LATVIJAS REPUBLIKA
TRANSPORTA NELAIMES GADĪJUMU UN INCIDENTU IZMEKLĒŠANAS BIROJS
Brīvības iela 58, Rīga, LV-1011 Reģ. Nr.90002064522 Tālrunis: +371-67288140 Mob. tālr.: +371-26520082 Fakss: +371-67283339
E-pasts: taiib@taiib.gov.lv www.taiib.gov.lv

REPUBLIC OF LATVIA
TRANSPORT ACCIDENT AND INCIDENT INVESTIGATION BUREAU
58 Brivibas Street, Riga, Latvia, LV-1011 Phone: +371-67288140 Mob. ph.: +371-26520082 Fax: +371-67283339
E-mail: taiib@taiib.gov.lv www.taiib.gov.lv

FINAL REPORT No 4-02/3-10/-2/2011

OF THE AIRCRAFT SERIOUS INCIDENT

INFRINGEMENT OF SEPARATION STANDARDS BETWEEN THE WizzAir AIRCRAFT AIRBUS A-320, REGISTRATION HA-LPV, FLIGHT WZZ125H AND KLM AIRCRAFT AIRBUS A-332, REGISTRATION PH-AOA, FLIGHT KLM 409 ON JULY 17, 2010

The Transport Accident and Incident Investigation Bureau of the Republic of Latvia is a governmental, independent of all aviation authorities' organization, established by law to investigate and determine the cause or probable cause of accidents and serious incidents that occurred in the civil aviation, as well, if necessary for enhancing flight safety, incidents.

The sole purpose of such investigation is in accordance with Annex 13 of the Convention of Chicago, as well as the REGULATION (EU) No 996/2010 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC is to prevent accidents and incidents and, if the Bureau finds it appropriate, to issue safety recommendations. The purpose of an investigation conducted under the responsibility of the Transport Accident and Incident Investigation Bureau Republic of Latvia is not to apportion blame or liability.

Address:

58 Brivibas Str., Riga
LV-1011, Latvia
Phone 67288140
Fax 67283339
E-mail: taiib@taiib.gov.lv

Director of Transport Accident and Incident Investigation Bureau — Ivars Alfreds Gaveika

FINAL REPORT Nr.4-02/310-2/2011

OF THE AIRCRAFT SERIOUS INCIDENT

INFRINGEMENT OF SEPARATION STANDARDS BETWEEN THE WizzAir AIRCRAFT AIRBUS A-320, SQ1733, FLIGHT WZZ125H AND KLM AIRCRAFT AIRBUS A-332, PH-AOA, FLIGHT KLM 409 ON JULY 17, 2010

TABLE OF CONTENTS

8. Certificate for maintenance validity of Air Traffic Control System ATRACC+ No028/8
9. ESARR 2 Reporting and Assessment of Safety occurrences in ATM
10. Air Traffic Controller's time-table of Latvian ATC (GSVC)
11. airBaltic Flight Check Records

Abbreviations

ATCC - Air Traffic Control Centre
ACC - Area Control Center
ATRACC - ATC System for Riga Area Control Centre
A-SMGCS - Advanced-Surface Movement Guidance and Control System
ACFT - Aircraft
SSR - Secondary Surveillance Radar
PSR - Primary Surveillance Radar
ARCC - Aeronautical Rescue Co-ordination Centre
ATC - Air Traffic Control
UTC - Universal Time Coordinated
ABI - Advance Boundary Information
ACI - Area of Common Interest
ACT - Activation Message
LAM - Logical Acnowledge Message
AoR - Areas of Responsibility
CWP - Controller Working Position Report RVSM - Reduced Vertical Separation Minimum
ODS - Operator input and Display System
NM - Nautical mile
FT - Feet
Z - Zulu = Universal Coordinated Time (UTC)
STAR - Standard Instrument Arrival
ESARR5 - EUROCONTROL Safety and Regulatory Requirement on ATM personnel
FIR - Flight Information Region
ATS - Air Traffic Services
HMI - Human Machine Interface
EHSI - Electronic Horizontal Situational Indicator
OSUP - Operational Supervisor
VMC - Visual meteorological condition
LoA - Letter of Agreement
SAR - Search and Rescue
CISM - Critical Incident Stress Management
SSR - Secondary Surveillance Radar
CWP - Controller Working Position
ESARR - Eurocontrol Safety and Regulatory Requirement
PANS-ATM - Procedures for Air Navigation Services-Air Traffic Management
STCA - Short-Term Conflict Alert
CTR - Control Zone
FL - Flight Level
RBPS - Radar Bypass System
OLDI - On-Line Data Interchange
COP - Coordination Point

Synopsis

Unless stated otherwise the time in this Report is UTC

On Friday, July 17, 2010 at 17:14 UTC the serious aviation incident - in fringement of separation standarta occurred in Riga ACC controlled airspace between two passenger aircraft. The Airbus A 330-200, registration PH-AOA, flight KLM 409 was on a scheduled passenger service from Amsterdam (EHAM) to Almaty airport (UAAA). At 17:13 KLM 409 was maintaining FL 370 and over point NINTA requested and was cleared by Riga ACC sector WEST controller (call sign Riga Control) to FL 390.

Picture 1

Picture 2

KLM 409 started to climb and at the moment when it was passing FL 372 STCA triggered showing possible conflict with KLM409 and unknown traffic at FL 380 (SQ 1733).

The other aircraft involved in incident was Hungarian Airbus A320 registration HA-LPV, flight WZZ125H diverged from its initially planned route via Warsaw and Kaliningrad FIR probably due to adverse weather conditions enroute. WZZ125H entered Vilnius FIR approximately 10 NM northwest of point BALIT from Kaliningrad FIR, then maintained track 345 degrees and crossed the boundary of Riga FIR at FL 380 without communication.

Kaliningrad ACC neither informed Vilnius ACC about deviation of WZZ125H from its route, nor coordinated that flight into Vilnius FIR. Consequently, Riga ACC was not advised about lately identified Hungarian A320 flight WZZ125H which took 1 minute 53 seconds within Vilnius ACC controlled airspace. A non authorized infringement of Lithuanian controlled airspace led to infringement separation minima in Riga ACC controlled airspace.

Both aircraft had approximately equal flight level, when KLM 409 was crossing FL374 there was WZZ125H at FL 380. Two aircraft passed each other and the separation standard between the two aircraft was infringement. Minimal distance between aircraft was 4,5NM.

Notification

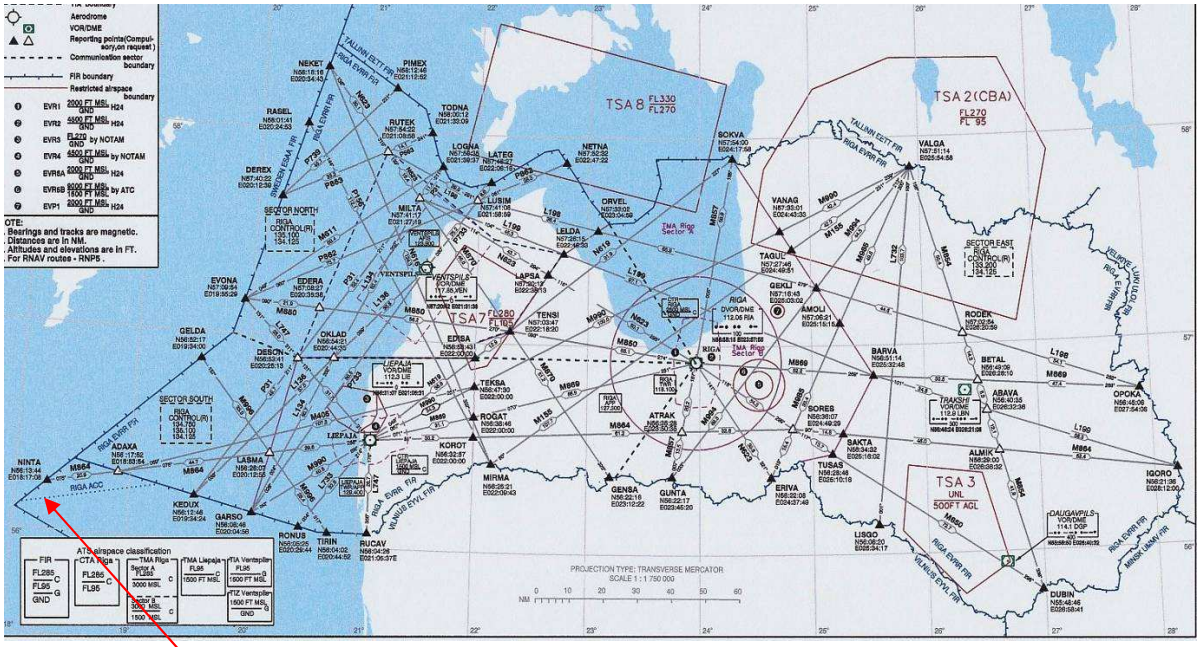
The Transport Accident and Incident Investigation Bureau of the Republic of Latvia was notified about the incident on Tuesday, July 21, 2010 from ARCC Riga, a structural part of LGS responsible for co-ordination of SAR operations within Riga FIR, Riga International Airport.

TAIIB Authorities had evaluated the received information relevant to that case and initiated formal investigation into this serious incident, under the provisions of Annex 13 to the Convention on International Civil Aviation (Chicago 1944) and the Republic of Latvia Cabinet Regulation No 660, Adopted 25 November 2003 as well as forwarded request to KLM and Wizzair of providing

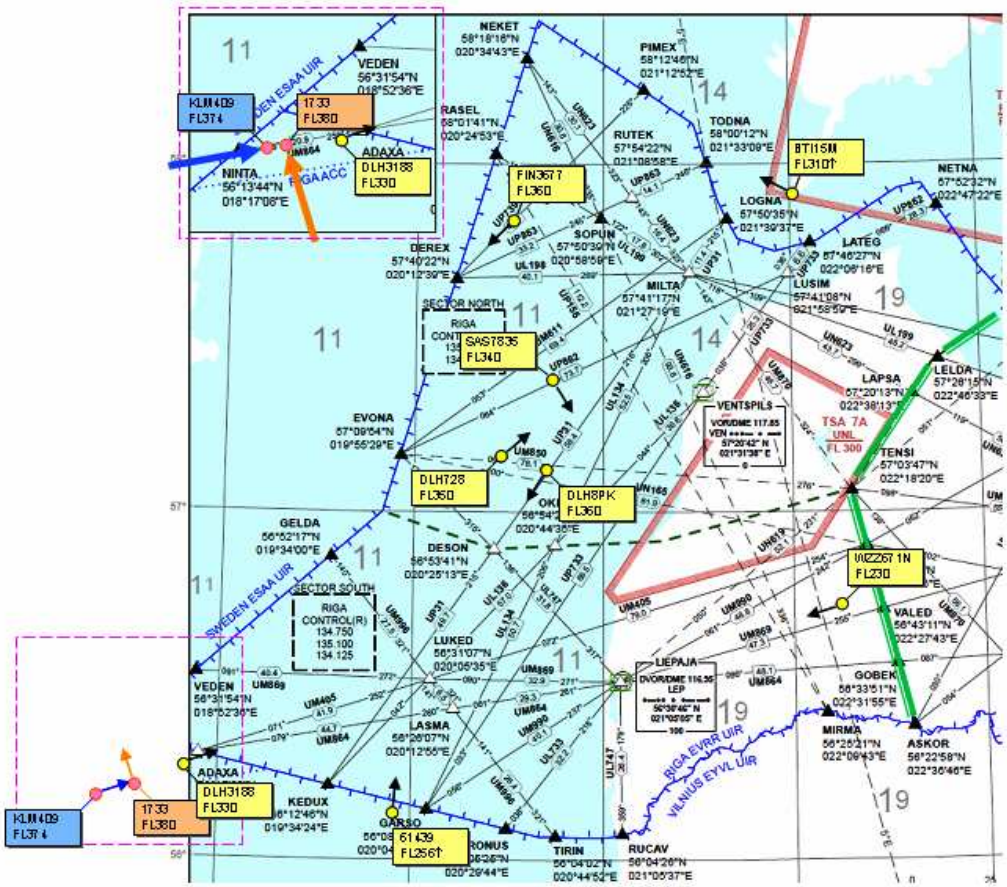
any relevant available information regarding to the aircraft and personal data of flight crew involved in the serious incident.

1. Factual Information

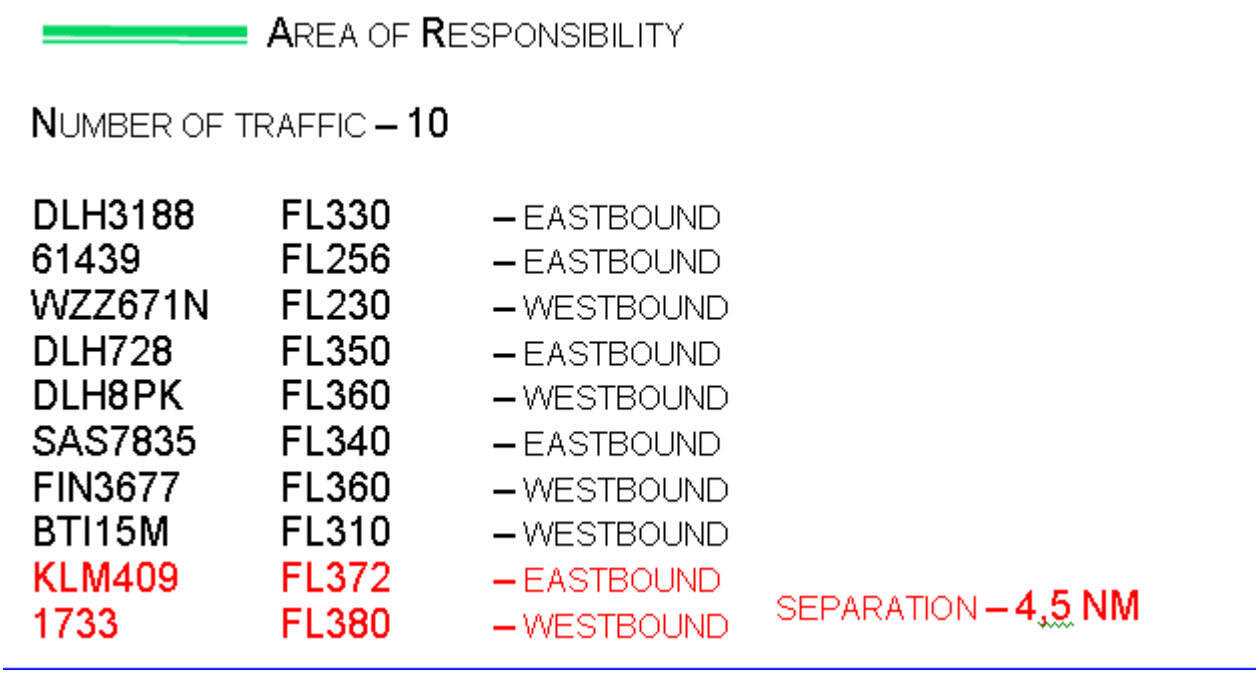
1.1. History of the flight



Picture 3, ENROUTE CHART



Picture 4, Traffic situation at 17:14:06 UTC



On its first contact with Riga ACC controller at 17:11:17, KLM 409, Airbus 330, indicated maintaining FL370, had cleared to FL 390 on present heading (071º).

Datums: 17.07. 2010
Laiks: 17:10 – 17:16 (UTC)
GSV : Riga ACC WEST 135,1Mh

TIME (UTC)		THE RADIOTELEPHONY
17:11:17	P(Pilot)	Riga Control , good evening , KLM409 maintaining FL 370.
	C (Controller)	Calling station, Riga, say again?
	P	Good evening KLM409 inbound NINTA FL370.
	C	KLM409 Riga control, guten abend, identified.
	P	Guten abend.
17:12:15	P	KLM409 requesting to climb FL 390.
	C	KLM409, stand by.
17:13:26	C	KLM409, climb FL 390.
	P	Climb FL390 409.
17:14:14	C	KLM409 immediately descend FL370.
	P	We are already descending KLM409.
17:15:20	C	KLM409 now clear of traffic and climb FL390.
	P	Clear of traffic and climb 390, and I am sorry we have to fill air-rs because of this, KLM409.
	C	KLM409 that's copied .We also gonna file air miss report , this was unknown traffic for me.
	P	Yes, we were … but 400 FT off then … track crossing, KLM409.
	C	Thanks.

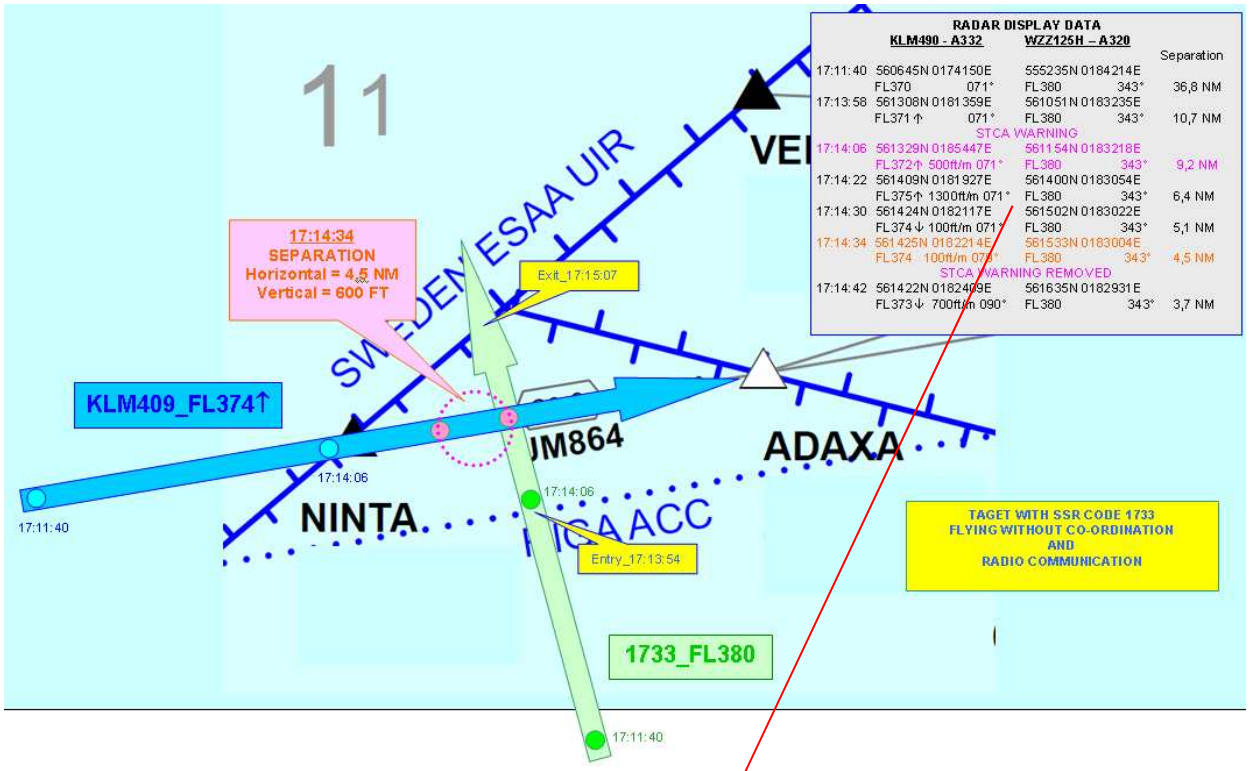
Radio communication frazeology transcription Riga ACC West sector Controller with crew of KLM 409

The Riga Control controller responsible for the West sector observed development of situation on his radar monitor. There were several aircraft that made avoiding maneuvers of thunderclouds.

At 17:13:58 STCA warning started for possible conflict between KLM 409 and unknown for controller aircraft with SSR code 1733 flying at FL380.

At 17:14:14 controller instructed KLM 409: “KLM 409 immediately descend FL370”.

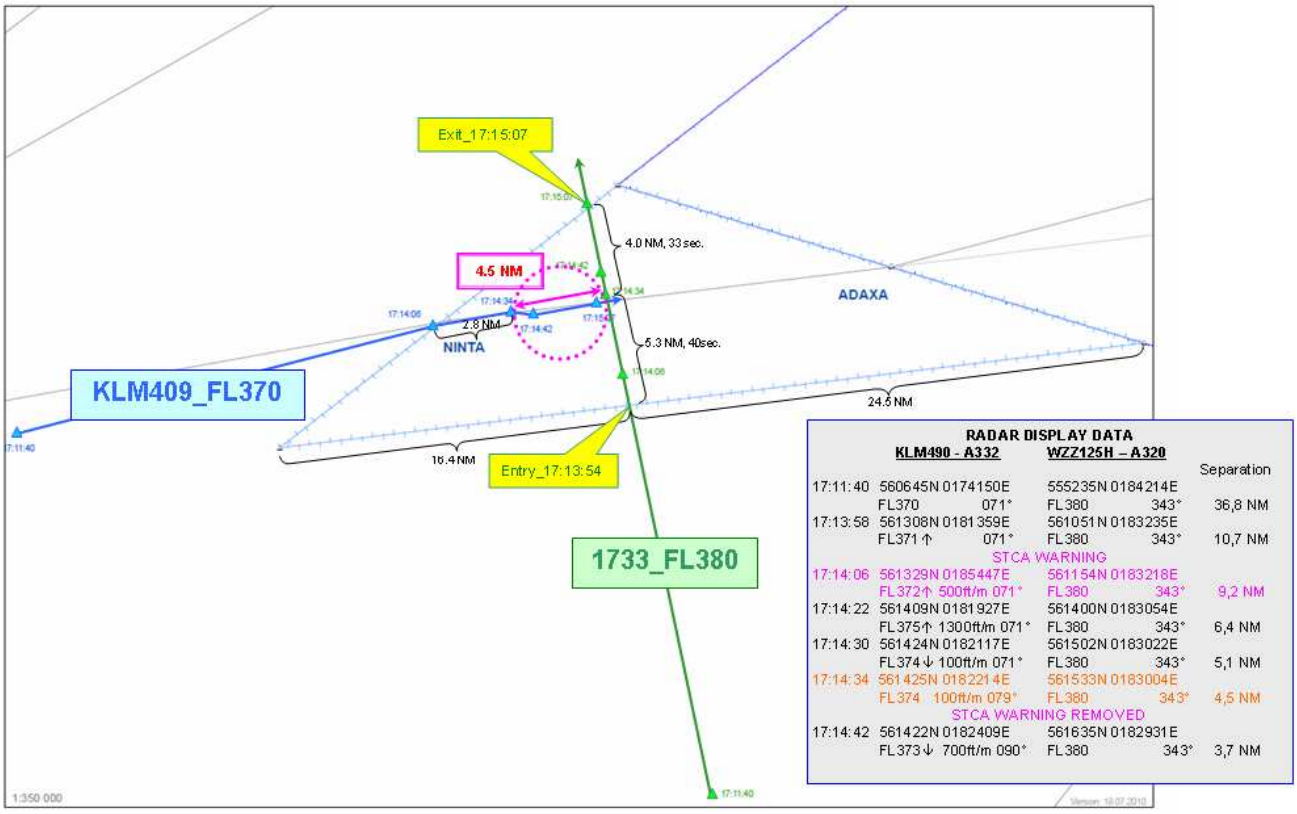
Because KLM409 saw crossing traffic on TCAS they started avoiding maneuver after TCAS “TA” warning as well as ATC controller instruction to descent immediately.



RADAR DISPLAY DATA

	KLM490 - A332		WZZ125H – A320		Separation
17:11:40	560645N 0174150E		555235N 0184214E		
	FL370	071°	FL380	343°	36,8 NM
17:13:58	561308N 0181359E		561051N 0183235E		
	FL371↑	071°	FL380	343°	10,7 NM
	STCA WARNING				
17:14:06	561329N 0185447E		561154N 0183218E		
	FL372↑ 500ft/m	071°	FL380	343°	9,2 NM
17:14:22	561409N 0181927E		561400N 0183054E		
	FL375↑ 1300ft/m	071°	FL380	343°	6,4 NM
17:14:30	561424N 0182117E		561502N 0183022E		
	FL374↓ 100ft/m	071°	FL380	343°	5,1 NM
17:14:34	561425N 0182214E		561533N 0183004E		
	FL374 100ft/m	079°	FL380	343°	4,5 NM
	STCA WARNING REMOVED				
17:14:42	561422N 0182409E		561635N 0182931E		
	FL373↓ 700ft/m	090°	FL380	343°	3,7 NM

Picture 5, Conflict situation KLM 409 & WZZ125H



Picture 6

1733 entered in Latvia ATCC area of responsibility at 17:13:54 at FL380, intersected Sector WEST between points NINTA and ADAXA and left Latvia ATCC area of responsibility at 17:15:07.

Because target with SSR code 1733 was flying without coordination and radio communication Riga Control controller contacted Vilnius ACC controller. Vilnius ACC controller answered that 1733 did not establish contact with him and recommended to contact with Malmo ACC.

Datums: 17.07. 2010
Laiks: 17:14:00 (UTC)
GSV : Vilnius ACC un Riga ACC

TIME (UTC)		
	Vilnius	Да, слушаю
	Riga	Можно ли на BOKSU GHIBLI 443 если он сейчас еще в Таллине пока, если дадим он немножко правее Ригу пройдет
	Vilnius	Да, давайте
	Riga	Спасибо
	Vilnius	Да, слушаю
	Riga	Насчет ответчика 1733 на 380
	Vilnius	А, 1733?
	Riga	1733, да
	Vilnius	Да он давно уже под Нинтой
	Riga	А какой call sign хотя бы
	Vilnius	Я не знаю, это с Мальмо надо, он ко мне не выходил
	Riga	Ясно
	Vilnius	Я не знаю, он насчет какого то ... 1244 мне звонил, а насчет этого так я и не знаю ничего
	Riga	Ясно

Communication description between controllers of Riga & Vilnius ACC

Later Riga ACC Controller contacted with Malmo ACC. Malmo ACC controller answered that 1733 call sign is Wizzair 125H which came from Kaliningrad and Vilnius airspace, is flying to point PEO and that Malmo ACC had not any coordination from Vilnius ACC.

Datums: 17.07. 2010
Laiks: 17:15:07 (UTC)
GSV : Riga ACC un Malmo ACC

TIME (UTC)		
	Malmo	Malmo
	Riga	Concerning squawk 1733
	Malmo	1733
	Riga	Do you have any information what kind of flight it is?
	Malmo	Wizzair 125H, it came from Kaliningrad and Vilnius airspace
	Riga	Say again the call sign
	Malmo	Wizzair 125H
	Riga	Do you have coordination from Vilnius?
	Malmo	No

Communication description between controllers of Riga & Malme ACC

According to approved time-table for July, 2010 of Latvian ATCC (GSVC), controller working shift No 2 on Friday, July 17, 2010. Controller logged in ATRACC+ system at 11:39:16 UTC and according to printout data of ATRACC+ system there was rest pause from 16:00:45 to 17:00:28 UTC (59 minutes), respectively at the moment when the incident occurred 17:14:36 ATCO1 had occupied a position in sector with operational role “CONTROL -EXECUTIVE”. Total working - time up to incident (17:14:36) is 05 hr 34 min 20 sec.

1.2. Injuries to persons

There were no injuries.

1.3. Damage to aircraft

Not damage occurred.

1.4. Other damage

Objects other than aircraft not damaged.

1.5. Personnel information

Air traffic controller: Male, 29 years old
Ratings: All necessary ratings were valid (Rating Certificate to Air Traffic Controller Licence valid).

Captain of AIRBUS A320: Male, 48 years old;
Ratings: All necessary ratings were valid;
Total flight experience - 9500 hours;
Flight experience on aircraft AITBUS 320-5000 hours;
Flight experience PIC - 6500 hours;
Total hours last 7 days - 17 hours;
Flight time last 24 hours - 5h 30 min;
Last 90 days 120 hours;

Flaying hours in incident day - 09h11min;
Rest period 48h before flight - 25h 20 min.

First officer of AIRBUS A320: Male, 23 years old;
Ratings: All necessary ratings were valid;
Total flight experience - 1600 hours;
Flight experience on aircraft AITBUS 320-1000 hours;
Flight experience PIC - 400 hours;
Total hours last 7 days - 13 hours;
Flight time last 24 hours - 5h 02 min;
Last 90 days 213 hours;
Flaying hours in incident day - 09h11min;
Rest period 48h before flight - 22h 40 min.

Captain of AIRBUS A-332
No information

First officer of AIRBUS A-332
No information

1.6. Aircraft Information

Aircraft type - Airbus A320 registration HA-LPV, owner aircraft - „Wizzair"; serial No.3927.

Aircraft type - Airbus A-332 PH-AOA, owner of aircraft - „KLM Royal Dutch Airlines, Netherlands"; serial No.682.

1.7. Meteorological information

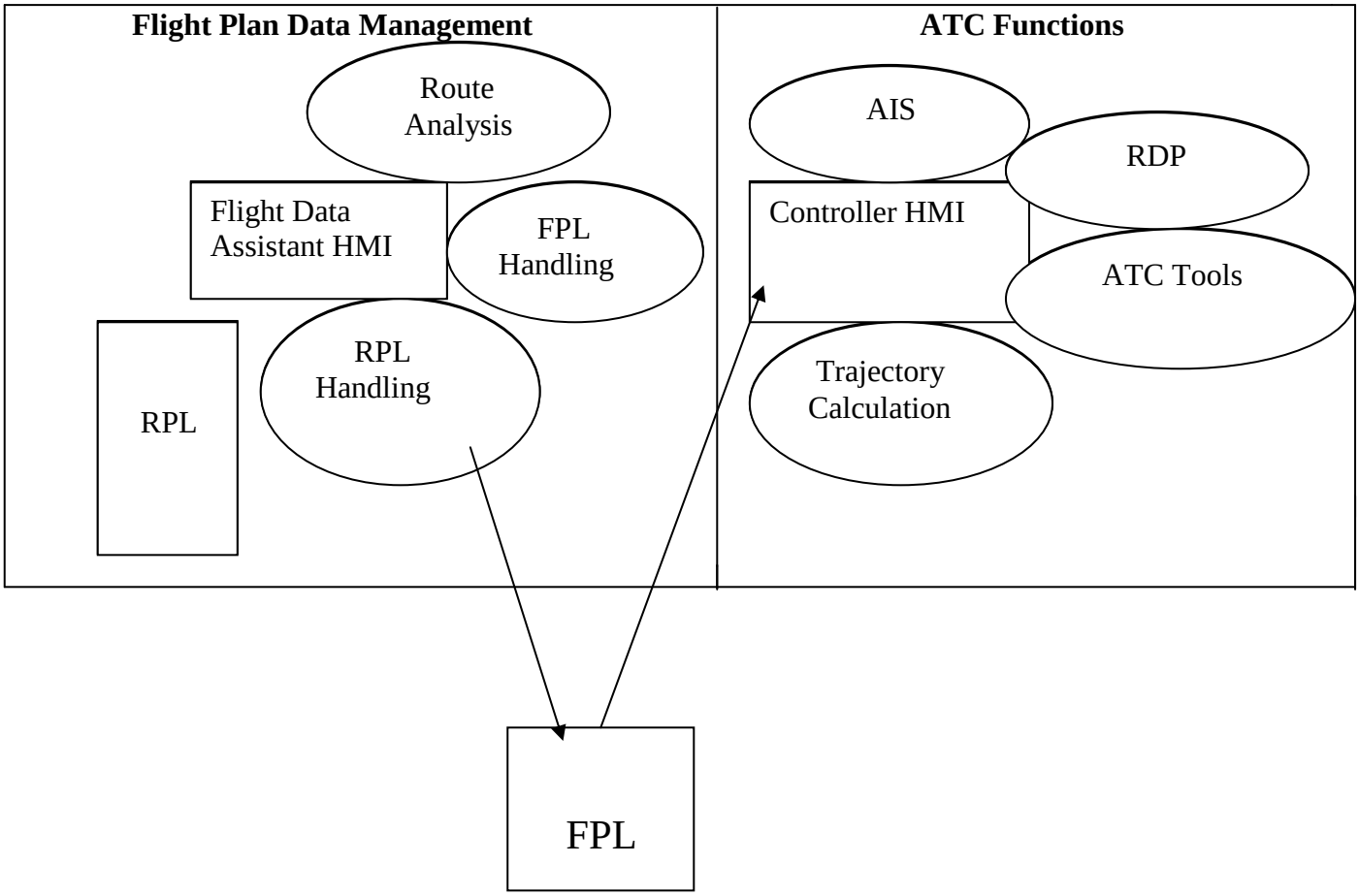
NIL

1.8. Aids to Navigation

The flights were under Radar control. Air Traffic Control System ATRACC+ (Manufacturer' s serial No N SI P 101.1) is an ATM system for area, approach and tower Control of the Riga FIR. From a functional point of view, the system consists of two main components: a Primary System, and a Radar Bypass System. A Primary System providing multi radar tracking advanced flight plan data integration, predicted flight trajectories, OLDI (On-Line Data Interchange), silent co-ordination and paperless HMI. A Radar Bypass System for use if the primary system should fail. The Radar Operator Workstation is common for the Primary System, and the Radar Bypass System.

Four main functional blocks are defined:

- The Flight Plan Data Management block
- The ATC Functions
- The Support Functional block and the ATC-Simulator



Picture 7

The distinct border is between the Flight Plan Data Management block and the ATC Functional block.

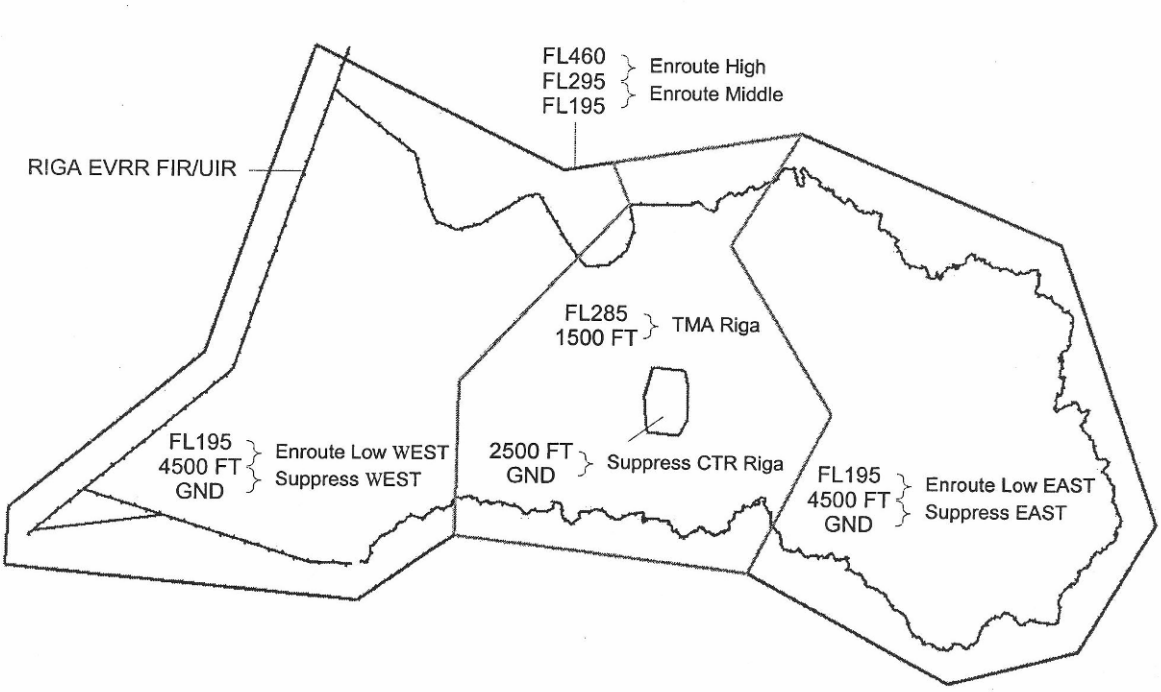
A Flight Data Assistant, (FDA) is working with Repetitive Flight Plans, (RPLs) and passive Flight Plans, (FPLs) in the Flight Plan Data Management block while the ATC controller is working with active FPLs in the ATC Functional block. Flight plan data management is available at flight data assistant working positions. The Flight Data Assistant HMI has efficient support for editing, browsing, queue handling and specification of complex search criteria.

RPLs can be searched, created, modified and deleted manually, but also automatically based on airline time schedules on data media. FPLs are normally created automatically from RPLs or received from AFTN. They can also be searched, created, modified and deleted manually. Received AFTN and OLDI messages are processed and checked automatically and produce updates of concerned FPLs. Billing data is automatically submitted to external systems at FPL termination. For RPLs and FPLs both, route analysis is done and route details are examined against the local airspace structure for compliance with ICAO rules.

The airspace structure is defined by means of system parameters. ATC functions are available at controller working positions. Controller interaction with flights is performed through extensive use of lists and flight symbols. A trajectory describing the flight path in airspace is calculated with consideration to aircraft performance characteristics and current weather data. The trajectory's coverage of ATC sectors determines the distribution of flight data to working positions. Data from PSR and SSR radar stations is processed by means of an advanced centralized true multi-radar tracker. The resulting system tracks are associated with FPLs. Flight symbols comprising surveillance and flight plan information are presented to controllers.

Short-term Conflict Alert Procedures

The generation of Short Term Conflict Alerts is a function of an ATC radar data processing system. If the distance between the three-dimensional positions of two aircraft is predicted to be reduced to less than the defined applicable separation minima within a specified time period, the visual alert will be generated to the radar controller within whose jurisdiction area the aircraft is operating. All types of flight transponder-equipped aircraft with Mode C are eligible for generation of STCA.



STCA WORK AREAS

The parameters for generation of STCA alert and alert warning time:

Item Area	Look Ahead Time[1]	Hsep[2] (NM)	Vsep[3] (feet)	Hsep[4] ATC (NM)	Vsep[5] ATC (feet)
Enroute High Above FL295	120 sec	4,2	870	5,0	1000
Enroute Middle FL195-FL295	120 sec	4,0	800	5,0	1000
Enroute Low East 4500FT-FL195 GND - 4500 FT (suppress)	90 sec	4,0	800	5,0	1000
Enroute Low West 4500FT-FL195 GND - 4500 FT (suppress)	90 sec	4,0	800	5,0	1000
Tma Riga 1500FT-FL255 GND - 1500 FT (suppress)	90 sec	4,0	700	5,0	1000
Ctl Riga GND - 2500 FT (suppress)	-	-	-	-	-

[1]- The maximum predicted time;
[2]- The minimum horizontal separation between ACFT;
[3]- The minimum vertical separation between ACFT;
[4]- The horizontal ATC separation Standard used between ACFT;
[5]- The vertical ATC separation Standard used between ACFT.

In the event an STCA generated in respect of controlled flights, the controller shall without delay take action to ensure that the applicable separation minimum will not be infringed.
Following the generation of an STCA, only in the event that a separation minimum was infringed, controllers must fill out ”ATS Occurrence Reporting Form”.

1.9. Communications

Riga ACC controller provides ATS using VHF radio stations on frequency 135.1 MHz, ATS system “ATRACC+” and pilot reports. For the investigation the Controller console recordings on the frequency 135.1 MHz was used. The quality of the recordings was good.

Co-ordination with adjacent ACCs shall be performed by means of available communication facilities.

Co-ordination within Riga FIR shall be performed using available “ATRACC+” system functionality.

Controller and crew members of KLM 409 used standard phraseology and there had not principal errors in the used phraseology.

Communication Transcript there was not essential inaccuracies in radio communications on all sides.

Within the framework of Quality Management System (QMS) Riga ATCC are worked out “Regulations and procedures on ground-to-air radiotelephony” PR-GSV/AvDN-01/ 2 which are applicable for the provision of Air Traffic Services within RIGA FIR/UIR. The provisions of this document are based on ICAO SARPs, ICAO Regional procedures. The provisions of this document are mandatory for ATS personal conducting direct ground-to-air radio communications.

1.10. Aerodrome information

The airport did not have any significance for the incident.

1.11. Flight recorders

The incident reconstruction was based on the radar records and voice communications transcript between controller of Riga ATCC and aircraft A 332 crew members.

1.12. Wreckage and impact information

Not damage

1.13. Medical and pathological information

Not relevant to this incident

1.14. Fire

There was no fire

1.15. Survival aspects

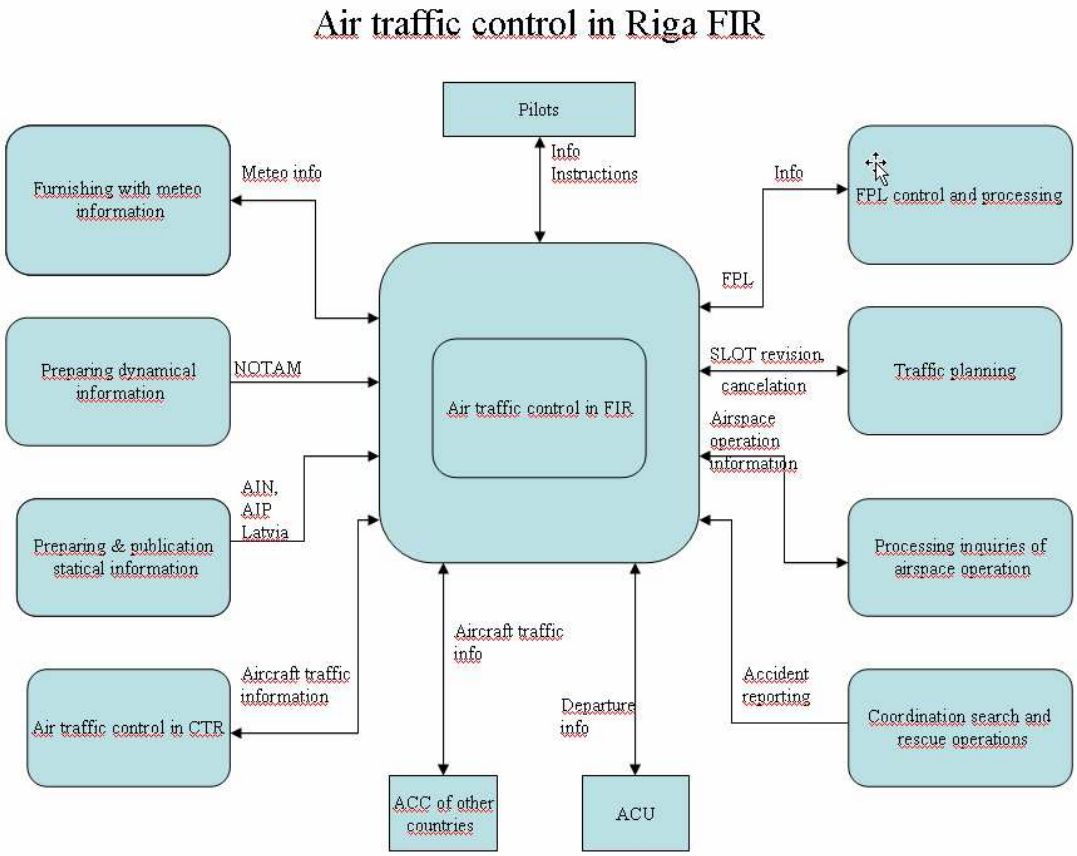
Not necessity to survey

1.16. Tests and research

Were not performed

1.17. Organizational and management information

According to Law on Aviation of the Republic of Latvia the authority responsible for activities of the utilizations of the airspace of the Republic of Latvia for civil and military needs and the flight of aircraft shall be controlled by the Air Traffic Control Unit - the State Joint-Stock Company - "Latvijas Gaisa Satiksme - LGS" which is the air traffic service provider in the Republic of Latvia. Air traffic control has provided in the airspace of Riga FIR, by Latvian Air Navigation Services (LGS) staff (see Picture 8).



Picture 8

For the ATS provision the following areas of responsibility (AoR) are established within Riga FIR/UIR: Sector EAST, Sector SOUTH, Sector NORTH, Riga TMA, Riga CTR, Liepaja TMA, Liepaja CTR, Ventspils TIA and Ventspils TIZ. Sector WEST provides ATS within NORTH AoR, SOUTH AoR, Liepaja TMA AoR, and Ventspils TIA AoR.

1.18. Additional information

Not applicable

1.19. Useful or effective investigation techniques

The incident has been investigated in accordance with Annex 13.

2. Analysis

2.1. General

The investigation of the serious incident – infringement of separation standards between the Airbus A330-200, registration PH-AOA, flight KLM 409 and Airbus A320, registration HA-LPV, flight WZZ125H was orientated essentially around the following questions:

- Had Air Traffic Control Services units' procedures, operations and instructions an influence to the incident?
- Had West Sector controller actions an influence to the incident?
- Had aircraft Airbus A330-200 and Airbus A320 crew members' actions an influence to the incident?
- Had any kind of the human errors or violations influence to the incident?
- Had complied crew actions with the provisions of International ICAO standards "Rules of air"?

The purpose of investigation is reconstruction of the circumstances of flight in order to analyze, determine causal factors and develop recommendations on preventive actions.

The analysis of activities of Airbus A330-200, registration PH-AOA, flight KLM 409, Airbus A320, registration HA-LPV, flight WZZ125H, Riga ACC and Vilnius is build on review of crew radio communications transcript with ACC controller, interview with ATC Controller involved, airline KLM Air Safety Report, letter of Lithuanian Air Traffic Control Services unit –State Enterprise "Oro Navigacija", ICAO Procedures for Air Navigation Services, Procedures for Co-ordination of Letter of Agreement (LoA) between ATCC Riga and ACC Vilnius, radar recording, controller's communication transcripts with adjacent ACC Vilnius and ACC Malmo, air operation service instructions.

2.2. Analysis of the actual situation

The aircraft (later known as Hungarian A320, flight WZZ125H diverged from its initially planned route via Warsaw and Kaliningrad FIR due to adverse meteorological conditions enroute. WZZ125H entered Vilnius FIR approximately 10NM northwest reporting point BALIT from Kaliningrad FIR, then maintained track 345 and entered Riga FIR at FL 380 without communication.

According to provisions of Annex C of LoA between ATCC Riga and ACC Vilnius "Exchange of Flight Data" Messages, including current flight plan data, shall be forwarded by the transferring Centre to the accepting Centre by telephone to the appropriate sector/position. Flight plan of WZZ 125H had not in disposal of ACC Vilnius, because WZZ125H initially planned route did not go through Lithuanian airspace.

In Automatic Data Exchange mode ABI/ACT/LAM messages are exchanged between the two Centres in accordance with Appendix 1 to Annex C[1].

For the conditions that are not supported by the automatic data exchange, verbal estimates will be exchanged. A verbal estimate shall be passed to the appropriate sector at the accepting Centre at least 10 minutes prior, but not earlier than 30 minutes before the aircraft is estimated to pass the transfer of control point.

According to provisions of Annex D of LoA between ATCC Riga and ACC Vilnius "Procedures for Coordination", Item D1.4.for any proposed deviation from the conditions specified in this Annex (e.g. COP, route or flight level) the transferring unit shall initiate an Approval Request that means requiest from ATS unit (in this case from ACC Vilnius) to the ATS unit concerned for an approval (in this case to ATCC Riga) of an aircraft in flight intending to operate under conditions other than those described in mutually agrees procedures.

Kaliningrad ACC didn't inform Vilnius ACC about deviation of A320, flight WZZ125H from its route as well as didn't coordinate that flight into Vilnius FIR. Therefore there occurred a non authorized infringement of Lithuanian controlled airspace. There were more traffic under

Vilnius ACC control at that time and due to this reason Vilnius ACC didn't succeed to identify in time either the fact of infringement of airspace or the aircraft involved in it.

Considering that adjacent Vilnius ACC did not identify aircraft A320 flight WZZ125H and did not transfer this flight to Riga ATCC there occurred separation minima infringement with A332, flight KLM409 in Latvian airspace.

2.2.1. Rules applicable to IFR flights within Riga ATCC controlled airspace

IFR flights shall comply with the provisions of ICAO Annex 2 paragraph 3.6. when operated in controlled airspace unless otherwise prescribed by the ATS of Latvia. An IFR flight operating in cruising flight in controlled airspace shall be flown at a cruising level, or, if authorised to employ cruising techniques, between two levels or above a level, selected from the Tables of cruising levels in Appendix3 a) of ICAO Annex 2 „Rules of the Air" to the Convention on International Civil Aviation.

2.2.2. Rules applicable to IFR flights outside controlled airspace

An IFR flight operating outside controlled airspace but within or into areas, or along routes, designated by the appropriate ATS authority in accordance with ICAO Annex 2 paragraph 3.3.1.2. c) or d) shall maintain a listening watch on the appropriate radio frequency and establish two-way communication, as necessary, with the air traffic services unit providing flight information service.

2.2.3. Adherence to flight plan

In accordance with ICAO Annex 2 „Rules of the Air" to the Convention on International Civil Aviation an aircraft shall adhere to the current flight plan or the applicable portion of a current flight plan submitted for a controlled flight unless a request for a change has been made and clearance obtained from the appropriate air traffic control unit, or unless an emergency situation arises which necessitates immediate action by the aircraft, in which event as soon as circumstances permit, after such emergency authority is exercised, the appropriate air traffic services unit shall be notified of the action taken and that this action has been taken under emergency authority. Exception is due to inadvertent changes and weather detorioration below VMC.

Unless otherwise authorized by the appropriate ATS authority, or directed by the appropriate air traffic control unit, controlled flights shall, in so far as practicable:

- when on an established ATS route, operate along the defined centre line of that route; or
- when on any other route, operate directly between the navigation facilities and/or points defining that route.

Subject to the overriding such requirement an aircraft operating along an ATS route segment defined by reference to very high frequency omnidirectional radio ranges shall change over for its primary navigation guidance from the facility behind the aircraft to that ahead of it at, or as close as operationally feasible to, the changeover point, where established.

Deviation from the above mentioned requirements shall be notified to the appropriate air traffic services unit.

2.2.3.1. Inadvertent changes

In the event that a controlled flight inadvertently deviates from its current flight plan, the following action shall be taken:

Deviation from track:

- if the aircraft is off track, action shall be taken forthwith to adjust the heading of the aircraft to regain track as soon as practicable.

2.2.3.2. Communications

An aircraft operated as a controlled flight shall maintain continuous air-ground voice communication watch on the appropriate communication channel of, and establish two-way communication as necessary with, the appropriate air traffic control unit, except as may be prescribed by the appropriate ATS authority in respect of aircraft forming part of aerodrome traffic at a controlled aerodrome. When entering in Vilnius ACC AoR as well as Riga ATCC AoR the crew of WIZZ125H did not establish contact with controllers'.

2.3. ATC Operations in Weather Avoidance Scenarios

2.3.1. Weather Avoidance Information for Flight Crews

Controllers are expected to provide the most appropriate advice/information to pilots of an aircraft requesting navigational assistance when avoiding areas of adverse weather. **ICAO Doc 4444 (PANS-ATM)**, Item 8.6.9.1. contains the following provisions on information to be given to flight crews in weather avoidance scenarios:

- Information that an aircraft appears likely to penetrate an area of adverse weather should be issued in sufficient time to permit the pilot to decide on an appropriate course of action, including that of requesting advice on how best to circumnavigate the adverse weather area, if so desired.

In analysing case neither with Vilnius ACC controller nor with Riga ATCC controller the crew of WIZZ125H did not establish contact or requested advice for navigation the adverse weather area.

2.4. Possible effects due to adverse weather avoidance. Operational Supervisor's, air traffic controller actions, Flow Management Position's actions, organizational measures for mitigation effects

There may occur possible effects due to necessity to avoid adverse weather conditions, which include:

- Pilots may be unwilling to execute a turn, as instructed by the controller to avoid conflict, due to proximity of adverse weather;
- Pilots may be unwilling to descend due to proximity of adverse weather area;
- Pilots setting a heading or altitude not expected by the controller;
- Pilots changing the assigned heading after clearing weather without informing ATC. In general pilots request deviation from the planned route due to adverse weather conditions but sometimes, when clear of weather, they turn back to their planned route without prior notification to ATC;
- Increased communications with pilots;
- Increased communications with adjacent ATC units to coordinate avoiding actions;
- Increased controllers' and pilots' workload;
- Reduced sector capacity - The complexity of the traffic situation (traffic demand, non-standard routings, potential conflicts) may necessitate the implementation of flow measures in order to ensure safe ATC service provision during periods of massive adverse weather avoidance.

2.4.1. Possible defences for effects of avoiding adverse weather

2.4.1.1. Operational Supervisor's (SUP) actions

The ATC shift supervisor should be able to mitigate the impact of severe weather avoidance by air traffic on the controller's workload by facilitating and engaging in the following actions:

- Establish a co-ordination pattern with the MET office for the provision of periodic weather updates and forecasts for the affected area. Following an established protocol, which outlines the roles and responsibilities of involved persons, will be of advantage;
- Use all available information: MET updates/forecasts, traffic load forecasts and availability of ATC personnel to assess the situation and establish with the help of local flow management position (FMP) possible tactical measures;
- Inform affected adjacent units of the (flow) measures taken;
- **Assess whether it is safe and possible to follow the procedures described in local letters of agreement (LoAs) with adjacent ATC units.** As necessary, agree with the SUPs of the neighbouring unit(s) special coordination procedures to substitute the normal operating procedures (i.e. flight level allocations, points of transfer etc.). It is important to point out to the controllers the need for dedicated coordination in these exceptional cases;
- **Provide additional controller** as necessary at the sector to help the sector team with coordination / monitoring / planning tasks, as applicable;
- Apply dynamic sectorisation management - the OPS Supervisor should monitor the situation and activate the most appropriate sector configuration depending on the traffic volume and complexity, and the scale of the weather avoidance. For example, in case of large deviations from planned routes vertically split sectors may be more appropriate than laterally split ones;
- If relevant, coordinate with respective parties release of temporary restricted airspace for use by general air traffic or its use under special crossing co-ordiantion procedure (e.g. use of dedicated SSR code);
- Consider application of the so-called "one-airway" procedure, i.e. closely situated airways are considered as one airway for traffic separation purposes.

In analysing case aircraft A320 flight WIZZ125H unexpected without coordination of adjacent ATS unit entered in Riga ATCC AoR for very short time therefore there was not possible promptly to take any measures by OPS Supervisor. Controller informed Superviser when conflict situation was resolved.

2.4.1.2. Flow Management Position's (FMP) actions

The FMP should provide the necessary assistance to the OPS Supervisor and facilitate the management of the severe weather by timely activation of coordinated flow control measures in order to prevent sector overloads. During the normalization period, special consideration must be given to possible bunching of traffic at the end of the regulated period. It is considered that return to normal capacity following flow control measures is usually more efficient if implemented on a gradual (step-by-step) basis. The FMP should consider passing timely information to regional flow management unit about the forecast and actual convective weather and its impact on ATC operations.

2.4.1.3. Controllers' actions

Controllers' should exercise their best judgment and expertise when dealing with adverse weather avoidance scenarios; in particular they should be prepared to:

- **Maintain awareness** of the adverse weather location, its evolution (laterally and vertically) and of the possible deviation routes. A controller may be alerted to the presence of adverse weather by a variety of sources including: radar observations, or adjacent ATS units, MET office reports, unit briefings and reports from pilots. **Being constantly aware of any ongoing deviations and flight crews' intentions should provide precious time for separation of affected nearby traffic**;
- Develop strategies – the executive (radar) and planner controller should develop strategies and practice mutual crosschecks of the current, planned and intended weather avoidance actions;
- Provide timely information to and coordinate with the adjacent sectors of any deviations which will affect them;
- Pro-actively seek information regarding traffic which is likely to enter own sector;
- Request any necessary details from the flight crews on the planned avoiding actions i.e. heading(s) on which the aircraft will be flying, as well as the estimated duration and/or the distance the aircraft will proceed on the heading(s);
- Provide extra room for manoeuvring, if in doubt that the traffic could request further deviation provide extra space for separation, issue instructions for flight level change as necessary, provide traffic information, as necessary;
- Inform pilot if weather avoidance will take pilot outside controlled airspace and offer an appropriate service.

In analysing case at 17:12:15 when KLM409 requested FL 390 there were not any conflicting traffic, therefore controller executer of sector WEST Riga ATCC after previously given instruction „KLM409 STAND BY" cleared KLM409 to climb to FL390. Because WIZZ125H entered Riga ATCC AoR without any coordination and communication, crossing sector WEST between Copse' NINTA ans ADAXA the arising conflict situation was unexpected for controller when at 17:14:06 STCA triggered warning about possible conflict. KLM409 was at FL372 climbing with 500 ft/m. At 17:14:00 Riga ATCC controller called to Vilnius ACC controller and asked (speaking in Russian) about SQ1733 at FL380, Vilnius ACC controller answered that SQ1733 didn't contact with her and that it is already over point NINTA that is in Latvian airspace. There are 9 aircraft in sector WEST and there were necessity to contact with controllers' of adjacent ACC due to adverse weather conditions when situation constantly had changes. Observing conflict situation Riga ATCC sector WEST controller at 17:14:14 ordered KLM409: „KLM409 immediately descend FL370" whereupon KLM409 answered that they are already descending, because TCAS „TA" switched on alerting pilots of the possibility of an „RA". At 17:14:22 KLM409 still was at FL374 with climbing rate 1300ft/m and when it descended at 17:14:34 with descending rate 100ft/m at FL 374 heading 079° the prescribed separation minima standarts between flying at FL380, at converging heading 343° WIZZ125H were not maintained. Horizontal separation at this moment was 4.5NM, vertical 600FT. The crew of KLM409 filled AIRPROX Report.

At 17:15:20 conflict situation was resolved and controller cleared KLM409 to climb at FL390 again.

The scope of the Air Traffic Control Services procedures, operations and instructions had not essential influence to incident.

According to EUROCONTROL guidance material (ESARR 2 Guidance to ATM Safety Regulators, EAM 2/GUI 1, Severity Classification Scheme for Safety Occurrences in ATM, Edition 1.0, edition date 12-11-1999), see tables I, II, this incident is classified as **Major Incident** - B -Loss of separation (***separation higher than half the separation minima/e.g., 4NM***) which is not fully under ATC control. A crew avoidance manoeuvre and/or an ATC instruction allowed to reduce the risk, without eliminating it, as safetyn margins were still infringed.

Taking into account the Severity Classification Scheme that specifies five qualitative frequency categories this incident is classified as **B3**.

SEVERITY	A	Serious incident	A1	A2	A3	A4	A5
	B	Major incident	B1	B2	**B3**	B4	B5
	C	Significant incident	C1	C2	C3	C4	C5
	D	Not determined	D1	D2	D3	D4	D5
	E	No safety effect	E1	E2	E3	E4	E5

1	2	3	4	5
Very Frequent	Frequent	**Occasional**	Rare	Extremely rare
FREQUENCY				

Table 5, Severity Classification Scheme for Aircraft Incidents

FREQUENCY	DEFINITION
Extremely rare	Has never occurred yet throughout the total lifetime of the system.
Rare	Only very few similar incidents on record when considering a large traffic volume or no records on a small traffic volume.
Occasional	**Several similar occurrences on record - Has occurred more than once at the same location.**
Frequent	A significant number of similar occurrences already on record - Has occurred a significant number of times at the same location.
Very Frequent	A very high number of similar occurrences already on record- Has occurred a very high number of times at the same location.

Table 6, Definitions of Accident/Incident Frequency

2.5. Underlying Human Factors problems associated with incident

For revealing causation of this incident it was put into practice the taxonomy of the Human Factors Analysis and Classification System that describes the human factors that contribute to an incident. It is based on a sequential or chain-of-events theory of accident causation. The human contribution don't build on the person approach, that focuses on the errors and violations of individuals but is based on the system approach, that traces the causal factors back into the system as a whole. The investigation view is not that Human Error is a cause of incident but that Human Error is a symptom of trouble deeper inside a system. The classification system has four levels, each of which influences the next level. These four levels are called:

- organizational influences;
- unsafe supervision;
- preconditions for unsafe acts;
- unsafe acts of operators;

Human factors played the major role in the cause of this incident and this further reinforces the requirements to examine the role of human factors in the Air Traffic Control.

2.6. Unsafe acts of operators

The unsafe acts can be loosely classified into two categories: errors and violations.

I. Errors

During investigation here were fixed following errors that ultimately led to the serious incident:

1. Skill-Based error

- There not fixed skill based errors of Controller.

2. Decision errors

- Investigation didn't reveal any poor decision made by operators.

II. Violations

Investigation didn't reveal any violations such as willful disregard for the rules and regulations that govern safe flight. Investigation revealed violation procedures of ICAO Annex 2 „Rules of the Air" to the Convention on International Civil Aviation by Crew of WIZZ125H. These violations can not classify as willfull but occurred due to adverse weather conditions.

2.7. Preconditions for unsafe acts

Two major unsafe subdivisions of unsafe conditions are developed:
- Substandard conditions of operators;
- Substandard practices of operators.

I. Substandard conditions of operators

Investigation didn't reveal any substandard conditions of operators such as adverse mental states, physiological states as well as physical/mental limitation.

II. Substandard practices of operators

Generally speaking, the substandard practices of operators can be summed up in two categories:
- Resource mismanagement;
- Personal readiness.

Within the context of this incident this includes coordination both within and between aircraft with air traffic control facilities as well as adjacent air traffic units. There was revealed poor coordination among adjacent Kaliningrad ACC, Vilnius ACC as well as Riga ATCC.

Personal readiness failures occur when individuals fail to prepare physically or mentally for duty. Within the context of this incident there not revealed personal readiness failures when operators fail to prepare physically or mentally for duty.

2.8. Unsafe supervision

Exist four categories of unsafe supervision:

- Inadequate supervision;
- Planned inappropriate operations;
- Failure to correct a known problem;
- Supervisory violations.

Within the context of this incident there was not reveled any inappropriate supervision of operations.

2.9. Organizational factors influencing incidents

Fallible decisions of upper-level management directly affect supervisory practices, as well as the conditions and actions of operators. The most elusive of latent failures revolve around following issues of organizational influences:

- Resource management;
- Organisational climate;
- Operational process.

Within the context of this incident there were not find lack of human resources, budget resources, deficient planning, as well as were not find any adversarial, or conflicting, or when they are supplanted by unofficial rules and values and confusion abounds that could to have influence on creation of this serious incident.

3. Conclusions

During process of investigation were made the following conclusions:

3.1. Findings

- At the time of the incident the traffic was handled by an air traffic controller of WEST sector with operational role “Executive”;

- At the time of incident in the WEST Sector due to adverse weather conditions the workload of the controller increases significantly;

- Aircraft WIZZ125H involved was not in radio contact with Riga ATCC as well as Vilnius ACC;

- WIZZ125H deviation from the planned route occurred due avoiding adverse weather conditions;

- Entering in Lithuanian and Latvian ACC controlled airspace WIZZ125H did not establish radio contact with controlers’;

- Adjacent to Riga ATCC ATS unit Vilnius ACC did not inform and transfer flight WIZZ125H to Riga ATCC controller due to lack information from adjacent Kaliningrad ACC;

- Authentic information about occurrence was received from the duty officer of ARCC Riga, a structural part of LGS responsible for co-ordination of SAR operations within Riga FIR.

According to Annex 13 to the Convention on International Civil Aviation given occurrence can classify as serious incident;

- The air traffic controller held valid licence and ratings and was qualified and current at the position;

- Both aircrafts involved were operating on IFR flight plans;

- Air Traffic Control System ATRACC+ (Manufacturer' s serial No N SI P 101.1) is an ATM system for area, approach and tower Control of the Riga FIR;

- The vertical separation is carried out according to ICAO Annex 2 Table of Cruising levels 3a -1000ft (300m);

- Horizontal separation (radar separation) if double SSR coverage is provided between identified, controlled aircraft not less than 5NM;

- According to EUROCONTROL guidance material (ESARR 2 Guidance to ATM Safety Regulators this incident is classified as Major Incident;

- At the time of incident Visual Meteorological Conditions (VMC) prevailed;

- Investigation didn't reveal any violations such as willful disregard for the rules and regulations that govern safe flight;

- The incident was reported according to the MOR System.

3.2. Causes

Causes of the serious incident - infringement the separation minima between AIRBUS 332, registered PH-AOA, flight KLM409 and WIZZAIR Airbus A320, registered HA-LPV, flight WIZZ125H, were the following:

3.2.1. Root Cause

The source or origin of an event that played the major role that caused this incident was the fact that the aircraft of WIZZAIR which due to adverse weather condition entering in Lithaunian ACC as well as Latvian ACC controlled airspace for avoiding storm clouds did not contacted with controllers' of these ATC.

3.2.2. Contributing causes

Adverse weather conditions

3.2.3. Primary cause

The event after which incident became inevitable.

Controller can not manage flight of WIZZ125H due to lack of contact with aircraft and when STCA triggered, controller gave instructios to KLM409 but it was insufficient for safe separating both aircraft.

4. Safety Recommendations

It is recommended that the airline Wizz Air Hungary Légiközlekedési Kft.:

Recommendation – 7-2011

- to discuss the occurrence in connection with this serious incident with goal to improve Crew Resource Management.

It is recommended that the authority responsible for air navigation services in the Latvian airspace - State Joint Stock Company Latvijas Gaisa Satiksme (LGS):

Recommendation – 8-2011

- should consider opportunity to appoint 2 Controllers for providing services in overloaded sectors during adverse weather conditions as well as to make appropriate changes in controllers working procedures and Quality Management System.

Riga July 12, 2011

Investigator in charge –Head of Aircraft Accident and Incident Investigation Department

Visvaldis Trubs

Director of Transport Accident and Incident Investigation Bureau

Ivars Alfreds Gaveika