

In Plane English

A multi-media course comes to the aid of pilots and controllers who must meet new ICAO English language standards.

BY RICK DARBY

BOOKS

'Washing the Traffic'

Flightpath: Aviation English for Pilots and ATCOs

Shawcross, Philip. Cambridge, England: Cambridge University Press, 2011. 192 pp. Illustrations, student exercises. Includes three audio compact discs (CDs) and one DVD (digital video disc).

"**F**lightpath is intended to assist pilots and air traffic control officers [ATCOs] in reaching and maintaining a robust ICAO [International Civil Aviation Organization] Operational Level 4, keeping in mind that language proficiency is soon eroded over time and considerably reduced in stressful situations," Shawcross says.

The emphasis in English-language training for pilots has expanded beyond the ability to use standard phraseology in radiotelephony, although that remains a firm baseline. ICAO member state personnel are now required to meet at least Level 4, "operational," proficiency. Among the criteria for Level 4 are: "Responses are usually immediate, appropriate, and informative. [The speaker] initiates and maintains exchanges even when dealing with an unexpected turn of events. Deals adequately with apparent misunderstandings by checking, confirming or clarifying."

As the official international language of aviation, English sometimes poses formidable

problems for non-native speakers. *Webster's Third New International Dictionary* contains 450,000 words, and the revised *Oxford English Dictionary* offers 615,000 to choose from. No wonder English needs guides to synonyms such as *Roget's Thesaurus*.

"The richness of the English vocabulary, and the wealth of available synonyms, means that English speakers can often draw shades of distinction unavailable to non-English speakers," says Bill Bryson in *The Mother Tongue*. "The French, for instance, cannot distinguish between house and home, between mind and brain, between 'I wrote' and 'I have written.'"

But speakers of other languages can make distinctions or have concepts difficult to express in English, another possible barrier.

"A second commonly cited factor in setting English apart from other languages is its flexibility," Bryson says. "This is particularly true of word ordering, where English speakers can roam with considerable freedom between passive and active tenses. Not only can we say, 'I kicked the dog,' but also, 'The dog was kicked by me' — a construction that would be impossible in many other languages."

English is further notorious for pronunciation that is not necessarily correlated with spelling. George Bernard Shaw pointed out that *fish* could just as well be spelled *ghoti*, with the



gh from “enough,” the o from “women” and the ti from “nation.”

Non-native speakers can be excused if they feel at times that English kicks them, or that they are kicked by it.

Coming to their aid, Shawcross has taken advantage of audio, video and contemporary graphic design. The book is highly visual, featuring photographs, drawings, diagrams, maps and approach charts, with contrasting colors and shaded text boxes to aid comprehension.

It includes many exercises in which the student must answer questions, add appropriate words to incomplete sentences, describe what is shown in illustrations, practice conveying various kinds of information including equipment failures and emergencies, and check his or her progress. Some exercises involve listening to flight crew and controller transmissions recorded on the discs and answering questions based on them. Student partners may be asked to discuss scenarios or compare their responses.

Flightpath is logically organized: an introduction; Part A, “Hazards on the Ground”; Part B, “En Route”; and Part C, “Approach and Landing.” The parts themselves are subdivided into “units” — for example, Unit 4 is “Runway Incursions.”

Each unit, in turn, consists of “operational topics,” “communication functions” and “language content.” Thus, operational topics for runway incursions include “runway confusion,” “incident precursors” and “taxiing best practices.” Communication functions include “call signs,” “failure to seek confirmation” and “conditional clearances.” Topics in language content include “safety vocabulary and synonyms,” “taking notes” and “pronunciation, phrasing and fluency.”

The CDs and DVD are essential parts of the training methodology and offer a rich source of scenarios for the student to work with. The recorded voices include a considerable variety of accents, conveying the flavor of differing pronunciations pilots will encounter on international flights and ATCOs will hear from pilots.

The following is an exercise in which an ATCO must respond to a pilot’s misunderstanding, as indicated by his readback. Neither the controller nor the pilot speaks “the Queen’s English” or its American equivalent; their pronunciation indicates that they are non-native-English speakers.

ATCO. “Delta three five seven, descend to altitude nine thousand feet, QNH [altimeter setting in hectopascals for height above sea level] one zero one seven.” The controller pronounces “altitude” very much like “attitude.”

Pilot. “Descend to altitude five thousand feet, Delta three five seven.”

The student who is playing the ATCO role must correct the pilot’s mistake. The text gives a suggested response:

ATCO. “Delta three five seven, negative: Descend to altitude niner thousand feet. I say again, altitude niner thousand feet.”

Other recorded voices illustrate mispronunciations of English words. A controller says, “I am washing the traffic on my screen.” A pilot informs the hearer that “we have a well that needs changing on our right main gear.” “The purser has asked for more eyes,” says a flight attendant.

Such errors may be amusing, but in the fast-changing, intense operational world they can lead to incomprehension or waste time as the mystery is cleared up. “There is a rich of hills ... to the east of the field” will probably be understood in context as “a ridge of hills,” but at the cost of a moment to figure it out. Sometimes that moment is needed to pay attention to other cues.

Many of the world’s languages do not have the *th* sound often found in English words. In French — where the letter combination is rare and occurs mostly in names — and German, *th* is pronounced simply *t*.

In the relevant exercise, the student listens to the spoken sentences and is asked to “cross out the word you hear, and circle the word which is intended.” For instance, “well” would be crossed out, “wheel” circled.

Runway excursions, which in a 14-year study period far outnumbered runway incursions and

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resulted in more fatalities, are covered in Unit 8, “Approach and Landing Incidents.” More than three-fourths of runway excursions occurred during landing.

Students are given a list of 16 factors involving landing — for example, “failure to select the appropriate runway based on the wind”; “poor crew resource management”; “late runway changes”; and “incorrect or obscured runway markings.” Students are asked to determine which factors relate to controllers, which to pilots and which to airports. Then, in a group, they discuss the question, “What do you think is the most immediate solution to these conditions?”

As in many of the exercises in all units, role playing helps learners practice correctly relaying information they have been given.

Ground crew to ATCO. “The surface of Runway zero niner left is contaminated.”

ATCO to pilot. “Airport Maintenance says that the surface of Runway zero niner left is contaminated.”

Pilot to ATCO. “Braking action is very poor on Runway two three right.”

ATCO to pilot of aircraft on approach. “The last flight to land reported breaking action was very poor on Runway two three right.”

The DVD consists of training and awareness videos sourced from Air New Zealand, Eurocontrol, Transport Canada and others. Although not specifically focused on aviation English, they feature re-creations of incidents in which spoken communication played a role, such as altitude deviations, call sign confusion and runway incursions.

In one re-enactment, the flight crew of an Air New Zealand airliner is flying the approach to the destination — apparently on a Pacific island — and to all appearances, everything is correct. The autopilot has captured the instrument landing system glideslope and localizer.

All three pilots sense that something is wrong, however, and their concerns increase when lights of a nearby island come into view,

closer than they should be. A check of the distance measuring equipment reveals that it is not reconciled with the altitude. The pilots unanimously opt for a go-around, climb the aircraft and eventually conduct a landing using an alternative navigation aid.

The narrator points out all the error defenses that had been breached for various technical and human factors reasons. One final defense still worked — the crew’s situational awareness, along with their timely communication. Their readily understood interaction probably played a role in the successful outcome.

REPORTS

Catching Rays

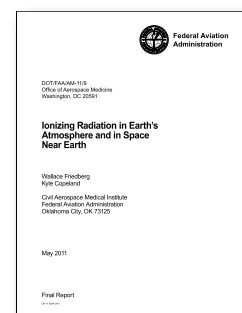
Ionizing Radiation in Earth’s Atmosphere and in Space Near Earth

Friedberg, Wallace; Copeland, Kyle. U.S. Federal Aviation Administration (FAA) Civil Aerospace Medical Institute. DOT/FAA/AM-11/09. May 2011. 28 pp. Tables, figures, references. Available via the Internet at <www.faa.gov/library/reports/medical/oamtechreports/2010s/2011>.

Ionizing radiation is a hazard to aviation and space travel. The report defines ionizing radiation as “a subatomic particle or photon sufficiently energetic to directly or indirectly eject an orbital electron from an atom.”

It explains: “Living material consists of molecules composed of atoms held together by electron bonds. Ejection of orbital electrons can break the bonds that combine atoms as molecules. Particularly harmful to a biological system is the breakup of molecules of deoxyribonucleic acid (DNA).

“DNA carries information required for the function and reproduction of an organism. Improper repair of DNA damaged by ionizing radiation or by free radicals produced by ionizing radiation may lead to cancer. Free radicals are also believed to have a role in the etiology of atherosclerosis, rheumatoid arthritis, and other diseases. A free radical is an electrically neutral atom or molecule containing one or more unpaired electrons in the valence shell, and this makes it very reactive. Ionizing radiation



particles produce free radicals when they react with the water in cells and with some cellular components.”

Ionizing radiation can stem from outer-space sources such as exploding stars — called supernovae — and the sun. Air travel also is subject to ionizing radiation from radioactive cargo, radioactive substances released into the atmosphere by a nuclear reactor accident, lightning and other causes.

The report describes the state of research on the health effects of ionizing radiation. The effects are of two types, deterministic — also called non-stochastic effects or tissue reactions — and stochastic.

“Harm from ionizing radiation is called *deterministic* if the harm increases with radiation dose above a threshold dose,” the report says. “The threshold dose is the dose below which no harm is observed, or the harm is not clinically significant. For most deterministic effects from low-LET [linear energy transfer, a measure of its power] radiation, the threshold dose is higher if the exposure time required to reach the dose is more than a few hours. Deterministic effects can occur soon (sometimes minutes) after radiation exposure if the dose is sufficiently high and delivered at a high rate.”

A table in the report describes deterministic effects from various doses of ionizing radiation released in less than one day. At 0.15 Gray equivalent (Gy-Eq, the measurement unit for deterministic effects), the radiation can produce “temporary sterility in males”; by 2.4 Gy-Eq, “mild headache in about 50 percent. Almost constant nausea and vomiting in 70–90 percent”; at 4 Gy-Eq, “about 50 percent die within 60 days”; above 8, never mind, you’re finished.

“Harm from ionizing radiation is called a *stochastic effect* ... if the probability (risk), but not the severity of the effect, is a function of the effective dose,” the report says. “It is believed that there is no threshold dose for stochastic effects. Stochastic effects include cancer, genetic disorders in succeeding generations and loss

of life from such effects. The risk is cumulative and persists throughout the life of the exposed person. Thus, individuals exposed to ionizing radiation have an increased lifetime risk of cancer, and their progeny have an increased risk of inheriting genetic disorders.”

The report includes recommended ionizing radiation dose limits from the FAA, the International Commission on Radiological Protection, the National Council on Radiation Protection and Measurements, and the European Union.

GUIDANCE MATERIAL

Carrying a Charge

Safe Transport of Lithium Batteries by Air

Hong Kong Civil Aviation Department. May 2011. 6 pp. Available via the Internet at <www.cad.gov.hk/english/pdf/Leaflet_lithium%20battery_May2011.pdf>.

Lithium batteries, both of the rechargeable lithium-ion type and the non-rechargeable lithium-metal type, are widely found in consumer electronics. Hardware with lithium batteries can be found in the cabins of passenger flights and in the cargo holds of passenger and cargo flights. They have been cited as causal factors in several on-board fires (ASW, 3/08, p. 42), and aviation industry regulators are working on rules to counter the risk (ASW, 3/10, p. 44).

As usual, the first line of defense is knowledge and care by front-line employees. This brochure, through text and full-color illustrations, explains the best practices for packing and shipping lithium batteries.

For example, a photo shows an example of correct packaging — the batteries separated by Styrofoam dividers, in individual blister packs and with an outer layer of insulation such as bubble wrap. Another photo shows the wrong way — loose and jumbled in a box along with metal objects such as tools.

The brochure discusses weight limitations, watt-hour ratings, lithium content limitations, labels on the outside of the box, documentation and other considerations. ➤

