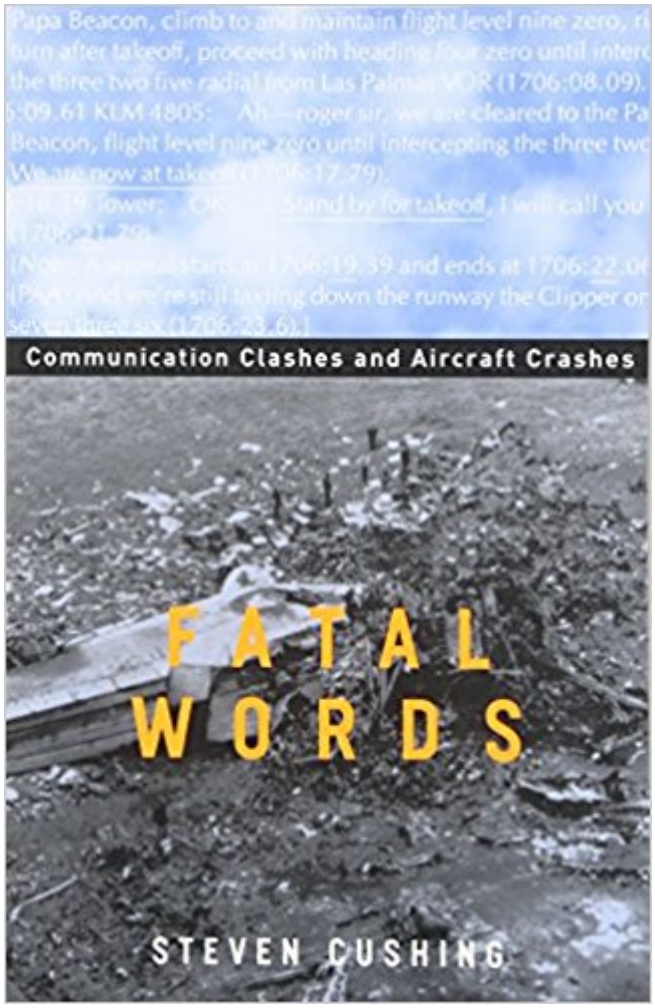
# Fatal Words: Communication Clashes And Aircraft Crashes



## Synopsis

On March 27, 1977, 583 people died when KLM and Pan Am 747s collided on a crowded, foggy runway in Tenerife, the Canary Islands. The cause, a miscommunication between the pilot and the air traffic controller. The pilot radioed, "We are now at takeoff," meaning that the plane was lifting off, but the tower controller misunderstood and thought the plane was waiting on the runway.In Fatal Words, Steven Cushing explains how miscommunication has led to dozens of aircraft disasters, and he proposes innovative solutions for preventing them. He examines ambiguities in language when aviation jargon and colloquial English are mixed, when a word is used that has different meanings, and when different words are used that sound alike. To remedy these problems, Cushing proposes a visual communication system and a computerized voice mechanism to help clear up confusing language.Fatal Words is an accessible explanation of some of the most notorious aircraft tragedies of our time, and it will appeal to scholars in communications, linguistics, and cognitive science, to aviation experts, and to general readers.

## Book Information

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## Customer Reviews

On March 27, 1977, 583 people died when KLM and Pan Am 747s collided on a crowded, foggy runway in Tenerife, the Canary Islands. The cause, a miscommunication between a pilot and an air traffic controller. The pilot radioed, "We are now at takeoff", meaning that the plane was lifting off, but the tower controller misunderstood and thought the plane was waiting on the runway. In Fatal Words, Steven Cushing explains how miscommunication has led to dozens of aircraft disasters, and

he proposes innovative solutions for preventing them. Cushing examines ambiguities in language and other causes of miscommunication between pilots and air traffic controllers. He looks at instances when a pilot or tower controller slips from technical aviation jargon into colloquial English, when a pilot inadvertently "tunes out" repeated instructions, when radios are misused, when a word is used that has different meanings, and when different words are used that sound alike. For example, he shows how a confusion involving to and two led to a fatal crash at a Southeast Asian airport. To remedy these problems Cushing proposes, for the short term, a visual communication system to supplement voice communication, one that would include a visual touchscreen interface. The technical details of a visual touchscreen prototype are included in an appendix. For the longer term, Cushing outlines an intelligent voice interface to filter conversations for potential confusions and provide real-time feedback to help clear up confusing language. Fatal Words is an accessible explanation of some of the most notorious aircraft tragedies of our time, and it will appeal to scholars in communications, linguistics, and cognitivescience, to aviation experts, and to general readers.

"Fatal Words" is a totally unique book, and it is impossible to pigeonhole. Is it a book on transformational grammar for linguists? Is it a book of miscommunications, and the resultant impact on aviation safety? Is it a book on computer programming? Actually, it’s all three. I bought the book to read from an air safety standpoint, given that I am an airline pilot. I found the book very interesting but very tough reading in parts, and occasionally a bit unfocused. The book is in three parts, plus a very long technical appendix. The first part concerns itself with language use, and includes many examples from not only NTSB Accident Reports, but from ASRS ’Callback’ (published by NASA) that were from incidents. Although I generally agree on all his points and would highly encourage all pilots and Air Traffic Controllers to heed his warnings (and to examine their speech for potential errors of the types Dr. Cushing points out) there are a couple of minor exceptions I take to statements he makes or assumptions he has about pilot-controller language use, particularly in reference to the word "hold" in the Air California gear up landing accident. Overall, though, it is a brilliant analysis. Part two is similar to part one in that it focuses on communication problems not related to language (numbers, radios, etc.). Both parts one and two are four chapters long per part. The analysis in part two is my favorite part of the book, and relates issues such as transposed digits, limitations of radios, the 10 versus 11 problem so common in altitude violations, etc. This is the part that has unparalleled insight into pilot-controller communications interactions and the foibles that can result. Every pilot and controller should read

part two.Part three deals with proposed solutions to the problem, and in this section he details a machine that can interpret language, check grammar, sentence structure, and meaning before allowing a message to be transmitted. He admits that this is a long time in the future, and proposes a short term data link system. I realize the machine he developed, while excellent research, is a prototype, but with all respect to the efforts of Dr. Cushing and his graduate students, I feel he may be barking up the wrong tree. The constructs of the machine are so complex, and the commands and menu options he envisions are so unwieldy that I can't imagine a machine that checks grammar and content of every transmission, and won't (at least to my understanding) let any non-database words pass its parser, being fast enough to keep up with the Air Traffic Control needs of Jackson, MS, much less LaGuardia at five in the afternoon. I am absolutely not closed minded on this subject, and am a huge proponent of CPDLC, which was in testing by American Airlines and Miami Center last year. I would love to see a revised edition of the book (it was published in 1994) with the latest technology added and the computer programs he developed to be updated and possibly integrated with CPDLC. The appendix is a very detailed (excruciating to a non-computer programmer) explanation of the constructs of his lab test system containing two computers that could converse with each other via the data link system and menus he developed. I read it, but only marginally grasped the material. The appendix information is best ignored by pilots and controllers, although it is probably very insightful to programmers and linguists.Overall it is the best book I have seen on the role of communications in aviation accidents, and I give it four stars for two reasons only: one, it diverges into a computer programming book in the last third of the text, which I had not expected given the summaries of the work I had read; and two, Dr. Cushing numbers every line of transcript throughout the book and then makes reference to that numbered line in the discussion. This is fine when the discussion is near the quotation, but often he refers to a line number that you read about fifty pages earlier instead of reprinting the quotation which makes the reader fumble back and forth looking for the line in question. This is an excellent work overall, just understand that it is technical reading and requires a basic understanding of 'aviation English' and grammar to fully comprehend the author's discussions and analyses. I eagerly look forward to reading more by Dr. Cushing in the future.

Great book - great price.

Great Book

This book provides very good insight into the flaws that surround the communication systems used for air traffic control sometimes aggrevated by pilots and controllers not abiding by strict aviation terminology. Also highlights errors due to language barrier difficulties between pilots and air traffic controllers. Very good entertainment and educational material for those interested in the subject! I have read this book before from a friend and ordering it from  to read again and keep!

The sub-title is a clue to the linguistic complexities covered. Cushing makes extensive reference to accident reports and NASA Aviation Safety Reporting System submissions by US pilots.Part 1 covers language based communication problems (i.e. ambiguities, uncertainties and inferences)Part 2 covers on-language based problems (e.g. numbers, radios, non-compliance etc)Part 3 focuses on a way forward based on computer program techniques

I’m sure this book is great, but it’s above my head. It’s too technical. I couldn’t get through it, so I re-sold it on eBay to a military air traffic controller who seemed to like it.

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