



ICAO

International Civil Aviation Organization
North American, Central American and Caribbean Office

ICAO/Eurocontrol Workshop on Eurocontrol's Base of Aircraft Data (BADA)

Online, 03 August 2023

Sixth ATS Interfacility Data Communication (AIDC) and North American Interface Control Document (NAM/ICD) Implementation Follow-Up Meeting for the NAM/CAR Regions (AIDC/NAM/ICD/6)

Online, 04 August 2023

Summary of Discussions

List of participants Appendix A

Agenda

Appendix B

Objectives

- a) Follow up on the recommendations of the Air Traffic Services (ATS) Interfacility Data Communications Task Group of the North American, Central American and Caribbean Working Group (NACC/WG/AIDC/TF) following the need for each CAR State work on updating the Air Traffic Control (ATC) aircraft database through a coordinated workshop between ICAO/Eurocontrol on the Aircraft Database (BADA) and establish the status of implementation activities of automated protocols in the NAM/CAR regions.
- b) Inform on the use, access and exploitation of the Eurocontrol Aircraft Database (BADA)

ICAO/Eurocontrol Workshop on Eurocontrol's Base of aircraft data (BADA)

1. Introduction

1.1 The Eurocontrol Aircraft Database (BADA) workshop was held as a preamble to the Sixth ATS Interfacility Data Communication (AIDC) and North American Interface Control Document (NAM/ICD) Implementation Follow-Up Meeting for the NAM/CAR Regions (AIDC/NAM/ICD/6), on-line, August 3 and 4, 2023.

1.2 Ms. Mayda Ávila, Regional Officer, Communications, Navigation and Surveillance of the ICAO North America, Central America and Caribbean Regional Office, welcomed participants to the ICAO/Eurocontrol Workshop on the Aircraft Database (BADA) provided by Eurocontrol as support to the States of the NAM/CAR Regions. Ms. Ávila thanked Eurocontrol for its support of this workshop and emphasized that it is a product of the work that the NACC/WG/AIDC Task Force has been carrying out in recent years. She also thanked the industry, in this case, Indra and Thales, for the support.

2. Development

Eurocontrol's presentation

2.1 BADA means Aircraft Database, an aircraft performance model, developed and maintained by EUROCONTROL since the early 90s, in cooperation with aircraft manufacturers and operators.

2.2 BADA provides aircraft performance data suitable for trajectory prediction and simulation within Air Traffic Control (ATC) applications.

2.3 All BADA aircraft models are developed using reference performance data from the aircraft manufacturer:

- Flight manuals
- Performance engineering tools

2.4 Main partners:



2.5 Main performance data provided by BADA:

- Push and pull => calculation of the rate of climb/descent, acceleration
- Fuel flow
- Flight envelope (in terms of speed, altitude, weight, etc.)
- Nominal speed profiles (take off, climb, cruise, descent, landing)
- BADA provides the “instant” performances (e.g. ROCD, airspeed), not a 4D trajectory – the ATC system oversees calculating the final trajectory (including restrictions, weather, etc.)

2.6 Eurocontrol explained the requirements to have a BADA license, which would serve so that States can update the database regarding the performance characteristics of aircraft in the databases of the ATC control centres. The lack of this update affects the automated coordination of the AIDC and NAM/ICD protocols.

2.7 To access the BADA Eurocontrol explained that:

- Use of BADA is governed by a license agreement.
- The use of BADA is free.

- EUROCONTROL acts as an interface with aircraft manufacturers by obtaining aircraft performance reference data, translating it into BADA and providing it to the international ATM community.
- Appropriate data-sharing agreements are in place with the world's leading aircraft manufacturers.
- License to access BADA is granted after careful evaluation of each request and only for the permitted intended use.

2.8 States that wish to have access to the BADA database should make the necessary coordination through each of the ICAO Regional Offices so that they can coordinate with Eurocontrol.

Industry presentations

2.9 The industry explained how Control Centres manage the BADA database for their air traffic control operations.

INDRA

2.10 Indra explained the Importance of accurate aircraft trajectory prediction for ATM systems. The Aircraft Performance Model (APM) is the core of trajectory prediction, and BADA has proven to be a suitable APM for both prediction and simulation.

2.11 Indra indicated the benefits of accurate trajectory prediction include improved punctuality, efficiency, reduced emissions, and lower operating costs. Trajectories are calculated based on flight plans, meteorological data, aircraft performance, and ATC procedures.

2.12 An example indicated by INDRA was the data provided by BADA on the ascent trajectory, from real conditions to the Requested flight (RFL):

What BADA provides? And what not?

BADA provides you which is the maximum Thrust force the engines are able to produce

BADA also provides a formula to compute the fuel consumption based on the Thrust.

BADA recommends to mode climbing trajectories with maximum Thrust.

BADA does NOT force using Maximum Thrust. You can use lower ones!

BADA provides you Drag force in clean configuration, depending on mass, speed and MET

BADA also provides the minimum and maximum mass for each A/C type

BADA recommends a clean configuration above certain speed.

BADA does NOT force setting a particular mass, neither to fly on clean configuration

BADA provides formulas to compute Rate of Climb for a given Thrust and Drag, assuming a constant operating climb IAS or Mach

BADA also provides formulas for those cases where the speed is not constant

BADA recommends to compute trajectories where the speed is the scheduled one

BADA does NOT force using that scheduled speed, neither even flying at constant speed!

2.13 Summarizing, INDRA indicated that:

- BADA Provides an A/C physical description and operating environment.
- BADA Provides formulas that model the physical consequences of any manoeuvre.
- BADA Recommends certain manoeuvres, these being the most common.
- BADA DOES NOT force the establishment of any particular manoeuvre.

THALES

2.14 Thales indicated that where BADA is implemented in TopSky control center systems, it uses the BADA database to:

- Unique and shared aircraft performances. The use of estimated mass and temperature to refine the calculation Precision of Estimated time over significant point (ETO) and Speed Precision of Top of climb (ToC) and Top of descent (ToD).
- Improved boundary estimation (resulting in better Air Traffic Services Inter-facility Data Communication (AIDC) coordination)
- Better knowledge of the evolution of the ascent and descent profile
- Better detection of crossed sectors in complex airspaces. Detection of conflicts in the medium term. Better anticipation in dense airports for arrival

2.15 Participating States had the opportunity to share with Eurocontrol and Industry representatives information about the use of the BADA.

Sixth ATS Interfacility Data Communication (AIDC) and North American Interface Control Document (NAM/ICD) Implementation Follow-Up Meeting for the NAM/CAR Regions (AIDC/NAM/ICD/6)

3. Introduction

3.1 Sixth ATS Interfacility Data Communication (AIDC) and North American Interface Control Document (NAM/ICD) Implementation Follow-Up Meeting for the NAM/CAR Regions (AIDC/NAM/ICD/6) was held on-line on 4 August 2023, with the participation of the NAM/CAR States, which were able to share the degree of implementation of their automated protocols through the two-hour session.

3.2 United States reported on the current NAM/ICD Automated Regional Operational Interfaces, that NAM ICD cross-border automation has been implemented between 6 Member States and 27 flight Information Regions (FIRs) in Canada, Cuba, Dominican Republic, Honduras and Mexico, and providing the opportunity to seamless interfaces between adjacent ATC systems. The States indicated that expects regional air traffic growth to continue in the years to come.

3.3 The other participating States provided the status of their implementation verbally and the table included in **Appendix C** was updated according to the information provided.

3.4 The documentation for both work sessions can be found under the following link: <https://www.icao.int/NACC/Pages/meetings-2023-bada.aspx>

3.5 The participants of the meeting were informed that Mr. Fernando Casso would stop acting as Rapporteur of the NACC/WG/AIDC Task Force and that he would be replaced by Messrs. Luis Fuentes and Luciano Rojas of Dominican Republic, proposal that was accepted. The Meeting and the Task Force thanked Dominican Republic for the great commitment to support the region with the active participation of its staff and particularly the leadership and follow-up of Mr. Fernando Casso throughout the time he served as rapporteur of the NACC/WG/AIDC Task Force, wishing him future success; and welcoming in turn the new rapporteurs, Mr. Fuentes and Mr. Rojas, wishing them success and reiterating everyone's commitment to their successful management.

Sixth NAM/CAR Air Traffic Services Inter-facility Data Communication (AIDC) and North American Interface Control Document (NAM/ICD) Implementation Follow-up Meeting/Sexta Reunión de seguimiento NAM/CAR sobre la implementación de Comunicaciones de Datos entre Instalaciones de Servicios de Tránsito Aéreo (AIDC) y del Documento de control de interfaz (ICD) para Norteamérica (NAM) (AIDC/NAM/ICD/6)

On-line, 4 August 2023 / En línea, 4 de agosto de 2023

APPENDIX A/APENDICE A

LIST OF PARTICIPANTS / LISTA DE PARTICIPANTES

ARGENTINA

1. David Ricardo Daniel Lezcano
2. Dario Ferrel
3. Lucas Fernández
4. Karina Leban
5. Marcos Marani

BOLIVIA

6. Douglas Pacheco
7. Jaime Y. Alvarez M.
8. Yecid Alcon Torrez
9. Yesid Arze

CHILE

10. Christian Vergara
11. Gina Tillería
12. Gustavo Caceres
13. Héctor Ibarra
14. Pablo Retamal
15. Pablo Valenzuela
16. Pedro Pastrian

COLOMBIA

17. Adriana Murillo Sepulveda
18. Andres Colmenares

19. Laura Carranza

20. Leonardo Gallo

21. Mercedes Mosquera

22. Miguel Segura

23. Nicolas Beltran

24. Nicolas Beltran

25. Wilbert De Jesus

Hernandez Rodriguez

COSTA RICA

26. Bernardita Mora

27. Gerardo Aguero

28. Jeffrey Rios

29. Kira Gerken Yong

30. Warren Quiros

CURAÇAO/CURAZAO

31. Jacques Lasten

32. Timothy Bregita

DOMINICAN

REPUBLIC/REPÚBLICA

DOMINICANA

33. Claudia Roa

34. Fernando Casso

35. Jonathan Franklin Méndez Mercedes

36. Luciano Rojas Almonte

37. Luis Emilio Fuentes

ECUADOR

38. Angel Yachimba

39. Bernardo Oñate

40. Christian Ramos

41. Fabricio Gavilanes

42. Jorge Zuñiga

**FRENCH GUIANA/
GUYANA FRANCESA**

43. Krystel Valendoff

GUATEMALA

44. Andres Asturias

45. Enio Hernandez

46. Hugo Andrade

47. Mario Grajeda

48. Sergio Enriquez

GUYANA

49. Sewchan Hemchan

HAITI/HAÏTÍ

50. Jean Claude Pierre

51. Nadia Leopold

52. Philippe Riche

HONDURAS

- 53. Alberto Josue Zuniga Lopez
- 54. Dunia Moncada
- 55. Gustavo Gonzalez

JAMAICA

- 56. Yannick Francis
- 57. Robbi-Ann Powis
- 58. Darren Mott

MEXICO/MÉXICO

- 59. Emilio Valencia
- 60. Alonso Hernandez
- 61. Héctor Abraham García Cruz
- 62. Lino Eduardo Páramo Molina
- 63. Manuel Rodriguez
- 64. Martín Reza Castillo
- 65. Alberto Romero Flores
- 66. Antonio Sánchez
- 67. Arturo Villela
- 68. Carlos Alva
- 69. Ernesto Trujillo
- 70. Gustavo Covarrubias
- 71. Jose Antonio Ruiz Martinez
- 72. Julio Ruiz
- 73. Salvador Lozano

PANAMA/PANAMÁ

- 74. Ana Montenegro
- 75. Cristino Vargas Racines
- 76. Daniel De Avila

PERU/PERÚ

- 77. Celso Gutierrez
- 78. Omar Vega
- 79. Giuliano Guzmán
- 80. Marco Vargas

- 81. Mariela Ingrid Rodriguez Gutierrez
- 82. Raul Ivan Moron Zamora

TRINIDAD AND TOBAGO/TRINIDAD Y TABAGO

- 83. Kent Ramnarace-Singh
- 84. Leonardo Totesaut
- 85. Ricky Bissessar
- 86. Steve Ramgoolam
- 87. Tecla Thomas

UNITED STATES/ESTADOS UNIDOS

- 88. Alfredo Costa
- 89. Chris Reingruber
- 90. Keith Dutch
- 91. Linda Mccray
- 92. Raymond Mcavaddy
- 93. Rudolph Lawrence
- 94. Vincent Mcmenamy
- 95. Wayne Young

URUGUAY

- 96. Andres Braida

VENEZUELA

- 97. Jean Lozano

AEROTEL

- 98. Peter Spence

COCESNA

- 99. Cristhian Mora
- 100. Gabriel Quirós Pereira
- 101. Gerberth Mancia
- 102. Hector Lee
- 103. Jenny Lee
- 104. Jose Morales

- 105. Luis Manuel Coello Flores

- 106. Reybin Sanabria
- 107. Victor Manuel Andrade Salgado

EUROCONTROL

- 108. Angela Nuic
- 109. Vincent Mouillet

INDRA

- 110. David De La Serna
- 111. Pedro Olivares Yuste

IFALPA

- 112. Pascual Álvarez Del Castillo

THALES

- 113. Govind Vekaria
- 114. Pablo Fernandez
- 115. Pascal Rohault

ICAO/OACI

- 116. Raul Martinez
- 117. Mayda Ávila
- 118. Eddian Méndez

ICAO



OACI

North American, Central American and Caribbean Office (NACC)
Oficina para Norteamérica, Centroamérica y Caribe (NACC)

ICAO/Eurocontrol Workshop on Eurocontrol's Base of aircraft data (BADA)

Taller sobre la Base de datos de aeronaves (BADA) de Eurocontrol

On-line, 3 August 2023, 14:00 -UTC / En línea, 3 de agosto de 2023, 14:00 -UTC

APPENDIX B / APÉNDICE B

PROGRAMME / PROGRAMA

Thursday 3 August 2023 / Jueves 03 de agosto de 2023

08:00 – 08:05

Opening Ceremony / Ceremonia de Apertura

Remarks by / Palabras de apertura de

- *Mr. Julio César Siu, Acting Regional Director, International Civil Aviation Organization (ICAO)*
Sr. Julio César Siu, Director Regional Interino, Organización de Aviación Civil Internacional (OACI)

Group Picture / Foto de Grupo

Seminar module topics / Temas de los módulos del Seminario:

08:05 – 09:00

- *Presentation by Eurocontrol*
Presentación por Eurocontrol

09:00 – 09:15

- *Question and Answer session*
Sesión de Preguntas y Respuestas

09:15 – 09:30

Coffee break / Pausa para café

09:30 – 10:45

- *Presentation by the industry*
Presentación por la Industria

10:45 – 11:00

- *Conclusions and closing*
- *Conclusiones y clausura*

Friday 4 August 2023 / Viernes 4 de agosto de 2023

09:00 – 09:05

Opening Ceremony / Ceremonia de Apertura

Remarks by / Palabras de apertura de

- *Mrs. Mayda Ávila, Regional Officer, Communications, Navigation and Surveillance, International Civil Aviation Organization – ICAO*

Sra. Mayda Ávila, Especialista Regional en Comunicaciones, Navegación y Vigilancia, Organización de Aviación Civil Internacional – OACI

Meeting topics / Temas de la Reunión:

09:05 – 11:00

- *NAM/CAR States will present their updated Action Plan for the implementation of AIDC and NAM/ICD protocols*

Los Estados NAM/CAR presentarán la actualización de su Plan de Acción para la implementación de los protocolos automatizados AIDC y NAM/ICD

APPENDIX C / APÉNDICE C

Interface	State or Organization	Adjacent State or Organization	FIR 1	FIR 2	Interface Class	Interface Status	Implementation Date	Bilateral Agreement or ICD
Belize-CENAMER	COCESNA	Belize	CENAMER	Belize	N/A	Planned	Jul-2023	PAC ICD
Belize-Guatemala	Guatemala	Belize	Guatemala	Belize	N/A	Planned	Jul-2025	PAC ICD
CENAMER-Kingston	COCESNA	Jamaica	CENAMER	Kingston	N/A	Planned	TBD	NAM-ICD Version E
CENAMER-San José	Costa Rica	COCESNA	San José	CENAMER	N/A	Planned	Jul-2025	PAC ICD
Costa Rica-Nicaragua	Nicaragua	Costa Rica	Nicaragua	Costa Rica	N/A	Planned	Jul-2025	PAC ICD
Curacao-Kingston	Curacao	Jamaica	Curacao	Kingston	N/A	Planned	Planned	NAM-ICD Version D
Curacao-Maiquetia	Curacao	Venezuela	Curacao	Maiquetia	N/A	Planned	Planned	0
Curacao-Santo Domingo	Dominican Republic	Curacao	Santo Domingo	Curacao	N/A	Planned	TBD	PAC ICD
El Salvador-Guatemala	El Salvador	Guatemala	El Salvador	Guatemala	N/A	Planned	Jun-2016	PAC ICD
El Salvador-Nicaragua	El Salvador	Nicaragua	El Salvador	Nicaragua	N/A	Planned	May-2016	PAC ICD
French Guyanne-PIARCO	Trinidad and Tobago	French Guyanne	PIARCO	French Guyanne	N/A	Planned	Jul-2025	???
Maiquetia-PIARCO	Trinidad and Tobago	Venezuela	PIARCO	Maiquetia	N/A	Planned	Jul-2025	0
Miami-Nassau	United States	Bahamas	Miami	Nassau	N/A	Planned	TBD	NAM-ICD Version E
Moncton-New York	Canada	United States	Moncton	New York	Class II	Planned	Q1 2019	TBD
New York-PIARCO	Trinidad and Tobago	United States	PIARCO	New York	N/A	Planned	Jul-2025	PAN ICD
Nicaragua-San José	Costa Rica	Nicaragua	San José	Nicaragua	N/A	Planned	Jul-2025	PAC ICD
PIARCO-SAL	Trinidad and Tobago		PIARCO	SAL	N/A	Planned	Jul-2025	NAM-ICD Version D
PIARCO-San Juan/Miami	Trinidad and Tobago	United States	PIARCO	San Juan/Miami	N/A	Planned	Jul-2025	NAM-ICD Version E
Curacao-Kingston	Jamaica	Curacao	Kingston	Curacao	N/A	Planned	Need to coordinate	PAN

END / FIN