

A SPECIAL REPORT



Defense in Virginia

Long on experience and savvy on technology, the state's military contractors get a big boost in the ongoing War Against Terrorism

by Peter Galuszka

Venetian blind-like screens flutter down the huge picture window at the conference hall, quickly concealing the commanding view of the wide James River. It's as if television secret agent Maxwell Smart had ordered the "cone of silence" because that's exactly what the screen does. Top-secret conferences about the future design of Navy ships are held at the newly completed Virginia Advanced Shipbuilding and Carrier Integration Center in downtown Newport News. "The blinds vibrate to thwart any electronic eavesdropping," says Bob Klosterman, VASCIC director.

The \$58 million center shows just how deeply Virginia is wedded to the defense industry. VASCIC is designed to develop the next generation of submarines and aircraft carriers that will defend the U.S. well into the 21st century. Northrop Grumman Newport News, which owns the giant shipyard next door and is a part owner of VASCIC, is the nation's sole builder of nuclear-powered aircraft carriers. These giant vessels launched the first U.S. airstrikes avenging last year's terrorist attacks in New York and Arlington that killed more than 3,000 Americans. Future aircraft carriers, however, may have unusual twists, such as new reactors that can power Buck Rogers-style laser weapons. Tomorrow's submarines dreamed up at VASCIC could have bullet-like pods around their hulls to house missiles, unmanned underwater drones or mini subs for Navy SEALs.

VASCIC's projects may be for the future, but there's plenty going on right now. Blessed by its proximity to Washington and with a great sea

port, the Old Dominion is once again gearing up for its portion of a major boost in military spending — more than \$40 billion extra in this year's \$369 billion defense budget — to help root out terrorism worldwide. With a defense industry already worth \$30 billion, Virginia has long been a major military state, trailing only California in defense-related payrolls and contracts. "Virginia has for generations played a very major role and has been a home for a large number of men and women in uniform ranging from the Pentagon in the extreme north of the state to Hampton Roads and in between," says U.S. Sen. John W. Warner, who for 30 years has wielded enormous clout on defense affairs in Washington.

The new war on terrorism has defense industries humming in about every corner of the state. Although the impact has yet to be felt in the rest of Virginia's economy, there's plenty of activity. In Richmond, DuPont makes Kevlar for flak jackets and Nomex for fire-resistant combat flight suits. Researchers in Blacksburg help design software for the

Virginia has the right mix of high-technology weapons systems such as nuclear air more flexible weaponry of the post Cold



Pictures of the War Against Terrorism: (from top left) a rocket is tested at NASA's Wallops Island facility; U.S. troops on the ground in Afghanistan; an Army helicopter fires the Hydra-70 rockets made by General Dynamics; the USS Theodore Roosevelt built by Northrop Grumman Newport News



engineering of Unmanned Aerial Vehicles (UAVs) that have been used to great effect in Afghanistan locating elusive al-Qaida and Taliban terrorists. After the UAVs find such enemies, they are hunted down by U.S. Special Operations troops wearing night vision goggles made in Roanoke by ITT Industries (see illustration, page 8). The company

has just snagged a \$450 million contract to make more.

In Northern Virginia, the dramatic need for high-tech cyber-weapons, such as combat communications and coordination systems, has sparked the biggest bout of initial public offerings (IPOs) for defense contractors in years (see story, page 10). Now there's an urgent demand for the software programs that can make sense of the tons of disparate information to prevent more terrorist attacks. "There's a growing awareness after 9-11 that we need to develop real-time intelligence from voluminous data," says Ken Dahlberg, executive vice president at Falls Church-based General Dynamics Corp. and head of its information systems and technology. Combat hardware is also getting a boost in

technology companies and makers of big ticket aircraft carriers and submarines. Smarter and older War era are ideal for fighting terrorism.

Virginia on the battlefield

How the state's technology is front and center in Afghanistan

1 U.S. Special Operations soldier on horseback in Afghan mountains sights al-Qaida forces in cave. He uses Global Positioning Device to relay location to aircraft carrier via satellite. He "paints" the target with a handheld laser to enable an attacking plane to pinpoint the cave.

Virginia connection:

Night vision goggles – ITT Industries Night Vision, Roanoke. Awarded five-year, \$450 million contract to provide night vision equipment for the Army.



2 Satellite relays coordinates to aircraft carrier



Graphic by Chris O'Brien
Data: Virginia Business
Photos courtesy of ITT Industries Night Vision, General Dynamics

Northern Virginia. At a site near Quantico, General Dynamics is testing the Advanced Amphibious Assault Vehicle, or AAV, for the Marine Corps. Woodbridge could be the location of a new manufacturing plant to make 1,000 of the fast and maneuverable vehicles that, at about \$2 million each, will help the Marines seize foreign beaches.

The densest concentration of the state's massive defense sec-

tor is in Hampton Roads. The dramatic, ship-like VASCIC building is a good vantage point to review it. Lying dockside near VASCIC, the new Nimitz-class aircraft carrier USS Ronald Reagan is being fitted out before commissioning next March at the Northrop Grumman Newport News shipyard. Farther down amid a clutter of cranes, the nuclear reactors of the carrier USS Enterprise are being refueled in a contract worth \$1.5

Virginia connections:

Battle space management and software systems—General Dynamics, Falls Church, and Virginia operations of TRW, Raytheon and Northrop Grumman. Coordinates information collected by satellites for military applications.



5 Global Hawk drone projects real-time intelligence.

Virginia connections:

Unmanned drone—A subsidiary of Raytheon Co. in Falls Church helps build sensors for drones. AVID, Virginia Tech, Blacksburg. Company designs software that serves as a design aid during engineering process of unmanned aircraft.

3 Aircraft carrier dispatches F-18 Hornet toward Afghanistan

Virginia connections:

Aircraft carrier—Northrop Grumman Newport News, Newport News. The only builder of nuclear-powered aircraft carriers in the United States. Sperry Marine, Charlottesville, ship steering and navigation systems.

6 C-17 transport plane drops parachuting troops to assist in battle at the cave.

Virginia connections:

C-17 aircraft—Advanced Technical Products, Inc. Marion. Makes parts—winglets, nose gear landing doors, flaps—for C-17, a cargo transport plane.

4 F-18 prepares to launch rockets at the cave

Virginia connections:

Handheld radio—General Dynamics, headquartered in Falls Church, country's sixth largest defense contractor. Radio enables any aircraft to perform search and rescue missions. Kevlar flak vests and helmets—DuPont, Chesterfield County. Makes bullet-resistant fibers such as Kevlar used in military helmets and vests and heat-resistant Nomex, used in flight suits of combat pilots.

INDIAN OCEAN
PAKISTAN

al-Qaida cave

7 Apache helicopter arrives to assist troops

Virginia connections:

Hydra-70 rockets—General Dynamics, Falls Church. Country's prime contractor for this weapon used on all U. S. Army helicopters.

billion. The shipyard's parent firm is now the largest private employer in the state with more than 30,000 employees, including more than 17,000 at the shipyard which it bought last year.

Just a few miles down the James River is the gigantic Norfolk Naval Station, home of the Atlantic Fleet, whose ships, including six aircraft carriers, are providing firepower and logistics for Operation Enduring Freedom in South Asia. Nearby at Little

Creek Amphibious Base, Navy SEALs train for Afghan operations. In Virginia Beach, Oceana Naval Air Station is the base for many of the carrier aircraft striking al-Qaida. The Norfolk Naval Shipyard in Portsmouth will be refitting city-busting Trident submarines so they can attack terrorist camps with highly accurate conventional missiles rather than nuclear-tipped ones.

At Hampton, Langley Air Force Base is the staging area for

Are defense IPOs the next big thing?

by Garry Kranz

If publicly held defense contractors are the new darlings of Wall Street, then Northern Virginia is their Cupid. Since last October, eight defense-contracting firms have filed for initial public offerings (IPOs) of stock. All but two are based in Northern Virginia.

A plus for the Old Dominion firms is that they specialize in high technology. So far, their satellite communications, reconnaissance systems and other gizmos have been the stars of Operation Enduring Freedom, rooting out terrorists responsible for the attacks on New York and the Pentagon last year.

Basking in the glow of battlefield victories, companies such as ManTech International Corp., Anteon Corp. and SRA International Inc., all of Fairfax, are going public with eye-popping results. Investors are betting that these stocks can produce stable, if unspectacular, returns. One big question looms, however: Will the surge to defense IPOs create the same kind of over-inflated bubble that hurt other high-tech *wunderkind* such as Internet companies and telecommunications firms?

For now, the big push towards defense high technology has launched the richest defense-sector market for IPOs since Ronald Reagan was in the White House. During that defense buildup, some 20 defense contractors went public with an average offering size of about \$15 million.

Today, the offerings are far greater, averaging \$220 million, an order of magnitude 15 times more. "The valuations and the market cap of these companies that have gone out recently are much bigger, even when adjusted for inflation. What we're seeing is bigger companies raising more money at higher pricing

relationships than at any time in history. That's the essence of how good this market is," says Jerry Grossman, managing director of investment banking firm Houlihan Lokey Howard & Zukin in McLean.

Going public had long been the dream of Ernst Volgenau, who launched SRA International Inc. in 1978. During the 1980s, SRA was too young and its market capitalization too small to interest investors. After the Soviet Union collapsed in 1991, U.S. military spending was curtailed, giving defense stocks even less cachet with investors. "We contemplated going public off and on over the years, but never believed the prices for our stock reflected the true value of our company," says Volgenau, whose firm provides consulting and systems integration services to the Department of Defense and other federal agencies.

Finally, in May, the timing was right. Roughly eight months after terrorists struck, SRA made a resounding debut on Nasdaq. Investors enthusiastically snapped up 4.4 million shares of SRA stock for \$18 a share, netting the company proceeds of \$79 million. By the end of the first trading day, SRA shares closed up nearly 11.5 percent — by no means a record, but given the market's flaccid state, something to cheer about. Nor was it a one-day market anomaly: SRA stock continued to climb, selling 40 percent higher than its offering price.

SRA is the third Virginia military IT services company this year to come up swimmingly in the equities market. Earlier this year, ManTech International Corp. and Anteon Corp., raised \$115 million and \$270 million, respectively. Their shares also are trading at

prices higher than their opening-day offering. And the rush to market isn't over. Veridian Corp. of Arlington and SI International of McLean have filed stock-sale plans with securities regulators and are expected to begin trading later this year. Veridian hopes to raise \$216 million while SI is angling to sell \$75 million worth of stock.

Anteon typifies the allure of defense companies these days. Investors scooped up 4.7 million company-sold shares on its first day of trading on the New York Stock Exchange in March. The stock kicked off at \$18 — Anteon was only the second company this year to upsize its offering price prior to its debut — and has been selling more than 30 percent higher than its opening. Or, consider ManTech International. It premiered on Nasdaq in February by selling 7 million shares — 1.2 million more than it planned to offer. The stock

Recent de

IPOs	Date
ManTech International	2/7/2002
Integrated Defense Technologies	2/27/2002
Anteon Corp.	3/12/2002
SRA International	5/23/2002
Veridian Corp.	6/4/2002

*in millions

Base Period: February 2002 = 100

Data: Houlihan Lokey Howard & Zukin, Company SEC filings

conflict-bound F-15 bombers and soon to be home to a new generation of F-22 Raptor jet fighters. In the other direction, just beyond the tourist attractions of Williamsburg, is super-secret Camp Peary. Hidden by pine trees and chain-link fences, Central Intelligence Agency operatives may be training Kurdish guerrillas for the next phase of the war against terrorists — possible U.S.-led strikes against the regime of Iraqi strongman Saddam Hussein if the war expands.

The boom in Virginia's defense industry comes after a decade of uncertainty. Military spending got a boost under President Reagan during the 1980s but declined under Bill Clinton as the Soviet Union disintegrated. A new buildup is underway. But critics say that it is limited — President George W. Bush may reduce the number of U.S. troops next

year. And Pentagon planners and Congressional experts are seriously rethinking what kinds of weapons they need. What they choose to do will have a major impact on Virginia's defense industries.

The discussion continues on so-called "transformational" weapons that would meet different threats than those of the Cold War. Thanks to easing tensions with Russia, the U.S. doesn't need to spend so much on nuclear missiles and bombers. Nor does it need as many artillery, tanks and tactical aircraft designed to turn back a Soviet invasion of Western Europe. What's needed instead are smaller, more mobile forces supported by highly sophisticated intelligence. Combat data will be assessed by computerized battlefield management software systems that can direct forces to counter terrorist threats. Homeland defense products range from new security systems at

opened at \$16, near the top of its offering range, and share prices have nearly doubled since. CACI International went public back in 1968, but managed to take advantage of the current climate to issue a second offering. In March, CACI scored \$171 million in a secondary public offering, perhaps smoothing the path for other companies to go public.

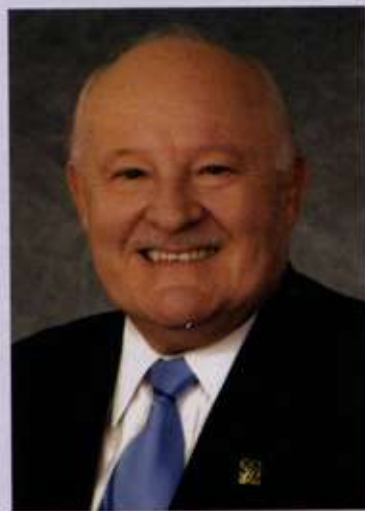
To be sure, most of the companies filed for their IPOs before Sept. 11, but there's no question the attacks "created a new emphasis on IT spending by the federal government, and that drew more public investors," says Ray Bjorklund, vice president of consulting services for Federal Sources Inc. in McLean, which advises technology vendors wanting to sell to the government. The market should stay strong. Research firm Input of Chantilly predicts some \$63 billion in federal expenditures on systems and IT services by 2007, with five agencies – defense, justice, transportation, treasury and the National Aeronautics and Space Administration – accounting for nearly 70 percent of the spending. An added attraction: Publicly held defense companies are sub-

ject to a welter of complex procurement rules and regulations. Auditing is tight and ongoing. "It's not the Wild West, where companies can make things up as they go along," says Grossman.

Not all of Virginia's IT contractors are in a hurry to exchange equity for investor dollars. The defense market lacks maturity, so it's difficult to predict how investors will react to even the slightest hiccup. If one defense company were to miss a quarterly earnings projection, for instance, all public companies in the sector could suffer, says Paul Lombardi, chief executive officer of Fairfax-based DynCorp, a privately held systems firm with \$2.2 billion in revenue. "I'd like to see a couple more quarters for the maturity of the sector to take hold, maybe even a year and a half," says Lombardi.

There are risks if investors run from one "big thing" to another like lemmings. Therein lies the danger for newly minted public companies. How long will it be before IT investors start sniffing around for higher margins, especially since "the national economy is expected to recover and recover well?" asks Bjorklund.

Even so, this doesn't seem like another looming dot-com disaster with fantasy-revenue expectations. Only a few companies possess the expertise and experience to win IT defense work and gain the momentum needed to push them public. Virginia IT companies, benefiting from their proximity to the Pentagon, will help shape the nation's defense and security. War may be hell. For Virginia's freshly anointed public IT companies, it also is big business. ■



CACI International of Arlington gained \$171 million in a secondary offering in March. A CACI laboratory (top) simulates combat conditions. CACI chairman and CEO Jack London, (above) was a Navy flyer and now sees a big jump in information technology contracts after last year's terrorist attacks.

Defense IPOs

Company Proceeds*	Shareholder Proceeds*	Total Issuance*
\$109.9	\$5.3	\$115.2
\$132.0	\$22.0	\$154.0
\$84.4	\$185.6	\$270.0
\$90.0	\$0.0	\$306.0
\$216.0	\$0.0	\$216.0

airport gates and in harbors along with biodefense weapons to counter biological terror weapons. Virginia has at least five private companies that specialize in biodefense, including Hadron Advanced BioSystems in Manassas and Public Safety Group Inc. in Woodbridge.

The new generation of highly sophisticated weapons, many with Virginia connections, is proving its worth. U.S. forces fighting in Afghanistan are using everything from night goggles to laser illuminators and special encryption radios to root out al-Qaida terrorist cells and Taliban fighters believed to support terrorists. In a stunning performance, U.S. troops have managed to secure most of the country in just a few months, thus achieving in a few months what Soviet army forces could not do in 10 years of fighting.

Even so, the conundrum over "transformational" forces among defense contractors has taken its toll in Virginia. Earlier this year, United Defense Industries, Inc. based in Arlington had expected to proceed with a \$265 million contract to build the advanced Crusader artillery system that can fire highly accurate shells much farther than existing artillery tubes. Problem was, the Crusader was designed to fight more sophisticated forces than Afghan terrorists, such as Soviet tanks invading Germany. The Crusader was likewise large and cumbersome, so the Pentagon killed the project. Absorbing the hit, United Defense got into another deal. It is acquiring United States Marine Repair, a major ship overhaul company in Norfolk for \$316 million. The point? As the U.S. responds to distant threats, it needs ships to ferry troops and gear and

Virginia's powerful defense block

Delegation on Capitol Hill keeps military dollars flowing

by Alexander H. Haislip

When it comes to defense on Capitol Hill, Virginia's congressional contingent wields unusual clout. Eleven of the 13 members of the state's delegation have seats on powerful committees that decide weapons systems, work out military manpower problems and make key recommendations for defense spending. Much of that money, about \$30 billion last year, ends up across the Potomac River in the Old Dominion.

Leading the pack is U.S. Sen. John W. Warner, who not only is a former sailor and Marine Corps officer, but has held high-ranking civilian posts in the Navy since 1969, including a stint as Secretary of Navy from 1972 to 1974. In his 24 years in the Senate, Warner has been head of the Senate Armed Services Committee and is still a ranking member.

Warner's years of service are evident in his Russell Office Building on Capitol Hill. With its clutter of Navy ship photos, stuffed wildlife and a model Norfolk & Western coal train, it looks like a men's club. Taking a breather from a Senate-floor debate, Warner slouches in an armchair and ponders what gives Virginia its military muscle. "Go back to (U.S. Rep.) Owen Pickett and (the late Rep.) Norman Sisisky. This delegation has worked for generations to get things that every other of the 49 states wants for themselves."

Among the latest additions are expansions for the Virginia Air Guard, whose Richmond-based F-16 fighters fly combat patrol missions over Washington. They are trained to roar in and shoot down planes should another

tragic terrorist hijacking occur as it did last year. Ft. Pickett near Blackstone is getting upgrades to train troops in anti-terrorism tactics, and defense contractors from Northern Virginia to Radford are expected to win more contracts as the defense budget expands to fight terrorism.

Virginia's roster on Capitol Hill reads like an alphabet soup of committees related to defense and international affairs. U.S. Rep. Jo Ann Davis' district includes Langley Air Force Base and Northrop Grumman Newport News shipyard. She holds seats on the House Armed Services Committee including subcommittees on Military Personnel and Military Procurement as does Rep. Edward L. Schrock whose district includes the Norfolk Naval Station, and Rep. J. Randy Forbes. Rep. Robert C. Scott and Rep. Bob Goodlatte have spots on the House Judiciary Committee groups studying terrorism and homeland security. Most of the rest of Virginia's delegation has some involvement with foreign affairs committees or military construction.

Naturally, defense campaign contributions follow defense budget expenditures. Just about every member of the delegation receives contributions from defense contractors in their areas. One of the biggest is Northrop Grumman Newport News, which, as an independ-



U.S. Sen. John W. Warner, who leads Virginia's congressional delegation, has years of experience as a military officer and a high-ranking civilian defense official.

ently owned company, funneled \$10,000 apiece to the election campaigns of Davis and Schrock in the past year. Other big contributors are Falls Church-based General Dynamics, and Raytheon and Lockheed Martin. Warner's biggest defense contributor in the past year has been the giant shipyard in Newport News, which kicked in \$5,000. For a complete listing of defense contributions to Virginia's congressional delegation, consult our Web site at virginiabusiness.com. Political campaign money and experience in the defense industry help grease the way for Old Dominion's military sector. ■

the vessels must be in good repair.

Besides large-ticket aircraft carriers, Virginia's greatest contribution against terrorism is likely to be in information technology. Secretary of Defense Donald Rumsfeld and the Bush administration have put a large premium on information to detect and destroy threats. Since Sept. 11, Virginia IT companies serving the U.S. military and related agencies have racked up a boatload of contracts that combined are worth several

billion dollars. Spending by a proposed homeland security agency alone will run as much as \$2 billion in 2003, according to Input, an IT sales and marketing research firm in Chantilly.

The Bush administration also wants to create a new federal agency to coordinate homeland security, focusing the spotlight on domestic concerns related to, but separate from, military issues. "Homeland security is going to be budgeted to a fare-thee-well," says Paul Lombardi, chief

executive officer of Reston-based DynCorp. "The supplemental budget this year is just the start. In Virginia, and especially Northern Virginia, companies that are successfully (helping) federal agencies can't help but benefit because there's more work than there are companies."

Privately owned DynCorp posted \$2.2 billion in revenue last year. The 54-year-old company has provided logistical support for the U.S. military from the Korean War to Desert Storm, assessing weapons, making sure computer systems can talk to each other and managing computer networks. At one time, the company made about 98 percent of its money on Pentagon contracts, Lombardi says, although the company began diversifying its federal IT customer base to compensate for decreased military spending during the Clinton administration. The war on terrorism surely will bring more defense contracts. "Two years ago our company was probably getting 48 percent of its revenue from defense contracts. This year, I'd say about 60 percent of our new business awards are for defense work," says Lombardi.

DynCorp, for instance, is putting together a new communications network for the Government Emergency Telephone System (GETS) that will add a wireless component so federal officials can talk if the landlines are cut. The firm is managing the program for a contract valued at \$15 million a year. DynCorp subcontracts with wireless carriers, such as Verizon and VoiceStream, to provide wireless spectrum to power the system. Since Sept. 11, the wireless GETS systems have been deployed in Washington, D.C., and New York City, and DynCorp engineers are working to roll out the system to link major metropolitan regions across the country. "The wireless piece never existed prior to Sept. 11," says Lombardi.

DynCorp is also helping the FBI, which found on Sept. 11 that its agents in New York City couldn't communicate with their colleagues across the Hudson River because landline service had been severed during the attacks. The FBI has appointed DynCorp to be prime contractor for its so-called Trilogy Project, which will retool 28,000 computer workstations and hundreds of servers around the country. The firm is providing the FBI with the computer architecture and helping with system installations under a contract valued at up to \$180 million. So urgent is the work that it must now be finished in 10 months rather than three years as originally planned.

Another player on the Northern Virginia defense scene is Jack London, who runs CACI International Inc. in Arlington. During the Cuban missile crisis, London helped chase Soviet submarines aboard a Navy "hunter-killer" aircraft. More than 40 years later, London is still helping with defense, albeit in a different, more high-tech way. As head of CACI, London has built a backlog of nearly \$1 billion in federal IT contracts with U.S. military agencies. CACI specializes in taking off-the-shelf products and integrating them into customized computer systems.

tems so upgrades will be faster and cheaper. About two-thirds of the company's revenue, which is expected to be around \$671 million in 2002, stems from defense-related work. The publicly traded company recently told Wall Street analysts that revenue for 2003 could jump as high as \$831 million. "Our compound annual growth rate has been about 20 percent over the last five years, and my goal is to exceed that," says London.

Even prior to Sept. 11, London says U.S. military planners were trying to prepare for warfare based around networks that use distributed computing, wireless communications systems, sophisticated sensors and other intelligence-gathering tools to track clandestine foes. "There has been infrastructure modernization going on in the federal sector, especially defense, for a number of years. The events of Sept. 11 just accelerated it," says London.

Predicting and pre-empting what terrorists might do is the mission of ManTech International Corp. of Fairfax. ManTech, for instance, helps with laser-guided bombs that are used to destroy terrorist sites in Afghanistan.

Securing U.S. outposts overseas is another specialty. After a car bomb exploded outside the U.S. Embassy in Karachi, Pakistan, in June, ManTech was hired by the U.S. State Department to assess ways to improve security in and around the building, part of a contract to develop "technical countermeasures" and deploy them at more than



Ken Dahlberg heads General Dynamics' Information Technology division in Falls Church.



Major defense installations and contractors in Virginia



General Dynamics is developing the new AAV amphibious assault vehicle for the Marine Corps. The company may make up to 1,000 of them at Woodbridge.

250 U.S. foreign-service posts. At Guantanamo Bay, Cuba, ManTech is installing secure communications to help military personnel keep better tabs on the hundreds of detainees from Afghanistan being kept for questioning. The company went public in February, selling 8 million shares of stock in an initial public offering that raised \$110 million.

Another Fairfax defense firm that recently went public is Anteon Corp. It collected \$250 million after selling 15 million shares in its offering. The company boosted its share price twice before trading began and shares are selling about 40 percent above the IPO price. As with others, Anteon is using advanced IT systems to bring information closer to the battlefield. When Bush sent troops to Afghanistan, Anteon sent personnel to help provide network administration for two of the key computer systems designed for sharing information among NATO allies and coalition forces.

Coordination can be much harder than simply getting troops and supplies to a war zone. "During the Gulf War, troops, ammunition, supplies and food were dumped in the desert," says Joe Kampf, chief executive officer of Anteon. "But no one knew where anything was." So, when the Air Force needed a way to coordinate supplies and troops, it called on Anteon to manage and integrate the Cargo Movement Operations System — known as the Federal Express of the Air Force.

Larger, marquee-name defense companies are developing computer

systems too. One is Lockheed Martin, which was the largest defense contractor in Virginia with \$14 billion in defense work until Northrop Grumman bought Newport News Shipbuilding last year. General Dynamics, which ranked No. 6 in contracts last year, has various systems to coordinate intelligence, guide aircraft and artillery to targets and assess the result.

All of the big defense companies have been jousting as the trend toward consolidation in the defense industry continues. Last year, Virginia became a battleground for both General Dynamics and Northrop Grumman. Attracted by its efficient management and big backlog of Navy orders, General Dynamics made a bid for Newport News Shipbuilding, which had become independent after being spun off by Texas conglomerate Tenneco in the mid-1990s. Northrop Grumman quickly countered and after tit-for-tat combat for stock and cash, emerged victorious. Now, Northrop Grumman has just won another battle, this time for Cleveland-based TRW Inc. The final settlement was engineered by TRW Chairman Phillip Odeen, well-known for his community affairs work in Northern Virginia. Northrop Grumman plans to spin off TRW's auto parts business and keep its formidable defense units based in Northern Virginia and California.

The shipyard and TRW fights are just more in a series of takeovers. In recent years, brand names such as jet fighter-maker McDonnell Douglas have been absorbed by bomber-maker Boeing. Los Angeles-based Northrop Grumman was close to bankruptcy in the mid-1990s when it began a highly profitable acquisition spree. Not to be outdone, General Dynamics, famed for its submarine-making Electric-Boat Division in Groton, Conn., picked up destroyer and frigate-maker Bath Iron Works in Maine.

Both Northrop Grumman and General Dynamics have been winning applause on Wall Street. Their stocks had been stagnating in the low \$40 a share range more than two years ago but are above \$100 a share now. In fact, defense stocks appear to be doing so well that some ponder if they could be forming a bubble of overvaluation of the type that plagued Internet stocks in the late 1990s.

There are big differences, however. The defense companies tend to get involved in "legacy" contracts that last for years whereas the business of dot-coms tended to be short-term. Also, much of the big spending on defense has yet to trickle into the rest of Virginia's economy. "We won't see an impact on the Virginia economy for at least a year," says Christine Chmura, head of Chmura Econometrics & Analytics, a Richmond forecasting firm. One problem, she says, is that the recent recession was worse than earlier predicted and it will take more time for a recovery.

Back at VASCIC, however, Northrop Grumman Newport News is gearing up to hire 1,500 engineers and others over the next few years to help out with its seven-year-long backlog in orders. The yard has gotten a boost since aircraft carriers, often criticized as outdated, have again shown their value because they can project air power without the messy politics of getting foreign governments to agree to airbases on land. "The debate used to be, 'do we need aircraft carriers?'" says Irwin F. Edenzon, vice president of business technology development at Northrop Grumman Newport News. "Now it will be: 'Do we need more aircraft carriers?'"

A fair question. As it has from the start of this nation, Virginia is supplying the manpower and hardware for the sad but necessary business of defense. ■

Reported by Garry Kranz in Northern Virginia, Paula C. Squires in Richmond and Alexander H. Haislip in Washington