

ABBREVIATIONS IN AVIONICS SYSTEMS

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The present time is characterised by a rapid and substantial development in science and technology, continuously bringing up new phenomena and information that are to be named and documented. Precise terminology is inevitable not only for the further development but also primarily for correct communication, a professional and standard levels. The branch of air transport, communication makes extensive use of abbreviations that enable expression of one's ideas in the most sparing way. It also expedites the flow of information needed for its safety, economy and regularity. High-performance and reliable aircraft equipment are considered as a contributory factor to air transportation safety by enabling and facilitating correct and precise control of aircraft.

Key words: avionics, database, abbreviations,

1 THE AVIONICS SYSTEMS

The term *avionics* is used to define electronic equipment of flying objects. Its origin is the result of development of both aircraft and air transportation. An important and most frequently discussed area of air transport is the one of safety, important and of crucial effect with regarding aviation is the development of technology.

Influence at the beginnings of aviation, pilots were to rely only on their judgement, while having available only a handful of instruments such as altimeter, fuel indicator, speedometer etc. Precision and reliability of those instruments, however, could never be matched to the ones used currently. Improvements in this branch made it possible to substantially increase both reliability and precision.

Historically, the roots of avionics reach as back as to 18th century, i.e. to the era when the first aircraft and board systems were designed. Already in 1783 the Montgolfiere brothers made use of a barometer to measure altitude and the Wright brothers employed an anemometer to measure the velocity of air. Later on, aircraft were equipped with magnetic compasses to measure course and other instruments for indicating fuel, etc. Navigation was based on visual references. The end of 1920 saw realization of the first „blind“ flight and navigation at landing was made on the basis of a gyroscope and radio guidance/homing. The years that followed witnessed the further development of instruments for navigation and landing of aircraft.

WWII was the time of the development of radar, aircraft detection and solving the problem of communication with pilots. This is when the VHF (Very High Frequency) and UHF (Ultra High Frequency) radio communication came to being.

The way of flying was crucially changed by the crude oil crisis of the 70s. Precision of flying won primary importance. Digital systems came into use to assist pilots in flying and more efficient navigation. Further contribution was the development of multifunctional display that enabled more flexible visualization of information. All that resulted in the design of so called glass-cockpits. These times were lots of advanced avionics systems with their development continuously forward press.

2 THE DATABASE OF ABBREVIATIONS

Abbreviations specialized for avionics, are coded in a database and categorized. Dividing them into categories help users finding their ways in the various subsystems of avionics. The abbreviations have been intentionally into the following categories:

- navigation systems,
- communication systems,
- sensors and radiolocation systems,
- systems of air traffic/aircraft control,
- airborne electrical systems,
- other flight instruments and a visualization systems.

In the course of making up the database, however, further abbreviation were found, related to avionics systems in a wider context, or being in more frequent use in aviation transport. A separate category of „Miscellaneous“ have been established for them. The aim was to ensure at least partial summarization and thus making up a more complex data base of abbreviation of practical use.

In professional terminology the term of „data base“ is a set of data related to a certain topic or purpose. This elaborate system to store data and have them processed subsequently. The data bear certain relations to one another and are partitioned to certain extent. In a wider context, contained in the data base are also tools that work with the data. Before realization of a data base, it is appropriate to assess how it will be used and what requirements it is to meet. Inevitable conditions of practical uses of the database are accessibility, flexibility, reliability of data etc.

The database of abbreviations in Slovak-English version was put together in the form of a website that enables search with a wide scale of user-selected criteria. The website is of open-system concept with the possibility of correcting existing items or adding new ones into the data base. It is available via the Internet, as currently the most used form of locating information. The website of the abbreviation database was developed applying the scripts of PHP and HTML languages. As a database system the MySQL was been chosen. The scripts were written in the freely circulated editor, the PSPad.

When developing websites, the most frequently used script language is the PHP (its scripts are

inserted/converted/encoded into the HTML) and the MySQL database. Such a combination along with the web server named APACHE is called a triade, and is highly flexible. Great advantage is also in the wide-spread availability of ready-made functions, fragments of codes and last but not least the continuous development of these programs, as they belong to the open-source category, i.e. are available for free. Certainly, it is also one of the important factors that contribute to their success and circulation. It was these factors of choice on our part when deciding for making up the data base of abbreviations. Among the programs languages used were e.g. Perl, Python and the administration of the data base is run on PostgreSQL, Oracle and others.

3 THE WEBSITE OF ABBREVIATIONS DATABASE

The website (further only „site“) for search in the data base of abbreviations is based on a freely circulated component - datagrid from phpGrid. In a simplified version, is available on the company website of phpGrid along with technical documentation. The datagrid component enables visualization of the data in the form of tables based on source of the database established. It is written in the PHP language and makes use of the AJAX (Asynchronous JavaScript and XML) technology). The freely circulated simplified version of the component does not, however, enable editing of the data, which in case of the website is not necessarily either. The component has been used mostly for its advantages, namely its simplicity: implementation into program, configuration of the linkup to the MySQL database, programming of functions.

From the user point of view, these functions are useful, as the data, thanks to the AJAX technology, are visualized without excessive re-plotting/re-drawing of the website and the research functions are universally applicable. They enable each by individual columns of the table in line with the selected criteria. Clicking on the headline of columns enables the possibility of alphabetical ordering of items in the table. Listing in the data base is comfortable, enabling the user to preset the number of presented records. As a practical solution is in having the function of exporting all the records of the database into MS EXCEL. The implementation of the component into the website as it is practically made up by several lines of the code. In one of the introductory lines of the machine/source code of the site, the use of the conf.php unit is defined as follows:

```
<?php
require_once("conf.php");
?>
```

In the subsequent lines of the source code of the site, gradually „called“ are the functions of the datagrid component, which are: connection to the table of the database, authorization for chaining the size of the displayed table, presetting the language of column heads, restriction to displaying the column of ID (data not

important for the user), enabling exporting of all the data base items into MS EXCEL, authorization of extended search, enabling presentation of data. Functions displayed in the source code of the site follow the same order:

```
<?php
$dg = new C_DataGrid("SELECT * FROM
avionicke_systemy",'skratka');
$dg->enable_resize(true);
$dg->set_locale('sk');
$dg->set_col_hidden("ID");
$dg->enable_export('EXCEL');
$dg->enable_advanced_search(true);
$dg -> display();
?>
```

Availability of the developed site is achieved thanks to widely used tools of internet survey such as the Internet Explorer, Mozilla Firefox, Google Chrome etc. Acces to the database developed is through the <http://web.tuke.sk/lfkaweb/> website.

The design of the database administration website is identical to the one of the DoA and that of the abbreviation database. For administering the database, the following functions are accessible: inserting a new record, amendment to the existing record, removal/deleting of the existing record. On the site there is a freely circulated component available on the website named The jQuery Project for more comfortable search for records designed for editing. The function of auto complete is based on the use of the jQuery script. This function enables the user to rapidly locate and chose form the offered record of values the one of his interests all that only after writing in only several letters of the text searched for. It is available on the site three times, so as to enable search in the column of abbreviations, Slovak and English descriptions of the abbreviation. Functions of JavaScript type called as lookup1, lookup2, lookup3 are sending the inscribed text into the fields of input types to units called rpc1.php, rpc2.php, rpc3.php and perform the actual search from the offered datas in the appropriate column of the database table and present them into the form of so-called popup record. Functions fill1, fill2, fill3 ensure writing in the selected value into the search field. Functions fillskrat, fillsk, fillaj, fillkat, and fillid perform inscription of items of the selected recording from the database into the lower-editing fields of the site.

Search and editing field of input type are inserted and arranged on the site in the table form. The site form uses the POST type method, which determines the way how the data from the form are sent/exported. On entering the values into the editing fields and applying the selected function via pressing the push-button, the edited values are sent/exported to write.php site, which makes sure the selected action is performed. Then the chosen function is tested and based on the result, the SQL function of UPDATE, DELETE or INSERT is called. The connection established to the database help editing the data in the database of abbreviations. The write.php site reports the administrator on successful completion of the action in the new window in a textual form and finally it terminates

connection to the database. The abbreviation database administration website is presented as in Fig. 2. For security reasons, on the database site there is no reference made to the login into the database administration. Unlawful accesses and attempts to log in the website present excessive load to the server thereby slowing it down the activities of authorized users. The address of the site for administration is known only to the administrator. In case when the user is interested in entering a new, hitherto not inserted abbreviation in to the database, he can do it via the administrator. On the database site, there is a reference, which upon clicking automatically opens the electronic post and generates a new message with already inscribed address of the administrator and the subject of message.

Reviewer: Ing. Rudolf Andoga, PhD.

With respect to the international nature of air transport, already at the very beginnings there appeared the need for international coordination and cooperation. High level of requirements of the aviation industry also apply to the use of a standardized terminology and abbreviations. It necessitates use of IT and overcoming language barriers in communication between the parties involved of the process of transportation.

4 CONCLUSION

The established database of abbreviations in the Slovak- English version currently comprises some 1400 divided into 7 categories, offering several modes of search by chosen criteria. The advantage is primarily in accessibility, as it is designed by as a website available via the website of the Department of Avionics (DoA). All the abbreviations contained in the database come from trustworthy resources (standards, Professional literature, website of different aviation companies and organizations etc.) thereby reliability is guaranteed.

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