Chapter 3
Simulators as an Essential Tool for Shaping the Competence of the Aviation Personnel

Jarosław Kozuba
Silesian University of Technology, Poland

Aleksander Śładkowski
Silesian University of Technology, Poland

ABSTRACT
The implementation of the aviation tasks, including the preparatory ones, is a difficult, complex task requiring from the aviation personnel a high level of general, technical, and specialist knowledge and a wide range of skills, appropriate to the type of technical tools and systems being at the disposal of the aviation personnel as well as the complexity and difficulty of their tasks. Particular importance is currently attached to the development of training devices used in the basic training and in-service training of the aviation personnel. The authors have referred to the role of simulators in achieving the desired level of specialist competence by flight personnel, including, among others, such issues as aircraft simulators development, and their application in the aviation training; aircraft simulators classification in accordance with current aviation regulations; essential functions performed by aviation simulators; flight simulator is an essential tool for basic and in-service training of the aviation personnel.

INTRODUCTION
The results of the analyses conducted by the Author’s of the material clearly point out to the fact that irrespective of the the type of aviation, the aircraft, and its nationality, or the time period taken into consideration, it is the human being – the pilot, mechanic, air traffic controller – that is the underlying factor of almost 70% of undesirable flight-related events (Kozuba, 2011). Z. Błoszczyński, when considering the relationship between the human factor and the undesirable flight-related events, highlights the inadequacy of the actions taken by operators – pilots and other aviation personnel who closely connected with flights, their organization and safety – to the situation that occurred in a certain phase of

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flight. Such an inadequate action usually leads to an undesirable flight-related event. That situation oc-
curs when threats caused by factors independent from human control have not been removed, or reduced
to an acceptable level, despite the real possibilities of doing so. Every action is a result of a particular
decision and the related decision-making process. The factor which conditions the emergence of an
undesirable flight-related event is usually the occurrence of several consecutive errors in the system of
directing (management) an aviation organization, errors in handling the aircraft or in air traffic control,
and/or operational errors committed by the air crew. The causes of erroneous decisions made by the
pilot-operator are sought for at various stages of investigation whose aim is to discover them, taking into
account particular complexity of the aviation system and its environment. Therefore, when discussing the
causes of undesirable flight-related events, errors committed by the crew of the aircraft at various stages
of the decision-making and implementation process are generally regarded as the key factor resulting in
more or less serious consequences. Consequently, in the era when aviation technology is subject to
dynamic development, great importance is attached to the quality of flight training, regardless of whether
it is basic flight training or professional development training. Modern methods and tools used in the
training process are expected to allow for the preparation of highly qualified aviation personnel having
a high level of expertise and a broad range of skills which guarantee achieving the desired level of air
mission execution at an acceptable level, from the perspective of aviation safety.

Taking into account the wide range of the topic, the authors referred to the main subject of work from
the perspective of the pilot-operator of the aircraft. However, the reader should take into account the fact
that the advantages and disadvantages of the simulator presented in the material refer both to the simula-
tors used in the training of pilots, as well as those used in relation to the residual aviation personnel.

BACKGROUND: DOES MODERN AVIATION NEED SIMULATORS?

Tasks carried out by human in interaction with aviation technologies require the involvement of its basic
senses in order to obtain data and information. The relationship between data and information was inter-
restingly presented by Daft, who says that “Information is what changes and supports understanding,
while data is the input of a communication channel. The data is tangible and consists of numbers, words,
phone calls or computer printouts sent or received. Data will not become information unless people use
it to improve their understanding (Daft, 1992). Thus, the pilot to carry out his tasks in a particularly
complex and dynamically changing task environment needs information in the sense of a “product of
significant data processing” (Clare, 1987). On the other hand, the necessary condition for the process of
“significant data processing” is the level of competence (knowledge and skills) and experience presented
by the pilot-operator (Figure 1).

Figure 1. The process of data processing into information
Source: Own study
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