STATEMENT OF STEPHEN KAHNE

The control field has a broad constituency ranging from research professors to control technicians in a broad industrial base. Although our topic is USTP [United States Technology Policy], it is relevant to non-U.S. control engineers due to the transnational nature of all engineering and scientific endeavors, including especially the fields affected by advances and practice in control engineering. U.S. technology policy is not something that has been handed down as doctrine that we all are encouraged to follow. It is, indeed, an aggregation of current practice that some people try to package as “a policy.” There are attempts to codify it, especially with regard to technology transfer, patent policy, college program accreditation requirements, component standards, research funding policies, etc. There are many USTP issues that affect all engineers, including control engineers, such as pension and compensation plans, manpower utilization, university faculty shortages, the hiring and firing cycle for engineering—which is not nearly as pronounced as casual observers of the employment scene might claim—continuing education opportunities, international competition for goods and services, ethical responsibilities of engineers, roles for professional societies, etc.

I will comment on a few issues in USTP as it affects control engineering. Control engineers have a responsibility to communicate with the general public to help them understand the impact of the engineer’s task. After all, our efforts can improve the accuracy of nuclear warheads or conserve energy in manufacturing processes. I expect our efforts on behalf of the military are more widely known. Especially those of us—the majority of Control and Decision Conference (CDC) attendees—who depend on public support for our work have this obligation. If we are inventors, we must be sure that the patent laws protect not only our employers but also ourselves. The portability of our pensions was a central issue to the majority of control engineers in the United States because...
of the tendency of control (and other) engineers to change jobs before they were fully vested in a company’s pension fund. IEEE helped bring about a change that now protects the pensions of many more control engineers.

It is now recognized that continuing education is a key to long-term success for control engineers. Universities and professional societies alike are challenged to provide offerings that will help enrich the technical careers of our people. The robotics satellite course at the CDC is one example of how the IEEE can contribute to this education effort. Such programs cannot succeed without strong participation by the engineers’ employers— a real partnership is needed for success.

Control engineers, in particular, are affected by the level of military spending, and so USTP, as it affects military spending, impacts the control community. This is true both in industry and at universities where much of the nation’s basic research is performed. How can the control and systems community have a more effective role in determining policies affecting these expenditures?

Indeed, USTP does affect control engineers. If a USTP is to be developed and if control engineers do not participate, people less knowledgeable about our field will do it. It seems to me that this is an undesirable alternative.

STATEMENT OF
HAROLD SORENSON
The U.S. government has had a long-standing policy regarding the support of science and technology. Generally, this policy has emphasized the support of basic research with the National Science Foundation (NSF) serving as the focus for this activity. Research and development has been supported through a variety of other channels. For example, the Department of Defense with its 6.1 and 6.2 funding elements has provided support for military technology. The formation of NASA provided an emphasis on space-related technology. Other government agencies (e.g., the Departments of Energy and Transportation) have been involved in supporting research and development in areas within their charters. The involvement of the federal government in the development of U.S. technology is well established, and a change in policy from one administration to the next always provokes controversy and lengthy debate.

Should the federal government continue to support technology or should it be left entirely to the private sector? Economist Milton Friedman wrote in his column in the May 18, 1981 issue of Newsweek that the National Science Foundation should be abolished and that the government should discontinue its policy of funding basic research. He claims that it is entirely feasible to expect the private sector to carry this burden and claims that there is ample proof for the success of this approach. Friedman’s position is not the prevailing view. Those who have grown up with the existing system of support may find it difficult to imagine his alternative, regardless of our complaints about the details of the current system.

The Reagan Administration has claimed that the policies of previous administrations have led to an excess of government involvement in research and development. As a result, the Reagan Administration has made several decisive changes in the federal policies regarding science and technology. These emphases are summarized, for example, in Science, November 12, 1982. In brief, the policy asserts that the federal government should concentrate on basic research and defense R&D, leaving commercial technological development to the private sector. Many of the budgetary actions of the OMB are consistent with this policy. It should be of particular interest to members of the Control Systems Society that funding for engineering within the National Science Foundation has increased at slightly more than the inflation rate. Also, funding for R&D has increased within the Department of Defense.

Policy decisions that provide the basis for actual funding decisions must be translated into guidelines at all levels. These policies impact everyone who attempts to gain support for their work from federal agencies. As examples, I cite the decision within the NSF to emphasize certain research areas; in particular, the decision, among others, to emphasize adaptive control and large-scale systems. Similarly, a decision was made at the Air Force Office of Scientific Research (AFOSR) to emphasize adaptive control, autonomous systems, and robotics. Because funds are limited, one can argue that it is more cost-effective to focus on problems having recognized payoffs and to impose, thereby, some coherence to a program. Those individuals working in other research areas whose funding is terminated or not granted may not appreciate this wisdom.