

Minutes of Meeting

Integration of A-SMGCS and DMAN, Workshop 01

Eurocontrol HQ Brussels, Meeting Room Neptune, 22 February 2008

Organiser: AOE – Airport Operations & Environment Division

1. Agenda

- 09.00 Introduction
- 09.15 ASMAS Overview (*Paul Adamson, EHQ*)
- 09.30 DMAN and CDM Definitions (*Eugène Tuinstra, EHQ*)
- 09.50 Presenting the Cases (*Kim Silander, EHQ*)
- 10.00 Variable Taxi Times (*Dr Dietmar Böhme, DLR*)
- 10.20 Discussions Case 1
- 11.00 **Coffee break**
- 11.20 Guidance function and DMAN (*Ake Wall, LRV*)
- 11.40 Discussions Case 2
- 12.30 **Lunch break**
- 13.30 Passing bays and airport layout (*Jason Atkins, Univ. of Nottingham*)
- 14.00 Discussions Case 3
- 15.00 Summary & Conclusions

2. Participants

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3. Opening Remarks & Introduction (Klaus Haschke, Eurocontrol)

Klaus Haschke (KH) welcomed all participants, opened the meeting at 9.10 hrs and presented the agenda. Introduction of all the participants was done after Agenda item 4, due to late arrival of some.

4. ASMAS Overview (Paul Adamson, Eurocontrol)

Paul Adamson (PA) provided an overview of the Eurocontrol mission, Airport Operations & Environment Division and ASMAS projects. Key activities of the project are

- Low Visibility situations (Stop Bars, Safety Bubbles, MLS trigger line)
- Level 2 Safety Nets (Lighting and Electronic Flight Strips)
- Low Cost Surveillance
- Vehicle Guidance/Navigation
- Auto Detection of Debris
- Integration of DMAN and A-SMGCS
- Roadmap development
- Support of Implementation
- Runway Safety

More details can be found on the website of AOE.

5. DMAN and Airport CDM definitions (Eugene Tuinstra, Eurocontrol)

Eugene Tuinstra (ET) presented draft definitions for the concept Departure Management and the sequencing or planning system DMAN, to create clarity on their key elements and functions. The foundation for implementing any element of Departure Management must be Airport CDM (A-CDM), as this concept contains fundamental elements such as Information Sharing between all airport stakeholders, Variable Taxi Time (VTT) calculation, and the turn-round Milestones approach with the target Off-Block Time (TOBT) as key output from the airlines.

The method choice of planning or sequencing is dependent on the airport congestion problem and preferences, which can vary during daily operations. For runway Target Take Off Time (TTOT) planning it is generally required to take vortex and other separation constraints into account, before deriving the Target Startup Approval Time (TSAT) backwards, using the Variable Taxi Time (VTT, or EXOT). For off-block sequencing on TSAT the TTOT can be derived by adding VTT. Then however the TTOT does not take any vortex separation into account, however CTOT is always taken into account.

A-SMGCS can provide feedback to the planning phase, as surveillance data is expected to provide accurate information on progress of taxiing aircraft, and actual events such as off-blocks or take-off. A second option for feedback of clearance events can be electronic flight strip inputs by the controller, as this is also a strong indication for gain or loss of time with respect to the planning.

The most important lesson from past experiments is that flexibility and stability of the system is of great importance to controllers; the system should adapt to their actual deviations of the planning, and the system shall support that.

DB states that TTOT can also be an earliest take-off time based on TOBT.

6. Presenting the cases (Kim Silander, Eurocontrol)

Kim Silander (KS) presented three topics (Cases 1 to 3) of the workshop. The background for discussing these three cases was the outcome of Eurocontrol's visits to Arlanda, Zurich, Fraport and Brussels in autumn 2007, to gather feedback from the DMAN activities at each of the respective airports. A common problem found was that the planned sequence often changed in the tactical phase due to various circumstances.

Within the context of Integration of A-SMGCS and DMAN, the three scenarios should be discussed to meet the objective: Finding ways to significantly reduce changes in sequence and possibilities to correct them when they occur.

The deviations differs from airport to airport depending on the constraints impacting the sequence. However it is clear that a sequence change generally results in a less optimal throughput at the runway.

A-SMGCS, VTT, Routing and airport layout may be enablers to sequence stability and optimal departure flow.

The workshop should help to gain operational knowledge and receive feedback, in order to update definitions, and derive input for future activities of the project team. Later this year a new TRS for validation of DMAN/A-SMGCS integration is planned with the goal to support implementation of DMAN in A-SMGCS environments and provide recommendations for stakeholders.

7. Case 1 - Variable Taxi Times (Dietmar Boehme, DLR)

Dietmar Boehme (DB) presented the DLR work concerning Variable Taxi Times (VTT). Variable Taxi Times can be better predicted by using surveillance data (e.g. x, y, v (speed), ID) , with the help of which for example an interruption of the taxiing process (movement) can be detected.

However it is hard to predict psychological feelings and intent from the pilots and controllers. Therefore a certain amount of uncertainty is inherent in the VTT already.

A good VTT enables however not only good prediction of the overall taxi time for flights still at gate but can be used to monitor the progress of an aircraft that is taxiing. By using virtual gates in combination with a surveillance based VTT provided by A-SMGCS, a better monitoring can be achieved than in the case of using a VTT based on e-strip (taxi "clearance"; hold short commands; RWY crossing clearances etc.).

During the presentation Volker Huck added that none of the solutions excludes the other. Basically e-strip clearance based VTT can be combined with the more refined surveillance based VTT solution.

8. Discussion Case 1

Q: What is the main requirement for a DMAN for aircraft taxiing?

A: In case there was set a pre-determined (optimal) flow rate of departures (or short a departure rate/flow) as a result of a pre-tactical departure planning a (tactical) DMAN should comply with this rate and not release too many aircraft at the same time.

Q: Does taxi planning not optimise ground handling, rather than have environmental benefits?

A: Different optimisation functions exist in the DMAN system. During the day the algorithm may alter its functioning and shift its focus, depending on traffic situation. However the system should always aim to reduce (taxi) delays both at holding and stand.

Q: How is the interaction with arrival aircraft taxiing?

A: This is taken into account in various stages and locations. On the runway a master-slave configuration of the system determines the gaps between the arrival and departures. However, gaps are usually not suited to the departure demand, for instance leaving space for 1.5 flight rather than 1 or 2 flights. In this situation a additional (semi- or automatic) AMAN-DMAN coordination layer (ADCO) may request tailored gaps for an integer number of departures (sometimes termed as tailored arrivals)

On the stand the system is aware of an arrival scheduled for the gate where a departure is still holding. With this awareness the departure can be given a higher priority for TSAT. In case the flight is late, stand management is aware early in order to move the flight to another gate.

Q: Can we expect enhanced predictions with A-SMGCS?

A: Surveillance data is more accurate and hence improves Variable Taxi Time calculations. Also it can be detected whether the aircraft is taxiing or stationary. Higher levels of an A-SMGCS providing in addition some routing functionality will even improve predictions in terms of accuracy and prediction horizon.

Q: How is airline behaviour logged in tables?

A1: DMAN uses taxi time tables in multi dimensions e.g. for Cat 2 or Cat 3 operations. A-SMGCS should record actual taxi times to improve the table accuracy or to enhance the variations or even the number of dimensions of the tables.

A2: On Arlanda VTT is applied. Refinement of the taxi times is needed, however updating the DMAN with actual event times is considered more important. Too much detail in the taxi times reduces flexibility and may over-complicate the matter.

A3: Agree, however for different visibility conditions different taxi times are applied, hence this is the minimum of variation in taxi times. Collection of actual data is vital for accurate determination of such taxi time model. This is recently confirmed in the Brussel Zaventem DMAN experiment.

Q: How about de-icing, is this considered in VTT on Arlanda?

A1: 1) on the stand → the pilot takes into account this extra time in his TOBT
2) after pushback on apron → VTT is extended with de-icing time estimation
3) remote → VTT is extended with de-icing time estimation

A2: De-icing is a very complex topic which requires multiple workshops to discuss it in more detail. DMAN should take multiple de-icing procedures into account.

A3: De-icing can become the limiting factor on an airport. Once this is the case, a new departure rate is set which is coordinated with the de-icing team in order to avoid queues.

Remark: Eurocontrol will consider whether a dedicated workshop for this topic shall be added.

Q: How is de-icing procedure varied in percentages stand/remote?

A1: Remote de-icing is rather new in Vienna. The feed to the platform is regulated to avoid queuing.

A2: Two ways of calculations are considered
.general case → all flights go de-icing → set the flow
Request case → special flight → input remote or stand de-icing manually, adapt VTT if applicable.

A3: Different aircraft types require different taxi times, e.g. 767 requires 15 minutes, where a 737 takes 10 minutes on average.

A4: Differences must be considered in order to derive estimates to insert in VTT. Also the company may have different equipage, or their time to perform the de-icing. In Arlanda the estimates seem to be a good predictions currently.

9. Case 2 – Guidance Function and DMAN (Ake Wall, LfV)

AW presented the experiment with the Linfair DMAN, which has been tested live and in shadow mode in Arlanda during four weeks in September/October 2007. The validation report will be available on request. The focus of the experiments was on acceptability

and usability, rather than demonstrating fuel saving benefits; they were already shown in earlier simulations. Hence, the afternoon medium traffic was chosen to introduce the system in operation.

VTT was applied for normal taxi times, however deviations occurred as expected. VTT was logged using the clearances given in the departure list (similar to e-strip). Several events can update the planning: Clearances in the Electronic Flight Strips and for the future also the actual movement of the aircraft and passing a virtual hold bar location on taxi route.

LFV believes that in future A-SMGCS will contribute to achieve smaller deviations in taxi time since integration with the Arlanda A-SMGCS may result in more refined VTT's. In the future LFV have identified benefits of data exchange between DMAN and the A-SMGCS environment. Especially routing functions and virtual hold bars are expected to have impact on DMAN monitoring and prediction of the taxi phase.

LFV have performed several simulations and one live trial activity for routing services in parallel with the DMAN activities. The Routing system generates standard routes automatically taking dynamic parameters such as closed taxiways, area of responsibility and change of runways into account. The routing function shows the cleared route (graphically depicted by a straight line) and the intended route (dotted line). The clearances along the route are updated by the controller either via E-strip or via the flight label.

Procedures were introduced for TOBT and TSAT communication. For example a three minute tolerance window around TSAT was defined to maintain flexibility for controllers and to enable decisions based on common sense. Phraseology and procedures were developed and refined during the trials.

10. Discussion Case 2

Q: How does the controller make an input certain route on his display?

A: The system generates a standard route. Clearances along the routes will be updated automatically through the e-strip system. In the trial Arlanda used an integrated Arrival and Departure list to update the clearances along the route. In December 2008 the new operational EFS will be in operation. Further studies will be made before integration of route functions into the operational A-SMGCS Surveillance display.

When editing a route this is done via mouse on the A-SMGCS Air/Ground Surveillance display by selecting the TX field on the flight label or the TX field in the ARR/DEP list and selecting new route waypoint.

Q: What display does the supervisor controller use?

A: The supervisor uses a timeline display with extra functionality, to change the runway configuration and make input of planned times for snow sweeping, runway maintenance etc.

Q: What does the controller do with TTOT presented to him on the display.

A: TTOT was only used for measurement of throughput on the runway. TTOT reflected the proposed sequence, however it was considered not mandatory to the controller in order to allow him to be flexible.

Q: How does a no-show of some aircraft affect the sequence in terms of vortex and SID separation?

A: The sequence will in many cases not be perfect. DMAN is not making tactical updates, so the runway controller is in charge of utilising the runway optimally. Any deviation (gain or loss of capacity) is fed back to DMAN pre-departure planning.

Q: Are different aircraft types considered when deriving VTT? In Zurich this is not the case, however airlines do vary in taxi time.

A: Only the number of engines is a factor that is aircraft specific in determining the start up part time.

Q: Does the supervisor have additional functions to influence the VTT?

A: Strong winds, low visibility procedures, de-icing, all may affect the throughput. The supervisor can set a lower rate on the runway to deal with such effects. To influence the VTT supervisor can set BA poor or LVP.

Q: Does this rate have an impact on the separation times on the runway, for vortex and SID's?

A: These separation values are always respected, also in case a flow rate is set.

Q: Are priority flights considered at Arlanda?

A: Hospital flights, Brazilian president recently, are type of flights that can from information in the Flight plan directly be placed in the timeline as priority flight. Also the supervisor can set a flight as priority or as a flight fixed in time. Other functions are for example swapping flights of one airline operator on request, or manually move one flight from one runway to another.

Q: How does DMAN provide awareness to controllers? Are alerts displayed to him?

A: CTOT monitoring is especially important in the morning peak. More integration of displays is needed for TSAT monitoring. If a flight leaves the gate on TSAT, we can guarantee take-off within CTOT. Integration of EFS in tower is due in December 2008. Integration of EFS with DMAN will be earliest in 2009, where different Airport CDM times are placed in electronic flight strips, using available space efficiently.

Q: If a RWY is changed when an aircraft is already pushing, how is such situation dealt with e.g. during heavy and dynamic wind conditions?

A: Normally the runway change is set 20 minutes in advance, and all controllers are aware. In special conditions the controllers will have to deviate from the proposal. The DMAN system will update by event feedback loops and recover from deviations made. DMAN will not solve all problems, such as situations where a flight receive a new CTOT unexpected, or a flight breaks off the take-off run.

Q: Planning can be deviated from by controller judgement in all times? Discussion on DMAN as support tool is only just starting. Some partners in the airport assume controller should always follow the sequence that is proposed by the system. Especially airline operators think a system does a better job then controllers.

A: TSAT nor the system are owned by the airlines. To use predefined procedures and discuss those with the partners can provide predictability and transparency.

Q: How much does the TSAT differ from TOBT on Arlanda?

A: In the trial the maximum deviation was 5 minutes. Traffic was up to 30 departures per hour. Airlines are worried about punctuality. Perhaps the IATA codes for delay need a "DMAN code" to be excluded from punctuality deviations. For small delays however, airlines should become aware that these are actually saving fuel and costs, as they would have been longer time in the holding queue otherwise. Discussion with IATA and the airline operators may be useful to review punctuality and delay definitions. You are not necessarily delayed if you are on-time with TSAT.

Q: How was the reaction of controllers on the experiment?

A: As our team got some information from to the Frankfurt experiment with DMAN, extra caution was needed when introducing the system. The live experiment started only with the Clearance Delivery position, in order not to over-complicate the situation. Leaflets were distributed to airlines and pilots in order to prepare them in pre-flight briefing about the new TOBT-TSAT procedure and NOTAM was issued. After three days the ground controller position was included in the experiment. By this stepwise approach the risk of chaotic situations was mitigated since we could resolve all issues on Clearance Delivery first before introducing it to the ground controllers.

At the end of the trial, pilots delivered a TOBT without receiving a request from Clearance Delivery. After two weeks of trials, the tuning of procedures was completed and initial problems were solved. The pilots believed it could improve predictability and reduce fuel costs. Controllers expected less frequency overload in the future, especially when TOBT will come earlier in the future when Airport CDM is implemented in Arlanda. The ground controller uses the TSAT to place the flights in the right order to improve the planning when flight will call. The stand management used TOBT to have predictable information on when the aircraft leaves the stand. In winter conditions the controllers asked for DMAN as it may be the right solution to control chaotic situations with de-icing, snow sweeping and runway changes.

Q: How was mixed mode applied in DMAN?

A: This is foreseen in future experiments and updates of the system with Arrival Management integration. Today the system can handle arriving traffic and create standard gaps but research still needs to be done in regards of tailored gaps. The experiments were conducted in segregated mode.

11. Case 3 – Passing Bays and Airport lay-out (Jason Atkin, Nottingham University)

Jason Atkin (JA) gave a presentation on departure sequencing at Heathrow airport, as PhD work sponsored by NATS. The objective was to take an analytical approach to optimise runway utilisation, and consider the effect of the runway holding areas .

The ability to re-sequence the aircraft within the holding area is a key factor for reducing delays and improving CTOT compliance. In such a way throughput is maximized, since the demand on runway use is close to saturation. However, the holding areas do not allow total flexibility to controllers.

A model was developed based on actual movements, traffic mix, SID routes, and holding area lay-out. The model responds as expected when disturbances - deviations in the taxi times - are applied. Delay is affected by each of the constraints applied on the aircraft. SID and CTOT constraints appear to be more influencing on delay than wake vortex. Different holding areas impose different levels of constraint on achieving the best sequence.

A similar algorithm has been developed as an element of a TSAT allocation system, adding a model for the contention for the cul-de-sacs that the stands are situated on, and removing the consideration of the holding area structure. This model calculates TSATs, and as part of the calculation it computes TTOTs to make sure there is a good mix of aircraft at the hold. The TTOTs are purely internal and it only displays the TSATs. The TSAT calculation is being implemented as a part of the CDM implementation at Heathrow.

12. Discussion Case 3

Q Is the sequence information not given to the Ground Movement Controller (GMC) today?

A: Not yet, because the high GMC workload limits the amount of sequencing that can be performed before the holding point.

Q: How are the routes in the holding area organised today?

A: The easiest route is generally used, unless overtaking of aircraft is required due to the traffic mix.

Q: Can the algorithm get into a deadlock situation where it no longer provides an outcome for a solution?

A: The algorithm is designed not to come into a deadlock. There is always a proposed solution for the controller available.

Q: What is the scope of the research, how will it be used within NATS?

A: The NATS R&D department tries to prepare new solutions for existing and future problems, and there is not yet any plan for operational use after TSAT. From the Airport CDM project the TSAT is the main focus for operations. However the TTOT is calculated also in the system and it could be used as a prediction of airborne time. The initial work from the PhD could be applied to integrate runway sequencing and taxi planning.

Q: What would happen if Heathrow did not have so many holding bays?

A: Delay would increase. This can be seen from the runway system 09R, where fewer options for overtaking are present than for the 27L and 27R holding areas. However, more taxiways have subsequently been built for runway 09R, so this has become also much more flexible in real life.

Q: So holding area design is an important factor to reduce delays?

A: It depends on the constraints applied on the traffic, e.g. SID and Vortex or CTOT. With fewer other constraints applied, the lay-out is of less influence to reduce delays.

Q: What considerations are taken into the algorithm for stand constraints?

A: Conflicts between departures from nearby stands are taken into account. for TSAT calculation. More buffer tuning can be necessary later on in tests.

Q: Will it become flexible for tuning by the supervisor?

A: This should be possible, however for this research it is considered out of scope.

Q: Is an arrival manager considered in the future?

A1: The Airport CDM project is well underway in Heathrow, taking arrivals into account.

A2: T5 is not yet taken into account, and long taxi times can be expected to runway 27.

Q: How did you model the algorithm, what patterns are used?

A: With controller input on how they use the holding area to make a sequence on the runway. Preferred patterns of routes are applied until deviations are needed. Important is the ease for the pilot, as some overtaking manoeuvres require difficult actions by the pilot. Focus of the algorithm is on TSAT in order to reduce the queue at the holding point.

Q: Arrivals, are they in the model?

A: No, data on arrivals is not sufficiently stable for pushback planning. Landing time and taxi in-time are essential to make the model complete.

Q: Will the EIBT be taken into account in the future system deriving TSAT?

A: Indeed it will.

Q: How about cul-de-sac conflicts in TOBTs? On Heathrow this is a big problem for controllers today.

A: Taking these into account are essential for smooth operation, indeed.

Q: So the TTOT is calculated but not displayed?

A1: Indeed, the controllers do not want it displayed, and in any case it would not be useful unless there were procedures for the case that aircraft deviate from their sequence.

A2: You need TTOT to calculate TSAT backwards, to match the runway flow rate or even optimised runway planning. In theory the TTOT could be used by controllers, but it would be necessary to overcome issues of workload and to prove that there are benefits. It must come from the controllers themselves.

Q: What if TSAT sequencing works, would there still be a need for overtaking of flights in the holding?

A: In Zurich we have DMAN for years, and recently we have added concrete to become more flexible in overtaking. So for us this extends flexibility, even though we have DMAN.

Q: What happens at Zurich if the sequence becomes impossible, e.g. if aircraft does not appear in holding or does not go off blocks in time?

A: If aircraft does not perform as planned, the flight will be placed backwards in the sequence, until it states it can comply. Controllers can adjust DMAN to actual events by manual inputs.

13. Summary

Before final conclusions are drawn, all participants were asked to reflect on the topic and the discussion of the workshop.

ML: The deviation of the controller and the system may lead to strong discussions due to interest conflicts between partners. More workshops on this topic sequencing and DMAN can structure those discussions, and are considered worthwhile.

AM: How does DMAN fit with Airport CDM?

RL: TSAT and TOBT are direct output from the CDM process. TTOT is runway planning and goes one step further. So DMAN for runway sequencing can be seen as extension, complementary to Airport CDM. DMAN supports the process, however requires all Airport CDM concept elements in place to function optimally.

MB: The combination of projects is part of EEC research, Airport Domain studies with the purpose to align all views for integration into SESAR.

RL: The Airport CDM manual is considered mature at this stage, where standardised data elements are listed and defined, and are mandatory for DMAN projects or other airport related projects. Today airports are implementing Airport CDM even without assistance or support from Eurocontrol. Further standardisation of Airport CDM is ongoing, procedures for the turnaround process being developed. It should be a common goal that pilots flying in Europe should find the same procedures at every airport.

KS: Airport CDM and DMAN must be aligned though the Airport CDM manual, as Industry requires one common platform to base their developments and interfacing on.

LN: DMAN is a controversial topic for many operational experts, especially controllers. De-icing, human factors, and other topics must be discussed more in order to get clarity on the topic, and get rid of its controversy by understanding and communication.

MB: Now is the right time for discussions on DMAN and sequencing. A-SMGCS and Routing is being explored in Arlanda and other airports, first DMAN's are working, in trial, or in development. Harmonisation has only just started with this workshop, and more are needed. All airports, also the smaller ones, should align with this harmonisation work in the near future in order to achieve a common standard for airport planning and procedures in the future.

MH: As said before, Human Factor is key to integration of A-SMGCS on controller display. More screens are not acceptable to controllers, and simplification is of great importance. One aspect that requires more attention in future workshops is how to deliver A-SMGCS information to the pilot: speed variation tolerances, routing, guidance, etc.

RP: From the Arlanda presentation it can be concluded that DMAN can work, however the approach may vary per airport, depending on circumstances. Hence also the benefits per airport may vary. This is important to learn, as no two DMAN's will be exactly the same, have the same purpose, or have the same impact on the operation.

JG: Three remarks:

- 1) The discussion is already worthwhile and very much appreciated
- 2) integration of tools and implementation into operation will remain very complex;

3) Updating of an existing plan with latest information (either surveillance or controllers inputs) will be very complex.

JA: Focus must be put to learn the actual airport bottlenecks, before you decide what to optimise. Routing should become part of DMAN inputs, as this is expected to improve the accuracy of the taxi times.

RB: It would be beneficial to have similar flexibility of holding areas such as Heathrow. It is believed A-SMGCS level 3 and 4 are needed for providing feedback to the DMAN planning system, and improve taxi time information. The question is how to implement routing properly in the future.

AM: In EEC the R&D is aiming to develop concepts for the longer future. Airport CDM and DMAN are part of this R&D, and already Total Airport management tackles part of these questions for the future: how to further develop Airport/Regional/Network CDM for future airport implementations.

SD: Integration of different concepts is essential for the proper concept development and implementation on airports. A coordination group is needed to involve expertise of different teams, and share experiences between airports.

RL: The main change that Airport CDM brings is the culture change for the airport CDM partners. Also, DMAN is no longer a controversial topic on airports, as even on Heathrow they are developing a system for TSAT and TTOT planning. The method applied by LFV in Arlanda airport may be a valuable experience for the smooth implementation in tower operations, and help operational controllers to become confident with new technology supporting their work.

TB: The workshop demonstrated clear understanding on DMAN and how the concept can become clear to controllers. Arlanda showed that it can be done in a controller friendly way. Also flexibility is shown when the lay-out is designed with a holding that allows overtaking, or multiple entries to the runway. Departure Management/Airport CDM Procedures should become transparent to all CDM partners, and harmonised where possible.

RP: Human factors is considered very critical in order to evaluate what information to display to controllers. Too much or detailed information causes confusion, too little means lack of awareness.

DB: Identification of new topics during this workshop is very good to shape the new agenda for the coming months/years. Three general remarks:

- 1) System integration → focus on flight phases tactical and pre-tactical
- 2) Invite other stakeholders to get the CDM community to participate in future workshops

3) How does DMAN affect the controller working methods, and how can it work with routing, surveillance input and controller inputs.

AW: More coordination in the topic of Departure Management in relation to Airport CDM is needed. One language of acronyms is needed between all stakeholders. In Arlanda SAS is already for years involved in the DMAN project, as is now in the Airport CDM project.

- Airlines need TTOT for airborne prediction of flight and fleet management.
- Pilots expect a similar standard for departure planning everywhere in Europe
- CFMU need TTOT for airborne time prediction for their network management
- Airports need accurate arrival times and in-block times for stand management

Together with DMAN, Airport CDM becomes the full picture for flight and network planning.

14. Conclusions

KS concluded the meeting after the reflection of the participants. The main topics were:

More attention should be reserved in future workshops on De-icing and Routing. How can De-icing impact taxi times, and how can Routing be a means to achieve more predictable taxi times.

KH ended the meeting with the request to fill out the questionnaire and return it directly. Also the draft definition document for Departure Management and DMAN will be distributed for review and comments. It is intended to give follow up on this meeting before the summer 2008, in perhaps a two day workshop tackling the main topics raised. Presentations will be made available to the participants on request. KH ended by thanking all and hoping to see them at future events.

15. Actions

Nr.	Description	Responsible	Date
1.	Distribute Minutes and Presentations	Eurocontrol	31 March 2008
2.	Distribute Definition Document	Eurocontrol	31 March 2008
3.	Call new Workshop	Eurocontrol	April 2008