COLLABORATIVE DECISION MAKING AND ITS IMPLEMENTATION ON PRAGUE AIRPORT

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During the last decade En Route delays are decreasing due to vast implementation of new methods and equipment, while on the other side, delay caused on airports increases each year. The contribution describes CDM, EUROCONTROL project, which is aimed to decrease delay and improve punctuality on European airports. It also refers to CDM functioning at the Prague-Ruzyne Airport.

K e y w o r d s: collaborative decision making, slot, airport, delay, airport procedures,

1 INTRODUCTION

Each day thousands of aircrafts fly in and out of airports all over the Europe, where each moment matters. In an ideal case, for both passengers and airports partners, everything keeps running smoothly on time and to schedule. The efficiency of air transport systems depends on air traffic predictability. The CDM airport project has been lunched to encourage information sharing and creates collaborative decision making to increase airport efficiency and performance and ensures maximal usage of airport infrastructure. While airport operators will have the latest and most accurate information related to their own area of operation so that airport efficiency could be significantly enhanced by sharing this information with other areas in the right time. This will ensure that airport operators receive accurate aircraft states information, aircraft operators obtain accurate operational data that may affect the flight of their aircraft and the central flow management unit is fed accurate status information regarding future flights.

2 CDM IMPLEMENTATION HISTORY

The first airport to believe in Airport CDM and strictly follow the CDM bible (the A CDM Implementation Manual), was the Munich airport. Full CDM implementation was completed in June 2007 through linking their airport with the ATM network via DPI (Departure Planning Information) messages sent to the EUROCONTROL Central Flow Management Unit. Very soon the first positive results came out, such as reduced taxi times, better ATFM slot adherence and other important benefits which are reported by the Munich CDM partners in every detail in yearly reports.

Soon the club of CDM believers started growing. Brussels had launched implementation in the very early days, led by an active but very democratic CDM workgroup, to have implementation completed only in June 2010. Barcelona has not yet become operational, but it's in the final stage. Paris CDG was the first hub airport to adopt the full CDM in November 2010 and Frankfurt followed in February 2011. Heathrow, Amsterdam, Helsinki, Prague, Vienna, Berlin and Gatwick will link to the ATM network during 2012. At this moment, more than thirty European airports have implemented or are implementing the CDM system.

3 CDM PROJECT PARTNERS

Quite often a delay situation can be anticipated, despite the fact that accurate information is often available but not always shared effectively. However, when information is communicated on time, efficient action can be taken. In the future air transport will continue to increase and airports must operate to their maximal potential in order to meet this challenge. To satisfy their demand for the higher punctuality, the airport CDM project offer solutions to regulate traffic flow, avoid delays and increase the all-round efficiency. The EUROCONTROL Airport CDM project aims to enhance information sharing,

encourage collaborative decision making and prompt reaction times in order to make the best use of everyone's time and resources.

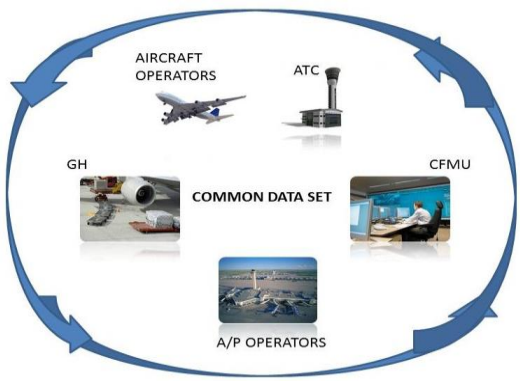

Figure 1 Partners of the CDM project

Partners cooperating in this CDM project in Prague-Ruzyne airport (Figure 1) are:

- Czech Airlines,
- Air navigation services of the Czech Republic,
- Prague Airport,
- The central flow management unit,
- Menzies Aviation.

4 HOW IT WORKS

The entire process is divided into sixteen significant events – milestones, (Figure 2) that occur during the preparation or course of flight. In the description, Prague-Ruzyne is selected as a destination airport, since it's one of the airports where CDM implementation is in progress.

It all starts with an aircraft departing from any CDM airport to Prague-Ruzyne Airport. This event brings to the CDM the first specific information about time of arrival in Prague-Ruzyne Airport. CDM receives data in its central database (CAODB) and makes the first calculations and refinements as: Estimated time of arrival (Estimated Landing Time ELTD), the time of arrival in block (Calculated In-Block Time, CIBT), Time when handling will be finished (Calculated Ground Handling Finish, CGHF). For calculation, the standardized taxi and handling time are used.

When the mentioned aircraft enters the area covered by surveillance system of ANS CZ, it is possible to perform a new and more accurate calculation of times listed before. If the arrival is delayed at Prague-Ruzyne Airport, the handling agent may choose to use Express mode of handling, so as to eliminate the entire delay, or at least part of it. The decision on an expedited handling should be made before the aircraft is about to land at Prague-Ruzyne airport, but it can be updated at any time during the handling process. According to this information, CDM recalculates the time when handling will be ended.

Aircraft landing at the Prague Ruzyne Airport will automatically record the actual time of arrival (Actual Landing Time, ALDTU). According to this time, CIBT and CGHF will be rechecked and re-finished. Parking the aircraft at aircraft stand will automatically initiate the creation of the actual time of arrival to stand (Actual In-Block Time, AIBT). According to this time, the CGHF time will be recalculated.

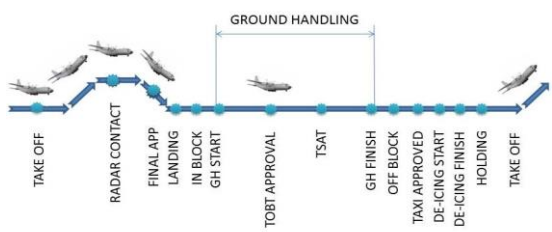

Figure 2 Significant events during the flight (milestones)

Ground handling usually begins immediately after the aircraft stops at a stand. If it's required by internal regulations of handling company, start of handling operation is recorded with a PDA via a CWI application to give us information on Ground Handling Start time, AGHS. From the moment when the ground handling operation starts, the ground handling agency is responsible for re-finishing of the TOBT. The next step is the confirmation of TOBT. Ramp agent responsibility is to insert/report first

time TOBT not later than 25 minutes before scheduled departure (Time EOBT in the flight plan). With the TOBT ramp agent confirming the completion of handling of the aircraft, the time is sent to the ATC systems/TWR, and will be used for schedule of further operations. The ramp agent needs to report crew requirement for deicing procedure at least 25 minutes before the TOBT value. The system will allow later entry of requirement for deicing, but it can mean disadvantage in ordering this procedure. TOBT can be updated at any time, but always at least by a value of current time + 5 minutes. TOBT update is not necessary when the new estimated TOBT is different from the last one by less than 2 minutes.

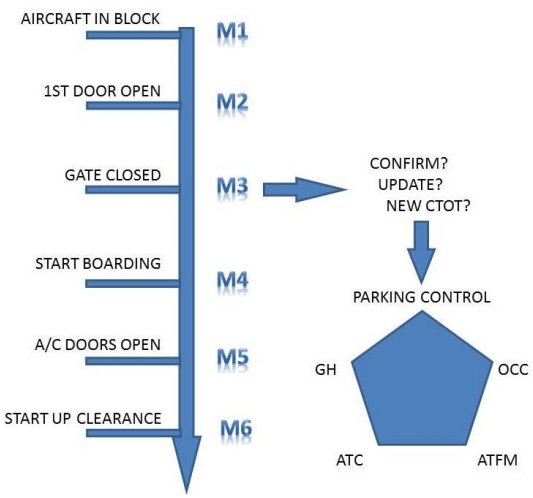

Figure 3 Significant airport events (milestones)

Target time of permit to start engines (Target Start-Up Approval Time, TSAT) occurs in the TWR system Start-up Manager (SUM) when controlling the aircraft movements to the departure sequence. SUM calculates the optimal time to start engines (TSAT), so that the aircraft can taxi to the runway holding point as smoothly as possible and without delay. The calculation of TSAT starts when TOBT is over, but not earlier than 40 min before the EOBT.

Completion of aircraft ground handling (Figure 3) means completion of all activities associated with loading and unloading of passengers, cargo, mail, provision of technical handling, etc. At this point the push-back vehicle should be attached; wedges and cones removed, and the flight crew should be on DELIVERY frequency. By entering the Actual Ground Handling Finish time AGHF, the ramp agent is confirming that aircraft is ready to start-up engines/ for push-back. In TSAT time (tolerance -3 to +3 minutes from TSAT), the flight crew have to request to start up engines. TSAT is sent through GHA crew at least 10 minutes before TSAT time. In case when there is no request for a permit in the interval TSAT, a new TSAT is recalculated, this may cause a delay.

After getting taxi clearance, aircraft is taxing on the runway holding position, respectively deicing stand (if deicing is required by flight crew). If the flight crew requires deicing, the plane stops at deicing stand where deicing begins, according to standard procedures for actual type of aircraft. At this point RA enters/report the Actual Deicing Start time, ADIS. After deicing procedure is successfully done, supervisor is moving mobile deicing equipment to safe distance so that flight crew would be able to taxi to the assigned runway holding point. After getting clearance aircraft is taking off and whole process starts all over again.

5 BENEFITS OF CDM

The Airport CDM project wants everyone to benefit by getting the best use out of their existing operational systems and the data. Before it was implemented Airport CDM project tested the individual priorities of each partner in to consideration to help create benefits for everyone. The idea of implementing CDM into Airport is to establish common situational awareness, to enhance positive understanding and collaboration between the main partners. EUROCONTROL CDM information sharing search should promote beater awareness amongst partners about the progress of flights and create easier information links concern all the inbound and outbound traffic. The other part of the foundation step is the CDM turn-around process otherwise known as the milestone approach. This process encourages and prompts all of the main partners to react quickly to incoming information at an early stage and to reschedule quickly as soon as any initial plan looks like being unpractical. Implementing the Airport

CDM project has an almost immediate benefit and increase of inbound and outbound traffic flow predictability. From this foundation of information sharing the Airport CDM project concentrates on improving punctuality. Part of this is achieved by replacing standard default taxi times, in practice by more realistic and variable times that take into account the actual time necessary for the aircraft to taxi from gate to the runway.

Figure 4 Airplanes waiting in queue for taking off

By more accurately calculated flight progress and using more realistic taxi times optimum slots can be requested which can increase punctuality.

Further improvements with the punctuality can be achieved with the airport CDM management flight updates. This encourages more accurate publishing information and information sharing with the ATM network. To ensure that the ATM network receives updated information smoothly, new message exchange system has been introduced. Firstly, the flight update message FUM from the CFMU provides real time flight updates to airports. Secondly, the departure planning information message DPI from airports provides realistic departure update to the CFMU. The CDM project also meets the specific needs of airport partners, giving them the chance to find their preferences. This is achieved by using the collaborative pre-departure sequence, tailored to help to increase flexibility and punctuality by taking into consideration airport and airline preferences. Under adverse conditions, CDM is aimed to facilitate cooperation airport capacity management in periods of reduced capacity. Benefits to aircraft operators are that daily programs of flight operations are on schedule and even potential destructions are managed more efficiently because they are well anticipated. For ground handling, the key benefits are: enhanced punctuality of operations and optimized resource management. Airport operators benefit from the increase in the punctuality of departures and arrivals with better airport slot usage and more efficient use of the infrastructure. For air traffic control, the main benefits consist in flexible pre departure planning and reduce congestion (Figure 4) thanks to smooth air traffic flow. CFMU benefits from the optimal utilization of available capacity based on obtaining a much clearer and more realistic overall traffic picture. The key to the CDM project is to put in place the collaborative decision making environment by facilitating information sharing between airport partners.

6 CONCLUSIONS

Collaborative Decision Making is now embedded in the ATM operational concept as an important element to improve efficiency and punctuality. It is also recognized that the implementation of Airport CDM will make it necessary to transform many of the existing communication policies and procedures that have historically dominated the airport operations environment, hopefully bringing substantial improvements to all partners. That's why it is absolutely clear that the Eurocontrol CDM project is a pragmatic solution for improving efficiency on Prague-Ruzyne airport.

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