

Embedded in Systems Engineering

How One Organization Makes It Work

By Michael F. Moore

There is growing interest today in dedicating—or embedding—information professionals to a specific team. I'm a librarian embedded in a team, and I'd like to tell you what it's like. First, I need to give you some background about where I work.

The Company

While most of us are aware of information technology as a large part of daily life in our profession, when I started at the MITRE Corporation, systems engineering was unknown to me.

It isn't an easy subject to explain in the space of a paragraph. Systems engineering focuses on functional abstraction (describing and partitioning behavior independently of form), codification of relationships (how things fit together as a solution and what actions are needed so the solution can be realized), and (new to the discipline) the deliberate and accelerated mimicry of the processes that drive natural evolution.

Some of the issues currently being discussed include the management of large-scale businesses and enterprises and the development of systems made up of multiple, interrelated systems. So, while engineers solve problems with the appropriate mix of form, fit and function, systems engineers address how the solutions to individual engineering problems fit together. Keynote speakers at the SLA Toronto conference spoke about systems engineering subjects, such as transparency, the importance of the human mind, and finding innovation in change. This is "big picture" thinking, and MITRE works with its customers to find solutions to "big picture" problems.

MITRE works in partnership with the Department of Defense, Federal Aviation Administration, Internal Revenue Service, and other U.S. government agencies to serve the public interest. We address issues of critical national importance that require a unique combination of systems engineering and information technology, developing innovative solutions to some of the government's most complex technological challenges.

As you would expect, the discipline of systems engineering is an important skill for many groups within MITRE. However, one group stands out as a corporate champion for the discipline: the Systems Engineering Process Office (SEPO). Organized in 1994, the SEPO team includes system engineers, designer/developers, and writer/editors. They advance systems engineering within MITRE through information, education, and collaboration. One of SEPO's important services is the SEPO Library, a digital collection of information related to systems engineering, so MITRE staff can find information not only from their MITRE colleagues but also from the rest of the systems engineering community.

When I joined MITRE in 2002, I was assigned to SEPO to help manage this digital collection. My position was the result of an agreement between SEPO and the Information Services Department, which also manages corporate library services. Instead of hiring a systems engineer to manage the collection, SEPO would try an information analyst, to be supplied by Information Services. This way, SEPO could gain the skills of someone with a library and information science background, while Information Services would provide supervision, training, and other support.

Co-Location

Being co-located with my customer organization was a critical factor in my success. When I started as the new SEPO information analyst, my office was two buildings away from the SEPO offices, and I knew only two contact people on the team. My assignments were to update and augment the online library and to respond to occasional research requests. I didn't know much about SEPO or about systems engineering, and I was trying to learn through the research I did. Then, at the start of a new fiscal year, I relocated to an office on the same hall with the SEPO Team, and things changed quickly.

Once I was co-located with SEPO, I met the rest of the 15-person team. I was invited to their meetings. I saw how my work related to their ongoing activities. I began to participate in conversations about how the library is organized and managed. People dropping in with a quick question became a common occurrence, and overhearing (and being brought into) discussions about upcoming projects became part of my day. Over time, I gained opportunities to expand my role.

The Service Portfolio

My role has developed over time from managing a collection of documents and links to providing multiple services. Over the past two and a half years, I have taken on the following responsibilities:

- **Stewarding content—tagging and linking.** The SEPO Library contains information on systems engineering policies, projects, modeling and simulation efforts, and theory. To provide access to the collection, items are tagged using a faceted taxonomy of customers, MITRE centers, item types, and subjects. This provides a rich combination of search capabilities. The SEPO library is separate from other collections at MITRE. However, it is searchable through the company-wide intranet Google search portal, so people can find items without needing to go to the SEPO Web site.

- **Providing news alerts.** When people began pointing me to documents and Web sites for the SEPO library, they also sometimes sent articles that were too small or too time specific for the library, but were good news for systems engineers to know. To deal with these articles, SEPO created a Systems Engineering News Update, which I produce. I assemble news items by scanning useful Web sites, using a Web tracking program called WatchThatPage (www.watchthatpage.com) and monitoring RSS Feeds using the Bloglines aggregator (www.bloglines.com). The articles I find with these tools, plus paid content, provide a valuable stream of systems engineering news for anyone at MITRE.

- **Capturing knowledge.** MITRE encourages collaboration, and one popular method is to bring together experts for a technical exchange meeting, or TEM. In the past, attendees and planners complained that no one provided a summary of the ideas after the TEM, so great ideas were lost. To address this problem, Information Services has taken on the job of providing summary proceedings of the meetings, which are shared on the intranet for the benefit of attendees and as a knowledge resource for the future. Information analysts like me leverage the knowledge they build up in working with project teams and communities so our summaries capture the important points of technical discussion. At the same time, we gain more in-depth knowledge of the subjects and get to connect with more experts. The only downside to this effort is that it has been so successful we have trouble keeping up with the demand for our service.

- **Researching.** While answering questions is a small part of my job, the growing visibility of SEPO means more people are asking questions, and many are funneled to me. Often,

the best answer I can provide for a question is to connect the questioner with other people at MITRE who are asking the same question, so they can collaborate. I also work on separate research projects, such as accumulating the various definitions of the new terminology springing up around complex system engineering.

All my services are enhanced by the contributions of other team members. For instance, when it was time to create the Systems Engineering News Update, the SEPO designers and developers took my raw content and created a good-looking newsletter, and the SEPO writers provided a promotional campaign to get the word out to the company. My job is made easier when I can work with software developers who know SEPO's goals and can provide improvements to the SEPO library that support those goals.

Who pays?

In this matrixed environment, funding needs to be tracked closely. My time is divided among SEPO, other clients, and the Information Services department. Time spent stewarding SEPO's digital library and issuing Systems Engineering News Updates is charged to a SEPO project number. Time spent performing a research request is often charged to the project or group making the request. Time spent in department meetings, training, and other activities is charged to the department. While it seemed like a complicated system when I started, it is well established throughout the company. Asking for a project number has become a standard part of any reference interview for larger projects.

Success Factors

Having embedded librarians like me brings benefits to the customer *and* to the library organization. Combining different disciplines and different ways of thinking makes the SEPO team a good proving ground for ideas. Having a varied team means you get different viewpoints, which can bring even more ideas to the table. As a librarian working with engineers, designers, and other professionals, I'm part of that mix.

Also, people from various departments are aware of solutions from their departments that others might not know about. Often a time-consuming task (such as checking broken links or gathering metrics) will have an implemented solution elsewhere in the company, and I only need to connect to the right person to find it. My job is to make these connections, and the SEPO team helps keep me aware of solutions.

My work with SEPO helps me build knowledge of the subject matter, and knowledge of the processes I use, both of which I can take back to my colleagues. When other information analysts at MITRE field questions on systems engineering subjects, they can certainly answer these questions themselves. However, it is often quicker for them to ask me, and take advantage of my familiarity with the subject. In return, when I am stumped by a question specific to one of MITRE's centers, I can ask my coworkers for help and use their specialized knowledge to move forward with my research.

Conclusion

Being dedicated to systems engineering means I can provide more extensive subject knowledge, both to the systems engineers I work for, and to the information analysts I work with. Working with people with various capabilities means I can contribute to (and take advantage of) the team's synergy. Working with other dedicated information analysts means I can take advantage of their subject knowledge. It also means I can be a bridge point for people in

both teams, finding out about solutions and opportunities and passing them on. For those of us who are dedicated to a project or team, it is a successful model to work with.

Michael F. Moore is a senior information analyst at the MITRE Corporation, a not-for-profit organization that operates federally funded research and development centers for the U.S. Government. He works at their offices in Bedford, Massachusetts. Readers may contact him at mjmoore@mitre.org.

SIDEBAR

For more information...

The seminar “Moving to Client-Embedded Services” is scheduled for Tuesday, June 13, at the SLA conference.

The speaker, David Shumaker of the MITRE Corporation, will discuss how the company successfully implemented embedded librarians as part of its full-spectrum information service.

Presented by the Corporate Information Centers Section of SLA’s Business and Finance Division and the Solo Librarians Division, the session will be sponsored by InfoCurrent and Hemscoff. Cynthia Lesky of Threshold Information Inc. will be the moderator.