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Operational Use of the English Language – ATM Safety around Europe

1 Introduction

Aviation represents a domain which arguably more than any other, requires world-wide standardized and harmonized regulations and practices.

As in other activities, common language and communication facilities represent the main means for exercising a job. But it seems that in no other industry is the use of language and communications more critical, and where misunderstandings in pilot-air traffic controller communication is so potentially disastrous, than in air traffic control.

A key mitigation in reducing aviation safety and operational problems is the use of **one** language in accordance with the agreed international standards and recommended practices related to the proficiency of the plain language and proper use of the aviation phraseology.

World common practice and operational and safety reasons have made English the Number One language in aviation, but not the only one. On the operational frequency it is not uncommon to hear two different languages, which could create a problem to those who do not know both of them. The need to have only one language on the operational frequency, when pilots and air traffic controllers communicate, creates a lot of issues among which the most important are: regulation, safety and efficiency but very often followed by historical and political discussions.

The data used in this article to identify language problems in Air Traffic Management (ATM) come from the EUROCONTROL Voluntary ATM Incident Reporting (EVAIR) scheme. EVAIR, which was established five years ago, is the first voluntary ATM incident data collection scheme to be organized on a pan-European level. ATM incidents are provided on a daily basis and are channeled through the Safety Management Systems (SMSs) of the airlines and Air Navigation Service Providers (ANSPs) who participate in the scheme. The data is analyzed by EVAIR experts who are licensed Air Traffic Controllers, pilots and engineers.

2 ATC Operations – Language Impact on Safety and Efficiency

The largest number of the EVAIR incidents come from pilots through the airlines' SMSs. Flying across the whole world every day, pilots have a clear perspective of the knowledge of English language in air traffic control (ATC). The Air Traffic Controllers (ATCOs), on the other hand, have a direct line to the different airlines and their pilots' knowledge of the English language.

EVAIR reports show that language problems are pan-European issues. In the EVAIR data base they fall within air-ground communication[1], which covers Operational (e.g. phraseology) and Spoken (e.g. plain language) communication.

EVAIR data shows that 14.5 % of all incidents have spoken or operational communication as one of the causal issues. The most frequent language problems are:

- Correct application of the ICAO (International Civil Aviation Organization) phraseology and proficiency in the plain English language when phraseology is not sufficient; and
- The use of two languages in a single environment and the problem of pilots' awareness of the traffic situation.

[1] According to the Harmonized European Incident Definitions Initiative for ATM (HEIDI) taxonomy air ground communication encompasses:
Operational communication, which covers Air-Ground and Ground-Ground communication, and Use of equipment verification testing. Air-Ground communication encompasses hearback omitted; pilots' readback; standard phraseology; message construction; radio telephony (R/T) monitoring including sector frequency monitoring and emergency frequency monitoring; handling of radio communication failure; and unlawful radio communications transmission. Ground-Ground communication refers to the standard phraseology; speech techniques; message construction; and standard use of equipment like radio frequency, telephones, intercoms, etc.
Spoken communication, which covers human/human communication encompassing Air-Ground and Ground-Ground communications, but also call sign confusion, noise interference and other spoken information provided in plain language. Air-ground communication refers to language/accent; situations not conveyed by pilots; pilots' breach of radio telephony (R/T); workload, misunderstanding/misinterpretation; and other pilot problems. Ground-ground communication refers to misunderstanding/ misinterpretation and poor/no coordination.

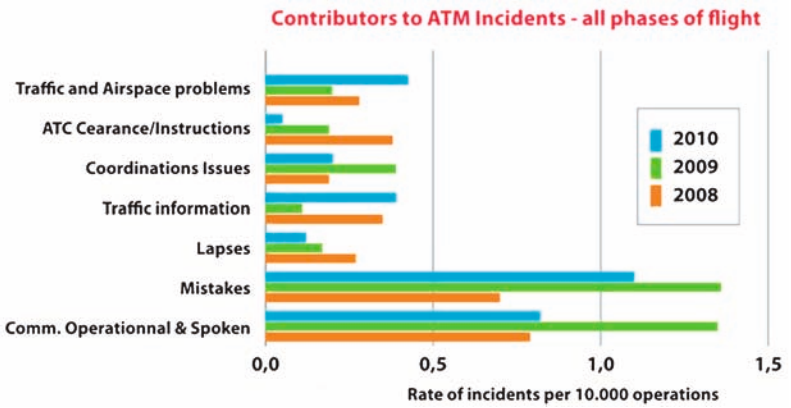

Figure 1: Contributors to incidents, 2008-2010 (EVAIR 2011)

The graph in *Figure 1* shows that through 2008-2010, Operational and Spoken Communication as well as 'Mistakes' were the main causes for incidents. The most frequent events that have language as one of the causes are: Level Bust, Call Sign Confusion, Go-around and Runway and Taxiway Incursion/Excursion.

Within the EVAIR database the areas with the highest number of reports are Standard Phraseology and Proficiency in English and (loss of) Situational awareness due to use of a language (usually the national one) other than English.

2.1 Correct Application of the ICAO Phraseology and Proficiency in a "Common" or Plain Language when Phraseology is not Sufficient

Correct application of the ICAO phraseology and proficiency in a "common" or plain language when phraseology is not sufficient is related to ATCOs and pilots. This does not, however, apply only to those whose mother tongue is not English but also to native-speakers of English. In general, the main problems for non-native speakers of English are a lack of knowledge in phraseology and in plain language, while for those to whom the English language is a mother tongue, the problems are the use of non-standard phraseology and the use of local terms and phrases.

Example: Short summary of an incident with language proficiency as the contributory factor

After take-off, the landing gear lever got stuck. In addition, an engine problem appeared. The pilot requested to be allowed to make a holding pattern due to technical problems. Quality of ATC radio telephone (R/T) communications and English proficiency was quite poor. R/T communication consumed half of the entire time required to solve the technical

problem! Assistance came from the company pilot on the jump seat, who spoke the local language.

2.2 The Use of Two Languages in a Single Environment and the Problem of Pilots' Awareness of the Traffic Situation

Pilots' situational awareness of the traffic situation and their active participation in traffic has a significant impact on air traffic safety and efficiency. The EVAIR data shows that the use of two languages in the same airspace is an everyday situation across Europe. It creates safety and air traffic efficiency problems. In such an environment, pilots cannot participate actively in managing the traffic scenario.

National regulation could contribute a lot by supporting the use of the English language as the sole language in aviation communication as the best safety and efficiency solution.

Example: Short summary of an incident with the use of two languages in a single environment and the problem of pilot's situational awareness

The incident occurred with three aircraft; one just landed, the second one was ready for take-off, and the third one was in the approach phase approaching the final. The communication with the landing aircraft was in the national non-English language. After landing the a/c stayed on the runway longer but that was not known to the non-national language speaking pilots. The departing traffic communicated with the ATC in English and got clearance for take-off, which was ATC's mistake. Due to lack of situational awareness, the pilot of the departing traffic accepted the clearance. Take-off was aborted at a speed of 60kts. The third a/c made a Go Around since there were two a/c on the runway. The pilot of the departing traffic stated that if he had been aware of the communication with the landing traffic he would have been in a position to warn ATC and correct the mistake. The use of the national language reduced general awareness and possible correction of the mistake.

3 Regulatory Issues

Two main regulatory issues have been identified through discussions with different Air Navigation Service Providers and airlines, and analysis of the ATM incident reports:

- Application of International Standards and Recommended Practices (SARPs) and improvement on the training field; and
- Status of the English language as the aviation language in national regulation.

3.1 Application of International Standards and Recommended Practices

It is generally acknowledged that, for a number of reasons – historical, cultural and political – the level of knowledge of English in the world varies considerably. In that regard the need to define a minimum proficiency in English language for aviation communication is recognized as being of great importance.

The main priorities, in that regard, should be the establishment of English as the common language for international aviation communication and the full application of ICAO standards for proficiency in English in pronunciation, structure, vocabulary, fluency, comprehension and interaction.

The percentage of incidents caused by language in the EVAIR database provides unambiguous support of the above statements and also of the necessity of English as the sole language for international aeronautical communication at airports and in the airspace designated for use by international air services.

3.2 Status of the English Language in National Regulation

Political and cultural reasons could create obstacles for the use of English as the single language in airspace designated for international use. In a number of states across the world, the use of English in aviation communication is not regulated by national regulation or if it is, then national language has the same priority as English. This is the origin of various problems.

As the best solution from a safety and efficiency point of view, Airline associations support practices in national policies to use the English language as the only one at airports and in the airspace designated for use by international air services. Unfortunately, at the moment it is not possible, in some areas, for political reasons which require further work, to improve the situation within the current circumstances and to make plans for the future. One of the possible solutions is that future pilots and air traffic controllers, as a precondition to participate in the selection process, should already possess a high level of English.

The practice shows that there are significant varieties amongst states in this respect. On the one hand, some states do have high standards regarding the knowledge of English as a prerequisite for applicants to enter the selection procedure. Usually this is a level of proficiency in spoken English. On the other hand, there are states which do not have any requirements or, if they do, it is knowledge of one foreign language, which may not necessarily be English.

There is a need for standardized requirements implemented in national regulation related to the applicants' knowledge of English as a condition to enter the selection procedure for pilots and air traffic controllers.

3.3 Maintaining and Upgrading the Knowledge of the English Language

Improvements in the training field, refresher courses and periodic checks could bring positive results and ensure an appropriate level of English language knowledge. Special attention should be paid to R/T phraseology but also to proficiency in plain language, as phraseology alone cannot satisfy all communication requirements. This should concern both those to whom English is a foreign language but also those to whom English is a mother tongue. Certainly the content of the courses for these two different categories should be different.

National regulations differ in various states with regard to maintaining and improving the knowledge of English. In some states refresher courses as well as continuous checks are required by national regulations while in others there are no more language checks or refresher courses after obtaining the initial license. In the current situation, more work and harmonization is needed.

The author works as a manager of the EVAIR (EUROCONTROL Voluntary ATM Incident Reporting) function.

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Markus Bieswanger

Applied Linguistics and Air Traffic Control: Focus on Language Awareness and Intercultural Communication

1 Introduction

Over the past half century, the scope of Applied Linguistics has broadened from its original focus on matters related to language teaching and learning to a "problem-oriented and problem-solving field" dealing "with the theoretical and empirical investigation of real world problems in which language and communication are a central issue" (Knapp/Antos 2007-2011: back cover; for a historical overview of the development of Applied Linguistics cf. Bieswanger 2007: 402-407). Along the same lines, Cook (2003: 20) defined Applied Linguistics as "the academic discipline concerned with the relation of knowledge about language and decision making in the real world." This means that many of the current issues and problems connected with real life communications between air traffic controllers (ATCs) and pilots are at the heart of contemporary Applied Linguistics. With respect to the use of English in aviation contexts (cf. Bieswanger/ Intemann forthcoming), aspects such as the development of unambiguous phraseology, the definition of proficiency levels as well as English language training and testing of controllers and pilots fall just as much within the scope of Applied Linguistics as do other relevant issues such as language variation and diversity, multilingualism, the use of English as a Lingua Franca, language awareness and intercultural communication. Due to space constraints, many of these areas can only be touched upon here. This paper will focus primarily on aspects of language awareness and intercultural communication in voice-based air traffic control communications and present observations based on authentic controller-pilot communications. All transcripts are based on audio recordings from JFK International Airport in New York, United States, taken from the archives of www.liveatc.net.

2 Language Awareness and Air Traffic Control

In the constitution of the *Association for Language Awareness*, language awareness is defined as "explicit knowledge about language, and conscious perception and sensitivity in language learning, language teaching and language use" (quoted in Garret/James 2000: 330). In the context of air traffic control, it is particularly conscious perception and sensitivity in language use that is instrumental in facilitating effective and efficient communication between ATCs and pilots from different linguistic backgrounds. This includes communication in English

between native speakers of different languages as well as communication between native speakers of different varieties of English.

When English-based controller-pilot communications fail in situations involving non-native speakers of English, native speakers and the media in countries of the so-called *inner circle* – i.e. countries where English is traditionally the primary language and the first or dominant language of the majority of the population (cf. Kachru 1985: 12) – are often quick to blame the allegedly inadequate command of the English language of a non-native speaker (see below). Indeed, insufficient English language proficiency has been identified by accident investigators as a contributing factor, leading to the loss of more than one thousand lives in several collisions and crashes (Mathews 2004a; cf. also Feldman 1998; Jones 2003: 237-239; Intemann 2008: 71). In response to these accidents, the 32nd Session of the ICAO Assembly in 1998 decided to address the matter of English language proficiency in aviation communications (ICAO 2010: vii), focusing on non-native speakers of English. As a result, the ICAO Council adopted amendments to *Annex 1: Personnel Licensing*, *Annex 6: Operation of Aircraft*, *Annex 10: Aeronautical Telecommunications*, *Annex 11: Air Traffic Services* and the *Procedures for Air Navigation Services: Air Traffic Management* on March 5, 2003, strengthening and extending English language proficiency requirements in international aviation and demanded their implementation by March 5, 2008 (cf., e.g., Mathews 2004b: 4; ICAO 2007a: 2). However, while gladly acknowledging the obvious need for the implementation of such proficiency requirements, it is certainly worth emphasizing that the lack of language awareness on the part of a number of controllers and pilots who are native speakers of English adversely affects effective and efficient controller-pilot communications as well. The examples of authentic interactions between ATCs and flight crews presented in the following subsections will illustrate this claim.

2.1 JFK Tower and Aerogal 700

In September 2010, an incident involving Aerolíneas Galápagos (AeroGal) flight 700 from Guayaquil, Ecuador, to JFK International Airport (JFK), United States, made headline news (ABC 7 New York 2010; Aviation Herald 2010, see also *Figure 1*).