

CAPacity

Newsletter for the ISA Certified Automation Professional® (CAP™)



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CAP™ Profile – Larry Holland



It's no surprise that Larry Holland works in automation. As early as high school, his dream job was to build robots controlled by computers. "There was no such thing back then," he said, now a 26-year veteran of the industry.

As an automation controls engineer for Leviton, an electrical and electronic products manufacturing company, Holland designs and develops automation processes. "We start with tasks that need to be automated and deliver fully functional automated systems," he said, explaining that the process includes designing controls, writing programs and performing automated testing. Prior to joining Leviton 12 years ago, he worked in automation positions for Martin Marietta's aerospace division, Motorola and Intel.

In the summer of 2005, Holland received the Certified Automation Professional® (CAP™) designation from ISA, a highlight of his career. "The certification program pulls together all of my training, education and experience," he said. "There is no other certification or designation like it."

Although Holland has attended education and training courses at NASA and Rockwell, and has the certificates to show for it, he believes the ISA certification is different. "The other certificates indicate something I *did*," he said. "The CAP™ qualifies what I *do*."

Passing the CAP™ exam and achieving the designation has added validity to his advice. Other professionals in the company seek out his opinion and recommendations. "The ISA certification has raised the bar," he said. "It is recognized at all levels of the organization including senior management."

Although Leviton did not require the certification, the company supported Holland's pursuit of the CAP™. It was noted in his annual performance review, and his management supports his participation in the continuing education courses he needs to keep the designation current.

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What is the Value of Automation Knowledge? Part 2

Part 1 of this article reviewed potential benefits from "general automation knowledge". You can read it in the December 2005 edition of CAPacity, available online at www.isa.org/CAP.

Can We Calculate How Much Might the Knowledge be Worth?

It would not be too hard to think of scenarios where each engineer could experience several of the situations described above in any given year, and that each of these instances could be worth a day of time. Assuming that a day of time is worth about \$600 in the office or \$900 in the field (with travel expenses), those several situations could easily amount to \$2,000 a year or \$6,000 over three years. That's a little over 1% of the cost of the engineer. If this general knowledge is worth anything it ought to be worth that much.

Some More about the Scope of Automation Knowledge

The Body of Automation Knowledge today is very large and is expanding at a rapid rate – partly because the scope of automation we are interested in is expanding beyond process

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As familiarity with the CAP™ increases, Holland expects to see more career opportunities opening for himself and other certified professionals. "CAP™ will be sought out, and the career value will increase," he said.

Holland's extensive preparation and study for the exam included use of the ISA study guide and the three-day review course. "It's a very comprehensive exam," he said. "There was something from every discipline, things I do not use every day on my job."

During his preparation, Holland relearned and revisited information that deepened his knowledge of automation across the board. "I did better on the exam because of taking the review course," he said, explaining that the course reviewed information from disciplines outside his primary focus area.

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In terms of his advice for others considering the exam, he recommends studying *A Guide to the Automation Body of Knowledge*, a comprehensive text that has been published since he tested. "Get this book and become familiar with it," he said.

While admitting that the exam was one of the most challenging he has ever taken, he describes the designation as a "good fit" for himself. "This designation is for a specialized group," he said. For those with that specialty, "this is one of the most rewarding things you'll ever do."

He encourages those considering it to accept the challenge. "This is something you can use for the rest of your life," he said. "Once you do it, it's something you can be proud of. It is a very distinctive honor."

In response to industry requests, ISA established the CAP™ program in 2004 to recognize and document the specialized knowledge, education and experience of automation professionals. CAP™ are responsible for the direction, design and deployment of systems and equipment for manufacturing and control systems.

CAP™ must renew their certification every three years. This is accomplished by earning Professional Development Points (PDPs) by working, training and continually gaining knowledge in the field.

Holland plans to keep his CAP™ certification current by obtaining the required education points and renewing it in the summer of 2008.

control, but mostly because there is so much new automation technology being developed.

A quick review of ISA's current *Automation Body of Knowledge* outline shows that only about 25% of that was known by the typical control engineer of 10 or 15 years ago! So to function in today's world of automation, those engineers have had to learn something about the other 75% or they have to work in a very restricted range of practice.

How Does One Get General Automation Knowledge?

If employees are sufficiently motivated, they can learn it through self-study. In my experience, this doesn't often happen. People are just too busy doing what they have to do to spend time learning other things.

Over time if a person is assigned to a wide variety of jobs, s/he will naturally absorb a range of knowledge. This happens in some people but it can take decades, and many, many people don't have the opportunity for this range of experience.

Regular reading the half dozen free technical magazines is an easy, no cost way to keep up with technology. My observation is that a very small percentage of engineers do this. Most don't even bother to subscribe to the free magazines – is that because we feel guilty for not reading them?

Monitored but self-paced study courses are somewhat more efficient though it costs some money ... And, still requires a good bit of motivation.

People can be sent to formal short courses on specific automation subjects or to automation survey courses. This is almost guaranteed to increase one's knowledge, but unless there is some strong incentive for retaining the knowledge like an immediate project, s/he tends to forget the information quickly. Few managers send engineers to survey courses, presumably because the payback is not obvious or immediate. We are more likely to send technicians to survey courses than engineers. Why is that?

You can hire only people that already have this general knowledge. If they were motivated enough to get it once, maybe they will keep up with changing technology. However, finding enough of these people or even being able to identify them in an interview is far from easy.

How Much Would it Cost?

Let's use as a benchmark 100 hours of focused self-study; and let's further assume that this knowledge would have a half life of three years. That is, to keep up one would need to do ongoing study of 15 hours per year.

If the studying was on work time that cost \$50 per hour and assuming that the student would need to purchase \$2,000 of self-study materials and books, the total cost would be \$6,000.

If the knowledge was obtained through good courses and assuming that these courses have an efficiency of twice that of self study, the cost would also be \$6,000 (\$2,000 tuition for 6 class days, 50 hours of time, and \$1,500 of travel cost.) About half of this should be a general survey course and the other half would have to be focused specifically on those topics where the engineer needed the most help. Such a course program could be put together with ISA courses: the three-day Certified Automation Professional® Review Course could do the survey half and then other ISA courses or self-study could provide the knowledge to fill specific gaps. This would take some calendar time and would be a challenge to schedule.

Do you put this much value on general automation knowledge? If you do, are you doing something to help your employees get that knowledge?

If the study was entirely on their own time, the only cost would be for training materials, say \$1,000. Few people have the motivation to do this studying without some driving force.

There is a Better Way

What is needed is motivation to do the studying necessary to get the knowledge. One of the best motivators is preparing for an exam; and the best type of exam is a certification exam since those exams tend to be focused on broad scopes and require fairly deep knowledge. Certification exams are much better than end-of-course exams since those focus only on the material in the course. The new ISA CAP™ is a very high quality, "high-stakes" certification that covers the entire Automation Body of Knowledge.

If you could convince your employees to get a CAP™, either by promising to give them preference in future assignments or future job advancement decisions, or if they were convinced that their future job prospects would be increased by having the certification, or if they just want to distinguish themselves by having the certification, then they might choose to apply for it – and they would then have the motivation to study. Even if they failed the exam, they would have gotten a lot of the knowledge preparing for the exam, and with enough motivation, they could try again.

The ISA Certified Control System Technician® (CCST®) certification has been in existence for some time and has reached a high degree of acceptance in many industry areas. For example, some employers hire new technicians with the requirement that they will become CCST® certified. Those companies typically pay for some training and pay the application fee for the new employee to take the exam up to two times. If the new employee does not obtain the certification within a certain time, say 18 months, they will not be able to retain their jobs.

The Project Management Professional (PMP) certification has become so widely accepted that many contracts require that the lead personnel on the work have a PMP. Some companies require the PMP before the person can be a project manager in their company. ❖

Part 3 of this article will be in the April 2006 issue of CAPacity.

About the Author

Vernon Trevathan worked for Monsanto for 35-years in a variety of positions including Manager, Process Control and Manager, Project Managers and was Vice-President, System Integration for Benham Company, a 1,000 person engineering company. He now consults and teaches automation project management and automation technology. He Chairs the ISA CAP™ Steering Team and is an ISA Fellow.

Questions or comments pertaining to this article are welcome, and can be forwarded by e-mail to Vernon Trevathan at trevathan@member.isa.org.

Thanks to the ISA Management Division for allowing us to reprint this article from their newsletter. For more information on the Division, please visit www.isa.org/community/divatman

Automation Body of Knowledge Outline

- I. BASIC CONTINUOUS CONTROL
 1. Process Instrumentation
 2. Analytical Instrumentation
 3. Continuous Control
 4. Control Valves
 5. Analog Communications
 6. Control System Documentation
 7. Control Equipment
- II. BASIC DISCRETE, SEQUENCING AND MANUFACTURING CONTROL
 8. Discrete Input and Output Devices and General Manufacturing Measurements
 9. Discrete and Sequencing Control
 10. Motor and Drive Control
 11. Motion Control
- III. ADVANCED CONTROL TOPICS
 12. Process Modeling
 13. Advanced Process Control
 14. Batch Control
 15. Environmental
 16. Building Automation
- IV. RELIABILITY, SAFETY AND ELECTRICAL
 17. Alarm Management
 18. Reliability
 19. Process Safety
 20. Electrical Installations
 21. Electrical Safety
- V. INTEGRATION AND SOFTWARE
 22. Digital Communications
 23. Industrial Networks
 24. MES Integration
 25. Network Security
 26. Operator Interface
 26. Data Management
 27. Software
- VI. DEPLOYMENT AND OPERATION
 28. Operator Training
 29. Checkout and System Testing
 30. Troubleshooting
 31. Maintenance
- VII. WORK STRUCTURE
 32. Automation Benefits and Project Justification
 33. Project Management
 34. Interpersonal Skills



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- Plant Manager
- Systems Integrator

HELP US OUT BY ANSWERING THIS QUICK QUESTION...

Send your answer to trevathan@member.isa.org. All you need to do is to send the letter of your answer – But please add comments if you have more to say.

How valuable do you consider your employees' or project team members' general automation knowledge?

- a) Don't consider it at all valuable – the engineer just needs to just how to do the current task.
- b) Consider it somewhat valuable; say worth \$5,000 if that knowledge will last for several years.
- c) Consider it valuable, say worth \$15,000 if it lasts several years, but I'm not doing much to help or motivate my employees to get this knowledge.
- d) Consider it valuable, say worth \$15,000, and I am doing a lot to things to help and motivate my employees to learn new areas of automation.



Founded in 1945, ISA (www.isa.org) is a leading, global, nonprofit organization that is setting the standard for automation by helping over 30,000 worldwide members and other professionals solve difficult technical problems, while enhancing their leadership and personal career capabilities. Based in Research Triangle Park, North Carolina, ISA develops standards; certifies industry professionals; provides education and training; publishes books and technical articles; and hosts the largest conference and exhibition for automation professionals in the Western Hemisphere.

Certification

ISA certification provides an objective, third-party assessment and confirmation of a person's skills, and gives them the opportunity to stand out from the crowd and be recognized. ISA currently offers three certification programs: Certified Automation Professional[®] (CAP[™]), Certified Control Systems Technician[®] (CCST[®]), and Certified Industrial Maintenance Mechanic[®] (CIMM[™]).