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CONCEPT OF OPERATIONS

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Abstract This document contains a medium level description of the target concept to support the creation of the Baltic FAB as PANSA and ORO Navigacija initiative to meet the growth forecast in air transport demand and meet the airspace users expectations for more flexible and cost-effective Air Traffic Management (ATM) services, while remaining sensitive to environmental issues.	
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Abbreviations

ACC	Area Control Centre
AD	Aerodrome
AD	Air Defense
ADS	Automatic Dependant Surveillance
AFIS	Aerodrome Flight Information Service
AFTN	Aeronautical Fixed Telecommunication Network
AIM	Aeronautical Information Management
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information Regulation and Control
AIS	Aeronautical Information Service
AMC	Airspace Management Cell
AMHS	Aeronautical Messages Handling System
ANS	Air Navigation Service
ANSP	Air Navigation Service Provider
APP	Approach
ASM	Airspace Management
ATC	Air Traffic Control
ATCC	Air Traffic Control Centre
ATCO	Air Traffic Controller
ATFM	Air Traffic Flow Management
ATFCM	Air Traffic Flow and Capacity Management
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATMC	Air Traffic Management Centre
ATS	Air Traffic Service
AUP	Airspace User Plan
BANC	Baltic ANS Commission
CAA	Civil Aviation Authority
CAO	Civil Aviation Office
CBA	Cost Benefit Analysis

CBA	Cross Border Area
CCD	Continuous Climb Departures
CDA	Continuous Descent Arrivals
CDM	Collaborative decision Making
CDR	Conditional Route
CNS	Communication Navigation Surveillance
CO_2	Carbon Dioxide
CPDLC	Controller Pilot Datalink Communication
CTA	Control Area
DCT	Direct
DIR	Director
DME	Distance Measuring Equipment
DNM	Directorate Network Management
DVOR	Doppler VOR
EC	European Commission
EC	Executive Controller
ECAC	European Civil Aviation Conference
ESARR	EUROCONTROL Safety Regulation Requirements
EU	European Union
EUROCAT	Thales ATM System
FAB	Functional Airspace Block
FAB CE	FAB Central Europe
FABEC	FAB Europe Central
FIR	Flight Information Region
FDP	Flight Data Processing
FL	Flight Level
FMP	Flow Management Position
FMTP	Flight message transfer Protocol
FTE	Full Time Equivalent
FUA	Flexible Use of Airspace
GAT	General Air Traffic

GNSS	Global Navigation Space System
HMI	Human Machine Interface
HQ	Headquarter
ICAO	International Civil Aviation Organization
IDO & WA	Identification Officer and Weapon Allocator
IFP	Instrument Flight Procedure
ILS	Instrument landing System
IFR	Instrument Flight Rules
LFV	Luftfartsverket (Swedish ANSP)
LGS	Latvijas Gaisa Satiksme (Latvian ANSP)
LOC	Localizer
MATSO	Military Air Traffic Services Office
MET	Meteorological services
MLAT	Multilateration
MONA	Monitoring Aids
MSSR	Monopulse Secondary Surveillance Radar
MTCD	Medium Term Conflict Detection
MTOW	Maximum Take Off Weight
NATO	North Atlantic Treaty Organization
NDB	Non – directional Beacon
NEAP	North European Airspace Providers
NEFAB	North European FAB
NM	Network Manager
NMOC	Network Management Operation Cell
NOTAM	Notice to Airman
NPA	Non Precision Approach
NSA	National Supervisory Authority
NUAC	Nordic Upper Airspace Centre
OAT	Operational Air Traffic
OLDI	On Line Data Interchange
OPS	Operations

ORCAM	Originating Region Code Assignment Method
PANSA	Polish Air Navigation Services Agency
PBN	Performance Based Navigation
PC	Planning Controller
PEGASUS_21	Polish Enhanced Generation ATC System for Unified Solutions of the 21st Century
PRANET	PANSA Radar Network
PRU	Performance Review Unit
PSR	Primary Surveillance Radar
QMS	Quality Management System
RCC	Rescue Coordination Centre
RCA	Reduced Coordination Area
RDP	Radar Data Processing
RMCDE	Radar message Conversion and Distribution Equipment
RNAV	Area Navigation
RNDSG	Route Network Development Sub Group (EATMP)
RNP5	Required Navigation Performance 5
SAR	Search and Rescue
SES	Single European Sky
SESAR	Single European Sky Air Traffic Management Research and Development Programme
SID	Standard Instrument Departure
SMS	Safety Management System
SSR	Secondary Surveillance Radar
STAR	Standard Terminal Arrival Route
STATFOR	EUROCONTROL Statistics and Forecast Service
STCA	Short Term Conflict Alert
TEN-T	Trans - European Network Transport programme
TMA	Terminal Manoeuvring Area
TRA	Temporary Reserved Area
TSA	Temporary Segregated Area
TWR	Tower

UAV	Unmanned Aerial Vehicle
UIR	Upper Information Region
UTA	Upper Terminal Area
UTC	Universal Time Coordinated
UUP	Updated User Plan
VCS	Voice Communication System
VFR	Visual Flight Rules
VHF	Very High Frequency
VOLMET	Meteorological Information for Aircraft in Flight
VOR	VHF Omni-directional Radio Range
WAM	Wide Area Multilateration

Documents

1. Baltic FAB Feasibility Study Report, October 2010;
2. Final Baltic FAB Development Study, August 2011;
3. EUROCONTROL Medium – Term Forecast, October 2011
4. European Air Traffic Management Master Plan, Edition 1, 30 March 2009;
5. Strategic Guidance in Support of the Execution of the European ATM Master Plan;
6. ICAO Global Air Traffic Management Operational Concept;
7. EUROCONTROL 2015 Airspace Concept & Strategy for the ECAC Area & Key Enablers;
8. EUROCONTROL Handbook for Airspace Management, October 2003;
9. EUROCONTROL ConOps FUA (Ed. 1, 2004) and EUROCONTROL Specification for the application of FUA (EUROCONTROL-SPEC-0112 Ed. 2009);
10. Overall ATM/CNS Target Architecture – Concept of Operations (ConOps) for the Year 2011+.

1 Introduction

1.1 The Baltic FAB Concept of Operations

This document is delivered by WG1 in the scope of framework programme of Baltic FAB creation and development. It is based on documents listed on page 12. It contains a medium level description of the target concept to support the creation of the Baltic FAB as a joint initiative of PANSA and Oro Navigacija to meet the growth forecast in air transport demand and meet the airspace users' expectations for more flexible and cost-effective Air Traffic Management (ATM) services, while remaining sensitive to environmental issues.

1.2 Functional airspace blocks

The fragmentation of air traffic management (ATM) in Europe has long been recognised as an obstacle to improving performance in the provision of ATM services. Successive packages of Single European Sky (SES) legislation have sought to address this in a number of ways. One of the principal mechanisms in the legislation is the requirement that Functional Airspace Blocks (FABs) are established in European airspace. The basic concept of a FAB is that the regions of airspace in which it is managed are determined by operational requirements, rather than by national boundaries.

The first package of SES legislation, enacted in 2004, required Member States of the European Union to establish FABs in their upper airspace. It required the FABs to satisfy certain criteria. This requirement was enhanced in the second package of SES legislation (SES II), enacted in July 2009.

In the current legislation, Member States are required to take all necessary measures to ensure the implementation of FABs by 4 December 2012. FABs should be established with a view to improving capacity and efficiency, should be supported by a safety case, and justified by a cost-benefit analysis. Member States are encouraged to cooperate with each other to the fullest possible extent to achieve these aims.

1.3 Background

For many years Polish and Lithuanian bodies responsible for navigation and aviation have been cooperating with each other at both local and European level. Milestones such as the memoranda of understanding signed by the aviation authorities and ANSPs in 2003 and 2004 indicate that the cooperation was close, whilst this cooperation was pursued through the medium of the Baltic Air Navigation Services Commission. The requirement to establish FABs by 2012 created a new impetus, and the bilateral relationship at the ministry level was strengthened in 2010 when the Vice-Minister of Transport and Communications of the Republic of Lithuania and the Vice-Minister of Infrastructure of the Republic of Poland signed Letter of Intent on the cooperation with regard to the development of the Baltic Functional Airspace Block initiative.

In 2009 Poland and Lithuania agreed in principle to evaluate the feasibility of establishing a Functional Airspace Block (the Baltic FAB) in their joint airspace. The ANSPs of the two countries applied for and were granted support from the Trans-European Transport Network programme (TEN-T) for a feasibility study into the establishment of such a FAB. PANSA commissioned Helios and Ernst &

Young to undertake this study to help the two governments and their ANSPs, and enable them to make appropriate decisions concerning the establishment of the FAB in time for the SES deadline in 2012.

1.4 Purpose and scope of the document

The Concept of Operations document (CONOPS) represents an essential reference for the Baltic FAB in terms of identification of functions and processes, their corresponding interconnections and information flows, the actors concerned and their roles and responsibilities.

The purpose of this document is to describe the Baltic FAB operational environment and associated operational improvements planned up to and after 2015.

The document provides information on:

- the Baltic FAB airspace structure;
- the collaborative process and harmonized ATM procedures aiming to support flexible management of the airspace;
- an integrated approach to airspace organization, flow and capacity management;
- processes aiming to support civil-military cooperation;
- demand - capacity managing;
- the Baltic FAB network improvements being in line with Pan-European Network developments;
- processes to support performance monitoring and sharing of best practices with a view to further improvements.

1.5 Pan-European Perspective

The Baltic FAB is being developed with a view to the optimum and efficient use of the airspace, in respect of all airspace users' needs regarding reduced fuel consumption, flexible use of airspace, harmonised procedures and environmental protection at European level. From the early stages of the Baltic FAB Project development, PANSA and Oro Navigacija promoted the idea of extending the cooperation area to neighbouring countries willing to improve ATM in a harmonized manner in compliance with the Single European Sky concept.

Both service providers, Oro Navigacija and PANSA, are partners in the Baltic FAB project development and are involved in the pan-European process of coordinated improvements at the ATM network level under the auspices of the DNM of EUROCONTROL and the Route Network Development Sub-Group (RNDSG).

The Baltic FAB will comply with EU Single European Sky legislation and will bring gradual harmonisation of air navigation service provision in the two countries, enhanced efficiency, reduction of the airspace users' costs and reduced impact of aviation on the environment, with due regard to traffic safety.

1.6 Document structure

Chapter 1 presents the background and context for the Feasibility Study of the Baltic FAB. The remainder of this document comprises the following sections:

Chapter 2 describes the current arrangements in Poland and Lithuania concerning ANS.

Chapter 3 describes the future arrangements of Baltic FAB.

Reference to safety management is specifically excluded from this document but is captured in the Baltic FAB Safety Case.

2 Current ANS environment in Poland and Lithuania

2.1 Airspace structure

The airspace under the jurisdiction of Poland and Lithuania is shown in Figure 1 below. The countries' sovereign airspace is extended to cover part of the Baltic Sea. The airspace comprises Warsaw FIR and Vilnius FIR.

Warsaw FIR lies within the national borders to the east, south and west, where it borders on the Vilnius, Minsk, Lvi'v, Bratislava, Praha FIRs, and the German FIRs and UIRs respectively. There are 2 areas where ATS are delegated to DFS - Germany and 2 areas where ATS are delegated to the ANS Czech Republic and 1 where ATS is delegated to PANSA form ANS Czech Republic.To the North it covers part of the Baltic Sea and has common boundaries with the Sweden and Kaliningrad FIRs. The air traffic services in two northern parts of the FIR over the Baltic Sea are delegated to Sweden.

Vilnius FIR adjoins Riga FIR to the north, Minsk FIR to the east and south, Kaliningrad FIR to the west, Warsaw FIR to the south-west and Sweden FIRs to the west.

The Figure 1 shows the airspace where the two national ANSPs provide air navigation services. In a portion of Lithuanian airspace extending above the Baltic sea ATS is delegated to the Latvian ANSP, LGS, and there are portions of Polish airspace where ATS services are delegated to the Swedish ANSP, LFV.

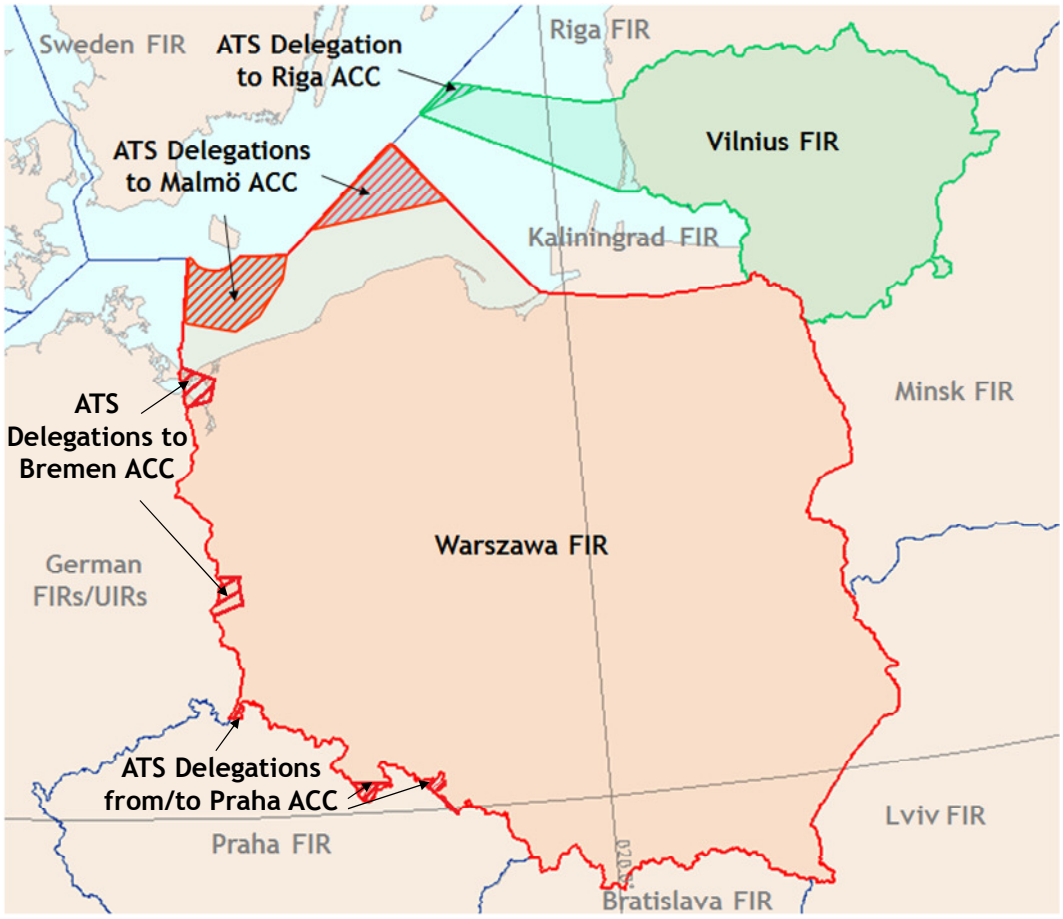

Figure 1: Existing ATC responsibilities in Poland and Lithuania

Area control services are provided from two Area Control Centres (ACCs): Warsaw, serving an area of 334,000 km^2, and Vilnius ACC, serving an area of 76,200 km^2. Both ACCs are responsible for both lower and upper airspace control. Polish airspace extends to FL460, whereas Lithuanian extends to FL660.

Radar approach control services are provided from seven Approach Control Units, at Warsaw, Gdańsk, Kraków (also serving Katowice), and Poznań in Poland and Vilnius, Kaunas and Palanga in Lithuania, and aerodrome control and non-radar approach services from Wrocław, Szczecin, Rzeszów, Łódź, Zielona Góra, and Bydgoszcz in Poland and Šiauliai in Lithuania.

The maximum number of sectors that can be open at busy periods is shown in Table 1. The eight sectors that can be opened at maximum configuration in Polish airspace are assembled from a combination of nine elementary sectors. The Lithuanian sectors are divided into two, vertically, with the boundary currently at FL335. Currently, the organisation of sectors between Lithuania and Poland respects country boundaries.

ATCC	Sectors
Warsaw ACC	8
Vilnius ACC	3

Table 1: En-route sectors currently open for civil traffic

2.2 Traffic Statistics

Together, PANSA and Oro Navigacija controlled over 774,000 flights and almost 370,000 flight-hours in 2009. This represents about 2.8% of the European total flight hours. The relative sizes of PANSA and Oro Navigacija are illustrated, on various measures, in Figure 2. PANSA controls approximately 90% of the combined IFR flight kilometres and around 88% of combined flight hours. On the other hand, the proportion of IFR flights controlled by Oro Navigacija is slightly higher, reaching 22% of all flights in the Baltic FAB airspace.

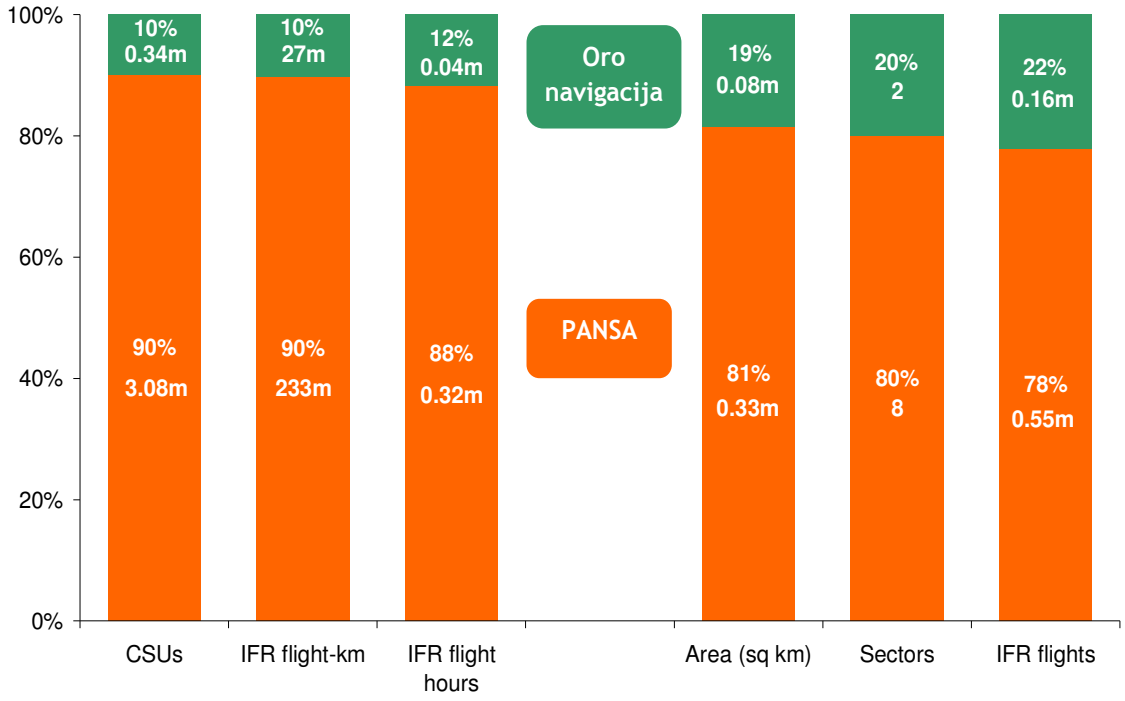

Figure 2: Relative sizes of PANSA and Oro Navigacija

Flows in the Baltic FAB region are highly diverse. Figure 3 gives an indication of the origins and destinations of the flows that arrive or depart from Baltic FAB airports. It is derived from a CFMU data base of all flights using Baltic FAB airspace in August 2009, but excludes over-flights, since they would make interpretation of the map too difficult.

The dominant flows comprise flows between Poland and countries to the west, Poland and countries to the south, and Polish domestic flights. Of the flows with origin or destination in Lithuania, the dominant flow is to the north (including to and from other Baltic States and the Nordic States).

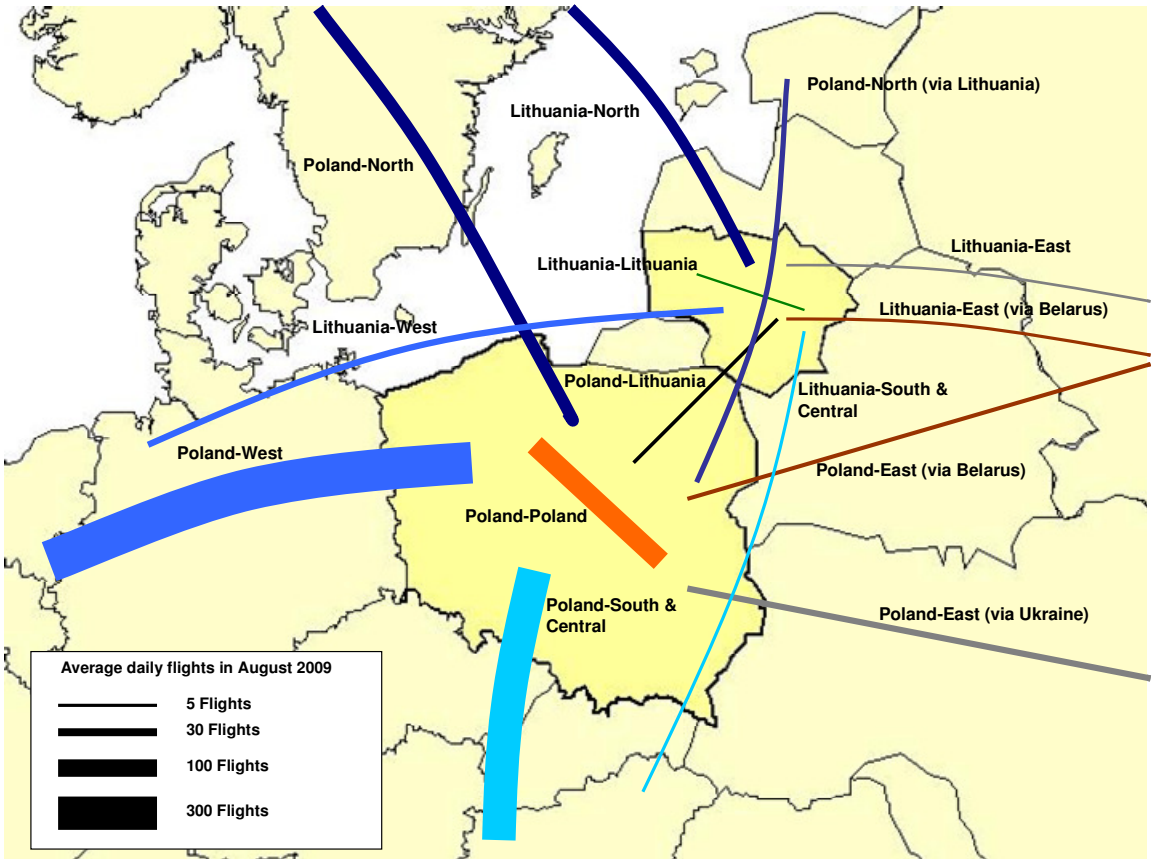

Figure 3: Origins and destinations of traffic using Baltic FAB airports

Figure 4 shows a different picture, derived from combining information from PANSA's and Oro Navigacija's data bases of flights for the whole of 2009. This picture includes over-flights, and shows the extent of cross-border flows. Each arrow has a width proportional to the traffic, and the percentage figures indicate the proportion of all Baltic FAB flights. The percentages do not therefore add up to 100%, since each flight could cross anything between zero (domestic flights) and four borders (if Poland, Kaliningrad and Lithuania are all over flown).

Interesting features of this pattern include the dominance of flows crossing the border with FAB CE. Flows over the two borders with Kaliningrad are, interestingly, almost as important as the Poland-Lithuania flow.

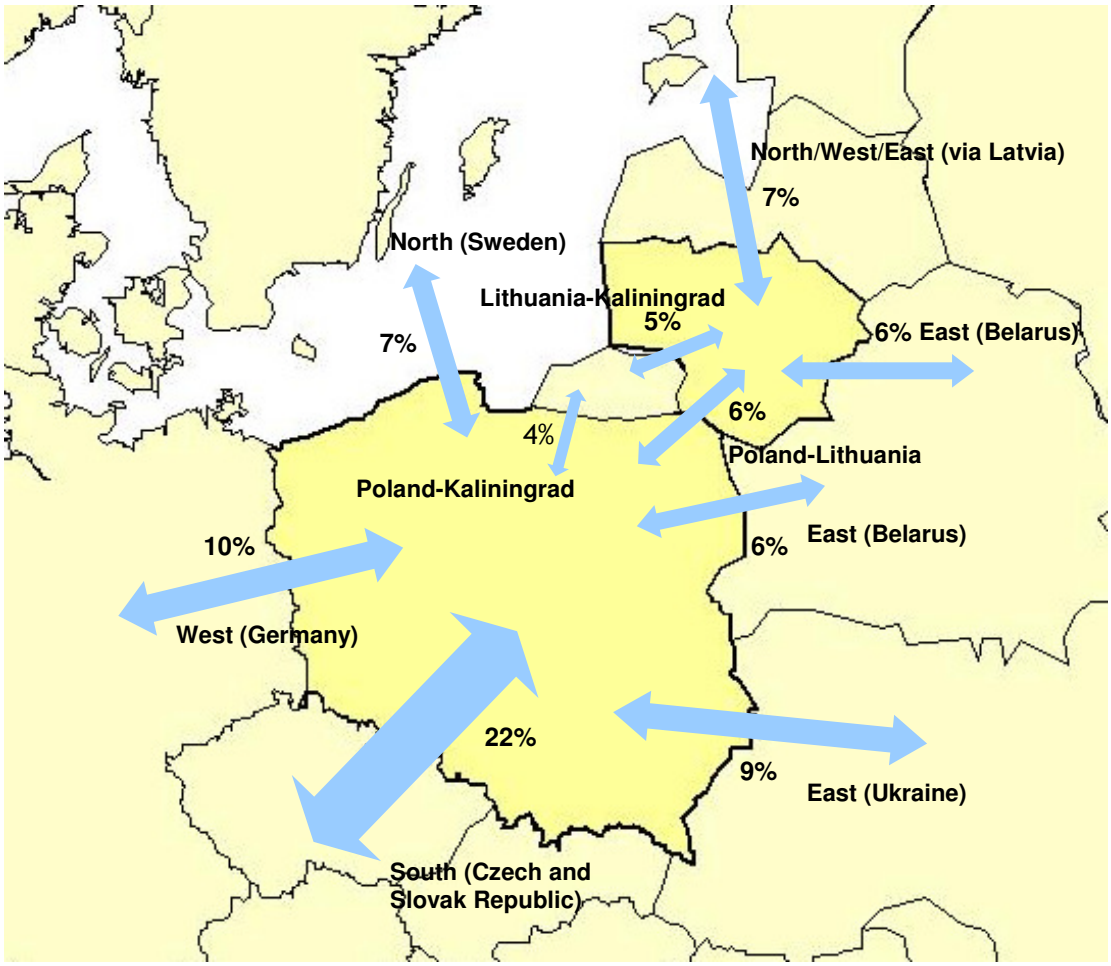

Figure 4: Cross-border traffic flows, 2009

Finally, Figure 5 below shows the geographical location of major traffic flows in joint airspace in two sample weeks in 2009. Similarly to previous picture, the width of the lines representing flows is proportional to the daily number of flights.

The traffic is dominated by two major flows in the east-west direction. The first major flow crosses the boundary with the German FIRs and also crosses the boundary between Warsaw and Vilnius FIR. Some of this traffic terminates in Vilnius TMA. The flow continues further to east through the boundary with Minsk FIR.

The second major traffic flow in east-west direction runs through Warsaw FIR and crosses the boundaries with Praha and Minsk FIRs. Some of this traffic arrives and departs from Warsaw TMA.

The seasonal variability[1] of traffic in Warsaw ACC and Vilnius ACC is about the same - 1.2 (ACE 2008). This is close to the European average.

[1] Seasonal variability is defined as the ratio of traffic in the peak month to average traffic.

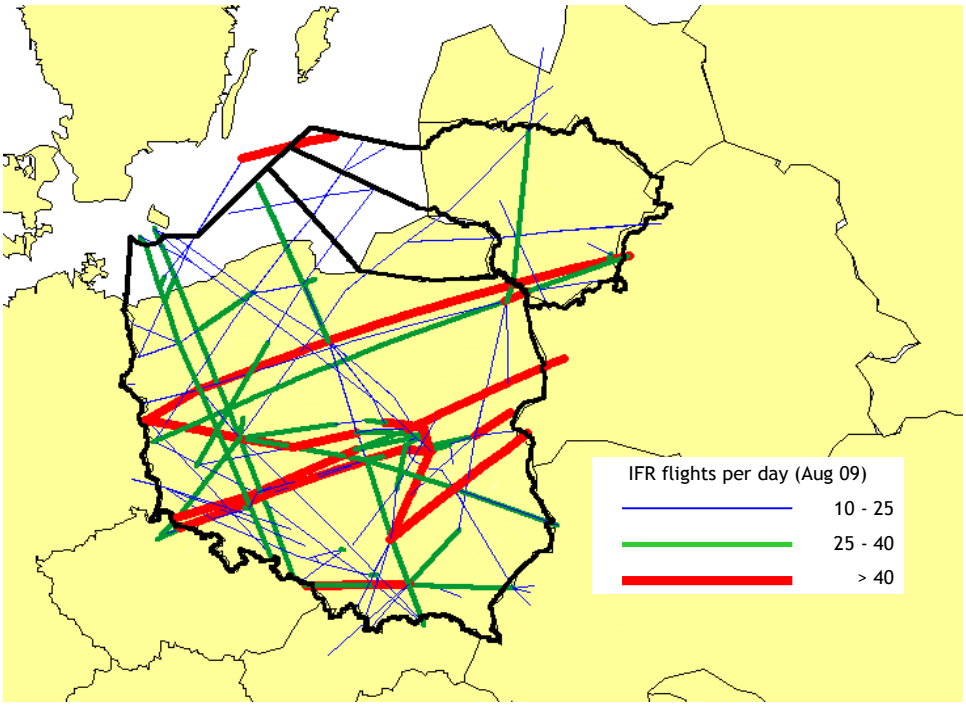

Figure 5: Traffic flows in the joint airspace in August 2009 (IFR flights)[2]

2.3 Airspace Management

2.3.1 Poland

In accordance with MOI Regulation on Polish airspace and detailed conditions of its use from 25 November 2008, the president of CAO is a decision-making authority in the High Level Airspace Policy Body. The ASM Committee is a joint civil-military advisory body responsible for creation of rules for ATM and airspace use by all users.

Strategic Planning Department of PANSA is a supporting unit responsible for preparing the analyses, proposals and documentation concerning Strategic Airspace Management (ASM Level 1).

With the agreement of PANSA and the military authorities, an Airspace Management Cell (AMC) is established to provide day-to-day management, temporary allocation of the airspace according to requests of the users and real time activation/deactivation of AMC manageable areas (Pre-Tactical (ASM Level 2) and Tactical airspace management (ASM Level 3)).

2.3.1.1 Strategic Airspace Management (ASM1)

Strategic Planning Department of PANSA is responsible for planning and modification of existing airspace structures and ASM procedures, enforcing proposals of changes concerning airspace assignment and utilisation and in ATS airspace classification.

[2] Based on analysis of CFMU flight data analysis from the period between 1 and 15 August 2009, including all arrivals, departures and overflights in Warsaw, Vilnius and Kaliningrad FIRs.

Other tasks of the Strategic Planning Department comprise:

- Providing analyses of the efficiency of airspace structures and routes usage;
- Preparing monthly statistics concerning airspace usage (TSA, CDR, etc);
- Performing periodic analysis of real utilisation of airspace structures (TSA, TRA, etc);
- Preparing air traffic flow forecasts;
- Planning and coordination of major events long before operation day (such as air shows, competitions, military exercises which require additional segregated or reserved airspace);
- Organising consultations/workshops with airspace users (multilateral);
- Annual review of airspace management and procedures at ASM level 1;
- Management of the route availability document (RAD);
- ENV database management;
- Periodical review of procedures and operational efficiency at ASM level 2 & 3;
- Participation in international ATM/ASM workshops (ASM-SG, RNDSG, TFA);
- Cooperation with EUROCONTROL, CFMU, RNDSG EUROCONTROL, RDGE ICAO.

2.3.1.2 Pre - Tactical Airspace Management (ASM2)

The Airspace Management Cell (AMC) receives requests for airspace usage from various civil and military users on the day before the proposed activity. The AMC resolves conflicting airspace requests and publishes an Airspace Use Plan (AUP) for the next day's operations. The AUP provides the activation schedule of AMC manageable areas. This may be updated with an Updated Airspace Usage Plan (UUP) upon amendment of user requests.

The AUP and subsequent UUPs are sent to the Centralised Airspace Data Function (CADF) of the NM. The CADF collates the AUPs of each AMC and publishes the European AUP (EAUP) to the Aircraft Operators.

2.3.1.3 Tactical Airspace Management (ASM3)

On the day of operations, the Airspace Management Cell receives a confirmation on real time usage of areas published in AUP/UUP or delays/cancelation and informs the appropriate ATS units from airspace users. It also reacts to any additional request related to serious incoherence of ATS routes or unexpected ATC problems.

2.3.2 Lithuania

A national ASM capability was established according to the Governmental Decree Nr. 38 of 22nd January 1997. ASM was later adopted in accordance with the requirements of the EUROCONTROL FUA concept, with the exception that for the

time being the AUP/UUPs are not sent to the NM (CDRs are not implemented within the Lithuanian airspace – see 2.9.2).

The ATM division is responsible for the airspace management in Lithuania (3 officers perform all duties related to ASM) as described below:

2.3.2.1 ASM level 1 (Strategic)

- Participates in the prohibited, restricted and danger areas draft preparation process;
- Creates temporary allocated areas, TSAs and SGZs drafts;
- Creates drafts of the appropriate agreements in regard of airspace use.

2.3.2.2 ASM level 2 (Pre-tactical)

- Collects and analyses applications/notifications;
- When necessary, coordinates the duration and scope of activity;
- Issues approvals for the activity within TSAs and SGZs;
- Provides SE „Oro Navigacija“ AIS unit with all relevant information, which is necessary to issue an appropriate NOTAM;
- Prepares and promulgates the information bulletins of the planned airspace restrictions to civil ATC and Lithuanian Air force units.

2.3.2.3 ASM level 3 (Tactical)

- Coordinates with appropriate users significant alterations of activity within the temporary allocated areas, TSAs and SGZs.

Note: Appropriate ATC unit conducts real-time coordination of appropriate activity (activation/de-activation etc.) with the temporary allocated areas, TSAs, SGZs and restricted areas users. This service is provided continuously, 24-hours a day.

2.4 Air Traffic Flow and Capacity Management

2.4.1 Poland

2.4.1.1 Co-operation with the Network Management Operation Cell (NMOC)

The Warsaw Flow Management Position is responsible for flow and capacity management for the Warsaw FIR in cooperation with EUROCONTROL NMOC.

On strategic level there are two meetings organised with Capacity Enhancement Function (DNM/EUROCONTROL) to prepare capacity plan for PANSA for next coming years including capacity targets. NE-Axis meetings (dedicated to plan ATFCM functions in the region) prepare detailed plans for a particular summer season or special events of the coming year.

Based on capacity targets agreed with DNM, the Capacity Manager in cooperation with FMP Manager and Chief of ACC Senior Controllers prepares a detailed capacity plan for Warsaw ACC which comprises capacity values for sectors, occupancy rates, sectors opening scheme, rostering system to manage traffic

demand and management procedures. A sector opening scheme for Warsaw ACC is delivered to the CFMU

During pre-tactical and tactical phases, the FMP use all ATFCM tools to monitor and protect ACC sectors in close cooperation with ACC Senior ATCOs.

2.4.2 Lithuania

2.4.2.1 Co-operation with the Network Management Operation Cell (NMOC)

Vilnius Flow Management Position (FMP) is responsible for the flow and capacity management for the Vilnius FIR in cooperation with EUROCONTROL NMOCaccording the Letter of Agreement between EUROCONTROL and SE Oro Navigacija. The Vilnius ACC published capacity exceeds the air traffic demand.

Vilnius FMP also has additional responsibilities for flight plan validation and liaison with airports briefing, ground handling service, military operators and CAA.

2.5 Air Traffic Services and Procedures

2.5.1 Poland

2.5.1.1 Aerodrome Control Services and Procedures

PANSA provides aerodrome control services at 12 aerodromes where IFR/VFR traffic is permitted.

ATS is provided H24 at:

- Warsaw (EPWA);
- Kraków (EPKK);
- Gdańsk (EPGD);
- Katowice (EPKT);
- Poznań (EPPO);
- Wrocław (EPWR);
- Rzeszów (EPRZ);
- Szczecin(EPSC);

and in dedicated periods of day at:

- Łódź (EPLL);
- Bydgoszcz (EPBY);
- Zielona Góra – Babimost (EPZG);
- Modlin (EPMO)

The geographical and vertical limits of each CTR and airspace classification are provided in AIP Poland. Services are assured from PANSA-owned facilities and equipment except for EPLL, EPMO and EPBY where the only rooms are rented from the airport

- Warsaw TWR is equipped with SMR and AMS2000Plus system displays on ADC and SUP positions.
- Kraków, Katowice and Gdańsk TWRs are equipped with PEGASUS_21 system displays at ADC positions.
- Poznań TWR is equipped with AIRCON system display at ADC position.
- Wrocław, Rzeszów and Szczecin TWRs are equipped with displays from local MSSR radar sites.

All above mentioned surveillance sources are used according to PANS-ATM Doc. 4444.

ATC procedures used by TWR Units and described in operational manuals are consistent with ICAO documents and EUROCONTROL manuals and specifications.

- Warsaw TWR works in the configuration of 3 positions maximum (ADC, GND, DEL) supported by a Senior Controller and an Assistant;
- Kraków TWR works in the configuration of 2 positions maximum (ADC, GND) supported by an Assistant;
- Rzeszów TWR works in the configuration of 2 positions maximum (ADC, DEL) supported by an Assistant;
- Gdańsk, Poznań, Wrocław, Szczecin TWRs work in the configuration of a single ADC position supported by an Assistant;
- Łódź, Bydgoszcz, Modlin and Zielona Góra TWRs work as SOP ADC only.

2.5.1.2 APP Services and Procedures

PANSA provides APP services in four major TMAs in Warsaw FIR:

- Warsaw APP for TMA Warsaw collocated with ACC in ATMC in Warsaw;
- Kraków APP for upper and lower sector of TMA Kraków located in regional centre at Kraków aerodrome;
- Katowice APP for lower sector of TMA Kraków located in regional centre at Katowice aerodrome;
- Gdańsk APP for TMA Gdańsk located in regional centre at Gdańsk aerodrome;
- Poznań APP for TMA Poznań and TMA Wrocław located in regional centre (ATC are also provided for Krzesiny AFB).

Geographical and vertical limits of each TMA including ATC sector descriptions and airspace classification are described in AIP Poland.

ATC procedures used by APP Units and described in operational manuals are consistent with ICAO documents and EUROCONTROL manuals and specifications.

- Warsaw APP uses AMS2000Plus System common with Warsaw ACC and Warsaw TWR.

- Kraków APP and Katowice APP use common PEGASUS_21 System.
- Gdańsk APP uses a standalone PEGASUS_21 System.
- Poznań APP uses a standalone Aircon System.

Because of limitation of ATM systems (no OLDI functionality) all coordination is done with adjacent ATS units by telephone.

- Warsaw APP works in the configuration of 3 sector maximum (2 APPs, DIR) supported by the Assistant and Senior ATCO.
- Kraków APP works in the configuration of 2 sectors maximum (APP, DIR) supported by the Assistant.
- Katowice APP, Gdansk APP and Poznań APP work in a single sector configuration (APP) supported by the Assistant.

2.5.1.3 En-Route Services and Procedures

PANSA provides en-route services in CTA of Warsaw FIR. The geographical and vertical limits of CTA including ATC sectors descriptions and airspace classification are described in AIP Poland.

Warsaw ACC, which is responsible for en-route services, is collocated with Warsaw APP and 2 FIS sectors in ATMC facilities.

ATC procedures used by Warsaw ACC and described in operational manuals are consistent with ICAO documents and EUROCONTROL manuals and specifications for GAT and based on ICAO documents, military regulations and respective LoAs.

Warsaw ACC uses a common AMS2000Plus System with Warsaw APP and Warsaw TWR. Because of limitation of regional ATM systems, all coordination is conducted with internal adjacent ATS units by telephone except for Warsaw APP.

System coordination with adjacent ACCs is performed using OLDI functionality (ABI, ACT, LAM messages) except for Kaliningrad ACC.

Warsaw ACC is configured for 9 elementary. . Depending on traffic demand it also uses collapsed sector configurations. The sector opening scheme is planned on the basis of traffic forecast and sector demand and managed on daily basis by ACC Senior ATCOs.

Detailed information concerning Regulatory, Service provision and Users role are described in LSSIP 2011-2015 Poland in Chapter 1.3.

2.5.1.4 Flight Information Service

PANSA provides en-route FIS in the Warsaw FIR. The geographical and vertical limits of FIS sectors, descriptions and airspace classification are described in AIP Poland.

The FIS structure consists of 5 sectors. Two are collocated with Warsaw ACC/APP in the ATMC. The others are divided between the regional centres and are collocated with APP sectors.

Procedures used by FIS and described in operational manuals are consistent with ICAO documents.

FIS collaborate very closely with AFIS (if established), ASM, ACC-OAT and AD Units.

2.5.1.5 Search and Rescue

In accordance with Article. 4 of the Polish Air Navigation Services Agency Act , the Agency will be responsible for coordinating search and rescue activities , while the military stakeholder will remain responsible for conducting search and rescue operations treated as a service.

At present MoD operates Aeronautical Rescue Co-ordination Centre (ARCC) located in Warsaw and a Maritime RCC is located in Gdynia on the Baltic Coast.

The ATM Supervisor located in the ATMC in Warsaw acts as the SPOC and passes all COSPASS/SARSAT messages to ARCC.

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2.5.1.6 Contingency arrangements

PANSA Contingency Plans have been developed for all ATM units: ACC, AMC, FMP, NOF, 4 radar APP units, 4 FIS units, 11 TWRs, 8 AROs and FPL processing unit. The units are divided into three groups according to their importance for the aviation sector: national, regional and local.

The responsibilities for actions, e.g plan activation, have been clearly allocated. Contingency arrangements contain communication and reporting scheme. Contingency Plans are subjects to updates when necessary.

Contingency arrangements are also reflected in ATM operational manuals which contain specific procedures for different degraded modes of operations. Technical contingency procedures describe technical staff actions to be performed for problem solving and repair even if built-in equipment redundancies are in place.

Contingency Plans documents form a part of PANSA integrated quality system and are subject to periodic reviews and audits.

At present, in the event of a catastrophic failure at the Warsaw ACC, the PANSA contingency arrangements are based on the combined use of the APP facilities at Kraków, Poznań and Gdańsk airport. This fragmented solution poses particular logistical difficulties in transporting ATCOs from Warsaw to the various locations. Additionally, it does not provide full coverage of Polish airspace.

This situation has been recognised as unsatisfactory and plans are in place to construct a purpose-built PANSA contingency facility.

2.5.2 Lithuania

2.5.2.1 Aerodrome Control Services/APP Services and Procedures

Oro Navigacija provides aerodrome control services at 4 aerodromes where IFR/VFR traffic is permitted. Services for CTR/TMA are provided by aerodrome control centres (ADCC).

ATS is provided H24 at:

- Vilnius (EYVI);
- Kaunas (EYKA);
- Siauliai (EYSA).

and in dedicated periods of day at:

- Palanga (EYPA).

In Vilnius, Kaunas and Palanga APPs are collocated with TWRs. In Siauliai APP services are provided by TWR. The geographical and vertical limits of each CTR/TMA and airspace classification can be found in AIP Lithuania.

In Vilnius, Kaunas and Palanga services are assured from Oro Navigacija-owned facilities and equipment except for EYSA where the building, facilities and equipment are owned by Lithuanian Air Force.

- Vilnius TWR is equipped with SMR displays on TWR and APP positions;
- Vilnius ADCC is equipped with Eurocat X system displays at TWR and APP positions;
- Kaunas ADCC is equipped with Czech-manufactured RADAS system at TWR and APP positions;
- Palanga ADCC is equipped with EUROCAT 200 at TWR and APP positions.

Siauliai ADCC provides procedural control only.

In Vilnius ADCC coordination with adjacent ATS units is supported by OLDI functionality.

Other ADCC coordination with adjacent ATS units is conducted by telephone.

All above mentioned surveillance sources are used according PANS-ATM Doc. 4444.

ATC procedures used by ADCC Units and described in operational manuals are consistent with ICAO documents and EUROCONTROL manuals and specifications.

- Vilnius ADCC works in the configuration of 2 positions maximum (APP, TWR) supported by a Supervisor and an Assistant;
- Kaunas ADCC works in the configuration of 2 positions maximum (APP, TWR) supported by a Supervisor;
- Palanga ADCC works in the configuration of 2 positions maximum (APP, TWR) supported by a Supervisor;
- Siauliai ADCC works in the configuration of a single TWR position supported by an Assistant.

2.5.2.2 En-Route Services and Procedures - General Air Traffic (GAT) and Operational Air Traffic (OAT)

In Lithuania, all traffic flying outside TSAs and except air policing missions is considered as GAT.

Oro Navigacija provides en-route services for GAT in CTA/UTA of Vilnius FIR. The geographical and vertical limits of CTA including ATC sectors descriptions and airspace classification are described in AIP Lithuania. En-route services are provided by Vilnius ACC.

ATC procedures used by Vilnius ACC described in operational manuals and are consistent with ICAO documents and EUROCONTROL manuals and specifications for GAT and based on ICAO documents,

Vilnius ACC uses a common Eurocat X system with Vilnius ADCC. All coordination with internal adjacent ATS units is conducted by telephone except Vilnius ADCC. System coordination with adjacent ACCs is performed using OLDI functionality (ABI, ACT, LAM messages) except for Kaliningrad ACC.

Vilnius ACC works in the maximum configuration of 3 ACC sectors. Each sector is manned with a radar controller and assistant positions. A reserve suite is installed for contingency purposes and can be used for ATC provision if required. Depending on traffic demand ACC sectors can be merged. The sector opening scheme is planned on the basis of traffic forecast and sector demand and managed on daily basis by the ACC Supervisor.

Provision of ATS to OAT

The Lithuanian airspace, along with that of its neighbours Latvia and Estonia, is used by NATO for military air policing missions. Procedures for coordination and responsibilities regarding OAT are promulgated in the respective LoAs with military authorities. OAT within TSAs and during AP missions outside TSAs is controlled by Military fighter controllers.

2.5.2.3 Flight Information Service

Oro Navigacija provides FIS in Vilnius FIR. Geographical and vertical limits of FIS sectors, descriptions and airspace classification are described in AIP Lithuania.

FIS provision structure consists of 4 sectors: Vilnius ACC, Kaunas ADCC, Palanga ADCC and Siauliai ADCC.

Procedures used by FIS and described in operational manuals are consistent with ICAO documents.

2.5.2.4 Search and Rescue

In Lithuania, Oro Navigacija is responsible for SAR coordination. The service is provided from an ARCC control room adjacent to the Vilnius ACC and is staffed by six people. The ARCC is equipped with state-of-the-art technology that enables Oro Navigacija to fulfil this responsibility in accordance with international standards.

2.5.2.5 Contingency arrangements

The contingency arrangements for Vilnius ACC are conceptually similar to the PANSA solution. Area radar services would be provided from Kaunas ADCC where a reserve ACC OPS room is established. Capacity for the reserve ACC is limited to 30 aircraft/hour and sector capacity is limited to 15 aircraft/hour.

The reserve ACC can work with a maximum configuration of 2 ACC sectors. Each sector is equipped with a radar controller and an assistant position.

However, in the event of a Vilnius ACC evacuation or prolonged systems failure, it would be necessary to relocate qualified area radar controllers to provide a service from Kaunas, posing the same requirement for a more effective solution.

2.6 Communication, Navigation, Surveillance (CNS)

2.6.1 Poland

2.6.1.1 ATM System

One of the most limiting elements of ATM/CNS infrastructure in Poland is the current ATM system responsible for Radar Data Processing (RDP) and Flight Data Processing (FDP). The Warsaw ACC currently still operates with the AMS2000+ System commissioned from Northrop-Grumman in 1993 (and upgraded in 2000) and although it has been upgraded since, the system no longer fulfils the operational requirements. The capacity of the databases is close to the limits and the system does not allow for vertical split of the sectors which limits further increase of en-route capacity. The ACC operates at its operational maximum during peak periods and at times of high traffic, the service may start to deteriorate very quickly which results in a significant increase of delays. Implementation of several important functionalities, that are mandated or foreseen by the European regulations, is also not possible with the current system. According to the PRC's PRR 2009 report[3], Warsaw ACC was the worst performing ACC with 225 days when the average en-route ATFM delay exceeded 1 minute and 96.3% of the delay was due to constraints in ATC capacity & staffing. The increase in the delay was 10.1% compared to 2008 (while the traffic decreased by 8%) which represents the highest delay increase in Europe.

In September 2008 PANSA procured a new ATM system for all ACC and APP units from Indra. The system is called Pegasus_21[4]. According to the Polish LSSIP[5], it is foreseen "*that the implementation of the new system could double the sector capacity of the airspace in Poland and also enable airspace re-sectorisation, increasing air traffic safety and reducing traffic delays*." The new system will allow for more extensive automation of processes, resulting in an increase in ATCO productivity with a consequent impact on cost-effectiveness.

[3] PRR 2009, Performance Review Report, An Assessment of Air Traffic Management in Europe during the Calendar Year 2009, May 2010, EUROCONTROL.

[4] Polish Enhanced Generation ATC System for Unified Solutions of 21st Century.

[5] Local Single Sky Implementation (LSSIP) POLAND, Years 2010-2014 Level 1, EUROCONTROL.

Many objectives from E/LSSIP can be achieved through Pegasus implementation. These include:

- Implementation of Safety Nets Level 2 functionalities, such as Short-term Conflict Alert (STCA), Minimum Safe Altitude Warning (MSAW) and Approach Path Monitor (APM);
- Implementation of automated controller tools, such as Medium Term Conflict Alert (MTCD) or Monitoring Aids (MONA);
- Implementation of ground-ground automated coordination processes: In the new Pegasus system, all OLDI messages will be implemented;
- Together with an extended network of DMEs and improved communications coverage, Pegasus_21 allows the implementation of improved ATS Route Network v6 that is aimed to bring significant flight efficiency improvements;
- Supply ETFMS (Enhanced Tactical Flow Management System) with Standard Correlated Position messages;
- The new Pegasus_21 system will have ADS-B and datalink capability, although there is currently no operational need for ADS-B. Limited use of some data-link services is foreseen in the near future;
- The implementation of Pegasus_21 is taking place in two phases:
- At Katowice, Kraków and Gdańsk APPs the system was commissioned in April 2010; and
- The ACC version of the system (ATM-C Warsaw) and its integration is currently in progress. All integration processes should be finalised at the beginning in the Q3 2011 and the system is planned to be implemented operationally in Q4 2011.

2.6.1.2 Communication

Poland has good communications coverage through its radio sites network in 28 locations (owned or rented). Additional radio stations are needed to complete implementation of mandated 8.33 kHz channel separation above FL195 (and in the future also below FL195), for which the location of radio stations is more important. There are three radio stations plus one contingency station for one ACC sector. There are 18 designated radio stations to meet the ACC civil/military requirements:

- 9 radio stations in VHF bandwidth;
- 9 radio stations in UHF bandwidth.

ACC is also equipped with seven Rohde-Schwarz radio stations with double bandwidth, 8.33 kHz channel spacing and automatic emergency receivers for 121.50 MHz and 243.00 MHz

Radio sites are connected to eight Voice Communication Systems (VCS) located in Warsaw, Gdańsk, Kraków, Katowice, Poznań, Wrocław, Rzeszów and Szczecin. There are 12 digital connection links between PANSA ATS Units. The development of the communication systems is necessary due to an increased

amount of transferred data and the need for system reliability and safety improvement.

The VCS in Gdańsk, Kraków, Katowice and Szczecin are ready to migrate to QSig digital signalling. Modernisation of VCSs in Warsaw, Poznań, Wrocław and Rzeszów is planned. Several improvements to communications networks are already ongoing by PANSA and are directly linked to the implementation of the new ATM system

2.6.1.3 Navigation

PANSA has implemented RNAV 5 (previously called B-RNAV) in en-route airspace. In the near future, when more users are equipped with the required avionics capabilities, Poland will be required to implement RNAV 1 (former P-RNAV). Today, only around 10% of Polish airspace is covered with a signal meeting the RNAV 1 criteria.

PANSA currently operates 10 Doppler VOR/DMEs (DVOR - three of them located at airports), nine conventional VOR/DMEs, one VOR and three DME which support en-route navigation. In addition to these, there are 11 ILS/DMEs at airports.

While a signal from both VOR and DME within the predefined distance is available throughout Poland (with sufficient redundancy), there are many gaps in DME/DME coverage which will be required to support GNSS in the future. To achieve a full DME/DME coverage in Poland, the extensive investments in the additional DME network is required. Procurement of the additional DMEs to improve the coverage is planned in the coming years. There are 10 new DVOR/DME planned to be placed at or near airports to provide en-route RNAV operation as well as non-precision approaches. Nine new standalone DMEs are foreseen as required to fill DME/DME coverage. In parallel, the navaids rationalisation process is ongoing which will replace eight existing VOR/DMEs with DMEs.

PANSA implemented RNAV 1 SIDs and STARs within TMA Warsaw on 17th December 2009 and is planning RNAV implementation in Gdańsk, Poznań and Kraków TMAs.

The supporting infrastructure consists of three DVOR/DMEs supporting terminal applications, five VOR/DMEs and 12 NDBs.

Procedures

Precision Approach (PA) procedures supported by Instrument Landing System (ILS) have been published at Warsaw, Bydgoszcz, Gdańsk, Kraków, Katowice, Łódź, Poznań, Rzeszów, Szczecin and Wrocław.

Seven airports have published Non-Precision Approach (NPA) procedures using NDBs (only Kraków has published procedures to both runway ends) and five airports have also published VOR/DME NPA procedures (Łódź has only procedures to one runway end, all other airports have both ends equipped). PANSA has begun replacing the old ILS/DMEs Additional DVOR/DMEs planned for airports are to enable VOR/DME NPAs procedures for every runway end at every international airport. In addition, PANSA has started the implementation of APV approaches at selected airports.

2.6.1.4 Surveillance

Radars are currently the only source of surveillance data in Poland. PANSA operates seven Primary Surveillance Radars (PSRs), one Primary Surface Movement Radar (SMR) and 11 Monopulse Secondary Surveillance Radars (MSSRs). PANSA also cooperates with the Polish Army, Oro Navigacija and DFS (the German ANSP), and uses data from their radars in Krzesiny, Poznań, Vilnius and Neu Brandenburg. PANSA also cooperates with LPS, the Slovak ANSP, to exchange radar data.

Almost 100% of Warsaw FIR is covered by secondary radars with sufficient redundancy - double or triple coverage from SSRs (except for north-eastern and south-eastern part of the FIR where only single coverage is available). In the terminal areas where radar APP service is provided, there is coverage from both primary and secondary sources of surveillance (PSR and MSSR). PANSA has begun a radar modernisation programme for their radars. The procurement for Warsaw, Poznań and Wrocław has already started with other radars to follow. The radars that are not obsolete will be modernised and upgraded to Mode S. The old Wrocław radar will be relocated to NE Poland and also upgraded to Mode S. This step will improve the radar coverage in this area and will enable a withdrawal of the old radar in Pułtusk.

The technical maintenance of radars is coordinated from the Warsaw Technical Surveillance Centre (located in the ACC). Where primary radars are used in the TMAs, the expert technical staff members specified in surveillance are located in the region providing ongoing supervision and monitoring 24 hours a day. In other centres, the general CNS technical staff members are responsible for radar supervision.

As far as distribution of radar data is concerned, PANSA has recently decided to develop a modern, future-proof and field-proven surveillance infrastructure and enhances its existing radar technology by installing a country-wide surveillance network, the PANSA RAdar NETwork (PRANET). PRANET, mainly used for civil purposes, aiming for increased availability of surveillance data throughout the country, has been installed in a redundant architecture.

PANSA has also implemented the Central RMCDE (Radar Message Conversion and Distribution Equipment) Monitoring and Control System accomplished by a Radar Monitoring Display, Radar Data Recording & Replay system and the RAPS-

3, the only EUROCONTROL qualified ASTERIX test and evaluation tool. The project was completed in 2009, by installing last RMCDE nodes in Poznan.

The PRANET system for distribution of radar data is based on EUROCONTROL standards and in the future, it will enable the creation of a contingency plan for ATS provision in the Warsaw FIR. At the moment, there is no contingency alternative including procedures, access to radar data, radio-communication and backup systems available in other ATS Units. The PRANET thus provides an important enabler for future backup of the whole ATS system in Poland.

Warsaw airport will implement A-SMGCS Level 2 in the next 2-3 years. This system will be used for wide area multilateration (WAM) in the future. WAM is also being considered for Krakow TMA and also in other parts of Poland, although it will be used as a complementary means of surveillance to the existing radars.

2.6.2 Lithuania

2.6.2.1 ATM Systems

Lithuania operates a number of different systems. Vilnius TWR/APP and ACC are equipped with EUROCAT X, purchased in 2005. The systems are planned to be upgraded or replaced around 2015. The system is continuously upgraded; for example an implementation of Safety Nets STCA function was assessed according to Level 2 and the following modifications are planned in the coming period:

- Compliance with the Area Proximity Warning Level 2 requirements;
- Compliance with the Minimum Safe Altitude Warning Level 2 requirements;
- Approach Path Monitor Level 2 planned to be assessed against Level 2 requirements in 2011;
- The feasibility study for the FASTI Tools and assessment will be conducted in 2011 and the plan for the implementation will then be proposed (currently there is a track conflict detection based on Radar track only).

There are plans for stepped implementation of ground-ground ATC coordination procedures in accordance with EC Regulation 1032/2006. Some requirements related to flow and capacity management (for example processing of flight plan messages in ATC Data Exchange Presentation (ADEXP) format) will be implemented by the end of 2012 during the upgrade of the system. Message Handling Service (AMHS) has been operational since March 2010.

Both the TWR/APP and the contingency centres in Kaunas are equipped with Czech-manufactured RADAS systems, installed in 2009. Palanga APP operates a EUROCAT 200 system that was purchased in 1995, an older generation of the system used in Vilnius. A replacement of the system in Palanga is planned for 2011/2012.

Future cooperation with PANSA will be a paramount consideration in any future decision on systems; only limited cooperation is currently available according to a bilateral agreement.

2.6.2.2 Communications

Oro Navigacija has achieved 8.33kHz channel spacing, although it does not currently have an operational requirement for this (radio equipment is operating in 25kHz mode). The conversion to 8.33kHz for operational use will be undertaken at a regional level.

Work on air-ground data-link activities has only just started with a plan to start the commissioning of this service in 2013.

The procurement contract of an AFTN/AMHS system for aviation messaging was signed in 2010 and AMHS is currently being implemented. Oro Navigacija also procured a new Voice Communications System in 2005 and it was upgraded to ATS Qsig digital signalling for ground telephone applications in 2009.

Oro Navigacija will fully migrate to ground international or regional X.25 data networks to the Internet Protocol by the end of 2011. Currently the physical data channels are point–to-point leased lines; once in PENS, both infrastructures will be used to exchange data. All networks of Oro Navigacija are operating in IPv4.

The data network currently used for communications and surveillance data is illustrated in Figure 6. The system is redundant, and has five nodes and uses optical data links. The system enables provision of ATC services from any ATC centre; there are also plans to connect this system up to neighbouring ANSPs. The network has a capacity of 10Gbit/s, which is more than enough for Oro Navigacija's requirements (currently only 20% of the network's capacity is used).

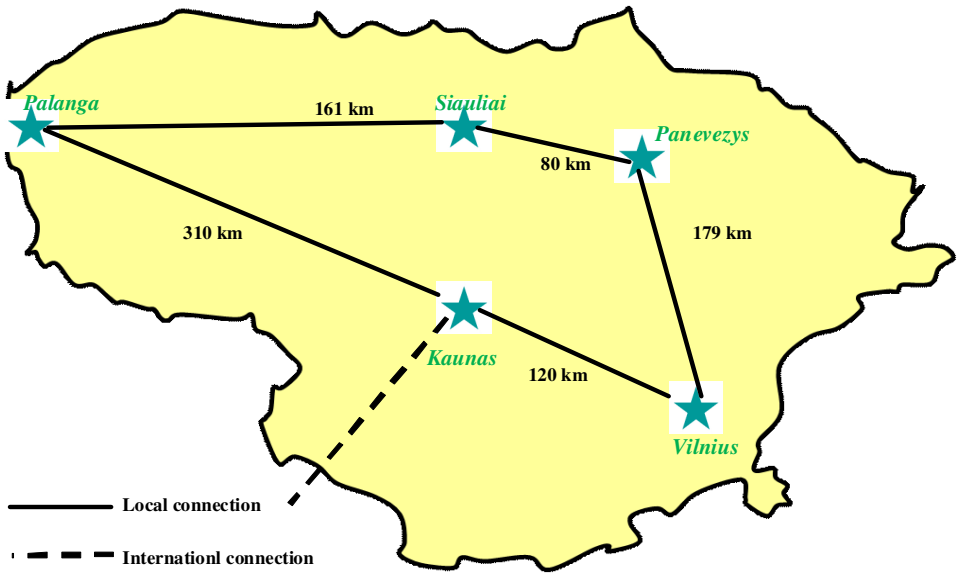


Figure 6: Optical data network in Lithuania

2.6.2.3 Navigation

A range of navigation aids are installed at each airport. Specifically:

- **Palanga:** VOR/DME, NDB and ILSs are installed at Palanga. The ILS was replaced in 2004; DVOR and DME replacement is planned for 2011;
- **Kaunas:** VOR/DME, NDB, ILS and ADF are installed at Kaunas. One ILS was replaced in 2011 and other replacement is planned for 2014;
- **Vilnius:** A complete modernisation of NAVAIDs was completed in 2006. The airport is equipped with DVOR/DME, NDB, ILS and ADF systems.

In Lithuania RNAV 1 (former P-RNAV) implemented SIDs and STARs within Vilnius TMA on 13 October 2004 and Palanga TMA on 26 August 2010. RNAV 1 implementation in Kaunas TMA will take place in May 2012. RNAV 1 is based on GNSS only, so DME/DME back-up is not available. Additional DMEs are required in the Vilnius TMA to be implemented until 2016.

2.6.2.4 Surveillance

Palanga, Kaunas and Vilnius airports have been recently equipped with new PSRs and MSSRs. All radars are already operational and MSSRs are Mode S capable, although this capability is not currently used as it is not operationally required. All radars are supplied by Indra Sistemas.

In order to improve the availability of services and enable greater contingency, a data network connecting all sites is currently being developed and implementation is planned between 2010 and 2013.

Surveillance data is also shared with the ATC centres of neighbouring ANSPs, with radar data-links feeding data from Gdansk to Vilnius and from Vilnius to Warsaw.

At Vilnius airport Oro Navigacija will commission SMGCS in 2011 and will upgrade this in 2012 to A-SMGCS Level 2, with the installation of an MLAT system.

2.7 Meteorological Services

Metrological services are outsourced in both countries from national meteorological agencies.

2.8 Aeronautical Information Services

Both ANSPs have similar, established AIS units responsible for the collection and distribution of aeronautical information received from data originators within the respective countries and both AIS provide data to the EAD.

2.8.1 Poland

2.8.1.1 AIS

PANSA AIS produces the following publications:

- **AIP Poland**: published in accordance with the requirements of Annex 15 and containing information on the civil controlled airports, Aeronautical Circulars (AIC) and Supplements (SUP).
- **AIP VFR**: containing information about other civil airports and airfields not included in the AIP Poland and Supplements (SUP).

- **MIL AIP**: Containing information about the military provisions, airports and Supplements (SUP).
- **Aeronautical Chart of Poland**: ICAO 1:500 000 in four versions.
- **Pre-flight Information Bulletins (PFB)**: available in 5 locations
- **NOTAM**: published in 4 English and 4 Polish language versions.

All the AIPs, including maps, and the Aeronautical Chart of Poland are produced from a system allowing collection of data from one AIS database. This database is also the only source of data for all other ATM systems and European Aeronautical Database, where they are transmitted by direct electronic connection. For appropriate data consistency across all AIS products and ATM systems used in PANSA are then archived. Unnecessary manual rewriting of the same data to different systems is also avoided.

Software used to design the SID, STAR and Instrument Approach Procedures also uses AIS data stored in the same AIS database and allows to encode them. The requirements of EC Regulation 73/2010 concerning the transmission of data through a direct electronic connection without rewriting them manually are then met. PANSA is also planning to implement a similar software that will allow a direct reception of aeronautical data from other data originators (in particular the Airport Operators) in 2012. NOTAMs and Preflight Information Bulletins are issued by PANSA from EAD terminals called ECIT.

2.8.1.2 Flight Design Procedures and Obstacle Analysis

PANSA Instrument Flight Procedure Design and Obstacles Analysis Department is responsible for providing instrument flight procedures in Terminal Airspaces within the Warsaw FIR. This includes: SID procedures, STAR procedures and IAP (instrument approach procedures). In some cases STAR procedures are in form of arrival routes (which are published in Area charts).

Designing of the procedures and their maintenance/support in operation is now provided for all controlled aerodromes in Poland (EPBY, EPGD, EPKK, EPKT, EPLL, EPMO, EPPO, EPRZ, EPSC, EPWA, EPWR, EPZG).

IFP implemented in Poland are mostly based on conventional navigation. According to navaids available at particular aerodromes the following types of IFP are in operation: NPA based on NDB, VOR with support of DME and NPA LOC which are overlays of PA ILS procedures. Precision approaches are available at all above mentioned aerodromes except EPMO and EPZG on basic RWY directions. At EPWA, which is the only controlled aerodrome with more than one RWY, ILS systems are installed at RWY 11 and 33. All ILS systems works in Cat I, only at EPWA ILS supports Cat II operations.

SIDs and STARs (arrival routes) are also conventional with the exception of TMA Warsaw where P-RNAV SID and STARs are available based on DME-DME sensor.

Maintenance and support is provided for all published instrument flight procedures. According to the current information about obstacles, the parameters of the procedures are accordingly verified and, if change is necessary, published in NOTAMs. PANSA also provides evaluations of the influence of temporary obstacles (which are planned for erection in the vicinity of controlled aerodromes)

on operationally introduced IFP. These evaluations are utilised by CAO on the obstacle location approval process.

In the IFP designing process and obstacle evaluation process PANSA utilises a professional computer tool connected with aeronautical database supporting everyday tasks.

2.8.2 Lithuania

2.8.2.1 AIS

The AIS of Oro Navigacija produces the following publications:

- **AIP Lithuania**: published in accordance with the requirements of Annex 15 as Integrated Aeronautical Package in PDF format and paper's version.
- **AIP VFR**: containing information about other civil airports and airfields not included in the AIP Lithuania and Supplements (SUP) in PDF format and paper's version.
- **MIL information**: Containing information about the military provisions, airports and are published as AIP Supplements (SUP).
- **Aeronautical Chart of Lithuania:** 1:500 000.
- **Pre-flight Information Bulletins (PIB)**: available in four briefing offices from EAD and "UBITECH" NOTAM DB.
- **NOTAM**: published series A in English and series B in Lithuanian languages.

All the AIPs, including maps, and the Aeronautical Chart of Lithuania are produced from a system allowing collection of data from one AIS database.

Software used to design the SID, STAR and IA also uses AIS data stored in the same AIS database and allows to encode them. The requirements of EC Regulation 73/2010 concerning the transmission of data through a direct electronic connection without rewriting them manually are then met.

2.8.2.2 Flight Design Procedures and Obstacle Analyses

In Lithuania Instrument Flight Procedure Design is a part of Airspace management service under responsibility of the ATM division, which provides instrument flight procedures in controlled airspace within Vilnius FIR/UIR. AIS personnel are involved in the process only when necessary.

Instrument Flight Procedure Design includes creation of SIDs, STARs, IA and appropriate flight procedures. Design of the procedures and their maintenance/support in operations is provided for all controlled aerodromes in Lithuania (EYVI, EYKA, EYPA and EYSA).

Instrument Flight Procedures implemented in Lithuania are mostly based on conventional and RNAV navigation. According to navaids available on particular aerodromes the following types of Instrument Flight Procedures are in operations: non-precision approach based on NDB, VOR, LOC and RNAV, and precision approach based on ILS. SIDs and STARs in EYVI and EYKA are based on RNAV (GNSS supported with VOR/DME). There are also established conventional departure and arrival flight procedures.

2.9 Civil-Military cooperation and procedures

2.9.1 Poland

According to the 'Polish Aviation Law' of 3rd July 2002, there are either civil or military ATS units in Poland to provide ATC service.

Military Air Traffic Service (aerodrome control, aerodrome flight information service) is provided ***solely*** to Polish military aircraft since they are not compliant with ICAO requirements. The military is not a service provider to GAT; the GAT service provision is solely PANSA's responsibility. Since 19th May 2006, FIS provides Flight Information Service and Alerting Service in airspace from GND up to FL 095 (Class G), which is outside CTRs, TMAs, MATZ, active TSAs, D, R and P zones for all airspace users in this area of responsibility.

Procedures for the national airspace of Poland have been developed taking into account ICAO, NATO standards and EUROCONTROL regulations. The implementation of FUA regulations and the transition to current EU requirements is complete.

In peacetime, the management of Polish airspace functions is carried out by the Minister of Infrastructure. During wartime or a state of emergency, in accordance with the 'Aviation Act', the Minister of Infrastructure and the Minister of Defence define the rules for handling the functions to the Minister of Defence, considering the rules of co-operation between national Air Traffic Management Authorities with relevant military services. The Minister of Defence realises all responsibilities relating to state security through appropriate executive bodies. Military Air Traffic Service Office (MATSO) is the main military body taking overall responsibility regarding to ATM, playing the supreme role in management and supervision of air traffic services in Polish Armed Forces.

MATSO cooperates with PANSA and other Polish civil aviation organisations. The main objective of this cooperation is the delegation of Air Traffic Management Authority to Military Authorities in times of war or crisis. PANSA draws up and concludes the Letters of Agreement with Military Air Traffic Services Units for as well as with The Air Force Command of the Armed Forces of the Republic of Poland. Those Agreements specify the procedures to be applied concerning military air operations, exchange of operational data, flexible use of airspace, flight planning, and support operation of the Airspace Management Cell.

To authorise and regulate best practices concerning ASM, a Letter of Agreement between PANSA and the Military Air Traffic Control Command has been developed.

2.9.2 Lithuania

The Lithuanian military do not provide ANS in Lithuania. All services are provided by Oro Navigacija.

Procedures for the national airspace in Lithuania have been developed taking into account local, ICAO, and NATO standards as well as EUROCONTROL regulations. The implementations of FUA regulations and adjustments process started in 2001, when integrated a civil-military air traffic management system was established (ATMAS project).

The arrangements for military activity in Lithuanian airspace are defined in two letters of agreement:

- According the „Letter of Agreement between HQ AIRNORTH and Estonia, Latvia and Lithuania“, Air policing functions within the airspace of three Baltic States are performed by NATO aircraft from Siauliai military base (approximately 96% of all Tango Scramble flights are conducted within the Vilnius FIR).
- The Letter of Agreement between The Lithuanian Army and SE “Oro Navigacija” describes the arrangement for different military functions within the airspace of the Republic of Lithuania are performed by Lithuanian Air force aircraft.

The concept of FUA and other civil-military cooperation or associated procedures in Lithuania are applied by ATM division.

2.10 Military air traffic services in each country

2.10.1 Poland

2.10.2 Military air traffic services (ATS) in Poland are confined to aerodrome control and aerodrome flight information serviceat the various military airfields. All military flights in controlled airspace (CTA) are considered as GAT and are subject to ATC from PANSA ACC/APP units. OAT dedicated missions (air-to-air refulling, split/join up, test flights) are conducted in segregated areas and servise provision is respective AD Unit responsibility but not ATS. Lithuania

There are no military ATCOs in Lithuanian Air Force (LAF). Civilian ATCOs provide ATS to all flights at the military aerodrome (Siauliai). In controlled airspace all military flights are considered as GAT. OAT flights are controlled in special activity areas by military air defence officers who are not authorised to provide ATS.

2.11 Temporary Segregated Areas

2.11.1 Poland

There are a number of Temporary Segregated Areas (TSAs) in Poland, the most heavily used of which are parts of TSA 02 to the north-east of the country. The TSAs are divided into segments to ensure the flexible use of airspace though restricting access only to those areas required by the particular exercise being conducted. FUA procedures for the reservation of these areas are well established and are managed by the AMC Poland. Users are required to book the areas in advance and, when active, only aircraft belonging to the user are permitted within the airspace. The unit operating the exercise aircraft is responsible for advising AMC Poland as soon as they start using specific TSA.

2.11.2 Lithuania

There are three TSAs (designated 3, 4 and 5) in Lithuania dedicated to the NATO and Lithuanian Air force tasks. TSA 4 and TSA 5 are the most heavily used ones. TSA 5 coincides with Siauliai TMA boundaries (the NATO and Lithuanian air force base is located at Siauliai aerodrome). Military aircraft departing from and arriving

to Siauliai aerodrome are controlled by civil ATCO with the exception of QRA missions.

GAT flights through the active TSAs are available tactically upon a request from the pilot-in-command. The clearance (coordinated with the military unit) is given by a civil ATCO. There is currently no plan to formally implement CDRs within the Lithuanian airspace.

There are also three more TSAs (designated 1, 2 and 6), which are dedicated to the different general and sport aviation tasks.

Activity within TSAs is subject to advance information. FUA procedures for the booking of all TSAs are well established (according to the appropriate LoAs) and are managed by the ATM division.

3 FAB ANS Concept

3.1 Baltic FAB Vision

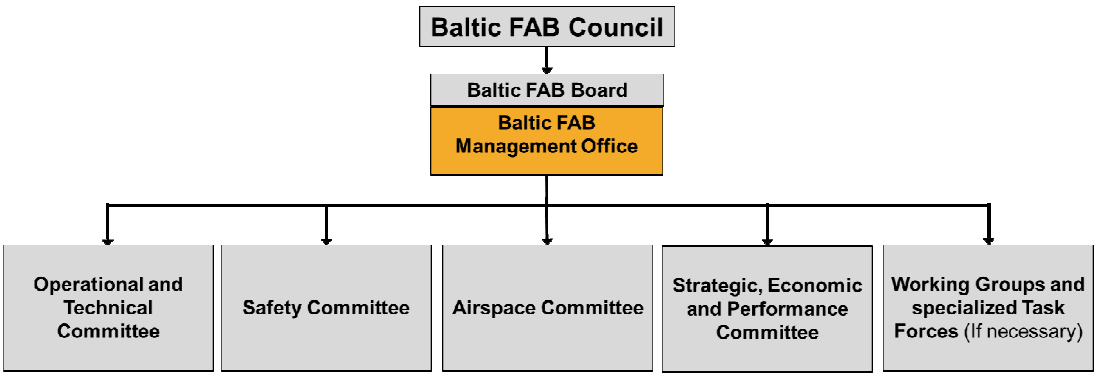
The Baltic FAB vision relies on the underlying principles of flexibility, standardisation and partnership between stakeholders, and on the availability of a realistic set of components capable of responding to the various requirements of the ECAC region.

The Baltic FAB Strategic Committee has selected the "partial integration" alternative of contractual cooperation ANS provision model for the Baltic FAB which assumes that:

- The designated Baltic FAB ANS service providers will continue to provide ANS/ATM services in the FAB airspace;
- En-Route ATS will be provided from the two existing ATM centres in Vilnius and Warsaw, jointly operating in the Baltic FAB;
- Terminal ATS will be provided by respective ATS Units of PANSA and Oro Navigacija;
- Further development of Baltic FAB airspace structures will be conducted in close cooperation with neighbouring States and FAB initiatives;
- Routes will be progressively optimised through the introduction of Free Route Airspace and other initiatives.

3.2 Organisation

The diagram below shows the management structure for Baltic FAB governance.



The Airspace Committee of the Baltic FAB (*Ref. "Agreement on the Establishment of the Baltic Functional Airspace Block between: The Republic of Lithuania and The Republic of Poland" and "Terms of Reference of the Baltic FAB Airspace Committee"*) shall be responsible to the FAB Board for all issues related to the airspace of the Baltic FAB.

Specifically, the Airspace Committee shall be responsible for:

- Analysis of recommendations for modification of the common legal and regulatory basis for the establishment and/or modification;
- Allocation and utilisation of airspace structures across national borders within the Baltic FAB boundarie;
- Provision of recommendations about the required changes to the Board and the Council of the Baltic FAB and, together with the body nominated to perform the network management and design functions, ensure collaborative airspace and route planning and design.

Recommendations provided by the Airspace Committee for consideration by the FAB Board shall include:

- Development of the civil and military cooperation in the field of ASM;
- Agreements on the common design and policy for the airspace concerned
- Cooperation on the application of the Flexible Use of Airspace;
- Arrangements for the provision of air traffic services in the airspace concerned and ensure the consultations involving ANSPs, airspace users and other stakeholders where appropriate.

(Ref. "Agreement on the Establishment of the Baltic Functional Airspace Block between: The Republic of Lithuania and the Republic of Poland" and "Terms of Reference of the Baltic FAB Airspace Committee").

The operational and Technical Committee of the Baltic FAB (*Ref. "Agreement on the Establishment of the Baltic Functional Airspace Block between: The Republic of Lithuania and The Republic of Poland" and "Terms of Reference of the Baltic FAB Airspace Committee"*) shall be responsible to the FAB Board for all issues related to the operational, technical, environmental and human resources issues of the Baltic FAB.

Specifically, the Operational and Technical Committee shall be responsible for:

- Working towards common technical systems and the cost-efficient deployment of infrastructure for the provision of CNS services by joint designing, purchasing, deployment, operation and maintenance of CNS infrastructure, systems and equipment;
- Implementation of common operational concept;
- Coordination of contingency plans;
- Cooperation in ancillary service provision;
- Operational performance assessments;
- Coordination of HR issues;
- Coordination of the provision of AIS;
- Common agreements on ASAR/SAR systems are concluded allowing cooperation to the most practical extent;
- Environment assessments.

In order to take into account all civil and military issues and requirements regarding the use of the Baltic FAB airspace, the appropriate civil and military representation is ensured in all Committees of the Baltic FAB, the Baltic FAB Board and the Baltic FAB Council has (Ref. *"Agreement on the Establishment of the Baltic Functional Airspace Block between: The Republic of Lithuania and The Republic of Poland").*

3.3 Airspace structure

3.3.1 General

The Baltic FAB airspace will be developed and harmonised in accordance with the Single European Sky (SES II) Regulations and the European ATM Master Plan ensuring maximised efficiency whilst maintaining the level of safety applicable to air traffic operations regardless of national borders.

3.3.2 Area of application

The Baltic FAB comprises the Vilnius FIR and Warsaw FIR (upper and lower airspace) which ensures facilitation of lower level collaborative processes (Ref. *"Agreement on the Establishment of the Baltic Functional Airspace Block between: The Republic of Lithuania and The Republic of Poland").*

The Warsaw FIR lies within the national borders to the east, south and west, where it borders to Vilnius FIR, Minsk FIR, Lvi'v FIR, Bratislava FIR, Praha FIR, and the German FIRs respectively. To the north it covers part of the Baltic Sea and has common boundaries with the Malmo and Kaliningrad FIRs.

Vilnius FIR adjoins Riga FIR to the north, Minsk FIR to the east and south, Kaliningrad FIR to the west, Warsaw FIR to the south-west and Malmo FIR to the west over the Baltic Sea,. Figure 7 shows the Baltic FAB airspace comprising main areas of ATS delegation to adjacent ANSPs.

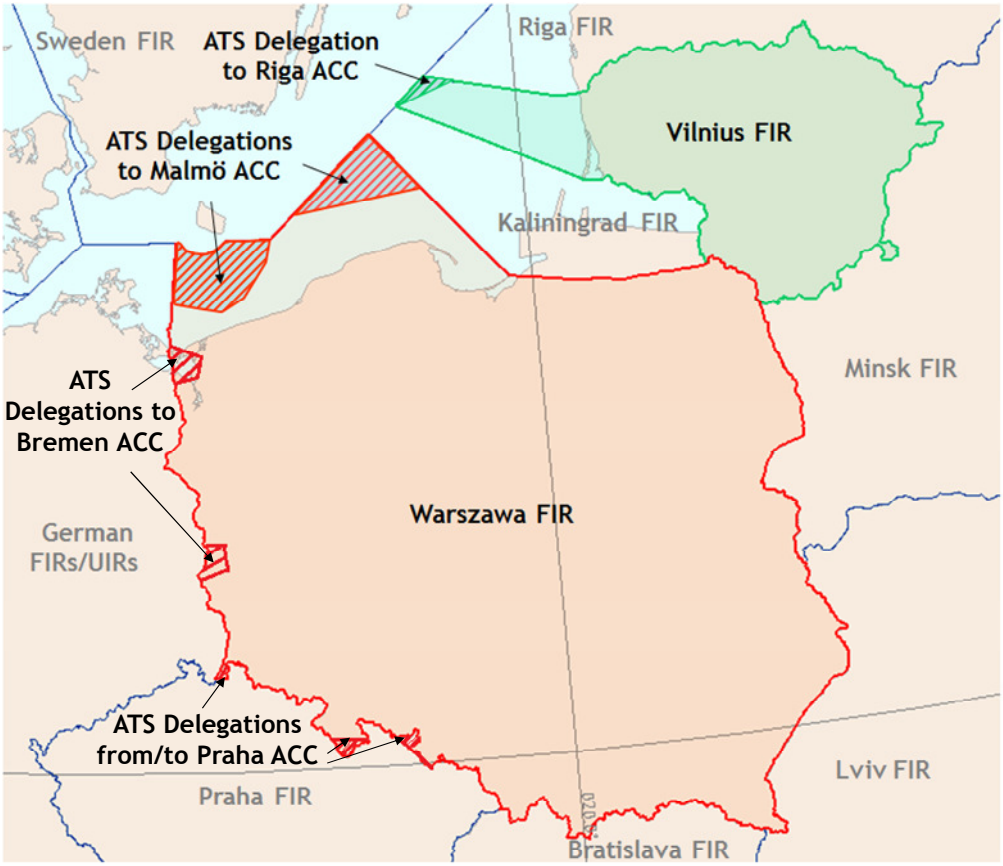


Figure 7: Baltic FAB airspace

Geographical and vertical limits of the FIRs comprising the Baltic FAB airspace, as well as the main aeronautical data are published in the respective AIPs of Poland and Lithuania.

The legal basis (Ref. “Agreement on the Establishment of the Baltic Functional Airspace Block between: The Republic of Lithuania and The Republic of Poland”, “Baltic FAB NSA’s Cooperation Agreement”, “Baltic FAB ANSP’s Cooperation Agreement” and “Baltic FAB Civil Military Cooperation Agreement”) and collaborative airspace capacity management (Ref. “Baltic FAB AMC’s Cooperation LoA” and “LoA between PANSA and SE “Oro Navigacija”) ensure optimal use of the overall Baltic FAB airspace not limited by state’s boundaries.

3.3.3 Traffic demand - forecast for 2012-2015+

The annual number of flights in Warsaw FIR and Vilnius FIR forecasted by STATFOR is the basis for traffic planning for flights controlled in these parts of the Baltic FAB. STATFOR forecasted figures are subsequently adjusted to take into account local findings from studies and current developments. Figure 8 shows the latest (September 2011) Medium Term Forecast for CRCO EUROCONTROL States.

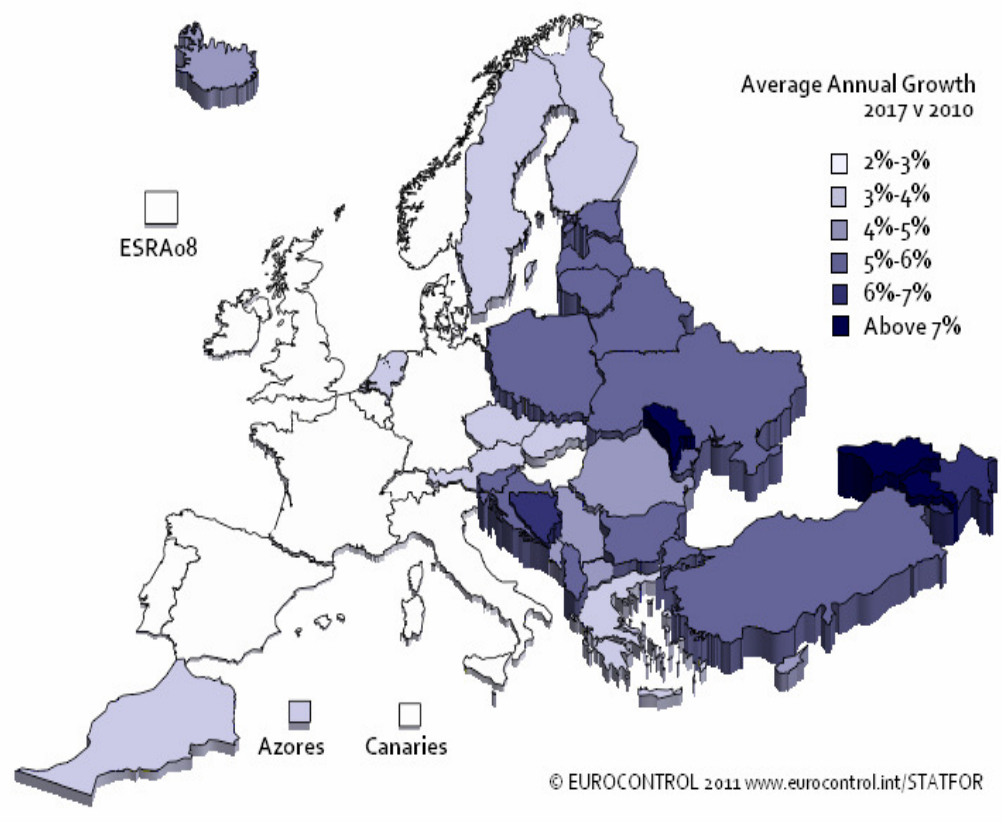
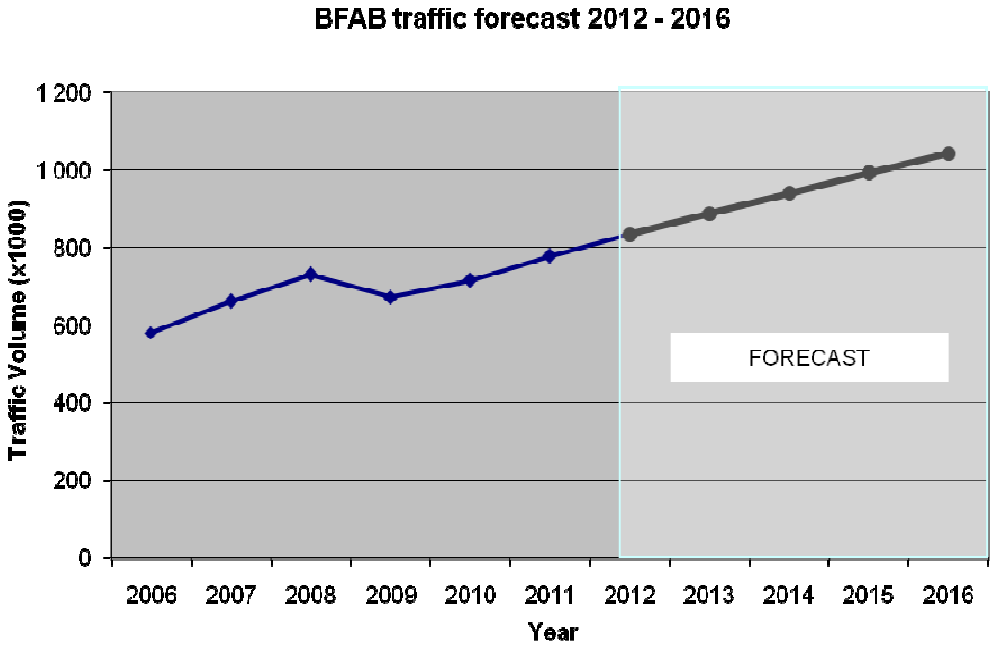


Figure 8: MTF for 2010 – 2017 period

In the reference period, the following number of flights is expected:



Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Warsaw FIR	480	544	597	554	588	641	690	739	787	835	880
Vilnius FIR	136	159	180	160	173	187	196	204	212	220	228
B FAB	**579**	**661**	**730**	**671**	**715**	**778**	**832**	**886**	**939**	**991**	**1 042**

Figure 9: Baltic FAB traffic forecast

The traffic forecast assumes:

- New ATM System installed by PANSA will be used for operational ATS provision at Warsaw ACC from the beginning of 2013. (Ref. “PANSA 2012–2016 strategic Development plan”);
- An additional 0.4% to the forecasted traffic increase in Warsaw FIR due to the UEFA European Football Championship;
- Robust growth of the global economy;
- Polish GDP growth at level of 4% (Ministry of Finance forecast);
- Lithuanian GDP forecast is at 5.8% level (STATFOR MTF from September 2011);
- No further increase in oil prices and reduced pressure on inflation figures;
- Further expansion of low-cost carriers;

- Increase of the market concentration through alliances and take-overs.

Potential consequences of terrorist attacks, more economic downturns or natural disasters are not included in presented forecast.

3.3.4 Airspace configuration

To ensure efficiency of ATS provision and to optimise the use of the Baltic FAB airspace, different airspace configurations will be developed to meet traffic flows, enable environmental requirements to be met and allow for the application of FRA to the maximum extent from 2015.

In accordance with EC Regulation No 730/2006 all ATS routes in Vilnius FIR and Warsaw FIR comprising Baltic FAB airspace above FL 195 are class C airspace, between FL 095 and FL 195 ATS routes are class C. In the Baltic FAB class G airspace is implemented below FL 095 and above FL 660. CTR/TMA in the Baltic FAB are class C and D airspace (Ref. "AIP of Poland", "AIP of Lithuania").

Effective and dynamic management of the pre-designed airspace configurations will be performed through an integrated CDM process at network, regional and national levels allowing meeting existing and future requirements of the different users. (Ref. "*The ANSP's Cooperation Agreement; "The Baltic FAB AMC's Load", "The LoA between PANSA and SE "Oro Navigacija", Service Level Agreement with Network Manager").*

3.3.5 Route network

Consistency with the European Route Network

ARN ATS routes form the basis of the route network. The ARN network is orientated around major traffic flows. Taking into account the concept of "delineation free of the national border" for the routes and sector design, optimised route options will be available to the airspace users, at the same time as for the benefit of the Service Providers in respect of efficiency.

The current ATS route structure will initially be maintained and is described in the AIPs (Ref. *"AIP of Poland"* and "*AIP of Lithuania").*

Optimizing the existing route network

A redesign of ATS routes in the Baltic FAB airspace is planned for mid-2014. (Ref. "Strategy of the Baltic FAB 2020", "LSSIP 2012-2016 of Poland", LSSIP 2012-2016 of Lithuania", "SE "Oro Navigacija 2012-2016 Strategic Development Plan", "PANSA 2012-2016 Strategic Development Plan").

The short border between the Warsaw and Vilnius FIRs and the proximity of Kaliningrad limits opportunities to optimise airspace or the route network at a FAB level. As such, the reorganisation of ATS route network will be provided through two closely coordinated national projects:

- The Polish Airspace Project 2010+ conducted by PANSA; and,
- The Airspace development project conducted by SE Oro Navigacija.

Both projects will ensure the implementation of a new airspace structure in the Baltic FAB, thereby maximising capacity and efficiency considering the main traffic flows in the region while retaining a high level of safety.

Route design and implementation for the FAB is consistent with, and completed within, the established process for overall coordination, development and implementation of the European route network referred to in Article 6 of Regulation (EC) No 551/2004.

Existing airspace coordination and procedures for cooperation with Directorate Network Managemet are being conducted in close relations with RNDSG as well as with ICAO RDGE and are included in ARN v7 and RDGE ATS route catalogue.

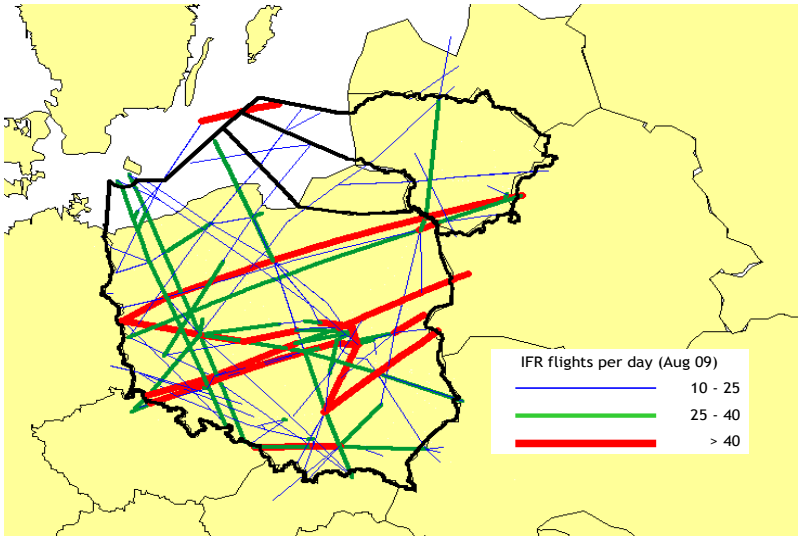


Figure 10: Main traffic flows in the Baltic FAB

Strategically, ATS routes will be implemented and the use of airspace configurations will result from main traffic flows as shown in Figure 10 and the gradual shift from conditional ATS routes to fixed routes and flexible management of the route network using the Flexible Use of Airspace concept. The implementation of the design will be a step-by-step process in order to assure at least the current level of safety. (Ref. *"LSSIP 2012-2016 of Poland", LSSIP 2012-2016 of Lithuania", "SE "Oro Navigacija 2012-2016 Strategic Development Plan", "PANSA 2012-2016 Strategic Development Plan")*.

The ATS route network in the Baltic FAB will be based on B-RNAV. Due consideration will be given to further global and European developments. Parts of the Baltic FAB will become a FRA from 2015.

A number of possible scenarios developed by both projects will be analysed during a real-time simulation planned for the third (or first and second) quarter of 2013. The final, optimised solution will be chosen at the end of 2013 (Ref. *"2012-2014 Performance Plan of Poland" and "2012-2014 Performance Plan of Lithuania").*

Ensuring a smooth and flexible transfer of responsibility for ATC between ATS units

As an outcome of this analysis a configuration of the new ATC structure for Warsaw and Vilnius FIRs and cross-border area will be agreed to optimise the ATS route network, accommodate major traffic flows and improve the interface between Warsaw and Vilnius FIRs to maximum possible extent. An indicative proposal for the FIR boundary is shown in the figures below.

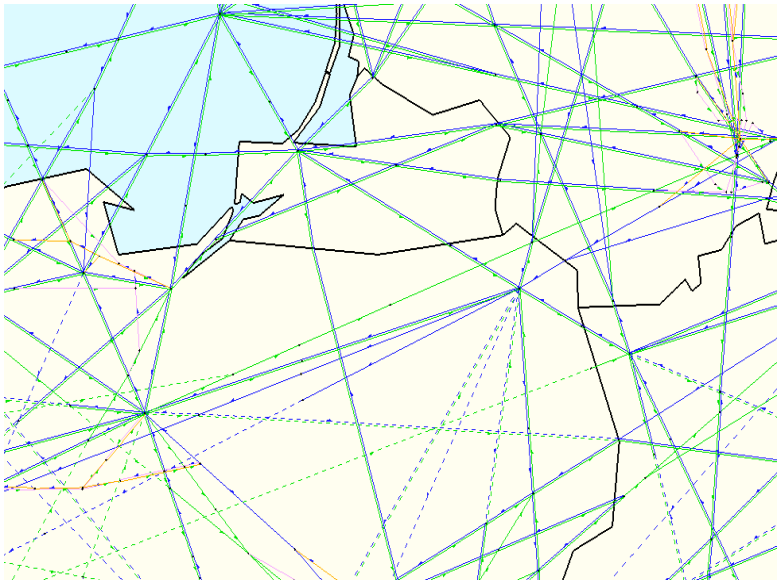


Figure 11: ATS route network, interface EYVL and EPWW FIRs – current situation

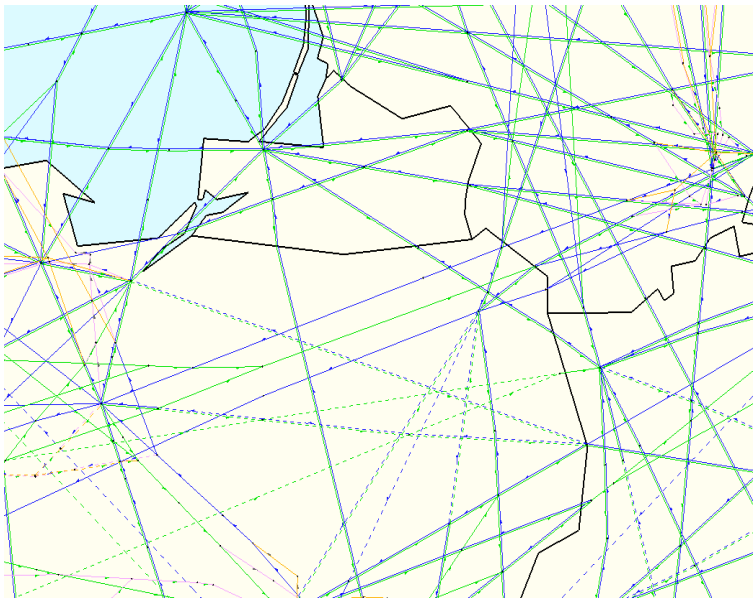


Figure 12: ATS route network, interface EYVL and EPWW FIRs – P2010+ Project changes

Horizontal flight efficiency

The initial analysis conducted during the Baltic FAB Feasibility Study determined the potential benefits as a result of optimising the Warsaw and Vilnius FIR boundary. Whilst changes could reduce the complexity of the FIR boundary, the benefits for airspace users in terms of horizontal flight efficiency are estimated to be less than €10,000 per annum because of the short border. As such, these have been excluded from the CBA and benefits statement.

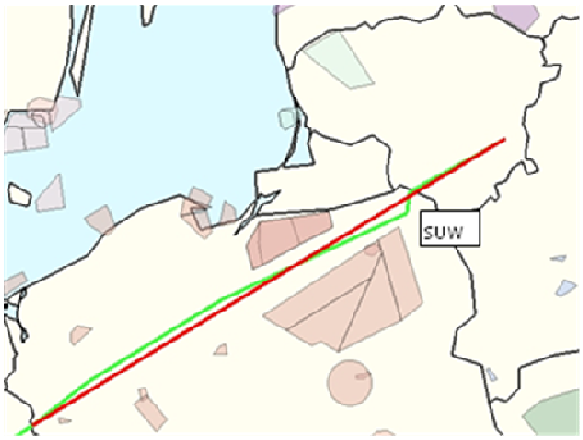


Figure 13: Example for improving horizontal efficiency in route design

Vertical flight efficiency

The new ATC sectorisation in the Baltic FAB will enable aircraft to follow an optimised vertical profile to/from EYVI and EYKA airports due to the continuity of the airspace through which the climb and descend is executed. Continuous Descent Approach procedures are already in place at EYVI so the ATCOs are already trained; the extension of CDA to EYKA and the ability to start CDAs at a much higher level will bring quantifiable FAB benefits.

An analysis was conducted during the Baltic FAB Feasibility Study to determine the potential FAB benefits as a result of introducing CDAs and CCDs to EYVI and EYKA; the analysis identified potential benefits. This opportunity has been further defined and is included in the CBA and benefits statement as 'Extension of CDAs and CCDs at EYVI and EYKA'.

Safety

Improved cross-border sectorisation between the Warsaw and Vilnius FIRs will also introduce benefits in terms of safety. The figures below depict a typical traffic scenario controlled by two different sectors. The different colours indicate different flight levels.

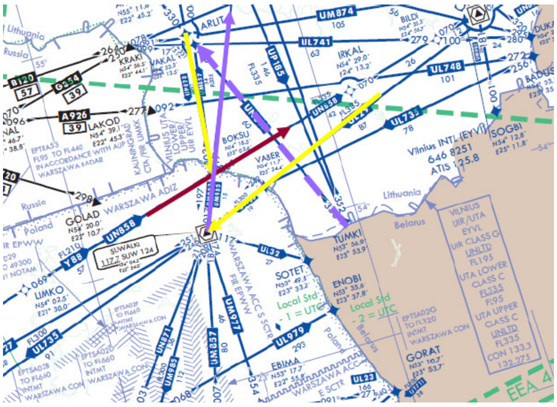


Figure 14: Potential conflict situation over SUW

Taking into account that currently two ATCOs, one at ACC Warsaw and the other at ACC Vilnius, have to solve a possible conflict short after getting the aircraft on the frequency, if the entire area was controlled from a single working position then the situation could be solved by advising only two aircraft specific headings until the conflict is solved. No change of flight level is necessary (see Figure 15).

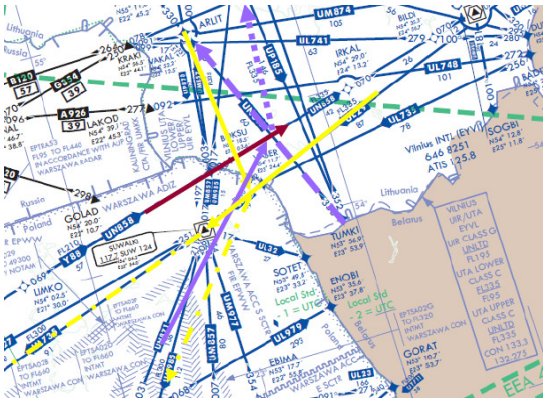


Figure 15: Conflict resolution enabled by a single working position

3.3.6 FRA (Free Route Airspace)

The Baltic FAB will progressively deploy the FRA concept of operations at the FAB level, thus further maximizing the efficient use of airspace resources regardless of FIR boundaries.

The development of FRA in the Baltic FAB is consistent with the aims of the Advanced Airspace Scheme, the Airspace Action Plan and the Flight Efficiency Plan to enhance European ATM Network Efficiency and will form an integral part of the overall European ATM network, interfacing vertically or laterally with adjoining fixed route operations airspace.

The deployment of FRA will initially require the introduction of a number of key enablers:

- **System support** – enhancement for the purposes of flight planning, flight data processing, flight data display and exchange, coordination, conflict detection and resolution;
- **Procedures** – new or amended procedures for the transit between Free Route Airspace and the fixed route network, and new procedures where necessary for operations within Free Route Airspace;
- Adaptations to **airspace structures**;
- Adaptations to **airspace management procedures**.

All airspace users will have equal access to free route operations airspace, which could, however, be affected by the activation/presence of specific airspace structures which will initially remain unmodified. This will be realised via harmonised application of the FUA concept and civil/military coordination under the ASM/ATFCM framework with the purpose of ensuring harmonised procedures and service provision for the benefit of all airspace users.

The upper limit of FRA in the Baltic FAB will be equal to the upper limit of controlled airspace. The interconnectivity between free route operations airspace and the underlying fixed ATS route network will be ensured through the publication of a set of way-points reflecting the most likely climbing/descending profiles. A common lower flight level will also be established for the application of free route operations inside the FAB, distinguishing between “day operations” (which,

decided on the basis of the complexity of the airspace, will have to be coordinated at the network level to ensure consistency with adjacent areas of airspace) and “night operations” (when the lower limit could be further lowered). Transition procedures between night-time and day-time operations will be set up accordingly. The FRA will replace the ARN and DCT network.

Free route operations are foreseen in the Baltic FAB airspace as an evolution of the night DCT route network initially based on the utilisation of the existing COPs in each ACC. An extension of free route airspace on a H24 basis in complex portions of airspace will be a further evolution of night-time free route application with the support of advanced ATC tools and ASM/FUA procedures.

Because of the short border and the disproportionate size of the Warsaw and Vilnius FIRs, it is planned that FRA will initially be deployed in Poland. Lithuania is ready to start deployment simultaneously or to join Poland at any stage of the deployment.

The FRA project will be initiated by PANSA. It is likely that the Baltic FAB will assume responsibility for the project after the initial deployment and if additional benefits can be realised by deploying it across both FIRs.

Initial analysis was conducted during the first phase of the Baltic FAB Feasibility Study to determine the potential FAB benefits as a result of introducing FRA and initially optimising the night DCT routes between the Warsaw and Vilnius FIRs. Because of the limited number of routes and negligible benefits these have been excluded from the CBA and benefits statement.

3.3.7 Delegation of ATS

There is currently no airspace delegated within the Baltic FAB. However, PANSA faces shortage of air traffic controllers and, by contrast, Oro Navigacija has spare capacity, therefore to resolve the ATCO shortage and to optimise efficiency in the EPWWSE ATC sector, ATS provision is cosidered to be delegated to Oro Navigacija.

Figure 16: EPWW S and EPWW E ACC sectors

Analysis was conducted during the first phase of the Baltic FAB Feasibility Study to determine the potential FAB benefits of delegating the provision of ATS to Oro Navigacija. This opportunity has been further defined and is included in the CBA and benefits statement. The future size of ATS delegation area and implementation date will be further analyzed

3.3.8 Sectorisation

Until the mid-2013 ACC services will be provided from the existing ACC sectors in Warsaw FIR and Vilnius FIRs and this organization of ACC sectors will respect the border between Lithuania and Poland. (Ref. *"The Baltic FAB Concept of Operations", "LSSIP 2012-2016 Poland", "AIP Poland", "LSSIP 2012-2016 Lithuania", "AIP Lithuania", LoA between PANSA and SE "Oro Navigacija"*).

According to the agreed plans Baltic FAB airspace will comprise 13 ATC sectors: nine ACC sectors controlled by PANSA and four ACC sectors controlled by SE Oro Navigacija. This configuration will ensure that at the maximum configuration of eight ACC sectors assembled from a combination of nine elementary sectors are controlled by PANSA and four ACC sectors controlled by SE Oro Navigacija.

According to the results of the Baltic FAB airspace development projects, especially PP2010+, it is clear that new sectorisation (vertical division of ACC sectors) of ACC Warsaw will allow to manage all the traffic without any problem. Capacity of the Baltic FAB airspace will be sufficient to accommodate all the forecasted traffic starting from 2015.

Future ATC sector design and management in the Baltic FAB will continue and will be based on:

- Operational requirements;

- CDM principles;
- Designation regardless from national/FIR boundaries while maintaining continuity of the cross-border operations;
- Designation taking into account military requirements and other airspace users;
- Operational efficiency;
- Consistency with the ATS route development;
- Designation taking into account optimal utilisation of the airspace and ATS route network;
- ATC systems capability.

In addition to these requirements, the following specific requirements will be added for the FRA ATC sectors:

- These ATC sectors will be unconstrained by FIR/UIR or state boundaries;
- They will be capable of being reconfigured to meet traffic demand. A structured methodology through which sectors are taken from a library of designs already known to the internal and external systems is likely in areas where there are significant fluctuations in traffic flow orientation;
- Development of the sector will take into account:
  - traffic flows and patterns;
  - reducing the length of transits through sectors to minimum;
  - reducing sector entries to minimum;
  - locations and dimensions of airspace reservations and restrictions;
  - coherence with adjacent ATS route sectors and SIDs and STARs;
  - Civil/military coordination aspects.

There are no direct FAB benefits as a result of re-sectorisation activities. These will instead act as an enabler for the route network, FIR boundary and FRA opportunities.

3.3.9 Segregated, reserved and other restricted airspace

There is no requirement for any significant change to the volume or location of segregated-reserved and other restricted airspace is anticipated for the time-frame up to 2015.

The structure of the segregated, reserved and other restricted airspace will be progressively changed to a modular structure. The modular design with the sub-division into smaller areas, will allow for greater flexibility by introducing a more mission-specific airspace request compared with the existing airspace layout. The modular design will also facilitate the demands of different airspace users as much as possible and will allow a good balance between capacity, mission effectiveness and flight efficiency.

The development and use of cross-border areas will also be investigated and promoted in areas where it is required in order to allow more flexibility to all airspace users.

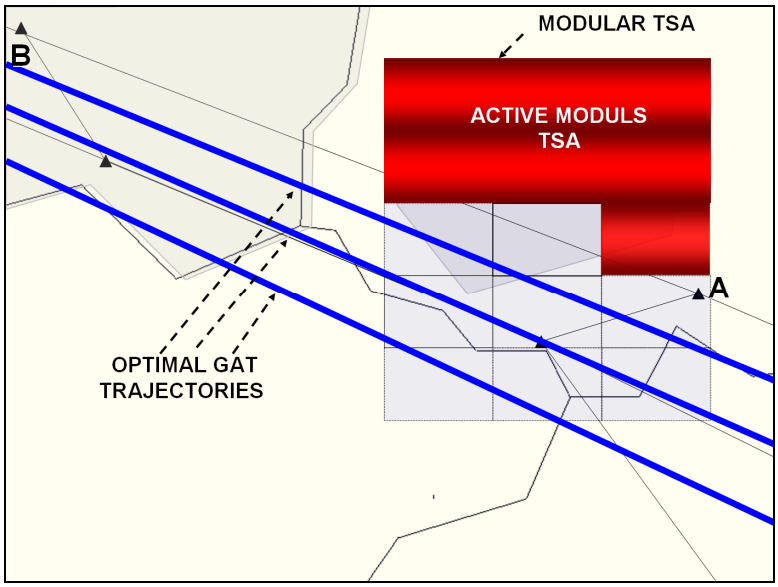


Figure 17: Modular design of restricted areas

Another item taken into consideration is the need to harmonise the segregated, reserved and other restricted airspace separation procedures. The heterogeneity of the procedures in place has highlighted the need for their harmonisation on a regional basis, in line with the **"EUROCONTROL Guidelines on generic military requirements to be considered when establishing a FAB"** document (*Ref." Agreement on the Establishment of the Baltic Functional Airspace Block between: The Republic of Lithuania and the Republic of Poland", „Baltic FAB NSAs Cooperation Agreement", „Baltic FAB ANSPs Cooperation Agreement", Baltic FAB Civil – Military Cooperation Agreement").*

3.4 Airspace and network management

3.4.1 General

The Baltic FAB airspace organisation has been developed and harmonised and further improvements will be made in accordance with the Single European Sky (SES I and II) Regulations and the European ATM Master Plan.

Baltic FAB traffic flows will be safely and efficiently managed, unconstrained by FIR boundaries, through the implementation of the necessary communication, information management and surveillance capabilities.

3.4.2 Advanced airspace management

An Advanced ASM process is considered as one of the key elements for ensuring more efficient use of the airspace at Baltic FAB level in order to exploit available capacity and balanced traffic demand in collaboration with the airspace users. Members, partners, airspace users and observer States will be fully involved in the delineation and recommended to ensure the implementation of the enhanced ASM process as early as possible.

The FAB management organisation is structured to ensure that airspace management is developed in collaboration with the airspace users (Ref. *"Agreement on the Establishment of the Baltic Functional Airspace Block between: The Republic of Lithuania and The Republic of Poland", „ToRs of the Baltic FAB Board", „ToRs of the Baltic FAB Airspace Committee", „LoA between Baltic FAB AMCs")*.

The Airspace Committee on behalf of the FAB Board is specifically responsible for tasks including:

- Provision of improved airspace allocation in order to meet the users' requests;
- Dynamically adjusting the airspace allocation in accordance with the actual occupation of segregated, reserved and other restricted areas;
- Flexibly managing airspace allocation for other purposes, including the operation of state aircraft.

They will also seek to identify potential flow problems, such as high-demand capacity imbalances, congestion, high degrees of complexity, and blocked or constrained airspace (e.g. segregated, reserved and other restricted areas), and collaborate at FAB level to develop flow strategies (i.e. aggregate trajectory solutions) (Ref. *"Agreement on the Establishment of the Baltic Functional Airspace Block between: The Republic of Lithuania and The Republic of Poland", „ToRs of the Baltic FAB Board", „ToRs of the Baltic FAB Airspace Committee")*.

Introduction of CDM

In order to respond to the need for the active collaboration of all involved ATM actors, a Baltic FAB collaborative decision-making model shall be established. Having an improved mutual knowledge of forecast, current or even past situations, and of each other's constraints, preferences and capabilities, this model will allow the ATM actors will proactively resolve potential conflicts in any area of interest. Consequently the best decision is predefined and agreed in advance among the appropriate stakeholders in the Baltic FAB.

Network management

PANSA and Oro Navigacija will continue to provide the network management function for their respective FIRs.

The network management interface between Baltic FAB and EUROCONTROL will be the subject of a SLA which will be implemented operationally through cooperation defined in an LoA between the national AMCs.

Within the Baltic FAB area of application, the pre-tactical level will be handled by the current national Polish and Lithuanian Airspace Management Cells (AMCs), enriched with certain ATFM functions. In order to ensure harmonisation of all users' requirements in the Baltic FAB, a strong inter-coordination process is implemented among both AMCs (Ref. *"LoA between Baltic FAB AMCs").*

In terms of pre-tactical airspace management, a coordination process among both AMCs will be activated with the aim of identifying solutions for efficient use of the airspace within the entire FAB area of application. Specifically, the process is aimed at identifying the most appropriate use of the Baltic FAB airspace by balancing requests of different users and/or different categories of users. The

implementation of pre-tactical ASM process at Baltic FAB level is based on the application of common procedures, rules and criteria. The cooperation procedures at pre-tactical level are described in the "LoA between Baltic FAB AMCs" (Ref. *"LoA between Baltic FAB AMCs", "Baltic FAB Concept of Operations").*

The strong coordination process enables the most efficient allocation of cross-border airspace and simplifying AUP/UUP management. The appropriate connectivity between AMCs is deployed, providing both direct communication facilities and access to advanced planning tools. In conducting these activities, AMCs are supported by the appropriate ATS and FMP units and the Network Manager for the eventual activation of airspace scenarios to better handle all users' operational needs, while trying to ensure that ATM capacity is not consistently affected. The Network Manager will also be involved in the provision to the AMCs of wider information about the overall traffic demand (Ref. *„LoA between Baltic FAB AMCs").* According to the "LoA between Baltic FAB AMCs", Lithuanian AMC will provide Polish AMC the AUP/UUP which will be considered and coordinated in order to issue a Baltic FAB Operation Plan. Subsequently, the plan will be updated in accordance with the changes provided by the UUP process and ATFCM changes. This process will be accordingly described in respective AIPs of Poland and Lithuania.

The possibility of managing modular reserved/restricted or other AMC manageable areas with a connected when necessary web of CDRs will facilitate the pre-tactical airspace management, with a greater choice of opportunities.

The integration of certain ATFCM functions ensures optimal provision of regional solutions, especially in terms of coordinated TSA/TRA allocation and sector configuration between the different ACCs in the Baltic FAB, leading towards more dynamic sector management across ACCs to optimise the resources available (Ref. *„LoA between Baltic FAB AMCs").*

In order to ensure such processes the adequate supporting systems allowing for management of the whole Baltic FAB airspace from the FAB perspective, to share the current status of the airspace among all the appropriate stakeholders and to ensure seamless and flexible operations within Baltic FAB and across its boundaries are used. Also, in order to ensure better coordination at inter-FAB level, there are plans to use common software systems which is seen as one of the qualitative steps forward in this area (Ref. *„LoA between Baltic FAB AMCs").*

The established processes provides the possibility to move the pre-tactical time-frame closer to the time of operations and, consequently, allows to achieve the maximum benefits from more accurate information sharing. Moreover, this organisation will allow the activation of routing scenarios on the basis of the pre-defined permanent or conditional route networks established at strategic (planning) level, granting the best usage of the ACCs sectors' capacities. Such pre-defined route networks will rely not only on the status, modularity and permeability of military reserved areas but also on sector configuration capability (modular/cross-border sectorisations) (Ref. "LoA between Baltic FAB AMCs").

The daily output of this process at pre-tactical level is definition of the Baltic FAB daily Network Operation Plan.

This management process will evolve from 2015 towards a deeper integration of ASM functions at Baltic FAB level.

3.4.3 Flexible Use of Airspace (FUA)

Flexible use of Baltic FAB airspace is ensured at all three levels:

- Strategic level;
- Pre-tactical level, and
- Tactical level.

In order to optimise use of the Baltic FAB airspace the ATCFM function and related processes are based on the legal acts ensuring harmonised procedures for cooperation among the ATS units of the designated ANSPs of the Baltic FAB and the institutions involved in airspace management in the Baltic FAB (Ref. *"Baltic FAB APSPs Cooperation Agreement", "LoA between Baltic FAB ACCs"*).

All levels of FUA are established in Poland and Lithuania and, consequently, in the Baltic FAB.

Strategic Level (level 1)

The Baltic FAB governance structure, in particular the Airspace Committee and the Baltic FAB Board ensures the realisation of all tasks at the strategic level of flexible use of airspace and supervision of all related activities at lower (Ref."*Agreement on the Establishment of the Baltic Functional Airspace Block between: The Republic of Lithuania and the Republic of Poland", "ToRs of the Baltic FAB Airspace Committee", "ToRs of the Baltic FAB Board"*).

The main function of the ASM Level 1 is to ensure a safe and efficient use of the Baltic FAB airspace structure and ATS route network and to provide a continuum and transparency of operational handling at Baltic FAB borders based on harmonised agreements derived from collaborative airspace planning with neighbouring States and FABs.

A joint civil-military coordination process in the Baltic FAB (Ref. "Agreement on the Establishment of the Baltic Functional Airspace Block between: The Republic of Lithuania and the Republic of Poland"; "Baltic FAB Civil–Military Cooperation Agreement") will ensure consistency between the planning and utilisation of the airspace and route networks in relation to the planning and use of airspace required for different activities. This process will rely on airspace configurations as a set of predefined, adaptable airspace structures, able to accommodate the common ATM partners' strategic objectives and requirements.

An enhanced coordination process on strategic level will ensure consistency between the setting-up and utilisation of route networks, segregated, reserved and other restricted, areas and ATC sector configurations.

This collaborative process of planning of airspace use is expected to accommodate the requirements of all the airspace users and ensure that the right decision is made in respect of the most appropriate stakeholder. For this purpose, the airspace architecture will cover both the segregated, reserved and other restricted activities (status, availability, adaptability and permeability) and the airspace route structures (network scenarios using permanent/conditional routes.

Pre-Tactical Level

ASM Level 2 consists of the day-to-day management and temporary allocation of airspace through AMCs on national and FAB level. The allocation of airspace is the prerogative of the State for the airspace under its sovereignty and/or the airspace under its jurisdiction.

Baltic FAB States have authorised their AMCs to manage Baltic FAB airspace under their responsibility on a daily basis. Units that represent entities (e.g. squadrons) wishing to utilise CBAs, TRAs/TSAs and other restricted (AMC-manageable) areas that are suitable for management/allocation by the AMC, are identified as Airspace Users (AUs) and are authorised by the national authority concerned. AUs are permitted to negotiate for airspace to be allocated by the AMCs. The requests for airspace use in the Baltic FAB could be presented as a block of airspace required during a specified period of time with the possibility of moving the request in terms of time and flight levels. In case of a modular design of the Baltic FAB airspace, the request should contain only the appropriate number of modules required for the activities concerned. The requests should cover a H24 period of time.

Detailed booking, utilisation or other respective procedures according to ASM level 2 tasks are described in appropriate LoA between each ANS provider and National Army (Air Force). In order to properly exploit airspace management, increased cooperation between ASM and ATFCM functions in the Baltic FAB is being developed. (Ref. “Baltic FAB Strategy 2020”, „LoA between Baltic FAB AMCs“).

Tactical Level

ASM Level 3 consists of the real-time activation, deactivation or real time reallocation of the airspace allocated at ASM Level 2 and the resolution of specific airspace problems and/or traffic situations between appropriate civil and military units. In the Baltic FAB the real time access to all necessary flight data, including controller’s intentions, with or without system support, permits the optimised use of airspace and reduces the need to segregate airspace. Adequate real-time co-ordination facilities and procedures are established in order to fully exploit the FUA Concept at ASM Levels 1 and 2. Flexibility in the use of airspace is enhanced by established real-time civil/military co-ordination capability (Ref. “LoA between Baltic FAB AMCs”).

In the Baltic FAB on the day of operations:

- AUs will utilise the AMC-manageable areas in accordance with the AUP allocation;
- ACCs and AOs will utilise the CDR1 and CDRs 2 (when those established) in accordance with the AUP.
- The Airspace Users that requested airspace shall advise the AMCs about any change in their planning (e.g. activity completed earlier than planned, cancelled or reduced in time or volume, etc). This will enable the associated CR to be available for additional period(s) than that planned in the AUP. If required, the appropriate AMC shall inform appropriate FMP and CFMU about the new airspace opportunities using a Draft UUP2.
- If required, the AMCs may publish one or more UUP-like messages for the period of validity of the current AUP. A minimum of agreed time one hour is allowed between the release of those UUP-like messages and the

commencement of any additional airspace structures made available by such message.

- ACCs will utilise the CDR1 and CDRs2 (when those established) in accordance with the UUP-like messages.
- When associated activity within AMC-manageable areas has ceased or has been cancelled, appropriate ATS and FMP units will utilise CDRs2 and CDR3 (when those established) on a tactical basis and may offer an aircraft a routing through the inactive area on short-notice (Ref. *"LoA between Baltic FAB AMCs"*).

Detailed booking, utilisation or other respective procedures according to ASM level 3 tasks are described in the appropriate LoA between each ANS provider and the national Armed Forces (Air Force).

Within the Baltic FAB area of application, the tactical level will be handled by national ACCs/FMPs together with the Military ATS Units concerned, under the CDM framework, ensuring consistency with the other Baltic FAB states' ACCs/FMPs/military ATS units where CBAs are established or large-scale military activities are carried out.

This tactical management process will be empowered by continuous coordination with the AMC concerned (Ref. *"LoA between Baltic FAB AMCs")*.

Within the Baltic FAB the ACCs/FMPs, together with the military ATS Units concerned, will promptly react to any short-notice and/or real-time requirements, activating/deactivating or reallocating specific tactical CDR/RCA (if established) scenarios and, at the same time, establishing and activating the most appropriate airspace configurations. As soon as dynamic airspace management based on enhanced FUA through a CDM process involving all the partners at tactical level (ACCs/FMPs, military ATSUs, AMCs and the NM) is implemented, the most suitable flight trajectory/profile, together with short notice users requirements, will be accommodated through dynamic routes and airspace availability. In the Baltic FAB the tactical phase deals with all the activities carried out to cope with short-notice or real-time events or measures that could require the modification of the airspace allocation decided during the previous pre-tactical phase (Ref. *"LoA between Baltic FAB AMCs")*. These interventions could result in:

- Real-time allocation of reserved, restricted or other AMC manageable areas/corridors for immediate military mission requirements;
- Consequent allocation of "ad hoc" routes or network scenarios;
- De-allocation of previously scheduled reserved, restricted or other AMC manageable areas/activities;
- Vertical/horizontal real-time modification of the manageable portions of modular reserved, restricted or other AMC manageable areas (for contingency reasons, for instance, such as bad weather conditions requiring AO trajectory modifications).

This tactical airspace management translates into practice as a set of rules and measures undertaken at the previous strategic ASM level 1 and then further refined during the pre-tactical ASM level negotiations (Ref. *"LoA between Baltic FAB AMCs")*.

The added value of these tactical actions/interventions is represented by the capability to place, in parallel, the re-routing and airspace allocation scenarios already planned at strategic and pre-tactical levels, real-time measures (in terms of allocation, deactivation or sizing of airspace structures) able to better accommodate real-time changes in the traffic situation/demand and/or different airspace user requirements (Ref. *"LoA between Baltic FAB AMCs")*.

This capability to react to specific short-notice requirements, in turn, allows the achievement of significant benefits, resulting in:

- Route network optimisation;
- Better accommodation of airspace user needs/requirements;
- More flexible ATM management.

Tactical airspace management in Baltic FAB also provides benefits from the activation/deactivation of specific portions of modular TSAs/TRAs and other restricted areas able to offer the most suitable options in order to match users demand. This is because real-time TSA/TRA and other restricted areas sub-divisions or vertical limitations in the Baltic FAB allow users to continue their tactical activities, while permitting traffic to satisfy immediate unexpected airspace requirements stemming, for instance, from meteorological constraints.

The final decisions are communicated by ACCs to the NM for the updating of the Airspace Data Repository, which will again provide input to the IFPS ENV to allow AOs in the planning phase to get the latest information regarding airspace status.

This process will be accordingly described in respective AIPs of Poland and Lithuania (Ref. *"LoA between Baltic FAB ACCs")*.

3.4.4 ASM in north-eastern part of the Warsaw FIR

Airspace management is provided in close coordination by separate units of respective Baltic FAB ANSPs. The delegation of GAT ATS in north-eastern part of Warsaw FIR with the existence of many AMC manageable areas, will cause the necessity of establishment close ASM co-operation on pre-tactical and tactical level between two parties. It will be done according to EUROCONTROL guidelines written in *"Airspace Management Handbook for Application of the Concept of the Flexible Use of Airspace" (Ref. "LoA between Baltic FAB AMCs").*

Rules of cooperation will be defined in an ASM coordination Letter of Agreement to be signed between Polish and Lithuanian AMCs, Vilnius and Warsaw ACCs. LoA covers detailed procedures regarding the exchange of information on activity within AMC manageable areas, availability CDRs and closure permanent routes (Ref. *"LoA between Baltic FAB AMCs"*).

3.5 Air Traffic Services and Procedures

3.5.1 Terminal Services and Procedures

In Baltic FAB, there are no foreseen major changes in the current way of handling aircraft in terminal operations for PANSA and Oro Navigacija, as described by the Republic of Lithuania and Poland AIPs.

Further evolution of terminal operations will be done in accordance with the European ATM Master Plan.

As relevant European research projects (e.g. SESAR) deliver validated operational and technical solutions, they will be considered for implementation to ensure that operations are harmonised with other FABs.

3.5.2 En-Route Services and Procedures

The target lateral separation minima will be 5 NM placed in 2015 which is justified by future air traffic demand. To the maximum possible extent, harmonised working methods will be the same intra-ACC and inter-ACCs. Constraints will be kept to a minimum.

As relevant European research projects i.e. SESAR deliver validated operational and technical solutions, they will be considered for implementation to ensure that operations are harmonised with other FABs.

New implemented ATM system e.g. in Poland PEGASUS-21 and existing Lithuanian EUROCAT X ATM system has already most of the features of Polish Pegasus_21 and will include trajectory-based capability as a development based on operational needs and available mature technology solutions.

Planning and conflict detection will be trajectory-based.

The prediction of trajectories may be improved by the use of aircraft-derived data. Receiving sectors will know the exact positions of expected aircraft within seconds.

Conflict management horizons will be extended by probing the trajectory over two or more sectors in the FAB.

Flight data will be electronically handled, supported by graphical representation. Where changes occur, revisions of flight data will be automatically triggered by the transferring sector, enabling trajectory recalculation upstream. Planning will become more important and more effective on the basis of the improved quality and accuracy of the flight data available.

PCs will plan ahead, searching for problems at sector entry, within a sector and at sector exit. They will identify conflicts early on, with the need for the PC to take action to resolve or highlight conflicts, either by coordinating upstream or by warning the EC of conflicts well in advance.

The EC's workload will be reduced owing to the PC's action. This is the final and most dynamic aspect of the layered planning processes, and is where the boundary between planning and tactical control occurs. Conflict detection, using surveillance separation minima, with reduced uncertainty, will be common operational practice.

The use of exit planning tools to assist PCs to plan the exit conditions of flights according to LoAs may also be used at FAB boundaries where transfer conditions may vary.

The enhanced planning concept will reduce EC workload. However, owing to their design and traffic characteristics, certain sectors will permit planning over a short time horizon only. Here, ECs will make use of their own tailored system support in

order to separate and provide instructions and clearances to flights that are climbing and descending. EC conflict detection, using a tactical trajectory combined with the state vector trajectory so that all possible manoeuvring is taken into consideration, will further reduce EC workload.

ECs will continue to monitor the progress of flights through their area of responsibility ensuring that aircrew conform to clearances and instructions, and that key actions are implemented in a timely manner.

To reduce monitoring workload, the progress of flights will be tracked by comparing the latest flight plan trajectory with the actual aircraft behaviour taken from surveillance data. Monitoring aids (e.g. MONA) will warn controllers when a flight deviates laterally from its flight path, deviates from its cleared level (level bust) or changes level without clearance.

Monitoring aids will also check for flight conformance to the flight plan trajectory in the longitudinal and vertical plane. Any deviation will automatically trigger an update of the aircraft's trajectory, ensuring that the position of the flight is known within seconds to all those sharing the flight data. This will also have a positive effect on the functioning of tools which are dependent on trajectory prediction, i.e. conflict detection.

MONA reminders may be used by ECs in relation to key events such as transfer to adjacent sectors or top of descent. A warning may also be provided when it is predicted that an aircraft will not reach its coordinated conditions with an adjacent sector. Some MONA benefits will also apply to the PC.

Coordination between sectors and ACCs should be the same, providing seamless operations. Where lower sectors need to coordinate with approach or aerodrome control, the same principles will apply where possible.

Building on the success of basic OLDI, all routine coordination, including tactical coordination, will be conducted using OLDI-SYSCO messages within the context of the framework of Regulation (EC) No 1032/2006 and actual Baltic FAB operational needs. SYSCO will be the first step to the improvement of interoperability, especially between ACCs. It will be available to both ECs and PCs. Voice coordination via direct telephone or intercom will remain available as required.

SYSCO will provide inter alia a variety of coordination functions in relation to coordination dialogue, transfer of control, transfer of communication, area of interest.

An appropriate tuning of SYSCO parameters (designation of coordination points, a set of messages to be applied for different coordination partners, composition of OLDI messages) accompanied with an appropriate HMI related to the coordination dialogue handling are essential elements for the operational deployment of SYSCO.

Flight data will be exchanged between civil and military units. This interoperability is important for ATSUs that require information on flights which come close to their boundary but will not penetrate their airspace. An area of interest may be defined around their airspace for this purpose and information can then be provided for any flights traversing that airspace.

The basic data exchanged allows the flight to be activated and if necessary correlated with radar data at the receiving unit. The exchange will normally be automatic, but controller-initiated exchanges can also be implemented.

Updates and additions to the information will also be exchanged as the flight progresses through the airspace concerned. The information provided will also include details of the controller's intentions for the flight.

Safety nets in new implemented ATM systems will be provided to controllers where surveillance exists. These safety nets will include the following:

- Short-Term Conflict Alert (STCA)
- Area Proximity Warning (APW)
- Minimum Safety Altitude Warning (MSAW)
- Medium Term Conflict Detection (MTCD) operational use will be considered after implementation FRA project.

The ground-based safety nets will alert controllers of potential hazards in order to take the necessary corrective actions. The warning time will be sufficient for the controller to evaluate the situation and issue a clearance, and for the aircraft to execute the manoeuvre. The facility will identify proximity between:

- aircraft (STCAs);
- aircraft and airspace (APWs);
- aircraft and terrain (MSAWs).

The ACAS down-link resolution advisories (RAs) will be assessed after 2015 depending on the pre-implementation validation and procurement of Mode-S sensors. It is essential for the uniform optimisation of safety net parameters between different ATS units to be achieved, in order to substantially improve safety net performances by reducing the number of nuisance alerts and improving the probability of conflict detection.

3.5.2.1 En-Route Services and Procedures - Operational Air Traffic (OAT)

States can follow EUROCONTROL Specifications for OAT IFR in controlled airspace, which are based on Europe OAT IFR harmonisation for Single European Sky.

Military and other State aircraft aviation require skills and capabilities for aircrews, ATM and Air Defence personnel and organisations beyond the scope for civil aviation. To gain and maintain the levels of readiness and proficiency, aerial activities have to be conducted, which are not covered by rules and procedures as specified by ICAO for GAT flights. These include airborne air refuelling, formation flying, air combat manoeuvring, test flights, reconnaissance flights etc.

Certification, designation and supervision of service provision to OAT is, and shall remain, a national responsibility.

Relevant procedures and agreements covered by LoAs between military and ANSP shall be implemented when needed.

3.5.3 Flight Information Services & Alerting

In the Baltic FAB, the FIS is provided in accordance with ICAO rules (PANS ATM Doc. 4444), as published in the Republic of Lithuania and Poland AIPs. The flight information service and alerting service in the Baltic FAB area of application will be provided by the FICs designated in the national AIPs, unless the responsibility for providing such services is assigned to an air traffic control unit having adequate facilities for the exercise of such responsibilities.

According to ICAO, the flight information service includes the provision of:

- Suitable SIGMET and AIRMET information;
- Suitable information concerning pre-eruption volcanic activity, volcanic eruptions and volcanic ash clouds;
- Suitable information concerning the release into the atmosphere of radioactive materials or toxic chemicals;
- Suitable information concerning changes in the serviceability of navigation aids;
- Suitable information concerning changes in the condition of aerodromes and associated facilities, including information on the state of the aerodrome movement areas when they are affected by snow, ice or a significant depth of water;
- Suitable information concerning unmanned free balloons;
- Any other information likely to affect safety; and
- An addition, for VFR flights, available information concerning traffic and weather conditions along the route of flight that are likely to make operation under visual flight rules impracticable;

As well as information concerning:

- weather conditions reported or forecast at departure, destination and alternate aerodromes; collision hazards to aircraft operating in airspace classes C and G (information including only known aircraft the presence of which might constitute a collision hazard to the aircraft informed will sometimes be incomplete, and air traffic services cannot assume responsibility for its issuance at all times, or for its accuracy.

The alerting service will be provided by the Air Traffic Services Units.

The alerting service along with the Flight Information Service will continue to be provided as defined by ICAO rules. In the environment of the Baltic FAB area of application there will be further exchanges of information regarding alerting services. Automated alerting notification and data exchange functions will be provided where applicable supporting the coordination of alerting services at FAB level, if the case demands further coordination and involvement of the Baltic FAB Member States

The designated ANSPs within the FIR of the responsible Member State will finally take decisions and initiate actions and coordination on the provision of the alerting service, based on the applicable procedures.

3.6 Contingency Plans

In Baltic FAB, there are no foreseen major changes in the current contingency arrangements for PANSA and Oro Navigacija during first reference period.

However, contingency arrangements are being reviewed in both States and it is likely that a solution will be developed which takes advantage of FAB cooperation. The potential solution and benefits to coordinated contingency arrangements and described in the CBA and benefits statement.

3.7 Communication, Navigation, Surveillance (CNS)

Systems

Communications

In the Baltic FAB controllers will continue to provide ATS by means of voice communication over VHF using 8.33 MHz spacing where necessary. However, non-time-critical communication will, in time, be conducted using CPDLC over VDL Mode 2 as per EC Regulation (EC) No 29/2009 on data link services by 2015. This will increase the efficiency of the use of the available VHF spectrum by off-loading routine messages to CPDLC and by deploying more VHF channels in the available spectrum for the foreseeable future. There is a need to adapt the communication infrastructure to handle the air-ground data link service.

The Baltic FAB partners will follow the evolution of the European communication infrastructure in the context of a European IP backbone network and plan for a potential implementation of VoIP (Voice over IP) for ground-ground voice communication.

Surveillance

Areas with poor surveillance coverage in the Baltic FAB will be identified and solutions will be provided in a collaborative inter-/intra-FAB environment to meet the operational needs.

The currently available surveillance sensors and surveillance data sharing with the adjacent ATS units will continue to provide surveillance data to the Baltic FAB surveillance data processing systems. The extension of the surveillance data sharing will be planned.

The upgrading/replacement of existing MSSR, with extended Mode-S capability and the deployment of ADS-B ground stations and WAM to support surveillance applications, will be gradually implemented starting form 2012. The surveillance data from all surveillance sensors will be processed by a multi-radar tracking system so as to provide the ATCO with a reliable and continuously updated picture of the whole Baltic FAB airspace.

CNS systems and procedures will ensure the required performance and quality of service within a given environment (surface, TMA, en-route) with known traffic characteristics, in particular in terms of accuracy and reliability of computed results, correctness, integrity, availability, continuity and timeliness of information at the control position.

FAB technical development strategy

The Baltic FAB technical development strategy will be overseen by the Operational and Technical Committee.

EC Regulation No. 552/2004 on interoperability requires the ATC systems to be compliant with standard and approved functionalities. The strategy will include a road map of ATC systems evolution in the Baltic FAB that will ensure that systems are the same generation in order to fulfil EC regulations. It will be achieved via coordinated procurement of new equipment.

A common contingency plan for the Baltic FAB CNS and ATM infrastructure will be developed. Also, in order to have duplicated radar data and, also increase availability of other aeronautical data a joint aeronautical data network will be developed.

FAB Technical Development Supervision Team

In order to ensure the appropriate level of coordination and practical implementation of technical stating CNS strategy, a Technical Development Supervision Team consisting of members from the both designated Baltic FAB CNS providers (three high-level members from each side) will be established as part of the Operational and Technical Committee.

The team will be responsible for implementing the Baltic FAB technical development strategy, taking into account the appropriate national and international requirements and coping with operational needs. It will also develop and maintain a coordinated CNS and IT development plan for the Baltic FAB and CNS and IT development plans with neighbouring EU and non-EU CNS providers.

When legislation allows, common procurement of equipment for the Baltic FAB will be undertaken.

Meetings of the Technical Development Supervision Team are held once per quarter, mainly using teleconferences. Face to face meetings could be organised if necessary.

FAB network management centre

Monitoring of the Baltic FAB CNS infrastructure and removal of CNS infrastructure failures will be ensured via joint Network Management Centre, for the contingency and timely availability, located in premises of both Baltic FAB CNS providers. Each part of network management centre will comprise monitoring group and mobile group and will serve CNS infrastructure in the agreed territory of the Baltic FAB or, in contingency, where necessary in the FAB.

Day-to-day CNS and ATM infrastructure will be maintained and implementation of the coordinated CNS and IT development plan for the Baltic FAB will be performed by the appropriate technical departments in each Baltic FAB CNS provider.

A FAB common quality management system

In order to maintain the same quality of CNS services common quality management system including common CNS service levels, joint software library, joint spare parts and components library and joint technical documents and procedures library will be established. All procedures, technical documents,

software and firmware versions will be stored in common database. To maintain and/or improve the quality of CNS in the Baltic FAB will be defined as services with key performance indicators.

Both partners will ensure that only qualified staff carry out equipment technical monitoring, supervision and repair. The staff training programs will be revisited and updated accordingly. Also, both partners will share the experience in technical supervision procedures development. The difficulty could be national legislation as it is required that documents shall be written in national language. That means that procedures shall be written at least in two languages: the national language and English.

The potential to jointly procure systems and to cooperate on support arrangements were assessed in the Feasibility Report. The opportunities and benefits are described in the CBA and benefits statement.

3.8 Aeronautical Information Services

In the early stage both ANSPs will continue to provide AIS within their area of responsibility and will collect, verify and distribute aeronautical information. However, a number of steps will be considered to improve cooperation and, where appropriate, integrate national services.

The first stage (2014) will be to use one AIS database in the Baltic FAB. The data integrity between the Warsaw and Vilnius FIRs will be then ensured without the need to coordinate them through the EAD. One database will also enable the exchange of data between the Baltic FAB and the neighbouring FIR / FAB.

The second stage (end 2014) will be to provide a joint submission of data through a direct electronic connection to the EAD, PANSA and Oro Navigacija ATM systems. This will prevent rewriting the same data while eliminating the need for time consuming manual updates to the EAD database. This will also reduce the inconsistency of AIS data resulting from the differences between both FIRs systems.

The third stage (2016) will be to produce all publications for the Baltic FAB using one software application from one AIS database. This will ensure consistency of all data in all publications and will allow the eventual reduction of investment costs related to the implementation of the provisions of EC Regulation No 73/2010. This should also reduce the necessity of training and software maintenance costs.

Ultimately, a part of the AIS dealing with the collection, verification and completion of data introduction process to the database shall be left at the national AIS level. The common part of Baltic FAB AIS will then create products (except Instrument Flight Procedure Design), publish, print and dispatch them to the recipients.

The implementation of common software providing integrated briefing accessible using the world-wide web will also be considered. This will certainly reduce the investment cost needed to achieve this goal and it will also create a common platform for providing access to information related to FPL, MET, AIS and ATFM for all airspace users in Baltic FAB. Implementation of this solution will also enable the expansion of commercial activity having impact on cost-effectiveness.

3.9 Civil-Military cooperation and procedures

Essential military requirements are those needed to ensure continuation of operations of national armed forces or other armed forces under the provisions of an international agreement.

Baltic FAB will ensure that military authorities are involved in the creation, planning and management of a specific airspace blocks which satisfy the demand for airspace capacity from all airspace users and meet military requirements.

3.9.1 Specific Military Operational Requirements

The States' prerogatives with regard to States' sovereignty over their airspace, the requirements of the States relating to public order, public security and defence matters and NATO requirements for the use of airspace have been taken into account during the development of the Baltic FAB.

The "Baltic FAB Civil – Military Cooperation Agreement" shall be the document which covers all the requirements identified and not reflected in other FAB Agreements.

3.9.2 Military-military cooperation

The cooperation between Polish and Lithuanian militaries is described in the 'Agreement between the Ministry of Defence for Poland and the Ministry of National Defence for the Republic of Lithuania on military air traffic in the airspaces of Poland and the Republic of Lithuania.