



**feani**

Fédération Européenne d'Associations Nationales d'Ingénieurs  
European Federation of National Engineering Associations  
Föderation Europäischer Nationaler Ingenieurverbände

# News

## 06 / 2006



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**On 24 April 2006, FEANI organized this Forum dedicated to European- and worldwide career possibilities of European Engineers in the framework of the renowned Hanover Fair in Germany.**

**Dr. Willi Fuchs, President of FEANI and Director of the VDI (Verein Deutscher Ingenieure), welcomed more than 150 participants that had registered for the Forum.**

The keynote speech was held by the EU Commissioner for Employment, Social Affairs, and Equal Opportunities, Dr. Vladimir Špidla who introduced the Commission's initiative 'European Year of Workers' Mobility 2006'. Other interventions came from high-level representatives of major international companies employing engineers as well as professional engineers.

The EU Commissioner Dr. Špidla related in his speech to the important role of the engineering sector in Europe in the framework of a globalized economy in view of attaining the EU's strategy for economic growth and employment, a top priority of the EU. He saw mobility not only as a fundamental right of all European citizens but also as an element of life long learning which would become more and more important in our knowledge-based society changing rapidly and continuously. However, only 2% of the Europeans would live in another country than their home country, despite a general positive attitude of Europeans towards EU mobility.

Dr. Špidla recognized in this context the need to promote occupational mobility through adequate employment and social policies in order to achieve a new balance between flexibility and employment security – flexicurity. He emphasized that administrative barriers, such as differences in the social security systems, in the legal systems, pension rights or recognition of diploma and professional qualifications, would need to be reduced.

He mentioned some of the EU initiatives to overcome such barriers: the proposed Directive for 'portability of supplementary pension rights', the introduction of the European health insurance card, the new internet platform of EURES, the new proposed Services Directive, the EU's communication on 'guidance on the posting of workers' and a first European job fair to take place in September 2006. ●●●

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# CONFERENCE



●●● At the end of his speech, Dr. Špidla welcomed the European Engineers' Forum as an important contribution of a European engineering federation for supporting the Year of Mobility 2006 and highlighted FEANI's Register of EUR ING's and INDEX (of approved programmes and higher education institutes), as well as the new proposal for a Professional Card for engineers in the framework of the European Directive on Recognition of Professional Qualifications, as valuable tools for promoting mobility.

Emphasizing the contribution of FEANI for its activities promoting mobility, it was agreed to set up without delay a meeting between Dr. Špidla, Dr. Fuchs, and Ph. Wauters.

The other speakers of the Forum, Messrs. **Juan de Dios Alf3rez (President of the Association of Industrial Technical Engineers of Madrid), Milan Bojanovsky (Director Section Human Resources at SIEMENS Czech Republic), R. J. Coackley (President of European Council of Civil Engineers), Carlo Parietti (President of EUROCADRES), and Martin Vlietstra (Freelance IT Engineer, Vliet Ltd. UK)** concentrated on a variety of aspects of mobility, such as:

- the challenges arisen from an increasing speed in a globalised knowledge-based economy, including the importance of continuous training
- other challenges - and benefits - for instance arising from different cultures and patterns; acquiring management skills through mobility; or accommodating double career problems
- the different approaches and policies of the EU Member States, for instance regarding access to the profession (some MS regulat-

ing the profession, others not); related to taxation; or different social, health care and pension schemes

- the lack of homologations and recognition of the different Titles (and the role of professional organisations, for instance FEANI's EUR ING title) as well as mutual recognition of accreditation procedures
- the concern related to the quality of education as well as the impact of the Bologna Declaration
- the role of European legislation (Directives) and other EU initiatives such as the European Qualifications Framework (EQF)

The speakers recognized that there were different durations and assignment forms of mobility (permanent or temporary for instance) and that there were certainly differences between working in a big multinational company versus working as a self-employed engineer.

They all agreed in seeing mobility as one of the pillars of the European Union, but at the same time acknowledged the need for reducing existing barriers to mobility.

In a following Q&A session, some of the Forum participants, several of them being engineering students, commented on the challenges and opportunities evoked by the speakers.

The moderator of the Forum, Mr. de Faria, closed the session entitled 'international career opportunities: reports on experience from international companies and engineers', inspiring each Forum participant to reflect personally on elements such as reasons for fear of



Mr. de Faria, Mr. Vlietstra



Dr. Vladim3r Špidla, Member of the European Commission



Mr. Juan de Dios Alf3rez



Mr. Carlo Parietti

# European Engineers' Forum



moving, the importance of change and learning, values and competence, as well as the motivation for mobility.

In view of presenting contributions to overcome previously mentioned obstacles for mobility, Philippe Wauters and Léon Jean Blaffart from FEANI then presented their projects 'Professional Card' (a proposed joint project with EUROCADRES in the framework of the European Directive on Recognition of Professional Qualifications) and 'EUR-ACE' (Accreditation of European Engineering Programmes), a EU SOCRATES-TEMPUS funded project.

In particular, the project '**Professional Card**' was followed

with great interest by the participants who asked many questions after the presentation.

According to the many congratulations FEANI received at the end of the Forum, we may conclude that it was a very successful event which contributed to the good reputation of FEANI.

The complete interventions of all speakers can be found on the FEANI website [www.feani.org](http://www.feani.org), section 'events'.

FEANI thanks all participants and speakers of the European Engineers' Forum as well as the organizer of the Hanover Fair, Deutsche Messe AG, for having contributed to the success of the Forum. □



## FEANI General Assembly and Strategic Plan 2006-2009



The Annual Business Meetings of FEANI in 2005 had taken place from 28-30 September 2005 in Athens, Greece. This included a General Assembly on 30 September which was attended by 24 of FEANI's 26 National Members (NMs). At the Assembly, the new President of FEANI, Dr. Willi Fuchs from Germany, as well as several other officers, were elected.

A Strategic Workshop was held on 11/12 November 2005 with participation of the new Board and the Secretary General to agree on common strategic goals and visions for the period 2006-2009, building upon the activities and achievements of the previous Strategic Plan 2003-2005. ●●●

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# FEANI General Assembly and Strategic Plan 2006-2009



●●● It defined four Strategic Goals for the new period:

- FEANI serving as the link between National Members and European organizations/institutions (notably the EU, including the provision of services)
- FEANI representing the views of the European engineering profession
- FEANI being recognized as the key provider of information about engineers and supporting the creation and maintenance of a world class engineering profession to the society
- FEANI participating in setting and maintaining standards, criteria, and procedures for engineering formation and ethics.



Dr. W. Fuchs, Dipl. Ing. K. Alexopoulos

It was agreed that the resources for the implementation would not be limited to the FEANI Secretariat General but would also come from National Members.

Where is FEANI now related to those Strategic Goals?

In his report the Secretary General Philippe Wauters stated that FEANI invested quite some efforts and resources in its visibility towards the EU institutions as well as other international organizations. In that context, FEANI was invited to EU meetings and consultations related to the European Qualification Framework EQF, the European Institute of Technology (IET), participated in international meetings such as the 7th WFEO World Congress on Engineering Education in Budapest, EUR-ACE presentation in Moscow, ...). It also submitted project proposals to the EU Commission related to the Professional Card in the framework of the call for tender 'European Year of Workers' Mobility 2006' (together with the project partner EUROCADRES) and a follow-up project of EUR-ACE (involving in total 20 project partners).

The EU-funded project EUR-ACE where FEANI is the legal

representative, was terminated in time and budget with an official and very successful presentation at the EU premises on 31 March 2006 with more than 120 participants. A new AISBL, organization called ENAEE (European Network for Accreditation of Engineering Education) was founded by 14 project partners to operate EUR-ACE with headquarters at FEANI.

Furthermore, in the framework of the new Strategic Plan, Working Groups have launched surveys with National Members in order to elaborate FEANI position papers on 'R&D' as well as on 'Code of Conduct/Ethics'.

A detailed report of the activities will be presented in the framework of the Annual Business Meetings 2006 in Prague at the General Assembly on Friday, 29 September 2006, as well as in the meetings on 28 September:

- Workshop on 'FEANI Key Strategic Projects':
- International Role, Professional Card, Position Paper - Code of Conduct/Ethics' and the Academic Session on 'The Importance of Innovation in the Future of Europe' (including also a presentation/discussion of the Position Paper on R&D). □

In the context of those Strategic Goals, the following *priority areas* were defined and responsibilities (Board Members and Secretary General) for these areas were agreed upon:

- **EUR-ACE project on 'accreditation'**
- **International and Worldwide role of FEANI**
- **Professional Card for Engineers**
- **Position Papers**
- **FEANI Committees**
- **Other ongoing activities (Finances, EU Relations, Communications)**

## Erfolgsgeschichte mit Zukunft – 150 Jahre VDI

**Der VDI (Verein Deutscher Ingenieure) feiert am 16. Mai 2006 in Berlin sein 150 jähriges Bestehen. Das Ziel der Vereinsgründer war es 1856, „allegeistigen Kräfte der Technik zum gemeinsamen Wirken“ zusammenzufassen. Bis heute bündelt der VDI die Kompetenzen der Ingenieure und Naturwissenschaftler und vertritt ihre Anliegen. 130.000 Mitglieder bilden das Rückgrad des Vereins und machen ihn zu einem der bedeutendsten technisch-wissenschaftlichen Vereinen in Europa.**

Was es heißt, die Anliegen der Ingenieure zu vertreten, wird durch einen Blick auf die Geschichte des Vereins und der technischen Entwicklung deutlich. Als 1866 der Einsatz von Dampfkesseln eine immer stärkere Verbreitung fand, förderte der VDI zur Sicherung dieser technischen Anwendung die Entstehung der Dampfkesselüberwachungsvereine, die als Vorläufer der Technischen Überwachungsvereine (TÜV) anzusehen sind.

Früh setzte sich der Verein dafür ein, Technik der Öffentlichkeit näher zu bringen und damit ihr Ansehen zu heben. Das Deutsche Museum in München – heute eines der weltweit größten Technikmuseen – wurde 1903 von Oskar von Miller

(Vorstandsvorsitzender des VDI von 1912-1914) in München gegründet.

Als führender Initiator war der VDI 1917 Mitbegründer des Normenausschusses der Deutschen Industrie (heute DIN), welcher die Qualitätssicherung der immer größeren Anzahl technischer Bauteile und Produkte vorantreibt. 1957 - zu einer Zeit als das Thema Umweltschutz noch nicht sehr populär war – wurde die VDI-Kommission zur Reinhaltung der Luft gegründet. Auf dem Deutschen Ingenieurtag 1989 in Aachen hieß das Leitthema „Technik zum Schutz der Umwelt“.



Frühzeitig machte der VDI auf den Nachwuchsmangel aufmerksam und versuchte diesem entgegenzuwirken: 1989 wurde der Schülerwettbewerb „Jugend Technik Zukunft“ initiiert und seit 1992 wird der Nachwuchswettbewerb „Jugend forscht“ unterstützt.

Ein weiteres wichtiges Jahr in der Geschichte des VDI ist das Jahr 1857, in dem die „Zeitschrift des Vereins Deutscher Ingenieure“

erstmals veröffentlicht wurde, aus der die heutige VDI-Z hervorgegangen ist.

Im Jahr 2006 blickt der VDI aber nicht nur auf 150 Jahre im Dienste der Ingenieure und Technik zurück, sondern gestaltet aktiv die Zukunft. Am 2. Februar startete der VDI zusammen mit 35 Partnern die Initiative «Sachen machen!» am Düsseldorfer Flughafen. Ziel ist es, das Image des Technikstandorts Deutschland zu steigern. Im April war der VDI erneut mit einem großen Stand auf der Hannover Messe vertreten. Neben einer Fachausstellung stand das Thema Karriere wieder ganz weit vorne. Der Tag der Technik – im Jahr der Technik 2004 initiiert - findet am 19. und 20. Mai wieder deutschlandweit statt. Im August messen sich die Hochschulteams mit ihren selbst entwickelten und gebauten Rennwagen im Rahmen des Wettbewerbs Formula Student am Hockenheimring. Aber auch das Wissensforum zusammen mit den Fachgesellschaften ist wieder aktiv. Im März treffen sich die Logistikexperten traditionell zum Materialflusskongress in München. Ebenfalls im März zeigt in Mannheim die VDI-Gesellschaft Kunststofftechnik Kunststoffrends im Automobil auf. Rund ums Getriebe dreht es sich in Friedrichshafen im Juni bei der Tagung Getriebe in Fahrzeugen der VDI-Gesellschaft Entwicklung Konstruktion Vertrieb.

Es wird also auch nach 150 Jahren VDI noch viel passieren.

Quelle: vdi-nachrichten 

# EVENT EUR-ACE WORKSHOP



## Workshop 31 March 2006

The final results of the EUR-ACE Project were officially presented on 31 March 2006 at the EU Commission in Brussels, within the framework of the "Launch of Two European Quality Labels in Higher Education". More than 100 participants from all over Europe interested in engineering education joined the EUR-ACE Workshop, which was seen as a great success, particularly by the representatives of the EU Commission. It has been judged as a major step for the following implementation phase of the EUR-ACE concept, which will deliver a European brand - EUR-ACE - to engineering degree programmes satisfying the requirement for an education necessary for the entry to the engineering profession.

The EUR-ACE Project was prepared and proposed to the European Commission (DG Education and Culture) as a development of the 'European Standing Observatory for the Engineering Profession and Education (ESOEPE). It is supported by funding from the Socrates and Tempus programmes.

The EUR-ACE Project aims at setting up a European system for accreditation of engineering education, with the following main goals:

- Establish a 'European label' for accredited education programmes
- Improve the quality of educational programmes in engineering
- Facilitate trans-national recognition by means of the label marking
- Facilitate recognition by the competent authorities, in accordance with EU Directives and
- Facilitate mutual recognition agreements.

The system is based on a set of common European standards that have been proposed, tested in a number of countries, refined and tuned, and then tested again in order to achieve the largest consensus. This process was concluded by the end of 2005. In addition, a detailed proposal has been



formulated on how to set up and run the system so that it can become self-supporting within the first five years of operation.

For more information on the EUR-ACE Project: <http://www.feani.org> under 'EUR-ACE'.

It is to note that the interest for EUR-ACE goes beyond the EU borders. Indeed, a Malaysian delegation took part at the Workshop and questioned if a support for implementing an accreditation system conform to the EUR-ACE standards could be foreseen in their country. This was positively answered by Mr Wauters, the Legal Representative of the EUR-ACE Project, and Mr Tailly (CTI) declared that the French administration, which will promote EUR-ACE in France, intends to highlight EUR-ACE in those countries which ask for support to put in place a national accreditation system. Similarly, it can be mentioned that a project for implementing an accreditation system in Lebanon referring the EUR-ACE standards has been introduced for financing through TACIS-MEDA programme. □



## European Network for Accreditation of Engineering Education



**The first General Assembly of the newly established Aisbl ENAAEE was held on 30 March 2006, at the FEANI offices, in Brussels, just after the last ESOEPE (European Standing Observatory for the Engineering profession and Education) General Assembly, which officially put an end to this association.**

The representatives of the 14 founding members of ENAAEE (FEANI, EC UK, CTI, ASIIN, Ordem dos Engenheiros, CoPI, UAICR, SEFI, Engineers of Ireland, RAEE, EUROCADRES, UNIFI, IDA and BBT) elected the Members of the Administrative Council as follows: Messrs Augusti, Wauters, Pugh, Siwak, Wasser, Chuchalin and Forslund. Prof. Augusti was elected as Chairman of the Administrative Council and Mr Wauters as Treasurer. The Permanent Secretariat is established at FEANI and carried out by FEANI staff for the time being.

ENAAEE pursues scientific and pedagogical goals. It intends to build confidence in systems of accreditation of engineering degree programmes within Europe and to promote the implementation of accreditation practice for engineering education systems in Europe.

In particular, it deals with:

- Facilitating the free exchange of information and providing an effective communication channel for those bodies and individuals concerned with educational and professional standards in Engineering throughout the European Higher Education Area. Such bodies may include government agencies, professional organisations, higher education institutions, employers and their associations, representatives of engineering student's bodies and their associations.
- Providing information that already exists within each country on topics and issues connected with educational and professional engineering standards.
- Participating in the creation and ultimately the administration of a European accreditation framework for engineering education programmes.

To achieve these purposes, ENAAEE implements at least the following activities:

- It establishes and maintains agreed Standards for the accreditation of engineering programmes as formulated by the EUR-ACE Project, and assumes responsibility for the protection of a corresponding European accreditation label – EUR-ACE.
- It participates in the establishment and operation of a European Accreditation framework for engineering education programmes.
- It provides information exchanged by regular communication of the membership's accreditation criteria, systems, procedures, manuals, publications, lists of accredited programmes and any other detail considered appropriate.
- It provides for the exchange of information between accreditation bodies at European and also worldwide level.
- It promotes the establishment of local (and possibly national) accreditation agencies.
- It organises meetings, seminars and workshops on accreditation practice.

ENAAEE does not intend to make any profit, but is allowed to seek public and private fundings, donations, allocations, fees and financial contributions through its own activities.

A dedicated website will be soon opened on the FEANI website [www.feani.org](http://www.feani.org)

Ir Léon Jean Blaffart



## European Engineer Professional Card

### FOREWORD

The following document highlights the ins and outs of the draft innovative concept for ENGCARD that has been designed by FEANI in collaboration with EUROCADRES (Council of European Professional and Managerial Staff - including a lot of engineers).

The objectives of that concept will be materialized by the delivery of European Engineer Professional Cards certifying and validating the qualifications of the cardholders.

The ENGCARD concept mainly concentrates on the mobility's aspects related to the TRANSPARENCY and the RECOGNITION of QUALIFICATIONS and COMPETENCES.

After a first series of presentations of the concept (as for instance during the Engineers' Forum on Mobility in Hanover Fair on 24 April 2006), it appears that the added value of a Professional Card has been positively recognized as a mobility facilitator for migrant engineers.

However, at this stage, the design of the concept of ENGCARD is in its analysis and validation phase. Indeed, an extended consultation is still ongoing and involves most of the stakeholders concerned : the Engineers and their National Representative Associations, the Social Partners (Employees, Employers and Liberal Professions), the Employers, several General Directorates of the European Com-

mission (Employment, Internal Market, Education), National Administrations in charge of academic and professional recognitions and also the National Public Employment Services.

The concept of ENGCARD is thus not yet definitively fixed and some reorientations or changes may occur to take into account the results of the ongoing consultations.

The notion of "Professional Card" to be set-up by European professional organization refers to the "Whereas 36" of the recently adopted Directive 2005/36 on Recognition of Professional Qualifications and on the Decision n°2241/2004/EC on a Single Community Framework for the transparency of qualifications and competences - EUROPASS.

The European Engineers Professional Card will be a facilitator for mobility and recognition as well in Europe as worldwide. However, it will not replace or overrule the national legislation in place in some EU Member States regarding the 'de jure' recognition of qualifications in the countries regulating the profession of engineer.

### THE ENGCARD VISION

One of the major difficulties encountered by engineers moving on a temporary or permanent basis to work in another country as their country of origin (in the European Union or elsewhere) is to have their professionals qualifications recognized at their fair worth and merit.

This is due to the lack of harmonization at European level (or global ) such that, within the engineer context, everything is different, namely from one EU Member State to another : education engineering contents, learning outcomes and programs,

the definition of an engineer itself, the recognition of professional qualifications and the professional regulations, the mode of pursuit of the profession, ...

Mr. de Faria, Mr. Forslund - Eurocadres Vice-President



Ir Blaffart, Mr. Parietti - Eurocadres President

# European Engineer Professional Card

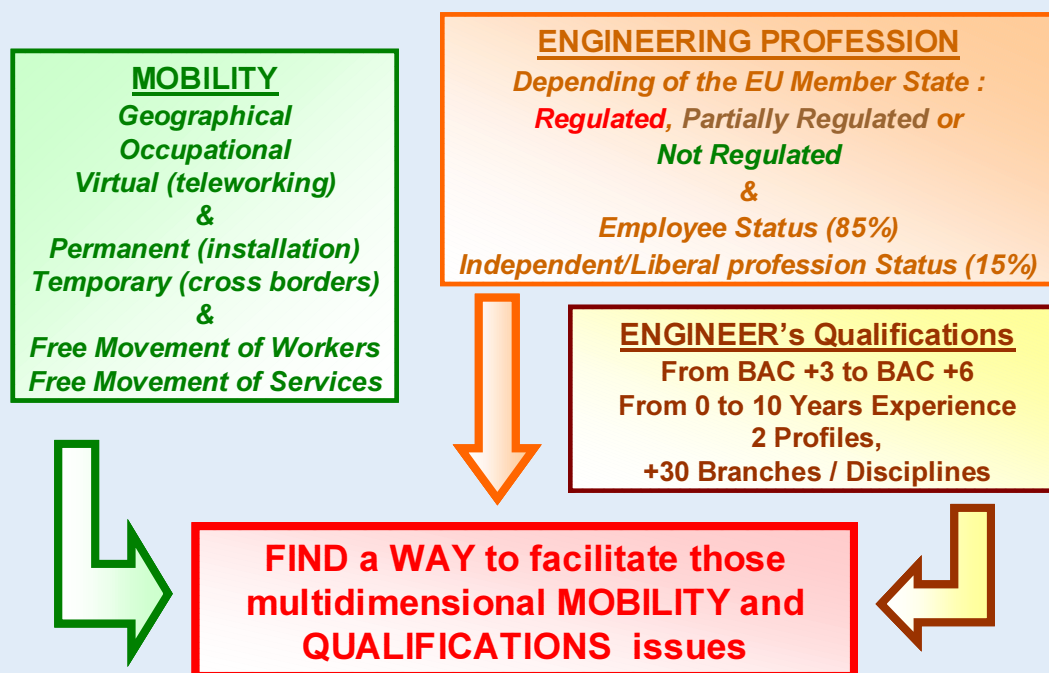
Rules and comparisons standards should therefore be defined and implemented on a **trusted** way to warrant the level of **transparency** requested to allow employers and contractors to evaluate and recognize objectively and at the right level, the qualifications and competences of the individual engineer.

The transparency of the recognition of the professional qualifications will

create a win-win situation for both employers/contractors and engineers. Indeed, on one side they will better understand which qualifications, competences and experience they need while reducing the risk of mistakes, and on the other side the engineer will be hired based on his real value on the market in term of content of the function, accountability, remuneration and social status.

Moreover and thanks to its **universal** dimension, the full potential of the ENG CARD concept will absolutely not be limited to bring advantages at the European Union level but it will also definitely strengthen the positioning of the European engineer on the global market place.

*The following blocks diagram schematizes the background context of ENG CARD and its Goal.*



As illustrated on that diagram, the ENG CARD concept is really multidimensional and complex.

It will not only address the issues related to the geographical, the occupational as well as the e-mobility or virtual mobility, but it will also consider the specificities of engineers working as employee (Free Movement of Workers) or as independent/liberal profession (Free Movement of Services), and this in Members States regulating (totally or partially) or not the profession.

In addition and with respect to the subsidiarity principle and mainly to the fact that access to the professions and education policies are not EU but strictly Member States competence, the concept will also take into account the diversity of the

engineers' qualifications (durations, orientations and disciplines of the qualifications).

At this stage, a clarification of some concepts used here is necessary :

- Geographical mobility (of workers or services) covers on a permanent or temporary/cross-borders basis, the migration of workers or the delivery of services from one country to another; those are rights for all EU citizens and services providers. For the regulated professions, such mobility is ruled by the Directive on Recognition of Professional Qualifications (Dir 2005/36).
- Occupational mobility encompasses Job to Job mobility and is mainly concerned with

formal and non-formal Lifelong Learning, also called Continuous Personal and Professional Development – CPPD.

- Virtual mobility covers the mode of operation of the profession as tele-workers. This last mode of mobility will grow in the future with the emergence of the Knowledge based Society - a key pillar of the Lisbon Strategy. For intellectual professions like the engineers profession, the physical location to work is becoming less important and e-mobility could offer an interesting opportunity in order to avoid another kind of mobility problems, the transport infrastructure congestion and traffic jams. This aspect of mobility needs Electronic Signature to proceed safely. ●●●

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Despite its complex multidimensional dimension, the challenge of ENGCARD is therefore to find a pragmatic way to improve all aspects of Mobility by **creating trust** thanks to the transparency of the knowledge of the present and future acquired qualifications and competences of the engineer, and to associate a kind of validated and certified quality label to the European Engineer.

At the end, the objective of ENGCARD is to provide a simple tool to guarantee to whom it may concern that the holder of a European Engineer Professional Card is really a qualified certified engineer.

With the deregulation of education where several completely different educational background will be covered under the qualification of "Bachelor or Master in Engineering", and the emergence of the new phenomenon of "diploma mills" where anybody could even buy a PhD on the Internet, it is essential, mainly in the countries not regulating the profession and where everybody can qualify himself as "engineer", to protect for health and security reasons, the final consumer and the society from this danger.

**The ENGCARD concept will set-up an open and flexible framework to gradually integrate all these aspects with a long-term coherent perspective.**

## THE ENGCARD CONCEPT

### THE APPROACH

The approach selected to design the ENGCARD concept complies with the ongoing legislation and standards, fits with the EU policies and initiatives, capitalizes as much as possible on successful achievements of ongoing or past projects, facilitates the commitment of all the stakeholders involved and finally avoids reinventing the wheel.

The legal base for ENGCARD is the EU treaty itself with its rights for free movement of Workers (art.39) and for free movement of Services (art.43 and art.49). Regarding recognition of professional qualifications, the Directive 2005/36 and its "Whereas 36" give the opportunity to a European Professional Organization to deliver Professional Cards to facilitate mobility. This directive is the corner stone for the recognition of the qualifications for regulated professions as well as for free movement of workers and services.



Additionally, the future Directive on Services in the Internal Market (COM (2004) 2 final) and its article 39. on "European Code of Conduct" also give the opportunity to the same European Professional Organization to implement a code of conduct to warrant the quality of services thanks to a monitoring of the qualifications and competences acquired by experience and lifelong learning, among others.

The different standards concern the usage of international characters set for passport from ISO, the ISCED (International Standard Classification of Education) from UNESCO, the ISCO (International Classification of Occupations) from ILO.

The intergovernmental BOLOGNA declaration with its Bachelor/Master structure, the ECTS, the Diploma Supplement document and the Accreditation process provides ENGCARD with a common structure and some tools to allow transparency of qualifications between the different national systems.

The compliancy with the EUR-ACE standards (see [www.feani.org](http://www.feani.org), section EUR-ACE) for the accreditation of engineering education programs will certify a EU quality label to the considered engineering programs.

Transparency of Qualifications and Competences will be also facilitated thanks to the EUROPASS (Decision n°2241/2004/EC of the European Parliament and the Council of 15 December 2004 on a Single Community Framework for the transparency of qualifications and competences). ENGCARD will be developed as an integral part of it.

The structure of the EC's EQF (European Qualifications Framework for Lifelong Learning) would also be considered as a reference to facilitate the transfer and recognition of the qualifications of individuals.

The EC's Lifelong learning initiative is also important to consider later because it is proposing a framework to measure non formal learning outcomes in the same way as formal ones and as part of, ENGCARD could also capitalize on some achievements of the EURORECORD project that provides a competence management tool for the Professionals in the Engineering Industry.

For its successful design and during its future operations, ENGCARD will also have to comply with the horizontal directives on Electronic Signature and on Data Protection.

**Finally, the "toolbox" at the disposal of the ENGCARD concept for its design is rather extended. ENGCARD should integrate or take into account most of the above-mentioned ones to deliver its full potential of benefits, commitments and supports.**

# European Engineer Professional Card

## THE CRITICAL SUCCESS FACTORS


After several round tables with the different project stakeholders, it has been rapidly and clearly emphasized that to generate real added value and create a Win-Win situation, the ENGCARD concept must be designed in such a way that:

- It is credible, in the sense that ENGCARD cannot be a proprietary concept developed by engineers for engineers. It would be open to all stakeholders in a European multipartite advisory or management structure including at least representatives of engineers (employee and liberal profession/independent) and employers.
- It is open to all engineers, on a non discriminatory basis, who are fulfilling the admission criteria independently if they are already members or not of a National Engineers' Association member of FEANI.
- It is visible by rapidly reaching a huge critical mass of users thanks to an intensive European and national awareness campaign to engineers, contractors, employers and national authorities,....
- It reinforces the image, the social status and the prestige of the European engineer, develops a European engineer culture and team spirit, a quality symbol not only at European level but also globally.
- It complies, relies and capitalizes on the existing legislation, standards, policies, best practices, initiatives and successful achievements related to mobility, transparency and recognition of qualifications,
- It implements a "ZERO DEFAULT" quality of the end to end business processes. This must occur at different levels, namely :
  - the verification and acceptance of the qualifications and competences of the engineer on a standardized uniform way throughout EU (EUR-ACE criteria) to avoid mistakes or unfair treatment of the applicants,
  - the procedure to verify the respect of the Code of Conduct,
  - the safe production, personalization, distribution and periodic renewal of the Professional Card and,
  - the security level of the card itself to avoid falsification or duplication.
- It shares responsibilities (according to the subsidiarity principle) between the EU and the NATIONAL levels to process the application forms, to control the compliance of education and lifelong learning programs with the EUR ACE standards, to manage the respect of the Code of Conduct, to promote and disseminate the projects at all levels of the profession including national administration and employers,...
- It is integrated architecturally within the EUROPASS framework as a new **EUROPASS-ENGCARD modulus**.
- It guarantees strict protection of the data privacy.
- It proposes a cost effective organizational and technical solution proposing affordable entrance and renewable enrollment fees and offering to the future cardholder, preferential access to complementary services such as : networking services, lifelong learning services, mobility services, ... in such a way that the benefits generated thanks to the preferential access conditions to the services largely cover the cardholder enrollment costs.

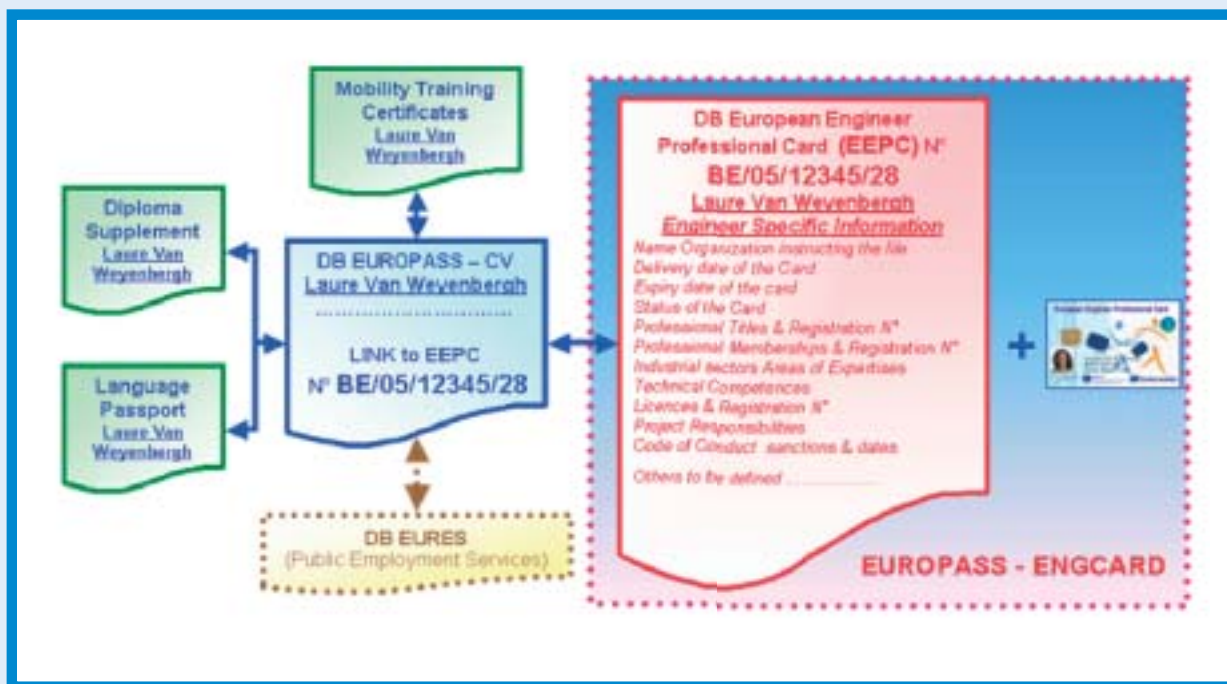
## THE ARCHITECTURE OF ENGCARD, INTEGRATED IN THE EUROPASS FRAMEWORK

As mentioned before, the framework decided by EC regarding Transparency of Qualifications and Competences is the EUROPASS framework.

For consistency reasons, ENGCARD should be integrated in that framework with an additional specific module to manage the specific 'engineering related information'.

The following drawing illustrates the architecture proposed for the ENGCARD concept 

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●●● The EUROPASS framework contains several interconnected electronic files or (scanned) paper documents that are self-declared or assessed by the citizen or certified by third parties.

The “EUROPASS-CV” is a very comprehensive standardized document proposed by the Recommendation 2002/236/EC. It is the backbone of the EUROPASS framework. It includes information on personal matters, language proficiency, work experience, educational and training attainments, additional technical, organizational and social competences and skills. Additional information might be added in the form of annexes.

- The “Mobility Training Certificates” record the training and experience spent in other countries and will help to communicate competences gained abroad. The document is filled in by the sending or the host organization.
- The “Diploma Supplement” is a document attached to a higher education diploma to understand what the diploma means in terms of knowledge

and competences acquired by its holder. The document is produced by a competent authority in accordance with a template developed by EC, the Council of Europe and UNESCO.

- The “Language Passport” has been developed by the Council of Europe and is a document in which language learner can record his language learning experience and competences in accordance with common criteria accepted throughout Europe.

EUROPASS seems very promising; more than 330.000 citizens have already used its templates and many EU Corporate Companies envisage to consider the EUROPASS framework for their internal pan European recruitment needs by using also the EUROPASS templates as corporate forms for HR purposes.

Moreover, it is also planned to link the EUROPASS with EURES, the network of the Data Bases of the National Employment Services which contains more than one million EU job offers.

After several validations, the best architecture for the ENGCARD concept will be to integrate it in the EUROPASS framework and to create a “EUROPASS –ENGCARD” new document composed of a data base and a chipcard.

To this end, all the generic information concerning the engineer could be easily recorded according to the different EUROPASS templates.

Additionally, when an engineer has satisfied the registration criteria and has been awarded a European Engineer Professional Card, an interface using the Identification Number of the Card as unique access key, will be made to create a new document for managing and recording information related to his specific professional engineering experience, expertise, memberships, licenses, specialized technical competences, project responsibilities, ... Code of Conduct sanctions, ...and also the data necessary for the management and follow-up of the card itself (validity period, status, ...).

At this stage, the precise layout of this new document still needs to be finalized.

# European Engineer Professional Card

The interface with this document will only be activated during the validity period of the card. Therefore, based on this very simple system, only a European Professional Engineer with a valid professional card will be able to transparently demonstrate the quality level of his/her exact actual proven and certified qualifications as engineer.

The deliverable of the ENGCARD concept will be physically materialized by a secure chipcard containing also such information recorded in several protected memory's zones of the chip.

A first zone will be reserved for the management of the EU level data, the second one for the National level and the last one zone for the cardholder. The card will also contain a professional electronic signature. The card will be a secure document to avoid duplication and falsification.

On the recto of the secure chipcard, the following data and objects will appear :

- the title, name and first name, picture, shadow picture and signature of the cardholder,
- an hologram of the organization

issuing the card, a chip with its electrical contacts,

- an unique card number composed of the code of the country issuing the card with the year of issuing, a serial number and a check digit
- and the expiry date of the card.

Some chipcard providers (Gemplus (FR) , Giesecke & Devrient (DE) and Zetes (BE) have already proposed the following samples as first draft for initial basic illustrative purposes :

## Samples of the recto of the draft card



On the verso of the card, the exact positioning of the validated and certified qualifications of the engineering training of the cardholder, taking also into account his/her lifelong learning outcomes, will be summarized in an unambiguous, transparent, condensed and standard way with the associated title and Diplomas and mentioning the corresponding ECTS (1U for 60 ECTS Higher Education and 1T for 60 ECTS Training).

The recognized number of relevant years of engineering experience (E), evaluated by a committee of engineers will also be mentioned as well as the primary and secondary disciplines of qualifications and/or recognized experience.

It is also proposed to mention the occupational code of the cardholder according to the ILO ISCO COM 88 standards.

## Sample of the verso of the draft card

QUALIFICATION FRAMEWORK HIGHER EDUCATION in ENGINEERING	Professional Practical U T	Academic Skills Applicational Theoretical U T U
<b>LEVEL 6 (First Cycle Degree / Bachelor)</b> Title / Abbréviation / Bachelor en Elektrotechniek Bridge or Postgraduate or Skills Title / Abbréviation / Bridge BECTS	2.5U 6.5T	
<b>LEVEL 7 (Second Cycle Degree / Master)</b> Title / Abbréviation / Master in de industriële wetenschappen / elektromechanica / industrieel ingenieur / etc. Bridge or Postgraduate or Skills Title / Abbréviation / Master en Sciences de l'Ingénieur / ingénieur civil électromécanicien / etc.		1U 1T
<b>LEVEL 8 (Third Cycle Degree / Doctorate)</b> Title / Abbréviation		3U
<b>RELEVANT YEARS ENGINEERING EXPERIENCES : 4 E</b>		
<b>DISCIPLINE</b> Primary : electromechanical Secondary : mechatronics		<b>ISCO 88 (COM) occupational code</b> 2143
<b>CONSOLIDATED QUALIFICATIONS : 7.5U + 1.5T + 4E</b>		

For the purpose of the card, the structure of higher education will be represented using the Bologna structure and some key elements of the draft European Qualification Framework (EQF).

It will also be based on the ISCED (International Standard Classification of Education) from UNESCO and its ISCED 5a (academic oriented) and ISCED 5b (professional oriented) levels as illustrated on the following draft model. ●●●

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With the EUROPASS generic documents supplemented by the new specific EUROPASS-ENGCARD documents (including the engineering specific data base and the European Engineer Professional Card) and combined with the commitment of the cardholder to adhere to the European Code of Conduct, it will be demonstrated that an Universal Quality symbol has been reached by the cardholder.

The image, the status and the prestige of the European Engineer will be reinforced at EU and worldwide level.

The successful implementation of the ENGCARD concept will act as a **Qualifications Transparency enhancer & Recruitment facilitator tool** for employers (mainly SMEs).

It will also act as **Qualifications Transparency enhancer** for national administrations in charge of recognition in the countries regulating the profession by facilitating and speeding up the evaluation procedure.

Finally, it will enhance **MOBILITY** for recognition of qualifications purposes which is exactly the goal of ENGCARD.

## THE ONGOING STUDIES AND NEXT STEPS

In order to exhaustively analyze and validate the whole ENGCARD concept, a certain number of studies and further actions needs to be done by October 2006. It includes :

- the finalization of consensus and co-operation between stakeholders,
- the set-up of supporting agreements (and organization - European Institute of Engineers) to vouch for the respect of the Code of Conduct and to warrant



- the end to end reliability/quality and credibility of the concept,
- the finalization of models, procedures and standards for structuring and measuring qualifications & competences,
- the finalization of the design of the card, of the Data Bases and of the business process,
- the decision on the card supplier, the outsourcing facilities and the financial arrangements,
- and the intensive AWARENESS and PROMOTION of the ENGCARD concepts, its deliverables and its added value to all stakeholders.

Afterwards, a pilot project could start from **October 2006 to June 2007** including a limited number of cards (15.000) and of Member States. The estimated budget for such pilot is around 300 KEuros with a mandatory funding by the EC.

Finally, when the pilot will demonstrate encouraging results regarding MOBILITY, a roll out could start **end 2007** all over EU.

## SUMMING-UP

This article has highlighted the vision, the philosophy and the added value

of the ENGCARD concept. ENGCARD is a flexible and comprehensive concept that will facilitate and enhance mobility in its broad sense thanks to an objective, transparent, standardized, certified and trusted presentation of the qualifications of a European engineer, associating a high quality label.

Behind the delivery of a European Engineer Professional Card to an engineer, a long process must have taken place previously to make sure that the system is credible, largely disseminated and accepted by its stakeholders.

Its full potential of benefits and the 'SESAME' role that the card would play in conjunction with the EUROPASS information will only appear afterwards.

ENGCARD is providing added value for the long term to secure quality but also health and consumer protection in a non harmonized professional and educational European and global context.

**The delivery of a professional identity card might become in the future the fourth card each EU citizens will have after his IDENTITY CARD, HIS DRIVING LICENCE CARD and HIS SOCIAL SECURITY CARD.** □



# Modelling perspectives of engineering education in the Slovak Republic

By Prof. Dušan Driensky, EUR ING,  
President of the Slovak Monitoring Committee for FEANI,  
and Assoc.Prof. Pavol Molnár,  
President of the Slovak National Committee for FEANI

**T**he understanding of technical university education supposes, besides the high scientific and professional level, also a certain flexibility in selection of its contents and setting up to a rational system. This contribution outlines one of possible model approaches to the solution of this socially important task.

Ever growing impact of technical sciences and their design and technological applications upon the life of a society increases not only the competence but also the responsibility of engineers and thus also the demands for their education. The concept supposes that a student could acquire within one stage of a close system of theoretical knowledge and practical methods sufficient competence to perform his professional carrier. Universities do not comply with the recent requirements. A modern understanding of the engineering education supposes a well-advised but anyway flexible system being open not only towards the high level University education but also towards the whole Life Long Learning.

The Slovak National Committee of FEANI considers the education of young technical intelligence as one of its main tasks. Therefore it cooperates with its members, some of them well-known university teachers, Ministry of Education of Slovak Republic, to the introduction of new aspects into education of engineers at the technical universities.

We will indicate hereafter some of the questions we are concerned with.

Democratization of engineering study means that the students should be offered such teaching disciplines that would enable them the participation in a well-considered formation of their own professional profile contrary to a determined dogmatic set of teaching programs overfilled with the numerous factographic notions. Such a profile should correspond to professional interests of a student but also to his intellectual capabilities. A graduate of the technical university should not be just a reservoir of diverse, partially understood notions but he should grasp everything that could be called the "branch philosophy". The extent of provided information should be limited, however, the demands on their depth and understanding of wider relationships should be emphasized at the same time. It is also important to coordinate adequately the development of technical skills while improving capacity and capabilities. We will try to suggest a possible theoretical approach to solve this present problem.

## Modeling the content of the reconstruction

The content of the reconstruction of the study program at the technical universities is an extraordinary variable and complex problem. It can be hardly covered in its all constantly

varying components which play the role in diverse functional relationships. Its solution will be simplified if we simulate it in a more acceptable form by the usage of models which suitability will be later verified directly in the pedagogical practice.

Modeling will enable to estimate the volume of teaching matter, optimize the time needed for its managing, to determine the contents and extent of the basic elements of the matter, to solve the horizontal and vertical linkage of the individual teaching disciplines and to set the time schedules, teaching program of the appropriate study branch and teaching curriculum.

Determination of the volume of the matter follows from a very simplified assumption, namely that the contents of education can be expressed as the difference between the required knowledge of a University graduate and the supposed knowledge of a student entering the studies. In particular the knowledge criterion for remembering and reproduction of the knowledge acquired during the studies should be considered but also the level and capability of their creative development and optimum application in problem solution in practice. In spite of the fact that such a definition does not consider the specific features of previous education nor the personal and experience peculiarities of individual students, it is sufficient for an informative assessment of the contents of the university studies. ●●●

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●●● The volume of knowledge that the future engineer should master after graduation from the technical university can be simply understood as the sum of systems of partial notions which integrate into his professional profile.

### Determination of optimum time

The values of education determine the quantity of knowledge, however, they do not express the quality level. That depends not only on the managing of the specified contents but also on the personal characteristics of students, on the percentage component of education (employed teaching forms, teaching methods and the material means used) and also on other factors.

To find the basic comparative unit poses the greatest problem in application of the mentioned simplified relationship for a current study branch, since the selection of criteria is complicated with the peculiarity of single taught disciplines, diversity of teachers' demands, sub-

jectivity in evaluation of priority of certain notions etc. A complex scientific analysis of the whole contents leading to the preparation of an engineer in the appropriate professional branch should be followed in its definition.

Determination of the optimum time for study must follow on one side from the sum of time needed for managing the individual contents components, however, on the other side it must be sufficient in order that the students could understand the functional and correlation relationships among the individual basic elements of the matter and would be able to transfer the knowledge obtained in one subject into another, always when it is necessary from the viewpoint of a synthetic professional overview.

### Basic elements of the study

Definition of basic elements of the study, meant as the quantitatively exactly defined portion of the study contents, which is necessary for the achievement of the educational and learning goals, can be attained

only through the analysis of contents, determination of the general and specific features and considering the functional and causal dependencies.

Through the linkage of the basic elements of the matter by the use of flow diagram and their incorporation into the individual teaching disciplines of the study curriculum, the study programs can then also be devised.

An engineer should know a wide variety of notions to classify them, should master the analysis of substance and interdependencies of the objects and phenomena of his profession, know the structure and methodology of his scientific branch together with its position and acting within the whole society, etc. The knowledge therefore should include not only the technical notions but also those of the natural and social sciences.

Unfortunately their methods cannot be described within the limited extent of this contribution. □

## MASTER EUROPEAN ENGINEERING PROJECT

### L'Airbus A380 : phénomène économique, technique et sociologique

par Gaëtan Sciacco

#### Le « super jumbo » dans la logique du marché

C'est en 1988 que débute l'épopée de l'A380. Le GIE Airbus et ses partenaires, le Français Aerospatiale, l'Allemand Deutsche Airbus (DASA), l'Espagnol CASA et le Britannique British Aerospace, sont en plein essor. La conjoncture est en effet favorable, portée par le succès de la gamme Airbus A300/A310 les débuts prometteurs de l'A320 et le lancement des long-courriers A330 et A340.



© AIRBUS SAS 1987 - Photo: comR MAMLET

**A**irbus ne compte pas en rester là et souhaite réaliser une gamme complète d'appareils couvrant tous les segments du marché. Tous, y compris celui du gros porteur où le Boeing B747 règne sans rival. Cette volonté s'appuie sur trois faits majeurs. D'abord, les analystes, ceux d'Airbus comme de Boeing, tablent sur une croissance du trafic aérien de 5 % par an dans les vingt ans à venir, davantage même dans la zone Asie. Ensuite, transporter plus de passagers revient à accroître le nombre d'avions en circulation, aboutissant immanquablement à la saturation des espaces aériens et des aéroports. Enfin, d'un point de vue opérationnel, les compagnies doivent composer avec les couvre-feux aéroportuaires imposés par des législations de plus en plus draconiennes en termes de diminution de nuisance. S'ajoute la nécessité de faire partir et arriver les passagers à des horaires décents. Toutes ces restrictions aboutissent à réduire les « fenêtres » de décollages-atterrissages disponibles.

Ces points de vue corroborés par les entretiens menés en 1991 par les commerciaux d'Airbus avec une vingtaine de transporteurs. Tous sont d'accord pour affirmer qu'ils mettront un jour en ligne un très gros porteur de 600 passagers et plus. L'économie du secteur du transport aérien obéit en effet à des lois simples. L'une d'elles veut que plus on emporte de passagers dans un avion et plus on diminue le prix au siège-kilomètre, à l'aune duquel les opérateurs jugent la rentabilité des machines.

Dans ces conditions, tous les arguments militent pour le lancement d'un « super jumbo », capable de transporter plus de passagers que le B747-400 avec des coûts d'exploitation inférieurs de 15 %.

## Dix années de gestation pour un géant

À partir de 1990, forts de cette certitude, les ingénieurs d'Airbus se mettent au travail. Lors du Salon de l'aéronautique de Singapour, en février 1992, Airbus présente son futur UHCA (Ultra High Capacity Aircraft), qui devient A3XX en août 1994. Le futur paquebot des airs affiche une configuration à deux étages logés dans une section de fuselage ovoïde, capable d'emporter 530 passagers répartis en trois classes. Peu à peu, les contours de la machine se figent. Il faut toutefois attendre juin 1999 pour que les équipes animées par Jürgen Thomas, Robert Lafontan (directeur technique) et Philippe Jarry (responsable marketing) n'arrêtent les caractéristiques finales de l'appareil. Place alors aux commerciaux, sous l'égide de John Leahy, qui signent les premières commandes (Emirates, Air France, ILFC, Singapore Airlines, Quantas et Virgin Atlantic), acquéreurs de 50 avions fermes et 42 options.

Enfin, le 19 décembre 2000, le P-DG d'Airbus, Noël Forgeard, obtient le feu vert des actionnaires pour le lancement du programme sous le nom d'A380. Pour

anecdote, le chiffre 8 a été retenu car représentant les deux étages superposés de l'appareil et en tant que porte-bonheur dans la culture asiatique.

## Un avion simple

Du point de vue technique, l'A380 n'est pas synonyme de révolution. Ce choix a été délibérément voulu par ses créateurs. En effet, sur un appareil pour lequel, encore plus que pour tout autre, sécurité et fiabilité sont les maîtres-mots, il n'est pas question d'introduire des innovations à risques. Les ingénieurs ont opté pour des technologies déjà éprouvées sur d'autres programmes et dans lesquelles ils avaient une confiance totale. Ainsi, l'A380 représente la synthèse des connaissances aéronautiques de ce début de XXI<sup>e</sup> siècle.

Sur le plan aérodynamique, l'A380-800, premier membre de la famille, est d'une facture très traditionnelle. Malgré ce classicisme, les équipes du programme, dirigées depuis 2001 par Charles Champion, sont confrontées à de nombreux défis. Le premier n'est pas le plus facile à relever car il concerne le poids du mastodonte. Pour l'A380, comme pour tout autre aéronef, la réduction de la masse est un enjeu crucial dont dépendent les qualités de vol et la rentabilité. À chaque kilo gagné, c'est un peu plus de passagers ou de carburant embarqué. Aussi Airbus s'emploie-t-il à faire maigrir son géant.

Pour cela, plusieurs « régimes » peuvent être prescrits. Le premier a recours aux matériaux composites plus légers et plus résistants que l'acier ou l'aluminium. Dans ce domaine, l'A380 bat des records en affichant 25 % de sa structure en composites. Pour ne prendre qu'un exemple, l'intégration de carbone sur le tronçon central génère un gain de masse de 1,5 tonne. Toujours dans le registre des matériaux, l'A380 est le premier avion civil à faire appel au « Glare », alliage de fibre de verre et de feuilles d'aluminium qui résiste aux fissures et à la corrosion. Son emploi, sur les bords d'attaque de la dérive et de la voilure, très exposés aux impacts, génère une économie de 800 kg.

La chasse au poids n'est pas le seul fait des matériaux. Adoptant le vieil adage selon lequel « il n'y a pas de petites économies », les ingénieurs décident d'utiliser un système hydraulique à haute pression, passant de 3 000 à 5 000 psi. Cette modification n'est pas anodine car elle permet de réduire le diamètre des tuyaux (un kilomètre sur l'A380) et d'alléger l'avion d'une tonne.

Dans le domaine de l'avionique, le poste de pilotage de l'A380 se veut d'une grande convivialité. Les ergonomes d'Airbus ont beaucoup réfléchi à l'interface homme-machine, avec le souci de renforcer la lisibilité des informations. Le tableau de bord accueille des écrans de grandes tailles plus faciles à lire. Les pilotes peuvent sélectionner les renseignements affichés grâce à un clavier et une bille roulante (sorte de souris d'ordinateur). L'équipage dispose également d'aides à la

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navigation, à l'atterrissage et au roulage par assistance vidéo, d'identification des appareils voisins. L'A380 s'inscrit dans la lignée des autres appareils de la gamme Airbus en terme de « communalité ». Ce concept permet à un pilote d'être qualifié simultanément sur plusieurs types de machines et de passer de l'une à l'autre selon les besoins de sa compagnie. Ainsi un commandant de bord qualifié sur l'A340 peut passer sur A380 moyennant huit jours d'entraînement seulement.

En termes de contrôle de vol, l'A380 reprend et optimise les commandes de vol électriques (CDVE) mises au point pour l'A320. Ce système assure le contrôle des surfaces mobiles de l'appareil (ailerons, spoilers, gouvernes de profondeur). Conséquence de cet emploi : l'installation du mini-manche, désormais classique sur tous les Airbus, qui permet un pilotage extrêmement précis.

Cette liste des prouesses réalisées par les ingénieurs d'Airbus est loin d'être exhaustive, la plupart demeurent cachées au passager, tout en contribuant à son bien-être et à sa sécurité.

## Un nouvel art du voyage aérien

Ce que les passagers pourront par contre constater en entrant dans l'A380, c'est le vaste espace qui leur est offert. Par rapport au Boeing B747-400ER, le paquebot d'Airbus affiche 50 % de surface habitable en plus pour seulement 33 % de voyageurs supplémentaires. Les sièges sont plus espacés, y compris en classe économique, les allées plus larges pour faciliter la circulation des passagers. Pour tirer le meilleur parti de cette cabine, Airbus a donné carte blanche aux « designers » pour penser un nouvel art du voyage. L'A380 peut ainsi recevoir des installations jusqu'alors réservées aux paquebots ou aux hôtels de luxe : bars, casinos, boutiques, salles de repos. L'équipage n'est pas oublié : la vingtaine d'hôtesse et de stewards au service des passagers se voit offrir des espaces de détente avec couchettes.

## Les grands travaux d'Airbus

Depuis longtemps, l'outil industriel créé par Airbus repose sur la spécialisation des usines. Cette organisation est basée sur le partage équitable des tâches et évite les redondances de compétences. L'A380 ne déroge pas à cette règle.

En Allemagne, sept usines (Hambourg, Brême, Varel, Stade, Nordenham, Laupheim et Buxtehude) sont en charge de l'assemblage de plusieurs éléments, de l'aménagement commercial de la cabine et de la décoration de l'avion selon les souhaits de la compagnie cliente.

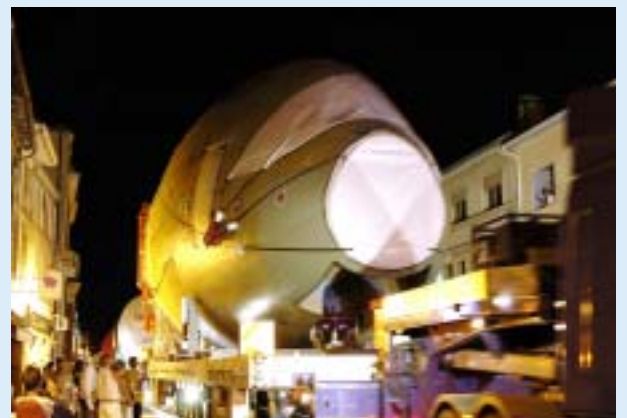
La Grande-Bretagne est traditionnellement le pays des ailes des Airbus. Une nouvelle usine dédiée à la fabrication des voilures a été inaugurée à Broughton. Près de Bristol, à Filton, Airbus a investi dans un nouveau centre de fabrication et dans le plus grand banc d'essai au monde de trains d'atterrissage. L'Espagne abrite trois implantations : Getafe, Illescas et Puerto Real. Ce dernier site produit le carénage ventral le plus grand au monde.

En France, Nantes est conforté dans son activité structures composites par la fabrication du caisson central de voilure. Saint-Nazaire assemble une grande partie du fuselage et Méaulte (Picardie) la pointe avant. C'est vers Toulouse, capitale de l'aviation européenne, que convergent toutes ces structures. À Blagnac, la ZAC AéroConstellation abrite le site de montage de l'A380, baptisé Jean-Luc Lagardère. Le hall est à la mesure du géant qu'il héberge : 490 m de long, 250 m de large, une superficie de 10 hectares. Les 8 000 tonnes du toit s'élèvent à 46 m de hauteur. La construction de ce bâtiment a nécessité plus de 32 000 tonnes d'acier, soit quatre fois la masse de la Tour Eiffel. L'usine recèle aussi son lot d'innovations. La plus importante concerne l'organisation du travail. Contrairement aux autres Airbus, l'A380 est assemblé sur un seul poste, abolissant les déplacements longs et délicats de l'avion. Le cycle de montage est ainsi réduit à une semaine, soit en rythme de croisière, la sortie de quatre avions par mois.

Tous les sous-ensembles rejoignent les bords de la Garonne pour donner naissance au très gros porteur. Mais, étant donné la taille des pièces, Airbus a dû revoir tout son processus de transport et l'adapter à l'A380.

## Tous les chemins mènent à Toulouse

Jusqu'à là, les Airbus arrivaient sur leurs lieux d'assemblage final par la voie des airs, transportés en pièces détachées par l'Airbus Super Transporter « Beluga ». Mais pour l'A380, la « baleine » se révèle trop petite. La solution retenue amène l'A380 à accomplir un périple dans les airs, mais aussi par voie maritime, fluviale et terrestre. Faire arriver chaque élément du puzzle en temps et en heure sur son lieu d'équipement ou de montage est une véritable gageure. Pourtant l'organisation mise en place par Airbus fonctionne telle une « horloge suisse ». Le Beluga conserve son importance puisqu'il assure le transport des « petites » structures. Le nez de l'A380 arrive ainsi en provenance de Méaulte à Saint-Nazaire. Le fuselage arrière fabriqué en Espagne est transporté à Stade, pendant que la dérive passe de ce même site à Toulouse.



# ENGINEERING PROJECT

Tout naturellement, une grande part du transport du paquebot de l'air se fait par bateau, le « Ville de Bordeaux ». Naviguant à 21 nœuds (39 km/h), il effectue du cabotage entre les ports de Hambourg, Mostyn près de Broughton, Saint-Nazaire et Cadix. À chaque escale, il récupère dans ses cales les composants de l'A380. Son voyage s'achève à Pauillac, dans l'estuaire de la Gironde.

Toutes les pièces sont ensuite transférées sur des barges qui rejoignent le port fluvial de Langon. À Bordeaux, le passage du « Pont de pierres » donne lieu à une manœuvre délicate. Elle ne peut se faire qu'à marée basse tant l'espace est faible entre le navire et l'édifice.

À Langon, débute la dernière partie du voyage par la route à grand gabarit (240 km) spécialement aménagée pour l'A380. Les convois, constitués de six semi-remorques, roulent à la vitesse de 10 à 30 km/h. Ne circulant pas de jour, trois nuits sont nécessaires pour parvenir à destination. Ils traversent ainsi les campagnes de Gironde, des Landes, du Gers et de la Haute-Garonne. Dans le petit village de Lévigac, les tronçons dépassent le toit des habitations qu'ils frôlent à moins d'un mètre. Enfin, les pièces rejoignent l'usine Jean-Luc Lagardère, berceau du géant.



## Le programme A380 aujourd'hui

L'A380 a effectué son premier vol le 27 avril 2005. Depuis cette date, quatre appareils ont pris l'air pour mener à bien une campagne d'essais de 2 500 heures de vol. Au terme de cette période, l'avion recevra sa certification (autorisation de vol) fin 2006.

Les machines sont soumises aux pires tortures pour tester toutes les configurations de vol et tous les systèmes. Début 2006, l'A380 a effectué une campagne « haut et chaud » à Medellin (Colombie) à une altitude de 1 500m. D'autres essais temps chaud sont programmés en Afrique pour affronter des températures de 40°C. À l'opposé, l'avion n°4 a séjourné dans le grand Nord canadien (Nunavut) où il a été soumis à l'épreuve du froid (-30°C).

Pendant ce temps, deux cellules d'avions, l'une à Dresde, l'autre à Toulouse subissent des essais statiques destinés à éprouver la résistance des structures aux contraintes du vol. Sur ces bancs d'essais sont notamment simulés les efforts supportés par l'avion au cours de 47 500 cycles (atterrissage/décollage), soit 25 ans de service commercial. Tous les composants de la machine sont poussés à l'extrême afin de garantir la sécurité des passagers. En mars 2006, le très gros porteur bénéficie de 159 commandes émanant de 16 compagnies. Les premières livraisons doivent intervenir fin 2006. Airbus, dirigé depuis juin 2005 par Gustav Humbert, ne souhaite pas en rester là. L'histoire de l'A380 ne fait que commencer. □



### L'auteur :

**Gaëtan Sciacco** : DEA d'Histoire contemporaine, travaille au Centre de documentation d'Airbus France (Toulouse). Auteur de « *Aérospatiale Suresnes: une vocation aéronautique* », 90 p, 1996 et de « *La passion de la conquête : d'Aérospatiale à EADS 1970-2000* » Ed. du Chêne, 303 p, 2001.



The Italian Government has approved the new regulation proposed by the Ministry of University and Research (MIUR) to have access to the State Exam and, therefore, to be enrolled in the various professional Albos on March 29, 2006. The matter was up to now ruled by the DPR 328/01, which implemented the introduction in the academic system of the 3+2 path following the Bologna Declaration.

The changes to the above mentioned Decree are substantial: as far as engineers are concerned, the main novelty is the introduction of a compulsory professional training of one year before having access to the State Exam; the Laurea Classes, defined in the DM 270/2004, were reviewed; the composition of the examining commissions as well as the formalities of the exams were modified to make them more transparent, qualifying and homogeneous on the whole national territory. Together with the representatives of the Deans of the Faculties at issue, representatives of the professional Ordini were, for the first time, in a Ministerial Commission drawing up a text relevant to professions.

Going back to the training in the engineering profession, it shall have a continuative duration, shall be supervised by a tutor member of the Albo for at least five years, it may be performed completely or partly during the study course not to lengthen the period to enter the working market (this shall be enabled by agreements between the Ordini and the universities within the limits provided for by the Ministry of Education and the Ministry of Justice), it may be carried out in public and private structures, the latter being accredited by the professional Ordini.

The Laurea Classes having access to the Albo are the same, but it was definitely confirmed that the Laureati in computer science and in Information Science will have access

to the Engineers' Albo both in section A and B in the computer science section.

The legal value of the Italian academic titles was reaffirmed and Article 5 provides that the academic titles awarded at the completion of study courses of the same level have the same legal value for the purposes of the access to the state exam, independently on their formation contents.

The new regulation might come into force already in the second exams sessions in 2006, even if the law provides for a series of provisional regulations to "guarantee the expectations of the young being about to enter in the labour market" (*Press release of the Ministry of Education*). □

## The New Italian Regulation relevant to the Access to the State Exam



### Swiss Engineers aim to bring World Engineers' Convention (WEC)

#### 2011 to Geneva

**The Swiss National Committee of FEANI aims to host the fourth World Engineers' Convention in September 2011 in Geneva. At the beginning of March it submitted its official bid to the World Federation of Engineering Organisations (WFEO).**

The "World Engineers' Convention" (WEC) is held by the World Federation of Engineering Organisations every three to four years. Following the World Engineers' Conventions in Hanover (2000) and Shanghai (2004), the next WEC will be held in 2008 in Brazil. On 3<sup>rd</sup> March in Budapest, the Swiss National Committee of FEANI – consisting of the Society "Swiss Engineering" (STV) and the "Swiss Society of Engineers and Architects" (SIA) which represent Switzerland at the WFEO - submitted its bid to host the World Engineers Convention 2011 in

Geneva. The proposed dates are from 5<sup>th</sup> to 7<sup>th</sup> September 2011. It is expected that the WFEO will reach a decision by the end of 2006.

#### Engineers and the "Energy challenge"

The preliminary theme of the World Engineers Convention 2011 in Geneva is "Engineers and the Energy Challenge". It is hoped that an interesting programme will attract over 3.000 engineers and researchers from all over the world. The Geneva municipal government has already assured organising bodies of its support. In addition, the Swiss Academy of Engineering Sciences (SATW) is lending its support to the bid.

The last World Engineers Convention took place from 3<sup>rd</sup> to 6<sup>th</sup> November 2004, in Shanghai. The biggest international meeting of engineers of its kind featured not only top-class series of lectures and discussions dealing with the topic "Engineers Shape the Sustainable Future" but gave engineers, pupils and students alike the opportunity to present their projects to a broad and international audience of experts.

For further information please visit [www.sia.ch](http://www.sia.ch) and [www.swissengineering.ch](http://www.swissengineering.ch) □



## Representatives of materials sciences join forces – Information office founded in Berlin for better cooperation

Under the auspices of the German Association of technical and scientific organisations, DVT, representatives from 16 non-profit societies in the field of materials sciences (MS) have agreed upon setting up a joint information office. This office will coordinate research, knowledge transfer, public relations, and campaigning for future students of MS. It will be run and paid for by the Federal Institute for materials research and testing (BAM) and supported by some of the technical societies. The foundation of the information office is due to the change in understanding how important materials sciences are for the economy. It is estimated that MS are responsible for almost 4 millions jobs and for nearly 15% of the gross net product in Britain. Figures for Germany indicate the same development. Participants of the meeting in Berlin take this decision as a starting point for a serious handling of this matter in the future.



Teilnehmer des Treffens von 16 technisch-wissenschaftlichen Fachgesellschaften aus dem Bereich von Materialwissenschaft und Werkstofftechnik am 20. März in Berlin. In der Mitte (mit roter Krawatte und dunklem Anzug) Prof. Dr.-Ing. Hubertus Christ, DVT-Vorsitzender, und zweiter von rechts Dipl.-Pl. Jörg Maas, Generalsekretär des Deutschen Nationalkomitees der FEANI

### Schulterschluss: Materialwissenschaften und Werkstofftechnik erhalten ein gemeinsames Informationssekretariat

Um die Bereiche Materialwissenschaften und Werkstofftechnik (M&W) stand es bisher schlecht in Deutschland. Zu diesem Schluss kam 1996 bereits der deutsche „Wissenschaftsrat“ in einer Stellungnahme und äußerte sich kritisch zu deren Perspektiven. Kern des Problems: Die Materialwissenschaften und die Werkstofftechnik verfügen über keine eigenständige Vertretung gegenüber Förderern, Politik, Wirtschaft und Verwaltung. Die fehlende Interdisziplinarität, die mangelnde Koordination der Öffentlichkeitsarbeit sowie die schlechte Nachwuchssicherung in diesen Schlüsseltechnologien verschlechtern ihre Zukunftschancen noch mehr. Vertreter von 16 Fachgesellschaften haben sich deshalb am 20. März in Berlin auf Vorschläge für eine gemeinsame Interessenvertretung und ein untereinander abgestimmtes Vorgehen in Forschung, Entwicklung und Wissenstransfer geeinigt.

Die Initiatoren der Idee, die Deutsche Forschungsgemeinschaft (DFG) und das Bundesministerium für Bildung und Forschung (BMBF), machten sich bei ihrem Vorhaben zunutze, dass zahlreiche M&W-Fachgesellschaften Mitglied im DVT sind und der DVT somit als neutrale Plattform für die Lösung der gemeinsamen Fragen dienen konnte.

In zwei Gesprächen der Fachgesellschaften im Abstand von zwei Monaten wurden unter der Leitung des DVT Vorstellungen und Ideen zum Selbstverständnis, zur Struktur und zu den Wirkungsmöglichkeiten eines gemeinsamen „Bundesverbandes Materialwissenschaften und Werkstofftechnik“ gesammelt. Anschließend wurden die Teilnehmer gebeten, ihre Vorstellungen zu konkretisieren und insbesondere Ideen zur Unterstützung einer gemeinsamen Organisation vorzulegen.

In der Schlussitzung einigten sich die Vertreter der anwesenden Fachgesellschaften darauf, den Vorschlag der Bundesanstalt für Materialforschung und –prüfung (BAM), einer Bundesoberbehörde im Geschäftsbereich des Bundesministeriums Wirtschaft und Technologie, umzusetzen, der Folgendes vorsieht:

- \* Einrichtung eines Informationssekretariates für M&W-Aktivitäten
- \* Kostenlose Unterstützung dieses Sekretariats durch Personalgestellung, Räumlichkeiten, Geräte und Kommunikationsmittel zunächst für ein Jahr

Der Aufbau des Informationssekretariates wird von den Fachgesellschaften mit gezielten Dienstleistungen unterstützt, so z.B. für die Pflege der gemeinsamen Homepage, Tagungskalender und weitere zentrale Services.

Darüber hinaus wird der Aufbau voraussichtlich durch eine Studie begleitet, die eine koordinierte Strategie zur Erhöhung der Effizienz und Zukunftsorientierung der Fachgesellschaften im Bereich M&W entwickeln soll. Die Studie will insbesondere globale Trends und Entwicklungen behandeln. Die Ergebnisse sollen helfen, die deutsche Technologieführerschaft in ausgewählten Forschungsbereichen zu sichern. Die Studie befindet sich momentan noch in der Antragsphase.

Als Ansporn für die schnelle Einigung dienten auch die jüngst bekannt gewordenen Bemühungen in Großbritannien, die eine „Strategy for materials“ vorsehen. Die Ziele sind dieselben wie in Deutschland. Aus der Erkenntnis heraus, dass die Materialwissenschaften und die Werkstofftechnik erheblichen Anteil am Bruttosozialprodukt haben (15% in GB) und dass zahlreiche Arbeitsplätze von ihr direkt oder indirekt abhängen, sollen die nationale Materialforschung und die bessere Umsetzung ihrer Resultate in die wirtschaftliche Anwendung gefördert werden. □

Jörg Maas  
Generalsekretär des Deutschen  
Nationalkomitees der FEANI



**Ing. Helga Pizzuto**



**The Chamber of Engineers has a new Council following the Annual General Meeting held on the 23rd February. The Chamber can this year boast of a milestone in the Chamber of Engineers' history having elected Ing. Helga Pizzuto as the first woman president.**



**Ing. Helga Pizzuto** graduated as an electrical engineer from the University of Malta in 1983. She brings to the Chamber a wealth of experience, having

occupied senior management positions in the private and public sector. Throughout her career she has worked within the local electronics manufacturing and telecommunications sectors. She has also held the position of head of the Management Efficiency Unit, Government's in-house consultancy group. She currently provides independent consultancy services.

In April, the new Council met with the Hon. Ninu Zammit, Minister for Resources and Infrastructure, under whose portfolio fall the Engineering Profession Act and the Engineering Board. In her address Ing. Pizzuto highlighted the Council's strategic objectives, namely that of ensuring that the quality of the engineering profession remains of the highest level and that of facilitating the profession's contribution to the social and economic advancement of the country.

Throughout the coming year, the Council intends to actively explore new opportunities and avenues, in line

with its mission, in order to ensure that the Chamber continues to be relevant to the profession and its members. In particular, the Chamber will be looking at mechanisms for supporting the continuing professional development of its members and it will be actively promoting the profession within the highest levels of Government and within industry.

The upcoming main event for 2006 will be the 15<sup>th</sup> Annual Engineering Conference which will discuss Research and Development in a small nation state. This Conference aims to highlight the work that is already being done by the various key players in the field, both of an academic nature as well as in industry and to bring under the spotlight the opportunities that exist and which need to be exploited. The Conference presents the vision and national strategy for RDI and the programmes and initiatives that are currently available. In addition it identifies the issues relevant to R&D in a small nation and will be addressed by both local and international speakers.

The Chamber has also secured a regular slot on the National Education Television Channel. This initiative will deliver a better exposure of the Engineering Profession to the general public. □

FEANI NATIONAL MEMBERS

## **Research and Development – Our Hidden Potential – 15<sup>th</sup> Annual Engineering Conference**

On the 27<sup>th</sup> April the Chamber of Engineers held its 15<sup>th</sup> Annual Engineering Conference which was very well attended and also reported in the local press. This year's theme was especially relevant in view of the emphasis that has been placed by Government on the importance of research, development and innovation as a key driver of the economic development of our country.

A number of international and local speakers participated to provide an interesting and valuable programme. The Conference presented the vision and national strategy for RDI and the programmes and initiatives that are currently available. It also highlight the work that is already being done by the various key players in the field, both in academia as well as in industry and brought under the spotlight the opportunities that exist and which need to be exploited. Issues relevant to R&D in a small nation were also identified. The presentations served to emphasis the key role that the engineering profession has to play both



in the area of basic research as well as in the applied research and development fields.

The Conference also provided a forum for information sharing as well as for generating dialogue with a view to identifying approaches that can be adopted in order to make a commercial success of research and development activities in Malta. It also encouraged engineers to take a leading role as champions of new and innovative technology within the local industry. □

**Ing. Helga Pizzuto,  
President Chamber of Engineers Malta**



## World Congress on Engineering Education

Hungary was the host country of the 7<sup>th</sup> WFEO World Congress on Engineering Education between the 4-8 March, 2006.

Hungary, as a new member of the European Union is in a strong economic development, which is partly due to the high-level engineering education in our country.

The World Congress was hosted by the Hungarian Academy of Engineering, the Federation of Technical and Scientific Societies and the Budapest University of Technology and Economics. One of the main tasks of the World Congress was to discuss issues of role and perspectives of the engineering mobility in our globalized world.

The main tracks of the World Congress were:

- ◆ Accreditation of engineering qualifications
- ◆ Establishing substantial equivalence
- ◆ Regional agreements
- ◆ Registration and licensing
- ◆ Case studies from industry on mobility issues
- ◆ Curriculum to promote the mobility of engineering students
- ◆ Special issues of engineering education

The Opening Plenary Session was held in the Upper House of the Hungarian Parliament, where among others Mr. László Mandur Vice President of the Parliament –, Mr. Kamel Ayadi, President of WFEO, Mr. Bálint Magyar, Minister of Education, Mr. Kálmán Kovács, Minister of Informatics and Communications, Mr. Gábor Náray-Szabó, Vice-President of MTESZ, and Mr. Károly Molnár, Rector of BME greeted the 280 participants, who arrived from 41 countries. In the absence of D.Willi Fuchs, President of FEANI Mr. Philippe Wauters held a keynote address "A

way to the International Comparability of Engineering Education". The presentations, the Proceeding as well as some selected photos are available at <http://congress.mti.bme.hu>.

As a conclusion of the world Congress the following declaration was accepted by the participants:

The participants of the 7<sup>th</sup> WFEO World Congress on Engineering Education in the main topics of "Mobility of Engineers" held in Budapest between the 4-7 March 2006 declared, that the Engineering Community has an essential role in promoting central issues of engineering education like quality of education, accreditation on engineering qualification, regional agreements, establishing substantial equivalence, curriculum (including interdisciplinary system-based subjects as well) and innovation.

It is essential, that engineering education of our new century – based on up-to – date research activities – must reflect issues like effects of globalization, importance of sustainability, the protection of natural and built environment, methods for poverty reduction, capacity building and must deal with initiatives in technological development and through these actions must contribute to the conditions of social welfare of humankind. Engineering education must prepare the future generation of engineers providing them with knowledge needed for the future world with knowledge, responsibility and competencies. These values are essential in order to help the mobility of engineers world-wide.

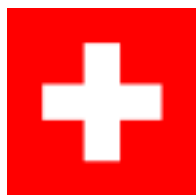
The participants agreed, that the engineering profession itself must represent a bridge between science and technology, and engineering education must reflect the interaction of engineers in industry and academia.

The Life-Long Learning for engineers should contain disciplines, which represent this bridge-role and help to take into account the global interests and help to safeguard the national interests and values as well as professional ethics. □

Mrs. Zsuzsanna Sárközi Zágoni  
Chief Counsellor, Secretary General of HNC for FEANI



Mr. Ph. Wauters, FEANI Secretary General



## Master-Degree für altrechtliche Fachhochschul-Titelinhaber

**D**er Schweizer Ingenieurverband Swiss Engineering STV – zusammen mit dem Schweizerischen Ingenieur- und Architektenverein SIA Träger des Schweizer Nationalkomitees der FEANI - setzt sich für ein massgeschneidertes Master-Angebot ein, womit Inhaber der altrechtlichen Fachhochschul-Titel (dipl. Ing. FH), mit einer „angemessenen Zusatzleistung“ einen Master-Degree erwerben können, ohne ein ganzes Studium absolvieren zu müssen. Eine Mitgliederumfrage dazu hat grosses und positives Echo ausgelöst.

Nach Ansicht von Swiss Engineering STV muss eine Lösung gefunden werden, damit Ingenieure und Architekten für ihre Tätigkeit im Ausland (speziell EU-Raum) die Berufsbefähigung behalten oder neu erhalten können. Im EU-Raum gewinnt der Master Degree an Bedeutung. Swiss Engineering STV geht davon aus, dass Bachelor Degrees v.a. bei regulierten Tätigkeiten eher einen geringen Wert haben werden: Selbständiges Arbeiten als Ingenieur im EU-Raum wird, so die Prämisse des Verbandes, mehrheitlich den Master Degree bedingen. Es geht also darum, zu sorgen, dass unsere Ingenieure und Architekten mit einem Master-Degree ins Ausland können: Für Studierende im neuen Bologna-System ist dies kein Problem, es gilt jedoch eine Lösung zu suchen für die Inhaber der altrechtlichen Titel HTL und FH.

### Vorleistungen anrechnen

Altrechtliche Titelinhaber FH sollen mit einer adäquaten Zusatzleistung einen Master-Degree erwerben können – dieses Vorgehen steht in Analogie zum Vorgehen im Berufsbildungsbereich in der Schweiz: Es geht darum, „aequivalent erworbene Leistungen“ in einem Titel abzubilden. Swiss Engineering STV prüft deshalb in Zusammenarbeit mit dem zuständigen Bundesamt für Berufsbildung und Technologie (BBT) ein Angebot eines massgeschneiderten Master-Studiums für Inhaberinnen und Inhaber eines FH-Abschlusses im Bereich Technik. Geprüft wird in einem ersten Schritt, ob und in welchem Umfang andere Lernleistungen, wie Nachdiplomstudien (resp. Master of Advanced Studies MAS) und berufsbegleitende Kurse sowie die entsprechende Berufserfahrung berücksichtigt werden können: Je nach Erfahrung und bereits erworbenem Wissen hätten Studierende eines solchen Masterstudienganges nur noch einen Teil der Module – zum Beispiel nur noch die Hälfte - zu absolvieren, da bereits erworbenes Wissen, Weiterbildung und Berufserfahrung angerechnet werden könnten.

### Bedürfnis ist ausgewiesen

Zu Beginn dieses Projektes wurde am 2. Februar eine Umfrage unter den Mitgliedern von Swiss Engineering STV und weiteren Interessierten lanciert, welche das Bedürfnis nach einem solchen Angebot sowie die Bereitschaft, Zeit und Geld zu investieren, klären soll (<http://www.swissengineering.ch/Master/d>). Der bisherige Rücklauf hat all unsere Erwartungen weit übertroffen: In nur einer Woche haben über 2'600 FH-Architekten und -Ingenieure an der Umfrage teilgenommen, bis Ende März ist diese Zahl auf über 3'700 Ingenieure und Architekten HTL / FH angestiegen. Gemessen an den ca. 74'000 FH-Ingenieuren in der Schweiz (Basis Volkszählung 2000) entspricht dies einer Beteiligung von mindestens 4.5%, was statistisch als gute Beteiligung gewertet werden muss. 89% der Umfrageteilnehmer sind daran interessiert, mit einem Teil eines berufsbegleitenden Studiums einen Masterdegree zu erlangen und würden dazu ein bis 2 Semester aufwenden. Davon sind immerhin ein Viertel bereit, sogar mehr als 2 Semester Zeit aufzuwenden. Die Umfrageteilnehmer sind sich bewusst, dass ein solches Studium neben Zeit auch finanzielle Aufwendungen bedeutet: 36% wären bereit, bis max. 6'000 Franken aufzuwenden, 31% wären bereit, sogar bis 10'000 Franken zu bezahlen. Ein Viertel der Teilnehmenden ist der Meinung, dass ein solcher Studiengang weniger als 6'000 Franken kosten müsste.

### Master wichtig für „Marktwert“

Zwei Drittel der FH-Titelinhaber sagen aus, dass der Master-Degree „wichtig für ihren Marktwert“ sei, 67% erwähnen die „Auslandkompatibilität“ als Motivation für einen solchen Studiengang. 9% sind der Meinung, dass der Master-Titel „für ihre Berufsausübung zwingend“ sei. In vielen individuellen Antworten der Umfrageteilnehmenden wird zudem die Angst vor einer Abwertung des FH-Titels im Bolognasystem ausgedrückt. 87% der Umfrageteilnehmer erwarten von einem solchen Masterstudiengang, dass er berufsbegleitend angeboten würde. Zwei Drittel wünschen inhaltliche Schwerpunkte in den Bereichen Management, Führung und Finance, 47% möchten mit einem solchen Studium eine fachliche Vertiefung in ihrem Fachgebiet. Die vollständigen Umfrageergebnisse sind unter [www.swissengineering.ch](http://www.swissengineering.ch) einsehbar. Mitte Mai 2006 hat Swiss Engineering STV die Gelegenheit, das Projekt den Vertretern der Fachhochschulen und den zuständigen politischen Behörden vorzustellen. Der Verband würde sich über Meinungen und Reaktionen der FEANI-Nationalkomitees freuen ([info@swissengineering.ch](mailto:info@swissengineering.ch)).