

# Education in the field of aviation yesterday and today

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The quality of education that one can receive is not always the reflexion of one's capability of learning and processing new information, but mostly the reflexion the society's capability of providing the student high-quality information with focus on the major principles of making further use of the information obtained. The contribution is aimed not at solving the issue of education on the whole, but to describe, in brief, the process of education in aviation during the last 20 year in the Slovak republic.

**K e y w o r d s :** education, aviation industry, aviation school, university, air training, number of students

## 1 INTRODUCTION

The year of 2009 was perceived, not only within the academic communities but also by the entire society, was the one of accreditation of universities. Education has attracted larger attention than in the earlier periods of time. The the process of transition, both the society and the education system, towards market-based conditions, marked by various, many times, non-conceptual steps, has lead to the degradation of the entire educational system, many of us might keep in good memory from studies. The year of 2009 was the round, 20<sup>th</sup> anniversary of the events that turned the wheel of the European history, changing the destiny of many countries and thier people. The period that elapsed is long enough to enable some retrospective and thereby taking stock of all the things that has changed since then on.

A said fact that the year of 2009 was also the 50<sup>th</sup> anniversary of the aviation school's arrival into Košice, but the residence to celebrate the half-centennial, the Kukorelli barracks, remained calm and quiet. It is not the lack of the reason to celebrate, but the lack of people who might do so. That important year was the one wintessing graduation of the last undergraduates of the Air Force Academy curriculum as well as the withdrawal of the very last outposts of higher-level, aviation-oriented education from Košice.

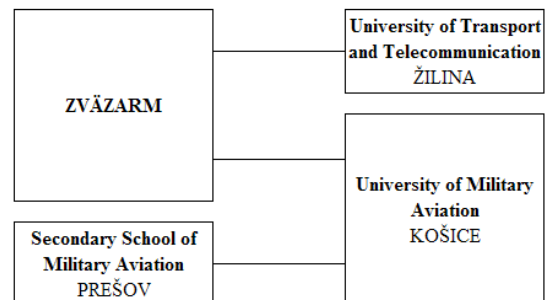
## 2 HISTORY OF THE AVIATION EDUCATION

Before 1989, education in the branch of aviation was focused on two major categories (military and civil), with responsibilities assigned to four institutions former Czechoslovakia:

- Union for cooperation with the Armed Forces

- Secondary School of Military Aviation, Prešov;
- University of Military Aviation, Košice;
- University of Transportation and Telecommunication, Žilina.

All these institutions were mutually interlinked and, in close cooperation, were preparing not only aircrew but servicing staff for all the specialties in both military and civil aviation on the territory of Czechoslovakia (Fig. 1).



**Fig. 1** *Institutions of aviation education*

Young people, interested in practical flying and in everything related to aviation could decide already at the age of 15-16 what next. There were lots of those who, captivated by military aircraft, have consequently decided for the career of a military professional career and started to study at the Secondary School of Military Aviation educating students from all over the Czechoslovakia. Other fans began to pay regular visits to local aeroclubs, mostly parts of the Zvāzarm, available practically in almost every cities, even in those smaller ones. The two institutions have been instrumental in generating a wide pool of people ready to satisfy the needs of aviation, be it military or civil.

**Zväzarm**, as a universal, voluntary public organization for defense was established on 4 November 1951 and, apart from other technical courses of interest, it was preparing youth interested in:

- Aviation;
- Parachuting;
- Hang-gliding.

Although the **Zväzarm** was also one of the tools of ideological manipulation, in fact it was a great contribution to the development of interest groups and was responsible for initial training of young pilots. Those interested in practical flying were, however, bound to go through a mandatory ground training including material parts for the individual parts of planes. Only successful completion of tests and passing state exams from radiotelephony made it possible for them to sit behind the control sticks under the supervision of experienced instructors. It was an unwritten law that young trainees were obliged to start first with gliders and only on having acquired the inevitable experience were they allowed to gradually transfer for engine-powered aircraft.

Provided that the trainee of the aviation school run by the **Zvazarm** showed firm determination for the career of professional pilot, each Aeroclub felt honoured to have him or her on the list and have attracted more attention in terms of improving worthiness for more intensive training. As a consequence, the young pilot before going to study at the University of Transportation and Telecommunication, Žilina or at the University of Military Aviation, Košice, could log as much as 40 or even more hours of flying to base on. Many of them, however, were not granted the opportunity to sit behind the controls of a military or civil aircraft, have yet returned to their hobbies and have been flying at their local airports, the place were they first experienced the where they first felt freedom of the flying in the air. Despite of the initial failure, they often went on to study further in aviation related specialties at other universities. It was the **Zvazarm**, this state-controlled organization that was instrumental in generating the largest pool of further specialists for the Czechoslovak aviation.

In the wake of the political changes, in 1990, Czechoslovakia saw the end of the **Zväzarm**,

which, following the constitution of the Slovak republic, was replaced by the Association of Sport Flying and Aviation Equipment Related Activities of the SR. The negative influence of the market economy was the cause to the deep recession in young people's interest in flying. Sport flying, so widely available for the wide public before 1989, has turned into a financially demanding hobby, no longer enjoying the mass-character of attendance, thus practically destroying the former large pool of would-be cadets of aviation.

**The Secondary School of Military Aviation**, Prešov, was established in 1967, when as the part of the Higher Apprentice School of Military Aviation, Košice. In 1973, following the foundation of the University of Military Aviation, Košice, it become an independent school till 1992, residing at the Prešov Air Force Base. The school was not performing practical training of pilots, as did the Aeroclubs, but it was preparing young of military aviation exclusively in technical specialties. Graduates of the school the become recognized pilots or excellent professionals in other field of aviation, as they were offered either to enroll to the University of the Military Aviation, Košice, or to take up positions directly at air force units. The split of Czechoslovakia and departure of Czech students from the school resulted in substantial changes even at this institution. The Secondary School of Military Aviation moved to Košice, changing its name into Military Secondary School. Ten years later, as of 1<sup>st</sup> September 2003, it was was disbanded and giving way to a new school, the School of Air Specialists' Training, Košice, in 2006 into the School of AF and AD Military Professionals, Communication Information Systems and Electronic Reconnaissance, practically ending secondary level education in aviation. As part of the reorganization with effect to 1 July 2009, the School for Military Professionals (OVŠ) left its facilities, thereby terminating the 50 year era of education in military aviation in Košice.

**University of Military Aviation** Košice was established in 1973 as the follower of the first educational institutions of military aviation in Košice. The very beginnings date back to the year of 1959, when Košice witnessed the foundation of

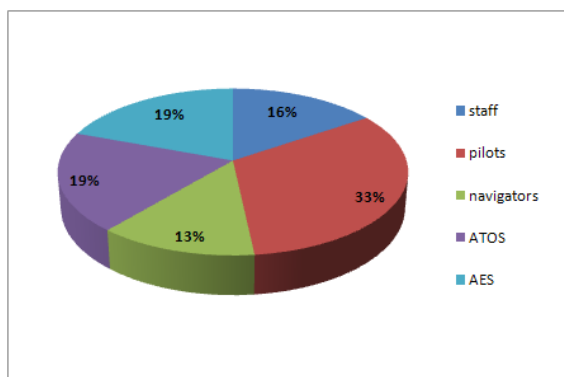
the Military Apprentice School of Aviation, in 1963 transformed into Higher School of Aviation which was providing education mostly in two areas of activities, namely active pilots and supporting specialties.

Between 1979 and 1993 education was offered on two Faculties:

- Faculty of Command and Engineering, specialized in specialties of:
  - staff
  - pilot
  - navigator
- Faculty of Military and Engineering, with specialties such as:
  - airport technical and operational support
  - aviation engineering service.

Subordinated to the University were three School Aviation Regiments (Přerov, Piešťany and Košice), providing practical aviation training of student pilots.

In sum total, the University of Military Aviation provided education to cca 1000 student in every academic year and to tenths of external students, exclusively specialized in technical support specialties. Two decades ago, year by year, some 200-250 students graduated on both Faculties, of which cca 61 % at the Faculty of Command and Engineering and and 39 % at the Faculty of Military Engineering, whereas student pilots made up cca 33 % of the overall number of graduates (Graph 1).



**Graph 1** Percentage share of students by specialties

Appart from students for the former Czechoslovakia, the University provided education

also for members of other armed forces, for example 1986 witnessed graduation of pilots from Ghana, the years from 1989 to 1991 students from Hungary and the year 1991 undergraduates from Germany. In 1994 graduated were also the participants to conversion courses for various type-trainings offered for pilots from Columbia and Costarica and in 2000 pilots from Angola and Rwanda and many others.

The first of great change in the life of the University of Military Aviation took place on the occasion of its 20<sup>th</sup> Anniversary of Foundation, i.e. 1993, when Czech students have stopped studying at the school. It was a rather irrational step ultimately leading to the end of the University itself, as the institution lost its international character becoming „only“ a College of Military Aviation to satisfy the need of the Slovak Armed Forces. Following the split of Czechoslovakia, the number of school regiments was reduced only to the one stationed in Košice. In 1994, the regiment was transformed into the Air Force Training Centre which terminated its operation in 2001 for good.

The year of 1996 brought a bright sparkle into the life of the University of Military Aviation, hoping for a change for better. It was the year that the Košice Airport, under the auspices of the University, was organizing the international day of aviation, the SIAD '96 and the College was transformed into the Air Force Academy host to the following departments:

- 10 departments providing Professional preparation to its cadets, namely:
  - Department of Avionics and Weapon Systems;
  - Department of Air Training;
  - Department of Ground-Based Information Systems;
  - Department of Mathematics and Physics;
  - Department of Operational and Combat Deployment of the Air Force;
  - Department of Physical Training, Sports and Parachute Training.
- 2 Centres tasked to work not only to the benefit of the Air Force Academy, but also to the entire branch of the Slovak Ministry of Defence, namely the:
  - Centre for Simulation Technologies;
  - Centre for Language Training.

- Starting with 2001 own training squadron stationed at the Košice Airport, incorporating the world-wide known military aerobatics team, the White Albatrosses, as the follower of the recognized Košice Six starting in the early 80<sup>s</sup>.

In 1993, the length of study was changed to 5 years for all study branches subdivided into three units:

- Air Traffic Control including:
  - control, operation, automation of command in military aviation;
  - air traffic control.
- Aviation Engineering, including:
  - airport technical and operational support;
  - operation, maintenance and repair of aircraft and aviation engines.
- Aviation electrotechnics, including:
  - radio-technical support of air traffic;
  - airborne instruments and electrical systems;
  - radio and radio-technical systems of aircraft.

The development later proved that this period was the swan-song of the education for military aviation in Košice. Between 1996-2004 the number of specialists was decreasing gradually, and in 2004 the short history of the Air Force Academy of General Milan Rastislav Štefánik, Košice, ended. This was also the end of the 45 year long history of education in military aviation provided in Košice. The relay baton was passed on to the Faculty of Aeronautics, Technical University. It was in the year when a total of 130 civil students were enrolled into both daily and external studies still studying by military syllaby. In 2006, the lasts of the military students graduated and the year of 2009, exactly 50 after the arrival of military aviation students to Košice, saw the termination of study of the last military specialty at the Faculty.

**University of Transportation and Telecommunication, Žilina** was established as a result of moving the University of Transportation from Prague between 1960-1962. Development of the industry, transportation and telecommunication necessitated the development of the University of

Transportation in a wider spectrum. Several new branches came into existence, such as the aviation transport, blocks and communications, road and municipal transport, building bridges and tunnels, railway transportation. Right in the wake of the move, two Faculties were established, namely the:

- Faculty of transport operation and economics
- Faculty of mechanical and electrical engineering

Within the framework of the Faculty of transport operation and economics, the Department of aviation transport was formed that specialized in providing students ground training and starting with 1962 air training as well. At the very beginnings, air training was performed in via the Zvazarm to obtain the Sport Pilot Licence. In the year of 1975, the Ministry of Education approved the study branch of Pilot-engineer and the University of Transportation and Telecommunication became an independent air operator and started commercial pilot licence training at the Žilina airport.

The split of the former Czechoslovakia resulted in a gradual reduction of students in number, mostly those already from abroad, and starting with 1996 it became part of the newly established University of Žilina. In 2002 approved and accredited was the branch of Professional pilot, the syllabus of which was conceived and gradually amended so as to meet the requirements of the JAR - FCL 1. In 2003 the split of the Department of Aviation Transport resulted in the formation of the Centre for Aviation Training and Education, University of Žilina taking over the responsibilities for civil aircrew practical training. In cooperation with the Department of aviation transport, they ensure education of aircrew for civil aviation.

### 3 CURRENT STATUS OF EDUCATION IN AVIATION

The recent 20 years saw substantial changes in the aircrew education for the aviation industry. Firstly, three of the originally four elements ceased to exist, namely the:

- Zvazarm (1990)
- Secondary School of Military Aviation (2003)
- Air Force Academy (2004)

With the Zväzarm disbanded, the individual Aeroclubs took economics into their own hands, and aviation became a financially rather demanding activity and lots of potential aviation cadets were discouraged. This is supported by the fact that the average age of pilots in the clubs is increasing, 20 years ago it was well under 30, whereas currently it is far behind it, approaching to the 40s. For financial reasons, it is no longer a prestigious act for the aeroclubs to prepare young cadets for the profession of pilots as earlier.

At the present time, Slovakia is home to a great number of aviation schools focused on air training, and they can be divided into state-owned, but mostly no-state-owned educational institutions comprising also organization as follows:

- Faculty of Aeronautics, Technical University Košice;
- Department of Aviation Transport, University of Žilina;
- National Training Centre for Air Safety in Civil Aviation, University of Žilina;
- Centre for Aviation Training and Education, University of Žilina;
- Academy of the Armed Forces of Gen. Milan Rastislav Štefánik, Liptovský Mikuláš.

**Faculty of Aeronautics, Technical University Košice** was established as the successor of the disbanded Air Force Academy, of which the „group of lone runners“ is credited for keeping aviation education still in Košice. Thanks to them, the former 10 Departments from the year of 2004 contributed to the formation of the Institute of Aeronautics at the Technical University Košice, and in 2005, the Faculty of Aeronautics came into existence at the same University, currently hosting a total of 6 Departments:

- Department of Aerodynamics and Simulations
- Department of Air Transport Management
- Department of Air Training
- Department of Air Technical Preparation
- Department of Aviation Engineering
- Department of Avionics

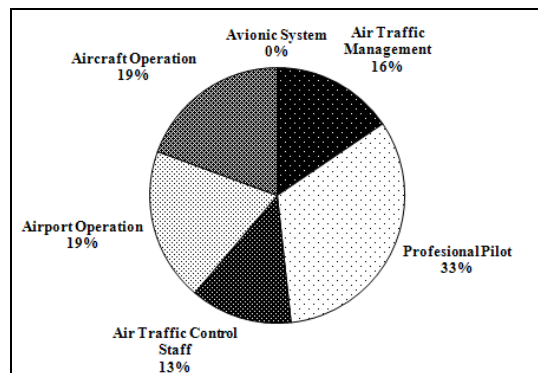
The Faculty provides education of civilian students for daily and external studies in a total of 3 study branches divided into 6 study programmes, as follows:

- Transport
  - Air Traffic Management
  - Professional Pilot
  - Air Traffic Control Staff
  - Airport Operation,
- Road Vehicles, Rail Vehicles, Ships and Aircraft
  - Aircraft Operation
- Electronics
  - Avionic Systems

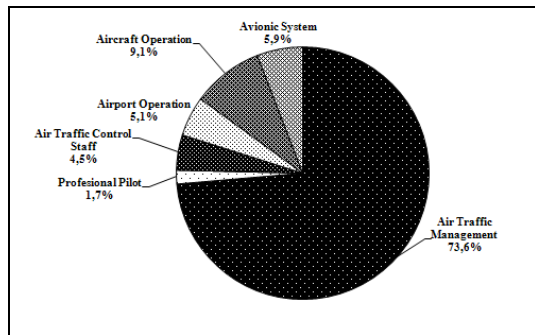
In the Academic year of 2008-2009, the Faculty of Aeronautics was attended by 1722 students in total. When compared to the status 20 years earlier, the structure of study programmes remained mostly identical, while the number of students increased but the proportional distribution of students by study programmes has completely changed (see Table 1 and Graphs 2 and 3).

1988-1989			2008-2009		
study programmes	N° *	ratio	study programmes	N°	ratio
staff	158	15,52%	Air Traffic Management	1268	73,64%
pilots	333	32,76%	Professional Pilot	30	1,74%
navigators	132	12,93%	Air Traffic Control Staff	78	4,53%
ATOS	197	19,40%	Airport Operation	88	5,11%
AES	197	19,40%	Aircraft Operation	157	9,12%
			Avionic System	101	5,87%
<b>TOTAL</b>	<b>1017</b>	<b>100,00%</b>	<b>TOTAL</b>	<b>1722</b>	<b>100,00%</b>

**Table 1** Comparison of study programmes and numbers of students in them



**Graph 2** Percentage of student numbers by specialities – University of Military Aviation



**Graph 3** Percentage of student numbers by specialities – Faculty of Aeronautics

The fact has been caused by the paradox of the education system as a whole and also by the fact that such a financially very demanding specialty like aviation is not distinguished from the rest of the branches. As the amount of financial support, not only those related to the Faculty of Aeronautics, is based and depends on the number of students as it. Paradoxically, it is the study program of the Air Transport Management is attended by a large number of students (as high as 74% of all the students at the Faculty), all that regardless of the fact that practical employment in the aviation industry is less than one per cent, more likely a promise of the number of graduates. Hand in hand with the numbers of students, declines the quality of the educational process of the individual groups, as it is different to provide teaching for a group of 15-20 students than for a group with over 100 and even more.

Despite of the large great numbers of students, the Faculty of Aeronautics is lacking financial means, if practical air training is taken into consideration, as in the past. At the Faculty of Aeronautics, student pilots are receiving only ground training, called theoretical preparation, and on completion of it they go for practical training to one of the contractor schools of aviation. Having finished their practical training, they are tested, at the Civil Aviation Authorities of the SR, to acquire the Commercial Pilot Licence (CPL) and the Instrument Rating (IR) for an appropriate type of aircraft in compliance with the JAR-FCL 1 regulations.

Slightly better is the situations in technical specialties, wherein the Faculty of Aeronautics has been acquired the Certificate of Airworthiness

issued by the Civil Aviation Authorities of the SR that entitles it to provide theoretical preparation for maintenance training by PART 147, giving the capacity of preparing aviation technical staff in line with the requirements as set out in the Air laws of the European Union, opening a wide range of potential for our graduates in their finding jobs even abroad.

This type of preparation, however, is provided only to cca 11% of students. The rest of them, almost 89% is educated at a theoretical plane or by way of using simulators as a maximum.

**Department of Aviation Transport, University of Žilina**, as part of the Faculty of Transport Operation and Economics as well as Telecommunication provides education focused on:

- Technology of aviation transport;
  - Technical, economical and operation-related subjects;
  - Design of aircraft;
  - Operation of aircraft;
  - Aeromechanics and performance of aircraft;
  - Operation, economics and marketing of aviation companies;
  - Design and operation of airports;
  - Air traffic control.
- Education is offered in study programmes:
- Air transport;
  - Professional pilot.

Similarly to the Faculty of Aeronautics, Technical University Košice, the syllabus of this department is also providing only ground training at the level of *frozen transport aircraft pilot*. Unlike the Technical University Košice, the organizational structure of the University of Žilina is featuring two more places of work focused on and certified for practical training.

The Department of Aviation Transport is providing, on a commercial basis, courses for air traffic controllers and pilots to qualification levels of *commercial pilot with a clause for multi-engine aircraft and qualification for instrument flights*. It is also the seat of the National Training Centre of the SR for Flight Safety in Civil Aviation.

**National Training Centre of the SR for Flight Safety in Civil Aviation** (NVCB ŽU) is providing, based on accreditation, starting with 2002, short-term courses in compliance with EU regulations for all aircrew categories of aviation. The courses are designed to improve theoretical knowledge of the staff and their technical skills for handling a number of potentially critical situations. The safety courses are certified by the Slovak Civil Aviation Authority.

**Centre for Aviation Training and Education** is performing practical training corresponding to the standards of JAR-FCL 1, conducted on aircraft such as Z-42, Z-43, Z-142, L-200, PA-34, approved for flight training in compliance with JAA and EASA. Theoretical and practical flight training is organized for students of the study pbranch of „Aviation transport“ and for others interested either from the SR or from abroad.

The aircraft such as Z-43, L-200, PA-34 and the FNPT II MCC flight simulator is used to provide training for instrument rating and multi-engine training on the renowned L-200.

The Centre for Aviation Training and Education is holder of the Certificate of approved Fligh Training Organization - FTO SK/01 and meets, in all aspects, the requirements of the Joint Aviation Requirements, the JAR-FCL 1 as laid down for running the approved courses.

#### 4 CONCLUSION

The present days are marked with the influence of market mechanism, i.e. if a state-controlled school wants to have a sufficient amount of financial means, it is to have a sufficiently high number of students. This, at the same time, however, requires a corresponding number of teachers, a fact that again is artificially increasing the costs. Mathematically, it is possible to make an final estimate in terms of the number of students that is sufficient enough to guarantee the availability of state subsidies. However, there remains a question whether that number of students will be able to find placements in the aviation industry. It is a matter of fact that as the the number of students unable to find jobs in their area of study increases the quality of education decreases proportionally.

For this reason, the issue of education in avition is to be handled in a different way, the one that leads not only to the rise in its level but also to the professional takeoff of graduates as well.

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