RASG-MID SAFETY ADVISORY – 06

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Flight Data Exchange (FDX)

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This document is RASG-MID safety advisory developed by the International Air Transport Association (IATA) under the auspices of the Regional Aviation Safety Group – Middle East (RASG-MID).

Disclaimer

TABLE OF CONTENTS

INTRODUCTION

The objective of the RASG-MID Annual Safety Report is to gather safety information from different stakeholders and to identify the main aviation safety risks in the MID Region in order to deploy mitigation actions for enhancing aviation safety in a coordinated manner.

Three editions of the RASG-MID annual safety report have been published so far. All editions include detailed reactive and proactive safety information; yet, the annual safety report team is facing some challenges in collecting predictive safety information.

The International Air Transport Association (IATA) has developed a very useful tool called Flight Data Exchange (FDX), which acts as a platform that allows for predictive safety data gathering and assessment. However, and due to the low levels of participation by the operators in the MID states in FDX, the tool could not be optimized to its full potential where comprehensive predictive safety assessments could be performed.

This informative safety advisory was developed based on requests from the different States that were part of the RASG-MID/3 Steering Committee meeting (RSC/3) held in Cairo, Egypt between 9-11 December 2014, which requested IATA, through Draft Conclusion 3/3, to develop a RASG-MID Safety Advisory to promote the use of FDX.

The RASG-MID/4 meeting held in Jeddah, Saudi Arabia from 30 March to 1 April 2015, agreed to the following Conclusion:

CONCLUSION 4/4: FLIGHT DATA EXCHANGE (FDX) RASG-MID SAFETY ADVISORY

That, the Draft RASG-MID Safety Advisory at Appendix 3A be further reviewed and finalized by ICAO in coordination with IATA and all concerned stakeholders in order to be posted on the ICAO MID website.

PURPOSE

The purpose of this safety advisory is to elaborate more on FDX and raise awareness among the different aviation stakeholders on who can join FDX, how the tool works, and what it offers.

Overview of Flight Data Exchange (FDX)

1. Definition of FDX

The Flight Data Exchange (FDX) is an aggregated de-identified database of Flight Data Analysis (FDA) events. FDA events are also known as Flight Data Monitoring (FDM) or Flight Operations Quality Assurance (FOQA) events. Raw flight data is collected from Participants and processed against a pre-defined event set. Results data is aggregated into a single de-identified database, and displayed via a website only when there are at least three (3) operators with the same aircraft type into an airfield. Users

may access the de-identified results and query more than 50 different measurements. Reporting capabilities and other outputs are also included in FDX.

2. Benefits of FDX

The FDX program allows flight operations and safety departments to proactively identify safety hazards. Currently, more than a dozen different event types are displayed by location including Ground Proximity Warning System (GPWS/TAWS) locations, Traffic Collision and Avoidance System (TCAS, or ACAS) events, windshear warnings, unstable approaches (low and high risk), go-arounds, and high tailwind landing events. More events will be added as the system is developed.

The analysis of the different types of events would allow the operator to:

- identify safety issues that the airline did not even know they existed and share safety hazards with flight crew
- anticipate safety concerns at new airports or new routes
- view flight animations for safety and training purposes
- compare and benchmark the airline's operations against the entire industry
- compare global and regional statistics

3. Data Processing Overview

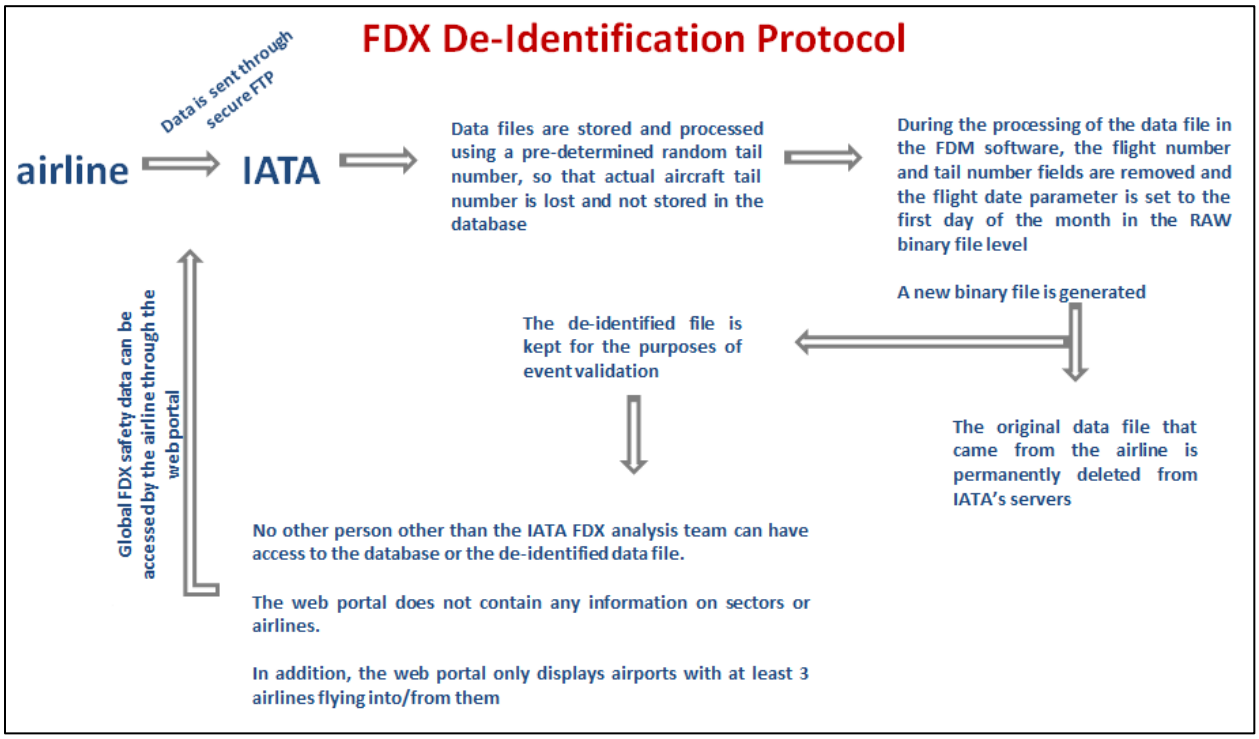
The FDX program merges de-identified Flight Data Analysis (FDA), Flight Data Monitoring (FDM), or Flight Operations Quality Assurance (FOQA) Binary Data from multiple operators into a de-identified global database, and then provides that aggregated information back to Participants via the website and various forms of reporting and other outputs. FDX is expected to become an essential component in an operator's Safety Management Systems (SMS) program, allowing operators to continuously monitor departure and destination airports, multiple hazards, and proactively assess new destinations before starting service.

Binary flight data is sent to IATA (minimum monthly) or an IATA vendor via secure File Transfer Protocol (FTP) site where it is processed using a common set of events including, but not limited to:

- Unstable approaches
- EGPWS/GPWS/TAWS
- Excessive tailwind on landing
- TCAS
- Hard landing
- Rejected Takeoff
- Go Around

Further events will be added as the system develops. IATA stores the Results Data in a de-identified database. Collated Information is stored in a separate de-identified database.

Below is an illustration of the de-identification protocol implemented by IATA towards FDM/FOQA data submitted by the airlines:



4. Events Types and Definitions

FDX currently captures a standard set of event types. Further events will be added as the system develops. Moreover, each event type has a threshold by which it is triggered and captured.

Below is a table which lists all the events and their respective triggers in FDX.

EVENT NAME	TRIGGER
Excessive Glideslope Deviation - Above (1000 – 500 ft)	> 1 dot between 1,000 and 500ft AGL
Excessive Glideslope Deviation - Above (Below 500 ft)	> 1 dot between 500 and 200ft AGL
Excessive Glideslope Deviation - Below (1000 – 500 ft)	< -1 dot between 1,000 and 500ft AGL
Excessive Glideslope Deviation - Below (Below 500 ft)	< -1 dot between 500 and 200ft AGL
Excessive Localizer Deviation (1000 – 500 ft)	> 1 dot between 1,000 and 500ft AGL
Excessive Localizer Deviation (Below 500 ft)	> 1 dot between 500 and 200ft AGL

High Rate of Descent (1000 – 500 ft)	RoD > 1200 ft/min between 1,000 and 500ft AGL
High Rate of Descent Below 500 ft	RoD > 1200 ft/min between 1,000 and 0ft AGL
Late Flap Configuration (1000 – 500 ft)	Landing flap selected between 1,000 and 500ft AGL
Late Flap Configuration (Below 500 ft)	Landing flap selected between 500 and 0ft AGL
Late Gear Configuration (1000 – 500 ft)	Landing gear selected between 1,000 and 500ft AGL
Late Gear Configuration (Below 500 ft)	Landing gear selected between 500 and 0ft AGL
Low Power on Approach (1000 - 500)	Low power between 1,000 and 500ft AGL
Low Power On Approach Below 500 ft	Low power between 500 and 0ft AGL
High Speed on Approach (1000 - 500)	Vref Deviation > 20kt between 1,000 and 500ft AGL
High Speed on Approach Below 500 ft	Vref Deviation > 20kt between 500 and 0ft AGL
Low Speed on Approach (1000 - 500)	Vref Deviation < -5kt between 1,000 and 500ft AGL
Low Speed on Approach Below 500 ft	Vref Deviation < -5kt between 500 and 0ft AGL
Excessive Tailwind on Landing	Tail Wind > 10kt
Go Around	Go Around executed below 3,000ft / 1,000 and 500ft
Hard Landing	Vertical Acceleration > 1.8g
Rejected Takeoff	RTO executed > 60kt

TCAS RA	TCAS RA when available in data frame
TCAS TA	TCAS TA when available in data frame
GPWS	All GPWS modes when available in data frame

5. Samples from FDX Web Portal

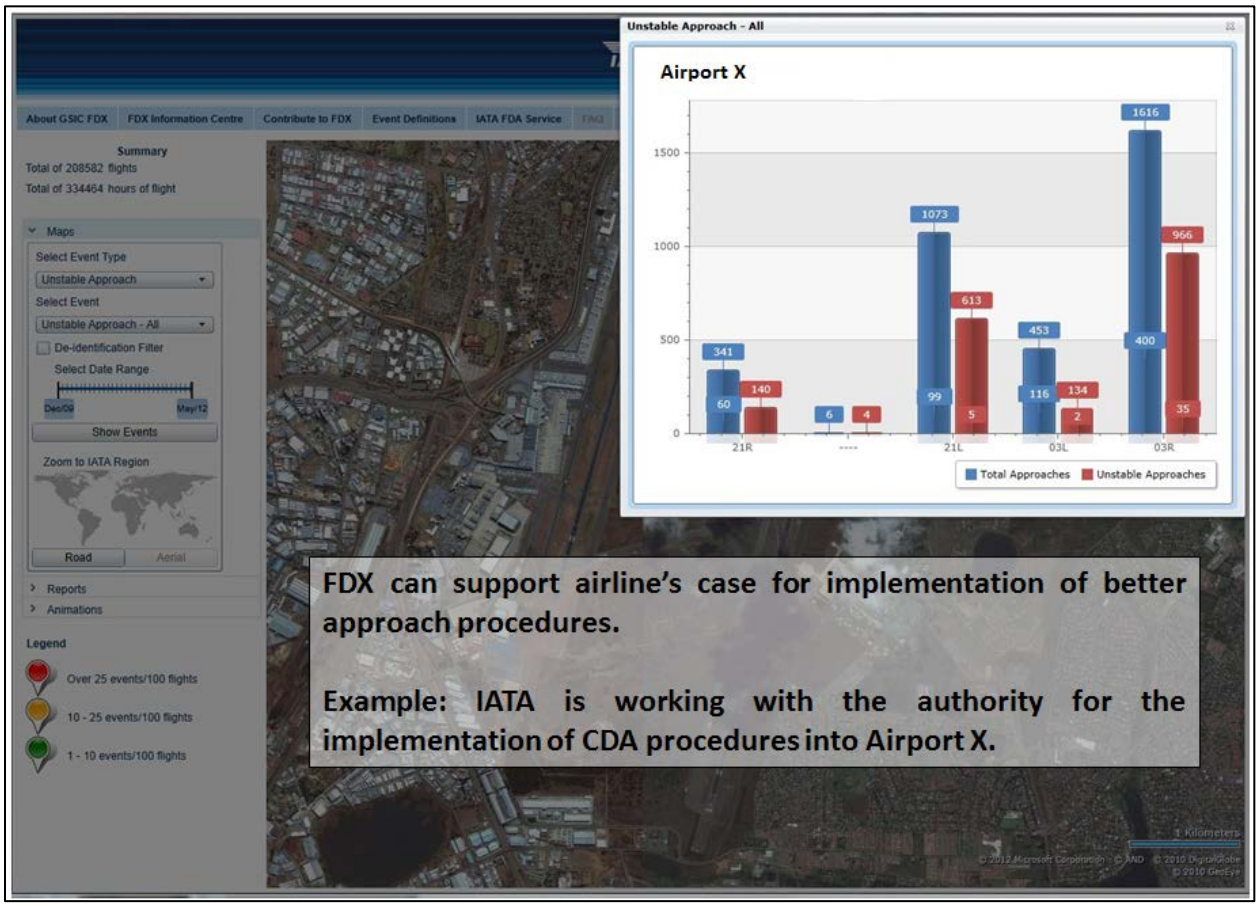
FDX information is available to users either through the IATA safety reports or through the web portal. The web portal uses google maps to show the distribution of events across the different locations as in the screenshot below:

To query a specific event type, the user would need to:

- Select the event type (for example: unstable approaches)
- Specify the date range
- Specify the region

Afterwards, the query results would show on the google map with the distribution of the event rates across the different airports. It is worth mentioning here that the user can only see airports with at least 3 airlines flying into them to ensure the de-identification of the data.

Queries can be also run per airport for the different event types as in the example below for Airport X. The screenshot illustrates the rate of unstable approaches compared to the total approaches per runway in that specific airport. Therefore, and upon analyzing this information, IATA has been working with the authority to implement CDA procedures into Airport X.



Furthermore, FDX has a Global Animation Archive where animations will be created during the course of the program. Contributing airlines can share and use these animations for training and safety awareness. Data is always de-identified. Below is a screenshot of an animation sample for GPWS events due to excessive rate of descend and low flap configuration near to the ground.


Animation
FROM ABOUT 300 FT AGL (0.6 DME) A SERIES OF GPWS WARNINGS OCCUR DUE TO EXCESSIVE RATE OF DESCENT AND LOW FLAP CONFIGURATION NEAR TO THE GROUND. SPEED IS STILL 60 KT ABOVE VREF. THE SPOILES ARE RETRACTED AT ABOUT 240FT AGL AND FULL FLAP IS SELECTED.
IATA
Flight Data Analysis Service
VREF DEV: 54 KT (VREF: 124 KT)
SEL SPD: 152 kt
VSI: -820 FT/MIN
DME: 0.4
HAA: 199 FT (AGL)
RECORDED TIME: 112873
GPWS - TOO LOW TERRAIN
FLAP HANDLE POS: 40
FLAP SURF POS: 18
Play
01:50 / 03:25

- END -