

Testimony
House Committee on Science and Technology

I am very pleased to have been invited to testify at the 12 December 2013 Congressional Hearings relative to H.R. 2996.

Moog Inc. is a 2.6 billion dollar company with our own facilities in 30 countries. We design and manufacture precision motion controls applied on aircraft of all types, launch vehicles, satellites, and industrial automation. We have been a leading-edge manufacturing company since our founding in 1951. Today, we have manufacturing locations in seven USA locations and 15 countries around-the-world. Significant factors in our success have been our focus on using innovative manufacturing machinery and technology, training our employees, and developing supply chain partners.

With this background, I can say my Moog colleagues and I are in full agreement with the premises outlined in Mr. Reed's and Mr. Kennedy's "Dear Colleague" letter. Manufacturing is a very important component in the USA economy. Many of our most skilled and experienced machinists, test technicians, and manufacturing engineers will be retiring in the next ten years. I do not believe we are unique in this regard. Most of our supply chain vendors have the same problem. We have worked with Erie Community College in Buffalo on training programs for over 40 years with good results. However, we now have facilities in six other locations, most of which do not have local training programs comparable to those in Buffalo. So having a network of Centers could help provide the in-place for training where we have facilities. The Federal Government could provide the seed money to create such a network. However, it seems to me that the question we should be addressing is not "Do we need more training in advanced manufacturing techniques and technologies?" but rather "How to most effectively provide the capabilities for training?"

Since this Act is about increasing productivity and innovation, it would seem the Act should encourage or even mandate that the leading-edge training and education techniques should be used. In the past five years, there has been a very rapid development of Massive Open On-line Courses (MOOCS). About one hundred of colleges and universities, including the leading schools are actively and aggressively pursuing developing their on-line course offerings. The courses are available on-line with the lectures available asynchronously. MOOCS have already

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shown they can produce a quality educational experience for many fields at a cost one-tenth of the on-campus model. I believe the MOOCS model can be used to provide the foundation courses for many of the disciplines needed in manufacturing such as mathematics, electronics, computer science, etc. Clearly, some training involves hands-on experience with actual equipment. However, most of the basic courses can be taught in the MOOCS format.

Consortia of universities have already been formed by groups, such as Udacity, edX, and Coursera, who have developed the processes and infrastructure to deliver on-line courses. Their current capabilities could be expanded to include the type of training and courses required for advanced manufacturing. The major advantages of the MOOCS format is the courses are taught by the best lecturers and students can access the lecturers on their own schedules without having to travel to a specific location at a specific time. In addition, courses are not dependent on the availability of physical facilities which is a large cost with the in-place education model.

It would also be possible to engage with companies and organizations that already have training programs in manufacturing. These would include companies who manufacture production equipment. They have the best view of the advances being made in manufacturing technologies and have an inherent interest in training people to operate their machines. Relative to supply chain, there are two groups, APICS and The Supply Chain Council, who have training and certificate programs in place for supply chain people. There is a possible role for the Federal Government to help these programs increase their reach by enabling these natural partners to develop their training in the MOOCS format.

How should policy makers prioritize spending decisions on manufacturing research and development programs in the current budget environment?

Relative to manufacturing research, I do not believe the Federal Government needs to spend on manufacturing research. We participate in industrial consortia at Purdue, Penn State, University of Wisconsin, and the University of Illinois on specific technical areas. Each of these has a manufacturing component. These are funded by companies who manufacture products. Most

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of the research is pre-competitive and openly shared. I believe this is a more effective model than having the Federal Government pick which technologies to research and develop.

Relative to training, as I outlined above, there is a role for the Federal Government in developing a new lower cost model for training programs. This Act risks being just another in a long string of Federally-sponsored training programs if it does not use this as an opportunity to change the training delivery mechanisms and these by dramatically lower the cost through the MOOCS model. The provision for a seven-year sunset should prevent this from becoming another institution with its own interest groups.

Given the current budget deficits, it is difficult to increase spending in any area without making cuts in other programs. Manufacturing is a very important component in the U.S. economy. To maintain our competitive position in the global economy, we need to have the best most productive workforce. That takes training. We have previously seen cycles when a large number of employees retired in a relatively short time period. Several articles by various professional and trade groups have noted the current large number of retirements just at the point there are a number of new manufacturing technologies. So one could argue a manufacturing initiative will provide a real sustained return to the U.S. economy. But as with a business, one needs to make reductions in one area to fund investments in another area.

In summary, this Bill comes at an opportune time to innovate the way manufacturing training is accomplished at a time when there is an increased need for training. The research component is probably best left to the universities with corporate consortia funding.