

CAETS Visiting Committee

Tuula Teeri, CAETS President, President of the Royal Swedish Academy of Engineering
Panu Nykanen, CAETS Board Member, Secretary General of the Finnish Academy of Technical Sciences
Ruth David, CAETS Secretary/Treasurer, Foreign Secretary of US National Academy of Engineering

Hosts

Branko Kovacevic, President of AESS
Biljana Stojanovic, Chair of Interdepartmental Committee for International Cooperation and Secretary of Department for Technological, Metallurgical and Materials Engineering Sciences, AESS
Aleksandar Gajic, Deputy Secretary General, AESS
Petar Petrovic, Representative of AESS in EuroCASE and Member of Executive Committee of EuroCASE

Background

Being familiar with the International Council of Academies of Engineering and Technological Sciences (CAETS) through its active participation in Euro-CASE, the Academy of Engineering Sciences of Serbia (AESS) contacted the CAETS Secretary/Treasurer on 25 February 2019 to inquire about membership requirements. The Secretary/Treasurer responded with the guidelines and requirements for application for CAETS membership.

After receiving the AESS application on 13 March 2019, the CAETS Executive Committee appointed the Visiting Committee noted above, which completed an onsite visit on 6-7 June 2019. This report summarizes that visit and substantiates their recommendation.

Recommendation of the CAETS Visiting Committee

The Visiting Committee concluded that the Academy of Engineering Sciences of Serbia satisfies the CAETS Membership Criteria. It therefore recommends election of the AESS as a member of CAETS.

Historical Overview of the Academy of Engineering Sciences of Serbia (AESS)

AESS is a successor to the Engineering Academy of Yugoslavia which was established in October 1998. The political situation in that region evolved in the years immediately thereafter, and in 2004 the Engineering Academy of Yugoslavia adapted its founding Statute, changing its name to the Academy of Engineering Sciences of Serbia and Montenegro. In 2006, after Serbia and Montenegro separated into independent states, the Academy again adapted its Statute, changing the name to the Academy of Engineering Sciences of Serbia. AESS was re-registered in the Serbian Business Registers Agency on 7 April 2010, establishing it as a legal entity and a non-profit and non-governmental organization with a mission to promote and contribute to the general progress of engineering and technical and technological sciences in the independent state of Serbia.

Serbia has a rich history in engineering and high-tech industry that was largely decimated by economic sanctions and a subsequent “brain drain” at the end of the 20th century. The University of Belgrade, which today hosts AESS, was established in 1905 as a direct successor of the Great School of Belgrade, founded in 1808, by the first Minister of Education of Serbia. By the middle of the 20th century, fundamental sciences were well established and strengths in applied research were spawning a vibrant industrial base in fields including aviation and shipbuilding. An electronics industry began to emerge in the late 1960s, coinciding with the development of digital electronics in western countries. At the

University of Belgrade, the School of Electrical Engineering and the Institute Mihajlo Pupin, in cooperation with California University, developed the first mobile robot mechanism, known as the Belgrade hand, which is today displayed in the Museum of Robotics in Boston as one of the most important discoveries of the 20th century in the area of computing technologies. According to a recently published monograph:¹

“The University of Belgrade, in cooperation with national higher education and scientific institutions, established affiliate research departments in regional centres and provided quality teaching personnel for successful work so that these departments, after some time, developed into independent higher education institutions. Hence, the University of Belgrade was a founder of all state universities in the republics of former Yugoslavia, i.e. Macedonia, Bosnia and Herzegovina, Montenegro and Serbia. This net of higher education institutions exists in Serbia today and represents a good foundation for the process of reindustrialization of the country.”

But the political upheaval took a toll; today Serbia has little high-tech industry and thus continues to lose technical talent to opportunities in other countries. This situation shapes the work of AESS, which prioritizes areas such as sustainable economic development; digitalization and industry; productivity technology and employment; ecology and protection of the human environment; smart cities and urban mobility; globalization of research; and engineering education.

Summary of Visit

During the visit the Committee met with AESS senior leadership (hosts noted previously) as well as selected Fellows from the AESS. The discussions provided an overview of the organization and operations of the AESS.

Additionally, the Committee visited the Ministry of Education, Science and Technological Development of the Republic of Serbia and met with Victor Nedovic, State Secretary for International Cooperation. During that meeting Secretary Nedovic conveyed the welcome news that on 6 June (the prior day) a law had passed that for the first-time recognized Engineering Sciences in relation to governmental planning and policy, explicitly naming the Academy of Engineering Sciences of Serbia. Previously, the only Academy acknowledged in such documents was the National Academy of Sciences and Arts.

The Committee ended its visit at the Institute Mihajlova Pupin, hosted by Director General Sanja Vranes, Fellow of AESS and Faculty member at the University of Belgrade. The Pupin Institute, which focuses on Information and Communications Technology (ICT), was founded in 1946 and today is among the most successful of the Serbian research and development institutes, earning an estimated 90% of its revenue from technology transfer, of which approximately 30% derives from foreign exports. The Institute’s staff once numbered 1400 but, in the aftermath of warfare and political upheaval, has approximately 400 on roll. (Approximately 300 former Pupin employees are working in Canada.) The Institute works collaboratively with AESS and is growing its in-house staff in alignment with market opportunities.

Discussions with AESS leadership and Fellows addressed each of the CAETS Membership Criteria; findings are summarized below.

Alignment with CAETS Membership Criteria

In accordance with CAETS Bylaws, Section 3: **A member of CAETS shall:**

¹ Academy of Engineering Sciences of Serbia – 1998-2018. Copyright 2018, Academy of Engineering Sciences of Serbia. ISBN:978-86-7466-744-6

a) Be representative of the engineering and technological community of that country

According to the current Statute of the Academy of Engineering Sciences of Serbia (Article 2):

“The Academy of Engineering Sciences of Serbia is the highest engineering institution in the country of Serbia which implements, organizes, develops and stimulates scientific research in the field of engineering.

The goal of the Academy is to influence scientific, development and innovative research, as well as other forms of scientific and technical creative work and knowledge dissemination in all engineering disciplines, and to direct them.”

b) Subscribe to the non-political, non-governmental international character of the Council

AESS is chartered under Serbian non-profit law (Law on Associations of Citizens) for Public Benefit. It is non-political and non-governmental and actively participates in international activities.

According to the current Statute of the Academy of Engineering Sciences of Serbia (Article 4), principle activities include:

- Taking part in the implementation and reviewing of scientific, development and innovative projects as the basis of the technological development of Serbia
- Giving incentives and proposals for preparation of the program of scientific and technological development of Serbia
- Analysis of scientific discoveries and recommendations regarding their implementation in Serbia
- Stimulation and nurturing of scientific and technical criticism
- Starting incentives, giving proposals and offering opinions to the creators of the social and economic development of Serbia with a goal to ensure successful implementation of both long-term and current goals of material development of Serbia, as well as for the improvement of the conditions for scientific and creative work of engineers
- Preparation of projects, studies, revisions and other project documentation
- Offering advice and expert reviews
- Publishing monographs, journals, textbooks, proceedings and other publications
- Organization of scientific forums, scientific and technical meetings in the field of engineering sciences
- Dissemination and popularization of scientific knowledge
- Assisting young engineers in acquiring their qualifications and in their professional development
- Supporting and organizing permanent education of engineers
- Monitoring the development of engineering as a whole and instigation of its implementation in science, practice and education in Serbia
- Scientific cooperation with scientific and technical organizations, institutions and persons in the country and abroad

Based on discussions with AESS leadership, the Committee concluded that the Academy’s activities are well-aligned with the CAETS criteria.

c) Have a peer elected membership with criteria for election based on significant personal contributions to engineering, technical sciences, or related activities

AESS currently has 120 Full Members, 69 Corresponding Members, 9 Honorary Members and 64 Foreign Members.

- A Full Member is an eminent engineer scientist-creator, who has achieved substantial contribution to science and engineering, and who is highly recognized, both nationally and internationally. A candidate must be a Full Professor or a Principal Research Fellow (although in practice there are some exceptions if the individual is otherwise extremely well-qualified).
- A Corresponding Member is an eminent engineer and scientist-creator, a PhD title holder, who has achieved substantial contribution to science and engineering. A candidate must be a Full Professor or a Principal Research Fellow.
- A Foreign Member is an eminent engineer scientist in the fields of engineering, who holds any foreign nationality, who has established a well-developed cooperation with Serbian scientists, and whose achievements have substantially contributed to the development of science and its application in Serbia.
- An Honorary Member is an eminent scientist-creator in engineering or closely related fields, who has achieved substantial contribution to science and engineering; a member of the National Academy of Science or respectable foreign Academy of Science, a bearer of high national or international awards in the fields of engineering sciences. *Honorary Members are nominated and elected by the AESS Presidency.*

AESS membership is organized into six Departments:

- Biotechnical Engineering Sciences
- Civil Engineering Sciences
- Electrical Engineering Sciences
- Mechanical Engineering Sciences
- Mining and Geological Engineering Sciences
- Technological, Metallurgical and Materials Engineering Sciences

The right to nominate candidates for AESS membership is held by:

- Any Department of AESS
- Institutes, faculties, business organizations and professional engineering associations
- Three Full Members of the Academy

Calls for nominations are launched in three-year periods. The election process includes four phases.

- During the first phase, all possible candidates are identified. Subsequently, each candidate provides a short curriculum vitae including a list of published papers together with a letter of acceptance to participate in the call.
- The second phase occurs at the AESS Department level, during which preliminary voting occurs. The documentation of selected candidates is transferred to the AESS Presidency (President, Vice President, Secretary General, and Secretaries of the Departments). Upon selection, the candidate provides a more detailed CV and must choose and report his/her 5+5 top scientific and engineering achievements.
- During the third phase the Departments vote again, based on the more detailed information. Full Members vote for all candidates, while Corresponding Members vote only for Corresponding Member and Foreign Member candidates. A candidate is accepted if he/she gets the vote of more than 50% of active department members. The Department transfers the complete election documentation to the AESS presidency.

- The complete election documentation is made public for a period of 20 days. After possible remarks and protests, the final documentation is prepared at least 20 days before the AESS Assembly balloting meeting. A candidate is accepted as a new AESS member if he/she gets the vote of over 50% of all the active members of AESS during the final ballot.
- AESS places strong emphasis on transparency of the election process from start to finish.

d) Be governed by its elected membership

The highest governing body of the AESS is the Assembly, which includes full, corresponding, and honorary members and member-advisors; the Assembly meets at least once per year. The Assembly is authorized to:

- Pass the Statute of the Academy and implement its amendments
- Make decisions on the election of the Academy members
- Make decisions on the establishment of departments
- Elect the President, Vice President and the Supervisory Board of the Academy
- Review the results of the work of the Academy
- Make the work plan
- Make the financial plan and adopt the annual account
- Decide on international cooperation and membership in the corresponding foreign academies and similar societies
- Perform other duties as defined by the Statute

The Presidency of the Academy is the executive body of the Assembly and includes the President, the Vice President, the Secretary General, and Secretaries of the Departments. The Presidency manages the work of the Academy between meetings of the Assembly and is authorized to appoint the Secretary General of the Academy, who supports the work of the Presidency.

The Supervisory Board controls financial transactions and tangible assets and is responsible for legal proceedings; it reports to the Assembly on all matters. The Supervisory Board is comprised of a chair and two members who are elected by the Assembly from among the Academy members.

The President is elected by the Assembly for a four-year term and may serve no more than two consecutive terms; the Vice President is elected in the same manner as the President. Department Secretaries and Deputy Secretaries are elected by the full members of each Department.

e) Be engaged in significant activities demonstrating that its objectives are compatible with the objectives of CAETS

AESS maintains an active schedule of lectures, round tables and conferences across a diverse range of topics, including issues of importance to Serbian society as well as the international community. The Academy performs its activities through its Departments as well as through Interdepartmental Committees, which are constituted as needed to focus on particular activities. AESS effectively leverages its access to university facilities to host meetings and conferences, but also participates in other venues. Activities from 2018 included:

- “Specificity of Business Plan Development in Agriculture”—Lecture by Zorica Vasiljevic.
- “Realization of Complex Investment Projects of Experience and Recommendations”—Lecture by Branislav Ivkovic.

- “Global and Regional Challenges of Preservation and Development of Underwater Resources of Serbia”—Lecture by Zoran Stevanovic.
- “Possibilities of Improving the Economy of Operation of Serbian Railways”—Lecture by Relja Jovanovic.
- “Designing the Closure of Historical Landfills in Serbia”—Lecture by Mica Jovanovic.
- “The Renaissance of Industry in a Globalized Economy”—Lecture by Petar Petrovic.
- “Smart City and Business”—Lecture at Danube Business Forum by Borislav Stojkov.
- Round table discussions organized by the AESS Interdepartmental Committee on Cities in the Future:
 - “Cities of Serbia in the Future”
 - “Urban Mobility – Opportunities for the Cities of the Future”
 - “Metropolitan Future of the Big Cities of Serbia”
 - “Urban Economy, Industry 4.0, Innovations and New Technologies”
- “Energy and Ecology Industry”—International Conference, organized by AESS
- “Mining and Geology Today”—2nd International Symposium, co-organized by AESS
- “Advanced Technologies, Systems and Services in Telecommunications”—International Conference, AESS supported

AESS also is an active member of EuroCASE.

f) Have sufficient financial support to pay the costs of CAETS membership and the costs of participation in CAETS activities

AESS provided financial statements for 2012-2018. Every year during that period shows a surplus (operating expenses less than income, with income including a carry-forward from the prior year). Surplus amounts varied from \$211 USD to \$8162 USD, with the high end being driven by extra donations received as the Academy prepared for its 20th anniversary celebration. Eliminating those extremes, the average annual surplus was \$1580 USD.

More than half of the AESS annual income is generated from membership dues paid by partner organizations. In its most recent annual activity report, AESS reported the addition of new partner organizations. AESS also receives some government funding to support its participation in EuroCASE, and anticipates additional government funding to defray the costs of participation in CAETS.

The Committee concluded that AESS has sufficient financial support to participate in CAETS activities and is highly motivated to do so.