President's Message

I am writing this message just after returning from the 43rd IEEE Conference on Decision and Control in The Bahamas where we celebrated the 50th anniversary of the IEEE Control Systems Society. Eighteen of the past CSS President's attended the conference and treated us to reminiscences of the early years of the Society and its growth into one of the most respected professional organizations in the world. The present high quality of the CSS is due in great measure to the vision and leadership of these past presidents. I did not have the opportunity to thank each and every one of them personally for their participation in the 2004 CDC, so I would like to thank them collectively now. It was obvious that this group cares deeply about the CSS and shares a special camaraderie. It is a cliché to say that I am standing on the shoulders of giants in my role as 2005 CSS President, but that is precisely the feeling that I took home from this year's CDC.

Are We Relevant Yet?

In the last issue of the Magazine I talked a little about history and the opportunities that the Control Systems Society has to impact a world increasingly reliant on technology. In this message I want to expand upon this theme. Ever since I first got involved in the CSS in the early 1980's I have been listening to concerns, complaints, and discussions about the relevance of control theory. The complaints usually go something like this:

Our journals are unreadable; we respect only mathematics and not applications; our textbooks have not changed in 50 years, and so on.

These statements may be overly simplified but since they are widely promulgated it is worth examining some of the underlying reasons for their persistence over the years. I will comment here on the theory versus application question and address engineering education in a future column. Ours is first and foremost an engineering discipline. As such, our contributions more often take the form of design methodologies than solutions of open problems. However, perhaps because of the nature of feedback and the need, as Gunter Stein once aptly stated, to respect the unstable, mathematical analysis has played a vital role in control, a role that predates the push toward engineering science that occurred after the Second World War. A decade before the Manhattan Project exposed the weaknesses of engineering education in the United States, Nyquist and others had already shown the importance of rigorous mathematical analysis in the development of design tools for feedback control systems.

My own attitude has been shaped by my involvement in the development of robot control theory in the 1980's. Robotics in the 1970's was characterized by clever but often ad hoc solutions to particular problems, the prime example being the well-known computed torque algorithm. In the 1980's researchers began applying deep results from nonlinear and adaptive control theory, such as differential geometric methods, singular perturbations, passivity, and Lyapunov-based design. The state-of-the-art today is such that students in first year graduate robotics course routinely complete class projects that would have represented PhD-level research two decades ago. The saying "There is nothing so practical as a good theory" has certainly been borne out in robotics and many other areas of control.

The question of relevance is more than a question of theory versus application, however. It is also a question of how theory evolves, of how applications drive new theory, and of how synergies arise among control and other disciplines. As an enabling technology underlying a multitude of applications, control

requires a diverse repertoire of theoretical tools and a continued influx of new ideas and new application areas to maintain its health and vitality. Thinking that it would be interesting to make a comparison between the CDC of two decades ago and the recently completed CDC, I pulled off my shelf the Proceedings of the 1984 CDC, which was held in Las Vegas. At that time, the largest number of sessions was in infinite dimensional, distributed parameter and delay systems, nonlinear systems, adaptive control, and stochastic control. Power systems, robotics, aerospace, and manufacturing dominated the application areas. There was a smattering of sessions in robust control, optimal control, decision systems and operations research, and two sessions on networks and communications.

In contrast, by 2004 the rise of hybrid, discrete-event, and switching systems is very much in evidence, followed by numerous sessions on communications and networked control systems, and coordination and control of multi-agent systems. Systems biology has begun to make an appearance. Of course, sessions on nonlinear, robust, adaptive, distributed parameter, and stochastic systems are still present as are robotics and aerospace systems. However, the preponderance of papers seems to have shifted to the three areas of hybrid, networked, and multi-agent control. What is driving this shift? Is it a healthy development for the field?

In answer to the first question, it seems clear that the advent of information technology and advances in computer hardware and software have been a major stimulus to the development of hybrid and networked systems. I believe that these areas have made control theory more relevant in industrial applications and more useful to society at large, which is a healthy development. On the other hand, the proliferation of research in multi-agent systems seems to be driven in large part by military interests. Military applications of control have always been important, and the best researchers continue to distill interesting theoretical problems from such applications. The difference I see these days has to do with the decreasing public support of state universities. I am speaking, in particular, of state support of US universities, but colleagues in Europe also tell of decreasing support for education. As state support decreases, universities are increasingly forced to balance their budgets with research dollars and subsequently the pressure to replace fundamental, long-term research with short-term deliverables has never been greater. My own research on multi-robot teleoperation is, in fact, supported by the US Defense Department so my message is not intended to criticize. It is intended only to ask whether it is healthy to have such a significant fraction of our research effort devoted to a specific application. From where will the fundamental breakthroughs in theory come to address new problems as they arise? As state support for education continues to shrink, will we be reduced to serving as consultants to the highest bidder? I still see plenty of reasons for optimism but, at the same time, I see black clouds on the horizon if we are not careful to guard our academic freedom. I think we have lost the old paradigm, most notably represented by Bell Laboratories, of "funding good people" and "turning them loose to think about interesting problems." As inefficient as this sounds, it is still the best way to produce the kind of fundamental research that can sustain long-term growth. So my answer to the question, "Are we relevant?" is yes, but we risk losing our relevance by focusing too much on too few application areas.

The Problem of Conference No Shows

Allow me now to switch topics and discuss the problem of conference "no shows" -- people who fail to attend and present accepted papers. Although the problem of no shows has been around as long as there have been conferences, recently it seems that the problem has become more severe and the CSS Executive Committee has been thinking long and hard about ways to ameliorate the problem. No shows are bad for several reasons, both financial and technical. Lost revenue to the conference results when the no show does not pay the registration fee. This creates a financial burden to the Society. Conference income is the primary source of revenue for the Society and helps pay for all Society activities and initiatives. Beginning in 2005 all CSS-sponsored conferences will implement a policy whereby at least one author of an accepted paper must be registered and have paid a full registration fee before the final paper can be uploaded to Paper Plaza. This policy will reduce the financial impact on conferences but, in

a way, the technical burden to the conferences resulting from no shows is even more severe. With rejection rates close to 50%, nearly every paper accepted means that someone else's paper must be rejected. Therefore, no show papers not only leave gaps in the technical program and waste valuable time, they rob others of the opportunity to present their work. There are various reasons for no shows, some of which are unavoidable, such as illness or other emergencies, cancelled or missed flights, or denial of visas.

However, these reasons do not account for the whole problem. Of more concern are avoidable reasons such as authors who submit papers to more conferences than they are able to attend or who may simply want to increase their publication count without necessarily intending to show up at the conference. Part of the blame may be directed at our reward system that gives promotions, tenure, salary raises, even direct monetary payments based on the number of published papers. A consequence of this reward system is the proliferation of conferences and journals that has occurred over the years. However, this does not absolve authors from the ethical responsibility to submit papers only to conferences that they will attend and to make every effort to attend and present their papers if they are accepted.

What can we do to reduce the impact of no shows on our conferences? First, I urge everyone to recognize the problems caused when authors fail to present their papers. I urge you to remind your colleagues and students of the ethical responsibilities involved in paper submission and conference attendance. Moreover, if you find that you are unable to attend a conference for any reason, I ask you first to notify the organizers immediately and second to try to find a substitute to present your paper. Over the years I have presented several papers for colleagues who found that they were unable to attend a particular conference. I find, in such cases, that the authors usually are careful to provide me with clear and well-planned presentation slides to assist me. (Otherwise, I ask them to redo their slides.) I have greatly enjoyed making such presentations for the simple fact that I always learn a lot. As the saying goes, the best way to learn something is to teach it to someone else. Is it not our primary purpose in attending conferences, after all, to learn new ideas? Likewise, if you hear that a colleague will not attend a conference that you are attending, why not volunteer to present his/her paper? Don't wait to be asked!

The alternatives are to generate "blacklists" of repeat offenders and ban them from submitting papers. Personally, I much prefer less drastic measures. If we all work together to increase the awareness of the negative impact of no shows, to help make sure, at the very least, that all papers are presented so that sessions are not disrupted, and finally to exert peer pressure on our colleagues not to submit papers to conferences unless they plan to attend, we can go a long way toward solving the problem of conference no shows.

CSS Fiftieth Anniversary Celebrations

I do not want to end my message without a few additional remarks to thank those who made our 50th anniversary celebrations a success. First, is Cheryl Schrader who suggested the idea of an anniversary celebration and contacted all of the past Presidents. Second, is Dennis Bernstein, who put together an outstanding issue of the Control Systems Magazine to mark the 50th anniversary, and to all of the authors who contributed to this issue. It will surely become a collector's item. Also, I would like to thank the members of the CSS Executive Committee and the CDC Operating Committee for their help. Finally, I would like to thank Linda Bushnell for her tireless efforts to help make the 50th anniversary celebration such a success. Among other things, Linda arranged for the production and distribution of attractive polo shirts

with the CSS and IEEE logos (shown above). These shirts were sold at the CDC and it was great fun to walk around the Atlantis resort and see so many CSS members wearing them. A number of shirts are still available for sale so, if you would like to have one, please contact Linda at L.Bushnell@ieee.org or order online at www.ieeecss.org.

As always, I welcome your comments and suggestions.

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President
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