Thoughts on CSS Publications

Steve Marcus and I recently attended a program review in Washington, D.C., and we were discussing the events this past spring celebrating the 60th birthdays of three of our IEEE Control Systems Society (CSS) colleagues, John Baras, Alan Willsky, and Nils Sandell. Steve and I had overlapped as students with John, Alan, and Nils during our Ph.D. years in Cambridge, Massachusetts. Somehow, our conversation drifted to the topic of the massive production efforts associated with typesetting our Ph.D. dissertations, back in the days (1970s) where "cut and paste" involved scissors and tape.

We recalled with amusement the preparation process for our early contributions to *IEEE Transactions on Automatic Control*, which we still had in filing cabinets. After taping retyped sentences, figures, and paragraphs on top of previous paper drafts, the resulting papers were reminiscent of Frankenstein productions, with odd snippets of sentences misaligned on pages with rough borders. Photocopying these submissions served several purposes: The resulting pages were actually rectangular, the weight of the copies was greatly reduced, and the "scars" from the numerous cuts were less visible. These submissions were sent to the IEEE for publication, where professionals retyped the papers entirely and generated proofs for editing. Understandably, the proofs often contained errors in the layout of equations as well as typographical errors in the text, which needed correction.

This procedure changed dramatically with the broad distribution of personal computing equipment and typesetting software. PCs allowed us to perform virtual cut-and-paste operations, generating drafts with the same quality as originals, while adding professional-looking graphics. The widespread distribution of typesetting TeX software and its variants allowed us to create manuscripts with professional typesetting that interfaced directly with publishers' standards and enabled us to specify complex equation structures in unambiguous formats, which could be interpreted in generating proofs.

Publishers took advantage of these advances to eliminate redundant tasks and accelerate the production of journals and books, exploiting the simpler interface provided by the authors. Several of our colleagues, such as Dimitri Bertsekas and Gil Strang, realized that they could have complete control of the editorial process in producing books and effectively became their own publishers. Increasingly, journal publications required electronic submission of manuscripts in typesetting languages using standard layout packages in addition to printed copies, making the transformation from submission to proof a simple production that required minor editing and avoided errors due to retyping.

Given these developments over the last 35 years, I was surprised to see the large number of typesetting errors in the review proofs of several recent IEEE publications, specifically *IEEE Transactions on Image Processing* and *IEEE Transactions on Automatic Control*. Equations had missing sym-bols, subscripts were converted to regular text, and figure captions were altered to change their meaning. Discussions with colleagues showed that they had noticed this trend as well. These errors are of great concern to our CSS editors, who seek to produce top-quality publications that are accurate and contain high quality content. At best, the errors create significant overhead on behalf of authors to correct the proofs. At worst, some errors won't be corrected in the revisions and result in erroneous presentations in our journals. The long-term concern is that authors may be discouraged from further submissions to these journals

Why are the error rates in our IEEE proofs similar to the error rates of the manually intensive retyped proofs of the 1970s? There are several factors that contribute to this effect. First, IEEE accepts manuscript submissions in formats such as Microsoft Word to make it easier on authors for manuscript preparation. Although this flexibility avoids the need to retype text, all equations must be retyped from scratch, increasing the error rate. Second, IEEE has evolved its typesetting standards to be compatible with Web access, in response to the success of IEEE *Xplore*. Even manuscripts submitted in TeX require extensive relabeling with XML tags, a process that IEEE subcontracts to its vendors. The relabeled documents use only plain TeX for equations and not variations such as LaTeX or other customized macros. Therefore, manuscripts submitted in LaTeX also require that equations be retyped in plain TeX. Finally, there is the issue of quality control in proofreading the retyped version that IEEE generates

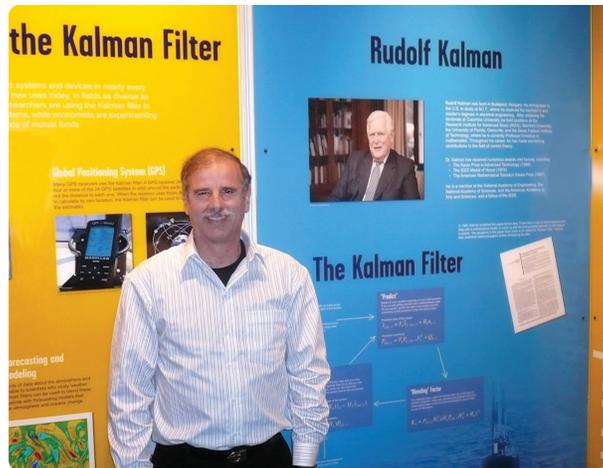versus the version accompanying our submissions.

Our Society is justifiably proud of our three publications: *IEEE Transactions on Automatic Control*, *IEEE Transactions on Control Systems Technology*, and *IEEE Control Systems Magazine*. We were among the first Societies to place all of our historical journal publications online through IEEE *Xplore*, and our PaperPlaza system allows us to produce quality conference publications at reduced costs, which are the envy of other Societies. Our volunteer conference and journal editorial boards spend significant effort selecting high-quality contributions to include in our publications, and expect nothing but the best service from our IEEE publishers.

Fortunately, we have good insight into the production processes that IEEE uses. John Baillieul is serving as the 2008 IEEE vice president for Publication Services and Products. One of John's goals for IEEE is to improve the quality of authoring tools aimed at improving the transcription process

David Castañón posing in front of the Boston Museum of Science exhibit honoring Rudolf Kalman for the development of recursive state estimation.

from authors' manuscripts to final proofs. Another of his goals is to understand how IEEE publications might be changed to accommodate the goals of the open access movement. John and our editors are working with IEEE to improve its publications procedures so that our journal products continue to have a presentation quality that matches our intellectual contributions.

On an unrelated note, the Boston Museum of Science features an annual exhibit that honors the winners of the

U.S. National Academy of Engineering's Draper Prize. Last year, the exhibit showcased Sir Timothy Berners-Lee, the winner of the Draper Prize in 2007, who was the pioneering force behind the creation of the World Wide Web in the 1980s. The exhibit in the museum was updated in May 2008, in honor of the most recent Draper Prize winner. Rudolf E. Kalman was awarded the 2008 Draper Prize for his development of the Kalman filter. The enclosed picture, taken the weekend that the exhibit opened, shows me in front of the exhibit at the Museum of Science. The exhibit consists of three panels describing the Kalman filter, selected applications of the filter and a biography of Kalman along with his original paper on the Kalman filter. If you have an opportunity to visit Boston, take a side tour to the Museum and see the exhibit that celebrates one of the foundational developments in modern systems theory.

—David A. Castañón

We Get It

And if Frontinus strikes us as perhaps a little ponderous, and a little obsequious towards his emperor, two points should be remembered. The formulae he uses at the start of his work were polite conventions, and had no more real meaning than (say) "I remain, Sir, your obedient servant." And just occasionally he shows a touch of ironical Roman humour. He tells us (Bk II, Chapter 115) that the official in charge of branch-pipe connections who had allowed illegal pipes to be connected up underground (in return for a bribe) was known as "a punctis." The joke consists in giving a high-sounding official name to an illegal activity, as one might say in English, "senior commissioner for water-theft in the Ministry of Punctures."

—J.G. Landels, *Engineering in the Ancient World*, Barnes and Noble Books, 1978, pp. 214, 215.