



ICAO

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WORKING PAPER

AIDC/NAM/ICD/5 — WP/09
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Fifth NAM/CAR Air Traffic Services Inter-facility Data Communication (AIDC) and North American Interface Control Document (NAM/IDC) Implementation Follow-up Meeting (AIDC/NAM/ICD/5)
Hybrid, Mexico City, Mexico – Zoom, from 28 to 30 June 2022

Agenda Item 3: Activities for the handling and management of the databases of the Control centres and regionally minimize flight plan errors

FOLLOW-UP ON THE ACTIVITIES TO REGIONALLY MINIMIZE FLIGHT PLAN ERRORS

(Presented by the AIDC Task Force Rapporteur)

EXECUTIVE SUMMARY	
This working paper offers an overview of Flight and Flow Information in a Collaborative Environment (FF-ICE), and points out important aspects regarding its implementation	
Action:	Suggested actions are presented in Section 3.
<i>Strategic Objectives:</i>	<ul style="list-style-type: none">• Safety• Air Navigation Capacity and Efficiency• Security & Facilitation• Economic Development of Air Transport• Environmental Protection
<i>References:</i>	<ul style="list-style-type: none">• Document 9965, <i>Manual on Flight and Flow Information for a Collaborative Environment (FF-ICE)</i>• Document 10039 – <i>Manual on System Wide Information Management (SWIM) Concept</i>.

1 Introduction

1.1 The AIDC Task Force, along with its ad hoc Flight Monitoring Group, has been working on the implementation of AIDC in the NACC region, as well as for the correction of flight planning errors respectively, since 2013. The next challenge for this group is the implementation of Flight and Flow in a Collaborative Environment, FF-ICE, which is the next logical step that unites flight data with automation. This working paper presents an overview of FF-ICE, and offers considerations for its future implementation.

2 Discussion

2.1 FF-ICE stands for Flight and Flow Information in a Collaborative Environment. ICAO Document 9965, *Manual on Flight and Flow Information for a Collaborative Environment (FF-ICE)*, contains

detailed information on the concept, and is currently being updated. The general idea behind FF-ICE is that information regarding a flight will be shared among all stakeholders, during all phases of flight, information that will be much more than what is currently transmitted through today's aviation information networks.

2.2 FF-ICE aims to overcome the limitations of how we manage information, which is based on concepts and practices established long ago. An example of this is the description of aircraft capabilities using individual letters, representative of a time where computer memory was a limitation, as well as processing power to code and decode information. This method has served us well through the time, but is not scalable or flexible enough to accommodate an ever increasing development of technology.

2.3 To fully understand the importance of FF-ICE, so as much as to be described as a cornerstone of the performance-based air navigation system, it is necessary to understand the concept of Trajectory Based Operations, or TBO. Under this concept, Airspace users (airlines) will submit the preferred trajectory to ATM Service Providers (ASPs), who will inform of any constraints to this desired trajectory. The result of this interaction will yield a trajectory that will be as close as possible to the desired one. This process of identifying and resolving constraints occurs constantly, so the trajectory is dynamically adjusted till its arrival. This will allow much more predictability of flights, time being the 4th dimension referred to in the term 4D trajectory.

2.4 Looking at this scenario, it is obvious that constant information regarding the development of the flight, the intentions of the aircraft, and any constraints that come to being anything that can affect this trajectory, must get to the right stakeholders at the right time. This is where FF-ICE comes in: it will be the information strategy that will allow all this to happen.

2.5 It is also obvious that we currently do not have the infrastructure in place for the ideal operation of FF-ICE. This reveals the relationship between FF-ICE and SWIM.

2.6 SWIM stands for System Wide Information Management. Under SWIM, there will be defined services, each offering a certain category of data. Applications should be able to obtain information needed from other applications that offer it by means of these services, which will be published in such a way that applications can find out which one can satisfy their requirements.

2.7 Information will be requested by an application in two ways:

- a) request/reply: an application requests an information from the provider, who responds with the answer for the query.
- b) publish/subscribe: applications that provide data will publish their services, and other applications will subscribe to the service, receiving information as it becomes available. This is the most powerful aspect of data exchange introduced by SWIM.

2.8 Detailed information for SWIM is also available in ICAO documents, specifically Document 10039 – *Manual on System Wide Information Management (SWIM) Concept*. An excellent video that explains the relationship between TBO, FF-ICE and SWIM has been create by IATA and is available on the internet.

2.9 Having seen the role of FF-ICE for the future performance based system, the next question may be “how do we implement FF-ICE?” The first question should be “do we need to implement FF-ICE?”.

As we are in a process of drafting Volume III of our regional eANP, any implementation plan should stem from the analysis of our regional objectives. This analysis is out of the scope of this working paper.

2.10 In any case, considering the significant role of FF-ICE in the scheme of performance based navigation, it would be interesting to see what the effort would look like. In **Appendix A** there is a graph that represents the dependencies between the FICE thread elements in the ASBU framework. As can be seen, elements FICE-B2/1 and FICE-B2/7 do not depend on any other FICE elements, so these should logically be the first elements to implement.

2.11 In **Appendix B**, the hierarchy of elements on which these two FICE elements are supported is shown. Only the dependencies that correspond to needs (in contrast to benefit or option) were taken into account. The colors identify the maturity level of each element, green meaning “Ready to implement” and yellow meaning “Standardization”. From this graph, it is noticed that the path for the implementation of FF-ICE is a rather complex one, involving many different components. The collaboration of several working groups would be necessary to achieve implement the two aforementioned elements.

2.12 In **Appendix C**, another graph depicts the enabler categories for each element in the previous graph, which further details the roadmap to follow for the implementation of FF-ICE. An interesting takeaway from this graph is that the great majority of elements require operational procedures as enablers, which indicates that for FF-ICE to be realized, we have to change how we work. Ground infrastructure is also present in many elements, but is almost always accompanied by operational procedures. Training is also an enabler appearing in several elements, enough to be worth mentioning.

2.13 The challenge of implementing FF-ICE is to change our mindsets, to grasp the concept. FF-ICE alone is not an end in itself, but a means for TBO, and FF-ICE itself would be difficult, if not impossible, to implement without SWIM. Thus, it would make sense to plan the implementation of SWIM, FF-ICE and TBO all in coordination, in an iterative fashion, in order to obtain incremental benefits after each iteration.

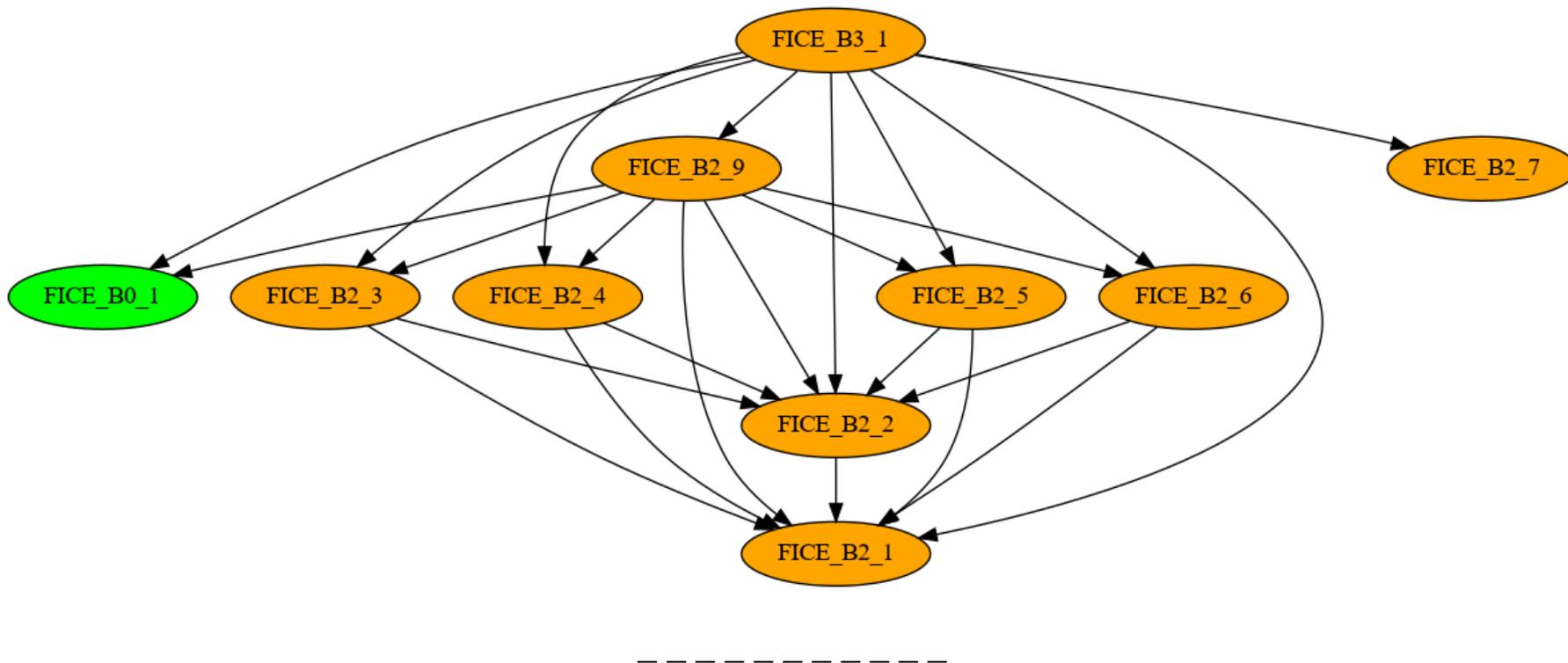
3 Suggested actions

3.1 The meeting is invited to:

- a) take into account the information presented in this working paper; and
- b) schedule a discussion for planning the next phase of implementation of Ff-ICE, in alignment with the regional plan.

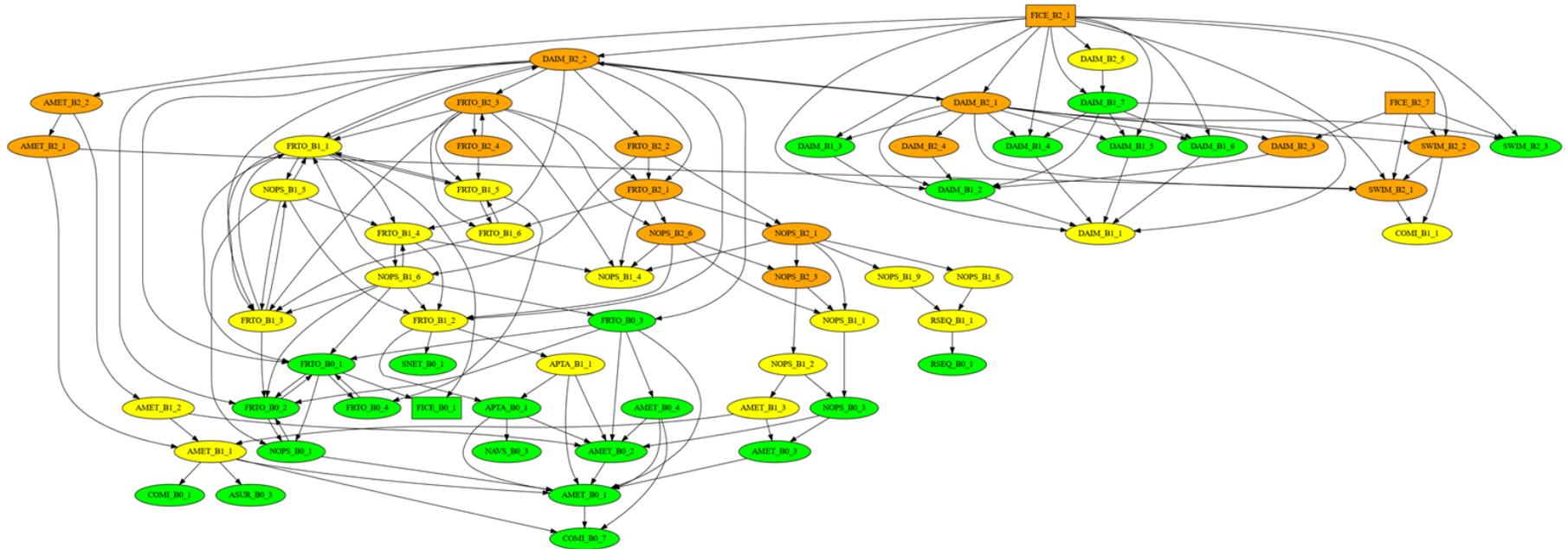
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APPENDIX A
DEPENDENCIES OF FICE THREAD ASBU ELEMENTS



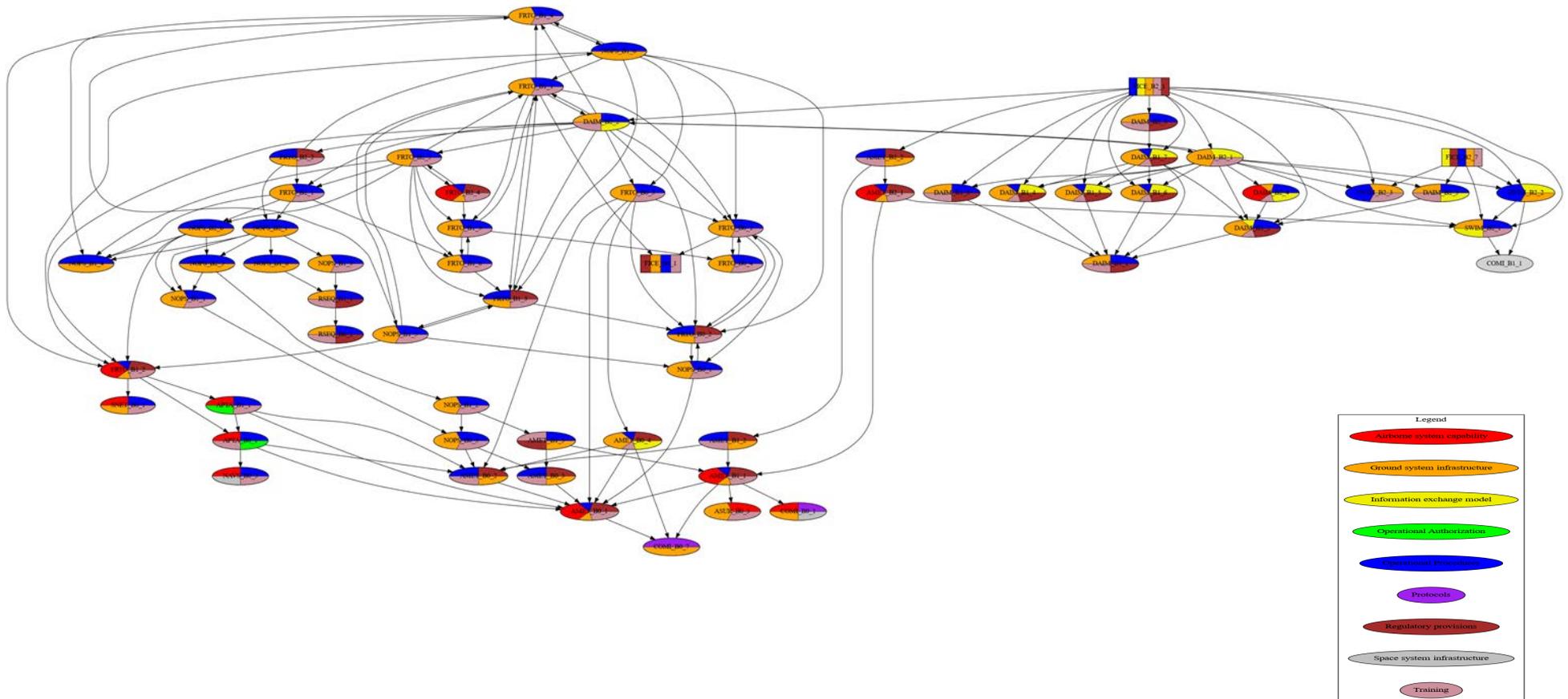
APPENDIX B

DEPENDENCIES, FICE-B2/1 AND FICE-B2/7 ELEMENTS



APPENDIX C

ENABLERS FOR ELEMENTS FICE-B2/1 AND FICE-B2/7 AND DEPENDENCIES



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