Aspects of oral Aeronautical English and its inherent communication problems within public air transportation

franz.rubenbauer@aero-lingo.com
University of Regensburg, Germany

Aspects of oral Aeronautical English

- Historical outline of AE
- Standardised transmitting techniques & phraseology
- Lexis
- Phonetics and phonology
- (Morpho-)Syntax
- Semantics
- Pragmatics

Historical outline

- English is **not** mandatory (international agreement)
- 1944 "Chicago Convention" → 96 articles
- 1947 International Civil Aviation Organization (ICAO)
- 1951 18 annexes to the articles: Annex 10: "…pending the development and adoption of a more suitable form of speech for universal use in aeronautical radiotelephony communications, the English language should be used as such…"

→ use of English is to be provisional

→ use of national languages still possible (respect sovereignty!)

→ use of English can be declined, but ICAO has to be informed

Preliminaries – Type of communication

- Oral communication as a strictly speaking-speaking relationship with no visual clues
- Only one person can talk at a time
- → *Clarity*, *intelligibility* and *efficiency*
- → Development of special transmitting techniques
- → Providing Standard ATC (Air Traffic Control) Phraseology
- → *Standard English* has been modified on many linguistic levels

Transmitting Techniques – Letters, Numbers, Read- & Hearbacks

- For Spelling letter codes: Alfa, Bravo, Charlie, Delta, Echo, Foxtrott, etc.
- Pronunciation of numbers: except whole hundreds numbers below 1000 are commonly transmitted by pronouncing each digit separately → reason: prevent possible confusion, e.g. *sixty* and *sixteen*
- Readback/ Hearback: The receipt of the messages affecting the aircraft's movement has to be acknowledged by pilots repeating the message verbatim. This *readback*, in turn, has to be rechecked in a so-called *hearback* by the appropriate controller, who acknowledges or corrects the *clearance read back*.

Readback / Hearback - Example

PAY ATTENTION TO PRONUNCIATION (UNDERLINED)!

[ATC gives instruction affecting the aircraft's movement]

- **ATC:** ***G-ATWS, descend and maintain 3500, turn right heading 290***

[pilot acknowledges repeating the message verbatim]

- **Pilot:** ***G-ATWS, descend and maintain 3500, turn right heading 280***

[*readback* has been rechecked in a silent *hearback* and the controller corrects the pilot]

- **ATC:** ***G-ATWS, negative, turn right heading 290***

[Pilot reads back correctly]

- **Pilot:** ***G-ATWS, turning right 290***

ATC Phraseology - Set of Phrases I

Words and Phrases + Meaning

- 1) ACKNOWLEDGE "Let me know that you have received and understood this message"
- **2) AFFIRM "Yes"**
- 3) APPROVED "Permission for proposed action granted"
- 4) BREAK BREAK "I hereby indicate the separation between messages transmitted to different aircraft in a very busy environment" (it means that the push-to-talk button is constantly being pushed)
- 5) CANCEL"Annul the previously transmitted clearance"
- 6) CHECK "Examine a system or a procedure (An answer is normally not expected)"
- 7) CLEARED "Authorized to proceed under the conditions specified"
- 8) CONFIRM "Have I correctly received the following/ did you correctly receive this message"
- 9) CONTACT "Establish radio contact with…"
- 10) CORRECT "That is correct"
- 11) CORRECTION "An error has been made in this transmission (or message indicated). The correct version is…"
- 12) DISREGARD" Consider that transmission as not sent"
- 13) GO AHEAD "Proceed with your message"
- 14) HOW DO YOU READ "What is the readability of my transmission?" (answered by "I read you…" followed by a number between 1 and 5, whereby 5 stands for "perfectly readable" and 1 for "unreadable")

ATC Phraseology - Set of Phrases II

- 15) I SAY AGAIN "I repeat for clarity or emphasis"
- 16) MONITOR "Listen out on (frequency)"
- **17) NEGATIVE "No/ permission not granted/ that is not correct"**
- 18) OVER "My transmission is ended and I expect a response from you"
- 19) OUT "This exchange of transmission is ended and no response is expected"
- 20) READ BACK "Repeat all, or the specified part, of this message back to me exactly as received"
- 21) RECLEARED "A change has been made to your last clearance and this new clearance supersedes your previous clearance or parts thereof"
- 22) REPORT "Pass me the following information"
- 23) REQUEST "I should like to know/ I wish to obtain"
- 24) ROGER "I have received all of your last transmission"
- 25) SAY AGAIN "Repeat all or the following part of your last transmission"
- 26) SPEAK SLOWER "Reduce your rate of speech"
- 27) SQUAWK "Switch transponder to the following setting"
- 28) STANDBY "Wait and I will call you"
- 29) VERIFY "Check and confirm with originator"
- 30) WILCO "I understood your message and will comply with it"(Short form for "will comply")
- 31) WORDS TWICE "As a request: Communication is difficult. Please send every word, or group of words twice. As information: Since communication is difficult, every word, or group of words, in this message will be sent twice."

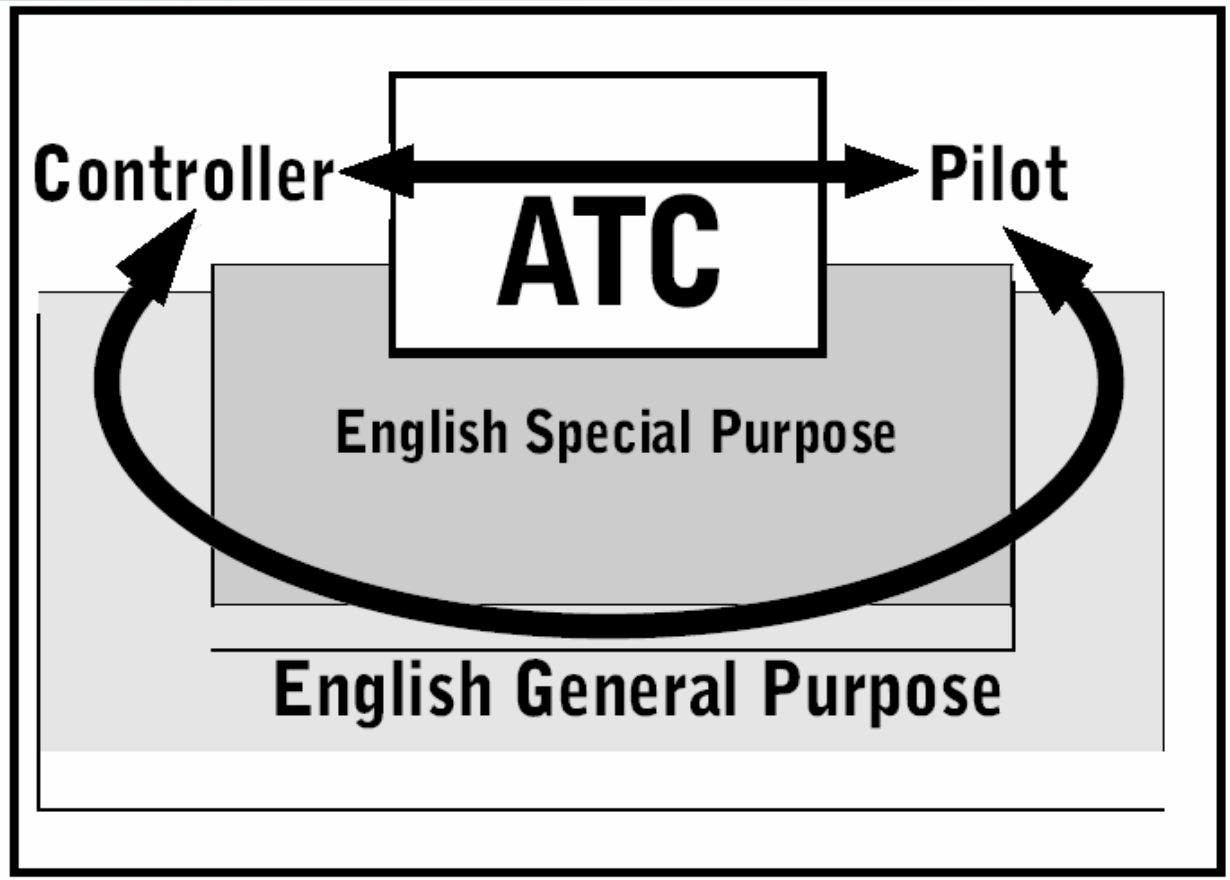
Criteria for selection

- Criteria for selection of words: *frequency* and *length*

→ As a rule frequently used and longer words can be understood with a greater background of noise

→ Compromise with *negation marker*: longer word "negative" (Nr. 17) vs. more frequently used "no" (reason: "no" is easily mistaken for "now") + *lexem* for *yes,* "affirmative" (Nr.2), was shortened to "affirm" (reason: not to be mixed up with "negative")

Lexis



Mitsutomi and O'Brien, 2003

Phonetics & Phonology

- Problem: two main types of distortion caused by noise: *clipping* (= elimination of certain frequency bands) and *masking* (= unwanted noise from the environment masks speech)
- Solution: modified pronunciation

→ <th> is realised as [t], i.e. <thousand> is pronounced as ['tauznd] and <three> as ['tri:]

→ <hundred> is pronounced like [hΛndrɪd]

→ <nine> is realised as [naɪner]

→ Reduction of *phonetic inventory* facilitates the application of *Aeronautical English* for speakers from all over the world

Linguistics & Flight Safety I

- Problem: (Near-) homophony & misleading intonation

Examples for (near-)homophony:

- During an approach for landing the encouraging *Cheer up* used by the captain was understood as "gear up" by the co-pilot

Example of ambiguous intonation:

- Captains *Back on – the power!* was perceived as Back on the power! → power was reduced instead of reapplying power
- Recommendation: normal, almost monotone intonation with no change of pitch is recommended

Syntax

- Simple, paratactic and mainly marked by elliptical expressions consisting of phrases
- Simplified pattern:

Imperative + to-infinitive + adverbial complement

"proceed to land Manchester"

- → Advantage: independently of word order the pragmatic content remains the same: "Manchester to land proceed" can be understood as "to land proceed Manchester" or "proceed Manchester to land"
- → Saving speaking time by introducing phrases with *explicit performative* verbs (e.g. *to clear* or *to request),* since it shortens the phrase + eliminates subordinate constructions

Morphosyntax

- Use of predicates in form of imperatives, progressives and infinitives, mainly set into the present tense
- No contractions of auxiliaries like “doesn’t”, “don’t”, “mustn’t”, “haven’t”, “aren’t”
- Use of nouns and nominalised forms without determiners *the/a*
- Avoidance of genitive constructions with apostrophe or preposition phrases, instead collocations, e.g. “runway heading”

Semantics

- Highly specialised vocabulary, reduced to one single meaning (*mono-referentiality*)
- Many shortened words/ abbreviations like *ATC* "air traffic control" and *CB* (meteorological abbreviation for *cumulonimbus/* thunderstorm cloud)
- → also for native speakers English aeronautical communication may remain cryptic
- → potential of misunderstandings also among native English speakers (e.g. BE *elevator*/ AE *(galley) lift* refers to the same concept in daily life ←→ in the aeronautical context *elevator* = control surface) → danger of *polysemy*

Airplane Parts - Elevator

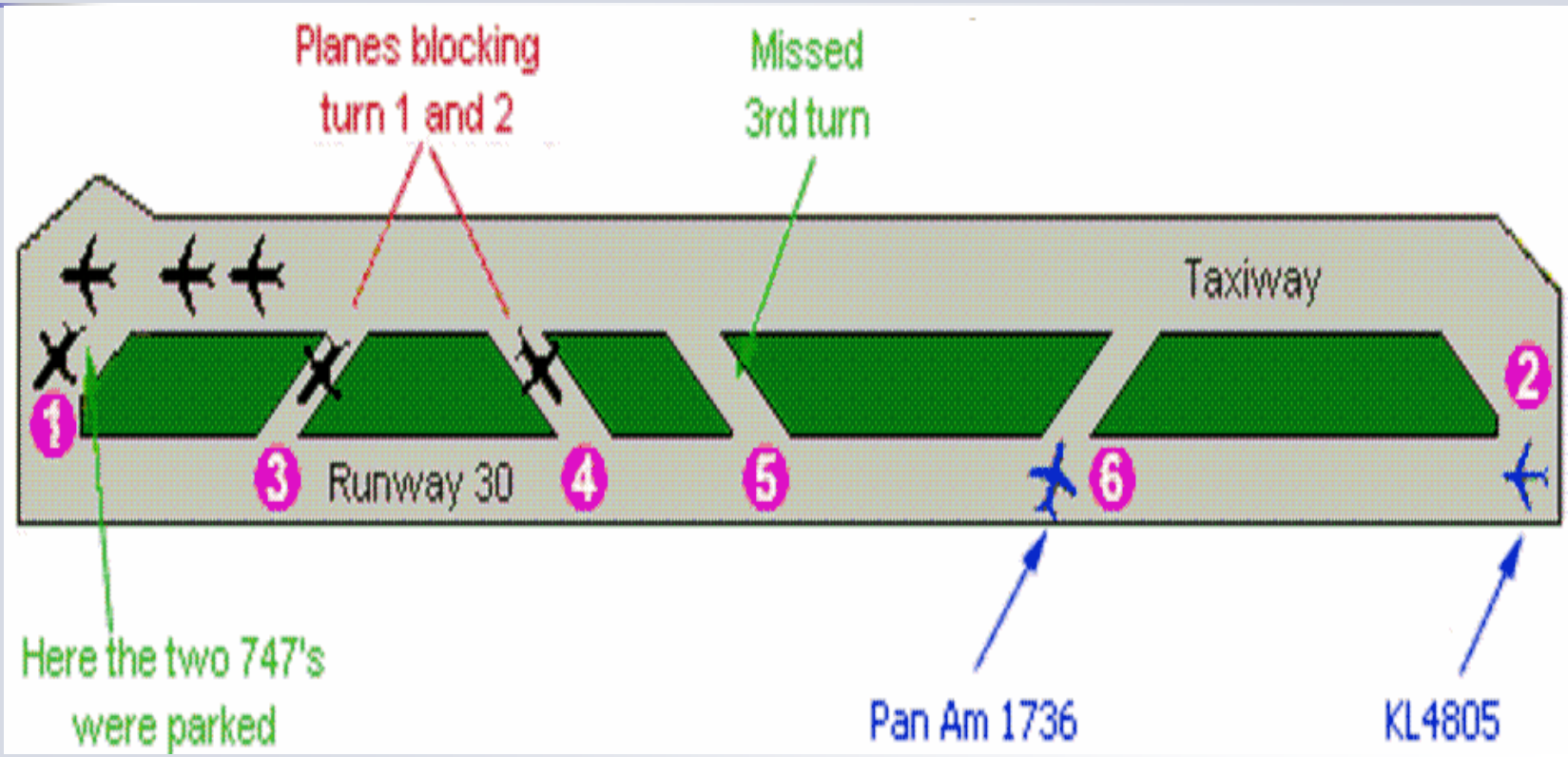
Linguistics & Flight Safety II

Tenerife disaster (1977):

KLM Boeing 747 "… we are now at takeoff." (position Nr. 2), tower:"OK…Stand by for takeoff. I will call you" → KLM plane was accelerating on the fogged runway and crashed into a Pan Am 747 (position Nr. 6) that was still taxiing back on the runway to reach a certain runway exit → 583 people were killed

- **Polysemy: meaning of *We are now at takeoff*: for KLM pilot "We are already on the take-off roll" vs. controller's interpretation "KLM plane is still waiting at the take-off point (beginning of the runway)". Unfortunately, because of radio interferences the Dutch pilots had only heard "O.K.", implying that they were cleared for take off.**

TENERIFE – LOS RODEOS (1977)



Several documentary movies on http://www.youtube.com/watch?v=nGhAfF8Wmn0

Pragmatics

- ***Illocutionary*** **speech acts for** ***clearances*****,** ***instructions*****,** ***confirmations*** **and** ***requests***
- **Standardised conversational structure: initiate - present – accept**
- **Advantages of standardised structure** ***Standard phraseology*****:**
  - → **minimising co-operative effort when taking turns**
  - → **messages are sequenced (Who? Where? What and why? →e.g. emergency message:**
  - → **helps improve intelligibility: gaps due to** ***clipping*** **and** ***masking*** **are filled in by the pilots based on previous experience and expectation of the phrases to come in a certain situation.**
  - → **<u>But</u>: danger of** ***wishful hearing***

Emergency Call – Structure

FOR MONITORING THE SAMPLE CLICK ON THE LOUDSPEAKER SYMBOL

- [1. Phrase "Mayday", repeated three times]
- **MAYDAY, MAYDAY, MAYDAY**
- [2. Name of radio station to be addressed]
- **BREMEN TOWER**
- [3. The call sign and type of the aircraft declaring an emergency]
- **D-ETRD (, e.g. CESSNA 172)**
- [4.Specification of the type of emergency]
- **ENGINE ON FIRE**
- [5.Intentions of the pilot]
- **WILL ATTEMPT TO LAND AT BREMEN**
- [6.What kind of help is needed?]
- **REQUEST PRIORITY LANDING**
- [7.Information on the aircraft's position, heading and altitude]
- **ONE NAUTCIAL MILE NORTH OF YOUR FIELD, HEADING 155, ALTITUDE 1500 FT**

Over & Out

- aero-lingo.com
- ENJOY YOUR FLIGHT HOME!