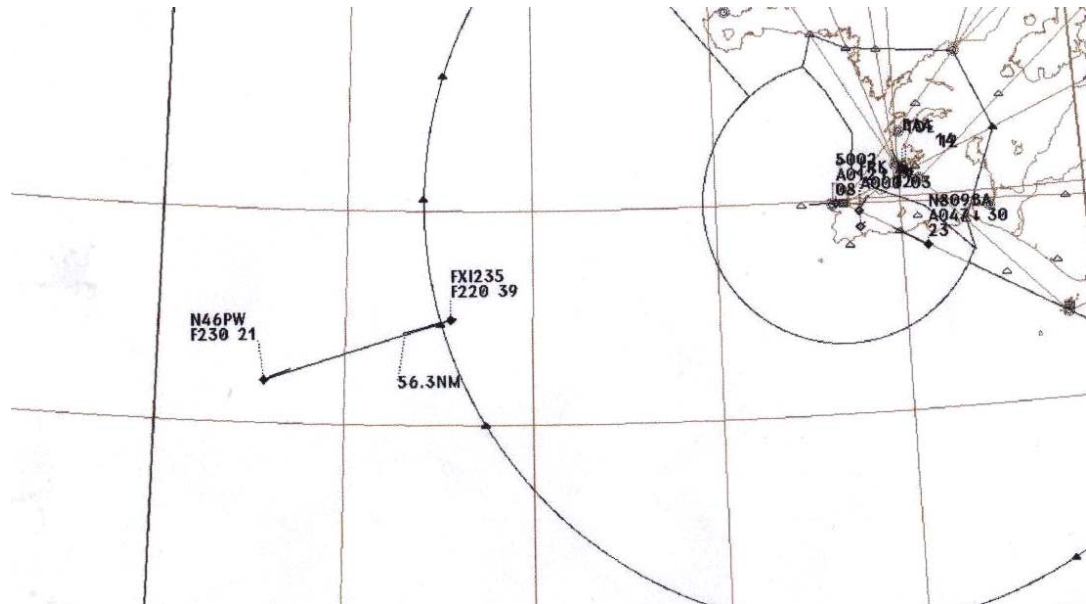
Following recommendations are made:

1. Air Atlantic training, quality audits and quality inspections should emphasis flight crew adherence to company SOP's.

Reykjavik, 12 May 2005

Aircraft Accident Investigation Board, Iceland

Appendix A - Radar plot 1



Appendix C - Radar plot 3

