

Chapter 1

Cleared for Takeoff: Exploring Digital Assistants in Aviation

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ABSTRACT

Digital assistants work with the support of artificial intelligence-supported systems and automation technologies. Due to the conveniences provided by digital assistants, they provide great benefits in many areas such as ensuring flight control in aviation operations, air traffic management, pilot training, and facilitating passenger services. Errors in flight operations and passenger experiences are reduced to a minimum with features such as voice commands transmitted through virtual assistants, artificial intelligence-based guidance system and automatic warnings. This book chapter has been created to cover the development of digital assistants in aviation and their impact on practice, with particular emphasis on key subtopics. In the content of the book chapter, the application of digital assistants in flight operations and passenger experiences in the field of aviation and future projects are evaluated based on current literature.

INTRODUCTION

In today's world, many technologies can do much more than just create a communication and information flow for users. Developments in this field aim to create machines that mimic human interaction and emotional intelligence, to achieve rational, logic-based outcomes (Krakovsky, 2018). Artificial intelligence technologies are expected to play an exceedingly

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crucial role in the future of the aviation sector. Investments in artificial intelligence, which amounted to approximately \$340 million in 2019, are projected to reach \$3.7 billion by 2027, with a compound annual growth rate of 45.3%. This growth rate indicates a significant shift in the aviation industry due to digital transformation. The migration of business processes to digital platforms enables the development of systems that provide real-time information flow to personnel, facilitating the easy completion of challenging and complex tasks (Innova, 2023). Additionally, according to a report published by Precedence Research, the global artificial intelligence in the aviation market was estimated to be \$653.74 million in 2021. It is anticipated to exceed \$9,985.86 million by 2030, demonstrating a registered Compound Annual Growth Rate (CAGR) of 35.38% from 2022 to 2030 (Precedence Research, 2022). These figures indicate that the global AI in the aviation market is projected to experience a substantial increase in the forecast period, driven by the growing adoption of big data analytics within the aerospace industry.

Airlines are using AI-based machines to improve passenger services, route planning and predictive maintenance to gain an edge in today's competitive environment. For example, companies using chatbots or virtual assistants can provide real-time information and personalized travel recommendations to passengers. Artificial Intelligence (AI) systems, with their revolutionary applications, lead to the beginning of a new process in the aviation world, improving operational efficiency, safety, security and passenger satisfaction. Digital and smart machines perform operations that require human intelligence by using artificial intelligence, digital assistants and smart maintenance systems in aviation systems. Among the conveniences provided by artificial intelligence are features such as automation in aviation operations, optimization of decisions and foreseeing maintenance needs that may arise. With these conveniences, it is frequently used by aviation companies, airports and aircraft manufacturers. Aviation companies that want to gain an advantage in the competitive environment can interact with passengers through chatbots or virtual assistants and provide real-time information and personalized travel recommendations. Artificial Intelligence (AI) is ushering in a transformative era in the aviation industry; it increases operational efficiency, safety and passenger experiences. While virtual assistants facilitate passenger services and flight operations efficiency, artificial intelligence-supported systems improve safety protocols based

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