



## Airliner Evacuation due to Smoke in the Cabin at Helsinki Airport on 3 August, 2018



## SYNOPSIS

Pursuant to section 2 of the Safety Investigation Act (525/2011) the Safety Investigation Authority, Finland decided to initiate a safety investigation into a serious incident which occurred on 3.8.2018. Smoke was detected in the cabin of an Airbus A319 airliner before take-off and the decision was made to evacuate the aircraft. The purpose of safety investigation is to promote general safety, to prevent accidents and incidents, and to prevent the losses resulting from accidents. A safety investigation is not conducted in order to allocate legal liability.

Airline captain Mika Kosonen was appointed as team leader for the investigation group, accompanied by Divisional Officer<sup>1</sup> Jaakko Niskala and Purser Sanna Winberg. Aircraft Mechanic Jukka Jylö was appointed as the expert member for the investigation. Chief Air Safety Investigator Ismo Aaltonen acted as investigator-in-charge. From 1.1.-31.3.2019, during Mr Ismo Aaltonen's leave of absence, Chief Air Safety Investigator Kalle Brusi acted as investigator-in-charge.

The French air accident investigation authority (BEA), the German air accident investigation authority (BFU) and the air accident investigation authority of the Czech Republic (UZPLN) designated their accredited representatives to the investigation. The European Aviation Safety Agency (EASA) designated a technical adviser to the investigation under the EU Regulation on the investigation and prevention of accidents and incidents in civil aviation (996/2010). Under section 12 of the Safety Investigation Act, Safety Investigation Authority Finland decided that the designated representatives and advisers could participate in the investigation.

Safety investigation examines the course of events, the causes and consequences, the search and rescue actions as well as the actions taken by the authorities. The investigation specifically examines whether safety had adequately been taken into consideration in the activity leading up to the accident and in the planning, manufacture, construction and use of the equipment and structures that caused the accident or incident or at which the accident or incident was directed. The investigation also examines whether the management, supervision and inspection activity had been appropriately arranged and managed. Where necessary the investigation also examines possible shortcomings in the authorities' provisions and orders regarding safety.

The investigation report includes an account of the course of the accident, the factors leading to the accident and the consequences of the accident as well as the safety recommendations addressed to the appropriate authorities and other actors regarding the measures that are necessary in order to promote general safety, prevent further accidents and incidents, prevent loss and improve the effectiveness of the operations of search and rescue and the other authorities.

Prior to the completion of the investigation report, an opportunity is given to those involved in the accident and to the authorities responsible for supervision in the field of the accident to comment on the draft investigation report. A summary of the comments is included in the investigation report. However, no comments given by private individuals may be included in the investigation report.

The investigation report was translated into English by R&J Language Service.

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<sup>1</sup> Fire service rank; comparable to Group Manager in the UK fire service

The investigation report, including its summary, is published on 19<sup>th</sup> June, 2019 on the internet page of the Safety Investigation Authority at [www.sia.fi](http://www.sia.fi).

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# 1 EVENTS

## 1.1 Sequence of events

On Friday afternoon, 3 August 2018, Czech Airlines flight OK481 was about to depart for a scheduled flight from Helsinki to Prague. The aircraft was an Airbus A319-112. There were 135 passengers and five crewmembers on board. The aircraft was taxiing along taxiway D towards runway 22R. During taxiing passengers and the cabin attendants detected grey smoke in mid-cabin. The smoke got thicker and one of the attendants sitting in the aft cabin used the interphone and reported this to the purser, who was positioned in the forward cabin. The purser reported this to the captain by interphone, who then stopped the aircraft on the taxiway.

Some passengers stood up and shouted to the cabin crew that there was smoke inside the aircraft. Evacuation was initiated by the crew. Emergency slides were used during the evacuation. During the evacuation some passengers rushed past slower-moving passengers. Among others, children were trampled over. Furthermore, passengers stumbled over carry-on luggage in the aisle. During the evacuation 26 passengers sustained minor injuries.

## 1.2 Alerting and rescue operations

### 1.2.1 Alerting

The captain assumed that the smoke originated in the cargo compartment. At 15:49<sup>2</sup> he reported to the Air Traffic Control that there was smoke coming from the cargo compartment and that they would evacuate the airplane. The air traffic controller pressed the yellow alarm button, which automatically relayed a full aviation emergency alert to the airport's fire brigade, to Kerava Emergency Response Centre, to the airport's central security control room<sup>3</sup>, and to Central Uusimaa Rescue Department's situation centre. In addition, the air traffic controller announced a full aviation emergency alert on the public address system to the airport's rescue service. At 15:51 the air traffic controller raised the full emergency to an accident by pressing the corresponding red alert button. Moreover, the ATC notified the airport rescue service that an evacuation was in progress and that there was, apparently, smoke inside the cargo compartment. The airport rescue service's response included the shift supervisor, one rescue unit and five foam tenders. The ATC suspended all departures from runway 22R.

At 15:53 the ERC began to dispatch rescue units as per air accident – large<sup>4</sup>. The units were dispatched in accordance with the rescue department's contingency plan. In all, 13 Central Uusimaa Rescue Department units were dispatched: The fire chief on duty, two divisional officers on duty, eight rescue units as well as a water tender and a ladder truck. The ERC also alerted a helicopter from the Finnish Border Guard as well as three police units from Eastern Uusimaa Police Department. They were dispatched to the following address: Lentoasemantie 1, Vantaa.

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<sup>2</sup> All times in this investigation report are Finnish Daylight Saving Time (UTC + 3 h)

<sup>3</sup> The control room of the company that provides airport security services, which among other things, dispatches escort vehicles to protect ground traffic at the airport.

<sup>4</sup> Large response means that there are 5-20 people to be rescued. When the number increases above 20, an additional alert is given to the EMS.

At 15:55 the ERC began to alert emergency medical service (EMS) units, in all, two EMS team leaders, a Helicopter Emergency Medical Services-helicopter and 15 ambulances were dispatched. The Social Emergency and Crisis Center (sic) of the City of Vantaa was alerted at 16:13.

### 1.2.2 Crew action during the evacuation

The captain and the first officer were in the cockpit. The cabin crew included purser<sup>5</sup> A, acting as the Senior Cabin Crew Member, situated in the forward cabin as well as cabin attendants<sup>6</sup> B and C, who were seated in their jump seats in the aft cabin.

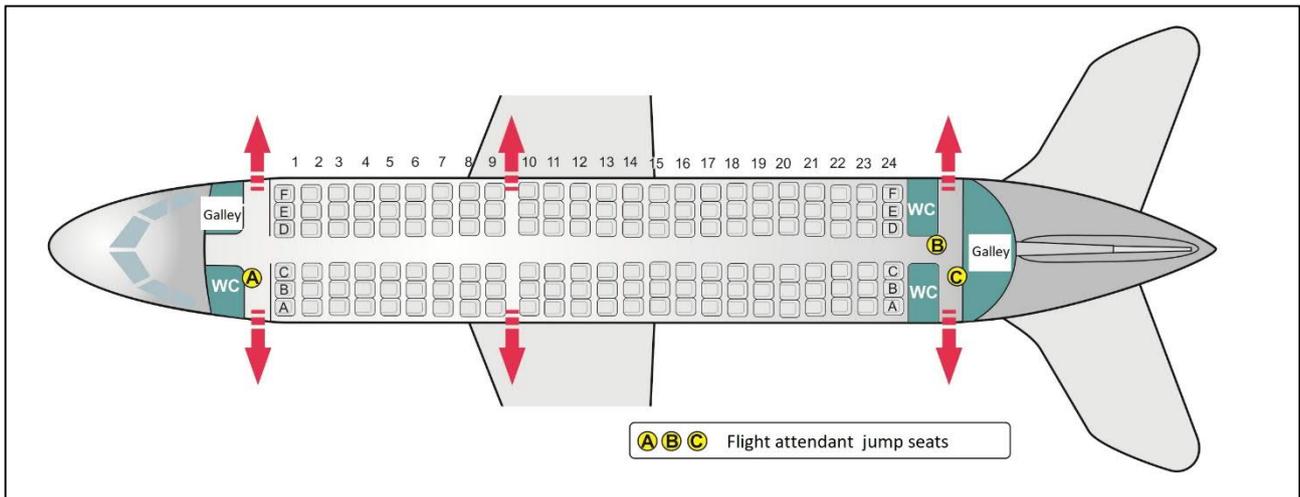


Figure 1. Cabin plan view. The red arrows indicate exits. (Image: SeatGuru, editing by SIAF)

During taxiing passengers detected smoke. They tried to catch the cabin attendants' attention by pressing the call buttons. Some passengers were shouting and banging on the wall to catch the cabin crew's attention. Cabin attendant B called the purser and reported smoke in the aft cabin. The attendants positioned in the aft cabin grabbed halon extinguishers and began to determine the source of the smoke.

At 15:49:22 the purser called the captain by interphone and reported smoke throughout the cabin, and asked for permission to evacuate the aircraft. The purser hung up before receiving an answer.

The captain stopped taxiing, set the parking brake and at 15:49:42 notified the ATC of smoke inside the cargo compartment and said that they would evacuate the airplane. The purser called the captain again at 15:49:52 and said that they must initiate the evacuation. The captain said yes. The purser then told the captain that they would initiate the evacuation, to which the captain, slightly perplexed, replied "yes/alright". At 15:50:04 the captain turned on the evacuation signal and at 15:50:05 the cabin crew opened all four cabin doors which inflated the emergency slides. The doors were opened even though the engines were still running. The cabin attendants at the rear doors had to prevent passengers from jumping onto the emergency slides because they were flapping and askew due to the jet blast. They had to prevent the passengers from exiting through the rear doors for altogether 33 seconds. The first passengers that deplaned used the left front door's emergency slide, emerging to the

<sup>5</sup> SCCM (Senior Cabin Crew Member)

<sup>6</sup> CA (Cabin Attendant)

front of a running engine. Opening the doors generated an ECAM<sup>7</sup> warning. At 15:50:20 the co-pilot shut down the engines by means of fire pushbuttons<sup>8</sup>. Following this, the flight crew, according to their account, completed the appropriate checklist procedures. The last passenger deplaned 154 seconds from the onset of the evacuation.

### 1.2.3 Air Traffic Control action

The ATC carried out the alerts without delay. At the time of the occurrence two air traffic controllers were on their break. One of them came to help by, among other things, relaying information among the ATC's shift supervisor, the rescue service and the police. Departures were limited and departing aircraft were not routed to the site of the occurrence.

At the time of the occurrence RWY 22L was in use for arrivals. The ATC was preparing to stop using RWY 22L for arriving traffic. The ATC was preparing for the rescue units to cross RWY 22L.

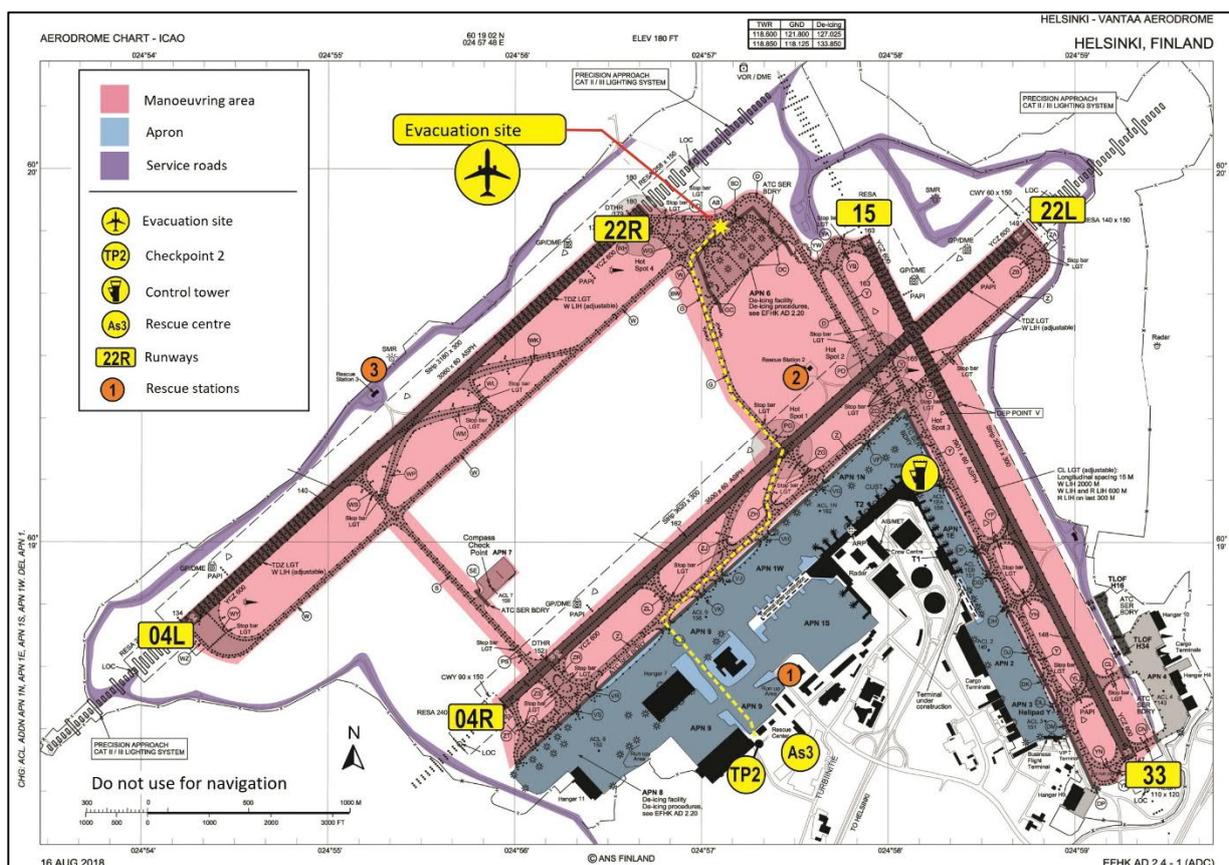


Figure 2. Aerodrome chart. The yellow dotted line is the shortest route (3.2 km) from checkpoint 2 (TP2) to the accident site. The length of the route using the service road is 11.1 km. (Image: © ANS Finland, added legends SIAF)

The first rescue units to arrive at the scene came from rescue stations 2 and 3. The ATC was prepared for nobody needing to cross the runway in use. Nevertheless, the units from rescue station 1 called the ATC and requested emergency permission to cross RWY 22L. The aircraft that was about to land was not ordered to go around, and the rescue units had to wait for

<sup>7</sup> ECAM (Electronic Centralized Aircraft Monitor)

<sup>8</sup> Fire pushbuttons shut off fuel supply to the engines. (ENG FIRE P/B)

permission to cross the runway. Arrivals were not suspended; RWY 15 was chosen as the runway in use for the duration of the occurrence.

#### 1.2.4 Rescue operations

The public authority network's (VIRVE) call group "Pelastus 1" (Rescue 1) was used for communication. Among its users are the airport's rescue service, Central Uusimaa Rescue Department, the ATC, the airport's security control room, the airport situation centre and the police, to name a few.

The airport rescue service received the alert at 15:51. The first foam tenders<sup>9</sup> left rescue station 2 and arrived at the occurrence site at 15:52:06. The first vehicle carried, among others, a divisional officer, who reported en-route to the site to other rescue units that the evacuation was underway and that no smoke or fire was visible. The fire tenders were parked line abreast to the front-left of the aircraft's nose.

Two foam tenders arrived from rescue station 3; they arrived at the accident site at 15:54:18.

The shift supervisor<sup>10</sup> of the airport rescue service left from rescue station 1. He ordered a rescue unit<sup>11</sup> and an extra foam tender<sup>12</sup> to be dispatched to the site. In addition, over the radio he ordered that the cargo compartment hatches be kept shut until the aircraft was clear of passengers and crew. The supervisor also contacted Central Uusimaa Rescue Department's divisional officer on duty<sup>13</sup> and reported that evacuation was underway and that smoke was coming out of the cargo compartment. The shift supervisor also said that vehicle escort<sup>14</sup> was arranged from checkpoint TP2<sup>15</sup>. He also ordered airport buses for the purpose of transporting passengers away from the occurrence site as well as passenger boarding stairs so as to be able to enter and inspect the airplane from the inside. At 15:54:06 the shift supervisor and the accompanying units from rescue station 1 called the ATC and requested to cross RWY 22L. Owing to an approaching aircraft the ATC did not issue the permission. The rescue units arrived at the site at 15:57:17.

The passengers evacuated from the airplane were left unsupervised for nearly eight minutes on the manoeuvring area. When the shift supervisor arrived, he parked the lead vehicle far from the aircraft and told the passengers, clustering outside, to gather behind the lead vehicle and wait. The passengers obeyed his command. Following this, he located the captain who told him that everyone had deplaned.

Airport rescue service inspected the airplane's cargo compartment. When the passenger boarding stairs arrived, they were able to inspect the airplane from the inside. Nothing indicating a fire was discovered.

Central Uusimaa Rescue Department's divisional officer on duty<sup>16</sup> left, with the EMS team leader<sup>17</sup> following close behind, towards checkpoint TP2 which was almost one kilometre away.

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<sup>9</sup> AR23 and AR24

<sup>10</sup> ARP30

<sup>11</sup> AR101

<sup>12</sup> AR13

<sup>13</sup> KUP30

<sup>14</sup> Escort refers to a vehicle driven by a person who is licenced to lead the vehicles being escorted to their destination.

<sup>15</sup> TP2 is a gated checkpoint at Turbiinikuja alley through which vehicles can enter the aerodrome area.

<sup>16</sup> KUP30

<sup>17</sup> EKU61

En-route to TP2 the divisional officer received the additional information of the occurrence according to which the evacuation was underway and smoke was coming out of the cargo compartment. He ordered that radiocommunication be transferred to the call groups earmarked to major accidents and designated leaders for the rescue teams. He also informed the airport's security control room that he required an escort to the aerodrome area. The shift supervisor said that escort was arranged at checkpoint TP2, where three security company vehicles were waiting.

At 15:58:20 the divisional officer and the EMS team leader arrived at checkpoint TP2. They were followed by two police units<sup>18</sup>. The first police unit<sup>19</sup> slowed down at the divisional officer's vehicle, whose driver interpreted this as an instruction to follow them. The police unit sped up and the divisional officer, the second police unit and the EMS team leader began to follow them. The security guard who was prepared for the escort also started to move, but decided to remain at the checkpoint after all. Since the driver of the police unit assumed that the divisional officer had the required driving permits for the entire aerodrome area, he stopped with the intention of letting the divisional officer pass. At that point in time it became apparent that the divisional officer had no driving permits. The police unit began to make their way to the site using the service road, and the divisional officer and the EMS team leader remained there, waiting for escort. The second police unit also took the service road to the occurrence site.

At 16:01 the shift supervisor of rescue service reported that everyone had left the airplane. It took until 16:24 for the divisional officer and the EMS team leader to arrive at the occurrence site via the service road, escorted by a rescue unit<sup>20</sup> from Central Uusimaa Rescue Department.

The shortest route from TP2 to the site was 3.2 km, via the apron, taxiway and the runway. The police units and rescue department units had to use the service road, which extended the distance to 11.1 km.

The fire chief on duty<sup>21</sup> was informed of the occurrence on the station's public address system and by text message at 15:51. He went to the rescue centre to get further information and began to set up a command centre. The fire chief ordered that the buses transporting the passengers were not allowed to leave the occurrence site prior to the arrival of the divisional officer on duty. When the divisional officer arrived the passengers were already inside buses, waiting to be transported to the terminal.

The divisional officer on duty, the rescue service shift supervisor, the EMS team leader and the incident commander of the police, collectively, made the decision to transport all passengers to Gate 20 at the terminal. Once there the Finnish Border Guard checked their identity and the emergency medical services interviewed each one. No medical care was required.

At 17:20 a three-member team from the Social Emergency and Crisis Center of the City of Vantaa arrived at the terminal. The team distributed information about crisis reactions and crisis support.

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<sup>18</sup> PIU717 and PIU027

<sup>19</sup> PIU717

<sup>20</sup> RKU301

<sup>21</sup> KUP20

The first police unit<sup>22</sup> from Eastern Uusimaa Police Department arrived at the site at 16:05. On their way to TP2 the police units asked the ATC to provide positional information on the occurrence site. Had they known the location from the outset, they would have chosen a shorter route. A Senior Constable, acting as incident commander<sup>23</sup> for the police, arrived at the site at 16:08. Together with the rescue service the police made certain that all of the passengers were inside the buses. The police also breathalysed the aircrew.

### 1.3 Consequences

During the evacuation 26 passengers sustained minor injuries. The injuries were mild, mostly scrapes from the emergency slides. A couple of passengers complained about mid-torso pain, which had been caused by the passengers who had stampeded past and over other passengers in the aisle. No-one had to be transported to hospital. The aircraft remained out of scheduled service for the time it took to carry out the ferry flight and subsequent repairs.

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<sup>22</sup> PIU515

<sup>23</sup> PIU717

## 2 BACKGROUND INFORMATION

### 2.1 Environment, equipment and systems

#### 2.1.1 Helsinki-Vantaa Airport

Helsinki-Vantaa Airport is located in the city of Vantaa, 25 km north of downtown Helsinki. The airport is maintained by Finavia, which is owned by the State of Finland. The aerodrome has three runways, of which 04L/22R and 04R/22L are parallel runways. The third runway is 15/33. In August of 2018 there were on average approximately 500 daily operations<sup>24</sup>. The state-owned Air Navigation Services Finland provides all air traffic control services to Helsinki-Vantaa Airport.

#### 2.1.2 Aircraft information

The occurrence aircraft is an Airbus A319-112 jetliner. Its registration is OK-PET and it was manufactured in 2010. It has 144 passenger seats and a five-member crew. There are six emergency exits in the cabin, all of which are equipped with emergency slides.

There are two CFM56 jet engines on the aircraft's wings; their intake suction danger areas extend to 2,2 m in front of the engine when at idle. The intake suction danger area refers to the area where there is a hazard of being ingested into the engine.

#### 2.1.3 Aircraft air conditioning system

The Airbus A319's air conditioning system is fully automatic. It supplies fresh air, keeps the cabin and flight deck pressurised and controls the temperature.

The air conditioning system contains two automatically operating air conditioning units<sup>25</sup>. The packs are comprised of primary and secondary heat exchangers, an Air Cycle Machine<sup>26</sup>, a condenser, water separator, valves and temperature sensors.

The packs operate automatically and autonomously. The air conditioning system is positioned in the lower fuselage, close to the leading edge of the wing. In normal conditions the left pack<sup>27</sup> provides air conditioning to the cockpit and the right pack<sup>28</sup> to the cabin. Should either pack malfunction, it is possible to operate with only one pack, which then pressurises and provides air conditioning to the flight deck and the cabin.

Bleed air coming from the engines or from the APU<sup>29</sup> provides air for pressurisation, which is then ducted through the pneumatic system into the heat exchangers. The heat exchangers cool down the hot air, the condenser condenses the humidity from the air and the water separator extracts water from the air. Following this, the air is vented through the mixer unit into use.

The air conditioning system is controlled through a cockpit panel and can be monitored in the flight deck through the ECAM<sup>30</sup> system. In normal conditions the air conditioning system buttons remain depressed and unlit. When a button is pressed again it frees and the air

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<sup>24</sup> Take-offs and landings

<sup>25</sup> Pack

<sup>26</sup> ACM (Air Cycle Machine)

<sup>27</sup> Pack 1

<sup>28</sup> Pack 2

<sup>29</sup> APU (Auxiliary Power Unit)

<sup>30</sup> ECAM (Electronic Centralized Aircraft Monitor)

conditioning unit turns off, which is marked by the OFF indication light on the button. When the system malfunctions the FAULT indication light illuminates.

## 2.2 Conditions

The afternoon rush hour was ongoing at the airport and six tower controllers were on duty. This eased the operation of the Control Tower (TWR) because one controller, who was taking a break, was able to handle the accident's radiocommunication. At the time of the occurrence the ambient temperature was 30°C and the weather was clear. It was possible to see the site of the occurrence from the TWR.

### 2.2.1 Conditions for the flight crew during the evacuation

The flight crew was preparing for take-off when the purser reported the smoke. The situation surprised them because there was no smoke on the flight deck, nor had the aircraft's systems generated any notifications. The second call to the cockpit revealed the gravity of the situation and the need for immediate evacuation. The situation was somewhat unusual for the flight crew because they had not practiced such a situation before. The captain deemed that the need to evacuate was so urgent that, to begin with, he activated the evacuation signal<sup>31</sup> even though the engines had not been shut off. When the aircraft's warning system generated warnings of open doors while the engines were still running, the co-pilot, acting on memory, shut off fuel supply to the engines by means of their fire pushbuttons<sup>32</sup>. The normal way to shut down engines would be to use their master switches<sup>33</sup>.

### 2.2.2 Conditions for the cabin crew during the evacuation

Having detected the smoke the cabin crew tried to determine its source. This, however, proved difficult because some passengers had already stood up in the aisle. When the smoke increased the purser considered this to be life-threatening and deemed an immediate evacuation necessary.

No emergency evacuation calls were made. Some passengers mistook the sound of the evacuation signal as a smoke alarm signal. Once the evacuation started, some passengers were sitting calmly in their seats while others began panicking. This, combined with the fact that carry-on luggage was being taken, caused congestion in the aisle. The crew had never practiced an evacuation initiated by the purser.

## 2.3 Personnel, organizations and safety management

### 2.3.1 Flight crew information

The captain has a valid licence and type-ratings for Airbus A320 and A330 airplanes. According to his account he had flown Airbus A320s for eight years and, prior to this, Airbus A310s for 15 years. His total flight experience amounts to approximately 18 000 flight hours.

The co-pilot has a valid licence and type-ratings for Airbus A320 and A330 airplanes. According to her account, she has flown Airbus A320s for eight years and, previously, ATR 42s, Boeing 737s and Airbus A310s, among others. Her total flight experience is

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<sup>31</sup> Emergency Evacuation Signalling system which sounds a loud signal in the cabin.

<sup>32</sup> The fire pushbutton is a switch which, among other things, shuts off fuel supply to the engine.

<sup>33</sup> Engine Master

approximately 13 000 flight hours. All crewmembers had appropriately completed their trainings.

### 2.3.2 Airline information

Czech Airlines engages in passenger and charter flight operations. Moreover, the company leases airplanes to other airlines and carries freight and mail on order. The airline's fleet comprises eight Airbus A319s, one Airbus A330 as well as five ATR 72s and three ATR 42s.

The airline was using the cabin/cockpit evacuation procedures made for Airbus A319 crews. The emergency evacuation procedures were appropriate and the investigation found nothing out of the ordinary in them. The company's safety management had prepared the airline's evacuation procedures and company personnel had had the opportunity to influence their content through the company's commenting process. The evacuation procedures are examined in more detail in subchapter 2.7.

Czech Airlines' training manual (OM-D) contains their training curriculum, which is developed by the company and checked and approved by the Czech national aviation authority. The OM-D's requirements are based on EU Regulation 965/2012 related to air operations. The Manual describes the training curricula and completion criteria for flight crews and cabin crews. The aircrew's basic and recurrent training contains theoretical instruction and examinations on, among other things, aircraft evacuation and crowd control. However, there have been no practical exercises for situations when the cabin crew initiates an evacuation and to which the flight crew has to react.

Annually, the cabin crew has three days of recurrent training. One day is spent together with the flight crew; the day's programme includes crew cooperation.

### 2.3.3 Air Traffic Control services

Air Navigation Services Finland maintains and develops Finland's air navigation services<sup>34</sup>. It is a wholly state-owned special assignment company steered by the Ministry of Transport and Communications.

The task of air traffic control (ATC) is to provide air traffic control services, aeronautical information services and alerting services. Helsinki-Vantaa ATC provides tower control<sup>35</sup> and approach control<sup>36</sup> services. The premises of the tower control are located within the control tower. Visibility in all directions is good and tower controllers are seated on two levels so that they can visually monitor their own sectors. Tower control is normally divided into three sectors of responsibility: TWR east<sup>37</sup>, TWR west<sup>38</sup> and Ground Controls<sup>39</sup>. Normally, during daytime TWR-E, TWR-W, GND and CLD are manned. The ATC Supervisor<sup>40</sup> works at the approach control. In wintertime, a Tower Supervisor<sup>41</sup> also occasionally works at the TWR. All these positions can be combined and/or closed, depending on the traffic situation and the runways in use.

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<sup>34</sup> Air traffic control services are a part of air navigation services.

<sup>35</sup> TWR (Tower)

<sup>36</sup> APP (Approach)

<sup>37</sup> TWR-E (Tower East)

<sup>38</sup> TWR-W (Tower West)

<sup>39</sup> Ground 1 and Ground 2 (GND1 and GND2)

<sup>40</sup> Supervisor (SUP)

<sup>41</sup> TWRSUP (Tower Supervisor)

Air traffic controller shifts consist of the time spent working at their positions and breaks. The longest continuous work period at one's position is two hours, which is followed by a 30 minute break, at the very least. The manning of each shift always exceeds the minimum manning for the ATC.

ANS Finland uses a safety management system (SMS) which is a part of the overall management system. The SMS Manual, appendices included, contains a description of the safety management system. The company's quality assurance is based on audits and on personnel self-monitoring, when applicable, and on observing the performance targets and indicators that demonstrate the quality of the service.

#### 2.3.4 The security company and Finavia as escorts

In case of full aviation emergencies the security company's security personnel are instructed to escort rescue units and ambulances from outside of the airport through checkpoints to a predetermined threshold on the apron where they are to remain on standby. Finavia's marshallers' manual lists the general task of assisting the rescue department and the police when accidents happen<sup>42</sup>. No separate instructions exist for escorts during accidents.

There are no checkpoint standard procedures on how to meet the vehicles to be escorted. The practice is that when vehicles arrive at the checkpoint the security company's vehicle drives as the lead vehicle and escorts them to their destination.

#### 2.4 Authorities' actions

The Finnish Transport and Communications Agency<sup>43</sup> issues licences within its purview and regulates, among other things, air operators, ANS organisations and aerodrome operators. The regulation and monitoring includes, for example, audits and on-site inspections. The Agency's action is based on national and EU-level legislation as well as other rules and regulations binding Finnish aviation organisations. On 7 December 2017, pursuant to EU Regulation 139/2014, national certificates for aerodromes converted to EU-certificates. They remain in force until further notice. On 15.8.2018 the Agency requested a report from Finavia regarding the movement and escort of vehicles associated with the rescue operation of this incident. Finavia replied to the request on 31.8.2018.

#### 2.5 Rescue services and preparedness

Kerava Emergency Response Centre provides ERC services for the province of Uusimaa. Its mission is to dispatch units in accordance with the competent authority's alerting instructions.

Finavia maintains Helsinki-Vantaa Airport which, as per aviation regulations, runs its own 24/7 rescue service in case of aviation accidents in the area of the aerodrome. The minimum manning of its operational shift is 7 persons. The rescue service response strength comprises one mobile command unit, one rescue unit and four foam tenders positioned at three rescue stations around the aerodrome. The task of the rescue service is to function as a part of the airport's rescue organisation. Helsinki-Vantaa airport is responsible for the rescue actions and preparedness which, pursuant to the Rescue Act, are not the responsibility of regional rescue

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<sup>42</sup> Finavia, Helsinki-Vantaa Airport Apron Management and Procedures Manual. Marshallers' operations manual 18.3.2009

<sup>43</sup> Traficom

services. The rescue service's shift supervisor commands rescue operations until the regional rescue department has been informed of the situation.

The rescue service's preparedness for possible accidents and incidents at and around the airport is described in the Aerodrome Emergency Plan. Helsinki-Vantaa Airport maintains the plan together with the Central Uusimaa Rescue Department.

SAR<sup>44</sup> exercises and training sessions among the authorities are annually arranged at or near Helsinki-Vantaa airport. Aviation companies also participate in these. The exercises are either map exercises or conducted in the terrain. The emergency plans of the various actors as well as the joint emergency plans are updated on the grounds of the lessons learned from the exercises.

Central Uusimaa Rescue Department (KUP) is also responsible for rescue operations inside the airport area. It is prepared for major accidents through an overall rescue management plan and by operating a 24/7 situation centre. The closest rescue station to the airport is located at the border of the aerodrome area.

Under the Rescue Act<sup>45</sup> the officer in charge of rescue operations comes from the rescue service region, i.e. KUP, when an accident happens at or near the aerodrome. Likewise, the same authority makes the explicit decision regarding the end of the rescue operations. KUP is prepared for aviation accidents and emergencies by way of separate instructions which, regarding content, are identical to the aerodrome emergency plan. According to the instructions the rescue authority takes overall command of the situation, assigns the needed rescue resources and issues the required orders. KUP participates in the annual SAR exercises and, with the exception of the manoeuvring area, regularly familiarises itself with the aerodrome area.

The Hospital District of Helsinki and Uusimaa has taken Helsinki-Vantaa Airport into account in its guidelines "Emergency medical services in aviation emergencies at or near Helsinki-Vantaa airport". The Hospital District, its emergency medical care units and its hospitals also participate in the airport's SAR exercises.

Eastern Uusimaa Police Department carries out police duties in the area of Eastern Uusimaa. There is a police station at the airport. It is tasked to take care of all police duties, so occasionally there are no police patrols at the airport. Nor are officers that are familiar with the airport or aviation accidents always present at the airport. Only a few police officers are permitted to drive on the manoeuvring area. According to the National Police Board's guidelines<sup>46</sup> on aviation accident investigation, police tasks at aviation accident sites include, among other things, cordoning off the site, traffic control and searching.

The Social Emergency and Crisis Center (sic) of the City of Vantaa is responsible for tasks under the Social Welfare Act<sup>47</sup>, such as continuous preparedness for providing crisis support in its area. The Crisis Center receives an SMS message from the ERC when occurrences involve, at least, medium-sized emergency alerts. The Center will then contact the authorities and ask whether crisis support is required.

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<sup>44</sup> Search and Rescue

<sup>45</sup> Rescue Act 379/2011

<sup>46</sup> The National Police Board's guidelines on aviation accident investigation 13.12.2013.

<sup>47</sup> Sosiaalihuoltolaki Social Welfare Act 1301/2014

## 2.6 Recordings

Voice recordings and recordings of other alert communication among Kerava ERC and the other authorities as well as the recordings of the Finnish rescue services' PRONTO resource and accident statistics reveal, among other things, that alert communication lines were made available to rescue and EMS units.

The logs of Central Uusimaa Rescue Department and the airport's rescue centre as well as KUP's call group recordings associated with the accident, helped explain the history of the occurrence. Finavia's call group "Pelastus 1" (Rescue 1) is not recorded.

Finavia's security camera recordings from around the airport as well as the photos taken by some of the passengers show, among other things, what happened at checkpoint TP2 and during the evacuation of the aircraft.

The Cockpit Voice Recorder's<sup>48</sup> recording was used for 30 minutes. Exceptionally, the recording ended when the engines were shut off, even though the CVR should have kept recording for five more minutes. Among other things, the recording provided meaningful information about the discussions between the flight crew and the cabin crew, both at the onset and during the situation.

The Digital Flight Data Recorder<sup>49</sup> provided significant information about aircraft systems and the manner they were used. Among other things, the recording gave the exact time when the aircraft doors were opened and when the engines were shut off. The aircraft's systems did not record any smoke or fire warnings.

## 2.7 Rules, regulations, procedures and other documentation

### 2.7.1 Emergency evacuation procedures for the aircrew

Czech Airlines' Cabin Crew Operational Safety Procedures<sup>50</sup> and Airbus 319's Cabin Emergency Check List<sup>51</sup> provide emergency instructions for cabin crews. The flight crew uses the Emergency Evacuation Checklist<sup>52</sup> for the purpose of evacuating the aircraft.

According to Airbus A319's evacuation procedures the items on the checklist must be completed if an evacuation is considered. Typical situations that result in evacuation include an uncontrollable engine fire and different situations related to smoke. If the cabin crew detects smoke or a fire, they must immediately determine its source and initiate firefighting. They must regularly update information about the actual situation to the flight crew. The flight deck door must remain closed at all times and communication should principally occur through the interphone.

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<sup>48</sup> Cockpit Voice Recorder (CVR)

<sup>49</sup> Digital Flight Data Recorder (DFDR)

<sup>50</sup> CCOM Cabin Crew Operational Safety Procedures

<sup>51</sup> A319 Cabin Emergency Check List

<sup>52</sup> Emergency Evacuation Checklist

<b>EMER EVAC</b>	
AIRCRAFT / PARKING BRK.....	STOP / ON
ATC (VHF 1).....	NOTIFY
CABIN CREW (PA).....	ALERT
$\Delta P$ (only if MAN CAB PR has been used).....	CHECK ZERO
<b>● If <math>\Delta P</math> not at zero:</b>	
CAB PR MODE SEL.....	MAN
V/S CTL.....	FULL UP
ALL ENG MASTERS.....	OFF
ALL FIRE pb (ENGs & APU).....	PUSH
ALL AGENTS (ENGs & APU).....	AS RQRD
<b>■ If evacuation required:</b>	
EVACUATION.....	INITIATE
<b>■ If evacuation not required:</b>	
CABIN CREW AND PASSENGERS (PA).....	NOTIFY

Figure 3. Figure 3. Airbus 319 flight crew emergency evacuation checklist. (Image: CSA)

The first item on the evacuation checklist is to stop the aircraft and set the parking brake. Following this, the captain informs Air Traffic Control and announces an order<sup>53</sup> for all passengers to remain seated. This gives time to the cabin crew to complete the necessary evacuation procedures. The announcement is also an order for the cabin crew to check their assigned emergency exits and the conditions outside the aircraft. Before shutting off the engines the co-pilot checks that the aircraft is not pressurised<sup>54</sup>. Following this, the co-pilot shuts down the engines<sup>55</sup>. When these procedures have been completed, the captain makes the final decision on evacuation.

Once the decision is made to evacuate the aircraft the captain announces the evacuation command<sup>56</sup> by repeating it three times, activates the evacuation signal and makes a distress call to the air traffic control. This is an order for the cabin crew to initiate the evacuation. The first officer deplanes through the nearest exit and helps passengers on the ground, directing them away from the aircraft.

During the evacuation the cabin crew must firmly guide the passengers by using clear announcements and commands. They must use a megaphone. Once the evacuation is completed, the cabin crew checks the passenger cabin, lavatories and the flight deck. The cabin crew deplanes through their assigned exits.

<sup>53</sup> "Attention, all passengers remain seated"

<sup>54</sup> In certain situations when pressurisation malfunctions the A319 may retain pressure after landing.

<sup>55</sup> If, following engine shutdown, there is an engine fire, the aircraft's firefighting systems must be used.

<sup>56</sup> "Evacuate, evacuate, evacuate"

The captain is the last person to leave the aircraft. The captain checks that all persons have evacuated the aircraft and deplanes via the rear exit. On the ground, the captain takes command of operations until rescue units arrive. Following evacuation, the crew must organise the passengers and take them a safe distance away (at least 100 m) from the aircraft, taking into account the operating area required by the rescue personnel. Finally, they must count the rescued passengers to make clear if all passengers were evacuated.

The emergency procedures also take into account a situation when the cabin crew must initiate an evacuation independently, without the captain's order. Such situations include, for example, dense and heavy blinding/choking smoke. If the cabin crew consider an evacuation necessary they must contact the flight deck and wait for the captain's orders. If the situation is life-threatening and there is no contact with the captain, only then will the cabin crew assume responsibility for initiating evacuation.

### 2.7.2 Emergency procedures for the Air Traffic Control

When accidents and incidents happen the task of the ATC is to alert Finavia's rescue service and the Emergency Response Centre (ERC), to help prevent additional accidents and to provide positional information of the occurrence to rescue organisations. The Alerting Service Manual<sup>57</sup> of ANS Finland includes, among other things, alerting and procedural instructions for air traffic controllers. In an accident the first thing to do is to alert the airport rescue service through public address announcements or on the Ground Control frequency and, when this has been done, alert the ERC.

According to Finavia's Alerting Service Manual<sup>58</sup> the ATC uses emergency alerting pushbuttons; the yellow one is used for full aviation emergencies and the red one for accidents. In addition to using the pushbuttons the ATC must contact rescue units over the radio to ensure that the alert has been received. Furthermore, alerts for aircraft accidents or incidents are to be completed in accordance with occurrence-specific checklists.

The Ground Operations Manual<sup>59</sup> orders the ATC to suspend all departures and landings when they observe an air accident at or near the airport. Moreover, the Manual orders that the ATC must allow the rescue units to freely drive to the occurrence site so long as aviation safety is not compromised. Air traffic controllers, in their line of work, must adhere to the Air Traffic Controller's Manual, which regulates the provision of air traffic services in Finland. The operational part of ANS Finland's manual describes the local and specific guidelines to be followed at Helsinki-Vantaa ATC.

### 2.7.3 Traffic in the aerodrome area

Finavia has issued rules<sup>60</sup> for ground traffic in the aerodrome area. Driving within the aerodrome is subject to a Finavia permit. In order to get the permit one has to complete theoretical instruction and pass the driving test. Permit areas are divided into three main categories, indicated by colour.

- The purple permit allows driving on the service road inside the security fence.
- The blue permit allows driving on the technical area and on the apron, which is intended for parking, loading and unloading aircraft.

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<sup>57</sup> ANS Finland Alerting Manual 8.4.2018

<sup>58</sup> Finavia PETO3 Alerting, 23.10.2017

<sup>59</sup> Finavia EFHK Ground Operations Manual, Permits and rules (section 6.2), 20.4.2017

<sup>60</sup> Finavia EFHK Ground Operations Manual, Permits and rules (section 6.2), 20.4.2017

- The red permit allows driving on the manoeuvring area, which is intended for take-off, landing and taxiing. This area comprises runways and taxiways, excluding aprons. The air traffic control is responsible for the red area, and traffic in the area is subject to ATC permission.

Red permits are mostly issued to Finavia units or their subcontractors. The exceptions are such authorities to whom permits to the manoeuvring area can be issued.

Not only must drivers have permits, also vehicles moving inside the aerodrome, apart from escorted vehicles or emergency vehicles, must have vehicle-specific permits. However, as per the manual, moving from the apron to the service road must also take place with an escort.

If a driver or a vehicle approaching the aerodrome area has no permit, the vehicle must be escorted. Escorting means driving to a destination under the control of a separate vehicle. The escort vehicle, and the driver, must have the appropriate permits for the area and the person conducting the escort must have permission to act as an escort. The escort must give clear instructions regarding the manner of escort. The escort must show the way and be the lead vehicle of the convoy. Up to three vehicles being escorted can be included in a single convoy. The escort vehicle being used within the manoeuvring area must maintain radio contact with the ATC.

The Ground Operations Manual includes instructions on procedures when the ATC has made an incident or accident alert. At such time emergency vehicles move within the manoeuvring area under standard permit rules. When accidents occur the ATC must allow the rescue commander to freely drive to the occurrence site so long as aviation safety is not compromised.

## 2.8 Other research

The U.S. National Transportation Safety Board<sup>61</sup> has investigated a similar occurrence in which the engines were left running when an evacuation was initiated<sup>62</sup>. On 8 September 2015, British Airways flight BA2276 was taking off from Las Vegas when, during the take-off run, the left engine caught fire. Take-off was aborted and the flight crew completed the procedures for an engine fire. The fire, however, was uncontrollable, and the captain had to rapidly make the decision to evacuate the aircraft.

The flight crew activated the evacuation signal and the cabin crew initiated the evacuation. They did not comply with the evacuation checklist and, as a result, the right engine was inadvertently left running. The fire, and the fact that the right engine was running, slowed down the evacuation and only two of the eight emergency exits could be used for evacuation.

There are some similarities between that accident and the occurrence now being investigated. The captain was very experienced. It is possible that, during the situation, he felt the need to evacuate the aircraft so urgently that he did not have the time to complete the checklist.

The company Czech Airlines Technics completed a technical examination on the aircraft following the occurrence. The mechanics started both engines and ran them at idle. When they turned on the right air conditioning unit<sup>63</sup> smoke began to build up in the cabin. Simultaneously, the ECAM<sup>64</sup> generated a fault warning<sup>65</sup> on that air conditioning unit, as well

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<sup>61</sup> NTSB

<sup>62</sup> Investigation report DCA15FA185 involving a Boeing 777-236ER jetliner.

<sup>63</sup> Pack 2

<sup>64</sup> ECAM (Electronic Centralized Aircraft Monitor)

as an overheating warning<sup>66</sup>. They removed the Air Cycle Machine on the right side<sup>67</sup>. Then they tested how the air conditioning unit was functioning with a new ACM. During this test no smoke or smell of smoke was observed.

The faulty ACM was sent to its manufacturer<sup>68</sup> for further testing and repairs. The reason for the fault was a failed bearing and a seized rotor. When the unit failed, it generated smoke which was ducted through the air conditioning system into the cabin. The running time on the piece of equipment was 28067 hours, including 14047 starts.

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<sup>65</sup> AIR PACK 2 FAULT

<sup>66</sup> AIR PACK 2 OVERHEAT

<sup>67</sup> ACM (Air Cycle Machine)

<sup>68</sup> Liebherr Aerospace Toulouse SAS

### 3 ANALYSIS

#### 3.1 Analysis of occurrence

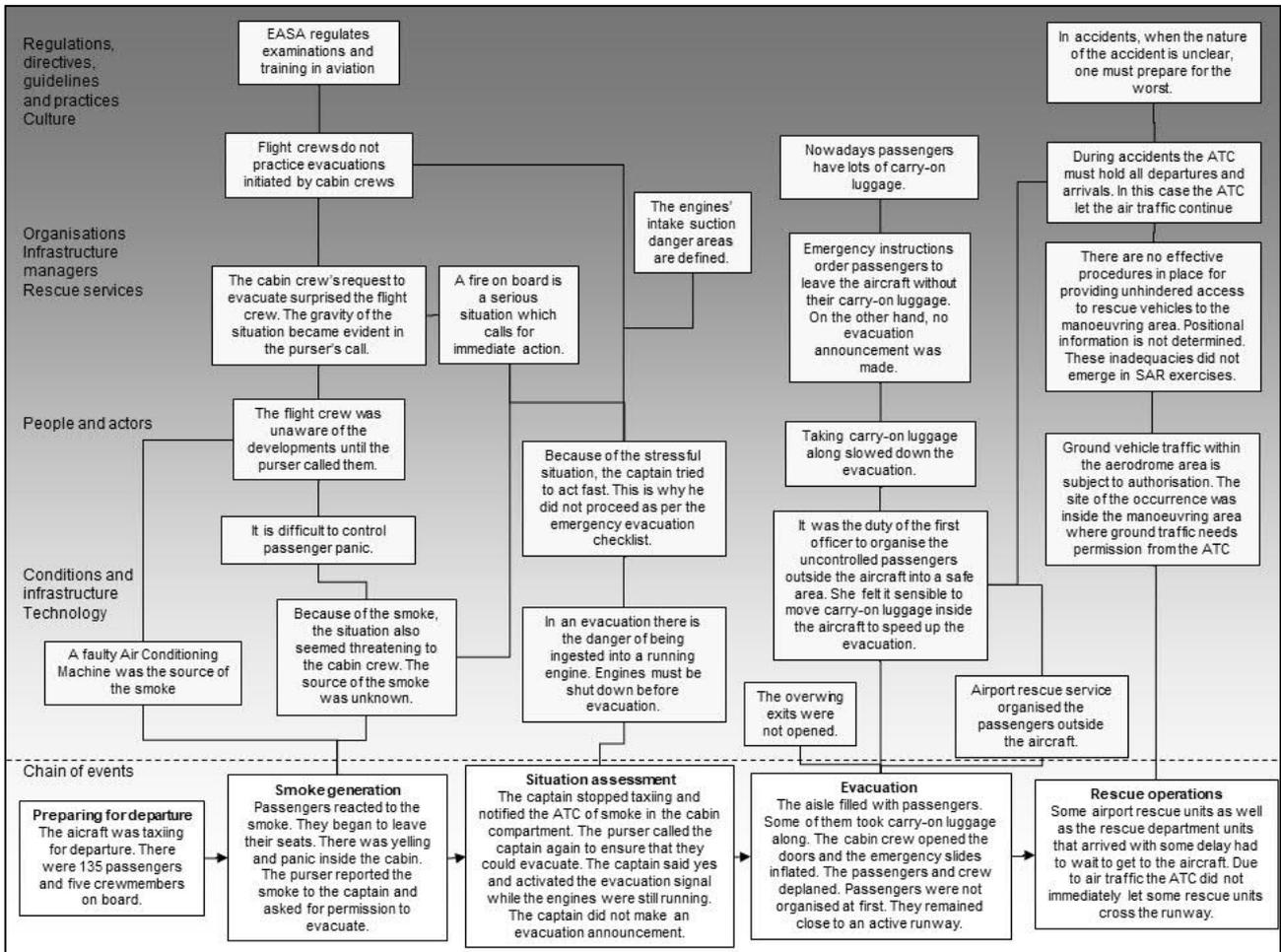


Figure 4. Accimap presentation

##### 3.1.1 Smoke generation

While taxiing the flight crew was preparing for departure. The smoke entered the cabin, but not the flight deck. The purser's call came as a surprise to the flight crew because no aircraft systems warned of smoke. Later it was found that the seizing of the ACM on the right side's Pack was the source of the smoke. In training it is the captain who announces the command to evacuate and, therefore, they had not practiced the need to evacuate by the cabin crew. While flight crews do practice evacuations<sup>69</sup>, they do not practice such evacuations that are initiated by cabin crews.

##### 3.1.2 Situation assessment

The purser considered the situation to be life-threatening and notified the captain of the need to evacuate immediately. The captain was faced with an unforeseen situation. He notified the ATC of smoke inside the cargo compartment, even though there were no indications of smoke there. Because of the stressful situation, the captain tried to act quickly and completed the

<sup>69</sup> The European Aviation Safety Agency (EASA) regulates examinations and training in aviation.

evacuation checklist's procedures intuitively and from memory. The procedures were not completed in the correct order. Rather, the captain activated the evacuation signal while the engines were still running. However, since the captain had given the go-ahead for evacuation to the purser and the evacuation signal was on, the aircraft doors were opened. This resulted in the danger of the first passengers to evacuate being ingested into the engine at the onset of the evacuation.

### 3.1.3 Evacuation

The evacuation announcement was not called and, therefore, some passengers thought that they were deplaning normally. They did not recognise the evacuation signal as a command to evacuate. Some passengers took carry-on luggage along, even though the aircraft's emergency instructions order everyone to leave the aircraft without carry-on luggage. This slowed down the evacuation. The emergency slides on the rear exits were askew at first, owing to the jet blast. They were unable to open the overwing exits although it was shown on safety briefing. This, too, slowed down the evacuation to an extent.

It is the duty of the first officer to deplane first and to organise the passengers into a safe area. In this situation she made a spontaneous decision and remained at the exit to gather carry-on luggage from the passengers to speed up the evacuation.

Since the passengers were not gathered together, most of them remained in the vicinity of the aircraft. Some of them ran onto the grassy area between the aircraft and RWY 15/33. At this stage, when no-one was controlling them, they could have entered the active runway. The shift supervisor of airport rescue service, upon arrival, took control of the passengers and told them to gather at a safe area.

Travelling with carry-on luggage alone is an increasing trend in aviation. This is partly driven by it making travel less complicated as well as the airlines' pricing policies.

## 3.2 Analysis of rescue measures

The ATC sounded the alert without delay and the ERC dispatched the appropriate response as per the contingency plan. The first airport rescue foam tenders arrived at the site in a little over a minute, which well meets the requirements. Since air traffic was not stopped, some airport rescue units as well as the rescue department units that arrived with some delay, had to wait to get to the aircraft.

Ground vehicle traffic within the aerodrome area is subject to authorisation. The site of the occurrence was inside the manoeuvring area where all ground traffic needs permission from the ATC. In case of full aviation emergencies, escorts to pre-planned standby positions have been arranged for the rescue department's rescue units and ambulances; these positions are outside the manoeuvring area. In this case an escort to the occurrence site via service road would have been eight kilometres longer than the direct route through the manoeuvring area.

There are no procedures in place for escorting rescue department vehicles without delay to an accident site which is on the manoeuvring area. Nor are there any standard procedures for how the escorts should meet the units to be escorted. Finavia's marshallers can carry out the escorts, but only on separate request. These inadequacies have not emerged in SAR exercises.

The ATC does not have enough information about the authorities' needs in accident situations. According to the instructions, the ATC must hold all departures and arrivals when an accident happens. In this case the ATC let the air traffic continue. In accidents, when the nature of the accident is unclear, one must prepare for the worst. Air traffic controllers do not normally

participate in SAR exercises at Helsinki-Vantaa. While several documents do provide instructions on how to handle accidents, they are not all-inclusive.

When it comes to rescue actions the chain of command was clear, even though no actual firefighting or rescue operation at the site proved necessary.

### 3.3 Analysis of the authorities' action

The ERC dispatched the appropriate response with regard to the accident alert.

The police acted in accordance with the instructions and there were no shortcomings in their action.

The Emergency Medical Services checked the passengers' health appropriately and efficiently.

The Social Emergency and Crisis Center (sic) arrived promptly and they offered their services comprehensively.

## 4 CONCLUSIONS

The conclusions include the causes of the accident or incident. Cause means the various underlying factors of the occurrence and the direct and indirect factors affecting it.

1. In training the captain issues the command to evacuate and, therefore, evacuation initiated by the cabin crew had not been practiced.

Conclusion: Evacuations initiated by the cabin crew are not normally practiced in commercial air transport.

2. Because of the stressful situation, the captain tried to act quickly and, therefore, did not complete the evacuation checklist procedures in the correct order. Passengers were in danger of being ingested into the running engine.

Conclusion: The Emergency Evacuation Checklist is not well-suited for situations in which the cabin crew initiate evacuation.

3. The passengers that evacuated from the airplane were left unsupervised for nearly eight minutes on the manoeuvring area. They could have entered the active runway which was in use for arriving traffic.

Conclusion: In an accident the air traffic control must prevent additional damage from occurring and also suspend, when required, arriving traffic.

4. All of the rescue units and police patrols were not allowed to the accident site without delay.

Conclusion: Helsinki-Vantaa Airport does not have effective procedures in place for providing unhindered access to rescue units, ambulances and police patrols to accident sites on the manoeuvring area.

## 5 SAFETY RECOMMENDATIONS

### 5.1 Evacuation initiated by the cabin crew

Evacuations initiated by the cabin crew are not normally practiced. However, the cabin crew may initiate evacuation if the situation is life-threatening and there is no contact with the captain.

The Safety Investigation Authority recommends that:

The European Aviation Safety Agency (EASA) ensure that operators, in their procedures and training, take into account the situation where evacuation is initiated without waiting for the captain's command. [2019-S30]

Trained procedures play a central role in managing risks in exceptional situations.

### 5.2 Emergency evacuation procedures for aircrews

When the cabin crew initiates an evacuation the engines are not immediately shut off because engine shutdown is only the fifth item on the aircraft manufacturer's emergency evacuation checklist. If the evacuation has already begun, there is the immediate danger of deplaning passengers being ingested into an engine.

The Safety Investigation Authority recommends that:

The European Aviation Safety Agency (EASA) ensure that Airbus S.A.S, in their emergency evacuation procedures, re-evaluate the situation where it becomes necessary to immediately shut down the engines. [2019-S33]

### 5.3 Accident on the airport's manoeuvring area

Since air traffic continued, the authorities in charge of the situation did not have unhindered access to the occurrence site. Helsinki-Vantaa's present escort arrangements for the rescue authorities do not guarantee delay-free access to an accident site which is on the manoeuvring area.

The Safety Investigation Authority recommends that:

The Finnish Transport and Communications Agency ensure that Helsinki-Vantaa airport develops effective procedures that guarantee unhindered access for authorities in charge of, and participating in, rescue operations to an accident site on the manoeuvring area. [2019-S34]

### 5.4 Implemented measures

A briefing of this occurrence has been added to the programme of Czech Airlines' cabin and flight crew recurrent training. In addition, the airline has added one extra day for flight crew evacuation drills.

Finavia Oyj has implemented the following measures:

- On 2 April 2019 Finavia, together with the Central Uusimaa Rescue Department, has updated the instructions regarding escorts in the aerodrome area.
- A map has been prepared for the authorities with which they are able to communicate the precise position of an occurrence site to rescue units and which makes it easier for them to find their way to an occurrence site.
- During full aviation emergency and accident alerts the Apron Control will always place a passenger boarding stairs vehicle on standby.
- The next update of the Aerodrome Emergency Plan will include the following notice: the Apron Control shall coordinate the escorts of vehicles that need escorting on the apron.

## REFERENCES

### Documents

- A319 Cabin Emergency Check List
- ANS Finland AIP
- ANS Finland, Alerting Service Manual (HPO) 8.4.2018, and other documents
- ANS Finland, Air Traffic Controller's Manual (LJKK), version 3.2, effective 12.10.2017, appendices included
- Czech Airlines Cabin crew operational safety procedures (CCOM)
- Finavia Ground Operations Manual, 20.4.2017
- Finavia's Alerting Service Manual (PETO) 23.10.2017
- Finavia, Helsinki-Vantaa Airport Apron Management and Procedures Manual. Marshalls' operations manual 18.3.2009
- Central Uusimaa Rescue Department: Rescue operations for aircraft accidents and full aviation emergencies at Helsinki-Vantaa aerodrome
- Instruction: Air accident - large. The Rescue Departments of Helsinki, Eastern Uusimaa, Central Uusimaa and Western Uusimaa, 2013
- NTSB DCA15FA185 investigation
- Securitas, security instructions with regard to the occurrence
- The National Police Board's guidelines on aviation accident investigation 13.12.2013.
- The S-report (miscellaneous police report) to the police regarding the occurrence, 17.8.2019 (5560/S/10987/18)

### Investigation material

- 1) Incident reports (Captain of the aircraft, ANS Finland, Aviator, Finavia, SIAF duty officer, Trafi standby duty officer)
- 2) Czech Airlines, the report of the Director of Quality and Safety Assurance regarding the occurrence
- 3) Recordings of the Finnish rescue services' PRONTO resource and accident statistics
- 4) Finavia's safety camera recordings
- 5) Photos taken during the investigation (Finavia, SIAF)
- 6) Meteorological information
- 7) Recordings of interviewing stakeholders during the investigation
- 8) Questionnaire to the passengers
- 9) CVR and DFDR recordings from the aircraft (OK-PET)
- 10) ANS Finland, EFHK TWR recordings
- 11) Finavia's APOC diary
- 12) Emergency Response Centre Agency recordings
- 13) Czech Airlines' investigations
- 14) The Finnish Transport and Communications Agency's request to Finavia on 15.8.2018 and Finavia's reply on 31.8.2018.

## SUMMARY OF COMMENTS TO THE DRAFT FINAL REPORT

The draft final report was sent for comments. Pursuant to the Safety Investigation Act no comments given by private individuals may be included in the investigation report.

The Safety Investigation Authority requested comments to the draft final report from the following organisations: Traficom, Air Navigation Services Finland (ANS Finland), Finavia, Central Uusimaa Rescue Department (KUP), the European Aviation Safety Agency, the aircraft manufacturer Airbus, the French air accident investigation authority (BEA), and Czech Airlines (CSA).

Traficom supports safety recommendation 5.3, and has requested Finavia to provide a report on the measures it has launched together with the different parties participating in rescue operations.

ANS Finland stated that while, in theory, it was possible for the passengers to enter runway 15, it was highly unlikely because of the difficult terrain and the physical distance. ANS Finland believes that it was safe to continue operations for runway 15 because visibility from the control tower to the occurrence site and runway 15 was good.

ANS Finland interprets Helsinki-Vantaa's Ground Operations Manual in such a manner that if the rescue services deem unhindered travel necessary in any given situation, they will ask the control tower for permission. ANS Finland points out that at no time did the rescue services ask for permission to freely cross runway 04R/22L and that the rescue vehicles only had to stop for 28 seconds.

Finavia, in its comments, requested that the measures that have been implemented since the occurrence be taken into consideration. These measures have been included in section 5.4 of the final report.

Central Uusimaa Rescue Department (KUP) stated that the report focused on important issues. The Rescue department has changed its procedures.

The European Aviation Safety Agency (EASA), in its comments, emphasises that already existing EU regulations require operators to ensure that their procedures and training take into account situations in which the cabin crew initiates an evacuation without the captain's command. This being the case, safety recommendation 5.2 should be reconsidered.

The aircraft manufacturer Airbus and the BEA

In accordance with the comments of the BEA/Airbus the captain made the decision to evacuate the aircraft and, following this, the cabin crew initiated the evacuation. Had the flight crew completed the procedures in the correct order of Airbus's evacuation checklist the engines would have been shut down prior to the evacuation. Therefore, in the opinion of the BEA/Airbus, safety recommendation two is in contradiction to the instructions. On the other hand, the BEA/Airbus state that prior training for cabin crew initiated evacuations might have given more time for the captain to respond to the situation.

Furthermore, the BEA/Airbus do not consider safety recommendation 5.2 to be necessary because, in addition to the abovementioned, the captain would have had enough time to complete the evacuation checklist and shut down the engines before the passengers deplaned.

Czech Airlines says that the conclusions in the report are fittingly described.

All received comments as well as the recommendations for amending and further specifying the text have been taken into consideration before publishing the final report.