AUTOMATION FEDERATION | Accelerating Automation Success

Work Force Development Policy:
Advancing the Automation Profession to Gain Global Competitive Edge

Issue: Today, a prime mover in the drive to retain America's global competitive edge is showing signs of faltering for several reasons. The Automation Profession consists of engineers, technologists, technicians, and others with acquired knowledge which spans several engineering disciplines and years of field experience in order to efficiently produce high quality manufactured goods and services. Current estimates show that thousands of new automation professionals are needed annually at a time when the workforce is bracing for the baby-boom bust. Engineers and technicians knowledgeable in automation are critical for keeping U.S. manufacturing competitive in a global market, according to U.S. industry leaders. Some of the main factors contributing to present situation are:

- Many of the automation professionals lost to retirement or made redundant by restructuring in the past decade have now fully retired. At the same time, demand in automation is increasing faster than ever as plants become more efficient, safer, more secure, and increase production to levels never intended within existing infrastructures. Skilled automation workers cannot be easily replaced, just at a time when a large influx is needed to just maintain the workforce size at current levels.
- U.S. schools do not teach automation as an undergraduate engineering discipline, and automation technology is advancing so rapidly that it takes one to three years for graduates of other engineering disciplines to perform at a professional level in the automation field.
- Manufacturers are still doing little to stave off the skills shortage that is created when experienced employees exit the workforce faster than new talent can join. One explanation might be lack of funds and time.
- Lack of preparedness in K-12 - 84% of respondents in a recent survey by National Association of Manufacturers (NAM) believed that K-12 schools were not adequately preparing students for the workplace
- The overall poor reputation of manufacturing in the US is seen as an insecure job, lacking opportunities and losing business to other areas of the world

The Automation Federation Role: The Automation Federation is stepping forward as the "Voice of Automation" and is positioning itself to be the catalyst for the development of the next generation of automation professionals. Our intention is to create a "cradle to grave" approach by preparing current and future workers for automation careers at all skill levels and all career stages. The core components of this approach are:

- K-12 Education
- Diversity Recruitment
- University Relations
- Establishment of Automation Curriculum
- Technical Training & Education
- Certification
- Government Relations
- Industry Relations

Within each component, a plan will be developed to answer the current problems and obstacles through research, marketing, partnerships—both corporate and governmental, and increased public awareness, amongst others.

Next step: Improving education and working towards better preparing our next generation requires federal involvement as well as local initiatives. The Automation Federation would like your personal recommendation and assistance in securing financial support to successfully execute our plans, and move forward.

The Automation Federation will be honored work with you and to assist with furthering this issue. Please contact:

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Automation Engineering Curriculum Policy:
Creating a Competitive Automation Profession for the Future

Challenge: One key factor in the ability for manufacturing to compete in the global market is automation. Automation engineers working in industry today are typically degreed in the electrical, mechanical, or chemical vertical engineering disciplines where little to no emphasis is placed on automation in the degree program. Today, the expertise necessary for the job is usually gained over years on the job through mentoring, available training courses, individual certifications, and trial & error with a significant time lag from hire date to useful productivity. The ability to perform well in global competition has placed strong demands on the automation profession. U.S. universities are not keeping up with these workforce demands in that no undergraduate Automation Engineering program currently exists in our country to meet the challenge. Students preparing for a career in automation are receiving a better education outside the US where programs are developing on a broad basis. Without this key ingredient, the automation engineering expertise available today cannot be sustained into the next generation. Creating new university programs has proven to be cumbersome and difficult for many reasons, not the least of which are budget and human resources restraints.

Plan: A career in automation encompasses a cross-over between a variety of engineering fields and disciplines. It is our intent to actively work to establish an accredited Bachelor of Science undergraduate degree program which would give students the multi-disciplinary educational and practical background necessary to begin performing automation engineering work in any industry as a more useful employee at the outset. Our members have been working on assembling draft curriculums for both a four year automation engineering degree and a two year engineering technology degree.

Educational Objectives – Within the first few years after graduation BS graduates will possess:

- Competencies – Adequate skill in tools and techniques that are fundamental to the job, many of which need to be learned after graduation.
- Professionalism – Partnership in the mission and human context of the enterprise; including ethics, effectiveness, initiative, creativity, critical thinking, and awareness of the broad context of the detailed work.
- Balance – A wise self-direction to life, community, and health. A self view that finds the right balance between personal choices, and that energizes and enables self and others.

Program Outcomes – Upon graduation students will have:

- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to design a system, component, or process to meet desired needs.
- An ability to function on teams with diverse members.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.
- The broad education necessary to understand the impact of engineering solutions in a global and societal context.
- A recognition of, the need for, and an ability to engage in life-long learning.
- A knowledge of contemporary issues.
- Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Next Steps: Improving and educating our future workforce is everyone's responsibility. Federal, state and local governments can give industry, learning institutions, and dedicated proponents a helping hand. The Automation Federation and ISA would like your personal support in securing funds for furthering this issue through the development of various initiatives and programs, such as pilot programs, academic education forums, scholarships, school funding, and grants, etc.

The Automation Federation will be honored to provide this service to policy makers and leaders at any time. Please contact:

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Informed Cyber Security Policy:
Vital in Defense of Our Nation's Industrial Infrastructure

Issue: Within the national emphasis on industrial infrastructure security, the cyber or electronic security of industrial automation and control systems (IACS) is critical because of the potentially disastrous impact a compromise could have on human safety and welfare, economic viability and stability, the environment, and the integrity of the overall national infrastructure.

IACS have proven to be vulnerable in both laboratory demonstrations and by actual cyber incidents. Consequently, government agencies and regulators are working with various industry groups to establish programs and standards to assess and improve IACS security posture and the protection capabilities of critical infrastructure. Much of this activity, however, is focused on specific sectors that may have narrow concerns and agendas – even though the nature of the challenge, while highly complex, is interrelated and essentially the same across all industries using manufacturing and process control equipment and automation systems. The costs to industry and the heightened risks of ineffective solutions are much higher with this fragmented approach through multiple, industry-specific standards. Universal and rationalized standards, while more difficult to achieve, are ultimately a much more effective business and technical solution for IACS cyber security.

The Automation Federation Role: Understanding the challenges and complexities in IACS cyber security across our nation's vast industrial infrastructure requires an unbiased collaboration of experts representing a range of private and public sectors and technologies. As a nonprofit engineering association of 30,000 automation and control systems professionals, ISA is uniquely positioned to bring together this wide-ranging expertise. The Automation Federation is an umbrella organization under which, amongst others, ISA lies. ISA is the international standards organization for industrial automation and control systems.

ISA, an accredited member organization of the American National Standards Institute, has harnessed this multi-sector expertise in two major ongoing industrial cyber security initiatives:

- The ISA99 Standards Development Committee, which is developing American National Standards and guidelines on IACS cyber security technologies and programs that can be universally applied across all industry sectors.
- The ISA Security Compliance Institute, which supports effective implementation of industry standards via compliance testing, market awareness, technical support, and education.

To help ensure informed policy decisions, ISA offers government policy makers and leaders access to the guidance and advice of our leading experts on industrial automation and control systems cyber security from a broad range of industries and technologies– as requested and at no cost. This service could include review and comment on proposed regulations, expert testimony before congressional and regulatory committees, participation on special commissions, definition and development of government supported initiatives in technology development and research, and more.

Next step: The Automation Federation would like your personal recommendation and assistance in securing a seat or active role on the President's Council to offer our assistance in furthering the discussion of this issue in legislation. In addition, your support of a monetary grant or other funding opportunity would facilitate the development and implementation of the standards.

The Automation Federation will be honored to provide this service to policy makers and leaders at any time. Please contact:

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