Evolving Air Force Intelligence with Agile Techniques

featuring Harry Levinson as Interviewed by Suzanne Miller

Suzanne Miller: Welcome to the SEI Podcast Series, a production of Carnegie Mellon University's Software Engineering Institute. The SEI is a federally funded research and development center sponsored by the U.S. Department of Defense and operated by Carnegie Mellon University. A transcript of today's podcast is posted on the SEI website at sei.cmu.edu/podcasts.

My name is Suzanne Miller. I am a principal researcher here at the SEI. Today, I am very pleased to introduce my fellow colleague and researcher Harry Levinson. Harry Levinson and I worked together on a project with the Air Force that he is going to talk about today, the distributed common ground system (AF DCGS). I am going to let Harry introduce himself and tell us a little bit about what he has been doing at the SEI for the last several years and before that as well.

Harry Levinson: I have been at the SEI for just over 10 years, working on a lot of different Air Force programs, mostly in the realm of what is called C4—command and control communications and computers—everything from satellite terminals to business systems.

Air Force DCGS is a program that focuses on intelligence gathering. In order to do this, it requires a lot of computers, a lot of storage, a lot of networking. Bringing a lot of those skillsets from throughout the SEI to Air Force DCGS has, I think, been a good asset.

Suzanne: This is a long-standing program, and it is now evolving sort of into its next life, I will call it. One of the big challenges has been how do we get legacy programs like this to deliver more quickly than in the past? There are lots of things about how slow the acquisition system is in the Department of Defense. DCGS is one of the programs that is trying some new approaches to that.

There are many things they are doing differently than they have in the past. But one of them, which is one of the things that I am working on with you, is adopting Agile methods. Do you want to talk a little bit about how they came to understand that as something that might be useful to them and what our role is in helping them with that?

Harry: Yes. Over the past 10, 15 years, they have built up some great capability. The problem has been that this capability is very, we call it *stove-piped*. It is very hard to sustain and manage. We are trying to help them evolve that system using Agile techniques working in incremental, more iterative approaches to deliver capability in smaller chunks.

Suzanne: That is a big deal because there are lots of people that want to use those capabilities. They are all on a different cadence, right? Some of them need it tomorrow. Some of them need it six months from now. One of the things that we are finding in other settings that use Agile techniques is that we can prioritize things a little differently than we have in the past and use some of that knowledge about the user and how and when they need things to actually make deliveries a little bit more in time for the user. What are some of the unique challenges that DCGS has in relationship to that?

Harry: DCGS has a lot of different engineering groups that have been focused on different parts of the system and getting them in the same schedule and synchronization is very difficult. Especially as they have been working in their legacy systems, they have had a lot of problems as more and more capability was put into a single release. Getting all that integrated and synchronized was very difficult.

We are trying to help them understand [that] moving to smaller releases and smaller delivery of capability will help them synchronize their delivery. Being able to get into a more regular cadence of delivery will help them understand and develop their processes for delivery on a regular basis.

Suzanne: The other thing that comes into play with this, as you said, is integration. When we have these stove-pipe kinds of system elements, there are a lot of interfaces. When you are dealing with a lot of sensor data—and you are trying to process that and fuse that and distribute that out to the people that need it—getting the right interfaces is a big problem in those kinds of systems. One of the things that we get with Agile is we get faster feedback. If we have interfaces that do not work right, we find out about it sooner and we get a more robust kind of interface across the set of things, the common set of things that DCGS is partly about.

Harry: Right.

Suzanne: What do you see as the biggest challenge that an organization like DCGS that has the stove pipes already in place and has all these very different ways of dealing with how they do contracting, how they do engineering, when they move to this iterative, incremental, small-batch faster delivery. What do you see as the challenges they are facing?

Harry: My experience as a software engineer throughout my career has been mostly over on the commercial side. On the commercial side, being able to adapt new technologies to new, different processes is a lot easier. What I learned when I came to the Software Engineering Institute and to be able to work with government programs, I found that the ability to adapt would change the way that systems are acquired.

Quite often it is very difficult for these organizations to change. So, being able to help them understand the direction that they want to go and being able to show them a path for change, I think, is very important to helping them deliver this capability on a more regular basis.

Suzanne: One of the things that I see—my role in this is to help explicitly with the Agile adoption and helping them with the changes that they are going to be facing—is to help them with training. What are some of the topics that if you were to recommend to another program, if you are going to get involved in Agile, what kinds of things do you want to make sure you get training about so that you are ready for this when it comes into your program?

Harry: There are lots of different Agile methodologies out there. Getting familiar with the basic tenants of the Agile Manifesto is a good start, but there are lots of different methodologies. Just pick one. Just start with understanding some of the techniques that are out there.

From a government setting, you are probably not going to be actually doing the development, but understanding how the contractors are going to be doing their work is very important. Being able to bring the Agile principles into a program office, into a government setting like I was saying earlier, is a huge change. It is very difficult for people to change.

Suzanne: One of the things that is a truism is that *Nobody likes to be changed*, right? Everyone will change, but nobody likes to be changed. Understanding how this can benefit your role is one of the things that we try to help people with in some of the training and things that we do with them as well as the coaching.

Harry: One of the other differences between a lot of different commercial settings and the government is that government programs are often very big. Being able to take commercial techniques into government settings means that you have to figure out how to scale. There are multiple versions of scaling Agile out there that help programs try to deal with the multiple teams, the different value streams that exist as you are trying to develop programs. There are lots of courses out there that people can take.

One of the things that you have been able to help us deliver is a combination of *Here is some of the challenges that we have in the government*, and *Here are the scale Agile models that we have*. *How can we blend those together*?

Suzanne: That turns out to be pretty important because when you do the scaling as you talk about, we are not just talking about now the software development. The software development teams, which are the contracted teams typically, are doing the development. The government is interacting with them, but they are not actually doing the development for the most part. What the government is doing is the systems engineering: determining the architecture, determining how things are going to get deployed, determining how they are going to get tested. That stuff has to interact with the incremental, iterative thing.

One of the challenges that I am seeing that is not uncommon in other settings—but DCGS also exhibits this—is figuring out how to test these things in a government setting because in the government we have a development test organization and operational test organization that are really siloed away from the acquisition and meant to be independent and have these mandates, but you really want them to be more integrated into the development cycle. So trying to break down some of those cultural norms, DCGS is out on the cutting edge of that particular process. My observation so far is they are actually taking that very seriously and trying to do that.

Harry: They are taking that very seriously. They are trying to figure out how to do all the different levels of test from the development test at the contractor level and bringing that into an integration lab and then moving that up through the various what they call DT and OT type testing…

Suzanne: Developmental testing.

Harry: …Developmental testing and operational testing and the final certification. The big challenge there is that to get systems into use, they have to go through all those levels of tests and be on a regular schedule, regular cadence. Getting that down to 30 days is almost like dreaming. It is very difficult to do.

Suzanne: It is like eating an elephant. One chunk at a time. You have to start somewhere before you can get to the final place. That incremental strategy is one that we are also seeing in the adoption not just in the development in terms of not trying to bite off too much as we go forward.

Harry: We are working on just a few pilot projects. Like you say, the recommendation is not to switch over in one day. We start small, start with one or two projects.

Suzanne: Learn fast.

Harry: Learn from those. Learn fast and being able to adjust fast. You can learn, but you also have to be willing to change and adjust as you learn that something is not working.

Suzanne: In Agile communication we call that *inspect and adapt*. We go after that. So this program, we are in the middle of pilots, and what is it that you see sort of as the next challenge once we have got things kind of rolling out in the Agile space. What are some of the other things that you hope that the SEI can help the DCGS program with?

Harry: As we have been speaking about the incremental and iterative approach, the fact that the government has to take over the understanding of the architecture and control a lot of the higher-level decisions that will enable the contracting Agile teams to work effectively. That actually starts to bring in a lot of concepts that the Department of Defense is trying to encourage, which is owning the technical baseline and open systems architecture.

Those are all very good models for getting a better technical understanding of the systems and being able to make decisions. They both help divide a larger system into smaller chunks and enables the decisions of the program office to being able to contract out smaller software applications or software modules to different contracting teams.

Suzanne: That interfaces and with the Agile. So these are things that sort of contribute to each other, the open systems and the government as the integrator working in smaller batches is very compatible with the Agile iterative small-batch approach as well. So these are all things that we hope together will synergize some of the program challenges and the new solutions, right?

Harry: Right. Moving with the Agile methodology and the software development technique or architectural techniques, I should say, as they become more compatible, it definitely makes the ability to be more iterative and incremental feasible.

Suzanne: I want to thank you for joining us, Harry, and for your article in The Year In Review which is the SEI's annual fiscal year publication about all our projects. I hope people will go and look for that because it's a very interesting article. If I am involved, I have to say that.

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