



**Agenda Item 3: Implementation of air traffic flow management (ATFM) and improvement of procedures for coordination between agencies**

**TRAINING COURSES**

(Presented by Brazil)

**SUMMARY**

This working paper presents to the Meeting the current status of ATFM used in Brazil and the availability of means and structures in the training process applied in the training of its specialists.

**1. Background**

1.1 With the growth of the aviation industry, the number of flights increased significantly and was regulated due to the limitations of air navigation. As a result, airlines began to challenge ICAO in the search for solutions to better utilize the available airspace capacity.

1.2 In order to meet the needs of the aviation industry, ICAO created a commission to study and propose possible solutions to the problem in question. The commission, known as the Future Air Navigation System (FANS), has opted for satellite navigation because it offers greater accuracy and, therefore, increases the number of flights by reducing the separation between aircraft. The commission also concluded that a system that handles many flights is needed to avoid impacts on ATS Services.

1.3 Therefore, the creation of the Air Traffic Management (ATM) was proposed. A system that would not only cover ATS (ATC service, information and alerts), but also the airspace management service (ASM) and the air traffic flow management service (ATFM) which, in an integrated manner, would ensure safety, fluidity and efficiency of air operations.

1.4 In Brazil, the ATFM Service is provided by the Air Navigation Management Center (CGNA), throughout the area of responsibility of the Brazilian Air Space Control System (SISCEAB). CGNA's mission is to manage the current actions of air traffic management processes and related infrastructure daily to contribute to a safe, orderly and efficient air traffic flow, ensuring that ATC capacity is used to its full possible extent and that the volume of traffic is proportional to the capabilities established by the authority for the adequacy and quality of the services provided in the Brazilian Airspace Control System (SISCEAB) and related links in real time and all flight intentions .

**2. Discussion**

2.1 Brazil has developed significantly in Air Traffic Flow Management (ATFM), with investments in equipment and new facilities beyond process development. Specialized training has been incorporated efficiently.

2.2. Since 2015, CGNA has been offering ATFM-related courses to countries in the SAM region, covering ATC capabilities, runway capacity, flow management measures and other features of the ATFM concept.

2.3 The purpose of these training courses is to provide students with technical knowledge of concepts related to the ATFM service that are essential to provide the service with a focus on collaborative decision-making (CDM), a process that aims to improve the performance of the ATM system as a whole through the harmonization of objectives and needs.

2.4 This course aims to enable air navigation service providers in the CAR/SAM region that are interested in implementing or improving the ATFM service in their respective states and seek to harmonize procedures and processes with other countries in the region.

2.5 Between 2015 and 2018, the CGNA had the opportunity to provide knowledge about ATFM in the SAM region by providing training courses for operators in Peru, Argentina and Paraguay.

2.6 By 2020, Brazil proposes to begin a joint effort to reserve a period to allow all States interested in activating or improving their respective FMP cells. The main objective of this joint work is the expansion of the number of cells in the region, greater integration and exchange of information between them, thus contributing to the growth of ATFM.

2.7 In addition to the concepts to be taught during this meeting, Brazil intends to present a module of its flow management tool, the Integrated Aerial Movement Management System (SIGMA), which currently has a web-based platform that It will be available to users in the SAM region. In this module, FMPs will have access to the movements contained in the database. It will be possible to see the data of flights originating in the Brazilian airspace for their respective airspace and in the opposite direction. In addition, traffic that does not originate from the Brazilian airfields, but which will eventually fly over some Brazilian airspace sector, will also be available to create the respective demand charts for the tool.

2.8 Seeking greater participation and integration of all cells in the region, the movements can be complemented by the respective demands posed by adjacent FMP cells. With this, it will be possible to measure the expected demand of the air spaces of interest, evaluate the possible measures that will be applied, coordinate their application time in a collaborative decision process that tends to grow and improve naturally.

2.9 It is important to clarify the need to analyze the capacities of each aerodrome of interest and of the airspace. These surveys are crucial to the functioning of the concept. Brazil is also available to train the operators of the States concerned and to monitor their measurements at the appropriate time agreed upon. It is noteworthy that the period of training and follow-up is for the implementation of the FMP cell with training in ATFM or for training in the measurement of expected capacities. The above-mentioned trainings can occur at the same event later for all interested parties. Subsequently, a monitoring of the measurements can be programmed, as well as the activation of the cells according to the interest of each State.

2.10. The schedule of activities is presented as **Appendix** to this Working Paper. The basic ATFM training course lasts 5 days. The capacity measurement capacity is expected to last 20 days, 10 days for the runway and 10 days for the airspace. However, you can work with a shorter time: 5 days for each specific type. In this specific case, it is necessary to validate the respective measurements by CGNA specialists.

2.11. The participation of the States with the indication of their respective operators for the training processes will be free, as well as the availability of access to the SIGMA tools module.

**3. Suggested actions**

3.1 The Meeting is invited to:

- a) Take note of the information provided by this Study Note;
- b) discuss possible dates for courses;
- c) indication of the States that manifest interest in the training; and
- d) indication of the States that manifest interest in the SIGMA tool.

- END -

## ANEXO I

## Objetivos e princípios ATFM

Tema	Objetivos e princípios do ATFM	
Objetivo	<ul style="list-style-type: none"> <li>- entender a filosofia do ATFM, seus objetivos e princípios;</li> <li>- saber como funciona o serviço ATFM;</li> <li>- conhecer termos e definições;</li> <li>- conhecer a estrutura e a organização do serviço ATFM, assim como o papel e as responsabilidades dos atores envolvidos</li> </ul>	
Conteúdo		Referências
<ul style="list-style-type: none"> <li>- Objetivos e princípios</li> <li>- Benefícios do ATFM</li> <li>- Funcionamento do serviço ATFM</li> <li>- Sistemas, processos e informações operacionais que permitem a aplicação do ATFM</li> <li>- Princípios do processo CDM</li> <li>- Coordenação civil/militar e utilização flexível do espaço aéreo (FUA)</li> <li>- Estrutura organizacional</li> <li>- Funções e responsabilidades</li> </ul>		<ul style="list-style-type: none"> <li>Doc 4444</li> <li>Doc 9971</li> <li>Documentos ATFM locais</li> </ul>

## Antecedentes institucionais e normativos do ATFM

Tema	Antecedentes institucionais e normativos do ATFM	
Objetivo	Conhecer a legislação, global e local, para a aplicação do serviço ATFM	
Conteúdo		Referências
<ul style="list-style-type: none"> <li>- Práticas recomendadas pela OACI</li> <li>- Procedimentos OACI</li> <li>- Regras e procedimentos locais</li> </ul>		<ul style="list-style-type: none"> <li>ICAO Anexo 11 e 15</li> <li>Doc 4444</li> <li>AIP e outros documentos locais</li> </ul>

## O processo CDM no contexto do ATFM

Tema	O processo CDM no contexto do ATFM	
Objetivo	<ul style="list-style-type: none"> <li>- Conhecer integralmente o proceso de comunicação e intercâmbio de informações operacionais em tempo real entre os atores envolvidos</li> <li>- Compreender como o proceso CDM permite a tomada das melhores decisões</li> </ul>	
Conteúdo		Referências
<ul style="list-style-type: none"> <li>- Estrutura e organização do processo CDM</li> <li>- Meios de comunicação</li> <li>- Funções e responsabilidades dos atores envolvidos</li> <li>- Interação com os atores nas distintas fases do processo</li> <li>- Benefícios do proceso CDM</li> </ul>		Doc 4444 Doc 9971 Documentos ATFM locais

## Planejamento do ATM

Tema	Planejamento do ATM	
Objetivo	<ul style="list-style-type: none"> <li>- Entender o processo de otimização da capacidade disponível e como utilizar outras capacidades disponíveis</li> <li>- Conhecer os fatores que impactam a capacidade</li> </ul>	
Conteúdo		Referências
<ul style="list-style-type: none"> <li>- Capacidade ATC</li> <li>- Planejamento ATFM (como mensurar o desequilíbrio entre demanda e capacidade e soluções na etapa estratégica)</li> <li>- Lista de turnos e configurações de setores</li> <li>- Otimização da capacidade</li> <li>- Fatores que reduzem a capacidade</li> <li>- Capacidade de pista</li> <li>- Fatores que afetam a capacidade do aeroporto</li> </ul>		Doc 4444 Doc 9971 Documentos ATFM locais

## Fases do ATFM

Tema	Fases do ATFM
Objetivo	Entender os princípios de aplicação do processo ATFM em distintas fases para manutenção do equilíbrio entre demanda e capacidade
Contenido	Referencias
<ul style="list-style-type: none"> <li>* Fase estratégica</li> <li>* Fase pré-tática <ul style="list-style-type: none"> <li>- procesos da fase pré-tática</li> <li>- planeamento da fase pré-tática</li> <li>- funções dos atores na fase pré-tática</li> <li>- planeamento de eventos especiais</li> <li>- proceso de alocação de slots</li> </ul> </li> <li>* Fase tática <ul style="list-style-type: none"> <li>- mudanças de rotas</li> <li>- gestão tática do PDA</li> </ul> </li> <li>* Pós-Operações <ul style="list-style-type: none"> <li>- requisitos para análises</li> <li>- realimentação e e avaliação</li> <li>- informe de incidentes</li> </ul> </li> </ul>	<p>Doc 4444 Doc 9971 Documentos ATFM locais</p>

## Medidas ATFM

Tema	Medidas ATFM
Objetivo	<ul style="list-style-type: none"> <li>- conhecer as medidas disponíveis e como aplicá-las;</li> <li>- entender o papel dos atores envolvidos no processo.</li> </ul>
Conteúdo	Referencias
<ul style="list-style-type: none"> <li>- Aplicar, ajustar e cancelar medidas ATFM</li> <li>- Medidas de otimização da capacidade</li> <li>- Medidas de distribuição da demanda</li> <li>- Medidas de ajuste/redução da demanda</li> <li>- Uso de ferramentas para apoiar os processos</li> </ul>	<p>Doc 4444 Doc 9971 Documentos ATFM locais</p>

## Dados e ferramentas ATFM

Tema	Dados e ferramentas ATFM	
Objetivo	<ul style="list-style-type: none"> <li>- garantir total conhecimento das funções e ferramentas para aplicação do ATFM</li> <li>- entender a necessidade de compartilhar informações</li> </ul>	
Conteúdo		Referencias
<ul style="list-style-type: none"> <li>- Ferramentas de apoio ao ATFM</li> <li>- Dados do ambiente e as ferramentas de apoio</li> <li>- Dados dos voos e as ferramentas de apoio</li> </ul>		Doc 9971 Documentos ATFM locais

## Procedimientos de contingencia ATFM

Tema	Procedimientos de contingência ATFM	
Objetivo	Entender completamente os procedimentos que devem ser aplicados em caso de contingência	
Conteúdo		Referências
<ul style="list-style-type: none"> <li>* Procedimientos de contingência</li> <li>- indisponibilidade de espaços aéreos / aeroportos</li> <li>* Situações climáticas adversas</li> <li>- clima convectivo</li> <li>- visibilidade reduzida</li> </ul>		Documentos ATFM locais