



The Croatian Academy of Engineering is a Member of the International Council of Academies of Engineering and Technological Sciences (CAETS), Inc., Washington D.C., U.S.A.

## Letter of the President

The Croatian Academy of Engineering (HATZ) was established shortly after the international recognition of the Republic of Croatia as an independent State and a full member of the U. N. In spite of the long Croatian tradition in higher education, which dates since 1669, and the activity of the Academy of Sciences and Arts since 1875, first as Yugoslav, and later, from 1992, as Croatian national institution, the organized approach to technical and biotechnical sciences was not initiated until the constitution of the HATZ.

In the year of celebrating the 10<sup>th</sup> Anniversary of the HATZ, 2003, the new Governing Board was elected, and I was elected President for the next two years. At this moment I have to say that I am grateful to all the members for investing me with their confidence to be a head of such an important scientific association, which gathers the membership elected on the same basis as members of the other scientific academies around the world. Having in mind that the HATZ has established its *numerus clausus* for Full and Associate Members, it means that the elected members are the scientists with the highest international recognition within their fields. They have also accomplished a large number of achievements in cooperation with industry, either in Croatia or abroad, including all continents.

Therefore, at this, for Croatia very important time, we would like to provide all companies and associations around the world (particularly the CAETS members), with the information of how to make, jointly with others, the bigger steps towards faster implementation of high technology discoveries in the production, and also how to participate in developing new technologies for our benefit. Several years ago, the "Engineering Power" was published as a Croatian window to the world. Since 1999, this activity had stopped and the new Editorial Board decided to continue this activity.

Firstly, I would like to invite all readers to visit our website (<http://www.hatz.hr>) and learn some important information about the HATZ. We are also very proud that, after being 10 years without our own location for our numerous activities, by kind support of the University of Zagreb and the Ministry of Science, Education and Sport, we have just finished a small but very pleasant place where we can host a lot of expert meetings in the future. At the same time, due to proximity of almost all technical and biotechnical faculties, as well as to the fact that our membership consists of top scientists and experts from various technical and biotechnical disciplines, we are capable of organizing highly sophisticated courses for engineers and technicians from the different fields. The activities of the HATZ are not located in Zagreb only, because our members come from all different parts of Croatia, like Rijeka, Split, Osijek, Slavonski Brod, Sisak, Varaždin. This is particularly important, because the Croatian industry is also dispersed throughout the country, and our particular interest is also set on maritime technologies as well as on communication, civil engineering, environmental protection, electronics, food engineering, chemical engineering and biotechnology.

The international experience and activity of our members has been recognized for a long time now, and at different levels. Our members also act as members or chairmen of international scientific associations, experts of the U. N. or the E. U., and participants at the different current scientific projects. Therefore, we can say that, after the first ten years of internal structuration, now we are approaching the active international cooperation, exchange and education of the new generation of scientists that will be capable to participate in the future technological developments, having in mind the necessity of sustainable development and environmental protection for the benefit of future generations.

I am particularly convinced that we all together can make this great step forward and help younger generation to develop the awareness that only by such a use of the natural resources, which includes also the obligation to protect these resources, the mankind can survive on the Earth.

Zlatko Kniewald

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# Engineering in the Changing Environment

Today's industrially developed communities are markedly technically and mercantile-oriented, with declared desires to improve the quality of living and preserve the environment. New and improved technical products (in the widest sense, including also processes, methods, procedures, etc.) lie in the focus of economic survival and added value generation.

Faced by the changed system of values within the engineering and society, we are simply forced to consider the elements of the present paradigm in the functioning of the technical professions, which is very different compared to the previous periods of civilisation development. The personal perception of some of the new tasks and roles of the technical professions can be summarised in the following theses:

Industrial and post-industrial society are characterised by the expansion and the setting of **new requirements** in the development of products and procedures. Here are additionally **ecological, aesthetic, legal** (e.g. protection of the new), **sociological and psychological** (e.g. generating of "fictitious" demands for the new), **ethical and cultural** criteria (e.g. movement or setting of the production in another cultural community or production of goods adapted to a certain civilisation and culture environment).

The implementation of the concept of sustainable (integral) development requires implementation of a precisely such (holistic) approach. Therefore, optimal solutions are constantly searched for, with changed criteria of evaluation, in ever shorter time cycles.

One can notice a **lack of managerial knowledge**, first of all the economic and legal knowledge, of engineers in managerial positions who make decisions on investments, production locations, purchase of enterprises, etc. Some say that engineers needn't tackle this type of tasks, but should rather only stick to solving the strictly technical problems. However, many cases from the practice show that, unlike others, the engineering way of thinking is more systematic, oriented to the understanding of the processes, and in turn also more logical, more integral, and pragmatically and target-oriented. It should be considered whether today the economists, lawyers or politologists, as well as other professions that make decisions more frequently, should acquire additional technical education!? Many will argue that this would require more efforts and that it would hardly yield satisfactory results.

The necessity of **interdisciplinary and transdisciplinary** teamwork is closely connected with the previously emphasised need for wider education of technical and other

professions as well. Complex integrated knowledge is necessary for solving a number of actual development problems. Efficient combination of natural sciences, engineering and other knowledge often represents a constraint in the realisation of ideas. The problem lies in the lack of understanding and maladjusted communication among professions – i.e. the same problem being discussed in different "languages".

Some examples can be found in the areas of medical technology, mechatronics, communication, new materials, biotechnology, nanotechnology, microtechnology, physical technology (e.g. laser, plasma, etc.).

The problem of **searching for and synthesis of knowledge** necessary to solve real problems is increasingly emphasised. The human mind is greatly limited by the need to handle fast the growing mass of information and knowledge. We are participants and generators of entropy of new facts and knowledge in all the fields of human activities, contributed by their omnipresent availability, thanks to computers and communication technology.

**Creativity and innovativeness** are the most desired characteristics of today's scientists and development engineers, due to the increasing saturation by products on the market. The constant pressure to which technical engineers are subjected to create new solutions in ever shorter periods of time causes their frustration.

The lack of readiness to change one's own attitudes and generally **the resistance to changes**, and also the lack of **desire to learn** represent the biggest brakes and barriers of development in all the fields, including engineering.

It may be subjective to consider that the non-technical environment is showing **insufficient understanding** or certain blindness for the technological contributions to the quality of living. The admiration for technical solutions is losing its intensity, as the constant generation of new products has been taken for granted by the environment (e.g. new makes of cars, computer models, electronics, household appliances, etc.).

It is only logical to start to adapt to such a new situation in the educational system, which is to a great extent inert regarding changes. More radical changes are needed regarding traditional educational methods. The higher education curricula need to be supplemented by an option of syllabuses from other fields, training in teamwork and project-oriented problem solving, creative approaches, methodology of information search and study, and similar.

Tomislav Filetin

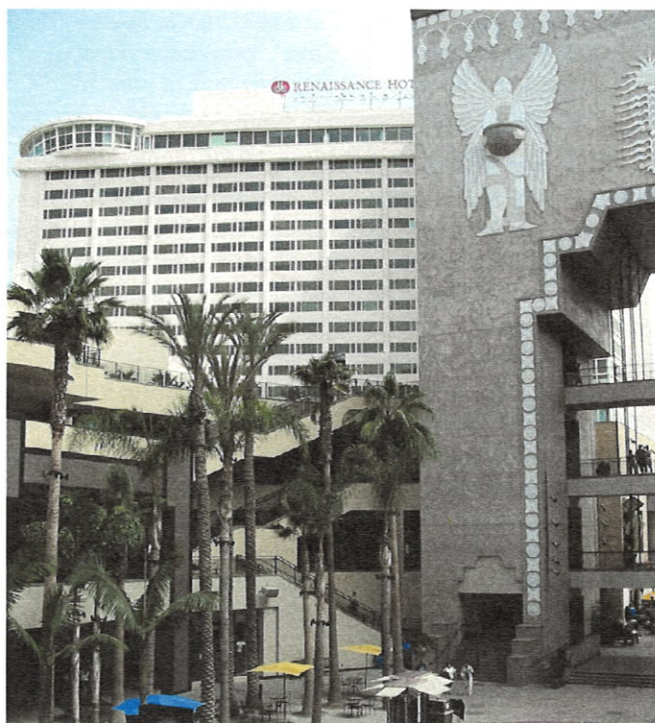
# 25<sup>th</sup> Annual Meeting of the International Council of Academies of Engineering and Technological Sciences (CAETS)

The 25th Annual Meeting of the International Council of Academies of Engineering and Technological Sciences took place on May 18-22, 2003, at the Renaissance Hollywood Hotel at Los Angeles, California, U.S.A

On May 18-21st the CAETS, celebrating its 25<sup>th</sup> Anniversary, organized the “15th CAETS Convocation – Entertaining bytes”, with participation of the most prominent producers of Hollywood film industry, and we were informed about the newest techniques applied in the film industry and film production.

At the CAETS Meeting on May 22, under the guidance of the CAETS President, Mr. Wm. A. Wulf, the delegations from 19 countries were present (from the total of 26 CAETS Member Academies). There were also 43 delegates from Australia, Belgium, Canada, Czech Republic, Croatia, Denmark, Finland, Great Britain, Hungary, India, Japan, Korea, Mexico, Netherlands, Norway, Spain, Sweden, Switzerland and U.S.A.

The Croatian delegation consisted of two delegates representing the Croatian Academy of Engineering (HATZ): Mr. Zlatko Kniewald, Head of the delegation, at the time of Meeting nominated for the President of the Croatian Academy of Engineering (elected May 25 2003), and Mrs. Jasna Kniewald, Chair of the HATZ Council for International Co-operation between Academies.



The President of the CAETS for 2003, Dr. William A. Wulf, presenting the development of National Academy of Engineering of the U.S.A. (NAE), gave an introductory speech at the Meeting.

The agenda for the Meeting was very extensive, and therefore I shall present here only the most important topics and conclusions:

- According to the previously accepted rule, the rotation at the Presidential position in the CAETS is annual. The next President, from January 1 to December 31, 2004, is Mr. Arne Björlykke from the Norwegian Academy of Technological Sciences (NTVA), and the President-Elect for 2005 is Mr. John Zillman from the Australian Academy of Technological Sciences and Engineering (ATSE). Mr. William C. Salmon from the NAE remains at the position of Secretary and Treasurer of the CAETS. The CAETS Board of Directors for 2004 consists of Past-President, Mr. Wm. A. Wulf, and four more members, representing the national engineering Academies of Denmark, China, Argentina and France.
- The proposed project of the CAETS, “Energy and Climate change”, will be elaborated until next CAETS meeting, which will take place on May 28, 2004, in the Norwegian city of Stavanger. The scientific meeting “Global Energy Foresight” will take place in Stavanger, on May 26-27, 2004, just before the CAETS meeting. All members of the CAETS as well as members of the HATZ are invited to find more information at the CAETS website ([www.caets.org](http://www.caets.org)), or directly at the NTVA website: [www.ntva.no](http://www.ntva.no).
- The representatives of all CAETS members have presented reports on the activities of their Academies in the past year. In order for the CAETS Member Academies to develop better mutual informing and possible cooperation, these reports will be available at the CAETS website.
- One of the most important topics was defining the 10 strategic goals and challenges for the next 25 years. These topics are important because the future students should participate in their development and implementation through their B. Sc., M. Sc. or Ph. D theses. This is the means of building a new generation of engineers for the 21st century.
- In order to provide fundamentals for future topics implementation, each delegation in attendance has accepted to provide a draft of the certain topic, which



will be discussed and finalized under the joint title "Future Engineering Challenges" until the next CAETS Meeting in Norway. In the following text I present a list of delegations accepting duties for the next period until December 15, 2003:

- EACR (Czech Republic) – Materials
  - ANIU (Uruguay) – Climate
  - CAE (Canada) – Fusion/Energy
  - IVA, NTVA, FACTE (Sweden, Norway, Finland) – Energy/Environment
  - NAE (U.S.A.) – Education
  - RAEng (Great Britain) – Biomedicine
  - NAEK (Korea) – Communications
  - ASTE (Australia) – Water, Practices and Management
  - INAE (India) – Digital Divide
  - CAE (China) – Transportation, Personal Use of Vehicles
  - HATZ (Croatia) – Agriculture and its Environment
  - EAJ (Japan) – Robotics
  - MMA, INAE (Hungary, India) – Reuse, Recycling and Environment
  - ATV (Denmark) – Sustainable Development
  - RAI (Spain) – Security
  - AI (Mexico) – Water Supply
  - SATW (Switzerland) – ?
- Each Member Academy of the CAETS is free to propose for any of its experts to participate in the platform preparation with some other Academy.
  - The CAETS Members are invited to propose their comments for any of the platform papers that will be available at the CAETS website after January 15, 2004.

Jasna Kniewald

## Agriculture and its Environment (proposal prepared by HATZ)

The increased need for food on the world market has often led to uncritical use of certain agents such pesticides, artificial fertilizers, natural or artificial hormones, antibiotics and many other biostimulators and their traces will be present in the environment for decades. Obviously only the constant monitoring of the quality and wholesomeness of foods as well as the purity of the potable water would be a measure for avoiding or at least reducing the harmful effects of current contamination.

Minimum standards of environmental care must be assured through regulatory standards and application of codes of good practice. Therefore the sustainable agriculture must meet the three related economic, social and ecological challenges and its production methods must reflect the concern of consumers. The measures to be adopted must obviously comply with existing environmental legislation and meet the general objectives of environmental policy.

By its very nature, agriculture is location-specific, and it is this specificity of crops, soils and animals that, over the centuries, has led to the great diversity and richness in agriculture which we see today. The principal change in the 20<sup>th</sup> century was the Green Revolution, during which all countries experienced a massive increase in yield per unit area and time, owing largely to greater control of production factors. While the mid-19<sup>th</sup> century marked the beginning of a more scientific approach to agricultural production with the introduction of fertilizers, it was the 20<sup>th</sup> century that has been considered the century of science-based agriculture more centralized or engineering approach to agriculture, including the setting of production targets, was a principal driver for increased agricultural output.

The 21<sup>st</sup> century will be marked by a return to a more location-specific, ecological approach to agriculture. The public eye is focused on globalization, globalization does not necessarily mean homogenization or centralized con-

trol. However, advances in science should allow greater specificity. In addition, there is a strong counter current, driven by both NGOs and civil society, towards maintaining local-specificity. Evidence for this may be found in the increased appreciation of local foods and the fact that globalization is increasingly seen in the context of local issues and not only of global concerns.

The globalization debate is the fact that inequality and inequity still exist in the world. More than 1,000 million people live on less than one dollar a day, and an estimated 800 million people are hungry. There is a need to double food production in developing countries, and, some 80 % of this increase will need to be gained from land that is already under production. It is clear that this increased intensification of production cannot be met without chemical inputs. The question is how to avoid the mistakes of the past and to fully benefit from the lessons learned and experience gained to date.

### Future Trends

- One of the major economic trends will be downward pressure on cereal prices.
- Government is no longer the predominant player in food regulation.
- Trends to increased consumption of animal protein, particularly in South East Asia, may be correlated with increased income.
- A potential concern associated with the increased production and movement of livestock.
- There is a trend to increasing urbanization in many countries. Agriculture in general is declining in economic importance and hence in public opinion. It is alarming to note that the number of students in agriculture faculties is declining rapidly but also at all engineering profiles. The reduced numbers of people involved in agriculture will also be a driver for increased mechanization of farming and raises a new challenge of how to find technologies that are ecologically sustainable, particularly for developing countries.
- Increasing public concern regarding food safety.
- The medicalization of agriculture is expected to continue. Further investigating the use of nutraceuticals to improve diets and a better understanding of the role of protective factors, found in certain foods such as brassicas, in protecting against certain types of cancer. Greater attention to such concepts as fertilizing plants rather than the soil, and a greater reliance on the principles concerning ecological farming systems developed through experience with integrated pest management (IPM). It will also benefit from new sources of information such as that available through global positioning systems including mapping of soils, watersheds and ecological zones and using this globalized information as the basis for local decisions.

A wide range of so-called “functional foods” have come onto the market in recent years. It is essential that these

products are developed, presented and marketed within the context of an overall healthy diet, that they are accessible to all consumers and that they are safe.

The existing limitations in expected food production could be overcome by consistent research policy deriving from basic research in food science and technology, innovations in particular areas, interdisciplinary approach and broad collaboration.

Modern technology, especially genetically modified organisms (GMOs) are reality and agriculture does not take place in a vacuum. There are other trends in the area of research and sustainable development is other side of the picture of the future food production against the hungry. Agricultural development in the 20<sup>th</sup> century was characterized by a centralized approach, it was also evident that it was most successful where it was linked with local ecological conditions. A case in point is that an integrated approach to pest management has been shown to be successful. A key reason for this success has been as a result of helping farmers to understand the concept of critical thresholds. The same principles can be applied to water and nutrient management. There is a need to further consider the role of genetically modified organisms (GMOs) in a broader IPM approach. For example, incorporating the gene for *Bacillus thuringiensis* (Bt) toxin into plants has demonstrated little evidence of risk to human health or the environment. However we must not be complacent and the potential ecological effects of GMOs needs to continue to be monitored. A more important issue than risk at this point is the accessibility of this technology to developing countries, which frequently lack the necessary infrastructure. The area planted to GMOs has tripled in the last three years. Some 75% of this in developed countries. Most of the work has been focussed on four crop groups – maize, soybean, cotton and canola – and has involved traits relating to pest-tolerance and herbicide-resistance. GMOs will be treated like the Green Revolution: a centralized engineering approach where it is presumed that one solution will fit all the needs rather than considering how they might best be integrated into ecologically based systems of farming in different countries and regions of the world. One possible solution might be to consider the development of an international code of conduct on genetic resources. A further challenge is how to improve/strengthen cooperation and coordination at the national and regional levels. The reality is that, in many countries, there is often only poor, if any, inter or intra-ministerial cooperation particularly between ministries of environment and agriculture. OECD work in the area of development with that on environment and agriculture. A principal challenge will be to ensure that these discussions at the national and international level are without a positive or negative aspect. There is a need for a neutral brokerage of the information available to maintain the credibility of the science. But what about the pesticides no longer permitted in OECD countries may be used on food, which is then imported.

We must use the global advances in science and technology, such as global positioning systems and genetic engineering, to develop more and better defined strategies for

location specific agriculture. Now more than ever we should recognize the need to act globally but to think locally. Apart from new tendencies of globalisation, standardisation, deregulation and food retail concentration, every country should apply, among numerous processing solutions available in the world, those which suit the structure of its food production, with stress on autochthonous products having specific regional properties.

We should keep track of the hazards of pollutants in the environment, human exposures, and the resulting health outcomes – and that this information should be easily accessible to public health professionals, policy-makers and the public. Yet even today we remain surprisingly in the dark about our nation's environmental health. The mapping of the human genome offers an unprecedented but as yet not fully realized opportunity to study gene-environment interactions and their relationship to disease causation.

We are benefiting from a new era or the era of globalization. This globalization is the result of three simultaneous democratizations, that of finance, technology and information.

Therefore in the future the **Special Programme for Food Security (SPFS)** aims to help those living in developing countries, in particular the low-income food deficit countries to improve their food security through rapid increases in food production and productivity, by reducing year-to-year variability in food production on an economically and environmentally sustainable basis and by improving people's access to food. In order to maximize the benefits of the SPFS we need to all work together in addressing these challenges by forming new partnerships. As was indicated earlier under globalization, these partnerships have to consider new dimensions, all stakeholders, consumers, producers as well as officials. We need to consider the global network, we need to look at our overseas counterparts as partners rather than adversaries. We must develop strategies as to how to improve the output of the international standard-setting organizations. We will need to develop better national strategies as well as stronger collaboration with countries having similar interests.

There are still many problems to be solved. At times national regulatory processes are held captive because of selfish domestic political interests, or highly publicized paranoia on food safety or environmental risks. We must take

advantage of these great opportunities for improving health, consumer choices and increases in incomes through international trade.

Another challenge is how to raise the productivity of the agricultural sector. Proper exploitation of natural resources can and has been used to jump start the process of economic development. However, any economic progress must not be achieved at the expense of environmental degradation. This involves not only the provision of education and training especially in the field of science and technology, but also the proper management of the country's population size and growth, and the all important employment opportunities. Finally, a country's economic development must not be hampered by internal political and social instability.

Poverty in a country is the proportion of population living under the poverty line, which is generally computed based on a basket of minimum needed consumption goods per person. According to the World Bank (2000), of the 6 billion people in the world, almost half of them live on less than US\$2 a day and 20% of the people live on less than US\$1 a day. The commercialisation and modernisation of the subsistence agricultural sector should thus be urgently looked into with a view to raise standards of "US\$2 a day peoples" living and to enhance their quality of life. Many have viewed the primitive nature of shifting cultivation not only as a waste of land but also a threat to the surrounding environment.

But it is also clear that environmentally friendly agriculture means old-fashioned methods. For example, organic food producing uses modern, yet natural, plant-protection methods, which avoid the use of pesticides. Research carried out in universities and agricultural or biotechnical institutes has a key role to play in promoting innovative food-producing techniques that meet environmental, health and quality standards.

Finally we must also consider, that a lot of food producing capacities belongs to the sea and fresh-water resources which environment is already from different reasons seriously damaged. The question is would it be better food production chain or agriculture frontiers broaden on the all food producing areas.

Presidency of the HATZ

# 84<sup>th</sup> Annual Meeting of the Royal Swedish Academy of Engineering Sciences (IVA)

Stockholm, October 23-24, 2003

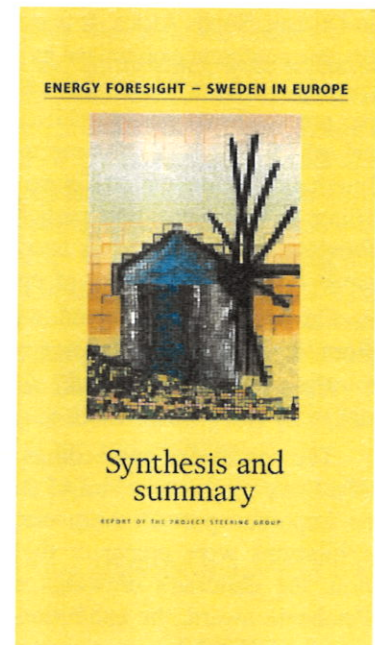
Due to the kind invitation of the President of the Royal Swedish Academy of Engineering Sciences (IVA), Prof. Lena Torell, we have participated at the 84th Annual Meeting of the IVA. This traditional meeting under the high patronage of His Majesty, King of Sweden, was organized jointly with "The IVA Royal Technology Forum 2003: Engineers for Tomorrow". A particularly important part of the Forum was the presentation of Mr. Claude Maury from the Comité des Etudes sur les Formations d'Ingénieurs (CEFI). He presented the results of the research conducted at high schools and universities for the education of engineers at different universities in Sweden. At the same time, he pointed out the two major problems for education of engineers in Europe.



Due to the high responsibility in production and ever higher market requests concerning the product quality and safety, and, at the same time, the competition at the global market, there is a strong reduction of interest (up to 10% per year) for the engineering professions. Beside that, at this moment it is time to retire the generation of engineers educated at the time when, due to the post-war requests, a great attention has been paid to the technological education. At the same time, due to the implementation of new and high technologies, the new knowledges are necessary, but, simultaneously, the salaries are in stagnation. Personal benefits for employed persons within the marketing are much better than in the direct production. In the future, we can expect even higher "brain drain" from Croatia than in the past period. Croatian demographic problem is present for a longer time, and today we are fully aware that we cannot provide enough students for Croatian university capacities programmed for the next 20 years. It means that this is

not only a question of education of engineers for tomorrow, but for the system of higher education in total.

The following problem that was pointed out was the application of the Bologna process and all other related documents in the future university restructuring. It is not probable that the big countries with long university tradition and experience would like to replace their native languages, German or French, with English. This will open the serious question for all "small" countries – to implement their systems according to the EU universal system in the future. The Euro currency, representing a single European monetary system, was accepted very fast, but in case of the single language there are still a lot of doubts. Therefore, it was very valuable that we were also informed about these problems within the EU.



The report on the most important technological achievements in the last year, "Progress in Swedish Research and Technology", was also submitted at the Annual Meeting, and the Swedish King, His Majesty Karl Gustaf, as an Honorary Member of the IVA, awarded the best scientists. The Meeting was held in the Stockholm Concert Hall, whilst later reception for the guests and foreign delegations took place in the Stockholm City Hall. His Majesty also awarded several foreign scientists with the acknowledgments for a long cooperation and mutual developed projects. Beside the HATZ delegation, the delegations from Great Britain and China were also present at the Meeting.

We are particularly grateful to the IVA for inviting us to this distinguished ceremony, and to the Government of the Republic of Croatia, for a travel grant. All materials from the Meeting are available for all scientists in the library of the HATZ, at our new location, 28 Kačićeva Street in Zagreb.

Zlatko Kniewald  
Jasna Kniewald

# Croatia at the 21<sup>st</sup> International Cartographic Conference and the 12<sup>th</sup> General Assembly of the International Cartographic Association

*Cartographic Renaissance* was the slogan and the basic theme of the 21st International Cartographic Conference and the 12th General Assembly of the International Cartographic Association (ICA) held from August 10 to August 16, 2003 in Durban, South Africa. It was the first international cartographic conference organized by ICA and held in Africa. 800 participants from 84 countries attended the conference. Paper presentations, poster exhibition, map exhibition, technical exhibition and all other meetings were held at the Durban International Convention Centre (ICC), in the vicinity of the Hilton hotel, where most participants were accommodated. Presentations were held in four halls at the same time because of the large number of presentations.

Croatia was represented with a paper by colleagues from the Ministry of Defence of the Republic of Croatia:

*Horvat, S., Železnjak, Ž., Jandriš-Sačar, M.: Generalisation of Geographic Elements of Aeronautical Chart.*

The conference proceedings was published in the form of a book of abstracts and of the CD. Map exhibitions are an important part of every cartographic conference. Five exhibitions were prepared: the international map exhibition, the children's drawings exhibition for the Barbara Petchenik award, the exhibition of old maps of South Africa, the UN exhibition *Preserving the Past – Linking to the Future* and the exhibition of charts of members of the International Hydrographic Organization (IHO). At the international cartographic exhibition, with more than 1000 maps from 34 countries, Croatia exhibited 32 maps and publications. There was also five Croatian children's drawings at the exhibition for the Barbara Petchenik award. A list of all exhibits was published in a catalogue.

The 12th General Assembly of ICA was held, as usual, on the first and the last day of the conference. On the first session, after the member roll-call and the adoption of the agenda, reports from the president, the secretary general,



*A detail from the international cartographic exhibition, Durban, 2003.*



*Mr. Mladen Lapaine and Mr. Landek by the Croatian flag at the 12th General Assembly of ICA*

and the treasurer were presented, and also the adoption of the report for the previous period, introduction to the proposal of the budget for the next four-year period, the presentation of the work of the committees and workgroups for the previous period, proposals for new committees were brought up, people proposed for the new Executive Committee of the Association were presented etc.

Croatia has been a full member of ICA since 1995 and pays the annual membership fee of 250 USD. At the General Assembly, Croatia was represented by Mr. Miljenko Lapaine, President of the Croatian Cartographic Society and Mr. Landek, Vice-Director of the State Geodetic Administration. A special national report was made for the General Assembly: *Cartography in Croatia 1999-2003*, National Report to the ICA/ACI, prepared by Mr. Miljenko Lapaine and Mr. Nedjeljko Frančula, 21st International Cartographic Conference and 12th General Assembly of the ICA, Durban, 10-16 August 2003. The report, which was previously copied 120 times, was distributed to all representatives of the ICA member countries.

At the second session of the General Assembly, held on August 16, 2003, a new budget was accepted, Mr. Milan Konecny became the new president of the Association, new vice-presidents, and the members of the Executive Committee were chosen, people were proposed for the ICA awards etc. At the end, a commercial movie about the city A Coruña in Spain, where the next, 22nd International Cartographic Conference in 2005 will be held, was presented.

Miljenko Lapaine



# 14<sup>th</sup> International Symposium of the International Committee for Study of Bauxite, Alumina and Aluminium (ICSOBA) on the Occasion of its 40<sup>th</sup> Anniversary

Croatian Academy of Sciences and Arts (HAZU), Zagreb, October 10-11, 2003

The Symposium took place in the Croatian Academy of Sciences and Arts in Zagreb, October 10-11, 2003, with more than 50 scientists in attendance from Hungary, Greece, Russia, Germany, Austria, Norway, Canada and Croatia.

The head organiser was the HAZU, with the Ministry of Science, Education and Sport of the Republic of Croatia and the Faculty of Medicine of the University in Zagreb, as co-organisers. The Chair of the Organisational Board was Mrs. Olga Šarc-Lahodny, and two members of the Croatian Academy of Engineering, Department of Mining and Metallurgy, were also in the Organisational Board: Mr. Josip Črnko and Mr. Anto Markotić.

Four plenary and thematic sessions were on the agenda of the 14th International Symposium of the ICSOBA, which was organized on the occasion of the 40th Anniversary of this association. The first, introductory session, has been dedicated to the 40th Anniversary of the ICSOBA, to

its scope of activities and the content of its work, as well as to the most prominent persons who were the bearers of its activities. The second and the third, which were scientific sessions, have dealt with the matter concerning issues from the fields of geology, mining and metallurgy – exploitation of bauxite and production of hydrated alumina and aluminium. The fourth, educational session, has been dedicated to the past and the contemporary high-professional education of human resources in the fields of mining and metallurgy. Within all four sessions approximately 20 papers have been presented, and the Symposium was concluded with the election of members for the new governing body of the ICSOBA in the future period. The conclusion was that the next gathering of the ICSOBA shall take place in St. Petersburg, Russia, at the end of 2004.

The Proceedings of the 14th International Symposium of the ICSOBA shall be published subsequently.

Anto Markotić and Josip Črnko

**\* \* \* Our New Location \* \* \***  
**\* \* \* February 13, 2004 \* \* \***

The first Presidency meeting in the new  
 "House of the HATZ"  
 Zagreb, 28 Kačić St., CROATIA



# Awards of the Croatian Academy of Engineering

The Academy's Awards were established in 2002, and were granted for the first time at the Jubilar Assembly of the Academy on the occasion of its 10th Anniversary, February 5, 2003. The festivity took place in the Great Hall of the Croatian Ministry of Economy in Zagreb.

Every year since, the Academy grants one Award for Life Achievement "Power of Knowledge", up to five Annual Awards "Rikard Podhorsky" and up to five Awards to Young Scientists "Vera Johanides". The Annual Award and Award to Young Scientist were named after distinguished scientists and university professors from the fields of engineering and bioengineering sciences, late Mr. Rikard Podhorsky and late Mrs. Vera Johanides.

Current President of the Academy's Committee for Awards is Mr. Borivoj Modlic.

The Award for Life Achievement is reserved for a distinguished scientist and a Member of the Academy for hers or his entire scientific and research opus in the field of engineering, and for long-term contribution to the progress of the respective profession. The application of hers or his research results is especially emphasised.

A Member or non-Member of the Academy may be granted the Annual Award if she or he is a prominent scientist, who has accomplished an especially valuable scientific or professional achievement during the past three years. The achievement has to be industrially or economically applicable.

A young scientist may be granted the respective Award "Vera Johanides" if she or he is under 35 years of age, and if, in the last five years, has achieved a noticeable scien-

tific promotion and contribution in the field of hers or his research.

The Departments of the Academy may propose candidates for the Awards, as well as a group of ten scientists, under condition that all of them are Members of the Academy.

The Academy has also provided the possibility for various institutions in the fields of science, research and higher education, such as universities, faculties, scientific and research institutes, as well as the Croatian Academy of Sciences and Arts, to propose candidates for the Academy's Awards.

The Academy has awarded two laureates for 2002, at the Jubilar Assembly held on February 5, 2003. Those were Mr. Zijad Haznadar, Full Member of the Academy, from the Faculty of Electrical Engineering and Computing, University of Zagreb, who was granted the Award "Power of Knowledge", and Mrs. Antonija Perl, from the Faculty of Food Technology, Josip Juraj Strossmayer University of Osijek, who was granted the Award "Vera Johanides".

In 2003, Mr. Nedjeljko Frančula, Full Member of the Academy from the Faculty of Geodesy, University of Zagreb, was the Academy's laureate, who was granted the Award for Life Achievement, while Mrs. Višnja Gaurina Srček, from the Faculty of Food Technology and Biotechnology, University of Zagreb, and Mr. Darko Velić, from the Faculty of Food Technology, Josip Juraj Strossmayer University of Osijek, were laureates of two Awards to Young Scientists.

The Awards for 2003 shall be consigned at the Academy's Annual Assembly, February 27, 2004.

Presidency of the HATZ

## The University of Zagreb Award "Fran Bošnjaković"

On the occasion of the 75th Anniversary of the engineering faculties of the University of Zagreb (1919-1994), and upon the initiative of the Central Celebration Committee, the Senate of the University of Zagreb has established the Annual Award "Fran Bošnjaković". Every year, on the Day of the University, the distinguished University professors are granted the Award for their achievements in science, promotion of scientific disciplines and profession, transfer of knowledge and education of young experts in the fields of engineering. From 1994 till the end of 2002, sixteen professors were granted this Award: five from the Faculty of Mechanical Engineering and Naval Architecture (Mr. Ivo Senjanović; Mr. Ivan Turk; Mr. Antun Galović; Mr. Željko Bogdan and Mr. Mladen

Andrassy), four from the Faculty of Chemical Engineering and Technology (Mr. Rikard Podhorsky – posthumously; Mrs. Helena Jasna Mencer; Mrs. Rajka Budin and Mr. Marin Hraste), two from the Faculty of Food Technology and Biotechnology (Mrs. Vera Johanides and Mr. Vladimir Marić), and one each from the Faculty of Electrical Engineering and Computing (Mr. Danilo Feretić), Faculty of Mining, Geology and Petroleum Engineering (Mr. Ivo Kolin), Faculty of Architecture (Mr. Boris Magaš), Faculty of Civil Engineering (Mr. Boris Androić) and Faculty of Geodesy (Mr. Miljenko Solarić).

On November 3, 2003, the Award was granted to the Full Members of the Croatian Academy of Engineering: **Mr.**

**Tomislav Filetin**, from the Faculty of Mechanical Engineering and Naval Architecture, and **Mr. Zijad Haznadar**, from the Faculty of Electrical Engineering and Computing.

### Mr. Tomislav Filetin



Mr. Filetin was born 1949 in Zagreb. He graduated 1973, course of thermal technology; acquired the Master's Degree in 1979, and the Doctoral Degree in 1986, both at the Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb (FSB). In 1974, he became the Assistant Lecturer at the FSB, and in 1997 the Full Professor. Since 2001, Mr. Filetin has been the Head of the Department of Materials at the FSB. Within the undergraduate curriculum at the FSB he teaches four subjects and organises lectures in four subjects at the postgraduate study.

Mr. Filetin is active in scientific research in the field of materials – computer-aided selection of materials, material recycling, information and expert systems, simulations and modelling of properties and heat treatment processes of materials. He is the author of 5 books, edited 2 books, published, as author or co-author, more than 90 scientific and professional papers, more than 70 studies and expertises of materials for industrial needs, as well as 18 computer software systems and databases. He is the leader of the scientific research project “Development of materials and processes by means of computer modelling” and of the technological project “SUMAT – Development and application of advanced materials”, funded by the Ministry of Science, Education and Sport of the Republic of Croatia.

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Mr. Filetin was granted the Croatian Academy of Sciences and Arts (HAZU) Award for the highest scientific achievement in the Republic of Croatia for the field of engineering in the year 2000.

He is one of the founders of the Croatian Society for Materials and Tribology (1992) and its first President. He is a member of the Croatian Society for Systems, Committee for Production Sciences, now “Council for Technological Development” of the HAZU. He is a Full Member and the Vice-President of the Croatian Academy of Engineering.

Six years ago he was the editor-in-chief at the Faculty of Mechanical Engineering and Naval Architecture, and in that period about 40 very noticeable university coursebooks were published.

### Mr. Zijad Haznadar



Mr. Haznadar was born 1935 in Banja Luka, Bosnia-Herzegovina. Since 1977, he is a Full Professor at the Faculty of Electrical Engineering and Computing in Zagreb. He acquired his Ph. D. in 1964 at the Faculty of Electrical Engineering and Computing (FER) in Zagreb. From 1976 to 1978, Mr. Haznadar has been the Vice-Dean of the FER, and first from 1986 to 1988 and again from 1998 to 2000, he was the Head of the Department of Essentials

of Electrical Engineering and Electrical Measurements. He built the CAD Laboratory at the FER in 1990. In 1997, he wrote three course materials and a significant and comprehensive fundamental coursebook “ELEKTROMAGNETIZAM” (Electromagnetism) in two volumes. His monograph, “Electromagnetic Fields, Waves and Numerical Methods”, was published in 2000 in Amsterdam, Netherlands, by JOS-Press.

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During the 43 years of active engagement at the Faculty of Electrical Engineering and Computing in Zagreb, Mr. Haznadar participated in the education of over 10,000 graduated electrical engineers, acted as supervisor in 55 Master's theses and 31 Doctoral dissertations.

Mr. Haznadar is the author or co-author of over 350 scientific and professional papers. Out of this number 123 are scientific papers, 45 of which were published abroad and 78 in the country. He wrote over 230 professional papers with his assistants. He led three international projects and 6 national ones. He led over 40 research projects for the Croatian industry and implemented 4 significant technical improvements and led the realisation of 8 new products.

Mr. Haznadar participates in the work and acts as a member in several international scientific committees of distinguished conferences and journals abroad and in Croatia. He was invited to give numerous lectures and participated as guest at many conferences and universities.

In 1987, he was granted the Croatian National Award for Science “Nikola Tesla”; in 1997, with the “Hrvoje Požar” Award for the development of energy sciences 1997, The same year he was awarded with two more prizes: the Golden Plaque “Josip Lončar” for his contribution to the development of the Faculty of Electrical Engineering and Computing, and the “J.J. Strossmayer” Award. In 2002, he received the Lifetime Achievement Award “The Power of Knowledge” of the Croatian Academy of Engineering.

Prof. Haznadar was intensively active at home and abroad and gave significant contribution to the development in the field of theory of electromagnetic fields. From 1968 to 1986 he was the editor for the area of “Electromagnetic fields” in the journal “Elektrotehnika” (Electrical Engineering) Zagreb. Since 1987 he has been a member of the Editorial Committee of the well-known International Conference on electromagnetic field computing “Compumag” London, and since 1991 he has been a member of the International Scientific Committee of the International Symposium on Magnetism “ISEM” Tokyo. He is a member of the scientific councils in several engineering journals.

He organised and led very successful International Symposia: “Projektiranje i proizvodnja podržani računalom – CAD/CAM” (Computer-aided design and manufacture – CAD/CAM). Since 1992 he has been a member of the “Committee for the Computer-guided Manufacture” – Class of Mathematical, Physical, Chemical and Engineering, i.e., since 1997, of the “Committee for Production Sciences” – Class of Engineering, HAZU.

From the day of its foundation, he has been a Full Member of the Croatian Academy of Engineering. On May 14, 2002, he was elected a Foreign Member of the Academy of Sciences and Arts of the Bosnia-Herzegovina (ANUBIH). From its foundation in 2003, he has been a member of the HAZU Council of Technological Development.

# Acknowledgements to our Supporting Members

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