COTS to the Rescue

Office of Naval Research Tech Solutions Pilot

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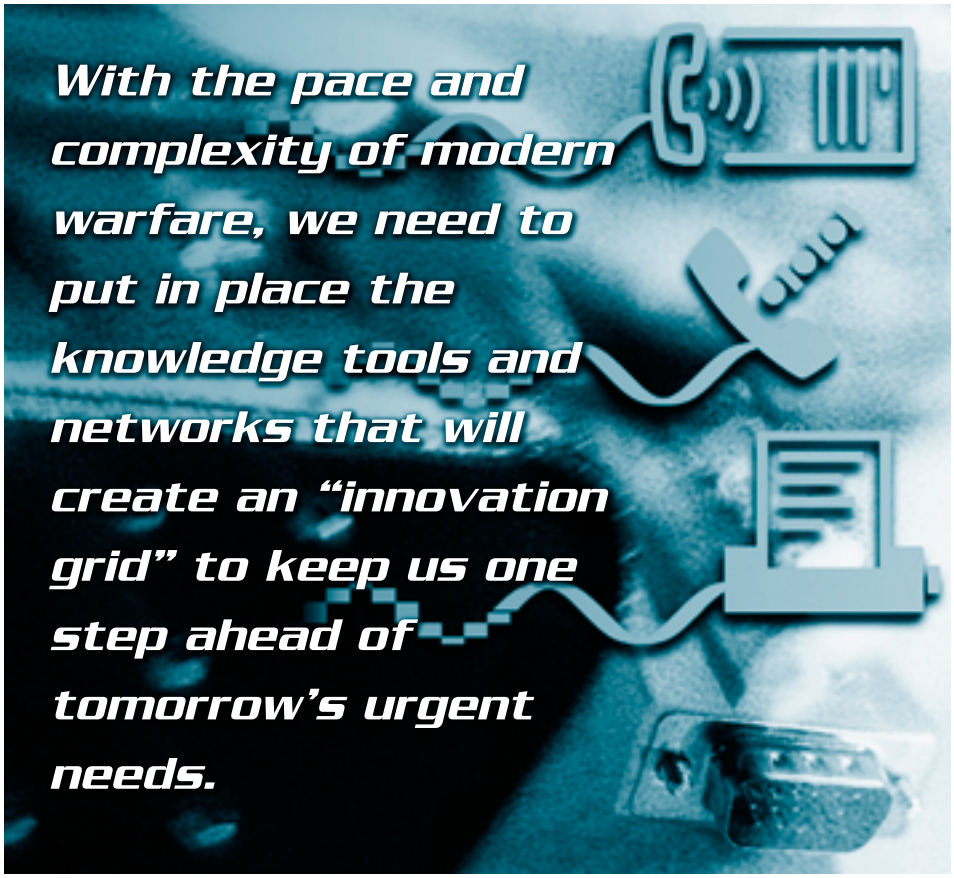
In a previous article [*Defense AT&L*, September-October 2005], we explored a method of leveraging the U.S. patent database to bridge the small worlds of technology and accelerate research and development (R&D). Sometimes, however, the need is so urgent that one must find commercial off-the-shelf (COTS) solutions and press them into service as rapidly as possible.



Finding mature solutions to today's problems is reactionary, however, and only half the answer. With the pace and complexity of modern warfare, we also need to put in place the knowledge tools and networks that will create an "innovation grid" to keep us one step ahead of tomorrow's urgent needs.

The Office of Naval Research Tech Solutions knows this all too well because the organization is in the business of finding innovative solutions to urgent needs every day. Tech Solutions has developed an online system for accepting, cataloging, and resolving problems from across the Navy and Marine Corps. Input comes from the highest levels of command right down to the sailor on the deck plates.

When a problem is received, the Tech Solutions team springs into action. The first task is to ensure that science and technology (S&T) is the most efficient manner of addressing the need. Before proceeding, the team conducts a comprehensive examination for potential sources of COTS, government off-the-shelf, current R&D, S&T programs, and planned programs. Tech Solutions next exercises its network of laboratories, university-associated research centers, and other organizations to solicit proposals on how the problem might be quickly solved. Then it selects and funds the best candidate.

Pilot Addresses Four Challenges

Over the years, Tech Solutions has built a significant network of scientists and engineers and has become adept at using search tools to ferret out potential solutions. Always seeking to improve performance, Tech Solutions de-

Blessé, *a U.S. Navy master chief petty officer, runs the Office of Naval Research Tech Solutions branch. He oversees the rapid development of technology from inputs submitted by sailors and marines in the fleet.* **Devin Markovits** *is vice president of patent analysis for Innovation Business Partners and led the development of Akribis Search™, the natural language processing patent search engine used in IP Driven Innovation.* **Gary Markovits**, *founder and CEO of Innovation Business Partners, developed the concepts of IP Driven Innovation™ to help research and development and engineering organizations increase their capacity for innovation.* **Mastroianni**, *at the time of the pilot, was the technical manager for the Tech Solutions program.*

signed a pilot to test methods that would use the patent database to find mature solutions, extend its network, and build a knowledge base in key areas—such as armor—where, it seems, new challenges arise every day.

The pilot tested the Innovation Business Partners Akribis Search™ technology and IP Driven Innovation™ process, focusing on four challenges:

- identifying mature ship-spotter technology for the EA-6B
- finding mature solutions for up-armoring buses
- identifying the key players in machine-based language translation, (i.e. mapping the innovation grid)
- testing the value of creating an ongoing armor knowledgebase.

The Tech Solutions team received IP Driven Innovation training and began the pilot by using the four-part needs/problem definition process to clearly define their critical challenges. The output of the needs/problems definition became input to the Akribis Search™ engine for mining the U.S. patent database.

Finding Mature Solutions

The EA-6B ship-spotter challenge required that the solution be hand-held and work from within the cockpit without modifying the plane's airframe in any manner. Mining the patent database, we were able to rapidly identify nine companies with technology that could provide potential solutions. Searching their Web sites, we further ascertained that two of the companies already sold products that were flight-certified by the U.S. Air Force. Thus in a very short time, Tech Solutions had at least two potential solutions.

The second example involved the up-armoring of vehicles. Within 24 hours of receiving an urgent request for up-armoring solutions, the tools and techniques used in the pilot identified key work done by the Army, as well as six companies with potential solutions.

These two examples demonstrate how the patent database can be turned into a knowledgebase of mature solutions and facilitate quick focusing on key players.

The machine language translation challenge was different again. The objective was twofold: to benchmark the IBP tools and techniques against funding decisions that had already been made in this area; and to identify "hubs of innovation" in this domain. The first count quickly identified the company in which Tech Solutions had previously invested. On the second count, the solution space map identified several other companies as the dominant hubs. The analysis also identified two industries that Tech Solutions had not been working with—call centers and medical transcription—both potentially interesting sources of new technology in the future.

The final Tech Solutions challenge assessed the idea of creating an ongoing Office of Naval Research armor knowledgebase that covered more basic science than that in the up-armoring example. The pilot version was formatted as a spreadsheet that could be sorted on a number of key parameters for analysis purposes. The results were reviewed by the Tech Solutions team, which concluded that such an ongoing database could be of significant value as a tool to continually survey the cutting-edge science as it pertains to armor technology research.

In many ways, the "immediate innovation" thrust represented by Tech Solutions' challenges is very similar to what is happening in industry. Major corporations are investigating alternatives to classic, long-term R&D. Firms are considering strategies that identify solutions from around the world and integrating them quickly. Where possible, they are seeking and finding off-the-shelf solutions. For example, last year Procter & Gamble obtained 40 percent of its new product innovations from outside its own labs.

Joining the Dots

Every year, the nations of the Organisation for Economic Co-operation and Development spends over half a trillion dollars on R&D. More than 50 percent is spent outside the United States. Over the last decade, the trillions of dollars spent on R&D have created a worldwide innovation grid—a network of organizations, scientists, and engineers that are inventing solutions to the world's problems. The IBP process allows for the grid to be visualized and tailored for specific topics.

In network theory, there is a concept called "degrees of separation." In any community of people, the degree of separation is a number that measures how many people you would have to go through on average to reach any other person in the community. The lower the degree of separation for a community, the more "connected" it is. The larger the degree of separation, the less one person on one side of the community knows about another person on the other side. [*The concept of degrees of separation was examined in "Knock, Knock, Knocking on Newton's Door,"* Defense AT&L*, March-April 2005.*]

Some people argue that with the Internet and the online publication of many scientific and technical journals, the worldwide R&D community should be highly connected. From a technical perspective this might be true—you are only a few short Google™ searches away from finding out what a scientist on the other side of the globe is doing. However, the problem is often *too much* information and a lot of *irrelevant* information.

There is a second conundrum. Even if a community is highly connected, the amount of intelligence or value that individuals can extract from that community depends upon the tools and processes they have at their disposal to activate and exercise the network.

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Small degrees of separation do not ensure high degrees of penetration; a precision search tool and a process to exercise the worldwide R&D and S&T network are required. Using the tools and techniques employed in this pilot, we demonstrated that it is indeed possible to leverage the money spent on R&D worldwide to find rapid solutions to urgent problems and build a bigger and better innovation grid to respond in the future.

What the Future Holds

Rapidly putting needed technology in the hands of our warfighters is paramount, and there is plenty of room for everyone—from small businesses to huge corporations—to participate in the future of military innovation. Urgent needs are most likely to be met by pulling several COTS technologies together and modifying and testing them to satisfy the requirement. But we must keep our eyes on the goals: to create technologies that are significant today and to forge a path to technologies yet to be discovered.

The authors welcome comments and questions, which should be referred to gary@innovationbp.com.