NAVY | SBIR | TAP

TRANSITIONS
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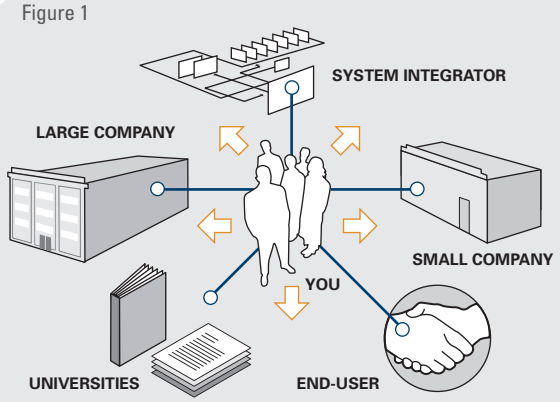
Introduction

STRATEGIES AND TACTICS FOR CHANGE

Ready to step out of your comfort zone and leave the status quo behind – then this issue of *Transitions* is for you. Every article contains strategies and tactics for change - change in the essential manner of delivering better products to customers.

As seen in Figure 1 below, various entities can be engaged in this quest for change, including universities, system integrators, the ultimate agency customer, large and/or small businesses, other potential agency customers, and congressional representatives.

Figure 1



Making Transitions – Changing Your Company

Strategic Staffing

A major concern of every organization is staffing. Finding and retaining good people is the key. Dr. Alex Stoyen of **21st Century Systems®** is a great example of a businessman who, among other things, knows how to keep staffing from becoming a problem. He systematically develops relevant relationships with key universities in an effort to assure that his customers are well supported in the early stages of RDT&E. In addition, in order to gain a more intimate understanding of the customer's problems, he often hires former military operations personnel to assure that the end-users perspective is adequately represented.

Integrating System Integrators

Early in Phase II, **Zivko Aeronautics** developed a close working relationship with system integrator, General Atomics, to provide solutions that benefit multiple agencies. Initially funded by Navy SBIR for the development of atmospheric / oceanographic research, Zivko's resulting aircraft, the Pelican, is capable of both manned and autonomous flight modes and has been used for various missions by a number of agencies.

Steve Lose, a TPOC from PEO Subs, has successfully used Government Furnished Equipment (GFE) and integration contracts to facilitate early involvement with system integrators and increase the likelihood that small businesses have opportunities to work with system integrators.

SBIR Expansion Plan

Curtiss-Wright is expanding its involvement with the SBIR program. They are looking to develop long term strategic partnerships with small businesses whose complementary skills would further enhance service to DoD customers. Success in developing such relationships requires a commitment of time from technical and support staff to the fledgling initiatives.

Some Things to Consider...

Question 1 – *Is your business adequately involving local universities with relevant expertise in the life of your organization? Are you building a staffing pipeline for the future? Has your business hired employees who have first hand experience with the DoD's needs?* No – Then consider taking a first step.

Question 2 – *Is your business adequately involving system integrators and/or looking for opportunities to share a solution with other agencies?* No - consider ways to develop such relationships.

Question 3 – *Does your business provide top-down support for developing new, complementary relationships?*

Finally...

Remember, changing business practices can be exhilarating, yet filled with uncertainty. Venture incrementally. Provide the resources required to run the experiment. See if "shaking things up a bit" changes the trajectory of growth for your organization.

STRATEGIES FOR GROWTH

21CSI® Board of Directors.

*Since its formation in 1996, **21st Century Systems, Inc® (21CSI®)** has transitioned more than 15 SBIR funded technologies to Phase III, and secured more than $40 million in non-SBIR government funding.*

The company is a pioneer in designing, developing and fielding agent-based decision support systems for time- and mission-critical military and commercial applications. 21CSI's® ground-breaking, intelligent, agent-based, real-time software represents a quantum improvement in software technologies with over 30 applications across broad spectrum of missions, including space-to-mud-to-ocean-bottom decision support systems developed for all DoD branches.

By providing human decision makers with a real-time integrated, common tactical picture – where needed, when needed and in the form needed – 21CSI®'s revolutionary decision support systems substantially improve situational awareness, reduce stress and increase productivity. Ranked at 448 with a three-year growth rate of 319%, 21st Century Systems, Inc.® (21CSI®) has been named by INC. magazine in its list of the top 500 fastest-growing privately owned companies. 21CSI® has a Department of Defense 100% Commercialization Achievement Index.

In an interview with the company's founder and CEO, Dr. Alexander (Alex) D. Stoyen, we discussed the strategies used to grow a very successful company, including tips on making it to Phase III, working with prime contractors building strong ties to universities and many other helpful items.

Dr. Stoyen has worked in both industry and academia. After working for IBM Research in Zurich and the T.J. Watson Research Center in New York, Stoyen took a position at the New Jersey Institute of Technology where he developed a successful real-time computing lab with five other faculty and several doctoral students. Later, he accepted a position at the University of Nebraska. After focusing on basic research in academia, Dr. Stoyen wanted to see what it would take to transition technology, not something many universities allow researchers to pursue. This desire to take his research to the next step with technology applications led to the formation of 21st Century Systems, Inc®.

"Although 21CSI® was formed in 1996, I did not shift to being full-time with the company until 2001," said Stoyen. "In 2001, we employed five people. Today, we have a staff of 140+ with a distributed structure. In fact, we did not have our first brick and mortar office until two years ago. Now we have 10 locations, strategically located near our Defense customers including sites in Rhode Island, Virginia, Indiana, Missouri, Nebraska, Colorado, Washington and Hawaii."

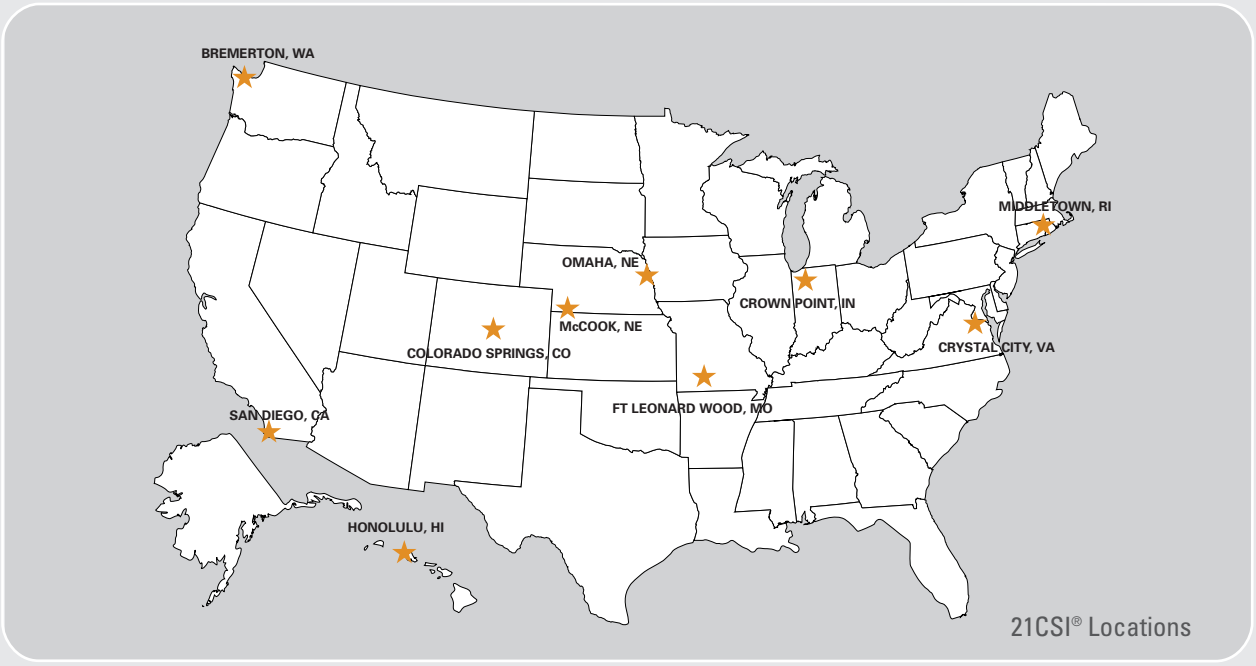
Getting to Phase III

21CSI® won its first SBIR award in 1996. Since that time, the company has received 15 Phase III's, clustered in approximately five or six established programs of record.

"In order to be successful in Phase III," Stoyen advises, "you must be very aware of the constraints of your acquisition program customers and also understand the needs of the operational users. Listen very carefully to what representatives from both communities say."

It is important to note that every command has a tech insertion program. The people working in these programs are fully informed concerning the appropriate contacts within the acquisition community. "To find the right contacts, follow the requirements. They will lead you to the right people in the acquisition community," remarks Stoyen.

At the beginning of the process, small businesses should not be discouraged. It can take some time to move things forward, including finding funding. "When you and the acquisition community first discover one another, they will not have funding available. If they are interested in what you have, they will need to start the Program Objective Memorandum (POM) process for future funding," he notes. "At the same time that the ac-



21CSI® Locations

quisition community starts the POM process, we start a Congressional strategy to locate funds for the present. Both parties need to work a strategy to bridge the funding gap. However, this should only be done if there is a committed program that wants to insert your technology."

21CSI® has found it beneficial, with respect to the operational us er, to hire former military operations personnel. "In order to understand their needs," explains Stoyen, "we often hire former military operations people as content experts or employees to assure that we have that perspective represented."

Working with Primes

To deliver a technology to the fleet, a small business must develop relationships with prime contractors who serve as system integrators. "We have good relationships with a number of primes, but typically primes are not motivated to work with small business unless their customer (the Navy) wants them to do so," Stoyen notes. That being said, small businesses will have a much easier time building relationships with prime contractors if they align with their interests.

"I find short-term relationships of any type to be inefficient. Some important questions to ask are: What is the future of this program and what will the next steps be? My experience has been that this is where most potential relationships with prime contractors break down. Middle management often cannot or doesn't address these issues. It takes time before they will introduce you to the decision-maker with whom you can begin to build a long-term relationship." Building a solid relationship with the decision-maker is key.

Other difficulties relate to sharing customer requirements and intellectual property (IP) issues. It is common for most primes to withhold information concerning the needs of the ultimate customer. Primes generally only share information on their particular need from the small business.

"Our experience has been that 90% of potential relationships with primes die off because our contacts can't or don't wish to discuss long-term strategic relationships or there are IP issues," said Dr. Stoyen. "The best relationships begin with the ultimate customer (the Navy) introducing us and indicating their interest in our technology." Relationships also work well in those situations where the prime is a subcontractor to the small business. "It's far more difficult when you are a subcontractor to them, due to the issues mentioned above," he notes.

Maintaining Strong University Affiliations

In addition to developing relationships with the Navy and prime contractors, 21CSI® has also maintained very strong academic affiliations and has a number of offices near universities.

"I have had two successful academic careers in quick succession and therefore have a good understanding of what is important to faculty and students. At the same time, I am very aware that 21CSI® - a technology company - needs to support the entire RDT&E and procurement cycle moving from basic research, to applied research, to technology, to fielding relevant research" explains Stoyen.

"Therefore, what we do is develop relationships with universities that have an emphasis on basic research. We offer subcontracts through the universities, which helps provide some stability for their doctoral students. We know that they need to publish and we work that through. We have a very collegial relationship. At the outset, we clarify that our work utilizes contracts, as opposed to

grants and we indicate the needs of the government in this process." In addition, 21CSI® addresses the issue of IP upfront and they ensure appropriate rights percolate through the contracting process.

Omaha, Neb., ribbon cutting. Pictured (L to R): Mayor Mike Fahey, Senator Ben Nelson, Chancellor Nancy Belck, Dr. Stoyen, Congressman Lee Terry and Govenor Mike Johans

Distributed company growth

As mentioned earlier in this article, 21CSI® has developed a distributed company structure with 10 geographically distinct locations. Each location is generally staffed by people who perform unique functions, such as test and measurement for the company. This is a difficult model to successfully manage, as so it is interesting to review how 21st Century® makes it work for them.

"This is one of the more interesting lessons. We have 10 offices. Typically the offices are located near our important customers, such as in Nebraska, Washington, Hawaii and Rhode Island, among others. To keep the vision coherent, we have very extensive interviewing and training processes," remarks Stoyen.

"New hires do quite a bit of traveling during the first months, assuring that they meet with all the key people associated with their program. It's not a culture for everybody. Our employees do very innovative work with direct and open communications, while being mindful of program management."

This model requires operations employees to interact with both military and civilian government program managers as well as with software developers and scientists.

We invest a lot of money in training...We also emphasize ethics of the highest degree, both with our customers and in the workplace.

Today, a number of their 10 offices specialize in company-wide functions. For example, their testing and Validation & Verification facility is in Bremerton, WA. "We have set up a Virtual Private Network, company-wide and have regular virtual meetings every Friday involving the president, program management and myself. Also, the executives travel extensively to various offices," he said.

Effective training is a top priority of 21CSI®. It is viewed as an invaluable contribution to the future of the company. "We invest a lot of money in training. In addition to technical training, we also emphasize ethics of the highest degree, both with our customers and in the workplace," Stoyen explains.

"I am mindful of a phrase that one of my mentors told me 'You can only lose your reputation once. You can be rich or poor numerous times.' Therefore, we have to assure that we have a coherent vision and perform as a whole."

Biggest Challenge

When contemplating the challenges he faces as the founder of a very successful and growing company, Dr. Stoyen believe his biggest challenge ahead is to stay aware of details without micro-managing and carving out appropriate functions for himself, the executives, and line management.

"Ninety-five percent of employees in the company do not report to me directly. What gets easier is to test the vision, to get confirmation on a direction. We have 30+ programs going on concurrently, so we can quickly test an approach with one program. For example - how to hire - and have the results available to use again with other programs, if it worked well."

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21CSI TECHNOLOGY IN IRAQ

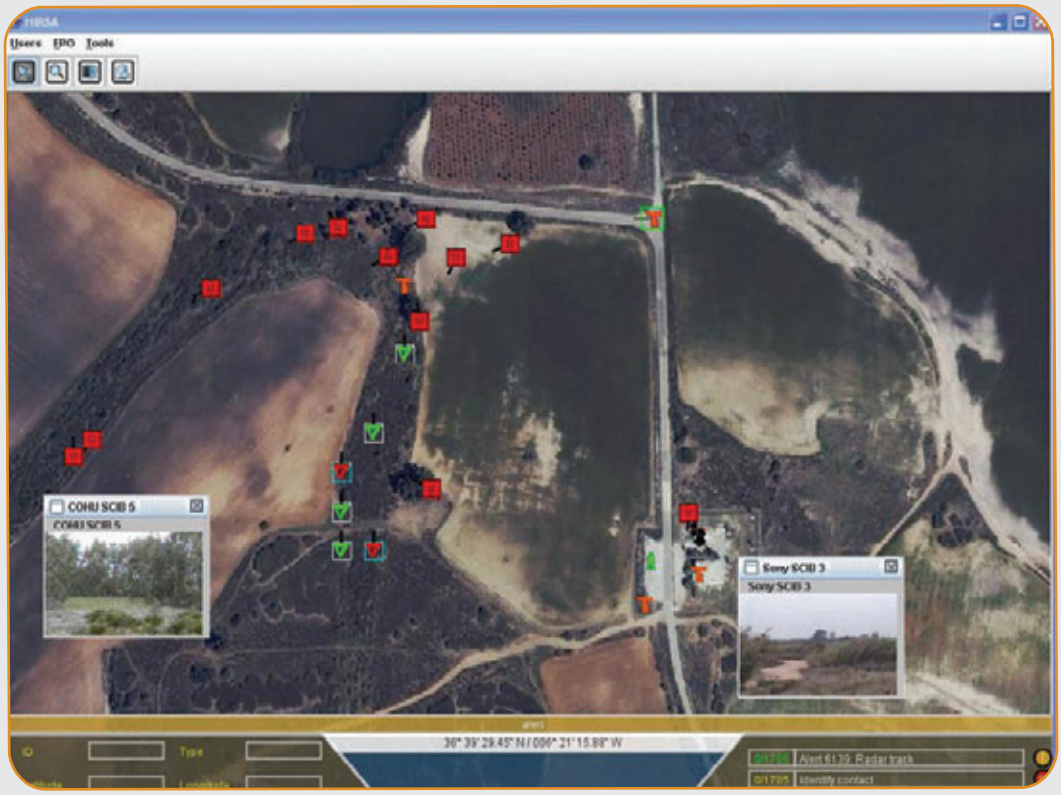
Innovative Technology Developed

In support of the U.S. Navy, 21st Century Systems, Inc.® produced an operational system called CAPS-HiRSA (Coastal Area Protection System - High Resolution Situational Awareness). HiRSA is the integrating command and control software for CAPS. It rests on 21CSI's® AEDGE commercial-off-the-shelf modular, open-architecture toolkit. This allows HiRSA to be used as a either stand-alone system or integrated with legacy systems, depending on the operational need. HiRSA provides the warfighter with advanced command and control software that integrates multiple sensors and data sources in a common backbone to provide enhanced situation awareness for force protection in the expeditionary urban tactical environment.

Since its deployment in Iraq, CAPS-HiRSA has undergone substantial capability upgrades and now provides full integration of new ground radar, acoustics and optical sensors.

DoD Implementation and Commercialization Summary

HiRSA was developed based on technology from Sentinel Net, an ONR-sponsored Phase II SBIR and anti-terrorism/force protection tool intended for naval vessels in foreign ports. In September 2004, CAPS-HiRSA was deployed for use in Camp Fallujah, Iraq where the 1st Marine Expeditionary Force (1MEF) installed the system with 5 surveillance nodes and 10 optical devices on the network. CAPS-HiRSA operates by providing situational awareness and actionable knowledge to 1MEF warfighters in Iraq using software agents to provide automated warning and advisory messages integrated with a high-resolution geospatial map display to help to simplify the tactical picture. HiRSA has allowed 1MEF to reduce its sensor systems monitoring manning from three Marines down to one Marine per watch shift, and reduced the need for illumination rounds by enabling greater use of integrated FLIR cameras. HiRSA's usefulness resulted in an October 2004 1MEF "Quick-Look" report, which noted a "much needed and appreciated increase in Force." Networked wireless PDA connectivity, adapted from SentinelNet and designed for use by force protection personnel on patrol, has also been incorporated to provide a robust, layered force protection capability. The U.S. Marine Corp selected CAPS-HIRSA to participate in a multi-national Advanced Concept Technology Demonstration for Counter Bomber technologies held this past fall in Rota, Spain.



A Winning Team: Zivko and General Atomics

A Phase II Pairing of a Small Business and a Large Business Breeds Success

Typically, in an SBIR Phase II a small business will work on a problem, pairing with a system integrator only at a later date. It is fairly unusual for a TPOC to match two companies together to work on a Phase II project, however when a pairing is prearranged, it is usually with another, small company. Though it is an ultimate goal of the Navy, it is still somewhat unusual for there to be a pre-arranged relationship between a large and a small company at the outset of an SBIR. Bob Bluth, a TPOC stationed at the Naval Postgraduate School (NPS) working with the Center for Interdisciplinary Remotely-Piloted Aircraft Studies (CIRPAS), did just that as he discusses in his interview concerning the success of one of his programs – the Pelican.

The companies involved with the Pelican include, Zivko Aeronautics, Inc. (ZAI) a small woman owned and operated aircraft and aviation company, founded in 1987. With 70 years of combined experience in every aspect of aviation, the staff of ZAI were well prepared to meet the needs of the Navy's Phase II request to build a UAV surrogate aircraft, called the Pelican.

General Atomics Aeronautical Systems, Inc. (GA) was founded in 1955 for the purpose of harnessing the power of nuclear technologies. Since that time, GA and its affiliated companies have grown to become one of the world's leading resources for high-technology systems development ranging from the nuclear fuel cycle to remotely operated surveillance aircraft, airborne sensors, and advanced electric, electronic, wireless and laser technologies. They were a top choice for producing the technology needed to allow the Pelican to operate as an UAV.

What it takes

It takes a great deal of talent, hard work and skill to build a successful company. To move a technology successfully to Phase III often requires more than that – it takes a committed, knowledgeable TPOC and the work of a good partner, too. Back in 1996, under a Phase II SBIR, Zivko Aeronautics developed the Pelican UAV surrogate aircraft for the Navy. The Pelican, a highly modified Cessna 337 Skymaster, was originally developed by the Office of Naval Research and NASA ERAST Program for low-altitude, long endurance atmospheric and oceanographic sampling.

"Zivko was partnered with GA to develop the Pelican's technology – ZAI constructed the aircraft, GA created the UAV capability with the support of ONR and NASA, and then ZAI integrated all of the payloads onto the platform," said Bluth. What was out of the ordinary was that Zivko, a small business, was asked to partner from the outset, not as sub-contractor to prime but truly partner, with GA - a large business. Both businesses were operating under separate contracts while working together on the Pelican project.

As happens sometimes with SBIR projects, the initial intent for the technology changed. Their UAV technologies, better suited to the atmospheric and oceanographic sampling were developed, making the Pelican obsolete for this particular project. It was the creative partnering of ZAI and GA, engineered by Bluth that, regardless of the change in the Navy's need, has transitioned the Pelican from a Phase II award into an ongoing project supporting our Nation's defense.

The Next Steps

Since it was no longer needed for atmospheric sampling, General Atomics (with additional support from Navair) was asked to configure the Pelican to operate, as a surrogate Predator UAV. The Predator system was designed to provide constant intelligence, surveillance, and reconnaissance to U.S. strategic and tactical forces and because the Predator is unmanned, it is suitable for deployment in "moderate risk" areas, unsecured air space, the open ocean, and in biological or chemical contaminated environments. It has also been utilized in search and destroy missions with no apparent risk to US military personnel.

Side by side photo of the Pelican surrogate UAV next to the Predator UAV.

That wasn't the end of the Pelican though or of Zivko's role in the project. "The Pelican, as a surrogate UAV was the perfect low-risk, low-cost test and evaluation alternative to a UAV," said Bluth. "Another distinct advantage is that the Pelican avoids airspace restrictions and the complications that go along with unmanned aircraft operations," Bluth continued. "This allows the Pelican to be used in urban exercises where a Predator or other UAV would be difficult, in not impossible to fly due to FAA restrictions."

Zivko's aeronautic expertise and their instrumental role in the Pelican's creation, prompted General Atomics to continue their partnership.

"With support from N87 in 1998, NPS worked together with Zivko and GA to add a UAV surrogate capability to Pelican, building on the work already supported by the

SBIR and the NASA ERAST Program," said Bluth. "NPS currently supports Zivko and GA to operate and maintain Pelican in support of various UAV Surrogate requirements for DoD and other Federal agencies."

Success in Phase III

With SBIR Phase III support through the Naval Postgraduate School, ZAI now integrates new payloads into the Pelican and conducts flight operations for the Joint Forces Command, the Department of Energy and other government entities. Many of the payloads tested are intended for integrated into the Predator by General Atomics. This system, with Zivko's expertise and the Pelican's ability to fly where other UAVs cannot, has been wildly successful. It has resulted in multiple projects including training troops, such as the Marine Expeditionary Unit (MEU) 22 before they are deployed to Iraq.

In one of their most recent projects, Zivko supported NPS by by operating the Pelican in a project to test and evaluate enhanced JC2ISR processes and operational concepts as well as to dynamically test their collection systems that process, and disseminate ISR information to operational users for the U.S. Army, Joint Command and Control, Intelligence Surveillance and Reconnaissance (JC2ISR) Joint Test and Evaluation (JT&E). The JT&E focused on the battle execution process to detect, identify, track and provide actionable target data to a Joint Force Commander, component commanders, delegated decision-makers and shooters, the goal being to enable engagement of high-value, time sensitive, mobile surface targets.

NPS together with Zivko and the Pelican have also been integral in supporting Skylink III. The Skylink mission series measures the performance of ground-to-air free-space optical (FSO) communications links. First. the Pelican is configured with a WESCAM Skyball gimbal mount with integral video auto-tracker, the Skyball houses an optical receiver. Then the ground station, using the FSO transceiver, tracks and illuminates the aircraft with modulated laser light. The optical receiver in the Skyball then recovers the optically-encoded digital data.

"Pelican has been particularly helpful in supporting military exercises that require UAV capability for to the troops to work with, but where a real UAV isn't very practical to operate due to FAA restrictions," Bluth explains. "With Pelican, the U.S. Military can realistically train with capabilities very close to those of the UAVs that they will work with on the battlefield. The more the military can work with UAV technology, even through a surrogate, the more likely UAV technology can be worked into operating concepts, doctrine, leadership and education for joint warfighting." As evidenced by the six major DoD Training Exercises since 2001, using the Pelican as a surrogate UAV on these missions provides the military with vital Predator experience that they otherwise would not receive.

Throughout all the changes, the Pelican still has a role as a science platform. A project also supported by Zivko. Flying over a five-week period, the Pelican enabled scientists from the Naval Post Graduate School, the University of Irvin and the University of Washington to measure turbulence fluxes of heat momentum and humidity in the waters south of Martha's Vineyard. They were also able to monitor the sea's surface temperature, broadband radiation and both upwelling and downwelling spectral irradiance.

In the end

Ultimately, a successful transition from Phase II to Phase III requires good working relationships among all parties and a willingness to zig when zagging just didn't work. The relationships forged by faculty and students at the Naval Postgraduate School, Zivko, General Atomics, N78, NASA and the ONR SBIR Program are a great example of doing just that and doing it well.

The TPOC Corner

STEVE LOSE : TPOC, PEO Subs

Having served as a TPOC for PEO Subs since 1992, Steve Lose has developed some innovative approaches to transitioning SBIR projects into the fleet. As the Assistant Program Manager for non-propulsion electronics and sensors, he views SBIR projects as "toolkits" for the Virginia-class submarine fleet. Lose utilizes the SBIR program by creating topics to solve problems as well as to serve as risk mitigation in key areas of concern. As a result of using this approach, he has been responsible for over 25 SBIR topics, with five achieving Phase III status as of this writing. He consistently strives to develop 1 – 3 new topics each year, beginning with the writing of the SBIR Phase I topics with an examination of risk areas over five years holding the expectation that the project could be in place in 3 – 4 years.

Lose is in a unique position of managing funding for the non-propulsion electronics and sensors in the Virginia-class subs, using that funding in support of the SBIR program. He manages the SBIR programs on a day-to-

A Virginia-class Submarine.

day basis just as he manages other developments for his programs and the products he procures for the ship. His position is one of great depth and responsibility that has continued to expand prompting him to recently hire a SBIR program manager to manage SBIRs more closely and interface with their major prime, General Dynamics.

To ensure a successful transition of his SBIR programs, Lose utilizes Phase III SBIR contracts to develop and produce Government Furnished Equipment (GFE) as well as developing and providing tools that support shipboard installation, integration and test. The Small Business is then able to coordinate directly with the prime through both the integration and construction contract. The goal of this approach is to "hook-up" the prime with the Small Business. Although he will readily admit that the program is not yet fully functional, the tools are in place to facilitate a very effective process.

Lose has also developed an acquisition plan that includes provision for possible transition of Phase II SBIRs to Phase III. He accomplishes this by incorporating every Phase II project in the Virginia-class Acquisition Plan (AP). This process, done periodically, provides the needed acquisition coverage, to move contracts forward to Phase III, when needed.

His goal is to transition 50 percent of his Phase II programs. Currently, he has 22 Phase II's completed or in process with nine that have moved or are in the process of moving on to Phase III .

The goal of this approach is to "hook-up" the prime with the Small Business.

Lose's forward thinking strategy allows him the luxury of know that at any given point in time, he has an approved budget, authorized by the acquisition community, for his planned Phase III transitions. By utilizing this process, he is position to assure a successful transition, even if funding for a project disappears, as long as a successful technology development has occurred. It also allows him to plan ahead, identify risks and offer topics that can mitigate said risk in two to three years.

So, what is the measure of success for a TPOC? Lose believes that it all starts with a clear and attainable plan and goal when writing a SBIR topic. Additionally, he says that being responsive to the Small Business is an essential quality of a successful TPOC. Difficulties in contacting a TPOC at the onset, don't bode well for a Small Business wishing to transition their technology. Above all, the TPOC must manage all aspects of the SBIR project. In the end, the TPOC will only get out of the project what is put in, and Lose works to maintain a good return for his projects.

When looking back on his time as a TPOC, Lose considers his greatest success to be getting Phase III awards for projects that he has initiated. He knows that as long as there is an acquisition path and the technology works, his ideas can be put to good use for solving real problems in the Virginia-class submarine fleet. It is all in a good day's work.

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CURTISS-WRIGHT:
Expanding SBIR Program Corporate-wide

"The Small Business Innovation Research program is an excellent fit with Curtiss-Wright's corporate growth strategy, and we expect our partnerships with SBIR firms will help us fill in technology gaps and foster innovation within our existing products and services. For these reasons, we've expanded our involvement with the SBIR Program and made it a corporate-wide initiative in which all three of our business segments will participate. At the end of the day, it's all about providing better solutions for our customers and keeping our technology advancing. Working with SBIRs simply makes good business sense."

-- Parker Miller, Senior Vice President for Government Relations, Curtiss-Wright Corp.

A rich legacy going back to the Wright brothers

From the Wright Brothers' iconic first flight at Kitty Hawk to Glen Curtiss' role as the father of naval aviation, the Curtiss-Wright Corp. is a company with a long tradition of innovation and a heritage built on the pioneering spirit of its original founders.

The company itself was formed in 1929 through the merger of the Wright Aeronautical Co., which was founded in 1919, and the Curtiss Aeroplane and Motor Corporation, created by Glen Curtiss in 1916. During World War I, Curtiss became the largest aircraft manufacturer in the world, employing more than 21,000 workers and producing more than 100 planes each week.

The newly-merged Curtiss-Wright rose to even greater prominence in the 1930s and 40s, building more than 29,000 aircraft during World War II, including the famous P-40 War Hawk plane made famous by the legendary "Fighting Tigers."

CW's critical function control, valve and pump products are installed on every nuclear submarine and aircraft carrier in the fleet today.

By the war's end, Curtiss-Wright had grown to become the second largest manufacturing company in the U.S., second only to General Motors. In the years that followed, Curtiss-Wright shifted its focus from building airplanes to developing mission critical components for the U.S. military, and was a pioneer in the development of flight simulators for military and commercial aircraft, also designing and manufacturing aerospace components. Through various acquisitions, the company also strengthened it roles in providing products and services to the US Naval Nuclear Program.

Defense markets provide approximately 50% of CW sales

Curtiss-Wright's business is diversified across three primary business segments with the company's various operating units providing products to the flow control, motion control and metal treatment industries. In recent years, the company's growth has been fuelled by significant acquisition and Curtiss-Wright is today poised to become a billion dollar company providing products and services to the aerospace, defense, commercial nuclear power, marine, and gas and oil processing industries. Although the company has greatly diversified since its days building warplanes, 50 percent of Curtiss-Wright's business is still defense-related.

Curtiss-Wright Flow Control is heavily focused on the US Navy market, and its subsidiary companies design and manufacture pumps, motors, valves, generators, secondary propulsion equipment, reactor plant instrumentation and other control systems. Every U.S. nuclear vessel, dating back to the introduction of the Nautilus submarine in 1954, is equipped with Flow Control products. In addition, CWFC companies participate in the EMALS and Arresting Gear development programs for the CVNX carrier. Other current key programs support the DD(X) destroyer, the CVNX carrier and the Virginia Class submarine.

Curtiss-Wright supplies critical components to chemical processing plants around the world.

Curtiss-Wright Controls, the Motion Control segment of Curtiss-Wright is a leading technology-based organization providing niche motion control products, subsystems and services internationally for the aerospace, defense and industrial markets. Key customers include the US Government, Boeing, BAE Systems, Lockheed Martin and General Dynamics. Their products range from, utility actuation systems, aiming and stabilization systems, fire detection and suppression systems, embedded computing open system architecture and rugged COTS computing solutions, shipboard helicopter landing and handling systems, to position sensors and industrial joy sticks used in the off-road heavy equipment market.

Curtiss-Wright is supporting the efforts of SBIR companies on more than 30 Phase I and Phase II topics...

Curtiss-Wright will continue to utilize internal resources to focus on its core competencies, while looking outside the company for complementary technologies to enhance its products and systems. In some cases, CW does purchase standard components such as microprocessors from large companies, but quite often the company contracts with smaller specialty firms for specific products and services.

"We have developed successful relationships with a number of small businesses including SBIR firms," said Gary Rieger, marketing manager for technology programs at EMD, a Curtiss-Wright Flow Control company. New technical capabilities, innovative technologies, speed, and lower cost all act as incentives for Curtiss-Wright to forge new, productive relationships.

"One particular small business with whom we've developed a good, complementary working relationship is the NDI Engineering Company in New Jersey," Rieger said. "We've worked on several SBIR programs together and have both benefited from the experience."

Currently, Curtiss-Wright Flow Control is supporting the efforts of SBIR companies on more than 30 Phase I and Phase II topics, primarily through EMD and Target Rock, another CWFC company.

Alan Brooks serves as business development manager for Curtiss-Wright Flow Controls' Peerless Instruments and has played an integral role in guiding the company's involvement in SBIR. He says that when Curtiss-Wright begins working with a small company it's with an eye towards establishing a long-term relationship.

"During the initial phase, our involvement with the SBIR company tends to be fairly limited," Brooks said. "But in the second phase, we become more of an active mentor in order to help guide the company through the project, and it's very important that we make certain that all parties are very clear about their respective roles, the goals and deliverables and the ground rules for how to share intellectual property and protect SBIR technical data."

Lessons Learned

Small and large companies alike look for best practices to effectively guide the transition of technology from small to large business. The following lessons are offered from a Curtiss-Wright Flow Control perspective:

- Be selective in topics/partners – desirable topics should have the potential for Phase III or fill a gap in your technology roadmap.
- SBIR partners must be a good fit with your company, both culturally and strategically.
- It is vital to have sufficient technical resources available to work closely with an SBIR firm. This is often difficult as companies are sometimes reluctant to pull engineers and other support personnel from directly-billed jobs to devote time to SBIR activities. But Curtiss-Wright officials say the success of the project depends to a large degree on the frequency and quality of interactions between the engineers of the prime and the SBIR partner. Top-level support from the product division GM and the senior management of the SBIR company is absolutely critical.
- Begin as early as Phase I to identify the potential sponsor and funding for Phase III.
- Remember that while the technology is important, your ability to market the resulting product or service to an end customer will be just as critical to your success in reaching Phase III.
- Ownership of prexisting and resulting intellectual property is an important issue and must be protected during all phases of collaboration by including all applicable notifications, identification and marking requirements.

Factory service is performed by a CW employee on one of the 300+ motors supplied to over 100 nuclear power plants worldwide.

Future Expectations are High

Curtiss-Wright officials say they are looking to develop a select group of trusted SBIR-partners for long-term collaboration, and they have high expectations for the success of this initiative. Like all public companies, Curtiss-Wright always keeps an eye on the bottom line with partnerships and acquisitions, but also recognizes that success won't happen overnight.

"While SBIR participation is a valuable tool for the exchange of ideas, concepts, working methodology and can provide access to new market opportunities, the SBIR process is volatile and doesn't always lead to a manufactured product," Gary Rieger noted. "It's not realistic to expect that there won't be some false starts and in most cases achieving success will take time and effort from all parties."

The real benefit in participating is in the process itself.

Rieger suggests that by clarifying roles and expectations at the outset and initializing relationships with targeted customers early in the process to verify their interest, a good foundation for Phase III success can be laid.

Apart from the expected financial gains, Gary Rieger says companies can gain other benefits from their participation in the SBIR program.

"The real benefit of participating is in the process itself," Rieger says. "The ability to draw upon other innovative concepts, companies, to develop fresh approaches and ways of thinking, to gain insight while exploring challenging technical issues is very exciting and a key benefit of participating!"

Curtiss-Wright Controls supplies the Integrated Mission Management Computer and the Sensor Management Unit for the Global Hawk UAV.

...In the second phase, we become more of an active mentor in order to help guide the company through the project.

The expectation is that partnering with innovative SBIR firms will help fill technology gaps and provide better solutions for Curtiss-Wright's customers. The company's rich heritage of innovation continues to welcome small business with complementary technologies to meet the unique needs of the defense community.

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SUBCONTRACTING: When LBCs are Subcontractors to Small Firms

David P. Metzger, Holland and Night LLP

It is common practice for large business concerns (LBCs) to develop their initial SBIR relationship with a small business via a subcontracting relationship. Generally, subcontracting initially takes place during a Phase I or Phase II Small Business Innovation Research (SBIR) award where the small business subcontracts to the large business concern (LBC). The main issue is how a small business, subcontracting to an LBC, can ensure that it protects its SBIR data rights during the execution of this subcontract.

According to the "SBIR Alerts" pamphlet (found on the Dawnbreaker Web site at: *http://www.dawnbreaker.com/navytap/alerts.php*) it is important that DoD SBIR awardees appropriately mark their proposal submissions and all documents submitted to the government during and following the performance of the SBIR award. The DFARS SBIR data rights clause (DFARS 252.227-7018) referred to as the 7018 Clause in the SBIR Alerts pamphlet, explains these requirements and is incorporated by reference as a line item in Section I of the SBIR contract. All SBIR contractors should obtain a copy of this clause as it must be incorporated in every Phase I, II, or III SBIR contract. A full copy of the 7018 Clause, including an SBIR data rights legend, is available on a Holland and Knight LLP Web page located at *http://www.hklaw.com/content/RequiredLegends.pdf*

The Government

SBIR contractors benefit from data rights provided by the 7018 Clause more than non-SBIR research and development contractors. That being said, steps must be taken, to ensure these rights are retained. The most important step is to properly mark technical data and software delivered to the Government. The basic message of this marking requirement is: "Mark it or lose it." In at least one case, the Armed Services Board of Contract Appeals found that delivery of items to the Government without restrictive markings resulted in the government's obtaining unlimited rights in the software.

Large Business Concerns

To protect SBIR data rights while working with an LBC, "disclosure" becomes the defining issue. SBIR contractors must ensure that discussions with a subcontractor, regarding technical data, is done only under an appropriately worded Non-Disclosure Agreement (NDA).

Unlike the markings needed when working with government agencies, the presence of a signed NDA, which expressly addresses data rights, will protect SBIR contractors with respect to their prime contractor. Failure to work under an NDA may result in lawful disclosure of such information. A model agreement containing appropriate clauses can be found on the website for the Navy Transition Assistance Program (TAP) http://www.dawnbreaker.com/navytap/

Subcontracting during Phase III

A Phase III award is made with non-SBIR source funds and derives from, extends or logically concludes prior Phase, I, II or III work. Phase III work can be for research, services, products, production or any combination of these activities. The SBIR Directive provides flexibility on insertion of SBIR Technologies into DoD missions and allows for multiple scenarios.

Possible scenarios include:

- SBIR firm (also known as an SBC) can act as prime contractor for the government;
- SBC can act as subcontractor to the large prime contractor; and
- SBC can serve as prime contractor with the LBC as subcontractor.

This portion of the article will only deal with the third scenario.

The 7018 Clause is a mandatory flow-down clause from the SBC prime to the subcontractor. This means the SBC prime must include the 7018 SBIR clause in any defense related subcontract with a large business subcontractor. That same clause imposes obligations and rights on both the SBC as the prime contractor and the large business concern as the subcontractor. Specifically:

- The LBC, acting as the subcontractor, owns the technical data/software generated under the subcontract, just as the SBC primes owns the technical data/software that it generates under both its prime contract and the subcontract;

» The SBC prime contractor receives a royalty-free, non-exclusive license to use, modify, reproduce, release, perform, display, and (subject to certain requirements) disclose the technical data/software. This is indeed the same right which the federal government receives from the SBC prime for its work; and

» The LBC can disclose the technical data/software it develops at any time to any person. Likewise, the SBC can do the same with the technical data/software that it develops, depending on negotiation of the NDA.

From a business perspective, the implications of these obligations are that the owner of the data has control of the data it owns. That is why the SBC must take special steps to protect SBIR data, even though it is SBIR data. The data, developed by the subcontractor, is not owned by the SBC – the LBC owns such data that it develops and can do with it what it wishes, subject to limitations in the subcontract. Again, this creates special burdens on the SBC to protect its data from disclosure. Hence, the NDA with the LBC is extremely important, and must protect against this disclosure by the LBC subcontractor, and these limitations must be carried through to the subcontract. The reason for this seeming anomoly is that the 7018 Clause contains a strict prohibition on using the SBIR prime contractor status as leverage to diminish the data rights of the subcontractor. Thus, when the LBC recieves the mandatory 7018 Clause in its subcontract, the LBC recieves the benefits of ownership to data it generates in the same manor as SBC recieves ownership in its data generated as prime.

Questions naturally arise regarding the benefits to both the small business as prime and the large business concern as subcontractor on a Phase III contract.

Some frequently asked questions include:

Q *- What is the scope of the SBC prime's rights in the technical data/software generated by the LBC under the subcontract?*

A - The same rights as those defined by "SBIR Data Rights" 7018 Clause (DFARS 252.227-7018), but the non-disclosure obligations applicable to SBIR data rights will also apply to the SBC.

Q *- What is the duration of the SBC Prime's rights?*

A - Five years for military contracts and four years for civilian contracts.

Q *- What is the duration of the SBC prime's non-disclosure obligations?*

A - The earlier of (i) five (5) years after completion of project from which data/software is generated or (ii) the LBC sub's disclosure.

Q *- Can the SBC Prime receive subsequent Phase III awards, on a sole source basis, based on technical data/software generated by the LBC sub under the subcontract?*

A - Yes, because the LBC's data generated under the SBIR Phase II contract are SBIR data.

Q *- If the SBC Prime receives follow-up work during the period that is 5 years after completion of the project from which the technical data/software is generated, will the non-disclosure protections roll-over?*

A - Yes. The government remains subject to the non-disclosure obligations, if the data has not been otherwise disclosed.

Q *- If the non-disclosure protections roll-over, does the SBC prime have any obligation to notify the LBC sub?*

A – No.

Q *- Can the LBC sub receive Phase III work, on a sole source basis, based on the technical data/software that the LBC sub developed under the subcontract?*

A - No. The LBC cannot "inherit" SBIR rights through subcontracting.

Q *- Can the LBC sub permit another SBC to use the technical data/software that the LBC sub developed under the subcontract to receive Phase III work on a sole source basis?*

A - No. Again, the LBC sub cannot inherit SBIR rights through subcontracting.

The small business as prime benefits from subcontracting to a large business. As many large companies appear to be developing their first relationships with small businesses via subcontracts, it also benefits the LBC to assure that non-disclosure of SBIR data rights is maintained and protected. The potential benefit to the LBC comes, if at some time in the future, it wishes to acquire the small business. In this instance, the SBIR data rights could be transferred to the LBC, granting the LBC the ability to obtain sole source contracts that derive from, extend, or logically conclude prior Phase I or Phase II SBIR work conducted by the small business and are funded with non - SBIR funds.

As referenced above, Phase III contracts can proceed in variant forms from those discussed above (e.g., subcontracts to LBCs or as prime contracts to the federal government without any subcontracts). For additional information on Phase IIIs, please consult SBIR Alerts at the cites below.

(The information and views presented above are those of the author and not the Navy or the Governement.)

For more information on Subcontracting during Phase I, II and III

SBIR Alerts:

www.dawnbreaker.com/navytap/alerts.php

SBIR Data Rights Legend:

www.hklaw.com/content/RequiredLegends.pdf

DoD SBIR/STTR CALENDAR 2006

DATE	EVENT
JANUARY	
12/26-1/17	STTR 06 DDR&E 2nd Review
1/13	SBIR 06.1 Closes at 6AM
1/20	STTR 06 IRT
FEBRUARY	
2/1	STTR 06 Pre-Released;
2/3-9	SBIR 06.2 Topic Submission to DDR&E
2/10-3/12	SBIR 06.2 DDR&E 1st Review
MARCH	
3/13-26	06.2 Agency Response to DDR&E
3/14	STTR 06 Opens
3/27-4/14	06.2 DDR&E 2nd Review
APRIL	
4/14	STTR 06 Closes at 6AM
4/19	SBIR 06.2 IRT
MAY	
5/1	SBIR 06.2 Pre-Released
5/3-11	SBIR 06.3 Topic Submission to DDR&E
5/12-6/11	SBIR 06.3 DDR&E 1st Review
5/15-18	National Conf / Louisville
5/23-25	Tri-Service Conf/SC
JUNE	
6/1	Fast Track Q2 Report
6/5-7	**Navy TAP Opportunity Forum, Washington, DC**
6/12-25	06.3 Agency Response
6/26-7/14	06.3 DDR&E 2nd Review

DATE	EVENT
JULY	
7/14	SBIR 06.2 Closes at 6AM
7/19	SBIR 06.3 IRT
AUGUST	
8/1	SBIR 06.3 Pre-Released
8/3-10	SBIR 07.1 Topic Submission to DDR&E
8/11-9/10	SBIR 07.1 DDR&E 1st Review
SEPTEMBER	
9/11-24	07.1 Agency Response to DDR&E
9/13	SBIR 06.3 Opens
9/25-10/13	07.1 DDR&E 2nd Review
OCTOBER	
10/13	SBIR 06.3 Closes at 6AM
10/18	SBIR 07.1 IRT
NOVEMBER	
11/1	SBIR 07.1 Pre-Released
11/3-9	STTR 07 Topic Submission to DDR&E
11/6-9	National Conf / Milwaukee
11/10-12/10	STTR 07 DDR&E 1st Review
DECEMBER	
12/11-24	STTR 07 Agency Response
12/12	SBIR 07.1 Opens
12/26-1/16	STTR 07 DDR&E 2nd Review

SBIR / STTR TOPIC SUBMISSION

Navy Moves to Rolling Topic Submission

In the past, topics were generally submitted 2-3 times a year for SBIR, and 1 time for STTR. That is now the way of the past. To make topic submission easier and more streamlined for users, a Web site has been developed for topic submission and review that can be used at any time. The site, *www.navysbir.com/login*, is password protected and can only be accessed through .mil and .gov IP addresses.

There were many reasons for the change. The DDR&E process is long and the time between topic calls so great, that the Navy needed a place to start the topic review process without waiting for a topic call to be issued or for the DoD Topic site to open. There was also a great interest among the SYSCOMS to view each others topics either for duplication in efforts or interest in co-funding. The new topic review site is now a repository for topics and those topics are viewable to all .mil and .gov users.

The current due dates for topic submission for DDR&E are listed on the preceding page. PEO, SYSCOM and Navy due dates for submission will be earlier than those listed for DDR&E and are available through those individual offices.

While the overall impact of the change will not be known for sometime, the Navy hopes this site makes topic submission simpler and more uniform and timely for its users.

For More Information

Questions concerning this new system can be addressed to Lore-Anne Ponirakis, support contractor at the Office of Naval Research.

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