

# Electronic Flight Bag, the new standard

## Meet the deadline

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Microsoft Surface and EFB software in A350 XWB cockpit

For several years, the Electronic Flight Bag (EFB) has been bringing the most up-to-date technology into the cockpit. As it has become the standard way of operations, all Airbus operators must transfer to full EFB-based operation by the end of 2021. From 2022, Airbus will no longer be providing information for operators to deviate from this standard way.

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The EFB aims at replacing the on-board paper documentation by providing the flight crew with:

- Performance applications to compute the aircraft loadsheet and performance at take-off, cruise and landing
- An application to manage the Checklists and Procedures
- A browser to access flight operations documentation, e.g. Flight Crew Operating Manual (FCOM), Flight Crew Techniques Manual (FCTM), Minimum Equipment List (MEL)
- Mission data, e.g. flight plan, navigation charts, flight folder

## What will change for airlines

From 2022, airlines will rely on performance software to determine aircraft performance data during operation. This is why, at the end of 2021, Airbus will be removing all performance data from the operational documentation and will only provide information which supports/enables the use of an EFB.

## EFB across the Airbus Family

For the A380 and the A350, operations have been entirely based on the EFB since the first day of operations, providing the necessary information to the flight crew. The A350 and A380 have a laptop receiver, with a dedicated screen and interfaces to use the laptop.



A380 cockpit

Over the past years, Airbus has continuously enhanced the operational documentation (Flight Crew Operating Manual (FCOM), QRH, MMEL, ...) for the A320/A330/A340 Family aircraft and has adapted the Standard Operating Procedures (SOPs) to EFB-based operations.





A320 typical EFB installations

As a result, most operators have now successfully introduced the EFB on board the A320/A330/A340 Family fleet, with all the following advantages:

- Optimized aircraft performance determination
- Easy and efficient documentation management and consultation, with latest technology
- Reduced environmental impact due to flight optimisation and suppression of paper

As an intermediate step, at the end of 2020, Airbus removed all paper-based information, performance tables, graphs, and associated information from the Flight Crew Operating Manual (FCOM).

As a final step at the end of 2021, to fully establish EFB-based operations as standard on A320/A330/A340 Family aircraft, Airbus will review the QRH and MMEL to remove information associated with paper-based operations. In this way all the performance tables, as well as associated procedures for both normal and abnormal situations, will be removed.

**End 2020: Performance paper-based information removed from FCOM**

**End 2021: Performance paper-based information removed from QRH and MMEL.**

## Advantages of EFB

- Optimisation aircraft performance:  
Using performance software to compute aircraft performance is easier for pilots and enables quicker and more accurate results. It also provides performance with less conservatism for all flight phases. This allows for increased payload, increased FLEX temperatures and more accurate prediction, making the operation more efficient.
- Documentation administration:  
The use of digital data provides the following benefits:
  - When associated with a well-defined and efficient EFB administration process, the use of EFB increases flight safety by reducing the risk of performance calculation errors.
  - It avoids printing, manually updating and carrying paper manuals. This enables a faster and easier documentation update process.
  - Enriched documentation with colours, hyperlinks and interactivity makes it easier and more efficient to use.
- Generational aspect:  
More and more pilots are part of the digital native generation. They are used to manipulating smartphones and tablets from an early age. Along their learning path they will study and will be trained on light aircraft that are more and more connected and more and more equipped with integrated avionics. Having an EFB on board their commercial aircraft when starting their career will no longer be an option but standard for operating an aircraft.

Finally, as a global result, performance optimisation and less paper on board reduce the environmental footprint of aircraft operations, one of the most important challenges to consider for the 21st century.

## Working with operators and authorities

To help airlines implement EFB as standard operations, Airbus and Navblue\* specialists have been providing support to both National Aviation Authorities (NAA) for approval, and to operators for setting up their EFB operation. Airbus is also involved in industry and NAA initiatives for rule-making and regulation preparation.

\*Navblue: Airbus flight operations services and air traffic management subsidiary

## A little history on the digital story of Airbus cockpits

Since the early years of Airbus history, innovation has always been part of Airbus DNA. In the 1990s with the democratisation of personal computers, Airbus rapidly identified the opportunity offered by such devices to enhance flight operations and safety. It was becoming obvious that future cockpits would be paperless, given the powerful computation capacity of personal computers. With this paperless cockpit objective and supported by the worldwide growing environmental concerns, Airbus developed tools to reduce the use of paper on board.

EFB is not a recent story. It started in the nineties with the first performance computation application, the LPC: Less Paper in the Cockpit. The second major step was the A380, where EFB became standard and, by design, there is a dedicated screen on board to display the EFB information. From 2010, tablets and their flexibility challenged the laptops. Performance computation application became easily accessible. In 2015, with the A350, EFB was confirmed as the new standard for operations, with the portable EFB becoming the standard. In the meantime, more and more airlines were adopting EFB in their operations, moving away from paper.

In 2017, Airbus decided to upgrade its operating standard and developed the electronic QRH (eQRH). Since then, the whole field of flight operations has been supported by a software solution.

\* QRH Quick Reference Handbook - refer to [eQRH article - FAST 60 2017](#)

## Looking forward

The concept of Electronic Flight Bag is now part of the aircraft operation. EFB contains four main categories of information, each stored in separate applications: performance data, charts, mission information and documentation.

Airbus and its subsidiary Navblue are working on continuously enhancing the product in order to allow easier and smoother operation beyond management of documentation and computation of aircraft performance. Already today, thanks to wifi and 3G/4G, the EFB on-ground connectivity enables securely upload onto the EFB, the mission data such as computerised flight plan and weather. Where available, wifi connectivity allows the EFB to be used in flight for real time updates. And future connectivity between the EFB and avionics bay is being developed under a project called 'Connected FMS' (Flight Management System). Of course, as for all software development managed by Airbus, and moreover when connectivity with avionics is involved, security concerns are addressed at each stage of the development. The dedicated Airbus department, Aircraft Security, develops solutions to provide all the necessary levels of security.

The next project phase anticipates that as more information is digitised, the offering of apps will increase. To enhance the EFB, 'Mission+' will be available within a year, fully integrating all the apps, providing an

automated assistant for pilots in the dynamic environment of the cockpit to provide a seamless experience and save valuable time.

Finally at a future stage, Airbus considers transitioning from the EFB as we know it today to an electronic flight assistant for missions that will be fully connected with ground and FMS with the final objective of assisting pilots in their daily work, while enhancing efficiency and safety.



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