



**Combined Third Meeting of Arabian Sea Indian Ocean ATS Coordination Group ASIOACG/7 and
Indian Ocean Strategic Partnership to Reduce Emissions (INSPIRE/3) –
Mumbai, India, 11 – 14th December 2012**

Agenda Item 8: Report from ANSPs on initiatives listed in the Strategic Plan

**“Dynamic Departure Slot Manager and TSAT Generator”
at Mumbai Airport.**

(Presented by Airports Authority of India)

SUMMARY

Project “Dynamic Departure Slot Manager and TSAT Generator” will be developed on “Common Information Sharing Platform”, which is the building block of Airport- Collaborative Decision Making (A-CDM). It will be Web Based system for sharing information by the partners to the platform, which will process information and send to selective partners depending upon requirement. Based on the available information and control instructions (Runway in use and Runway Capacity) from Air Traffic Control (ATC), system will calculate Target Start Up Approval Time (TSAT). TSAT information will be available with ATC and partners. ATC will use TSAT for clearing pushback/start up of aircraft. The algorithm in the system will ensure optimal delay of departing aircraft at the holding point.

This project has enormous potential to reduce “Holding Delay” of departing aircraft, which in turn will reduce wastage of Aviation Fuel and Environmental Pollution and enhance passenger comfort.

1. INTRODUCTION

1.1 Multiple agencies are involved in Airport Operation. Bigger the Airport, more numbers of agencies require to be engaged to tackle multiple activities associated with Airport Operation. All agencies must work in tandem for optimization of aircraft movement keeping safety, passenger comfort and commercial aspect in mind. This is possible only when all the agencies share information related to aircraft movement to each other. But there may be some information of commercial importance, which cannot be shared with all the agencies. So the

concept of “Common Information Sharing Platform”, which is the building block of Airport-Collaborative Decision Making (A-CDM), can be used. For example, Target off Block Time (TOBT) of an aircraft may be commercially sensitive information for rival airlines, if any, but for calculating Target Start up Approval Time (TSAT) by the system, TOBT is the most important information, which may not be shared with other Airlines.

2. DISCUSSION

2.1 Congestion of Air traffic on ground and in air is prevalent at CSI Airport, Mumbai due to;

- High volume of Schedule and Non-schedule traffic
- Limited runway capacity due to limitations in ground infrastructure and airport design
- Non-availability of decision supporting tools for optimization of runway capacity.

At present, it is difficult to provide revised ETD as desired by Airlines due to non availability of dynamic management of slot timings. Slot timings allocated to the non-schedule operations are based on timings of schedule airlines but not on real time traffic scenario. It has been creating unnecessary and avoidable congestion on ground and in air.

2.2 The objectives of this Project are

- To reduce congestion at the holding point. This will reduce wastage of Aviation Fuel and Environmental Pollution.
- To reduce R/T congestion,
- To enhance orderly flow of traffic,
- To enhance transparency of slot management.
- To achieve Common Situational Awareness(CSA)

2.3 **Designing and developing of Dynamic Website** with provision of inputs from Airlines Operators and inputs of parameters from ATC, which will generate Target Start-Up Approval Time (TSAT), can be used as decision support tools to the controllers. Upon receiving Airline operators input: 1) TOBT or No Delay, 2) Parking Stand Number; system will follow complex algorithm, will select control variables from the matrix of Runway in use, Apron and Departure Capacity. System will generate Dynamic TSAT (Equivalent to Revised Slot Time). It will continuously update TSAT to bring it closer to user preferred timing, i.e. at or after TOBT.

ATC input: 1) Runway in use, 2) Capacity of Runway, 3) departure Capacity. All parameters will have default values already in place to reduce requirements of frequent ATC inputs.

Airlines Operators will submit status of flight (No delay or Target Off Block Time (TOBT)) and Parking Stand Number to the Website using internet.

Computer will calculate Variable Taxi Time (VTT) based on parking stand and Runway in use information from ATC

Computer will calculate Departure Sequence using VTT and Runway Capacity

Computer will calculate Pre Departure Sequence and generate TSAT

TSAT will be generated for Non-Schedule operators also

Same TSAT will be available to The Airlines Operator through the website and to ATC.

Computer Server will calculate TSAT and CTOT (Calculated Take off Time) for every departure and display as a Dynamic Table-dashboard in the website. Electronic Flight Plans with same TSAT/CTOT with different colour coding depending on Status of Flight will be available to PDC (Pre-Departure Control) in an interactive Monitor.

- Information through web will be available to MLU, AOCC/MIAL to achieve Common Situational Awareness (CSA).

2.4 **Advantages of the Project:**

Direct Advantages:

- Reduction of delays at holding point,
- Orderly flow of traffic,
- Optimization of capacity and better OTP,
- Reduction of RT congestion,
- Achieving Common Situational Awareness(CSA)

Indirect Advantages:

- Reduction in wastage of Aviation fuel,
- Reduction in Carbon Emission, reduction in Environmental Pollution,
- Reduction of Passengers discomfort,

- Once algorithm in place, system will calculate similar way every time, for all operators,
- Increase of Trust Level between ATC and Airlines Operators due to greater transparency,

2.5 **Challenges of the Project:**

There are quite a few challenges associated with this project. Some of the biggest challenges are as follows:

- Developing the algorithm which will able to deliver advantages mentioned earlier and at the same time satisfy all the partners.
- Creating Flight Plan data same as available in AT3 (Autotrac3, ATS Radar Surveillance System) without interacting with AT3.

2.6 **Future expansion**

In first phase the system works as standalone system.

In the second phase we will introduce limited one way integration with external system. In Second Phase primary objective will be to generate Expected In Block Time (EIBT), the single most important Mile Stone for fine tuning TOBT information to be entered in the system by the Airline Operators. This is in line with the concept elements of ACDM.

In this phase, we will use actual movement data to generate reports and monitor TSAT adherence. It will be shown in the website for performance monitoring.

In third phase the system will be integrated with other ATC systems in a secured manner. The system will be able to generate Departure Plan Information (DPI) and accept/utilize Flight Update Message (FUM) from Central Flow Management Unit (CFMU).

3. **ACTION BY THE MEETING**

3.1 The meeting is invited to,

- a) to note the AAI's efforts to develop an indigenous ACDM project in which in house development of web based technology is being done,
- b) the project has significant potential for carbon emission savings,
- c) Inspire partners with experience in ACDM projects are requested to share their experience for value addition of the project.
- d) Inspire partners desirous of initiating such projects at other airports are welcome to interact with the CDM team of Mumbai. The contact email is cdmmumbai@aai.aero