



Investigation report

D8/2010L

Risk of collision in Pori Terminal Control Area on 23 August 2010

Translation of the Finnish original report

OH-PCE

Piper PA-28-140

SP-KWN

Jetstream J32

Pursuant to Annex 13 to the Convention on International Civil Aviation, paragraph 3.1, the purpose of aircraft accident and incident investigation is the prevention of accidents. It is not the purpose of aircraft accident investigation or the investigation report to apportion blame or to assign responsibility. This basic rule is also contained in the Investigation of Accidents Act, 3 May 1985 (373/85) and Regulation (EU) No 996/2010 of the European Parliament and of the Council. Use of the report for reasons other than the improvement of safety should be avoided.

Because of the nature of this incident, the report does not follow the format specified in ICAO Annex 13. AIB Finland uses the format recommended in Annex 13 for investigation reports published in series A, B and C.

INVESTIGATION NUMBER: D8/2010L **INVESTIGATORS:** Pekka Orava and Martti Lantela
INVESTIGATION COMPLETED: 30.3.2011

Time:	Monday 23 August 2010 at 20:51 (Finnish local time)	
Location of incident:	Pori Terminal Control Area (TMA)	
Aircraft type:	Piper PA-28-140	Jetstream J32
Registration:	OH-PCE	SP-KWN
Type of flight:	Local flight	Scheduled flight
Damage to aircraft:	No damage	No damage
Number of persons on board:	OH-PCE, 2	SP-KWN, 4
Pilots:	Pilot-in-command: Age 45	Pilot-in-command: Age 40 Co-pilot: Age 61
Licence and ratings:	Pilot-in-command: Valid licence and ratings	Pilot-in-command: Valid licence and ratings Co-pilot: Valid licence and ratings
Total flying experience:	Pilot-in-command: About 160 hours	Pilot-in-command: 3 650 hours Co-pilot: 10 449 hours
Air traffic controller:	Age 26	
Licence and ratings:	Valid licence and ratings	
Meteorological information:	<p>METAR (Aviation routine weather report) for Pori airport (EFPO) on 23 August 2010 at 17:50 UTC (20:50 Finnish time).</p> <p>Wind 260 degrees 2 knots, visibility over 10 km, few clouds (1/8–2/8) at 720 m (2400 ft). Temperature 15 °C, dew point 11 °C. QNH (altimeter setting to indicate height above mean sea level) 1001 hectopascal (hPa). At the time of the incident, Visual Meteorological Conditions (VMC) prevailed in Pori airport area.</p>	

Translation: Leila Iikkanen

SUMMARY

An incident occurred at Pori Terminal Control Area (TMA) on Monday, 23 August 2010 at 20:51 Finnish time. A Piper PA-28-140 aircraft owned by the association Länsilentäjät, registration OH-PCE, and a Jetstream J32, registered SP-KWN and operated by the air carrier Jet Air, had a near collision. SP-KWN was using the radio call sign JEA874. OH-PCE was on a local VFR (Visual Flight Rules) flight around Pori, and JEA874 was conducting a scheduled IFR (Instrument Flight Rules) flight from Helsinki to Pori. At the same time when JEA874 was approaching runway 30, OH-PCE flew across the approach line for runway 30. The aircraft passed each other on intersecting flight paths, at an angle of about 90 degrees. At the time of passing, the vertical distance between the aircraft was 400 feet (120 meters) and the horizontal distance about 0.2 nautical miles (370 meters).

The air traffic controller filed an incident report in accordance with Finnish aviation regulation GEN M1-4. The pilot of OH-PCE made a written report of the incident on 31 August 2010, at the request of an AIB (Accident Investigation Board) investigator. The pilot-in-command of JEA874 reported the incident immediately to the air traffic control unit by radio and made an incident report to the Polish SCAA (State Commission on Aircraft Accidents Investigation). At the request of AIB Finland, the pilot-in-command sent a written description of the sequence of events. On 3 September 2010, the Accident Investigation Board of Finland appointed investigator Pekka Orava and investigator Martti Lantela to investigate the incident.

The air traffic controller who was on duty at the time of the incident and the pilot of OH-PCE were interviewed on 8 September 2010 at Pori airport. The investigators had access to the radar data recorded at the time of the incident, as well as to radio communications and telephone recordings from Pori air traffic control. All times in this investigation report are in Finnish local summer time (Co-ordinated Universal Time, UTC +3 h).

The final draft of the investigation report was sent for comments on 28 January 2011.

The material used in the investigation is stored at Accident Investigation Board of Finland.

1 FACTUAL INFORMATION

1.1 Sequence of events

The pilot of OH-PCE filed a local flight plan by telephone to Pori briefing for the route Pori-Pomarkku-Isojärvi-Harjavalta-Pori. According to the flight plan, the flight time would be one hour. There were two persons on board. At 20:12, OH-PCE received a route clearance: *"Oskar charlie echo, leave control zone straight towards pomarkku vfr"*. OH-PCE departed from runway 12 at 20:14 with a left turn towards the north.

OH-PCE was equipped with a Mode C transponder. The pilot set the transponder to code 2000 which was intended for VFR flights, but did not switch it to Alt position (mode C). Therefore the transponder did not send flight altitude information. According to the pilot, OH-PCE flew the route Pomarkku-Isojärvi at an altitude of 1500–1700 feet. At the final stage of the flight at about 20:45, OH-PCE circled above Harjavalta at an altitude of 1000–1100 feet. The town of Harjavalta is located in the south-east corner of Pori Control Zone (CTR), below the approach line for runway 30. As the weather was good, the pilot decided to give his passenger a better view of the scenery by flying a little higher. OH-PCE climbed to about 2700 feet without air traffic control clearance, reaching the

controlled airspace in TMA. The lower limit of Pori TMA is 1100 feet from mean sea level (MSL).

At the same time, the passenger aeroplane JEA874 was approaching Pori on a scheduled flight from Helsinki. The air traffic controller gave an arrival clearance: *"Jetair eight seven four cleared to pitum, continue descent to one thousand seven hundred feet qnh one zero zero one, expect visual approach to runway three zero, no delay"*. The arrival clearance permitted JEA874 to descend to 1700 feet to the initial approach fix PITUM and instructed it to expect visual approach clearance for runway 30.

At a distance of about 17 NM (nautical miles) from runway 30 threshold, the TCAS (Traffic alert and Collision Avoidance System) of JEA874 generated a Traffic Advisory (TA). At that time, JEA874 was flying at an altitude of about 2800 feet. Based on the information on the TCAS display, the pilots got visual contact with the intruder aircraft. The aircraft was approaching from the right, on a crossing track at an angle of about 90 degrees. The radar recording showed that when the aircraft passed each other, JEA874 was flying on a heading of 300 degrees and OH-PCE on a heading of 210 degrees. The pilot-in-command of JEA874 estimated that the other aircraft flew ahead of them at a distance of about 500 m (0.27 NM), almost at the same altitude. TCAS did not generate a Resolution Advisory (RA), since the pilot of OH-PCE had not switched the transponder to mode C.

According to the radar recording, JEA874 interrupted the descent 0.6 NM before the other aircraft passed, and climbed to 3200 feet for a moment. The aircraft passed each other at 20:51:25. At 20:51:30 the pilot of JEA874 reported the incident by radio to Pori air traffic control: *"Pori tower, we have a traffic ahead, the same level the same altitude, just passed us"*. After the passing, JEA874 continued descent to the cleared altitude of 1700 feet.

The air traffic controller had already earlier noticed the aircraft flying near Harjavalta, using code 2000, on the ATC remote display (Remote Airfield Terminal Equipment, RATE). The airplane did not send altitude information. Air traffic controller assumed that it was flying in uncontrolled airspace below the TMA. After JEA874 made a radio report of an aircraft having passed in front of them, the controller asked about OH-PCE's flight altitude. The pilot replied that they were flying at 2700 feet. At this stage the pilot of OH-PCE started to suspect, based on the radio communications, that it might be his aircraft they were talking about. The air traffic controller informed the OH-PCE pilot that he had not been cleared to fly to the TMA, and the pilot said that he would descend below the TMA.

The pilot of OH-PCE saw the passenger aeroplane on approach only after the aircraft had passed each other. According to his statement, he saw the other aircraft for the first time at a distance of about 4–5 km when he was looking backwards to the right. The passenger aircraft was then flying above a thin layer of cirrostratus cloud towards Pori. At 20:53:37 the air traffic controller advised OH-PCE that its flight altitude was not shown on the RATE display. The OH-PCE pilot switched the transponder to Alt position (mode C). According to the radar recording, the altitude of OH-PCE was shown for the first time at 20:54:00 and was 2200 feet at that time. JEA874 made a visual approach to runway 30 in accordance with the ATC clearance and landed at 20:58. OH-PCE landed on runway 30 at 21:05.

Based on radar and radiotelephony recordings, the vertical distance between the aircraft at the time of passing was about 400 feet (120 m) and the shortest horizontal distance about 0.2 NM (370 m).

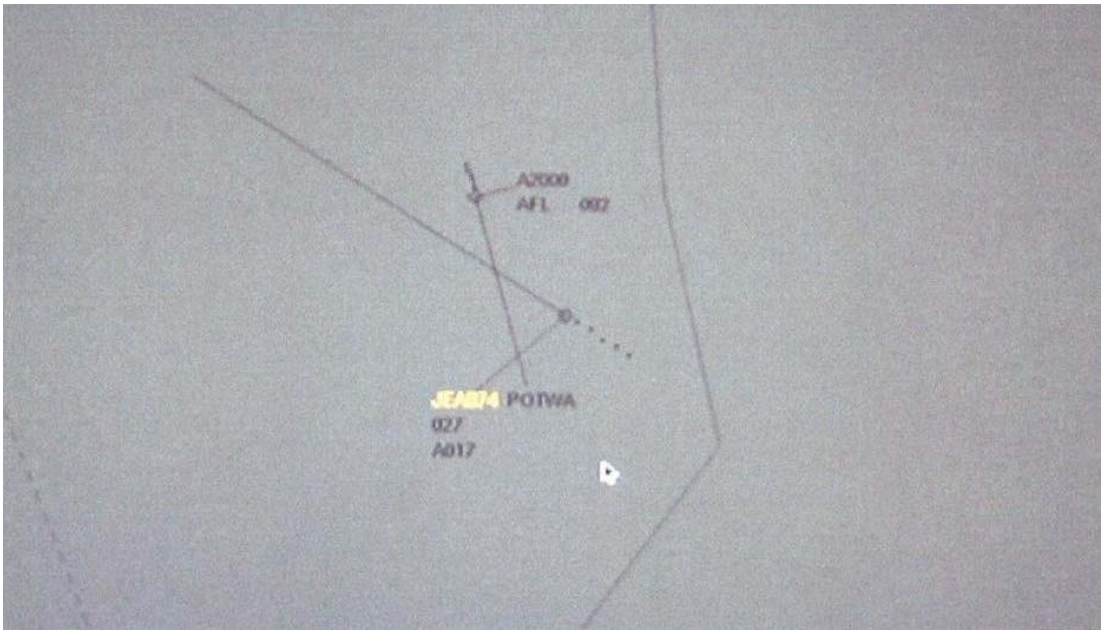


Figure 1. Positions of the aircraft before passing according to the radar recording. (JEA874's altitude 2700 feet).

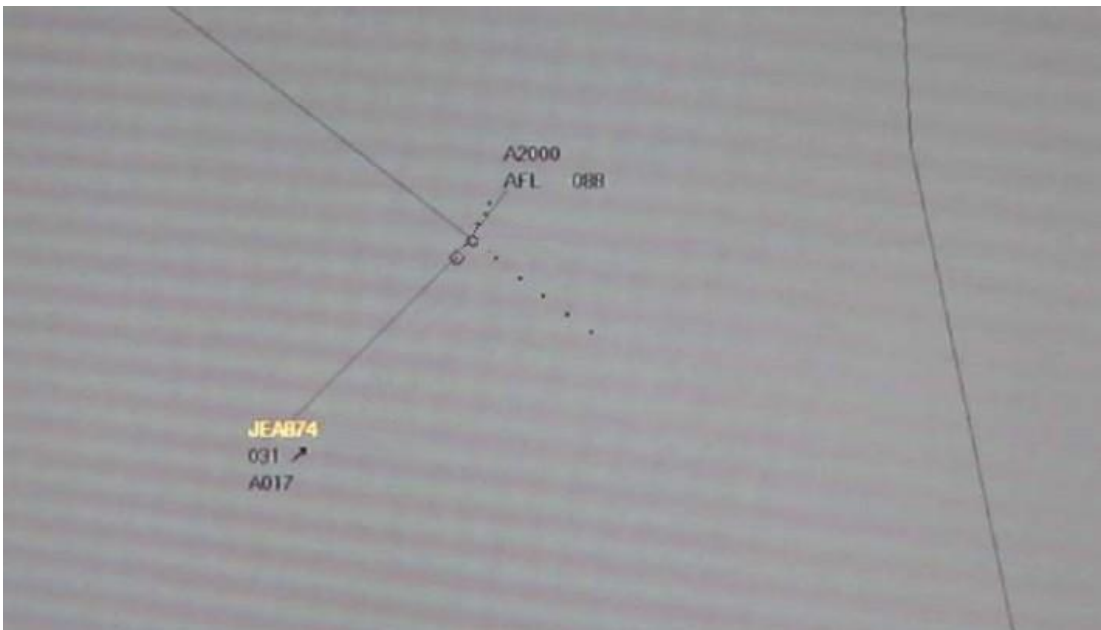


Figure 2. Closest distance between the aircraft according to the radar recording. (JEA874's altitude 3100 feet).

1.2 Detailed investigations

1.2.1 Action of air traffic control

Pori airport has combined aerodrome control and approach control services. The air traffic control service provided is based on procedural control. The air traffic control unit is equipped with a RATE remote display, which shows information e.g. from the Eurocat 2000 radar display system. The radar image on Pori airport's RATE display is intended for the planning of procedural separations and for monitoring air traffic. It is not allowed to be used for radar control.

The airport technical equipment was serviceable except for the radio direction finder, which had been out of use since May 2008. However, the unserviceability of the direction finder had no effect on the incident. There was one air traffic controller working at the unit at the time of the incident, as indicated on the duty roster. The shift started at 15:00 and ended at 22:00. According to an interview, the air traffic controller's level of alertness was good, and there were no distractions. Traffic density was low at the time of the incident.

OH-PCE was departing for a local flight in accordance with its flight plan. The air traffic controller gave it a clearance: *"Oskar charlie echo, leave control zone straight towards pomarkku vfr"*. Flight altitude was not assigned in the clearance. In this case the altitude should have been assigned, since the flight was not leaving through the departure point marked on the Visual Approach Chart (VAC). The ATS instruction / regulation RAC 79, Clearances for VFR flights in Control Zone, published on 15 July 2004 by the Finnish Civil Aviation Administration (currently Finavia Plc), states e.g. the following: *"The required flight altitude in the Control Zone shall always be assigned if the flight leaves via another route than the departure point published on the VAC chart"*.

Because the traffic density was low the air traffic controller did not ask OH-PCE to report the turning points indicated in the flight plan as usual. Turning point reports helps the air traffic controller at air traffic management (ATM).

On the RATE display, the air traffic controller saw an aircraft using code 2000 flying above Harjavalta. The airplane did not send altitude information. Air traffic controller assumed that it might be OH-PCE, which had no clearance to fly in controlled airspace in Pori TMA. The air traffic controller did not regard it as essential traffic to JEA874 and did not give traffic information to JEA874.

In uncontrolled airspace above Harjavalta, the highest allowed flight altitude of OH-PCE would have been 1100 feet MSL. Radar cover above Harjavalta was tested during school flight on 18. October 2010. The flight revealed that the radar cover was about 800 feet. Therefore the air traffic controller could not have concluded that the aircraft using code 2000 was flying in the TMA only because it was shown on the RATE display.

After JEA874 had landed, the air traffic controller and the pilot had a conversation on radio. It came out in the conversation that the aircraft had passed each other very close. According to the radar recording, JEA874 took avoiding action by climbing about 400 feet (120 m), and after the other aircraft had passed, continued approach to the initial approach fix (IAF) PITUM as instructed in its arrival clearance. The pilots of JEA874 did not inform the air traffic controller of their avoiding action. When filing an occurrence report, the air traffic controller did not treat the case as a serious incident and did not report it to the area control unit.

Appendix 1 to Finnish aviation regulation GEN M1-4 contains a list of examples of serious incidents. It mentions e.g.: *"A near collision requiring an avoidance manoeuvre or when an avoiding manoeuvre would have been appropriate to avoid a collision or an unsafe situation."*

1.2.2 Action of OH-PCE

The pilot, who was a member of the Länsilentäjät flying club, had had his pilot licence valid almost without interruption since year 1991. He had about 160 total flight hours experience. The flights had mainly been flown in summer near the city of Pori. In recent times he had flown only a little, and had always taken a check flight before the licence was revalidated. The radio communications of OH-PCE were clear and complied with the instructions. On the other hand, it came out during an interview that the pilot's knowledge about lateral and vertical airspace limits near Pori was insufficient, and he did not check the limits in the aviation chart that was on board. In a telephone conversation with the air traffic controller after the flight, the pilot told that he had usually received an altitude clearance of 3000 feet or below. He thought that he could climb to 3000 feet on this flight as well.

The pilot did not use transponder mode C during the flight. For this reason, the flight altitude of OH-PCE was not shown on the RATE display, and the TCAS system of JEA874 did not generate RA. Paragraph 5.2.1 in section ENR 1.6, Radar services and procedures, of the Aeronautical Information Publication (AIP Finland) states that: *"An aircraft carrying a serviceable transponder shall operate the transponder at all times during the flight"*. Paragraph 5.2.6 states: *"When the aircraft carries a serviceable transponder equipped with mode C, this mode shall be continuously operated unless otherwise instructed by the appropriate ATC unit"*.

After the air traffic controller reported that the flight altitude of OH-PCE was not shown on the RATE display, the pilot switched the transponder to Alt position (mode C).

The pilot of OH-PCE did not maintain sufficient lookout as required by the Rules of the Air. He only saw the passenger aircraft after passing it, when the distance between the aircraft was 4-5 km. Finnish aviation regulation OPS M1-1, Rules of the Air, states the following in Note 1 to paragraph 3.2, Avoidance of collisions: *"It is important that vigilance for the purpose of detecting potential collisions be exercised on board an aircraft, regardless of the type of flight or the class of airspace in which the aircraft is operating, and while operating on the movement area of an aerodrome"*. [The Finnish regulation has been translated from ICAO Annex 2, Rules of the Air, the text of which is used here.]

The pilot of OH-PCE was not aware of aviation regulation GEN M1-4 and the duty to report imposed in it. Paragraph 2 of aviation regulation GEN M1-4 states e.g. the following: *"All incidents in which flight safety was endangered or may have been endangered shall be reported in accordance with this regulation. If it is unclear whether the incident needs to be reported, a report shall always be filed"*. In accordance with this regulation, a report to the civil aviation authority should have been made as soon as possible after the incident. [The regulation is available both in Finnish and in English.]



Figure 3. Piper PA -28-140 -type aircraft.

1.2.3 Action of JEA874

Air traffic control cleared JEA874 to the initial approach fix PITUM. The clearance included permission to descent to 1700 feet. The pilots flew in accordance with their clearance and waited for a visual approach clearance to runway 30. At about 17 NM from runway threshold, at an altitude of about 2800 feet, the TCAS generated a TA but no RA. The pilots saw another aircraft flying from right to left almost at the same altitude. The pilot-in-command of JEA874 estimated that the other aircraft had flown ahead of them at a distance of about 500 m (0.27 NM). They interrupted the descent and climbed about 400 feet (120 m). After the passing, JEA874 continued to an uneventful landing. The pilot of JEA874 informed the air traffic control by radio of the aircraft having passed ahead of them, but not of the change of flight altitude. After landing the air traffic controller and the pilot discussed the incident on radio. The air traffic controller told that he would file a report of the incident and asked the pilot whether there had been a risk of collision. The pilot answered yes and told that the aircraft had been very close.

The pilot-in-command of JEA874 reported the incident immediately to the air traffic control unit by radio and made an incident report to the Polish SCAA.



Figure 4. Jetstream J32 -type aircraft.

1.2.4 Location of incident

The incident occurred in Pori TMA, at a distance of about 17 NM from runway 30 threshold at an altitude of about 2800 feet. The lower limit of the Control Zone (CTR) is ground surface and the upper limit is 1100 feet MSL. The lower limit of the TMA is 1100 feet MSL and the upper limit FL95. Both the CTR and the TMA are controlled airspace in class D. In class D airspace, an air traffic control clearance and continuous two-way radio communication with the appropriate ATS unit are required. In class D airspace, IFR and VFR flights are not separated from each other, but traffic information is provided and traffic avoidance advice given on request. IFR flights are separated from other IFR flights.

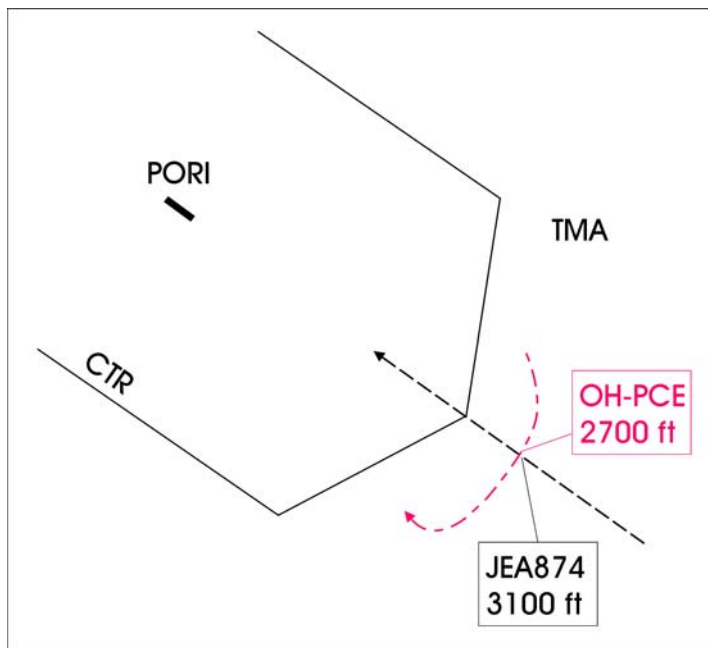


Figure 5. Tracks and altitudes of the aircraft at the time of passing.

2 ANALYSIS

The air traffic control service provided in Pori is based on procedural control. The air traffic control unit is equipped with a RATE display, which shows information e.g. from the Eurocat 2000 radar display system. The radar image on RATE display is intended for the planning of procedural separations and for monitoring traffic. Monitoring traffic on RATE display does not mean active radar monitoring as in those air traffic control units providing radar control service.

A risk of collision between two aircraft is mentioned in the air traffic controllers written report. However, air traffic controller did not treat the case as a serious incident and did not report it to the area control unit. The avoiding action taken by JEA874 only came out in the radar recordings during investigations. In accordance with aviation regulation GEN M1-4, the area control unit shall report any serious incidents without delay to the Accident Investigation Board and the aviation authority. The assessment of severity of the incident is an important part of the reporting procedure. Appendix 1 to regulation GEN M1-4 contains a list of examples of serious incidents, but the list is not exhaustive and can only be used as a guide when defining a serious incident. It is sometimes difficult for an air traffic controller to estimate the severity of an incident, since the information available immediately after the incident may be inadequate. In the investigators' opinion, air traffic controllers should make a report to the area control unit in their own area of responsibility of all cases where flight safety has been compromised and it is not completely certain how serious the incident was. This would provide a broader view on the assessment of severity.

Flight preparation by the OH-PCE pilot was insufficient, as he did not pay attention to the requirements for flying in different classes of airspace. Moreover, the pilot concentrated on showing the scenery to his passenger, which may have attracted too much of his attention. As a result, he did not keep sufficient lookout and failed to notice the passenger aircraft on approach.

Severity of the incident reduced because of visual meteorological conditions prevailed at the time of the incident. TCAS TA helped the pilots of JEA874 to establish visual contact with the other aircraft.

3 CONCLUSIONS

3.1 Findings

1. The air traffic controller had a valid licence and the required ratings.
2. The pilot of OH-PCE had a valid licence and the required ratings.
3. The pilots of JEA874 had valid licences and the required ratings.
4. JEA874 was on a scheduled flight from Helsinki to Pori.
5. OH-PCE was on a local flight under Visual Flight Rules.
6. OH-PCE's transponder was set on code 2000, mode C was not selected.
7. The air traffic controller did not assign to OH-PCE the flight altitude required in this case in the Control Zone.
8. The traffic density was low and there were no distractions in the ATC.
9. OH-PCE climbed to controlled airspace in Pori Terminal Control Area (TMA) without air traffic control clearance.
10. JEA874 flew in accordance with its ATC clearance.
11. Visual meteorological conditions prevailed at the time of the incident.
12. The TCAS of JEA874 gave a Traffic Advisory (TA).
13. The pilots of JEA874 saw an aircraft flying from right to left in front of them, almost at the same altitude.
14. JEA874 interrupted the descent and climbed about 400 feet (120 m).
15. JEA874 did not report the change of flight altitude to air traffic control.
16. JEA874 received no traffic information about OH-PCE.
17. At the time of passing, the vertical distance between the aircraft was about 400 feet (120 m) and the horizontal distance about 0.2 NM (370 m).
18. The pilot of OH-PCE did not notice the incident and only saw JEA874 after passing it.
19. Pursuant to Eurocontrol's recommended severity classification scheme, the incident was of grade A (Serious incident).

3.2 Cause of incident

The incident was caused by OH-PCE climbing to controlled airspace in Pori Terminal Control Area without the required air traffic control clearance.

4 SAFETY RECOMMENDATIONS

4.1 Action taken

Investigation C8/2010L is in progress by Accident Investigation Board on the incident which occurred in Helsinki Terminal Control Area. That investigation will focus more thoroughly on unauthorised flying in controlled airspace. Any safety recommendations and proposals will be given in connection with that investigation.

4.2 Safety recommendations

No safety recommendations were issued.

4.3 Other remarks and proposals

Flying in controlled airspace without air traffic control clearance has become more and more common. Investigations and surveys have revealed that some pilots do not have sufficient knowledge about different classes of airspace and the requirements for flying in them. The knowledge of airspace classes and identifying them during the flight, as well as the operational requirements for different classes, could be emphasised in flying schools, flight instructor seminars and on flight examiners' recurrent training courses.