

AESS Ukraine Visit



Zafar Taqvi (AESS) and the Committee members of the IEEE AES East Ukraine Joint Chapter at the Institute of Radiophysics and Electronics of the National Academy of Sciences of Ukraine in Kharkov. From left: Taqvi, Eldar Veliev (Chair), Sergiy Vorobyov (Vice-Chair), and Alexander Nosich (Secretary)

Kharkov and Kiev were visited by **Zafar Taqvi**, IEEE AES Society, on November 7-8, 2005. **Taqvi** visited the Institute of Radio-Physics and Electronics of the National Academy of Sciences of Ukraine (IRE NASU). The IRE Director, Academician of NASU **Vladimir Yakovenko**, briefly introduced him to the institute structure and scope of research. Then Prof. **Alexander Nosich**, EDS East Ukraine Joint Chapter secretary, guided him through the institute and talked about its history (since 1955) and major accomplishments in the area of millimeter and sub-millimeter wave physics and technology including various effects, devices, and systems. He also introduced him to the history and major activities of the East Ukraine AESS Joint Chapter. It was established in May 1995 by the initiative of 16 grassroots IEEE members, as the first in the ex-USSR IEEE chapter of the Antennas and Propagation Society. Next year it joined the ED, MTT, and AES Societies, and later the LEO, GRS, NPS, and EMB Societies. [Reports and announcements of coming activities can be found on: www.rocket.kharkov.us/eua chapter.]

Today this is the largest IEEE chapter in Ukraine, a nation of 47 million population with strong aerospace and electronic scientific community. It is not a surprise that it was

established in Kharkov, the second largest Ukrainian city (1.6 million) and the hub of Ukrainian science and technology. Kharkov is located in the East-North of Ukraine and boasts a 201-year-old classical university, 23 other university-level educational establishments, National Center for Nuclear Physics, 7 other R&D institutes of NASU, and, what is most remarkable, a perfectly cosmopolitan reputation. The East Ukraine Chapter holds two regular international forums with English as the working language and 300-strong attendance: *The Kharkov Symposium on Physics and Engineering of Microwaves, Millimeter and Sub-Millimeter Waves (MSMW)*, and the *International Conference on Mathematical Methods in Electromagnetic Theory (MMET)*. The next MMET will take place in 2006 and the next MSMW in 2007; both can be found through the chapter website.

What is especially interesting is that this chapter is the only one in Ukraine (and probably the ex-USSR) which practices competitive annual elections of the chapter officers by the voting of all members, with an IEEE-style nomination, secret ballot, and tellers commission. Election information is available on-line and can be recommended to other chapters. [Perhaps IEEE RAB/TAB should encourage somehow this experience and disseminate it as widely as possible.]

When at IRE, **Taqvi** presented a talk on the *Aerospace Technologies: Global Trends, Systems of Systems*, and the *IEEE AES Society*. This was a survey of existing and prospective aerospace and electronic systems and systems of systems. Included were such exotic ones as an aerocar equipped with multiple-purpose sensors and other emerging technologies. The audience consisted of the IRE staff laboratories and universities. **Taqvi** responded to many questions about his own research and research done in the Boeing Space Station Division. The day was completed by a dinner at a restaurant hosted by local chapter officers to mark the first visit to Kharkov of an IEEE emissary.

Moving to Kiev, **Taqvi** visited the National Aviation University – a large technical university established in 1933, where he was introduced to the Rector of the university and presented an invited paper. He discussed the organization of a local AESS chapter with Prof. **Felix Yanovsky**.

Kiev scientists and engineers, experts in electronic systems, radar, telecommunications, avionics and adjacent fields, were happy to take part in the meeting. [This event was organized by previous arrangement by Dr. **Felix Yanovsky**, Professor of the National Aviation University (NAU), IEEE Senior Member (1994), on behalf of the Rector of NAU Prof. Dr. **Vitaliy Babak**, IEEE member (2005).]

The visit to Kiev was extremely short and local organizers did their best to make this visit maximally saturated and useful.

The route to NAU was through the downtown of Kiev-city. Unfortunately, because of strong fog that morning the real beauty of Kiev went unseen. However **Yanovsky** provided facts and historical information. Kiev is the biggest city and the capital of modern Ukraine, at the same time, the most ancient centre of the East Slavic nationhood and culture.

It is located on the Dnieper River and counts its history from the 6th century. Its population is about 3 million. Kiev has innumerable architectural, historical and cultural treasures. Some survive intact from the 11th century, for instance, interiors of St. Sophia Cathedral. The oldest surviving church, built in 1037 by **Prince Yaroslav the Wise**, it is a national shrine and is under the patronage of UNESCO.

Kiev-Pechersk Laura is the orthodox monastery founded in 1051 in caves close to Kiev. In the 11th century, the monastery became a centre of expansion and consolidation of Christianity and chronicle writing in Kiev, Russia. Defensive walls were built around Laura at the end of the 12th century. Laura is the burial place of Kiev **Prince Yuriy Dolgorukiy**, founder of Moscow, and legendary hero Ilya Muromets. The Laura architectural complex consists of more than 80 buildings.

During recent years, the face of Kiev has been significantly renewed, many old buildings and streets repaired and restored, and new created.



From left: **V. Kharchenko**, **Z. Taqvi**, **F. Yanovsky**

Kiev is the most important scientific and academic centre of Ukraine. It has at least 35 universities and large scientific community, the Presidium of the National Academy of Sciences of Ukraine (NASU) and majority of NASU research institutes are situated in Kiev. The National Taras Shevchenko University of Kiev (founded in 1834) has over 30,000 students. The National Technical University "KPI" (1898) today counts 41,700 students. It is the biggest university in Ukraine.

The National Aviation University (NAU) was founded on the basis of aviation faculty of "KPI" in 1933. About 35,000 students study in NAU. The research process at the University is carried out by a highly skilled team. The branches of the University faculties are represented in some Research Institutes of NASU and at many aircraft plants, radioelectronic enterprises, research and design institutions, where their experts are involved in scientific and academic pursuits.

The research infrastructure of NAU includes the departments of scientific and technical policy, financial and economic supply, scientific and technical information, and coordination. Nine research institutes have been created within NAU, including the Institutes of the integrated telecommunication technologies and innovations. Research Laboratories, Centers, and Groups operate at the faculties, institutes, and other divisions. Recently completed research works are available at the University website: <http://www.nau.edu.ua> or: <http://www.nau.edu.ua/>. Among them:

- Acoustic and Emission System
- System of air noise monitoring
- On-board monitoring system of technical state of the engine
- Estimation of physical and mechanical properties of materials
- On-board Radar Systems For Remote Sensing of the Atmosphere and Mapping



In the NAU Museum, *F. Yanovsky* and *Z. Taqvi* flank their guide

- Doppler-Polarimetric Models of Microwave Remote Sensing of Rain
- Development and Application of CNS/ATM systems in Ukraine
- Means of displaying events as graphic images in 3D space
- Hydraulic-jet scalper
- Automatic navigation and flight control systems of small unmanned aircraft
- MEMS technology – non-contact interference nano-profilograph = ABMicron-alpha = BB
- MEMS Technology – nano-mechanical device = ABMicron-gamma = BB
- “Friction wear test system” for lubricants and dopes
- LSPP laser scanning profilograph-profilometer
- Expert systems of management and diagnosis
- Automatic systems of air traffic management
- Systems of dynamic objects management
- Systems of educational process planning
- Monitoring of aviation systems
- Computer linguistic systems
- Noise, sonar, and others.

There is also an NAU Museum where historical exhibits and major accomplishments of NAU are presented.

Before the collapse of the USSR, this University was the main source of engineers of all aviation profiles including the wide field of avionics for all the USSR and other countries of Eastern and central Europe, Africa, Latin America, Middle East, South-Eastern Asia, etc. During the years of its existence the University became a real cradle of aviation specialists having trained thousands of experts, which work in Ukraine and almost 90 countries of the World. There are well-known scientists, industry organizers, military and state figures among them. They head the air companies, factories, research & design institutions, universities & other educational institutions, different organizations, services, and departments.

Powerful scientific schools in the fields of mechanics, electronics, electrical engineering, materials science, computer science and computer facilities have been created not that the profile of the University is much wider. A working team led by the Rector, Professor **V. Babak** has entered a critically difficult period of reforms in the higher education system of Ukraine, working up the concept of University development being implemented very rapidly for the transformation into a versatile educational institution.

Students from 50 countries study at the 14 institutes, 4 colleges, technical school, 3 aviation high schools & ICAO European Regional Center. The spacious basic campus of NAU has a convenient connection with the central part of Kiev. The basic campus of NAU occupies 72 hectares. Total area indoors is 140,000 m². The library of NAU is one of the longest among Universities in Ukraine and contains about 2.6 million books.

A number of airplanes and helicopters are used in educational process, as well as flight simulators, and different aircraft, electronic systems, and table simulators. NAU is the only University with an educational hangar with real airplanes and helicopters in the center of the University campus. The campus integrates also 11 dormitories, a canteen with 1000 seats, Internet-cafe, student "Bistro," Medical Center with modern diagnostic equipment, preventorium, Center of Culture and Arts with main hall of 1,500 seats, Center of sports and health. The Yacht Club as well as hobby groups of hang-glider and aircraft modeling are popular among staff and students.

The majority of university buildings have been recently repaired. The University has all necessary conditions and the experience to conduct successful conference events.

For many years, NAU annually conducts the conference "AVIA" devoted to main aviation scientific directions. Annually several conferences of students and young scientists are held. Two times (2003 and 2005) the World Congress "Aviation in the 21st Century" was organized under the Chairmanship of Professor **V. Babak**. In 2005 the Congress was devoted to safety in aviation and attracted the attention of many experts from many countries. In the framework of this Congress, the *International Workshop on*

Microwaves, Radar and Remote Sensing, MMRS-2005, was organized by NAU (Chairman of MMRS-2005 was Prof. **F. Yanovsky**) with technical sponsorship of the East Ukraine AESS Joint Chapter, IEEE GRS, European Microwave Association (EuMA), and URSI <www.congress.org.ua/mrrs>. The working language at MMRS-2005 was English. Nearly 100 attendees registered at MMRS-2005, and 56 papers from 18 countries were presented.

Five years ago the project "Education in English" started in NAU at several faculties including the Aerospace Faculty, Faculty of Electronics, and Faculty of Information Technologies, among others. This project assumes that students who are able and who want to study all subjects in English may form special groups. Both Ukrainian and foreign students may do that. All lectures, labs, term papers, other studies, tests, and graduation thesis are fulfilled in English during all term of study. Participation in this project has led to a significant improvement of the English skills of both students and teachers. Many foreign MMRS-2005 participants noted the improved English of NAU scientists.

After the visit to NAU, a Mini-Symposium and panel discussion were conducted. **Taqvi** was introduced to the audience of 45 attendees: professors, scientists, teachers, students and IEEE members, mainly NAU collaborators. The first presentation was "Radar Researches in NAU" by **Felix Yanovsky**. Then **Taqvi** presented his talks of Radio Frequency ID, Systems of Systems, and IEEE/AESS current visions. His presentations contained impressive reviews of important and perspective directions in aerospace and electronic systems. They were received by the attendees with great interest as shown by the questions asked.

During the panel discussion areas of possible cooperation between IEEE AESS and NAU are discussed. The following recommendations on the needs of the local community were formulated.

1. Local community needs closer cooperation with IEEE AESS when organizing international workshops, symposia, conferences and congresses. Technical and financial IEEE AESS sponsorships, joint events organization, involvement of IEEE distinguished lecturers, realization of IEEE AESS meetings at NAU campus and other kinds of joint activity are very welcome.
2. Kiev and, more widely, the Central Ukraine aerospace and electronic systems community, tends to enhance its activity in the framework of IEEE AESS. For this purpose, creation of IEEE AESS Chapter or Joint Chapter with AESS core or another additional IEEE AESS structure in Kiev is expedient and useful for both Ukrainian scientific community and IEEE AES Society as a whole.
3. Insufficient skills in English language make difficulties for Ukrainian scientists and experts when



Participants of Panel Discussion

participating in international conferences, projects, reading scientific publications, and preparing their own publications. Finally, this factor is also an essential barrier to join IEEE. If one cannot use majority of advantages offered to IEEE members, it is senseless for him to be an IEEE member. That is why the project "Education in English," which allows to increase number of experts educated in English in the particular professional field, is extremely important. Two consequences follow from NAU experience in Education in English

- 3A. This experience can be recommended to other universities in Ukraine, and Russia and other countries where people are traditionally poor in English.
- 3B. The project Education in English suffers from the lack of original textbooks on special subjects. To support continuation and further development of the project, NAU needs textbooks, monographs, and possible and methodical materials originally prepared in English in USA or Europe. It would be great if IEEE AESS contributed some books to this project, probably, books on Radar, Avionics, Airborne Radar, Navigation, Telecommunications, Air Traffic Control, Remote Sensing, Electrical Engineering, Electronics, Antennas, Waves Propagation, Signal Processing, Electromagnetics, and all other

subjects useful for the professional field.
Secondhand books would be as useful as new.

4. This meeting and interesting discussions gave the impetus to some of our colleagues to join IEEE AES at the first opportunity.

This exciting day ended with a wonderful dinner at the NAU restaurant.

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Epilogue from F. Yanovsky:

It is my pleasure to note that 11 individuals from NAU joined IEEE AES Society for 2006 as a result of this visit.