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FINAL REPORT Nr.4-02/3-12(3-2013)

OF THE AIRCRAFT SERIOUS INCIDENT

LOSS OF SEPARATION BETWEEN THE AEROFLOT AIRCRAFT A320, REGISTRATION VP-BZS, flight AFL2100 and AirBaltic AIRCRAFT Boeing 735, REGISTRATION YL-BBN, FLIGHT BTI60K, ON MAY 19, 2012

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 to prevent accidents and incidents in accordance with Annex 13 to the Convention on International Civil Aviation and 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. If 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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Attachment to Final Report
Comments to Final Report of ATS provider "Latvijas Gaisa satiksme"

Abbreviations

IFR - Instrumental Flight Rules
RWY - Runway
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
SMR - Surface Movement Radar
ATIS - Automatic Terminal Information Service
AWOS - Automated Weather Observing System
ACFT - Aircraft
ARCC - Aeronautical Rescue Co-ordination Centre
APP - Approach
FAP - Final Approach Point
ATC - Air Traffic Control
UTC - Universal Time Coordinated
ABI - Advance Boundary Information
ACI - Area of Common Interest
ACT - Activation Message
LAM - Logical Acknowledge Message
AoR - Areas of Responsibility
CWP - Controller Working Position
RVSM - Reduced Vertical Separation Minimum
SMA - Standard Missed Approach
ODS - Operator input and Display System
NM - Nautical mile
FT - Feet
Z - Zulu = Universal Coordinated Time (UTC)
STAR - Standard Instrument Arrival Route
FIR - Flight Information Region
ATS - Air Traffic Services
HMI - Human Machine Interface
EHSI - Electronic Horizontal Situational Indicator
OSUP - Operational Supervisor
SAR - Search and Rescue
CISM - Critical Incident Stress Management
SSR - Secondary Surveillance Radar
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
TMA - Terminal Control Are
SID - Standard Instrument Departure
SSR - Secondary Surveillance Radar
PSR - Primary Surveillance Radar

Glossary

Aerodrome control tower - A unit established to provide air traffic control service to aerodrome traffic.

Aerodrome traffic - All traffic on the maneuvering area of an aerodrome and all aircraft flying in the vicinity of an aerodrome.

Aeronautical Information Publication (AIP) - A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

Air-ground communication - Two-way communication between aircraft and stations or locations on the surface of the earth.

Initial approach segment - That segment of an instrument approach procedure between the initial approach fix and the intermediate approach fix or, where applicable, the final approach fix or point.

Final approach - That part of an instrument approach procedure which commences at the specified final approach fix or point, or where such a fix or point is not specified:

a) at the end of the last procedure turn, base turn or inbound turn of a racetrack procedure, if specified; or

b) at the point of interception of the last track specified in the approach procedure; and ends at a point in the vicinity of an aerodrome from which:

1) a landing can be made; or
2) a missed approach procedure is initiated.

FAP (Final Approach Point) which is where the final approach altitude intercepts the glideslope.

Radar approach - An approach in which the final approach phase is executed under the direction of a controller using radar.

Flight information region (FIR) - An airspace of defined dimensions within which flight information service and alerting service are provided.

Glide path - A descent profile determined for vertical guidance during a final approach.

Heading - The direction in which the longitudinal axis of an aircraft is pointed, usually expressed in degrees from North (true, magnetic, compass or grid).

Missed approach procedure - The procedure to be followed if the approach cannot be continued.

Runway-holding position - A designated position intended to protect a runway, an obstacle limitation surface, or an ILS/MLS critical/sensitive area at which taxiing aircraft and vehicles shall stop and hold, unless otherwise authorized by the aerodrome control tower.

Radar separation - The separation used when aircraft position information is derived from radar sources.

Standard instrument arrival (STAR) - A designated instrument flight rule (IFR) arrival route linking a significant point, normally on an ATS route, with a point from which a published instrument approach procedure can be commenced.

Standard instrument departure (SID) - A designated instrument flight rule (IFR) departure route linking the aerodrome or a specified runway of the aerodrome with a specified significant point, normally on a designated ATS route, at which the en-route phase of a flight commences.

Threshold - The beginning of that portion of the runway usable for landing.

Vectoring - Provision of navigational guidance to aircraft in the form of specific headings, based on the use of an ATS surveillance system.

Synopsis

Unless stated otherwise the time in this Report is UTC

On Saturday, May 19, 2012 at 08:19 UTC an AIRBUS A320, operating by AEROFLOT, registration VP-BZS (flight No AFL 2100) was on short final approach for landing on RWY 18 of Riga International airport.

The crew of A320 received order from APP controller to turn left on heading 210° for intercepting LLZ for further ILS approach to RWY 18. After crew of A320 report “Loc. established” he was transferred to TWR controller. When TWR controller cleared Aeroflot A320 to land the crew declared that they are not stabilized and go around. TWR controller instructed Aeroflot A320 to climb to altitude 2500FT on runway heading, to follow Standard Missed Approach (SMA) procedure, informed about preceding traffic (Boeing 735) and transferred to APP frequency for operations.

At the same time a Boeing 735, operating by air Baltic, registration YL-BBN declared readiness for departure, got clearance for immediate take-off from the same RWY 18 Riga International Airport and was climbing to altitude 4000FT.

When both aircraft were at APP the horizontal interval between them was 2,2NM at the same altitude, minima separation standards at CTR and TMA boundary during "go around procedure" initiated by A-320 and traffic departing from Riga were infringed.

Notification

The Transport Accident and Incident Investigation Bureau of the Republic of Latvia (TAIIB) were notified about the incident on Tuesday, June 05, 2012 from ARCC.

TAIIB Authorities evaluated the received information relevant to that case and initiated collecting data for investigation into this serious incident, under the provisions of Annex 13 to the Convention on International Civil Aviation (Chicago 1944) and 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, as well as forwarded request to air traffic service provider LGS for providing any relevant available information regarding to the incident and personnel data of controller involved in the serious incident.

1. Factual information

1.1. History of the Flight

1.1.1. Conditions

AIRBUS A320, operating by AEROFLOT, registration VP-BZS coming from Sheremetyevo International Airport – Moscow, Russia (UUEE) was on approach to RWY 18 Riga International airport (EVRA) crew declared that they are not stabilized and go around At the same time Boeing 735, operating by air Baltic, registration YL-BBN received take off clearance and performed take off and flew out by SID VALED 3E to Brussels Airport – Zaventem, Belgium (EBBR).

Both aircraft at the moment of incident were being controlled by the Tower controller of Riga Area Control Center (ACC).

Picture 1

Picture 2

1.1.2. Sequence of events

At **08:08:40** crew of A-320 (flight No AFL 2100) established contact with "APP" controller and accepted instruction vectoring for ILS approach to RWY18".

At **08:14:51** the "APP" controller issued heading 270° for A- 320 (flight No AFL 2100).

At **08:15:36** the crew of A-320 (flight No AFL 2100) received order to turn left on heading 210° for intercepting LLZ for further ILS approach to RWY 18.

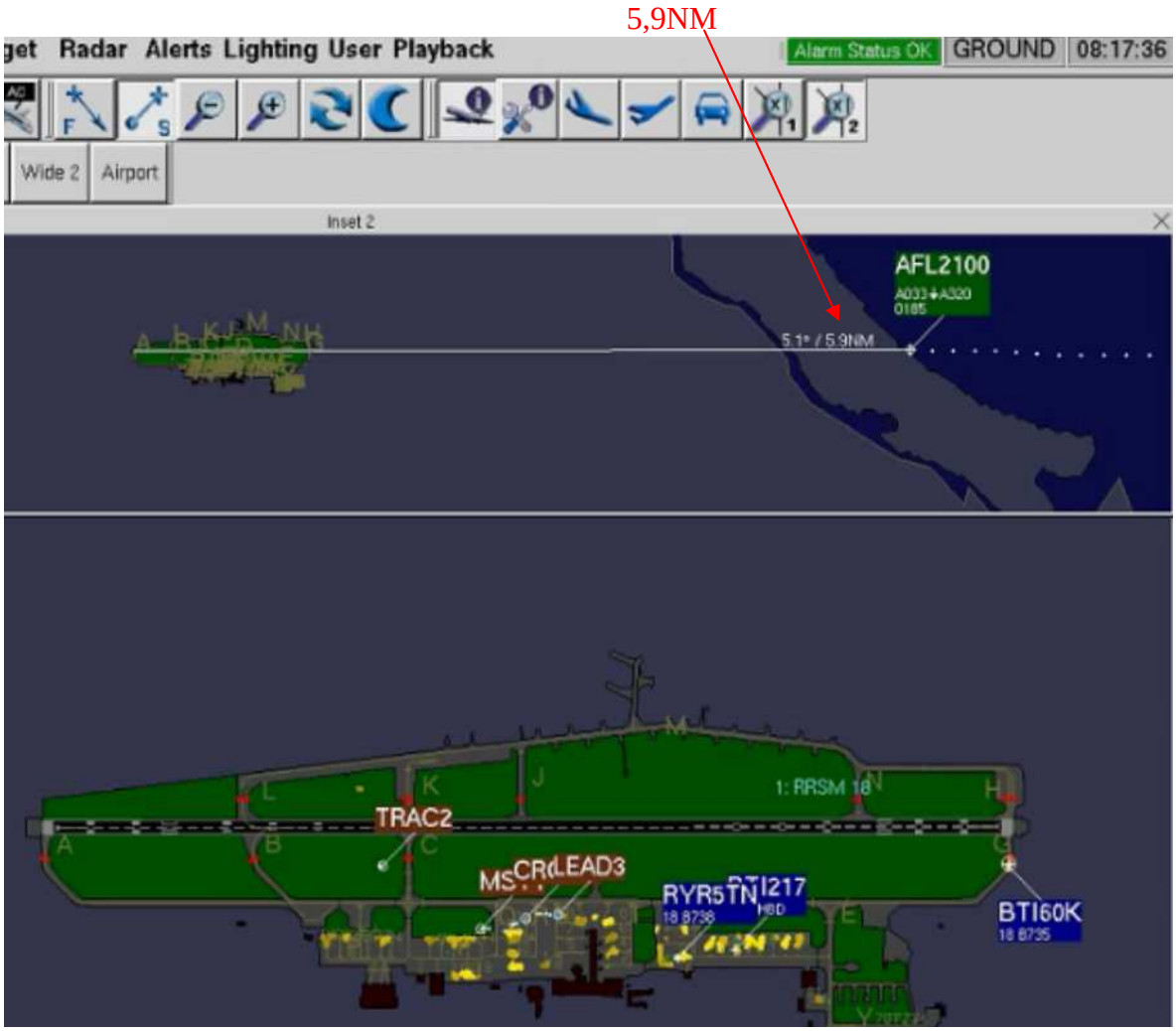
At **08:16:00** A- 320 (flight No AFL 2100) was on heading 269°, his ground speed was 254KN at 4900FT on descent.

At **08:16:26** after A-320 (flight No AFL 2100) crew's report "Loc. established" it was transferred to TWR frequency 118.1 MHz.

At **08:16:38** A-320 (flight No AFL 2100) was at altitude 4400FT descended to 2500FT (8.8NM final to RWY18) **under TWR jurisdiction**.

At **08:16:45** the pilot of A-320 (flight No AFL 2100) reported to TWR controller: "Tower, Aeroflot 2100 fully established, sorry LOC established 18".
TWR controller gave instruction: "Good morning Aeroflot 2100, Riga Tower, continue approach RWY 18".
The crew read back controller's clearance.

At **08:17:00** A-320 (flight No AFL 2100) was on track 183 degrees, with ground speed 216KN at 4200FT on descent, (7.7NM from threshold RWY18).



*Picture 3, at **08:17:36,** Air Baltic 60K cleared for immediate take-off*

At **08:17: 36** the crew of air Baltic Boeing 735 (flight BTI-60K) contacted TWR controller and declared: “Good morning, Air Baltic 60K, rolling 18, ready for departure.”

TWR controller answered: “Good morning Air Baltic 60K, landing traffic 5NM, are you ready for immediate?”

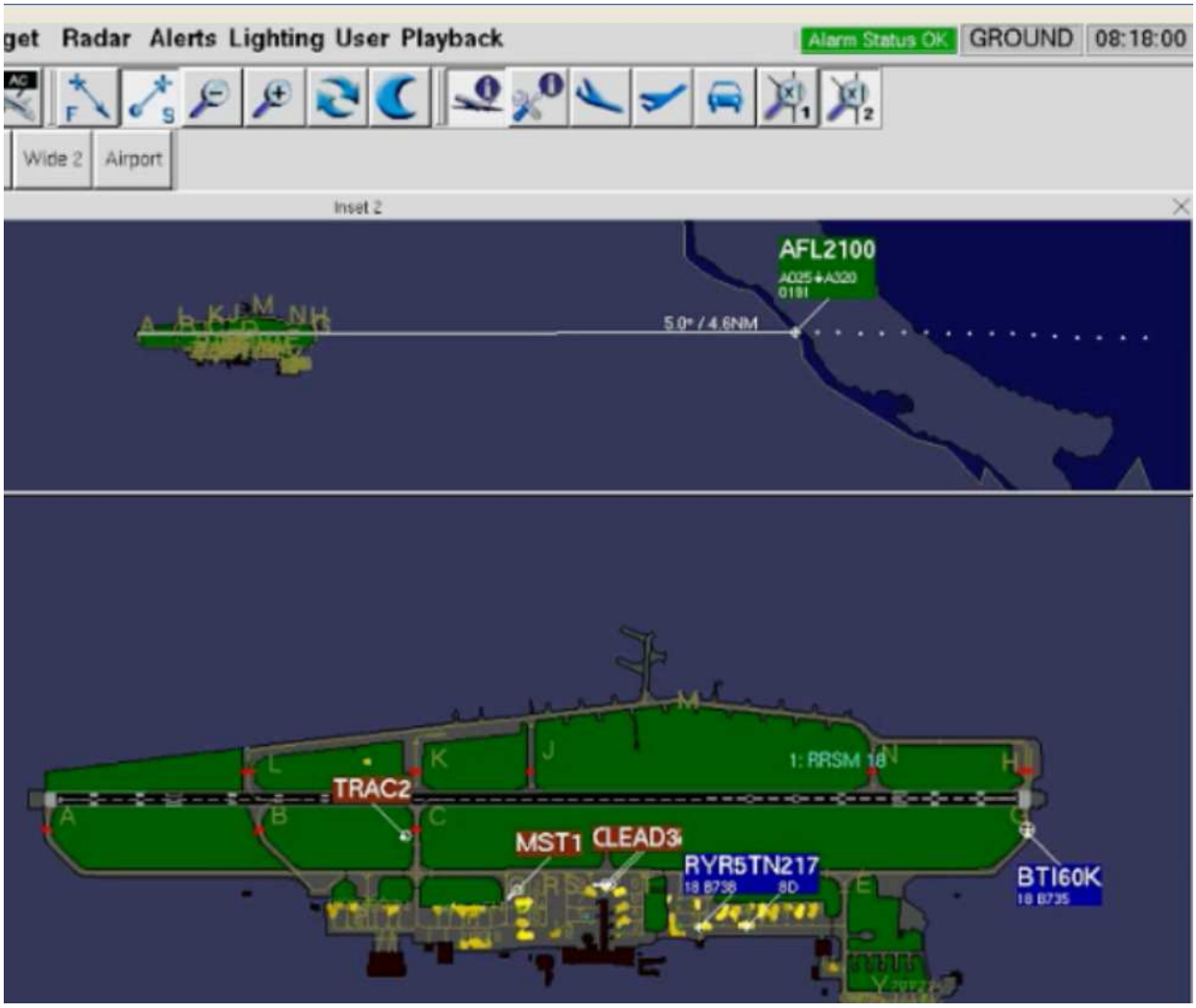
The crew of Air Baltic answered: „Affirmative, 60K”.

After that TWR controller gave clearance for Air Baltic 60K: “Air Baltic 60K, wind 140 degrees, 7 knots, RWY 18, cleared for immediate take-off”. The crew of Air Baltic 60Kread back controller’s clearance.

Aircraft A-320 (flight No AFL 2100) was on 5.9NM final to RWY 18.

At **08:18:00** A-320 (flight No AFL 2100) on track 186 degrees, with ground speed 190KN at 2500FT on descent, (4.6NM from threshold RWY18).

A-SMGSM Radar: BTI60K crossed holding point to take-off position.

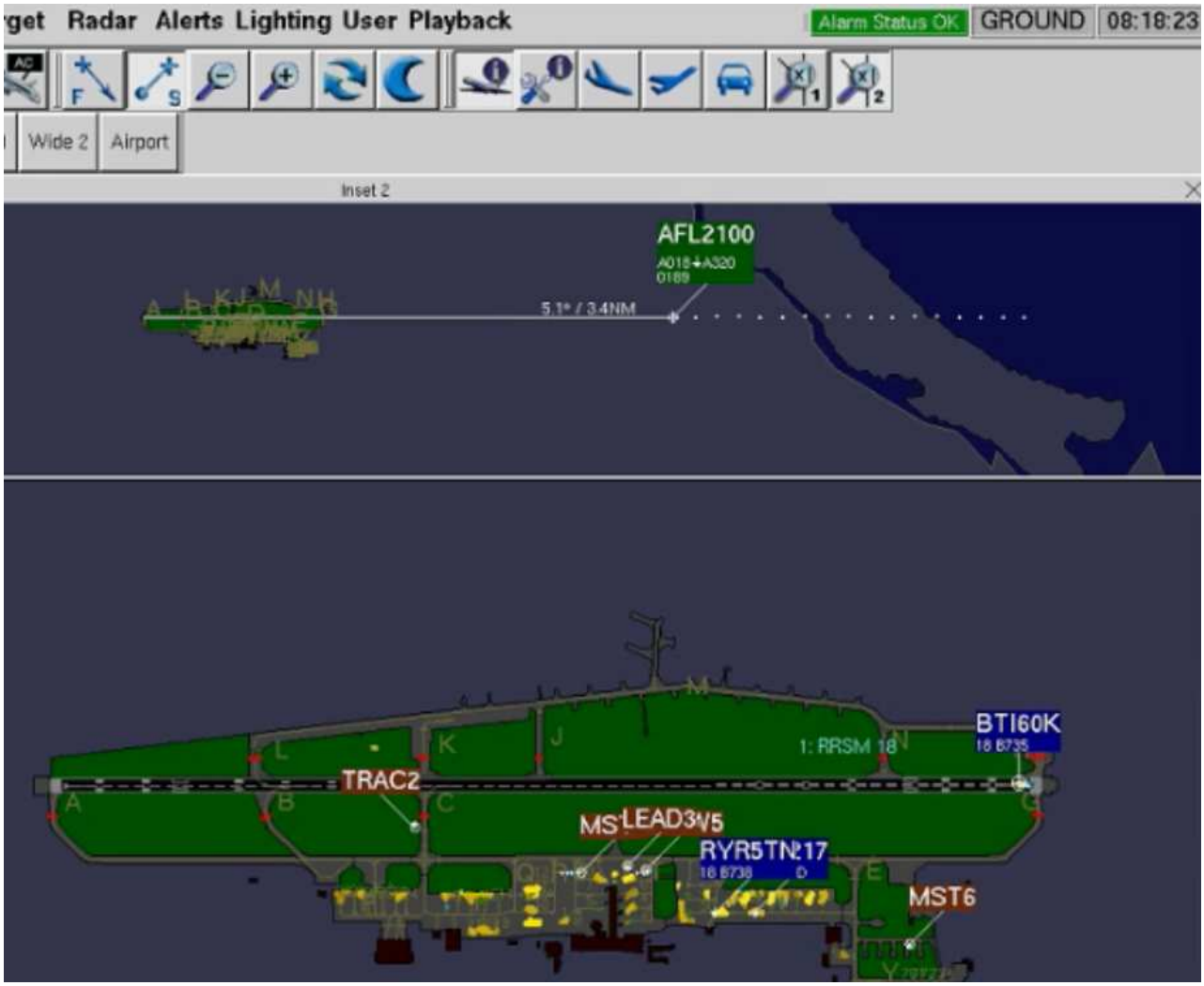


*Picture 4, at **08:18:00**, BTI60K crossed holding point to take-off position*

At **08:18:13** A-320 (flight No AFL 2100) was on 4NM final to RWY18.

At **08:18:23 A-SMGSM Radar:** BTI-60K started take-off roll.

AFL2100 was 3,3NM from RWY threshold.



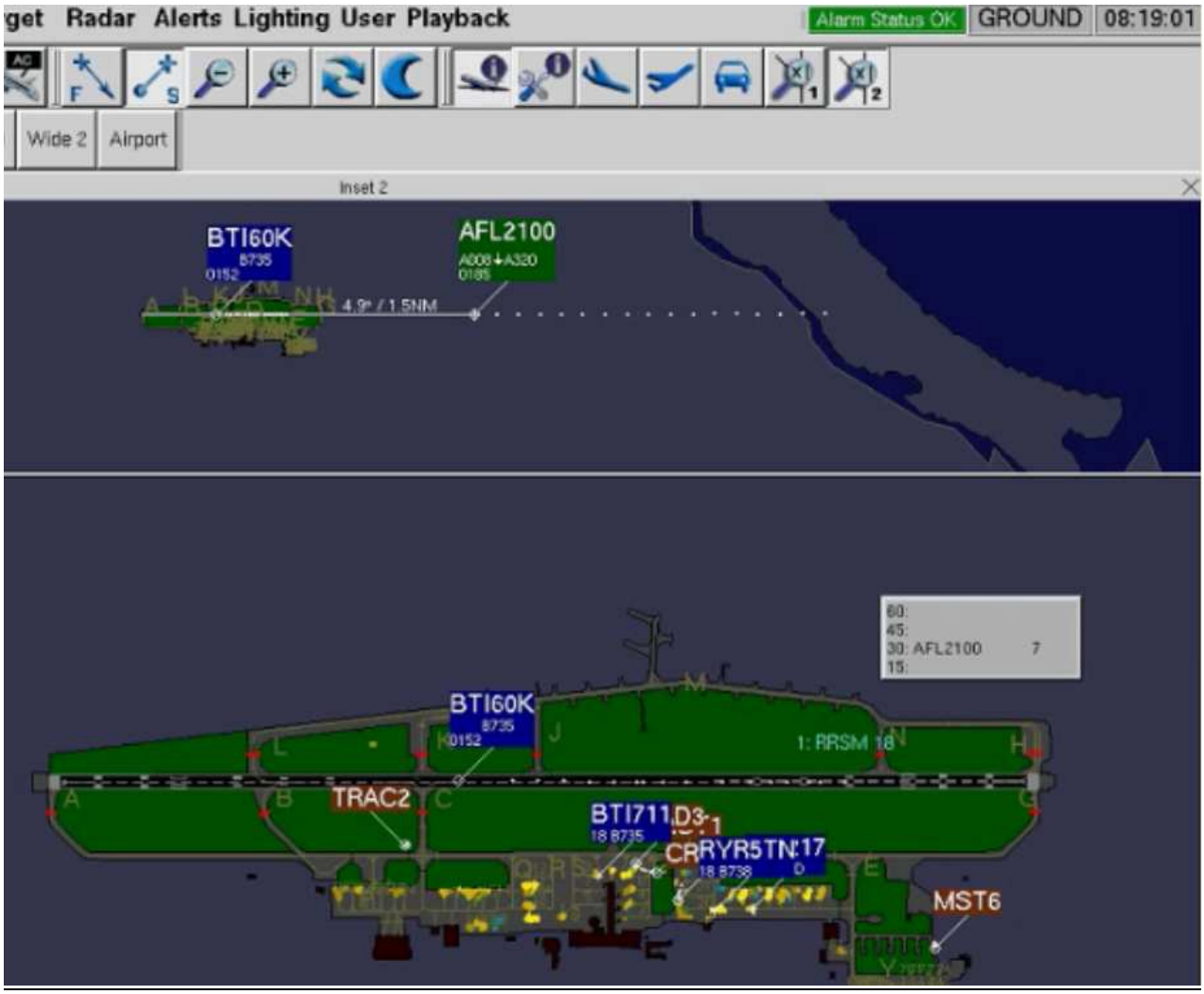
*Picture 5, at **08:18:23**, BTI-60K started take-off roll.*

At **08:19:01** the crew of A-320 (flight No AFL 2100) received following clearance from TWR controller: “Aeroflot 2100 RWY 18, cleared to land”.
The crew of A-320 (flight No AFL 2100) declared:” Aeroflot 2100 go around, are not stabilized”.

After declaring "Go around" intentions, the TWR controller issued clearance to the crew of A-320 (flight No AFL 2100): “Aeroflot 2100 roger, climb altitude 2500Ft and **follow missed approach procedure**, contact Approach 129.925”.

The crew of A-320 (flight No AFL 2100) read back controller’s clearance, and after that controller informed the crew of A-320 (flight No AFL 2100) about traffic ahead: “Aeroflot 2100, be informed departing aircraft climbing 4000FT, B737”

Aircraft A-320 (flight No AFL 2100) was on heading 185 degrees, with ground speed 188KN at 800FT, 1,5NM from threshold RWY18. Separation between traffic was 3NM.



*Picture 6, at **08:19:01**, Aeroflot 2100 go around, are not stabilized*

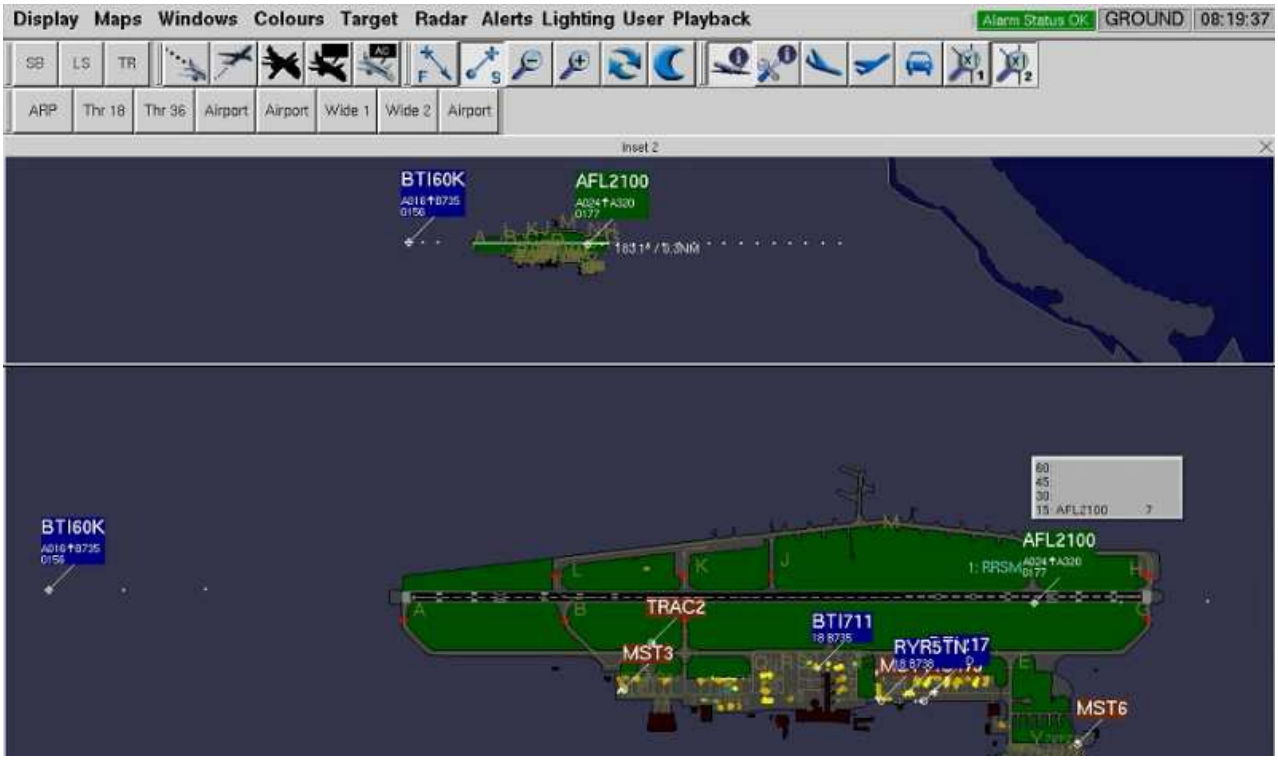
At **08:19:03** the crew of air Baltic Boeing 735 (flight BTI-60K) established communication with APP controller.

At **08:19:21** the crew of air Baltic Boeing 735 (flight BTI-60K) got instruction from APP controller: "…kept higher rate of climb till 3500FT".

At **08:19:37** the crew of A-320 (flight No AFL 2100) reported missed approach to APP controller and received instruction to turn left on heading 90°.

There was used voice communication system –SCHMID Telecom Communication module for communication between TWR and APP controllers regarding "Go around" procedure. The transcription of information recorded on tape recorder did not submit to investigators.

Boeing 735, flight BTI60K after airborne was cleared to FL280 and continued to climb.

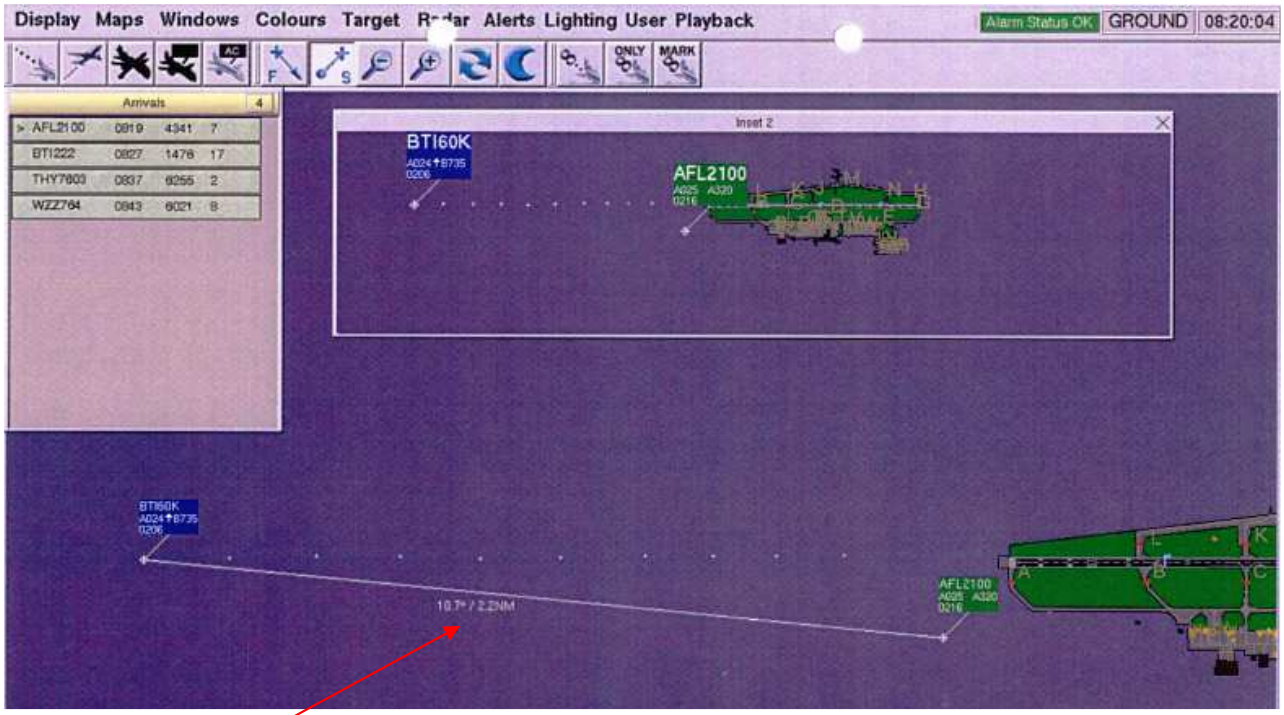


*Picture 7, at **08:19:37**, APP controller issued instruction for AFL2100 to turn left on heading 90°.*

At **08:20:04** Aircraft A-320 (flight No AFL 2100) was on track 172° with ground speed 216KN at **2500FT**.

AirBaltic Boeing 735 (flight BTI-60K) was on track 185° with ground speed 211KN at **2200FT**.

Horizontal separation between aircraft was 2,2NM



2.2NM *Picture 8, at **08:20:04**, minima separation between aircraft 2,2NM*

The flights were under Radar control.

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:

Female, 37 years old
Ratings: All necessary ratings were valid (Rating Certificate to Air Traffic Controller Licence valid);
Medical Certificate Class 3- valid.

1.6. Aircraft information

Aircraft type – Airbus A320-214, registration VP-BZS, owner aircraft -„AEROFLOT"; serial No.3644;
Date of manufacturing: 2008.

Aircraft type – Boeing 737-522, registration YL-BBN, owner aircraft -„airBaltic"; serial No.26683;
Date of manufacturing: 1992.

1.7. Meteorological information

METAR EVRA 190650Z 16006KT 130V210 CAVOK 13/03 Q1025 NOSIG

METAR EVRA 190720Z 14006KT 120V210 CAVOK 14/02 Q1025 NOSIG

METAR EVRA 190750Z 19006KT 140V250 CAVOK 14/02 Q1024 NOSIG

METAR EVRA 190820Z 15007KT 100V200 CAVOK 15/03 Q1024 NOSIG

METAR EVRA 190850Z 15006KT 110V190 CAVOK 15/02 Q1024 NOSIG

METAR EVRA 190920Z 17006KT 130V210 9999 FEW016 16/03 Q1024 NOSIG
TREND NOSIG

1.8. Aids to Navigation

1.8.1. ATRACC system

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 main function of the system is processing of radar data and flight plan data and presentation of related information.

From a functional point of view, the system consists of two main components:

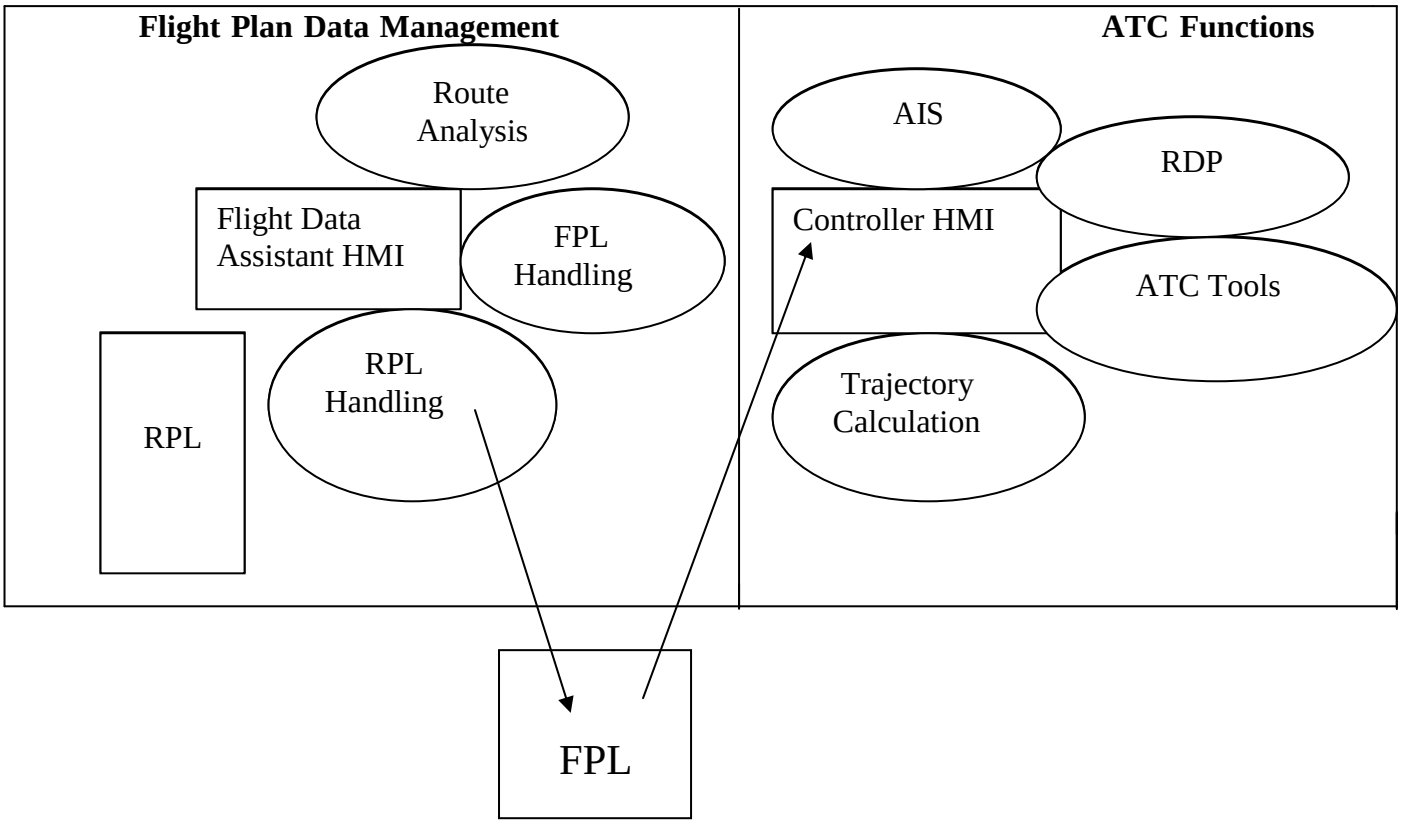
- a Primary System;
- a Radar Bypass System.

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.

Radar data is received from 4 radar stations and processed by means of a multi radar tracking function. Flight plan data is received via AFTN, OLDI, RPLs or manually entered.

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 9

Picture 9

From a functional point of view the system provides the following main functions:

- Radar data processing
- Flight plan data processing
- Information handling
- Operator support
- System monitoring and control
- History function
- AAAF functions (ATRACC ATM Added Functions)

ATRACC has the capability to receive and present information from a weather system called ATIS as well as AWOS (sensors) and from a time system.

The operator work position consists of:

- A Computer
- Two monitors;
- A keyboard;
- A mouse.

Screen presentation is done by use of windows. A window is a rectangular field. There are two types of windows:

- radar windows;
- dialogue windows.

The radar window shows symbols representing real objects that have a geographical position. They are presented in a window position that corresponds to the actual geographical position of the object.

A dialogue window contains text boxes, list boxes and buttons.

1.8.2. A-SMGCS (NOVA9000) system

A system provide routing, guidance and surveillance for the control of aircraft and vehicles in order to maintain the declared surface movement rate under all weather conditions within the aerodrome visibility operational level (AVOL) while maintaining the required level of safety.

A-SMGCS (NOVA9000) system processes and displays radar signals received from the local SMR together with data received from additional systems and databases on the airport. The display presents pictures of the traffic movement on maps created within the system. Tabular information is presented in windows and menus.

The planning and guidance functionality provides fight plan information in Arrival and Departure lists, local vehicles local vehicles list and operational controlling of stop-bar lighting and taxiway/route lighting.

When a system alarm occurs, the System Alarm Window in the upright corner of the screen turns red. The System Alarm Window is displayed in red color as long as an alarm situation is present.

In ***informational*** status the system cannot be used for routing, guidance and surveillance purposes for the control of aircraft and vehicles.

In ***operational*** status the system can be used for identification, measuring, sequencing, positional separation purposes, situational awareness, as well as during the night or low visibility conditions.

1.8.3. Alert Levels

An indication of an existing or pending situation during aerodrome operations, or an indication of an abnormal A-SMGCS operation, that requires attention and/or action.
RIMCAS has two alerts levels - **Stage One** alert and **Stage Two** alert.

- Stage one alert (**amber colour**) is used to caution the controller that a situation has occurred which needs special attention;
- Stage two alert (**red colour**) is used to warn the controller that a critical situation may occur.

In the event an alert is generated, **TWR controller should without delay assess the situation and take appropriate action as required.**

1.9. Communications

Riga Tower controller provides communication with a computerized voice communication system using pre-set switching and distribution of various aeronautical frequencies and direct communication lines. Frequency 118.1 MHz Tower controller use for pilot - controller communication, 121.5 MHz in emergency situations. Co-ordination within Riga FIR shall be performed using available "ATRACC+" system functionality.

APP controller used for pilot - controller communication frequency 129.925 MHz.

For the investigation the Tower Controller console recordings on the frequency 118.1 MHz were used. The quality of the recordings was good.

The recordings of APP controller were not at the disposal of investigation.

Tower Controller and crew members of AFL2100 and BTI60K used standard phraseology and there had not principal errors in the used phraseology. Communication Transcript there was not essential inaccuracies in radio communications from all sides.

For voice communication there is SCHMID Telecom Communication module. The transcription of information recorded on tape recorder during incident did not submit at investigation disposal.

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 had not any significance for the incident.

1.11. Flight recorders

The incident reconstruction was based on A-SMGCS (NOVA9000) system processes and displays radar information and Runway Incursion Monitoring and Conflict Alert Sub-system voice communications transcript between Tower and APP controllers of Riga ATCC and both aircraft involved in incident 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

1.18. Additional information

Not applicable

1.19. Useful or effective investigation techniques

NIL

2. Investigation and Analysis

2.1. Introduction

An occurrence is usually the result of a sequence of events. All causes together form the necessary and sufficient adverse events or conditions for a particular occurrence. Therefore the investigation of the serious incident – infringement of separation standards between the two aircraft Airbus A320 and B735 is based that at least one ATM event was judged to be directly in the causal chain of events leading to this serious incident. Without that ATM event (or if there was a different order of events), the occurrence would not have happened.

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

This chapter is subdivided into 4 main parts as indicated below:
The occurrence
Air Traffic Control aspects
Human and organizational factors
Investigation reports of Air Traffic Control the Latvia – LGS

Under *The occurrence* the runway operation being used at the time, the relevant provisions as laid down in the regulations for Air Traffic Services and the timing of the crew AFL2100 reporting the missed approach will be considered.

In Air Traffic Control aspects the regulations for a missed approach, the opportunities tor Air Traffic Control to take corrective actions, and the “break-off” to RWY 18 on the take off clearance of B735 will be considered. The cause of the occurrence will also be discussed, followed by examples of investigation of previous incidents where deviation from the rules and regulations for Air Traffic Services were considered to have been a factor. Possible contributing factors will be analyzed.

Human and organizational factors provides of the human and organizational factors investigation with the overall investigation to clarify the circumstances that existed at the time of the occurrence which influenced the action of the individuals involved by asking what part the organization played in creating these conditions or allowing them exist, thereby increasing the likelihood of a incident.

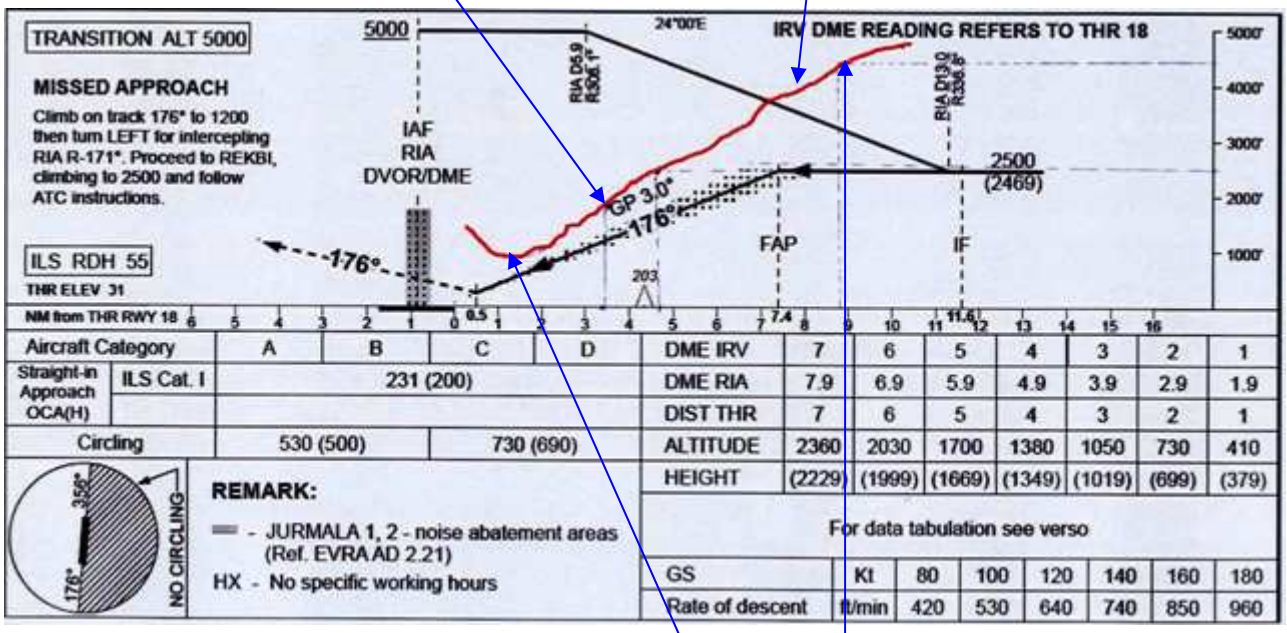
Finally *Investigation report of Air Traffic Control the Latvia* – LGS contains some observations regarding the internal investigation report by the LGS.

2.2. The occurrence

In order to maintain an overview arriving traffic, the Air Traffic Control radar system ATRACC+ was in use. When AFL2100 established contact with APP controller the crew got vectoring instructions for ILS approach to RWY 18.

AFL2100 3,3NM from THR RWY 18
B735 started take-off roll

*AFL2100 descending profile according to **radar data***



AFL2100 transferred to TWR frequency

AFL2100 1.5NM from THR RWY 18, cleared to land and the crew declared "go around" intentions

Picture 10, Descent vertical profile for Instrument Approach Chart ILS RWY 18 EVRA

AFL2100 A320 was on heading 269°, ground speed 254kn at 4900FT on descent. After crew's report "LOC established" AFL2100 was transferred to TWR controller frequency.

It appears from the radar data at LGS disposal (See Pic.7) and the radiotelephony recordings, that the APP controller vectored AFL 2100 and climbed it higher than descent approach vertical profile in Instrument Approach Chart to ILS RWY 18 EVRA published in Latvian AIP as well as did not issue information about remaining traffic miles to arriving traffic, thereby the crew of AFL 2100 descended according to controller's given clearances and probably was not aware what vertical rate of descend needed to intercept Glide Path (GP) 18 and had reached FAP higher than published in Latvian AIP. The crew of AFL2100 did not inform the controllers and did not request additional space to decrease altitude for ILS. Accordingly APP controller did not inform TWR controller about AFL2100 high descent approach, therefore TWR controller hadn't had information about that.

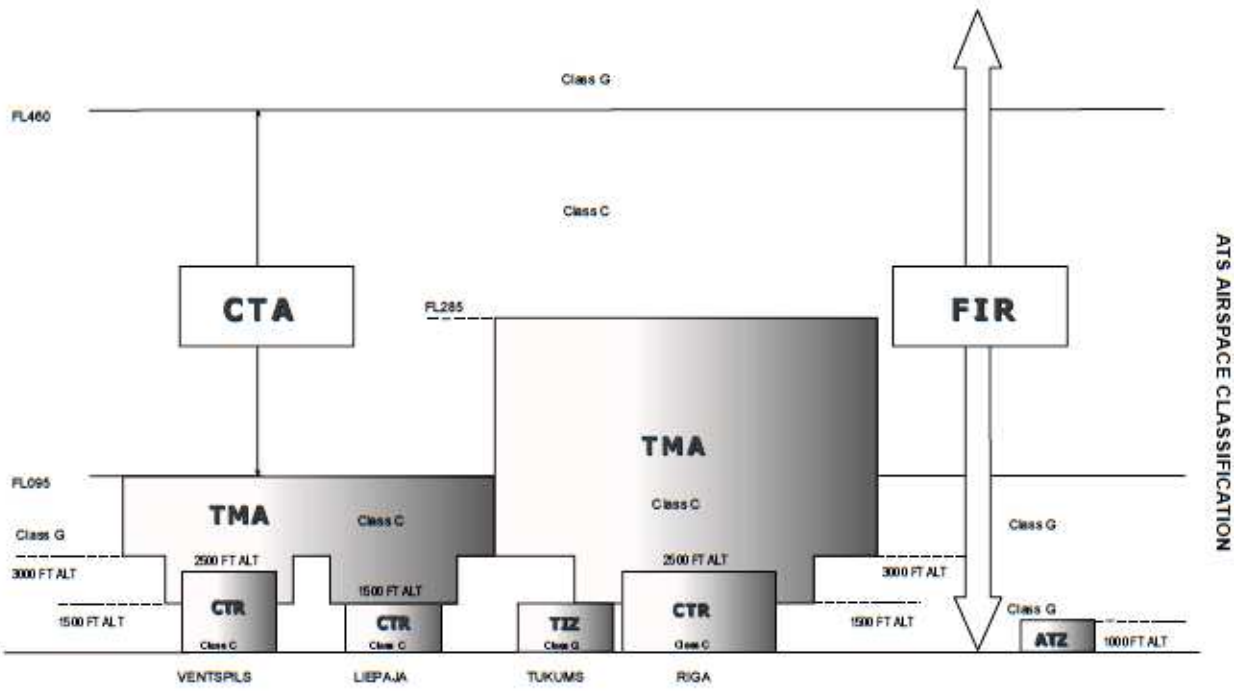
When AFL 2100 was transferred under TWR controller jurisdiction controller cleared AFL2100 to continue ILS approach and tried to provide necessary separation for departing aircraft on the basis of existing traffic flow. He was not aware that AFL2100 is approaching higher than descent approach vertical profile in Instrument Approach Chart to ILS RWY 18 EVRA and there could be problematic to stabilize for AFL2100.

Consequently when controller issued clearance to land AFL 2100 declared "go around" because it was not stabilized, TWR controller gave instructions to climb at altitude 2500 FT, to follow standard missed approach procedure, informed about aircraft B735 ahead and transferred to APP frequency. Separation between aircraft at this moment was about 3NM. Taking into account that the airborne B737 had lower horizontal speed (ground speed 211KN) in comparison

with following AFL2100 (ground speed 216KN) the separation decreased to 2.2NM and separation standards were infringed. Upon establishing contact with APP controller AFL2100 received instruction to turn left on heading 90° to correct the separation.

2.3. Air Traffic Control aspects

2.3.1. Approach controller



Picture 11

Control Sector RIGA APPROACH could be operational or not operational, and includes:

- Riga TMA (sector A and sector B) AoR.

Control Sector RIGA TOWER includes Riga CTR AoR.
Working position of Rīga APROACH is shareable between a radar controller with operational role "AE", „B (approach executive and a controller with operational role „AP" (approach planner).

Class of airspace	*Type of flight*	*Separation provided*	*Service provided*	*VMC visibility and distance from cloud minima*	*Speed limitation*	*Radio communication requirement*	*Subject to an ATC clearance*
C	IFR	IFR from IFR, IFR from VFR	Air traffic control service	Not applicable	Not applicable	Continuous two-way	Yes

Table 1 requirements for the flights within C class of airspace

Horizontal separation minima within Riga TMA between identified, controlled aircraft at the same flight level when single PSR and double SSR coverage is provided the radar separation not less than 3NM within Riga TMA AoR.

The approach and departure procedures in use are based on those contained in the ICAO DOC 8168-OPS-Procedures for AIR Navigation Services - Aircraft Operations (PANS-OPS). IFR flights entering and landing within a Terminal Control Area will be cleared to proceed via STAR, route and/or radar vector. Approach clearance will be given at or before Initial Approach Fix.

According to Approach Sector Operational Manual and AIP rules radar vectoring of arriving traffic is executed for ILS and LOC approach for glide path entering altitude (FAP) **4000 FT**, **2500 FT** or **1500 FT** for the purpose of establishing an expeditious and efficient approach sequence; The Approach controller shall inform TWR concerning the sequence of arriving aircraft and any instructions or restrictions are given in order to maintain separation.

Radar vectors should be given and **descent clearance should include an estimate of track distance to touchdown.**

Type of Approach	Glide path entering altitude (FT)	Intercept angle (degrees)	Minimum distance to touchdown * (NM)
ILSRWY 18/36	1500	0-15° 16-30° 31-60°	6,0 6,5 7,0
	2500	0-15° 16-30° 31-60°	9,1 9,6 10,1
	4000	0-15° 16-30° 31-60°	13,9 14,4 14,9

** The minimum distance to touchdown is determined taking into account distance from FAP to touchdown, distance (length) of intermediate approach segment and intercept angle with ILS or LOC.*

Table 2 Minimum values for track distance

The following fix points are established for ILS RWY18:

RIA D12.8 IRV D11.9 (FAP 4000)	RIA D8.3 IRV D7.4 (FAP 2500)	RIA D5.3 IRV D4.4 (FAP 1500)

Descent Approach vertical profile will be used and assume the aircraft will maintain a descent gradient of approximately 320 ft per NM (3° descent angle). According to approach procedures with radar control published in the LATVIA AIP the radar controller may, in order to facilitate radar control or reduce the need for radar vectoring, request aircraft under radar control to adjust their speed in a specified manner. Specific speed should normally be expressed in multiples of 10 kt based on indicated air speed (IAS). Only minor speed adjustments, of not more than ± 20 kt, should be requested of an aircraft established on intermediate and final approach.

Pilots should typically expect the following speed restrictions:

- 210 kt - during the initial approach phase;
- 180 kt - on base leg/closing heading to final approach;
- 160±10 kt - when established on final approach until 4 NM from the threshold.

These speeds are applied for ATC separation purposes and are mandatory. Aircraft unable to conform to these speeds must inform ATC and state what speeds can be used. In the event of a new (non-speed related) ATC instruction being issued pilots shall continue to maintain the previously allocated speed. All speed restrictions are to be flown as accurately as possible.

Non-compliance with speed control instructions may lead to an aircraft having to be executed from the planned approach sequence. Aircraft concerned should be advised as soon as speed control is no longer necessary. Only when requested by the radar controller and accepted by the pilot-in-command, a lower speed could be specified.

The APP controller vectored aircraft AFL2100 higher than it is published and required by standard rules in Latvian AIP for ILS to RWY 18 as well as did not issue remaining track miles information to arriving aircraft.

The aircraft AFL2100 subsequently descended according to APP controller clearances.

Transferring of control for arriving (landing) aircraft handed over by the APP controller to the TWR controller for aircraft using ILS is when pilot reported "ESTABLISHED ON ILS" from the distance of 12.5 NM but not closer than 4.0 NM from THR RWY 18. Due to the limited airspace available, it is of importance that the approaches to the patterns and the holding procedures are carried out as exactly as possible.

AFL2100 was 8.8 NM from final to RWY 18 when it was transferred to TWR jurisdiction

Pilots are strongly requested to inform ATC if for any reason the approach cannot be performed as required. For AFL2100 there were not any obstructions to perform normal approach. The pilot did not inform the controllers of any untypical situation as well as did not request additional space for descent to change altitude for ILS.

2.3.2. Tower controller

According to TWR controller Operational Manual designated aerospace area of responsibility - Riga CTR, aerospace classification - C.

Tower controller shall provide air traffic services for the following traffic:

- VFR/IFR flights entering, leaving or flying within the control zone, or otherwise operating in the vicinity of controlled aerodrome, unless they have been transferred to APP controller;
- aircraft landing and taking off;
- aircraft on the maneuvering area in Tower area of responsibility.

Normally one of the Tower controller tasks is to issue clearances and instructions to aircraft:

- clearances to enter the control zone;
- clearances to leave / cross the control zone;
- clearances to join the aerodrome traffic circuit;
- instructions to establish a take-off and landing sequence;
- instructions to taxi to the take-off(line-up) position;
- take-off and landing clearances.

TWR controller should monitor APP frequency to be aware that departed traffic has been successfully transferred to APP controller.

When issuing take-off clearance, the TWR controller has to be assured that the appropriate separation between aircraft is provided. When controller cleared B735 for immediate take-off AFL2100 was 5.9 NM from final. When B735 started take off roll AFL2100 was 3.3 NM from THR RWY 18 therefore nothing did not indicated that there could arise conflict situation.

According to rules of airport Riga TWR controller's Operational manual DI-GSV/TWR when issuing landing clearance, the TWR controller shall be sure that the appropriate separation between aircraft is provided and the runway-in-use is clear of any obstacles.

When the TWR controller issued clearance to AFL2100 to land he did not take into account that AFL2100 is approaching higher than descent approach vertical profile according to Instrument Approach Chart to ILS RWY 18 EVRA and as well speed of aircraft, therefore controller was liable to see that there could be problematic to stabilize for AFL2100.

When TWR controller cleared AFL2100 to land the pilot declared that they did not stabilize and reported missed approach. The altitude of AFL2100 was 800ft, distance from THR RWY 18 1.5NM and separation between traffic 3.0NM.

According to rules TWR controller Operational manual DI-GSV/TWR of airport Riga if an approaching aircraft commences a missed approach procedure, the take-off clearance to aircraft ready for departure from the RWY-in-use shall be issued only after additional coordination with APP.

Arriving aircraft shall not be normally permitted to land until the departing aircraft has passed the end of the runway-in-use or the departing aircraft has started a turn.

At the moment when AFL2100 was cleared to land and the pilot declared that they did not stabilize and reported missed approach aircraft B735 already took of by SID VALED 3E and climbed to altitude 4000FT.

At such situation **when the departing aircraft started rolling and its take-off could not be aborted, and arriving aircraft started go around procedure the** Item 3.9.5.of TOWER CONTROLLER'S OPERATIONAL MANUAL DI - GSV/TWR - 01/2 of AIRPORT RIGA prescribes following actions for controller: Instruct the arriving aircraft:

- to turn to the west (heading 270°);
- to climb to, to descend to or to maintain 1500 ft;
- to contact Riga APP

Inform APP controller about nonstandard go around procedure.

In contrary of prescribed rules the tower controller instructed AFL2100 to climb at altitude 2500FT, to follow standard missed approach procedure, informed about preceding traffic, then to contact APP frequency 129.925 MHz.

***MISSED APPROACH according to AIP*:** Climb on track 178° to 1200, then turn LEFT for intercepting RIA R-173°, proceed to REKBI, climbing to 2500 and follow ATC instructions.

Controller did not take into account the altitude of AFL2100 when it went around, therefore departing B735 and arriving (performing MSA procedure) had at nearly same altitude. According to radar data AFL2100 was leveling at 2500FT with ground speed 216 KN and B735 was climbing at 2200 FT with ground speed 211KN. Longitudinal separation was 2.2NM.

In all cases, when departing aircraft are entering TMA, the vertical separation of aircraft not less than 1000ft, or the longitudinal separation not less than: -3NM when SSR and PSR source of information is not out of order.

When both aircraft contacted APP controller got instruction for B735 to keep higher rate of climb till 3500FT and respectively AFL2100 after reporting missed approach to APP received instruction to turn left on heading 90° and existing conflict situation was resolved.

Investigation have not information in its disposal what was coordination between TWR and APP controllers regarding "go around" procedure by ATCC means of communication.

2.3.3. Staffing and supervision

The Tower controller had all necessary ratings**.** The analysis of documentation determined that Tower controller according to service provider LGS controllers schedule for May, 2012, should working shift No2 on May 19 from 14:30 to 22:00 (local time), actually controller has logged in ATRACC+ system at 04:37:35 UTC and logged out at 06:23:39 UTC after working hours 1:46:04. Controller had rest brake and logged in ATRACC+ system for a second time at 07:01:29 UTC logged out at 08:34:39UTC and worked 01:33:10 hours. After brake logged in at 09:36:25 UTC logged out at 11:39:19 UTC and worked 02:02:54 hours. Incident occurred at 08:19 UTC.

In operational respect Riga Tower staff on duty subordinates to Tower supervisor. Tower supervisor subordinates directly to the Chief of Riga Tower. Tower supervisor is the senior operational chief in respect of ATS in Riga CTR, coordination with ATS units concerned and with other services connected with ATS.

Tower supervisor duties are shift work organization, which includes:

- pre-shift briefing;
- shift takeover/handover;
- fulfillment of air traffic controller's duties (if necessary);
- after-shift debriefing (if necessary).
- organization of substitution of air traffic controllers during the shift;
- constant control of the work of the shift;
- coordination and information exchange with concerned units;
- control of serviceability of all equipment used for ATS provision;
- decision-taking and emergency alerting control according to the prescribed procedures.

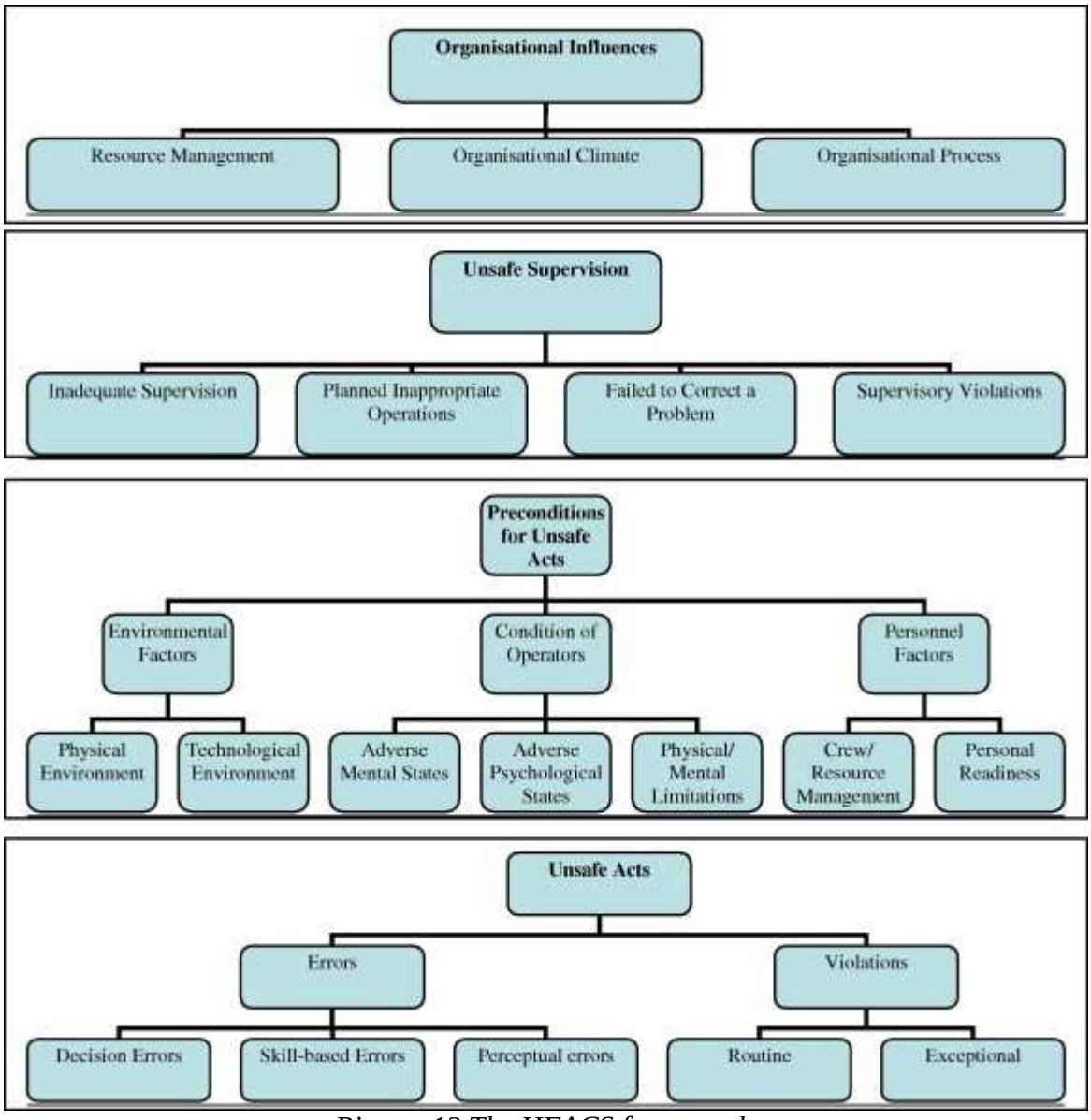
TWSUP should control of the work and actions of Riga Tower staff on duty directly at the workplace and prepare analysis for the after –shift debriefing on shortcomings revealed during the shift.

Investigation has not documentary confirmation about preparing such analysis of incident after –shift debriefing.

2.4. Human and organizational factors

2.4.1. Underlying Human Factors problems associated with incident

For revealing causation of this incident investigation has tried to put into practice the taxonomy of the Human Factors Analysis and Classification System that describes the human factors that contribute to an incident.



Picture 12 The HFACS framework

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. Such approach to providing investigation is not that Human Error is a cause of incident, but that Human Error is a symptom of trouble deeper inside a system. For analysis investigation has considered that the classification system has following four levels, each of which influences the next level:

- 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.

2.4.2. 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

The TWR controller issuing clearance to AFL2100 to land did not take into account that AFL2100 is approaching higher than descent approach vertical profile according to Instrument Approach Chart to ILS RWY 18 EVRA and there could be problematic to stabilize for AFL2100 as well as TWR controller did not evaluate the altitude of AFL2100 when it commenced to "go around".

The opinion of investigation is that when AFL2100 suddenly declared intention to go around TWR controller inadequate assessed existing situation. According to the Human Factors Analysis and Classification System controllers action is classified as skill based error.

TWR controller did not stop AFL2100 at FL1500 because considered that B735 will get in time such altitude so that vertical separation between aircraft is at least 1000FT, taking into account that B735 (BTI60K) rate of climb is higher than A320 (AFL2100) rate of climb.

2. Decision errors

Investigation stated that when landing aircraft AFL2100 declared intention to go around after it was cleared to land controller's decision to give pilot instruction to perform standard MSA procedure was wrong.

II. Violations

Investigation stated that TWR controller contravened requirements of the TOWER CONTROLLER'S OPERATIONAL MANUAL DI - GSV/TWR - 01/2 of AIRPORT RIGA, Item 3.9.5.for case if the departing aircraft has started rolling and take-off can not be aborted, and arriving aircraft has started go around procedure.

Investigation stated that APP controller contravened requirements of the ATCC Approach sector Operational Manual DI-GSV/GSVC-01, Item 4.1.3., 4.1.4.and did not issue remaining track miles information to arriving aircraft AFL2100. APP controller vectored AFL2100 and climbed it higher than it is required by standard rules for approach descent vertical profile in Instrument Approach Chart to ILS RWY 18 EVRA published in Latvian AIP as well as did not warn TWR controller about that.

2.4.3. 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. There was not revealed poor coordination.

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.

2.4.4. 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.

2.4.5. 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;
- Organizational 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.

2.5 Internal investigation reports of JSC "VAS LGS"

Within framework of Safety Management System the JSC "VAS LGS" should perform investigation of safety occurrencies according to safety management procedure PR-DKD-05/1 "VAS LGS safety occurrencies internal investigation". For safety investigation investigators of "VAS LGS" use tool HEIDI (Harmonization of European Incident Definitions Initiative for ATM).

The Quality Department of "VAS LGS" produced and issued on June 25, 2012 an investigation Report regarding this occurrence internally. Pursuant to request by TAIIB for additional information about taken measures and provided safety analysis by Quality Department, internal Report was sent to TAIIB. According to this Report Quality Department issued 2 (two) Safety Recommendations:

- The approach controller who provided vectors should report remaining track miles for arriving traffic to keep the pilot informed regarding intended flight regulations;

- The tower controller should apply standard "Go around" procedure on RWY heading only if longitudinal separation provided was grater than 3NM for TMA control area.

Both Recommendations actually recommend to complying with controllers manual requirements as well as Report don't include any analysis of human factors what of the opinion of TAIIB played significant role in the occurred incident .

At disposal of investigation submitted also ATC occurrence evaluation signed by head of flight region unit issued on May 29, 2012.

Reviewing both above mentioned documents - Report produced by Quality Assurance Department as well as Safety occurrence evaluation by flight region unit it is apparent that there is not close collaboration for investigating and revealing occurrence causes between Quality Assurance Department and ATC Department. Of the opinion of TAIIB both structure units of "VAS LGS" make it actions separately and there is not tight accordance to reach common goal-improving air traffic control safety. Quality Assurance Department makes paper work and sends results to ATC Department, ATC Department performs its own analysis, not feed-back between safety staff and in occurrence involved Department. Of the opinion of TAIIB after occurred incidents it is necessary to organize safety meetings together with managers of involved Department and safety staff, respectively under management and monitoring of Quality Assurance Department.

2.6. Previous investigations

The Transport Accident and Incident Investigation Bureau published various investigation reports about occurrences at Riga FIR. Latvia ATCC where non-compliance of established operational procedures as well as human factors were a contributing factor.

These concern the following investigations:

1. FINAL REPORT No.1/2008, LOSS OF SEPARATION OVER THE SEA NEAR REPORTING POINT ON REQUEST LASMA, ON AUGUST 20, 2007;
2. FINAL REPORT Nr.2/2008, INFRINGEMENT OF SEPARATION STANDARDS BETWEEN BOEING 757-200 YL-BDC, FLIGHT BTI65T AND AIRBUS A340-600, ON APRIL 21, 2008;

3. FINAL REPORT Nr.5/2008, INFRINGEMENT OF SEPARATION STANDARDS BETWEEN EMBRAER 190 OH-LKG, FLIGHT FIN912 AND MILITARY AIRCRAFT G 4, CALL SIGN SVF 22 OVER THE BALTIC SEA NEAR REPORTING POINT ON REQUEST EVONA, ON MAY 28, 2008;
4. FINAL REPORT Nr.2/2009, INFRINGEMENT OF SEPARATION STANDARDS BETWEEN THE AIRCRAFT BOEING 735, FLIGHT BTI6C4 AND AIRCRAFT AIRBUS A-320, FLIGHT LTC306 DURING APPROACH IN THE TERMINAL CONTROL AREA OF RIGA INTERNATIONAL AIRPORT, ON JULY 25, 2008;
5. FINAL REPORT Nr.4/2009, INFRINGEMENT OF SEPARATION STANDARDS DURING GOING AROUND BETWEEN THE AIRCRAFT BOEING 737, FLIGHT BTI3G2 AND DEPARTING AIRCRAFT AIRBUS A-320, FLIGHT ART531 IN THE TERMINAL CONTROL AREA OF RIGA INTERNATIONAL AIRPORT, ON FEBRUARY 13, 2009;
6. FINAL REPORT Nr.1/2010 INFRINGEMENT OF SEPARATION STANDARDS BETWEEN THE AIRCRAFT BOEING 733, FLIGHT BTI16C AND AIRCRAFT BOEING 777, FLIGHT JAL 407 IN THE VICINITY OF THE POINT RUTEK, ON AUGUST 31, 2009;
7. FINAL REPORT No 4-02/3-10/-2/2011, INFRINGEMENT OF SEPARATION STANDARDS BETWEEN THE AIRCRAFT AIRBUS A-320, FLIGHT WZZ125H AND AIRCRAFT AIRBUS A-332, FLIGHT KLM 409, ON JULY 17, 2010;
8. FINAL REPORT Nr.4-02/4-11-(4/2012) OF THE AIRCRAFT SERIOUS INCIDENT LOSS OF SEPARATION DURING FINAL APPROACH BETWEEN THE AIRCRAFT LIBERTY AEROSPACE XL-2, REGISTRATION YL-EON and AIRCRAFT AIRBUS A-320, REGISTRATION HA-LPI, FLIGHT WZZ7BU, ON JULY 08, 2011.

2.7. Severity Classification for Safety Occurrences in ATM

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** - an ATC instruction allowed to reduce the risk, without eliminating it, as safety margins were still infringed.

Taking into account the Severity Classification this incident is classified as **B2**

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 3 Severity Classification Scheme for Aircraft Incidents

SEVERITY	AA	Total inability to provide safe ATM services	AA1	AA2	AA3	AA4	AA5
	A	Serious inability to provide safe ATM services	A1	A2	A3	A4	A5
	B	**Partial inability to provide safe ATM services**	B1	**B2**	B3	B4	B5
	C	Ability to provide safe but degraded ATM services	C1	C2	C3	C4	C5
	D	Not determined	D1	D2	D3	D4	D5
	E	No effect on ATM services	E1	E2	E3	E4	E5
			1	2	3	4	5
			Very Frequent	**Frequent**	Occasional	Rare	Extremely rare
			Frequency				

Table 4 Severity Classification Scheme of ATM specific occurrences according to the Severity of their Effect on the ability to provide Safe ATM Services

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

Table 5 Definitions of Accident/Incident Frequency

According to the Severity of their Effect on the ability to provide Safe ATM Services this serious incident is classified as **B2**.

3. Conclusions

During process of investigation were made the following conclusions:

3.1. Findings

- In order to maintain an overview arriving traffic, the Air Traffic Control radar system ATRACC+ was in use;

- When AFL2100 established contact with APP controller the crew got vectoring instructions for ILS approach to RWY 18;

- The APP controller vectored aircraft AFL2100 higher than it is published and required by standard rules in Latvian AIP for ILS to RWY 18;

- The APP controller did not issue remaining track miles information to arriving aircraft AFL2100;

- The pilot of AFL2100 did not inform the controllers of any untypical situation as well as did not request additional space for descent to change altitude for ILS.

- At the time of the incident the traffic was handled by Tower Controller;

- When the TWR controller issued clearance to AFL2100 to land he did not take into account that AFL2100 is approaching higher than descent approach vertical profile according to Instrument Approach Chart to ILS RWY 18 EVRA and as well speed of aircraft, therefore controller was liable to see that there could be problematic to stabilize for AFL2100;

- When TWR controller cleared AFL2100 to land the pilot declared that they did not stabilize and declared "go around" intentions;

- At the moment when the pilot of AFL2100 declared that they did not stabilize and reported missed approach aircraft B735 already took of by SID VALED 3E and climbed to altitude 4000FT;

- When the departing aircraft has started rolling and take-off **can not be aborted**, and **arriving aircraft has started go around procedure** Tower controller shall: instruct the arriving aircraft: to turn to the west (heading 270°) and to climb to, to descend to or to maintain 1500 ft;

- In contrary of prescribed rules the Tower controller instructed AFL2100 to climb at altitude 2500FT, to follow standard missed approach procedure;

- TWR controller did not take into account the altitude of AFL2100 from which it went around;

- TWR controller actions were disregard with the rules and regulations of Procedures of air navigation services, ICAO Doc. 4444 ATM/501 „Air Traffic Management";

- The runway in service was RWY 18;

- Radio communications on the TWR frequency 118.1 MHz and APP frequency 129.925 MHz between the pilots of AFL2100, and the APP and TWR controllers took place in English;

- At the time of incident the workload of the controller was not high;

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

- The minimum of horizontal separation between aircraft was 2.2 NM;

- Horizontal separation minima within Riga TMA is not less than 3NM within Riga TMA AoR;

- According to EUROCONTROL ESARR 2 this incident is classified as Major Incident;

- According to EUROCONTROL ESARR 2 Severity Classification table this incident is classified as **B2;**

- According to the Severity of their Effect on the ability to provide Safe ATM Services this serious incident is classified as **B2**;

- There was fixed skill based errors of TWR controller - inadequate assessing existing situation when AFL2100 suddenly declared intention to go around;

- There was fixed decision errors of TWR controller to give pilot instruction to perform standard MSA procedure;

- Investigation stated violations of the TOWER CONTROLLER'S OPERATIONAL MANUAL DI - GSV/TWR - 01/2 of AIRPORT RIGA, Item 3.9.5. for case if the departing aircraft has started rolling and take-off can not be aborted, and arriving aircraft has started go around procedure;

- Investigation stated violations of the ATCC Approach sector Operational Manual DI-GSV/GSVC-01, Item 4.1.3., 4.1.4. not issuing remaining track miles information to arriving aircraft AFL2100;

- It was stated that there is not feed-back between safety staff and in occurrence involved Department. They make it investigation separately and there is not tight accordance to reach common goal - improving air traffic control safety;

- "VAS LGS" staff issued internal investigation don't include any analysis of human factors what played significant role in the occurred incident;

- 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;

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

3.2. Causes

3.2.1. Main Cause

The source or origin of an event that played the major role that caused this incident - infringement the separation minima between an aircraft A320, registration VP-BZS in the final approach phase and Boeing B735, registered YL-BBN taking off, were the an inappropriate traffic management.

3.2.2. Contributing causes

Inadequate assessment of approaching traffic what lead to unexpected situation for TWR controller when the pilot AFL2100 declared “go around”.

3.2.3. Primary cause

The event after which incident became inevitable.

Not issuing instruction to the aircraft AFL2100 to turn to the west (heading 270°) and to climb to and maintain 1500 FT.

4. Safety Recommendations

It is recommended that the authority responsible for air navigation services in the Latvian airspace VAS Latvijas Gaisa Satiksme (LGS):

Recommendation - 6-2013

Should take measures to analyze the causes of serious incidents which occurred before, to predict errors what can or may happen in the future, in particular to pay attention to rule based errors (rule based mistakes and violations).

Recommendation - 7-2013

Should take measures to improve collaboration between Quality Assurance Department staff and VAS LGS structure units involved in occurrences investigation.

Riga, July 3, 2013

Investigator in charge
Visvaldis Trubs

Director of Transport Accident and Incident Investigation Bureau
Ivars Alfreds Gaveika