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The Critical Components of Aviation English

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Abstract

Aviation safety depends on accurate pilot-controller dialogue. Both must be able to negotiate meaning through language at all times. Communicative competence in aviation English means that airmen have common and standardized proficiency levels in their use of the English language. This paper defines the critical components of aviation English as air traffic control (ATC) phraseology, English for Special Purposes (ESP) and English for General Purposes (EGP). The Aviation English Model is also introduced to serve as a framework for subsequent discussions on language issues as they relate to the global aviation context.

The Critical Components of Aviation English

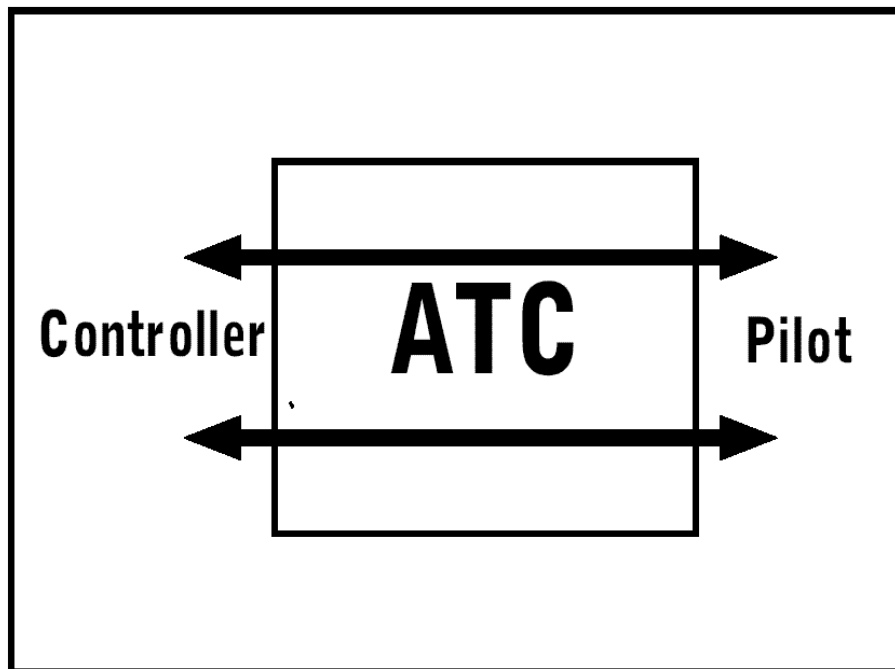
International air operations continue to increase in 2003 as industrial powers expand their customer base and emerging countries move aggressively into the marketplace. In the United States alone, according to the Wilber Smith Associates (as cited in Heimerman, 1997), the aviation industry contributes about five percent of the annual U.S. gross domestic product, and there are strong economic incentives to maintaining a safe and healthy civil aviation industry. Along with the increase in air commerce activity, there is the push to expand system capacity by increasing air traffic density. As the runways and airways get busier, the need to communicate ever more efficiently and accurately is also multiplied. The issue of efficient communication in the aviation context is complicated by the fact that the participants in the complex global system represent multiple ethnicities, languages, and cultures. According to Day (2002, p. 24), "Language is an imperfect medium for communication, but with awareness of basic linguistic principles, operating personnel can be motivated to adhere more closely to standard phraseology in all air-ground radio exchanges, thus enhancing safety."

It is now becoming common knowledge that pilots and air traffic controllers must be communicatively competent in English as a language, not just the specialized jargon used in air traffic control (ATC) communications. This new realization has caused an urgent need for English language proficiency standards both in domestic as well as global aviation. Since discussions about proficiency in aviation English will only intensify in the near future, it is important that all interested parties have a common understanding of the underlying terms and concepts that relate to the development of minimum proficiency standards in aviation English. This applies equally to native and nonnative English speakers.

This article will examine the role of the English language within the aviation context, particularly as it relates to the pilot-controller dialogue. Our goal is to explain the role and function of English in this dialogue. We will identify the three distinct areas of language use that, when taken together, form the basis of English proficiency for safe communications:

1. ATC phraseology
2. English for Specific Purposes (ESP)
3. English for General Purposes (EGP)

We will discuss the role of English as a lingua franca of today's business world and its implications on global aviation. Finally, we will offer a framework, a common frame of reference, for further explorations and discussions on language and aviation.



Air Traffic Control Phraseology

Figure 1

Air traffic control Phraseology

Background

The ATC is in existence to resolve conflicts between participating aircraft. Elaborate systems define procedures and the system works well. When pilots and air traffic controllers speak to one another in the professional context, it usually takes place in prescribed, coded language, called ATC phraseology (also known as radiotelephony) as shown in Figure 1. This phraseology is used routinely all over the world allowing pilots to fly across linguistic as well as national boundaries and still be understood by their foreign peers.

Nature of ATC Communications

Although differences between the International Civil Aviation Organization (ICAO) and the Federal Aviation Administration (FAA) phraseology do exist, the similarities far outweigh the discrepancies. It is important to note that the type of language which is supposed to be used in the ATC context is not tied to any particular culture or local variety of English. It is the mutually agreed upon and studied variety of language that uses English as its basic structure but focuses solely on communicative needs in aviation.

Another feature that separates ATC phraseology from general (also known as natural or plain) language is that the usage is standardized and non-idiomatic. All aircraft flying in controlled airspace adhere to certain standard procedures. These operations have accompanying standard phraseology, thereby allowing all the parties in the air and on the ground at any given time to stay informed about the progress of the flight. All the prescribed and predetermined expressions used in this context are self-contained and

limited to the set sanctioned by the appropriate aviation authority. The Air Traffic Controllers' Handbook, 7110.65 (Air Traffic Control Services, The Federal Aviation Administration), contains extensive listings of words, phrases, and sentences to be spoken in a myriad of situations. As the airspace is increasingly busy, there is little time for friendly chatter or conventional politeness and niceties, although they do occur.

Most veterans of the skies seem to be able to understand one another's intents with amazingly few miscommunications. As reported by Mell (<http://www.icao.int/anb/sg/pricesg/background/OotB.htm>), this communicative success is largely due to three factors: the use of internationally recognized phraseology, a restricted number of topics, and the predictable and repetitive nature of the communications.

The phrases used in the radiotelephony context are designed to make the communicative function between the ground and aircraft as concise and brief as possible, with the emphasis on accurate content as opposed to linguistic form. The brevity and conciseness of the communication is accomplished partly by using formulaic and predetermined sentence fragments as opposed to complete sentences. Typically, grammatical markers, such as determiners (the/a) and auxiliary verbs (be) are deleted, this feature making the ATC communications markedly different from natural language.

Example:

American Airlines flight 54, turn left heading 100, intercept the localizer and proceed inbound, cleared for the ILS approach to 13 Right, maintain 2,200 until established. Contact tower on 120.6 at NOLLA.

The beauty of the ATC communication is that all parties know what is expected of them in terms of their performance-related procedures, both technical and linguistic. Thus, those who undertake aviation studies with the goal of either flying or directing

traffic will memorize this standard phraseology in English, whether they speak the language as a native or not. However, air traffic communications outside the United States do not always take place in English.

Limitations of ATC Phraseology

Within national borders of other countries, when pilots and ground station personnel share the same language, the communication may take place in their native language. However, when pilots or controllers do not share the language of the ground station, both parties are expected to communicate in English using ATC phraseology. Using this practice, all information relayed between air traffic and the aircraft use language that is comprehensible to all those intimately involved in the operations. To further assure the safety and efficiency of international air operations, ICAO members in March of 2003 directly addressed the importance of this issue by elevating the use of English from a recommended practice to the standard practice (B. Day, personal communications, March 5, 2003).

One obvious challenge in pilot-controller dialogue for both native speakers and nonnative speakers is the memorization and mastery of the ATC phraseology. To improve communication between both groups, Mathews (2001, p. 26) observes that "the need for closer conformity to standard phraseology and for greater care in communication on the part of native and non-native speakers alike becomes readily apparent." The frequent use of informal language in place of standard phrases is an area of concern. This practice relates to personal usage of language rather than personal ability in language and requires discussion outside of the proficiency issue.

All novice airmen (in this context we mean pilots and air traffic controllers) begin at the same place, not knowing what the phrases are and how to use them. With practice,

they eventually become fluent in the use of ATC phraseology. The differences and limitations that ultimately emerge in a particular airman's ability to communicate correctly and efficiently with ATC can partially be attributed to frequency of practice and quantity of experience. Other factors such as timidity, fear, and anxiety can also have a negative effect on communicative success. The goal at all times is the proper use of ATC phraseology and that goal, excluding any unusual circumstances, is achievable.

English for Specific Purposes

Background

For pilots and controllers to successfully send and receive messages from one to the other, they are expected to use and understand their common, shared, and standardized medium of communication: the ATC phraseology. The already mentioned ATC Controller's Handbook covers, as Villaire (1994) notes, "almost every situation, instruction and communication request imaginable, and each paragraph is based on information bought and paid for by someone's disaster." Much memorization and recall is required to be able to produce the appropriate phrase each time.

Besides mastery of the phraseology, pilots and controllers also need an intimate understanding of their area of study with the related technical and practical applications. When pilots and air traffic controllers first embark on their respective studies, they enter a highly specialized and technical world with its own language, the ATC phraseology being a subset of the larger whole. Orr (2002) defines this language, ESP, as follows: "specific subsets of the English language that are required to carry out specific tasks for specific purposes" (p. 1). ESP consists of vocabulary and concepts which are "unfamiliar to most native and nonnative speakers and thus require special training"(Orr, 2002, p. 1).

In the following examples, common English words such as *base*, *three o'clock*, and *clear* have aviation-specific meanings:

Turn base now, follow traffic at your three o'clock, cleared for the option.

Remain clear of Class Charlie airspace, contact approach on one two three point six five.

For pilots and controllers to be successful in their careers, they must possess this type of specialized literacy. Their studies share many of the same topics and themes such as weather, emergency procedures, radio calls, etc. It is exactly this common core of shared knowledge that allows pilots and controllers to speak to one another; they understand the specialized world of flying each from their own perspective. They send messages to each other which are primarily related to their immediate situation, and they expect those messages to be received and understood as they were originally intended (see Figure 2).

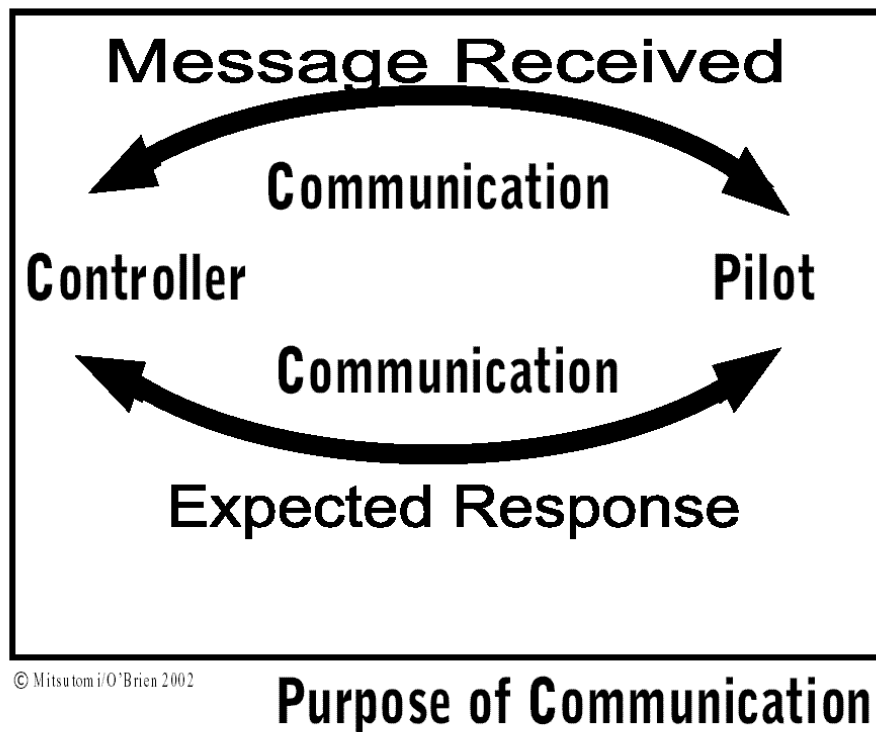


Figure 2

Nature of ESP

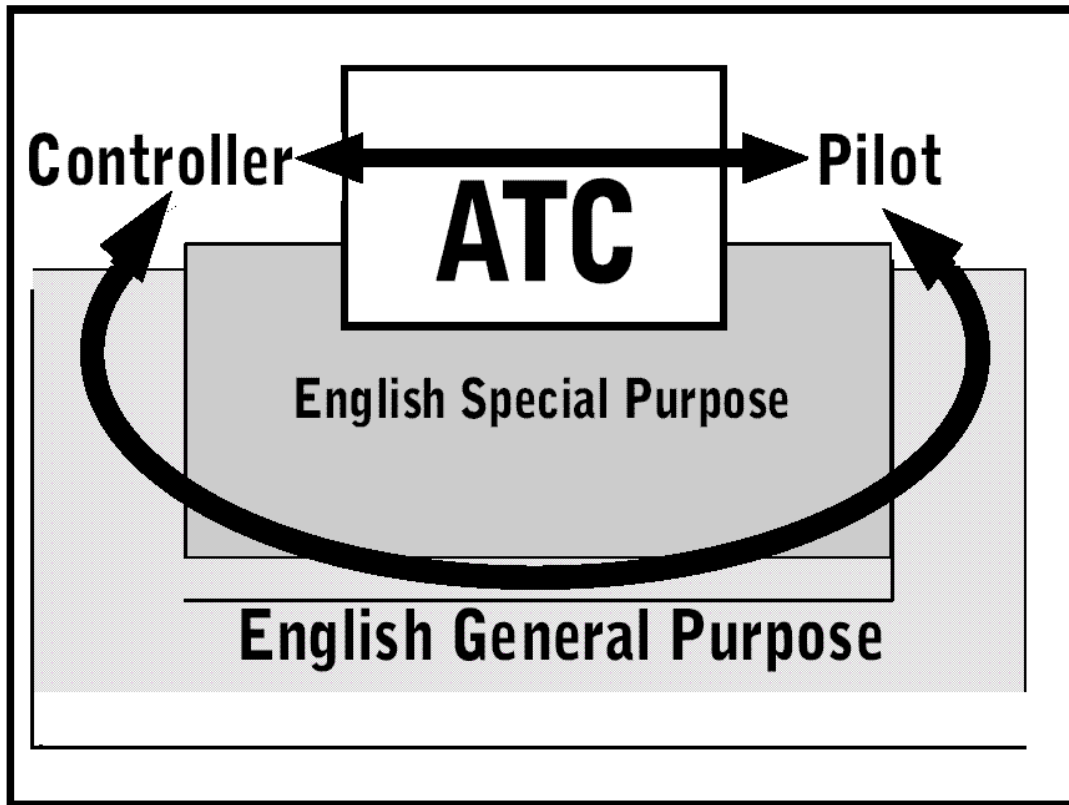
Like the ATC phraseology, the ESP component of aviation English does not exist in a vacuum. It is rooted in general language. It is the use of the English language itself that gives life to the specialty area. EGP carries the specialty language within its sentence structure, vocabulary, and paragraph organization. The ability to understand text (written or spoken) in a specific subject is referred to as content area literacy. Expertise in related fields and shared experiences make the communication between pilots and air traffic controllers contextually meaningful.

As with ATC phraseology, airmen must master the ESP jargon. All airmen begin at the same place with the goal of becoming fluent in its use through practice. Here again, some of the differences and limitations that ultimately emerge in a particular airman's ability to discuss topics related to the ESP can be partially linked to practice and experience. Excluding unusual circumstances, competency in the use of aviation-specific ESP is an achievable goal for most airmen.

However, it needs to be mentioned that the vast repertoires of linguistic and technical information place a heavy burden on the brain's capacity to handle several pieces of information at once. In discussing the role of controllers to keep aircraft separated from one another, Villaire (1994) warns that the issue of cognitive workload also comes into play. Although outside the scope of this study, cognitive workload must be factored into the entire equation.

When recall of discrete linguistic points (including the phrases themselves and the conventions controllers have agreed on) is added to the multifaceted list of tasks, successful communication becomes even more demanding. To avoid a "linguistic stall"

(Mitsutomi, 1999), the pilot-controller dialogue requires language readiness that goes beyond the current assumption that ATC phraseology is sufficient. It is not.



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Aviation English Model

Figure 3

English for General Purposes

Background

Aviation accidents have always fascinated the public, and flying is feared by thousands of people. For many years it has been recognized that communication problems are implicated in many aviation accidents and in runway incursions. One of the most dangerous places for aviators is on the ground. In 1977, the world was shocked by

the collision of two, new, giant Boeing 747 aircraft at Tenerife. A Pan Am 747 missed or misunderstood taxi instructions which required a turn off the active runway at taxiway three. At the same time, a KLM 747 initiated a fog-shrouded takeoff in the opposite direction. The two aircraft met on the active runway with the KLM at approximately 160 Knots. Five hundred eighty two (582) died in the crash.

O'Hare and Roscoe (1994) point out that although the vast majority of flights operate smoothly and without incident, misunderstandings between air traffic controllers and pilots, or between pilot to pilot, have played a major role in a number of accidents. A familiar example of ambiguity in communication is the instruction "takeoff power" issued by the pilot to initiate a missed approach procedure. In several cases this phrase has been interpreted by the first officer as an instruction to reduce (take off) power. Such misunderstandings have led to the replacement of this phrase by the potentially less ambiguous "go-around power."

In all of life, unusual and unexpected things happen and aviation is no exception. Emergencies crop up, inexperience causes havoc, and other unpredictable things occur routinely. This is when the pilot-controller communication is put to test. When working together using language, ATC or otherwise, they must be able to address the emerging situation quickly, accurately, and precisely. Recently, the aviation community, being influenced by cross-disciplined information, has turned its attention to language competency itself.

The ability to communicate when there is no prescribed script (ATC phraseology) is critical to safety. In practice this means that pilots and air traffic controllers must have the ability to achieve mutual understanding through the use of their general language

ability to get their messages heard and understood. As Figure 3 illustrates, this ability to negotiate meaning at all times is the key to communicative competence.

Communicative Functions of Aviation English

Examining the communicative functions in pilot-controller dialogue has revealed the following four categories to be the most dominant (J. Mell, personal communication, July 5, 2002):

1. Triggering actions
2. Sharing information
3. Managing the pilot-controller relationship
4. Managing the dialogue

As Mell explains it, the ability to trigger actions is at the core of the pilot-controller exchanges. Giving orders and requesting actions or permission to do something are speech acts that trigger specific responses. Information sharing, on the other hand, is related to one's intentions, actions, readiness, or availability of something, etc.

Relationship and dialogue management include greetings, complaints, paraphrases, checking for understanding or confirmation of information, etc. These actions need to be accomplished in pilot-controller dialogue.

Each category described by Mell contains all the pertinent ATC phrases which are always to be used first. However, when the situation so requires, general language (GL) in addition to the ATC phraseology must be accessible to the speaker as well. It is this issue of GL use that has been problematic in aviation contexts. Strict adherence to phraseology is always preferred, but situations arise for which there is no phrase or the phrase needs to be expanded upon with real-time information.

Proficiency in EGP

The problem with communication particularly in global aviation is that pilots' and air traffic controllers' ability to use general English varies considerably. Some can only parrot the memorized ATC phrases, other are comfortable functioning in English in any situation. This vast discrepancy in airmen's English ability is precisely the reason for concern especially of international flight crews. As a matter of fact, the capability of flight crews and controllers in the recommended common language, English, is an unexamined area. It is safe to assume that everyone in the cockpit and tower has mastered at least the basics of ATC communication as it is part of one's course of study. What cannot be assumed, however, is that these same people have basic conversational ability in general English since it has not been commonly regulated in many training facilities.

Recognizing then, even if reluctantly, the need for competency in general English to complement the use of ATC has been the driving force behind the ICAO PRICE (Proficiency Requirements in Common English) Study Group and the FAA PEC (Pilot English Competency) Working Group for the last few years. The task of these groups has been to define the minimum level of proficiency in English needed to communicate safely at all times. ICAO has pioneered the way by already describing this minimum level of proficiency that facilitates speaking and understanding English in usual and unusual aviation-related contexts. The scale applies to native and nonnative speakers of English. This ICAO scale is published and currently available to be viewed on the ICAO website. (For a brief description of one milestone study regarding setting English proficiency standards, refer to Chatham and Thomas, 2000).

The Aviation English Model

"Communicative competence specifically in aviation means that pilots, air traffic controllers, mechanics, and ground crews can exchange important information in mutually intelligible messages" (Mitsutomi and O'Brien, 2001, p. 4). For aviation communication to be successful, the following is assumed: mastery of professional jargon or phraseology, including standard situations and standard procedures. The ATC phraseology contains expressions for all of the above functions, and they work very well most of the time. But for those times when the ATC phraseology does not "do the job," the call is out to use general English (EGP) which, in the aviation context, will consist mostly of aviation-specific topics and vocabulary (ESP). Unlike ATC phraseology, general English is not tied to a prescribed code (as illustrated in Figure 3) but is flexible, allowing the speaker to manipulate it to get the desired message across. It also allows the speaker produce novel utterances that satisfy the communicative needs of the moment. In other words, general English facilitates thinking in English, outside of the "ATC box," and that can be the difference between life and death. Excluding unusual circumstances, competency in the use of EGP at the proficiency level specified in the ICAO scale is an achievable goal for most airmen.

The Role of the English Language in Global Aviation

Background

Within global aviation, pilots fly in and out of countries where the controllers speak English in distinctly different ways. The ICAO PRICE Study Group in its efforts to establish English proficiency guidelines for a very diversified membership has been keenly aware of the challenges created by the many varieties of English. The recently developed English proficiency description, therefore, in its very definition places the burden of successful communication on native (NSs) and nonnative (NNs) speakers alike.

The scale states that proficient speakers of English “use a dialect, accent or variety which is intelligible to an international community of English language users.”

It is of no small significance to note that the ICAO proficiency scale does not measure NNSs against NSs, using the latter group as the norm. As Mathews (2002) cautions, "The proficiency requirement and scale were developed with both native and nonnative speakers in mind and are applicable to both groups." It puts all English speakers in the same category of “English users,” requiring all to be careful and considerate users of the shared language. In the recent International Aviation English Association Seminar in Warsaw, Day (2002) noted that in the arena of international aviation, "English sheds all connection to political agendas, real or perceived, and becomes simply another tool for increased safety and efficiency of aviation operations."

English as the World's Lingua Franca

Indeed, there are many users of English today; according to some conservative estimates, approximately 1.6 billion use it to some extent daily (Geary, 1997; Fishman 1999). These English users can be divided into three major categories. Kachru (1988) in his groundbreaking work in the field of linguistics divided English use into three circles, ranging from the extended circle to the inner circle. He labeled native speakers of English as being in the inner circle, the “insiders” as it were, those with the original rights to English as their native language (for example, the United Kingdom, the United States, Australia). This group consists of approximately 400 million people. The outer circle includes countries where English has an official position, such as India, Nigeria, and the Philippines. The speakers of English in the outer circle use it as their second or third language. In many of the countries in the expanding circle, English has no official purpose nor is it the language typically spoken on the streets. Yet, the expanding circle is

the fastest growing of the three as it absorbs all those nations where English is being studied as a foreign language in addition to any other native or second languages. The list of the countries in the expanding circle is long, indeed, and includes small and large nations alike.

Native and Nonnative Speakers

English no longer belongs just to the native speakers. Nayar (1994, p. 4) questions to whom English belongs and concludes the following: “It is ours and everyone's: the English language is truly a world possession.” Because of the vast numbers of Englishes (established varieties of English) in the world today, many students of English are introduced to the major native speaker varieties but are not expected to adhere to any one of them as *the correct* variety. In fact, in many parts of the world, nonnative speakers of English never meet “authentic” native speakers of English but communicate solely with other NNSs whose accents may be distinctly different from their own. Incidentally, not all NSs of English understand one another always either. Not all varieties of English are mutually intelligible. It is not uncommon for native speakers of different varieties of English to experience difficulty understanding one another.

In order to communicate in English globally, the speakers of this same language must be aware of the major features of the other varieties. Accent is only one of those features although it may be the most salient one. Speakers of various varieties of English, native and nonnative, must also be willing to adjust their own speech so it becomes more understandable to those outside of their own community. The reality is that, “Communicating across cultures is no longer a goal; it’s a mere starting point” (Anthony, 2000, p. 4).

Since English usage in the world is so commonplace, the NSs can no longer dictate to the rest of the world how it is to be properly spoken. The rules of crosscultural communication must be defined by those who represent the various cultures, together forming an international community of English users.

World Englishes

Within the field of linguistics itself, identifying and analyzing the role of English in the world has been the major focus of a branch of linguistic study. Conceived and founded by Kachru some two decades ago, the premise of World Englishes (WE) is to recognize and examine all of the many native and nativized varieties of English as legitimate. Besides engaging in this analytical study, WE promotes the use of English as an International Language (EIL) serving as the medium for crosscultural communication.

The official recognition of a type of English that belongs to no particular group is an exciting development for the global aviation community. EIL is a generic form of general purpose English, if you will, which is capable of accommodating the many differences stemming from local cultures and varieties of speech, including accent. While independent from regional variations and peculiarities, EIL uses the basic structure of English syntax and lexicon to make communication among English speakers possible. Global aviation requires effective communication between all the participants. This is certainly a crucial consideration in an age where English, although not everywhere, is “just closer to being everywhere than any language in history” (Anthony, 2000, p. 7). It is certainly the language of the skies.

Conclusions

Regardless of current and yet-to-be invented technology, language will always remain central to communication between humans. The communicative context in

aviation requires pilots and air traffic controllers to send and receive messages primarily through the medium of ATC phraseology. There are times, however, when general language ability is necessary, times when the limited ATC phraseology fails to suffice the needs of the communicative situation. The ATC phraseology is useful but only in limited situations and lacks the dynamic energy of a “living” language.

Since aviation safety depends on accurate pilot-controller dialogue, both must be able to utilize all that language has to offer. In the ATC context, this means the ability to ask and answer questions, follow instructions, narrate events, describe situations, and paraphrase information; i.e., to be a full participant in a two-way dialogue. Pilots and controllers must be able to negotiate meaning through language at all times and under all circumstances. Communicative competence in aviation English means that airmen have common and standardized proficiency levels in the following three critical components: highly specialized ATC phraseology, ESP as it applies to aviation, and the foundational EGP. The three together form the linguistic safety cushion that will significantly enhance safe communications in the aviation context world-wide.

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Figure Captions

Figure 1. Air Traffic Control Phraseology

Assumption: ATC phraseology contains most, if not all, the phrases needed for standard routine aviation procedures. The phraseology is expected to suffice in most emergencies.

Figure 2. Purpose of Communication

Communication is the process of sending and receiving messages. Communication is successful when the sent and the received messages are similar enough to trigger the expected response.

Figure 3. Aviation English Model

ATC phraseology remains central to aviation communications. However, when the phraseology does not suffice, airmen will possess a standard of proficiency in the EGP that will be sufficient to communicate in all possible situations.