Editorial
Control Systems Technology: Towards a Systems-of-Systems Perspective?

THIS IS the second issue of the 18th year of publication of the IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY and my first year as Editor-in-Chief. I am very proud to serve under this capacity. I would like to thank Prof. Frank Doyle for his exceptional support and help in this smooth editorship transition. The editorial office at the University of Trieste is now fully operational thanks to Frank's extremely insightful support. A heartfelt thank you goes to Elizabeth Goffin for the patience in sharing her knowledge in managing the Scholar One electronic review system with my office.

My recent research experience in control systems applications regards the process control context with a specific focus on the steel industry. The number of challenging control problems posed by this kind of a (apparently) mature field always surprises me and leads to the title of my first editorial: "Control Systems Technology: Towards a Systems-of-Systems Perspective?"

I am referring to very large-scale integrated and interconnected systems, for example, critical infrastructures, energy systems, very large process plants, and so on. When looking at these real-world examples from a systems-of-systems perspective, it turns out that wider control objectives and significance arise. Systems of this kind are typically made of many thousands of embedded subsystems interconnected by wired and wireless communication links at component, control, and management levels. Plant-wide key process indicators such as safety, availability, dependability, and so on, have to be considered at the automation system design level. Indeed, by the systems-of-systems conceptual approach, the integration of current separate and independent technological aspects such as production, control, energy management, and maintenance has to be achieved in a seamless way, thus raising several interesting research challenges, both theoretical and practical.

As mentioned by Prof. Antsaklis in the January 2010 editorial of the IEEE TRANSACTIONS ON AUTOMATIC CONTROL, "feedback transcends models and we need to broaden our horizons". I share this vision as far as control applications are concerned, especially in the light of the framework above, where models that are useful for control purposes are typically very difficult to develop. As a consequence, our well-known model-based approaches may very well turn out to be inadequate and new systems engineering paradigms will be needed, characterized by a pervasive influence of "control-thinking" at the design level, for example, by codesigning significant parts of the system and of its control architecture. I hope to be able to attract high-quality papers on significant control technology advances in this very promising field of engineering research.

In order to succeed in this scientific challenge, a "zero-gap" between theory and practice is needed and a collaborative and interdisciplinary approach is required. My goal is to support a very close cooperation between industry and academy in all areas of control systems applications, but with a special emphasis towards shaping the systems-of-systems approach to the control of very large-scale systems. Industry people should definitely get more involved with the IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY. This can be achieved in several different ways, ranging from writing papers for the Transactions, to actively participating in the review process as reviewers and as associate editors, to proposing special issues with significant conceptual and technological content.

Now, I would like to briefly summarize the current situation of this TRANSACTIONs, the initial state for my editorship. My challenge is to strengthen the leadership of the journal even more as the major venue for cutting-edge research on control systems technology while trying to streamline the overall review and production process as much as possible.

Submissions in 2009 reached a record number of 620. As far as metrics for the publication are concerned, the mean time for a first decision to an author was about 98 days, which is a little worse than the 2008 metric, which is due to the transition between the editorial offices during this past summer. My plan is to work hard with the Editorial Board to reduce the delays in the review process. Our acceptance rate is about 25% and the current page count for the journal is 1500 pages, the same as the previous year. Overall, thanks to Prof. Frank Doyle's editorship, the metrics tell about a journal in very good shape. Unfortunately, the backlog has increased compared to 2008 and is currently at about five issues. This growth in backlog is mostly due to the increased submission rate. I will do my best to reduce this backlog to a more acceptable six months period as soon as possible. In the meantime, the managing of the increased backlog involves enforcing even more manuscripts page limits. In this respect, I would like to remind the authors of the current length limitations on submissions. Papers should be no longer than 32 double-spaced pages, including figures, and Brief Papers should be no longer than 16 double-spaced pages, again including figures. As far as Letters are concerned, the limit is 8 double-spaced pages of text, including figures.

I would like to acknowledge the Associate Editors who have finished their terms and gone off from the Editorial Board. They are: Bram de Jager (Tech. Univ. Eindhoven), Santosh Devasia (Univ. Washington), Ali Feliachi (West Virginia Univ.), Ian Hiskens (Univ. Wisconsin Madison), Sharon Liu (GM Powertrain), and Pieter Mosterman (Mathworks Inc.). My sincere thanks to them for the great help they gave me during this transition and my best wishes for their future endeavors.

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Moreover, I am pleased to announce a very strong list of new Associate Editors that have joined the board since January 2010: YangQuan Chen (Utah State University), Claudio De Persis (University of Twente and Sapienza University of Rome), Nael H. El-Farra (University of California, Davis), Masayuki Fujita (Tokyo Institute of Technology), Martin Guay (Queen's University, Kingston), Bin Jiang (Nanjing University of Aeronautics and Astronautics), Jae Lew (Eaton Innovation Center), Derong Liu (Institute of Automation, CAS and University of Illinois at Chicago), Jianbo Lu (Ford Motor Company), Kristin Pettersen (Norwegian University of Science and Technology), Andrea Serrani (Ohio State University), Sophie Tarbouriech (LAAS-CNRS, Toulouse), and Miloš Žefran (University of Illinois at Chicago).

This list of new Associate Editors, along with the continuing ones, make up an excellent Editorial Board (see the front inside cover for the full list). Needless to say, the Associate Editors are the key invaluable element of the review process of our Transactions as they interact both with the reviewers and with the authors.

I welcome any and all of your comments and suggestions for improvements! Please e-mail me at eic-ieeetcst@units.it.

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Thomas Parisini received the "Laurea" degree (*cum laude* and printing honors) in electronic engineering and the Ph.D. degree in electronic engineering and computer science from the University of Genoa, Genoa, Italy, in 1988 and 1993, respectively.

He was an Associate Professor with Politecnico di Milano, Milano, Italy. Since 2001, he has been a Full Professor and Danieli Endowed Chair of Automation Engineering with University of Trieste, Trieste, Italy. Since 2009, he has been a Deputy Rector of the University of Trieste for Business Relations. He has authored or coauthored over 200 research papers in archival journals, book chapters, and international conference proceedings. His research interests include neural-network approximations for optimal control and filtering problems, fault diagnosis for nonlinear and distributed systems, and nonlinear model predictive control systems. He is involved as a Project Leader in several projects funded by the European Union, by the Italian Ministry for Research, and he is currently leading consultancy projects with some major process control companies (ABB, Danieli, Duferco among others).

Prof. Parisini was a recipient of many awards including the 2007 IEEE Distinguished Member Award and a corecipient of the 2004 Outstanding Paper Award of the IEEE TRANSACTIONS ON NEURAL NETWORKS. He is currently the Editor-in-Chief of the IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY. He was the Chair of the IEEE Control Systems Society Conference Editorial Board, the Chair of the Technical Committee on Intelligent Control, and a Distinguished Lecturer of the IEEE Control Systems Society. He is an elected member of the Board of Governors of the IEEE Control Systems Society and of the European Union Control Association (EUCA) and a member of the board of evaluators of the 7th Framework ICT Research Program of the European Union. He is currently serving as an Associate Editor of the *International Journal of Control* and served as Associate Editor of the IEEE TRANSACTIONS ON AUTOMATIC CONTROL and of the IEEE TRANSACTIONS ON NEURAL NETWORKS. He was involved in the organization and in the technical program committees of several international conferences. In particular, he was the Program Chair of the 2008 IEEE Conference on Decision and Control and he is General Cochair of the 2013 IEEE Conference on Decision and Control.