International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)
Eleventh Meeting of the GREPECAS Aeronautical Meteorology Subgroup (AERMETSG/11)
Lima, Peru, 28 to 30 November 2011

Agenda Item 6: Transition from the AERMETSG Subgroup and its Task Forces to the MET Programme and its projects

COLLABORATIVE DECISION MAKING

(Presented by United States)

SUMMARY

This paper gives a brief overview of the collaborative decision making (CDM) process as it applies to aviation meteorological forecasts and Air Traffic Management (ATM). The paper also provides three working examples of CDM for aviation meteorology forecasts.

1. Introduction

1.1 Collaborative decision making (CDM) has been shown to be a successful process used by the United States (U.S.) in determining operational impact of thunderstorm activity on Air Traffic Flow Management (ATFM). The purpose of this paper is to make the CAR/SAM Regions aware of the CDM process and provide examples of aviation meteorological forecasts that use the collaborative decision process.

2. Discussion

2.1 Concept of Collaborative Decision Making

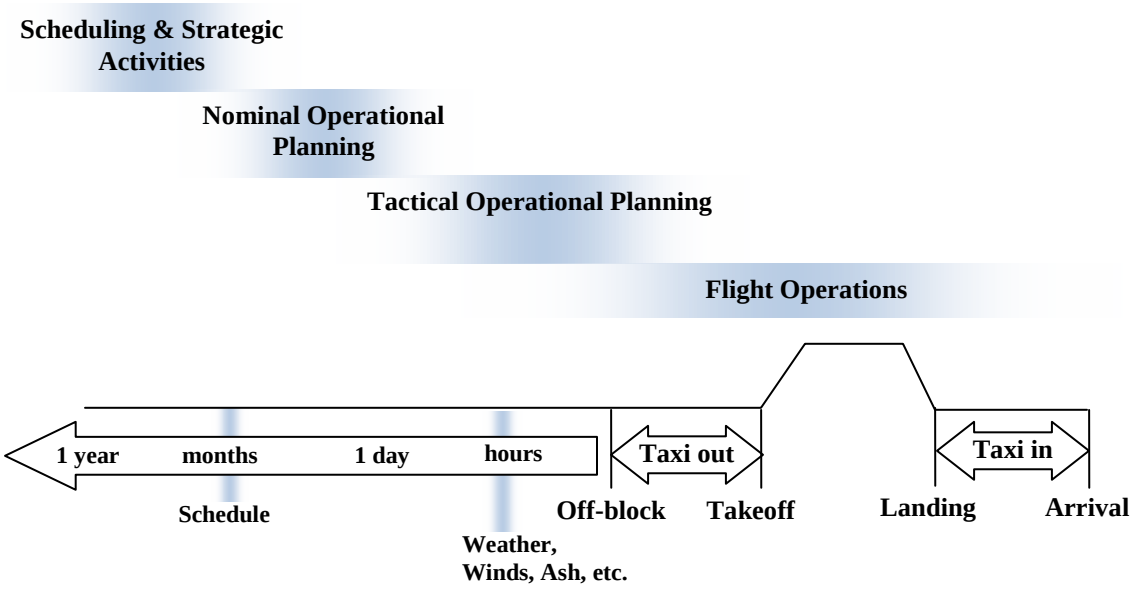
2.1.1 The Air Traffic Management Requirements and Performance Panel (ATMRPP) has recognized the value of CDM and is the process of providing global guidance on the implementation and use of CDM with the issuance of a Manual on CDM. While this concept is not necessarily new, it is still maturing. At the 11th Air Navigation Conference in Montreal in 2003 there was an endorsement for a global ATM operational concept. Central to the concept is the following:

"*The goal, therefore, was an evolution to a holistic cooperative and collaborative decision-making environment, where the expectations of the members of the ATM community would balance to achieve the best outcome based on equity and access.*"

2.1.2 CDM is not a system, rather it is a process. The following are attributes of CDM:

- CDM allows all members of the MET and ATM community to participate in decisions that affect them.
- CDM may apply to all layers of decision from longer-term planning activities through to real-time operations.
- CDM can be applied actively, or through collaboratively agreed procedures, passively.
- Effective information management and sharing enables each participant to be aware of information of relevance to other participants' decisions.
- Any member can propose a solution; these are of greater utility when enhanced with effective information

2.1.3 The figure below illustrates the timeline for CDM, where one can see that the process is flexible to meet the operational needs for aviation.



2.1.4 Other matters that need to be considered in the development of a robust CDM program that includes but is not limited to:

- Harmonization of data. Data exchange is critical to CDM as it allows participants to have the necessary information to make decisions consistent with sought objectives. This involves the need for data standardization for exchange of information that is transparent to all stakeholders.
- Clearly identify overall shared objectives to seek a common agreed goal.

- Understand the implementation of decisions and how they are achieved within a framework of multi-lateral decision-making with a common goal. This may occur complementary to individual goals or adversarial goals.

- Development of rules for both tactical and strategic planning where conflicts can easily exist because of time constraints for safety related issues.

2.2 CDM in practice

2.2.1 The eruption of Kasatochi volcano in August 2008 provides an example of the collaborative decision process. Key to this process is information sharing. On 11 August 2008, the Volcanic Ash Advisory Center (VAAC) Montréal took over the lead for issuing volcanic ash advisories from VAAC Anchorage. This was done following several coordination phone calls with the Anchorage VAAC to determine at what point the bulk of the area of volcanic ash was into the VAAC Montréal area of responsibility. This decision was facilitated by consultation of satellite images which showed the location of the volcanic ash and sulfur dioxide cloud and allowed both VAACs to come to a mutual agreement as to the best time to transfer responsibility from one to the other. As noted above the key to this was that both VAACs were able to share common information and mutually agree on the forecast of the ash cloud thus avoiding inconsistency between the information provided by Anchorage VAAC and Montreal VAAC.

2.2.2 Since 2000, the U.S. National Weather Service's Aviation Weather Center (AWC) has successfully used the collaborative decision process in their thunderstorm forecast product in support of ATFM. This forecast product is known as the Collaborative Convective Forecast Product (CCFP). AWC aviation meteorologists prepare CCFP forecasts for thunderstorms across the U.S. that meets certain pre-established criteria that affects ATFM decisions. The AWC meteorologists provide the preliminary CCFP forecasts every two hours inviting meteorologists at Airline Operations Centers (AOC) and Area Control Centers (known as ARTCC) to critique and provide their input on the forecast. With technology that is provided by the Public Internet, information is easily shared in a real time assessment via "white board" and "chat". The end result of collaborative decision process results in a mutually agreed forecast that all agree to use in support of their operations.

2.2.3 For nearly ten years, the Washington World Area Forecast Center's (WAFC) World Area Forecast System (WAFS) Significant Weather (SIGWX) forecasts, prepared by aviation meteorologists at the AWC, have used the collaborative decision process in the final stages of production of the SIGWX forecasts. Preliminary SIGWX forecasts are posted on an Internet "white board" and participating users are provided the opportunity to comment on the preliminary SIGWX forecasts and if necessary, suggest changes to the forecasts of thunderstorms, clear air turbulence, etc.

2.2.3.1 Of special note is that the national meteorological service of Brazil are participants on the WAFC Washington SIGWX collaboration program.

2.2.3.2 Other CAR/SAM States are welcome to inquire to WAFC Washington about the SIGWX collaboration program. Please contact Mr. Matt Strahan at Matt.Strahan@noaa.gov.

3. **Conclusions**

3.1 CDM should be thought of as a two step process in that there is a collaborative forecasting process and then there is a decision making process by the principal users. The terms are

interwoven in some context but the over all aim is support of a CDM program that can be implemented to facilitate aviation meteorological forecasts in support of flight planning and ATFM decisions.

3.2 Given the above discussion the subgroup may wish to endorse the concept of CDM by considering the following draft conclusion:

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CONCLUSION 11/XX DEVELOPMENT OF COLLABORATIVE DECISION PROCESS

That,

a) the subgroup endorse the concept of using CDM in support of improving decision making and the use of aviation meteorological information to provide improved forecasts of ash cloud, thunderstorms or any significant weather hazard that cuts across Flight Information Regions; and

b) States are invited to contact WAFC Washington to inquire about participating in the collaborative decision process for the SIGWX forecasts.

4. Action required

4.1 The subgroup is invited to consider the information in this working paper.

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