CAPRS Project
Pilot phase of the Community Air Passenger Reporting system

Final Report

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Executive summary

The pilot phase of the CAPRS (Community Air Passengers Reporting System) was launched by the European Commission – Directorate General Transport and Energy (DG TREN) with the goal of enabling the regular publication in a public website of punctuality reports, statistics, and other service quality indicators concerning European Air Carriers. The objective is to give European air passengers easy access to flight punctuality details and information on disruptive events (such as flight cancellations, baggage mishandling, denied boarding), in such a way as to allow for simple, but immediate, performance comparisons across European Air Carriers, thus helping to facilitate consumer choice.

The CAPRS project has been conducted by Bassilichi S.p.A. in the frame of contract B2002/B2-7040B/S07. Relevant stakeholders have been grouped in a Panel of Experts and a Steering Committee, both of which acted as consultation and advisory bodies. These consisted of Air Transport Associations and organisations, Consumer Organisations and services of the European Commission (DG TREN, DG SANCO and ESTAT). In addition, various air carriers were invited to participate on a voluntary basis in the pilot phase itself.

The CAPRS project has been organised and divided in 4 stages:

- ✈ Preparatory activities
- ✈ The establishment of the requirements of the reporting system
- ✈ Reporting system development
- ✈ Testing, validation and delivery of the reporting system itself

During the preparatory activities, a consultative plan was set up and visits to several Air Carriers were conducted in order to collect the necessary background information for a comprehensive definition of the requirements. The output of this stage was the first version of the High- Level Requirements document (HLR - see chapter 3.1). Key issues during the discussions were the specification of the requirements for reporting data, the publication of information, and the definitions of the data models themselves. In the industry there currently exists a series of definitions at various levels and in various organisations (airports, air carriers, air traffic control, ICAO, IATA, WorldTracer etc.). The HLR document relies as much as possible on these existing definitions (see chapter 3.2).

Establishing the requirements of the system and the need to minimise the burden on air transport operators was taken into account by reviewing the available data from air transport operators and then evaluating their suitability, accessibility and reliability in terms of feeding the reporting system. For this purpose an inventory of other available data (such as OAG, EUACA, CODA, ESTAT and CRS) has also been carried out and the opportunity of using such data evaluated. These further data sources have also been evaluated for validation purposes (see chapter 3.2). Based on the results of this stage, the reporting system has been designed with a modular and evolutionary architecture, and a database has been established. The website has been designed with functional user-friendly interfaces. As and from May 2003 the website implementation has been completed providing the basis for the actual version (see chapter 3.3).

The Commission invited 51 Air Carriers to participate on a voluntary basis in the pilot phase. In the end, 16 Air Carriers (hereafter called 'reporting air carriers') actively participated in the pilot phase. The reporting Air Carriers represent 70% of all reportable flights, a figure deemed to provide a critical mass for the pilot phase (see chapter 4).

The website presents reports on flight punctuality and cancellation, mishandling of baggage (divided into categories called "delayed/lost" and "damaged/pilfered") and denied boarding. The figures display monthly reports, allowing the user to select any given month and year (between 2003 and 2005) and to run comparisons between selected periods. The system also permits users to select airport pairs among the 300 busiest airport pairs in Europe.

The web application has been developed and completed by the implementation of an automatic validation and loading procedure and by an administrative area reserved to the sole reporting Air Carrier for the sending of data and the checking of their own data set (see chapter 5).

Testing has been performed on the website regarding all relevant functional components (software, user interface, access control, coherence of information, link quality and existence, data validity) at technical (internal), customer (EC) and Air Carrier and Stakeholders levels. The continued evaluation of the reporting system based on the results of the tests has consisted in taking into account all the feedback, comments and advice received by the Users (see chapter 3.4).

It has not been possible to obtain an agreement from the reporting Air Carriers to open the website to the public for reasons explained in Chapter 3.4, despite two attempts to reach a consensus. The result is that access to the website has remained restricted during the pilot phase.

The required data is available, most of which immediately, though other data may require changed data collection procedures. The quality and the reliability of the received data on punctuality has been accurate and compliant to the data structures. However, some obstacles have been encountered for other kinds of data. Only a limited number of reporting Air Carriers were immediately able to provide the full data set concerning baggage handling. Also, it has only been possible to obtain very limited data concerning Denied Boarding since most Air Carriers asserted that they themselves did not have reliable data (see chapter 3.2) on this issue.

At the end of the CAPRS pilot phase it can be concluded that there is the concrete possibility of establishing a system which will provide comprehensive information to the consumer. Furthermore, we state that the data available is reliable and that the efforts and costs needed to provide them are not unreasonable. However, it does seem unlikely that the system could work on a voluntary basis.

1   **Introduction**

In November 2000, the European Commission issued a Consultation Paper on a *Community Air Passenger Report* on service quality indicators. This paper described the main features of a reporting system on the quality of air transport services; one which would satisfy the need for increased awareness of air passengers on the performance of the different air transport operators within the European Community.

The objective of setting up a *Community Air Passenger Report* is to compare the service quality of the various air transport operators with a view to facilitating consumer choice and helping air transport operators improve upon their services. The main features of this report   include:

- the publication of clear and simple information through appropriate means (including the Internet) on flight punctuality and other service quality indicators, such as flight cancellations, denied boarding and baggage (delayed/lost or damaged/pilfered);
- the selection of adequate coverage in terms of air transport operators and routes concerned;
- the creation of adequate synergies with existing publication processes in the same domain.

In their replies to the consultation, some respondents suggested the setting up of a pilot scheme and/or a trial period run on a voluntary basis, namely using data from a sample of operators (air carriers) in order to establish an initial framework for the reporting system.

This project is therefore aimed at establishing an appropriate *pilot reporting system* on the basis of an operational trial of reduced scope:

- focussing on flight punctuality and other indicators of service quality (such as flight cancellations, denied-boarding, and loss and damage of baggage) whilst also making provisions for its extension to other service quality indicators.
- defining the forms and the modalities for the publication of service quality indicators, including statistics on an airport pair basis, thus allowing for comparisons between different operators.
- covering a sample of air carriers operating in the European Union, along routes with significant traffic load.
- devising the reporting system in such a way that extension which will cover other indicators of service quality is possible during a second phase beyond this project.

The European Commission decided to engage the services of a suitably qualified supplier to carry out this project as described in these specifications.

The European Commission invited the air transport operators above the established threshold (2 million annual passengers) to participate in this pilot project on a voluntary basis.

1.1   Purpose of the pilot phase

The establishment of a Community Air Passenger Report on service quality indicators can be better achieved by launching a pilot project for the design and implementation of the features of such a reporting system. This will allow the provision of the necessary tools in terms of hardware and software and communication interfaces to support the creation of the database and its continued update and use.

It would create a preliminary framework of the reporting system so as to:

- provide information on data availability, timeliness and accuracy;
- verify the impact of the reporting system on air transport operators;
- investigate cost implications for air transport operators in relation to the provision of data;
- test the reporting system in an operational environment.

The project was also set up to assess how the initial framework of the reporting system can establish an adequate database and associated tools and equipment, including reporting/query functions based on use of Internet, for permanent use.

2   Involvement of stakeholders

This chapter describes in what manner the various stakeholders have been involved in the CAPRS project. For this purpose a Panel of Experts and a Project Steering Committee were established. In addition, bilateral meetings with air carriers were organised, as were meetings with all reporting air carriers.

The Panel of Experts:

Role	The Panel of Experts was established as a reference group for consultation and verification of the actions carried out during the CAPRS pilot project life cycle. The Panel covers Air Transport and Consumers Organisations. The expert panel advised the European Commission and the contractor on the work carried out in the various stages of the project, in particular, on how best to report data, and on technological obstacles faced by operators.			
How the Panel of Experts has been employed	During periodic meetings and contact via e-mail and phone, the members of the Panel of Experts contributed to the preparation of the High Level Requirements, as well as the process of verification of the project enhancements. Their expertise and experience were invaluable during the implementation phase of the website and in the design of the data presentation and user interface. Each version of the CAPRS website was presented to the Panel before actual publication.			
Members				
	Organisation	Representative		
	ACI (Airport Council International)	Mr. Stefano BARONCI		
	AEA (Association of European Airlines)	Mrs. Sue LOCKEY		
	COMUTA (Comité des usagers du transport aérien)	Mr. Marc DEBY		
	Department for Transport	Mr. David SHEPHARD		
	ERA (European Regions Airline Association)	Mr. Andrew CLARKE		
	FATURE c/o Air Transport Users Council"	Mr. Simon EVANS		
	IACA (International Air Carrier Association)	Mr. Bob PARKER-EATON		
	IATA (International Air Transport Association)	Mr. Jack ADELMAN		

Meetings	Title	Date	Place	
	1st Panel of Experts meeting	26/03/2003	Brussels	DG TREN
	2nd Panel of Experts meeting	1/7/2003	Brussels	DG TREN
	3rd Panel of Experts meeting	27/11/2003	Brussels	DG TREN
	4th Panel of Expert meeting	03/06/2004	Brussels	DG TREN

The Project Steering Committee:

Role	The Steering Committee was established to monitor the actions carried out during the CAPRS pilot project life cycle. The Steering Committee was comprised of members of the European Commission – DG TREN, DG SANCO and ESTAT. It also included two representatives of Eurocontrol and the Project Manager of the Contractor. The Committee organised regular progress meetings to verify the work carried out during the project, offering advise and proposing suitable solutions.
How The Project Steering Committee has been used	During periodic progress meetings (held on a monthly basis during the first year of the project) and contact via e-mail and phone, the members of the Committee contributed to the preparation of the High Level Requirements, and also during the process of verification of the project enhancements. The Committee controlled the adherence to the project plan, collecting the comments from the Panel of Experts, the establishment of guidelines, and the monitoring of the progress of the system.
Members	
▪ DG TREN Unit F2	▪ Mr. Maurizio CASTELLETTI
▪ DG TREN Unit F2	▪ Mr. Morten JENSEN
▪ DG TREN Unit F2	▪ Mr. Ben VAN HOUTTE
▪ DG TREN Unit F1	▪ Mr. John WILSON
▪ DG TREN Unit F1	▪ Mr. Reijo PUUMALAINEN
▪ DG SANCO	▪ Mr. David VOIDIES
▪ Eurocontrol	▪ Mr. Tim GUEST
▪ Eurocontrol	▪ Mr. Francesco PRETI
▪ ESTAT	▪ Mr. Luis DE LA FUENTE
▪ Bassilichi	▪ Mrs. Gloria CENNI

Meetings	Title	Date	Place	
	Kick-off meeting	10/01/2003	Brussels	DG TREN
	1st Progress meeting	13/02/2003	Brussels	
	2nd Progress meeting	16/05/2003	Brussels	DG TREN
	3rd Progress meeting	01/07/2003	Brussels	DG TREN
	4th Progress meeting	10/10/2003	Brussels	DG TREN
	5th Progress meeting	27/11/2003	Brussels	DG TREN
	6th Progress meeting	18/03/2004	Brussels	DG TREN

The contractor had bilateral meetings with a number of air carriers during the development of the High-level Requirements document and also, later in the process, on various specific topics. Two further meetings were organised with all the reporting air carriers in order to present and discuss the work with a view to reaching a common understanding of the issues.

The following Air carriers (called reporting carriers) provided data for the pilot phase of the CAPRS project (some for the entire duration of the project, others for a limited time only):

- AEGEAN AIRLINES
- AIR FRANCE
- ALITALIA
- AUSTRIAN AIRLINES
- BRITANNIA
- BRITISH AIRWAYS
- CSA (Czech Airlines)
- DEUTSCHE BA
- DEUTSCHE LUFTHANSA AG
- FINNAIR
- IBERIA
- KLM-ROYAL DUCTH AIRLINES
- RYANAIR
- SAS SCANDINAVIAN AIRLINES
- SN BRUSSELS AIRLINES
- VIRGIN EXPRESS

However, only a few of the reporting air carriers provided all the requested data and others only provided data for a short period only. Chapter 5 provides further information on data reporting by the air carriers.

3   Tasks carried out

The work was carried out in four stages in collaboration with the stakeholders and the European Commission.

The project team was made up as follows:

Name and Role	Profile
Mrs. Gloria Cenni as Project Manager	*Mrs. Cenni is a senior project manager with a long track record of managing EC projects. In most such projects, Mrs. Cenni has handled committee-related activities.* *Mrs. Cenni was responsible for setting up and running a suitable project and quality management framework for APR.* *As part of this task, Mrs. Cenni was responsible for representing the study team in liaison activities with partners and stakeholders.*
Mr. Vittorio Mazza as independent Air Transport consultant Mr. Marco Gajetti as Analyst during the start-up phase	*Mr. Gajetti and Mr. Mazza are senior business consultants with a long track record of innovative solutions for Aviation and Aerospace business.* *They were available on a day-to-day basis to the other team members for professional advice on business-related matters.*
Mr. Luca Falsiroli as Analyst and Senior developer	*Specification, coding, documentation*
Mr. Stefano Materazzi as Graphic Specialist	*Web Design, documentation*

Furthermore, Bassilichi ensured that its technical experience was available at all times and during the course of the project ad-hoc specialists were put at project disposal when additional resources were required.

On the Commission side, the project was lead by Mr. Maurizio Castelletti until April 2003 when Mr. Morten Jensen took over proceedings.

3.1   Preparatory Activities (stage 1)

During this phase the overall work plan was organised and contacts established with the stakeholders. It was during this time that the contractor set up a consultative plan and visited several Air Carriers in order to collect the necessary background information for a comprehensive definition of the requirements.

The output of this stage was a first version of the High-Level Requirements document (HLR document in version 1.1).

In the frame of the consultation activities it became evident that standardisation of the provided information is of utmost importance to guarantee data integrity and consistency.

The task was completed in March 2003.

3.2 Establishment of the requirements of the reporting system (stage 2)

The High Level Requirements document version 1.1 formed the basis for the consultation of the stakeholders and the subsequent establishment of the requirements of the reporting system.

This stage took into account the need to on the one hand provide valuable information to the public and on the other to minimise the burden on air transport operators . It comprised two distinct sub-stages:

- Specification of the data model
- Functional specification of the reporting system

3.2.1 Specification of the data model

This sub-stage was aimed at ensuring that the data model was complete and investigated whether it could be compiled from existing sources. It consisted of the following activities:

- Reviewing available data from air transport operators and ascertaining their suitability, accessibility and reliability to feed the reporting system
- Creating an inventory of other available data (such as OAG, EUACA, CODA, ESTAT and CRS) and assessing the possibility of using such data, where available, in setting up the reporting system.
- Specifying requirements for reporting data and the publication of information.

The data has been analysed in the following categories:

Punctuality Data (including cancellation):

This type of data is immediately available within all the air carriers. It is generally used for a series of business analyses and reports already (internal and external) and can easily be obtained for purposes such as the CAPRS project. The point is to identify the most relevant data items for the CAPRS project.

The one data item that may potentially not be immediately available is that of scheduled times (times as stated on the ticket) as these, it seems, are not usually used in other reports.

Baggage Data:

With very few exceptions all air carriers use WortldTracer (WT) to manage their baggage.

WT is a baggage management system (SW application) produced by SITA. Although there are different WT 'modules', all airlines subscribe to the basic module in order to facilitate effective baggage handling. In addition, a number of airlines subscribe to other modules, which may provide different standard reports. It seems that it is actually possible to collect the data required for CAPRS by taking different items from different standard reports. However, this cannot be automated. Creating a new standard report can only be done by SITA and is quite costly.

It has been found relevant to split baggage data into two categories, namely "Delayed and lost baggage" and "Pilfered and damaged baggage".

In principle delayed and lost baggage is 100% managed within WT and there is agreement amongst WorldTracer users that globally the information in WorldTracer could provide comprehensive data.

Damaged and pilfered baggage is only partly managed within WT and this data is considered to be potentially ambiguous. It seems there are different interpretations/definitions of damage among air carriers. These ambiguities will likely influence the figures in question.

During the pilot phase only a few reporting air carriers were able to provide the full data set required concerning baggage. However, almost all reporting air carriers were in a position to provide an overall figure (network-wide). It was therefore agreed that only the overall figure should be provided during the pilot phase.

There is however a new service offered by SITA to WorldTracer subscribers. This service is called "Baggage Information Repository" (BIR) and consists of data files extracted from WorldTracer. The presence of this data in a database would allow for the extraction of the data required by CAPRS via a specific query. Such a query would be easy to create and could be shared by the users depending on the environment used for hosting the database. It seems that BIR could make it possible to acquire the required baggage data for CAPRS simply and effectively.

Early estimates of the costs for subscribing to this service are in the order of 500 to 1300 Euro per month depending on the size of the air carrier (the price consists of a monthly fee and the number of files). The data may be used for various baggage data mining purposes, of which CAPRS is but one. At this stage the SITA BIR would seem to be the most viable way forward in order to enable air carriers to provide data at an affordable price. However, for the moment, only one or two of the reporting airlines are actually subscribing to the BIR service offered by SITA. For this reason it has not been possible to benefit from this service during the pilot phase.

Denied Boarding Data:

Denied boarding is a very sensitive issue, particularly for the 'network' carriers who generally overbook their flights as part of their reservation policy. Charter and low cost carriers seem not to overbook as a policy and generally have very few incidents of denied boarding.

Most air carriers claim they do not have reliable data concerning denied boarding. This is because denied boarding incidents are handled by handling agents etc. and are not necessarily recorded, even when compensation is paid out.

It has only been possible to obtain very limited data concerning denied boarding during the pilot phase. However, as air carriers must pay compensation to passengers in cases of denied boarding due to overbooking and the like, it is reasonable to expect that such payments are in fact registered (for accounting purposes, for example). It should therefor be possible to obtain this data for CAPRS.

In relation to the data in the three categories it can be concluded that not only is it possible to obtain the data requested by CAPRS, but also that the data (as described in the HLR) *should* in fact be made available to the public, as this will give consumers access to comprehensive and comparable statistics. Such a situation will also be in the interest of air carriers themselves, as it means that figures on quality and services will be available for comparison purposes. Furthermore, the suitability and reliability of the data in question can be considered to be high.

lnterviews have been conducted in order to assess the burden of reporting data to CAPRS. In the end the labour time necessary for the analysis and development of an export procedure adherent to the CAPRS requirements is estimated to be maximum one week for a person with experience in using available query tools and an overview of the different internal databases.

The time needed for periodic data preparation and submission has been estimated to be a maximum one day per month. This task could be carried out by a standard employee, without specific skills, simply using the export procedure as mentioned above.

Inventory of other available data (such as OAG, EUACA, CODA, ESTAT and CRS) and assessment of the opportunity of using such data, where available, for setting up the reporting system.

Several central data sources which could potentially provide the required data to CAPRS, have been investigated for each category of data needed:

Punctuality data (including cancellation):

EUACA: European Union Airport Co-ordinators Association
This association is present in several countries and groups the main airports in the countries in question. In theory this association could provide data related to the information collected by the airports themselves.

However, it was quickly concluded that the EUACA is in fact not a potential source of data for the CAPRS project. There are several reasons for this: data collection in the different airports is not consistent, airports can only provide data related to flights operated to and from the specific airport, airport and air carrier scheduled times often differ, CAPRS pilot measures air carrier performance and not airport performance, etc.

CODA: the Central Office for Delay Analysis within EUROCONTROL provides 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 makes this information available to anyone with an interest in delay performance. CODA data have been carefully analysed. Of the data reported to CODA by the air carriers only the **actual times** could be used in CAPRS, whereas CAPRS needs several other data items also. Furthermore, the data in question is owned by the air carriers themselves and EUROCONTROL/CODA can only provide this data with the air carriers' consent.

ESTAT: EUROSTAT, the European Statistical System, publishes on a regular basis statistical data concerning Air Transportation in Europe. These publications report statistical data on transported Air Passengers and Goods but not the data relevant to CAPRS. Also, the data is reported in different intervals.

CRSs, the main Computer Reservation Systems are: Worldspan, Galileo, Amadeus and Sabre. Most air carriers maintain their schedules (**scheduled times**) in a CRS and distribute them to other CRSs and OAG. (OAG is the platform for the exchange of schedules and is therefore considered to be the most up-to-date source of scheduled times - see also under OAG).

OAG: is a global content management company specialising in travel and transport. OAG operates an airline schedules (scheduled times) database which holds flight details for 1000 airlines and more than 3000 airports. It is continuously updated on the basis of schedules supplied by the CRSs.
For this reason OAG has been considered as the most appropriate source of data concerning **scheduled times**. It is particularly relevant to have an 'independent' source of scheduled times because this allows for an overview of all flights.

During the pilot phase OAG was used for validation purposes related to Punctuality – 'Scheduled Time'. Although it was possible to reach a special agreement with OAG regarding the cost of this data for the pilot phase, the cost vs. benefit of acquiring OAG data (or similar) should however be reconsidered if the standard market price does not fall significantly.

Baggage data:

WORDLTRACER (WT): It has been investigated whether baggage data for CAPRS could be supplied by a central source (SITA). Meetings took place with SITA in order to discuss this possibility.

Baggage data for subscribing air carriers are in the WT databases and as such SITA could extract this data centrally for all reporting air carriers. However, the cost versus benefit was disproportionate for the setting up of a central data supply system.

Additionally, the data is owned by the air carriers and all insisted that such data be supplied by them, and not by SITA.

Denied Boarding data:

There are no other sources available for denied boarding data. As mentioned above, this data is very sensitive and air carriers do not currently provide this information to external bodies.

Specifying requirements for reporting data and the publication of information

Detailed data requirements have been defined for reporting data and for the publication of information on the basis of the preliminary requirements described in the consultation note of the European Commission. The output data has been the source for defining the input data requirements.

The definitions and data model were defined after several meetings of the Steering Committee and the Panel of Experts and with Air Carriers (bilateral meetings between the contractor and the Air Carriers that agreed to participate on a voluntary basis in the pilot phase of the project) and after the preparation and definition of the High Level Requirement Document.

This stage also included discussions on how to present the data to air passengers. The objective was to provide air passengers with easy access to flight punctuality and other service quality indicators. This will allow consumers to make simple but immediate performance comparisons across air carriers in order to support their choices .

Chapter 5 details what statistics it has been proposed to provide to air passenger and how this information is to be presented. It was recognised that air carrier performance is also dependant on the performance of other service providers (such as handling agents, air navigation, etc.). However, as airline tickets are contracts with the passengers, focus is on air carrier performance itself. It may be considered at a later stage whether it would be useful to add statistics concerning other service providers involved in air travel, e.g. airport performance (baggage delivery times etc.).

A key issue during the discussions was that of definitions. The industry works with a series of definitions at various levels and in various organisations (airports, air carriers, air traffic control, ICAO, IATA, WorldTracer etc.). The definitions in the CAPRS HLR rely as much as possible on these existing definitions.

In addition to the wide variety of existing definitions it should also be noted that some definitions are identical but have different meanings depending on where they are used. It is therefore important to ensure that that there is a common understanding and interpretation of the definitions. Furthermore, as definitions can always be improved, this should be considered as an ongoing task.

Punctuality and cancellation
Punctuality and cancellation reports show overall Air Carrier performance (ranking of all carriers, scheduled and charters, based on all intra-EU flights on a monthly basis) presenting the following data:

- Month
- Carrier

- Number of flights
- Percentage of on-time performance (departure/arrival)
- Number of delayed flights with more than 15 min delay (arrival)
- Average delay on all flights (arrival)
- Number of Cancelled Flights
- Percentage of Cancelled Flights on total flights

Airport-pairs Air Carrier performance reports present the above data plus:

- Departure Airport
- Destination Airport

It should be possible to select different months and aggregate results on several consecutive months.

Baggage

The baggage section includes 'Delayed and lost baggage' and 'Damaged and pilfered baggage' () subsections:

Missing Baggage reports show overall air carrier performance presenting:

- Month
- Carrier
- Total number of passengers
- Total number of delayed or lost baggage items
- Percentage of incidents per 1000 PAX

Damaged and pilfered reports show overall air carrier performance presenting:

- Month
- Carrier
- Total number of passengers
- Total number of damaged and pilfered baggage items
- Percentage of incidents per 1000 PAX

Also, in these sections it should be possible to select different months and aggregate results on several consecutive months.

Denied boarding:

Denied boarding reports show overall air carrier performance presenting the following data:

- Month
- Carrier
- Total number of passengers
- Denied boarding

- Percentage of complaints regarding baggage per 1000 PAX

It should be possible to select different months and aggregate results on several consecutive months.

3.2.2 Functional specification of the reporting system

Based on previous requirements defined during the meetings mentioned above, specifying detailed requirements for all the working phases of the reporting system, including data collection, processing, verification, as well as publication and distribution of statistics to the public and the European Commission, HLR version 1.1 was delivered to the members of the Panel of Experts, the Project Steering Committee and the Reporting Air Carriers for inspection.

Comments were analysed and included in the HLR version 2.0. This version was then re-circulated for feedback. On this basis HLR version 2.1 was issued. The technical and functional analysis of CAPRS web application was carried out in parallel. Consistency within HLR version 2.1 has been ensured by the project team.

The task was completed in May 2003. During this stage extra time was allocated to HLR preparation. Further consultation meetings were held with the project stakeholders, in particular with the Air Carriers.

The HLR was considered the cornerstone of the CAPRS pilot system. It was therefore decided to make it a living document and to update the document during stage 4.

The data model and the functional specifications were also produced during this stage.

3.3   Development of the reporting system (Stage 3)

Based on the requirements developed under Stage 2, this stage entailed the following sub-stages.

- Design of the reporting system This consisted of the following activities:
  - o Designing the architecture of the reporting system based on a modular and evolutionary structure and an adequate hardware and software environment.
  - o Designing the database with updating facilities, including all the necessary features in order to check data availability, timeliness and accuracy.
  - o Designing the necessary interfaces (based on state of the art technology) between the database and the data sources. Data entry shall be automated as much as possible and based on agreed appropriate formats.
  - o Designing the interfaces (with access to the Internet in mind) between the database and its private and public users. Reports from the database will be generated automatically and presented via Internet in all Community languages. Adequate queries shall be designed to access the database.

- Implementation of the reporting system

This sub-stage covers the construction of the reporting system and the related database as designed in the previous sub-stage. Starting in May 2003 the website implementation has been completed as
a basis for the actual version. The web application has been integrated and completed by the implementation of an automatic validation and loading procedure and by an administrative area reserved for use by the sole reporting Air Carrier for data sending and checking of their own dataset.

The CAPRS Pilot system is a Web Application. *Access to the website is currently restricted.*

Versions 1 and 2 of the CAPRS Web application were delivered during stage 3. The modification history of these two versions is as follows:

- July 2003: First version based on HLR document, with partial implementation of the foreseen functions. Only the EU Consumer Section and Air Carrier Section (partially) are released. The system works using a purely demonstrative set of data. Punctuality data is presented with an explanatory legend.

- August 2003: the creation of a demo website aimed at evaluating the look and feel of interfaces and the user accessibility. It is based on Version 1 of the website. and takes into account comments from the Stakeholders. A Graphic tool, released with Macromedia Flash, help EU Consumers to easily select Airport Pairs..

During stage 4 (see also following section) the Web application was tested and validated. On this basis versions 3 and 4 were developed. For clarification purposes the modification history of these two versions is also reported below and the final version (version 4) summarised.

- December 2003: Release of first version open to the active reporting Air Carriers that had signed a confidentiality agreement with the European Commission. The content and layout are based on the specification reported in High Level Requirements version 3.

- March 2004: The website is improved by adding more detailed information on Flight Punctuality and Mishandled Baggage. The Document Area and Links are also updated.

- June 2004: Release of final version of the website, where a Restricted Administrative Area has been added allowing air carriers to send data and examine their submission history status directly.

3.3.1 System Prototype Overview

The CAPRS prototype architecture can be defined as a set of integrated functional building blocks. CAPRS modules work as illustrated in the diagram below:

The diagram illustrates a system implemented on a central application domain granting access to networked partners and the community of users. The system consists of three main blocks: data gathering, management and publishing.

The display component is web-based, conformant to an increasingly successful three-tier model. In order to develop customised applications, alternative approaches would be considered, covering the simple HTML-based model (the only providing assurance of widespread, browser independent availability) and the rich applet-based model.

The data gathering system supports the exchange of business documents between the parties involved in the CAPRS reporting process. Incoming messages are stored in a repository. Data is drawn from the message and stored in the database.

CAPRS supports both asynchronous, store-and-forward electronic data interchange services (delivered by the "messaging manager" module in the diagram above) and interactive, synchronous "B2B" system interconnection (using the web service approach.) The two services share a unique message repository, a database (Oracle based) and an Active Directory-based directory system. XML is the underlying content format, common to both services.

The publishing system is designed to provide a wide range of queries, covering both factual data and statistics drawn up over time. A specialised query module offers a wide range of query options, on top of a set of predefined queries.

Ultimately, as part of the query module, a "push" functionality can be incorporated to perform predefined analyses of standard data sets and to deliver unsolicited messages to designated users

in the case of events that need consideration. Based on the user profile definition, this functionality delivers notifications using the means specified for the intended recipient.

A centralised directory is designed to handle all information relating to user profiles and exchange processes. This information is used to define and enforce both the permission schema and the business rules. Business rules define how incoming/outgoing messages should be handled for a given user profile.

A specialised, centralised system administration functionality allows a particular user defined as an 'administrator' to formulate an operation policy, a security policy and the associated set of permissions and processes. Policies are "pushed" out to all the other system modules for enforcement.

Each system module provides its own specialised GUI, which extensively relies on look-up tables and graphic visual objects. All user interfaces are based on the light client model, and only require that users be equipped with a standard browser.

3.3.2 System Architecture Overview

CAPRS has been developed following the three-tier model because of the need for an effective distributed client/server design to provide increased performance, flexibility, maintainability, reusability, and scalability, whilst at the same time hiding the complexity of distributed processing from the user. This lies beyond the scope of a two-tier model.

In Logical Structure views the CAPRS system can be viewed as a set of co-operating services grouped in the following layers:

•   Presentation Layer (UI Layer)
•   Business Layer
•   Data Layer

This architecture view has helped to identify the generic types of services, to ensure proper segmentation, and to drive the definition of interfaces between tiers. This segmentation has allowed for more discreet architecture and design choices when implementing each layer, and for the building of a more maintainable application.

The three layers described above are organised as follows:

UI Layer Composition

•   User Interface: HTML and ASPX pages of the various areas of the CAPRS website
•   Proxy libraries that wrap the interfaces toward the Application Layer. The purpose of the Proxy is to uncouple the ASPX pages from the protocol used to talk to the database layer

Business Layer Composition

- Interface to expose the business services.
- Business Processes. Components to manage complex business workflows.
- Business Entities. Component used to represent the entity passed through the tiers (for example database query results)

Data Layer Composition

- Wrapping Interfaces: Interface to unbind the business components from the specific database system used.
- Data Access: Component for accessing the relational database, components for accessing the storage services (file server)
- Relational Database: Microsoft SQL Server 2000
- Storage devices: Data server File System (NTFS)

Please refer to the System Architecture Design for more details. (see also chapter 5 "Description of the pilot website")

Database schema (see next page)

The following pictures present the database itself, showing tables, column names, primary key and relationship.

3.4 Test, validation and delivery of the reporting system (stage 4)

In August 2003 the first version of the system and website were put into production with access restricted to the Project Team and the DG TREN. In October 2003, the website was presented for the first time to the Air Carriers. For this first presentation a static website containing *dummy* data was created in order to allow the Air Carriers to test and explore the site. During December 2003 an updated version of the website was published online, with access only available (restricted access by Username and Password) to the Air Carriers that had signed a letter by which they undertook not to disclose any data or information contained on the CAPRS web site. The final version of the website was put on-line in June 2004.

The CAPRS System in all its components (software, user interface, access control, coherence of information, link quality and existence, data validity) has been tested following different test procedures. Testing has been performed on the website functionality at technical (internal), customer (EC) and Air Carrier and Stakeholders level. These procedures have been performed by different users, with the system tested by SW specialists, by Usability specialists, and by the CAPRS Stakeholders. A widespread test, involving public users has not been possible since the website information could not be made public without the air carriers agreement. Detailed results of this test are reported in the Technical documentation.

The continued evaluation of the evolution of the reporting system based on the results of the tests consisted in taking into account all the feedback, comments and advice received. Contact by phone and e-mail was conducted and different solutions and modifications investigated.

Major updates of the system:

- o December 2003: The first version of the system is open to the active reporting Air Carriers that had signed a confidentiality agreement with the European Commission. The content and layout are based on the specification reported in High Level Requirements version 3.
- o March 2004: The website is improved by adding more detailed information on Flight Punctuality and Baggage Mishandled. The Document Area and Links are updated.

Corrective maintenance is part of the testing and validation activities. Evolution maintenance is part of the specification and development stages. Corrective maintenance is used in updating web pages, data structures, validating processes and data presentation.

A training course for the system administrator was held at the Bassilichi premises, with the following agenda:
- • System Architecture Overview
- • Description of CAPRS Installation Procedure:
  - o Database installation and configuration
  - o Website installation and configuration

- • OAG data loading

- CAPRS Data validation and loading:
  - o Punctuality data validation/loading
  - o Baggage data validation/loading
  - o Denied boarding data validation/loading

- Data rendering and optimisation

At the end of the training course a system installation CD and a "hardware and software" manual was released.

During the pilot phase it was not possible to obtain an agreement from the reporting air carriers to publish the website with data pertaining to their activities The reporting air carriers were asked twice for their agreement to open the website to the general public. The first time only three airlines agreed to the publication of data concerning them on the website.It was considered that this would not provide the general public with sufficient choice.

The reporting air carriers who responded negatively to this first request raised a number of concerns in relation to the website. These concerns related to the following issues: lack of participation of air carriers, insufficient data reported by the reporting airlines, website 'look and feel', correctness of received and processed data (including validation), no differentiation of delay causes, time involved in processing and publishing the data.

Therefore a meeting was organised with the reporting air carriers to discuss these concerns and with a view to reaching an agreement to open the website to the general public. During this meeting a list of action points were identified as necessary to be implemented before the website be made open to the public.

On this basis the second request to open the website to the public was submitted to the airlines. Additionally four reporting air carriers agreed to a publication of the website upon implementation of the action points. However, the European Commission felt that as a critical mass had not been obtained with the agreement of seven reporting air carriers the website was not suitable to be opened to the general public during the pilot phase. Reasons provided for not agreeing to a publication of the website at the second request were: lack of participation of air carriers, concerns about the quality of the data provided by other airlines, that the air carriers were not grouped (network, low cost, charter and regional).

The website was presented to the reporting air carriers, the Panel of Experts and the Steering Committee. Two meetings with the participation of the reporting air carriers and other invited air carriers also took place.

Validation or quality control processes have been implemented so as to verify the reliability of Punctuality data against OAG data (see Establishment of the requirements of the reporting system [stage 2]). The punctuality validation procedure operates on the Scheduled Departure/arrival times of each reported flight and compares them with the correspondent value of the data source provided by OAG, classifying it as correct or incorrect. Correct

flights are loaded while incorrect data is saved in appropriately named files available to reporting air carriers in order to help them identify and correct the problem in question.

4 Data reporting by Air Carriers

In 2002 the Commission invited 43 air carriers to participate on a voluntary basis in the pilot phase following the publication of the call for tender concerning the Pilot Phase of the CAPRS. Later, an additional 8 air carriers were invited.

Only 16 air carriers actually participated on a voluntary basis during the pilot phase. However, these air carriers, also called reporting air carriers, represent approx. 70% of all reportable flights, a figure considered adequate to provide a critical mass for the pilot phase. It should be noted that most of the air carriers did not deliver data for all categories or for the full duration.

The contractor was available to support the air carriers in setting up their data reporting to CAPRS in order to facilitate the implementation and to aid in the clarification of issues that arose.

The reporting air carriers have been closely involved in the development of the CAPRS pilot as described in chapter 2. The other air carriers have been informed about the progress of the work during the pilot phase and the Commission has reiterated its request made to these air carriers to participate on a voluntary basis in the pilot phase.

In general the reporting air carriers have participated with scepticism but also in a constructive manner to the process, offering valuable input.

4.1 Reporting air carriers

Summary of reporting situation

	Air Carrier	Contact(s)	Reporting status	Provided data
1	**AEGEAN AIRLINES**	Mr. N. Costopoulos	Suspended since January 2004	Punctuality
2	**AIR FRANCE**	Mr. L. Barthelemy	Active	Punctuality
3	**ALITALIA**	Ms. C. Lomabardini	Active for baggage data Punctuality suspended since May 2004	Baggage

4	**AUSTRIAN AIRLINES**	Mr. Martin Sostar	Suspended since April 2004	Punctuality, Baggage, Denied Boarding
5	**BRITANNIA**	Mr. C. Sharples	Active	Punctuality, Baggage (mishandling), Denied Boarding
6	**BRITISH AIRWAYS**	Mr. A. Cahn Mr. M. Ryan	Active	Punctuality, Baggage (mishandling)
7	**CSA**	Mr. J. Roubicek	Active	Punctuality, Baggage
8	**DEUTSCHE BA**	Mr. H. Lindner	Active	Punctuality
9	**DEUTSCHE LUFTHANSA AG**	Mr. T. Kropp	Active	Punctuality
10	**FINNAIR**	Mr. S. Skogberg Mr. J. Rahko	Active	Punctuality, Baggage
11	**IBERIA**	Ms. E. Herrero	Active	Punctuality, Baggage
12	**KLM-ROYAL DUCTH AIRLINES**	Ms. L. Oudkerk Mr. M. van der Goot	Active	Punctuality, Baggage (mishandling)
13	**RYANAIR**	Ms. C. Green	Active	Punctuality, baggage (mishandling)
14	**SAS SCANDINAVIAN AIRLINES**	Ms. H. Fuhrmann	Active	Punctuality, Baggage
15	**SN Brussels Airlines**	Mr. P.Lucq	Active	Punctuality
16	**Virgin Express Holdings PLC**	Mr. A. Blake Mr. R. Theunis	Active	Punctuality, Denied Boarding, Baggage

See detailed table in the Global status of reporting.xls document.

4.2   Invited air carriers

In 2002 the following 43 air carriers were invited to participate in the pilot phase on a voluntary basis:

- AEGEAN AIRLINES

- AER LINGUS

- AIR BERLIN

- AIR DOLOMITI

- AIR EUROPA LINEAS AEREAS, S. A.

- AIR EUROPE

- AIR FRANCE

- AIR LIB

- AIR LITTORAL

- AIR NOSTRUM GROUP

- AIR ONE

- ALITALIA

- AUSTRIAN AIRLINES

- BINTER CANARIAS

- BRITISH AIRWAYS

- BRITISH EUROPEAN

- BRITISH MIDLAND

- CONDOR FLUGDIENST

- CRONUS AIRLINES

- DEUTSCHE BA

- DEUTSCHE LUFTHANSA AG

- EASY JET

- EUROWINGS

- FINNAIR

- HAPAG LLOYD FLUG GmbH

- IBERIA

- KLM-ROYAL DUCTH AIRLINES

Project	Author:	Date / Version	**Final Report**
CAPRS	Gloria CENNI	June 2005	
Contract B2002/B2-	Stefano MATERAZZI		
7040B/S07			
Client	Info		Reference / Page
European Commission	Final Report		**CAPRS Final Report (final)**
DG TREN			**07072005.doc/** 28 of 56

- KLM UK

- LAUDA AIR

- L.T.U.

- LUXAIR

- MAERSK AIR

- MERIDIANA

- OLYMPIC AIRWAYS

- PORTUGALIA

- REGIONAL AIR LINES

- RYANAIR

- SAS SCANDINAVIAN AIRLINES

- SKYWAYS

- SPANAIR

- TAP AIR PORTUGAL

- TYROLEAN AIRLINES

- VIRGIN EXPRESS

During the pilot phase the below mentioned 8 air carriers have been invited to participate on a voluntary basis:

- ALPI EAGLES

- BRITANNIA

- CSA (Czech Airlines)

- LOT Polish Airlines

- MALEV

- SN BRUSSELS AIRLINES

- SWISS

- VOLARE AIRLINES

5 Description of the pilot website

5.1 Overall Description

The CAPRS website permits access to different User types, for whom individual interfaces have been developed.

The different Interfaces are:

- EU Consumer Web Interface
- Air Carrier Web Interface

Each Web Interface is structured with the following sections:

- Header
- Menu Bar
- Main
- Footer

5.2 Header section

The header section features:

- Project name and logo.
- Directorate-General for Energy and Transport logo and link to website.
- European Commission logo and link to website.
- Language selection (during pilot phase only available in English).

.

5.3   Menu Bar section

The Menu bar gives access to all website sections. Available sections depend on the connected type of user and are listed in a user type dedicated paragraph.

5.4 Main section

The Main page content depends on menu selection. Single page detail will be presented in a user type dedicated paragraph.

5.5 Footer section

The footer section features the logos of all project-related entities, as well as the legal and copyright disclaimers.

5.6   EU Consumer Web Interface

This paragraph describes sections and function available to EU Consumers when entering the CAPRS website. This action requires no login or password.

The Community Air Passenger Reporting System (CAPRS) provides European air passengers with information on airlines' **flight punctuality** and other aspects of **service quality**.

Comprehensive information is available in the three data sections.

(Last update 21.05.2004)

Punctuality data - latest month available (April 2004)

Air Carrier	On Time Arrival	Cancelled flights	Delay and Lost Baggage	Denied Boarding passengers
Alpha	95%	0.16%	Not Available	Not Available
Beta	91%	0.66%	1.01%	Not Available
Gamma	89%	0.43%	Not Available	Not Available
Teta Airlines	88%	0.53%	Not Available	Not Available
Omega	83%	1.53%	Not Available	Not Available
Epsilon	82%	0.59%	0.95%	Not Available
Total	87%	0,64%	0,97%	--%

*: Partially Available

You are the visitor n°: 69

Legend

On time Arrival: OPERATED FLIGHTS ARRIVED IN ADVANCE OR WITH A DELAY BETWEEN 0 AND 15 MINUTES

Cancelled flights : % of cancelled flights (cancelled within 7 days before flight scheduled date)

Delay and Lost Baggage: % of delayed and lost baggage

Denied Boarding passengers: % of denied boarding passengers

Images trademark: Courtesy of Lufthansa AG and Naviair, Denmark

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5.7   Menu Bar section

In the menu bar section EU Consumers will find the links to the following CAPRS pages:

- Home Page
- Info page about the project in general
- General info page about the Air Carriers
- Project disclaimer
- System algorithms, definitions and figures details
- Project and system related links
- Project and system related documents
- Query page for Global Punctuality performance
- Query page for Single Airport Pair Punctuality performance
- Query page for Global Delayed and Lost Baggage performance
- Query page for Global Pilfered and Damaged Baggage performance.
- Query page for Global Denied Boarding performance

Depending on the Menu bar choice one of the following page is displayed:

Home Page

This page displays a brief presentation of the project, together with an extract of the results (punctuality, baggage and denied boarding) related to the last collected month. This is the 'home page' where EU Consumers are redirected on accessing the website.

General info about the project

This page displays the general presentation of the project.

General info about the Air Carriers

In this page is displayed the list of the participating and invited air carriers.

Project disclaimer

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In this page is displayed the project disclaimer

System algorithms, definition and figure details.

▶ **DATA PROCESSING**

Algorithms and figures specifications

The following section describes methods and algorithms used by CAPRS system in classifying incoming data and produce aggregate figures. It is organized in four sections:

- **Punctuality and cancellation**
- **Delayed and Lost Baggage**
- **Pilfered and Damaged Baggage**
- **Denied Boarding**

Data validation procedure

All data provided by the airlines is quality checked for its compliance with the required format and for consistency errors (e.g. departure time after arrival time). In addition data is validated as follows:

Punctuality and cancellation:

Scheduled times are validated against published scheduled times (OAG [1]) seven days before departure/arrival. This allows verifying that all reportable flights have been reported and subsequently that scheduled times are correct and any cancellations. Actual times are not validated as there are no other sources than the airlines themselves for such data. Airports are validated against listed airports.

Baggage:

Baggage data is not validated as there are no other sources than the airlines themselves for such data.

Denied boarding:

Denied boarding data is not validated as there are no other sources than the airlines themselves for such data.

More details about data validation can be found **here**

[1] Official Airline Guide (www.oag.com)

This page displays the technical information regarding the project. Here EU Consumers can find algorithms used by the system in calculating figures, together with definitions and classification rules.

Project and system related links.

In this page are displayed all the links related to the system and the project itself, such as the Directorate-General for Energy and Transport, European Commission, reporting Air Carriers websites, etc.

Project and system related documents.

In this page are displayed all documents related to the system or to the project. These documents can be downloaded by the visitor.

Global Arrival Punctuality performances.

This page presents the Flight Arrival Punctuality figures of the reporting Air Carriers related to all operated flights and the last available month. Air Carriers are listed in order of performance.

Reported figures are:

- Total reported/Operated Flights
- Cancellations
- Delays in Arrival

From this page the User can access the Global Departure Punctuality Performance page.

On this second page the following functions are available

- Month Selection
- Month Comparison
- Aggregate last 3 month
- Aggregate last 6 month
- Aggregate last 12 month
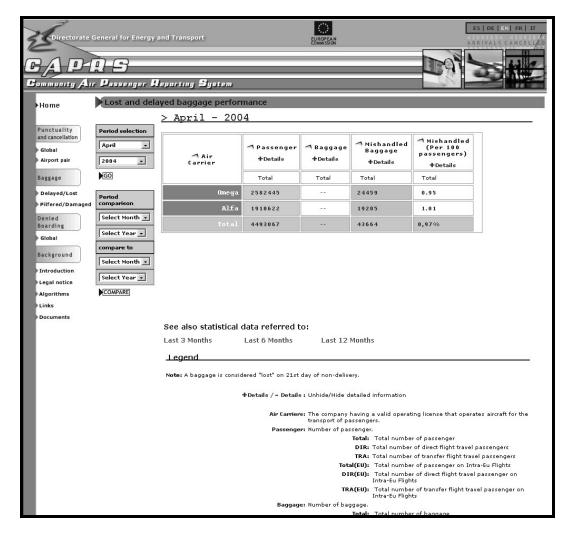
Global Departure Punctuality performances.
This page presents the flight Departure punctuality figures of the reporting Air Carriers related to all operated flights and the last available month. Air Carriers are listed in order of performance starting with the best.

From this page users can access the Global Arrival Punctuality Performance page.

Airport Pair Selection (punctuality).

This page permits the EU Consumer to select the requested Airport Pair among the supported ones. After selection, the "Single Airport Pair Punctuality performance" page is opened.

Single Airport Pair Arrival Punctuality performances.
This page presents the flight arrival punctuality figures of the reporting Air Carriers related to selected Airport Pair and the last available month. Both directions are presented. Air Carriers are listed in order of best performance.

The following functions are featured on this page:

- Month Selection
- Month Comparison
- Aggregate last 3 month

- Aggregate last 6 month
- Aggregate last 12 month

This page is not accessible directly from the menu bar but instead requires a selection of the airport pair in a dedicated page.

Single Airport Pair Departure Punctuality performances.
This page presents the flights departure punctuality figures of the reporting Air Carriers related to selected Airport Pair and the last available month. Both directions are presented. Air Carriers are listed in terms of performance starting with the best.

From this page users can access the Single Airport Pair Arrival Punctuality Performance page.

Global Delayed and Lost Baggage performance.

This page presents the Delayed and Lost Baggage figures for the reporting Air Carriers related to all operated flights and the last available month. Air Carriers are listed in order of performance starting with the best. Reported figures are:
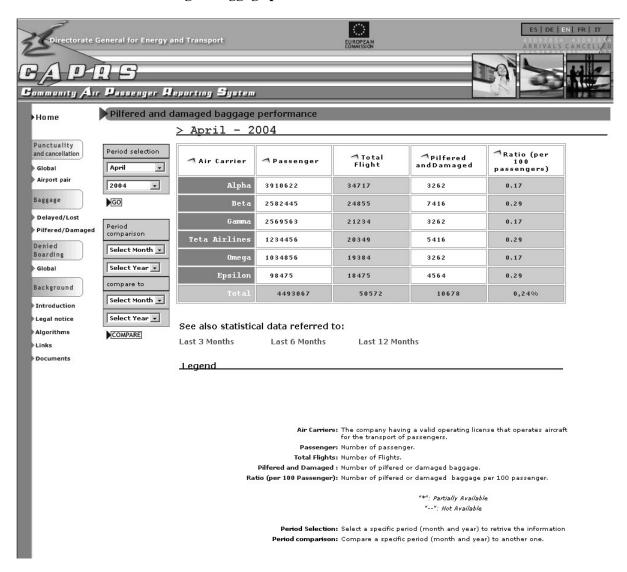
- N° of Passengers:
- Mishandled Baggage:

The following functions are also featured on the page:

- Month Selection
- Month Comparison
- Aggregate last 3 month
- Aggregate last 6 month
- Aggregate last 12 month

Global Pilfered and Damaged Baggage performance.

This page presents the Pilfered and Damaged Baggage figures for the reporting Air Carriers related to all operated flights and the last available month. Air Carriers are listed in order of performance starting with the best. Reported figures are:

- N° of Passenger
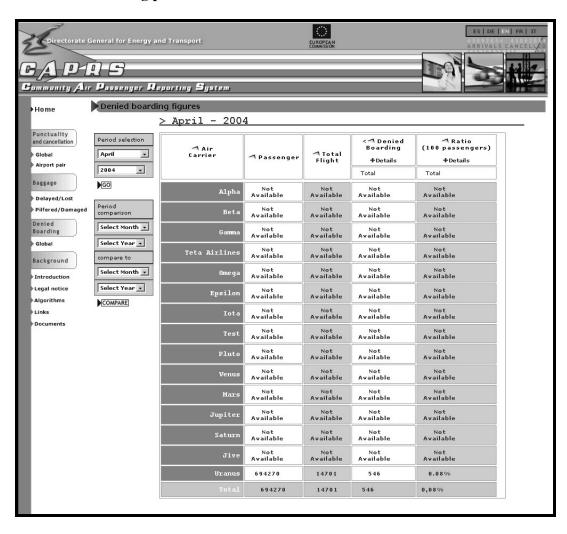- Pilfered and Damaged Baggage

The page also features the following functions:

- Month Selection
- Month Comparison
- Aggregate last 3 month

- Aggregate last 6 month
- Aggregate last 12 month

Global Denied Boarding performance.

This page presents the Denied Boarding figures for the reporting Air Carriers related to all operated flights and the last available month. Air Carriers are listed in order of performance starting with the best. Reported figures are:

- N° of Passenger
- Denied Boarding

The page also features the following common functions:

- Month Selection
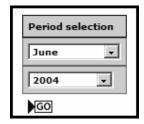- Month Comparison
- Aggregate last 3 month

- ▪ Aggregate last 6 month
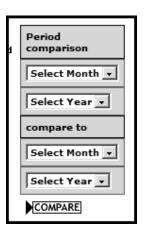- ▪ Aggregate last 12 month

Common Functions

Certain pages feature 'common functions', functions that have been designed to help EU Consumers in evaluating the Air Carrier Performance:

Month Selection

EU Consumer selects a month and a Year, among reported ones. System displays data referring to that month.

Month Comparison

EU Consumer selects a pair of months and a year from those reported. The system displays data on those months, allowing for easy comparison.

Aggregating functions are not available.

Aggregate last 3 months

See also statistical data referred to:

Last 3 Months   Last 6 Months   Last 12 Months

This function allows EU Consumers to aggregate data (if available) of the two displayed months with that of two previous ones.

Aggregating functions are not available.

Aggregate last 6 months

See also statistical data referred to:

Last 3 Months   Last 6 Months   Last 12 Months

This function allows EU Consumers to aggregate data (if available) of displayed month with that of five previous ones.

Aggregating functions are not available.
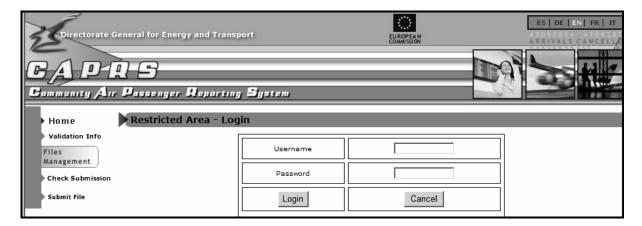
Aggregate last 12 months

See also statistical data referred to:

Last 3 Months   Last 6 Months   Last 12 Months

This function allows EU Consumers to aggregate the data (if available) of displayed months with that of eleven previous ones.

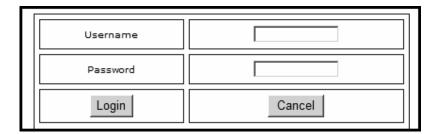Aggregating functions are not available.

Air Carrier Web Interface

This paragraph describes sections and functions available to an Air Carrier when it accesses the CAPRS website. Access requires a login and a password provided by the CAPRS administrator after the registration process.

Login

In the header section of the common homepage there is a link to a login procedure. After inserting the correct UserID and Password the Air Carrier is redirected to its own private homepage.

Menu Bar section

In the menu bar section the Air Carrier will find links to the following reserved pages:
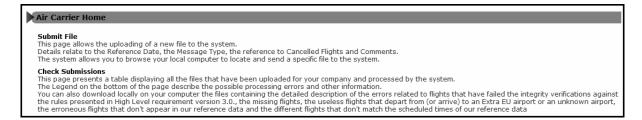
- General info about the project
- General info about the air carrier itself
- Data submission page
- System query page for data submitted
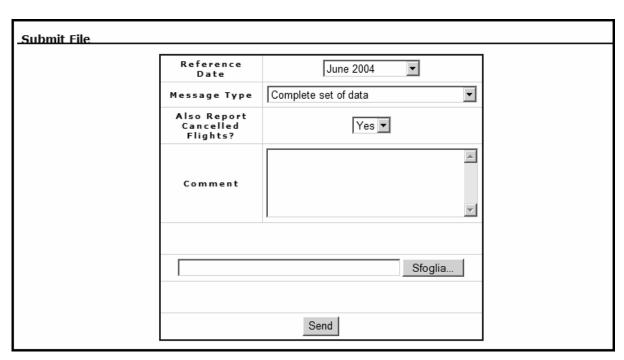
Main section
Based on Menu bar choice one of the following pages is displayed:

General info about the Air Carrier (Air Carrier Home Page)

This page displays general information about the Air Carrier itself.
This is the homepage where the Air Carrier is redirected after login.

Data Submission.

Through this page the Air Carrier can send data to the system.

The Air Carrier can select, by means of a browsing function, a file on the local system. Through the use of a text box and a combo box it can specify the message info related to the selected file:

- Reference Date: Reference Period
- Type: Message type (D, M, O, or B)
- Comment: Optional Comment

Finally a send function allows the air carrier to physically submit the file to the CAPRS system. A separate page (see §5.3.4) gives information about successful operations or possible problems.

Submission info.

punctualityValidation

Punctuality Validation Procedure

The punctuality validation procedure verifies each reported flight (from now on identified as item) and classifies it as correct or incorrect. Correct items are loaded while incorrect items are saved in files with meaningfully name and made available to reporting air carriers in order to help them in identify the problem and correct it. Incorrect items are classified with following name:

- ERRONEOUS
- EXTRANEOUS
- USELESS
- MISSING
- DIFFERENT

The meanings of these names are discussed in following subparagraphs.

Validation process is split into Local and External validation depending on information required to verify incoming data.

Local validation procedure

Local validation requires CAPRS static internal resources (i.e. Airport list, data and time format etc.) These internal resources being quite static change rarely. All incoming data will be submitted to Local validation process. Local validation will operate on:

- No missing info
- Airports Departure and destination correctness
- Period correctness
- Departure time, Arrival time correctness

Data integrity Validation

All required data (mandatory values) must be supplied, in the correct format, for each reported item.

- If the validated item misses one or more mandatory field, or the format used is not correct it is marked as **ERRONEOUS** and it will be not loaded

Mandatory values and their format, as reported in HLR 3.0 document, are:

Field Code	Field Description	Format	Example	Mand.
Date	Reference date (month and year)	mm/yyyy	05/2003	Yes

This page displays info on successful sending operations or possible problems during submission.

Data Submitted check.

Check Submission

Air Carrier	Reference Date	Receipt Date	Loading Date	Type	Status	Cancelled Reported	Items	Errors	Missing	Useless	Extraneous	Different	User Comment
X	December 2004	17 Jan 2005	24 Jan 2005	Data about flight punctuality	Message has been loaded succesfully	Yes	2723	28	2	14	14	6	
X	November 2004	13 Dec 2004	03 Jan 2005	Data about flight punctuality	Message has been loaded succesfully	Yes	3068	1	1	9	16	13	
X	October 2004	15 Nov 2004	25 Nov 2004	Data about flight punctuality	Message has been loaded succesfully	Yes	3123	0	4	154	26	6	
X	September 2004	20 Oct 2004	26 Oct 2004	Data about flight punctuality	Message has been loaded succesfully	Yes	2745	0	0	181	31	3	
X	August 2004	20 Oct 2004	26 Oct 2004	Data about flight punctuality	Message has been loaded succesfully	Yes	2083	0	17	219	62	2	
X	July 2004	20 Oct 2004	26 Oct 2004	Data about flight punctuality	Message has been loaded succesfully	Yes	2448	1	0	0	43	0	
X	June 2004	20 Oct 2004	26 Oct 2004	Data about flight punctuality	Message has been loaded succesfully	Yes	2810	2	0	0	0	0	

- This page displays the info about the files sent by the Air Carrier. For each file System provides links to acknowledge files containing errors or missing items.

6   Conclusion

The objective of the study has been to set-up a pilot reporting system on the basis of an operational trial of reduced scope.

The study has defined the form and modality of a system focussing on flight punctuality and other service quality indicators (cancellations, baggage and denied boarding). The pilot reporting system has been tested with genuine and relevant data.

In defining and testing the system, the stakeholders (consumer organisations, air transport industry organisations and air carriers) have been involved in this project with the aim of providing clear and simple information to the consumer (air passenger).

All effort has been made to ensure that the information provides a fair and balanced picture of the quality of services provided, without putting disproportionate burden on the air carriers. The pilot reporting system has been developed in such a manner as to balance the various issues.

A user interface has been developed providing high-level statistics for the main indicators. A second level of statistics on each group of indicators provides the user with a more detailed view, including airport pairs whereby a map is used for airport selection. In addition an expand function allows more experienced users to enjoy even greater detail. This way relevant, clear and simple information is provided to the consumer (air passenger) directly.

The system in all its components (software, user interface, access control, coherence of information, link quality and existence, data validity) has been fully tested and deemed operational.

Testing has been performed on the website functionality at technical (internal), customer (EC), Air Carrier and Stakeholders level. The continued evaluation of the evolution of the reporting system based on the results of the tests has consisted in taking into account all the feedback, comments and advice received from the various parties.

Technically the system is very straightforward and although the database will, where deemed relevant, eventually contain a considerable quantity of data, the computations involved are not overly complex. Provisions for migrating to a permanent system have been made.

A key issue has been that of investigating the availability, timeliness and accuracy of the data.

It can be concluded that data related to punctuality and cancellations is immediately available. The requested scheduled times may require minor changes to current data collection procedures. However, this data is also available in the public domain. The accuracy of this data is very high, with the data itself available shortly after the flight. The proposed delivery of this data 2 weeks into the following month is entirely feasible.

Although the required baggage data is not immediately available within all airlines, ultimately it is a question of organising the gathering of the data as such.

Two categories of baggage data were defined: 1) Delayed and lost baggage and 2) Damaged and pilfered baggage. The accuracy of the first category is considered to be high, while the accuracy of the second category remains uncertain. This is partly due to the fact that company policies on this issue differ.

Denied boarding data is very sensitive and a majority of the air carriers (in particular network carriers) say that this data is not collected. However, it should be possible to organise this collection, not least because in relevant cases air carriers must pay a compensation which presumably is registered in the accounting system. In general, low cost and charter carriers do not overbook flights and therefore have very limited denied boarding incidents and they are consequently less sensitive on this issue.

In addition it has been investigated which sources there may be for the data, especially with a view to simplifying the data collection. In the short term, the only source for the data are the air carriers themselves.

Effectively, only scheduled times are available in the public domain. Some punctuality data (actual times) could be collected from EUROCONTROL as the air carriers provide it to them. Baggage data could be collected from WorldTracer (SITA). However, this would require the consent of the air carriers. The air carriers have been unanimous in their insistence on providing this data themselves.

The burden of providing the data is considered small once the data collection procedure has been organised within each air carrier. Some air carriers are already able to provide all the required data, whereas others will require more organisational time. The time involved depends on how well organised the data is.

51 air carriers were invited to participate in the pilot phase. During the pilot phase 16 air carriers participated in the development of the reporting system and provided data to it. These air carriers represent around 70% of the flights that were considered reportable for the pilot phase. A critical mass of data has thus been achieved. However, as mentioned above, not all requested data was supplied. The other invited air carriers have been informed of the progress made and the invitation to participate has been reiterated.

During the pilot phase it has not been possible to reach an agreement with the 16 reporting air carriers to open the website to the public with a critical mass of data. Two attempts were made to reach an agreement. Although not all air carries gave clear reasons, reasons provided for not agreeing to the publication of the website at the second request were: lack of participation of air carriers, concerns about the quality of the data provided by other airlines, that the air carriers were not grouped (network, low cost, charter and regional). For this reason the website has only been available to the involved stakeholders and the reporting air carriers.

The overall conclusions are:

→ It is feasible to establish a system providing comprehensive information to the consumer

→ The data is available (although initiating the provision may require some additional organisational effort)

→ It seems unlikely that the system will work on a voluntary basis

→ The efforts required to provide data are limited

7   Annexes

7.1   Annex 1 - Global status of reporting

7.2   Annex 2 - High Level Requirements Version 3