POLISH NATIONAL SUPERVISORY AUTHORITY

POLISH PERFORMANCE PLAN 2012 – 2014

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General remark with regard to cost-efficiency area:

With regard to the cost-efficiency KPA this Plan has been developed and presented for consultation purpose in two versions:

1. *The basic version based on the current allocation of PANSA's costs between en-route and terminal services.*
2. *Alternative version based on the proposed new allocation of PANSA's costs between en-route and terminal services. This modified allocation has been presented by PANSA to the airspace users' representatives in March 2011 for preliminary consultation. The proposal will be consulted during charges and performance bilateral consultations in May.*

The parts constituting the alterative proposal are clearly indicated and are presented in italics.

The two versions of en-route and terminal costs are to be consulted with stakeholders during consultation on Performance Plan and 2012 air navigation charges. Decision on the choice of one of these will be taken following these consultation processes.

1. INTRODUCTION

1.1. The Situation.

Description of the main pillar of Performance Scheme registers the commitment of Poland to achieve the objectives of the SES and the balance between the needs of all airspace users and supply of services provided by PANSA and IMWM. Polish Civil Aviation Office as a National Supervisory Authority is responsible for elaboration of performance plan setting out performance targets and describing incentive scheme. The plan takes into consideration civil-military cooperation and necessity of military mission effectiveness in order to achieve the performance objectives. The plan is prepared for the duration of the first reference period 2012 – 2014 in accordance with Commission Regulation (EU) No 691/2010 of 29 July 2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005 laying down common requirements for the provision of air navigation services.

Polish Performance Plan covers Flight Information Region Warsaw, which with regard to cost efficiency area constitutes the en-route charging zone in Poland. As concerns terminal services in the area of cost efficiency the Plan covers all airports in Poland where air traffic services are provided by PANSA and to which European Commission Regulation (EC) No 1794/2006 of 6 December 2006 laying down a common charging scheme for air navigation services (further referred to as “Charging Regulation”) applies:

- Warszawa Chopin / EPWA
- Gdańsk Lecha Wałęsy / EPGD
- Kraków - Balice / EPKK
- Bydgoszcz - Szwederowo / EPBY
- Katowice - Pyrzowice / EPKT
- Łódź - Lublinek / EPLL
- Poznań - Ławica / EPPO
- Rzeszów - Jasionka / EPRZ
- Szczecin - Goleniów / EPSC
- Wrocław - Strachowice / EPWR
- Zielona Góra - Babimost / EPZG

The above 11 airports in 2011 are covered by a common terminal charging zone. Currently there are no other airports in Poland where terminal services are provided by designated ANSPs.

The accountable entities covered by performance plan are listed in Table 1.

Table 1. Accountable Entities for Polish Performance Plan

Performance target	Accountable Entities
Capacity	PANSA
Cost Efficiency	Civil Aviation Office PANSA Institute of Meteorology and Water Management

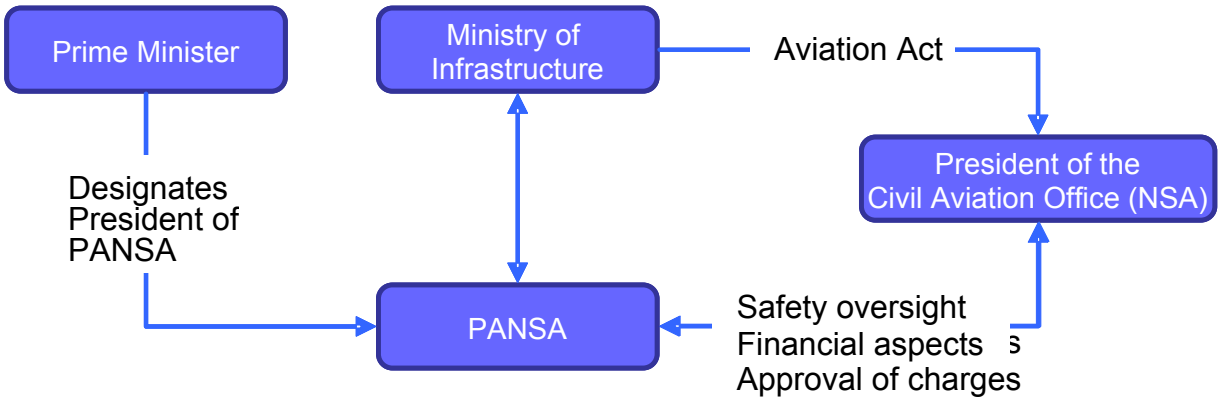
General information on the accountable entities is provided in the following chapter describing the institutional context for ANS provision.

1.2. Overall assumptions for Reference Period 1

1.2.1. Institutional context for ANS provision

The institutions relevant to ANS in Poland are summarised in the table below:

Table 2. Institutional interdependencies between ANSP and aviation administration



The President of the Civil Aviation Office (CAO) of Poland performs the function of national supervisory authority. The CAO President is a decision-making administration body responsible for all civil aviation related matters that are not within the authority of the minister responsible for transport or other governmental administration authorities. The scope of responsibilities is defined in the Polish Aviation Act of 3rd July 2002. The CAO is responsible for all aspects of regulation, including economic/financial and

safety issues. The CAO President executes his functions through the CAO being a national budgetary unit. The CAO is institutionally and functionally separated from air navigation services providers. Supervision of the activities of the CAO President is executed by the Minister of Infrastructure.
There are currently no plans to modify the status or organization of the CAO, however, following the establishment of the Baltic FAB it is expected that with regard to supervisory functions of NSA the Polish CAO will cooperate closely with the Lithuanian CAA on the basis of an agreement between the NSAs.

Institute of Meteorology and Water Management (**IMWM**) is a research-development unit created on the basis of the decree no. 338/72 issued by the Council of Ministers on 30 December 1972 on merging the State Hydrological and Meteorological Institute with the Institute of Water Management. IMWM operates on the basis of the act dated 25 July 1985 concerning research-development units. IMWM provides meteorological and hydrological services as the Polish National Hydro-Meteorological Service (NHMS). Statutory tasks of the Institute include scientific and development activities as well as state services in meteorology, hydrology, oceanology, water management, wastewater management, sewage utilisation, technical control of dams and hydrological constructions.
The Institute it a public entity - separated legally, financially and organizationally from all other public bodies. It belongs to the public finance sector and as such its budget is part of the Budget Bill. The Minister of Environment supervises the Institute for Meteorology and Water Management and approves its financial statements. IMWM has been certified in accordance with EC Regulations No 550/2004 and 2096/2005 as MET service provider. It has been designated for MET services – the current designation expires in April 2011.

Polish Air Navigation Services Agency (PANSA) is a statutory state agency and has legal personality. It is supervised by minister responsible for transport (Minister of Infrastructure). PANSA is responsible for air navigation in the Polish airspace and airspace which falls under its responsibility according to international agreements and arrangements (FIR Warszawa). It is certified provider of ATC services, FIS, CNS and AIS and designated provider of ATC services.

PANSA was established under the Act of 8 December 2006 on the Polish Air Navigation Services Agency (the PANSA Act). The Prime Minister has the responsibility of appointing the President of PANSA, under the PANSA Act.

According to the PANSA Act, PANSA performs air navigation services in the broadest sense[1], and provides the coordination of search and rescue operations as statutory activities. PANSA may carry out other activities if so permitted by the Minister for Infrastructure.

The PANSA Act states that PANSA should provide meteorological information. In practice, it buys this information from the Institute of Meteorology and Water Management, which has been designated as the provider of aeronautical meteorological services.[2]

Financially, PANSA operates independently. Its income is derived from the revenues of its operations and other revenues coming from interest and the performance of economic activities such as the sale of aeronautical maps. PANSA is compensated by the government for the provision of air navigation services to flights exempted from air navigation charges.

PANSA owns the infrastructure for ATM. Currently it also owns Aeronautical Weather Observation Systems (AWOS) used by IMWM, although it is planned that this infrastructure will be transferred to IMWM by the end of 2011.

This plan sets out the institutional context considered for Reference Period 1. However, consideration should be given how the institutional arrangements can be developed taking into account the legislative deadline of Functional Airspace Blocks establishment by 4 December 2012.

Currently, it is hardly possible to determine a final institutional model of closer co-operation between PANSA and Oro Navigacija within the Poland-Lithuania FAB for RP1 and beyond. However, bearing in mind the long-term objectives of FAB initiatives and their contribution to expected performance improvements, it cannot be ruled out that for the FAB Baltic purposes the two ANSPs will strive to enhance cooperation through the creation of a joint company.

1.2.2 Macroeconomic and traffic forecasts

1.2.2.1 Macroeconomic forecast

[1] See Article 6(4)(A) of the PANSA Act.

[2] The current designation expires in April 2011, after which date – provided that no further designation takes place - PANSA becomes free to identify an alternative meteorological service provider.

After the difficult period for the world and European economy caused by the economic crisis, for the coming years it is expected that the economy will recover and will be developing.

In case of the Polish market it is expected that during the RP1 economic growth will be recorded. The expected GDP growth that was taken into account for the purpose of drafting this Plan is presented in table below. The table shows also the expected inflation trend.

The assumptions that were adopted with regard to inflation and GDP values are compared with publically available data and forecasts provided by national and international institutions[3].

Table 3. Macroeconomic assumptions for Poland for RP1 and reference values.

	2009 A	2010 A	2011 F	2012 F	2013 F	2014 F
Real GDP growth rate (%)						
Assumed for the performance plan purpose	**1,70**	**3,00**	**3,50**	**4,80**	**4,10**	**4,10**
EUROSTAT data	1,70	3,80				
IMF forecast	1,70	2,75	3,24	3,91	3,98	3,97
European Commission forecast	1,70	3,50	3,90	4,20		
Ministry of Finance forecast		3,00	3,50	4,80	4,10	4,00
Inflation rate (%)						
Assumed for the performance plan purpose	**4,00**	**2,70**	**2,30**	**2,50**	**2,50**	**2,50**
EUROSTAT data	4,00	2,70				
IMF forecast	3,45	2,33	2,45	2,50	2,50	2,50
European Commission forecast	4,00	2,60	2,90	3,00		
Ministry of Finance forecast		2,00	2,30	2,50	2,50	2,50
EUR exchange rate (1EUR= … PLN)						
Assumed for the performance plan purpose	**4,32**	**3,99**	**3,80**	**3,80**	**3,80**	**3,80**

[3] The reference values presented in Table 2 are based on the following sources:

- EUROSTAT - actual figures for 2009 and 2010; for GDP: http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsieb020, for inflation: http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&language=en&pcode=tsieb060&tableSelection=1&footnotes=yes&labeling=labels&plugin=1;
- International Monetary Fund – forecasts from the World Economic Outlook database, April 2010, http://www.imf.org/external/pubs/ft/weo/2010/01/weodata/weoselgr.aspx;
- European Commission – forecasts from European Economic Forecast Autumn 2010, http://ec.europa.eu/economy_finance/eu/forecasts/2010_autumn_forecast_en.htm;
- Polish Ministry of Finance – forecasts presented in the Guidance on the use of uniform macroeconomic indicators for estimations of financial consequences of draft bills; http://www.mofnet.gov.pl/_files_/bip/bip_publikacje/2010/wytyczne_do_stosowania_jednolitych_wskaznikow_makro.pdf.

Forecasted inflation rate that was assumed for the purpose of this Plan reflects the forecast of the International Monetary Fund for Poland, which is also in line with national forecasts prepared by the Polish Ministry of Finance. The expected level of inflation is constant during all the years of RP1. GDP growth rate assumed in this Plan is equal to the forecast prepared by the Polish Ministry of Finance. It seems reasonable to align the assumptions of this document with those that shall be used for public finance planning as all three national institutions covered by this Plan are public sector entities.

With regard to EUR exchange rate 2009 and 2010 figures represent the average of the daily "Closing Rates" calculated by Reuters based on daily BID rates as provided by EUROCONTROL for the purpose of calculating actual 2009 and 2010 costs of ANS. Values forecasted for the period of 2011-2014 take into account forecasts published by the main financial institutions in Poland.

For the purpose of cost-efficiency target evaluation Poland will be compared with Nordic States (Norway, Sweden and Finland) which are developed and economically stable countries. For comparison, Table 4 below presents forecasts of inflation and GDP prepared by the International Monetary Fund for these three states. 2009 and 2010 figures are actual figures based on EUROSTAT data.

Table 4. Inflation and GDP for Nordic States.

Country	2009 A	2010 A	2011 F	2012 F	2013 F	2014 F
Real GDP growth rate (%)						
Poland	**1,7**	**3,8**	**3,2**	**3,9**	**4,1**	**4,0**
Finland	-8,2	3,1	2,2	2,2	2,2	2,1
Norway	-1,4	0,4	1,8	1,9	1,9	2,0
Sweden	-5,3	5,5	2,5	3,0	3,5	3,4
Inflation rate (CPI) (%)						
Poland	**4,0**	**2,7**	**2,5**	**2,5**	**2,5**	**2,5**
Finland	1,6	1,7	1,4	1,5	1,6	1,7
Norway	2,3	2,3	1,8	2,5	2,5	2,5
Sweden	1,9	1,9	2,1	2,0	2,0	2,0

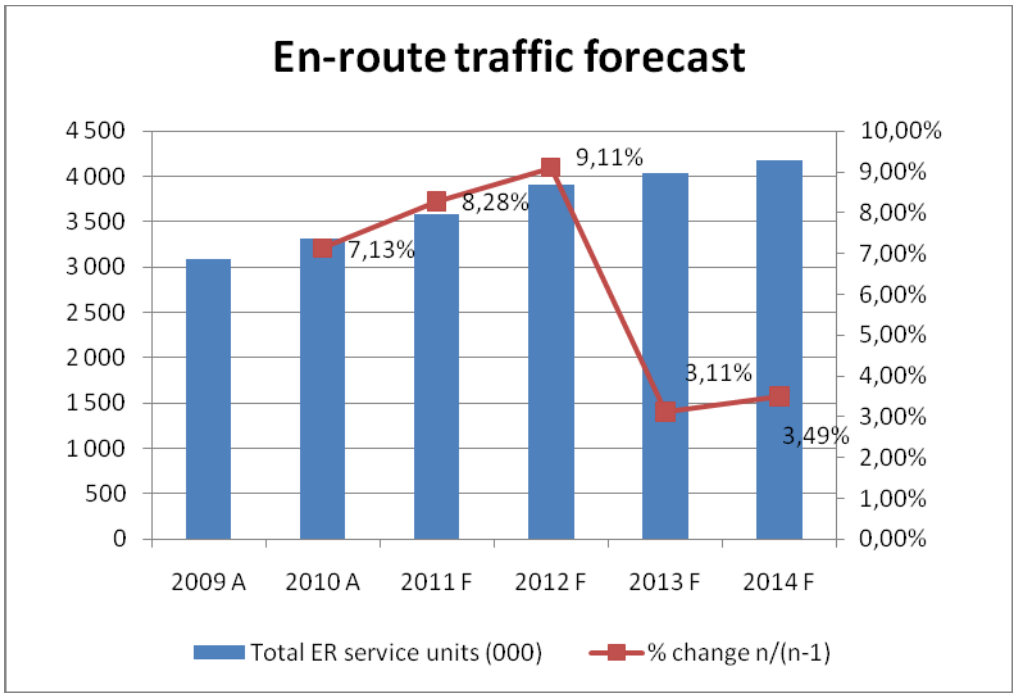
It can be noted that in 2009 Poland was the only country with positive economic growth figure. For RP1 the IMF forecasts increase in GDP in all these states, although Poland is expected to have the highest increase. Additionally it can be added that within the comparator group Poland currently has the lowest level of GDP per capita (for 2009 11,3 thousands USD, while in case of the other states this figure amounted to 79,1 thousands USD for Norway, 44,0 thousands USD for Sweden and 44,4 thousands USD for Finland).

1.2.2.2 Traffic forecast

For the purpose of this Plan with regard to en-route traffic Poland used the forecast prepared by STATFOR in February 2011. The table below presents the assumed traffic variations, both in terms of number of flights (IFR movements) and service units (number of total service units that covers both chargeable and exempted flights). For 2009 and 2010 the numbers are actual data according to STATFOR documentation. 2011 numbers are PANSA's forecasts that were assumed as the basis for establishing 2011 en-route charges. For 2011 STATFOR forecasts traffic in Poland at the level of 3.648 thousands of service units. As 2011 en-route unit rate as approved within the EUROCONTROL Multilateral Route Charges System was based on PANSA's forecast it seems reasonable to maintain this 2011 figure for the purpose of this Plan to avoid any possible incomparability of this plan with the 2011 final cost base and unit rate figures.

Table 5. En-route traffic forecast for RP1.

	2009 A	2010 A	2011 F	2012 F	2013 F	2014 F
Total service units (000)[4]	3 092	3 313	3 587	3 914	4 036	4 177
% change n/(n-1)		*7,13%*	*8,28%*	*9,11%*	*3,11%*	*3,49%*
Number of IFR movements ('000)[5]	566	599	722	687	710	737
% change n/(n-1)		*5,83%*	*20,53%*	*-4,85%*	*3,35%*	*3,80%*



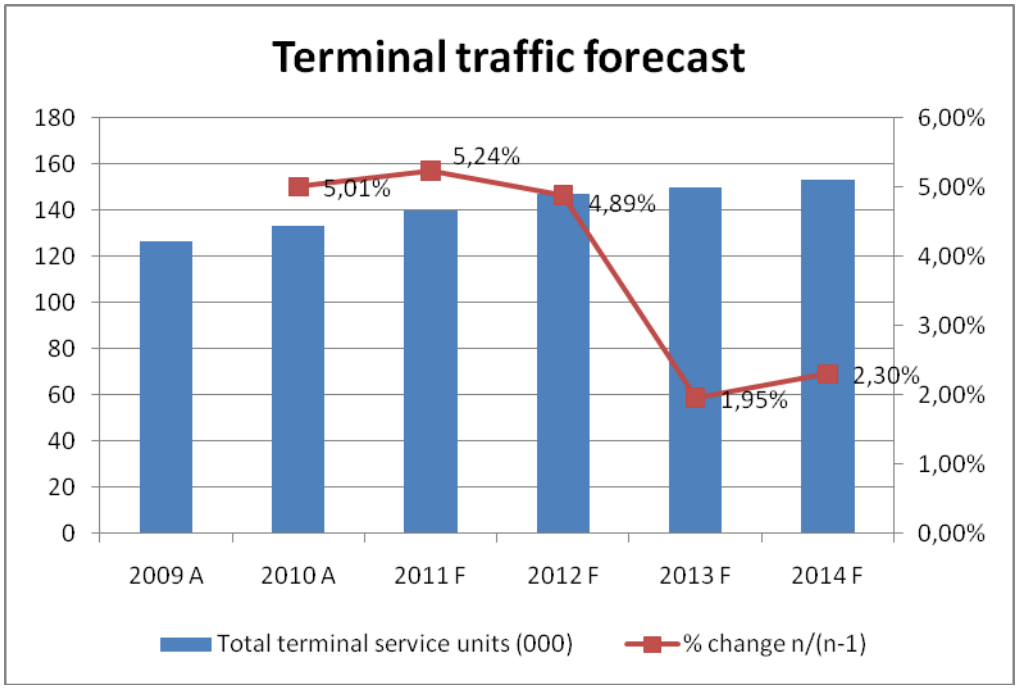
[4] Source: EUROCONTROL Short- and Medium-Term Forecast of Service Units: February 2011 update, except for 2011 data which is PANSA's own forecast

[5] Source: EUROCONTROL Medium-Term Forecast: IFR Flight Movements 2011-2017, except for 2011 data which is PANSA's own forecast.

With regard to terminal traffic forecast this Plan is based on forecast prepared by PANSA. The respective forecast for terminal traffic during RP1 is presented in the table below.

Table 6. Terminal traffic forecast for RP1.

	2009 A	2010 A	2011 F	2012 F	2013 F	2014 F
Total terminal service units (000)	127	133	140	147	150	153
% change n/(n-1)		*5,01%*	*5,24%*	*4,89%*	*1,95%*	*2,30%*
Number of IFR movements ('000)	143	147	156	179	183	187
% change n/(n-1)		*3,27%*	*5,92%*	*14,79%*	*1,95%*	*2,27%*



1.2.3 SRC-SRLD safety Levels and Regulation of Deficiencies

There is lack of legal base to determine an acceptable level of safety as required in ICAO Annex 11, Section 2.27.2. It will be finally done after decision making on a higher ministerial level. Poland at the moment does not have hard and binding regulations that could allow to introduce SSP (State Safety Programme) and the tools to carry out safety oversight activities, as it is defined in ICAO SSP assumptions. Nevertheless, all performed activities have their legitimacy in the existing legislation within the competence of the CAO, and are based on the principles highlighted in ICAO doc 9859 second edition "Just Culture" environment is supported at ANSP and Regulatory level but it is not established at National level.
CAO has a mechanism to collect, evaluate process and store occurrences in aviation (including ATM). And a National Focal Point for safety data is appointed.

The NSA has established a documented process & procedures for issuing Safety Directives.

1.3 Stakeholder consultation.

The formal written consultation, organized by PRB from 2nd August 2010 to 3rd September 2010, focused on setting EU-wide targets in order to elaborate the proposal at the request of the EC. Polish NSA disseminated the survey to all stakeholders and got feedback from the main players (PANSA and LOT Polish Airlines). The Polish NSA provided PRB with responses to the questionnaire taking into consideration outcome of stakeholders consultation. The stakeholders and NSA had a common view only on the safety evidence chapter. As concerns EU-wide environmental target NSA and PANSA agreed that US aviation environment was different to European and the low weight should be given US-EU comparison. LOT Polish Airlines declared benchmarking with US as the improvement driver, moreover underlined that EU-wide environmental targets are not sufficiently challenging. Concerning EU-wide capacity targets NSA supported LOT with the statement that collaborative approach is essential to ensure the correct and intended outcomes of capacity planning across multiple States. Consequently with the use of best ATC practice the small gap between effective capacity and traffic demand could be bridged during the RP1. NSA evaluated the cost-efficiency targets as very ambitious especially after the 2009 crisis. The plan based on the reduction of the determined unit cost of 4,5 – 5 per cent per annum would be too optimistic. The reductions in unit costs may require longer time and may not be achievable in the short term.

The threshold of 10%, based on the difference between actual traffic and baseline traffic forecast, consistent with the charging regulation was assessed as being reasonable for NSA and Polish Airlines LOT.

1.3.1 The consultation event is provided on 11 or 12 May 2011. The invitation letter with the draft of national performance plan will be sent to stakeholders three weeks before meeting (before 20 April 2011) – after acceptation of this document by President of CAO.

2. NATIONAL PERFORMANCE TARGETS AND ALERT THRESHOLDS FOR RP1

Legislation, reference document • Commission Regulation (EU) No 691/2010 of 29 July *2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005 laying down common requirements for the provision of air navigation services* (Regulation 691/2010);	Article 10, clause 3 (d) Article 18, clause 3
Annex I of the Regulation 691/2010	Section 2
Annex II of the Regulation 691/2010	Sub point 2.1 of template

2.1 Performance targets and alert thresholds for RP1

2.1.1 Key Performance Areas and Key Performance Indicators with associated targets adopted at national level.

Below there are presented reference to each key performance indicator, for the entire reference period, with annual values to be used for monitoring and incentive purposes.

(a) Safety Indicators:

- Effectiveness of safety management as measured by a methodology based on the ATM Safety Maturity Survey Framework. This indicator shall be developed jointly by the Commission, the Member States, EASA and Eurocontrol and adopted by the Commission prior to the first reference period. During this first reference period, national supervisory authorities will monitor and publish these key performance indicators, and Member States may set corresponding targets. National individual target is to increase the SMS maturity level by one notch (compared to the baseline established at the turn of 2010/2011) at the end of the first reference period compliant with SES II (until 2014) due to the adopted methodology.
- Application of the severity classification of the Risk Analysis Tool to allow harmonized reporting of severity assessment of Separation Minima Infingement, Runway Incursion and ATM Specific Technical Events at all Air Traffic Control Centres and airports with more than 150 000 commercial air transport movements per year within the scope of this Regulation (yes/no value). The severity classification shall be developed jointly by the Commission, the Member

States, EASA and Eurocontrol and adopted by the Commission prior to the first reference period. During this first reference period, national supervisory authorities will monitor and publish these key performance indicators, and Member States may set corresponding targets. There is no target provided for this KPI;

- Reporting of just culture. This measure shall be developed jointly by the Commission, the Member States, EASA and Eurocontrol and adopted by the Commission prior to the first reference period. During this first reference, national supervisory authorities will monitor and publish this measure, and Member States may set corresponding targets. There is no target provided for this KPI.

(b) Capacity Indicators:

- Minutes of en route ATFM (Air Traffic Flow Management) delay per flight, defined as follows:
  (a) the en route ATFM delay is the delay calculated by the central unit of ATFM as defined in Commission Regulation (EU) No 255/2010 of 25 March 2010 laying down common rules on air traffic flow management and expressed as the difference between the take-off time requested by the aircraft operator in the last submitted flight plan and the calculated take-off time allocated by the central unit of ATFM;
  (b) the indicator includes all IFR flights within European airspace and covers ATFM delay causes;
  (c) the indicator is calculated for the whole calendar year.

Table 7. The target for the mandatory capacity KPI for Reference Period 1

Capacity KPI	2012	2013	2014
	Intermediate value	Intermediate value	Target
Indicative reference value calculated for Poland	0,32	0,31	0,26
Minutes of en route ATFM delay per flight (national target)	2	1	0,6

- Specific airport ANS-related capacity issues.
  (a) the total of ATFM delays attributable to terminal and airport air navigation services;
  (b) the additional time in the taxi out phase;

(c) for airports with more that 100 000 commercial movements per year the additional time for ASMA (Arrival Sequencing and Metering Area).

(c) Environment Indicator:

- The average horizontal en route flight efficiency, defined as follows:
  - the average horizontal en route flight efficiency indicator is the difference between the length of the en route part of the actual trajectory and the optimum trajectory which, in average, is the great circle,
  - 'en route' is defined as the distance flown outside a circle of 40 NM around the airport,
  - The flights considered for the purpose of this indicator are:
    (a) all commercial IFR (Instrumental Flight Rules) flights within European airspace;
    (b) where a flight departs or arrives outside the European airspace, only that part inside the European airspace is considered,
  - circular flights and flights with a great circle distance shorter than 80 NM between terminal areas are excluded

(d) Cost Efficiency Indicator:

- Determined unit rate for en route air navigation services, defined as follows:
  (a) the indicator is the result of the ratio between the determined costs and the forecast traffic contained in the performance plan;
  (b) the indicator is expressed in national currency and in real terms;
  (c) the indicator is provided for each year of the reference period.

2.1.2 National alert thresholds

In application of article 18.2 of the Regulation 691/2010 for RP1 for en-route services Poland adopts alert thresholds at national level compliant with those set by the Commission in article 2 of Commission Decision of 21 February 2011 *setting the European Union – wide performance targets and alert threshold for the provision of air navigation services for the years 2012-2014*:

- with regard to traffic – for deviation over a calendar year by at least 10% of the actual traffic expressed in service units in FIR Warszawa as compared to the forecast presented in this plan.
- with regard to the cost-efficiency area concerning the determined costs – deviation over a calendar year by at least 10% of the actual costs at the national

level expressed in PLN as compared to the reference national determined costs presented in this chapter.

If at least one of the above thresholds is exceeded during RP1 Poland will verify and possibly adjust the respective en-route target, but only provided that those thresholds were exceeded as a result of external circumstances that were unforeseeable at the time when this performance plan was adopted and that they were beyond the control of the entities subject to this plan.

2.1.3 National targets and alert thresholds – summarized

Poland does not adopt the alert thresholds activating incentive scheme in case of differences between the targets and real data in Key Performance Area capacity.

With regard to cost efficiency incentives on ANSP will be activated in accordance with provisions of article 11a of the amended Charging Regulation.

The table below summarizes the national KPI and targets with thresholds for reference period 1.

Table 8. Presentation of the national targets and thresholds for RP1

KPA	KPI	National targets			National thresholds
		2012	2013	2014	
(a) safety	Effectiveness of safety management			***To be developed***	
	Application of the severity classification of the Risk Analysis Tool	**No targets**	**No targets**	**No targets**	
	Reporting of just culture	**No targets**	**No targets**	**No targets**	
(b) capacity	Minutes of en route ATFM (Air Traffic Flow Management) delay per flight	**2**	**1**	**0,6**	
	Specific airport ANS-related capacity issues	**No targets**	**No targets**	**No targets**	
(c) environment	the average horizontal en route flight efficiency,				
(d) cost-efficiency	determined real unit rate for en route air navigation services in PLN	**140,07** ***[146,22]***	**138,74** ***[144,90]***	**135,94** ***[142,11]***	deviation of ER SU by at least 10% deviation of ER determined costs by at least 10%

2.1.4 The detailed description of each KPI for each KPA and means of implementation and achievement of EU-wide and national targets:

(a) Safety

Legislation, reference document: • Annex I of the Regulation 691/2010 • Annex II of the Regulation 691/2010 • Annex III of the Regulation 691/2010 • Annex II of the Commission Regulation (EC) No 2096/2005 of 20 December *2005 laying down common requirements for the provision of air navigation services*; • *ATM Safety Framework Maturity Survey* – Methodology for ANSPs; • *Risk Analysis Tool* • *ESARR 2 Reporting and Assessment of Safety Occurrences in ATM;* • *ESARR 2* Guidance to ATM Safety Regulators – *Severity Classification Scheme for Safety Occurrences in ATM;* • *ESARR* Advisory Material/Guidance Document (EAM 2/GUI 6) *Establishment of 'Just Culture' Principles in ATM Safety Data Reporting and Assessment*	Section 2, item 1 Sub point 2.1 (a) of template Clause 2 Sub point 3.1.1

2.1.5 – No EU-wide targets for safety in RP 1;
2.1.6 – The safety KPIs will be developed prior to the RP1

(a) effectiveness of safety management shall be monitored with reference to the following areas of safety management according to Annex II of Commission Regulation (EC) 2096/2005 of 20 December *2005 laying down common requirements for the provision of air navigation services*:

- general safety requirement;
- requirements for safety achievement;
- requirements for safety assurance;
- requirements of safety promotion;

According to *ATM Safety Framework Maturity Survey* – Methodology for ANSPs above mentioned areas of safety shall be monitored with regard to methodology contained in this document and with reference to the following maturity categories:

- initiating;
- planning/initial implementation;
- implementing;

- managing and measuring;
- continuous improvement

The assessment shall be conducted by means of completing the questionnaire and telephone call and face-to-face interviews. The results will be presented according to methodology stemming from *ATM Safety Framework Maturity Survey* – Methodology for ANSPs in quantitative manner (data developed from an analysis of replies provided by respondents) and qualitative manner (data from the telephone interviews and collected through any random visits made to ANSPs).

(b) Application of the severity classification of the Risk Analysis Tool to allow harmonized reporting of severity assessment of Separation Minima Infrigement, Runway Incursion and ATM Specific Technical Events at all Air Traffic Control Centre and airports with more than 150 000 commercial air transport movements per year within the scope of this Regulation.

The requirements concerning the implementation by States of an Occurrence Reporting and Assessment Scheme for Air Traffic Management (ATM) Safety is covered by EUROCONTROL Safety Regulatory Requirement (ESARR) – ESARR 2 *Reporting and Assessment of Safety Occurrences in ATM* and its Guidance Material – especially ESARR 2 Guidance to ATM Safety Regulators – *Severity Classification Scheme for Safety Occurrences in ATM*. According to Appendix A to ESARR 2 there are mentioned occurrences to be reported and analysed. Among others there are separation minima infringement, runway incursion (divided in two categories – where avoiding action was necessary and where no avoiding action is necessary) and ATM Specific Technical Events (ATM specific occurrences). ESARR 2 Guidance to ATM Safety Regulators – *Severity Classification Scheme for Safety Occurrences in ATM* defines two Severity Classification Schemes for safety occurrences in ATM:

- One that allows the classification of occurrences according to the severity of their effect on the safe operations of aircraft and occupants; it enables to determine the actual level of risk that existed for aircraft and occupants;
- One that allows the classification of occurrences according to the severity of their effect on the ability to provide safe Air Traffic Management Services.

The severity of an accident is to be expressed according to:

- the levels of damage to the aircraft (ICAO Annex 13 identifies four levels: destroyed, substantially destroyed, slightly damaged and no damage);
- the type and number of injuries (ICAO Annex 13 identifies three levels of injuries: fatal, serious and minor/none).

Table 9. Classification Schemes for incidents consists of categories of severity for the risk that existed and for the frequency of their occurrence.

Severity	A	Serious incident	A1	A2	A3	A4	A5
	B	Major incident	B1	B2	B3	B4	B5
	C	Significant incident	C1	C2	C3	C4	C5
	D	Not determined	D1	D2	D3	D4	D5
	E	No safety effect	E1	E2	E3	E4	E5
			1	2	3	4	5
			Very frequent	Frequent	Occasional	Rare	Extremely rare
			FREQUENCY (RISK)				

The investigation of occurrences shall be conducted follow the Risk Analysis Tool. The Risk Analysis Tool (RAT) provides a method for consistent and coherent identification of risk element. It also allows users to effectively prioritise actions designed to reduce the effect of those elements.

The RAT tool has evolved over time to be a sophisticated yet simple program for quantifying the level of risk present in any air incident. Requiring only a brief series of program inputs to produce a valid result, the tool expresses the relationship between actions and consequences and provides a quantifiable value to these relationships.

The RAT is not a risk mitigation tool in and of itself. Instead, it allows the analysis of a single event in order to understand the factors involved and then place the event in context with other events.

The objective of the safety occurrence classification exercise is to produce a severity and risk or recurrence assessment for safety occurrences (refer to ESARR 2 requirement 5.1.6 “the severity of each occurrence is determined, the risk posed by each such occurrence classified, and the results recorded”).

The evaluation should therefore assess the likely consequence of such occurrence(s), including the question as to whether it is likely to re-occur and the likelihood of it doing so.

The marksheet system retains the principles of a question-based scoring system as it provides an objective basis for judgement which is easy to use.

Table 10. The types of safety occurrence with marksheet to use.

Number of aircraft involved	Marksheet to use	purpose
More than one aircraft	1	When 2 or more aircraft are involved in the occurrence – usually for incidents with airborne aircraft, e.g. usually involving separation minima infrigements or inadequate separations.
Aircraft-aircraft tower	2	When the occurrence is in encounter between two aircraft under tower control. This includes situations where: a) both aircraft are airborne; b) both aircraft are on the ground; c) one aircraft is airborne and one aircraft is on the ground.
Aircraft with ground movement	3	When the occurrence is an encounter between aircraft and a vehicle. In this situation, the aircraft could be on the ground or it could be airborne.
One aircraft	4	When only one aircraft is involved in the occurrence (e.g. an airspace infringement, a level bust without a second aircraft involvement, a loss of separation with ground and/or obstacles). The near-CFIT occurrences should be assessed with this marksheet.
ATM specific occurence	5	To be applied in the cases of technical occurrences influencing the capability to provide safe ATM services.

Within each section there are two types of marksheet, one for quantitative analysis of an ATM occurrence and one for qualitative analysis. In cases where more than one controller and/or more than one pilot crew were involved in the incident with different performances, there is generally a preference noted from the practice, to use the quantitative marksheet. This is probably because more flexibility in granting marks is allowed when using the quantitative version of the marksheet.

Each marksheet has two key sections:

Severity – the overall severity of one occurrence is built up from the risk of collision/proximity (separation and rate of closure) and the degree of controllability over the incident. There is also a specific spreadsheet to enable the scoring of ATM specific occurrence (i. e. technical incidents affecting the capability to provide safe services) where the severity is looked at differently i. e. ti considers the failure critically, the coverage of the failure and the required time to restore the ATM function affected or to fail-safe to a degraded mode by introducing contingency measures.

The ATM elements in the marksheet include three columns covering ground airborne and ATM overall segments (except for the marksheet dealing with ATM

specific occurrences, which are ATM ground only). In the risk of collision section, only one should be used to record either the ATM ground or the ATM airborne part, never both. The ATM airborne column should be used to score the ATM airborne part only in cases where ATC is not responsible for providing separation (i. e. certain classes of airspace – e. g. close encounter between IFR and VFR flights in Class E airspace).

In the controllability section the ATM airborne column is used to record the pilot execution and the effectiveness of the airborne safety nets.

The score in the ATM overall column is automatically calculated and represents the overall score for both ATM ground and ATM airborne for each criteria being scored.

Repeatability – this section computes the probality that a similar occurrence will recur in the future.

Both these sections have a number of sub elements to be scored. For each specific situation the values are not fixed and can be adjusted by the investigator within the provided values.

At the top of each marksheet is an overall set of indicators that provide an ongoing dynamic view of how the severity and risk of recurrence classification is progressing as users work through the marksheet.

(c) reporting of just culture: general definition of 'just culture' is given in Commission Regulation (EU) 691/2010. According to this definition, "*Just culture means a culture in which front line operators or others are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but where gross negligence, willful violations and destructive acts are not tolerated*". More detailed explanation is included in ESARR Advisory Material/Guidance Document (EAM 2/GUI 6) *Establishment of 'Just Culture' Principles in ATM Safety Data Reporting and Assessment*. This document characterizes 'just culture' "as an atmosphere of trust in which people are encouraged (even rewarded) for providing essential safety-related information, but in which they are also clear about where the line must be drawn between acceptable and unacceptable behaviour. A 'just culture' refers to a way of safety thinking that promotes a questioning attitude, is resistant to complacency, is committed to excellence, and fosters both personal accountability and corporate self-regulation in safety matters. A 'just' safety culture is both attitudinal as well as structural, relating to both individuals and organizations. Personal attitudes and corporate style can enable or facilitate the unsafe acts and conditions that are the precursors to accidents and incidents. The culture requires active identification of safety issues and the development of appropriate remedial action. 'Just culture' is one

of the element of ‘safety culture’ in organization. Apart from mentioned above ‘just culture’ the ‘safety culture’ is composed from the following elements:

- ‘informed culture’ – means those who manage and operate the system have current knowledge about the human, technical, organizational and environmental factors that determine the safety of the system as a whole;
- ‘reporting culture’ – means an organizational climate in which people are prepared to report their errors and near-misses;
- ‘learning culture’ – means an organization must posses the willingness and the competence to draw the right conclusions from its safety information system and the will to implement major reforms;
- ‘flexible culture’ – means a culture in which an organization is able to reconfigure themselves in the face of high tempo operations or certain kinds of danger – often shifting from the conventional hierarchical mode to a flatter mode.

The principles of ‘just culture’ are as follows:

- Evaluating the benefits of punishment versus learning from unsafe acts;
- Learning from unsafe acts;

It can be identified 6 following pre-requisites for a ‘just culture”

- MOTIVATION and PROMOTION
  Staff must be motivated to report and the trend must be maintained.
- EASE of REPORTING
  Reporting occurrences must be made as easy as possible and staff must not perceive reporting as an extra task.
- ACKNOWLEDGEMENT
  Reporters like to know whether their report was received and what will happen to it, what to expect and when.
- INDEPENDENCE
  Some degree of independence must be granted to the managers of the reporting system.
- FEEDBACK
  Feedback to reportees and other stakeholders is essential, otherwise the system will die out.
- TRUST
  All of this can only happen if TRUST between reporters and the managers of the reporting system genuinely exists.

The key aspect of ‘just culture’ is the line must be drawn between acceptable and unacceptable behaviour. It is necessary to agree on a set of principles for drawing this line.

A ‘just culture’ can lead not only to increased event reporting, particularly of previously unreported occurrences, but also to the identification of trends that provide opportunities to address latent safety problems.

A lack of reported events is not indicative of a safe operation, and likewise, an increase in reported events is not indicative of a decrease in safety. Event reporting illuminates potential safety concerns, any increase in such reporting should be seen as a healthy safety indicator (increased reporting).

It can be expected that a ‘just culture’ will enhance the organization’s effectiveness by defining job performance expectations, establishing clear guidelines for the consequences of deviance from procedures and by promoting the continuous review of policies and procedures. The ultimate objective is to improve safety.

‘Just culture’ can allow an organization to be better able to determine whether violations are occurring infrequently, or if deviation from established procedures has become normalized among its front-line employees and supervisors (safer system). Eight steps to create and implement a ‘just culture’:

- Redce the legal impediments;
- Establish methods of reporting and assessment;
- Determine roles and responsibilities, tasks and timescale;
- Reporting from development;
- Development of a template for feedback to potential users;
- Develop a plan for educating the users and implanting the system;
- Developing and maintaining the right ‘culture’;
- Employee involvement. Ensure employee involvement so that they are committed to the need to be actively involved in decision making and the problem solving process.

2.1.7 – 2.1.8 The additional safety KPIs and target will be developed by Polish Air Navigation Services Agency;

Referring to Status of State Safety Programme of Poland stemming from the standard 2.27.1 ICAO Annex 11 (amendment 47-B from 20th July 2009) the situation is as follows:

There is lack of legal base to determine an acceptable level of safety as required in ICAO Annex 11, Section 2.27.2. It will be finally done after decision making on a higher ministerial level. Poland at the moment does not have hard and binding regulations that could allow to introduce SSP and the tools to carry out safety oversight activities, as it is defined in ICAO SSP assumptions. Nevertheless, all performed activities have their legitimacy in the existing legislation within the competence of the CAO, and are based on the principles highlighted in ICAO doc 9859 second edition A "Just Culture" environment is supported at ANSP and Regulatory level but it is not established at National level.

CAO has a mechanism to collect, evaluate process and store occurrences in aviation (including ATM). And a National Focal Point for safety data is appointed. The NSA has established a documented process & procedures for issuing Safety Directives.

(b) Capacity

Legislation, reference document:	
• Annex I of the Regulation 691/2010; • Annex II of the Regulation 691/2010; • Annex III of the Regulation 691/2010 • *ICAO Doc 4444 PANS ATM 15 ed 2007* • Operational Manuals *of Polish Air Navigation Services Agency (AMC POLAND, FMP POLAND and ACC WARSZAWA);*	Section 1, item 3.1 Section 2, item 3.1 Sub point 2.1 (b) of template Clause 4

2.1.9 — Minutes of en route ATFM delay per flight;

National target will be compromise reached between the EUROCONTROL (CFMU) target proposal and target indicated by PANSA stemming from current capacity of Polish ATS.

2.1.10 The en route ATFM delay is the delay calculated by the central unit of ATFM as defined in Commission Regulation (EC) 255/2010 on ATFM and expressed as the difference between the take-off time requested by the aircraft operator in the last submitted flight plan and the calculated take-off time allocated by the central unit of

ATFM. All IFR flights and all ATFM delay causes shall be considered for the whole calendar year. This indicator is to be given for each year of the reference period.

The capacity of an ATS system depends on many factors, including the ATS route structure, the navigation accuracy of the aircraft using the airspace, weather-related factors, and controller workload. Every effort should be made to provide sufficient capacity to cater to both normal and peak traffic levels; however in implementing any measures to increase capacity, the responsible ATS authority shall ensure, that safety levels are not jeopardized[6].

Air traffic flow management (ATFM) service shall be implemented for airspace where traffic demand at times exceeds the defined ATC capacity.

ATFM is provided in centralized manner in all ICAO European Region – by CFMU – which is localized in EUROCONTROL Headquater (Brussels). For this reason ATFM shall be considered as ATFCM (air traffic flow and capacity management).

ATFM on level of FIR Warszawa is provided by Flow Management Position Warszawa (FMP Warszawa). The function of FMP Warszawa is to provide the capacity of the individual aerodromes, sectors and significant points to CFMU and cooperate with CFMU in the scope of ATFCM problems solution in FIR Warszawa. FMP Warszawa cooperates with airspace users in cases connected with ATFCM.

Airspace of FIR Warszawa is divided in 8 sectors (B, C, D, G, J, R, SE, T – sectors S and E are usually joined). Each sector has declared by PANSA capacity (declared and occupancy – means the quantity of aircraft on communication.

As from the second reference period, a second European Union-wide capacity indicator (KPI) shall be developed on the basis of the monitoring described in the specific airport ANS-related capacity issues.

In order to prepare the development of this second KPI, it shall be collected, consolidate and monitor as from first reference period:

(a) the total of ATFM delays attributable to terminal and airport air navigation services; Each Airport has declared capacity of runways;

(b) the additional time in the taxi out phase;

- each airport has standard taxiways for landing and take-off;
- number of operations – queue before runway;

(c) for airports with more that 100 000 commercial movements per year the additional time for ASMA (Arrival Sequencing and Metering Area).

[6] ICAO Doc 4444 PANS ATM 15 ed 2007 chapter 3

2.1.11 For the purpose of setting capacity targets, the capacity planning process of Eurocontrol will communicate so-called reference values for each en-route operational unit, corresponding to the individual contribution to achieve the EU-wide target. These figures are expected to be communicated by the end of January 2011 (preliminary figures) and by the end of March 2011 (figures updated with the February STATFOR traffic forecast).

2.1.12 The Polish performance plan concerns Polish airspace in its operational boundaries.

2.1.13 The target for the manadatory capacity KPI for Reference Period 1 is set out in Table 11 below. The table includes reference values calculated for Poland by the EUROCONTROL (CFMU) and values proposed as national target which is compromise between values indicated by PANSA and EUROCONTROL (CFMU) values.

Table 11. The reference values for the mandatory capacity KPI for Reference Period 1

Capacity KPI	2012	2013	2014
	Intermediate value	Intermediate value	Target
Indicative reference value calculated for Poland	0,32	0,31	0,26
Minutes of en route ATFM delay per flight	2	1	0,6

(c) Environment

Legislation, reference document:	
• Annex I of the Regulation 691/2010; • Annex II of the Regulation 691/2010; • Annex III of the Regulation 691/2010 • Regulation (EC) No 1070/2009 of the European Parliament and of the Council of 21 October *2009 amending Regulation (EC) No 549/2004, (EC) No 550/2004, (EC) No 551/2004 and (EC) No 552/2004 in order to improve the performance and sustainability of the European aviation system*; • *IATA/EUROCONTROL/CANSO Flight Efficiency Plan. Fuel and emission savings*;	Section 2, item 2.1 Sub point 2.1. (c) of template Clause 3 Recital 24 of the preambule Article 6.1

2.1.16 Environment target: an improvement by 0.75% point of the average horizontal en route flight efficiency indicator in 2014 as compared to the situation in 2009 — description of the national improvement process on route design (optional in the first reference period).

2.1.17 The first European Union-wide environment KPI shall be the average horizontal en route flight efficiency, defined as follows:

- the average horizontal en route flight efficiency indicator is the the difference between the length of the en route part of the actual trajectory and the optimum trajectory which, in average, is the great circle,
- "en route" is defined as the distance flown outside a circle of 40 NM around the airport,
- The flights considered for the purpose of this indicator are:

(a) all commercial IFR flights within European airspace;

(b) where a flight departs or arrives outside the European airspace, only that part inside the European airspace is considered,

- circular flights and flights with a great circle distance shorter than 80 NM between terminal areas are excluded.

In measuring en route horizontal flight-efficiency only the portion of the trajectory within European airspace and outside a 40 nautical mile circle around the airports of departure and destination is considered. For aircraft leaving or entering European airspace: only the portion of the flight within European airspace is included.

The KPI compares two quantities:

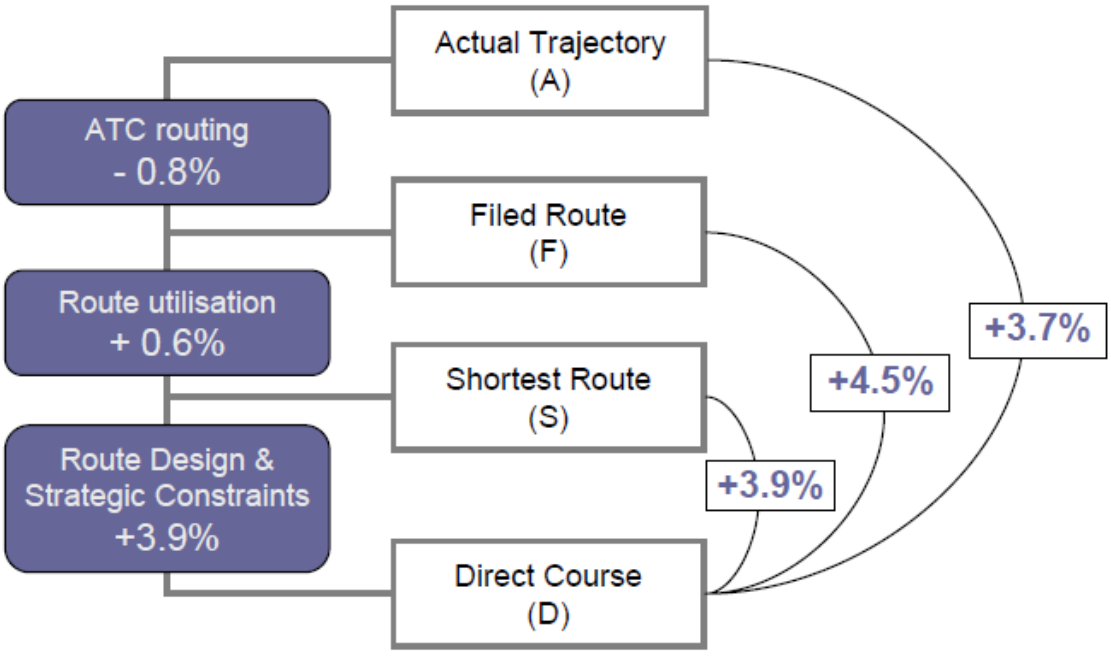
- A, the actual trajectory of the en route section;
- D, the direct en route course (i. e. the great circle distance) between the entry and exit points (i. e. excluding a 40 nm circle around the airport).

It is recognized that the great circle distance may not always be the optimum (e. g. because of wind) and may not always be achievable due to inherent necessary (safety) and desired (noise, capacity) limitations.

In 2009 the overall average direct horizontal en route extension was 3.7%, which constituted favourable factors such as ATC routing as well as unfavourable factors such as inefficiencies in route utilization and design.

Table 12. A schematic illustration of the average direct horizontal en route extension.

highlighting the three areas where ANS has an impact: (1) en route design and strategic constraints, (2) route utilization, and (3) ATC routing.



- Actual trajectory is the actual route flown by the aircraft;
- Filed route is the route extracted from the last filed flight plan;

- Shortest route is the shortest available route at time of filling plan;
- Direct course is the great circle distance between terminal entry points from ADEP/ADES or entry/exit into European area.

Route Design & Strategic Constraints concerns the design of the route structure, including any limitations on use, as defined in the strategic phase.

Route utilization concerns the actual utilization of available routes for flight planning in the pre-tactical phase.

ATC routing concerns ATC providing aircraft with direct tracks, when traffic and airspace availability permits, in the tactical phase. This would also include any path stretching due to capacity constraints (not common in European en route airspace).

The actual trajectory was measured (A) using CFMU current flight profile: a combination of flight plan and actual surveillance data. The CFMU flight profile is updated if surveillance data are received and if they show a significant deviation from the flight plan data

It is therefore proposed that for RP1 the target should be based on the route extension computed from the flight plan. Using flight plan data will not provide information on flight extension due to holding nor will it provide information on short cuts provided by ATC.

This is the reason which Poland did not adapted the target in environment KPA. According PL position average horizontal en route flight-efficiency KPI should not be based on the last filed flight plan (due to reason above mentioned).

2.1.18 The European Community's Single European Sky (SES) legislation identifies in recital 24 of the regulation 1070/2009 that: "The EATMN should be designed and implemented with a view to achieving the safety, environmental sustainability, capacity enhancement and improved cost-efficiency of the whole air transport network". Moreover art. 6.1 of this regulation says: "The air traffic management (ATM) network functions shall allow optimum use of airspace and ensure that airspace users can operate preferred trajectories, while allowing maximum acces to airspace and air navigation services…" paragraph 2 of Art. 6 provides: "In order to achieve the objectives referred to in paragraph 1 and without prejudice to the responsibilities of the Member States with regard to national routes and airspace structures, the Commission shall ensure that following functions are carried out:

(a) design of the European route network;"

According to IATA/EUROCONTROL/CANSO Flight Efficiency Plan. Fuel and emission savings, there was developed action plan in 5 points containing the measures which can lead to to fuel savings in the short term. This 5 points are as follows:

1. enhancing European en-route airspace design through annual improvements of European ATS route network, high priority being given to:
    - implementation of a coherent package of annual improvements and of shorter routes;
    - improving efficiency for the most penalized city pairs;
    - implementation of additional Conditional Routes for main traffic flows;
    - supporting initial implementation of free route airspace;
2. improving airspace utilization and route network availability through:
    - actively support and involve aircraft operators and the computer flight plan service providers in flight plan quality improvements
    - gradually applying route availability restrictions only where and when required;
    - improving the utilization of civil/military airspace structures;
3. efficient TMA design and utilization, through;
    - implementation advanced navigation capabilities;
    - implementing Continuous Descent Approach (CDAs), improved arrival/departure routes, optimized departure profiles, etc.
4. Optimising airport operations, through:
    - implementation of Airport Collaborative Decision Making.
5. Improving awareness of performance

(d) Cost-efficiency

Legislation, reference document:	
• Annex I of the Regulation 691/2010;	Section 2, item 4.1
• Annex II of the Regulation 691/2010;	Sub point 2.1. (d) of template
• Annex III of the Regulation 691/2010	Point 5
• Commission Regulation No 1794/2006 of 6 December 2006 laying down a common charging scheme for air navigation services as amended by Regulation 1191/2010	
• EUROCONTROL Principles for establishing cost base for en-route charges	

This part presents national target in the cost-efficiency area for the mandatory KPI defined in Section 2 of Annex I to the Commission Regulation (EU) No 691/2010 of 29 July 2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005 laying down common requirements for the provision of air navigation services for RP1.

Table 13. National en-route cost-efficiency target for RP1 (current allocation)

En-route cost-efficiency KPI	2011	2012	2013	2014	Annual average	Total % change
	Basic value	Target	Target	Target	% change in RP1	in RP1 (2014 vs. 2011)
Real en-route determined unit rate (in national currency at 2009 prices)	148,39	140,07	138,74	135,94	**-2,88%**	**-8,39%**
Real en-route determined costs (in national currency at 2009 prices)	532 316	548 256	559 970	567 840	**2,18%**	**6,67%**
Service units forecast	3 587	3 914	4 036	4 177	**5,20%**	**16,44%**

This cost-efficiency target covers four entities whose costs are included in the en-route charges' cost base: Polish Air Navigation Services Agency (ca. 91% of the total determined costs), Institute of Meteorology and Water Management (ca. 3% of the total

determined costs), Civil Aviation Office (ca. 1,2% of the total determined costs) and EUROCONTROL (ca. 5% of the total determined costs).

[alternative version – new allocation between ER and TNC:

Table 13. National en-route cost-efficiency target for RP1 (new allocation)

En-route cost-efficiency KPI	*2011*	*2012*	*2013*	*2014*	*Annual average*	*Total % change*
	Basic value	*Target*	*Target*	*Target*	*% change in RP1*	*in RP1 (2014 vs. 2011)*
Real en-route determined unit rate (in national currency at 2009 prices)	*148,39*	*146,22*	*144,90*	*142,11*	***-1,43%***	***-4,23%***
Real en-route determined costs (in national currency at 2009 prices)	*532 316*	*572 303*	*584 833*	*593 614*	***3,70%***	***11,52%***
Service units forecast	*3 587*	*3 914*	*4 036*	*4 177*	***5,20%***	***16,44%***

This cost-efficiency target covers four entities whose costs are included in the en-route charges' cost base: Polish Air Navigation Services Agency (ca. 91% of the total determined costs), Institute of Meteorology and Water Management (ca. 2,9% of the total determined costs), Civil Aviation Office (ca. 1,1% of the total determined costs) and EUROCONTROL (ca. 5% of the total determined costs).]

Further, more detailed information on the values presented in the above table is provided in chapter 2.2 (justification for consistency of the national target with EU-wide target) and in chapter 3 (description with regard to each of the accountable entities).

2.2. Consistency with the EU-wide targets.

(a) Safety

2.2.4 In the Commission Regulation (EU) No 691/2010 of 29 July 2010[7] the following performance safety indicators were laid down:

1) The first safety KPI corresponds to the effectiveness of safety management as measured by a methodology based on the ATM Safety Maturity Survey Framework. This indicator shall be developed jointly by the Commission, the Member States, EASA and Eurocontrol and adopted by the Commission prior to the first reference period.

[7] Commission Regulation (EU) No 691/2010of 29 July 2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005 laying down common requirements for the provision of air navigation services.

2) The second safety KPI corresponds to the application of the severity classification of the Risk Analysis Tool to allow harmonized reporting of severity assessment of Separation Minima Infringement, Runway Incursions and ATM Specific Technical Events at all Air Traffic Control Centres and airports with more than 150 000 commercial air transport movements per year. The severity classification shall be developed jointly by the Commission, the Member States, EASA and Eurocontrol and adopted by the Commission prior to the first reference period.
3) The third safety KPI is the reporting of "Just Culture". This measure shall be developed jointly by the Commission, the Member States, EASA and Eurocontrol and adopted by the Commission prior to the first reference period. During this first reference period, national supervisory authorities will monitor and publish this measure, and Member States may set corresponding targets.

Acting in compliance with the applicable law and regulations PANSA's core responsibility involves the provision of high-quality safety level achieved as a result of efficient work of air traffic services and systems. Therefore the Agency is committed to maintaining and developing of the ATM Safety Management System (SMS) within the meaning of ICAO, Eurocontrol and EU law provisions whose underlying, primarily objective is the assurance that every aspect related to the safe provision of air traffic management services is dealt with in a due and sufficient manner resulting from the application of measures reflecting the entire scope of actual responsibility for the safety.

In view of the above the Agency aims to deliver and maintain high-level safety standards independently of any possible economic, environment or social considerations.

(b) capacity

2.2.5 Commission Regulation (EU) No 691/2010 determines the en-route delays indicator (in en-route flight minutes). European Union-wide target for that indicator approved by European Commission for the first reference period assumes achievement of e-route ATFM delay indicator in 2014 at the level of 0,5 min/flight. The EU en-route delay target was broken down at ANSP and ACC level by EUROCONTROL. CFMU, as future *Network Manager Directorate (DNM),* proposes the following values for Poland: 0,32 min/flight for 2012, 0,31 min/flight for 2013, 0,26 min/flight for 2014 (mathematical ANSP breakdown).

2.2.6 Taking into consideration the technical limitations and current operational implementation of new ATM system – Pegasus_21 and still present shortages of qualified operational staff (air traffic controllers – mainly ACC/APP), PANSA will not be able to fulfill DNM proposed targets. Bearing in mind that the target should be ambitious and realistic at the same time, PANSA proposes to set the national target as stated in table below. These targets indicate significant improvement in terms of capacity on the one hand and at the same time remains realistic.

Table 14. ATFM en-route delays value (in minutes per flight) in 2008-2014.

Year	**2008** actual	**2009** actual	**2010** actual	**2011** forecast	**2012** forecast	**2013** forecast	**2014** forecast
Delays value	2,0	1,6	1,1	3	2	1	0,6
% change year/year-1		-16%	-31%	173%	-33%	-50%	-40%

It is important to note that the PRR (*Performance Review Report*) data in Annex I for Poland are not consistent with official CFMU Network Operations Reports (NORs) as well as with CFMU ATFCM Monthly Summary per ACC. In order to maintain the consistency of the data for the purpose of performance planning as well as for internal analysis PANSA uses the CFMU data contained in CFMU Network Operations Reports.

2.2.7 The detailed justification of for the mandatory national capacity target is placed in point 3.1 Individual performance targets for each accountable entity.

(c) Environment

2.2.8 The Commission Regulation (EU) No 691/2010 lays down the environment indicator in the air traffic management exclusively at the European level – the environment KPI is the average horizontal en-route flight efficiency. In pursuance of the definition included in the EU Commission Regulation No 691/2010, the average horizontal en-route flight efficiency indicator is the difference between the length of the en-route part of the actual trajectory and the optimum trajectory, which, in average, is the great circle, where “en route” is defined as the distance flown outside a circle of 40 NM around the airport.

On top of that, for the purposes of the calculation of the indicator the following flights are taken into account:

- all commercial IFR flights within European airspace;

- where a flight departs or arrives outside the European airspace, only the part inside the European airspace is considered

Additionally, for the purposes of the indicator's calculation, circular flights and flights with a great circle distance shorter than 80 NM between terminal areas are excluded.

The European Union-wide target in respect of the environment KPI adopted by the European Commission for the first reference period assumes an improvement by 0.75 of a percentage point of the average horizontal en route flight efficiency indicator in 2014 as compared to the base value in 2009.

At the national level no targets in the KPA environment were adopted. PANSA, however, takes a definite stand on the issue of environment and assumes that the efficiency in this area is one of the key determinants of the quality of services provided by the Agency. Therefore, the Agency pursues a number of activities to improve the realization of environmental protection goals.

(d) cost efficiency

This section provides explanation and justification for the national cost-efficiency target and its consistency with the EU-wide target adopted by the European Commission, with due regard to assessment criteria defined in Annex III to the EC Performance Regulation. It is divided into the following sub-sections:

1) En-route service units forecast;
2) Determined en-route ANS costs in nominal terms;
3) Determined en-route ANS costs in real terms;
4) Real en-route determined unit rate;
5) Terminal ANS costs.

2.2.1.1 En-route service units forecast

As already indicated in chapter 1, for RP1 Poland uses the service units forecast developed by EUROCONTROL STATFOR published in February 2011. For 2012 the adopted forecast takes into account the expected influence of the European Football Championship that is to take place in Poland and Ukraine in June 2012 and which is expected to generate additional traffic both with regard to overflights as well as flights to/from Polish cities where the games will be organized.

The table below presents detailed information about the adopted en-route service units forecast.

Table 15. En-route service units forecast used for the calculation of the national en-route cost-efficiency target for RP1.

	2009 A	2010 A	2011 F	2012 F	2013 F	2014 F
En-route total service units prior to RP1	3 092	3 313	3 587			
Forecast total service units used for the determined unit rate				3 914	4 036	4 177
Source:			PANSA's forecast final 2011 ER cost-base	STATFOR 2011 SUF1	STATFOR 2011 SUF1	STATFOR 2011 SUF1
% n/n-1		7,13%	8,28%	9,11%	3,11%	3,49%
STATFOR service units forecast (Baseline scenario)	3 092	3 313	3 648	3 914	4 036	4 177
Date of STATFOR SU forecast:	Sept 2011	Sept 2011	Sept 2011	Sept 2011	Sept 2011	Sept 2011
% n/n-1		7,13%	10,10%	7,31%	3,11%	3,49%

2.2.1.2 Determined en-route ANS costs in nominal terms.

This subchapter presents the determined en-route costs for RP1 by entity (PANSA, IMWM, CAO and EUROCONTROL) and by nature in nominal terms. The table below presents evolution of en-route costs per entity.

Table 16. National determined en-route costs – breakdown per entity (in nominal terms in national currency) (current allocation)

ANS en-route cost per entity	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D
PANSA	000 PLN	395 480	402 968	499 659	531 275	560 653	584 059
% n/n-1			*1,9%*	*24,0%*	*6,3%*	*5,5%*	*4,2%*
IMGW	000 PLN	15 902	18 472	22 011	17 757	18 783	19 513
% n/n-1			*16,2%*	*19,2%*	*-19,3%*	*5,8%*	*3,9%*
CAO	000 PLN	6 409	6 480	6 897	7 005	7 455	7 388
% n/n-1			*1,1%*	*6,4%*	*1,6%*	*6,4%*	*-0,9%*
EUROCONTROL	000 PLN	42 046	44 023	31 789	35 526	32 418	32 752
% n/n-1			*4,7%*	*-27,8%*	*11,8%*	*-8,7%*	*1,0%*
Total determined costs in nominal terms	000 PLN	**459 837**	**471 942**	**560 356**	**591 564**	**619 309**	**643 712**
% n/n-1			*2,6%*	*18,7%*	*5,6%*	*4,7%*	*3,9%*

[alternative version – new allocation between ER and TNC:

Table 16. National determined en-route costs – breakdown per entity (in nominal terms in national currency) (new allocation)

ANS en-route cost per entity	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D
PANSA	000 PLN	395 480	402 968	499 659	557 221	588 150	613 277
% n/n-1			1,9%	24,0%	11,5%	5,6%	4,3%
IMGW	000 PLN	15 902	18 472	22 011	17 757	18 783	19 513
% n/n-1			16,2%	19,2%	-19,3%	5,8%	3,9%
CAO	000 PLN	6 409	6 480	6 897	7 005	7 455	7 388
% n/n-1			1,1%	6,4%	1,6%	6,4%	-0,9%
EUROCONTROL	000 PLN	42 046	44 023	31 789	35 526	32 418	32 752
% n/n-1			4,7%	-27,8%	11,8%	-8,7%	1,0%
Total determined costs in nominal terms	000 PLN	**459 837**	**471 942**	**560 356**	**617 510**	**646 806**	**672 930**
% n/n-1			2,6%	18,7%	10,2%	4,7%	4,0%

It can be noted that in 2010 costs of all entities covered by this plan increased only moderately as compared to 2009. It was mainly caused by the need to apply significant costs limitation in both 2009 and 2010 due to the crisis.

At the same time it should be underlined that 2010 actual costs are significantly lower than costs forecasted for this year at the end of 2009. It is caused by cost discipline applied by the entities concerned. With regard to IMWM the difference also results from the fact that the transfer of Automatic Weather Observation System (AWOS) that originally was supposed to take place in 2010 was postponed and as a consequence costs related to this transfer were also postponed (currently planned for 2012). The table below shows the difference between forecast and actual 2010 costs per entity.

Table 17. 2010 forecast and actual en-route costs per entity in nominal terms

	Currency	2010 A	2010 F	Difference
PANSA	000 PLN	402 968	444 405	-41 437
IMGW	000 PLN	18 472	22 023	-3 551
CAO	000 PLN	6 480	7 232	-753
EUROCONTROL	000 PLN	44 023	36 219	7 803
Total	000 PLN	471 942	509 880	-37 938

Detailed description of evolution of costs by entity is provided at entity level in chapter 3.

Table 18. National determined en-route costs – Breakdown by nature (in nominal terms in national currency) (current allocation)

ANS en-route cost per nature	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D
Staff	000 PLN	298 435	304 450	354 824	372 345	388 872	401 940
% n/n-1			*2,0%*	*16,5%*	*4,9%*	*4,4%*	*3,4%*
Other operating costs*	000 PLN	111 366	116 499	130 435	134 486	130 380	133 501
% n/n-1			*4,6%*	*12,0%*	*3,1%*	*-3,1%*	*2,4%*
Depreciation	000 PLN	33 535	34 038	39 292	50 508	61 684	67 429
% n/n-1			*1,5%*	*15,4%*	*28,5%*	*22,1%*	*9,3%*
Cost of capital	000 PLN	16 500	16 954	35 805	34 225	38 373	40 842
% n/n-1			*2,8%*	*111,2%*	*-4,4%*	*12,1%*	*6,4%*
Exceptional items	000 PLN						
% n/n-1							
Total determined costs in nominal terms	000 PLN	**459 837**	**471 942**	**560 356**	**591 564**	**619 309**	**643 712**
% n/n-1			*2,6%*	*18,7%*	*5,6%*	*4,7%*	*3,9%*

** Includes EUROCONTROL costs*

[alternative version – new allocation between ER and TNC:

Table 18. National determined en-route costs – Breakdown by nature (in nominal terms in national currency) (new allocation)

ANS en-route cost per nature	*Currency*	*2009 A*	*2010 A*	*2011 F*	*2012 D*	*2013 D*	*2014 D*
Staff	*000 PLN*	*298 435*	*304 450*	*354 824*	*391 863*	*408 934*	*422 595*
% n/n-1			*2,0%*	*16,5%*	*10,4%*	*4,4%*	*3,3%*
*Other operating costs**	*000 PLN*	*111 366*	*116 499*	*130 435*	*137 627*	*133 620*	*136 859*
% n/n-1			*4,6%*	*12,0%*	*5,5%*	*-2,9%*	*2,4%*
Depreciation	*000 PLN*	*33 535*	*34 038*	*39 292*	*52 672*	*64 337*	*70 609*
% n/n-1			*1,5%*	*15,4%*	*34,1%*	*22,1%*	*9,7%*
Cost of capital	*000 PLN*	*16 500*	*16 954*	*35 805*	*35 348*	*39 915*	*42 867*
% n/n-1			*2,8%*	*111,2%*	*-1,3%*	*12,9%*	*7,4%*
Exceptional items	*000 PLN*						
% n/n-1							
Total determined costs in nominal terms	*000 PLN*	***459 837***	***471 942***	***560 356***	***617 510***	***646 806***	***672 930***
% n/n-1			*2,6%*	*18,7%*	*10,2%*	*4,7%*	*4,0%*

** Includes EUROCONTROL costs]*

When 2011-2014 costs are compared with actual 2009-2010 figures it should be taken into account that during 2009-2010, taking into account users expectations and their difficult situation caused by the crisis, PANSA decided to reduce by almost half (to only

3,5%) the level of return on equity that is included into the chargeable cost of capital. This resulted in lowering the national cost base by ca. 15 million PLN in 2010.

The changes in the level of staff costs especially in 2011 and 2012 reflect the need to increase the number of ATCOs to improve the capacity situation following implementation of the new ATM system (Pegasus_21). With regard to the level of depreciation the increasing value of costs is related to investment projects that will be implemented by PANSA and IMWM during RP1 that aim at increasing capacity, ensuring safety of air operations and further improving quality of services provided. It has to be underlined that these projects shall foster narrowing the gap between the current situation and EU-wide targets with regard to operational goals. These investment projects are described in detail in chapter 3.

[for the alternative version – new allocation between ER and TNC – additional info:

With regard to PANSA the significant increase in en-route costs in 2012 as compared with 2011 is mostly related to modification of allocation of PANSA's costs between en-route and terminal cost bases. The new allocation methodology is described in Annexx I The table below presents the financial consequence of modification of the allocation system for the level of en-route determined costs during RP1.

Table 18a. Increase in determined en-route costs resulting from change in the allocation of PANSA's costs (in PLN in nominal values)

	Currency	2012 D	2013 D	2014 D
Increase in determined ER costs resulting from modifcation of allocation	*000 PLN*	*25 946*	*27 497*	*29 218*

2.2.1.3 Determined en-route ANS costs in real terms.

The table below presents the level of determined en-route costs for RP1 expressed in real terms in 2009 values. The nominal values presented in the subchapter above were discounted using inflation rates assumed for the purpose of drafting this plan as justified in chapter 1.

Table 19. National determined en-route costs – total in real 2009 terms (current allocation)

	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D
Total determined costs in nominal terms	000 PLN	459 837	471 942	560 356	591 564	619 309	643 712
Inflation %		4,0%	2,7%	2,5%	2,5%	2,5%	2,5%
Inflation index (100 in 2009)		100	102,7	105,3	107,9	110,6	113,4
Total determined costs in real 2009 terms	000 PLN	459 837	459 535	532 316	548 256	559 970	567 840
% n/n-1			-0,1%	15,8%	3,0%	2,1%	1,4%

[alternative version – new allocation between ER and TNC:

Table 19. National determined en-route costs – total in real 2009 terms (current allocation)

	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D
Total determined costs in nominal terms	*000 PLN*	*459 837*	*471 942*	*560 356*	*617 510*	*646 806*	*672 930*
Inflation %		*4,0%*	*2,7%*	*2,5%*	*2,5%*	*2,5%*	*2,5%*
Inflation index (100 in 2009)		*100*	*102,7*	*105,3*	*107,9*	*110,6*	*113,4*
Total determined costs in real 2009 terms	*000 PLN*	*459 837*	*459 535*	*532 316*	*572 303*	*584 833*	*593 614*
% n/n-1			*-0,1%*	*15,8%*	*7,5%*	*2,2%*	*1,5%*

2.2.1.4 Real en-route determined unit rate.

The table below presents national target with regard to the cost-efficiency area which is the determined unit rate in real 2009 terms. This rate is expressed both in PLN and EUR.

Table 20. National real en-route determined unit rate (in national currency at 2009 prices and in EUR2009) (current allocation)

	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D	Average per annum 2009-2014	Average per annum 2011-2014
Determined costs in real terms (in national currency at 2009 prices)	000 PLN	459 837	459 535	532 316	548 256	559 970	567 840	4,31%	2,18%
Total en-route SUs		3 092	3 313	3 587	3 914	4 036	4 177	6,20%	5,20%
Real en-route determined unit rate in national currency (at 2009 prices)	**PLN**	**148,71**	**138,71**	**148,39**	**140,07**	**138,74**	**135,94**	**-1,78%**	**-2,88%**
% n/n-1			-6,7%	7,0%	-5,6%	-0,9%	-2,0%		
2009 Exchange rate (1 EUR=)	PLN	**4,32**							
Real en-route determined unit rates (in 2009 EUR at 2009 exchange rate)	PLN	34,39	32,08	34,32	32,40	32,09	31,44	**-1,78%**	**-2,88%**
% n/n-1			-6,7%	7,0%	-5,6%	-0,9%	-2,0%		
EU-wide target: average determined en-route unit rate (in 2009 EUR)	2009 EUR				57,88	55,87	53,92	-3,20%	-3,50%

As compared to the EU-wide trend for the DUR as stemming from the level of DUR set forth by the European Commission in its decision of 21 February 2011, Polish DUR is planned to fall a little less (2,9% p.a. during RP1 as compared to 3,5% p.a.). This is linked mostly to necessity to provide adequate capacity in order to reduce delays. As indicated in PRR and ACE reports prepared by EUROCONTROL/PRU delays constitute major problem in Poland and there is an urgent need to improve the situation. Increasing capacity requires investment in new infrastructure that generates additional depreciation costs. It also requires increasing the number of ATCOs in order to operate the new Pegasus_21 ATM system that will enable improvement in sectorization of the Polish airspace and thus increase capacity. Additionally the necessity to provide required ANS services for additional traffic in June 2012 during EURO2012 football championship influences the level of 2012 determined costs. Due to trade-offs between different performance areas these project and realted costs that influence the level of determined unit rate are necessary to enable Poland getting closer to European operational targets especially with regard to capacity area. Further details on costs are presented in chapter 3.

[alternative version – new allocation between ER and TNC:

Table 20. National real en-route determined unit rate (in national currency at 2009 prices and in EUR2009) (new allocation)

	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D	Average per annum	
								2009-2014	2011-2014
Determined costs in real terms (in national currency at 2009 prices)	*000 PLN*	*459 837*	*459 535*	*532 316*	*572 303*	*584 833*	*593 614*	*5,24%*	*3,70%*
Total en-route SUs		*3 092*	*3 313*	*3 587*	*3 914*	*4 036*	*4 177*	*6,20%*	*5,20%*
Real en-route determined unit rate in national currency (at 2009 prices)	***PLN***	***148,71***	***138,71***	***148,39***	***146,22***	***144,90***	***142,11***	***-0,90%***	***-1,43%***
% n/n-1			*-6,7%*	*7,0%*	*-1,5%*	*-0,9%*	*-1,9%*		
2009 Exchange rate (1 EUR=)	*PLN*	***4,32***							
Real en-route determined unit rates (in 2009 EUR at 2009 exchange rate)	*PLN*	*34,39*	*32,08*	*34,32*	*33,82*	*33,51*	*32,87*	***-0,90%***	***-1,43%***
% n/n-1			*-6,7%*	*7,0%*	*-1,5%*	*-0,9%*	*-1,9%*		
EU-wide target: average determined en-route unit rate (in 2009 EUR)	*2009 EUR*				*57,88*	*55,87*	*53,92*	*-3,20%*	*-3,50%*

[alternative version – new allocation between ER and TNC:

As compared to the EU-wide trend for the DUR as stemming from the level of DUR set forth by the European Commission in its decision of 21 February 2011, Polish DUR is planned to fall a little less (1,43% p.a. during RP1 as compared to 3,5% p.a.). This difference in trend is caused by the modification in the allocation of PANSA's costs between en-route and terminal services. It has to be underlined that the modification of allocation does not influence the gate-to-gate costs therefore is not contrary to the performance scheme and targets. Without this modification of the allocation the determined unit rate for Poland would fall by 2,9% p.a. during RP1 as compared to 3,5% p.a. stemming from the EU-wide target. Little less annual decrease in the DUR in the scenario without modification of allocation is linked mostly to necessity to provide adequate capacity in order to reduce delays. As indicated in PRR and ACE reports prepared by EUROCONTROL/PRU delays constitute major problem in Poland and there is an urgent need to improve the situation. Increasing capacity requires

investment in new infrastructure that generates additional depreciation costs. It also requires increasing the number of ATCOs in order to operate the new Pegasus_21 ATM system that will enable improvement in sectorization of the Polish airspace and thus increase capacity. Additionally the necessity to provide required ANS services for additional traffic in June 2012 during EURO2012 football championship influences the level of 2012 determined costs. Due to trade-offs between different performance areas these project and realted costs that influence the level of determined unit rate are necessary to enable Poland getting closer to European operational targets especially with regard to capacity area. Further details on costs are presented in chapter 3.]

It should be also underlined that in accordance with point 11 of the preamble to the Commission Decision of 21 February 2011 setting forth EU-wide performance targets for RP1, due regard should be given to finding the proper balance between all targets taking into account trade-offs between different key performance areas, having regard to the overriding safety objectives. National targets should also take into account local context in particular with regard to states with low unit rates.

As indicated by the Commission in its Decision establishing the EU-wide targets for RP1 national targets do not have to be the same as EU-wide but need to contribute to the achievement of EU-wide values. Therefore the trend for evolution of the determined unit rate at national level does not need to be 1:1 the same as for EU-wide unit rate. Fully aligning the trend at national level with the one established at EU level would not foster improvement in performance as would prevent achievement of capacity target. At the same time establishing the same trend for all EU states would mean that the states with already high cost-efficiency would be forced to look for the same improvement as those much less efficient what would contradict the whole performance system goals.

It has to be underlined that the determined unit rate for Poland is at low level and remains low during the whole RP1. The determined unit rate for Poland in 2014 is by 42% lower than the EU-wide (31,4 EUR vs. 53,9EUR) [*39% lower than the EU-wide (32,9 EUR vs. 53,9EUR)]*. For the purpose of analyzing the level of DUR as referred to in point 5 letter b) of Annex III to the Performance Regulation, Poland was grouped together with Nordic States (Finland, Norway and Sweden). However, as indicated already in chapter 1, these three states are at different level of economic development than Poland. PRC report on the initial proposal for EU-wide targets for RP1 dated 2

August 2010[8] indicates that Poland (PANSA) was originally classified in the same group as the Baltic States (ANSPs). Finally Poland has been placed with the Nordic States taking into account great difference in traffic volume as compared to other Baltic States, however it seems necessary to compare Polish DUR not only with the Nordic States but also with the EU states with similar economic environment – for this purpose two groups were identified: Baltic States and Central Europe States.

The three tables below present the DURs for these three groups of states. Values for Poland are those presented in Table 20 above, while for other states the DURs are taken from draft ACE 2009 report[9] – these are based on states November 2010 forecasts that were presented for the purpose of establishing en-route unit rates for 2011.

Table 21. Comparison of DUR of Poland with Nordic States (current allocation)

	2009	2010	2011	2012	2013	2014
Nordic States	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR
FINLAND	41,3	41,0	49,6	50,1	48,6	47,2
NORWAY	62,6	61,8	59,4	59,5	58,5	58,2
SWEDEN	56,3	66,9	57,1	54,9	54,3	53,1
POLAND	**34,4**	**32,1**	**34,3**	**32,4**	**32,1**	**31,4**
average	*48,6*	*50,4*	*50,1*	*49,2*	*48,4*	*47,5*
minimun	*34,4*	*32,1*	*34,3*	*32,4*	*32,1*	*31,4*
maximum	*62,6*	*66,9*	*59,4*	*59,5*	*58,5*	*58,2*
difference min-max	*28,2*	*34,8*	*25,1*	*27,1*	*26,4*	*26,7*

Table 22. Comparison of DUR of Poland with Baltic States (current allocation)

	2009	2010	2011	2012	2013	2014
Baltic States	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR
ESTONIA	24,7	25,5	21,6	24,5	23,3	24,2
LATVIA	25,5	26,4	30,1	29,5	27,9	26,9
LITHUANIA	49,8	49,8	51,3	49,4	45,6	43,3
POLAND	**34,4**	**32,1**	**34,3**	**32,4**	**32,1**	**31,4**
average	*33,6*	*33,4*	*34,3*	*34,0*	*32,2*	*31,5*
minimun	*24,7*	*25,5*	*21,6*	*24,5*	*23,3*	*24,2*
maximum	*49,8*	*49,8*	*51,3*	*49,4*	*45,6*	*43,3*
difference min-max	*25,1*	*24,3*	*29,7*	*24,9*	*22,3*	*19,1*

[8] Performance Scheme: Initial EU-wide Targets Proposals CONSULTATION Document, produced by the EUROCONTROL Performance Review Commission upon the invitation of the European Commission DG-MOVE, 2 August 2010.

[9] Individual assessment for ANSPs cost effectiveness performance [Extract from second draft ACE 2009 Benchmarking Report, Chapter 8] Document prepared by the Performance Review Unit (PRU) in support to the PRB, Version: 28 March 2011.

Table 23. Comparison of DUR of Poland with Central Europe States (current allocation)

Central Europe	2009 Determined unit rate in 2009 EUR	2010 Determined unit rate in 2009 EUR	2011 Determined unit rate in 2009 EUR	2012 Determined unit rate in 2009 EUR	2013 Determined unit rate in 2009 EUR	2014 Determined unit rate in 2009 EUR
CZECH REPUBLIC	45,1	43,5	41,4	39,3	38,0	37,2
HUNGARY	32,0	35,0	38,2	37,0	35,5	34,7
SLOVAK REPUBLIC	56,6	58,5	52,5	53,8	52,8	51,1
SLOVENIA	71,9	75,3	71,1	69,5	67,0	64,6
POLAND	**34,4**	**32,1**	**34,3**	**32,4**	**32,1**	**31,4**
average	*48,0*	*48,9*	*47,5*	*46,4*	*45,1*	*43,8*
minimun	*32,0*	*32,1*	*34,3*	*32,4*	*32,1*	*31,4*
maximum	*71,9*	*75,3*	*71,1*	*69,5*	*67,0*	*64,6*
difference min-max	*39,9*	*43,2*	*36,8*	*37,1*	*34,9*	*33,2*

[alternative version – new allocation between ER and TNC:

Table 21. Comparison of DUR of Poland with Nordic States (new allocation)

Nordic States	***2009*** ***Determined unit rate in 2009 EUR***	***2010*** ***Determined unit rate in 2009 EUR***	***2011*** ***Determined unit rate in 2009 EUR***	***2012*** ***Determined unit rate in 2009 EUR***	***2013*** ***Determined unit rate in 2009 EUR***	***2014*** ***Determined unit rate in 2009 EUR***
FINLAND	*41,3*	*41,0*	*49,6*	*50,1*	*48,6*	*47,2*
NORWAY	*62,6*	*61,8*	*59,4*	*59,5*	*58,5*	*58,2*
SWEDEN	*56,3*	*66,9*	*57,1*	*54,9*	*54,3*	*53,1*
POLAND	***34,4***	***32,1***	***34,3***	***33,8***	***33,5***	***32,9***
average	*48,6*	*50,4*	*50,1*	*49,6*	*48,7*	*47,8*
minimun	*34,4*	*32,1*	*34,3*	*33,8*	*33,5*	*32,9*
maximum	*62,6*	*66,9*	*59,4*	*59,5*	*58,5*	*58,2*
difference min-max	*28,2*	*34,8*	*25,1*	*25,7*	*25,0*	*25,3*

Table 22. Comparison of DUR of Poland with Baltic States (new allocation)

Baltic States	***2009*** ***Determined unit rate in 2009 EUR***	***2010*** ***Determined unit rate in 2009 EUR***	***2011*** ***Determined unit rate in 2009 EUR***	***2012*** ***Determined unit rate in 2009 EUR***	***2013*** ***Determined unit rate in 2009 EUR***	***2014*** ***Determined unit rate in 2009 EUR***
ESTONIA	*24,7*	*25,5*	*21,6*	*24,5*	*23,3*	*24,2*
LATVIA	*25,5*	*26,4*	*30,1*	*29,5*	*27,9*	*26,9*
LITHUANIA	*49,8*	*49,8*	*51,3*	*49,4*	*45,6*	*43,3*
POLAND	***34,4***	***32,1***	***34,3***	***33,8***	***33,5***	***32,9***
average	*33,6*	*33,4*	*34,3*	*34,3*	*32,6*	*31,8*
minimun	*24,7*	*25,5*	*21,6*	*24,5*	*23,3*	*24,2*
maximum	*49,8*	*49,8*	*51,3*	*49,4*	*45,6*	*43,3*
difference min-max	*25,1*	*24,3*	*29,7*	*24,9*	*22,3*	*19,1*

Table 23. Comparison of DUR of Poland with Central Europe States (new allocation)

	2009	2010	2011	2012	2013	2014
Central Europe	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR	Determined unit rate in 2009 EUR
CZECH REPUBLIC	45,1	43,5	41,4	39,3	38,0	37,2
HUNGARY	32,0	35,0	38,2	37,0	35,5	34,7
SLOVAK REPUBLIC	56,6	58,5	52,5	53,8	52,8	51,1
SLOVENIA	71,9	75,3	71,1	69,5	67,0	64,6
POLAND	**34,4**	**32,1**	**34,3**	**33,8**	**33,5**	**32,9**
average	48,0	48,9	47,5	46,7	45,3	44,1
minimun	32,0	32,1	34,3	33,8	33,5	32,9
maximum	71,9	75,3	71,1	69,5	67,0	64,6
difference min-max	39,9	43,2	36,8	35,7	33,4	31,7

In comparison to the Nordic States the determined unit rate for Poland is the lowest of the group for the whole period of 2009-2014. It is well below average for this group. In comparison with the Baltic States, Poland is in the middle with its determined unit rate – Polish DUR is at the same level as the average for the four states concerned. [*alternative version – new allocation between ER and TNC: - Polish DUR is a little bit above the average for the four states concerned.]* In relation to the Central Europe States, Poland again has the lowest unit rate and is well below the average for this group.

Finally the table below contains comparison of the determined costs set forth in this plan with en-route costs forecasted at the end of 2010 as presented in the final 2011 cost base for en-route charges (values from 2012-2014 from the final 2011 cost base are verified with regard to EUROCONTROL costs which are converted into PLN, for comparability of data, using the same exchange rate as used for establishing the determined costs, i.e. 1EUR=3,8PLN; 2009-2010 values are actual figures). The values compared are based on the same allocation methodology (current allocation). It can be noticed that the level of determined costs is lower than values forecasted at the end of 2010 what also reflects Poland's attempt to contribute to the achievement of the EU-wide target in terms of cost-efficiency.

Table 24. Comparison of determined costs with forecast values presented in final 2011 en-route cost base (current allocation)

	2009 A	2010 A	2011 F	2012 F	2013 F	2014 F
ER costs from final 2011 ER CB (Nov 2010)						
Total costs in nominal terms (in PLN)	459 837	471 942	560 356	605 492	631 991	651 397
Inflation rate **	4,00%	2,70%	2,50%	2,50%	2,50%	2,50%
Inflation index (100 in 2009)	100,00	102,70	105,27	107,90	110,60	113,36
Total costs in real terms (in PLN at 2009 prices)	**459 837**	**459 535**	**532 316**	**561 165**	**571 438**	**574 619**
% n/n-1		*-0,06%*	*15,84%*	*5,42%*	*1,83%*	*0,56%*
ER determined costs						
Total determined costs in nominal terms	459 837	471 942	560 356	591 564	619 309	643 712
Inflation %	4,00%	2,70%	2,50%	2,50%	2,50%	2,50%
Inflation index (100 in 2009)	100,00	102,70	105,27	107,90	110,60	113,36
Total determined costs in real 2009 terms	**459 837**	**459 535**	**532 316**	**548 256**	**559 970**	**567 840**
% n/n-1		*-0,07%*	*15,84%*	*2,99%*	*2,14%*	*1,41%*
ER determined costs - ER costs from final 2011 ER CB						
Difference in total costs in nominal terms	0	0	0	- 13 929	- 12 683	- 7 685
Difference in total costs in real terms	0	0	0	- 12 909	- 11 467	- 6 779

2.2.1.5 Terminal ANS costs.

This chapter presents values of terminal costs for RP1 as total and per accountable entity. As indicated in chapter 1, this performance plan covers all airports in Poland where air traffic services are provided by certified and designated ANSP (PANSA). Although during RP1 there are no EU-wide targets with regard to terminal cost-efficiency, for the purpose of assessing and improving gate-to-gate cost efficiency in provision of air navigation services it is necessary to determine and present the level of terminal costs in Poland (terminal costs related to the 11 airports listed in chapter 1). These costs shall be determined at the level presented in the table below.

Table 25. National determined costs for terminal ANS – Breakdown per entity (in nominal and real terms in national currency) (current allocation)

ANS terminal cost per entity	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D
PANSA	000 PLN	110 415	104 568	127 995	118 466	121 382	127 453
% n/n-1			*-5,29%*	*22,40%*	*-7,44%*	*2,46%*	*5,00%*
IMGW	000 PLN	9 357	8 503	9 797	14 377	15 382	16 135
% n/n-1			*-9,13%*	*15,21%*	*46,75%*	*6,99%*	*4,89%*
CAO	000 PLN	3 167	3 488	3 621	3 846	4 048	3 975
% n/n-1			*10,14%*	*3,83%*	*6,22%*	*5,24%*	*-1,81%*
Total terminal costs in nominal terms	000 PLN	122 939	116 560	141 413	136 689	140 812	147 563
% n/n-1			*-5,19%*	*21,32%*	*-3,34%*	*3,02%*	*4,79%*
Inflation %		4,0%	2,7%	2,5%	2,5%	2,5%	2,5%
Inflation index (100 in 2009)		100	102,7	105,3	107,9	110,6	113,4
Total terminal costs in real 2009 terms	000 PLN	122 939	113 495	134 336	126 682	127 320	130 170
% n/n-1			*-7,7%*	*18,4%*	*-5,7%*	*0,5%*	*2,2%*

[alternative version – new allocation between ER and TNC:

Table 25. National determined costs for terminal ANS – Breakdown per entity (in nominal and real terms in national currency) (new allocation)

ANS terminal cost per entity	*Currency*	*2009 A*	*2010 A*	*2011 F*	*2012 D*	*2013 D*	*2014 D*
PANSA	*000 PLN*	*110 415*	*104 568*	*127 995*	*95 899*	*97 020*	*101 401*
% n/n-1			*-5,29%*	*22,40%*	*-25,08%*	*1,17%*	*4,52%*
IMGW	*000 PLN*	*9 357*	*8 503*	*9 797*	*14 377*	*15 382*	*16 135*
% n/n-1			*-9,13%*	*15,21%*	*46,75%*	*6,99%*	*4,89%*
CAO	*000 PLN*	*3 167*	*3 488*	*3 621*	*3 846*	*4 048*	*3 975*
% n/n-1			*10,14%*	*3,83%*	*6,22%*	*5,24%*	*-1,81%*
Total terminal costs in nominal terms	*000 PLN*	*122 939*	*116 560*	*141 413*	*114 121*	*116 450*	*121 511*
% n/n-1			*-5,19%*	*21,32%*	*-19,30%*	*2,04%*	*4,35%*
Inflation %		*4,0%*	*2,7%*	*2,5%*	*2,5%*	*2,5%*	*2,5%*
Inflation index (100 in 2009)		*100*	*102,7*	*105,3*	*107,9*	*110,6*	*113,4*
Total terminal costs in real 2009 terms	*000 PLN*	*122 939*	*113 495*	*134 336*	*105 767*	*105 293*	*107 189*
% n/n-1			*-7,7%*	*18,4%*	*-21,3%*	*-0,4%*	*1,8%*

It can be noted that 2010 actual costs are lower than actual figures for 2009. This results from lower level of PANSA's other operating costs as well as from lower staff and other operating costs of IMWM. It should also be noted that for 2010 the CAO

President refused to approve the level of costs as proposed by PANSA and established the terminal unit rate at lower level. Analysis of 2010 costs indicates that the actual figures are similar to those determined by the CAO President in his decision establishing the terminal unit rate. The table below compares 2010 terminal costs as determined by the CAO president in December 2009 (F) and actual (A).

Table 26. 2010 forecast and actual terminal costs per entity in nominal terms

	Currency	2010 A	2010 F	Difference
PANSA	000 PLN	104 568	104 443	125
IMGW	000 PLN	8 503	9 263	-759
CAO	000 PLN	3 488	2 593	894
Total	000 PLN	116 560	116 299	260

Taking into account the actual 2010 figures as well as values of costs planned for 2012 it can be expected that 2011 actual figures will also be lower than those forecasted in November 2010 as presented in the table above. During RP1 terminal cost are expected to increase slightly, however in real terms this increase is slower than expected evolution of traffic as presented in chapter 1, and as a consequence the unit rate expressed in real terms should decrease.

Annual variations of costs per entity during RP1 are described in chapter 3. Here it should, however, be indicated that with regard to IMWM some modification of allocation of costs of certain products was introduced what had an impact on the level of 2012 costs as compared to 2011 values. This allocation consisted in adjusting the percentage division (between en-route and terminal) of some products to the WMO Publication No 904[10] and regarded METAR communications, TAF, SIGMET, AiRMET and SIGNIFICANT map.

[alternative version – new allocation between ER and TNC:

Changes in the values of PANSA's costs between 2012 and 2011 result mainly from proposed modification of allocation of ATS/CNS costs between en-route and terminal services. The proposed change in respect of allocation concerns primarily cost allocation keys related to the provision of the approach control services. Under the methodology currently used the allocation keys are evaluated using the proportion of

[10] Guide to Aeronautical Meteorological Services Cost Recovery Principles and guidance, World Meteorological Organization No 904.

the TMA volume to 20 kilometers (the distance used also for the purpose of calculating en-route service units and charge). In the new, proposed methodology the approach-related costs are allocated in whole to en-route services, since the approach service is provided in the TMA airspace. Additionally, certain modifications in allocation of costs of CNS infrastructure elements were introduced. These modification are described in Annex I and detailed explanation of evolution of PANSA's terminal costs under the current and the new proposed methodology is provided in chapter 3.]

(e) interdependecies between targets

2.2.31 Trade-offs between Key Performance Areas are crucial for the assessment of the overall performance of air navigation services and their providers. Changes in one area should not be assessed without reviewing changes in the other. This plan aims to improve efficiency in all the four KPAs, namely: to improve service quality by reducing delays, to optimize costs of ATM/CNS provision, to contribute to horizontal flight efficiency as well to "think green" in other aspects of the environment, and on the top of that ensuring ANS safety. However, reduction of delays will be one of the most challenging goals. As already indicated above, currently PANSA is one of the most delay generating ANSPs in Europe. The actions to be undertaken in order to significantly reduce delays until the end of 2014 are described in details in chapter 3 below regarding capacity.

For the purpose of this Performance Plan, trade-off between cost efficiency and capacity areas has been analysed. These two areas are strongly interrelated since some investments, measures or actions undertaken to reduce delays may have financial impact on airspace users. It should be noted that interdependencies between these two areas shall be analysed only from the perspective of PANSA as the two other entities covered by this Plan do not contribute directly to the capacity area and with regard to their activities no clear and direct relation between the level of costs and ATM delays can be established. Therefore the quantitative assessment of trade-off between capacity and cost-efficiency targets provided in this chapter is limited to PANSA's costs.

For the purpose of this Plan, a thorough analysis of financial and economic cost-effectiveness based on Eurocontrol/PRU methodology has been carried out. The indicator of financial cost-effectiveness is computed as ATM/CNS provision costs of

PANSA per composite flight hour[11]. Economic cost-effectiveness indicator comprises financial cost-effectiveness plus the cost of delay per composite flight hour. The cost of ATFM delay was assessed at 82 EUR in accordance with the latest ACE[12] Benchmarking Report. The presented calculation includes gate-to-gate analysis since it shows the overall performance of the ANSP in the most consistent way. Table 27 presents the calculation of the financial and economic cost effectiveness for PANSA for the period 2009-2014.

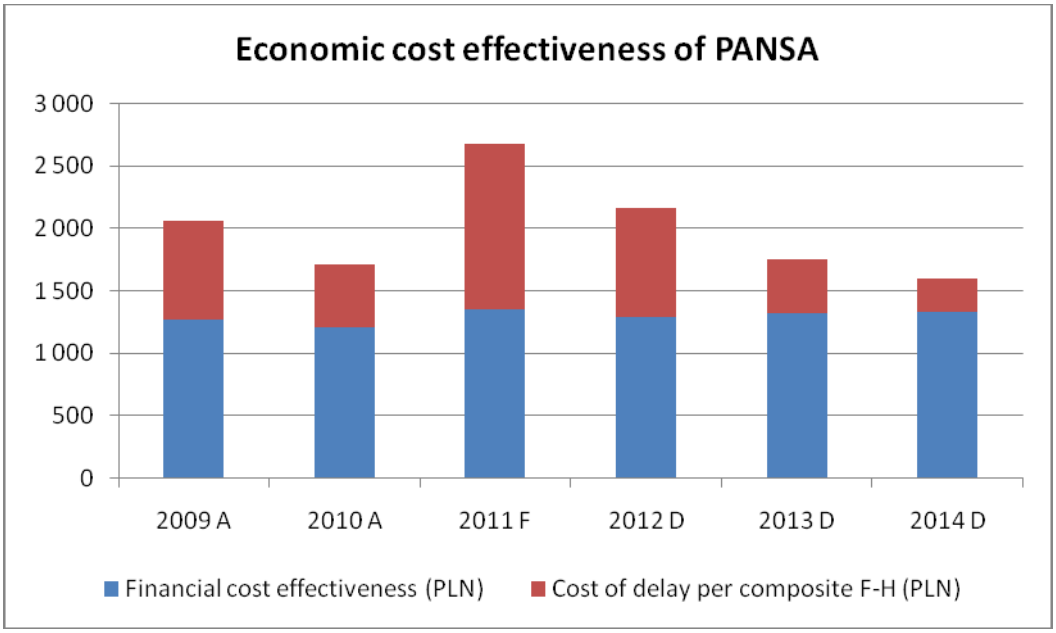
Table 27. PANSA financial and economic cost-effectiveness 2009-2014

	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D
Enroute + terminal costs (PLN)	505 894 981	507 536 379	627 653 565	649 740 918	682 034 290	711 511 827
Financial cost effectiveness (PLN)	**1 270**	**1 205**	**1 357**	**1 293**	**1 319**	**1 333**
IFR flight-hours controlled by the ANSP	324 966	346 269	383 319	411 332	424 143	438 960
IFR airport movements controlled by the ANSP	282 668	288 339	305 034	350 179	356 833	365 040
IFR airport movements * 0,26	73 494	74 968	79 309	91 047	92 777	94 910
Composite flight-hours	398 460	421 237	462 628	502 379	516 919	533 871
Average delay per flight	1,6	1,1	3,0	2,0	1,0	0,6
IFR flights controlled	552 173	591 556	651 323	698 923	720 690	745 868
Minutes of delay=average delay per flight * IFR flights controlled	883 477	650 712	1 953 970	1 397 845	720 690	447 521
Unit cost of delay (per minute, EUR)	82	82	82	82	82	82
Cost of delay (EUR)	72 445 098	53 358 344	160 225 527	114 623 306	59 096 617	36 696 715
Exchange rate (1EUR=…PLN)	4,32	3,99	3,80	3,80	3,80	3,80
Cost of delay (PLN)	313 240 286	212 927 539	608 857 001	435 568 562	224 567 144	139 447 516
Cost of delay per composite F-H (EUR)	182	127	346	228	114	69
Cost of delay per composite F-H (PLN)	**786**	**505**	**1 316**	**867**	**434**	**261**
Economic cost effectiveness (PLN)	**2 056**	**1 710**	**2 673**	**2 160**	**1 754**	**1 594**
n/(n-1) %		*-17%*	*56%*	*-19%*	*-19%*	*-9%*

The figure below shows the trend of the economic cost-effectiveness in the period of 2009-2014. It clearly reflects the actions related to capacity, e.g. in 2011 there is a 48% increase in the economic unit cost. The main reason of this significant increase in delays in 2011 is the implementation of the new air traffic management system – Pegasus_21. In the following years a significant decrease in the economic unit cost is

[11] Composite gate-to-gate flight-hours are defined as en-route flight-hours plus IFR airport movements weighted by a factor that reflected the relative (monetary) importance of terminal and en-route costs in the cost base.
[12] ACE – ATM cost effectiveness.

visible. In the period of 2011-2014 the increase in financial unit cost is compensated by the significant reduction of delays. Overall, the trend of the economic unit cost is downward, which constitutes a fair balance between cost-efficiency and capacity.



More detailed analysis presents the costs which are directly attributed to capacity. These are costs of staff, mainly related to ATCOs' overtime due to implementation of Pegasus_21 or additional remuneration for senior ATCOs (see Table 28 and due to investments directly influencing capacity (see Table 29). The data below is based on PANSA's calculations.

Table 28. Staff costs entirely attributed to capacity increase, in PLN, PANSA, 2009-2014

Staff costs entirely attributed to capacity	2009	2010	2011	2012	2013	2014
Additional remuneration relating to senior ATCO function	650 520	1 395 240	4 080 654	5 518 235	5 610 827	5 713 099
Overtime ATCO ACC GAT	5 519 057	7 149 007	9 295 188	8 891 325	6 709 549	6 893 950
shadow mode – implementation of Pegasus_21 – overtime	x	x	x	3 013 166	x	x
Consultancy, training - Pegasus_21	0	1 773 709	1 447 656	1 320 000	1 320 000	1 320 000
Remuneration relating to OJT instructor function	1 424 722	3 356 652	3 888 931	4 388 550	4 603 737	4 702 297
Consultancy - PP2010+ project	0	0	0	540 000	540 000	540 000
TOTAL	**7 594 299**	**13 674 608**	**18 712 429**	**23 671 276**	**18 784 113**	**19 169 346**

Source: PANSA calculations

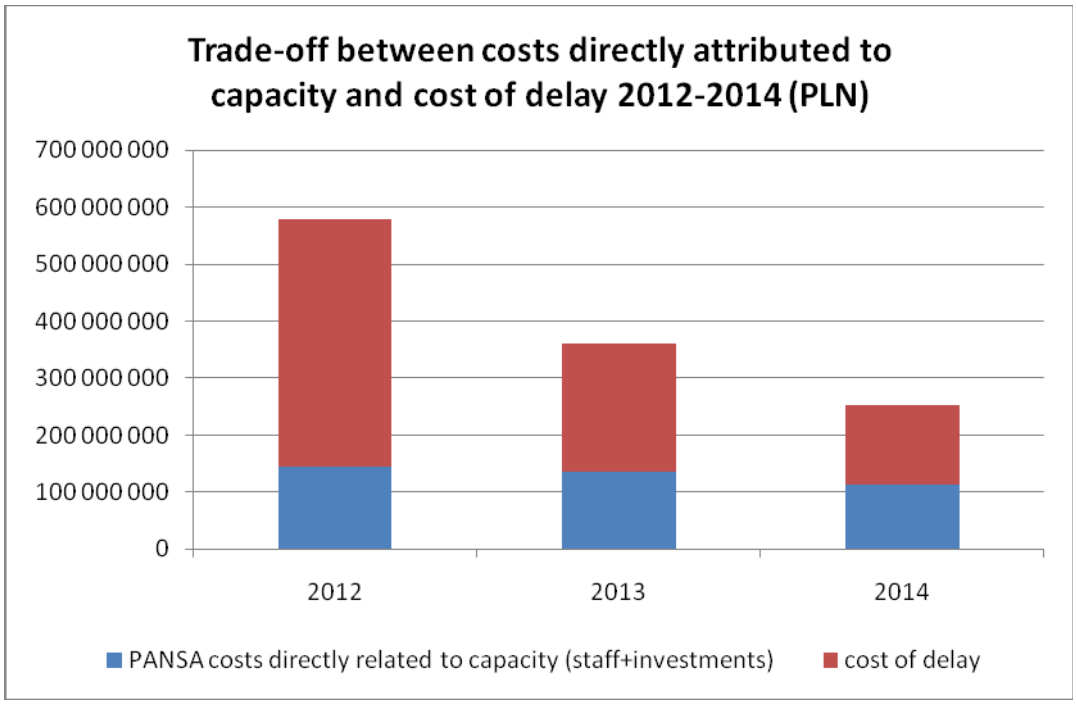
Table 29. CAPEX entirely attributed to capacity increase, in PLN, PANSA, 2012-2014

	2012	2013	2014
capex according to investment plan 2012-2016	138 026 130	142 775 100	114 068 000
capex of investments related to capacity	120 177 930	117 945 000	95 006 500
% of capex related to capacity in the total capex	**87%**	**83%**	**83%**
planned additional* depreciation according to investment plan 2012-2016	16 933 025	33 031 798	44 917 650
planned additional depreciation of investments related to capacity	6 364 164	16 740 427	25 793 776
% of depreciation of investments related to capacity	**38%**	**51%**	**57%**

**Additional depreciation due to commissioned fixed assets in the year n-1*
Source: PANSA calculations

Among all the investments planned by PANSA in the first reference period, more than 75% have direct or indirect impact on increase of the capacity. 87% of capital expenditure planned for 2012 is related to capacity key investments. In the following years the share decreases slightly to 83%. Analysis of depreciation shows that share of planned additional depreciation of investments related to capacity in the planned additional depreciation according to investment plan 2012-2016 will amount to 38% in 2012, 51% in 2013 and 57% in 2014 due to increase in value of fixed assets related to capacity.

It is important to note that these costs are only those which could be easily attributed to capacity increase. Other PANSA costs not listed in the table above are used for capacity and safety maintanance and environmental protection in common. The figure below shows therefore a trade-off between costs of delay borne by the airlines supplemented by the delay reduction costs. Complete economic effectiveness (ATM/CNS costs + delay costs) is referenced in figure above.



2.2.32 The maintenance of high–level safety of air traffic is always a pivotal aspect behind the Agency's activity. The safety area is never subjected to any compromise solutions, however the necessity to guarantee adequate safety levels is always analyzed in terms of the financial input it requires, and in particular the necessary investment projects it entails, as well as the necessity to launch the recruitment or training of the CNS/ATM personnel. PANSA aims to achieve the adequate safety maturity in relation to the financial capability of the Agency. On the other hand, the financial constraints and the reduction of air traffic delays will be provided only if the risk is maintained at the acceptable level.

The replacement investments in the scope of CNS/ATM systems and installations, which are implemented to guarantee an uninterrupted work of the infrastructure dedicated to the provision of air navigation services in a seamless manner contribute additionally to the achievement of high safety standards. In respect of the development investments the Agency's activities will focus on the enhancement of the technological level and the functionality of the CNS/ATM systems, which will gradually translate into the improvement of the quality of the services offered.

Furthermore, PANSA is actively involved in the development of the so-called *contingency model* in line with the ICAO provisions, the community acquis (regulations) and Eurocontrol guidelines. Such model will provide PANSA with the possibility to provide high safety level services and continue the operational activity of its services even if unexpected events, which disrupt the standard Agency mode of operation

occur. The year 2011 will see the continuation of activities in this scope specified in PANSA strategic documents and resulting from the solutions improvement process in the scope of the organization of work of CNS/ATM services.

To guarantee high safety air traffic level and the continuity of its services work the Agency plans to improve the contingency plans in place and implement them using the actions recommended and specified in the strategic documents and resulting from the solutions improvement process in the scope of organization of work of the CNS/ATM services.

As far as the Air-Ground Communication aspect is concerned, it is envisaged that in the years 2010-2013 the modernization and extension of the radio-communications centers network will be carried out in order to separate the *send* and *receive* functions. Such investment will allow to reduce the interference of wavelengths, which cut out of the frequencies reducing thereby the volume of channels which may be derived for use from a given OR (radio-communication centre). The modernization activities, applied on an on-going basis at PANSA in respect of the existing installations/systems currently in use contributes, among others, to the noticeable reduction of failure/breakdown frequency and if accompanied by the development of new infrastructure to the assurance of continuity of the services and information provided.

In respect of the air navigation installations and systems, works will proceed on the exchange and extension of radio-navigation aids network to enhance the technological standard (e.g. the application of VOR radio beacons within the airport/ aerodrome areas will be replaced with the application of DVOR radio beacons), which will in turn enable the development of airways network and flexible airspace management via e.g. the extension of the DME network. The activities pursued are aimed at adjusting the airspace capacity to the prognosticated air traffic volumes, and contribute at the same time to the increase or maintenance of the required safety levels in the air navigation services provided. The multiplication of the coverage by the radio navigation aids signals will enable more accurate determination of aircraft position and ensure the radio-navigation coverage redundancy.

With regard to the surveillance systems, the Agency will pursue the implementation of new data sources (both via replacement and/or development) and proceed with the migration to new technological solutions which will replace the existing single source of surveillance information, (e.g. the radar) with the currently developed hyperbolic systems or ADS-B [Automatic Dependent Surveillance – Broadcast] systems once they become ready for certification and operational use. Additionally, the Agency will

continue to extend the scope of exploitation of radiolocation sources, which are not PANSA's property, e.g. among others, the radio-location sources owned by the Air Forces of the Republic of Poland (OP system) or the neighbouring ANSPs. The precise aircraft identification and determination of its accurate position without the need to interrupt the seamless flow of the surveillance information is bound to ensure the entire area coverage and the maintenance of the current safety levels in the circumstances of the increased air traffic volumes.

To meet the safety–related challenges ahead PANSA personnel improves its qualifications by the attendance in the customized system of training for the ATC personnel (e.g. TRM and CISM training). The type and quality of the navigational aids and systems in use requires from the personnel to improve their skills in the scope of operation, application rules and other aspects, which directly or indirectly have an overall impact on the safety provision.

The current changes in the AIS and its full integration with the EAD take into consideration the overall trend in the European-wide services development included in SES package. These activities are bound to accelerate the process of conversion from the "traditional" AIS provision to the aeronautical information management (AIM) system, which will in turn enable the dispatch of current flight data at the adequate time-limit (e.g. 28 days before they come into force) in the electronic form.

PANSA's task entails also the maintenance of the adequate technical condition and operability of the meteo systems in spite of the fact that the process of consultations and arrangements concerning the taking-over of the current infrastructure by the Institute of Meteorology and Water Management (IMWM) started more than two years ago. Due to the fact that so far the final decision has not been taken by the Ministry of Infrastructure PANSA is obligated to perform the necessary activities to maintain the meteo system in a proper technical condition.

2.3. Carry-overs from the years before the reference period.

Legislation, reference document • Commission Regulation (EU) No 691/2010 of 29 July *2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005 laying down common requirements for the provision of air navigation services*;	Recital Number 15 Article 11 clause 1-6 Article 17 clause 3 Annex II Sub point 2.4 of template
• Commission regulation (EU) No 1191/2010 of 16 December 2010 *amending Regulation (EC) No 1794/2006 laying down a common charging scheme for air navigation services*	Article 11a Article 12 Annex II Transparency of cost base, clause 2 Annex VI Charging mechanism

This chapter presents information on the balance between costs and revenues of the years preceding the RP1 to be carried-over to subsequent years.

Poland joined the EUROCONTROL Multilateral Route Charges System on 1 January 2008 which is also the date from which the air navigation charges are subject to provisions of the EC Charging Regulation. Before year 2008 air navigation charges in Poland were not fully cost-based and there was no mechanism for annual establishing of charges. As a consequence before year 2008 the difference between costs and revenues from en-route charges was not calculated for the purpose of carrying it over to the following years. Therefore Poland calculates the under- and overrecoveries only starting from 2008.

The table below presents the balance of years 2008-2010. The 2008 and 2009 balance together with the amounts to be carried over to the following years are consistent with the amounts contained in the final 2011 cost base presented in November 2010. Year 2010 balance has been established on the basis of PANSA's accounts with actual for CAO and IMGW for this year. It should be noted, however, that these accounts have not yet been audited and may be verified and modified following any possible remarks from the auditor examining PANSA's 2010 financial statement (to be finalized by end of May 2011). Due to substantial amount of overrecovery in 2010, which results from lower execution of costs planned for this year as well as higher than originally assumed level of actual traffic, it is proposed that the balance of 2010 is carried over to the years 2012-2016 in equal amounts constituting 20% of the balance. This issue will be subject

to charges consultation with users' representatives in accordance with article 8 of the amended Charging Regulation.

Table 30. Carry-overs from the years before RP1 – under (-) and over (+) - recoveries (in nominal terms in PLN)

Carry-over from	Balance of the year	To 2009	To 2010	To 2011	To 2012	To 2013	To 2014	To 2015	To 2016
2008	26 424		2 960	7 609	5 285	5 285	5 285		
2009	-21 976			-4 395	-4 395	-4 395	-4 395	-4 395	
2010	81 500				16 300	16 300	16 300	16 300	16 300
2011									
Total			**2 960**	**3 214**	**17 190**	**17 190**	**17 190**	**11 905**	**16 300**

At the time of drafting this Plan for RP1 it is not possible to establish even estimated amount of balance of the year 2011. The difference between revenues and costs for this year will be established in 2012 after closing and auditing the financial accounts for this year and will be presented together with en-route charges reporting tables for 2013 both for user consultations and approval within the EUROCONTROL system.

2.4. Parameters for risk-sharing and incentives.

2.4.1 The incentive schemes applied by Poland as part of the performance plan complies with the following general principles as required in art. 11 of Commission Regulation (EC) No 691/2009.

It is effective, proportional, and credible and will not be changed during the reference period.

The schemes was implemented on a non-discriminatory and transparent basis, so PANSA & IMWM are aware of it. The intention of the schemes are to encourage all stakeholders to achieve a high level of performance and meet the associated targets. Further development of the incentive schemes calls for update of national law and regulations. The specific incentives applied to each ANSP are expected to be set out in the corresponding Section 3 of the performance plan, except for cost-efficiency (full description is provided below).

(a) Safety

2.4.5 There are no EU-wide performance targets in safety KPA for the first reference period (RP1) however NSA will collect the data to assess the KPI proposed by EC. The incentive schemes defined for RP1 in safety area will be based on records from annual safety oversight process performed by Polish NSA. NSA shall verify compliance with applicable safety regulatory requirements and safety related conditions. IAW Safety Oversight Manual 2008, the findings and the observations resulting from safety audits

are subject to corrective action plans carried out by PANSA and IMWM. ANSPs are obliged to define the reasons for nonconformities in order to find the way to mitigate them. The information concerning corrective action plans shall be sent to NSA within 15 days. NSA is authorized to suspend the ANSP certification due to safety reason.

(b) Capacity

2.4.6 NSA will perform the audits to ensure that ANSP(s) are committed to deliver the capacity target established for RP1. The audit findings will be communicated to ANSPs simultaneously with request for corrective actions. ANSPs shall determine actions to deemed necessary to correct nonconformity and the time frame for their implementation. They will be subject to assessment and acceptance by NSA. EC will be informed on the performance plans and targets at least on an annual basis and when performance targets risk not being achieved. Polish NSA will not implement financial incentives, the applicable level of bonus and penalties, on capacity targets due to lack of appropriate provision in national law.

(c) Environment

2.4.8 Poland does not adopt EU-wide performance targets in environment KPA for the first reference period (RP1). Consequently there will be no incentive scheme established for this area.

(d) Cost-efficiency

The following paragraphs present incentives to be applied to the accountable entities in the area of cost-efficiency during RP1. In accordance with article 11.3 of the Performance Regulation the incentives on cost-efficiency target are based on provisions of article 11a of the amended Charging Regulation. The amended Charging Regulation sets forth the incentives in respect of the two following risk areas:

- traffic risk (article 11a.2-7 of the amended Charging Regulation),
- cost risk (article 11a.8 of the amended Charging Regulation).

Therefore the following description of applicable incentives is divided into these two areas.

Traffic risk:

In accordance with article 11a.2 of the amended Charging Regulation the following cost components in the Polish en-route determined costs are not subject to traffic:

- CAO (NSA) costs,
- IMWM (MET service provider) costs,
- EUROCONTROL costs.

There are no air navigation service providers who have received permission to provide air navigation services in Poland without certification, therefore the last sentence of article 11a.2 is not applicable.

With regard to article 11a.7 in case of PANSA the criterion of equity capital not higher that 5% of total liabilities as of 31.12.2011 will not be fulfilled so this provision is not applicable.

Additionally before 8 July 2010 there were no national regulations in Poland requiring reductions in the level or unit rate, therefore the possibility of exemption referred to in Article 2 of EC Regulation 1191/2010 does not apply.

In application of Article 11a.3 and 4 for RP1 Poland will use the following traffic risk sharing parameters:

- where, over a given year, the actual number of service units does not exceed or fall below the forecast established at the beginning of the reference period by more than 2 %, the additional revenue or loss in revenue of the air navigation service provider with regard to determined costs shall not be carried over.
- where, over a given year n, the actual number of service units exceeds the forecast established at the beginning of the reference period by more than 2 %, a minimum of 70 % of the additional revenue obtained by the air navigation service provider(s) concerned in excess of 2 % of the difference between the actual service units and the forecast with regard to determined costs shall be returned to airspace users no later than in year n+2.
- where, over a given year n, the actual number of service units falls below the forecast established at the beginning of the reference period by more than 2 %, a maximum of 70 % of the loss in revenue incurred by the air navigation service provider(s) concerned in excess of 2 % of the difference between the actual service units and the forecast with regard to determined costs shall be borne by the airspace users in principle no later than in year n+2. However, Member States may decide to spread the carry-over of such loss in revenue over several years with a view to preserving the stability of the unit rate. Such a possibility in Poland is foreseen, subject to proper consultation after actual figures for year n are available and requires approval by the CAO President during the process of establishing unit rate for year n+2.
- where, over a given year n, the actual service units are lower than 90 % of the forecast established at the beginning of the reference period, the full amount of the loss in revenue incurred by the air navigation service provider(s) concerned

in excess of the 10 % of the difference between the actual service units and the forecast in respect of determined costs shall be borne by the airspace users in principle no later than in year n+2. However, Member States may decide to spread the carry-over of such loss in revenue over several years with the view to preserving the stability of unit rate. Applicability of this possibility is the same as described above for negative difference between 2% and 10%.

- where, over a given year n, the actual service units exceed 110% of the forecast established at the beginning of the reference period, the full amount of the additional revenue obtained by the air navigation service provider(s) concerned in excess of the 10% of the difference between the actual service units and the forecast in respect of determined costs shall be returned to airspace users in year n+2.

The above traffic risk sharing parameters will be applicable only with regard to PANSA.

Cost risk:

In accordance with article 11a.8 of the amended Charging Regulation, all entities covered by this plan with regard to the cost-efficiency area (PANSA, IMGW, CAO) will bear consequence of any difference between the determined costs set out in this plan and actual costs. It means that those three entities will retain any surplus and bear any shortfall that is a consequence of the difference in costs.

With regard to EUROCONTROL contribution, in accordance with the possibility set forth in article 11a.8 c) iv) of the amended Charging Regulation (costs stemming from international agreements) these costs are considered as out of the control of the ANSPs and Member State and subsequently with regard to these costs any difference between actual costs and determined costs (as described in chapter 3 of this plan) shall be passed on or returned to airspace users through a carry-over to RP2.

Additionally, the following costs will be regarded as out of control of the entities covered by this Plan:

- unforeseen changes in national legally binding pension regulations and pension accounting regulations that are obligatorily applicable to the entities covered by this plan;
- unforeseen changes to national taxation law;
- unforeseen and new cost items not covered in the national performance plan but obligatorily required by law (resulting from legal provisions that entered into force following drafting of this Plan);

- unforeseen changes in costs or revenues stemming from international bilateral or multilateral agreements concluded by Poland, including any possible new costs that will have to be incurred by the entities covered by this plan;
- significant (not lower than 2 percentage points) changes in interest rates on loans as compared to the assumptions of this plan concerning calculation of the cost of capital.

For the purpose of a possible carry-over of these costs, in accordance with the amended Charging Regulation, explicit agreement of the CAO President (Polish NSA) will be necessary. Such an agreement is subject to fulfillment of the criteria listed in article 11a.8 of the amended Charging Regulation.

The parameters for risk sharing described above will be also applicable to terminal costs and traffic.

Incentive schemes in respect of airspace users

2.4.10 Poland has decided not to establish incentive schemes on airspace users for the first reference period.

3. CONTRIBUTION OF EACH ACCOUNTABLE ENTITY

3.1. Polish Air Navigation Services Agency share in the targets and individual binding performance targets.

POLISH AIR NAVIGATION AGENCY

(a) safety

3.1.1 Every year the obligation to provide high-level safety to all airspace users remains unremittingly the top priority task on the list of PANSA's activities. In order to meet this requirement the safety-related activities performed at PANSA are essentially geared towards continuous improving of work efficiency of services responsible for the provision of air traffic safety with the application of a comprehensive, "holistic" approach to all aspects of PANSA's activity as the entity ensuring air navigation services. In order to maintain the assumed safety levels PANSA consistently improves the competence of its personnel and adjusts the CNS/ATM equipment, infrastructure, software and procedures to the applicable standards and requirements imposed by both national and international law. Furthermore, PANSA implemented and constantly improves the Safety Management System (SMS), which primarily involves the assessment and aviation accidents risk mitigation, monitoring of overall safety level trends in the ATM as well as the investigation and explanation of reasons for the

occurrences having impact on the safety along with specific activities aimed at preventing their recurrence.

PANSA's operational activity features high safety standards achieved as a result of the maintenance and improvement of the ATM Safety Management System (SMS) within the meaning of ICAO, EUROCONTROL and EU law provisions whose underlying, primary objective is the assurance that every issue related to the safe provision of air traffic management services is dealt with in a due and sufficient manner resulting from the application of measures reflecting the entire scope of actual responsibility for the safety.

Taking the above into account the Agency is highly committed to maintaining high safety levels independently of any possible economic, environmental or social considerations.

At the turn of 2010/2011 the *baseline* with regard to process indicators was determined for PANSA as the ANSP, based on the new methodology "*ATM Safety Framework Maturity Survey – the Methodology for ANSPs*", developed and recommended by Eurocontrol. One of the Agency's key objectives is to increase the SMS maturity level by one notch (compared to the baseline established at the turn of 2010/2011) at the end of the first reference period compliant with SES II (until 2014) due to the adopted methodology.

The basic safety management measures adopted and implemented at PANSA consist of :

- the application of formal, explicit and creative approach to the systemic safety management to foster the achievement of the required level of responsibility for the safety in the air traffic,
- active engagement of all ATM services and auxiliary services operating within PANSA organizational structure,
- actions pursued in line with the safety policy document, which defines the key safety management principles (ATM Safety Management Manual).

SMS – related activities are pursued in three basic groups comprising respectively:

1) the achievement of the required safety level using:
   - defined and documented safety standards and procedures,
   - personnel competences,
   - risk management,
   - cooperation with other internal and external systems,
2) maintenance of the adequate safety level by means of:

- reporting and investigating into the occurrences of safety significance and constant improvement to prevent their recurrence in the future,
- safety monitoring
- safety reviews.

3) safety promotion involving chiefly the dissemination of information regarding the investigated safety occurrences, drawing conclusions from the “lesson learnt” and sharing “best practices” in this regard.

Consequently, PANSA carries out the tasks in the following scope:

- investigation of reasons for ATM occurrences,
- assessment of threats/hazards posed by the planned changes in the ATM system,
- periodic or *ad hoc* safety oversight audits of the existing ATM centers, services and systems to evaluate the risk of air traffic accidents/ incidents.
- maintaining and documenting of safety records in the scope of SMS operational activity, current safety threat register, the accident/incident risk in the ATM system.

The risk assessment and analysis are carried out in consideration of all air traffic management-related aspects. Every operational, organizational and technical improvement introduced into the ATM system, as well as the incorporation of new elements into the system are evaluated in terms of their safety impact. The possible faults/defects, which may disrupt the functioning of the respective elements of the ATM system and the threat posed by the occurrence of such faults/defects are precisely determined and classified accordingly. Additionally, the risk mitigation solutions are proposed for the improvements/changes to be introduced. Upon the performance of assessment and risk analysis, adequate activities are employed to prevent the occurrence of the identified threats/hazards. Pursuant to EU Regulation 1315/2007 and PANSA’s bylaws the NSA is notified of the introduction of a change to the existing systems and of the new systems having impact on the air traffic safety.

The outsourced services having impact on the ATM safety are also evaluated in terms of safety level guaranteed by them. All ATM occurrences of the operational or technical nature with significant impact on the safety are immediately reported and investigated. Safety oversight audits are regularly conducted to recommend the required changes and to report on the safety level in the respective areas of responsibility and to confirm the compliance of the current safety status with the assumptions of the respective SMS

parts. Additionally, methods for the detection of changes which may affect adversely the safety level in the ATM systems and operational procedures are established. Safety performance indicators are recorded while the SMS is in operational use. Such indicators constitute the evidence of safety aspects observance by PANSA to be demonstrated further on to all air navigation providers, air navigation services users as well as PANSA's supervisory body i.e. the President of the Civil Aviation Office. The results and conclusions from the assessment and risk mitigation processes in respect of the new systems or changes in the existing systems having impact on the ATM safety in the course of their life cycle are also recorded/documented.

The conclusions arising from the investigation of the occurrences of safety insignificance and other air traffic safety related activities are disseminated. The entire PANSA staff is obliged to cooperate in the scope of threats identification.

To enable the execution of tasks by all PANSA's organizational units the detailed scope of safety responsibilities of the individual units was drawn up and the processes in place refer to the specific recommendations included in the ATM Safety Management Manual.

The efficient safety management is inseparable from the requirement to abide by the national and international law and requirements and create and develop the safety culture. The ATM Safety Management Manual, Eurocontrol requirements in the scope of safety provisions (ESARRs), ICAO and European Single Sky ImPlementation (ESSIP) are the key documents specifying the requirements to be fulfilled in order for PANSA to deliver services of sufficient safety level.

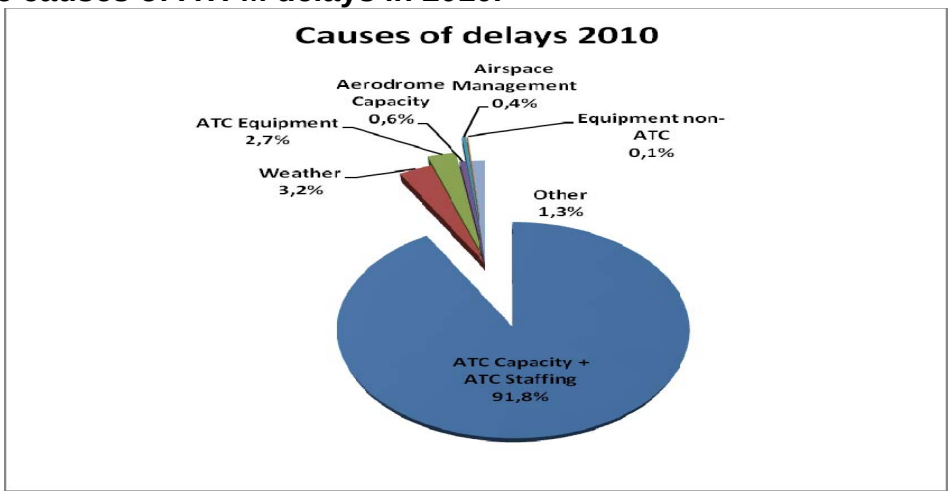
(b) capacity

3.1.4 As a result of legal obligation to provide safe and smooth air navigation services by PANSA, the Agency aims for the optimization of air traffic flow according to users needs. The indicator measuring the proper quality service level of airspace capacity is the ATMF delay per flight. The aim of the Agency is to minimize ATFM delays and to increase en-route airspace capacity.

PANSA, having recognized the set targets as a very ambitious will make every effort to achieve them in a systematic way. Taking into account the fact that 'capacity' (almost 71% in 2010 – chart 1) and "staffing" (21%) category constitute the most significant percentage of ATFM delays, PANSA's activities will be firstly concentrated on the limitation of delays leading to complete removal of these causes of delays. The activities will be as follows:

- operational implementation of the new air traffic management system – Pegasus_21,
- implementation of a new FIR Warszawa airspace organization including new ACC sectors architecture,
- continuation of reduction of air traffic controllers shortages

Table 31. The causes of ATFM delays in 2010.

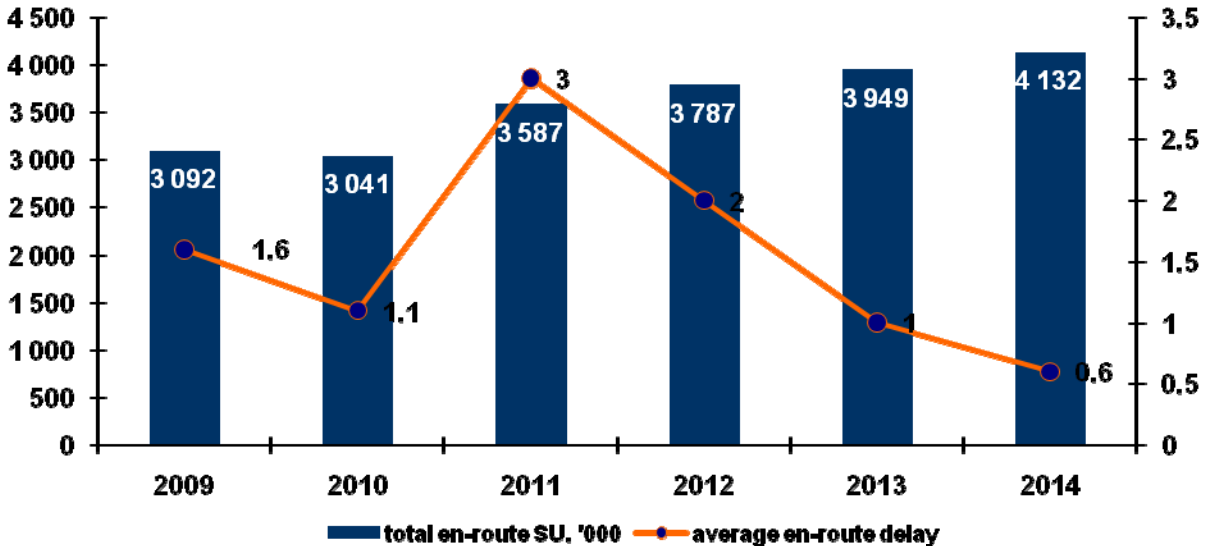


Source: PANSA based on CFMU data base

However, taking into account considerable ATFM delays due to limited capacity in a base year of 2009 and the time-consuming period of the implementation of the new air traffic management system, the delays might be reduced a little bit slower than averagely in Europe.

The Table below present the process of reduction of en-route delays (in minutes per flight) in PANSA in 2009-2014.

Table 32. The value of ATFM en-route delays actual and forecasted (in minutes per flight) in comparison with air traffic (en-route SU) in 2009-2014.



Source: PANSA based on CFMU and cost base data

It is worth to note that delays were continually decreasing between 2008-2010 (by 23,5% on average). For 2011 the ATFM en-route delays are expected at the level of 3 min/flight. The main reason of this one-time abrupt increase of delays will be the process of operational staff training with regard to the implementation of the new air traffic management system – Pegasus_21 (delays category: “other”) and still existing lack of optimal capacity (delays category: “capacity”).

3.1.5 PANSA predicts that in 2012 en-route delays will fall below 2 min/flight. 2012 delays will be a result of the process of sectors’ capacity limitation during Pegasus_21 implementation (“*shadow mode*”). Despite this implementation is planned for the first half of 2012, the transition to Pegasus_21 will influence the year-long value of the indicator. The second factor influencing the value of delays indicator in 2012 may be temporary significantly increased level of air traffic resulting from UEFA European Football Championship in 2012 – UEFA EURO 2012™.

European Football Championship UEFA EURO 2012™ which will be held between June 8 and July 1, 2012 in Poland and Ukraine will cause a temporary increase of air traffic within both countries’ airspace. PANSA is aware that during UEFA EURO 2012™ this temporarily increased traffic will have to be handled in a smooth and efficient manner, fulfilling the event organiser’s expectations and guarantying delays minimization for operations not directly connected with this sport event. Such a demand implies the need of a suitable modification of airspace architecture enabling, according to the needs, organization of air traffic flow especially in those parts of FIR EPWW airspace which are critical as far as airspace capacity is concerned.

3.1.6 PANSA’s activities with regard to UEFA EURO 2012™ preparations are currently focused on the preparation of lower FIR EPWW airspace architecture enabling the accommodation of the event-related air traffic volume and simultaneously supporting the implementation of Pegasus_21 air traffic management system.

The overriding objective of proposed solutions regarding the airspace redesign is the extension of ACC sectors through more efficient utilization of particular TMAs for the time of UEFA EURO 2012™ and by the time the new ACC EPWW structure is implemented.

In the face of a gap in ACC EPWW airspace capacity which could not be closed due to a direct implementation of the new air traffic management system, the airspace modification aims to particular TMA airspace extensions in geographical and vertical range. As a result, a significant part of transit traffic will be under control of APP/TWR

which could offload some ACC sectors capacity which – according to analysis and simulations currently done in PANSA – might be most loaded with air traffic during the sport event.

Updated analysis and air traffic forecast of FIR Warszawa done on the basis of UEFA EURO 2012™ games schedule presented by UEFA in October 2010 showed that during the tournament the air traffic intensity in many ACC sectors of FIR EPWW is expected to go beyond their declared capacity.

Tests of the proposed solutions with regard to the airspace (SAAM Programme) proved that the geographical and vertical extension of TMA borders together with application of altitude restrictions (below the optimal flight levels) at the border of extended TMAs will have a positive effect on optimization of the air traffic intensity and complexity in FIR EPWW during UEFA EURO 2012™. In some cases – after having analyzed samples of potential traffic origin-destination flows – the implementation of the recommended new airspace architecture would allow to significantly offload potentially most overloaded ACC sectors. The expected benefits in terms of ACC sectors' offload in some cases could amount to even more than 10 operations per hour what – in a situation of forecasted air traffic increase in a very short period of time – will be of utmost importance to PANSA.

The short-term PANSA's objective is the implementation of Pegasus_21 new air traffic management system and the recommended airspace modification includes technical feasibility of the new ATM system. Due to considerable amount of changes in operational work environment because of the new air traffic management system implementation, the airspace redesign in 2012 will be limited to indispensible minimum. These limited changes aim to support EURCO2012 event.

In 2013 PANSA predicts further decrease of en-route ATFM delays i.e. below 1 min/flight, yet not before the implementation of a new architecture of ACC sectors with a vertical split. However, it should be highlighted that at the time of the new airspace organization implementation, transitory limitation in ATM system capacity will be imposed in order to ensure smooth and safe implementation of a new work environment for air traffic controllers.

In 2014 at the end of the first reference period it is envisaged – taking a full advantage of implemented technical and organizational solutions – to reach the value of delays indicator at the level of 0,6 min/flight.

Apart from the above described PANSA's activities enabling to increase airspace capacity ultimately and thus gradual reduction of ATFM delays, the crucial factors shaping the operational effectiveness in this area will be the following:

1. airspace structures development
2. airways network development
3. CNS/ATM systems solutions development and
4. ATS staff availability

Ad 1.

PANSA's development of airspace structures aims to increase the airspace capacity, that besides the already mentioned new vertical split of ACC sectors will be done through:

- development of tools and procedures making airspace more flexible and thereby increasing the efficiency of its usage,
- conceptual change of ATC sectors design: from static elements within the borders of potential FIR to module sectors managed dynamically designed in a way that enables the realization of operational demands.

With relation to tools and procedures development making airspace more flexible and thus increasing the efficiency of its utilization, especially in the vicinity of aerodrome where the volume of air traffic is the largest and so there are most significant delays, PANSA intends to:

- re-organize main TMA while implementing flexible arrival/departure RNP1 routes,
- optimize TMA and CTR airspace structures,
- implement TMA and CTR airspace system (ultimately *Gate-to Gate* operation) with consideration of final approach APV procedures (development from LNAV/VNAN to LPV or RNPx),
- implement GLS/FMS usage procedures,
- implement and develop the TMA and CTR airspace systems.

Ad 2.

The development of ATS routes network and other structures of airspace aims to order particular air traffic flows, increase capacity and flexibility of airspace structures. Thanks to ATS routes network development the effective air operations will be possible in the context of airspace availability improvement: *Night Routes/Night DCT, Direct Routes, Early Access to Weekend Routes, Free Routes.* En-route configuration of airspace is a base for future dynamic progress of air routes network (ARN). Besides, in

order to increase airspace capacity it is planned to decrease the distance between routes – the possibility of flight using offset trajectory *(parallel offset)* and to introduce 4D operations and also UPR (*user-Preferred Routing)* flights/operations in the end.

The increase of precision of navigation methods and so the possibility to diminish the distance between air routes with a consideration of high level of air traffic safety is one of the elements that will influence on the possibility to increase airspace capacity as one of the capacity elements of the whole ATM system. Making the airspace structure flexible thus guarantying better availability of favoured air routes improves the efficiency of air operations directly. Ultimately, the existing ARN network will be replaced by optimised trajectories together with multi-sector planning tools. Introduction of AFUA solutions will trigger GAT/OAT operational procedures development.

Ad 3.

Within the scope of the development of CNS/ATM systems and infrastructure the declared airspace capacity maintenance is supported first of all by replacement projects guarantying uninterrupted work of infrastructure assuring continuity of air traffic services provision (the causes of delays out of *ATC Equipment* category reached the level of 2,7% in 2010). Simultaneously, as far as the development investments are concerned that enable configuration optimizing and airspace usage, the activities will aim to raise the technological level and ATM system functionality and CNS/ATM infrastructure development. PANSA's activities oriented to increase the number of operating navigation aids will allow for more precise location of the pinpoint of the aircraft thus enabling airspace capacity increase. One of the consequences is the achievement of coverage enabling gradual implementation and development of air routes network with higher precision factor (RNP) and making the use of airspace more flexible. Increasing the navigational coverage above the minima together with the development of shorter and more effective procedures and the reduction of used separations whilst keeping proper safety level will have and impact on the process of flexible airspace management improvement.

Ad 4.

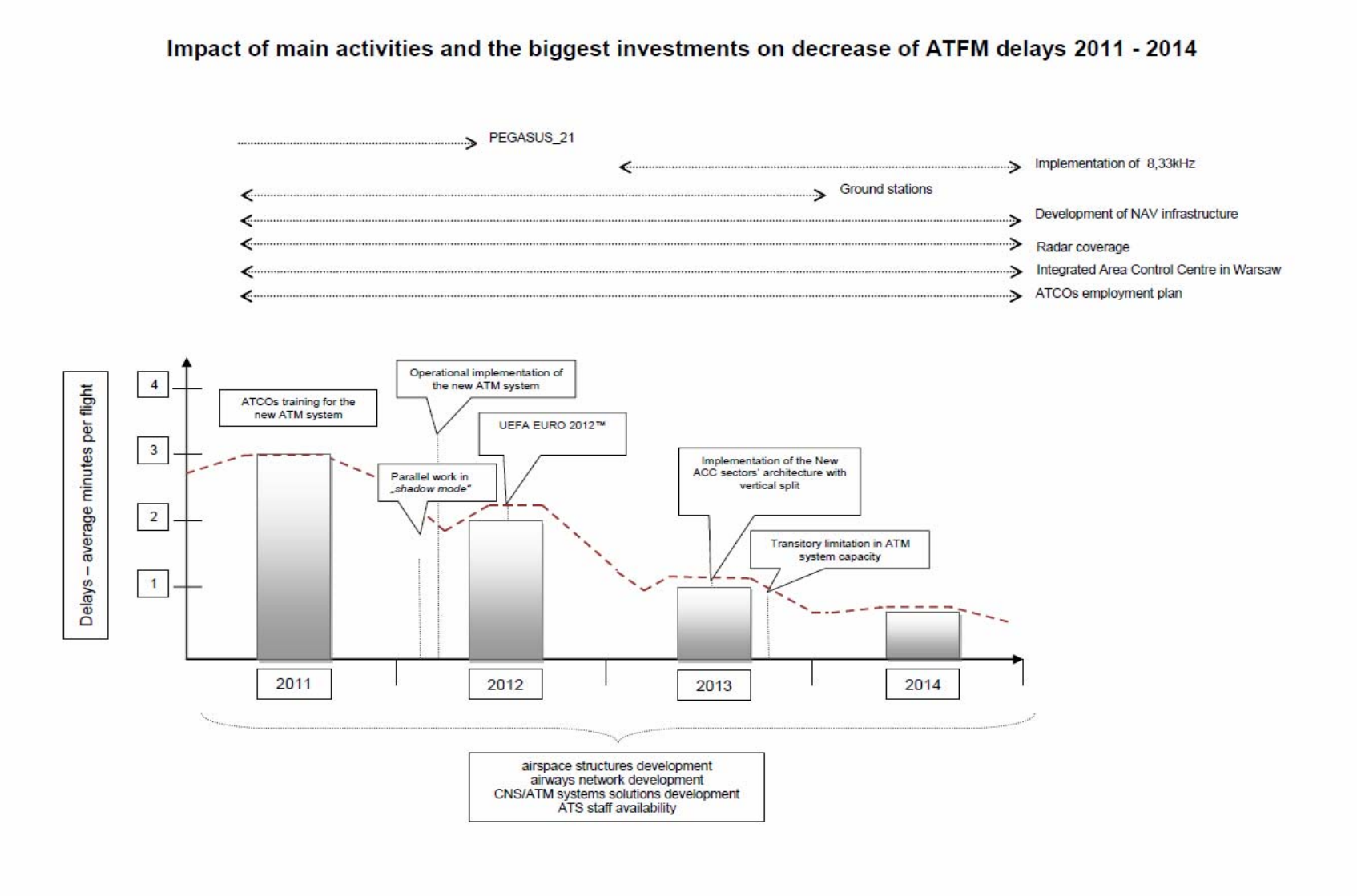
The achievement of desired airspace capacity is also conditioned by the efficiency of PANSA's activities in terms of human resources shortages minimization (above all within the air traffic controllers group), maintenance and development of operational staff ratings. The planned demand for air traffic controllers for 2015 is 64 ACC ATCOs and 22 APP ATCOs additionally in comparison with 2011. Furthermore, the

continuation of IT tool implementation in 2011, supporting the ATCOs' roster, will enable further optimization of ATCOs working hours usage in the coming years.

Bearing in mind the fact that for the last years PANSA has been one of the ANSPs generating the most significant delays in Europe for historical reasons, PANSA must make a greater effort than the ANSPs with minor delays. In 2014 PANSA will reduce delays by 80% compared to 2011 which is a considerable efficiency improvement of airspace capacity. The relations between financial and economic cost-effectiveness should also be taken into consideration. With regard to financial cost-effectiveness (the cost of CNS/ATM service provision/composite flight hours) in 2009 PANSA was one of the European ANSPs with the best indicator examined by Eurocontrol/PRU[13]. Having considered costs of delays PANSA's position is less beneficial. However, it should be noted that PANSA's economic cost-effectiveness indicator for the first time in 2009 was below the European average and by 2010 it was systematically dropping which depicts the Agency's efforts to improve efficiency and diminish delays in air traffic.

[13] ACE 2009 Benchmarking Report

Table 33. Impact of main activities and the biggest investments on decrease of ATFM en-route delays in 2011–2014.



Monitoring of terminal KPIs

Following the Commission Regulation (EU) No 691/2010 of 29 July 2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005 laying down common requirements for the provision of air navigation services Member States may decide not to apply this Regulation to terminal air navigation services provided at airports with less than 50 000 commercial air transport movements per year. They shall inform the Commission thereof. Where none of the airports in a Member State reaches the threshold of 50 000 commercial air transport movements per year, performance targets shall apply as a minimum to the airport with the highest commercial air transport movements.

Being the part of ATMAP project PANSA is monitoring the input to SES. Inputs with regard to the data collection refer to the information in the Annex IV of 691/2010 (data requirements for airlines, aiport operators and aiport coordinators) and the Article 20 of 691/2010 providing details on the data validations strategy, mandatory action plan to improve quality whenever necessary and mandatory electronic format to be specified by the European Commission.

The EUROCONTROL PRU started the voluntary process of data collection for the ATMAP project. All stakeholders in the ATMAP project agreed to create a Common Database with information collected from CFMU, CODA (data submitted by airlines) and airports. The aim of the Common Database is to achieve the most complete data set for the calculation of performance review KPIs. In parallel, this initial step will facilitate the mandatory data flow from January 2011 onwards (as described in COMMISSION REGULATION No 691/2010 of 29 July 2010 laying down a performance scheme for air navigation services). EUROCONTROL will provide participants with a validation report based on the submitted data which will be distributed to EPWA, PANSA and LOT.

The ATMAP performance framework is geared towards a common performance goal as agreed during previous ATMAP meetings between main airport stakeholders (main aircraft operators, airport managing bodies and ANSPs). This commonly agreed performance goal is: *"to maximise the use of the airport airside capacity in line with air traffic demand at an accepted level of service quality (efficiency, predictability, flexibility) in a safe and cost-effective manner while optimising environmental impacts (noise &*

emissions) and maintaining the awareness of network effects."

The ATMAP framework refers to airport airside operations and airspace in a range of 40 NM around the airport. This airspace is called the Arrival Sequencing and Metering Area (ASMA). The framework encompasses scheduling and operational data.

As shown in Figure 1, the framework comprises 8 indicators which address:

- Capacity
- Predictability
- (Flight) Efficiency, including punctuality

It does not address airport related:

- Environmental performance (CO_2 and noise emissions)
- Safety
- Cost effectiveness

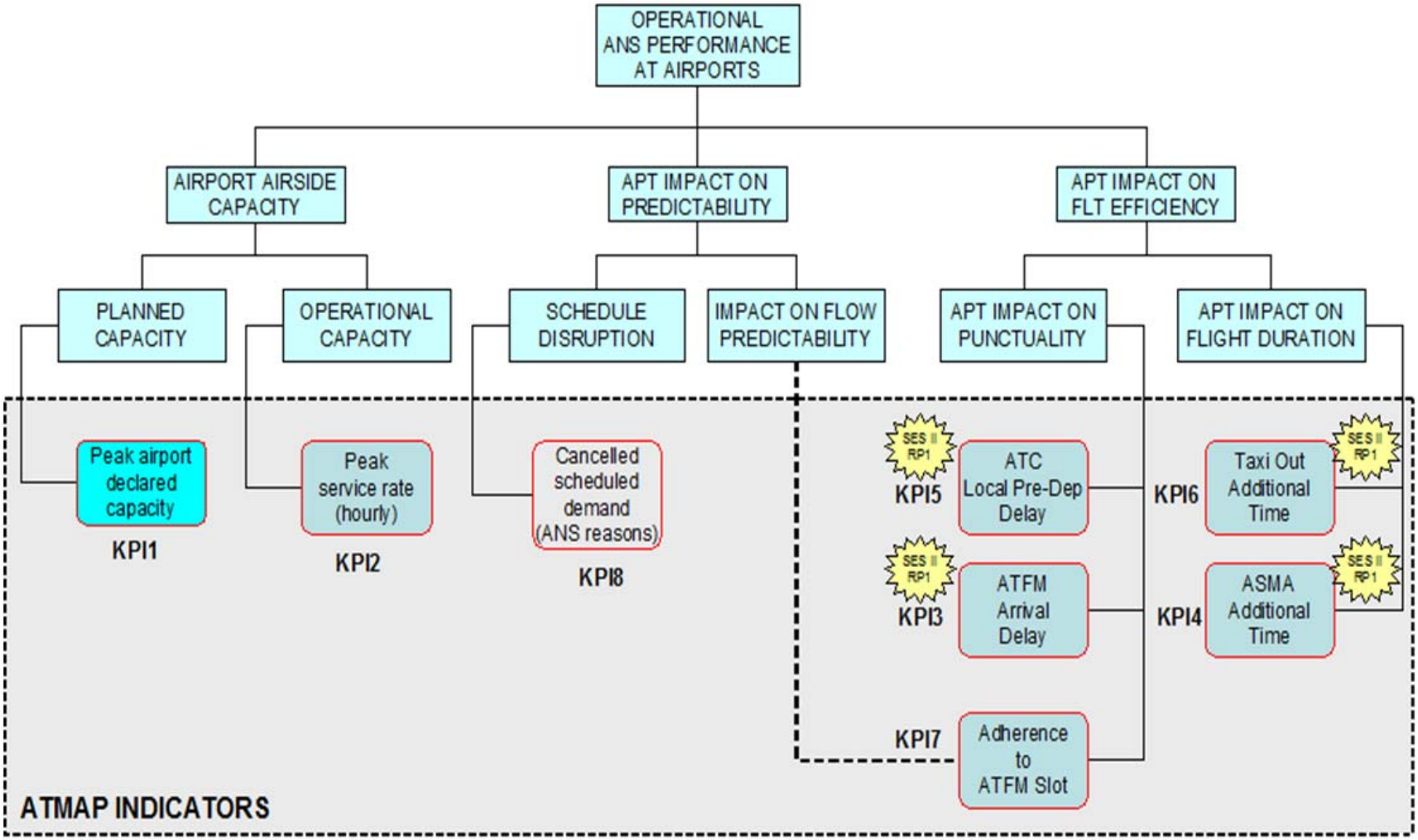


Table 34 – ATMAP KPIs

In order to prepare the development of a second national/FAB capacity KPI, Member States, including Poland, shall report as from the first reference period:

1. the total of ATFM delays attributable to terminal and airport air navigation services;
2. the additional time in the taxi out phase;
3. for airports with more that 100 000 commercial movements per year the additional time for ASMA (Arrival Sequencing and Metering Area).

KPI 3 ATFM Arrival delay

This indicator is calculated for the inbound flow at a destination airport. For all flights arriving at the airport, it takes that portion of the pre-departure delay which is caused by landing restrictions at the destination airport. The indicator is the average generated ATFM delay per inbound flight.

The purpose of this indicator is to measure the effect that inbound demand/capacity imbalances (known prior to off-blocks) could have on departure punctuality. This indicator is "specific" on what should be measured and there is no need to filter out any value.

KPI 6 Taxi-out additional time

This purpose of the Taxi-out additional time indicator is to provide an approximate measure of the average departure runway queuing time on the outbound traffic flow, during times that the airport is congested.

The approach for calculating this indicator on the basis of data availability for actual off block time (AOBT) and actual take-off time (ATOT).

KPI 4 ASMA additional time

This purpose of the ASMA additional time indicator is to provide an approximate measure of the Average inbound queuing time on the inbound traffic flow, during times that the airport is congested.

The approach for calculating this indicator on the basis of data availability for actual ASMA entry time (flight entering the area with 40 NM radius around the airport) and actual landing time (ALDT).

(c) environment

3.1.7 The activities undertaken by Polish Air Navigation Services Agency aimed at minimizing the negative impact of the air transport on the environment are compliant with the objectives included in the ESSIP (*European Single Sky Implementation*) and *European ATM Master Plan*, and primarily include:

- the reduction of CO_2 and NOX emissions into the air arising as a consequence of aircraft fuel burn and,
- the reduction of aircraft–generated noise in the course of the ATC activities.

The key activities taken by PANSA to achieve the improvement in the environmental protection in the ATM area include the provision of efficient airspace management, which guarantees better horizontal flight efficiency as well as the popularization and promotion of the CDA (*Continuous Descent Approach*) technique at the major FIR Warszawa controlled airports.

PANSA has been actively involved for some years in the modernization of the airspace to improve the en-route flights efficiency indicator. However, PANSA's potential to "straighten" the air routes is relatively limited since the average horizontal en route flight efficiency indicator in Poland amounted to 1.4% in 2009 (compared to 3,9% within the EUROCOTROL zone). In spite of the relatively low air route extension values, PANSA actively engages in additional activities related to the efficient management of aircraft operations, such as e.g. the identification and deployment, where operationally possible, of the en-route direct flights and the night direct flights.

3.1.8 The measurements taken in 2010 indicate that as a result of the direct flights given by air traffic controllers in FIR Warszawa ("*enroute DCT"*), the route of a single en-route flight (based on the analysis in respect of one day of 2010) was reduced by approximately 3.54 km/flight. It means that only during one day when the measurement was taken, the DCT commands issued contributed to the reduction of CO2 emissions by 45.71 kg of CO2 per flight. During the entire day on which the tests were carried out the reduction of CO2 emissions amounted to 5.3 tones. Due to technical constraints of the AMS2000+ system, the above measurements were performed by manual analysis. The implementation of a new air traffic management system will enable to accommodate the functionalities allowing automatic registration and measurement of the differences between the actual route & distance of individual aircraft operation and the values as planned in the FLP.

With regards to the Night DCTs, such commands were issued most frequently between the following entry points to the FIR Warszawa: LASIS – DIBED, GOTIX – DEVEL, BODLA – BOKSU, ENORU – RUDKA, SUI – BOKSU, VABER – BODLA, ELPOL – DIBED, DIBED – LASIS and USTIL – GOVEN. The analysis conducted by PANSA reveals that due to the Night DCTs given to approximately 170 aircraft operations occurring between the above mentioned points, the fuel consumption was reduced by approximately 10 tons, while the CO_2 emissions by circa 31.6 tons.

The DCT commands were also issued by PANSA's operational services in the terminal manoeuvring areas (TMA). In 2010 PANSA conducted the measurements and tests regarding the environmental impact of the P-RNAV procedures implementation within TMA Warszawa. The measurements

involved the analysis of the air traffic situation in respect of the distance of the Warsaw airport (EPWA) terminal arrivals in the controlled traffic. In the course of the measurements, taken in a real traffic situation, the actual route and distance of each *terminal arrival route* in relation to the planned in the FLP landing procedure was checked ("STAR procedure"). The results showed that on average the distance of each analyzed terminal arrival at TMA Warszawa upon receiving of the DCT command issued by ATC was reduced compared to the distance of the procedure included in the FPL by approx. 34.4NM/terminal arrival route. The obtained distance reduction resulted in the overall reduction of CO2 emissions by 1 114.6, which translates into approximately 507kg of CO2 less per a terminal arrival.

The results of the measurements prove that PANSA services are efficient in the reduction of the negative impact of air navigation on the environment. PANSA's intention is that in the years to come the DCTs (in the en-route, terminal and night air traffic) are used at every place where operationally and economically justified. Additionally, the development of the navigation infrastructure and thus the increase of the navigational aids planned by PANSA is bound to improve the air traffic management flow and enable further reduction of the flight trajectory, which will, in turn, result in the CO_2 emissions reduction.

As far as the vertical flight efficiency is concerned, PANSA's intention is a gradual, following the implementation of the Continuous Descend Approach technique at Warsaw Airport, deployment of such solution at other regional airports, i.e. Kraków, Katowice, Gdańsk, Poznań. PANSA intends to increase the volume of the CDA aircraft operations by approximately 7% annually, which will translate directly into the significant reduction of the CO_2 emissions. The volume of saved fuel due to the application of the CDA technique ranges according to EUROCONTROL estimations from 50 to 150 kg per flight depending on the aircraft type. The increase and promotion of aircraft operations performed using the CDA technique constitute PANSA's activities in the scope of the reorganization of terminal airspace, which will be directed at the provision of more economic flight profiles.

To comply with the objective of the environmental protection the Agency in cooperation with airport operators engages also in a number of other activities aimed at mitigating the nuisance of the aviation transport and airports activity suffered by the local community. The key PANSA's activities in this scope, apart from the CDA landing technique mentioned before include:

- anty-noise procedures design,

- CEM (*Collaborative Environmental Management*) and CDM (*Collaborative Decision-Making*) projects implementation at Warsaw Airport.

Other areas of future PANSA's activity include, among others, the development of the Environmental Management System (EMS), waste management and the monitoring of electromagnetic fields emissions into the environment. These activities are not directly linked to the environmental protection in the air traffic management, however positively match to the European environmental policy.

(d) cost efficiency

PANSA provides air traffic services, excluding the meteorological services, in the area of FIR Warszawa. PANSA covers their costs by air navigation charges, state budget's subsidy for the exempted flights[14] and other revenues including other non-navigation sources and EU funding, etc.

During the process of preparation the National Performance Plan PANSA presented new methodology for the costs allocation between en route and terminal services. Taking into account that the consultation process for new methodology is still in progress, all PANSA's costs presented in chapter 3 of the National Performance Plan are established using current methodology for cost allocation as well as the proposed new methodology (in *italics*). The main changes in the method of allocation of the cost between terminal and en route services result from including all the costs related to approach services to en route services. Additional information about the proposed changes in the method of costs allocation between en route and terminal is presented in the Annex I

PANSA's costs presented in this draft performance plan were established by the CAO President. The level of determined costs for PANSA is lower than presented by PANSA in its input to the national performance plan in April 2011.

Remark: Taking into account the changes made by President of CAO in the cost bases presented by PANSA in its input to the Plan the presentation of the PANSA's costs by service is currently not possible. After the consultation meeting and when the final decision about the applicable method of the cost allocation for the first reference period will be taken Polish National Performance Plan shall be completed by the required information.

[alternative version – new allocation between ER and TNC:

[14] The flights exempted from the air navigation charges are listed in the article 130.6 of the National Aviation Law of 3 July 2002.

The table below presents PANSA's costs for the years 2012-2014 in the current version and the altered (new) version of cost allocation. The figures are expressed in nominal terms.

Table 22a. PANSA' s costs broken down by ENR and TNC according to the current and altered (new) cost allocation principle.

PANSA's ANS costs	en-route			terminal		
'000 PLN	New methodology	Current methodology	Difference	New methodology	Current methodology	Difference
2012	557 221	531 275	25 946	95 899	118 466	-22 567
2013	588 150	560 653	27 497	97 020	121 382	-24 361
2014	613 277	584 059	29 218	101 401	127 453	-26 052

For the year 2012 the change in cost allocation results in the decrease in PANSA's terminal costs by approximately 19% with the accompanying increase in the en-route costs by approximately 4,9% The data for the subsequent years reveal the decrease in costs allocated to terminal services at the level of circa 20% while the ENR costs increase by approximately 5%. The balance of the changes is not equal to zero in all of the years of RP1. These differences are caused by the fact that during the process of establishing the proposed level of determined costs for PANSA the CAO had to take into account some estimates for certain staff cost figures due to lack of detailed data. These differences are, however, negligible as they amount to ca. 0,46% of the total PANSA ANS costs.]

3.1.1 PANSA determined en-route costs

PANSA's en-route determined costs for the first reference period (2012-2014) are presented in the table below. Table presents also the actual data for the years 2009 and 2010 and forecasted data for 2011 (as included in the final cost base for 2011 charges).

Table 35. PANSA costs by nature for the first reference period in nominal and real 2009 values – current allocation

PANSA - en route current allocation	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D	2014D/ 2011F
determined costs nominal values								
Staff	000 PLN	287 723	292 727	343 625	362 105	378 096	390 954	*13,77%*
Other operating costs	000 PLN	57 891	59 453	81 865	85 310	83 806	86 500	*5,66%*
Depreciation	000 PLN	33 461	33 923	38 663	50 050	60 904	66 385	*71,70%*
Cost of capital	000 PLN	16 405	16 865	35 506	33 810	37 847	40 219	*13,27%*
Exceptional items	000 PLN							
Total en-route costs	000 PLN	395 480	402 968	499 659	531 275	560 653	584 059	*16,89%*
% change n/(n-1)			*1,89%*	*23,99%*	*6,33%*	*5,53%*	*4,17%*	

determined costs real 2009 values								
Staff	000 PLN	287 723	285 031	326 431	335 596	341 869	344 874	*5,65%*
Other operating costs	000 PLN	57 891	57 890	77 768	79 064	75 776	76 305	*-1,88%*
Depreciation	000 PLN	33 461	33 031	36 729	46 386	55 068	58 561	*59,44%*
Cost of capital	000 PLN	16 405	16 422	33 729	31 335	34 221	35 478	*5,19%*
Exceptional items	000 PLN							
Total en-route costs	000 PLN	395 480	392 374	474 656	492 381	506 935	515 217	*8,55%*
% change n/(n-1)			*-0,79%*	*20,97%*	*3,73%*	*2,96%*	*1,63%*	
Total Service units (000)		3 092	3 313	3 587	3 914	4 036	4 177	*16,44%*
Determined unit cost - nominal	**PLN**	**127,89**	**121,64**	**139,29**	**135,73**	**138,91**	**139,83**	***0,39%***
% change n/(n-1)			*-4,89%*	*14,51%*	*-2,55%*	*2,34%*	*0,66%*	
Determined unit cost - real 2009	**PLN**	**127,89**	**118,44**	**132,32**	**125,80**	**125,60**	**123,35**	***-6,78%***
% change n/(n-1)			*-7,39%*	*11,72%*	*-4,93%*	*-0,15%*	*-1,80%*	

[alternative version – new allocation between TNC and en route:

Table 23. PANSA costs by nature for the first reference period in nominal and real 2009 values – new allocation

PANSA - en route new allocation	***Currency***	***2009 A***	***2010 A***	***2011 F***	***2012 D***	***2013 D***	***2014 D***	***2014D/ 2011F***
determined costs nominal values								
Staff	*000 PLN*	*287 723*	*292 727*	*343 625*	*381 622*	*398 157*	*411 609*	*19,78%*
Other operating costs	*000 PLN*	*57 891*	*59 453*	*81 865*	*88 451*	*87 046*	*89 859*	*9,76%*
Depreciation	*000 PLN*	*33 461*	*33 923*	*38 663*	*52 215*	*63 557*	*69 565*	*79,93%*
Cost of capital	*000 PLN*	*16 405*	*16 865*	*35 506*	*34 933*	*39 390*	*42 244*	*18,98%*
Exceptional items	*000 PLN*							
Total en-route costs	*000 PLN*	*395 480*	*402 968*	*499 659*	*557 221*	*588 150*	*613 277*	*22,74%*
% change n/(n-1)			*1,89%*	*23,99%*	*11,52%*	*5,55%*	*4,27%*	
determined costs real 2009 values								
Staff	*000 PLN*	*287 723*	*285 031*	*326 431*	*353 684*	*360 008*	*363 094*	*11,23%*
Other operating costs	*000 PLN*	*57 891*	*57 890*	*77 768*	*81 976*	*78 706*	*79 267*	*1,93%*
Depreciation	*000 PLN*	*33 461*	*33 031*	*36 729*	*48 392*	*57 467*	*61 366*	*67,08%*
Cost of capital	*000 PLN*	*16 405*	*16 422*	*33 729*	*32 375*	*35 616*	*37 265*	*10,48%*
Exceptional items	*000 PLN*							
Total en-route costs	*000 PLN*	*395 480*	*392 374*	*474 656*	*516 428*	*531 797*	*540 992*	*13,98%*
% change n/(n-1)			*-0,79%*	*20,97%*	*8,80%*	*2,98%*	*1,73%*	
Total Service units (000)		*3 092*	*3 313*	*3 587*	*3 914*	*4 036*	*4 177*	*16,44%*
Determined unit cost - nominal	***PLN***	***127,89***	***121,64***	***139,29***	***142,36***	***145,73***	***146,82***	***5,41%***
% change n/(n-1)			*-4,89%*	*14,51%*	*2,21%*	*2,36%*	*0,75%*	
Determined unit cost - real 2009	***PLN***	***127,89***	***118,44***	***132,32***	***131,94***	***131,76***	***129,52***	***-2,12%***
% change n/(n-1)			*-7,39%*	*11,72%*	*-0,28%*	*-0,13%*	*-1,71%*	

The total en route costs - using the new allocation between en route and terminal - will increase in the whole reference period by 14% (in real terms). The biggest costs increase is noted in the staff costs position. The main reason is allocation of approach-related staff costs to en route services. We can also see substantial differences in the level of depreciation costs. The larger amount of depreciation is the effect of application of the new cost allocation method as well as results from significant capital expenditures planned for RP1.]

Staff costs

PANSA's staff costs cover salaries, bonuses and social security contribution, Labor Fund contributions, retirement and jubilee benefits and additional bonuses, compulsory medical services, deduction for company social security benefits fund, staff trainings and other.

The main part of the staff costs constitute costs of salaries and social security contribution – the share of these parts of the costs fluctuate from 63 % to 66 % in the total en-route costs for RP1. The biggest increase in the staff costs during RP1, of 5,1 % in 2012, is caused by the implementation of the new operating system PEGASUS_21. Both the increase of the airspace capacity and traffic capacity owing to the introduction of the new ATM system PEGASUS_21 and the new division of airspace planned for the period from 2012 to 2013 will have a direct impact on the reduction of the level of delays but will also cause the increase in the staff costs especially in the implementation phase of the new ATM system (late 2011 and 2012). In consequence the number of staff employed in the phase of implementation will increase (during the final stage of the initiation of the new system the number of the operating staff will temporarily double to guarantee the continuity of the services provision and to maintain the level of capacity during the transition period).

Additional staff costs will be generated also as a result of an increased availability of airports and a need to increase a capacity of airspace in 2012 associated with the EURO 2012 European Football Championship hosts by Poland and Ukraine.

In the subsequent years the increases of the staff costs will be at the level of 4,4% in 2013 and 3,4% in 2014 (in comparison with the previous year). The impact on the staff costs increase in the period 2013-2014 will have also the necessity of the RTS simulation (Real-time simulation), as an element of the implementation of the new architecture of ACC sectors, planned for the fourth quarter of 2013, for the purpose of the validation of a new space by the operating personnel.

CAO in the process of establishing PANSA's determined staff costs for RP1 based its calculation on the financial forecasts from PANSA's business plan for the period 2011-2015 submitted for approval by Minister of Infrastructure at the end of 2010. The plan contained the expected financial implications of extension of infrastructure and systems (including PEGASUS_21) with regard to staff costs and assumed decrease in delays at the same level as presented by PANSA it its input to the Performance Plan. The necessity of improvements in the field of capacity (delays) that PANSA has to introduce in order to foster the achievement of EU-wide capacity target for RP1, including implementation of the new ATM system PEGASUS_21, will help Agency decrease the expected costs of delays in the subsequent years - trade-off between cost-efficiency and capacity areas is described in chapter 2 above (as presented in the draft ACE 2009 Benchmarking Report delays represented up to a third of PANSA economics costs in 2009). During the implementation of PEGASUS_21 to ensure adequate human resources to fulfill all the tasks PANSA will have to temporarily involve the staff above the normal work time what also influences the level of staff costs for RP1.

During the process of establishing the determined PANSA's staff costs for RP1 the CAO considered also the benchmarking analysis provided in the draft ACE 2009 Benchmarking Report. According to the draft ACE 2009 Report Poland has one of the lowest unit costs in comparison with Avinor, LFV/ANS Sweden and Finavia (all the ANSPs from the "Nordic States" group) but PANSA's ATCO employment costs per ATCO-hour equal to EUR 72, close to those of Finavia and LFV/ANS Sweden. What is more the costs per ATCO-hour rose by 42% from 2005 to 2009 so twice the growth of Polish Gross Domestic Product[15]. Taking into account the main target of the performance scheme with regard to cost-efficiency and data presented in ACE Report PANSA should enhance its cost efficiency especially in the field of staff costs – both with regard to ATCO employment costs and support staff costs.

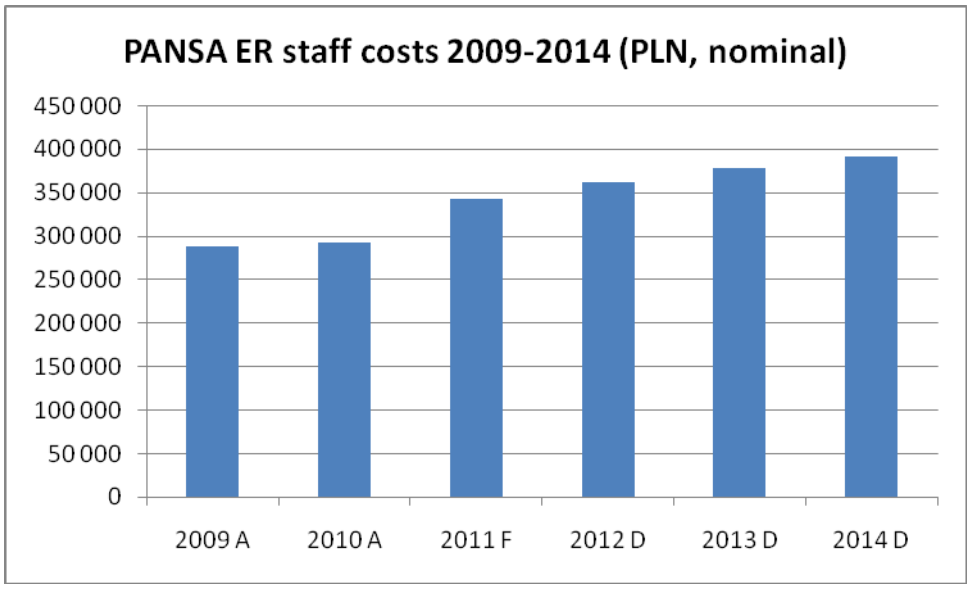
It should also be noted that the forecasted PANSA's staff costs for the RP1 do not include the automatic inflation indexation.

In the RP1 the changes in the staff costs are also caused by:

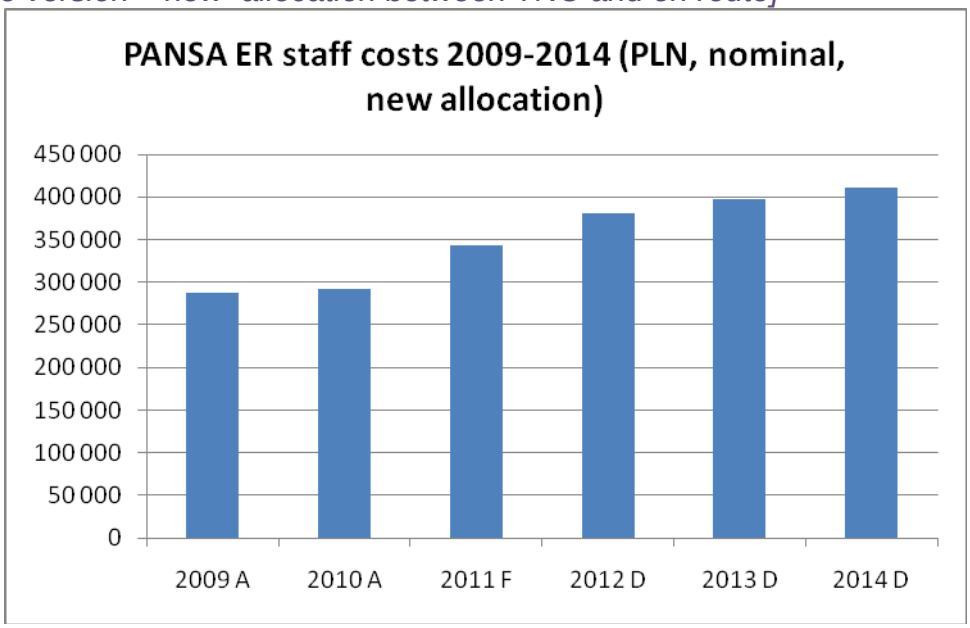
- classifying Approach Control Service APP PO to the category of 30-60 thousand of air operations under the Regulations Remuneration for employees of PANSA, approved by the Minister of Infrastructure on 12 July 2010;
- taking into account salaries of workers at retirement age, who are not willing to retire;

[15]Draft ACE 2009 Benchmarking Report, Version: 28 March 2011, Performance Review Body.

- the increase in a planned number of trainees in accordance with the document ‘Air traffic controllers in PANSA in years 2011-2015’, prepared on the basis of the document ‘Prognosis of the demand for air traffic controllers in years 2011-2015’.



[alternative version – new allocation between TNC and en route]



Other operating costs

Other operating costs cover consumption of materials and raw materials, energy, taxes and charges, insurances, repairs services, analysis and translations, costs of business trips, telephone and internet access services and costs of other services. During the whole RP1 other operating costs decrease in real terms by 1,88% *[increase by 1,93%]*. The differences in the level of other operating costs in nominal terms during PR1 is caused by the necessity of the modernization of CNS/ATM infrastructure and other PANSA’s technical infrastructure, as well as increased demand for replacement of

missing parts due to aging of the technical infrastructure. The increase in nominal costs in this area is due to increase in prices of materials and repair services. The infrastructure modernization will allow to decrease the exploitation costs of the systems in the following years. Another group are costs of technical inspections and maintenance of facilities and equipment used in PANSA, telecommunications charges, consultancy services, rents and lease payments paid to the companies from which PANSA rents spaces. The significant position in the other operating costs constitute the insurance costs for annually renewed insurance policies, which cover liability and property. In this group there are also costs of impairment charges.

It is assumed that after the introduction of new solutions such as: VCX, radio communications, infrastructure maintenance costs will fall by several percent. Investment and development activities will be undertaken in the search for alternative technical solutions, ensuring the stable functioning of Agency in the domains of communication and navigation, while rationalizing expenditures of PANSA. Separation of the functions of transmitting and receiving in the OR will reduce the number of objects needed to be build, which in turn will reduce system operating costs. The transition from the use of DVOR/DME to DME, and finally GNSS, namely the use of cheaper technology, will reduce the costs of maintenance of navigational infrastructure and unit value of investment. Maintaining and developing surveillance infrastructure, allows the increase in the number of aircraft operated and minimizing the delays.

Depreciation

Forecasts for RP1 show a significant increase in this cost item. The rationale for the increase in depreciation is an increase in fixed assets, value of which increases as a result of planned investments (information on the investment plan is provided in subsequent part of this Plan). This is mainly due to the priority project which is the installing of a new air traffic management system Pegasus_21, CNS infrastructure and Radar investment projects. Due to ACE Report the new investment cycle cumulating with the commissioning of a new ATM system will translate into higher depreciation costs (the phase of installation of the new ATM system will take place in the late 2011 and beginning 2012), with the annual depreciation costs systematically higher that in the preceding years. It has to be mentioned that rebuilding of the ATM system for Warsaw ACC will bring about the capacity and what is very important reduce the ATFM delays significantly in the subsequent years. Adapting to the new system will require the purchase, upgrading or replacing of many devices. Similarly as with the staff costs, increase in depreciation costs shall be considered together with the trade-offs between

costs and capacity – implementation of the new infrastructure and systems will allow for decrease in the level of delays, and as a consequence their costs to airspace users.
As it was for the staff costs, also the costs of depreciation do not include the inflation indexation.

Cost of capital

The calculation of the cost of capital is based on the methodology of the weighted average cost of capital. The average net book values of fixed assets are taken into account and the average net values of assets that are required for en-route services provision.
As already indicated in chapter 2, the values of the cost of capital in the period 2009-2011 are low due to the decision taken by PANSA's management to reduce the return on equity well below the bond rate (the applicable rate of return on equity amounted to 3,5% while the actual bond rate accounted for ca. 6%).
For the first reference period taking into account the projected increase in PANSA's staff costs and depreciation costs as well as the need to ensure proper contribution of the national target to the achievement of EU-wide target, the CAO President decided not to include the risk premium on ROE. It has to be underlined that the risk for ANSPs stemming from the new performance scheme and new rules on the division of risk between ANSPs and airspace users is limited in RP1. The risk sharing set forth in article 11a of the amended Charging Regulation limits the traffic risk of ATSPs to 4,4%. Additionally RP1 covers only 3 years what allows for more reliable planning than if it covered 5 years. Also in accordance with this Plan if the difference in traffic or costs that results from unexpected and uncontrollable events takes place during RP1 the targets will be verified.
Taking the above into account the CAO President decided to apply ROE at the level similar to state bonds. Lower cost of capital should compensate for the increase in PANSA's staff costs and depreciation during RP1.
The table below presents elements used for the calculation of the cost of capital for RP1. For calculation of the cost of capital and working capital, the balance sheet data presented in Table 24 is used. The table contains information on the assets, with the division of assets and working capital. The table also presents the cost of capital, return on equity (ROE) and the interest cost of borrowed capital. The debt financing showed in the table reflects investment credit taken by the Agency. As the cost of external capital an interest rate of an investment loan at 5.95% per annum has been adopted.

The increase of external financing in 2012 in the financing structure leads to the increase of financial risk and consequently the level of ROE is slightly higher in 2012 as compared to subsequent years when the share of debt is lower.

Table 36. PANSA – Complementary information on the cost of capital en-route (in nominal terms in national currency) (current allocation)

PANSA cost of capital calculation - en-route (new allocation)	2011 F	2012 D	2013 D	2014 D
Net book val. fixed assets	534 338	639 931	696 415	725 522
Adjustments total assets	0	0	0	0
Net current assets	68 472	26 693	70 638	115 743
Total asset base	602 810	666 624	767 053	841 265
Cost of capital pre tax rate - base	5,89%	5,07%	4,93%	4,78%
Return on equity - base	5,90%	5,00%	4,86%	4,74%
Average interest on debts - base	5,75%	5,95%	5,95%	5,95%
Share of debt financing		7,21%	6,71%	3,41%

The value of total ER assets in 2011 amounts to PLN 602 810. In the years following the implementation of investment plans their value increases respectively by 10,6%, 15% and 9,7% to reach the value of PLN 841 265 in 2014. As was mentioned above the increase in the total asset base is caused mainly by the implementation of the ATM new system and other investments which will have a significant impact on the reduction of the AFTM delays and from that point are necessary to performed.

[alternative version – new allocation between TNC and en route:

Table 24. PANSA – Complementary information on the cost of capital en-route (in nominal terms in national currency) (new allocation)

PANSA cost of capital calculation - en-route (new allocation)	*2011 F*	*2012 D*	*2013 D*	*2014 D*
Net book val. fixed assets	*534 338*	*658 283*	*722 563*	*760 885*
Adjustments total assets	*0*	*0*	*0*	*0*
Net current assets	*68 472*	*30 473*	*75 750*	*122 743*
Total asset base	*602 810*	*688 755*	*798 313*	*883 628*
Cost of capital pre tax rate - base	*5,89%*	*5,07%*	*4,93%*	*4,78%*
Return on equity - base	*5,90%*	*5,00%*	*4,86%*	*4,74%*
Average interest on debts - base	*5,75%*	*5,95%*	*5,95%*	*5,95%*
Share of debt financing		*7,21%*	*6,71%*	*3,41%*

The value of total ER assets in 2011 amounts to PLN 602 810. The increase in 2012 as compared to 2011 is partly caused by the modification of cost allocation system which results in allocating additional infrastructure element to en-route asset base. Without this reallocation during RP1 following the implementation of investment plans the value of total asset base would increase respectively by 10,6%, 15% and 9,7% to reach the

value of PLN 841 265 in 2014. As was mentioned above the increase in the total asset base is caused mainly by the implementation of the ATM new system and other investments which will have a significant impact on the reduction of the AFTM delays and from that point are necessary to performed. As a consequence of the new allocation method the value of total en-route assets increases to PLN 883 628 in 2014.]

3.1.2 PANSA determined terminal costs

PANSA's terminal determined costs for the first reference period (2012-2014) are presented in the table below. Table presents also the actual data for the years 2009 and 2010 and forecasted data for 2011 (as included in the final cost base for 2011 charges).

Table 37. PANSA terminal costs by nature in the period 2009-2014

PANSA - TNC current allocation	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D	2014D/ 2011F
determined costs nominal values								
Staff	000 PLN	77 724	77 564	84 496	77 158	80 095	83 095	-1,66%
Other operating costs	000 PLN	17 858	11 882	23 071	21 951	19 853	20 185	-12,51%
Depreciation	000 PLN	9 411	9 537	10 092	11 023	12 810	14 777	46,43%
Cost of capital	000 PLN	5 422	5 585	10 336	8 333	8 624	9 396	-9,09%
Exceptional items	000 PLN							
Total terminal costs	000 PLN	110 415	104 568	127 995	118 466	121 382	127 453	-0,42%
% change n/(n-1)			-5,29%	22,40%	-7,44%	2,46%	5,00%	
determined costs real 2009 values								
Staff	000 PLN	77 724	75 525	80 268	71 510	72 421	73 301	-8,68%
Other operating costs	000 PLN	17 858	11 570	21 917	20 344	17 951	17 806	-18,76%
Depreciation	000 PLN	9 411	9 286	9 587	10 216	11 582	13 035	35,97%
Cost of capital	000 PLN	5 422	5 439	9 819	7 723	7 798	8 289	-15,59%
Exceptional items	000 PLN							
Total terminal costs	000 PLN	110 415	101 819	121 590	109 793	109 752	112 431	-7,53%
% change n/(n-1)			-7,78%	19,42%	-9,70%	-0,04%	2,44%	
Total Service units (000)		126,67	133,01	139,98	146,83	149,69	153,14	9,40%
Determined unit cost - nominal	**PLN**	**871,67**	**786,16**	**914,36**	**806,85**	**810,86**	**832,26**	**-8,98%**
% change n/(n-1)			-9,81%	16,31%	-11,76%	0,50%	2,64%	
Determined unit cost - real 2009	**PLN**	**871,67**	**765,49**	**868,61**	**747,78**	**733,17**	**734,16**	**-15,48%**
% change n/(n-1)			-12,18%	13,47%	-13,91%	-1,95%	0,13%	

During the whole RP1 PANSA's terminal costs in nominal terms stay at almost the same level. The determined unit cost decreases in whole period by 15,5%. All costs

presented in the Table 25 are calculated for 11 airports listed in the chapter 1 of the Plan. Taking into account the cost values for 2010 and 2012 it can be suspected that actual costs for 2011 will be lower than forecasted.

[alternative version – new allocation between TNC and en route:

Table 25. PANSA terminal costs by nature in the period 2009-2014.

PANSA - TNC new allocation	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D	2014D/ 2011F
determined costs nominal values								
Staff	000 PLN	77 724	77 564	84 496	61 082	63 277	65 769	-22,16%
Other operating costs	000 PLN	17 858	11 882	23 071	18 804	16 607	16 828	-27,06%
Depreciation	000 PLN	9 411	9 537	10 092	8 857	10 156	11 598	14,93%
Cost of capital	000 PLN	5 422	5 585	10 336	7 155	6 980	7 206	-30,28%
Exceptional items	000 PLN							
Total terminal costs	000 PLN	110 415	104 568	127 995	95 899	97 020	101 401	-20,78%
% change n/(n-1)			-5,29%	22,40%	-25,08%	1,17%	4,52%	
determined costs real 2009 values								
Staff	000 PLN	77 724	75 525	80 268	56 610	57 214	58 017	-27,72%
Other operating costs	000 PLN	17 858	11 570	21 917	17 428	15 016	14 845	-32,27%
Depreciation	000 PLN	9 411	9 286	9 587	8 209	9 183	10 231	6,72%
Cost of capital	000 PLN	5 422	5 439	9 819	6 631	6 312	6 357	-35,26%
Exceptional items	000 PLN							
Total terminal costs	000 PLN	110 415	101 819	121 590	88 878	87 725	89 450	-26,43%
% change n/(n-1)			-7,78%	19,42%	-26,90%	-1,30%	1,97%	
Total Service units (000)		126,67	133,01	139,98	146,83	149,69	153,14	9,40%
Determined unit cost - nominal	**PLN**	**871,67**	**786,16**	**914,36**	**653,15**	**648,13**	**662,14**	**-27,58%**
% change n/(n-1)			-9,81%	16,31%	-28,57%	-0,77%	2,16%	
Determined unit cost - real 2009	**PLN**	**871,67**	**765,49**	**868,61**	**605,33**	**586,03**	**584,10**	**-32,76%**
% change n/(n-1)			-12,18%	13,47%	-30,31%	-3,19%	-0,33%	

During the whole RP1 PANSA's terminal costs in nominal terms will decrease. The decrease results mainly from the reallocation of APP costs to en-route cost base. If the reallocation did not take place, costs of 2014 would stay at the same level as those forecasted for 2011. The determined unit cost decreases in whole period by almost 33%. Hal of this decrease results from the changes in the allocation of APP costs, while the other half from decrease of costs forecasted for RP1 a compared to forecast for 2011. However, taking into account the cost values for 2010 and 2012 it can be suspected that actual costs for 2011 will be lower than forecasted.

All costs presented in the Table 25 are calculated for 11 airports listed in the chapter 1 of the Plan.]

3.1.3 PANSA investment plan

PANSA's planned tasks have been harmonized with the company's strategy which was aligned with external strategic plans for the whole European ANS system (i.e. ATM Master Plan). According to accepted plans, investments are spread over five-year periods in order to reach the strategic milestones including assumed performance measures and maintain unchanged level of safety. Having taken forecasted growth in traffic (en-route and terminal) into consideration, PANSA had to take a number of actions leading to maintain safety and cost-effectiveness parameters. The sector capacity of Polish airspace should increase adequately to the actual and forecasted traffic growth. An implementation of the new technologies, systems, personnel and sector management will result in airspace re-sectorization, maintain air traffic safety and reduction of traffic delays.

In order to fulfil those requirements, PANSA is planning the following:

1. maintain safety level of ATC services;
2. reduce an average en-route delay time per delayed en-route flight;
3. improve effectiveness of provision of ATC services and different operational and organizational undertakings of PANSA in the field of provision of ATC services mentioned in this paragraph;
4. continue the process of rationalization of NAV infrastructure is based on PANSA's deliverables, taking into account operational needs;
5. implement P-RNAV procedures;
6. further develop CDA;
7. support more flexible airspace management;
8. modernize airspace structure and FUA procedures;
9. implement "DCT" flights during night-time operations as a standard;
10. continue a close cooperation with airports in order to create procedures and solutions which will improve airport capacity;
11. continue investments in air navigation in line with the European ATM MP;
12. continue efforts on CDM implementation at Warsaw Airport;
13. introduce a new technology which gives the possibility to reduce operating costs;
14. implement changes in roster scheme;
15. strengthen dynamic sector management.

For all the planned action PANSA has to perform some strategic investment. Table 26 presents the main capital expenditures to be performed by PANSA during the period 2009-2016. The main investments listed below concern the ATM system, radars allocations, modernization and development of the CNS infrastructure. Almost all of the

listed investments are planned for the period ending in 2014. A detailed description of CAPEX is presented in the Annex II. The Annex contains also the description of the allocation of each of the CAPEX investments between en-route and terminal, both for the current allocation methodology and for the new proposed by PANSA.

Table 38. PANSA – Annual investments (capex) in nominal terms in national currency for en-route and terminal ANS

	Capital expenditure		Currency	2009A	2010A	2011F	2012F	2013F	2014F	2015F	2016F
1	Radars: PSR MSSR Warszawa, PSR/Mode SSR Poznań, PSR/Mode SSR Kraków, PSR/Mode SSR Wrocław, PSR/Mode SSR North-East Poland		PLN	27 142	9 346	25 467 790	17 480 000	24 380 000	26 000 000	0	0
2	17 Ground stations		PLN	0	3 022 849	6 720 470	14 220 000	16 880 000	0	0	0
3	Integrated Area Control Centre in Warsaw		PLN	0	0	1 500 000	11 500 000	20 000 000	2 000 000	0	0
4	Modernization and develop of the navigation infrastructure in FIR Warsaw (modernization 4 DME and 2 DVOR/DME; develop 9 DME and 5 DVOR/DME)		PLN	0	22 454	8 825 680	13 020 000	9 475 000	15 000 000	0	0
5	TWR modernization Project in Kraków, Łódź, Poznań, Rzeszów	The land purchase, construction and design process	PLN	1 495 754	3 729 465	18 207 000	12 900 000	11 900 000	13 216 500	0	0
		The equipment purchase	PLN	0	0	3 800 000	3 400 000	3 800 000	3 400 000	4 800 000	
6	Enterprise resource planning system		PLN	0	0	0	5 000 000	12 000 000	0	0	0
7	Modernization and develop of ILS/DME investments		PLN	0	0	100 000	6 010 000	5 990 000	9 200 000	1 300 000	0
8	Transmitter and receiver system needed to complete implementation of 8.33 kHz		PLN	0	0	0	0	5 000 000	5 000 000	0	0

	channel separation above FL195									
9	Modernization of VCS in Poznań, Wrocław, Rzeszów, Gdańsk, Warszawa	PLN	0	971 573	207 889	5 000 000	2 000 000	0	0	0
10	ICT (information and communication technology) infrastructure	PLN	0	0	0	5 600 000	0	0	0	0
11	Multilateration system	PLN	0	0	0	3 880 000	0	0	0	0
	Sub-total main Capex above		1 522 896	7 755 687	64 828 829	98 010 000	111 425 000	73 816 500	6 100 000	0
	Sub-total others Capex		34 555 941	32 999 030	50 839 217	40 016 130	31 350 100	39 051 500	48 250 000	2 899 300
	Total Capex		36 078 837	40 754 717	115 668 046	138 026 130	142 775 100	112 868 000	54 350 000	2 899 300

3.2. Institute of Meteorology and Water Management share in the targets and individual binding performance targets.

INSTITUTE OF METEOROLOGY AND WATER MANAGEMENT

3.2.1 IMWM determined en-route costs

Accountability of the IMWM with regard to the national targets described in chapter 2 is limited to cost-efficiency area.
The level of IMWM determined costs is not directly related to the level of traffic. Majority of IMWM activities related to ANS have to be performed to the same extent no matter what the level of traffic is. This is confirmed by the fact that according to the amended Charging Regulation MET costs are excluded from the traffic risk sharing mechanism. Therefore it seems reasonable to adopt as the individual target for the IMWM for RP1 the level of real determined en-route costs for every year of the period as set out in this subchapter of the Plan.

The aviation costs of IMWM are calculated according to the amended Charging Regulation which defines the costs of meteorological services for aviation as direct costs and core MET costs (for methodology used for allocating total MET costs and MET core costs to civil aviation see Annex III). Additionally, the cost of capital is incurred.
Direct costs of meteorological services for aviation consist of costs of services, facilities and activities performed exclusively to provide meteorological services for aviation. Except for such defined direct costs, the costs of meteorological services for aviation include also indirect costs which are understood to be MET core costs and which constitute relevant part of the costs of the core systems of IMWM which are used for the provision of national meteorological services, namely for the public.
According to Charging Regulation, direct and core costs of meteorological services for aviation provided by IMWM are split into staff costs, other operating costs, depreciation costs and the cost of capital.

For the purpose of achieving the required cost-efficiency of its activities related to MET services the following goals were defined for the IMWM:

- Investments and modernization activities planned for the years 2012-2014 shall only be those necessary and indispensable for proper and reliable functioning of the Meteorological Civil Aviation Service (MOLC) area.

The biggest investment for the years 2012-2014 is the acquisition of automatic weather observation system (AWOS) from PANSA. Considering the wear and tear of the equipment, immediate modernization, especially at the airports in Warsaw and Cracow, is necessary because of the fact that systems are redundant and the risk of fault is high. In order to avoid any shortage of measurement equipment in case of damage of the main systems, IMWM plans also to purchase Meteorological Automatic Weather Stations (MAWS) and install them at the airports at which they have not been installed yet as well as equip additionally the systems installed in 2007. These investments are necessary to improve reliability of systems to enable IMWM to ensure the required quality of MET services.

It has been assumed that the modernization of the systems will be started in 2012.

Additionally to that the following other investments and modernization activities are planned during RP1:

- modernization of the weather radar system;
- modernization of the telecommunication and IT network;
- development and modernization of the client service and communication systems,
- development, updating and improvement of the scope of software supporting work of main systems of National Hydrological-Meteorological Service (NHMS);
- modernization and investments in infrastructure;
- modernization of the measurement systems,

which will have influence on quality of meteorological services but will be financed by IMWM from other sources than meteorological services for civil aviation (ANS charges).

- All planned activities are aimed at improving the quality of services.
- IMWM shall aim to maintain the standard of the personnel training at the present level and improve their competence.

The table below presents cost components of IMWM en-route determined cost base. The amounts include possession of AWOS systems by IMWM and starting of their modernization.

Table 39. Main components of IMWM en-route costs in 2009-2014

	Cost category	Main components of IMWM en-route costs in 2009-2014
Staff	Remuneration and remuneration-related expenditures	Personal and impersonal remuneration, social insurance contributions, allowance to the labour fund and other deductions, allowance to the Company's Social Benefit Fund, till September 2010 the contributions to the Company's Award Fund were paid (due to the change of legal provisions the payment of these contribution was suspended).
Other operating costs	Indirect costs	Indirect costs covering administration and related functions are imposed automatically every month in proportion to the remuneration and remuneration-related expenditures.
	Materials and spare parts	Stationery, purchase of equipment including spare equipment installed at the airports, electricity, heat, computers and spare parts for equipment and devices, fuel, workplace equipment, toners, licenses, software.
	Third party services (IT services, repairs and maintenance)	Costs of maintenance and service of specialist software (LEADS, TIM, DEDAL, ODBIÓR). Repairs, inspections and maintenance of equipment (computers, copiers, plotters etc.). Costs of travel of the personnel to the data collection point (according to the signed service agreement). Service of IT network (routers and servers) in the part used by Aeronautical Meteorological Stations and Forecast Offices for the purposes of provision of civil aviation services.
	Telecommunications	Costs of maintenance of communication between Headquarters, Aeronautical Meteorological Stations and Forecast Offices, and through GTS with other countries. Satellite communication SADIS. Fees for fixed-line telephones and mobile phones, related directly to the civil aviation meteorological services.
	Business trips	Business trips inside and outside the country (trips related to the current tasks of civil aviation MET services).
	Trainings and certification	Periodical meteorological trainings on international European standards, trainings increasing qualifications, costs of internal audits related to the implementation of the Quality Management and Security System, other trainings related to the work services.
	Rental of premises, meteorological gardens and pairs of cables	Rental of meteorological gardens, rental of premises at the airports, according to the signed agreements.
	Costs of basic infrastructure	Costs related to the maintenance of main systems in the part related to the civil aviation MET services, according to the approved methodology.
	Costs related to the AWOS systems	Till the moment of taking over the AWOS system from PANSA - the costs related to the purchase of meteorological data from PANSA and initial training of the personnel on service of AWOS. For the moment of taking over the system there will be the costs related to the maintenance of service of AWOS.
	Working out and preparation of new products	Costs related to the preparation of MeteoFlight product for PANSA.
Depreciation	Depreciation of AWOS	Depreciation of the modernized AWOS systems, the cost will occur after take over the systems from PANSA.
	Depreciation of computer equipment	Depreciation of fixed assets bought for the purposes of provision of civil aviation MET services, among others computer equipment and automatic weather stations.
Cost of capital	Cost of capital	As defined in the amended Charging Regulation (EC).

The table below presents the IMWM en-route costs for the period 2009-2014, where 2009 and 2010 values are actual ones, while for subsequent years these are forecasts (2011 values are consistent with those included into the final 2011 en-route charges cost base).

Table 40. IMWM en-route costs 2009-2014

IMWM	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D	2014D/ 2011F
determined costs nominal values								
Staff	000 PLN	6 233	7 108	6 747	5 735	5 979	6 227	*-7,70%*
Other operating costs	000 PLN	9 499	11 159	14 336	11 149	11 499	11 619	*-18,95%*
Depreciation	000 PLN	75	115	628	457	780	1 044	*66,06%*
Cost of capital	000 PLN	96	90	300	415	525	623	*108,04%*
Exceptional items	000 PLN							
Total en-route costs	000 PLN	15 902	18 472	22 011	17 757	18 783	19 513	*-11,35%*
% change n/(n-1)			*16,16%*	*19,16%*	*-19,32%*	*5,78%*	*3,89%*	
determined costs real 2009 values								
Staff	000 PLN	6 233	6 921	6 409	5 316	5 406	5 493	*-14,29%*
Other operating costs	000 PLN	9 499	10 866	13 619	10 333	10 397	10 250	*-24,74%*
Depreciation	000 PLN	75	112	597	424	705	921	*54,20%*
Cost of capital	000 PLN	96	87	285	385	475	550	*93,19%*
Exceptional items	000 PLN							
Total en-route costs	000 PLN	15 902	17 986	20 909	16 457	16 984	17 213	*-17,68%*
% change n/(n-1)			*13,11%*	*16,25%*	*-21,29%*	*3,20%*	*1,35%*	
Total Service units (000)		3 092	3 313	3 587	3 914	4 036	4 177	*16,44%*
Determined unit cost - nominal	**PLN**	**5,14**	**5,58**	**6,14**	**4,54**	**4,65**	**4,67**	***-23,86%***
% change n/(n-1)			*8,43%*	*10,04%*	*-26,06%*	*2,58%*	*0,38%*	
Determined unit cost - real 2009	**PLN**	**5,14**	**5,43**	**5,83**	**4,20**	**4,21**	**4,12**	***-29,30%***
% change n/(n-1)			*5,58%*	*7,36%*	*-27,86%*	*0,08%*	*-2,07%*	

With regard to variations between 2009-2012 values some modification of cost-allocation methodology has influenced the level of en-route costs. These modifications influenced the division of IMWM MET costs between groups of users: en-route charges, terminal charges, airport operators, the users of uncontrolled airspace (VFR).

- With regard to 2010 the modification consisted in different approach to establishing costs of services related to VFR flights. From 2011 these costs are calculated using the marginal cost methodology. Additionally the list of products delivered by IMWM was reduced by information for the purposes of search and rescue services and trend to ATIS information. The improved methodology was applied when the cost bases for 2011 were established.

- In 2011 the change of methodology, consisting in adjustment of the percentage division of some products to the WMO Publication No 904, has been done. This concerned METAR communications, TAF, SIGMET, AiRMET and SIGNIFICANT map which were allocated in higher that previously percentage to terminal services, as a consequence lowering the level of en-route costs.

It has to be noted that during 2009-2011 IMWM implemented cost-efficiency plan that resulted in lower costs of MET services to civil aviation than planned. In included the following actions:

- organizational changes: the number of forecast offices has been reduced, since 2009 the Meteorological Forecast Offices in Białystok and Szczecin and since 2010 the Meteorological Forecast Offices in Gdynia and Poznań have been excluded from the area of Meteorological Civil Aviation Service (MOLC) (the Central Aeronautical Forecast Office (CBPL) has taken over meteorological services for the civil aviation from the Meteorological Forecast Office in Białystok and the Marine Meteorological Forecast Office in Gdynia has taken over meteorological services for the civil aviation from the Meteorological Forecast Office in Szczecin). As a result the number of offices was reduced from 7 Meteorological Forecast Offices in 2008 to only 4 Offices carrying out the tasks in 2011;
- while preparing the cost base for 2011, the decision on freezing of wages at the level of average for one post in 2010 was taken;
- the new format of area forecast – GAMET and the sub-website – AVIATION have been created; thanks to the fact that they were worked out and prepared by IMWM employees, the costs were much lower and the period of preparation and implementation much shorter than if it was provided by a third company. The only cost incurred by IMWM was the cost of task bonus paid.

With regard to the difference between 2009 and 2010 figures as well as comparison of 2010 forecast and actual values:

- Increase in staff costs was related to increase in salaries; at the same time actual 2010 staff costs were significantly lower than planned (7 107 913 PLN vs. 9 588 093 PLN) due to minimizing the employment of service personnel for AWOS; 13,5 posts were planned while only 4 persons were actually employed. The indirect costs were also lower than planned (reduced by 7% for MOLC).
- Other operating costs for 2010 were higher due to purchase of equipment, telecommunications service and business trips. With regard to equipment originally these purchases were planned as capital expenditures to be

depreciated overtime – however bid conditions indicated that the unit value was below 3.500 PLN and this equipment was financed by other operating costs (at the same time lowering the 2010 level of depreciation and cost of capital as compared to 2010F). The growth in costs of telecommunication services was the result of additional WLAN network modification costs. Additional costs of business trips were related to SESAR Project and Baltic FAB works as well as WMO meeting. The reasons listed above constitute also explanation for the fact that in 2010 actual other operating costs were a little bit higher than planned (11 158 922 PLN vs. 11 125 723 PLN). As concerns the difference between forecast and actual 2010 figures it was also stemming from third party services – due to the change of location of Aeronautical Meteorological Station Kraków Balice, for some months in 2010 the rent was paid for two premises, what was not included in the forecast cost base. The other reason for the growth in this item was the need to purchase meteorological data from AWOS systems from PANSA due to the postponement of the takeover.

- Higher depreciation costs were related to the new equipment purchased in 2010. At the same time it has to be noted that there is a large difference between the 2010 actual and forecast costs (115 299 PLN vs. 1 076 720 PLN) which is related to the suspension of investments related to the modernization of AWOS systems and equipping a service team with cars and computers.
- The reasons of differences listed above for depreciation are also valid for differences in the amount of the cost of capital. Additionally, the difference between 2010 forecast and actual figures stems from unrealized purchases of AWOS systems equipment for Aeronautical Meteorological Stations in Warsaw and Cracow, on which a credit was to be taken.

As regards the difference between 2011 and 2010 values it results from the planned AWOS overtaking and their modernization what will require additional staff expenditure and will increase the level of depreciation costs and cost of capital (due to the increase in the asset base). In 2010 it was planned that process of overtaking and modernization of AWOS systems from PANSA will start in year 2011 but because of lack of decision of the Minister of Infrastructure the whole process is postponed for year 2012. That is giving the effect that the cost of first part of modernization of systems is shown twice in year 2011 and 2012. At the same time this postponement will cause the significant reduction of actual costs vs. planned for year 2011 with regard to depreciation and cost of capital, as well as staff. With regard to staff costs of 2011 and 2010 the difference is also caused by a shift of costs between staff and other operating costs. These shifted

costs are those directly related to the maintenance of the organizational units of the Institute that are working for aviation and include electricity and heating energy, utilities etc. Those cost categories were excluded from staff costs and included into other operating costs, what impacted the level of these two items with the total unchanged.

From 2012 other operating cost will increase because of the cost of license for NinJo meteorological data presentation system and because of the cost of UK Post Processing System. Further explanations to the variation of en-route costs during RP1 are provided below:

- Staff costs – since 2012 the employment is on the same level (126,5). The annual salary increase of 200 PLN on average per month is planned starting from 2012 (the plan is related to the necessity of increase personal remunerations in connection with very low salaries that were not increased in previous years even by the inflation rate). Within the salaries a social insurance contribution accounting for 18% (average index of the Institute) is planned every year.
- Other operating costs – they are increasing by inflation rate 2,5%. Moreover in 2013 replacement of telephone receivers and an increase in number of equipment with Internet access is planned additionally. The costs related to the main systems are planned, according to the methodology these costs depend directly on the amount of financing of the National Hydrological and Meteorological Service.
- Depreciation - continuation of depreciation of the equipment depreciated in 2011 and the equipment newly purchased within next years. These include also depreciation of the modernized equipment of AWOS systems.
- Cost of capital – the increase is related to increase in the asset base caused by the purchase of AWOS and MAWS.

Cost of Capital

The table below presents the information on the IMWM cost of capital included in en-route determined costs for the period 2009-2014.

Table 41. IMWM - Complementary information on the cost of capital en-route (in nominal values in national currency)

IMWM	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D
Net book value fixed assets	000 PLN	229	224	6 176	4 897	6 715	8 329
Adjustments to total assets	000 PLN	0	0	0	0	0	0
Net current assets	000 PLN	1 077	1 453	1 565	1 264	1 330	1 374
Total asset base	000 PLN	1 307	1 677	7 742	6 161	8 045	9 703 1
Cost of capital pre tax rate %		6,850	5,625	6,260	6,650	6,560	6,440
Return on equity %		6,850	5,625	5,250	5,250	5,250	5,250
Average interest on debts %		0,000	0,000	7,000	7,000	7,000	7,000

The cost of capital has been calculated in accordance with the amended Charging Regulation. Explanation of the values is provided below.

Average net book value of fixed assets was established on the basis of fixed assets in operation (measure systems) used for MOLC and planned fixed assets for MOLC.

Average net current assets:

- Net current assets are current assets excluding short-term liabilities.
- Average net current assets include:
    - (net current assets for the beginning of the year + net current assets for the end of the year): 2
    - Current assets include receivables from MOLC for the end of year. Taking into account that the agreement is settled in monthly cycle, the installment for December of a given year – 1/12 part of the agreement – will remain as the amount due at the end of the year.
    - Short-term liabilities – the percent of short-term liabilities (average 29%) on the basis of IMWM balance rate = short-term liabilities : current assets x 100, which was ca. 29%.

The weighted average of the interest rate on debt and the return of equity – established on the basis of:

- The interest rate of planned bank loan for financing the modernization of AWOS. This interest, after bank's consultations, amounts to 7%.
- The return on equity – the interest rate of 10-years State bond in 12.2010 – 5,25%, because of interest decline movements (EDO 1219 from XII.2009 – 6,75%; EDO 1220 from XII.2010 – 5,25%).

3.2.2 IMWM terminal costs

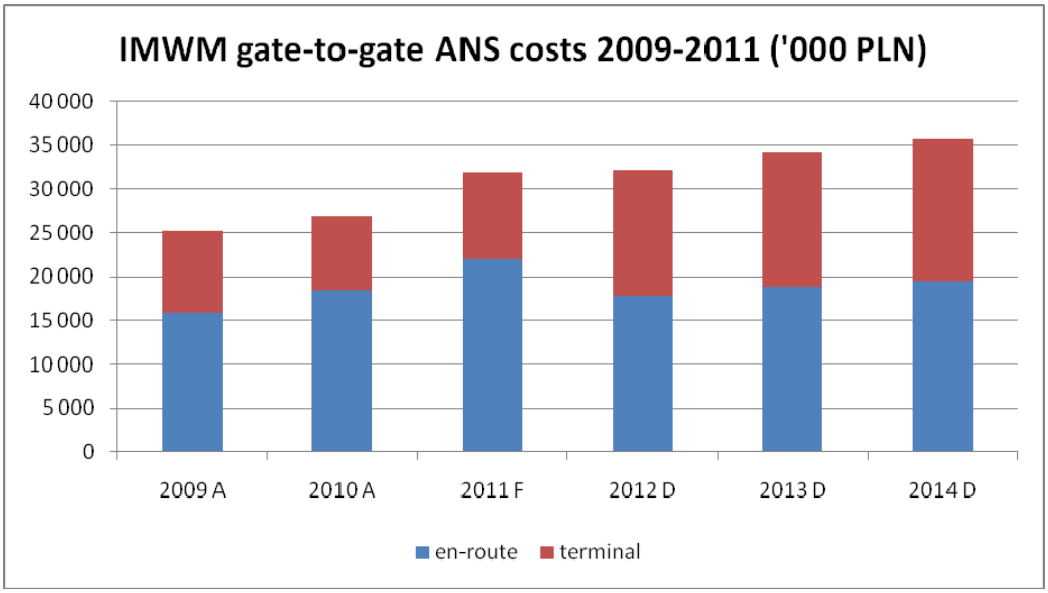
The table below presents the IMWM terminal costs for the period 2009-2014, where 2009 and 2010 values are actual ones, while for subsequent years these are forecasts (2011 values are consistent with those included into the final 2011 terminal charges cost base).

Table 42. IMWM terminal costs 2009-2014

IMWM	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D	2014D/ 2011F
determined costs nominal values								
Staff	000 PLN	3 668	3 272	3 003	4 644	4 896	5 149	*71,48%*
Other operating costs	000 PLN	5 590	5 137	6 381	9 027	9 417	9 607	*50,56%*
Depreciation	000 PLN	44	53	298	370	639	863	*189,84%*
Cost of capital	000 PLN	56	41	133	336	430	515	*286,48%*
Exceptional items	000 PLN							
Total terminal costs	000 PLN	9 357	8 503	9 815	14 377	15 382	16 135	*64,39%*
% change n/(n-1)			*-9,13%*	*15,42%*	*46,48%*	*6,99%*	*4,89%*	
determined costs real 2009 values								
Staff	000 PLN	3 668	3 186	2 853	4 304	4 427	4 542	*59,23%*
Other operating costs	000 PLN	5 590	5 002	6 062	8 366	8 515	8 475	*39,81%*
Depreciation	000 PLN	44	52	290	361	639	863	*197,08%*
Cost of capital	000 PLN	56	40	130	336	430	515	*296,14%*
Exceptional items	000 PLN							
Total terminal costs	000 PLN	9 357	8 280	9 335	13 367	14 011	14 396	*54,21%*
% change n/(n-1)			*-11,52%*	*12,74%*	*43,19%*	*4,82%*	*2,75%*	
Total Service units (000)		127	133	140	147	150	153	*9,40%*
Determined unit cost - nominal	**PLN**	**73,87**	**63,93**	**70,12**	**97,92**	**102,76**	**105,36**	***50,27%***
% change n/(n-1)			*-13,46%*	*9,68%*	*39,65%*	*4,94%*	*2,53%*	
Determined unit cost - real 2009	**PLN**	**73,87**	**62,25**	**66,69**	**91,04**	**93,60**	**94,00**	***40,96%***
% change n/(n-1)			*-15,73%*	*7,13%*	*36,52%*	*2,81%*	*0,43%*	

The main reasons for the variations of the terminal costs are the changes of methodology between 2012 and 2011 and the effect of modernization of AWOS systems as it was explained above in the part concerning IMWM en-route costs.

With regard to the modification of allocation between en-route and terminal services, the graph below shows evolution of the gate-to-gate ANS costs of MET services provided by IMWM during the analysed period in nominal values.



As concerns variation in terminal costs, in 2010 actual costs were lower than forecasted for this year at the end of 2009 by 1 375 879 PLN. This difference resulted from:

- with regard to staff costs (actual figure lower by 1 032 124 PLN than planned) - minimizing of the employment of service personnel for AWOS as well as lower indirect costs (see part for en-route services);
- with regard to depreciation (actual figure lower by 430 280 PLN) - suspension of investments related to the modernization of AWOS systems and equipping a service team with cars and computers;
- with regard to cost of capital (actual figure lower by 55 966 PLN) – postponement of AWOS overtaking and unrealized bank credit on the modernization of the equipment as described above with regard to en-route costs.

As concerns other operating costs the plan was exceeded by 142 491 PLN and it took place in the items: materials, telecommunication services and third party services. As described under the en-route part these differences are related to different actual classification for some equipment purchase (as operating costs and not capital expenditure), underestimation of costs of modification of WAN network and rent for premises.

With regard to staff costs of 2011 and 2010 the difference is also caused by a shift of costs between staff and other operating costs. These shifted costs are those directly related to the maintenance of the organizational units of the Institute that are working for aviation and include electricity and heating energy, utilities etc. Those cost categories were excluded from staff costs and included into other operating costs, what impacted the level of these two items with the total unchanged.

With regard to the difference between 2011 and 2012 costs it results from the modification of allocation of the following products: METAR, TAF, SIGMET, AiRMET

and SIGNIFICANT map which were allocated in higher that previously percentage to terminal services. This new allocation is consistently applied during the whole RP1.
As concerns 2012-2014 costs explanation to the variation of terminal costs is provided below. It is analogous to the explanation provided under the en-route part.

- Staff costs – since 2012 the employment is on the same level. The annual salary increase of 200 PLN on average per month is planned starting from 2012 (the plan is related to the necessity of increase personal remunerations in connection with very low salaries that were not increased in previous years even by the inflation rate). Within the salaries a social insurance contribution accounting for 18% (average index of the Institute) is planned every year.
- Other operating costs – they are increasing by inflation rate 2,5%. Moreover in 2013 replacement of telephone receivers and an increase in number of equipment with Internet access is planned additionally. The costs related to the main systems are planned, according to the methodology these costs depend directly on the amount of financing of the National Hydrological and Meteorological Service
- Depreciation - continuation of depreciation of the equipment depreciated in 2011 and the equipment newly purchased within next years. These include also depreciation of the modernized equipment of AWOS systems.
- Cost of capital – the increase is related to increase in the asset base caused by the purchase of AWOS.

Cost of Capital

The table below presents the information on the IMWM cost of capital included in terminal costs for the period 2009-2014.

Table 42. IMWM - Complementary information on the cost of capital terminal (in nominal values in national currency)

IMWM	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D
Net book value fixed assets	000 PLN	135	103	2 749	3 965	5 500	6 887
Adjustments to total assets	000 PLN	0	0	0	0	0	0
Net current assets	000 PLN	634	669	697	1 023	1 089	1 136
Total asset base	000 PLN	769	772	3 446	4 988	6 589	8 023
Cost of capital pre tax rate %		6,850	5,625	6,260	6,650	6,560	6,440
Return on equity %		6,850	5,625	5,250	5,250	5,250	5,250
Average interest on debts %		0,000	0,000	7,000	7,000	7,000	7,000

The assumptions and values used for the purpose of calculating the cost of capital with regard to terminal services are the same as described for en-route services above.

3.2.3 IMWM investment plan

The tables below shows the main planned investments in the area of meteorological services to civil aviation. During RP1 two major investement project are foreseen: mordernization of automatic weather observation systems (AWOS) and purchase of Meteorological Automatic Weather Stations (MAWS). Detailed description of these investments is provided in Annex IV.

Table 43. IMWM – Annual investments (capex) in nominal terms in national currency for en-route and terminal ANS

Capital expenditure (national currency)	Currency	2011F	2012F	2013F	2014F
AWOS	PLN	8 075 000	3 952 000	3 952 000	3 952 000
MAWS	PLN	392 122	202 768	773 680	

Table 44. IMWM – Description of the main investments impacting RP1 (in nominal terms in national currency for en-route and terminal ANS)

CAPEX Project ID	AWOS
Domain(ex.ATM Systems, C,N,S,..)	MET
Allocation en-route/terminal ANS	
Assessed impact on Performance Targets	
(Planned) Start date of investments project	2011
(Planned) Commissioning date of investments	
Lifecycle (Amortisation periods in years)	10
Planned total capex (in national currency)	19 931 000
European ATM Master Plan (OIs reference)	
Relate SES IR/Community Specification	

CAPEX Project ID	MAWS
Domain(ex.ATM Systems, C,N,S,..)	MET
Allocation en-route/terminal ANS	
Assessed impact on Performance Targets	
(Planned) Start date of investments project	2011
(Planned) Commissioning date of investments	
Lifecycle (Amortisation periods in years)	10
Planned total capex (in national currency)	1 368 570
European ATM Master Plan (OIs reference)	
Relate SES IR/Community Specification	

3.3. Civil Aviation Office share in the targets and individual binding performance targets.

CIVIL AVIATION OFFICE

3.3.1 CAO determined en-route costs

Accountability of the CAO with regard to the national targets described in chapter 2 is limited to cost-efficiency area.

The level of CAO determined costs is not directly related to the level of traffic. Majority of CAO activities related to ANS have to be performed to the same extent no matter what the level of traffic is. This is confirmed by the fact that according to the amended Charging Regulation CAO costs are excluded from the traffic risk sharing mechanism. Therefore it seems reasonable to adopt as the individual target for the CAO for RP1 the level of real determined en-route costs for every year of the period as set out in this subchapter of the Plan.

The determined en-route costs described in chapter 2 include costs of the CAO related to its tasks and responsibilities in the en-route air navigation services area.

The CAO is the nominated national supervisory authority (NSA) in Poland. As indicated in the SES annual reports, its areas of responsibility cover all air navigation services: ATS, CNS, AIS, AFIS and MET. Within the scope of NSA functions it is responsible for ATCO licensing, engineering and technical staff, interoperability issues and also has access to ANSPs financial accounts. Apart from the functions of NSA the CAO also conducts other tasks in the area of air navigation services – these cover i.a. rulemaking activities (participation in the development of national, EU and international legislation, as well as preparation of drafts of national legal acts in the area of civil ANS), environmental issues, aviation obstacles, supervision of PANSA on the basis of PANSA Act, airspace management issues, air navigation charges, crisis management and civil-military cooperation issues, participation in the designation procedure, safety issues (internal safety management system).

Costs of provision of those tasks are included into the cost base of air navigation charges.

CAO as central national administration body and budgetary entity has to follow accounting rules applicable to such entities. Therefore the CAO does not calculate depreciation on its assets but the costs of investments are included on cash basis. However, due to very limited capital expenditures any differences arising from this are negligible. As a consequence, the CAO also does not calculate cost of capital to be included in the chargeable costs. Therefore the CAO costs included in the national

determined costs presented in chapter 2 cover only staff costs and other operating costs.

CAO staff costs cover salaries, social security contributions, Labor Fund contributions, compulsory medical services, deductions for company social security benefits fund as well as remunerations for contractual workers.

CAO other operating costs include purchase of materials and equipment, energy, maintenance and renovation services, Internet access, telephone services, translations, analyses, office rent, costs of business trips (domestic and abroad) and trainings, contributions to international organizations as well as investment purchases.

The table below presents the CAO en-route costs for the period 2009-2014, where 2009 and 2010 values are actual ones, while for subsequent years these are forecasts (2011 values are consistent with those included into the final 2011 en-route charges cost base).

Table 45. CAO en-route costs 2009-2014

CAO	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D	2014D/ 2011F
determined costs nominal values								
Staff	000 PLN	4 479	4 615	4 452	4 505	4 798	4 758	*6,88%*
Other operating costs	000 PLN	1 930	1 865	2 445	2 500	2 657	2 629	*7,56%*
Depreciation	000 PLN							
Cost of capital	000 PLN							
Exceptional items	000 PLN							
Total en-route costs	000 PLN	6 409	6 480	6 897	7 005	7 455	7 388	*7,12%*
% change n/(n-1)			*1,11%*	*6,44%*	*1,57%*	*6,41%*	*-0,90%*	
determined costs real 2009 values								
Staff	000 PLN	4 479	4 494	4 229	4 175	4 338	4 198	*-0,75%*
Other operating costs	000 PLN	1 930	1 816	2 322	2 317	2 402	2 320	*-0,12%*
Depreciation	000 PLN							
Cost of capital	000 PLN							
Exceptional items	000 PLN							
Total en-route costs	000 PLN	6 409	6 309	6 552	6 493	6 740	6 517	*-0,53%*
% change n/(n-1)			*-1,55%*	*3,84%*	*-0,91%*	*3,82%*	*-3,31%*	
Total Service units (000)		3 092	3 313	3 587	3 914	4 036	4 177	*16,44%*
Determined unit cost - nominal	**PLN**	**2,07**	**1,96**	**1,92**	**1,79**	**1,85**	**1,77**	***-8,01%***
% change n/(n-1)			*-5,62%*	*-1,70%*	*-6,91%*	*3,20%*	*-4,24%*	
Determined unit cost - real 2009	**PLN**	**2,07**	**1,90**	**1,83**	**1,66**	**1,67**	**1,56**	***-14,57%***
% change n/(n-1)			*-8,11%*	*-4,10%*	*-9,18%*	*0,68%*	*-6,58%*	

The methodology for calculating the CAO costs related to air navigation services (en-route and terminal) used until 2011, due to time schedule for performance plan development and the need to ensure reliable planning for the whole reference period,

had to be modified (detailed justification and description of the new system is provided in Annex III).

The CAO ANS ER costs presented above were calculated on the basis of the following assumptions:

- 2011 ER costs were taken as a basis for subsequent years planning (2012-2014),
- for NSA-related part the 2011 NSA-related costs were multiplied by the ratio of:
    - expected annual change in the amount of work as a consequence of variations of external factors (number of certified ANSPs, number of licensed ATCOs, number of ATS staff training centers, changes in the CNS infrastructure and ATS/MET/AIS units that are supervised by the CAO, expected activities related to the performance scheme);
    - annual inflation + 1 percentage point - that reflects the general state budget rule for planning of expenditures for coming years[16];
    - expected improvement in efficiency with regard to these tasks established by the CAO management for each of the years of RP1; with regard to NSA tasks the assumed efficiency improvement is greater after 2012 as the result of Baltic FAB establishment (expected positive results in terms of workload);
- for other ANS-related tasks the respective 2011 costs were indexed by the following ratios:
    - annual inflation + 1 percentage point - that reflects the general state budget rule for planning of expenditures mentioned above;
    - expected improvement in efficiency with regard to these tasks established by the CAO management for each of the years of RP1.

The values of the multiplication ratios mentioned above are presented in the table below. These indexes were used to forecast both staff costs and other operating costs.

The same methodology and the same ratios were used to forecast CAO terminal costs in RP1 (see chapter 3.3.2).

[16] In accordance with article 112a of the Public Finance Act of 27 August 2009, the amount of expenditure from the state budget for public tasks cannot exceed the level from the previous year uprated taking into account forecasted annual inflation plus 1 percentage point. This rule shall also apply to developing Multiannual State Financial Plan and draft budgetary bill.

Table 46. Indexation of CAO ANS-related tasks in RP1.

Indexation of the CAO ANS-related tasks in RP1 (2011 = 1)				
	2011	2012	2013	2014
NSA-related tasks				
NSA-related workload change	**1,0000**	**1,0414**	**1,1612**	**1,1095**
(n/(n-1))-1		*4,1%*	*11,5%*	*-4,5%*
Inflation + 1pp	**1,0000**	**1,0350**	**1,0712**	**1,1087**
(n/(n-1))-1		*3,5%*	*3,5%*	*3,5%*
Efficiency improvement	**1,0000**	**0,9800**	**0,9506**	**0,9221**
(n/(n-1))-1		*98,0%*	*97,0%*	*97,0%*
ANS-other tasks				
Inflation + 1pp	**1,0000**	**1,0350**	**1,0712**	**1,1087**
(n/(n-1))-1		*3,5%*	*3,5%*	*3,5%*
Efficiency improvement	**1,0000**	**0,9800**	**0,9604**	**0,9412**
(n/(n-1))-1		*98,0%*	*98,0%*	*98,0%*

The expected increase in the workload with regard to NSA-related tasks in 2012 and 2013 is related to expected development in CNS infrastructure and increase in the number of ATCOs. Additionally with regard to 2013 the increase results from the obligatory periodic review of English language proficiency of ATCOs (to be performed every 3 or 6 years – depending on the results of examinations).

The determined costs on the CAO side presented in Table 34 are the result of the above mentioned indexation in the area of NSA-related and other ANS-related tasks being the total of those two cost categories.

The graph below presents the CAO en-route costs in the period of 2008-2014 where 2008-2010 are actual figures and 2011-2014 are forecasts. It should be noted that the significant decrease of en-route costs in 2009 vs. 2008 resulted from two factors: reduction of the CAO budget as a whole, what was reflected in the ANS-related part, as well as shift in the percentage allocation between en-route and terminal-related tasks. This shift results from the fact that division of CAO tasks between en-route and terminal services (measured by FTEs allocation between those two activities) in reality was different than planned at the beginning of operating within the Multilateral Route Charges System. Methodology of establishing this allocation percentage remained unchanged. The review of percentage allocation of the CAO ANS-related tasks between en-route and terminal services for 2009 and for subsequent years shows that the share of those two fields of activity remains almost constant, what is confirmed by the data presented in Table 36.

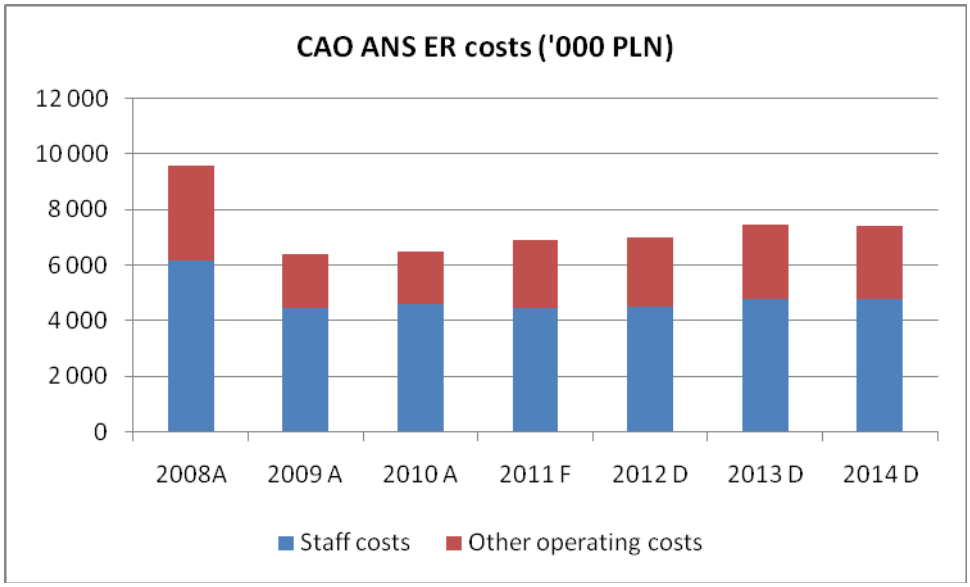


Table 47. Share of CAO ANS costs.

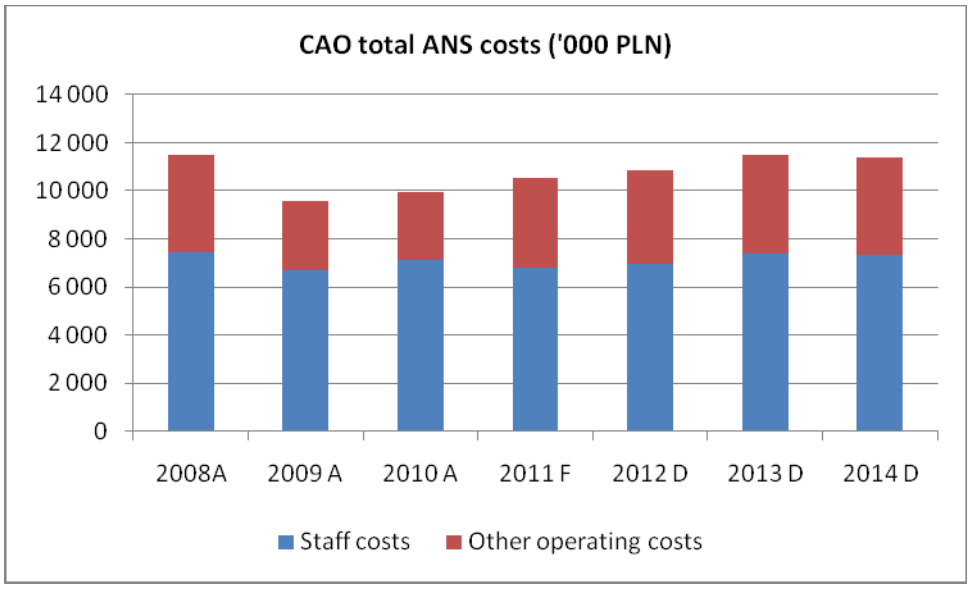
	2009A	2010A	2011F	2012F	2013F	2014F
Share of ANS costs in total CAO budget	**20,14%**	**21,83%**	**20,10%**	**20,02%**	**20,51%**	**19,57%**
Share of en-route in total ANS costs	**66,93%**	**65,01%**	**65,57%**	**64,56%**	**64,81%**	**65,02%**
Share of terminal costs in total ANS costs	**33,07%**	**34,99%**	**34,43%**	**35,44%**	**35,19%**	**34,98%**

It should be noted that as the result of economic slowdown and strict budgetary policy in Poland CAO budget was reduced in 2009 vs. 2008. In 2010 and 2011 CAO staff costs and employment level were frozen at the level of 2009, without even inflationary increase in the level of salaries. This brought a significant reduction in the CAO unit cost as showed in Table 34.

CAO ANS costs in the analyzed period (2009-2014) remain below the level of 2008, except for 2013 (which is at the level of 2008) what shows the real increase in the cost efficiency of the CAO over these years. This reflects the strict budgetary policy in Poland in terms of public finance expenditures mentioned above. This is even more visible when the nominal values are discounted taking into account inflation rates. The level of total CAO ANS costs, both in nominal and in real terms (2009 PLN), is presented in table 37 and on the graph below.

Table 48. Total CAO ANS costs 2008-2014 ('000 PLN)

CAO	Currency	2008A	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D	2014D/ 2011F
determined costs nominal values									
Staff	000 PLN	7 425	6 692	7 099	6 790	6 978	7 403	7 318	*7,79%*
Other operating costs	000 PLN	4 071	2 884	2 868	3 728	3 873	4 100	4 044	*8,47%*
Depreciation	000 PLN								
Cost of capital	000 PLN								
Exceptional items	000 PLN								
Total ANS costs	000 PLN	11 496	9 575	9 967	10 518	10 852	11 503	11 363	*8,03%*
% change n/(n-1)				*4,09%*	*5,53%*	*3,17%*	*6,00%*	*-1,22%*	
determined costs real 2009 values									
Staff	000 PLN		6 692	6 912	6 450	6 468	6 694	6 456	*0,09%*
Other operating costs	000 PLN		2 884	2 793	3 542	3 590	3 707	3 567	*0,73%*
Depreciation	000 PLN								
Cost of capital	000 PLN								
Exceptional items	000 PLN								
Total ANS costs	000 PLN		9 575	9 705	9 992	10 057	10 401	10 023	*0,31%*
% change n/(n-1)				*1,36%*	*2,95%*	*0,66%*	*3,41%*	*-3,63%*	



3.3.2 CAO terminal costs

As indicated above methodology of forecasting CAO terminal costs was analogous to the one used to en-route costs. Therefore this subchapter presents only the values of terminal CAO costs by nature without repeating the description of methodology.

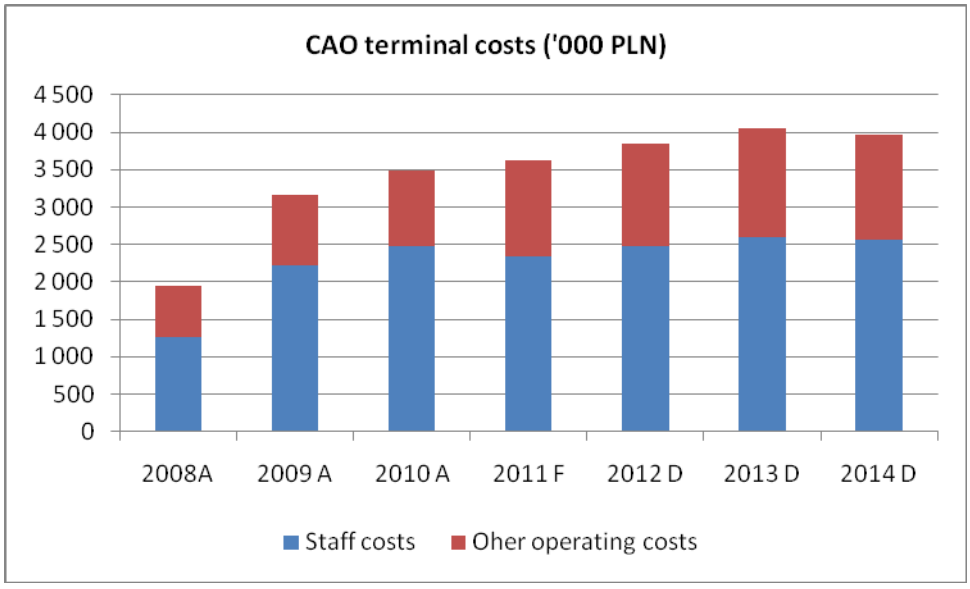
The table below presents the CAO terminal costs for the period 2009-2014, where 2009 and 2010 values are actual ones, while for subsequent years these are forecasts (2011 values are consistent with those included into the final 2011 terminal charges cost base).

Table 49. CAO terminal costs 2009-2014

CAO	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D	2014D/ 2011F
determined costs nominal values								
Staff	000 PLN	2 213	2 484	2 338	2 473	2 605	2 560	*9,51%*
Other operating costs	000 PLN	954	1 004	1 284	1 373	1 443	1 415	*10,21%*
Depreciation	000 PLN							
Cost of capital	000 PLN							
Exceptional items	000 PLN							
Total terminal costs	000 PLN	3 167	3 488	3 621	3 846	4 048	3 975	*9,76%*
% change n/(n-1)			*10,14%*	*3,83%*	*6,22%*	*5,24%*	*-1,81%*	
determined costs real 2009 values								
Staff	000 PLN	2 213	2 419	2 221	2 292	2 356	2 258	*1,69%*
Other operating costs	000 PLN	954	977	1 219	1 272	1 305	1 248	*2,34%*
Depreciation	000 PLN							
Cost of capital	000 PLN							
Exceptional items	000 PLN							
Total terminal costs	000 PLN	3 167	3 396	3 440	3 565	3 660	3 506	*1,92%*
% change n/(n-1)			*7,25%*	*1,30%*	*3,63%*	*2,67%*	*-4,21%*	
Total service units (000)		127	133	140	147	150	153	*9,40%*
Determined unit cost - nominal	**PLN**	**25,00**	**26,22**	**25,87**	**26,20**	**27,04**	**25,95**	***0,33%***
% change n/(n-1)			*4,89%*	*-1,34%*	*1,27%*	*3,22%*	*-4,02%*	
Determined unit cost - real 2009	**PLN**	**25,00**	**25,53**	**24,57**	**24,28**	**24,45**	**22,89**	***-6,83%***
% change n/(n-1)			*2,13%*	*-3,75%*	*-1,20%*	*0,71%*	*-6,36%*	

Since 2009 no modification in the allocation of CAO ANS costs between en-route and terminal has been introduced and no such modification is foreseen to be introduced during the RP1. This is confirmed by almost constant percentage share of terminal and en-route costs as presented in Table 36. in chapter 3.3.1.

The graph below illustrates the level of CAO terminal costs since 2008. As explained above, change between 2008 and 2009 results not from the increase of total CAO budget or total ANS costs but from verification of the tasks performed with relation to terminal and en-route services. The increase in terminal share was mainly due to CAO tasks related to aviation obstacles in the vicinity of airports.



3.4. EUROCONTROL share in the targets and individual binding performance targets.

EUROCONTROL

EUROCONTROL contribution to the national targets is related to en-route cost-efficiency area as Polish contribution to the Agency's budget, paid by PANSA, is included in the determined en-route costs and as a consequence in the determined unit rate which is the key performance indicator in the cost-efficiency area.

EROCONTROL costs that are included in the determined en-route costs for RP1 represent the amount of Polish contribution as approved at the end of 2010. The annual amounts are those that were included in the final 2011 en-route cost base in November 2011. ***Remark****: If new EUROCONTROL costs and Polish contribution are established and approved before finalization of the performance plan for RP1, cost figures presented in this chapter will be verified to reflect the new contribution amount*.

The table below presents these costs in both EUR and PLN together with calculation of their contribution to the national cost-efficiency target.

Table 50. EUROCONTROL en-route costs 2009-2014

EUROCONTROL	Currency	2009 A	2010 A	2011 F	2012 D	2013 D	2014 D	2014D/ 2011F
determined costs nominal values								
EUROCONTROL contribution - Poland	000 EUR	9 724	11 032	8 365	9 349	8 531	8 619	*3,03%*
% change n/(n-1)								
Exchange rate (1EUR=)	PLN	4,32	3,99	3,80	3,80	3,80	3,80	
EUROCONTROL contribution - Poland	000 PLN	42 046	44 023	31 789	35 526	32 418	32 752	*3,03%*
% change n/(n-1)			*4,70%*	*-27,79%*	*11,76%*	*-8,75%*	*1,03%*	
determined costs real 2009 values								
Total en-route costs	000 PLN	42 046	42 865	30 198	32 925	29 312	28 892	*-4,33%*
% change n/(n-1)			*1,95%*	*-29,55%*	*9,03%*	*-10,98%*	*-1,43%*	
Total Service units (000)		3 092	3 313	3 587	3 914	4 036	4 177	*16,44%*
Determined unit cost - nominal	**PLN**	**13,60**	**13,29**	**8,86**	**9,08**	**8,03**	**7,84**	***-11,52%***
% change n/(n-1)			*-2,27%*	*-33,31%*	*2,42%*	*-11,51%*	*-2,38%*	
Determined unit cost - real 2009	**PLN**	**13,60**	**12,94**	**8,42**	**8,41**	**7,26**	**6,92**	***-17,83%***
% change n/(n-1)			*-4,84%*	*-34,94%*	*-0,07%*	*-13,66%*	*-4,76%*	

3.5. Incentive mechanisms to be applied on each entity to encourage the targets being met over the reference period.

Table 51. The incentive mechanism applied to individual entities.

Entity	Measure	Threshold	Impact beyond threshold
PANSA	Capacity		
PANSA	Cost efficiency		
IMWM	Cost efficiency		

4. MILITARY DIMENSION OF THE PLAN

Legislation, reference document	
• Regulation 691/2010;	Recitals Number 12 and 13 Article 8, clause 6
• Annex II of the Regulation 691/2010;	Article 10, clause 3 sub point (e)
• The Act of 3rd July 2002 *Aviation Law* (Journal of Law from 2006, No 100, item 696);	Sub point 4 of template

• The Act of 8th December 2006 on Polish Air Navigation Services Agency (Journal of Law No 249, item 1829); • Regulation of Ministry of Infrastructure of 25th November 2008 *on the structure of Polish airspace and detailed conditions of its use* (Journal of Law No 210, item 1324);	

The Flexible Use of Airspace (FUA) Concept in FIR Warszawa has been developed at the three Levels of Airspace Management aiming at the Civil/Military co-ordination. In accordance with MoI Regulation of 25th of November 2008, on Polish airspace and detailed conditions of its use, President of CAO is a decision-making person in High Level Airspace Policy Body. ASM Committee plays a advisory role to President of CAO as a joined civil-military body. Strategic Planning Unit of PANSA is a supporting civil-military unit responsible for preparing the analyses, proposals and documentation concerning ASM Level 1. President of CAO ensures fair and effective regulation of the airspace organisation and management. Temporary airspace structures and procedures are defined by PANSA, coordinated with Polish Air Forces (PLAF) and eventually approved by President of CAO, if required (restriction longer than 3 months). Strategic Planning Unit (PANSA) is authorized to introduce temporary airspace reservation and restrictions for less than 3 months without CAO approval. PANSA makes regular review of user's requirements concerning airspace structure while ASM Committee makes assessments of the submitted results once a year. Pre-Tactical ASM at Level 2 consists of the day-to-day management and temporary allocation of airspace through Polish AMC, which is joint civil/military ASM unit authorized to conduct operational ASM. Tactical ASM Level 3 consists of the real-time activation, deactivation or real-time reallocation of the airspace allocated at Level 2 and the resolution of specific airspace and traffic situations between civil and military flights, as appropriate. All levels of ASM are under ongoing oversight process, carried out by CAO.

Flexible airspace structures have been established including Conditional Routes (CDRs), Reduced Coordination Airspace (RCA), Temporary Reserved Areas (TRA) and Temporary Segregated Areas (TSA). PANSA contributes to Route Availability Document management. Airspace is reserved taking into consideration timely and dimensional criteria, the TFRs are used based on safety requirements. Responsibility for separation between civil and military flights in controlled airspace rest on ATS units (including OAT ATCOs) IAW MOD Regulation from 28 February 2005 on cooperation

between ATM and PLAF and direct agreements between PANSA and PLAF, describing the conditions and responsibilities during Air Policing missions and daily routing flights.

5. Analysis of sensitivity and comparison with the previous performance plan

5.1 Sensitivity to external assumptions.

The cost-efficiency performance target set in this document was checked against variations of the following external factors:

- fluctuation of the EUR exchange rate;
- level of traffic during RP1 (both in one of the years of RP1 and in the total RP1).

Any significant deviation from the assumed EUR/PLN exchange rate could have the following impact on the cost-efficiency area:

- impact on the revenue side – within the EUROCONTROL system en-route charges are invoiced and paid in EUR; the amount received by CRCO is then transferred to PANSA's account and for the purpose of covering expenses needs to be exchanged to PLN. As a result PANSA is subject to exchange rate risk, although the level of this risk is significantly limited by the monthly recalculation of the unit rate from PLN to EUR. Due to this monthly recalculation any possible impact of changes in the exchange rate on the level of revenues is negligible, unless these exchange rate variations are sudden (take place in a short time) and significant in the amount;
- impact on the cost side – majority of costs included in the determined costs for RP1 are incurred in PLN. Fluctuations of the exchange rate could have an impact on the level of some capital expenditures which are made in EUR, and as a consequence could influence the level of annual depreciation costs with regard to those assets. Change in the level of exchange rate would also influence the PLN amount of contributions to international organizations, including EUROCONTROL. Sensitivity analysis conducted for the assumption of +/-15% change in the level of the exchange rate as compared to the assumed for the purpose of drafting this plan shows that such a variation could result in cash surplus or deficit at the level of around 7 million PLN during the whole RP1 (amount for the total en-route cost base). Impact on the amount of depreciation would be negligible from the perspective of the total cost base. Such a difference would not therefore have a significant impact on the cost-efficiency target for RP1.

As concerns sensitivity to traffic if the actual traffic is by 10% lower than assumed this would result in the necessity to increase the level of external financing (banking credit) as not all costs/expenses can be reduced in the short term (majority of costs are fixed costs that are incurred irrespective of traffic variations). If such a decrease in traffic maintained for a longer term this would result in additional demand for external financing and would result in a significant increase in the financial costs. It should, however, be noted that the determined costs include costs of both external and equity financing (cost of capital calculated as weighted average of cost of debt and equity). Unless the above mentioned additional demand for external financing is substantial, from the perspective of determined costs impact of the analyzed variations should not be significant.

5.2 Comparison with previous performance plan

Not applicable for the First Reference Period (RP1).

6. IMPLEMENTATION OF THE PERFORMANCE PLAN

Description of the measures put in place by the national supervisory authorities to achieve the performance targets, such as:

- monitoring mechanisms to ensure that the ANS safety programmes and business plans are implemented,
- measures to monitor and report on the implementation of the performance plans including how to address the situation if targets are not met during the reference period.

Alert thresholds

(1) For all key performance indicators applicable to the performance reference period, the alert threshold beyond which the alert mechanism referred to in Article 18 of Regulation (EC) No 691/2010 may be activated shall be a deviation over a calendar year by at least 10% of the actual traffic recorded by the Performance Review Body versus the following traffic forecasted, expressed in million en route service units:

107.338 in 2012, 110.105 in 2013 and 113.049 in 2014.

(2) For the cost-efficiency indicator, the costs evolution alert threshold beyond which the alert mechanism referred to in Article 18 of Regulation (EC) No 691/2010 may be activated shall be a deviation over a calendar year by at least 10% of the actual costs at European Union-wide costs recorded by the Performance Review Body versus the following reference determined costs (expressed in real terms, million Euros 2009):

€5,986 in 2012, €5,872 in 2013 and €5,765 in 2014.

KPA capacity (delay data) will be monitored on regular basis according to point 1.1 letter c Annex IV of Regulation 691/2010 and by means of ongoing oversight mechanism. The ongoing ovesrsight is performed on the basis of Chapter 3 of Law of 3rd July 2002 Aviation Act (Journal of Law from 2006, No 100, item 696). The ongoing oversight is conducted by President of Civil Aviation Office. The same the Law of 8th December 2006 on Polish Air Navigation Services Agency (Journal of Law No 249, item 1829) gives the President of CAO in Art. 2 section 1 authority for carrying out of ongoing oversight. During the activities of oversight the representatives of the President of CAO shall have acces to data concerning the capacity, delay and status of implementation of performance plan. The ongoing oversight shall be performed on the basis of National Supervisory Authorities' audits plan.

With regard to the cost-efficiency area regular monitoring will take place on annual basis. It shall be based on PANSA's and IMWM's annual reports, financial statements and annual plans, CAO financial accounts, charges' reporting tables as well as information provided by EUROCONTROL, concerning actual traffic level and revenues from air navigation charges.

With regard to PANSA, in accordance with the Act of 8 December 2006 on the Polish Air Navigation Services Agency, annual reports and audited financial statements shall be provided to the CAO President by the end of May of the following year. On the basis of these reports CAO will evaluate the level of annual costs. With regard to the IMWM it is subject to general rules on the elaboration of financial statements stemming from the Accounting Act of 1994 – in accordance with these provisions audited and approved by the relevant bodies financial accounts shall be available by the end of June. IMWM shall be obliged to provide the financial accounts to the CAO President by this date (end of June of the following year).

Additionally, with regard to the division of these costs into en-route, terminal and other (commercial activity) PANSA and IMWM are obliged – by provisions of regulation of the Minister of Transport of 15 May 2007 on air navigation charges – to provide preliminary reporting tables on air navigation charges (en-route and terminal) in May. These tables contain also information on the actual level of costs incurred in the preceding year with regard to en-route and terminal services. These tables will be used to monitor the achievement of individual targets for PANSA and IMWM.

Apart from this regular monitoring activities the CAO reserves the right to conduct audits or to oblige PANSA and IMWM to provide financial information to obtain up-to-date information on the level of actual costs and related information if there are signs

showing that there might be a significant deviation of these costs from the determined costs.

For the monitoring purpose the CAO will also use the annual plans of PANSA and IMWM and annual updates of their business plans to verify if the content of these plans is in line with this Performance Plan. In accordance with the PANSA Act PANSA is obliged to provide the draft annual plan together with update of business plan to the CAO President for opinion by 1 November of the preceding year. Following opinion issued by the CAO – which will also contain information of compliance of these plan with the Performance Plan – by 1 December the plans are to be provided to the Minister of Infrastructure for approval. Any correspondence between the Minister of Infrastructure and PANSA with regard to the approval of these plans, as well as the final decision taken by the Minister, shall be copied to the CAO President for the purpose of monitoring execution of this Plan.

IMWM annual plan and update of business plan shall be available by the end of February of the given year. They shall be communicated to the CAO President without delay.

Any material deviations from the performance assumed in this Plan shall be explained in detail by the entity concerned.

Monitoring of the CAO own costs will be conducted on the basis of annual financial statements provided by the CAO to the Minister of Infrastructure (and further by the MoI to the Minister of Finance). These are available by end of February of the following year. Additionally regular flow of information on any significant modifications of the CAO budget during the RP1 between the CAO units responsible for financial planning/accounting and performance issues in the area of cost-efficiency is established.

With regard to traffic level CAO will be monitoring the situation on the basis of monthly en-route data available in the EUROCONTROL/CRCO ETNA. PANSA shall be obliged to communicate monthly terminal traffic (SU-L) to the CAO.

If the monitoring reveals that the alert thresholds established in the Plan are exceeded CAO will verify the cause of such situation and – if this analysis proves that those thresholds were exceeded as a result of external circumstances that were unforeseeable at the time when this performance plan was adopted and that they were beyond the control of the entities subject to this plan - will consider adjustment of the RP1 national targets.

Information on external assumptions concerning exchange rate and inflation will be monitored by the CAO on regular basis. For EUR/PLN exchange rate this monitoring will take place on a monthly basis taking into account the average monthly Reuters bid closing rates published by EUROCONTROL/CRCO. For inflation the monitoring on the CAO side will be on annual basis and will take into account the inflation figures published by Eurostat.

LIST OF TABLES

ANNEXES

Annex I

New principles of cost allocation between en-route and terminal air navigation services.

Due to the currently implemented and planned rearrangements of legal and organizational nature PANSA has analyzed and verified the methodology used for its operating cost allocation between terminal and en-route air navigation services. The legal changes, mentioned above, include, in particular, the implementation of Commission Regulation (EU) No 1191/2010 of 16 December 2010 amending Regulation (EC) No 1794/2006 laying down a common charging scheme for air navigation services. Pursuant to Article 3 of the amended Regulation the provisions thereof shall start applying to the air navigation services costs, charges and unit rates of the year 2012. With reference to clause 1 in the Preamble of the amended Regulation the development of a common charging scheme for air navigation services provided during all phases of flight is of the utmost importance for the implementation of the Single European Sky. The scheme should achieve greater transparency with respect to the determination, imposition and enforcement of charges to airspace users and more transparency in the determination of the unit rate achieved through the adequate allocation of costs incurred by PANSA's services.

The organizational rearrangements incorporate the activities geared towards establishing of the Baltic FAB ("Baltic Functional Airspace Block") covering Warszawa FIR and Vilnius.

Drawing on the conclusions from the analyses conducted PANSA suggested some changes in respect of the cost allocation . The new cost allocation principle is based on the so-called spatial concept of the services allocation, it being understood that the cost allocation is determined on the basis of the services provided in a specific airspace, contrary to the currently applied local cost allocation formula, whereby the cost allocation is determined according the CNS/ATM equipment location. The new method is thus more explicit and transparent. Under the document entitled "Air Traffic Management PL 4444" the arrivals and departures constitute part of the ATS routes, which consequently entails that the TMA airspace is established to ensure the safety of air operations in the arrival and departure traffic within the CTA controlled airspace. The CTR airspace is not part of the CTA airspace.

Additionally, the change of the costs allocation keys proposed by PANSA complies to a wider extent with the provisions resulting from Article 15 Paragraph 2 (e) of Regulation

EC No 1070/2009 of the European Parliament and of the Council of 21 October 2009 amending Regulations (EC) No 549/2004, (EC) No 550/2004, (EC) No 551/2004 and (EC) No 552/2004 in order to improve the performance and sustainability of the European aviation system, including the provision on the ban on cross-subsidy between en-route services and terminal services. Under the new methodology the costs that pertain to both terminal services and en-route services shall be allocated between en-route services and terminal services on a pro-rata basis in more explicit and transparent manner.

The change in respect of allocation concerns primarily cost allocation keys related to the provision of the approach control services. Under the methodology currently used the allocation keys are evaluated using the proportion of the TMA volumeto 20 kilometers. In the new, proposed methodology the APP related costs are allocated in whole to the ENR, since the APP service is provided in the TMA airspace. The navigational aids e.g. NDB, VOR/DVOR and DME are used during the arrival and departure operations. During the take-off and landing operations performed in the CTR airspace such navigational aids are scarcely used. The ILS navigational aids are exploited by the TWR services solely in the phase of a flight performed in the CTR airspace, while in the case of other airspace such support is used for the approach control services purposes. The exploitation of other navigational aids for the flights in a specific airspace is strictly conditioned by the volume such airspace.

It is worth noticing that PANSA is currently in the process of the airspace reconfiguration involving, among others, alterations in the CTR and TMA airspace volumes at some aerodromes, which is ultimately aimed at optimizing of the airspace sectors design at a country-wide scale.

PANSA – Description of main investments impacting RP1 (in nominal terms in national currency).

1	**CAPEX Project ID**	Radars: PSR MSSR Warszawa, PSR/Mode SSR Poznań, PSR/Mode SSR Kraków, PSR/Mode SSR Wrocław, PSR/Mode SSR North-East Poland
	Domain	SUR
	Allocation en-route/ terminal ANS	1) 96,32% en route/3,68 TNC - current allocation ; *[100% en-route/0% TNC – new allocation]* 2) 95% en route/5% TNC - current allocation; *[100% en-route/0% TNC – new allocation]* 3) 75% en route/25% TNC - current allocation ; *[100% en-route/0% TNC – new allocation]* 4) 90,38% en route/9,62%TNC -current allocation ; *[100% en-route/0% TNC – new allocation]*
	Assessed impact on Performance Targets KPA01 – safety KPA02 – capacity KPA03 – environment KPA04 – cost efficiency	KPA01- precise identification and determination of the position of aircraft with surveillance information continuity, enable to provide continuous coverage of the area and maintain the current level of security with an increasing level of air traffic. KPA02 - determine the position of the aircraft along with ensuring continuity of information, surveillance, can reduce the separation of aircraft and leads to increased capacity and reduce delays in air traffic. KPA04 - Secondary impact on the cost-effectiveness. Maintaining and developing surveillance infrastructure, increased the number of aircraft operated.
	(Planned) Start date of investment project	II Q 2009
	(Planned) Commissioning date of investment	III Q 2014
	Lifecycle (Amortisation periods in year)	15 years
	Planned total capex	93 364 278
	European ATM Master Plan (OIs reference)	Enablers: CTE-S4a, CTE-S5, OIs: AO-0102, AO-0201, AO-0205, AO-0402, AUO-0602, AUO-603, AUO-0605, CM-0203, CM-0801
	Related SES IR/Community Specifications	SPI IR (under dev.), ModeS (Reg 262/2009)
2	**CAPEX Project ID**	17 Ground stations
	Domain	COM
	Allocation en-route/ terminal ANS	87,67% en route/12,33% TNC – current allocation, *[99,8% - 100% en-route / 0 - 0,2% TNC - new allocation]*
	Assessed impact on Performance Targets KPA01 – safety KPA02 – capacity KPA03 – environment KPA04 – cost efficiency	KPA01- separation of the functions of transmitting and receiving in the Ground stations, will reduce the interference of waves, causing the cut frequency to reduce the number of usable channels KPA02- increasing the number of frequencies in the Ground station, will increase the number of sectors possible to handle, which in turn helps to reduce air traffic delays KPA03- reducing consumption energy for retrofitted and new equipment KPA04- implementation of new technologies in the COM area allows to reduce the operating costs of systems. Separation of the functions of transmitting and receiving in the Ground station, reducing the number needed to build the facilities, which in turn will reduce operating costs
	(Planned) Start date of investment project	IV Q 2009

	(Planned) Commissioning date of investment	IV Q 2013
	Lifecycle (Amortisation periods in year)	10 years
	Planned total capex	40 843 319
	European ATM Master Plan (OIs reference)	Enablers: CTE-C5, CTE-C9 OIs: AOM-0803, AOM-0804
	Related SES IR/Community Specifications	VCS IR (Reg. 1265/2007), VCS II IR (under. dev)
3	**CAPEX Project ID**	Integrated Area Control Centre in Warsaw
	Domain	
	Allocation en-route/ terminal ANS	88,28 en route/11,72 TNC – current allocation, *[96,5% en route / 3,5% TNC – new allocation]*
	Assessed impact on Performance Targets KPA01 – safety KPA02 – capacity KPA03 – environment KPA04 – cost efficiency	KPA01- reduces the risk of possible loss of communication between ATC system components by concentrating them in one localization. Elements of the contingency system will be provided in one place instead of scattered sites KPA02- the ability to create sectors in both APP and ACC, response to customer needs KPA03- generate less waste and less energy consumption than in the case of scattering objects KPA04- increase operational qualification by acquiring new powers to other sectors located in the same place. Reduction of demand for supporting staff
	(Planned) Start date of investment project	I Q 2011
	(Planned) Commissioning date of investment	1 Q 2014
	Lifecycle (Amortisation periods in year)	40 years
	Planned total capex	35 000 000
	European ATM Master Plan (OIs reference)	
	Related SES IR/Community Specifications	
4	**CAPEX Project ID**	Modernization and develop of the navigation infrastructure in FIR Warsaw (modernization 4 DME and 2 DVOR/DME; develop 9 DME and 5 DVOR/DME)
	Domain	NAV
	Allocation en-route/ terminal ANS	96,87% en route/ 3,13 TNC – current allocation; *[100% en-route/0% TNC – new allocation]*
	Assessed impact on Performance Targets KPA01 – safety KPA02 – capacity KPA03 – environment KPA04 – cost efficiency	KPA01- fulfill the requirements of navigation coverage. Multiple coverage of the beacon signal, will increase the accuracy of the aircraft location and to provide redundancy radionavigation coverage. KPA02- increase the accuracy of the position of the aircraft by increasing the coverage of the navigation will allow more flexible airways and flight procedures. Minimizing delays in air traffic by increasing the precision of determining the position of the aircraft. KPA03- The flexibility to design procedures for fluent air traffic management and reduction trajectory KPA04- transition from the use of the DVOR / DME to the DME which is a cheaper technology, will reduce infrastructure maintenance costs. Coverage of the RNP1 is much cheaper than RNP5, also due to the increased accuracy of the location of the aircraft, reducing delays and generated support for air traffic services
	(Planned) Start date of investment project	I Q 2010
	(Planned) Commissioning date of	IV Q 2014

	investment	
	Lifecycle (Amortisation periods in year)	15 years
	Planned total capex	46 343 134
	European ATM Master Plan (OIs reference)	Enablers: CTE-N5a, CTE-N5b OIs: AOM-0602, AOM-603
	Related SES IR/Community Specifications	PBN IR (under dev.), CS APV/LPV (under dev.)
5	**CAPEX Project ID**	TWR modernization project in Kraków, Łódź, Poznań, Rzeszów.
	Domain	ATS
	Allocation en-route/ terminal ANS	*1)* 66,76% en route/33,24% TNC – current allocation; *[?? – new allocation]* 2) 66,60%/33,40% - current allocation ; *[95% en-route/5% TNC – new allocation]* *3)* 73,16% en route/26,84% TNC – current allocation; *[?? – new allocation]* 4) 86,96% en route/19,35% - TNC – current allocation; *[98% en-route/2% TNC- new allocation]*
	Assessed impact on Performance Targets KPA01 – safety KPA02 – capacity KPA03 – environment KPA04 – cost efficiency	KPA01 – fit build parameters to the characteristics of the airport and needs in the provision of aerodrome control services KPA02- opportunity to develop services adequate to the level of traffic. KPA04 – increasing cost efficiency resulting from leaving the airport services TWR. Reduction in demand for supporting staff
	(Planned) Start date of investment project	I Q 2010
	(Planned) Commissioning date of investment	I Q 2015
	Lifecycle (Amortisation periods in year)	The land purchase, construction and desig process – 40 years
		The equipment purchase – 15 years
	Planned total capex	The land purchase, construction and desig process – 71 448 719
		The equipment purchase – 19 200 000
	European ATM Master Plan (OIs reference)	
	Related SES IR/Community Specifications	
6	**CAPEX Project ID**	Enterprise resource planning system
	Domain	System
	Allocation en-route/ terminal ANS	86,96 en route/13,04 TNC – current allocation; *[95% en-route / 5% TNC – new allocation]*
	Assessed impact on Performance Targets KPA01 – safety KPA02 – capacity KPA03 – environment KPA04 – cost efficiency	KPA04- ability to efficiently allocate human resources and define the possible bottlenecks. Improving the process of planning, controlling, costs allocating and create financial forecasts
	(Planned) Start date of investment project	III Q 2010
	(Planned) Commissioning date of investment	II Q 2013
	Lifecycle (Amortisation periods in year)	5 years
	Planned total capex	17 000 000
	European ATM Master Plan (OIs reference)	
	Related SES IR/Community Specifications	

7	**CAPEX Project ID**	Modernization and develop of ILS/DME investments
	Domain	NAV
	Allocation en-route/ terminal ANS	0,00% en route/ 100% TNC – current allocation; *[50% en-route / 50% TNC – new allocation]*
	Assessed impact on Performance Targets KPA01 – safety KPA02 – capacity KPA03 – environment KPA04 – cost efficiency	KPA01 - Exchange of exploited ILS systems will increase safety - new equipment are generally more reliable. Increasing the accuracy of the aircraft location can navigate the aircraft with the prescribed rate on the path of approach in low visibility. Provide by instrument approach for landing, depending on the category, minimize the amount on which the decision is made whether to interrupted the approach to landing. The Airport with ILS system, are able to service the aircraft in bad weather conditions. KPA02 - airport facilities in the ILS can reduce separation between landing aircraft and making possible to increase the number of landings. KPA04 – airport facilities in the ILS allows to increase the number of aircraft to be serviced even under adverse weather conditions, which generates income for both ANSPs and Airport. Simultaneously are decreasing costs and delays associated with the return of aircraft to the another airport in heavy weather.
	(Planned) Start date of investment project	III Q 2010
	(Planned) Commissioning date of investment	II Q 2015
	Lifecycle (Amortisation periods in year)	15 years
	Planned total capex	22 600 000
	European ATM Master Plan (OIs reference)	Enablers: CTE-N6 OIs: AO-0503, AO-0504
	Related SES IR/Community Specifications	
8	**CAPEX Project ID**	Transmitter and receiver system needed to complete implementation of 8.33 kHz channel separation above FL195
	Domain	COM
	Allocation en-route/ terminal ANS	87,68% en route/12,33% TNC – current allocation *[99,8% - 100% en-route/0% - 0,2% TNC – new allocation]*
	Assessed impact on Performance Targets KPA01 – safety KPA02 – capacity KPA03 – environment KPA04 – cost efficiency	KPA02 –additional transmission channels used to provide the service due to on voice necessity of handle generating level of traffic
	(Planned) Start date of investment project	I Q 2013
	(Planned) Commissioning date of investment	III Q 2014
	Lifecycle (Amortisation periods in year)	10 years
	Planned total capex	10 000 000
	European ATM Master Plan (OIs reference)	Enablers: CTE-C5, OIs: AOM-0803, AOM-0804
	Related SES IR/Community Specifications	VCS IR (Reg. 1265/2007), VCS II IR (under. dev)
9	**CAPEX Project ID**	Modernization of VCS in Poznań, Wrocław, Rzeszów, Gdańsk, Warszawa
	Domain	COM
	Allocation en-route/ terminal ANS	76,41% en route/23,59% TNC – current allocation; *[99,4% en-route / 0,6% TNC – new allocation]*

	Assessed impact on Performance Targets KPA01 – safety KPA02 – capacity KPA03 – environment KPA04 – cost efficiency	KPA01- Modernization of equipment currently in use, this translates into a reduction of their unreliability KPA04- Implementation of new technologies will reduce the systems operating costs
	(Planned) Start date of investment project	2009
	(Planned) Commissioning date of investment	III Q 2013
	Lifecycle (Amortisation periods in year)	12 years
	Planned total capex	8 179 462
	European ATM Master Plan (OIs reference)	Enablers: CTE-C9 OIs: AOM-0208, AOM-0803, AOM-0804
	Related SES IR/Community Specifications	
10	**CAPEX Project ID**	ICT (information and communication technology) infrastructure, VCX
	Domain	COM
	Allocation en-route/ terminal ANS	82,64% en route/17,36% TNC – current allocation; *[97% en-route / 3% TNC – new allocation]*
	Assessed impact on Performance Targets KPA01 – safety KPA02 – capacity KPA03 – environment KPA04 – cost efficiency	KPA01- Modernization of equipment currently in use, translates into a reduction of their unreliability KPA04- Implementation of new technologies will reduce the systems operating costs
	(Planned) Start date of investment project	I Q 2011
	(Planned) Commissioning date of investment	IV Q 2012
	Lifecycle (Amortisation periods in year)	8 years
	Planned total capex	5 600 000
	European ATM Master Plan (OIs reference)	Enablers: CTE-C9, CTE-C11b OIs: AOM-0208, AOM-803, AOM-0804
	Related SES IR/Community Specifications	
11	**CAPEX Project ID**	Multilateration system
	Domain	SUR
	Allocation en-route/ terminal ANS	100% en-route/ 0% TNC – current and *new allocation*
	Assessed impact on Performance Targets KPA01 – safety KPA02 – capacity KPA03 – environment KPA04 – cost efficiency	KPA01- precisely to identify and determine the position of aircraft with surveillance information continuity, enable to provide continuous coverage of the area and maintain the current level of security with an increasing air traffic level. KPA02- determine the position of the aircraft with the ensuring continuity of information surveillance, can reduce the aircraft separation and adjusted to increased capacity and reduce air traffic delays. KPA04- Analysis of the investment costs and possible operational and technical solutions lead to the selection of a solution requires the least cost in complying with the operational requirements
	(Planned) Start date of investment project	I Q 2011
	(Planned) Commissioning date of investment	III Q 2012
	Lifecycle (Amortisation periods in year)	5 years
	Planned total capex	3 880 000
	European ATM Master Plan (OIs	Enablers: CTE-S1, CTE-S5, CTE-S9

	reference)	OIs: AO-0102, AO-0201, AO-0205, AO-0402, AUO-0502, AUO-602, AUO-0605, CM-0203, CM- 0801
	Related SES IR/Community Specifications	SPI IR (under dev.), ModeS (reg 262/2009)

CAO ANS-related costs calculation methodology

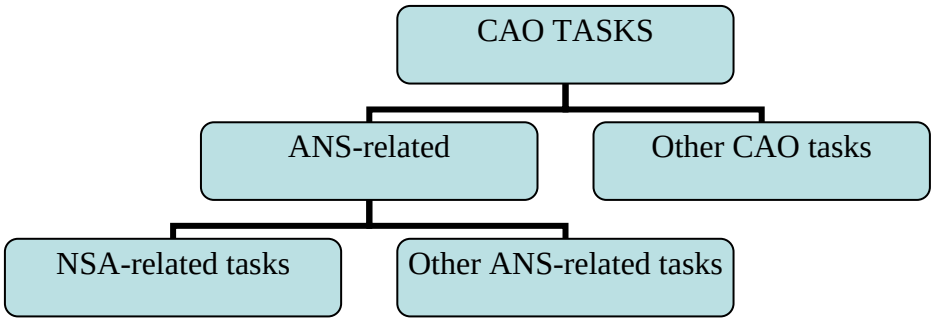
The system of CAO financing with regard to ANS costs used until 2011 did not properly reflect the needs of the CAO acting as an NSA. The reason is that the ANS financing was directly linked to the forecasted CAO total budget and was calculated purely on the basis of staff numbers (ratio based on the staff allocation percentage multiplied by the total CAO budget for a given year). It did not take into account variations in CAO-ANS-NSA activities that may require additional workload using the current human resources as well as may result in additional costs in other operating expenses items. Any modification of the total CAO budget automatically resulted in the change of the level of ANS related costs even though it might have touched other than ANS-related activities of the CAO and may have had no impact on the ANS tasks.

Additional problem related to the above system of financing of the ANS part regards the annual system of CAO budgetary planning. CAO budget has to follow the general state budget planning schedule and expenditure guidelines. These guidelines concerning eg. remuneration fund increase, inflationary assumptions etc. are not yet known when the preliminary cost bases for the following year are prepared. Moreover, according to the budgetary schedule planning of budgetary income is conducted earlier than planning of expenditure (including CAO budget). As a consequence for budgetary income planning the CAO calculates the income from air navigation charges before the CAO budget (costs) for the given year is known. Additionally, the state budget planning focuses on the following year with a preliminary forecast for the next 2 years. As a consequence the CAO budget that is the basis for mid-term plan of ANS expenditures presented in the ANS charges reporting tables except for the year n+1 was always a very preliminary forecast that reflected only the assumptions and expectation of the CAO – experience from previous years shows that the final CAO budget for subsequent years always differs significantly from the forecast for the years n+2 - n+5 shown in the last year's reporting tables.

Having the above mentioned problems in mind and also taking into account the modified system of air navigation charges establishing (time schedule of cost base planning linked to performance plan drafting schedule, the need to fix the amount of costs included into the cost bases for the whole period covered by the performance plan taking into account the improvement in performance as well as modification of the

current full cost recovery system) there was a need to modify the process of establishing the amount of ANS related costs of the CAO.

For this purpose the CAO conducted a detailed analysis of ANS-related tasks and factors influencing the level of expenditures related to those tasks. As a result of this analysis CAO ANS-related tasks were divided into those related to NSA functions and other ANS tasks. This is shown on the graph below.



Acting as the NSA the CAO:

- issues certificates of compliance with common requirements to Polish air navigation services providers;
- organizes proper inspections and surveys to verify compliance with the requirements of the service provision Regulation;
- issues certificates to ANS training providers and aviation medical centers and monitors compliance of the holders of certificates with legal requirements; approves training programs;
- ensures adequate and appropriate safety regulatory oversight of the engineering and technical staff;
- ensures achieving an interoperability between the different systems, constituents and associated procedures of the EATMN;
- supervises proper accounting and financial reporting systems of ANSPs in accordance with article 12 of the EU Regulation No 550/2004;
- licensing of ATS personnel and keeping register of licensed personnel;
- examination of ATS personnel and ELPAC administering.

Apart from those main NSA functions described above the CAO also performs various other functions related to en-route air navigation services provision that are competencies of a member state in accordance with EU regulations or that stem from national legal provisions. These functions include i.a.:

- supervision of air navigation charges in accordance with Commission Regulation No 1794/2006 and EUROCONTROL provisions, including consultation,

verification and approval of cost bases, provision of data to EUROCONTROL and EC;

- participation in the ATSP and METSP designation procedure through issuing opinions on the possible designation prior to the decision of the minister responsible for transport;
- additional supervisory tasks with regard to PANSA on the basis of Act of 8 December 2006 on Polish Air Navigation Services Agency including approval of financial auditor, giving opinions on PANSA's annual and business plan as well as annual report prior to their approval by the minister responsible for transport;
- supervision of providers of security training with regard to ANS as well as other functions related to aviation security including approval of security programs;
- conducting safety oversight of changes in a system or a constituent of a system, to comply with the relevant requirements;
- conducting annual safety oversight reporting to contribute to the transparency and accountability of the safety oversight.

Additional CAO tasks with regard to ANS comprise also collection, validation and distribution of statistical data on air traffic in the Polish airspace for the purpose of analyses and provision of data to ICAO as well as for capacity issues monitoring, participation in the process of concluding international agreements containing provisions on air navigation services or charges, preparation of drafts of national legislation with regard to ANS-related issues as well as participation in the process of drafting or amending international regulations on these issues including ICAO and EU, crisis management with regard to ANS and ANSPs, participation in the civil-military cooperation with regard to ANS, participation in the process of drafting or amending national or international strategies or programs, etc., day-to-day cooperation with ATSP on the issues related to air traffic operation in the Polish airspace.

The CAO 2011 final cost base, calculated for the purpose of establishing the final cost bases for en-route and terminal unit rates for 2011, was divided into those two fields (NSA-related costs and other ANS-related costs). This was done on a basis of a detailed analysis of tasks performed by all departments responsible for ANS-related tasks, engaging management of those departments as well as the top CAO management.

NSA-related tasks:

In the subsequent step in the area of NSA-related tasks directors of the departments involved in these tasks, with the support from the top CAO management and specialists in the area of ANS tasks, identified external factors that influence the workload, and as a consequence the level of expenditures, in this area. These factors include number of certified ANSPs, number of licensed ATCOs, number of ATS staff training centers, changes in the CNS infrastructure and ATS/MET/AIS units that are supervised by the CAO, expected obligations related to performance scheme. Taking into account expected evolution of these external factors the workload for the CAO was forecasted.

This exercise resulted in establishing an index of increase/decrease in workload at the CAO in the area of NSA-related tasks for every year of the RP1, taking 2011 as the basis (2011=1). These indexes for every year were used to establish the level of resources that would be needed to perform these tasks if no improvement in performance was assumed and expressed in the monetary values of 2011 PLN.

Second step with regard to NSA-related tasks was to take into account the necessary increase in the level of expenditure related to inflation expectations. In this regard the rule applicable to the state budget was assumed, in accordance with which the level of expenditure cannot exceed the level from the previous year uprated taking into account forecasted annual inflation plus 1 percentage point. Taking into account the inflation forecast as presented in chapter 1 (2,5% p.a. during RP1), this means that the 2011 expenditures shall increase by 3,5% p.a.

Third step was to take into account the necessary and possible improvements in the efficiency. After internal analyses on the basis of CAO top management decision for 2012 the improvement was assumed at the level of 2%, while for 2013-2014 at the level of 3%, following expectations of positive results of Baltic FAB establishment and cooperation between NSAs within the FAB.

Other ANS-related tasks:

With regard to these costs similar analysis was performed with the exception of assuming increase in the workload. It was assumed that the CAO tasks in this area and respective workload will remain at the level of 2011. As a consequence these costs were indexed only using the 3,5% p.a. resulting from forecasted inflation level + 1 percentage point, and in the second step were discounted taking into account expected improvement in efficiency. The efficiency indicator assumed was 2% p.a. during the whole RP1.

Forecasted CAO ANS costs for each year of the period 2012-2014 are the sum of NSA-related costs and ANS-other costs.

As in previous years, these total ANS-related costs were divided into en-route and terminal taking into account the criteria defined in article 7.2 of the Charging Regulation.

Description of the methodology used for allocating total MET costs and MET core costs to civil aviation

Methodology of separating the costs of meteorological services for aviation in Institute of Meteorology and Water Management

In accordance with the amended Charging Regulation, determination of the share of costs of meteorological services for civil aviation provided by Institute, in total MET costs is based on separation of direct costs of such services and on separation of MET core costs.

A. Methodology of direct costs of meteorological services determination.

The separation of direct costs of meteorological services for aviation from the total MET costs consists in defining the costs of services, facilities and systems used exclusively to provide meteorological services for aviation. Institute of Meteorology and Water Management defines these costs in accordance with ICAO Doc. 9161 “Manual on air navigation services economics” and WMO Publication No 904 “Guide to aeronautical meteorological services cost recovery. Principles and guidance”, Annex 1, as the costs of: Meteorological Watch Office, Aerodrome Meteorological Offices - only this part of the costs that deals with services for aviation, Aeronautical Meteorological Stations, telecommunication system which serve aviation, systems of aerodrome meteorological measuring devices, and costs of administrative support (including training) directly serving the aviation. So defined direct costs include:

1. gross payments including: personal and impersonal wages, company’s award fund contribution, social insurance contribution, company’s social benefit fund contribution, and others; this cost is proportional to the amount of employees rendering meteorological services for civil aviation.

These group of costs, in accordance with the Charging Regulation, are qualified as the staff costs.

The other groups of the direct costs of meteorological service for aviation are:

2. indirect costs proportional to remuneration fund and remuneration-related expenditures;
3. materials and equipment spare parts: office tools, printers ink, equipment purchase including purchase of equipment at airports, electricity, heat, computers, full equipment of the workplaces.

4. third party services: specialized software service (LEADS, TIM, ODBIÓR, METAR), renovation, check-ups, maintenance (computers, copiers, plotters, etc.), data communication network service (servers, routers) used by Meteorological Offices, and Aeronautical Meteorological Stations for meteorological services for civil aviation.
5. telecommunication: costs of maintaining communication between headquarters and Meteorological Watch Office and between Meteorological Offices and Aeronautical Meteorological Stations; satellite communication SADIS; fees for fixed-line telephones and mobile phones directly connected with meteorological services for civil aviation.
6. business trips inside and outside the country directly connected with meteorological services for civil aviation,
7. trainings and conferences: periodical meteorological training in respect to international European standards; enhancing qualifications trainings, inner audit costs connected with Quality Management System; other trainings connected with the service provision.
8. lease of premises and meteorological ground on the premises of airports- leasing according to signed agreements,
9. usage of automatic weather observation systems for the needs of meteorological services for civil aviation, including: trainings for the service workers, relevant business trips, the costs directly connected with AWOS maintenance and the cost of measuring equipment modernization.

The above costs, point 2 to 9 constitute other operating costs of meteorological services for aviation.

B. **Methodology of determining the share of meteorological services for aviation costs in core MET costs.**

According to the above analysis based on the Charging Regulation, ICAO Doc. 9161 and WMO no 904 MET core systems are defined as systems, facilities and services not only used for meteorological services for aviation but also for the public. These are as follows:

- Generally forecasting system;
- Numerical weather watch system;
- Telecommunication infrastructure;
- Hydrological-meteorological stations network;

- Aerological measurements system;
- Meteorological radars and air discharge systems;
- Satellite data reception system;
- Historical database;
- Systems supervision.

Core MET costs are the costs of maintenance of above listed systems in this part which was included within total MET costs and on the basis of the methodology presented above.

The share of costs of most MET core systems in aviation costs was calculated in accordance with procedures defined in ICAO Doc. 9161 and WMO no 904 point 3.10 (d), namely: in proportion of all employees working for aeronautical meteorology to employees working for National Hydrological-Meteorological Service. The number of employees working for aeronautical meteorology was determined on the basis of dividing National Hydrological-Meteorological Service into HYDRO Service and MET Service.

This methodology was applied in order to determine the share of costs of the following core systems:

- Generally forecasting system;
- Numerical weather watch system;
- Hydrological-meteorological stations network;
- Aerological measurements system;
- Satellite data reception system;
- Historical database;
- Systems supervision.

The share of costs of telecommunication systems in aviation costs was determined analogously to the methodology which determines the share of MET costs (total MET costs) in National Hydrological-Meteorological Service. The methodology is defined in ICAO Doc. 9161 and WMO no 904 point 3.10 (c), namely it is based on the analysis of the size of computer network flow in IMGW.

C. Methodology for division of costs of MET services to civil aviation into costs of particular products

Methodology for apportioning the costs of aviation meteorological services of various products in 2012-2014:

Breakdown of the cost of meteorological services to civil aviation between users of the service was compiled using the methodology of product. In this elaboration principle of costs transparency and charging individual users only for costs of services which they actually use has been applied.

The methodology for determining the cost of various aviation products is based on an assessment of the percentage contribution of the working time of one post per day in the manufacture of products for meteorological service to civil aviation. The basis of the methodology is the assessment of involvement of different organizational units, directly producing air products such as the Meteorological Office of Supervision (MBN), Meteorological Office (BPM) and the Airport Meteorological Stations (LSM) units and indirectly involved in the services for civil aviation. The measure of this commitment is the amount of time required to manufacture particular product.

The share of work of the units indirectly involved is assigned to each product, and contribution of the Central Measuring Equipment Laboratory, was assigned only to products that are based on measuring instruments.

A detailed description of the methodology used to determine the costs of products is as follows:

1. A new catalogue of basic classes of meteorological products has been defined, which will be made by IMGW to conduct protection of meteorological aviation in 2012-2014. This catalogue is based on ICAO Annex 3, WMO Publication No. 904.
2. Daily work tables were constructed for the Meteorological Supervision Office and individual Meteorological Offices, and airport meteorological stations, which describe the average time it takes to produce various air meteorological products in specific classes in the next hours of the day, in different organizational units.
3. On the base of obtaining percentage of product workload, partial product cost has been calculated on which product of following positions comprise:

- Number of posts;
- Labour consumption of the products;
- Annual amount of salaries per post;

The term workload is understood as the amount of work needed or used for the implementation and monitoring of a single product that is expressed as a percentage of working time to the entire time.

4. Cost share of other groups (service, AWOS, materials, external services, delegations, telecommunications, SADIS, trainings, rentals, infrastructure, depreciation, cost of

capital) has been established - on the basis of dedicated work at each cost group to manufacture the product. This share has been added to the partial cost of the product. In this way, an annual cost of developing each of the products ordered by PANSA has been achieved. The sum of the individual products gives an annual cost of MET services to civil aviation.

5. Completion of this phase of costs determining allowed to divide the costs to individual users (en-route charges, terminal charges, airport operators, VFR flights which are exempted from navigation charges). This division was carried out according to the users' needs.

The costs of flights which are exempted from navigation charges were calculated using the marginal cost methodology, based on the use of meteorological information contained on IMGW website in the 'aviation' tab. This cost is calculated as follows:

• From the analysis of Internet connection load by a www.imgw.pl webpage results that it takes 11% of the leased bandwidth.

* 11% of the annual cost of Internet bandwidth = the cost of maintaining the website www.imgw.pl

• The average number of entrances to the sub 'aviation' is 1.76% of all visits to the IMWM website, what after following calculation:

1.76% * annual cost of maintaining the website

gives an annual cost of maintaining sub 'aviation'

• We assume that 50% of flights from these entries are subject to exemptions from navigation charges.

* 50% of the annual cost of maintaining the tab "aviation" = annual marginal cost of flights exempted from navigation charges

All products dedicated to VFRs are loaded with marginal costs at the same rate.

Description of IMWM investments in MET area during RP1

1) Modernization of AWOS

AWOS system at EPWA is the oldest system in Poland. Optical sensors - ceilometers type CT12K, transmissometers type MITRAS and automatic station type MILOS200 were produced in 1990. All of the above types of equipment are no longer produced, and during the time between the installation and the date of this, occurred three new generations of these devices. Access to spare parts for these models is almost impossible due to the cessation of production of these devices. Due to the general exploitation the system needs urgent replacement. In case of failure, lack of access to spare parts can result in lack of capacity to repair a damaged component, and at the same time can result in an immediate need to replace the entire system.

The scope of the modernization of the AWOS at EPWA will cover servers, software and sensors. Detailing, there will be done the following works:

- replacement of 4 wind sensors and 4 wind parameters transmitters, using existing masts, elements of power and signal lines;
- replacement of 1 automatic meteorological station with set of sensors (1 wind sensor, 2 air thermometers, 1 barometer, 1 humidity sensor, 1 rain gauge, 5 soil thermometers, 1 sunshine sensor), using the existing visibility meter and current weather sensor, mast, elements of power and signal lines;
- replacement 4 ceilometers using the existing foundations, elements of power and signal lines;
- replacement of 6 transmissometers including the foundations, elements of power and signal lines;
- replacement of 2 servers and software of the main CDU using the existing computer cabinet and communications modules;
- replacement of data visualization software for observers, forecasters, and other users (tower, approach);
- replacement of 2 cloud height displays.

AWOS system at EPKK was installed in 1998. It is equipped with outdated ceilometer type CT25K and CPU type MIDAS600. The system is equipped with only one ceilometer, and additionally its position is outside the airport. Also RVR measurement system consists of only two sets, the third set in the middle of the runway is missing.

The measurement of wind speed and direction is not representative for the middle of the runway because of the unsuitable height of sensors - 2m above the ground.

The scope of the modernization of the AWOS at EPKK will include a comprehensive exchange of the entire measurement system, that means the installation: 1 central data processing unit, set of sensors along the runway - 2 anemometers, 3 transmissometers, 2 ceilometers, 1 background luminance sensor, 1 automatic meteorological station with set of sensors (1 anemometer, 2 air thermometers, 1 barometer, 1 humidity sensor, 1 rain gauge, 5 soil thermometers, 1 sunshine sensor, 1 visibility meter and current weather sensor), terminals for data visualization, elements of power and data transmission. This action increases the accuracy of measurements and data representativeness for each zone of the runway.

AWOS systems at EPGD, EPPO, EPWR are hybrids done by combination of Jenoptik Impulsphysik sensors and the CPU type MIDASIV produced by VAISALA OYJ. Jenoptik Impulsphysik's liquidation leaded to lack of access to spare parts.

AWOS systems at EPSC, EPRZ, EPKT are relatively new systems which do not need immediate upgrading, so that their upgrade is planned in subsequent years.

The scope of the modernization at EPGD, EPPO, EPWR, EPSC, EPRZ, EPKT will be analogous to the scope of the modernization at EPKK, but without changing the central data processing unit.

AWOS systems at EPLL, EPBY, EPZG are very simplified systems, measuring only in one place, using the AW11, VAISALA station, designed according to the manufacturer for very small airports. Due to serving passenger flights at the airports it is necessary to equip them with more expanded measuring systems, appropriate to the category of airports.

The scope of the modernization at EPLL, EPBY, EPZG will be similar to the scope of the modernization at EPKK, but limited to 2 measuring points along the runway. Additional work on these locations, will be construction of telecommunication channels, along the runway and to the building of a meteorological station, which must be conducted in the form of the investment process.

Other accompanying activities

In the case of AWOS acquisition, IMWM will be obliged to pay many costs associated with maintenance of measuring systems. Maintenance costs will include rental of premises and lands (for measuring equipment, servers, etc), changing locations of meteorological gardens - in order to ensure better representation for measurements, adaptations of premises - to ensure adequate working conditions for servers, leasing of power and signal lines, power meters installations charges, electricity, etc.

All these activities are aimed at improvement of quality of work with respect to technical end economic aspects, care of quality of products, meeting the customers' expectations, providing of comprehensive meteorological services in the territory of Poland.

When the AWOS systems are taken over, in IMWM the service team will be formed requiring for their proper work, among other, cars and computers.

Cars are necessary to ensure transport for field service engineers to places of work - for 14 advanced service engineers, their necessary tools, spare parts and other needed materials to the site of works. Due to the need of continuous access to them, the cars will not be used for other works than those with AWOS systems. Planned quantity of seven cars for the 14 advanced service engineers. Cars locations: 2 cars in Warsaw for EPWA and EPLL airports service (2 employees) and for supervision and support services at other airports (2 employees), 1 car in Krakow for EPKK and EPRZ airports service (2 employees), 1 car in Poznan for EPPO, EPBY and EPZG airports service (2 employees), 1 car in Gdynia for EPGD and EPSC airports service (2 employees), 1 car in Wroclaw for EPWR airport service (2 employees), 1 car in Katowice for EPKT airport service (2 employees).

Computers are necessary to do any service works by both the advanced service engineers and technicians from basic service. Without computers, it is impossible to communicate with measuring instruments and other intelligent elements of AWOS systems, and perform any service works. Due to the need of continuous access to them, the computers will not be used for other works than those with AWOS systems. It is planned to purchase 25 computers for 14 advanced service engineers and 22 technicians from basic service. Computers locations: 6 computers in Warsaw for EPWA and EPLL airports service (4 employees) and for supervision and support services at other airports (2 employees), 4 computers in Krakow for EPKK and EPRZ airports service (6 employees), 5 computers in Poznan for EPPO, EPBY and EPZG airports service (8 employees), 4 computers in Gdynia for EPGD and EPSC airports service (6 employees), 3 computers in Wroclaw for EPWR airport service (4 employees), 3 computers in Katowice for EPKT airport service (4 employees).

11 computers will be located at the airports – 1 computer on each of the 11 airports, available for the basic service technicians, and 14 computers will be an equipment of each of the 14 advanced service engineers, who will be able to remotely control the parameters of measuring systems.

IMWM plans to apply for a loan on this investment.

2) Purchase of Meteorological Automatic Weather Station (MAWS)

In 2011, IMWM plans to purchase and install additional sensors to the automatic weather stations MAWS301, installed at the airports, EPWR (in 2000), EPWA, EPKK and EPGD (in 2007). Planned extension will include the following sensors: ceilometers - 4 pcs, temperature sensors above the ground - 4 pcs, visibility meters and current weather sensors - 4 pcs. The extended MAWS stations will be able to serve as a backup for the AWOS systems in cases of emergency situations. This extension significantly enlarge their measurement range, including very important parameters for meteorological protection of aviation.

In 2012, IMWM plans to purchase and install additional sensors to the MAWS automatic weather stations installed at airports EPRZ and EPPO (in 2007). Planned extension will include the following sensors: ceilometers - 2 pcs, temperature sensors above the ground - 2 pcs, visibility meters and current weather sensors - 2 pcs. The extended MAWS stations will be able to serve as a backup for the AWOS systems in cases of emergency situations. This extension significantly enlarge their measurement range, including very important parameters for meteorological protection of aviation.

In 2013, IMWM plans to purchase and install automatic weather stations MAWS301 with sets of sensors, that will be installed as a backup of AWOS at the airports EPSC, EPZG, EPBY, EPLL and EPKT.

These purchases will be financed from IMWM own resources and in the cost base they will be reflected in the depreciation.