R.A. Gilchenko

THE INTERRELATION BETWEEN THE ADEQUACY OF AVIATION TERMS TRANSLATION AND SAFETY OF FLIGHTS

NAU Institute of the Humanities, e-mail: rgilchenko@ukr.net

The article considers the common aspects of aerospace terminology of Ukrainian language creation. Its author determines main ways of term-formation, ways of aerospace terminology enrichment as well as some objective difficulties of the corresponding terminological system in Ukraine. The article enlightens the issue of bilinguism of Ukrainian society, and the main requirements to be met in order to decrease the language problems related accidents rate. The author gives a recommendation for development of clear and monosemantic Ukrainian aviation terminology, its standards and English-Ukrainian dictionaries

Introduction

Last year the global community celebrated the 100th anniversary of aviation. More than a century ago Wright's piloted heavier-than-air aircraft took-off the ground and flew several hundred yards. Face of the global aviation has considerably changed since that time. Commercial aviation powered with large and comfortable airliners changed world's society into one global village. This brought to ordinary people both advantages and fear.

Safety of the civil aviation was always considered as one of the major objectives of the International Civil Aviation Organization (ICAO), another international and local civil aviation authorities throughout the world. Aviation safety experts and the ordinary travelers note the considerable improvement in this field, but still there exist a lot of objectives to be achieved.

One awesome figure is known to all experts in aviation industry – some three out of four aircraft accidents result from insufficient human performance. One of the factors, which disable aviation specialist from different countries of the world to cooperate in an efficient manner, is the language barrier.

Analysis of Research and Publications

The Assembly of ICAO adopted in 1986 the Resolution A 26-9 on Flight Safety and Human Factors. Based on the aforementioned Resolution, the Air Navigation Commission formulated the objectives, which all ICAO Contracting States must try to gain. The Air Navigation Commission of ICAO issued a recommendation to the States to be more aware and responsive to the importance of human factors in civil aviation operations.

Human factor was cited as a causal factor in the majority of aircraft accidents. Manual on the Implementation of ICAO Language Proficiency Requirements' gives us an awesome data to think over: in three accidents, among which there were one collision on the ground, one accident involving fuel exhaustion and one CFIT (Controlled Flight Into Terrain), over 800 people were killed [1: 1–1].

From the very first view all these disasters have nothing similar between them. The only common thing in all of them was, by the conclusion of the official investigators, insufficient English language proficiency of both pilots and controllers which had played a contributing role in the chain of events leading to the accident.

The ICAO has also published "International Civil Aviation Vocabulary. Doc 9713", which provides to en-users about 5 000 English aviation terms and their canonical translation [2].

Task Arrangement

Unfortunately, Ukrainian doesn't belong to the working languages of the International Civil Aviation Organization. Thus we may set up a hypothesis, that Ukrainian aviators are, to some extent, in the deprived situation. The author believes that creation of clear and single-equivalent translations for English aviation terms will facilitate in better understanding between civil aviation experts of the Ukraine and other countries of the world, which will finally result in the language-related accident rate decrease.

The interrelation between the adequacy of aviation terms translation and safety of flights

A number of incidents and near misses caused by the language problems are registered every year. It's a well known fact, that nowadays there is the only language for international communication in the field of high-tech, and aviation in particular. This tongue is English, or rather American English. It's not a secret that communication between even native English speakers from different countries may come along with some misunderstandings. Even more difficulties are related to the communication process between non-speakers talking foreign language, or conversation between native speaker and foreigner, even an experienced one.

The conceptual model of the Human Factors called SHEL (the name derived from the initial letters of its components: Software, Hardware, Environment and

Liveware) was developed by Edwards in 1972, and modified by Hawkins in 1975. The following interpretations were suggested:
– liveware (human);
– hardware (machine);
– software (procedures, symbology, etc.);
– environment (the situation in which the L-H-S system must function).

The effective communication within the SHEL system is undoubtedly essential for the safe operation of flight. The message may be transferred from pilot to pilot by oral speech, in a written form, a variety of symbols and displays, or by non-verbal means like body language. The quality of the communication process is determined by the degree to which the abovementioned message is understood to the receiver.

Several factors may reduce the effectiveness of communications:
– failures during the transmitting process (e.g. sending of unclear messages, or language problems);
– difficulties caused by the medium of transmission;
– failures during receiving (e.g., wrong interpretation of the arriving message);
– failures due to interference between the rational and emotional levels of communication (e.g. arguments);
– physical problems in listening or speaking (e.g. wearing of the oxygen mask);
– use of English among native and non-native speakers.

No doubt, prevention of communication errors is an important task to be solved for the purpose of the safety of flights.

All countries of the world are explained the common communication problems, and the need to reinforce the standard of language in order to guarantee the correct interpretation of the messages.

In order to avoid any potential sources of error, the content, structure, dialogues, vocabulary and sequences of spoken ATC messages have been standardized as much as possible years ago.

One of the other important steps taken to decrease the rate of human factor related aviation accidents was the development of the ICAO spelling alphabet (tab. 1).

This is known as well as the NATO phonetic alphabet, despite it actually is the radiotelephony spelling alphabet of the International Civil Aviation Organization, which assigned words to the letters of the English alphabet so that critical combinations of letters could be pronounced and understood by aircrew and air traffic controllers regardless of their native language [3]. Some other organizations like the International Telecommunication Union, Federal Aviation Administration, and American National Standards Institute have developed similar versions as well.

This spelling alphabet was the product of extensive research to choose a set of words which would sound as different from each other as possible, even when spoken over noisy and degraded communication channels by people whose native language was not English.

Communications can be improved by good controller and pilot discipline. It is always important to speak slowly and clearly, especially when the language used is not the native language of either the speaker or the listener. Towards the end of a long shift or a long flight, the controller or pilot may be tired and speech should be particularly slow and clear. Voices become familiar, and it can confuse the pilot if a different controller from the one expected replies, and confuse the controller if parts of a single dialogue with the crew of an aircraft are with different crew members. Transmissions where the start or the end of a message is cut off can be potentially dangerous, especially if the controller is busy, which is when this is most likely to happen. Routine confirmation of messages and requests to repeat them if there is any uncertainty can help to prevent errors. Particular care is needed to counteract the human propensity to hear what is expected rather than what is actually said. The alphabet is used to spell out parts of a message or call sign that are critical or otherwise hard to recognize during voice communication. For instance the message "proceed to map grid DH98" could be transmitted as "proceed to map grid Delta-Hotel-Niner-Eight".

The radio exchange phrase "SAS 941, behind DC9 on short final, line up behind" should be read as "Sierra-Alfa-Sierra-Niner-Four-One behind Delta-Charlie-Niner on short final, line up behind" [4: 12–2].

Despite the spelling alphabet was an important means of the improvement of the pilot/controller communication quality, a lot of problems related to language proficiency hasn't been solved.

Table 1

ICAO spelling alphabet

Letter	Word	Letter	Word
A	Alfa	N	November
B	Bravo	O	Oscar
C	Charlie	P	Papa
D	Delta	Q	Quebec
E	Echo	R	Romeo
F	Foxtrot	S	Sieera
G	Golf	T	Tango
H	Hotel	U	Uniform
I	India	V	Victor
J	Juliett	W	Whiskey
K	Kilo	X	X-ray
L	Lima	Y	Yankee
M	Mike	Z	Zulu

Number of language-barrier caused accidents didn't increase as much as the ICAO expected.

For instance, in a result of the mid-air collision which happened in 1996, more than 300 passengers and crew members lost their lives. Insufficient English language proficiency played an important role in this awful accident [1: 1–1].

A number of such accidents appear in the ICAO ADREP, and the "language barrier" is cited as a factor.

The UK's Mandatory Occurrence Reporting Systems registered 134 language-related problems within six years only.

In year 2000, ICAO convened the Proficiency Requirements in Common English Study Group to develop provisions concerning standardized English language testing requirements and procedures, and minimum skill level requirements in the common usage of the English language [1: 1–2].

The linguistic experts with backgrounds in aviation or aviation English training and applied linguistics became the members of the study group.

As well, the ICAO has previously developed provisions relating to the language use (Recommended Practices in Annex 10 and a Standard in Annex 1) [1: 1–3].

In addition to the English language proficiency requirements the International Civil Aviation Organization has developed the standardized phraseologies to be used be all parties of the international communication process in the field of civil aviation (tab. 2).

The official documents of ICAO give a detailed list of instructions and phraseologies, which must ensure the full understanding between pilots and air traffic controllers in both routine events and emergencies.

For instance, Document 4444 ICAO "Procedures for Air Navigation Services" specifies the samples, which are frequently utilized for the purposes of air navigation. Most phraseologies show the text of a complete message without a call signs of the aircraft. These phraseologies are grouped according to types of air traffic service.

Different sections of the document include phrases for use by pilots, ATS personnel and other ground personnel [4: 12–3]. Here there are some of the samples of the ICAO approved radio exchange developed to construct clear messages and avoid possible confusion by those persons using a language other than one of their national languages [4: 12–3]. Despite the ICAO phraseology covers both routine operations and some predictable events, it is evident that it is absolutely impossible to forecast all possible circumstances arising from the communication of native and non-native speakers. No doubts, all attempts to create limited number of phrases in an artificially constrained language will fail. Only the full understanding of all nuances of language in addition to some language discipline may considerably reduce rate of language problems related aviation accidents. Pilots and ATC controllers must have a sufficient level of language proficiency to manage all potential requirements of communications, like routine situations, circumstances not addressed by the limited phraseologies, non-routine situations and outright emergencies [1: 1–3].

Among other activities of the International Civil Aviation Organization are the recommendations on the use of plain language, slang, jargon and idioms. The regulatory documents stress the importance of English as a language of international aviation communication.

The ICAO's documents specify for instance, that the radiotelephony communications shall be conducted either in the language of the station on the ground or in English, and that English shall be made available when pilots are unable to use the language of the station on the ground [1: 2–3].

As the International Civil Aviation Organization's Contracting State, Ukraine does a lot to comply with new stricter requirements towards English language proficiency.

Table 2

ICAO standardized phraseology of radio exchange

Air traffic services	(aircraft call sign) "SQUAWK THREE FOUR TWO FIVE"
Aircraft reply	"SQUAWK THREE FOUR TWO FIVE, (aircraft call sign)"
Issuance of a clearance	a. (*name of unit*) CLEARS (*aircraft call sign*); b. (*aircraft call sign*) CLEARED TO; c. RECLEARED (*amended clearance details*)[REST OF CLEARANCE UNCHANGED]; d. RECLEARED (amended route portion) TO (significant point of original route) [REST OF CLEARANCE UNCHANGED]; e. ENTER CONTROLLED AIRSPACE (*or* CONTROL ZONE) [VIA (*significant point or route*)] AT (*level*) [AT (*time*)]; f. LEAVE CONTROLLED AIRSPACE (*or* CONTROL ZONE) [VIA (*significant point or route*)] AT (*level*) (*or* CLIMBING, *or* DESCENDING); g. JOIN (*specify*) AT (*significant point*) AT (*level*) [AT (*time*)].

Despite these efforts our country still encounters a lot of difficulties in this field. Definitely, one of them is closely related to the fact, that Ukraine is not an English-speaking country, and not a rich one too.

Ukrainian government and the Ministry of Transportations must find the effective and cost-efficient ways for training and refresher training of domestic pilots and air traffic controllers.

On the other hand there is a difficulty caused by the bilinguism of Ukraine.

Ukraine inherited from the USSR (the Union of Soviet Socialist Republics) not only one of the most powerful aerospace complexes, but domination of Russian language in many regions of Ukraine. Taking into consideration, that Russian was the only language of the higher education, science and engineering of the former Soviet Union, one may understand, why millions of well-educated Ukrainians still prefer speaking Russian 13 years after Independence. Majority of aviation experts used to communicate in Russian for a while, and transition into Ukrainian is a sort of disaster for many of them. The author emphasizes this fact only to explain what situation modern Ukrainian terminology is nowadays in. This would be fair and correct, if international regulatory documents and specifications were translated into Ukrainian, as the only official language of Ukraine. But the enthusiasts working in the field of aviation terms translation find plenty of difficulties. Many of them are caused be the unwillingness of aviation experts switch to Ukrainian. They feel comfortable with English-Russian dictionaries developed either in Soviet era, or in Russian Federation.

But at the same time many aviators are native Ukrainian speakers, and need the comprehensive reference materials in Ukrainian to understand precisely English written texts and oral speech. Despite the need in such English-Ukrainian-English dictionaries, nobody actually carried out the careful research of the aviation terminology and the ways and methods of the aviation terms translation from English into Ukrainian and vice versa. As a result, the only printed reference source, a sort of Russian-Ukrainian-English dictionary was published in 1997 [5]. However, it contained 4 000 terms only and just couldn't become a competitor of much better developed dictionaries published in Russia [6]. As well, there were a lot of incorrect translation articles there in its Ukrainian part. That's why the author decided to create the new and more comprehensive English-Ukrainian dictionary of aviation terms generally for the students of the National Aviation University (Kyiv) and other higher educational institutions of our state.

This dictionary comprises 10 000 terms of civil aviation and their translations are with accordance with new rules of the Ukrainian orthography. The author believes his effort will facilitate in reaching the higher level of international aviation safety. Sure, a lot of issues are not solved yet.

For example, the abovementioned dictionary contains a lot of synonyms, which number author would like to reduce in the future issues of the dictionary. But in spite of evident drawbacks, this dictionary carries out its general function – it gives a clear translation of English aviation terms into Ukrainian.

The articles contain terminological word-combinations and the verbal combinations found in original texts on civil aviation:

> airplane *n* літак, аероплан; all-metal ~ суцільно-металевий літак; all-wood ~ суцільнодерев'яний літак; high-wing ~ високоплан, літак із високим розташуванням крила; liaison ~ літак зв'язку; low-wing ~ низькоплан, літак із низьким розташуванням крила; mid-wing ~ середньоплан, літак із середнім розташуванням крила; multi-engine ~ багатомоторний літак; propeller-driven ~ гвинтовий літак; rocket ~ реактивний літак; single-engine ~ одномоторний літак; supersonic ~ надзвуковий літак; widebody ~ аеробус, широкофюзеляжний літак; ◊ to abandon ~ покидати літак; to board an ~ сідати на літак; to ditch ~ здійснити вимушену посадку; to fly an ~ керувати літаком; to hijack ~ захопити літак; to navigate ~ керувати літаком; to pilot an ~ керувати літаком; to shoot down an ~ збити літак; to take an ~ сісти в літак [7: 14].
>
> range 1. *n* 1) діапазон; 2) дальність дії (*візуального або радіотехнічного обладнання*); 3) дальність польоту (*повітряного судна*); 2. *v* 1) вимірювати дальність; 2) простягатися (*від ... до*); aileron ~ діапазон кутів відхилення елерона; aircraft's ~ 1) радіус дії ПС; 2) дальність польоту ПС; altitude ~ діапазон висот (*польоту*); angle-of-attack ~ діапазон кутів атаки (*крила*); extended ~ збільшена дальність польоту; flight visual ~ дальність видимості в польоті; flying ~ дальність польоту; fuel ~ дальність польоту з наявним запасом палива; minimum ~ мінімальна дальність *чи* зона дії; operating ~ дальність дії; робочий діапазон; radar ~ дальність дії РЛС; runway visual ~ дальність видимості на ЗПС; speed ~ діапазон швидкостей; visual ~ дальність прямої видимості [7: 100].
>
> GS 1. [glide slope] 1) глісада; 2) нахил глісади; 2. [ground speed] шляхова швидкість; 3. [guidance system] система наведення; 4. [gyroscope] гіроскоп [7: 155].
>
> OR 1. [omnidirectional (radio) range] всеспрямований курсовий радіомаяк; 2. [operating range] робочий діапазон; 3. [operational requirements] експлуатаційні вимоги [7: 164];

SMGCS [Surface Movement Guidance and Control System] система керування наземним рухом і контролю за ним; advanced ~ удосконалена система керування наземним рухом і контролю за ним [7: 172].

In English and American periodicals we can find a lot of examples how authors implement the brand new terms in the field of civil and especially military aviation [8: 42], [9: 12], [10: 9]. Definitely, translation of such terms becomes a serious problem not only for aviators but also for quite experienced translators as this requires some special techniques which I should admit are not fully developed in Ukraine. What becomes a real help is a great number of explanatory dictionaries published in the USA and Great Britain [11].

Conclusion

Aviation has always been considered as an interdisciplinary subject belonging to the very top of high-tech. Aviation brought us a lot of advantages and convenience, but its utilization is sometimes related to some danger.

One of the most dangerous factors in the field of the civil aviation application is a human factor. A lot of aspects, such as physical condition or cross-cultural relations may endanger the safe operation of the aircraft. Aviation experts say that leaks in English language proficiency of pilots or controllers make up a considerable percentage of all aviation accidents. The author believes, that the full understanding of instructions said in English by non-native speakers may considerably add to the safety of international civil aviation.

That's why the author is going to present his doctoral thesis on the problems of the aviation terms translation from English into Ukrainian. This research makes a theoretical analysis of the aviation terms related issues, and 10 000 words English-Ukrainian dictionary of aviation terms will become its practical outcome, giving to Ukrainian aviators an opportunity to understand their English-speaking colleagues in a proper and efficient manner.

These two works will give the comprehensive analysis of the terminological situation in the field of aviation from both theoretical and practical point of view.

Literature

1. *Manual* on the Implementation of ICAO Language Proficiency Requirements. Doc 9835, AN/453. International Civil Aviation Organization. – 1st ed. – 2004.

2. *International* Civil Aviation Vocabulary. Doc 9713. International Civil Aviation Organization. – 2nd ed. – 2001.

3. http://en.wikipedia.org/wiki/NATO_phonetic.

4. *Procedures* for Air Navigation Services. Air Traffic Management. Doc 4444, ATM/501. International Civil Aviation Organization. – 14th ed. – 2001.

5. *Бабейчук Д.Г.* Російсько-українсько-англійська авіаційна термінологія: Посіб. – К.: Дієслово, 1997.

6. *Марасанов В.П.* Англо-русский словарь по гражданской авиации. – М.: Рус. яз., 1989.

7. *Гільченко Р.О.* Англо-український навчальний словник авіаційних термінів. – Фастів: Поліфаст, 2005. – 220 с.

8. *Aircraft* Technology. Engineering & Maintenance. Issue 35 August-September 1998. Aviation Industry Press ltd., 31 Palace Street, London SW1E5HW, England.

9. *Flight* International. 18-24 Apr. 2000. Reed Business Information Ltd., Quadrant House, the Quadrant, Sutton, Surrey SM2 5AS.

10. *CAT* Magazine. Issue 7/2000. Friary Press, Dorchester, UK.

11. *U.S. Department* of Defense. Dictionary of Military Terms.: Greenhill Books, London, 1999.

Р.О. Гільченко

Взаємозв'язок між правильністю перекладу авіаційних термінів та безпекою польотів

Розглянуто загальні проблеми авіакосмічної терміносистеми української мови та взаємозв'язок між належним рівнем володіння англійською мовою і безпекою польотів у цивільній авіації. Визначено об'єктивні труднощі становлення мови авіації та космонавтики в Україні. Проаналізовано способи підвищення безпеки польотів міжнародної цивільної авіації через впровадження однозначної української авіаційної термінології, відповідних стандартів та перекладних словників.

Р.А. Гильченко

Взаимосвязь между правильностью перевода авиационных терминов и безопасностью полетов

Рассмотрены общие проблемы авиакосмической терминосистемы украинского языка и взаимосвязь между надлежащим уровнем владения английским языком и безопасностью полетов в гражданской авиации. Определены основные трудности становления языка авиации и космонавтики на Украине. Проанализированы способы повышения безопасности полетов международной гражданской авиации путем внедрения однозначной украинской авиационной терминологии, соответствующих стандартов и переводных словарей.