

Exploring an Aviation English Corpus: Equipping Professionals with Pedagogic and Lexicographic Skills

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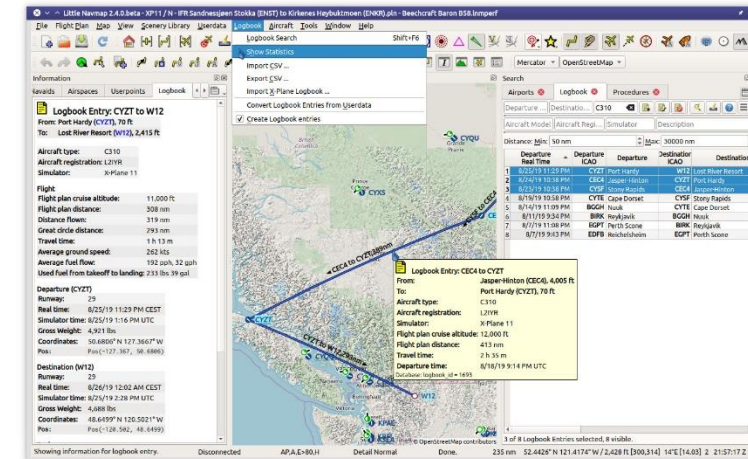
Aviation English and Corpus Linguistics

- To investigate patterns
- To analyze language beyond the common scope
- To contrast genres/registers
- To examine English used worldwide
- To develop materials and inform test design
- To enable students to discover language structures and patterns on their own (Friginal & Roberts, 2022)

(Pacheco et al., forthcoming; Prado et al., 2023)

The image shows a detailed aircraft flight and maintenance log for a Lion Air flight. The form is organized into several sections: flight details (airline, flight number, date, time), engine and fuel data, maintenance actions, and release information. The log is filled with handwritten entries and printed text, providing a comprehensive record of the flight and any maintenance performed.

JetAirways two three four // good morning // line up runway / whiskey one // you are number two / ready for departure //
 Line up runway / whiskey one // ... JetAirways two three four //
 JetAirways two three four / remain this frequency / runway <break> one eight center / cleared for takeoff //
 <unreadable> //
 JetAirways two three four / contact Departure // good bye //
 Contacting Departure / JetAirways two three four // Schiphol Departure / hello / JetAirways two three four / climbing five one
 thousand niner for six thousand feet //
 JetAirways two three four / ... / climb one three zero / ... two seven zero //
 Sir uh / cleared to climb level uh one three zero / <unreadable> //
 JetAirways two three four? //
 ... for two three four? //
 JetAirways two three four / colleague from the tower uh thought you had uh light tail strike on uh on rotation / the runway
 controller didn't see it any // so just to inform you //
 Okay / uh JetAirways two three four //
 <unreadable> <blocked transmissions>
 KLM three six five / ... climb level one three zero //
 <blocked transmissions>
 ... confirm we had a tail strike on uh rotation? //
 JetAirways two three four / just one colleague ... did see that but the runway controller didn't see //
 Okay //
 <blocked transmissions>



In textbooks

POSSIBILITY

Use *can* + infinitive to express possibility. (It is usually better than “it is possible to/that...”.)

Can expresses physical or technical possibility, capacity etc. For example:

The A320 *can* carry 172 passengers.

Coaxial cables *can* transmit numerous messages.

In the event of an engine failure, the remaining engine *can* power all the hydraulic systems through the PTU.

The APU *can* be started up to 25,000 feet.

PROBABILITY

May is used to indicate that an action or event could occur (happen). *Could* is also used.

In a technical context, this applies more to natural phenomena, unplanned technical incidents, failures, etc. For example:

In dense cloud, ice *may* form on the wings.

If there is a lot of traffic on arrival, the aircraft *may* have to hold before landing.

If the washer is perished (worn, old), the union *may* leak.

The assembly *may* be repaired before overhaul.

Hot oil *could* cause injury.

N.B. In everyday English, *can* and *may* are often interchangeable. In Simplified English, use only *can*.

NECESSITY

Must, *shall* and *have to* are commonly used to express necessity (Do not use: “It is necessary to/that”.) e.g.

If the tire is deflated the mechanic *must* remove it.

When open on the ground, the landing gear bay doors *shall* be safetied (locked by a safety pin or sleeve).

During refueling, fire fighting equipment *has to* be available (ready for use).

Non-approved lubricants *shall not* be used.

N.B. In technical and legal English, *shall* does not indicate the future, but an idea of necessity. *Shall* = *must*.

Shawcross, 1992: 93-4

Sarmiento (2008)

That information is correct; however, it does not fully represent the salient characteristics of aircraft manuals

Shawcross

- *can* is introduced in affirmative sentences only
- the meanings are of possibility and capacity
- simple subjects or noun phrases
- *can* is introduced in conditional sentences

Sarmiento's findings not present in Shawcross

- *you* (used in 60% of combinations with modal verbs)
- negative form
- negative semantic prosody
- WARNING / CAUTION

In textbooks

When a compound word/expression is in a text (e.g. the Maintenance Manual), the “key word” – the component – is the last word in the chain. The words before qualify the “key word” with more and more specific information:

LOCATION	SYSTEM/ FUNCTION	ASSEMBLY/ FUNCTION	SUB-ASSEMBLY	COMPONENT
<i>left</i>	<i>engine</i>	<i>mounting</i>	<i>bolt</i>	<i>washer</i>
<i>upper</i>	<i>rudder</i>	<i>servo</i>	<i>drive</i>	<i>rod</i>
<i>nose</i>	<i>gear</i>	<i>ground</i>	<i>safety</i>	<i>pin</i>

Remember that the “key word” is also the smallest item in the chain. The other words only help to identify it.

Shawcross (1992: 11)

Bocorny (2008)

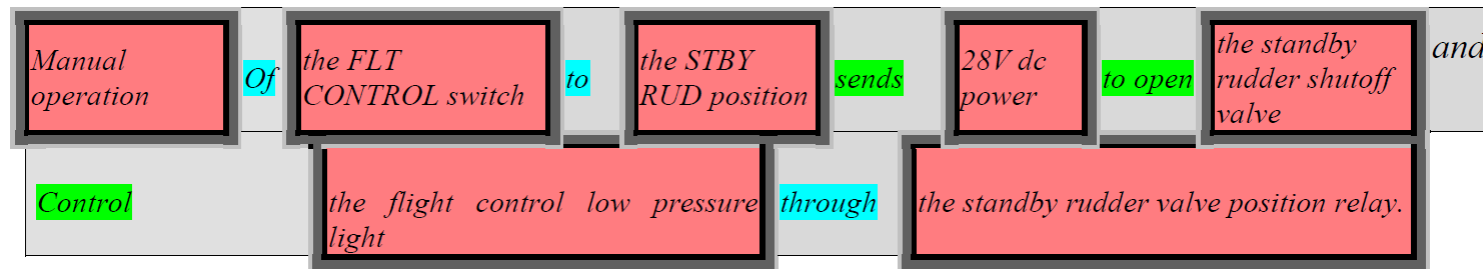
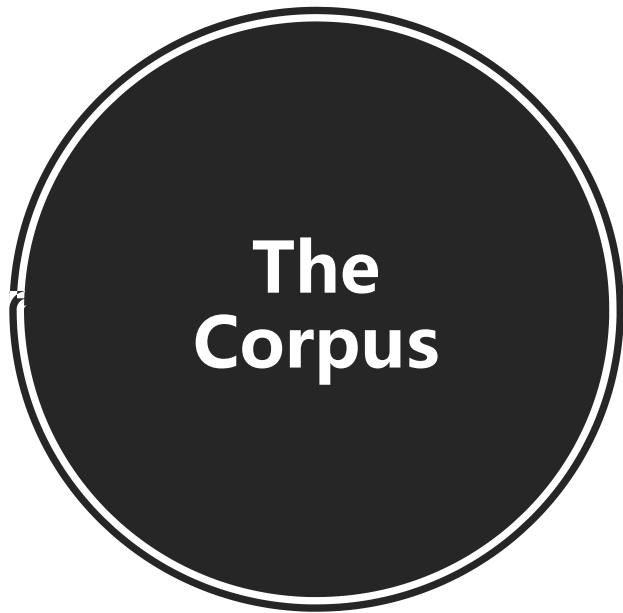


Figura 08: O texto especializado como uma PAREDE DE TIJOLOS.

Terenzi (forthcoming)

- Aircraft engineering students (not language students)
 - Corpora in her classroom material
 - DDL
 - Glossaries
 - Final year theses
-



The Corpus

Prado, Terenzi, Tosqui-Lucks,
Zhou (2023)

Sub-corpora	Text Type	Aircraft Type	# of texts	# of words	T/TR (%)		
English	Aircraft Maintenance Manuals	B737 AMM	43	33,947,536	0.17		
		B737 AOM	37				
		B737 SRM	8				
		B767 AMM	42				
		B767 AOM	70				
		B777 SRM	3				
		A319 AMM	69				
		A320 AMM	8				
		A320 SRM	1,194				
		A320 TSM	35				
		A330 AMM	37				
		E190 AMM	40				
		E190 AOM	472				
		MD11 AOM	47				
		MD11 Task cards	36				
		Cessna single engine AMM	1				
		Cessna jets AOM	26				
		Helicopter manuals	48			525,711	2.12
		Airworthiness Directives	61			183,297	2.42
		Aviation reports	Safety reports			30	992,113
Magazine articles	56		1,761,104	2.24			
Accident reports	352		2,260,878	1.17			
Handbooks (ab initio training/other kinds of aircraft)	9		1,095,723	1.81			

Sub-corpora	Text Type	Aircraft Type	# of texts	# of words	T/T R
Chinese	Aircraft Maintenance Manuals Flight operations	B787 MEL	1	7,656,680	1.98
		B737MAX MEL	1		
		B737 AMM	86		
		B737-6 Line maintenance manual	1		
		B737-8 Line maintenance manual	1		
		B737 AOM	167		
		A320 AOM	1		
		B737-NG Max FCTM	1		
		B737-8 QRH	1		
		B747 FCOM	1		
		B757 FCOM	1		
		B767 FCOM	1		
		B787 FCOM	1		
		A320 SOP	1		
		A330 FCTM	1		

Sub-corpora	Text Type	Aircraft Type	# of texts	# of words	T/T R
Brazilian Portuguese	Accident reports Aviation Agency Regulatory documents	CENIPA Relatórios finais	111	221,865	4.10
		ANAC Diretriz de aeronavegabilidade	458	347,369	2.48
	Portuguese- English documents	ANAC Diretriz de aeronavegabilidade /	414	342,665	2.15
		Airworthiness Directives	381	274,798	2.01
		Relatorios de acidentes /	8	68,231	7.96
		Accident reports	8	58,595	7.22
			4370	49,736, 565	

Different students, different needs

- Ground staff, maintenance personnel, flight dispatchers
 - Corporate aviation pilots
 - Tower, approach, sala AIS, meteorologists
 - Aviation college students
 - Flight school students
-

Yeah, well, but...

- Different initiatives
 - Difficult to find material available
 - We often talk about the importance of corpus, but where's the corpus?
-

Step 1/3: Select your tool.

List of Tools

- Concordancer
- Frequency Counters
- N-Gram Generator

Step 2/3: Corpus selection.

Select which one(s) you want to work on.

Language

- Portuguese
- English

List of Corpora

- | | | | |
|--|---|--|---|
| <input type="checkbox"/> Astronomia + | <input type="checkbox"/> Aviação + | <input type="checkbox"/> Café + | <input type="checkbox"/> Ciências da Saúde + |
| <input type="checkbox"/> Culinária + | <input type="checkbox"/> Direito + | <input type="checkbox"/> Esportes Olímpicos + | <input type="checkbox"/> Esportes Paralímpicos + |

#	Occurrence
1	N47BA to climb and maintain FL 260. N47BA acknow
2	N47BA to climb and maintain FL 390. At 0927:18 E
3	aircraft typically maintain a consistent environ
4	on. 2. Engine RPM - Maintain . 3. IN NORMAL OUT DE
5	d) - As required to maintain satisfactory pressur
6	et in an attempt to maintain cabin pressure. Diff
7	on system would not maintain a full pressure diff
8	the flight crew to maintain consciousness and th
9	iation?s failure to maintain pilot discrepancy re
10	1340 to descend and maintain 24,000 feet. At 0928
11	the flight crew to maintain an airspeed of 170 k
12	the flight crew to maintain a proper pitch attit

Frequency Table

[Download Table](#)

Position ↕	Word ↕	Frequency ↕
1	the	180169
2	and	60616
3	of	57473
4	to	51374
5	a	41736
6	that	34920
7	in	30689
8	cid	22861
9	was	20798
10	for	19961
11	on	18882
12	s	16079
13	flight	15290

Corpus in Portuguese

- We can explore the Portuguese corpus using the same tools
 - The texts are not translations; they were written in their original language (comparable corpus)
 - Technical terminology
 - Communication protocols (Peixoto, 2023)
-

Tabela 6 – Guia de traduções e explicações acerca dos termos *Aircraft*, *Airplane*, *Plane*, *jet*, *Jetliner*, *Airship*, *Aeroplane* e *Airliner*.

Termos	Tradutor (GOOGLE, 2019)	Dicionário Online (CAMBRIDGE, 2019)	Minidicionário Prático (MAIA, 2006)	Michaelis (MELHORAMENTOS, 2008)	Sugestão das autoras	Explicações
<i>Aeroplane</i>	Avião	Avião	Aeroplano avião	-	Avião	Inglês Britânico
<i>Aircraft</i>	Aeronaves	Avião	Avião aeronave	-	Aeronave	Termo técnico, usado como um termo geral (vários tipos de aeronave)
<i>Airliner</i>	Avião comercial	-	-	-	Avião de Carreira	Advém da palavra <i>airline</i> (empresa aérea)
<i>Airplane</i>	Avião	Avião	Aeroplano	Avião	Avião	Inglês Americano
<i>Airship</i>	Dirigível	Dirigível	-	Avião	Dirigível	Termo específico para esse tipo de aeronave
<i>Jet</i>	Jato	Avião a jato	Jato Cano de descarga Avião a jato	Jato Avião a jato	Jato (tipo de motor) Avião a jato	Pode denominar o tipo de motor (jato) ou o próprio avião (também jato)
<i>Jetliner</i>	Avião a jato	-	-	-	Avião de Carreira como motor tipo jato	<i>jet + airliner</i> , ou seja, o avião de carreira que possui motor do tipo jato
<i>Plane</i>	Avião	Avião plaina	Plano aeroplano	-	Avião	Termo informal que substitui <i>aeroplane</i> ou <i>airplane</i>

Work in small groups (5-6)

1

Background

Talk about your [learners'] needs.

Discuss ways to use the corpus.

5 min

2

Worksheet

Do the activities on the worksheet.

25 min

3

Share

Present your ideas to the whole group.

20 min



Some final thoughts

- Compiling a corpus is not an easy task, but it can be useful and productive.
 - Sharing material may have copyright issues or other implications; but working collaboratively on a corpus can help ease the burden (Tosqui-Lucks et al., in progress).
 - Corpora help us see features we wouldn't otherwise.
-

A final example (in case you're not fully convinced)

Students are exposed to the writing conventions of professionals in their own field, are given clear examples of lexico-syntactic features of various written reports and documents, and are able to focus on the nuances and skills that prepare them not only in writing, but more importantly, in reading genre-specific texts. What is clear from such publications is the need for successful collaborations between professors of various disciplines, corpus and applied linguists, and technical writing instructors in order to develop meaningful and effective corpus-based teaching materials

Friginal & Roberts, 2022: 143

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THANK YOU

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