



Episode 3
D3.3.1-04 - Airline / Airport Data Exchange

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EXECUTIVE SUMMARY

The EUROCONTROL Airport Collaborative Decision Making (A-CDM) initiative was developed with a view to enhancing the quality of both airport and network operations through the sharing of accurate information, particularly relating to arrival and departure estimates. Whilst far from being embraced as a standard throughout Europe, a number of airports have A-CDM implementation projects which are at a mature stage of development. These airports have, on the whole, in parallel implemented a collaborative data sharing environment accessible by all interested CDM partners – see for example <https://www.cdmcdg.net/>. A range of information is generally available through such interfaces covering parameters which are directly related to the CDM process (Target Start up Approval Times for example) as well as other pertinent information covering demand and capacity issues, and meteorological information. Each of these sites are however 'local' - that is to say that the conception, content, accessibility etc are unique to each individual CDM airport.

This report summarises the deliberations of an expert group comprising individuals from Air France, LVNL and EUROCONTROL which considered the question of the utility of a "European portal" of relevant information relating to airports. The aim of such a portal would not be to replace the local sites referred to above, but instead it should provide a "quick-look" capability for an airline Operations Control Centre to rapidly access relevant information for airports of their choice, so as to be able to take operational decisions in a timely manner. If further information is required, then the operator should be directed to the local CDM site or should seek clarification from their local representatives as is the case today.

This expert group was made possible within the context of the Episode 3 project, due to the withdrawal of one of the Consortium members during the project execution phase. As a result of the additional funding which was therefore available, a small team of experts from both Air France and LVNL was constructed at a late stage in the project lifecycle to address a specific issue highlighted by Air France, namely the lack of up to date information relating to remote¹ airport operations. As a result of the limited time available, the experts were only able to provide high level guidelines concerning the minimum information that a common information portal should be able to provide. Despite this, it is considered that these guidelines will be particularly useful for SESAR WP11 (Flight Operations Centre System), WP8 (Information Management) and WP13 (Network Information Management Systems).

Much of the data relating to airport operations that could be made available to airlines would stem in the short term from (IP1) A-CDM implementation and in the longer term through the development of the Collaborative Airport Planning concept which is the focus of SESAR Work Packages 6 and 12. Within Episode 3, the M1 DOD has been written to specifically support the Collaborative Airport Planning concept. This current expert group has permitted confirmation that the alignment coverage of the M1 DOD is sufficient to support the type of information exchange which forms the focus of this report.

Whilst the SESAR Work Programme has been defined in a way as to take this work forward, the deliberations of this expert group are believed to provide valuable early operational guidance relating to the information requirements for a flight operations control centre (FOC).

¹ Throughout this report the term 'remote' is used to refer to airports forming part of the airline network (including its diversion possibilities) but away from the main hub or 'home base'.



1 INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

The SESAR Operational Concept states that airport operations during the medium/short term planning phase will be built upon the framework of Airport Collaborative Decision Making (A-CDM) – see Reference [2] - but with further enhancements to the decision making process. In the current system, despite improved data sharing, notably through the A-CDM initiative (See a detailed implementation Manual for A-CDM [2]), there still remains the reality that operational decisions within an airport are implemented largely as the result of “reactive management” rather than “predictive management”. Invariably the “solution” is limited to maximising the immediate interests of those responsible for making a given decision. SESAR therefore proposes a concept whereby operational decisions, particularly those during periods of reduced capacity, taken by any given airport actor may be made in the full knowledge of the operational constraints and/or priorities of other actors who may be impacted by the decision. The management of degraded situations will therefore be improved, coupled with an earlier recovery to normal operations. The focus of the collaborative planning concept is illustrated below:

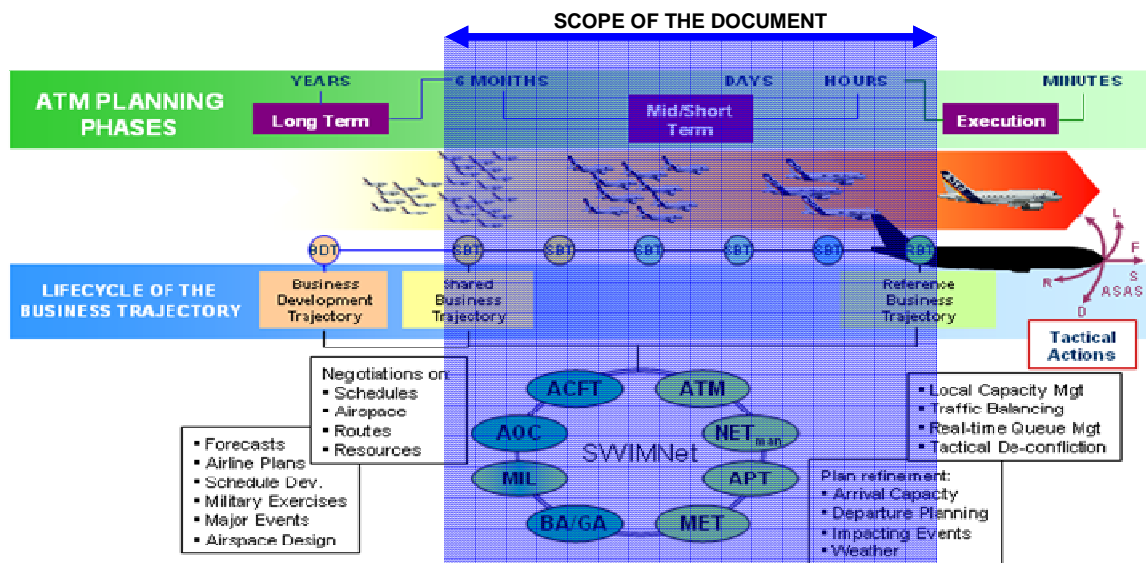


Figure 1: ATM Planning phases

The reflections of the expert group described in this report are specifically within the “day-1” timeframe through to the execution phase.

A fundamental aspect of the future SESAR concept is the evolution toward a performance based ATM system. This notion of performance management is therefore a cornerstone of the future airport concept which foresees an “integrated” airport management framework, where all major aircraft operator, airport, aerodrome ATC and ground handling processes are conducted using common data sets and agreed procedures. This future method of airport management, can, with some justification, be referred to as Total Airport Management (TAM) – the original concept of which is described in Reference [1].



An integral element of TAM is the idea of a common planning and common performance monitoring process. In such an environment, the possibility for increased information sharing amongst the airport actors as well as the wider network is significantly enhanced. The stability and improved predictability afforded by such a concept leads to the possibility to improve the decision making quality of all actors involved. If pertinent airport information is “broadcast” to the wider network and made accessible through a common interface, then the decision making quality within an airline flight Operations Control Centre (FOC) at either the fleet level or on an individual flight by flight basis will be enhanced. The top level requirements for such a common information source are the focus of this current report.

The quality of information accessible for an airline Flight Operations Control Centre (FOC) relating to ‘remote’² airport operations is variable and the method of gaining access to such information is non-standard. Whilst, for example, the quality of information relating to the hub at CDG for both Air France and other incumbent airlines (notably as a result of the CDM initiative) can be considered as high, the same cannot always be said for the remote airports.

Typically the use made by an FOC of airport operational data relates to the tactical management of flights as well as the pre-tactical (1-2 days ahead) tuning of operations. For remote airports, the access to information can be through various sources (local duty manager, Central Flow Management Unit (CFMU), teleconferences, etc) and this is on a case by case basis.

For certain airports (e.g. at Schiphol), a regular teleconference with users is held which provides valuable operational information. However, access to such teleconferences is not always obvious or practical for non home-based airlines. Also a teleconference may not always be the most appropriate method for flight operations management due to issues of both practicality (impossible to follow simultaneous teleconferences) and time issues (the necessity to make decisions rapidly).

This report contains the deliberations of an expert group which comprises airline FOC and ATC operational expertise. The deliberations are presented according to a number of “themes”. In terms of the timescale of the various ideas presented in this report, the vast majority relate to data and procedures in “today’s” system with the exception of information relating to the User Driven Prioritisation Process (UDPP) which is within the IP2 timeframe.

The aim of the expert group has been to provide an initial description of the most useful operational information which could be shared with the “outside world” as a means to identifying the content of a European portal which could be used to provide a rapid view on the performance status of a particular airport. Whilst limiting itself to a discussion on potential operational information, the airline experts stressed the importance that they place in the construction of an early ‘mock-up’ of such a portal so as to be able to focus on usability issues relating to the interface as well as enabling the elaboration of additional requirements.

This European portal should be seen as a first ‘port of call’ or ‘dashboard’ whereby an airline FOC can rapidly visualise whether an airport is functioning nominally or whether performance is degraded in any way. In order to achieve such functionality, a typical interface using appropriate colours (green = OK, red = severely degraded, for example) is envisaged. Once a degraded performance in a particular area for an airport is highlighted, the user would then be directed to the local airport site (typically that developed as part of a CDM initiative) in order to obtain more detailed information.

² Throughout this report the term ‘remote’ is used to refer to airports forming part of the airline network (including its diversion possibilities) but away from the main hub or ‘home base’



It is recognised that these local sites require different access authorisations, employ different user interfaces and have different levels of functionality. Whilst there is possibly a case that could be made for a completely centralised and uniform information source, the requirements of such an interface are considered to lie outside the scope of this expert group. Furthermore, a centralised information source cannot achieve the same level of detail or replace some of the 'local' functionality inherent in certain airport CDM sites such as, for example, the possibilities for direct dialogue ('chat') with the weather information service provider.

1.2 INTENDED AUDIENCE

The report is intended to provide scoping material for the SJU in defining the content of a number of individual work packages. The main "user" of such a centralised information portal is an airline FOC and therefore the report is of direct relevance to SESAR WP11 (Flight Operations Centre System). The broader questions of Information Management and particularly how the future seamless information sharing environment that is to be realised through SWIM means that this report is of interest to both WP8 (Information Management), WP7 (Network Operations) and WP13 (Network Information Management Systems) of the SESAR Work Programme.

1.3 DOCUMENT STRUCTURE

The context of Collaborative Airport Planning within SESAR has been presented above and a specific 'problem' in relation to the quality of information relating to remote airports for a FOC has been highlighted. Section 2 of this report therefore contains the results of a short series of deliberations (expert group sessions) conducted with Air France and LVNL in relation to the potential content and utility of a common, centralised information source for airports.

1.4 BACKGROUND

This report has been developed during a series of meetings between EUROCONTROL, Air France and LVNL. An initial kick-off meeting was held for the participants to agree on the objectives of the expert group, its working methods and particularly its scope. Subsequent working meetings considered the specific data requirements applicable to each of the "themes" which the group had agreed upon during the kick-off meeting. The particular themes which formed the focus of the group reflections related to airline requirements in the domains of Airport and ATC information, meteorological information and communication methods. A small number of meetings were held between the participants as follows:

Date	Location	Objective / Themes
20 April 2009	Air France Headquarters, Roissy CDG	Kick-off meeting
26 May 2009	Air France Headquarters, Roissy CDG	ATC and airport information sharing
22 June 2009	Air France Headquarters, Roissy CDG	Meteorological information
27 November	Air France Headquarters, Roissy CDG (LVNL by correspondence)	Wrap-up



1.5 GLOSSARY OF TERMS

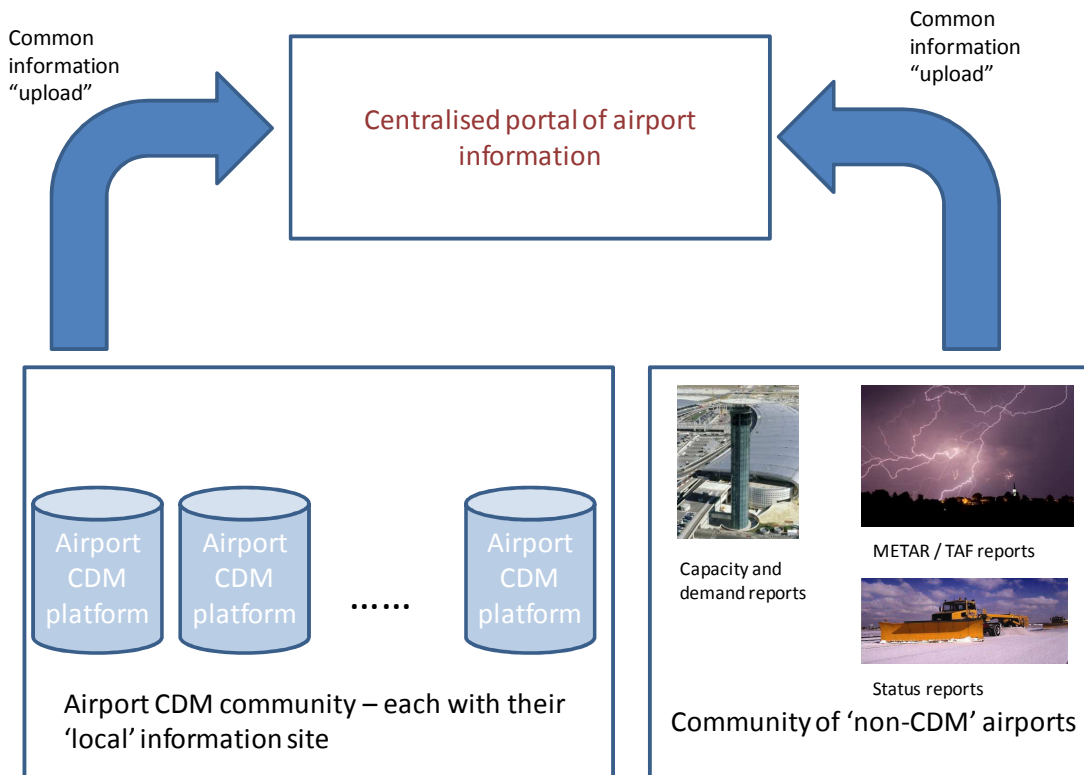
Term	Definition
AAS	Amsterdam Airport Schiphol
A-CDM	Airport Collaborative Decision Making
ANSP	Air Navigation Service Provider
AOP	Airport Operations Plan
ATC	Air Traffic Control
ATM	Air Traffic Management
c/d	Capacity to demand ratio
CDG	Paris Charles de Gaulle airport
CFMU	Central Flow Management Unit
FOC	Flight Operations Centre
LVNL	Dutch Air Navigation Service Provider
METAR	Meteorological observation report
NOTAM	Notice to Airmen (provides details of temporary restrictions or work in progress etc at an airport)
SESAR	Single European Sky ATM Research and Development Programme
SESAR JU or SJU	SESAR Joint Undertaking
TAF	Meteorological forecast report
TAM	Total Airport Management
TSAT	Target Start-up Approval Time
TOBT	Target Off-Block Time (communicated to partners at A-CDM airports)
TTOT	Target Take Off Time

Table 1: Glossary of Terms



2 SCOPE OF A CENTRALISED PORTAL OF AIRPORT INFORMATION

2.1 POTENTIAL ARCHITECTURE



The essential idea behind the centralised portal of airport information is that it be accessible by an airline FOC and that its content be derived directly by “uploading” pertinent information from individual airports. For the A-CDM community of airports, the available information will by definition be both richer and more accurate. For the non-CDM community of airports, certain minimal information should be provided relating to capacity and demand balancing, general status and meteorological information, as described in more detail in the following sections. The fundamental objective of the portal is to therefore provide a “quick-look” capability for the FOC to assess whether or not an airport is operating normally and to be able to assess rapidly the impact of any deviation from normal operations. The portal is therefore not a replication of the individual CDM sites but it should rapidly point to those airports for which a more in-depth analysis (through direct access to the ‘local’ CDM site or other means) is necessary.



2.2 ATC INFORMATION

2.2.1 The question of "capacity" and "demand"

The group discussed at length the advantages of having a timely access to relevant operational information held by ATC. At the heart of the information requirements from ATC is the anticipated evolution in the provision of 'capacity' and the expected 'demand', but vitally the relationship between the two – referred to herein as c/d.

An important distinction should be made for both arrivals and departures when referring to the CFMU regulation capacity and the actual operational capacity. For example, the use of a 'zero rate' regulation does not necessarily imply that an airport is closed. For CFMU regulations, both the rate and expected duration should be published as well as the expected capacity profile during the return to 'nominal' operations. Whilst the operational capacity is an important entity, the key for an FOC to understand the potential impact on their operations is to have a visibility on the demand evolution during the corresponding time period. Experience in the CDM initiative at Paris Charles De Gaulle airport (CDG) has shown that a simple graphical representation using colour to differentiate different thresholds of the c/d relationship permits a rapid assessment of the situation. For example:

- Green if demand < 90% of operational capacity;
- Yellow if demand between 90% and 100% of operational capacity;
- Orange if demand between 100% and 110% of operational capacity;
- Red if demand exceeds 110% of operational capacity.

The notion of 'which' capacity to provide through such a portal is not a trivial issue. At the vast majority of airports it may be appropriate to display information at its most aggregated level e.g. operational arrival capacity. For some airports however, this level of aggregation may hide certain key information necessary as part of the decision making process. In this case, a lower level of aggregation may be necessary, for example 'southern arrival capacity' and 'northern arrival capacity' so as to ensure that the most appropriate level of information is always available for individual airlines.

It is also important that the capacity figures indicated are understandable to all. The distinction between a theoretical capacity (e.g. that used for slot allocation) and the operational capacity against which ATC are organising their operations should be apparent.



It should be possible to rapidly visualise in the form of a graphic the relationship between the predicted demand and the actual demand for both arrivals and departures. Again, whilst this relationship can be displayed in detail at the local site using a fine display interval, some thought should be given as to how it should be aggregated so as to provide the user with a rapid indication that there is a deviation between the planned demand and the actual demand, coherent for example with the imposition of ATFM regulation. It is also important for the airline to be able to deduce quickly from this information the level of 'knock-on' delay that is currently being experienced due to any capacity and demand imbalance and over what time interval such induced delay is likely to be absorbed by the system.

2.2.2 Information relating to taxi times and holding

Statistics concerning taxi-time should be available. Again, whilst local sites could display taxi-time information for both arrivals and departures, the quick look facility should provide a rapid indication as to the conformance of the taxi out times with that declared to the CFMU (including flight specific variable taxi time information in the case of a CDM airport) as well as statistical information for recent taxi-in times.

If the average taxi-time at a given airport is currently exceeding that declared to the CFMU then an airline should have access to additional information concerning the average waiting time at the bloc (difference between TOBT and TSAT in a CDM airport) and the average waiting time at the runway holding point. This distinction is necessary as it enables the airline FOC to address two key questions, namely:

- Will the flight be delayed?
- Is there a possible necessity for increased fuel upload?

Similarly the average taxi-time for arriving aircraft currently being experienced in relation to the historical average should be available as it is a reasonable indicator of possible parking congestion. For arrival flows/flights it would be useful for an airline to have access to information concerning the average holding time at a given (remote) airport for the past hour as well as the tendency ("will increase", "stable", "will decrease") for the coming hour.

Information concerning potential arrival holding based on statistical information for the past hour minutes should be available as this would help to respond to crew requests concerning the potential necessity to divert. Whilst airlines have information relating to CFMU slots for their own fleet, more detailed information comprising runway holding time, gate holding time and mean taxi time evolution should also be made available for the airport.

Concerning special situations such as de-icing, the experts spent some time considering the relative merits of displaying information through a 'local' site and whether or not is useful to have information available through a centralised source. The viewpoint was that the specifics of the de-icing operation are most applicable to the local site as both the procedures and available resources are very much airport specific. However, the overall impact on the runway throughput and the (if any) impact on operational capacity (including for example the impact of de-icing operations in progress) should be available in the centralised tool.

2.3 AIRLINE INFORMATION

The scope of a centralised information source defined by this expert group has been very much from the perspective that the main 'user' and beneficiary would be an airline FOC. The



necessity for airlines to actually input information to such a tool is therefore quite limited. One exception which the experts identified was however in the context of the User Driven Prioritisation Process (UDPP).

During periods of severe capacity shortfall when the UDPP process is invoked, it is important that airlines have access to the “new” flight programme so as to ensure a level playing field. Although, or perhaps because, this is a contentious issue, when airlines are requested to reduce their flight programme, it is important that the actions taken by each airline be readily visible to all. Such information is ideally placed in a centralised tool since an airline needs to be able to assess the UDPP processes that are taking place across a number of airports.

2.4 METEOROLOGICAL INFORMATION

In today’s information system, the only observation and forecast weather information which is available as a standard is the METAR and TAF. The philosophy behind the design of a European portal providing high level information from local sites is inherent in the relationship between the CDM site at CDG and the weather information provided by *Météo France*. The detailed information provided by *Météo France* is “aggregated” into the form of a dashboard which provides a rapid view of the current and predicted weather information. The judicious use of colour is also important as it enables the nature and timing of any potential weather event to rapidly be located. Also, importantly, such an interactive visualisation negates the need to be able to read the specific coding that is contained in the weather observation and forecast reports (METAR and TAF).

Broadly, the airline FOC requires an indication of the presence or otherwise of significant phenomena during the forthcoming 36 hours. The observed and predicted presence of any of the following during 36 hours or should be indicated allowing the user to go to the local site for further information and clarification.

- Reduced Operational ceiling;
- Reduced Runway Visual Range;
- Fog or freezing fog;
- Thunderstorm;
- Strong Rain or Rain / Snow;
- Snow or ground icing;
- Low Temperatures;
- High Temperatures;
- Gusts (absolute and crosswind component).

It was stressed that this meteorological information is in itself useful for the provision of an alert but is not immediately something on which an FOC will take action. However, when coupled with the ATC data detailed above, the information utility becomes vastly increased.

If the local sites employ a “chat” mechanism relating to meteorological observations and forecasts and particularly their severity then this should be available in a read-only mode at the centralised level.



2.5 COMMUNICATION ISSUES

The individual CDM projects have, through their local sites, addressed a number of issues relating to communication of information. These relate to both “how” information is displayed to the user as well as its timeliness but also the appropriate use of communication media such as internet based ‘chat’, teleconferencing and web-based access.

In Amsterdam Schiphol, a regular teleconference between airport stakeholders (AAS as airport authority, LVNL as ANSP and KLM as main incumbent airline) is held which permits the Air Traffic control authority to provide information concerning the forecasted level of provision. Much of this type of information, technical issues aside, could be incorporated into the centralised tool for those operators unable to participate in the teleconferences.

One idea advocated by Air France relates to the idea of having a “hot news” element in a centralised portal where any information considered as important from an operational perspective be available as a regular news scroll. The airline should then be able to filter on those airports which it is specifically interested in.

The question of moderating the information in the centralised tool and more widely how the information will be managed (ensuring it is both accurate and up-to-date for example) should not be ignored. A specific role will probably be necessary here.

The relationship with the Network Operations Plan (NOP) is important. Over time, a centralised tool covering information relating to both network planning and airport operation will probably evolve.

A certain amount of “static” information and “less dynamic” information for each airport should also be available through the centralised tool. For example, runway configurations, parking characteristics, etc would fall into this first category and NOTAMs etc would form part of the second category. The idea here is that for any airport, there should be a set of “standard” information in a common format that is available to all, as is the case for example for the visual and instrument approach charts for an airport.



3 CONCLUSIONS

This report has described the rather limited information relating to airport performance that is currently available as part of the decision making process of a Flight Operations Centre (FOC). Whilst for CDM airports and typically for the 'home base' of most carriers, the information is more mature, this is certainly not the case for remote airports. Today, the main information sources for an airline are the CFMU or their local representatives. As a result, the information is not always the most up-to-date or accurate and importantly it is not provided through the direct participation of the key actors involved namely ATC and the airport operator.

In the extremely limited time available to it, the expert group has focussed on a number of themes which should form part of a centralised information source relating to airports. Whilst more detailed information will always be available through a local CDM site for example, the overall concept is one of a "quick-look" possibility for a FOC to assess immediately whether an airport is operating normally or not. In the event of a deviation from normal operations, the FOC should be able to rapidly identify the source and duration of the problem, possibly seeking additional help from a local site if necessary but in any case to be able to make operational decisions in a timely manner.



4 REFERENCES

- [1] **EUROCONTROL** Total Airport Management (Operational Concept and Logical Architecture) Version 1.0 October 2006
Jointly produced by EUROCONTROL and DLR (copies may be obtained on request from alan.marsden@eurocontrol.int)
- [2] **EUROCONTROL** Airport CDM Implementation Manual Version 3 December 2008 http://www.euro-cdm.org/implementation_manual.php



ANNEX 1: PARTICIPATING EXPERTS

The following experts participated directly during the course of the expert group sessions. Other expertise, not listed here, was sought as necessary by all participants within their organisations in order to clarify and refine the various ideas.

Name	Company
Laurent Renou	Air France, ATM Studies Manager
Hugo Simatic	Air France, , FOC (Deputy Duty Manager)
Pierre Boniface	Air France, FOC
Ron Sloopbeek	LVNL, Schiphol CDM Secretary
Alan Marsden	EUROCONTROL
Giuseppe Murgese	EUROCONTROL

Table 2: Participation



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