

FINAL REPORT Nr.2/2008
OF THE AIRCRAFT SERIOUS INCIDENT

INFRINGEMENT OF SEPARATION STANDARDS BETWEEN THE AIRBALTIC CORPORATION BOEING 757-200 YL-BDC, FLIGHT BTI65T AND VIRGIN ATLANTIC AIRWAYS AIRBUS A340-600 G-VBLU, FLIGHT VIR301 OVER THE SEA IN THE VICINITY OF LIEPĀJA (N56:31:07; E021:05:31) ON APRIL 21, 2008

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 Directive 94/56/EC of 21 November 1994, establishing the fundamental principles governing the investigation of civil aviation accidents and incidents of the Council of the European Union, 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.

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Director of Transport Accident and
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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
 TCAS - Traffic Alert and Collision Avoidance System
 SSR - Secondary Surveillance Radar
 PSR - Primary Surveillance Radar
 ARCC - Aeronautical Rescue Co-ordination Centre
 ATC - Air Traffic Control
 UTC - Universal Time Coordinated
 UTA - Upper (Traffic) Control Area
 CTA - Control Area
 TMA - Terminal Control Area (ICAO)
 TIA - Traffic Information Area
 TIZ - Traffic Information Zone
 AoR - Areas of Responsibility
 CWP - Controller Working Position

ReportRVSM –Reduced Vertical Separation Minimum
 ODS - Operator input and Display System
 VOR - VHF Omni Directional Range
 ILS - Instrument Landing System
 DME - Distance Measuring Equipment
 RA - Resolution Advisory
 NM - Nautical mile
 FT - Feet
 Z – Zulu = Universal Coordinated Time (UTC)
 ESARR5 –EUROCONTROL Safety and Regulatory Requirement on ATM personel
 FIR - Flight Information Region
 UIR - Upper (flight) Information Region
 FIS - Flight Information Services
 FPL - Filed Flight Plan (ICAO format)
 RPL -Repetitive Flight Plan
 HMI - Human Machine Interface
 EHSI - Electronic Horizontal Situational Indicator
 OSUP - Operational Supervisor
 FAP – Final Approach Point

METAR - Meteorological Aviation	CAA –Civil Aviation Agency
Routine Weather CAVOK – Ceiling and Visibility OK	VMC - Visual meteorological conditions
SAR - Search and Rescue	TSN – Time Since New
SSR - Secondary Surveillance Radar	CISM- Critical Incident Stress Management
ESARR- Eurocontrol Safety and Regulatory Requirement	ACFT - Aircraft
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
SARPs- Standards and Recommended Practices	

Synopsis

Unless stated otherwise the time in this Report is UTC

On Monday, 21 April, 2008 at 15:05 UTC a serious aircraft incident took place in Riga FIR, in the vicinity of Liepaja (N56:31:07; E021:05:31). A VIRGIN ATLANTIC AIRWAYS AIRBUS A340-600, G-VBLU, United Kingdom, FLIGHT VIR301 was en route from Indira Gandhi Intl (DEL), Delhi, India to Heathrow Airport (LHR), London, EN, GB, cruising at FL 380. AIRBALTIC CORPORATION BOEING 757-200 YL-BDC, FLIGHT BTI65T was en route from London - Gatwick (LGW) on a reciprocal track at FL390 to Riga Intl (RIX). At 14:57:58 the crew of the Boeing 757-200 got issued clearance from the Riga ATC WEST-COMBINED sector controller (hereinafter ATCO1) direct to FAP Vekas of CTR Riga International airport. (See Attachment 1-Radar Minimum Altitude Chart –EVRA and Attachment 2 –Instrument Approach Chart (EVRA). Using controller pilot data link communications (CPDLC)http://www.atsb.gov.au/publications/investigation_reports/2006/AAIR/air200600396.a_spx - fn1 the crew declared readiness to descend from FL390 to FL170 and had issued clearance from ATCO1 descend to FL170 despite that the same time with opposite heading at FL 380 was cruising AIRBUS A340-600, FLIGHT VIR301. Clearance was read back by the crew of Boeing 752, FLIGHT BTI65T and Boeing 752 started descending. At 15:05:06 the two aircraft passed each other with opposite headings in the vicinity of LIEPAJA (N56:31:07; E021:05:31) in the RIGA Flight Information Region and the separation standard between the two aircraft was infringed. The crew of AIRBUS A340-600, FLIGHT VIR301 received the traffic alert and collision-avoidance system (TCAS) resolution advisory (RA) to descend as a result of the Boeing 752, FLIGHT BTI65T traffic ahead of them.

The circumstances leading to this serious incident were following: At the time of the incident the traffic was handled by an air traffic controller- student of ANS Training Center who was on an On- the-job training period. The air traffic controller on duty had about at the working position and coordinated the traffic by ground communication with adjacent Riga ATCC MALMO AoR sector controller. During communication air traffic controller on duty did not control actual situation in the airspace between abovementioned aircraft. The student cleared Boeing 757-200 flight BTI65T to descend from FL390 to FL170 despite the opposite heading at FL 380 was cruising AIRBUS A340-600, FLIGHT VIR301. Air traffic controller on duty started to handle the traffic after completing communication with MALMO controller and perceiving that there is conflict situation tried to contact with crew of Boeing 752, FLIGHT BTI65T three times issuing heading change for the aircraft but the crew did not answer. After that controller on duty issued heading change for the aircraft AIRBUS A340-600, FLIGHT VIR301 but at that time resolution advisory (RA) "DESCEND, DESCEND" was annunciated, the PIC of AIRBUS A340-600 disengaged the Autopilot and followed the RA. After a while the RA reduced to a Monitor Vertical Speed RA and then Clear of Conflict.

At the time of the incident, vertical separation between the two opposite aircrafts decreased to 700 feet, horizontal separation was to 4.0 nautical miles. (See Picture 1, 2) The conflicting traffic was in sight for aircrafts crews, so Boeing 752, FLIGHT BTI65T and AIRBUS A340-600,

Notification

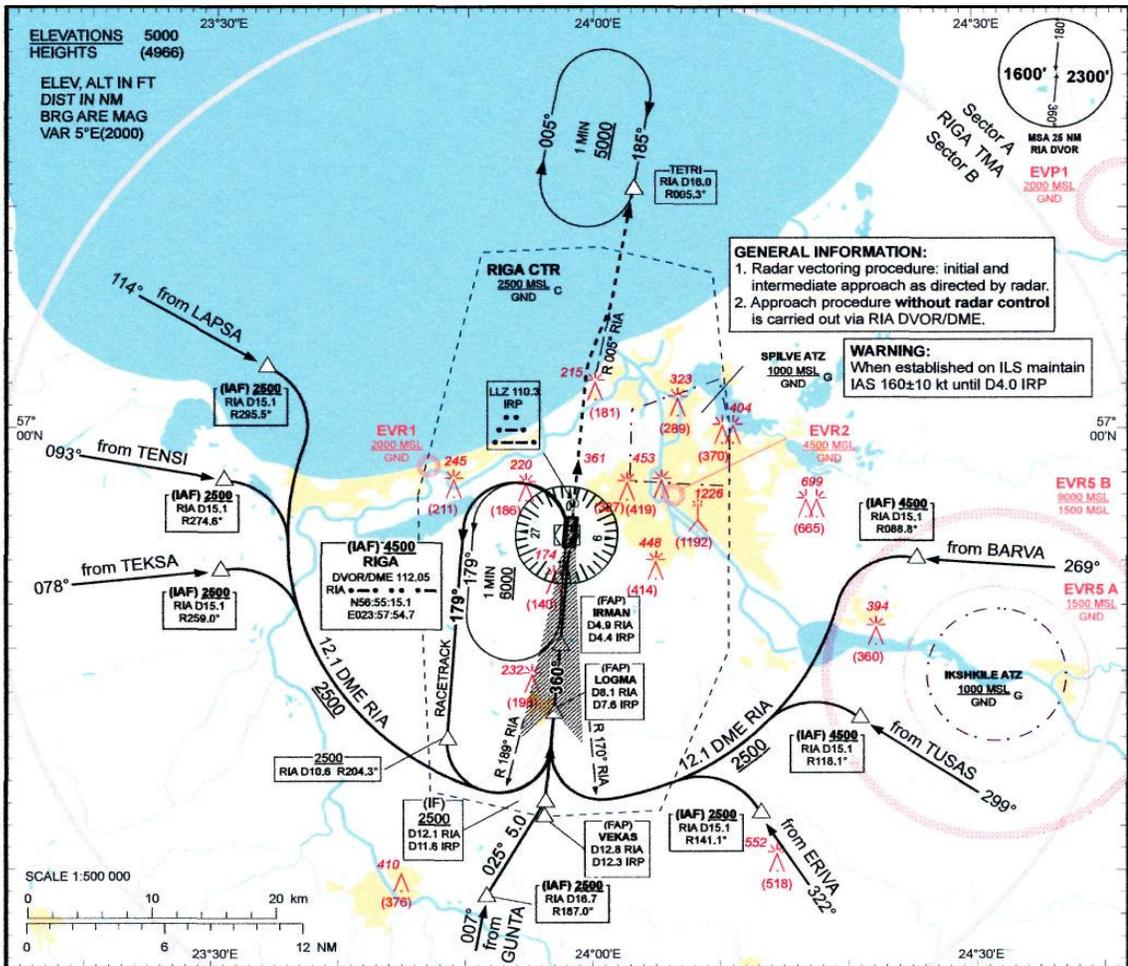
The Transport Accident and Incident Investigation Bureau of the Republic of Latvia was notified about the incident on Tuesday, 22 April, 2008 by the duty officer of ARCC Riga, a structural part of LGS responsible for co-ordination of SAR operations within Riga FIR, Riga International Airport as well as by Flight Safety Report from Air Baltic Corporation. 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 VIRGIN ATLANTIC AIRWAYS of providing any relevant available information regarding the aircraft and personal data of flight crew involved in the serious incident.

Factual information

1.1 Sequence of events

1.1.1 Flights involved in the incident

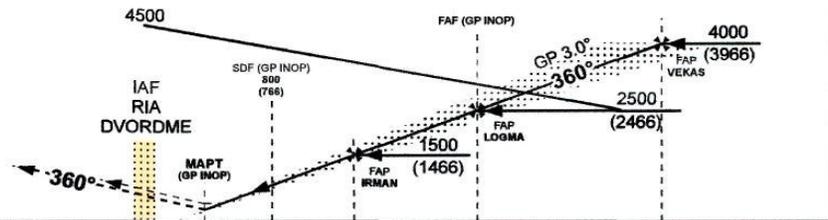
The incident took place on Monday, April 21, 2008, at 15:05 UTC over the sea in the vicinity of LIEPĀJA (N56:31:07; E021:05:31). AIRBUS A340-600, G-VBLU, FLIGHT VIR301 was flying WESTBOUND from Indira Gandhi Intl (DEL), Delhi, India to Heathrow Airport (LHR), London at FL 380 (11582 m). Upon glancing at the navigation display Captain of AIRBUS A340 became aware of another aircraft approximately 1000ft above flying EASTBOUND. This aircraft [Boeing 752, FLIGHT BTI65T from London - Gatwick (LGW) was flying at FL390 to Riga Intl (RIX)] at 15:03:25 commenced a descent to FL170 because at 14:57:58 was cleared from the Riga ATC WEST-COMBINED ATCO1 direct to to FAP Vekas of CTR Riga International airport. (See Picture 3, 4) At 15:04:33 ATCO1 of WEST-COMBINED sector issued instruction „Baltic 65T turn right, heading ... 10 degrees to the right, please” and at 15:04:41 called the crew once more „65T turn right, 10 degrees to the right, please”. At 15:04:49 ATCO1 had tried another time to contact Boeing 752, FLIGHT BTI65T. On all efforts of ATCO1 to get in contact with Boeing 752, FLIGHT BTI65T the crew didn't answer. Thereafter at 15:04:53 ATCO1 called up AIRBUS A340-600, FLIGHT VIR301 and issued instruction “Virgin 301 turn right 10 degrees, please” whereupon at 15:05:05 the crew of VIR301 declared „Virgin 301 TCAS descend”. Before now at 15:04:53 also the crew of Boeing 752 declared “65T TCAS climb” The sequence of events were following. According to TCAS data, when the Boeing 752, FLIGHT BTI65T was approximately 700ft above, at 15:04:54 a [//////////traffic](#) Traffic Advisory was issued. VIR301 was level 38030 ft, intruder aircraft BTI65T was level 38480ft with a descent rate of 18ft/s. The Captain of AIRBUS A340 was aware of ATCO1 issuing a heading change to the Boeing 752. After 14 sec the event had escalated to an RA (Resolution Advisory, Descend, Descend) with green band commanding descent rate of approximately 1000ft/min. The Captain immediately disengaged the Autopilot and followed RA. VIR301 Altitude was 38030 ft, intruder aircraft BTI65T Altitude was 38480ft with descent rate 18ft/s. After a further 13 sec RA reduced to a Monitor Vertical Speed and the Clear of Conflict received after a total of 54 sec. Both aircraft responded immediately to their respective RA's. VIR301 altitude was 37820ft (descent rate - 21ft/s), intruder BTI65T altitude was 38440ft (climb rate + 41ft/s).



TRANSITION ALT 5000

MISSED APPROACH
 Climb on track 360° to 1200 then turn RIGHT for intercepting RIA R-005°. Proceed to TETR1, climbing to 2500 and follow ATC instructions.

ILS RDH 60
 THR ELEV 34



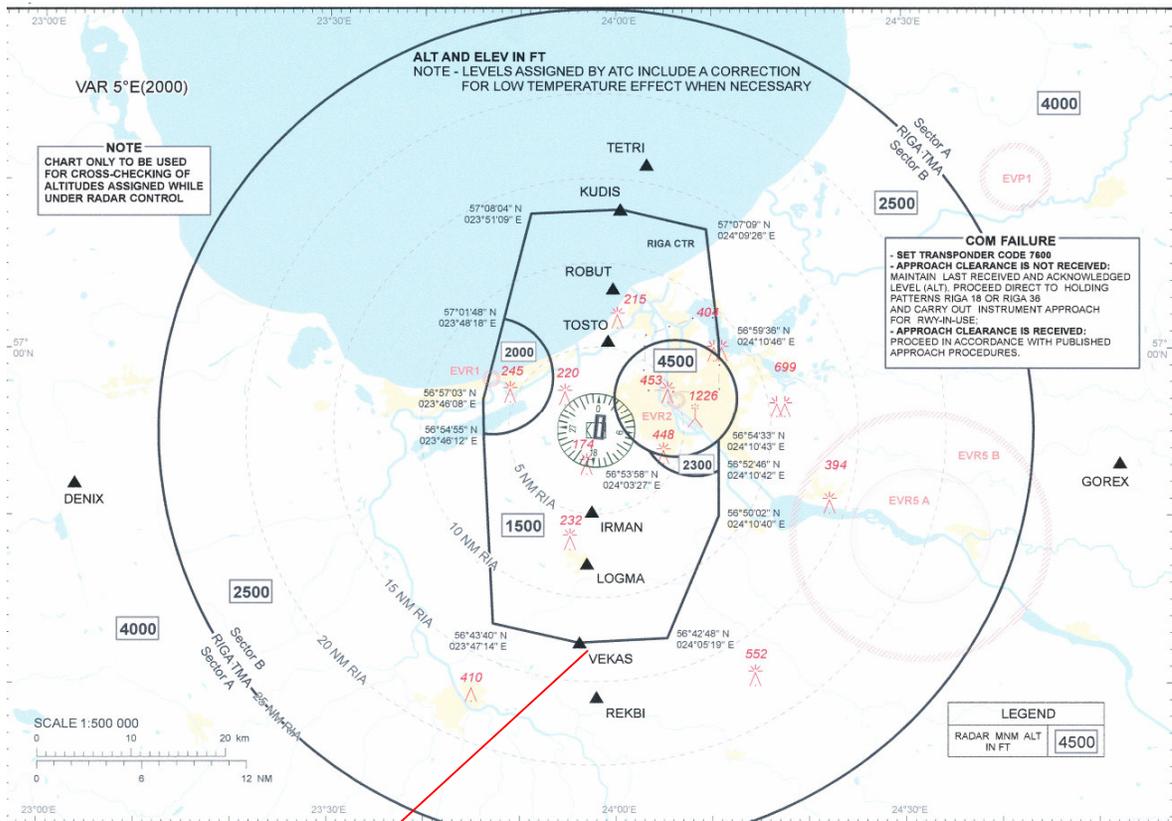
Aircraft Category	NM from THR RWY 38 8				DME IRP											
	A	B	C	D	7	6	5	4	3	2	1					
Straight-in Approach OCA(H)	ILS Cat. I	234 (200)				DME RIA	7.5	6.5	5.5	4.5	3.5	2.5	1.5			
	LLZ	370 (340)				DIST THR	7	6	5	4	3	2	1			
Circling	510 (480)				720 (690)				ALTITUDE	2320	2010	1690	1370	1050	730	410
									HEIGHT	(2286)	(1976)	(1656)	(1336)	(1016)	(696)	(376)
Timing not authorized for defining the MAPT																
REMARKS: CIRCLING NOT AUTHORIZED EAST OF THE AIRPORT																
GS		Kt		80	100	120	140	160	180							
Rate of descent (5.24%)		ft/min		420	530	640	740	850	960							
FAF-MAPT(7.1 NM)		min:sec		05:19	04:15	03:33	03:02	02:40	02:22							

Changes:

Picture 3

INSTRUMENT APPROACH CHART RIGA Intl (EVRA)

RADAR MINIMUM ALTITUDE CHART RIGA/Intl (EVRA)



Picture 4

Final Approach Point VEKAS of CTR Riga

At the time of the incident, vertical separation between the two opposite aircraft decreased to 700 feet, horizontal separation was to 4.0 nautical miles. The conflicting traffic was in sight for aircrafts crews, so Boeing 752, FLIGHT BTI65T and AIRBUS A340-600, FLIGHT VIR301 passed each other by right side. Visual meteorological conditions existed at the time.

1.1.2 Events in the Riga air traffic control center

In the afternoon of Monday, April 21, 2008, one of air traffic controller (ATCO1) was on duty for ATS provision in the WEST-COMBINED sector of Riga FIR at the moment when the incident occurred. Sector WEST-COMBINED provides services within sector SOUTH AoR and sector NORTH AoR. Working position of the Sector WEST-COMBINED is shareable between a controller with operational role "WEST-EXECUTIVE" and a controller with operational role "WEST-PLANNER" appointed by the Operational Supervisor during the highest flight intensity hours ATS is provided at flight levels from FL100 till FL460.

At the moment when the incident occurred ATCO1 had occupied a position in sector SOUTH with operational role "WEST-EXECUTIVE". According to the time-table for April, 2008 of Latvian ATC (GSVC), ATCO1 working shift No2 on April 21, 2008 began at 11:30 (UTC), 14:30 (local time). Actually ATCO1 during first hour after login in the ATRACC+ system operated with operational role "WEST-PLANNER" and after 1 hour regulated rest pause during the afternoon shift began to operate with operational role "WEST-EXECUTIVE". Total working - time up to incident (at 15:05) is 03 hr 35 min. Total working-time at the display 2 hr 35min. before the incident occurred.

At the same time there was one air traffic controller student from ANS Training Center who was on an On- the-Job Training period in accordance with his syllabus to learn about different operations at the airport which comprised practicing of air traffic controlling – to provide an air traffic control service under the supervision of an On-the-Job Training instructor in a live traffic situation. The student was in a study period complying with State Joint Stock Company Latvijas Gaisa Satiksme (LGS) and ANS Training Center contract „Technical specification to provide for student after basic training Pre-OJT and OJT for obtaining ATC licence” which consisted of Aerodrome Control Instrument, Approach Control Procedural/Surveillance /Radar, Area Control Procedural/Surveillance/Radar. He had completed Phase Pre-OJT (Simulation Training) in the simulator of ANS Training Center and primary field practice in APP, ACC and TWR working places of ATCC.

An air traffic controller student of ANS Training Center who was on an On- the-job training period at the time of the incident handled the traffic. The controller student handled the radio communications, made notes of the traffic on the controller's flight strips and took care of the Air Navigation Services system (ANS). The air traffic controller on duty had about at the working position and coordinated the traffic by ground communication facilities with adjacent Riga ATCC MALMO controller. During communication air traffic controller on duty did not control actual situation in the airspace between abovementioned aircraft. The controller student cleared Boeing 757-200 flight BTI65T to descend from FL390 to FL170 despite the opposite heading at FL 380 was cruising AIRBUS A340-600, FLIGHT VIR301 believed that distance between aircraft are sufficient. Air traffic controller on duty started to handle the traffic after completing communication with MALMO controller and perceiving that there is conflict situation tried to contact with crew of Boeing 757-200 flight BTI65T and had issued instruction to turn 10 degrees to the right. Because the crew of Boeing 757-200 flight BTI65T did not reply to the three requests of controller on duty ATCO1 he instructed AIRBUS A340-600, FLIGHT VIR301 – „“Virgin 301 turn right 10 degrees, please”. This instruction came too late because there was unsafe separation and infringement of separation standards yet and as a result of the crew of VIR301 declared–“Virgin 301 TCAS descend” as well as two seconds before Boeing 757-200 flight BTI65T reported - „65T TCAS climb”.

1.1.3 Cockpit crew actions

Cruising at FL380 Captain of VIR301 was alone in the flight deck as the F/O had stepped out for a comfort break. Upon glancing at the Navigation Display he became aware of another aircraft approximately 1000ft above. This aircraft commenced a descent and when the other aircraft was approximately 700ft above, a Traffic Advisory was issued. The event then escalated to an RA (Descend, Descend). The Captain immediately disengaged the Autopilot and followed the RA. He saw the other aircraft passed overhead. The Captain was not wearing his headset and when event occurred he could not make a call to ATC until after the aircraft had received a Clear of Conflict.

BTI65T was cruising at FL390. When ATCO1 of Riga ACC had cleared BTI65T direct to FAP Vekas of CTR Riga International airport the Clearance was read back by the crew of BTI65T and they declared readiness for descend. After while ATCO1 issued instruction for BTI65T to descend to FL170, the clearance was read back and the crew commenced to descend.

When ATCO1, perceived that there is a conflict situation, tried to contact with crew of Boeing 752, FLIGHT BTI65T, two times issuing heading change for the aircraft, on all efforts of ATCO1 to get in contact with Boeing 752, FLIGHT BTI65T the crew didn't answer.

1.1.4 ANS Training Center's actions

The State Stock Company Latvijas Gaisa Satiksme (LGS) had in advance signed a contract with company „ANS Training Center” Ltd. about training 20 (2 groups of 10 participants) new air traffic controllers. According signed agreement „ANS Training Center” Ltd. was responsible for providing courses of Pre-OJT (Simulation Training) and OJT for obtaining ATC licence for students-controllers after basic training. The students' control training was planned to be started from June, 2007 until July 2008. On- the-Job Training should be conducted at State Joint Stock Company Latvijas Gaisa Satiksme (LGS) operational ATC position under the supervision of a qualified on-the-job instructor.

An air traffic student-controller who handled the traffic at the time of the incident was on an On-the-Job Training period according to Unit Training and Assessment Plan for Area Control Surveillance/Radar. Unit Training and Assessment Plan was approved by the Training Manager of „ANS Training Center” Ltd. and the Head of ANS department of the Latvia Civil Aviation Supervision Authority - CAA. He had completed Basic Training and Rating, phase Pre-OJT and at the end of Pre-OJT had the assessment which allow him to start OJT for licence. According to Order of „ANS Training Center” Ltd. issued on March 25, 2008 for student- controller was appointed on-the-job instructor for training at State Joint Stock Company Latvijas Gaisa Satiksme (LGS) operational ATC position Area Control Procedural/Surveillance/Radar. The On-the-Job Training Instructor appointed for training Controller- student according to Unit Training and Assessment Plan was replaced by other person – reserve instructor. Controller- student had medical assessment - Medical Certificate Class 3. He had not a Student Air Traffic Controller licence or certificate of competence to be entitled to provide an ATC service under the supervision of a suitably qualified on the job training instructor. According to Item 3.1.2.1.of EUROCONTROL document ESARR 5 ATM SERVICES' PERSONNEL as well as Item 5 of Article 4 of Directive 2006/23/EC of the European Parliament and of the Council of 5 April 2006 on a Community air traffic controller licence a Student Air Traffic Controller licence required for persons who do not hold Air Traffic Controller licence to provide an ATC service under the supervision of a suitably qualified on the job training instructor.

1.1.5. Supervisory authority – CAA actions

Civil aviation operations in the Republic of Latvia have regulated by international agreements binding on the Republic of Latvia and the regulatory enactments of the European Union, Law on Aviation and regulatory enactments issued within the scope of the competence prescribed by this Law. A Designated Authority for the safety regulation of Air Traffic Control personnel shall issue an ATC licence or certificate of competence to any applicant who complies with the obligatory provisions of ICAO Annex 1 section 4.31 and of ESARR 5 section 5.2. The licence or certificate of competence issued shall contain one or more of the ratings of the classes:

- Aerodrome control visual;
- Aerodrome control instrument;
- Approach control procedural;
- Approach control surveillance;
- Area control procedural;
- Area control surveillance.

According to Article 13 of Directive 2006/23/EC of the European Parliament and of the Council as well as point 1 of Article 42 of Law on Aviation the responsibility for issuing air traffic student-controllers' licences, certification and supervision the Providers of training air traffic controllers lies on the designed authority – Civil Aviation Agency.

The Civil Aviation Agency shall perform the State supervision of the training, retraining and raising of qualifications of civil aviation personnel.

1.1.5.1. Certification of Training Providers

- a) The provision of training to air traffic controllers, including related assessment procedures, **shall be subject to certification by the Civil Aviation Agency.**
- b) The requirements for certification shall relate to technical and operational competence and suitability to organise training courses as set out in point 1 of Annex IV of Directive 2006/23/EC.
- c) Applications for certification shall be submitted to the Civil Aviation Agency.

The Civil Aviation Agency shall issue certificate when the applicant training provider fulfils the requirements laid down in REQUIREMENTS TO BE ATTACHED TO CERTIFICATES AWARDED TO TRAINING PROVIDERS

Certificates may be issued for each type of training or in combination with other air navigation services, whereby the type of training and the type of air navigation service shall be certified as a package of services.

- d) Civil Aviation Agency shall monitor compliance with the requirements and conditions attached to the certificates. If a Civil Aviation Agency finds that the holder of a certificate no longer satisfies such requirements or conditions, it shall take appropriate measures, which may include withdrawal of the certificate.

Civil Aviation Agency for the safety regulation of Air Traffic Control personnel shall:

- issue an **ATC licence** or certificate of competence to any applicant who complies with the obligatory provisions of ICAO Annex 1 section 4.32 and of ESARR 5 section 5.2;
- issue a **Student Air Traffic Controller licence** or certificate of competence to persons who do not hold an Air Traffic Controller Licence or a certificate of competence to enable them to provide an ATC service under the supervision of a suitably qualified on the job training instructor;
- issue **On-the-Job Training Instructor (OJTI) licence/certificate** of competence endorsements to suitably qualified air traffic controllers to enable them to supervise student air traffic controller licence or certificate of competence holders, or trainee air traffic controllers, while they provide an operational air traffic control service **during on the job training**;
- **approve such personnel**, as it sees fit, **to conduct examinations or assessments**, as it requires, to ensure that applicants for an ATC licence or certificate of competence are competent and meet the appropriate requirements;
- before granting a Student air traffic controller licence or certificate of competence, ensure that the applicant:
 - a) has undertaken the appropriate initial training and passed any associated examinations or assessments in the rating discipline in which he/she will be authorised to undergo on the job

training to be suitable for training under supervision of an authorised OJT instructor to be an Air Traffic Controller;

b) **holds a valid medical certificate** of the appropriate class;

Civil Aviation Agency before granting an air traffic controller authorisation to provide operational training as an OJT Instructor, ensure that the applicant has:

a) A minimum of two years experience in the rating discipline in which he/she will instruct;

b) A minimum of six months experience in the rating on the specific sector or operational position on which the instruction will be given;

c) Completed an appropriate OJT Instructor course and passed any associated assessments required.

1.1.6. The actual state of affairs during period of student's-controller training and at the moment of incident

The Civil Aviation Agency:

-did not issue Certificate for Training Provider „ANS Training Center” Ltd. to organise training courses as set out in point 1 of Annex IV of Directive 2006/23/EC, as a result Training Provider not authorized by the Civil Aviation Authority;

-did not issue Student Air Traffic Controller licence for student controller;

-did not develop requirements for Training Providers;

-issued Medical Certificate Class 3 for student controller;

-issued **On-the-Job Training Instructor (OJTI) licence** endorsement to air traffic controller to supervise air traffic student-controller, while he provided an operational air traffic control service **during on the job training** (Decree of CAA No R-273 of October 16.2000).

ANS Training Center

- During training period of student - controller Training Provider „ANS Training Center” Ltd. had not Certificate for provision of training to air traffic controllers (including related assessment procedures) issued by Latvian supervisory authority – CAA required according to Article 13 of Directive 2006/23/EC of the European Parliament and of the Council.

- Had signed contract with The State Joint Stock Company Latvijas Gaisa Satiksme (LGS) about training new air traffic controller after basic training Pre-OJT and OJT for obtaining ATC licence (radar endorsement);

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, 40 years Licence: Air traffic controller, valid until April 11, 2009.
Medical certificate: Air traffic controller Medical Certificate valid until May 08, 2008.
Ratings: All necessary ratings were valid (Rating Certificate to Air Traffic Controller Licence valid until April 11, 2009).

Air traffic controller student: Male, 20 years
Licence: No licence
Medical certificate: Air traffic controller Medical Certificate valid until March 02, 2009.

Captain of Boeing 752 BTI65T: 37 years old
Certificate: ATPL LVA/JAA 015A; Data of last medical: April 19, 2007
Total flight experience – 6763 hours; Total hours on aircraft type – Boeing 757 - 1700 hours;
Flying hours in previous day -10:45;
Flying hours in incident day - 05:10;
Previous rest period - 15: 25.

First officer of Boeing 752 BTI65T: 38 years old
Certificate: JAR/FCL 9138; Data of last medical: April 19, 2007
Total flight experience - 2000 hours; Total hours on aircraft type – Boeing 757 - 73 hours;
Flying hours in previous day – 10:45;
Flying hours in incident day – 05:10;
Previous rest period - 15: 25.

Captain of A340-600 G-VBLU
Total flight experience - NA for investigation

First officer of A340-600 G-VBLU
Total flight experience - NA for investigation

1.6. AIRCRAFT INFORMATION

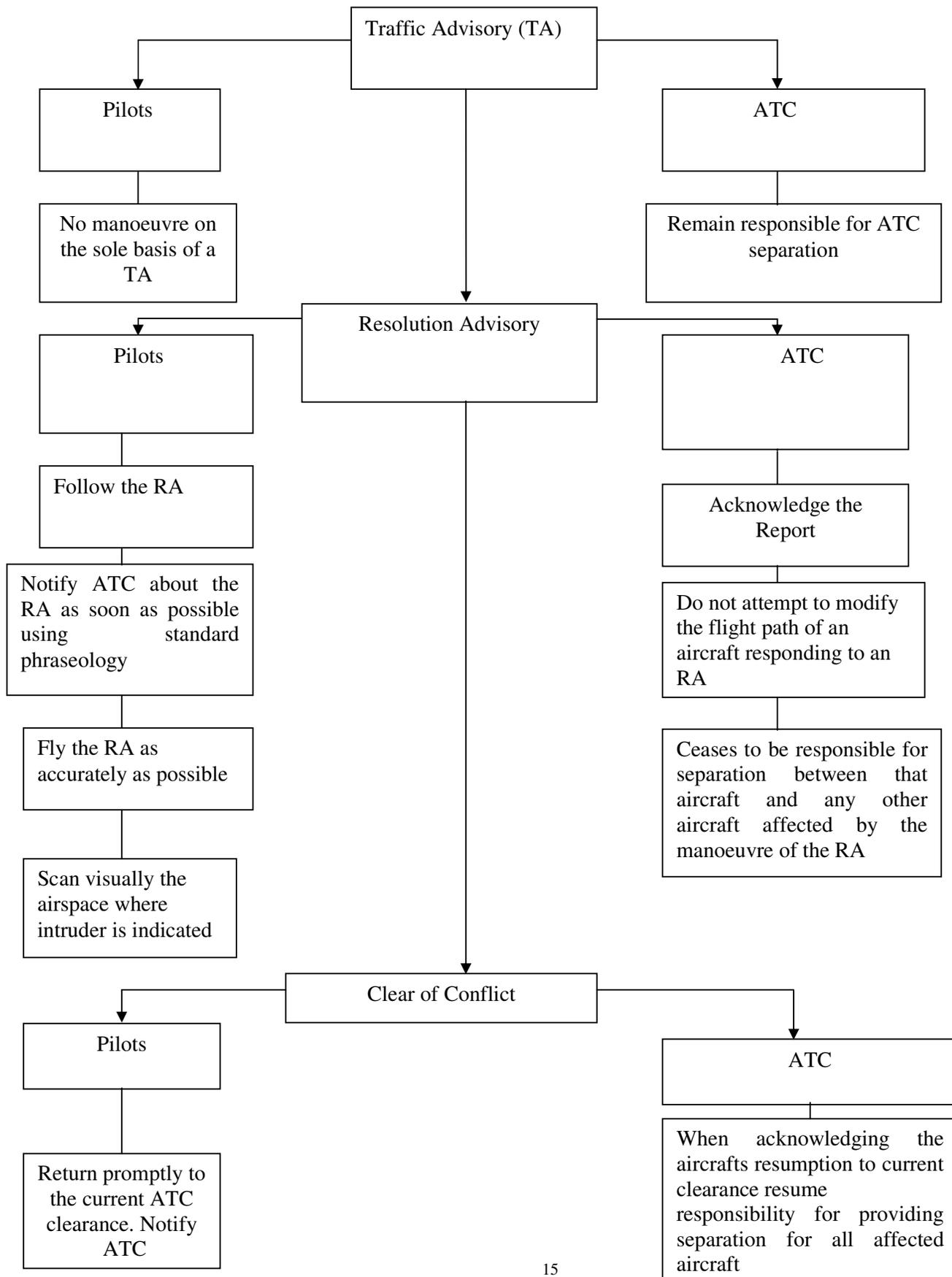
Aircraft type - Boeing 757-200;
Registration - YL-BDC;
Owner of aircraft - „Air Baltic Corporation” Airlines;
Total aircraft flying hours-18559:49 FHRS;
Manufacturer-Boeing, Seattle, WA, USA;
Manufacturer’s serial No.26253;
Take off Weight - 86752kg;
Landing Weight - 78752kg;
Fuel weight before flight - 12700 kg;
Fuel weight after landing - 4700 kg;
Fuel type - Jet A;
Engines - RB211-535E 4-37/19D;
Serial No.-LH-31688; RH-31689;
Manufacturer-Rolls-Royce;
The left (number1) engine TSN - 18405:25 hours;
The right (number2) engine TSN - 17657:08 hours;
Last maintenance check – C1 + C2 performrd in Iberia Part 145 with CRS release on March 25, 2008.

Both aircrafts were equipped with Traffic Alert and Collision Avoidance System. Traffic Alert and Collision Avoidance System (also known as Airborne Collision Avoidance System)

is based upon the use of aircraft transponder equipment to provide warnings of possible collision with other transponding aircraft. TCAS alerts the crew to possible conflicting traffic. TCAS interrogates operating transponders in other airplanes, tracks the other airplanes by analyzing the transponder replies, and predicts the flight paths and positions. TCAS provides advisory and traffic displays of the other airplanes to the flight crew. Neither advisory guidance, nor traffic display is provided for other airplanes which do not have operating transponders. TCAS operation is independent of ground-based air traffic control.

To provide advisories, TCAS identifies a three dimensional airspace around the airplane where a high likelihood of traffic conflict exists. The dimensions of this airspace are based upon the closure rate with conflicting traffic. TCAS equipment interrogates the transponders of other airplanes to determine their range, bearing, and altitude. Traffic advisory (TA) is generated when the other airplane is approximately 40 seconds from the point of closest approach. If the other airplane continues to close, a resolution advisory (RA) is generated when the other airplane is approximately 25 seconds from the point of closest approach. The RA provides aural warning and guidance as well as maneuver guidance to maintain or increase separation from the traffic. Non-transponder equipped airplanes are invisible to TCAS. RAs can be generated if the other airplane has a mode C transponder. Coordinated RAs require both airplanes to have TCAS. TAs are indicated by the aural "TRAFFIC, TRAFFIC" which sounds once and is then reset until the next TA occurs. The TRAFFIC message appears on the EHSI. The TA symbol appears at the proper range and relative bearing of the other airplane. Altitude and vertical motion are included with the symbol if the other airplane is using transponder mode S or C. RAs are indicated by one or more aural listed in the RA aural table. The TRAFFIC message and RA symbol which depicts the traffic's relative bearing, range, altitude, and vertical motion are on the EHSI similar to the TA symbol. Additional symbols are proximate traffic and other traffic. Proximate traffic is within six miles and 1200 feet vertically, but is not expected to cause a TA or RA alert. Other traffic is beyond the six mile and 1200 feet vertical criteria. Traffic symbols reevaluated as the TCAS system constantly reevaluates the motion of other airplanes. If the range selected does not permit the display of a TA or RA an OFFSCALE message appears on the EHSI.

An interaction of ATC and Crew during ACAS event



1.7. Meteorological information

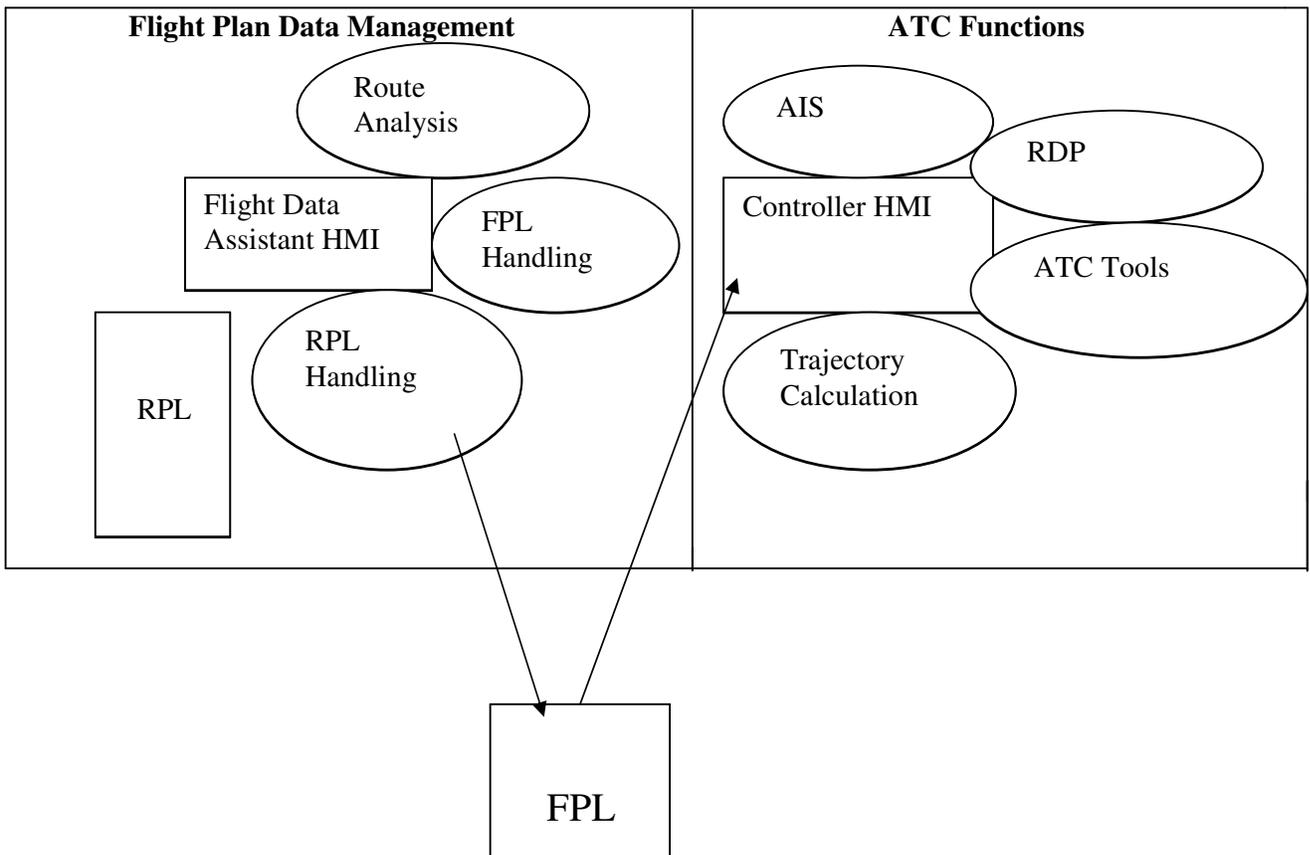
Daylight, VMC, Meteorological Aviation Routine Weather Report
METAR EVLA 211320Z 31007KT 280v360 CAVOK 10/02 Q1016=
METAR EVLA 211350Z 31005KT 270v020 CAVOK 10/02 Q 1016=
METAR EVLA 211420Z 31004KT CAVOK 10/02 Q 1016=
METAR EVLA 211450Z 31005KT 280v360 CAVOK 10/02 Q 1016=
METAR EVLA 211520Z 31006KT 280v360 CAVOK 10/02 Q 1016=
METAR EVLA 211550Z 31006KT 280v360 CAVOK 10/02 Q 1016=
METAR EVLA 211620Z 31006KT 280v360 CAVOK 10/02 Q 1016=
METAR EVLA 211650Z 31006KT 280v360 CAVOK 10/02 Q 1016=

1.8. Aids to Navigation

1.8.1. 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



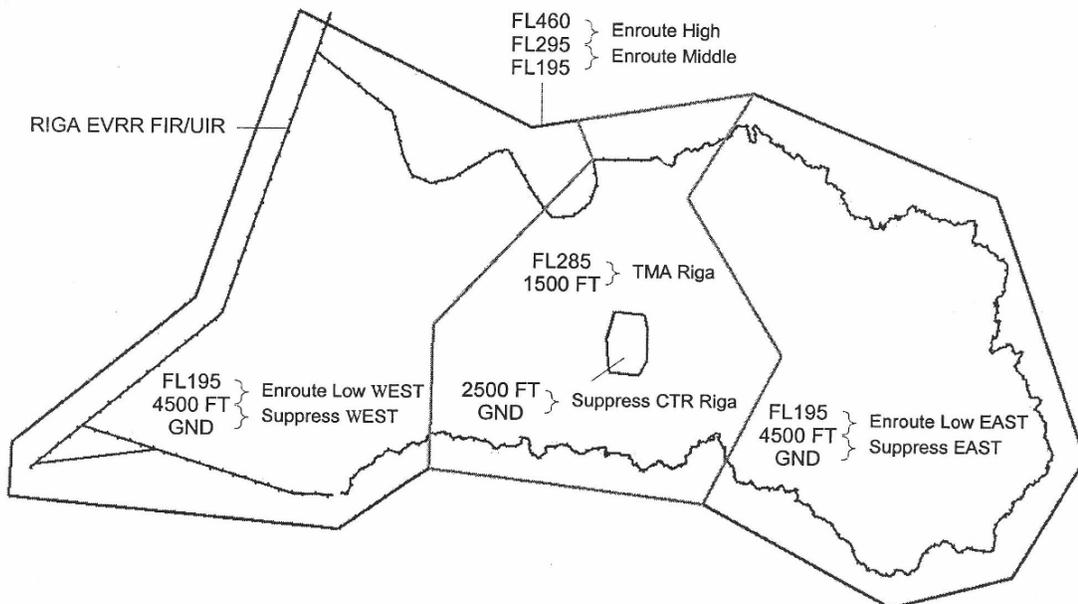
The distinct border is between the Flight Plan Data Management block and the ATC Functional block. A Flight Data Assistant, (FDA) is working with Repetitive Flight Plans, (RPLs) and passive Flight Plans, (FPLs) in the Flight Plan Data Management block while the ATC controller is working with active FPLs 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 position 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

Area Name	Area Corners
Enroute High, Enroute Middle	583731N 0202623E – 580347N 0225723E – 581451N 0251700E – 573916N 0274718E – 561428N 0283405E – 553816N 0274721E – 553024N 0263530E – 560413N 0244503E – 561407N 0220028E – 555341N 0210753E – 555609N 0175044E – 561331N 0174923E – 570430N 0193307E – 583731N 0202623E
Enroute Low EAST, Suppress EAST	581451N 0251700E – 573916N 0274718E – 561428N 0283405E – 553816N 0274721E – 553024N 0263530E – 560413N 0244503E – 565114N 0253247E – 574144N 0243520E – 581451N 0251700E
Enroute Low WEST, Suppress WEST	561407N 0220028E – 555341N 0210753E – 555609N 0175044E – 561331N 0174923E – 570430N 0193307E – 583731N 0202623E – 580347N 0225723E – 580616N 0232544E – 575357N 0233605E – 570000N 0220000E – 561407N 0220028E
TMA Riga	561407N 0220028E – 570000N 0220000E – 575357N 0233605E – 580616N 0232544E – 581451N 0251700E – 574144N 0243520E – 565114N 0253247E – 560413N 0244503E – 561407N 0220028E
Suppress CTR Riga	570530N 0235044E – 570436N 0240859E – 570018N 0241046E – 565002N 0241040E – 564521N 0240545E – 564614N 0234739E – 565425N 0234613E – 565703N 0234608E – 570530N 0235044E

STCA WORK AREA COORDINATES

The parameters for generation of STCA alert and alert vvarning 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.

AIS data is received, processed, stored and presented to controllers

The Support functional block contains a parameter system making the system easily adaptable to any operational environment by means of extensive use of system parameters. In

the Recording and Playback data is continuously recorded and at playback, operational scenarios are recreated at a controller work position.

System Monitoring and Control is performed by means of graphical presentation and tools for diagnostics and configuration control.

Event Analysis provides tools for technical analysis, traffic analysis, statistics and prognosis.

The Simulator is a so-called high fidelity simulator, which means that the trainee functionality is an exact simulation of the operational system's ATC functions.

Efficient tools are available for the definition of airspace structure and the preparation and execution of exercises.

APPLICATION OF AIRSPACE CLASSIFICATIONS UP TO FL 660

LATVIA

FL or Alt Band	France/Monaco	FYROM	Germany	Georgia	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Malta	Moldova	Netherlands
Up Limit CAS	660	660	660	460		660	660	460	460	660	460	660	660
245-460				A					A from 285				
205-245	C	C						C			C		C
195-205			C										
150-195	D	D				C	C		C	C		C	
130*-150				C									A B
95*-130*	G		C E					G			G C		
3K*-95*		E	E			F							
SFC-3K*		G	G	G		G	G		G	G		G	G
Major TMA	A	D	C					A E		C D			A
Minor TMA	C D E	E	C D E					D E					B E
CTA/Awy	D E D E		C D E	C				D E	C	D		C	A
CTR*	A D E	D D	D F					A C D		C D			C

Legend	A	B	C	D	E	F	G	Unclassified or N/A	No Reply
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3K* = FL55/ 1,000/ 1,500/ 2,000/ 2,500/ 3,000/ 3,500/ 5,000 (ft AGL or AMSL)

95* = FLs 75/ 85/ 95/ 100/ Alt 7,500

130* = FLs 115/ 125/ 130/ 135

CTR* = CTR/ Aerodrome Zone

G* = G or G with special conditions

1.9. Communications

The radio communication between the aircrafts and ATCO was held on the frequency 135,1 MHz in English. For the investigation the ATCO console recordings on the frequency 135,1MHz was used. The quality of the recordings was good.

1.9.1. Read – Back clearances

The flight crew shall read back to the ATCO safety –related parts of ATC clearances and instructions which are transmitted by voice. The following items shall always be read back:

- ATC route clearance;

- Clearances and instructions to enter, land on, take off from, hold short of, cross, taxi and backtrack on any runway;
- Runway in use, altimeter settings, SSR codes, level instructions, heading and speed instructions and whether issued by the controller or contained in automatic terminal information service broadcasts, transition levels.

Other clearances or instructions, including conditional clearances, shall be read back or acknowledged in a manner to clearly indicate that they have been understood and will be complied with.

The controller shall listen to the read back to ascertain that the clearance or instruction has been correctly acknowledged by the flight crew and shall take immediate action to correct any discrepancies revealed by the read back.

ATCO and crew members of AIRBUS A340-600 G-VBLU as well as BOEING 757-200 YL-BDC have used standard phraseology and there had not principal errors in the used by the phraseology.

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

Aerodrome information

The airport did not have any significance for the incident.

Flight recorders

The incident reconstruction was based on the radar records and voice communications transcript between controller ATCO1 of Riga ATCC and aircrafts crew members. The investigation members did not have the CVR transcript and FDR recordings of AIRBUS A340-600 G-VBLU at their disposal.

Recordings FDR of BOEING 757-200 YL-BDC at the time of incident enclosed in Attachment.

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

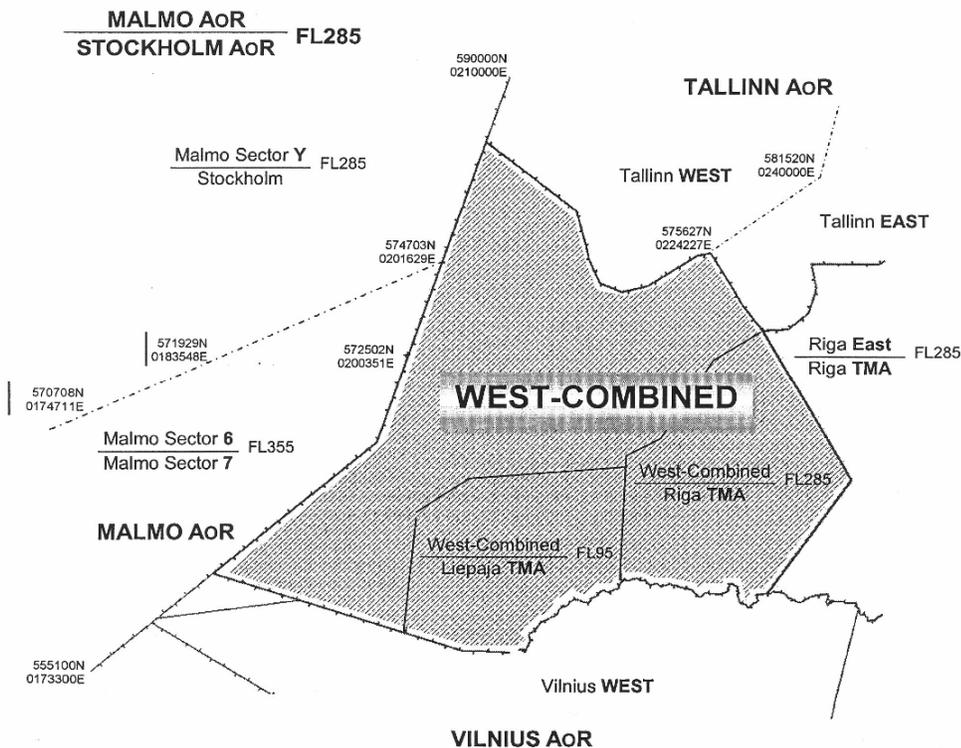
Were not performed

1.17. Organizational and management information

The State supervision of the training, retraining and raising of qualifications of civil aviation personnel is in charge of Supervisory Authority – Civil Aviation Agency. The Civil Aviation Agency shall approve the study programmes in special aviation disciplines.

The ANS Department CAA is in charge for the safety and quality management of the air navigation services in the entire area of Latvia, as well as for airspace use and flight procedure planning and air traffic service systems, their development and follow-up of their functionality. The ANS Department is in charge of matters related to training ATC personnel in the branch and of co-ordinating their arrangement with Training Provider institutions. The ANS department, as supervisory authority, is in charge of control and performing the State supervision of the training, retraining and raising of qualifications of ATC personnel. The ANS department shall approve the study programmes and the training programmes for ATC personnel as well as issuing instructions for on-the job training in the branch.

According to Law on Aviation of the Republic of Latvia the authority responsible for activities of the utilisation 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 Stock Company - Latvian Air Traffic (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. 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.



AREA OF RESPONSIBILITY

According to WEST-COMBINED Sector controller technological procedures DI-GSV/GSVC-02 of Riga ATCC, working position of the sector WEST-COMBINED is shareable between a controller with operational role “WEST Executive” and a controller with operational role “WEST Planner” appointed by the Operational Supervisor (OSUP) during the highest intensity hours. When traffic intensity permits one Controller may provide the service at WEST Sector with operation role “WEST Executive”. According to “Sector capacity recalculation and the control of the air traffic demand” (*Attachment A of Sector controller technological procedures DI-GSV/GSVC-02 of Riga ATCC*) maximal allowed capacity per hour for WEST-COMBINED Sector when employed 1(one) controller is 31 and respectively the air traffic demand 30. If the capacity per hours is forecasted to be more than allowed for employing 1(one) controller and there is not possible to organize of 2 (two) controllers or if the capacity per hours is forecasted to be more than allowed for employing 2(two) controllers, OSUP during the shift shall to determine the capacity of the sector depending from the number of the controllers and shall to warn the adjacent control centres about capacity restrictions for the centres.

Within Riga CTA/UTA vertical separation is carried out according to ICAO Annex 2 Table of Cruising levels 3a and applied between FL 290 and FL 410 inclusive -1000ft (300m). Horizontal separation (radar separation) if double SSR coverage is provided between identified, controlled aircraft not less than 5NM. Sector WEST-COMBINED provides services within sector SOUTH AoR and sector NORTH AoR. ATS is provided at flight levels from FL 100 till FL 460. FIS is provided at and below FL 95 and above FL460. Sector WEST-COMBINED controller provides ATS using VHF radio station on frequency 135,1 MHz, re-transmitter Liepaja and Spare on frequency 135,1MHz, ATS systems ATRACC+, pilot’s reports.

According to technological procedures of Riga ATCC at the start of the shift controller has to login in the ATRACC+ system. The start of the shift is determined by the login time. All temporary substitutions shall be performed via login procedure. Substitution of the controller is determined by the operational or the administrative supervisor. A temporary leaving of the working position during the shift requires a substitution.

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.

Air traffic control unit were obliged to arrange and prepare instructions for on-the-job training complying with instructions of supervisory authority - ANS department CAA.



ATC working place



WEST-COMBINED SECTOR

ATC working place display

The ANS Training Centre is a limited private company which rendered contract training services of basic and refresher training of the Air Traffic Management specialists in Latvia. Its major activities are concentrated in the area of aviation specialist training. The ANS Training Centre offers a variety of training courses, among them courses for ATCOs and maintenance staff of Air Navigation Service.

The ANS Training Centre operates in the area of vocational education – render training services of Control Surveillance/Radar in accordance with Training Programm. On request of the ANS Training Centre CAA in the letter No 01-8-400/174 issued on March, 2006 notified that Training Programm has approved. The ANS Training Centre hasn't certified as training provider by Supervisory Authority-CAA.

According to provisions of the contract the ANS Training Centre is responsible for air traffic controllers' basic training and qualification training until the student has got his/her air traffic controller licence and rating to work in some air traffic control. The State Stock Company - Latvian Air Traffic (Latvijas Gaisa Satiksme - LGS) orders training from the ANS Training Centre and recruits its air traffic controllers among the persons trained by the ANS Training Centre. The State Stock Company - Latvian Air Traffic provide posts for the students during their on-the-job training. In professional fields corresponding training is essentially connected to close co-operation between the educational institute - the ANS Training Centre and the company providing posts for students - The State Stock Company - Latvian Air Traffic, and to jointly performed follow-up of training and proficiency assessment. The ANS Training Centre is a Permanent Member of ICAO TRAINAIR Programme.

According to the European Air Traffic Management Programme (EATMP)- Common Core Content guidelines, the ATCO Training includes 4 phases:

Initial Training

Initial Training includes technical subjects and ATC theory and simulator practice. The object of initial training is to prepare an ab initio for training at an ATC unit. It includes **basic training**, designed to impart fundamental knowledge and skills to enable ab initio air traffic controllers to progress to specialised ATC training, and **rating training** (training in the rating discipline), specialised ATC training to provide knowledge and skills related to a job category and appropriate to the discipline to be pursued in the ATS environment (Rating training might also be provided to training for conversion to another training). Initial Training leads to a Student Licence.

Unit Training

Training comprising transitional training, pre-OJT and OJT leading a learner to the obtention of an air traffic controller licence, with appropriate rating and with appropriate rating and unit endorsements. The transitional phase follows initial training during which site-specific theoretical knowledge and understanding will be transferred to the learner using a variety of methods and during which skills will be developed through the use of site-specific simulations. The Pre-On-the-Job Training (Pre-OJT) is a phase of locally based training during which extensive use of simulation using site-specific facilities will enhance the development of previously acquired routines and abilities to an exceptionally high level of achievement. On-the-Job Training (OJT) is the integration in practice of previously acquired job-related routines and skills under the supervision of a qualified On-the-Job Instructor (OJTI) in a live traffic situation.

Continuation Training

Training given to licensed or certificated personnel designed to augment existing knowledge and skills. It includes refresher, emergency and conversion training.

Development Training

Training designed to provide additional knowledge and skills demanded by a change in job profile, e.g. new licence endorsement (OJTI) or any other career development like assessor, supervisor, safety manager, training manager, traffic flow manager, etc.

Student-controller who handled air traffic at the time of the incident was on an On-the-job training period, at post Area Control Surveillance/Radar. He was participant of student-controller's group by virtue of contract between the State Joint Stock Company Latvijas Gaisa Satiksme (LGS) and ANS Training Center. He completed Air Traffic Basic Training Course (total duration-716 hrs, average examination rating 85,8%, required limit of the prosperous result-70%) and Rating Training Course (total duration-590hrs), average examination rating 85,8%, required limit of the prosperous result-75%)

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 VIRGIN ATLANTIC AIRWAYS AIRBUS A340-600, FLIGHT VIR301 and AIRBALTIC CORPORATION BOEING 757-200, YL-BDC, FLIGHT BTI65T was orientated essentially around the following questions:

- Did Air Traffic Control Services unit procedures, operations and instructions have an influence on the incident?
- Did Supervisory Authority procedures, operations, or lack instructions have an influence on the incident?
- Did Training Provider procedures, operations, quality of training programs have an influence on the incident?
- Did Flight crew actions have an influence on the incident?
- Did Radio communication language have an influence on the incident?
- Did the human errors have an influence on the incident?

The analysis concerned the activities of VIRGIN ATLANTIC AIRWAYS and AIRBALTIC CORPORATION crew radio communications transcript, radar recording and air operation service instructions.

2.2. Explanation of the situation

At 14:50:56 in the controlled airspace of Riga FIR/UIR WEST-COMBINED Sector has not been very high traffic activity. Controller (ATCO1) had worked at the time of incident with operational role "Executive" at the post of area of responsibility "SOUTH" WEST-COMBINED Sector. According to Sector Capacity recalculation and the control of the air traffic demand of technological procedures DI-GSV/GSVC-02 of Riga ATCC at the time of incident the traffic can handle just one controller. De facto at the time of the incident the traffic had handled by an air traffic controller- student of ANS Training Center who was on an On-the-job training period. The air traffic controller on duty and at the same time controller-instructor had about at the

working position and coordinated the traffic by ground communication with adjacent Riga ATCC MALMO AoR sector controller. The incident occurred within the Riga ATCC in Class A controlled airspace (See Attachment), were operating under IFR and were on radio contact with Riga ATCC WEST-COMBINED Sector on VHF frequency 135,1 MHz. *The classifications adopted by ICAO are: Class A- All operations must be conducted under Instrument Flight Rules (IFR) or Special visual flight rules (SVFR) and are subject to ATC clearance. All flights are separated from each other by ATC.*

Both aircrafts were on the opposite track and radar contact. A340-600, G-VBLU, FLIGHT VIR301 was en route from Indira Gandhi Intl (DEL), Delhi, India to Heathrow Airport (LHR), London, Boeing 747-100/200 ABW226A was en-route from Amsterdam to Sheremetyevo. Both aircrafts were equipped with Traffic Collision and Avoidance System (TCAS).

2.3. Air Traffic Control Services procedures, operations and instructions, air traffic controller actions.

The controller shall be provided with the capability to respond to messages, including emergencies, to issue clearances, instructions and advisories and to request and provide information, as appropriate.

The chain of events that led to this incident was following:

At 14:51:59 the Boeing 757-200 cruising at FL 390 entered in the Riga ATC zone, got into contact with the Riga ATC WEST-COMBINED sector controller ATCO1 and had cleared direct to FAP Vekas of CTR Riga International airport. (See Attachment 1-Radar Minimum Altitude Chart –EVRA and Attachment 2 –Instrument Approach Chart (EVRA). At 15:03:18 using controller pilot data link communications (CPDLC)http://www.atsb.gov.au/publications/investigation_reports/2006/AAIR/air200600396.aspx - fn1 the crew of Boeing 757-200 declared readiness to descend from FL390 to FL170. At 15:03:25 controller-student who had handled air traffic issued clearance for Boeing 757-200 to descend to FL170 despite that at the same time with opposite heading at FL 380 was cruising AIRBUS A340-600, FLIGHT VIR301. Clearance was read back by the crew of Boeing 752, FLIGHT BTI65T and Boeing 752 started descending.

The air traffic controller on duty had about at the working position and coordinated the traffic by ground communication means with adjacent Riga ATCC MALMO AoR sector controller. During communication air traffic controller on duty did not control carefully actual situation in the airspace between two abovementioned aircraft. At 15:04:21 STCA visual alert had generated to the radar controller because the distance between the three-dimensional positions of two aircraft was predicted to be reduced to less than the defined applicable separation minima within a specified time period, within whose jurisdiction area the aircraft is operating. (see Radar Display Data, Picture 1). The generation of Short Term Conflict Alerts is a function of an ATC radar data processing system. At 15:04:33 air traffic controller on duty started to handle the traffic after completing communication with MALMO AoR sector controller and perceiving that there is conflict situation tried to contact with crew of Boeing 752, FLIGHT BTI65T and issued instruction: “Baltic65T turn right, heading ...10 degrees to the right, please”. At 15:04:41 air traffic controller on duty repeated his instruction: “65T turn right 10 degrees to the right, please”. At 15:04:49 controller had a try to contact with Boeing 752, FLIGHT BTI65T for the last time but the crew of did not answer. After that at 15:05:05 controller on duty had called Virgin 301 and issued instruction: “Virgin 301 turn right 10 degrees, please”, but the time was lost and at that time resolution advisory (RA) “DESCEND, DESCEND” on aircraft was annunciated, the PIC of AIRBUS A340-600 disengaged the Autopilot and followed the RA. At the same time the crew of Boeing 752, FLIGHT BTI65T declared: “65T TCAS climb” At 15:05:06 the two aircraft passed each other with opposite headings in the vicinity of LIEPAJA (N56:31:07; E021:05:31) in the RIGA Flight Information Region and the separation standard between the two aircraft was infringed. The crew of AIRBUS A340-600, FLIGHT VIR301 received the traffic alert and

collision-avoidance system (TCAS) resolution advisory (RA) to descend as a result of the Boeing 752, FLIGHT BTI65T traffic ahead of them. At the time of the incident, vertical separation between the two opposite aircrafts decreased to 700 feet, horizontal separation was 4.0 nautical miles. (See Picture 1, 2) The conflicting traffic was in sight for aircrafts crews, so Boeing 752, FLIGHT BTI65T and AIRBUS A340 600, FLIGHT VIR301 passed to each other by right side. Visual meteorological conditions existed at the time. After a while the RA reduced to a Monitor Vertical Speed RA and then Clear of Conflict.

That conflict situation – infringement of separation mainly issued as a result, that controller-student due to lack of experience underestimate the real situation, thought that distance between aircraft is adequate, gave instruction for Boeing 752, FLIGHT BTI65T to descend to FL170. He did not consult with instructor – controller on duty, because he was busy oneself communicating with adjacent MALMO controller. Controller on duty did not prevent student controller actions in due time. According to Radar Display Data STCA visual alert had generated at 15:04:21 but controller on duty had a try to change a heading of Boeing 752, FLIGHT BTI65T at 15:04:33. Imperative and timely actions by the controller on duty if he had recognized that student-controller instruction is wrong could be able to prevent the developing traffic conflict. If he had made imperative instructions when the crew of Boeing 752, FLIGHT BTI65T declared descending to FL170, especially when had started descending, the incident would have not occurred. **Despite that the air traffic was handled by an air traffic controller student the air traffic controller on duty was responsible for the operations;**

Accordingly to air control unit Air Traffic Control Services procedures, operations and instructions the investigation had stated following:

- Air control unit- the State Joint Stock Company Latvijas Gaisa Satiksme (LGS) have a quality management system which covers all air navigation services it provides;
- - The contract signed between the State Joint Stock Company Latvijas Gaisa Satiksme (LGS) and ANS Training Center did not foreseen any responsibility of contracting entity - the State Joint Stock Company for student controller’s groups training organization although the training take place in the premises of Company and students are handle Company air traffic control systems and equipment;
- At disposal of investigation had not any instructions of Air control unit- the State Joint Stock Company Latvijas Gaisa Satiksme (LGS) approved by administration of student –controller’s group training organization and procedures and Company air traffic control systems and equipment handling arrangement;

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 **A3**.

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	Occasional	Rare	Extremely

Frequent				rare
FREQUENCY				

Table I. - 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 II. - Definitions of Accident/Incident Frequency

2.3. Supervisory Authority procedures, operations, instructions

During investigation of serious incident it was stated:

- On April 21, 2008 Supervisory Authority - CAA did not issue certificate for Training Provider – ANS Training Center according to requirements of Article 13 of Directive 2006/23/EC of the European Parliament and of the Council as well as point 1 of Article 42 of Law on Aviation;
- On April 21, 2008 Supervisory Authority - CAA did not issue air traffic licence for student-controller as well as was not set rules for student-controller licensing according to of Directive 2006/23/EC of the European Parliament and of the Council as well as EUROCONTROL regulation ESARR 5 „ATM SERVICES' PERSONNEL”;
- On April 21, 2008 Supervisory Authority - CAA did not approved air traffic controller Training Programs in conformity with requirements of EUROCONTROL regulation ESARR 5 „ATM SERVICES' PERSONNEL”;
- Supervisory Authority – CAA did not issued any instructions for student controller’s groups training organization in the air traffic units which provide ON the Job Training services;
- Student-controller ON the Job Training plan was approved by the Head of ANS Department of CAA;
- Air traffic controller –instructor was approved for trainig student-controller’s by CAA.

The scope of the Supervisory Authority procedures, operations, instructions did not have direct influence.

2.4. Training Provider procedures, operations, quality of training programs

- ON the Job Training plan for student-controller of ANS Training Center developed according to requirements of European Air Traffic Management Programme (EATMP)- Common Core Content guidelines and ICAO standards;
- Training Provider - ANS Training Center was not certified by Supervisory Authority –CAA according to requirements of Article 13 of Directive 2006/23/EC of the European Parliament and of the Council as well as point 1 of Article 42 of Law on Aviation;

- On the job training instructor held valid licence and ratings;
- On the job training instructor was approved for training by Supervisory Authority –CAA;
- Despite that controller -student had only Medical Certificate and had not air traffic controller – student licence he was admit for On the JOB Training;
- ON the Job Training plan for student-controller of ANS Training Center did not foreseen procedures for obtaining air traffic controller –student licence.

2.5. Flight crew actions

2.5.1. Boeing 752, FLIGHT BTI65T

Boeing 752, FLIGHT BTI65T was operated by AirBaltic Corporation, on a scheduled passenger flight from London (LGW) to Riga. At When at 15:04:33 ATCO1 perceived that there is a conflict situation tried to contact with crew of Boeing 752, FLIGHT BTI65T for instructions to change heading of the aircraft with a design to prevent conflict situation the crew did not answer on triple ATCO1 voice callings. On other period of time the crew read back information correctly and communication conform to procedures of PANS ATM and CPDLC. Because examination of the CVR transcripts for the investigation was not available all radio communications between crew and ATCO were examined on basis of Radio communication records of RIGA ATCC-WEST- COMBINED SECTOR, time period 14:50:56 – 15:15:01 UTC on April 21, 2008. When TCAS generated RA the actions of the crew conformed to Operating procedures of PANS-OPS. The crew of aircraft could see the conflicting aircraft not only on TCAS display but also visually.

Fact that the crew did not answer to air traffic controller callings had some influence to incident because controller lost time for prevention conflict. When after unsuccessful contacting with BTI65T controller had a try to change a heading of opposite aircraft VIR301 TCAS already generated resolution advisory (RA).

2.5.2. A340-600, G-VBLU, FLIGHT VIR301

A340-600, G-VBLU, FLIGHT VIR301 was operated by VIRGIN ATLANTIC AIRWAYS, UK, on a commercial flight in the West direction from Indira Gandhi Intl (DEL), Delhi, India to Heathrow Airport (LHR), London, UK. The captain of VIR301 saw that Boeing 752, FLIGHT BTI65T commenced a descent and when the opposite aircraft was approximately 700ft above, a Traffic Advisory was issued. The event then escalated to an RA (Descend, Descend). The Captain immediately disengaged the Autopilot and followed the RA. He saw the other aircraft passed overhead. The Captain was not wearing his headset and when event occurred he could not make a call to ATC until after the aircraft had received a Clear of Conflict.

2.6. 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, CAA, Flight Crew Operations as well as ANS Training Center.

2.6.1. 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 errors

- The air traffic controller-student due to lack of experience did not predict potential conflict between VIR cruising at FL 380 and BT165T at FL390;
- air traffic controller on duty failed to prioritize attention during communication with adjacent AoR MALMO controller and attention failure of actual situation in the airspace as well as dealing of controller-student;

2. Decision errors

- poor decision of air traffic student-controller cleared BT165T to descend to FL 170;
- poor decision of air traffic controller on duty to didn't contact with both aircraft together before conflict ;

II. Violations

- the crew of BT165T didn't answer to request of air traffic controller on duty a number of times

2.6.2. Preconditions for unsafe acts

There are two major unsafe subdivisions:

- 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:

- crew resource mismanagement;
- personal readiness.

Within the context of this incident this includes coordination both within and between aircraft with air traffic control facilities. There was revealed poor coordination among aircrew of BT165T and air traffic controller.

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.

2.6.3. Unsafe supervision

There are four categories of unsafe supervision:

- inadequate supervision;
- planned inappropriate operations;
- failure to correct a known problem;
- supervisory violations.

I. Inadequate supervision

In a mishap sequence, it would be when supervision proves to be inappropriate or improper, and fails to identify a hazard, recognize or control a risk, provide guidance, training and/or oversight that result in human error or an unsafe situation.

Within the context of this incident there was fact-find:

- Supervisory Authority –CAA didn't issue any instructions, guidance manuals or rules of On-the-Job Training performance in the ATC unit - State Joint Stock Company Latvijas Gaisa Satiksme (LGS)
- not identified a hazard, recognized a risk what can occur during performing an ATC service by student – controller which hadn't Student Air Traffic Controller licence or certificate of competence. State Joint Stock Company Latvijas Gaisa Satiksme (LGS) and ANS Training Center Contract terms don't include any responsibility of ATC unit despite that On-the-Job Training take place on its equipment and during providing ATC services.

II. Planned inappropriate operations

This is a factor in the mishap sequence when supervision fails to adequately assess the hazards associated with an operation and allows for unnecessary risk.

Within the context of this incident there was not revealed planned inappropriate operations.

III. Failure to correct a known problem

This is when supervision fails to correct known deficiencies in documents, processes or procedures, or fails to correct inappropriate or unsafe actions of individuals and this lack of supervisory action creates an unsafe situation.

Within the context of this incident there was not revealed failure to correct a known problems.

IV. Supervisory violations

It is where supervision, while managing organizational assets, willfully disregards instructions, guidance, rules or operating instructions, and this lack of supervisory responsibility can create an unsafe situation.

Within the context of this incident there was fact-find:

- Training Provider - ANS Training Center was not certified by Supervisory Authority –CAA according to requirements of Article 13 of Directive 2006/23/EC of the European Parliament and of the Council as well as point 1 of Article 42 of Law on Aviation;
- Unauthorized student – controller was permitted to occupy a position of ATC controller during On-the-Job Training.

2.6.4. 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.

I. Resource management

This category refers to the management, allocation, and maintenance of organisational resources, including human resource management (selection, training, staffing), monetary safety budgets, and equipment design (ergonomic specifications). In general corporate decisions about two distinct objectives – the goal of safety and the goal of on time, coast-effective operations within the organizations implicated in the incident are balanced and satisfied.

Within the context of this incident there were not find lack of human resources, budget resources, deficient planning, that could to have influence on creation of this serious incident.

II. Organisational climate

Organizational climate is the working atmosphere within the organization. One telltale sign of an organization’s climate is its structure, as reflected in the chain-of-command, delegation of authority and responsibility, communication channels, and formal accountability for actions. Communication and coordination are vital within an organization. If management and staff within an organization are not communicating, or if no one knows who is in charge, organizational safety clearly suffers and accidents or incidents do happen.

In relation to this serious incident there were not find any adversarial, or conflicting, or when they are supplanted by unofficial rules and values, confusion abounds within the organizations implicated in the incident.

III. Operational process

This category refers to corporate decisions and rules that govern the everyday activities within an organization, including the establishment and use of standardized operating procedures and formal methods for maintaining checks and balances (oversight) between the workforce and management. Operational process refers to formal processes (operational tempo, time pressures, production quotas, incentive systems, schedules, etc.), procedures (performance standards, objectives, documentation, instructions about procedures, etc.), and oversight within the organisation (organisational self-study, risk management, and the establishment and use of safety programs).

In relation to this serious incident during the investigation it was disclosed that organizational process of students-controllers group training in the State Joint Stock Company Latvijas Gaisa Satiksme (LGS) was unsatisfactory, as well as contract terms with ANS Training Center didn’t provide any responsibility as well as there are not procedures for students-controllers group training organization.

Likewise Supervisory Authority – CAA did not issued any instructions of students-controller's group training organization for the air traffic units on which basis have provided ON the Job Training services;

Thereto in disposal of investigators there are not affirmatory documents that in the ATC unit State Joint Stock Company Latvijas Gaisa Satiksme (LGS) on which basis had carried out students-controller's training and serious incident occurred are established Risk Management procedures and Safety Mangement Programms.

3. Conclusions

During process of investigation were made the following conclusions:

3.1. Findings

- 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 given information occurrence can classify as serious incident;
- At the time of the incident the traffic was handled by an air traffic controller- student of ANS Training Center, who was on an On- the-job training period;
- During communication with adjacent Riga ATCC MALMO AoR sector air traffic controller on duty did not control actual situation in the airspace between abovementioned aircraft;
- The controller - student cleared Boeing 757-200 flight BTI65T to descend from FL390 to FL170 despite the opposite heading at FL 380 was cruising AIRBUS A340-600, FLIGHT VIR301;
- STCA visual alert had generated to the radar controller because the distance between the three-dimensional positions of two aircraft was predicted to be reduced to less than the defined applicable separation minima within a specified time period, within whose jurisdiction area the aircraft is operating;
- STCA visual alert had generated before TCAS RA generation occurred, (15:04:21 UTC);
- The pilots of the two aircraft held valid licences and ratings required by their duties;
- The air traffic controller held valid licence and ratings;
- Student-controller had not a Student Air Traffic Controller licence or certificate of competence to be entitled to provide an ATC service under the supervision of a suitably qualified on the job training instructor;
- The air traffic was handled by an air traffic controller student but the air traffic controller was responsible for the operations;
- The incident occurred within the Riga FIR/UIR WEST-COMBINED SECTOR;
- At the time of incident in the controlled airspace of Riga FIR/UIR WEST-COMBINED Sector has not been very high traffic activity;
- Both aircrafts involved were flying in Class A controlled airspace;
- The aircrafts were flying on opposite tracks;
- Both aircrafts involved were operating on IFR flight plans;
- The flights were under Radar control;
- Both aircrafts was equipped with Traffic Collision and Avoidance System (TCAS);
- The TCAS system of VIR301 and BT165T generated a resolution advisory (RA).
- 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;
- Within Riga CTA/UTA vertical separation is carried out according to ICAO Annex 2 Table of Cruising levels 3a and applied between FL 290 and FL 410 inclusive -1000ft (300m);
- Horizontal separation (radar separation) if double SSR coverage is provided between identified, controlled aircraft not less than 5NM;

- At the time of incident Visual Meteorological Conditions (VMC) prevailed;
- Both aircrafts involved were in radio contact with Riga ATCC;
- The radio communication between the aircrafts and ATCO1 Riga FIR/UIR WEST-COMBINED Sector was held on the frequency 135,1 MHz in English;
- The student-controller Training Program and content meet Eurocontrol requirements (EATMP Common Core);
- Supervisory Authority – CAA did not issued any regulations or order of procedures of students-controller’s group training organization for the air traffic units on which basis have provided ON the JoTraining services;
- organizational process of students-controllers training group in the State Joint Stock Company Latvijas Gaisa Satiksme (LGS) was unsatisfactory;
- in disposal of investigation there are not affirmatory documents that in the ATC unit State Joint Stock Company Latvijas Gaisa Satiksme (LGS) are established Risk Management procedures and Safety Mangement Programms.

3.2. Causes

Causes of the serious incident - infringement the separation minima between VIRGIN ATLANTIC AIRWAYS AIRBUS A340-600, G-VBLU, FLIGHT VIR301 and AIRBALTIC CORPORATION BOEING 757-200 YL-BDC, FLIGHT BTI65T, 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 human factor - air traffic student controller error- the fact that the air traffic controller - student who handled an air traffic due to lack a experience did not estimate time of passing as well as did not predict consequences and issued instruction for BT165T to descend to FL 170 that potentially can lead to conflict between VIR cruising at FL 380 and BT165T cruising at FL390.

3.2.2. Contributing causes

- The fact that before conflict controller-student can not get consultation from air traffic controller on duty becausehe was busy with communication of adjacent ACCC Malmo AoR Sector controller;
- The ATC controller on duty did not recognise that separation would be infringed if the BT165T pilots were cleared to descend their aircraft to FL170, until after separation was infringed;
- The fact that crew of Boeing 752, FLIGHT BTI65T for instructions to change heading of the aircraft with a design to prevent conflict situation did not answer on triple ATCO1 voice callings.

3.2.3. Primary cause

The event after which the incident or accident became inevitable.
TCAS generation, when resolution advisory (RA) ”DESCEND, DESCEND” was annunciated.

4. Flight Safety Recommendations

It is recommended that the Supervisory Authority – CAA responsible for supervision air navigation services and safety in the Latvian airspace shall:

Recommendation 2008-6

- to perform Certification of air traffic controller Training Providers according to requirements of Article 13 of Directive 2006/23/EC of the European Parliament and of the Council as well as point 1 of Article 42 of Law on Aviation. Supervisory Authority shall issue certificates when the applicant training provider fulfils the requirements laid down in point 1 of Annex IV above mentioned Directive;

Recommendation 2008-7

- monitor compliance with the requirements and conditions attached to certificates as well as audit Training Providers on regular basis;

Recommendation 2008-8

- issue a Student Air Traffic Controller licence or certificate of competence to persons who do not hold an Air Traffic Controller Licence or a certificate of competence to enable them to provide an ATC service under the supervision of a suitably qualified On the Job Training instructor. Before granting a Student air traffic controller licence or certificate of competence, ensure that the applicant has undertaken the appropriate initial training and passed any associated examinations or assessments in the rating discipline in which he/she will be authorised to undergo on the job training to be suitable for training under supervision of an authorised OJT instructor to be an Air Traffic Controller;

Recommendation 2008-9

- together with the State Joint Stock Company Latvijas Gaisa Satiksme (LGS) develop On-the-Job Training instructions in which define the air traffic unit, on which basis have provided On the Job Training services, responsibilities and rights, training targets as well as students' and instructors' responsibilities and rights during On the Job Training process;

Recommendation 2008-10

- to supervise the On the Job Training process in accordance with given instructions.

It is recommended that the authority responsible for air navigation services in the Latvian airspace - State Joint Stock Company Latvijas Gaisa Satiksme (LGS) in case of providing On the Job Training on company air traffic control systems and equipment should:

Recommendation 2008-11

- prepare On-the-Job Training instructions and order responsible persons for student- controller group training on air traffic control systems and equipment;

Recommendation 2008-12

provide Human Factors training to all controllers based on ICAO Human Factors digests (*Human Factors in Air Traffic Control - Circular 241*) and in accordance with EuroControl (EA TCHIP) recommendations;

Recommendation 2008-13

- evaluate and if necessary improve company Quality Management System in relation of performing corrective actions for air traffic controller-student's groups training, eliminate deficiencies and it potential causes;

Recommendation 2008-14

- consider opportunity to establish in the company the Risk Management procedures as well as developing Safety Management System (SMS) with further implementation;

Recommendation 2008-15

- consider opportunity to establish a Critical Incident Response Programme for ATC personnel for decreasing post traumatic stress of staff involved in incidents.

It is recommended that the air traffic controller's Training Provider - ANS Training Center should:

Recommendation 2008-16

- submit application to Supervisory Authority – CAA for Certification as air traffic controller Training Provider;

Recommendation 2008-17

- include in the On-the-Job Training Plans air traffic student- controller licensing before beginning training procedures after Initial training;

Recommendation 2008-18

- provide air traffic unit responsibilities, determine the training arrangements necessary for air traffic controllers' on-the-job training in case of concluding cooperation contracts with organizations for performing On-the-Job Training on their basis so that reaching the training targets can be ensured.

Recommendation 2008-19

It is recommended that the airline Air Baltic Corporation should:

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

December 18, 2008

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