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BOOK REVIEW

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Aviation English (AE)

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BOOK REVIEW OF:

Estival D, Farris C, Molesworth B.
Aviation English: A Lingua Franca for Pilots and Air Traffic Controllers.
Bahía Blanca, Argentina: Routledge; 2016.

This book brings together three different perspectives to look into the phenomenon of Aviation English (AE). Linguistics, human factors and language testing are combined to focus on the importance of effective communication in the global aviation context, where both native and non-native English speakers are responsible for the success of air traffic controller-pilot interaction. To successfully provide an interdisciplinary approach to such a complex issue, this volume draws on the experience and research interests of its three authors.

The first one, Dominique Estival, is a linguist with a background in syntax and computational linguistics. Being also a licensed pilot and a flight instructor for both general and recreational aviation, her current area of research is aviation communication. The second author is Candace Farris, an applied linguist with a broad experience as an aviation consultant. Her research focuses on the interaction between controllers and pilots in radio communication as well as on the language testing policy in the aviation context. And the third author, Brett Molesworth, is a psychologist with an interest in human factors, such as fatigue, workload and noise that adversely affect pilots and cabin crew performance. Like Estival, he holds a commercial pilot license, and he has several joint publications with her about the influence of a second language on miscommunication.

Structured in eight chapters, this book explores the essence of AE through a balanced interplay of the authors to discuss the above mentioned topic areas: linguistics is dominant in Chapters 1 and 2; language testing is the main focus of Chapters 3 and 4; human factors are analyzed in Chapters 5 and 6; and the three areas converge in Chapters 7 and 8. In the preliminary pages, a list of relevant abbreviations is included for quick reference by both linguists and aviation experts.

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In Chapter 1, Estival and Candace make clear that the focus of the book is on communications between pilots and air traffic controllers (ATCs), particularly, on exchanges in AE, a purposely designed variety of English that is highly regulated. Firstly, they distinguish English as a *lingua franca* (ELF) from AE stating that ELF is an unstable variety that covers a much broader spectrum of contexts, situations and speakers than AE. At this point, the authors mention their adherence to an expanded view of *lingua franca* that includes both non-native and native speakers. According to this approach, ELF can also encompass native speakers when it is used functionally in intercultural communication, i.e. with a speaker of a different L1, rather than formally referring to native speaker rules (Hülmbauer, 2008:27). Therefore, AE is defined as a *lingua franca* and a relatively stable variety of English that even native speakers must learn for the specific purpose of communicating in the aviation environment. That is to say, being a native speaker of English does not imply proficiency in AE. Secondly, the authors give a brief account of how AE turned into the working language of aviation, from the time when military and maritime conventions were also applied in aeronautical communication until the rapid development of commercial aviation after World War II and the setting up of the International Civil Aviation Organization (ICAO). Thirdly, there is a section devoted to the importance of effective oral communication for aviation safety, which became evident after the accident in Tenerife, Canary Islands, in 1977. However, the authors point out that miscommunication is not the only factor leading to an aviation accident since, in most cases, communication failures are closely intertwined with contextual factors. To illustrate this, they shortly analyze the crash of Avianca 052 in Cove Deck, New York, another paradigmatic accident where the crew failed to communicate to ATC that they were in an emergency situation due to lack of fuel, which was the main cause of the disaster. Then, for readers who are not familiar with the topic, this chapter offers an overview of aviation language and language testing research, followed by some considerations about the three main factors that make AE unique among other Englishes for specific purposes, namely: the impact of technology, the limitations imposed by the operational environment, and the human factor. Finally, in a section of high interest to AE teachers, the authors expose the need to turn to 'plain English' in certain emergency or unusual situations when there is no phraseology available. They also underline the fact that 'plain English' in aviation is part of AE, which reflects the complexity of this variety of ESP.

The multidimensional concept of AE is further developed in Chapter 2, where Estival clearly differentiates AE from aviation communication, which involves language but also other forms of communication, such as light signals, navigation aids, codes for weather forecasts and weather reports. Then, the author highlights the specificity of AE as a restricted code that even native English speakers must learn not only because it is not easy for them to understand on first exposure, but also because they need to practice in order to attain proficiency. But this chapter's main contribution is definitely the linguistic description of AE it provides, from the pragmatic to the phonological level. Instead of offering a traditional characterization, the author analyzes an example of pilot-controller interaction in order to identify and explain several aspects. For instance, dialogues follow a prescribed sequence (pilot call, ATC response, pilot readback); syntax is reduced (only main clauses, no subject pronouns); prepositions are dominant (determiners, auxiliary and modal verbs are omitted); few adjectives and adverbs are included; and as regards pronunciation, each letter of the alphabet is pronounced as a specific word (Alpha, Bravo, Charlie, etc.) and some words in the phraseology are pronounced or stressed differently in order to avoid confusion, particularly numbers (e.g. five-fife; nine-niner).

In Chapter 3, Farris offers an effective overview of the origin and development of the ICAO language proficiency requirements (LPRs) along with some considerations about the issues and implications of their implementation. The contents of this chapter clearly serve the dual purpose of promoting reflection among experts in the field, while being informative to newcomers. Based on data obtained from major accidents, incident reports and testimonial evidence provided by ATCs and pilots, LPRs specify that English must be used as a *lingua franca* among speakers not sharing the same language and require proficient use of both ICAO phraseology and plain English. LPRs are delineated in *Annexes 1* (*Personnel Licensing*), *6* (*Operation of Aircraft*), *10* (*Aeronautical Communications*) and *11* (*Air Traffic Services*) of ICAO's Standards and Recommended Practices (SARPs) for air safety in civil aviation in both domestic and international contexts. In order to facilitate the implementation of the SARPs related to language proficiency, ICAO devised *Document 9835* (2004, revised in 2010). As Farris accurately emphasizes, a distinction must be made between the aspects of the LPRs included in the *Annexes* and the other contents of *Document 9835* because only the former are mandatory for member states, while the latter are recommendations

or guidance material. One of the major aspects included in *Annex 1* is the ICAO Language Proficiency Rating Scale, based on the following categories of language proficiency: pronunciation, structure, vocabulary, fluency, comprehension and interactions, and divided into six levels of performance: 1) Pre-elementary, 2) Elementary, 3) Pre-operational, 4) Operational, 5) Extended, and 6) Expert. Those pilots and controllers who are non-native speakers of English must achieve Operational Level 4 to obtain the license to operate. Consequently, this requirement poses several challenges for aviation professionals, authorities and regulators as regards language training and testing. As stated in *Document 9835*, LPRs also apply to native speakers, but no formal evaluation is required in SARPs' *Annex 1*, which may be rather controversial. Therefore, to shed some light on the role of native speakers the author summarizes the policies and practices of some English-speaking countries, such as Australia, Canada, the United Kingdom, and the United States, among others. This summary is surely helpful to recognize the differential treatment assigned to native and non-native speakers of English in relation to language proficiency assessment.

Chapter 4, also written by Farris, focuses on language testing. First, she gives an account of the origins and goals of the Aviation English Language Test Service (AELTS) initiated by ICAO to assess tests of AE submitted by test service providers. A team of experts in language testing, experts in the application of the ICAO rating scales, and subject matter experts (i.e. ATCs and/or pilots) evaluate tests based chiefly on Chapter 6 of *Document 9835*, entitled 'Language testing criteria for global harmonization'. Then follows a description of four tests of AE: ELPAC for air traffic controllers; RELTA for Pilots Heavy (instrument flight rules); Versant Aviation English test (VAET) and ELPAC Level 6. The first two are listening and speaking tests recognized by the AELTS. While ELPAC assesses levels 3, 4 or 5 of the ICAO rating scales, RELTA covers Levels 1 to 6. The VAET, developed by Pearson and targeted at pilots and ATCs, evaluates both standard phraseology and plain language. Delivered by phone or computer using semi-direct prompts, this test is surely innovative, as Farris remarks. But she also notes that it may be questionable because no human interaction is involved. The fourth one, ELPAC Level 6, is not currently recognized by AELTS. Also aimed at controllers and pilots, it assesses the interactional skills recommended for native or expert-level speakers. Farris summarizes the main features of the cited tests and observes that differences about who are tested (pilots, controllers or both), which standard phraseology or plain language is included, how closely real-life communications are reflected, or which levels of the ICAO scales are evaluated show diversity but also uncertainty about how to comply with ICAO LPRs. As regards the rating scales, some stakeholders argue that descriptors are not as specific as required in AE and may, in fact, contradict the communicative needs of pilots and ATCs. Moreover, the limited empirical evidence available may demand a revision of the LPRs and of the rating scales, in particular, in terms of their validity and usefulness. This problematic situation adds up to the political and economic factors underlying certification, such as the need to achieve political agreement among ICAO member states about the importance of investing money on English tests to assess and validate second language proficiency (Alderson, 2009:180).

Molesworth joins Farris in Chapter 5 to address pilot-controller communications, concentrating on commercial operations. Focusing on the challenging context where such operations take place, the authors begin by describing airspace classes, from strictly controlled Class A to uncontrolled Class G, depending on the different flight rules (instrument or visual) required and the type of information provided. Then, they offer a brief but detailed description of the many duties performed by controllers and pilots, which are mainly related to being aware of airspace organization and have a direct influence on communication between pilots and controllers. The following section presents the core content for language teaching and testing as it describes the challenges in controller-pilot communications in terms of linguistic understanding and production. For example, ATCs who are simultaneously handling a number of aircraft may issue a series of instructions at a time to a pilot which may prove to be too much information for a single message, mainly because the pilot is performing several tasks as well. Being overloaded, controllers may not detect possible errors in the pilot's readbacks. What makes the situation more problematic is the fact that controllers and pilots may not be acquainted with each other's work environment or demands because they rarely train together. Finally, the authors wisely include a review of empirical research into factors affecting controller-pilot communications, such as the impact of linguistic properties and message length on pilot comprehension and retention of controller messages (Barshi, 1997); the effects of speech rate and message length on performance (Barshi & Healy, 1998); the effect of language proficiency, message length and cognitive workload on readback and navigation accuracy, and speech production (Farris, 2007).

In line with the preceding description of the aviation setting, Chapter 6, by Molesworth, examines other contextual factors, also known as stressors, and their impact on aviation communication. As stated in previous studies on the topic, stressors can be either physical (noise, temperature, light) or psychological (interaction with another person) and they may potentially affect speech performance, which has critical safety implications in the aviation context. Therefore, the author highlights that if any, or a combination of these conditions occurs, without being properly managed, there is an increased probability of an unfortunate outcome. As an introduction, there are a few considerations about the definition of stress and its effects on cognition. Then, the author refers to noise, defined as unwanted sound, which inside the cabin of a commercial aircraft, even with hearing protection, may reach levels of at least 30 decibels louder than a typical office. In this respect, Molesworth explains that he employs the term 'non-meaningful noise' to refer to aircraft engine noise that has no recognizable speech sounds, bearing in mind that this noise may supply pilots with valuable information about the environment. Next, there is an illustrative summary of several studies carried out by different researchers to determine the effects of noise on cognition, perception, attention, auditory discrimination, memory and motivation. Other mentioned research explores the relation between noise and fatigue, between noise and individual differences such as age/sex and personality types such as introverts/extroverts, and between noise and language background. Concerning the last cited relation, Molesworth affirms that in-cabin aircraft noise entails special difficulties for non-native speakers, when the tasks they have to perform involve using recognition memory in a foreign language. As regards other stressors like thermal conditions and fatigue, the author draws on evidence from various studies indicating that excessive temperature produces temporary loss in auditory sensitivity and also that a person experiencing fatigue may mispronounce certain speech sounds thus affecting speaking and listening. In sum, by raising awareness of the hindering influence of stressors on communication performance, this chapter signals the relevance of active listening, even if this aspect is not developed as extensively as required for English teachers, who should help their students acquire the skill of listening "with all senses" in order to minimize misunderstandings or ambiguities derived from the effects of contextual factors.

In Chapter 7, the emphasis is on the challenges arising when both native (NES) and non-native (EL2) speakers of English communicate over the radio using AE in an operational environment. Estival and Molesworth offer a detailed description of a series of flight simulator experiments carried out to study the complex relations between language background, flying experience and four conditions under which communication is expected to be more difficult, namely (1) slow or fast rate of speech of ATC, (2) low or high amount of information transmitted by ATC, (3) low or high pilot workload, and (4) congested or non-congested radio frequency. The results of investigating the impact of the cited flight conditions on the communication accuracy of NES and EL2 pilots with varying flight training levels are particularly revealing of the difficulties experienced by both groups of pilots, hence opening the way to potential areas of training, which may also involve ATCs. For instance, it may be useful to make ATCs aware of the fact that including four or more information items in a radio transmission is detrimental to effective communication even for a qualified or native speaker pilot. Another interesting result that suggests the need for linguistic awareness programs is that AE training proves to be more important than the number of flight hours to achieve communication accuracy.

Co-written by the three authors, Chapter 8 presents the conclusions and lines of future research in the aviation communication field. Throughout the book, it was demonstrated that AE is a language variety that functions as a common working language between speakers of different native languages to be used for a specific purpose. The evidence provided by the authors indicates that this *lingua franca* has to be learned even by native English speakers, who are not exempt from making communication mistakes. About the ICAO LPRs and the associated rating scales, the authors consider that there is still much work to be done and they strongly recommend that training organizations and testing service providers use the guidance material of *Document 9835* when designing training and testing materials. In relation to the aviation environment, readers are shown that contextual factors such as noise, workload and fatigue have a negative impact on operational performance, including language understanding and production. Hence the importance of limiting message length and structuring readbacks and turn-taking in the interactions between pilots and controllers. Also, an interesting and, to some extent, unexpected result from the experiments including different flight scenarios suggests that improving the quality of language training is more effective than increasing the quantity of exposure for successful aviation communication. What this result implies, as readers are told, should not be minimized

by flight instructors and flight training organizations that generally assume communication improves with exposure. Lastly, the authors concur that attaining the goal of error-free or at least effective communication presents certain challenges that require further research: technological challenges (improving radio transmitters and microphones; hearing/listening devices; insulation of flight deck; etc.); operational challenges (studying the impact of noise, time pressure and workload on miscommunication, etc.); and individual challenges (improving language proficiency and being aware of fatigue, distractions, etc.).

In a simple and *straightforward style, including specific terminology, but not sounding too technical, the authors manage to emphasize the need for a lingua franca in aviation communication, and the difficulties involved. Given its relevant insights into the concept of AE and the variety of factors affecting the communication performance of pilots and controllers, either native or non-native English speakers, this book* is compelling reading not only for AE trainers and test developers, but also for aviation instructors and experts in aviation safety. Additionally, it is a valuable resource for researchers in the fields of ELF and ESP because as well as providing significant information to increase their understanding of the operative context, it opens several paths for further investigation. Moreover, extra reading on the most relevant topics is encouraged through a list of additional references included at the end of each chapter. This exceptionally well crafted book certainly demonstrates the significance of collaborative work and joint research to achieve the ultimate goal of aviation safety through effective communication.

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