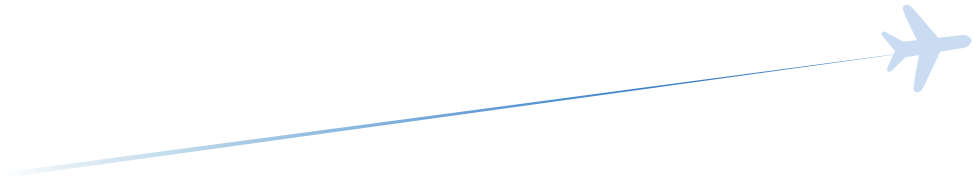

Performance Data Inventory and Quality Assessment

D2.1

INTUIT

Grant:	**699303**
Call:	**H2020-SESAR-2015-1**
Topic:	**Sesar-11-2015 ATM Performance**
Consortium coordinator:	**Nommon**
Edition date:	**15 December 2016**
Edition:	**01.00.00**

Founding Members

EUROPEAN UNION EUROCONTROL

SESAR JOINT UNDERTAKING

Authoring & Approval

Authors of the document

Name/Beneficiary	Position/Title	Date
Rodrigo Marcos / Nommon	Project Contributor	31/08/2016
Laia Garrigó / ALG	Project Contributor	31/08/2016
Vladimir Coca / ALG	Project Contributor	10/11/2016

Reviewers internal to the project

Name/Beneficiary	Position/Title	Date
Rodrigo Marcos / Nommon	Project Contributor	30/11/2016
Laia Garrigó / ALG	Project Contributor	30/11/2016
Núria Alsina / ALG	Project Contributor	30/11/2016
Rubén Martínez / ALG	Project Contributor	30/11/2016
Ignacio Agüi / ALG	Project Contributor	30/11/2016
Ricardo Herranz / Nommon	Project Coordinator	30/11/2016

Approved for submission to the SJU by — Representatives of beneficiaries involved in the project

Name/Beneficiary	Position/Title	Date
Ricardo Herranz/Nommon	Project Coordinator	15/12/2016

Rejected By - Representatives of beneficiaries involved in the project

Name/Beneficiary	Position/Title	Date
-	-	-

Document History

Edition	Date	Status	Author	Justification
00.00.01	26/08/2016	Draft	Laia Garrigó	Initial draft for internal review
00.01.00	02/09/2016	Approved for submission to the SJU	Laia Garrigó	Review and approval by INTUIT Consortium
00.01.01	30/11/2016	Amended based on comments from the SJU	Ignacio Agüi	Draft after first round of SJU comments
01.00.00	15/12/2016	Approved for submission to the SJU	Ignacio Agüi	Review and approval by INTUIT Consortium

INTUIT

INTERACTIVE TOOLSET FOR UNDERSTANDING TRADE-OFFS IN ATM PERFORMANCE

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 699303.

Abstract

This document identifies the main data sources on ATM performance and provides a qualitative assessment on quantity, validity, quality, and geographical and temporal resolution of each dataset. The work documented in this deliverable has produced three main outcomes: a set of Performance Data Factsheets characterising each data source, a Performance Data Guide which links ATM performance data with the sources where such data can be found, and the INTUIT Data Repository, which allows the project partners to share the datasets used for the INTUIT data analysis work.

Founding Members
EUROPEAN UNION EUROCONTROL

Table of Contents

Executive summary

The goal of INTUIT is to explore the potential of visual analytics, machine learning and systems modelling techniques to improve our understanding of the trade-offs between ATM KPAs, identify cause-effect relationships between KPIs at different scales, and develop new decision support tools for ATM performance monitoring and management. The purpose of the present document is to identify the available data sources on ATM performance, analyse their characteristics, and determine their usefulness for INTUIT.

Different types of data sources have been reviewed:

- SES KPI monitoring data: ANS dashboard, NPPs and PRR.
- Capacity and delay data: CODA and ATFCM Statistics.
- Traffic data: STATFOR and DDR2.
- Cost data: ACE Reports.
- Other data: Public Airport Corner, NOP and RAD.

These data sources have been described and the information available has been analysed by filling a factsheet with the following information:

- General information: name, link, etc.
- Abstract.
- Sources: name of the publisher, access permissions, format, etc.
- Data resolution: temporal and geographical granularities, last update, etc.
- Comments.
- List of Performance Areas and Performance Indicators provided.
- List of other data or indicators.

The main outcomes of this analysis are:

- Performance Data Factsheets with the information described above.
- A Performance Data Guide, which links the information required with the potentially useful data sources.
- The INTUIT Data Repository, which allows the project partners to share the different datasets used for the INTUIT data analysis work.

There are two types of potentially useful data sources: (i) high granularity data sources with low-processed data and (ii) low granularity databases with highly aggregated data.

- High granularity databases include DDR2 (flight trajectories), Daily Summaries (regulations delay), ANN (regulations), EAUP/UUP (civil-military coordination), CODA (delay) and STATFOR (traffic).
- Low granularity databases include ACE report (ANSP costs), PRR (KPI statistics), ANS dashboard (KPI statistics for RP1 and RP2), RAD (route restrictions), NPP (KPI objectives) and Public Airport Corner (airport operational data).

The information extracted so far from the data sources reviewed in the present document and data stored in INTUIT Data Repository already provides a good basis to tackle most of the research questions envisaged within the project. The INTUIT Data Repository will be permanently updated throughout the project life with any other datasets deemed necessary for the data analysis work.

This document also provides useful information for any research project on ATM, and is expected to help other researchers beyond the INTUIT consortium to correctly identify and select the data sources needed for each specific study.

1 Introduction

1.1 Scope and objectives

The goal of INTUIT is to explore the potential of visual analytics, machine learning and systems modelling techniques to improve our understanding of the trade-offs between ATM KPAs, identify cause-effect relationships between KPIs at different scales, and develop new decision support tools for ATM performance monitoring and management. The specific objectives of the project are:

1. to conduct a systematic characterisation of the ATM performance datasets available at different spatial and temporal scales and evaluate their potential to inform the development of new indicators and modelling approaches;
2. to propose new metrics and indicators providing new angles of analysis of ATM performance;
3. to develop a set of visual analytics and machine learning methodologies and algorithms for the extraction of relevant and understandable patterns from ATM performance data;
4. to investigate new data-driven modelling techniques and evaluate their potential to provide new insights about cause-effect relationships between performance drivers and performance indicators;
5. to integrate the newly developed analytical and visualisation functionalities into an interactive dashboard supporting multi-dimensional performance assessment and decision making for both monitoring and management purposes.

The present document responds to the first of these objectives: identify the available data sources on ATM performance, analyse their characteristics, and determine their usefulness for INTUIT.

1.2 Reference and applicable documents

Two key documents served as a basis for the preparation of this deliverable:

- Grant Agreement No 699303 INTUIT – Annex 1 Description of the Action.
- INTUIT D1.1 Project Plan, v00.02.00, June 2016.

In addition, various documents were used as reference. They mainly consist of Commission regulations and decisions, Performance Review Body and Performance Review Unit documents, and ICAO, EUROCONTROL and SESAR project documents:

- Commission Regulation EC No 549/2004 “laying down the framework for the creation of the single European sky”.
- Commission Regulation EC No 691/2010 “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”.
- Commission Regulation EC No 390/2013 “laying down a performance scheme for air navigation services and network functions”.

- Commission Decision of 11 March 2014 “setting the Union-wide performance targets for the air traffic management network and alert thresholds for the second reference period 2015-19”.
- Commission Decision EC No 599/2016 “concerning the consistency of certain targets included in the revised national or functional airspace block plans submitted pursuant to Regulation (EC) No 549/2004 of the European Parliament and of the Council with the Union-wide performance targets for the second reference period”.
- Performance Review Body (PRB) of the Single European Sky, “Proposed EU-wide Performance Targets for the period 2012-2014”, 27/09/2010.
- Performance Review Body (PRB) of the Single European Sky, “Report on the preparation of the revision of the SES Performance Scheme addressing RP2 and beyond”, 17/07/2012.
- Performance Review Body (PRB) of the Single European Sky, “Union Wide Targets for the 2nd Reference Period of the Single European Sky Performance Scheme”, 17/05/2013.
- Performance Review Body (PRB) of the Single European Sky, “Proposed regulatory approach for a revision of the SES Performance Scheme addressing RP2 and beyond”, 01/03/2012.
- Performance Review Body (PRB) of the Single European Sky, “PRB Annual Monitoring Report 2013. Volume 1 – European overview and PRB recommendations”, 06/10/2014.
- Performance Review Body (PRB) of the Single European Sky, “PRB Annual Monitoring Report 2013. Volume 2 – National Overviews”, 14/11/2014.
- Performance Review Unit (PRU) with the ACE Working Group, “ATM Cost-Effectiveness (ACE) 2014 Benchmarking Report with 2015-2019 outlook”, May 2016.
- Performance Review Unit (PRU), commissioned to Competition Economists Group (2011). “Econometric cost-efficiency benchmarking of air navigation service providers”, May 2011.
- “European ATM Master Plan Edition 2015”, Draft Edition October 2015.
- SESAR WPB.4.1, “Updated Validation Targets S1 S2 - 20130214 V2_1”14 February 2013.
- SESAR B.04.01, “SESAR 2020 Transition Performance Framework”, Edition 00.06.00, August 2016.
- SESAR B.05, “Guidance on KPIs and Data Collection - Support SESAR 2020 transition”, Edition 00.01.00, 31/03/2016.
- EUROCONTROL, “ATM Safety Framework Maturity Survey”, ESP-2009-78, August 2009.
- EUROCONTROL, “Risk Analysis Tool Guidance Material”, Version 2.0, December 2015.
- EUROCONTROL, “EUROCONTROL Data and Tools available for Long-term Research and Innovation (WP-E) Projects”.
- ATM Performance Model – D1 Report on relevant experience (ALG, 2013).
- Network Manager CODA Digest 2015, “All-Causes Delay and Cancellations to Air Transport in Europe – Annual 2015”, 30/05/2016.

1.3 List of acronyms

Acronym	Definition
ACC	Area Control Centre
A-CDM	Airport Collaborative Decision Making
ACE	ATM Cost-Effectiveness Benchmarking Report
AIM	ATFM Notification Message
AIRAC	Aeronautical Information Regulation and Control
AIS	Aeronautical Information Service
ANM	ATFM Notification Message
ANS	Air Navigation Services
ANSP	Air Navigation Service Provider
AO	Aircraft Operator
ASMA	Arrival Sequencing and Metering Area
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATFCM	Air Traffic Flow and Capacity Management
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATM-S	ATM Specific Technical Events
AUP	Airspace Use Plan
CDR	Conditional Route
CNS	Communication, Navigation and Surveillance
CODA	Central Office for Delay Analysis
COM	Aeronautical telecommunications service
CRCO	Central Route Charges Office
DUC	Direct Unit Costs
EAUP	European Airspace Use Plan
ECAC	European Civil Aviation Conference
ESRA	EUROCONTROL Statistical Reference Area
FAB	Functional Airspace Block
FL	Flight Level
FP	Flight Plan
IFPS	Integrated Initial Flight Plan Processing System

Acronym	Definition
IFR	Instrumental Flight Rules
KEA	Average horizontal en-route flight efficiency of the actual trajectory
KPA	Key Performance Area
KPI	Key Performance Indicator
MET	Meteorological services for air navigation
NM	Network Manager
NMOC	Network Manager Operations Centre
NOP	Network Operations Portal
NOR	Network Operations Report
NPP	National Performance Plan
NSA	National Supervisory Authority
OPS	Operations
PI	Performance Indicator
PRC	Performance Review Commission
PRB	Performance Review Body
PRR	Performance Review Report
PRU	Performance Review Unit
RAD	Route Availability Document
RAI	Rate of Aircraft Interested
RAU	Rate of Aircraft Actually Using
RI	Runway Incursions
RP	Reference Period
RSA	Restricted Airspace
SES	Single European Sky
SESAR	Single European Sky ATM Research Programme
STATFOR	Statistics and Forecasts
SMI	Separation Minima Infringements
SJU	SESAR Joint Undertaking
STW	Slot Tolerance Window
UUP	Updated Airspace Use Plan

Table 1. List of acronyms

1.4 Structure of the document

The document is structured as follows:

- Section 2 provides an overview of the data sources that have been reviewed, organised into different categories according to the type of data available from each source.
- Section 3 presents the methodology followed for data quality assessment.
- Section 4 presents the results of the data quality assessment, including the main issues identified for each data source.
- Section 5 provides a visual guide of the information available from the different data sources.
- Section 6 describes the INTUIT Data Repository, which will be used to share different datasets among the project partners.

2 Overview of data sources for ATM performance analysis

2.1 List of data sources

The reviewed data sources are listed alphabetically. A link to each source is provided when available:

- **ATM Cost-Effectiveness (ACE) benchmarking reports**: reports that present yearly factual data and analysis on cost-effectiveness and productivity for ANSPs in Europe.
  Available at: http://www.eurocontrol.int/prb/publications
- **ATFCM Information Messages (AIM)**: messages used to inform the aviation community when relevant. A table lists the most recent valid AIMs for the selected target date, giving a short description of the message along with its release date and time.
  Available at: https://www.public.nm.eurocontrol.int/AIM
- **ATFCM Notification Messages (ANM)**: messages issued by the NM Operations to notify all concerned stakeholders of the aviation community of any ATFCM regulations. The ANMs resulting from the ATFCM daily plan are sent the day before the day of operations, upon finalisation and release of the plan, around 16.00/17.00 UTC summer/winter time.
  Available at: https://www.public.nm.eurocontrol.int/ANM
- **European AUP/UUP portlet**: lists of the European Airspace Use Plans (AUPs) and their updates (UUPs). It provides information about:
  - ATS Route and Conditional Route (CDR) Type 1 Closure
  - CDR Type 2 Availability
  - Level 1 Restricted Airspace (RSA) Allocations
  - Level 2 RSA Allocations

  Available at: https://www.public.nm.eurocontrol.int/EAUP
- **NM ATFCM Statistics**: OneSky Online users can access the latest operational reports detailing daily, weekly and monthly delay and traffic information as well as ATFM Compliance reports via the NM ATFCM Statistics website. This page gives access to the following reports:
  - Daily Reports:
    - Daily Briefing: regulations and ATFM delay
    - Daily Summary: aggregated data about regulations
  - Weekly Briefings
  - Monthly Summaries:
    - Monthly Summary
    - Monthly Summary per ACC
    - Monthly Summary per Airport (Delay and Traffic parts)
    - Adherence to ATFCM Slots
    - Monthly Network Operations Report (NOR)
  - ATFM Compliance Reports:
    - Missing Flight Plans

        - ATFM Departure Slot Monitoring
        - Flight Plan Suspensions Monitoring
    - Annual NOR

  Available at: https://intra-x.eurocontrol.int/atfm_report
- **National/FAB Performance Plans (NPP)**: published by the PRB, the NPPs contain the official National (RP1) or FAB (RP2) Performance Plans including annexes and, in some cases, an official corrigendum and the corresponding PRB assessments.
  Available at: http://www.eurocontrol.int/articles/ses-performance-scheme-RP2
- **ATFCM Events** (relevant events affecting the network):
    - Seasonal events that happen every year at the same time and impact the network in a relatively predictable way (e.g. South-West Axis flows).
    - Significant events that generate strong traffic demand in a relatively small area (e.g., Olympic Games).
    - Military events, like military exercises.

  Available at: https://www.public.nm.eurocontrol.int/Events
- **Performance Review Reports (PRR)**: they present an assessment of the performance of European ANSPs for each year since 1999 under the KPAs of safety, capacity, environment and cost-efficiency. They provide data about the PIs and KPIs defined in SES and SESAR frameworks and additional indicators such as traffic statistics. Due to its large temporal scope, indicators are not equal from the first version to the last.
  Available at: http://www.eurocontrol.int/prb/publications
- **Route Availability Document (RAD)**: extensive document containing the policies, procedures and description of routes and traffic orientation. Its aim is to provide sufficient information to design the initial flight plan. It also includes availability and utilisation rules of route network and free route airspace together with their restrictions. The RAD lists also geographical and vertical ATFCM requirements.
  Available at: http://www.nm.eurocontrol.int/RAD/index.html
- **ANS Performance Monitoring Dashboard**: online dashboard developed by the Performance Review Body of EUROCONTROL that presents information covering all Key Performance Areas and their corresponding Key Performance Indicators.
  Available at: http://www.eurocontrol.int/prudata/dashboard/rp2_2015.html
- **Central Office for Delay Analysis (CODA)**: dashboard developed by EURCONTROL that provides information on the air traffic delay situation Europe, with information obtained from aircraft operators and ATFM data from the EUROCONTROL Network Manager.
  Available at: www.eurocontrol.int/coda
- **EUROCONTROL Statistics and Forecasts Service (STATFOR)**: it provides statistics and forecasts on air traffic in Europe and monitors and analyses the evolution of the air transport industry.
  Available at: www.eurocontrol.int/statfor
- **Public Airport Corner**: data repository that contains key airport information such as capacity, airside and landside information, traffic forecast and future events impacting operations.
  Available at: https://ext.eurocontrol.int/airport_corner_public/
- **Demand Data Repository 2 (DDR2)**: the DDR service aims to provide the most accurate picture of pan-European air traffic demand, past and future, from several years ahead until the day before operations.
  Available via One Sky Online at: https://ext.eurocontrol.int/ddr/

2.2 Classification of ATM performance data

The data sources described in section 2.1 have been classified according to the KPAs defined for RP2 of the SES: capacity, cost-efficiency, environment and safety. In addition, a 'Traffic data' group has been added. Data not classifiable in any of these groups is listed under the group 'Other data'. Some databases provide data on different KPAs, so the same database can appear in more than one group.

Capacity and delay data: statistics regarding delay metrics (e.g., average delay of take-off time per flight) with different levels of spatial granularity and aggregation (per airport, per route, per ACC), as well as information about declared capacity and throughput of different elements of the network such as runway operations per hour or sector declared capacity.

- CODA
- ATFCM Statistics
- ANS dashboard
- PRR
- Public Airport Corner

Traffic data: information about the planned, actual and forecasted traffic flows in the network.

- STATFOR
- DDR
- CODA
- ACE Reports
- NPP
- ATFCM Statistics
- PRR

Cost data: economic and financial information of ANSPs, their services (ANS, MET, AIS, etc.) and EUROCONTROL.

- ACE Reports
- NPP
- ANS dashboard
- PRR
- ATFCM Statistics

Environmental data: information about fuel consumption and fuel inefficiencies due to ATM.

- ATFM Statistics
- ANS dashboard
- PRR

Safety data: information about safety incidents and accidents and safety procedures implementation.

- ANS dashboard
- PRR

Other data: other general information such as route availability, events or airport location.

- Public Airport Corner
- NOP: AUP/UUP, ANS, AIM, ATFCM Events
- RAD

3 Quality assessment methodology

Once the data sources have been identified, it is necessary to analyse and classify all the information that is provided in each one of them. This analysis has been performed by filling, for each data source, the factsheet depicted in Figure 1.

The information recorded in the factsheet can be summarised as follows:

1. **General information**: identification of the data source and how to access it.
    a. Database name
    b. Link
    c. Last factsheet update
2. **Abstract**: brief description of the content and purpose of the database.
3. **Sources and data format**: original source from which the information is obtained and details on the way the information is provided.
    a. Name of the publisher
    b. Public/Restricted access
    c. Sources used to calculate the information provided in the database
    d. Data format (Excel, pdf, online…)
4. **Data resolution**: temporal and geographical characteristics of the information provided.
    a. Temporal granularity (daily, monthly, yearly…)
    b. Temporal scope (From… / To…)
    c. Geographical granularity (by airport, country, ANSP, region…)
    d. Geographical scope (EU member states, worldwide, single country…)
    e. Update frequency: how often the information of the database is updated (monthly, quarterly, yearly…)
    f. Last database update
    g. Usefulness for INTUIT project
5. **Comments**: relevant information related to data availability, data reliability and other observations.
6. **Performance Framework indicators**: Performance Framework used in the data source, together with the list of Performance Areas and Performance Indicators and their main characteristics.
7. List of **other data or indicators** that are not identified as Performance Indicators of the corresponding Performance Framework.

The completed factsheets for all the reviewed data sources are included in Appendix A.

INTUIT - WP2 Multiscale performance characterisation
T2.2 Data quality assessment
Performance databases factsheet

1. General information - *Identification of the database and howto access it*

Database name	Xxx
Database code	Xxx
Link	Xxx
Last factsheet update	Xxx

2. Abstract - *Brief description of the content and purpose of the database*

Xxx

3. Source and data format - *Howthe information is provided and where it is obtained from*

Published by	Xxx
Public	Xxx
Sources	Xxx
Data format	Xxx

4. Data resolution - *Temporal and geographical characteristics of the information provided*

Temporal granularity	Xxx
Temporal scope	Xxx
Geographical granularity	Xxx
Geographical scope	Xxx
Update frequency	Xxx
Last database update	Xxx
Usefulness for INTUIT project	Xxx

5. Comments - *Relevant information related to data availability, data reliability and other observations*

Xxx

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database*

Performance Framework Xxx

PA	Performance Indicator	Detailed information	Geographical granularity	Geographical scope	Temporal granularity	Temporal scope
Xxx	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx
	Xxx					
	Xxx					
	Xxx					

Figure 1. Simplified template of a Performance database factsheet

4 Data quality assessment

This section presents the main outcomes of the data quality assessment. For each data source, the most useful data are identified. In addition, the main issues affecting the usability of data for INTUIT research questions are discussed. The information from the reviewed databases has been organised according to the **SESAR 2020 KPAs** stated in the SESAR 2020 Transition Performance Framework (Deliverable D108, edition 00.06.00) in order to provide consistency and homogeneity to the analysis. When the indicators included in the SESAR 2020 Transition Performance Framework are available from one of the data sources, the identifier of such indicator is added in brackets.

As a high-level summary, section 5.2 includes a table mapping the SESAR 2020 KPAs and the studied databases (Table 16), as well as a more detailed table linking all the indicators to their associated databases (Table 17).

The complete results of the data quality assessment can be found in the factsheets included in Appendix A. The information presented in these factsheets is structured following the associated Performance Framework(s) used in each database, which can be the SESAR Performance Framework, the SES II Performance Framework or both.

4.1 ACE Reports

4.1.1 Introduction

In ACE reports, traffic and cost-efficiency data are listed on a yearly basis from 2002 onwards. These documents are publicly downloadable from the PRC and PRB publications section in the EUROCONTROL website.

4.1.2 Provided data

The ACE reports include several metrics apart from cost-efficiency indicators, including traffic and complexity metrics. Among the cost-efficiency metrics, some of the SESAR KPIs are found.

Area	Information provided	Description
Cost efficiency	Economic cost-effectiveness	• Economic and financial (without delay costs) • Overall and per ANSP • Cost divided by economic, en-route delays and airport delays • Forecast 2013/2018
	ATCO Hour Productivity (CEF2)	• Overall and per ANSP • ATCO hours on duty per year per ATCO with and without overtime

Area	Information provided	Description
	Employment costs per ATCO-hour	• Overall and per ANSP • With and without PPP correction
	Support costs per composite flight-hour (CEF3)	• Overall and per ANSP • Divided by employment (excl. ATCOs in OPS), capital-related, non-staff and exceptional

Table 2. Summary table of data provided by ACE Reports

In addition, the report includes some annexes with data in a table format. These tables include information about ACC complexity, revenues breakdown, staffing and operational data:

- Regarding complexity, several metrics are defined, such as adjusted density, vertical interactions, horizontal interactions, speed interactions and average used flight level.
- Regarding revenues, the report provides cost breakdown of ANS and ATM/CNS services together with the ANSP balance sheet.
- Regarding staffing, number of staff in and outside operation is shown.
- Regarding operational data, size of airspace, number of ACC, airport units and IFR flight hours controlled are found together with other operational data.

4.1.3 Identified issues

The first limitation of the ACE data is its granularity. Data has yearly granularity, which limits the usability of the metrics for a dashboard or decision-support tool.

The format of the reports is a PDF file without any other file format with data publicly available. This data is often found in the form of figures, which makes many of the metrics difficult to extract, like SESAR metrics. These metrics can also be found in NPP reports excel sheets (when available), so this information should be available in table format from alternative sources.

On the other hand, data in table format (annex 8 of ACE reports) can be extracted with some software such as Tabula®.

The ACE reports provide some metrics apart from cost-efficiency KPA. These other metrics are found in other databases. For metrics related with KPAs other than cost-efficiency, it is usually better to refer to the specific database (e.g., PRR for complexity metrics or STATFOR for traffic metrics).

4.1.4 Usability

The data in table format provide the most usable information. These tables contain important cost-efficiency information of ANSPs like cost breakdown, revenues, staff and cost-effectiveness index. In addition, operational data and complexity metrics are essential to perform ANSP or ACC clustering, classification, etc.

4.2 ATFCM Statistics

4.2.1 Introduction

ATFM Statistics consists of several documents with different formats. They are produced by Network Manager and published in One Sky Online platform. The main KPA addressed by these documents is delay-capacity. A list of the available documents is depicted hereafter:

- Daily Reports:
  - Daily Briefing: tables and figures of aggregated data about the most important regulations and their effects during the day in PDF format.
  - Daily Summary: regulations and ATFM delay information with different levels of aggregation in Excel format.
- Weekly Briefings: similar metrics and format as Daily Briefings with weekly temporal granularity.
- Monthly Summaries:
  - Monthly Summary: similar metrics and format as Daily Briefings with monthly temporal granularity.
  - Monthly Summary per ACC: similar metrics as Monthly Summary with higher geographical granularity.
  - Monthly Summary per Airport (Delay and Traffic): airport ATFM delay and regulation metrics with similar format as the Monthly Summary.
  - Adherence to ATFCM Slots: monthly statistics, aggregated by airport and by country.
  - Monthly NOR: different figures and visualisations of ATFCM delay statistics and compliance with different levels of aggregation.
- ATFM Compliance Reports: compliance statistics with monthly temporal granularity.
  - Missing Flight Plans: brief document with figures and tables with different levels of aggregation (overall, per country and per operator).
  - ATFM Departure Slot Monitoring: similar to Adherence to ATFCM Slots document with higher number of metrics.
  - Flight Plan Suspensions Monitoring: brief document with figures and tables with different levels of aggregation (overall, per country and per operator).
- Annual NOR document: different figures and visualisations of ATFCM delay statistics and compliance metrics with different levels of aggregation. It provides a higher number of statistics than the Monthly NOR. It includes extensive comments about the reasons which produced delays and non-compliances. It includes three annexes with public comments, national statistics and airport statistics.

4.2.2 Provided data

NM ATFCM statistics provide a large list of different documents with incremental granularity. The main difference between low granularity and highly aggregated data is the number of metrics and the level of data processing. Low granularity data provide raw data to compute customised metrics whilst aggregated reports provide significant metrics and KPIs.

The most relevant documents are the ones with lowest and highest granularity, namely the Annual NOR and the Daily Summaries. This section focuses on these two.

The Daily Summaries contain information about the ATFCM delay produced by the different regulations applicable for the issued day. The definition of each regulation is provided together with its duration, its causes and its effects on air traffic. Different levels of aggregation are provided: overall, per country, per airport destination, per departing airport, per sector and per airline operator.

Area	Information provided	Description
Predictability and Punctuality	Regulated flights	• Overall, per country, per ACC, per regulation, per country of departure, per airport departure, per airport destination, per aircraft operator • Daily granularity • Regulation definition, validity, duration and reason
	Delayed flights	
	ATFM delay	

Table 3. Summary table of capacity-ATFM delay data provided by ATFCM Statistics

The Annual NOR provides yearly updated information about an extensive set of ATFCM metrics. These metrics include several capacity and environmental KPIs defined both in SES II and SESAR frameworks.

Performance framework indicators are depicted in Table 4:

Area	Information provided	Description
Capacity	En-route throughput (CAP2)	• Average daily traffic • Average summer daily traffic • Peak day traffic • ACC estimated capacity (flights/hour)
	Airport busy hour throughput (CAP3)	• Peak 1 hour arrivals • Peak 1 hour departures • Peak global 1 hour operations • Separated by RWY configuration
	En-route increased throughput	Capacity increase

Area	Information provided	Description
Predictability and Punctuality	En-route delay/flight	Minutes of delay / number of flights
	Airport delay/flight	Minutes of delay / number of operations
	ATFM departure slot adherence (PUN1)	Aircraft departing within their Slot Tolerance Window (SWT)
Environmental	RTE-DES (route extension due to airspace design)	Minimum route extension achievable in flight plan
	RTE-FPL (route extension on last filed flight plan)	Last filed plan route extension
	KEA	Average horizontal en-route flight efficiency of the actual trajectory
	RAI	Rate of Aircraft Interested (aircraft which planned flying CDR)
	RAU	Rate of Aircraft actually Using the CDR

Table 4. Summary table of capacity data provided by ATFCM Statistics

Other indicators related to ATM performance are depicted in Table 5:

Area	Information provided	Description
En-route performance	Planned Events and Disruptions	En-route planned events: equipment upgrades or implementations
		En-route disruptions
	ACC performance	En-route delay
		Traffic
		Capacity increase
Capacity / Predictability and Punctuality (Airport)	Airport delay	Average daily arrivals and departures (actual, regulated and delayed)
		Total airport delay
	Disruptions	• Date • ATFM delay impact • Traffic impact

Area	Information provided	Description
	Airport traffic (PUN1)	IFR movements per year
		Yearly ATFM delay by cause of delay
		Arrival punctuality (+/- 15 min within scheduled time)
		Departure punctuality (inside DWT, early and late DEP)
Flight Efficiency	Conditional Routes (CDR)	CDR number of segments
		Rate of CDR availability (RoCA)
		Monthly distance and time savings
		CDR availability and usage
		Potential Flight Economy (PFE)
	Free Route Operations	Airports with FRA implementation and grade of implementation
Predictability - Network Manager	Delay Reductions	En-route delay savings
	Flight Efficiency	Initiatives, phases and steps of implementation
		Route savings proposed
		Route savings accepted
ATFM Compliance	Adherence to Flight Plan Suspensions	Flights suspended per airport
	ATFM Exemptions	Number of exemptions
	Missing Flight Plans	Flights that entered the European airspace without FP and an ATS Unit filed the Flight Plan
	Multiple Flights	Number of FPs received for which no subsequent activation or airborne information was received

Table 5. Summary table of other ATFM performance indicators provided by ATFCM Statistics

Other indicators are depicted below:

Indicator	Information provided
Traffic	Daily IFR traffic (flights)
Effective Capacity Indicator	Flights per day
Average departure delay per flight (CODA)	Minutes per flight
Average departure delay per flight (NM)	Minutes per flight
Delayed flights	Percentage

Indicator	Information provided
ATFM delays	• Average min per day • Average min per flight
Extra European flights	Average daily flights
Airline load factor	Percentage
Market share	• Traditional • Low cost • Business • Non-scheduled • All-cargo • Military and other
Crude oil and fuel prices	• Brent crude / barrel • Rotterdam Kerosene / tonne
Ticket Prices	Yearly percentage change
Rate of Operational Cancellations	Percentage

Table 6. Summary table of other indicators provided by ATFCM Statistics

4.2.3 Identified issues

The NOR data have in general low temporal and spatial granularity. This limits the usability of metrics inside the document. These data could only be used for a strategic dashboard that required low temporal granularity.

All the PDF documents provide some of the data in figures, thus requiring some pre-processing tool. Some data is in table format inside the PDF files and can be extracted by means of external software. The only documentation that does not require pre-processing are Daily Summaries, which are provided in Excel format.

The NOR provides some metrics other than those pertaining to the delay-capacity KPA. These other metrics are also found in other databases. For metrics related to KPAs than delay-capacity, it is better to refer to the specific database (e.g., STATFOR for traffic metrics).

4.2.4 Usability

NOR data is mainly presented in figures, thus it requires to use a pre-processing tool. In addition, data has low granularity, mainly yearly. Therefore, its use is almost limited to yearly metrics and interdependencies. Some metrics are disaggregated down to monthly or AIRAC cycle granularity, like CDR and trajectory efficiency metrics. However, this monthly information is often presented in figures.

The only documents in table format which do not need any pre-processing are the Daily Summaries. They are presented in Excel format. Moreover, data is highly disaggregated. This fact allows the construction of customisable metrics different from those defined in the SES Performance Scheme. Information about regulations definition and ATFM delay is complete and available on a daily basis. This data is therefore usable for a daily statistics dashboard and decision-making tools.

4.3 National Performance Plans

4.3.1 Introduction

The NPP consists of a document edited by a European ANSP. In this document, the performance strategy of the ANSP is detailed. The temporal scope of this document is a complete Reference Period (RP). There are two documents for each ANSP: the NPP for RP1 and for RP2. NPPs for RP2 are no longer edited by each ANSP, but by each FAB. These documents are reviewed and corrected by the PRR to ensure the performance plan is coherent with the SES performance strategy. If non-compliances are found, the PRR issues a document reporting these non-compliances and the ANSP has to upload a corrigendum of the original document. Thus, each document has an original version plus a corrigendum with annexes.

4.3.2 Provided data

The NPPs present SES KPIs measurements, objectives and forecasts during the issued RP for each ANSP or FAB. The data is disaggregated by ANSP and available in tables inside a PDF. In addition, ANSP costs and balance sheet are included in the document. Essentially, this economic data is the same as the economic data provided in ACE report annexed tables. Therefore, in this section only the KPI data and forecasts are discussed. For economic data, please refer to the data presented in ACE reports.

Area	Information provided	Description
Safety	Effectiveness of Safety Management	FAB/National target
	Reporting of Just Culture	FAB/National target
	Application of the severity classification based on RAT methodology	FAB/National target
Capacity	Minutes delay per flight	FAB/National target
	Average terminal and airport ANS ATFM delay	Airport target
Environment	KEA	Actual trajectory route extension target
	KEP	Planned trajectory route extension target
Cost-Efficiency	En-route Cost Efficiency	FAB/National target
	Terminal Cost Efficiency	Airport target
	EUROCONTROL costs	Actual and forecasted

Table 7. Summary table of data provided by National Performance Plans

4.3.3 Identified issues

NPPs have a limitation due to their granularity. Documents are uploaded for each reference period (three to five years). This limits the use of the metrics, which could only be used for a strategic dashboard that required low temporal granularity. Moreover, not all the documents are available for RP2. This lack of data severely limits the usability of these documents.

Each ANSP elaborated its own performance plan. In principle, all the documents have a standardised format with some tables they have to fill out. However, each ANSP includes special formats and fills the form in different ways.

Moreover, this document has usually an initial issue and a corrigendum which contains only the parts that were corrected from the original, which makes the document not very reader-friendly.

In some cases, the document includes an annex with economic data provided in a standardised Excel format. However, these Excel files are not available for all ANSPs and they are often incomplete.

4.3.4 Usability

In some cases, an annex is uploaded with a standardised Excel sheet provided by the PRU and filled out by the ANSP. These Excel files contain mainly economic data about the current and planned balances of the ANSP for the RP. However, these Excel files are not available for all ANSPs and they are often incomplete. They would be useful for INTUIT project if a complete set of Excel sheets were obtainable from the PRU.

The KPI data are usable for analysing interdependencies between KPIs or with other metrics. In addition, this data is necessary for the assessment of the causes of KPI non-compliances or not fulfilled objectives.

4.4 NOP Events

4.4.1 Introduction

The Network Operations Portal (NOP) provides information about the network status in several ways. One of these is the event browser. The events stored in this database are all the events which affect air traffic. They are classified into several categories: airport, airspace improvement, military or special. Several additional sub-categories exist for each category.

The event browser works as a public browser where the user can launch queries for a certain period, a certain location or name patterns. The browser creates a list of events in table format downloadable in csv format with the events that match the search preferences.

4.4.2 Provided data

Each event is shown as a row in the table of event list. Each column provides relevant information about the event.

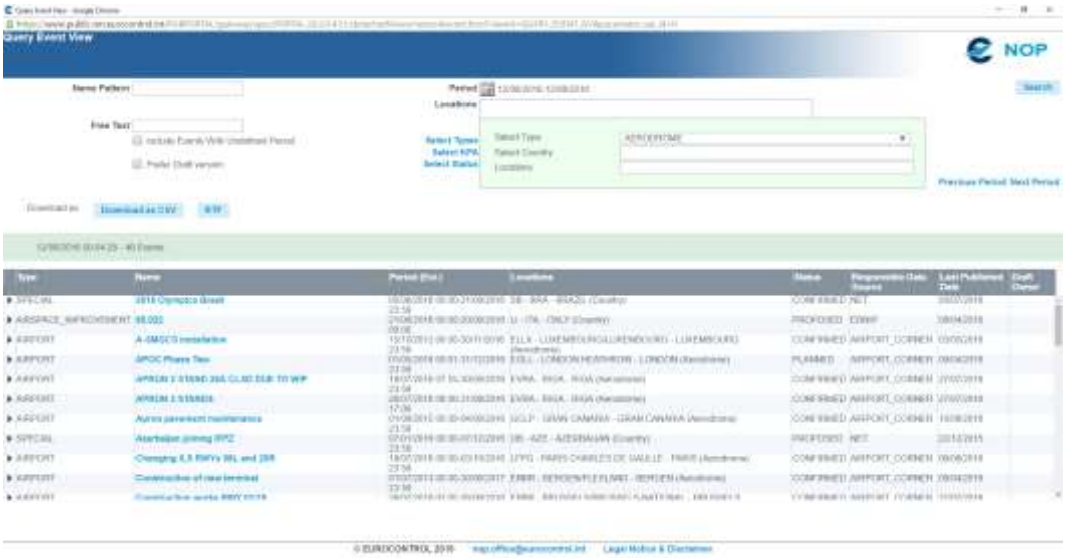

Figure 2. Screenshot of NOP event browser

The information given for an event is:

1. Type: airport, airspace improvement, military or special
2. Subtype
3. Name
4. Event Start: date and time
5. Event End: date and time
6. Data Source
7. Status
8. Short Description
9. Locations
10. NM Internal Remarks
11. NM comments
12. Originator internal remarks
13. Originator comments: detailed description of the event
14. Measures/Scenarios: Yes or No
15. Capacity impact: Yes or No
16. Flight efficiency impact: Yes or No
17. Expected benefits
18. Attachments (to description and benefits)
19. Reference Publications
20. Activities and Impacts
21. Originator

4.4.3 Identified issues

The format in which events are presented lacks of a complete standardisation, complicating its processing by means of automatic methods. Usually, not all the cells are filled. There are some columns that are systematically not used. Moreover, in most cases the information is only contained in the originator comments cell in text format.

In addition, the exportable csv file does not contain all possible information. The last five items listed in section 4.4.2 are missing. Also, measures/scenarios, capacity impact and flight efficiency impact are only described in the online list.

4.4.4 Usability

These events are of use for the INTUIT project to understand performance of the network under unusual circumstances and evaluate the resilience of the system.

Automating the reading these events would be necessary to identify the weaknesses of the system under certain scenarios. Another potential use is as an input to an automatic early warning system that would detect scenarios where problems in the network are likely to arise in the future.

4.5 Aeronautical Information Messages

4.5.1 Introduction

The AIM is another tool accessible from the NOP. This database receives and broadcasts messages about NMOC daily operations such as possible disruptions. The AIM browser works as a public browser where the user can launch queries for a certain day (pre or post operations).

4.5.2 Provided data

The tool provides a table of all the applicable AIMs for the date selected. Each row in the table is an individual message with its own application time and description. The table presents its validity period and a brief description that works as a title.

The description is linked to a new window with an extended description of the message in text. A snapshot of the data browser and the extended description is shown in the figures below.

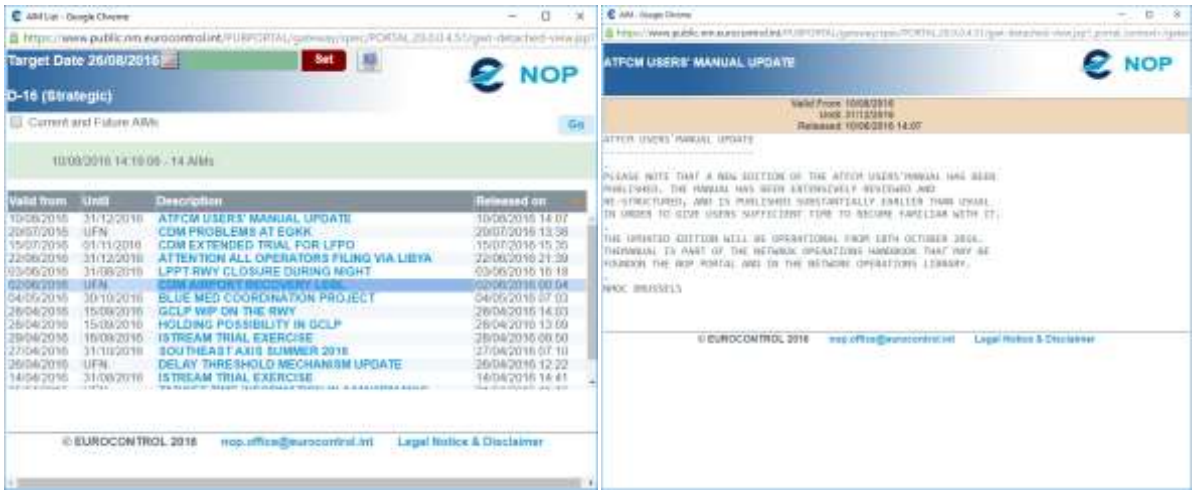

Figure 3. NOP AIMs browser (left) and example of AIM description (right)

4.5.3 Identified issues

There is no possibility of downloading this database as NOP events list. In addition, the table shown in the browser does not provide the full information about each AIM. Instead, this information is shown in the detailed description. These facts add difficulty to the processing of the database.

Moreover, the description consists of a text without a standardised format. Processing of this text would require some text-interpreter software tool to be implemented.

4.5.4 Usability

The usability is similar to that of NOP events. AIMs are usually linked to some events like RWY closure or scenarios like southwest axis. These events or scenarios are of use for INTUIT to understand performance of the network under unusual circumstances and evaluate the resilience of the system.

Automatic reading of these events would be a necessary tool to identify the vulnerability of the system under certain scenarios. Another use is as input to an automatic warning system that detects scenarios where problems in the network are likely to arise in the future.

4.6 European Airspace Use Plans

4.6.1 Introduction

The AUP/UUP is another tool accessible from the NOP. This database lists and updates the European Airspace Use Plans. The AUP/UUP browser works as a public browser where the user can launch queries for a certain day (current or post operations). The tool provides a table of the applicable use plans and updates for the current and previous day selected. Plans are normally applied from 6:00 a.m. to 6:00 a.m. of the next day and can be updated every half-hour.

4.6.2 Provided data

Once the query is launched, the browser creates a list of Airspace Use Plans and updates for the current and previous day. The table shows the type of the entry: whether EAUP or EUUP (initial or update, respectively). The table also shows the use plan validity and release date. An example is shown in the figure below:

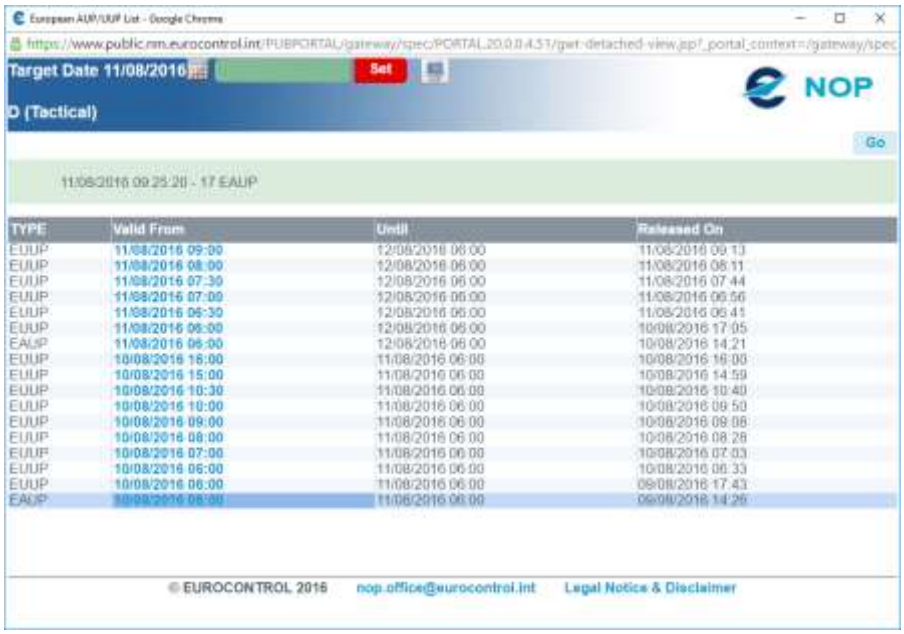

Figure 4. Screenshot of European AUP browser

Each entry of the list links to a detailed description of the AUP/UUP. Inside the description, there are four tables with the information of the availability of airspace:

- ATS route and CDR Type 1 Closure.
- CDR Type 2 Availability.
- Level 1 RSA Allocations.
- Level 2 RSA Allocations.

There are two types of tables. CDR tables share the same format indicating route ID and start and end point of the closure/availability, minimum FL, maximum FL, validity, FIR and/or UIR. An example is shown in the figure below.

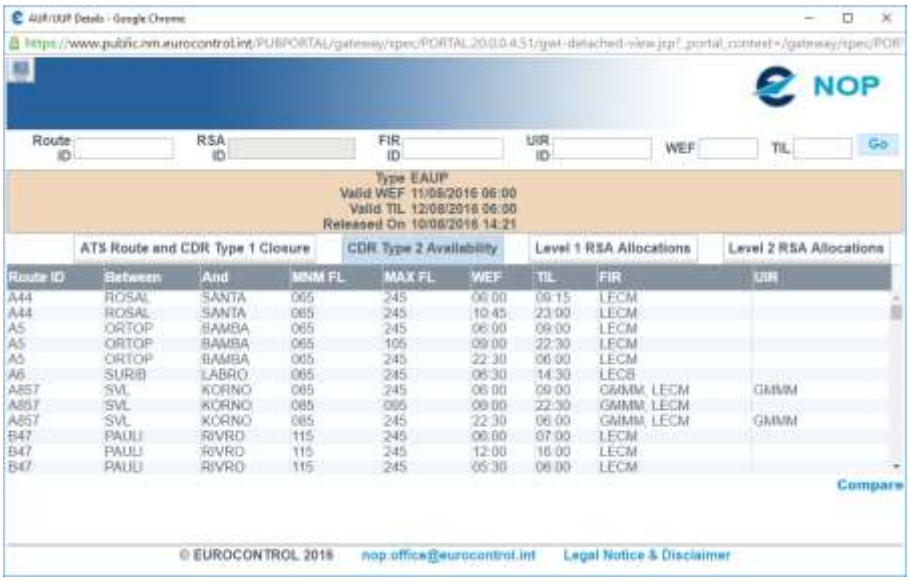

Figure 5. Screenshot of AUP/UUP detailed description: CDR Type 2 Availability

RSA tables share the same format indicating airspace restricted, minimum FL, maximum FL, validity, FIR and/or UIR. An example is shown below.

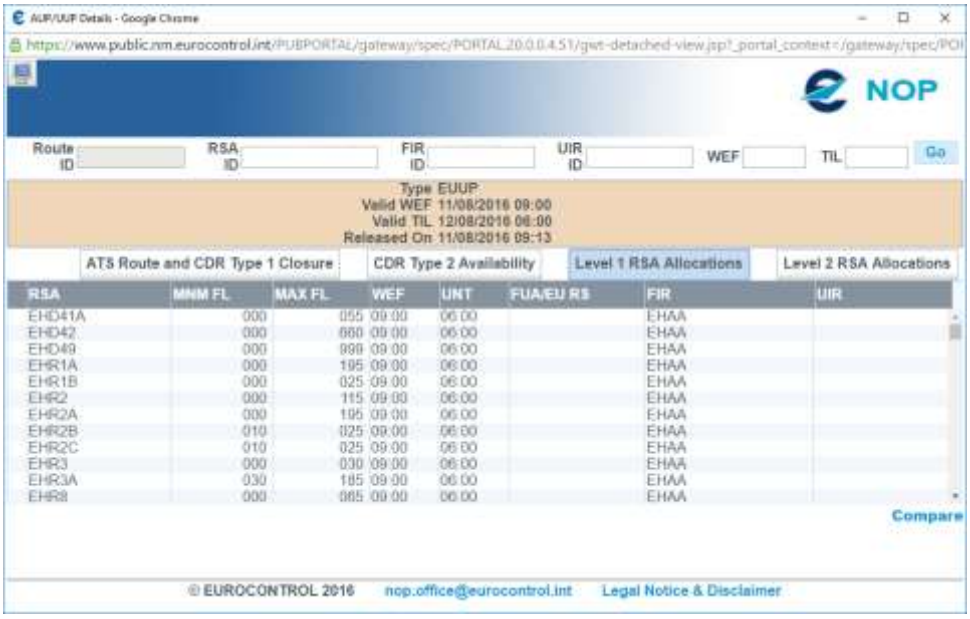

Figure 6. Screenshot of AUP/UUP detailed description: Level 1 RSA Allocations

4.6.3 Identified issues

The EAUP database, despite using a fully standardised format, is not downloadable. Thus, its study requires the implementation of automatic methods to collect data. The information about the details of the availability of CDR and RSA is not directly shown in browser list, so manual extraction is unpractical. Moreover, the data shown in a query is applicable to only one day.

4.6.4 Usability

This database is useful to evaluate military-civil cooperation. Cooperation can be measured in three ways:

- Study the influence of military traffic on the operation of civil aircraft. Reserved military airspace constrains the options for aircraft to fly.
- Study the use of military reserved airspace. Military airspace is sometimes allocated and infra-used without it being available to civil aircraft.
- Study the use of alternative routings. Alternative routings are set when military airspace is restricted. These routings are supposed to compensate the effects of constraining airspace.

4.7 Route Availability Document

4.7.1 Introduction

The RAD consists of a series of documents published every AIRAC cycle. It provides information in advance to the operation about airspace restrictions to allow AOs to upload their flight plan complying with these restrictions. RAD is published online on its website.

4.7.2 Provided data

The documents are publicly downloadable in PDF or Excel format from the RAD website. The documents downloadable for an AIRAC cycle are:

- RAD Consolidated Version: PDF file which aggregates the information coming from the rest of documents.
- Checklist.
- Appendix 1: RAD General description. Word format file with the description of the document and explanation of the different tables.
- Appendix 2: Area definitions. Excel file with the definition of area groups and airport groups.
- Appendix 3: City-pair Level Capping. Excel file with the restrictions for routes between airports. Each row represents a restriction. The information presented is:
    - City pair
    - FL capping
    - Restriction application: hours or dates when the restriction is activated
    - Remarks

- Appendix 4: En-route DCTs / General Limits. Excel file with the restrictions (usually in flight level) for routes inside a DCT. Each row represents a restriction. The information presented is:
    - FROM: naval point
    - TO: naval point
    - Lower Vertical: FL
    - Upper Vertical: FL
    - Available (Y) Not available (N)
    - Utilization: availability or non-availability conditions in text
    - Time availability
    - Operational Goal
    - Remark
    - Direction of Cruising Level: Odd, Even or blank
- Appendix 4: DCTs MAP. PDF file with the representation of the DCT routes and FRA in European airspace.
- Appendix 5: Airport Connectivity. Excel file with airport general, departure and arrival restrictions. Each row represents a restriction. The information presented is:
    - ARR AD: arrival airdrome
    - First PT STAR / STAR ID: standard arrival naval point
    - DCT ARR PT: DCT arrival naval point
    - ARR Restrictions: availability, unavailability and restrictions in text
    - ARR Restriction Applicability: hours or dates when the restriction is activated
    - ARR Operational Goal / Remark
- Appendix 6: Flight Profile Restrictions. Excel file with restrictions on flow routings over areas or navigation points. Each row contains a restriction. The information presented is:
    - Flow Routing: naval point direction
    - Utilization: availability, unavailability and restrictions in text
    - Time Availability: hours or dates when the restriction is activated
    - Operational Goal
- Appendix 7: FUA Restrictions. Excel file with restrictions on the use of Free Route Airspace. The information presented is:
    - RESTRICTION applied during times and within vertical limits allocated at EAUP/EUUP: availability, unavailability and restrictions in text
    - Operational Goal
    - Affected ATS route/s / DCT/s
- Annex - Pan Europe. Excel file with route segment restrictions. The information presented is:
    - AIRWAY
    - FROM: naval point
    - TO: naval point
    - Point or Airspace
    - Utilization: availability, unavailability and restrictions in text
    - Restriction Applicability: hours or dates when the restriction is activated
    - Operational Goal
    - Remarks

- Annex - Special Event LF NTFSR Route. Excel file with special restrictions. The information presented is:
    - FROM: naval point
    - TO: naval point
    - Lower Vertical: FL
    - Upper Vertical: FL
    - Available (Y) Not available (N)
    - Utilization: availability or unavailability conditions in text
    - Time availability
    - Operational Goal
    - Remark
    - Direction of Cruising Level: Odd, Even or blank

4.7.3 Identified issues

Although the general information format is standardised, information about special application conditions or remarks about the reason for restrictions are written under a generic column. This information is written in technical language, which would require a specific algorithm for automatic interpretation.

All files are downloadable and automatically readable as they are mostly in Excel format. However, the website only allows the user to download the current and next cycle's RADs. Thus, the temporal scope is compromised unless data is obtained from another source different from the website.

4.7.4 Usability

RAD would be of use for INTUIT to analyse Flight Plan efficiency. RAD gives a description of all the restrictions that aircraft have to comply with when uploading a FP. Aircraft trajectories are affected by these restrictions. Highly restricted airspace could have a significant effect on environment KPIs, for example.

Another use would be the evaluation of NM traffic predictions and restrictions. This study would compare RAD restrictions (strategic) with ANM regulations (pre-tactical), applied ATFM delay and actual saturation of sectors subject to restrictions during the day of operation. The results would give an idea of the accuracy of NM predictions regarding saturation of airspace.

4.8 ATFCM Notification Messages

4.8.1 Introduction

The ANM is another tool accessible from the NOP. Like the RAD, it provides information in advance to the operation (the day before, pre-tactical information) about regulations during the operation. The ANM browser works as a public browser where the user can launch queries for a certain day (current or post operations).

4.8.2 Provided data

The tool provides a table of the applicable regulations for the day selected. Each entry in the table contains the information about the regulation:

- Status: new, updated or cancelled.
- Location: FMP where the regulation is applied.
- Temporal applicability.
- Reason.
- Remarks: detailed information about the regulation in text format.

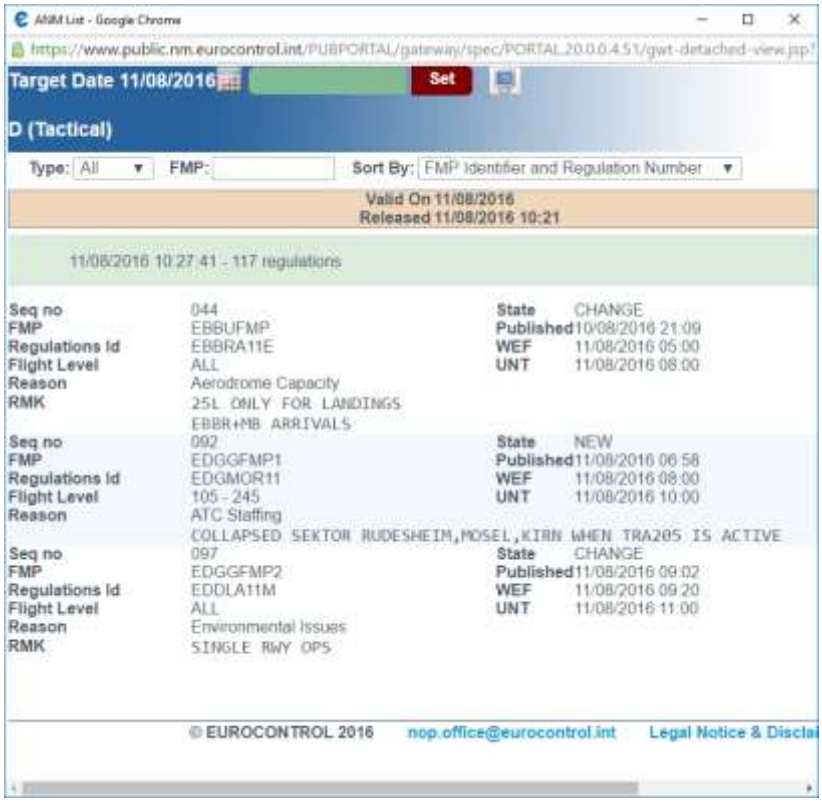

Figure 7. ANM browser screenshot

4.8.3 Identified issues

ANM fields are almost all standardised. There is only one field (RMK, remarks) which has content in text format that would require a text processing tool (or to be obviated). The main issue is that specific information about which aircraft are affected by the regulation is written in remarks. In addition, information provided in ANM seems to be covered by information found in Daily Summaries.

The format in which ANM is provided is not downloadable. However, the content can be easily converted into table format with a copy-paste operation. Another issue is that only ANM applicable for one day can be shown at once in the browser, which hampers automatic reading.

4.8.4 Usability

This database is useful to analyse the efficiency of actual trajectories. ANM gives a description of regulations that apply to aircraft in the day of operation. Aircraft FPs can be changed to avoid these regulations, thus affecting trajectories. Highly restricted airspace could have a significant effect on environment KPIs, for example.

Another use, together with RAD and actual trajectory data, would be the evaluation of NM traffic predictions and restrictions imposition, by comparison of RAD restrictions (strategic) with ANM regulations (pre-tactical), applied ATFM delay and actual saturation of those sectors subject to restrictions during the day of operation.

4.9 Performance Review Report

4.9.1 Introduction

The PRR is a document edited by the PRU. It presents an assessment of the performance of European ANSPs for each year since 1999 under the KPAs of safety, capacity, environment, and cost-efficiency. It is edited in PDF format and publicly downloadable.

4.9.2 Provided data

The PRR is a single document with different statistics of ANSP performance. The data includes both data defined in the SES and SESAR performance frameworks together with additional data linked with the performance areas.

The available performance framework metrics are depicted in the table below:

Area	Information provided	Description
Safety	Accidents with ANS contribution (SAF1)	• Fatal, non-fatal • By occurrence category
	Number of accidents	• Fatal, non-fatal
	Serious incidents with ANS contribution (SAF1)	• Fatal, non-fatal • By occurrence category
	Serious incidents	• Fatal, non-fatal
	Number of reported separation min. Infringements	Classified by severity
	Total number of reported runway incursions	Classified by severity
	Total number of reported unauthorised penetration of airspace	Classified by severity

Area	Information provided	Description
Capacity	Airport declared arrival capacity vs peak arrival traffic (CAP3)	Operations per hour
Predictability and Punctuality	Average en-route ATFM delay per flight	Classified by causes
	En-route ATFM delay per flight	Classified by causes
	ATFM delayed flights	
	ATFM delayed flights > 15 min.	
	Departure delay per flight (PUN1)	Classified in: • Reactionary • Turnaround • Weather • ATFM weather • ANS related • ATFM en-route
	Airport ATFM delay	• Total • En-route • Classified by causes
	Additional ASMA time	Time per flight
	Airport departure ATC delay (PUN1)	Time per flight
	Airport departure Additional Taxi-out time	Time per flight
	Airport departure ATFM slot adherence (PUN1)	Percentage
	Arrival punctuality	within 15 min
	Departure punctuality	within 15 min
	Average arrival delay	Intra-European flights
	Average scheduled block time	Intra-European flights
	Predictability (PRD1)	Standard deviation of: • Departure time • Taxi-out phase time • Flight phase time • Taxi-in phase time • Arrival time
Environment	Horizontal en-route flight efficiency	Percentage
	Use of allocated airspace for military	Percentage

Area	Information provided	Description
Cost-efficiency	En-route Service Units	
	En-route ANS cost	
	En-route unit costs	
	Terminal recomputed SU	
	Terminal ANS cost	
	Gate-to-gate ATM/CNS provision costs per composite flight-hour	
	Gate-to-gate ATCO-hour productivity (CEF2)	
	Gate-to-gate employment costs per ATCO-hour	
	Gate-to-gate support costs per composite flight-hour (CEF3)	

Table 8.Summary table of data provided by Performance Review Reports

Other indicators available in the document are depicted in table below:

Area	Information provided	Description
Traffic	Flights	IFR flights
		Average daily IFR flights
		Passengers
		En-route Service Units
		Distance flown
		Flight hours controlled
		Average weight (MTOW)
		Traffic growth
		Traffic variability
	Complexity	Structural Index
		Adjusted density
		Overall complexity
	Segments share	Traditional Scheduled
		Low-cost
		Charter
		Business
		Cargo
		Military and other

Area	Information provided	Description
	Airport	IFR movements (arrival + departure)
		Average airport arrival ATFM delay
		Average additional ASMA time
		Average Additional Taxi-in Time
		Average Local ATC pre-departure delay
		Average Additional Taxi-out Time
		Cancellation percentage
		Average arrival delay
		Average departure delay
		Declared peak arrival capacity (CAP3.2)
		Actual peak service rate
Capacity	Delay	Reactionary to primary delay rate
	Inefficiencies with ANS impact	Airport ATFM arrival delay
		En-route ATFM delay
		Additional taxi-out time
		Horizontal en-route flight efficiency (actual)
		Additional ASMA time
	ATFM compliance	% of take offs outside ATFM slot tolerance
		% regulated hrs with actual demand/capacity > 110%
		% of ATFM delays due to avoidable regulations
Cost-efficiency	Inefficiencies with ANS impact	Airport ATFM arrival delay
		En-route ATFM delay
		Additional taxi-out time
		Horizontal en-route flight efficiency (actual)
		Additional ASMA time
	Costs	En-route real cost per SU
		En-route SU index
		En-route ANS cost index
		En-route cost breakdown
		En-route ANS cost actual vs forecast
		Terminal real cost per TNSU
		TNSU index
		Terminal ANS cost index
		Terminal ANS cost actual vs forecast

Area	Information provided	Description
		ANSP gate-to-gate cost breakdown
		ATFM delay costs per composite flight-hour
		ATM/CNS provision costs per composite flight-hour
	Economic Evaluation	Projected ANS costs
		Estimated cost of inefficiencies in the gate-to-gate phase
		Estimated cost of en-route and airport ATFM delay
		Total estimated ANS-related economic costs
Safety	ATM Specific Occurrences	Occurrences with severity B (SAF1)
		Occurrences with severity A (SAF1)
		Occurrences with severity AA (SAF1)
	AST reporting	Number of incidents reported
		Incidents not severity classified
		Completeness of AST data

Table 9. Summary table of other indicators provided by Performance Review Reports

4.9.3 Identified issues

The format of the document is a PDF file. Many of the time series are presented in figures and diagrams. Due to its format, much of the data is not automatically interpretable and would require the use of an interpretation tool.

Nevertheless, raw data used to produce the reports could be obtainable from other sources (directly from PRU). In addition, there are some tables from which data can be extracted using external software. These tables contain data about traffic, delay and airport performance.

Almost all the indicators presented in the PRR have yearly granularity. This fact limits the usability of the data to the study of yearly progression of KPIs. Another use would be the analysis of interdependencies between metrics and ANSP clustering/classification according to these indicators.

Regarding KPI monitoring, the data available in the PRR has a higher temporal scope than data obtainable from the ANS dashboard. Several KPIs are monitored from the beginning of the edition of these documents (1999). These data would provide a broad basis to study KPI evolution from the creation of the SES.

4.10 ANS Performance Monitoring Dashboard

4.10.1 Introduction

EUROCONTROL, designated by the European Commission as the Performance Review Body of the Single European Sky, has developed an online performance monitoring dashboard with the purpose of supporting National Supervisory Agencies in their monitoring activities.

4.10.2 Provided data

This dashboard presents information covering all KPAs and their corresponding KPIs and PIs defined in the Performance Scheme for both reference periods RP1 and RP2. Information regarding PI results and their adopted targets is provided at EU-wide, FAB and airport level for the States subject to the Regulation (EU) Nº 691/2010 and Nº 390/2013.

Information is provided online through graphics, tables and maps and it can also be exported as Excel files. In addition, the dashboard also contains links to metadata detailing the calculation of each indicator.

Information is provided in two separate dashboards: one for RP1 and another for RP2. Each dashboard is organised differently.

4.10.2.1 Provided data for RP1

Each dashboard contains a control panel that allows the user to select the information he/she wants to obtain. The control panel for RP1 is depicted in the following figure.

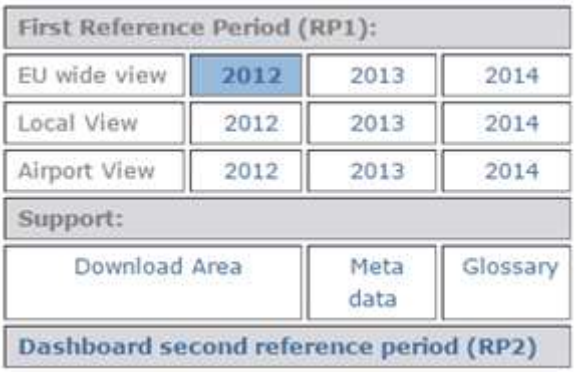

Figure 8. ANS dashboard control panel with links to the corresponding information for RP1

In RP1 dashboard, the following structure is presented:

- **Performance indicator results**: the control panel contains one link for each geographical level (EU-wide, local: FAB or State, and airport) and one for each year of RP1 (2012, 2013, 2014) where the performance indicator results are presented in an online view. Part of this information can be exported as an Excel file.

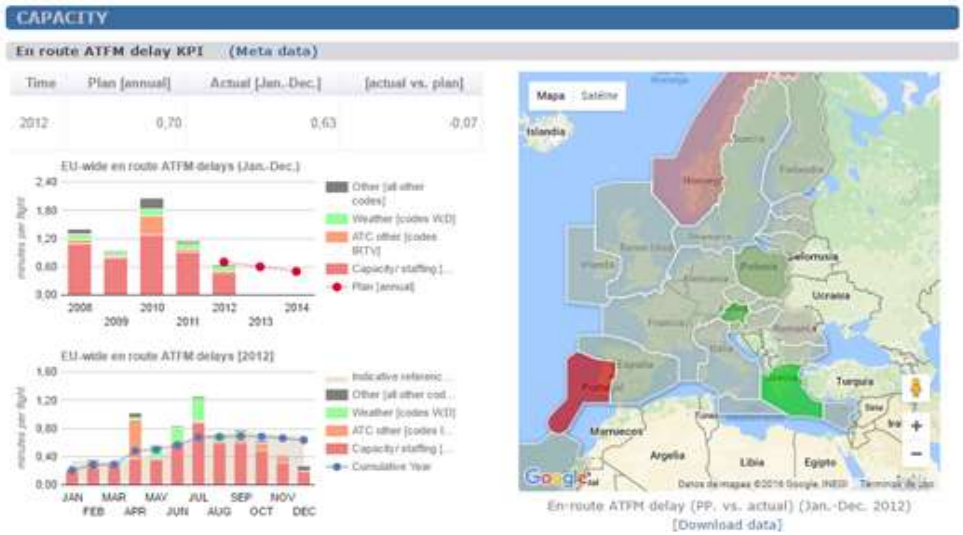

Figure 9. En-route ATFM delay KPI information provided for EU-wide level (2012)

- **Download area**: link to download the underlying data files used for the production of the charts on the dashboard.
- In addition, the control panel also contains links to metadata for the KPI calculation and the SES Performance Glossary.

A summary of the information provided in both online view and download area is depicted in the following table.

Area	Information provided
Safety	Effectiveness of Safety Management
	Reporting of Just Culture
	Application of the severity classification based on RAT methodology
	Separation Minima Infringements (SMI)
	Runway Incursions (RI)
	ATM Specific Technical Events (ATM-S) (SAF1)
Predictability and Punctuality	En-route ATFM delay
	Airport arrival ATFM delay
	Additional time for ASMA
	Additional time in the taxi out phase
Environment	Horizontal en-route flight efficiency
	Effectiveness of booking procedures for FUA
	Effective use of CDRs
Cost-efficiency	En-route Service Units

Area	Information provided
	En-route costs
	En-route unit costs
	Terminal ANS costs
	Inflation
Traffic	IFR flights

Table 10. Summary table of data provided by the ANS Performance Monitoring dashboard for RP1

This information is then segregated monthly and yearly, at EU-wide/FAB/airport level and for each year of the reference period.

4.10.2.2 Provided data for RP2

Figure 3 below presents the control panel for the RP2 dashboard:

Figure 10. ANS dashboard control panel with links to the corresponding information for RP2

The information is structured as follows:

- One link for each year of RP2 (2015 to 2019) where all the information at EU-wide, FAB, and local level is provided at the same web page, and in both online and exportable forms.
- The same links than in RP1 with the Glossary and metadata information.

The following table summarises the information presented for RP2. This information is currently provided for 2015 and part of 2016.

Area	Information provided
Safety	-
Predictability and Punctuality	En-route ATFM delay
	Airport ATFM arrival delay
	Adherence to ATFM slots (PUN1)
	ATC pre-departure delay
Environment	Horizontal en-route flight efficiency
	Additional taxi-out time
	Additional time in terminal airspace
	Effectiveness of booking procedures for FUA
	Effective use of CDRs
	Rate of planning of CDRs

Area	Information provided
Cost-efficiency	En-route Service Units
	DUC for en-route ANS
	DUC for terminal ANS
Traffic	IFR flights

Table 11. Summary table of data provided by the ANS Performance Monitoring dashboard for RP2

This information is then segregated monthly and yearly, at EU-wide/FAB/airport level and for each year of the reference period.

4.10.3 Identified issues

The main issues identified in this data source can be summarised in the following list:

- For RP1 dashboard, it is difficult to obtain a clear picture of the available information, since it can be downloaded from two different sites (the Download Area and the online dashboard), and in the second one only part of the information is downloadable. Furthermore, both sites contain similar information but with different granularity. The organisation of RP2 dashboard is much simpler and clearer, with all data provided in the same site for the same year.
- Identified missing data in RP1:
    - Safety: no SMI, RI and ATM-S data for 2014. According to the dashboard it should have been available in Sep/Oct 2015.
    - Predictability and Punctuality: additional ASMA and taxi-out times with some missing airport data mostly for 2012.
    - Environment: missing 2014 data for Effectiveness of booking procedures for FUA and Effective use of CDRs.
- Identified missing data in RP2:
    - No information regarding Safety for 2015. According to PRU metadata, it should have been available in June 2016.
    - Predictability and Punctuality (ATC pre-departure delay) and Environment (additional ASMA, and taxi-out times) with missing 2015 information for approximately 20 out of 30 States.
    - Environment (Use of civil/military airspace) and Cost-efficiency (DUC) with no 2015 information.
- Minor errors such as misplaced links or typos in the online dashboard.
- As mentioned before, KPI and PI calculation is not possible since no raw data is provided.

4.10.4 Usability

The ANS dashboard is oriented to providing KPI and PI results, not the raw data for the calculation of these indicators. For this reason, it should be used to compare performance results but not to perform the calculation itself. The narrow temporal scope of the data (which can be considered complete only from 2012 to 2014) limits its use for historical and statistical analysis.

4.11 Central Office for Delay Analysis (CODA)

4.11.1 Introduction

EUROCONTROL's Central Office for Delay Analysis (CODA) provides policy makers and managers of the ECAC Air Transport System information on the air traffic delay situation Europe. This information is obtained from aircraft operators, which supply CODA with the necessary data, together with ATFM data from the EUROCONTROL Network Manager. CODA data is available to those professionally engaged in ATFM and aircraft operations through the online CODA dashboard, and to anyone with an interest in delay performance through monthly and annually CODA Publications. This section is focused on the information presented in the CODA dashboard.

4.11.2 Provided data

CODA data is mainly related to arrival and departure delays, together with traffic information and CODA indicators that use a combination of both delays. Delay information is focused on average and total delays, number of delayed flights and punctuality distribution.

This data is segregated daily and monthly, from 2005 up to date. It can also be found split by market segment (traditional scheduled, low-cost, charter…), aircraft operator and aircraft type. The CODA dashboard provides a set of graphics and tables than can be exported as data files for further analysis.

The scope of this information covers all the States of the ECAC area. However, CODA coverage is approximately about 70% of the IFR flights in this area, since it is voluntary airline-reported information and therefore subject to each airport operator.

The information provided in the dashboard has been processed and classified in different areas:

Area	Information provided	
Predictability and Punctuality	Average arrival delay	Average delay per movement for arrival delay
		Average delay per delayed flight for arrival delay
	Arrival punctuality distribution	Percentage of delayed flights on arrival by delayed time (short delays)
		Percentage of delayed flights on arrival by delayed time (long delays)
		Number of delayed flights
	Average departure delay	Average delay per movement for departure delay
		Average delay per delayed flight for departure delay
		Average delay per movement
		Average delay per delayed flight
		Average departure delay per flight

Area	Information provided	
	Departure delay by cause	Number of flights with delay
		Total delay
		Delay percentage
	Departure punctuality distribution	Percentage of delayed flights on departure by delayed time (short delays)
		Percentage of delayed flights on departure by delayed time (long delays)
		Percentage of delayed flights by delay cause and time
		Daily IFR flights by delayed time (PUN1)
		Number of delayed flights
	CODA planning indicators	Block time overshoot
		Average delay Difference Indicator per flight
Traffic	IFR flights	Average daily IFR flights
		Average monthly IFR flights

Table 12. Summary table of data provided by CODA

4.11.3 Identified issues

The main issues identified in this data source are summarised in the following list:

- Limited coverage (around 70% of the IFR flights in the ECAC area).
- Information is mainly reported by airlines and therefore subject to their criteria for delay classification and calculation. Sometimes it differs from the information calculated by the NM (e.g., ATFCM delays in CODA Digest 2015).
- Data can only be visualised and exported for a single month in each request. Therefore, exporting information for a large period of time can be time-consuming.
- Some segregations (usually Market segment) can only be exported for a single market segment at a time.
- The “Aircraft Operator” sheet of the dashboard, which provides information segregated by aircraft operator, is not available (no aircraft operator can be selected).

4.11.4 Usability

The granularity and the broad temporal scope of the delay information provided make the CODA dashboard useful for the analysis of predictability, punctuality, capacity-delay and the interdependencies with other areas.

However, it has to be taken into account that the information is mainly reported by airlines and therefore subject to their criteria for delay classification. Moreover, the scope of the analysis has also to be considered, since CODA does not include all the flights in the ECAC area.

4.12 Statistics and Forecasts (STATFOR)

4.12.1 Introduction

The goal of EUROCONTROL's STATFOR service is to provide statistics and forecasts on air traffic in Europe and to monitor and analyse the evolution of the air transport Industry.

The STATFOR Interactive Dashboard (SID) is the self-service source of statistics on flights in Europe. It provides the user with:

- a customised and flexible use of the tool,
- updated statistics available in the first week of each month,
- a wide coverage of the statistics.

For its statistics, forecasts and analysis, STATFOR makes use of three distinct flight data sources:

1. The Network Management Unit of EUROCONTROL is the major flight data source for STATFOR. The NM flight database reflects the last filed flight plans held by the IFPS (Integrated Initial Flight Plan Processing System), but the actual route flown is gradually becoming available.
2. The Central Route Charges Office of EUROCONTROL. CRCO flight data is primarily used for airline billing and to enhance the details of the flight data provided by the NM.
3. National Administration data transmitted by Belarus, Estonia, Georgia, Latvia, Lithuania, Iceland and Azerbaijan are used to complete STATFOR geographical coverage.

4.12.2 Provided data

The dashboard contains information related to air traffic (number of IFR flights, distance flown, aircraft age) and the corresponding traffic flows inside and partly outside the European airspace, together with an analysis of the re-routings (change in flights patterns) of the last years.

Passenger and cargo information (number of seats, load factor, revenues, tonnes) are also presented using Eurostat data. Forecasts are related to the evolution of IFR flights with a 20-year projection, using different scenarios describing separate possible future growth tendencies.

All this data is segregated by different classifications such as market segment (business aviation, traditional scheduled, low-cost…), flow (arrivals, departures, internal or overflights), or distance flown. Information can be found with daily, monthly or yearly granularity, covering the European airspace and from 2005 to present (2035 in forecasts).

The information provided in the dashboard has been processed and classified in different areas, as summarised in the following table.

Area	Information provided	Description
IFR flights	Daily IFR flights	Average daily IFR flights
		Total daily IFR flights
	Monthly IFR flights	Total monthly IFR flights Total minutes

Area	Information provided	Description
	Yearly IFR flights	Total IFR yearly flights
	Traffic growth analysis	Top traffic zones with higher change and growth of daily flights in the selected period
	Mean distance flown	Mean distance flown per flight Flight distribution by distance flown Total distance flown Total IFR yearly flights
	Flight movements distribution	Total yearly arrivals by hour Total yearly departures by hour Total yearly flight movements by hour Total yearly flight movements Average arrivals and departures by hour
	Mean aircraft age	Distribution of flights by aircraft age Mean aircraft age per flight Mean aircraft age for distance flown
Traffic flow	Traffic flow inside ESRA08	Average IFR daily flights
	Traffic flow to outside ESRA08	Daily departures from selected traffic zone/region to traffic zones/regions outside ESRA08 Daily flight change compared to previous year
	Traffic flow from outside ESRA08	Daily departures from selected traffic zone/region outside ESRA08 to ESRA08 Daily flight change compared to previous year
	Reroutings over a specific region	Reroutings over a specific region for each flow: - Average daily movements on period 1 - Average daily movements on period 2 - Growth rate - Difference in average daily movements - Difference in average daily movements due to rerouting
	Reroutings for a specific flow	Reroutings over different regions for a specific flow: - Average daily movements on period 1 - Average daily movements on period 2 - Growth rate - Difference in average daily movements - Difference in average daily movements due to rerouting
Forecasts	Yearly IFR flights and distance flown	Total yearly IFR flights
		Total yearly IFR flights Total distance flown
		Flight distribution by distance flown Total IFR yearly flights Total distance flown Mean distance flown per flight

Area	Information provided	Description
	Forecast deviation	Forecasted vs real daily flights by traffic zone/traffic region with: - Forecasted growth - Actual growth - Growth deviation - Deviation mean
		Forecast IFR daily flights Actual IFR daily flights
Pax. and cargo	Mean Available Seats per Flight	Mean available seats per flight Total yearly seats Total yearly IFR flights
	Average Load Factor (total pax. /total flights)	Yearly load factor Total yearly seats Total yearly pax.
	Average Revenue Passenger Kilometres per Flight	Average Revenue Passenger Kilometres per Flight Total yearly flights Total yearly pax.
	Average Available Seat Kilometres per Flight	Average Available Seat Kilometres per Flight Total yearly flights Total yearly seats
	Total Passengers	Total yearly pax. Average passengers per flight
	Total Tonnes	Total yearly tonnes

Table 13. Summary table of data provided by STATFOR

4.12.3 Identified issues

The main issues identified in this data source are the following:

- Data can only be visualised and exported for a single month in each request. Therefore, exporting information for a large scope can imply significant amount of time.
- Some segregation (usually Market segment) can only be exported for a single market segment at a time.

4.12.4 Usability

The granularity from airport to European level and the broad temporal scope of the information make the STATFOR dashboard useful for the calculation of indicators that use traffic data and also the interdependencies of different KPIs with traffic evolution.

4.13 Public Airport Corner

4.13.1 Introduction

The Airport Corner is a data repository that contains key airport information such as capacity, airside and landside information, traffic forecast and future events impacting operations, among other data.

It is developed by EUROCONTROL as the Network Manager, with the data that regularly captures from European airports in order to help effectively manage the European ATM Network.

The Public Airport Corner contains non-confidential information directly reported by airports.

The list of participant airports is available at:
http://www.eurocontrol.int/sites/default/files/content/documents/nm/airports/airport-corner-participants.pdf

4.13.2 Provided data

The information provided by the Public Airport Corner has been processed and classified in different areas, as summarised in the following table.

Area	Information provided	Description
Capacity	Current capacity	Terminal capacity
		Global yearly capacity
		Capacity per each runway configurations
		Capacity with adverse weather conditions
	Forecasted capacity	Global yearly capacity
		Global hourly capacity
Traffic	Traffic forecast	% increase
On-going and planned activities	Airport activities and events impacting operations	-
	Joint EUROCONTROL projects	Airport CDM implementation
		Airport ACE implementation
		Analysis and delay reduction
General information	Opening hours	-
	Environmental constraints	-
	Environmental management	-
	Adverse conditions	-

Area	Information provided	Description
Weather management	Processes and procedures	-
TMA / Approach	Separation and spacing procedures and practices	-
	Continuous Descent Operations	-
Traffic mix	Flights	Foreseen changes in traffic mix
		A380 facilitation and plans
	Passengers	Purpose of travel
		Type of travel
Infrastructure services	Airside information	Runway configurations
		Runway designators
		Systems
	Landside information	Air-rail intermodality
	CNS	Digital Automatic Terminal Information Service
		Departure clearances
Contacts	Local	-
	Crisis management	-
	Safety	-
	Environmental	-
	EUROCONTROL	-

Table 14. Summary table of data provided by Public Airport Corner

4.13.3 Identified issues

The main issue identified in this database is the completeness of the information provided: since it depicts information provided voluntarily by the airports (currently around 77 airports), the amount of information provided is up to each airport operator. The dashboard contains online information for each selected airport, but the Information is not exportable.

4.13.4 Usability

This data source is useful to obtain a global picture of airport operational information. In addition, airport forecasted capacity can be used to calculate indicators that compare future traffic demand with future airport runway capacity.

4.14 Demand Data Repository 2 (DDR2)

4.14.1 Introduction

The Demand Data Repository provides a clear picture of air traffic demand in Europe through traffic, trajectory and environment data inside the ECAC area.

The DDR project was developed in two phases. DDR2 covers historical and forecasted traffic demand using early available flight intentions from airlines and from coordinated airports, mixed with STATFOR predictions.

Several users can benefit from this service: the Network Manager for strategic demand and capacity balancing, ANSPs to prepare their capacity plans, or airlines to detect flight efficiency improvement opportunities.

4.14.2 Provided data

Access to DDR web portal is restricted to aviation stakeholders within Europe, based on a license agreement approval and formal EUROCONTROL acceptance. The information provided in this section regarding DDR data is limited to the access that has been provided to the INTUIT team.

Data is provided in AIRAC files that have to be processed with NEST software (which is also available in the DDR2 database). This software allows to visualise and analyse the traffic demand data from the DDR2 and also export the information in excel and txt files. More information regarding NEST capabilities is provided in NEST user guide.

Data is downloaded through the DDR2 portal, depicted in the following figure.

Figure 11. Screenshot of the DDR2 portal

The information available covers the following sectors and is summarised in the following table:

- Traffic demand covering the European airspace (ECAC area), provided with a list of scheduled flights (information relative to the last filed flight plan by the airlines) and actual flights (updated with radar data)
- Route trajectories of the flights mentioned in the previous bullet
- Airspace data of the ECAC area (airports, sectors, navigation points)

Area	Description	Information provided
Flight list	List of all the flights that have entered the ECAC area	Origin and destination airports
		Flight number
		Airline
		Aircraft type
		Wave vortex category (Heavy, Medium, Light)
		Scheduled flights: Estimated off-block time, Estimated take-off time, arrival time Actual flights: Actual off-block time, Actual take-off time, arrival time
		ATFM Delay
		Route length
		Requested Flight Level
		Most penalising regulation
Route trajectories	Trajectories of all the flights that have entered the ECAC area	Origin and destination airports
		Flight number
		Aircraft type
		Trajectory discretisation. For each segment: - Initial and final latitude and longitude - Initial and final altitude - Initial and final time (PRD1)
Airspace configuration	Airspace data of the ECAC area	Airports' latitude, longitude and altitude Navigation points' latitude and longitude Airblocks' latitude and longitude Sectors' name, type and altitude

Table 15. Summary table of data provided by DDR2

4.14.3 Identified issues

The main issues identified in this data source are the following:

- Difficulty to obtain access to the database, it is provided strictly.
- Downloads are limited to a 5 per week.
- To receive forecasts enriched with airlines' flight intentions you must specify so in your request
- As DDR2 is used primarily for statistical purposes, the integrity of the data cannot be ensured throughout time and may need prior assessment.
- Route trajectories discretisation is not highly precise, especially in scheduled flights.

4.14.4 Usability

This database has the highest potential for metrics computation compared to the rest of databases analysed in INTUIT. All European flights with their respective trajectories (both scheduled and actually flown) are included in the database. Historical analyses, however, are limited to the temporal scope of the database (2011 onwards).

5 ATM Performance Data Guide

Once all the data sources have been analysed and the data they provide have been classified, it is possible to create a visual guide to link the different data sources with the available information.

This guide has been called “ATM Performance Data Guide”, and aims to provide a general view of the available performance information and where it can be obtained.

The guide is presented in different forms:

- A map providing a visual guide with the main areas of performance data (Figure 12).
- A high-level table mapping the studied databases with the SESAR2020 Performance KPAs (Table 16).
- A table with more detailed information of the data provided and the database where it can be found (Table 17).

5.1 ATM Performance Data Map

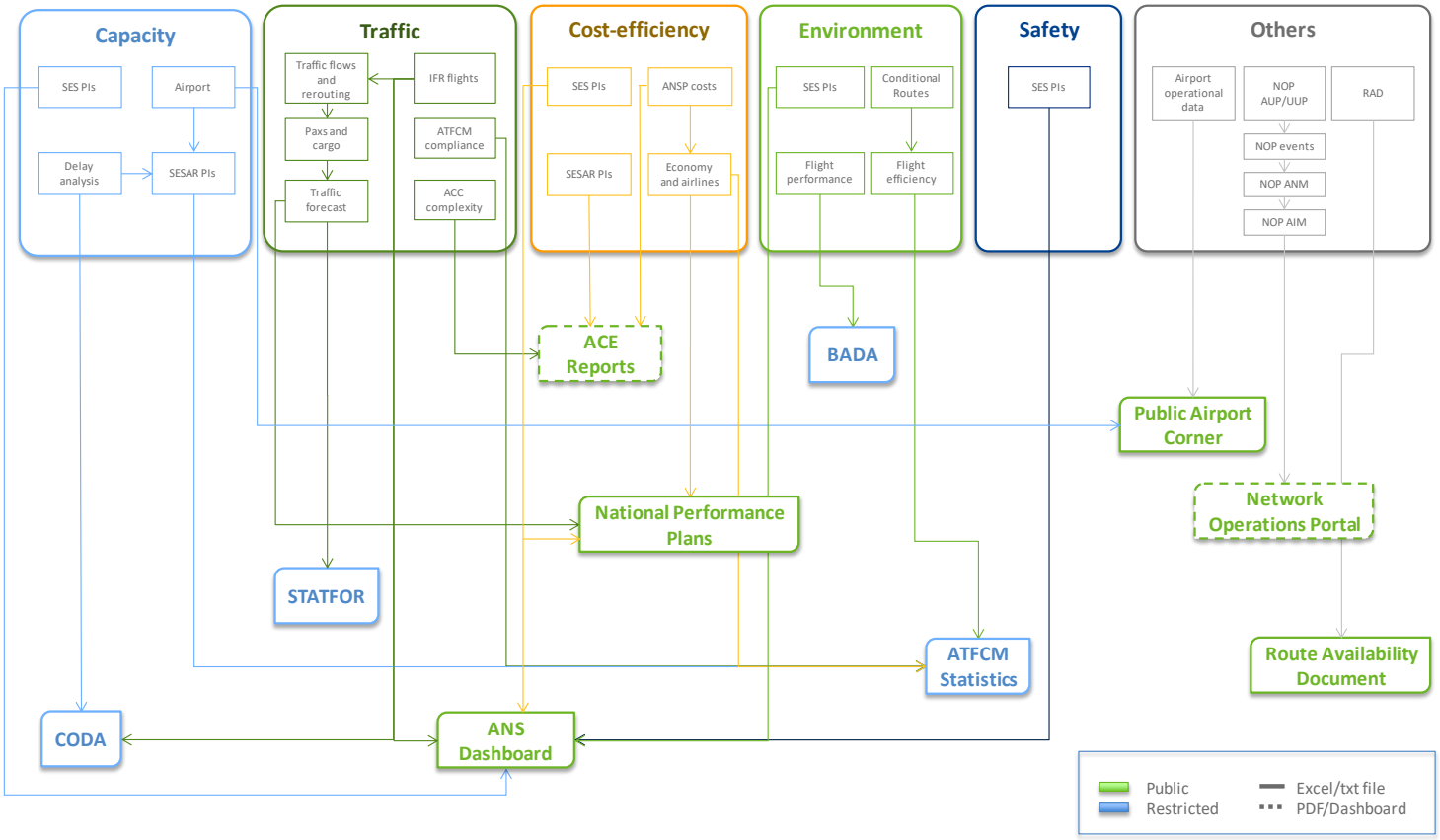

Figure 12. ATM Performance Data Map

5.2 ATM Performance Data Table

A high-level matrix mapping SESAR2020 Performance Framework KPAs and the databases analysed is shown in Table 16. The table has been filled based on the KPAs for which the databases provide useful metrics.

Table 17 provides a comprehensive, in-depth analysis of the KPAs, subareas and indicators provided by all the databases reviewed in this document. Further details on the specific indicators for each database can be found in Appendix A INTUIT Data sources factsheets.

SESAR 2020 KPAs	Databases													
	ACE	AIM	ANM	AUP/UUP portlet	NM ATFCM	NPPs	NOP events	PRRs	RAD	ANS Performance Monitoring Dashboard	CODA	STATFOR	Public Airport Corner	DDR2
CAPACITY		X		X	X	X	X	X	X			X	X	X
COST EFFICIENCY	X							X		X				
ENVIRONMENT					X									
PREDICTABILITY AND PUNCTUALITY			X		X	X		X	X	X	X			X
SAFETY							X	X		X				
SECURITY				X										

Table 16: ATM High-level Performance Table

Area	Subarea	Indicator	Database
Traffic	IFR flights	Total IFR flights	ANS Dashboard
			STATFOR
		Average daily flights by market segment share	CODA
		Average daily new flights	STATFOR
		Flight movements per hour of the day	STATFOR
		Mean aircraft age per flight	STATFOR
		Route length distribution per aircraft type	CODA
		Total distance flown	STATFOR
	Traffic flows and rerouting	Traffic flows	STATFOR
		External partners	STATFOR
		Rerouting	STATFOR
	Pax. and cargo	Total passengers	STATFOR
		Mean available seats per flight	STATFOR
		Average load factor	STATFOR
		Average revenue passenger kilometres per flight	STATFOR
		Average available seat km per flight	STATFOR
		Total tonnes	STATFOR
	Traffic forecast	Total flights	STATFOR
		Total distance flown	STATFOR
		Total flights by distance flown	STATFOR
		Forecast deviation	STATFOR
		Traffic and service units' forecast	NPP
	ACC complexity	Adjusted density	ACE
		Traffic variability indicators	ACE
		Vertical interactions	ACE
		Horizontal interactions	ACE
		Average used Flight Level	ACE
		Speed interactions	ACE
		Operational data	ACE
	ATFCM compliance	ATFCM exemptions	ATFCM Statistics
		Missing Flight Plans	ATFCM Statistics
		Multiple Flights	ATFCM Statistics
Capacity	SES PIs	En-route ATFM delay	ANS Dashboard
		Airport ATFM arrival delay	ANS Dashboard
		Adherence to ATFM slots	ANS Dashboard
		ATC pre-departure delay	ANS Dashboard
	SESAR Indicators	ENR throughput	ATFCM Statistics
		Airport busy hour throughput	ATFCM Statistics
	Airport	Regulated and delayed departures	ATFCM Statistics
		Regulated and delayed arrivals	ATFCM Statistics
		IFR movements	ATFCM Statistics
		Flight suspensions	ATFCM Statistics
		Arrival and departure punctuality	ATFCM Statistics
		Runway capacity	ATFCM Statistics

Area	Subarea	Indicator	Database
		Current and forecasted capacity	Public Airport Corner
Predictability and Punctuality	Departure analysis	Average delay per departure	CODA
		Flight punctuality distribution	CODA
		Primary departure delay causes	CODA
		Average delay per delayed flight on departure	CODA
		Average delay per flight and flight level	CODA
		Slot compliance	ATFCM Statistics
		Delay reductions and savings by ATFCM	ATFCM Statistics
	Arrival analysis	Average delay per delayed flight on arrival	CODA
		Average delay per arrival	CODA
		Flight punctuality distribution	CODA
		Arrival punctuality	ATFCM Statistics
	General	Average delay per flight by cause	CODA
		Average delay per flight	CODA
		Delay difference indicator per flight	CODA
		Block time overshoot	CODA
Cost-efficiency	SES PIs	En-route Service Units	ANS Dashboard
		ENR costs	ANS Dashboard
		ENR unit costs	ANS Dashboard
		Terminal ANS costs	ANS Dashboard
		Inflation	ANS Dashboard
		EURCONTROL costs	NPP
	SESAR Indicators	ATCO hour productivity	ACE
		Employment costs per ATCO-hour	ACE
		Support and technology costs per composite flight-hour	ACE
		Direct operating, indirect and overhead costs for users	ACE
		Composite gate-to-gate flight-hours	ACE
	ANSP costs	Gate-to-gate ATM/CNS provision costs	ACE
		ANS revenues	ACE
		ANS costs	ACE
		ANSP balance	ACE
		Total staff and ATCOs in OPS	ACE
		Disaggregated direct costs by nature	NPP
		Disaggregated direct costs by service	NPP
		Costs of capital	NPP
		Costs of exempted VFR	NPP
		Capital Expenditures	NPP
		Average Regulatory Asset Base and Depreciation	NPP
	Economy and Airlines	GDP growth forecast	NPP
		Inflation forecast	NPP
		Purchasing Power Parity	ATFCM Statistics

Area	Subarea	Indicator	Database
		Airline load factor	ATFCM Statistics
		Market share (traditional, low cost, charter)	ATFCM Statistics
		Ticket prices increase	ATFCM Statistics
		Crude oil and fuel prices	ATFCM Statistics
Environment	SES PIs	Horizontal en-route flight efficiency	ANS Dashboard
		Horizontal en-route flight efficiency	ANS Dashboard
		Additional taxi-out time	ANS Dashboard
		Additional time in terminal airspace	ANS Dashboard
		Effectiveness of booking procedures for FUA	ANS Dashboard
		Effective use of CDRs	ANS Dashboard
		Rate of planning of conditional routes	ANS Dashboard
	Conditional Routes	Number of CDR and type	ATFCM Statistics
		Rate of CDR Availability	ATFCM Statistics
		Distance and time savings	ATFCM Statistics
		Potential Flight Economy	ATFCM Statistics
	Flight Efficiency	Free Route implementation	ATFCM Statistics
		Route extension due to airspace design	ATFCM Statistics
		Route extension based on last filed flight plan	ATFCM Statistics
Safety	SES PIs	Effectiveness of Safety Management	ANS Dashboard
		Reporting of Just Culture	ANS Dashboard
		Application of the severity classification based on RAT methodology	ANS Dashboard
		Separation Minima Infringements	ANS Dashboard
		Runway Incursions	ANS Dashboard
		ATM Specific Technical Events	ANS Dashboard
Apt op. data		On-going and planned activities	Public Airport Corner
		Environmental constraints	Public Airport Corner
		Weather management	Public Airport Corner
		Infrastructure services	Public Airport Corner
Other Databases			NOP Events
			NOP AIM
			NOP AUP/UUP
			NOP ANM
			RAD

Table 17. ATM Performance Data Table

6 INTUIT Data Repository

The datasets used for research purposes in the frame of INTUIT will be shared by means of the INTUIT Data Repository. The purpose of the repository is to provide a single set of datasets for all project members, in order to ensure that the conclusions achieved by different partners carrying out different data analysis tasks are consistent.

The repository consists of a page in the project wiki. This page is linked to other pages, each focused on one type of data. Inside each page, several datasets are available, together with other relevant information required for addressing the research questions defined in INTUIT deliverable D2.2.

The URL of the repository is:

https://nommon.atlassian.net/wiki/display/VizzATM/INTUIT+DATA+REPOSITORY

7 Conclusions

In this document, we have identified a set of data sources that provide the required level of detail and data quality for the achievement of the project objectives. These data sources can be coarsely classified into two groups:

- High granularity data sources, which provide large amounts of low-processed data. They are useful to compute new metrics. However, they typically require a high computing effort.
- Low granularity data sources, which provide highly processed and aggregated data. They contain relevant metrics that can be used without any processing.

The most useful high granularity databases identified are depicted below:

- DDR2: trajectories of individual flights in the European airspace. This database has the highest potential for metrics computation. The geographical granularity is not the highest obtainable, but it is sufficient to compute a wide range of metrics.
- Daily summaries: aggregated statistics during the day of operation of the delays caused by ATFM regulations. This database is useful for research regarding delay-capacity and its interdependencies.
- ANN: information of regulations prior to the operation. This database is useful for research on delay-capacity and predictability.
- European AUP/UUP: airspace restrictions and alternative routings due to military activity. This database is essential for any study about cooperation between civil and military aircraft.
- CODA: reported delay statistics by airlines. This database is useful for any research related to delay-capacity and its interdependencies. Data has some issues due to incompleteness.
- STATFOR: actual and forecasted capacity. It is useful for research about delay-capacity and its interdependencies.

The most useful low granularity databases identified are the following:

- ACE reports: statistics and balance of ANSP costs and staffing. This database is essential for any cost-efficiency analysis. Data is highly aggregated and could be improved with the provision of raw data.
- PRR: statistics regarding KPIs with broad temporal scope. This database is necessary for the study of interdependencies between metrics. Data is highly aggregated and could be improved with the provision of raw data.
- ANS dashboard: it provides KPIs and PIs metrics during RP1 and RP2. These data are provided by PRR with a wider temporal basis and higher number of statistics. The advantage with respect to PRR is that data shown in ANS dashboard is more easily exportable in table format, especially for RP2. Therefore, data downloadable from ANS dashboard is preferable when available, but the type analysis that can be performed is limited by the temporal scope of the date, which is narrower than in the case of the PRR.

- RAD: route restrictions during an AIRAC cycle. This document can be used to study the interdependencies between airspace constraints and capacity/demand adjustment.
- NPP: ANSP plans to comply with KPI objectives. They are useful for computing statistics regarding the accomplishment of the SES objectives. The data has issues with temporal scope as there is only complete data for RP1.
- Public Airport Corner: static operational data limited to some European airports. Forecasted runway capacity could be used to analyse airport demand-capacity balance.

The rest of reviewed databases, which are not listed above, provide duplicated or non-usable information. These databases are:

- NOP Events: it provides information of events that affect air traffic. The format, although standardised, is filled in different ways depending on the source. In addition, interpretation of description in text would require excessive computing effort.
- AIM: information about events or possible disruptions in the network. The format of messages is in text. The interpretation of text would require excessive computing effort.

Appendix A INTUIT Data sources factsheets

The factsheets of each data source analysed by the INTUIT project can be found in the next pages in printable format.

1. General information - *Identification of the database and how to access it*

Database name	Online ANS Performance Monitoring Dashboard - RP1
Link	http://www.eurocontrol.int/prudata/dashboard/eur_view_2012.html
Last factsheet update	09/06/2016

2. Abstract - *Brief description of the content and purpose of the database*

The PRB has developed an online performance monitoring dashboard which aims at supporting NSAs in their monitoring activities.
It presents information related to the performance scheme at different levels: EU-wide, Performance Plan (either national or FAB) and Airports.
The dashboard covers all KPIs and PIs regulated by the performance scheme Regulation. In addition, KPIs are presented against adopted targets.
The dashboard contains links to metadata detailing the calculation of each indicator as well as a download function which allows stakeholders to use the data for their own purpose.
There are two different sites to obtain information:
The Online Dashboard (OD) contains some information provided exclusively online and some other may be downloaded as an Excel file
The Download Area (DA) contains downloadable information as an Excel file or Google Spreadsheet, and also a link to the PRU wiki with information about the PI calculation

3. Source and data format - *How the information is provided and where it is obtained from*

Published by	EUROCONTROL, as the Performance Review Body of the Single European Sky
Public	Yes
Sources	EASA, NM, PRU analysis, CODA, CRCO, National/FAB Performance Plans, DPS/SSR
Data format	Downloads: Microsoft Excel file Online: Dashboard

4. Data resolution - *Temporal and geographical characteristics of the information provided*

Temporal granularity	Monthly, Yearly
Temporal scope	RP1: 2012-2014
Geographical granularity	Airport, State, ANSP, Charging zone, EU
Geographical scope	SES Area RP1
Update frequency	Quarterly (every 3 months)
Last database update	June 2015
Usefulness for INTUIT project	High, it contains all SES II Performance Scheme KPIs and PIs for RP1

5. Comments - *Relevant information related to data availability, data reliability and other observations. See Section 4 of the Report for more details.*

Dashboard oriented to provide KPIs and PIs results, not the raw data for the calculation of these indicators.
Difficulty to obtain a clear map of the available information, since it can be obtained from two different sites and in one of them only part of the information is downloadable.
Safety, Capacity and Environment with some 2014 missing information that according to the dashboard should have been available during 2015.
Some airports with missing information related to additional ASMA and taxi-out times (Capacity KPA).
Comment from dashboard: "*The views expressed herein do not necessarily reflect the official views or policy of EUROCONTROL or of the European Commission, which make no warranty, either implied or express, for the information contained on this website, neither do they assume any legal liability or responsibility for the accuracy, completeness or usefulness of this information*."
Information related to the Performance Indicators and their calculation is provided in INTUIT D2.2.

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

Performance Framework SES II Performance Framework

PA	Performance Indicator	Detailed information	Units	Geographical granularity	Temporal granularity	Temporal scope	Source	Last update	Download available	Location (OD/DA)	Comments
Safety	**Effectiveness of Safety Management (EoSM)**	# Overall effectiveness score	[Questionnaire score]	# State / NSA # ANSP	# Yearly	2012-14	EASA	jun-15	Yes	DA	PRU Metadata mentions "Effective score for each Management Objective and area of study" but in the dashboard only appears the overall score
	Reporting of Just Culture	# Score per surveyed area (3) # Overall score	[Number of YES/NO answers]	# State # ANSP	# Yearly	2012-14	EASA	jun-15	Yes	DA	NAV Portugal 2014 has no score
	Application of the severity classification based on RAT methodology	# Percentage of SMIs occurences assessed with RAT # Percentage of RIs occurences assessed with RAT # Percentage of ATMs occurences assessed with RAT	[Percentage of assessed occurrences]	# State # SES Area RP1	# Yearly	2012-14	DPS/SSR	feb-15	Yes	DA	Missing 2014 excel that should have been available since April 2015 and it's only available in the Online Dashboard Source in 2012: DSS/SQVS instead of DPS/SSR, probably due to the change in the ECTL organisation
	Separation Minima Infringements (SMI)	# Total SMIs reports # SMIs still under investigation # Number of SMIs States reporting # Reported SMIs with severity A # Reported SMIs with severity B	[Number of reports]	# SES Area RP1	# Yearly	2008-13	DPS/SSR	-	No	OD	2014 data should have been available since Sep/Oct 2015 according to the dashboard
	Runway Incursions (RI)	# Total RIs reports # RIs still under investigation # Number of RIs States reporting # Reported RIs with severity A # Reported RIs with severity B	[Number of reports]	# SES Area RP1	# Yearly	2008-13	DPS/SSR	-	No	OD	2014 data should have been available since Sep/Oct 2015 according to the dashboard
	ATM Specific Technical Events (ATM-S)	# Total ATM-S reports # ATM-S still under investigation # Number of ATM-S States reporting # Reported ATM-S with severity A # Reported ATM-S with severity AA	[Number of reports]	# SES Area RP1	# Yearly	2008-13	DPS/SSR	-	No	OD	2014 data should have been available since Sep/Oct 2015 according to the dashboard
Capacity	**En route ATFM delay**	# Number of IFR flights	[IFR flights]	# ANSP # FAB # SES Area RP1	# Monthly # Yearly	2008-14 2008-14	NM NM	jan-15 jan-15	Yes Yes	DA OD	All ansps and fabs, all data until end of 2014. Although not member of the SES Area in RP1, ANSP Croatia Control is also included in the excel files of the Download Area (not in the SES computation)
		# Total en-route ATFM delay	[Minutes]	# ANSP # FAB # SES Area RP1	# Monthly # Yearly	2008-14 2008-14	NM NM	jan-15 jan-15	Yes Yes	DA OD	*For the monitoring of National/FAB Performance targets, the performance of the ANSP designated as the accountable entity in the performance plan is considered. This is extended to a group of ANSPs in the case of a FAB Performance Plans and targets. It should be noted that the areas of responsibility of the individual ANSPs are not necessarily coincidental with the geographical boundaries of the State.*
		# Total en-route ATFM delay segregated by cause: Capacity/staffing, ATC other, Weather, Other	[Minutes]	# ANSP # FAB # SES Area RP1	# Monthly # Yearly	2008-14 2008-14	NM NM	jan-15 jan-15	Yes Yes	DA OD	
		# Actual en-route ATFM delay	[Minutes / IFR flight]	# ANSP* # SES Area RP1	# Monthly # Yearly	2008-14	NM	jan-15	Yes	OD	ANSP* refers to RP1 States and corresponding ANSP, but with FABEC and DK-SWE States grouped as a FAB
		# Actual en-route ATFM delay segregated by cause: Capacity/staffing, ATC other, Weather, Other	[Minutes / IFR flight]	# SES Area RP1	# Monthly # Yearly	2008-14	NM	jan-15	Yes	OD	
		# Cumulative year	[Minutes / IFR flight]	# SES Area RP1	# Monthly	2008-14	NM	jan-15	Yes	OD	
		# Planned en-route ATFM delay	[Minutes / IFR flight]	# ANSP-State # SES Area RP1	# Yearly	2012-14	NM	jan-15	Yes	OD	
		# Actual vs Planned en route ATFM delay	[Minutes / IFR flight]	# ANSP-State # SES Area RP1	# Yearly	2012-14	NM	jan-15	Yes	OD	
		# Indicative reference line	[Minutes / IFR flight]	# SES Area RP1	# Yearly	2012-14	NM	jan-15	Yes	OD	
	Airport arrival ATFM delay	# Number of IFR arrivals	[IFR arrivals]	# Airport	# Monthly # Yearly	2008-14 2012-14	NM NM	jan-15 jan-15	Yes Yes	DA OD	Although not member of the SES Area in RP1, LDZA airport (Croatia) is also included in the excel files of the Download Area (not in the SES computation)
				# SES Area RP1	# Monthly # Yearly	2008-14 2012-14	NM NM	jan-15 jan-15	Yes Yes	OD OD	
		# Total airport arrival ATFM delay	[Minutes]	# Airport	# Monthly # Yearly	2008-14 2012-14	NM NM	jan-15 jan-15	Yes Yes	DA OD	
				# SES Area RP1	# Monthly # Yearly	2008-14 2012-14	NM NM	jan-15 jan-15	Yes Yes	OD OD	
			[Minutes]	# Airport	# Monthly # Yearly	2008-14 2012-14	NM NM	jan-15 jan-15	Yes Yes	DA OD	
				# SES Area RP1	# Monthly # Yearly	2008-14 2012-14	NM NM	jan-15 jan-15	Yes Yes	OD OD	
		# Actual airport arrival ATFM delay	[Minutes / IFR arrival]	# Airport # SES Area RP1	# Monthly # Yearly	2008-14 2012-14	NM NM	jan-15 jan-15	Yes	OD OD	
		# Actual airport arrival ATFM delay segregated by cause: Capacity/staffing, ATC other, Weather, Other	[Minutes / IFR arrival]	# SES Area RP1	# Monthly # Yearly	2008-14	NM	jan-15	Yes	OD	
		# Cumulative year	[Minutes / IFR arrival]	# SES Area RP1	# Monthly	2008-14	NM	jan-15	Yes	OD	
	Additional time for ASMA	# Number of IFR arrivals with unimpeded reference time	[IFR arrivals]	# Airport	# Monthly # Yearly	2012-14 2012-14	PRU, NM, CODA PRU, NM, CODA	apr-15 apr-15	Yes Yes	DA OD	Although not member of the SES Area in RP1, EDDT is also included (not in the SES computation)
		# Total ASMA unimpeded time	[Minutes]	# Airport	# Monthly # Yearly	2012-14 2012-14	PRU, NM, CODA PRU, NM, CODA	apr-15 apr-15	Yes Yes	DA OD	Missing data: ENGM, EPWA, LFMN with no data at all
		# Total ASMA additional time	[Minutes]	# Airport	# Monthly # Yearly	2012-14 2012-14	PRU, NM, CODA PRU, NM, CODA	apr-15 apr-15	Yes Yes	DA OD	EDDK missing 2012 data EDDS missing 11 months of 2012 data
		# Actual ASMA unimpeded time	[Minutes / IFR arrival]	# Airport	# Monthly # Yearly	2012-14 2012-14	PRU, NM, CODA PRU, NM, CODA	apr-15 apr-15	Yes Yes	DA OD	LFPO missing 4 months of 2012 data LPPT missing 1 month of 2012 data
		# Actual ASMA additional time	[Minutes / IFR arrival]	# Airport	# Monthly # Yearly	2012-14 2012-14	PRU, NM, CODA PRU, NM, CODA	apr-15 apr-15	Yes Yes	DA OD	EGKK missing 1 month of 2014 data The OD excel provides information about the reasons of missing data
				# SES Area RP1	# Monthly # Yearly	2012-14 2012-14	PRU, NM, CODA PRU, NM, CODA	apr-15 apr-15	Yes Yes	OD OD	SES Area additional times for 2013 and 2014 probably miscalculated
	Additional time in the taxi out phase	# Number of IFR departures with unimpeded reference time	[IFR departures]	# Airport	# Monthly # Yearly	2012-14 2012-14	PRU, NM, CODA PRU, NM, CODA	apr-15 apr-15	Yes Yes	DA OD	Although not member of the SES Area in RP1, EDDT is also included (not in the SES computation)
		# Total taxi out unimpeded time	[Minutes]	# Airport	# Monthly # Yearly	2012-14 2012-14	PRU, NM, CODA PRU, NM, CODA	apr-15 apr-15	Yes Yes	DA OD	Missing data: EDDK, EDSS, EETN, EGNT, ELLX, ENBR, ENGM, ENVA, ENZV, ESGG, EYVI, LCLK, LFMN, LICC, LIMC (7), LIME, LIML (7), LIPE, LJLJ, LMML, LPPT (2), LROP, LZIB no 2012 data at all
		# Total taxi out additional time	[Minutes]	# Airport	# Monthly # Yearly	2012-14 2012-14	PRU, NM, CODA PRU, NM, CODA	apr-15 apr-15	Yes Yes	DA OD	EDSS, EETN, EGNT, ELLX, ENBR, ENGM, ENVA, ENZV, ESGG, EYVI,
		# Actual taxi out unimpeded time	[Minutes / IFR departure]	# Airport	# Monthly # Yearly	2012-14 2012-14	PRU, NM, CODA PRU, NM, CODA	apr-15 apr-15	Yes Yes	DA OD	LCLK, LFMN, LICC (8), LIME, LIPE, LJLJ, LMML, LROP, LZIB no 2013 data EDDN(1), EDSS, EETN, EGGC (1), EGKK (1), EGNT, EGPF (1), ELLX,
		# Actual taxi out additional time	[Minutes / IFR departure]	# Airport	# Monthly # Yearly	2012-14 2012-14	PRU, NM, CODA PRU, NM, CODA	apr-15 apr-15	Yes Yes	DA OD	ENBR, ENGM, ENVA, ENZV, ESGG, EYVI, LCLK, LFMN, LIME (5), LIPE, LJLJ, LMML, LROP, LZIB no 2014 data (*) also has LIME 2014 data, which is not updated in the DA
				# SES Area RP1	# Monthly # Yearly	2012-14 2012-14	PRU, NM, CODA PRU, NM, CODA	apr-15 apr-15	Yes Yes	OD OD	SES Area additional times for 2013 and 2014 probably miscalculated
Environment	**Horizontal en route flight efficiency (KEP)**	# Horizontal en route flight efficiency of last filed flight plan (KEP)	%	# FAB # SES Area RP1	# Monthly # Yearly	2012-2014 2009-2014	NM NM	jan-15 jan-15	Yes Yes	DA DA	Calculated with the last filled flight plan (FTFM) Annual data is also available for 2009-2011, with an indicative profile between baseline and target
		# Indicative profile	%	# SES Area RP1	# Yearly	2009-2014	NM	jan-15	Yes	DA	
		# Target	%	# SES Area RP1	# Yearly	2014	NM	jan-15	Yes	DA	
		# Number of trajectories	[Trajectories]	# SES Area RP1	# Monthly	2012-2014	NM	jan-15	Yes	DA	
		# Flown km	[km]	# SES Area RP1	# Monthly	2012-2014	NM	jan-15	Yes	DA	
		# Achieved km	[km]	# SES Area RP1	# Monthly	2012-2014	NM	jan-15	Yes	DA	
	Horizontal en route flight efficiency (KEA)	# Horizontal en route flight efficiency of actual trajectory (KEA)	%	# FAB # SES Area RP1	# Monthly	2012-2014	NM	jan-15	Yes	DA	Calculated with the actual trajectory No PI nor KPI in RP1, however
		# Number of trajectories	[Trajectories]	# SES Area RP1	# Monthly # Yearly	2012-2014	NM	jan-15	Yes	DA	
		# Flown km	[km]	# SES Area RP1	# Monthly # Yearly	2012-2014	NM	jan-15	Yes	DA	
		# Achieved km	[km]	# SES Area RP1	# Monthly # Yearly	2012-2014	NM	jan-15	Yes	DA	

	Effectiveness of booking procedures for FUA	# Percentage of hours that SUA was actually used	%	# State	# Yearly	2012, 2013 (no 2014)	NSAs	aug-14	Yes	DA	2012 only has the first #, and with 5 States missing 2013 with 4 States missing, and 5 States with only first #
		# Percentage of hours that SUA allocated but released with 3 hour notice	%	# State	# Yearly	2012, 2013 (no 2014)	NSAs	aug-14	Yes	DA	Missing 2014 data ("To be updated in 2015") PRU metadata: "The data is measured for individual SUAs but is reported as an aggregated EU wide statistic", however it appears by State
		# Percentage of hours that SUA was allocated but not released with 3 hour noticed nor used	%	# State	# Yearly	2012, 2013 (no 2014)	NSAs	aug-14	Yes	DA	
	Effective use of CDRs	# CDR1	%	# ECAC Area	# Yearly	2012, 2013 (no 2014)	NM	aug-14	Yes	DA	Missing 2014 data ("to be updated in 2015") Scope: ECAC Area
		# CDR2	%	# ECAC Area	# Yearly	2012, 2013 (no 2014)	NM	aug-14	Yes	DA	Monitoring indicator (according to Regulation), but it does not appear in the Summary KPI table
Cost-efficiency	**En route Service Units (ENR SU)**	Planned ENR SU (National/FAB Performance Plan)	[SU]	# ENR charging zone RP1	# Monthly	2012-14	CRCO, NPPs	jan-15	Yes	DA	Although not SES Area RP1, Croatia is also available is the Online Dashboard (monthly and yearly granularity from 2012-14, and not downloadable) The DA link redirects to general DA, not to the ENR SU download
					# Yearly	2012-14	CRCO, NPPs	jan-15	Yes	OD	
				# FABs	# Monthly # Yearly	2012-14	CRCO, NPPs	-	No	OD	
				# SES Area RP1	# Monthly # Yearly	2012-14	CRCO, NPPs	jan-15	Yes	OD	
		Actual ENR SU	[SU]	# ENR charging zone RP1	# Monthly	2008-14	CRCO, NPPs	jan-15	Yes	DA	
					# Yearly	2012-14	CRCO, NPPs	jan-15	Yes	OD	
				# FABs	# Monthly # Yearly	2012-14	CRCO, NPPs	-	No	OD	
				# SES Area RP1	# Monthly # Yearly	2008-14	CRCO, NPPs	jan-15	Yes	OD	
		Actual vs planned ENR SU	%	# ENR charging zone RP1	# Yearly	2012-14	CRCO, NPPs	jan-15	Yes	OD	
				# FABs	# Monthly # Yearly	2012-14	CRCO, NPPs	-	No	OD	
				# SES Area RP1	# Monthly # Yearly	2012-14	CRCO, NPPs	jan-15	Yes	OD	
	ENR costs	Planned ENR costs (NPP)	Real terms, €2009	# ENR charging zone RP1 # FAB # SES Area RP1	# Yearly	2012-14	CRCO, NPPs	-	No	OD	Charging zone and FAB values are also available in national currency and nominal terms
		Actual ENR costs	Real terms, €2009								
		Actual vs planned ENR costs	%								
	ENR unit costs	ENR Determined Unit Rate (DUR) (NPP)	Real terms, €2009	# ENR charging zone RP1 # FAB # SES Area RP1	# Yearly	2012-14	CRCO, NPPs	-	No	OD	
		Actual ENR unit costs	Real terms, €2009								
		Actual vs planned ENR unit costs	%								
	Terminal ANS costs	Planned terminal ANS costs (NPP)	Real terms, €2009	# ENR charging zone RP1 # FAB # SES Area RP1	# Yearly	2012-14	NPPs	-	No	OD	
		Actual terminal ANS costs	Real terms, €2009								
		Actual vs planned terminal ANS costs	%								
	Inflation	Planned inflation (NPP)	Index (2009=100)	# ENR charging zone RP1 # FAB	# Yearly	2012-14	CRCO, NPPs	-	No	OD	
		Actual inflation									

7. List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework

Area	Indicator	Detailed information	Units	Geographical granularity	Temporal granularity	Temporal scope	Source	Last update	Download available	Location (OD/DA)	Comments
Traffic	**IFR flights**	# Total IFR flights	[IFR flights]	# State*/ANSP*	# Yearly	2011-14	Network Manager	jan-15	Yes	OD	* RP1 States and corresponding ANSP, but with FABEC and DK-SWE States grouped as a FAB
				# SES Area RP1	# Monthly # Yearly	2008-14	Network Manager	jan-15	Yes	OD	
		# Average daily IFR flights	[IFR flights/day]	# Airport # State # FAB	# Monthly	2012-14	Network Manager	-	No	OD	
					# Yearly	2008-14	Network Manager	-	No	OD	
				# State*/ANSP*	# Yearly	2011-14	Network Manager	jan-15	Yes	OD	* RP1 States and corresponding ANSP, but with FABEC and DK-SWE States grouped as a FAB
				# SES Area RP1	# Monthly # Yearly	2008-14	Network Manager	jan-15	Yes	OD	

INTUIT - WP2 Multiscale performance characterisation

T2.2 Data quality assessment

Performance databases factsheet

1. General information - *Identification of the database and how to access it*

Database name	Online ANS Performance Monitoring Dashboard - RP2
Link	http://www.eurocontrol.int/prudata/dashboard/rp2_2015.html
Last factsheet update	01/08/2016

2. Abstract - *Brief description of the content and purpose of the database*

The PRB has developed an online performance monitoring dashboard which aims at supporting NSAs in their monitoring activities.
It presents information related to the performance scheme at different levels: EU-wide, Performance Plan (either national or FAB) and Airports.
The dashboard covers all KPIs and PIs regulated by the performance scheme Regulation. In addition, KPIs are presented against adopted targets.
The dashboard contains links to metadata detailing the calculation of each indicator as well as a download function which allows stakeholders to use the data for their own purpose.

3. Source and data format - *How the information is provided and where it is obtained from*

Published by	EUROCONTROL, as the Performance Review Body of the Single European Sky
Public	Yes
Sources	EASA, EC, NM, PRU analysis, CRCO, National/FAB Performance Plans, airports
Data format	Downloads: Microsoft Excel file Online: Dashboard

4. Data resolution - *Temporal and geographical characteristics of the information provided*

Temporal granularity	Monthly, Yearly
Temporal scope	RP2 2015-2016 (YTD)
Geographical granularity	Airport, State, ANSP, Charging zone, EU
Geographical scope	SES Area RP2
Update frequency	Not specified
Last database update	August 2016
Usefulness for INTUIT project	High, it contains all SES II Performance Scheme KPIs and PIs for RP2

5. Comments - *Relevant information related to data availability, data reliability and other observations. See Section 4 of the Report for more details.*

Dashboard oriented to provide KPIs and PIs results, not the raw data for the calculation of these indicators.
Information is provided in a more organised way than the ANS dashboard for RP1. All information provided online is exportable directly from the dashboard.
The dashboard is updated regularly (maximum every 4 months) but not all information is complete. More concretely:
- Safety with no 2015 information. According to PRU metadata, it should have been available since June 2016;
- Capacity (ATC pre-departure delay) and Environment (additional ASMA, additional taxi-out) with missing airport information for 2015: aprox 10/30 States only;
- Environment (use of civil/military airspace) and Cost-efficiency (DUC) with no 2015 information.

Comment from dashboard: "*The views expressed herein do not necessarily reflect the official views or policy of EUROCONTROL or of the European Commission, which make no warranty, either implied or express, for the information contained on this website, neither do they assume any legal liability or responsibility for the accuracy, completeness or usefulness of this information .*"
Information related to the Performance Indicators and their calculation is provided in INTUIT D2.2.

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

Performance Framework SES II Performance Framework

PA	Performance Indicator	Detailed information	Units	Geographical granularity	Temporal granularity	Temporal scope	Source	Comments
Safety	-	-	-	-	-	-	-	Dashboard: "*To be provided in line with the scheduled reporting cycle*" Acording to PRU Metadata: "*The data is displayed to the public in June the following year*", which means that 2015 data should have been available in June 2016.
Capacity	**En route ATFM delay**	# Number of IFR flights	[IFR flights]	# FAB	# Yearly	2015 2016 (YTD)	Network Manager	YTD until June 2016 included
				# SES Area RP2	# Monthly # Yearly	2015 2016 (YTD)	Network Manager	
		# Total en-route ATFM delay	[Minutes]	# FAB	# Yearly	2015 2016 (YTD)	Network Manager	
				# SES Area RP2	# Monthly # Yearly	2015 2016 (YTD)	Network Manager	
		# Actual en-route ATFM delay	[Minutes / IFR flight]	# FAB	# Yearly	2015 2016 (YTD)	Network Manager	
				# SES Area RP2	# Monthly # Yearly	2015 2016 (YTD)	Network Manager	
		# Cumulative year	[Minutes / IFR flight]	# SES Area RP2	# Monthly	2015-19	Network Manager	
		# Planned en-route ATFM delay	[Minutes / IFR flight]	# FAB # SES Area RP2	# Yearly	2015 2016 (YTD)	Network Manager	
		# Actual vs Planned en route ATFM delay	[Minutes / IFR flight]	# FAB # SES Area RP2	# Yearly	2015 2016 (YTD)	Network Manager	
	Airport ATFM arrival delay	# Number of IFR arrivals	[IFR arrivals]	# Airport # State	# Yearly	2015 2016 (YTD)	Network Manager	YTD until June 2016 included
				# SES Area RP2	# Monthly	2015 2016 (YTD)	Network Manager	
					# Yearly	2015	Network Manager	
		# Total airport ATFM arrival delay	[Minutes]	# Airport # State	# Yearly	2015 2016 (YTD)	Network Manager	
				# SES Area RP2	# Monthly	2015 2016 (YTD)	Network Manager	
					# Yearly	2015	Network Manager	
		# Actual airport ATFM arrival delay	[Minutes]	# Airport # State	# Yearly	2015 2016 (YTD)	Network Manager	
				# SES Area RP2	# Monthly	2015 2016 (YTD)	Network Manager	
					# Yearly	2015	Network Manager	
		# Cumulative year	[Minutes / IFR arrival]	# SES Area RP2	# Monthly	2015 2016 (YTD)	Network Manager	
		# Planned airport ATFM arrival delay	[Minutes / IFR arrival]	# State	# Yearly	2015-16	Network Manager	
		# Actual vs planned airport ATFM arrival delay	[Minutes / IFR arrival]	# State	# Yearly	2015 2016 (YTD)	Network Manager	
	Adherence to ATFM slots	# ATFM slot adherence	%	# Airport # State	# Yearly	2015 2016 (YTD)	Network Manager	YTD until June 2016 included % flights inside the slot tolerance window of [-5, +10 min] Percentage of outbound regulated IFR flight [% of regulated departures] 2015:170/173 airports with data, all states with data 2016: 163/175 airports with data, all states with data
		# ATFM regulated departures	[IFR regulated departures]					
		# Flights outside ATFM slot window	[IFR regulated departures]					
	ATC pre-departure delay	# Number of IFR departures	[IFR departures]	# Airport # State	# Yearly	2015 2016 (YTD)	Airports	YTD until May 2016 included 2015: 54/173 airports with data, 11/30 states with data 2016: 62/175 airports with data, 14/30 states with data
		# Total ATC pre-departure delay	[Minutes]					
		# ATC pre-departure delay	[Minutes/departure]					
Environment	**Horizontal en route flight efficiency (KEP)**	# Horizontal en route flight efficiency of last filed flight plan (KEP)	%	# FAB	# Yearly	2015 2016 (YTD)	NM, PRU analysis	YTD until June 2016 included
				# SES Area RP2	# Monthly # Yearly	2015 2016 (YTD)	NM, PRU analysis	YTD until June 2016 included
		# Planned KEP (Performance Plan)	%	# SES Area RP2	# Yearly	2015-19	NM, PRU analysis	
	Horizontal en route flight efficiency (KEA)	# Horizontal en route flight efficiency of actual trajectory (KEA)	%	# FAB	# Yearly	2015 2016 (YTD)	NM, PRU analysis	YTD until June 2016 included
				# SES Area RP2	# Monthly # Yearly	2015 2016 (YTD)	NM, PRU analysis	YTD until June 2016 included
		# Planned KEA (Performance Plan)	%	# SES Area RP2	# Yearly	2015-19	NM, PRU analysis	
	Additional taxi-out time	# Number of IFR departures with unimpeded reference time	[IFR departures]	# Airport # State	# Yearly	2015 2016 (YTD)	Airports, PRU analysis	Only 49 of the 173 listed airports have data in 2015, 10/30 States Only 51 of the 175 listed airports have data in 2016,10/30 States YTD until May 2016 included
		# Total additional taxi-out time	[Minutes]					
		# Average unimpeded taxi-out time	[Minutes/IFR departure]					
		# Average additional taxi-out time	[Minutes/IFR departure]					
	Additional time in terminal airspace	# Number of IFR arrivals with unimpeded reference time	[IFR arrivals]	# Airport # State	# Yearly	2015 2016 (YTD)	Airports, PRU analysis, NM	55 of the 173 listed airports have data in 2015, resulting in 13/30 States 54 of the 175 listed airports have data in 2015, resulting in 13/30 States YTD until February 2016 included
		# Total additional ASMA time	[Minutes]					
		# Average unimpeded ASMA time	[Minutes/IFR departure]					
		# Average additional ASMA time	[Minutes/IFR departure]					
	Effectiveness of booking procedures for FUA	-	-	-	-	-	-	Dashboard: *"To be provided in line with the scheduled reporting cycle"* According to PRU Metadata, information is disseminated annually.
	Effective use of CDRs	-	-	-	-	-	-	Dashboard: *"To be provided in line with the scheduled reporting cycle"* According to PRU Metadata, information is disseminated annually.
	Rate of planning of CDRs	-	-	-	-	-	-	Dashboard: *"To be provided in line with the scheduled reporting cycle"* According to PRU Metadata, information is disseminated annually.
Cost-efficiency	**En route Service Units (ENR SU)**	Determined ENR SU (National/FAB Performance Plan)	SU	# ENR charging zone RP2 # SES Area RP2	# Yearly	2014, 2015 2016 (YTD)	CRCO, EC, PRU analysis	All charging zones with data YTD until June 2016 included 2015 data is also available as YTD (Jan-March 2015)
		Daily determined ENR SU						
		Actual ENR SU						
		Daily actual ENR SU						
		Actual vs determined ENR SU	%					
	DUC for en-route ANS	-	-	-	-	-	-	Dashboard: *"To be provided in line with the scheduled reporting cycle"*
	DUC for terminal ANS	-	-	-	-	-	-	Dashboard: *"To be provided in line with the scheduled reporting cycle"*

7. List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework

Area	Indicator	Detailed information	Units	Geographical granularity	Temporal granularity	Temporal scope	Source	Comments / Update checks
Traffic	**IFR flights**	# Total IFR flights	[IFR flights]	# FAB	# Yearly	2014, 2015 2016 (YTD)	Network Manager	YTD until June 2016 included 2015 data is also available as YTD (Jan-June 2015)
				# SES Area RP2	# Monthly	2015 2016 (YTD)	Network Manager	YTD until June 2016 included
					# Yearly	2015 2016 (YTD)	Network Manager	YTD until June 2016 included
		# Average daily IFR flights	[IFR flights/day]	# FAB	# Yearly	2015 (YTD) 2016 (YTD)	Network Manager	YTD until June 2016 included
				# SES Area RP2	# Monthly # Yearly	2015 2016 (YTD)	Network Manager	YTD until June 2016 included 2015 data is also available as YTD (Jan-June 2015)

1. General information - *Identification of the database and how to access it*

Database name	Central Office for Delay Analysis (CODA)
Link	https://ext.eurocontrol.int/analytics/saw.dll?Dashboard
Last factsheet update	01/08/2016

2. Abstract - *Brief description of the content and purpose of the database*

The objective of the Central Office for Delay Analysis (CODA) within EUROCONTROL is to provide policy makers and managers of the ECAC Air Transport System with timely, consistent and comprehensive information on the air traffic delay situation in Europe, and to make these available to anyone with an interest in delay performance.
More information: http://www.eurocontrol.int/articles/central-office-delay-analysis-coda

3. Source and data format - *How the information is provided and where it is obtained from*

Published by	EUROCONTROL as the Network Manager
Public	No
Sources	Airlines and Network Manager
Data format	Dashboard / PDF / Excel

4. Data resolution - *Temporal and geographical characteristics of the information provided*

Temporal granularity	Daily, monthly
Temporal scope	2005 - present
Geographical granularity	ECAC area (some information is segregated by airport and/or aircraft, see Section 7 for more details)
Geographical scope	ECAC area
Update frequency	Monthly
Last database update	Not specified (July 2016 at least)
Usefulness for INTUIT project	Delay calculation

5. Comments - *Relevant information related to data availability, data reliability and other observations. See Section 4 of the Report for more details.*

CODA average coverage is approximately 70% of the ECAC (European Civil Aviation Conference) area.
Information can be visualised usually only for a single month at each request (detailed as "Temporal scope for a single request" in Section 7).
Some segregations (usually Market segment) can only be exported individually: one request for each market segment. More details in Section 7.
The "Aircraft Operator" sheet, that provides delay information segregated by aircraft operators, is not available (no aircraft operator can be selected).
CODA uses airline-reported information which is not always consistent with the information obtained from the Network Manager (see CODA Publications: Annual reports for further analysis).

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

No Performance Indicators are provided in this database

7. List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework

Area	Sub-area	Detailed information	Segregation	Units	Temporal granularity	Temporal scope for a single request	Source	Comments
Traffic	IFR flights	# Average daily IFR flights	# By market segment - Traditional scheduled - Low cost - Charter - All cargo - Business aviation - Military - Other types	[flights]	Monthly	Selected month, past and actual year	STATFOR	
		# Average monthly IFR flights	# By route length: - Less than 500km - Between 500km and 1500km - Larger than 1500km # By aircraft type	[flights]	Monthly	Selected month	EUROCONTROL Network Manager (NM), filtered on airlines reporting to CODA	Segmentation by aircraft type can only be obtained for the selected aircraft (not all aircraft at the same request)
Delays - General	CODA planning indicators	# Block time overshoot (BTO)	-	[% flights]	Monthly	Last 12 months before selected month	-	Percentage of flights with an actual block time which exceeds the scheduled block time
		# Average delay Difference Indicator per flight (DDI-F)	-	[min/flight]	Monthly	Last 12 months before selected month	-	Difference between departure and arrival punctuality expressed in minutes
Delays - Arrival	Average arrival delay	# Average delay per movement for arrival delay (ADMA)	-	[min/flight]	Monthly	From January of 4 years ago until selected month	-	Difference between ATA and STA divided by number of arrivals
		# Average delay per delayed flight for arrival delay (ADAF)	-	[min/flight]	Monthly	Last 12 months before selected month		Percentage of delayed flights also included
	Arrival punctuality distribution	# Percentage of delayed flights (PDF) on arrival by delayed time (short delays)	# By delayed time: Adv>15, Adv 5-15, On time, Del 5-15, Del 16-30, Del 31-60, Del>60	[% flights]	Monthly	Selected month, past and actual year	-	
		# Percentage of delayed flights (PDF) on arrival by delayed time (long delays)	# By delayed time: >60min, >120min, >180min, >240min, >300min	[% flights]	Monthly	Last 12 months before selected month	-	Total number of flights also included
		# Number of delayed flights	# By aircraft operator # By airport # By ON-block delay: - Delayed flights (>=5 min) - On-time flights (0 to 4 min) - Early flights (before STA)	[flights]	Monthly	Selected month	-	
Delays - Departure	Average departure delay	# Average delay per movement for departure delay (ADMD)	-	[min/flight]	Monthly	From January of 4 years ago until selected month	-	Difference between ATD and STD divided by number of departures Not exactly consistent with "Departure delay by cause" subarea information
		# Average delay per delayed flight for departure delay (ADDF)	-	[min/flight]	Monthly	Last 12 months before selected month	-	
		# Average delay per movement (ADM)	# By source: - All-causes of delay - Network Manager	[min/flight]	Daily	Selected month	Airline, NM	
		# Average delay per movement (ADM)	# By top flight level	[min/flight]	Monthly	Selected month	EUROCONTROL Network Manager (NM), filtered on airlines reporting to CODA	
		# Average delay per delayed flight (ADD)	# By delay cause and time: - "All Causes of Delay" ADD from 5 mins delay - "All Causes of Delay" ADD from 15 mins delay - ATFM ADD from 5 mins delay - ATFM ADD from 15 mins delay	[min/flight]	Daily	Selected month	EUROCONTROL NM	
	Departure delay by cause	# Average departure delay per flight	# By delay cause (see CODA classification, afegir reactionary) # By aircraft type # By airport	[min/flight]	Monthly	Selected month, past and actual year	Airline-reported	
		# Number of flights with delay		[flights]				
		# Total delay		[min]				
		# Delay percentage		[% min]				
		# Total delay	# By aircraft type # By airport	[min]				
		# Total flights		[flights]				
	Departure punctuality distribution	# Percentage of delayed flights (PDF) on departure by delayed time (short delays)	# By delayed time: Adv>15, Adv 5-15, On time, Del 5-15, Del 16-30, Del 31-60, Del>60	[% flights]	Monthly	Selected month, past and actual year	-	
		# Percentage of delayed flights (PDF) on departure by delayed time (long delays)	# By delayed time: >60min, >120min, >180min, >240min, >300min	[% flights]	Monthly	Last 12 months before selected month	-	Percentage of delayed flights also included
		# Percentage of delayed flights (PDF) by delay cause and time	# By delay cause and time: - "All Causes of Delay" PDF from 5 mins delay - "All Causes of Delay" PDF from 15 mins delay - ATFM PDF from 5 mins delay	[% flights]	Daily	Selected month	EUROCONTROL NM	
		# Daily IFR flights by delayed time	# By delayed time: - Between 5 and 15 min - Between 16 and 30 min - Between 31 and 60 min - More than 60 min	[flights]	Monthly	Selected month	EUROCONTROL NM	
		# Number of delayed flights	# By aircraft operator # By airport # By OFF-block delay: - Delayed flights (>=5 min) - On-time flights (0 to 4 min) - Early flights (before STD)	[flights]	Monthly	Selected month	-	

1. General information - *Identification of the database and how to access it*

Database name	Statistics and forecasts (STATFOR)
Link	https://ext.eurocontrol.int/analytics/saw.dll?dashboard
Last factsheet update	05/08/2016

2. Abstract - *Brief description of the content and purpose of the database*

The objective of STATFOR is to provide statistics and forecasts on air traffic in Europe and to monitor and analyse the evolution of the Air Transport Industry.
The STATFOR Interactive Dashboard (SID) is the unique self-service source of statistics on flights in Europe. Thanks to the SID's segmented approach, the users benefit from:
a customised and flexible use of the tool,
an early access to the statistics – updated and available in the first week of each month,
a wide coverage of the statistics, and the synchronisation with the other STATFOR products.
More information: http://www.eurocontrol.int/statfor

3. Source and data format - *How the information is provided and where it is obtained from*

Published by	EUROCONTROL as the Network Manager
Public	No
Sources	EUROCONTROL Network Manager, Eurostat
Data format	Dashboard, Data format (CSV, Tab delimited, XML), Web archive, PDF, JPG

4. Data resolution - *Temporal and geographical characteristics of the information provided*

Temporal granularity	Daily, monthly, yearly
Temporal scope	2005 to present
Geographical granularity	Airport, Traffic zone, Traffic region, FAB, ECAC area, ESRA02, ESRA08, SES-RP2, SES-SJU, EU27, EU28
Geographical scope	ECAC area
Update frequency	Monthly
Last database update	Not specified (July 2016 at least)
Usefulness for INTUIT project	Traffic forecasts

5. Comments - *Relevant information related to data availability, data reliability and other observations. See Section 4 of the Report for more details.*

Information can be visualised usually only for a single month at each request (detailed as "Temporal scope for a single request" in Section 7).
Some segregations (usually Market segment) can only be exported individually: one request for each market segment. More details in Section 7.
Definitions related to airspace classification and market segments can be found in the "Definitions" sheet of the STATFOR Dashboard

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

No Performance Indicators are provided in this database

7. List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework

Area	Sub-area	Detailed information	Segregation	Units	Geographical granularity	Temporal granularity	Temporal scope for a single request	Source	Limitations	Comments
IFR flights	**Daily IFR flights**	# Average daily IFR flights	# By market segment (ind): - All market segments - All-cargo - Business aviation - Charter - Low-cost - Traditional scheduled # By flow: - All flows - Arrivals - Departures - Internal - Overflights	[flights]	# ECAC, ESRA02, ESRA08, SES-RP2, SES-SJU, EU27, EU28 # FAB # Traffic zone # Airport	# Monthly	# Only selected month # YTD		Market segment only individually or grouped	Change [flights] and growth [%] with respect to the same month of the previous year are also included
		# Total daily IFR flights	# By market segment: - All market segments - All-cargo - Business aviation - Charter - Low-cost - Traditional scheduled # By origin: - Total - East Atlantic - West Atlantic - Non-Atlantic	[flights]	# ECAC, ESRA 02, ESRA08, SES-RP2, SES-SJU, EU27, EU28 # FAB # Traffic zone (individually)	# Daily	2005-present		Geographical granularity only exportable individually All market segments in a single request	STATFOR note: *These numbers will differ slightly from those published by the CFMU, largely because they refer to a different geographical area.* *Numbers for the current, incomplete month, are provisional.* *In order to have a better daily accuracy this report uses as time reference the Entry Date in the State.*
	Monthly IFR flights	# Total monthly IFR flights # Total minutes	# By market segment: - All market segments - All-cargo - Business aviation - Charter - Low-cost - Traditional scheduled # By flow: - All flows - Arrivals - Departures - Internal - Overflights	[flights] [min]	# ECAC, ESRA 02, ESRA08, SES-RP2, SES-SJU, EU27, EU28 # FAB # Traffic zone	# Monthly	2005-present		All market segments in a single request but downloaded individually	Growth [%] with respect to the same month of the previous year is also included
	Yearly IFR flights	# Total IFR yearly flights	# By market segment: - All market segments - All-cargo - Business aviation - Charter - Low-cost - Military - Other types - Traditional scheduled # By scenario (only in forecast): - A: Global growth - C: Regulated growth - D: Fragmenting world	[flights]	# EU28+EFTA # ECAC (individually)	# Yearly (historic) # 5-year (forecast)	2004-2035	ECTL	Traffic region only exportable individually	See note below
	Traffic growth analysis	# Top X traffic zones with higher change and growth of daily flights in the selected period		[flights] [%]	# Traffic zones	# Selected period	2005-present			Overflights are excluded
	Mean distance flown	# Mean distance flown per flight # Flight distribution by distance flown # Total distance flown # Total IFR yearly flights	# By distance flown: - Less than 500 km - [500, 1000) km - [1000, 1500) km - [1500, 2000) km - [2000, 4000) km - More than 4000 km # Only 1 scenario: - C: Regulated growth	[km/flight] [flights] [km] [flights]	# EU28+EFTA # ECAC (individually)	# Yearly (historic) # 5-year (forecast)	2004-2035	ECTL	Traffic region only exportable individually	See note below
	Flight movements distribution	# Total yearly arrivals by hour # Total yearly departures by hour # Total yearly flight movements by hour # Total yearly flight movements # Avg arrivals and departures by hour		[flights] [flights] [flights] [flights] [flights/hour]	# EU28+EFTA # ECAC (individually)	# Yearly	2004-2015	ECTL	Traffic region only exportable individually	See note below
	Mean aircraft age	# Distribution of flights by aircraft age # Mean aircraft age per flight # Mean aircraft age for distance flown	# By market segment: - Freight - Business aviation - Combined passenger - Low-cost - Traditional scheduled - Charter	[flights] [years] [years]	# EU28+EFTA # ECAC (individually)	# Yearly	2005-2015	ECTL	Traffic region only exportable individually	See note below
Traffic flow	**Traffic flow inside ESRA08**	# Average IFR daily flights	# By market segment (ind): - All market segments - All-cargo - Business aviation - Charter - Low-cost - Traditional scheduled # By origin-destination pair (traffic zones)	[flights]	# Traffic zone	# Monthly	# Only selected month # YTD		Market segment only individually or grouped	Change [flights] and growth [%] with respect to the same month of the previous year are also included *Showing only Airports with 1 or more flights/day*
	Traffic flow to outside ESRA08	# Daily departures from selected traffic zone/region to traffic zones/regions outside ESRA08 # Daily flight change compared to previous year		[flights]	# ECAC, ESRA 02, ESRA08, SES-RP2, SES-SJU, EU27, EU28 # FAB # Traffic zone	# Monthly	2005 - present		Departure traffic zones/regions only exportable individually or grouped	
	Traffic flow from outside ESRA08	# Daily departures from selected traffic zone/region outside ESRA08 to ESRA08 # Daily flight change compared to previous year		[flights]	# Traffic zone/region	# Monthly	2005 - present		Departure traffic zones/regions only exportable individually or grouped	
	Reroutings over a specific region	# Reroutings over a specific region for each flow: - Avg daily movements on period 1 - Avg daily movements on period 2 - Growth rate - Difference in avg daily movements - Difference in avg daily movements due to rerouting	# By O-D traffic zone or traffic region	[flights]	# ECAC, ESRA 02, ESRA08, SES-RP2, SES-SJU, EU27, EU28 # FAB # Traffic zone (individually)	# Selected period	2013 - present		Beta version Traffic zone/region only exportable individually	Difference in daily flights that flow over the selected traffic zone (or traffic region) by each O-D pair due to rerouteing (change in flight patterns). Comparison with respect to: - One month ago - 364 days ago - This season - This season last year
	Reroutings for a specific flow	# Reroutings over different regions for a specific flow: - Avg daily movements on period 1 - Avg daily movements on period 2 - Growth rate - Difference in avg daily movements - Difference in avg daily movements due to rerouting	# By traffic zones or traffic regions	[flights]	# ECAC, ESRA 02, ESRA08, SES-RP2, SES-SJU, EU27, EU28 # FAB # Traffic zone	# Selected period	2013 - present		Beta version Traffic zone/region O-D only exportable individually	Difference in daily flights from the selected O-D pair that flow by each traffic zone (or traffic region) Comparison with respect to: - One month ago - 364 days ago - This season - This season last year

Forecasts		# Total yearly IFR flights	# By traffic zone # By O-D traffic region # By forecast issue (ind) - MTF16 - MTF15, MTF 15b - MTF 14, MTF 14b - MTF 13b # By scenario (ind) - High - Medium - Low	[flights]	# ECAC, ESRA 02, ESRA08, SES-RP2, SES-SJU, EU27, EU28 # FAB # Traffic zone	# Yearly	2010-2022		Forecast issue and scenario are only exportable individually However, total traffic (without O-D segmentation) can be exported for the 3 scenarios in a single download	Growth [%] with respect to previous year is also available Two-year forecast by traffic zone, forecast issue can be obtained as a map
	Yearly IFR flights and distance flown	# Total yearly IFR flights # Total distance flown	# By market segment: - All market segments - All-cargo - Business aviation - Charter - Low-cost - Military - Other types - Traditional scheduled # By scenario (only in forecast): - A: Global growth - C: Regulated growth - D: Fragmenting world	[flights] [km]	# EU28+EFTA # ECAC (individually)	# Yearly (historic) # 5-year (forecast)	2004-2035	ECTL	Traffic region only exportable individually	See note below
		# Flight distribution by distance flown # Total IFR yearly flights # Total distance flown # Mean distance flown per flight	# By distance flown: - Less than 500 km - [500, 1000) km - [1000, 1500) km - [1500, 2000) km - [2000, 4000) km - More than 4000 km # Only 1 scenario: - C: Regulated growth	[flights] [flights] [km] [km/flight]	# EU28+EFTA # ECAC (individually)	# Yearly (historic) # 5-year (forecast)	2004-2035	ECTL	Traffic region only exportable individually Only scenario Regulated Growth	See note below
	Forecast deviation	Forecasted vs real daily flights by traffic zone/traffic region with: - Forecasted growth - Actual growth - Growth deviation - Deviation mean	# By flow: - All flows - Arrival/Departure - Internal - Overflight	[%] [flights]	# ECAC, ESRA 02, ESRA08, SES-RP2, SES-SJU, EU27, EU28 # FAB # Traffic zone	# Selected period	2005 - present			Input parameters: - Forecast issue (Feb16, Sept15, Feb15) - Reference year (2014, 2015) Interactive maps included
		# Forecast IFR daily flights # Actual IFR daily flights	# By flow (ind): - All flows - Arrival/Departure - Internal - Overflight	[flights]	# ECAC, ESRA 02, ESRA08, SES-RP2, SES-SJU, EU27, EU28 # FAB # Traffic zone	# Monthly	# From month of the forecast issue until end of year		Market segment only exportable individually or grouped	Input parameters: - Forecast issue (Feb16, Sept15, Feb15)
Pax and cargo	**Mean Available Seats per Flight**	# Mean available seats per flight # Total yearly seats # Total yearly IFR flights		[seats/flight] [seats] [flights]	# EU28+EFTA # ECAC (individually)	# Yearly	2004-2015	Eurostat, ECTL	Traffic region only exportable individually	See note below Yearly flights use Eurostat data corrected with ECTL data
	Average Load Factor (total pax/total flights)	# Yearly load factor # Total yearly seats # Total yearly pax		[%] [seats] [pax]	# EU28+EFTA # ECAC (individually)	# Yearly	2004-2015	Eurostat	Traffic region only exportable individually	See note below
	Average Revenue Passenger Kilometres per Flight (RPK)	# Average Revenue Passenger Kilometres (RPK) per Flight # Total yearly flights # Total yearly pax		[RPK/flight] [flights] [pax]	# EU28+EFTA # ECAC (individually)	# Yearly	2004-2015	Eurostat, ECTL	Traffic region only exportable individually	See note below Yearly flights use Eurostat and ETCL data
	Average Available Seat Kilometres per Flight (ASK)	# Average Available Seat Kilometres (ASK) per Flight # Total yearly flights # Total yearly seats		[ASK/flight] [flights] [seats]	# EU28+EFTA # ECAC (individually)	# Yearly	2004-2015	Eurostat, ECTL	Traffic region only exportable individually	See note below Yearly flights use Eurostat and ETCL data
	Total Passengers	# Total yearly pax # Average passengers per flight		[pax] [pax/flight]	# EU28+EFTA # ECAC (individually)	# Yearly	2004-2015	Eurostat	Traffic region only exportable individually	See note below
	Total Tonnes	# Total yearly tonnes		[tonnes]	# EU28+EFTA # ECAC (individually)	# Yearly	2004-2015	Eurostat	Traffic region only exportable individually	See note below

* Note (STATFOR):

1) Eurostat data for the last calendar year (2015) is incomplete as of 05/08/2016.

2) The scope of the statistics is all (IFR) flights which either depart or arrive at an airport in the EU28 or EFTA region.

3) For continuity of statistics, recent member States of the EU, such as Croatia, Bulgaria, Romania, are included in the "EU28" aggregate region even before their accession. Note that pure overflights are not included.

4) "Flight" here is in the ATC sense, which elsewhere may be referred to as 'flight stage', ie the operation of an aircraft from departure to arrival. We use 'flight movement' for the departures and arrivals at an airport – a 'flight' may generate 1 or 2 'flight movements' at airports in the region covered.

5) We provide an aggregate 'passenger' group of flights which is a sum of the 3 market segments (traditional) scheduled, low-cost and non-scheduled (ie leisure charter).

6) Seats information is available from Eurostat (avia_par dataset), but this only covers major flows. So seats/flight and load factors are based on this subset of flights.

7) Total pax, total tonnes, pax/flight are for commercial flights as reported by Eurostat (avia_paoc dataset).

8) Airport-pair statistics (Eurostat avia_par as in note 5) are also used for seat-km statistics, joined with actual flown distance from EUROCONTROL data. So these averages are based on a subset of busier airport-pairs.

9) Distances for future years are shown as great-circle (shortest) distance. We also provide actual flown distances for historical years, which are longer – and in the aggregate total distance flown graph you will find both, for comparison.

INTUIT - WP2 Multiscale performance characterisation

T2.2 Data quality assessment

Performance databases factsheet

1. General information - *Identification of the database and how to access it*

Database name	Demand Data Repository (DDR)
Link	https://ext.eurocontrol.int/ddr/ http://www.eurocontrol.int/ddr
Last factsheet update	30/08/2016

2. Abstract - *Brief description of the content and purpose of the database*

The DDR service aims to provide the most accurate picture of pan-European air traffic demand, past and future, from several years ahead until the day before operations.
The DDR project was developed in two phases, DDR1 and DDR2.
DDR1 produced future traffic samples, mainly using historical traffic samples adjusted with STATFOR forecast data and the FIPS (Flight Increase Process). It is currently being phased out.
DDR2, now promoted as the DDR service, covers DDR1 functionalities and also collects early available flight intentions from airlines (SSIM/INNOVATA data) and from coordinated airports through the European Union Airport Coordinators Association (EUACA).

3. Source and data format - *How the information is provided and where it is obtained from*

Published by	EUROCONTROL as the Network Manager
Public	No
Sources	Network Manager
Data format	AIRAC files that have to be processed with NEST and then exported to excel or txt files

4. Data resolution - *Temporal and geographical characteristics of the information provided*

Temporal granularity	Daily
Temporal scope	jul-2012 to present
Geographical granularity	See section 6
Geographical scope	ECAC area
Update frequency	One week after the end of each AIRAC cycle (28 days period)
Last database update	23/08/2016
Usefulness for INTUIT project	High, this database has high potential for metrics computation

5. Comments - *Relevant information related to data availability, data reliability and other observations*

Access must be requested to EUROCONTROL and it is provided strictly
This datasheet is limited to the DDR2 data access that has been provided for the INTUIT project
Data is provided in AIRAC files that have to be processed with NEST software (also available in the DDR2 database). This software allows to visualise and analyse the route trajectories and also export the information in excel and txt files (more info in NEST manual).
Route trajectories discretisation is not highly precise in "Initial flights", specially those proceding from outside the European airspace

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

No Performance Indicators are provided in this database

7. List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework

Area	Description	Detailed information	Units	Geographical granularity	Temporal granularity	Comments
Flight list	List of all the flights that have entered the ECAC area	# Origin and destination airports # Flight number # Airline # Aircraft type # Wave vortex category (Heavy, Medium, Light)	[ICAO codes]	Possibility to filter flights (by ACC, sector, airport, navigation points, military areas...)	Daily	Flights are avalable as "Initial flights", which correspond to the last filed flight plan, and "Actual flights", which correspond to the actual trajecotry flown by the aircraft updated with radar data. Off-block times, Take-off times and arrival times are "Estimated" for Initial flight trajectories, and "Actual" for Actual flight trajectories. Most penalising regulation: even though delayed flights may pass through more than one regulation, the total flight delay is attributed to the regulation causing the most delay.
		# EOBT, ETOT, Arrival time / AOBT, ATOT, Arrival time	[hhmmss]			
		# ATFM Delay	[minutes]			
		# Route length	[NM]			
		# Requested Flight Level	-			
		# Most penalising regulation	-			
Route trajectories	Trajectories of all the flights that have entered the ECAC area	# Origin and destination airports # Flight number # Aircraft type	[ICAO codes]	Possibility to filter flights (by ACC, sector, airport, navigation points, military areas...)	Daily	Flights are avalable as "Initial flights", which correspond to the last filed flight plan, and "Actual flights", which correspond to the actual trajecotry flown by the aircraft updated with radar data.
		# Trajectory discretisation. For each segment: - Initial and final latitude and longitude - Initial and final altitude - Initial and final time	[minutes decimale] [Flight level] [hhmmss]			
Airspace configuration	Airspace data of the ECAC area	# Airports' latitude, longitude and altitude # Navigation points' latitude and longitude # Airblocks' latitude and longitude # Sectors' name, type and altitude	-	ECAC area	AIRAC cycle	

1. General information - *Identification of the database and how to access it*

Database name	Public Airport Corner
Link	https://ext.eurocontrol.int/airport_corner_public/
Last factsheet update	20/04/2016

2. Abstract - *Brief description of the content and purpose of the database*

The Airport Corner is a data repository that contains key airport information such as capacity, airside and landside information, traffic forecast, future events impacting operations among other data.
It is developed by EUROCONTROL as the Network Manager, with the data that regularly captures from European airports in order to help effectively manage the European ATM Network.
The Public Airport Corner contains non confidential information directly reported by airports.
List of participant airports: http://www.eurocontrol.int/sites/default/files/content/documents/nm/airports/airport-corner-participants.pdf
More information: http://www.eurocontrol.int/articles/airport-information

3. Source and data format - *How the information is provided and where it is obtained from*

Published by	EUROCONTROL as the Network Manager
Public	Yes
Sources	Airport
Data format	Dashboard

4. Data resolution - *Temporal and geographical characteristics of the information provided*

Temporal granularity	N/A (Most information is static data)
Temporal scope	N/A (Most information is static data)
Geographical granularity	Airport level
Geographical scope	More than 70 European airports and others in the process of joining
Update frequency	Unknown
Last database update	End 2015 / Beginning 2016 (depends on the airport)
Usefulness for INTUIT project	Statistic airport data (capacity-demand balance)

5. Comments - *Relevant information related to data availability, data reliability and other observations. See Section 4 of the Report for more details.*

This data repository is updated voluntarely by European airports.
This facthseet indicates the global information that can be provided, but the amount of information provided by each airport is up to the each airport operator.
Information is not exportable, the dashboard contains online information for each selected airport.
Useful to obtain a global picture about airport operational information.

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

No Performance Indicators are provided in this database

7. List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework

Area	Sub-area	Indicator	Comments	Temporal granularity	Temporal scope	Units
Capacity	Current capacity	Terminal capacity	-	Single value	Single value	Pax/year
		Global yearly capacity	-	Single value	Single value	Mov/year
		Capacity per each runway configurations	Divided in Arrivals, Departures, and Global. Some airports with additional info (times, coordinated values, reconstruction plans)	Single value	Single value	Mov/hour
		Capacity with adverse weather conditions	Divided by Arrivals, Departures, and Global. Divided also by Cat II, Cat III and strong winds	Single value	Single value	Mov/hour
	Forecasted capacity	Global yearly capacity	A lot of airports declared as confidential (check how many)	Yearly	Current - 2039 (aprox)	Mov/year
		Global hourly capacity	A lot of airports declared as confidential (check how many)	Yearly	Current - 2039 (aprox)	Mov/hour
Traffic	Traffic forecast	% increase	In some airports also absolute number of ATMs	Yearly	Current - 2021	%
On-going and planned activities	Airport activities and events impacting operations	-	Local plans and special events with their expected impact (new planned configurations, new regulations...)	-	-	-
	Joint ECTL projects	Airport CDM implementation	Project implementation status, local contacts, expected benefits, lessons learned	-	-	-
		Airport ACE implementation	Project implementation status, local contacts, expected benefits, lessons learned		-	-
		Analysis and delay reduction	Project implementation status, local contacts, expected benefits, lessons learned	-	-	-
General information	Opening hours	-	Airport opening hours, curfews and planned changes	-	-	-
	Environmental constraints	-	Airport noise and CO2 constraints	-	-	-
	Environmental management	-	Airport environmental reports and certifications	-	-	-
Weather management	Adverse conditions	-	List of most frequent adverse conditions and number of days or hours per year	-	-	-
	Processes and procedures	-	Description of procedures for each adverse condition (low visibility, de-icing, cross wind)	-	-	-
TMA / Approach	Separation and spacing procedures and practices	-	Minimum radar approach separations, control and application of this separation	-	-	-
	CDO (Continuous Descent Operations)	-	Information about CDO implementation, operating times, altitude and procedure	-	-	-
Traffic mix	Flights	Foreseen changes in traffic mix	-	-	-	-
		A380 facilitation and plans	-	-	-	-
	Passengers	Purpose of travel	Divided by business, private, leisure and others	-	-	%
		Type of travel	Divided by Final destination / Transfer	-	-	%
Infrastructure services	Airside information	Runway configurations	List of RWY configurations, mode of operation, usage	-	-	-
		Runway designators	List of RWY designators and usage	-	-	-
		Systems	List of available systems and future plans (SMR, AMAN, DMAN...)	-	-	-
	Lanside information	Air-rail intermodality	Train or other planned accesses to the airport	-	-	-
	CNS	D-ATIS	Data link / Digital Automatic Terminal Information Service provision	-	-	-
		DCL	Departure Clearance provision	-	-	-
Contacts	Local	-	Airport tactical/operational contacts, ANSP, main carrier, MET	-	-	-
	Crisis management	-	Crisis management point of contact (Airport operator and ANSP)	-	-	-
	Safety	-	Safety focal point (Airport operator and ANSP)	-	-	-
	Environmental	-	Environmental focal point	-	-	-
	EUROCONTROL	-	Directorate Network Management	-	-	-

INTUIT - WP2 Multiscale performance characterisation
T2.2 Data quality assessment
Performance databases factsheet

1. General information - *Identification of the database and how to access it*

Database name	ATM Cost-Effectiveness (ACE) YEAR Benchmarking Report
Link	http://www.eurocontrol.int/prb/publications
Last factsheet update	31/05/2016

2. Abstract - *Brief description of the content and purpose of the database*

Prepared PRU with ACE Working Group
It presents global and segregated (per ANSP) data about incurred costs and efficiency parameters of ATM/CNS provision.
Parameters include relevant KPIs for cost-efficiency focus area.

3. Sources and data visualisation - *How the information is provided and where it is obtained from*

Published by	EUROCONTROL, as the Performance Review Body of the Single European Sky
Public	Yes
Sources	ANSPs annual reports, NM
Data format	PDFs, some data (DUC calculation) is found in excel format in annexes of National Performance Reports

4. Data resolution - *Temporal and geographical characteristics of the information provided. Fill only if these characteristics are common for the entire database.*

Temporal granularity	Yearly
Temporal scope	2002 onwards (SEID version 2.6 since ACE 2008)
Geographical granularity	ANSP level
Geographical scope	ECAC countries plus Armenia, Moldova, Turkey and Ukraine
Update frequency	Yearly
Last database update	may-15
Usefulness for INTUIT project	Contains all economic indicators defined for SESAR framework

5. Comments - *Other relevant information*

Since these services are outside the PRC's terms of reference, this report does not address performance relating to: oceanic ANS; OAT or airport landside management
DSNA and HCAA are still not in a position to provide complete balance-sheet data, HCAA data quality is not satisfactory
7 ANSPs (out of SES) did not make public their annual reports for 2013
Information is in €2013
Also avaible 2014 draft (date 18 March 2016)
SES cost-efficiency KPI is not defined as ACE cost-efficiency KPI, see annex 3 of the ACE report

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

Performance Framework SESAR

Performance Area	Performance Indicator	Detailed information	Units	Calculation
Cost-efficiency	Economic cost-effectiveness	# Economic and Financial (without delay costs) # Overall and per ANSP # Cost divided by economic, en-route delays and airport delays # Forecast 2013/2018	€ / hour	(ATM/CNS provision costs + ATFM delay costs) / Composite flight hours
	ATCO Hour Productivity	# Overall and per ANSP # ATCO hours on duty per year per ATCO with and without overtime	hour / hour	Composite flight hours / ATCO in OPS hours
	Employment costs per ATCO-hour	# Overall and per ANSP # with and without PPP correction	€ / hour	€ per ATCO hour on duty
	Support costs per composite flight-hour	# Overall and per ANSP # Divided by employment (excl. ATCOs in OPS), capital-related, Non-staff and exceptional	€ / hour	€ per composite flight hour

7. Indicators not directly related to Performance Framework - *List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework*

Indicator	Calculation	Comments	Geographical granularity	Last update
Planned capital expenditures and depreciation costs	M€	Divided by project (project temporal scope also avaible) Temporal scope 2009/2018	ANSP	may-15
Composite gate-to-gate flight-hours = En-route flight-hours + (0.27 x IFR airport movements)	En-route flight-hours + (0.27 x IFR airport movements)		ANSP	may-15
Gate-to-gate ATM/CNS provision costs	€'000		ANSP	may-15
En-route ATFM delays	000 minutes		ANSP	may-15
Airport ATFM delays	000 minutes		ANSP	may-15
Costs of ATFM delays	87€ x minute		ANSP	may-15
Adjusted density	N/A		ACC	may-15
Vertical interactions	N/A		ACC	may-15
Horizontal interactions	N/A		ACC	may-15
Speed interactions	N/A		ACC	may-15
Average used flight level	feet/100		ACC	may-15
Purchasing Power Parity	Exchange rate (1 if euro), inflation rate (%) and PPP (national currency/€)		ANSP	may-15
Traffic variability indicators	# Based on three months periods, peak month / average month and peak week / average week		ANSP	may-15

ANS revenues breakdown	See Annex 8		ANSP	may-15
ANS costs breakdown	See Annex 8		ANSP	may-15
ATM/CNS provision costs breakdown	See Annex 8		ANSP	may-15
ANSP balance sheet	See Annex 8		ANSP	may-15
Total staff and ATCOs in OPS	See Annex 8		ANSP	may-15
Operational data	See Annex 8	Size of airspace, ACC number, APP units, IFR flight hours controlled…	ANSP and ACC	may-15

Links:	Report (2013)	http://www.eurocontrol.int/publications/atm-cost-effectiveness-ace-2013
	Required data from ANSPs	http://www.eurocontrol.int/sites/default/files/publication/files/Specification-for-Economic-Information-Disclosure-V3.pdf

INTUIT - WP2 Multiscale performance characterisation
T2.2 Data quality assessment
Performance databases factsheet

1. General information - *Identification of the database and how to access it*

Database name	NM ATFCM Statistics
Link (Network Operations Report)	http://www.eurocontrol.int/publications?title=&field_term_publication_type_tid=207&year[value][year]=
Link (NM ATFCM Statistics)	https://intra-x.eurocontrol.int/atfm_report/nonpublic/subsite_homepage/homepage.html
Last factsheet update	01/06/2016

2. Abstract - *Brief description of the content and purpose of the database*

On this page you will have access to the reports published by the Performance, Forecasts and Relations (PFR) Unit of the Network Manager Directorate (NMD).
The Network Operations Report 2015 provides a high level view of the performance of the European ATM network in 2015.
Report is based on several indicators obtained from Network Manager (NM), airlines, CODA and airports.
Results are linked with main disruptions and ATM changes.

3. Sources and data visualisation - *How the information is provided and where it is obtained from*

Published by	EUROCONTROL, as the Performance Review Body of the Single European Sky
Public	No, access must be requested for most of data (except annual and monthly Network Operations Reports)
Sources	NM, airlines, CODA, airports
Data format	Daily briefings in excel format, the rest are PDFs

4. Data resolution - *Temporal and geographical characteristics of the information provided. Fill only if these characteristics are common for the entire database.*

Temporal granularity	See section 6
Temporal scope	See section 6
Geographical granularity	See section 6
Geographical scope	NM Area
Update frequency	See section 6
Last database update	See section 6
Usefulness for INTUIT project	High number of indicators linked with delay statistics, some data is disaggregated and of usefulness

5. Comments - *Other relevant information*

2015 report is open for consultation
April 2016 report also availble
Requested access via Onesky Online of not public data, where daily briefings seem the most useful data in excel format
Some of this data may be directly found in CODA

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

Performance Framework SESAR

Performance Area	Performance Indicator	Detailed information	Units	Geographical granularity	Geographical scope	Temporal granularity	Temporal scope	Source	Last update	Calculation	Comments / Update checks
Capacity	En-route throughput	# Average daily traffic # Average summer daily traffic # Peak day traffic # ACC estimated capacity (flights/hour)	flights / day flights / day flights / day flights / hour	ACC	Network Manager	Yearly	2015	NM	abr-16	Estimation, some provide method (eg ACCESS) others dont	Annex II of annual report
	Airport busy hour throughput	# Peak 1 hour arrivals # Peak 1 hour departures # Peak global 1 hour operations # Separated by RWY configuration	flights / day	Airport	Network Manager BIC airports	Yearly	2015	ANSP	abr-16	Not specified	Annex III of annual report. Some only provide global or no data, capacity might be expressed as a function of hour (noise limitations)
	En-route increased throughput	Capacity increase	%	ACC	Network Manager	Yearly	2015	NM	abr-16	Not specified	Annex II of annual report.

Performance Framework SES II

Performance Area	Performance Indicator	Detailed information	Units	Geographical granularity	Geographical scope	Temporal granularity	Temporal scope	Source	Last update	Calculation	Comments / Update checks
Capacity	En-Route delay/flight	mins of delay / number of flights	min / flight	ACC	Network Manager	Daily	2005/2015	NM	up-to date		Raw data in excel to compute the indicator in daily briefings
	Airport delay/flight	mins of delay / number of operations	min / flight	Airport	Network Manager	Daily	2005/2015	NM	up-to date		Only airports with >=50 operations; Raw data in excel to compute the indicator in daily briefings
	ATFM departure slot adherence	Aircraft departing within their Slot Tolerance Window	%	Network	Network Manager	Monthly	2014/2015	NM	abr-16		It is not exactly the indicator defined by SESAR (flights departing in +/- 2 min). Found in slot adherence reports
Environmental	RTE-DES (route extension due to airspace design)	Similar to KEP indicator (in PRU dashboard)	%	Network	Network Manager	Airac cycle	2007/2015	NM	abr-16	Minimum achievable planned distance / minimum ortodrombic distance	Annual report, definition not clearly stated
	RTE-FPL (route extension based on last filed flight plan)	Last filled plan route extension	%	Network	Network Manager	Airac cycle	2007/2015	NM	abr-16	Flight plan distance / minimum ortodrombic distance	Annual report, definition not clearly stated
	KEA	Actual trajectory route extension Already found in PRU dashboard									
	RAI	Rate of aircraft interested (aircraft which planned CDR)	%	Network	Network Manager	Airac cycle	2005/2016	NM	abr-16	Aircraft planning CDR / aircraft affected by CDR	Annual report
	RAU	Rate of aircraft actually using (aircraft which fly CDR)	%	Network	Network Manager	Airac cycle	2005/2016	NM	abr-16	Aircraft using CDR / aircraft affected by CDR	Annual report

7. Indicators not directly related to Performance Framework - *List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework*

Indicator	Units	Comments		Temporal scope	Source	Temporal granularity	Geographical granularity	Last update
Traffic	Daily IFR traffic (flights)			2000/2015	NM	Daily	ACC and Airport	up-to date
Effective Capacity Indicator	Flights per day	Indicator defined by PRC		2005/2015	?	Yearly	NM	apr-16
Average departure delay per flight (CODA)	min per flight	# Separated in reactionary, other primary delay all causes and ATFM en-route # Definition different from that of NM, lower values of delay		2005/2015	CODA	Monthly	NM	apr-16
Average departure delay per flight (NM)	min per flight	# ATFM restriction delays # ATFM delays reported by airlines may be lower than the NM calculated ATFM delays due to difference in methods: ATFM delays of NM are the (flight) planned "delays"; the airlines report the "actual" experienced ATFM delay on departure		2005/2015	NM	Monthly	NM	apr-16
Percentage of delayed flights	%	# Separated between NM and CODA reported # Separated by delays of >15 min and >30 min		2005/2015	NM and CODA	Yearly	NM	apr-16
ATFM delays	average min per day average min per flight	# Separated between Airport and en-route # Separated by causes (different causes for en-route and airport) # Disaggregated for 20 top delay ACC		2005/2015	NM	Yearly	ACC and NM	apr-16
Extra European flights	average daily flights	# Fligths from/to extra-european main countries # Separated by country		2005/2015	NM	Monthly	NM	apr-16
Airline load factor	%	# Aircraft load factor		2005/2015	AEA	Weekly	NM	apr-16
Market share	%	# Market share of traditional, low cost, bussiness, non-scheduled and all-cargo plus military and other		2005/2015	NM	Monthly	NM	apr-16
Crude oil and fuel prices	€	# Brent crude / barrel # Rotterdam Kerosene / tonne		2005/2015	EIA, Eurostat, IATA	Monthly	N/A	apr-16
Ticket Prices	%	# Percentage change with respect to previous year		2005/2015	STATFOR	Monthly	NM	apr-16
Rate of Operational Cancellations	%	# Remarkable events analised # Only 30 of 50 CODA airports analised		2005/2015	CODA	Monthly	NM	apr-16

Area	Subarea	Indicator	Comments	Geographical scope	Temporal granularity	Geographical granularity	Units
En-Route performance	Planed Events and Disruptions	En-route planned events	# Upgrades or implementations and temporal scope		Three months	ACC	N/A
		En-route disruptions	# Date, ATFM delay impact and traffic impact		Daily	ACC	N/A
	ACC	En-route delay	# Forecast, actual		Yearly	ACC	min / flight
		Traffic	# Forecast, summer, peak day, annual		Yearly	ACC	flights per day
		Capacity increase	# NOP plan, actual		Yearly	ACC	flights per day
Airports	Airport delay	Average daily arrivals and departures (from those, regulated and delayed)		top 500 airports	Monthly	Airport	flights per day
		Total airport delay	# Clasified by delay reason for 20 most penalising	top 500 airports	Monthly	Airport	min per day
	Airport traffic	Disruptions	# Date, ATFM delay impact and traffic impact		Yearly	Airport	N/A
		Runway capacity	# Maximum arrivals, departures, global	35 airports with most delays	Yearly	Airport	movements per hour
		IFR movements per year	# Separed by CFMU/CODA and CFMU covered	35 airports with most delays	Yearly	Airport	movements per year
		Yearly ATFM delay by cause of delay	# Causes: weather, events, disruptions, capacity, ATC disruptions, ATC staffing, ATC capacity	35 airports with most delays	Yearly	Airport	min per year
		Arrival punctuality	# Divided by >15 min behind within +-15 min and >15 min ahead schedule	35 airports with most delays	Yearly	Airport	%
		Slot compliance (inside SWT, early and late DEP)	# Divided by >15 min behind within +-15 min and >15 min ahead schedule	top 20 most penalising airports	Monthly	Airport	%
		Departure punctuality (inside DWT, early and late DEP)	# Divided by >15 min behind within +-15 min and >15 min ahead schedule	top 20 most penalising airports	Monthly	Airport	%

Flight Efficiency	Airspace Design	Average Route Extension due to Airspace			Yearly	NM	%
		Potential Yearly Savings			Yearly	NM	NM
	Airspace Changes vs Flight Planning	Average Route Extension based on Latest Filed Flight Plan (RTE-FPL)			Yearly	NM	%
		NM savings	# NM flown also shown		Yearly	NM	NM
	Actual Trajectory	KEA			Yearly	NM	%
	Conditional Routes (CDR)	CDR number of segments	# Separated into CDR1, CDR1/2 and CDR2		Yearly	NM	-
		Rate of CDR avaibility (RoCA)	# Separated into CDR1, CDR1/2 and CDR2		Airac cycle	NM	%
		Rate of Aircraft Interested (RAI)			Airac cycle	NM	%
		Rate of Aircraft actually Using (RAU)			Airac cycle	NM	%
		Monthly Distance and Time Savings			Airac cycle	NM	NM per flight and min per flight
		CDR availbility vs usage	# Number of CDR avaible, planned and used		Airac cycle	NM	-
		Potential Flight Economy (PFE)	# Planned and used		Airac cycle	NM	NM
	Free Route Operations	Airports with FRA implementation and grade of implementation	# Divided into full, full night and DCT implementation		-	-	-
Network Manager	Delay Reductions	En-route delay savings			Yearly	NM	min / flight
	Flight Efficiency	Initiatives, phases and steps of implementation			Yearly	NM	-
		Route savings proposed			Yearly	NM	NM per day
		Route savings accepted			Yearly	NM	NM per day
ATFM Compliance	ATFM Departure Slots	Traffic departing within Slot Tolerance Window (STW)			Monthly	NM	Flights per day and %
	Adherence to Flight Plan Suspensions	Flights suspended per airport			Yearly	Airport	Flights per year and %
	ATFM Exemptions	for State Aircraft Monitoring			Yearly	State	%
	Missing Flight Plans	Flights identifying those flights that entered the European airspace without a flight plan and an ATS Unit filed the Flight Plan			Monthly	NM	Flights per year and %
	Multiple Flights	Number of flight plans received for which no subsequent activation or airborne information is received			Monthly	NM	Flights per year and %

INTUIT - WP2 Multiscale performance characterisation
T2.2 Data quality assessment
Performance databases factsheet

1. General information - *Identification of the database and how to access it*

Database name	National Performance Reports
Link	http://www.eurocontrol.int/articles/ses-performance-scheme-reference-period-2-2015-2019
Last factsheet update	19/05/2016

2. Abstract - *Brief description of the content and purpose of the database*

NPRs contain forecast of the KPIs for each of the ANSPs inside a FAB in accordance to objectives set by RP2
In addition, several PIs and other indicators are collected and forecasted for the reference period
It contains detailed past and forecast financial data of the ANSP segregated by service and source
In the reports additional information is found about forecasts and measures to achieve the indicators

3. Sources and data visualisation - *How the information is provided and where it is obtained from*

Published by	EUROCONTROL, as the Performance Review Body of the Single European Sky
Public	Yes
Sources	Dependant on data
Data format	Zip files with PDF and Excel (one per FAB)

4. Data resolution - *Temporal and geographical characteristics of the information provided. Fill only if these characteristics are common for the entire database.*

Temporal granularity	Yearly
Temporal scope	RP1 and RP2
Geographical granularity	ANSP
Geographical scope	SES area
Update frequency	Reference Period
Last database update	RP2
Usefulness for INTUIT project	Financial data of each ANSP is found in excel format in annexes and segregated by service (MET, ANS…) and source (STAFF, CAPITAL…)

5. Comments - *Other relevant information*

RP1 data also avaible
RP2 reports are not complete (only UK-IE, DK-SE, BALTIC and NEFAB availble for 20/05/2016)
Last update of RP2 database 2/03/2015
Economic and financial data not identified as performance indicator found in annex C, if any excel is not found, it is located in the NPR pdf (EG UK-IE en-route costs)
KPIs targets are found in the performance plan itself

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

Performance Framework SES II

Performance Area	Performance Indicator	Detailed information	Units	Geographical granularity	Geographical scope	Temporal granularity	Temporal scope	Source
Safety	EoSM	FAB/National target		FAB level	RP2 countries	Yearly	2015/2019	PRB / ANSPs
	RAT	FAB/National target		FAB level	RP2 countries	Yearly	2015/2019	PRB / ANSPs
	JC	FAB/National target		FAB level	RP2 countries	Yearly	2015/2019	PRB / ANSPs
Capacity	Minutes delay per flight	FAB/National target	min / flight	FAB level	RP2 countries	Yearly	2015/2019	PRB / ANSPs
	Average terminal and airport ANS ATFM delay	Airport target	min / flight	Airport level	RP2 countries	Yearly	2015/2019	PRB / ANSPs
Environment	KEA	FAB/National target	%	FAB level	RP2 countries	Yearly	2015/2019	PRB / ANSPs
	KEP	FAB/National target	%	FAB level	RP2 countries	Yearly	2015/2019	PRB / ANSPs
Cost-Efficiency	En Route Cost Efficiency	FAB/National target	DUCs (Direct Cost/Service Units)	FAB level	RP2 countries	Yearly	2015/2019	PRB / ANSPs
	Terminal Cost Efficiency	Airport target	DUCs (Direct Cost/IFR movement)	FAB level	RP2 countries	Yearly	2015/2019	PRB / ANSPs
	EUROCONTROL costs		€	ANSP level	RP2 countries	Yearly	2015/2019	PRB / ANSPs

7. Indicators not directly related to Performance Framework - *List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework*

Indicator	Calculation	Comments	Units	Temporal range	Source	Temporal granularity	Geographical granularity
GDP growth forecast	Combination of diverse forecasts	# Each country provides its own forecast # Found in the report	%	2013/2019	Several	Yearly	State
Inflation forecast		# Found in the report	%	2013/2019	IMF	Yearly	State
Traffic forecast and total Service Units		# Already found in STATFOR # Also predicted service units		2015/2019	STATFOR	Yearly	ANSP
Direct cost, by nature		# Disaggregated by en-route and terminal # Separated in staff, other operating, depreciation, cost of capital, exceptional # Separated by ANSP, MET, NSA	€	2015/2019	ANSPs	Yearly	ANSP
Cost of Capital	See annex H	# Parameters: gearing, cost of debt, cost of equity (pre and post tax) and WACC (pretax) in real and nominal terms	%	2015/2019	ANSPs	Yearly	State
Direct cost, by service		# Disaggregated by en-route and terminal # Separated by ATM, COM, NAV, SUR, SAR, AIS, MET, supervision and other # Separated by ANSP, MET, NSA	€	2015/2019	ANSPs	Yearly	ANSP
Determined costs		# Disaggregated by subjected to risk sharing or not and other revenues # Disaggregated by terminal and en-route # Separated by ANSP, MET, NSA	%	2015/2019	ANSPs	Yearly	ANSP
Cost of exempted VFR			€	2015/2019	ANSPs	Yearly	ANSP
Bonuses and penalties	RP2 animates to set thresholds for different KPIs to define bonuses and penalties (financial or other) for ANSPs	Chapter 4 covers incentive schemes and definition	%	2015/2019	ANSPs	Yearly	ANSP
Capex		Planned capital expenditures per project	€	2015/2019	ANSPs	Yearly	ANSP
Average RAB and Depreciation		Used for cost calculation	€	2015/2019	ANSPs	Yearly	ANSP

INTUIT - WP2 Multiscale performance characterisation
T2.2 Data quality assessment
Performance databases factsheet

1. General information - *Identification of the database and how to access it*

Database name	NOP ATFM Events
Link	https://www.public.nm.eurocontrol.int/PUBPORTAL/
Last factsheet update	20/05/2016

2. Abstract - *Brief description of the content and purpose of the database*

Network Manager storages relevant events for air traffic, which can be accessed through the Network Operations Portal
These events are public and can be searched with period, keywords, source and geographical filters

3. Sources and data visualisation - *How the information is provided and where it is obtained from*

Published by	Network Manager
Public	Yes
Sources	ERNIP, AIRPORT CORNER, NET, WIND…
Data format	.csv or .rtf table format

4. Data resolution - *Temporal and geographical characteristics of the information provided. Fill only if these characteristics are common for the entire database.*

Temporal granularity	hour
Temporal scope	2009/up-to date
Geographical granularity	ACC
Geographical scope	NM Area
Update frequency	real-time
Last database update	up-to date
Usefulness for INTUIT project	Events may be linked with ATFCM delays or outliers in data

5. Comments - *Other relevant information*

Format is not fully standarized: each event follows different ways of description and often fields are empty when they shouldn't
Each row contains an event and information of the event is shown in the different columns
Each column content is described in a row in section 7 of this excel
If reference documents, measures, capacity or efficiency impact are found, they are found in the details of the event online

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

7. Indicators not directly related to Performance Framework - *List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework*

Indicator	Description	Comments
Type		airport/airspace improvement/military/special
Subtype		Each type has a series of subtypes, one may have more than one type, a normally not filled
Name		Numeric, description or both, not standarized
Event Start		DD/MM/YYYY HH:mm
Event End		DD/MM/YYYY HH:mm
Data Source		ERNIP, AIRPORT CORNER, NET, WIND…
Status		Proposed / Implemented / Planned / Confirmed / On Hold / …
Short Description		Usually empty
Locations		2 first letters indicate geographic granularity: ACC, Country next the indicative of the location: LEMD, UK, CROATIA if more than one separated with commas
NM Internal Remarks	Item = Status	eg: NM action = Coordination required eg: Project Group = SG MIDASIA usually empty
NM comments		practically empty
Originator internal remarks		practically empty
Originator comments	Detailed description of the event	Usually empty If filled, may contain useful info
Measures/Scenarios	Yes / No	Further description online
Capacity impact	Yes / No	Further description online
Flight efficiency impact	Yes / No	Further description online
Expected benefits		practically empty, only found online
Attachments (to description and benefits)		practically empty, only found online
Reference Publications		practically empty, only found online
Activities and Impacts		practically empty, only found online
Originator	Information of the source: Organization Type (Airport / ANSP) Organisation Name (Amsterdam / LVNL) ICAO Code (EHAM)	Only found online, maybe more than one different originator listed

INTUIT - WP2 Multiscale performance characterisation
T2.2 Data quality assessment
Performance databases factsheet

1. General information - *Identification of the database and how to access it*

Database name	NOP AIM (ATFM Information Management)
Link	https://www.public.nm.eurocontrol.int/PUBPORTAL/
Last factsheet update	03/06/2016

2. Abstract - *Brief description of the content and purpose of the database*

Network Manager storages relevant events for air traffic, which can be accessed through the Network Operations Portal
These events are public and can be searched with period, keywords, source and geographical filters

3. Sources and data visualisation - *How the information is provided and where it is obtained from*

Published by	Network Manager
Public	Yes
Sources	NM
Data format	Online text

4. Data resolution - *Temporal and geographical characteristics of the information provided. Fill only if these characteristics are common for the entire database.*

Temporal granularity	Minutes
Temporal scope	2009/real-time
Geographical granularity	Route
Geographical scope	NM Area
Update frequency	real-time
Last database update	real-time
Usefulness for INTUIT project	Events may be linked with ATFCM delays or outliers in data

5. Comments - *Other relevant information*

Data is only available online
Format is not standarized, it is text in different formats

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

7. Indicators not directly related to Performance Framework - *List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework*

Indicator	Description
Valid from	DD/MM/YYYY HH:mm
Until	DD/MM/YYYY HH:mm
Released on	DD/MM/YYYY HH:mm
Title	
Description	Text

INTUIT - WP2 Multiscale performance characterisation
T2.2 Data quality assessment
Performance databases factsheet

1. General information - *Identification of the database and how to access it*

Database name	NOP AUP/UUP List (Airspace Use Plan/Updated Use Plan)
Link	https://www.public.nm.eurocontrol.int/PUBPORTAL/
Last factsheet update	03/06/2016

2. Abstract - *Brief description of the content and purpose of the database*

Network Manager storages relevant events for air traffic, which can be accessed through the Network Operations Portal
These events are public and can be searched with period, keywords, source and geographical filters

3. Sources and data visualisation - *How the information is provided and where it is obtained from*

Published by	Network Manager
Public	Yes
Sources	NM
Data format	online table

4. Data resolution - *Temporal and geographical characteristics of the information provided. Fill only if these characteristics are common for the entire database.*

Temporal granularity	30 minutes
Temporal scope	2009/real-time
Geographical granularity	Route
Geographical scope	NM Area
Update frequency	30 minutes
Last database update	real-time
Usefulness for INTUIT project	Route restrictions may have impact on capacity, fully standarized format

5. Comments - *Other relevant information*

Information about waypoints or routes is neccesary, if not, FIR is described but not in all cases
Importance of the route being issued is important for the analysis
First EAUP is issued at 6 a.m., after this EUUP are issued when necessary every 30 minutes to change the CDR availability
CDR type 1 are open if not otherwise stated, CDR type 2 are closed if not otherwise stated, RSA allocations are restricted routes with its own designation

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

7. Indicators not directly related to Performance Framework - *List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework*

Restriction	Indicator	Description	Comments
ATS Route and CDR Type 1 Closure	Route ID	Identificator of the route	
	Between	Initial waypoint of the route	
	And	Final waypoint of the route	
	MNM FL	minimum Flight Level	NNN
	MAX FL	maximum Flight Level	NNN
	WEF	Init time of closure	HH:mm
	TIL	End of closure	HH:mm
	FIR	FIR of the route	
	UIR	UIR of the route	
CDR Type 2 Availability	Route ID	Identificator of the route	
	Between	Initial waypoint of the route	
	And	Final waypoint of the route	
	MNM FL	minimum Flight Level	NNN
	MAX FL	maximum Flight Level	NNN
	WEF	Init time of availability	HH:mm
	TIL	End of availability	HH:mm
	FIR	FIR of the route	
	UIR	UIR of the route	
Level 1 RSA Allocations	RSA	Identificator of the route	
	MNM FL	minimum Flight Level	NNN
	MAX FL	maximum Flight Level	NNN
	WEF	Init time of closure	HH:mm
	UNT	End of closure	HH:mm
	FUA/EU RS	Restricted airspace identification	Normally left blank
	FIR	FIR of the route	
	UIR	UIR of the route	
CDR Type 2 Availability	RSA	Identificator of the route	
	MNM FL	minimum Flight Level	NNN
	MAX FL	maximum Flight Level	NNN
	WEF	Init time of closure	HH:mm
	UNT	End of closure	HH:mm
	FUA/EU RS	Restricted airspace identification	Normally left blank
	FIR	FIR of the route	
	UIR	UIR of the route	

1. General information - *Identification of the database and how to access it*

Database name	RAD (Route Availability Document)
Link	http://www.nm.eurocontrol.int/RAD/index.html?./1607/index.html
Last factsheet update	03/06/2016

2. Abstract - *Brief description of the content and purpose of the database*

Network Manager storages relevant events for air traffic, which can be accessed through the Network Operations Portal
These events are public and can be searched with period, keywords, source and geographical filters

3. Sources and data visualisation - *How the information is provided and where it is obtained from*

Published by	Network Manager
Public	Yes
Sources	NM
Data format	excel

4. Data resolution - *Temporal and geographical characteristics of the information provided. Fill only if these characteristics are common for the entire database.*

Temporal granularity	AIRAC cycle
Temporal scope	Real-time
Geographical granularity	Route
Geographical scope	NM Area
Update frequency	AIRAC cycle
Last database update	23/06/2016 (AIRAC 1607)
Usefulness for INTUIT project	Route restrictions may have impact on capacity, fully standarized format

5. Comments - *Other relevant information*

Information about waypoints or routes is neccesary
Importance of the route being issued is important for the analysis
Contains 6 appendixes (2 to 7) in excel format with route availability information
Past AIRACs to the previous of the actual could not be found
Description of tables is found in appendix 1

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

7. Indicators not directly related to Performance Framework - *List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework*

Appendix	Sheet	Item	Comments / Description
Appendix 2: Area definitions	Area	Change record	Status of area (blank is unmodified)
		Area Definition	Name of the area (city names or geographic)
		Area Airports	Airport name list (ICAO identificator)
	Group	Change record	Status of group (blank is unmodified)
		Group Definition	Name of the group (city names or geographic)
		Init time of closure	Airport name list (ICAO identificator)
Appendix 3: City-pair Level Capping		Change record	Status of capping (blank is unmodified)
		ID number	
		City Pair	From airport/area/group to airport/area/group
		FL Capping	restricted FL (usually not above FLXXX)
		Restriction Applicability	Daily hours of application (usually H24)
		Remark	Reasoning of the capping
Appendix 4: Enroute DCTs (Direct Routing)/ General Limits	Appendix 4 - 1 (DCT segment)	Change record	Status of segment (blank is unmodified)
		FROM	Start point of DCT segment (navaid or waypoint)
		TO	End point of DCT segment (navaid or waypoint)
		Lower Vertical Limit (FL)	GND (ground) or FL (flight level)
		Upper Vertical Limit (FL)	GND (ground) or FL (flight level)
		Available (Y) not Available (N)	Allowance or not (YES / NO)
		Utilization	Restrictions of its use
		Time Availability	Daily hours of application (usually H24)
		ID number	
		Operational Goal	Reasoning of the DCT definition
		Remark	Additional information
		Direction of Cruising Level	Odd or even or blank
		ATC Unit	to which the DCT belongs
	Appendix 4 - 2 (DCT en-route limit)	Change record	Status of limit (blank is unmodified)
		ATC Unit Name	to which the DCT belongs
		ATC Unit Vertical Limit	above FL, below FL or blank
		DCT Horizontal Limit	in NM
		Cross-border DCT Limits	"allowed" or "not allowed" to surpass ATC Unit borders
		ID Number DCT limit	?
		ID Number Not allowed Cross-border DCT / Cross border country codes in ID number may be bi-directional	?
Appendix 5: Airport Connectivity by DCT	General ARR DEP Conditions	Change record	Status of capping (blank is unmodified)
		NAS/FAB	ICAO code for country (2 letters)
		Conditions	SID STAR Requirements / Limits
		Explanation	Description of limitations
		Applicability	Daily hours of application (usually H24)
	DEP (Departure)	Change record	Status of capping (blank is unmodified)
		DEP AD (Departure Airdrome)	4 letter ICAO code
		Last PT SID / SID ID	Final waypoint of SID (navaid or waypoint) and SID designator
		DCT DEP PT	Final waypoint for departure DCT (navaid or waypoint)
		DEP Restrictions	Traffic, sectors, FL...
		DEP Restrictions Applicability	Daily hours of application (usually H24)
		DEP ID No	
		DEP Operational Goal / Remarks	Reason for restriction and remarks
		NAS/FAB	ICAO code for country (2 letters)
	ARR (Arrival)	Change record	Status of capping (blank is unmodified)
		ARR AD (Arrival Airdrome)	4 letter ICAO code
		First PT STAR / STAR ID	Initial waypoint of STAR (navaid or waypoint)
		DCT ARR PT	Initial point of a DCT arrival (navaid or waypoint)
		ARR Restrictions	traffic, sectors or waypoint, FL
		ARR Restriction Applicability	Daily hours of application (usually H24)
		ARR ID No	

		ARR Operational Goal / Remark	Reason for restriction and remarks
		NAS/FAB	ICAO code for country (2 letters)
Appendix 6: Flight Profile Restrictions		Change record	Status of restriction (blank is unmodified)
		ID Number	
		Flow Routing	Where the restriction is applied (navaid or waypoint or ATC sector or ATS route segment) usually airports
		Utilization	Restrictions in FL
		Time Availability	Daily hours of application (usually H24)
		Operational Goal	Reason for restriction
Appendix 7: FUA Restrictions		RSA	Identificator of the route
		MNM FL	minimum Flight Level
		MAX FL	maximum Flight Level
		WEF	Init time of closure
		UNT	End of closure
		FUA/EU RS	Restricted airspace identification
		FIR	FIR of the route
		UIR	UIR of the route
Annex: PAN EUROPE Route Restrictions		Change record	Status of restriction (blank is unmodified)
		AIRWAY	Identification of ATS route
		FROM	First point of ATS route segment (navaid or waypoint)
		TO	Final point of ATS route segment (navaid or waypoint)
		Point or Airspace	Point where restriction is applied (navaid or waypoint or airspace name as coded in CACD)
		Utilization	Traffic availability, route and FL
		Restriction Applicability	Daily hours of application (usually H24)
		ID Number	
		Operational Goal	Reason for restriction
		Remarks	Usually left blank
		ATC Unit	to which it belongs or passes
		NAS/FAB	ICAO code for country (2 letters)
Links:	General Description	http://www.nm.eurocontrol.int/RAD/1607/docs/RAD%20APPENDIX%2001.doc	

1. General information - *Identification of the database and how to access it*

Database name	NOP ANM (ATFM Notification Message)
Link	https://www.public.nm.eurocontrol.int/PUBPORTAL/
Last factsheet update	03/06/2016

2. Abstract - *Brief description of the content and purpose of the database*

Network Manager storages relevant events for air traffic, which can be accessed through the Network Operations Portal
These events are public and can be searched with period, keywords, source and geographical filters

3. Sources and data visualisation - *How the information is provided and where it is obtained from*

Published by	Network Manager
Public	Yes
Sources	NM
Data format	online table

4. Data resolution - *Temporal and geographical characteristics of the information provided. Fill only if these characteristics are common for the entire database.*

Temporal granularity	real-time
Temporal scope	2009/real-time
Geographical granularity	Sector
Geographical scope	NM Area
Update frequency	real-time
Last database update	real-time
Usefulness for INTUIT project	Regulations could be connected to capacity issues, format is fairly standarized

5. Comments - *Other relevant information*

Phraseology and acronyms must be studied
Cancelled regulations are also shown

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

7. Indicators not directly related to Performance Framework - *List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework*

Indicator	Description	Comments
Seq no	Number of the ANM	
State		NEW/CHANGE/CANCEL
FMP (Flow Management Position)	Type of the ANM	LLLLFMP Acronyms with some information about the type of regulation, the four letters describe the sector to which is applied
Published		DD/MM/YYYY HH:mm
Regulations ID		LLLLLNNL
WEF (With Effect From)		DD/MM/YYYY HH:mm
Flight Level		ALL / NNN-NNN
UNT (Until)		DD/MM/YYYY HH:mm
Reason		First line usually is the reason of regulation (e.g. Aerodrome capacity) Second line is usually used for deeper description (e.g. LTFJ arrivals)
RMK (Remarks)		Usually does not appear When appears, contains deeper description or reason of regulation change, may contain several lines (e.g. regulation extended/nLTFJ arrivals)

Links: fua-amc-cadf-ops-manual https://www.eurocontrol.int/sites/default/files/publication/files/fua-amc-cadf-ops-manual-current.pdf

INTUIT - WP2 Multiscale performance characterisation

T2.2 Data quality assessment

Performance databases factsheet

1. General information - *Identification of the database and how to access it*

Database name	Performance Review Report
Link	http://www.eurocontrol.int/prb/publications
Last factsheet update	13/06/2016

2. Abstract - *Brief description of the content and purpose of the database*

These reports present an assessment of the performance of the European Air Traffic Management system for a specific calendar year
Analyses the performance of the Europena Air Traffic Management System in the issued year under the KPAs of Safety, Capacity, Environment and Cost-efficiency

3. Sources and data visualisation - *How the information is provided and where it is obtained from*

Published by	EUROCONTROL as the PRU
Public	yes
Sources	dependant on data
Data format	pdf

4. Data resolution - *Temporal and geographical characteristics of the information provided. Fill only if these characteristics are common for the entire database.*

Temporal granularity	Yearly
Temporal scope	dependant on data
Geographical granularity	dependant on data
Geographical scope	EUROCONTROL area
Update frequency	Yearly
Last database update	21-may-15
Usefulness for INTUIT project	KPA data is shown for longer temporal scope than PRU dashboard, there are some tables with useful data

5. Comments - *Other relevant information*

Format is a report, some data is found in tables, other in figures
Most of data is aggregated and shown in figures

6. Performance Framework indicators - *List of Performance Areas and Performance Indicators provided in the database, together with their main characteristics*

Performance Framework SES / SESAR

Performance	Performance Indicator	Detailed information	Units	Geographical	Data format	Temporal	Temporal	Source	Last	Calculation
Safety	Accidents with ANS contribution	Fatal, non-fatal by occurrence category	-	EUROCONTROL area	figure	Yearly	2004/2014	EASA		
	Number of accidents	Fatal, non-fatal	-	EUROCONTROL area	figure	Yearly	2004/2014	EASA		
	Serious incidents with ANS contribution	Fatal, non-fatal by occurrence category	-	EUROCONTROL area	figure	Yearly	2004/2014	EASA		
	Serious incidents	Fatal, non-fatal	-	EUROCONTROL area	figure	Yearly	2004/2014	EASA		
	Number of reported separation min. Infringements	By severity (B < A)	-	EUROCONTROL area	figure	Yearly	2004/2014	EASA		
	Total number of reported runway incursions	By severity (B < A)	-	EUROCONTROL area	figure	Yearly	2004/2014	EASA		
	Total number of reported unauthorised penetration of airspace	By severity (B < A)	-	EUROCONTROL area	figure	Yearly	2004/2014	EASA		
Capacity	Airport declared arr capacity vs peak arr	some capacity not stated	flights / hour	Airport	table	Yearly	2014	CODA, PRU		
Predictability and Punctuality	Arrival punctuality	arr within 15 min	%	EUROCONTROL area	figure	figure	2011/2014	CODA		
	Departure punctuality	dep within 15 min	%	EUROCONTROL area	figure	figure	2011/2014	CODA		
	Average arrival delay	Intra european flights, 12 months trailing average	min	EUROCONTROL area	figure	figure	2011/2014	CODA, PRC		
	Average scheduled block time	Intra european flights, 12 months trailing average	min	EUROCONTROL area	figure	figure	2011/2014	CODA, PRC		
	Departure variability	Range 80-20 percentile and std	min	EUROCONTROL area	figure	Yearly	2008/2014	CODA, PRC		
	Taxi-out phase variability	std	min	EUROCONTROL area	figure	Yearly	2008/2014	CODA, PRC		
	Flight phase variability	std	min	EUROCONTROL area	figure	Yearly	2008/2014	CODA, PRC		
	Taxi-in variability	std	min	EUROCONTROL area	figure	Yearly	2008/2014	CODA, PRC		
	Arrival time variability	Range 80-20 percentile and std	min	EUROCONTROL area	figure	Yearly	2008/2014	CODA, PRC		
	Average en route ATFM delay per flight	by causes	min / flight	EUROCONTROL area	table	Yearly	1997/2014	NM		
	En-route ATFM delay per flight	by causes	min / flight	EUROCONTROL area / 5 most contraining ACC (in table)	figure	Monthly	2011/2014	PRC, NM		
	Flights ATFM delayed		%	EUROCONTROL area	figure	Yearly	2010/2014	NM		
	Flights ATFM delayed > 15 min.		%	EUROCONTROL area	figure	Yearly	2010/2014	NM		
	Departure delay per flight	Reactionary, turn round, weather, ATFM weather, ANS related, ATFM en-route	%	EUROCONTROL area	figure	Yearly	2008/2014	CODA, PRU		
	Airport ATFM delay	Total En-route (by causes)	min / flight	Country	table	Yearly	2012/2014	NM		
	Add. ASMA time		min / arr	Airport	table	Yearly	2014	CODA, PRU		
	Airport dep ATC dep delay		(min / dep)	Airport	table	Yearly	2014	CODA, PRU		
	Airport dep Add. Taxi-out time		min / dep	Airport	table	Yearly	2014	CODA, PRU		
	Airport dep ATFM slot adherence		%	Airport	table	Yearly	2014	CODA, PRU		
Environment	En-route flight efficiency (vs great circle)		%	EUROCONTROL area / country for 2014	figure	Monthly	2011/2014	PRU		
	Flight plan efficiency (vs great circle)		%	EUROCONTROL area / country for 2014	figure	Monthly	2011/2014	PRU		
	Use of allocated airspace for military	pre-tactical there is not data for all countries	% / total hours	Country	table	Yearly	?	States		
Cost-efficiency	En-route SU		euros 2009	EUROCONTROL area	figure	Yearly	2009/2014	PRU		
	En-route ANS cost		euros 2009	EUROCONTROL area	figure	Yearly	2009/2014	PRU		
	En-route unit costs	All states in Route Charges system	euros 2009	EUROCONTROL area	figure	Yearly	2009/2013	EUROCONTROL/CRCO		
	Terminal recomputed SU		-	EUROCONTROL area	figure	Yearly	2009/2013	ANSP		
	Terminal ANS cost		-	EUROCONTROL area	figure	Yearly	2009/2013	ANSP		
	Gate-to-gate ATM/CNS provision costs per composite flight-hour		euros 2009	EUROCONTROL area	figure	Yearly	2009/2013	ANSP		
	Gate-to-gate ATCO-hour productivity		euros 2009	EUROCONTROL area	figure	Yearly	2009/2013	ANSP		
	Gate-to-gateemployment costs per ATCO-hour		euros 2009	EUROCONTROL area	figure	Yearly	2009/2013	ANSP		

	Gate-to-gate support costs per composite flight-hour		euros 2009	EUROCONTROL area	figure	Yearly	2009/2013	ANSP	

7. Indicators not directly related to Performance Framework - *List of other data or indicators that are not identified as Performance Indicators of the corresponding Perf. Framework*

Area	Subarea	Indicator	Comments	Source	Data format	Geographical granularity	Temporal granularity	Temporal scope	Units
Traffic	Flights	IFR flights		ACI/STATFOR	figure	EUROCONTROL area	Yearly	1990/2020F	-
		avg daily IFR flights		NM	figure	EUROCONTROL area	Monthly	2011/2014	-
		Passengers		ACI	figure	EUROCONTROL area	Yearly	2004/2014	-
		En-route Service Units		ACI/STATFOR/CRCO	figure	EUROCONTROL area	Yearly	2004/2014	-
		Distance		ACI/STATFOR/CRCO	figure	EUROCONTROL area	Yearly	2004/2014	km
		Flight hours controlled		ACI/STATFOR/CRCO	figure	EUROCONTROL area	Yearly	2004/2014	hour
		Avg. Weight (MTOW)		ACI/STATFOR/CRCO	figure	EUROCONTROL area	Yearly	2004/2014	kg
		Traffic growth	Per segment (domestic/international/overflight)	STATFOR, PRC	figure	Country	Yearly	2004/2014	%
		Traffic variability	Peak vs daily IFR flights	PRU	figure	ACC	Yearly	2004/2014	-
	Complexity	Structural Index	Definition found in annex III: separated in horizontal, vertical and speed	PRC	figure	ANSP	Yearly	2004/2014	-
		Adjusted density	Definition found in annex III	PRC	figure	ANSP	Yearly	2004/2014	-
		Overall complexity	Definition found in annex III; more info in "Complexity Metrics for ANSP Benchmarking Analysis"	PRC	figure	ANSP	Yearly	2004/2014	-
	Segments (share)	Traditional Scheduled		EUROCONTROL/STATFOR	figure	EUROCONTROL area	Yearly	2004/2014	%
		Low-cost		EUROCONTROL/STATFOR	figure	EUROCONTROL area	Yearly	2004/2014	%
		Charter		EUROCONTROL/STATFOR	figure	EUROCONTROL area	Yearly	2004/2014	%
		Business		EUROCONTROL/STATFOR	figure	EUROCONTROL area	Yearly	2004/2014	%
		Cargo		EUROCONTROL/STATFOR	figure	EUROCONTROL area	Yearly	2004/2014	%
		Other (mil incl)		EUROCONTROL/STATFOR	figure	EUROCONTROL area	Yearly	2004/2014	%
	Airport	IFR movements (arr + dep)	Top 30 airports	NM, PRC	figure	Airport	Yearly	2004/2014	-
		Avg airport arrival ATFM delay	Top 30 airports by cause	PRU	figure	Airport	Yearly	2004/2014	min / arr
		Avg additional ASMA time	Top 30 airports	PRU	figure	Airport	Yearly	2004/2014	min / arr
		Avg Additional Taxi-in Time	Top 30 airports	PRC	figure	Airport	Yearly	2004/2014	min
		Avg Local ATC pre-departure delay	Top 30 airports per departure and % of total	NM, PRC	figure	Airport	Yearly	2004/2014	min
		Avg Additional Taxi-out Time	Top 30 airports per departure and % of total	?	figure	Airport	Yearly	2004/2014	min
		% cancelation rate	24/30 top airports	PRU, CODA	figure	Airport	Yearly	2004/2014	%
		Avg arrival delay	Top 30 airports	CODA, PRC	figure	Airport	Yearly	2004/2014	min
		Avg departure delay	Top 30 airports	CODA, PRC	figure	Airport	Yearly	2004/2014	min
		Declared peak arrival capacity	Top 30 airports	PRU	figure	Airport	Yearly	2004/2014	-
		Actual peak service rate	Top 30 airports	PRU	figure	Airport	Yearly	2004/2014	-
Capacity	Delay	Reactionary to primary delay		?	figure	EUROCONTROL area	Yearly	2006/2014	-
	Inefficiencies with ANS impact	Airport ATFM arrival delay		PRU	figure	EUROCONTROL area	Yearly	2006/2014	min // fuel tonnes // CO2 tonnes
		En-route ATFM delay		PRU	figure	EUROCONTROL area	Yearly	2006/2014	min // fuel tonnes // CO2 tonnes
		Additional taxi-out time		PRU	figure	EUROCONTROL area	Yearly	2006/2014	min // fuel tonnes // CO2 tonnes
		Horizontal en-route flight efficiency (actual)		PRU	figure	EUROCONTROL area	Yearly	2006/2014	min // fuel tonnes // CO2 tonnes
		Aditional ASMA time		PRU	figure	EUROCONTROL area	Yearly	2006/2014	min // fuel tonnes // CO2 tonnes
	ATFM complicance	% of take offs outside ATFM slot tolerance		NM	figure	EUROCONTROL area	Yearly	2003/2014	%
		% regulated hrs with actual demand/capacity > 110%		NM	figure	EUROCONTROL area	Yearly	2003/2014	%
		% of ATFM delays due to avoidable regulations		NM	figure	EUROCONTROL area	Yearly	2003/2014	%
Cost-efficiency	Inefficiencies with ANS impact	Airport ATFM arrival delay	Operational time, fuel burn and CO2	PRU	table	EUROCONTROL area	Yearly	2009/2014	min // fuel tonnes // CO2 tonnes
		En-route ATFM delay	Operational time, fuel burn and CO2	PRU	table	EUROCONTROL area	Yearly	2009/2014	min // fuel tonnes // CO2 tonnes
		Additional taxi-out time	Operational time, fuel burn and CO2	PRU	table	EUROCONTROL area	Yearly	2009/2014	min // fuel tonnes // CO2 tonnes
		Horizontal en-route flight efficiency (actual)	Operational time, fuel burn and CO2	PRU	table	EUROCONTROL area	Yearly	2009/2014	min // fuel tonnes // CO2 tonnes
		Aditional ASMA time	Operational time, fuel burn and CO2	PRU	table	EUROCONTROL area	Yearly	2009/2014	min // fuel tonnes // CO2 tonnes
	Costs	En-route real cost per SU		PRU	table	EUROCONTROL area	Yearly	2009/2014	euros 2009
		En-route SU index		PRU	figure	EUROCONTROL area	Yearly	2009/2014	euros 2009
		En-route ANS cost index		PRU	figure	EUROCONTROL area	Yearly	2009/2014	euros 2009
		En-route cost breakdown	Difference with previous year by nature	PRU	figure	EUROCONTROL area	Yearly	2009/2014	euros 2009 / %
		En-route ANS cost actual vs forecast		PRU	figure	Country	Yearly	2009/2014	euros 2009
		Terminal real cost per TNSU		PRU	table	EUROCONTROL area	Yearly	2009/2014	euros 2009
		TNSU index		PRU	table	EUROCONTROL area	Yearly	2009/2014	euros 2009
		Terminal ANS cost index		PRU	table	EUROCONTROL area	Yearly	2009/2014	euros 2009
		Terminal ANS cost actual vs forecast		PRU	table	Country	Yearly	2009/2014	euros 2009
		ANSP gate-to-gate cost breakdown		ANSP	table	EUROCONTROL area	Yearly	2009/2014	euros 2009
		ATFM delay costs per composite flight-hour		ANSP	table	ANSP	Yearly	2009/2014	euros 2009
		ATM/CNS provision costs per composite flight-hour		ANSP	table	ANSP	Yearly	2009/2014	euros 2009
	Economic Evaluation	Projected ANS costs		ANSP	table	ANSP	Yearly	2014/2020	euros 2009
		Estimated cost of inefficiencies in the gate-to-gate phase		ANSP	table	ANSP	Yearly	2014/2020	euros 2009
		Estimated cost of en-route and airport ATFM delay		ANSP	table	ANSP	Yearly	2014/2020	euros 2009
		Total estimated ANS-related economic costs		ANSP	table	ANSP	Yearly	2014/2020	euros 2009
Safety	ATM Specific Occurrences	Severity B Severity A Severity AA	Situations where the ability to provide safe ATM services is affected	SRC Intermediate Report	figure	EUROCONTROL area	Yearly	2004/2014	-
	AST reporting	Number of incidents reported		SRC Intermediate Report	figure	EUROCONTROL area	Yearly	2004/2014	-
		Not severity classified	By category	SRC Intermediate Report	figure	EUROCONTROL area	Yearly	2005/2014	%
		Completeness of AST data	Empty+Unknown / Empty / Unknown	SRC Annual Report	figure	EUROCONTROL area	Yearly	2005/2014	%