Up Close with Dr. Delores Etter

Kathy Gurchiek
CROSSTALK Managing Editor

As Deputy Under Secretary of Defense (Science and Technology) since June 1998, Dr. Delores Etter is responsible for Defense S&T strategic planning, budget allocation, program execution, and evaluation. She also is responsible for the Department of Defense (DoD) High Performance Computing Modernization Organization and the Defense Modeling and Simulation Program.

Her background in the defense community includes chairing the Naval Research Advisory Committee from 1995-97, recent membership on the Defense Science Board, and sitting on the Ballistic Missile Defense Advisory Committee.

She coordinates the North Atlantic Treaty Organization's (NATO) collaborative efforts for science and technology, and is the principal U.S. representative to NATO's Research and Technology Board and to the Technical Cooperation Program among Australia, Canada, New Zealand, the United Kingdom, and the United States.

Etter has long been a part of the education community. She was a professor of electrical and computer engineering at the University of Colorado, Boulder, from 1990-98, and on the faculty at the University of New Mexico from 1979-89. There she was Associate Chair of the Department of Electrical and Computer Engineering from 1987-89. Etter was a National Science Foundation visiting professor in Stanford University's electrical engineering department from 1983-84. She also has spent time at Sandia National Laboratories working in seismic signal processing.

Her educational and research interests include software engineering technologies, development of collaborative experiments in virtual teaming of students, using the Internet, developing distance learning courses for computer software tools, and digital signal processing.

In the next two years, she will also be the executive agent for acquisition of software and has management oversight of the Software Engineering Institute. She is a Fellow of the Institute of Electrical and Electronic Engineers (IEEE), where she has held various positions, including president of the IEEE Acoustic, Speech, and Signal Processing.

Etter is the newest member of the NCS (NASDAQ:NLCS) board of directors. NCS is a global information services company headquartered in Minneapolis, Minn., with employees in North America, Europe, and Australia. It provides software, services, and systems for the collection, management, and interpretation of data. Its focus is serving the kindergarten through high school market.

She can be reached at the Office of the Director, Defense Research and Engineering, the Pentagon, Washington, D.C. Contact also can be made at 703-695-0598 or at etterdm@acq.osd.mil

Editor's note: Dr. Etter was one of the featured speakers during the general session of the 11th annual Software Technology Conference held May 2-6 in Salt Lake City, Utah. *CROSSTALK* had an opportunity to talk with Dr. Etter at length, following her remarks. Here is the result of that interview, interspersed with excerpts from her speech, which are set apart in boxes.

CROSSTALK: During the past several years, the DoD and other government agencies have had no specific objectives or direction dealing with the improvement of software development and sustainment processes and practices. Do you see a more directed and specific direction coming from senior Air Force leadership?

ETTER: It seems to me it's very important that we have more things happening in this area, and that's certainly one of the things I would like to participate in. … But I see it really as something that is going to (come) from working together with all of the services, not just the Air Force, because clearly every one of the services has very major software programs. ... If we are going to come up with some specific goals, (then) they really need to be goals that all of the services are a part of.

> ETTER ON THE IMPORTANCE OF SOFTWARE . . .
>
> "It is true that software is the new physical infrastructure of the information age … Software is everywhere we look within the Department of Defense."

CROSSTALK: Former Deputy Assistant Secretary of the Air Force, Lloyd K. Moseman II (now corporate vice president at SAIC) was working with the Air Force and saw strong interest in software and talked about some specific direction. We wondered if you saw that in the DoD and if there was going to be a strong emphasis on software.

ETTER: I think everybody is concerned about it.

There are some retired officers who really have some incredible insight into systems, and one of the first things I would like to do is get together a small group (of flag-level retired officers from each of the services). I plan to go to the service acquisition executives and ask them to give me suggestions of candidates. …(The different organizations within the services and agencies that are working on software-related projects) would meet and address some of these kinds of questions, because I think they would have a lot of good ideas. … The way you get people to buy into that is that they have to see they are a partner in what is going on. It's very critical to have people involved from the services and agencies in both of these groups.

ETTER ON REQUIREMENTS FOR SOFTWARE DEVELOPMENT . . .

"There are a lot of ways we are able to work with discipline, and certainly one of those is through the Capability Maturity Models for software. … Discipline is important on both sides of the street, so I'm looking forward to starting discussions on how we include acquisition within CMMI."

CROSSTALK: Some kind of a steering group from DoD made up of all the Services?

ETTER: I see a very informal advisory group. The other place I think it's important to have a lot of interaction is with all the various software development organizations within the DoD that have a formal organization that provides some kind of software support — either within their service or organization or even on a broad level. I think we are going to be surprised at the number of groups that perform this function.

CROSSTALK: What priorities should software developers, sustainers, and acquirers place on improving their practices and process?

ETTER: It's top priority, not just for the software developers but for the DoD as a whole. It has to do with the discipline. And, of course, discipline isn't just on the software side. There are a lot of pieces to the overall system, but certainly the software is one part of it.

We have to have a lot of discipline and some way of certifying or measuring the changes in the process. I think that's absolutely critical.

CROSSTALK: Are we going to continue with process improvement for software development and acquisition organizations?

ETTER: It really needs to be both sides of the street, doesn't it? If the acquisition side doesn't have the discipline in it, then having a very high level of discipline on the software development side still doesn't get you systems that are on time and on budget and have the functionality that the acquisition side expected, because there's a difference in expectations.

Capability Maturity Model and CMM are registered trademarks of Carnegie Mellon University.

CROSSTALK: One of the conference speakers at the STC '99 general session, Dr. John Guttag of MIT, talked about assembling DoD software instead of coding software. What is your response to that?

ETTER: Well, it's a very interesting concept, isn't it? My interpretation was that it was taking reusability to another level.

CROSSTALK: Is that doable?

ETTER: Sure. That doesn't mean we could do it today, but it's certainly the kind of thing that if we were to make that a goal and begin working towards that, I think it is.

It would take a commitment that that's one of the objectives we want to achieve within the DoD's software program. And it would take commitments of dollars and you are talking about something that's probably in the realm of the S&T program. We certainly are not there today.

CROSSTALK: What kind of timeframe would that involve?

ETTER: I would think a program that was a three- to five-year timeframe would be one that would give you very good insight into what was feasible and also give you some very workable systems.

CROSSTALK: Software process improvement initiatives or mandates within the DoD have become less clear during the past few years. What do you see coming as requirements for software development and sustainment organizations — either government or contractor?

ETTER: I think we have to have some kind of a policy to have consistency. Consistency is very important when you are trying to develop systems that you want to work together and you want reusability. You have to have some consistent policy. But my sense is that the less policy you have, the better. We ought to be able to do things simpler rather than more complicated. Now I know that is an easy thing to say and not necessarily an easy thing to do.

Certainly, that's one of my goals: To see if we can't simplify the policy without giving up discipline … the discipline is absolutely critical.

CROSSTALK: Government organizations don't respond to normal business processes because they don't have a profit motive. USWest, for example, is putting in millions of dollars over the next few years to get to higher levels of maturity because it's going to save them money and they know that. It's quite an investment. But government agencies don't seem to be motivat-

ed by those kinds of things.

ETTER: But it's very important for us to change that sense.

There's a very strong sense within OSD (Office of the Secretary of Defense) right now to look at commercial practices and pick up there what we can and to try to do things that, in the long term, are going to be better.

Not looking at the short term but looking at the longer term. We have to do it in a way that the different groups that are going to be affected are a part of the discussion and whatever policy comes out of it.

What doesn't work is for OSD to mandate a lot of things. What works is to get people together.

CROSSTALK: You are going for a consensus approach?

ETTER: As much as you can. You want people to buy into the process that is going to improve the system, but consensus to some extent really slows things down, so I think you have to find a happy medium. … You have to make things happen.

If all you do is have committee meetings and talk about it, nothing happens. Lots of good ideas get discussed, but nothing gets implemented. On one hand you have to do the consensus building and the partnering, but then you also have to make some decisions and give things a chance to work.

CROSSTALK: Do you see specific initiatives or programs dealing with software and related issues in the future?

ETTER: We shouldn't have such strong separation between the acquisition side and the S&T side. …We have some new things going on in the S&T arena that I think are going to be very important to the acquisition side.

A lot of it is through the programs that are going to be started in fiscal year 2000, part of the information technology initiative.

- There's $70 million of new programs in the Defense Advanced Research Projects Agency. It's more advanced, or applied types, of activity.
- There's $10 million in this multidisciplinary research program. The $10 million is basic research (going into) university/industry collaborations.

We have a lot of things that are going to be starting that cover the whole range of the S&T spectrum. I think we are going to see a number of things that could very possibly lead to changes on the acquisition side.

CROSSTALK: And these are all things we will see in the next fiscal year?

ETTER: They will be starting in 2000. That's not to say thatthere are not things going on right now. It's very clear we need to be doing more in this arena. That's why you are seeing this initiative within DoD to do a very significant increase in the funding we have there.

CROSSTALK: Do you have any thoughts in using distance leaning technology in the DoD? Are you going to push that?

ETTER: It's certainly something the DoD has been using a lot.But I think there are additional ways the DoD can capitalize on things that are coming out of technology.

We have a new initiative in the S&T program that we are calling cognitive readiness. It covers a lot of different areas, for example, the augmented reality. (Dr. Guttag) also mentioned more about it. It covers learner-centric education, which probably is the closest thing to distance learning.

We all learn in different ways. … I'm a visual person; if I can see a diagram or picture of it, I learn it much faster than somebody describing it, which is probably why I'm an engineer.

It's very much in the realm of things today that we can be designing education systems that are computerized — you sit down and you start interacting with it. And by asking questions in certain ways and getting your responses, the software can figure out how you learn best and adapt its whole interaction with you based on that. That's one very simple example of what we are talking about in terms of cognitive readiness.

CROSSTALK: How would you relate that to the DoD in terms of training?

ETTER: We talk a lot about physical readiness, but the education and training side is also a very important part of readiness. (Education and training) also looks at how we augment or add

ETTER ON SPECIFIC PROGRAMS DEALING WITH SOFTWARE FOR FY 2000. . .

" • Multidisciplinary university research program. Some of the areas include real-time, fault-tolerant network-centric protocols. The objective is to develop the foundations of adaptive mobile network protocols for network-centric systems. Requirements include quality of service guarantees of real-time and fault-tolerance performance, security, and safety.

• Interoperability and emergent behavior. We need to develop links that are appropriate for systems with characteristics of adaptability, self-assembly, rapid reconfiguration, self-stabilizing, and fault tolerance.

• Mobile augmented reality. (This) is going to look at recent advances in information technology for mobile use and in novel interactions.

to a person's sense of what the environment is around them. There may be things that real-time sensors are providing; if you can give that to the individual soldier as things are happening, you make a huge difference in the success of missions.

CROSSTALK: A question certainly related to that is what role should the DoD entities play in furthering the sciences and practices related to software?

ETTER: I think it should play a very important role. I think the Software Engineering Institute is a very valuable resource for trying to collect things like that and to build programs that help us be aware of those types of things — run the studies, the analyses. I think the Software Engineering Institute might be a key player in that.

> ETTER ON THE TRAINING OF WARFIGHTERS . . .
>
> "You can envision a helmet where as a soldier goes into a building, immediately on the helmet is displayed the layout of that building and shows him exactly where the other people are in the building. This would be done in real-time, so as people move they would (be shown) on the helmet display. It's this kind of information (in real-time) that you are able to give to a person that they wouldn't have otherwise."

CROSSTALK: The DoD started the computer industry. This industry has taken off and the DoD's participation is maybe 10 percent at most. How does the DoD keep up? How does it get what it needs from the industry?

ETTER: Or take advantage of what's out there. It's a real challenge. Even though in many ways DoD is not a key player in driving what happens, you look at the software systems being developed and it clearly has the largest systems and the most expensive systems that are being developed. Somehow it's a key player in that, but we are not driving it and in many ways maybe it's driving us. It has changed a great deal.

CROSSTALK: How are you going to communicate this vision and these kinds of goals to the implementers, the buyers, the developers, the people who are sustaining weapons software, so that they can move toward goal attainment?

ETTER: Program managers are clearly very key people in this. But if you want them to change, to be adaptable and flexible to doing things in a way that you are going to see benefits longer term rather than short term, … you don't just convince them, you also have to have the service acquisition executives buy into it and recognize that it means you have to maybe evaluate these people differently, you have to evaluate the performance of the program differently.

One of the things that I'm also planning to do is ask that we add software reviews to each of our major reviews on acquisition programs. I'm amazed that's not being done now.

CROSSTALK: It's one of the most costly elements (of a program).

ETTER: Absolutely. It comes up when there is a problem, but we ought to be asking questions at every single Defense Acquisition Board review, every single milestone review. That's something that I'm planning.

CROSSTALK: In your position as Under Secretary, if you had to choose one thing, what is your priority?

ETTER: That's a very tough one. This is such a broad program. I think it's really critical that we focus on the things that are going to give the warfighters the revolutionary edge. And that certainly means we have to carefully assess and plan our S&T programs.

One could say that a dramatic improvement in software development capabilities gives one a real revolutionary edge, too. Because if we can't get the systems such that they are affordable and on schedule, some of those revolutionary capabilities that would make a dramatic difference three years from now won't get out there until maybe eight or 10 years from now.

Certainly you could say software performance falls into those categories. That's probably the challenge — to decide what things fall into that category and really focus on them. ◆