International Civil Aviation Organization

The Fourth Meeting of ICAO Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/4)

Bangkok, Thailand, 1 – 5 December 2014

Agenda Item 5: Development of Regional ATFM Framework

CDM IN THE CONTEXT OF REGIONAL ATFM FRAMEWORK

(Presented by India)

SUMMARY

This paper presents a view of Collaborative Decision making (CDM) process needed for a regional ATFM framework. ATFM process which enables an efficient ATM environment is inherently collaborative in nature. As the regional ATFM framework is taking shape, it is necessary that simultaneously a regional CDM environment is conceptualized to aid the process. The ultimate goal of 'seamless ATM' across Asia Pacific region can only be achieved with a clear and unambiguous realization of the regional ATFM framework with CDM.

1. INTRODUCTION

1.1 India is in the process of implementation of a Central ATFM system wherein CDM is an integral part. The implementation is planned to take place in phases in a gradual evolutionary manner, making sure that the stakeholders are involved at each stage. As part of the implementation process, AAI is conducting a series of stakeholders meetings to familiarize the concepts of ATFM with CDM

1.2 During the interactions with Stakeholders, i.e., airport operators, airlines, military, Met etc., it was apparent that the concept of CDM was understood in different ways. For many of the participants CDM was synonymous with A-CDM. The application of CDM process in all the phases of flight with a network optimization objective is still not a familiar concept to many stakeholders.

1.3 In the recent ATFM workshop in Beijing, many of the presentations focused on the distinct aspects of A-CDM and CDM as a network process. It was made clear that the focus of A-CDM was optimization of airport resources and A-CDM is an important subset of the whole CDM process. The need for stakeholders and CDM Partners to buy in the CDM process was also duly highlighted.

1.4 The IATA study on baseline ATFM capabilities has highlighted the present ATFM implementation efforts in the APAC region. It can be clearly seen that most of the ATFM efforts are concentrated at addressing national demand and capacity problems. The need for considering cross border ATFM needs is not yet in the planning considerations of majority of States.

1.5 While ATFM is proven to enhance safety and provide measurable efficiency gains, in the APAC regional context, it is also viewed as a transformational concept that introduces new levels of collaborative decision making and offers potential for harmonizing seamless airspace operations.

1.6   Effective implementation of ATFM requires the active participation of all affected stakeholders. ATFM should be performed as a collaborative decision making process, where airports, ANSPs and airspace users work together to improve the performance of the network.

1.7   Collaborative Decision Making (CDM) enables CDM partners to share information and work together more efficiently and transparently with the common goal of improved overall performance, bringing a common situational awareness between all partners involved; refining the processes and information flows. CDM is a "Philosophy" that embraces partnership, and combines the talents and experience of participating organizations. This philosophy facilitates harmonization and globalization and allows for the sharing of values and preferences.

1.8   CDM is an important element in the operational concept of both the European Single European Sky ATM Research (SESAR) program and NextGen in the US. Under these initiatives, all decisions are required to be collaborative to the maximum extent possible and hence the idea of CDM will be influencing the very core of air traffic management practice at every level.

1.9   This concept requires a culture change within the ATFM community. This culture change should incorporate the sharing of information to create a common world view. CDM is about acting on shared information to improve decisions and the decision making process. It is about people, not technology. More importantly, it is about bringing benefits to all stakeholders.

2.   DISCUSSION

2.1   The regional ATFM framework has considered the multi-modal ATFM virtual network model as a viable option for initiating a APAC regional collaborative ATFM system. The highlights of the concepts of the model are:

- Each State / ANSP plans , implements and operates its own ATFM infrastructure;

- The regional ATFM framework is based on a distributed authority model;

- These independent ATFM systems collaborate through "cloud" for cross border traffic flow management;

- Different ATFM units collaborate through information exchange and multi-lateral negotiation, finalize and execute ATFM   measures;

- The airspace users have the flexibility to apportion the delay component among the phases of flight.

- Each local facility selects its ATFM measures based on a common set of ATFM rules;

- The regional framework also will provide a description of common set of terminology, common ATFM letters of agreement, data sharing mechanisms and contingency procedures.

CDM in the Context of Regional ATFM

2.2   CDM is defined in ICAO (DOC 9971) as the "process focused on how to decide on a course of action articulated between two or more community members through [which], ATM community members share information […] and agree on and apply the decision-making approach and principles. The overall objective of the process is to improve the performance of the ATM system as a whole while balancing the needs of individual ATM community members.

2.3   DOC 9971 Part 1 describes different types of CDM based on the characteristics of decision making and alignment. They may be multilateral, unilateral, complementary and adversarial.

2.4   The Regional ATFM Framework concept is evolving as a multi modal virtual network with different CDM partners participating at various levels of decision making. This situation is best captured as a '**multilateral decision making with complimentary individual goals**" CDM type, as described in DOC 9971 Part 1.

2.5   The TOR for the ATFM SG include developing collaborative ATFM responses to ATM contingencies. Therefore the Regional ATFM framework should include a comprehensive guidance on CDM.

Characteristics of CDM – For APAC Regional ATFM

2.6   The CDM concept is fairly easy to understand when applied at the airport level, viz., in the form of A-CDM. The role and responsibilities of various partners like airport operator, ATC, security, ground handler, airlines and the whole objective, viz., ensuring optimal utilization of airport resources during all operational conditions are clearly defined. The standards and best practice examples elsewhere in the world, help in "buy-in" from the stakeholders.

2.7   When the same CDM concept is amplified to a larger, national environment, the interactions among the various stakeholders becomes more complex. Adding to the complexity is the different business objectives of the participants, complicated data sharing mechanisms, role of the regulator, operational needs of the military etc. It is necessary for a State, which is implementing ATFM, to realize the capability of the participants to contribute in the process and scale up the CDM processes gradually. Therefore the national ATFM infrastructure needs to cater to a flexible collaboration mechanism in order to allow a gradual CDM participation capability.

2.8   The regional ATFM Framework, as envisaged in 2.1 above, therefore should address the different ATM and ATFM capabilities of the APAC States. As the goal is towards achieving a "Seamless ATM "environment, the framework for ATFM should contain the probable contours of CDM.

2.9   The paragraphs below list some of the main characteristics of a Regional ATFM/CDM system.

- To be efficient and reach the required objectives, CDM should have the following characteristics:

  − An Inclusive process,
  − A Transparent process,
  − A Process that builds Trust within the aviation community
  − Allows Sharing of information between all partners through a common platform to improved efficiency and operational decision making
  − Achieving Common Situational Awareness for all partners

- CDM should provide opportunities for:

  – Efficient exchange of operational and strategic information for all stakeholders
  – Common situational awareness
  – Strategic cooperation
  – Optimization of traffic flows

- Challenges – for regional ATFM framework

  – Establish procedures that are transparent, easily understood and flexible
  – Abide by the procedures – Compliance of CDM partners to agreed procedures
  – Ensure Participation of CDM Partners
  – How to change attitudes and methods through proven benefits

- Suggested CDM Partners and Stakeholders - (For Regional ATFM) – The organizations participate in the overall CDM process with different objectives and roles. They may be as below:

  – States - (Preferably Through regulators) – For ensuring compliance of CDM business rules
  – ANSPs – Through ATFM Organizations or Otherwise
  – International Agencies (as representative partners) – IATA, CANSO, ACI, IFATCA….
  – International ATFM Organizations (to share tactical flight data through FUM) – Euro control, FAA …..
  – Individual airports when they are not part of national ATFM – Through A-CDM whenever possible

- CDM Process – Concepts and Levels of Participation of ANSPs

  – Participating ANSPs will develop their individual ATFM capabilities according to their needs and requirements
  – Individual ANSPs operating an independent, virtual ATFM/CDM node
  – Complimentary Goal is "Seamless ATM "across APAC region.
  – Participation in the regional Virtual Mode ATFM CDM is envisaged to happen at various levels.
  – They could be as below: (a broad model based capabilities of individual ATFM nodes)

    a. No Ability for exchange of relevant tactical flight data – No ATFM requirement.
    b. Ability for exchange of relevant tactical flight data – Though ACCs , No ATFM capability or requirement – Facilitators.
    c. Ability for exchange of relevant tactical flight data – Through ATFM centers. - Passive participation.
    d. Ability for exchange of relevant tactical flight data and ATFM Capacity information– Through ATFM centers , active participation

e. Ability for exchange of relevant strategic and tactical flight data, participation in ATFM measures implementation (both at airport phase or en-route phase or both)– Though ATFM centers , Active CDM Partners.

f. Ability for exchange of relevant strategic and tactical flight data , ATFM capacity, Participation in CDM Process – Though ATFM Centers , Full CDM Partners.

– We will need to define levels of engagement, roles and responsibilities, participation process, obligations and compliance,etc., depending on the levels of participation.

- CDM Processes and levels of participation, access for participating Airspace Users, Airports may also be defined with different privileges to enable flexible participation.

Challenges of Sharing information for Regional ATFM

2.10 Information sharing is the basis of an efficient ATFM system. In order to have better, harmonized decisions, CDM partners need common situational awareness. This common situational awareness is built by sharing each other's information so that each partner has access to the same set of information.

2.11 The common situational awareness helps the CDM partners to understand the impact of any independent decision on the overall big picture.

2.12 APAC States have diverse ATM system capabilities. The ATFM systems planned or under implementation in APAC region will also have different technical capabilities for exchanging of information. Therefore it will be advisable to develop a roadmap indicating required information exchange capabilities for cross border ATFM measures.

2.13 The regional ATFM framework and CDM roadmap may consider the following topics for further exploration and development for inclusion in the final framework document.

- Standard information exchange protocols: FIXM, WXXM, AIXM …..

- Data sharing agreements

- Common set of business rules for CDM

- Data analysis and feedback mechanism

- CDM Conference call mechanism – rules of engagement

Conclusion

2.14 The APAC regional ATFM framework is contemplating a radically revolutionary concept of collaborative regional ATFM. The concept calls for participation of stakeholders in various capacities in the CDM process with an overall network optimization objective. As the concept grows in maturity and the partners equip themselves with better ATFM capabilities, the process of collaborative engagement will also evolve to a greater participation.

3. **ACTION BY THE MEETING**

3.1 The meeting is invited to:

    a) note the information contained in this paper;

    b) consider the proposed CDM mechanism for discussion and inclusion in the Draft Regional ATFM Framework document; and

    c) discuss any relevant matters as appropriate.