

Building a *Simulation* World to Match The *Real* World

Navy Capt. Drew Beasley Leads Team Effort to Deliver JSIMS — Nation's Most Advanced Simulated Warfare System

KARI PUGH • COLLIE JOHNSON



"In today's post-Cold War era, global politics are more complex, fluid, and unpredictable than ever. All branches of our military must now be prepared to work together to confront any of several potential foes under widely varying conditions. In such an environment, the ability to exercise both Joint and combined task forces command and staff personnel, under realistic simulated battle conditions, is crucial.

"I urge you to consider the advantages of the Joint Simulation System. It is the one modeling and simulation tool which will prepare all our commanders to coordinate their forces for all levels of warfare, wherever we might have to conduct it."

—Retired Army Gen. John M. Shalikashvili
Former Chairman, Joint Chiefs of Staff

Today's warfighter lives and fights in a complex world. Unprecedented technological advances in modeling and simulation are providing greater opportunities than ever before to conduct more effective and realistic training and improve readiness at lower costs. Everywhere you look, DoD's austere budget situation forces the Military Services to "look for the value added" and aggressively seek out affordable, "results-oriented" approaches to training and readiness.

This story is about a new approach to simulated warfare that will, in essence, build a *simulation* world to match the *real* world. Although this article will un-

doubtedly draw its largest audience from the modeling and simulation (M&S) community, it's also a story for commanders and warfighters, about an increased fighting edge made possible through the unprecedented technological breakthroughs of recent years.

Leading the Way

In 1995 the Navy selected Capt. Drew Beasley to head the Joint Simulation System (JSIMS) Program Office — undeniably one of the biggest challenges of his career. An experienced program manager and deputy program manager, Beasley had served in several diversified positions that added to his credentials for the job: engineering officer; opera-



The Joint Simulation System

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tions officer; company officer; destroyer commander; technical director; and most recently, former program manager for the Battle Force Tactical Training System, Naval Sea Systems Command.

“I was appointed by the Assistant Secretary of the Navy for Research, Development and Acquisition, to take this job,” Beasley says of his selection. “And I believe that the decision was probably based on the skills required for the job. Since I was assigned to the Naval Sea Systems Command Battle Force Tactical Training System [BFTTS], I was already working closely with the modeling and simulation community. At that time, BFTTS was going to be the keynote of the Navy’s contributions to JSIMS.”

When Beasley turned over management of the JSIMS Program Office to his successor, Army Col. James R. Taylor, he left JSIMS and Taylor with a strong, viable program. But his most important legacy by far was generating unprecedented levels of support and collaboration among the Services and Agencies on a Joint program – not an easy accomplishment for any program manager.

How he and his team – the JSIMS Joint Program Office – pulled together a plan, formed an “enterprise” conglomerate, and built a strong foundation for the nation’s most advanced simulated warfare system is a story that offers renewed inspiration for engineers, programmers, and program managers who, like Beasley, face the inherent difficulties and monumental challenges of managing Joint programs.

The Need for a Joint System

The Department of Defense (DoD) now has an array of sophisticated visual systems for simulated warfare training that represent incredible advances in M&S technologies. In the past 20 years, every branch of the Armed Forces has adopted simulated warfare training created by advances in sophisticated visual systems. But as might be expected, the systems now used by the various branches reflect each branch’s perspective of warfare and only meet needs for single-Service training.

Realistic and stressful training has been the primary way to keep readiness high and prepare us to face the challenges of combat.

Joint Vision 2010

Consider this: The Army has CBS (the Corps Battle Simulation System), the Marines have MTWSS (Marine Air Ground Task Force [MAGTF] Tactical Warfare Simulation System), the Navy has RESA (Research Evaluation and Systems Analysis), and the Air Force has AWSIMS (Air Warfare Simulation). The Army also has TACSIM (Tactical Simulation) as well as CSSTSS (Combat Service Support Training Simulation System). Then there’s JECEWSI (Joint Electronic Combat Electronic Warfare Simulation). And finally, we have the U.S. Space Command’s PSM (Portable Space Model).

All of these simulations are part of what’s called the Joint Training Confederation or JTC. JSIMS, as designed, will ultimately replace the JTC.

Interoperability Crucial

Obviously, real warfare is not conducted by the Services in isolation, but in joint and coordinated efforts with one another,

and often with allied forces. Therein lies the problem with all this incredible technology.

Most current training simulation systems are Service-specific. They are not interoperable. In other words, they don’t “talk” to one another in a manner that supports a fully integrated representation of the battlespace. JSIMS will eliminate the many, often redundant current models and simulations that have reached their technological limit and do not provide true interoperability.

Besides providing 21st century warfighters a simulated training environment using real-world Command, Control, Communications, Computers, and Intelligence (C4I) systems, JSIMS will also mate with real “go-to-war” C4I systems. No longer will warfighters be dependent on inefficient work-arounds to achieve interoperability.

Over the years, attempts to link the several simulation systems for Joint exercises have proven largely ineffective, due to differing architecture and conflicting databases. Commanders, who are required to act in concert with their counterparts at other command centers and in other Services, have found this particularly frustrating. DoD recognized that a single integrated system for all Services had to be developed so that, put simply, warfighters could *train the way they fight*.

Beasley speaks of ensuring interoperability as the “largest challenge of the program. It’s not necessarily the technical but the management challenges that have been the most difficult ... the efforts to manage different programs from different Services and Agencies and their contractors.” He notes that in many cases verbiage that directs interoperability with the Joint Simulation System has been inserted in contract wording.

First a Vision

To begin, Beasley and his team developed a two-part vision, identifying how JSIMS will be used and how it will be developed. The first part, the JSIMS Warfighter Vision, is a short, clear, concise statement that establishes JSIMS as

CAPT. DREW W. BEASLEY, U.S. NAVY

*JSIMS Program Manager
August 1995 — August 1998*

Captain Drew W. Beasley was born in Baltimore, Md., Aug. 28, 1947. He enlisted in the U.S. Naval Reserve in September 1964, completing Basic Training at the Naval Training Center, Great Lakes, Ill. He went on to graduate from the U.S. Naval Academy and received his commission in June 1971.



From September 1971 until August 1995, Beasley held several positions of increased responsibility: Gunnery Assistant aboard the *USS Claude V. Ricketts* (DDG-5), homeported in Norfolk, Va.; Engineer Officer aboard the *USS Roark* (FF 1053), San Diego, Calif.; Operations Officer aboard the *USS Frederick* (LST 1184); Company Officer and Commandant's Administrative Assistant, U.S. Naval Academy; and Combat System Officer aboard the *USS BELKNAP* (CG-26).

Other assignments included: Commanding Officer, *USS Pegaus* (PHM-1); Long Range Missile Weapon Systems Division (TERRIER) Technical Director/Deputy Program Manager, Naval Sea Systems Command (NAVSEA); and Commanding Officer of the Destroyer, *USS Stump* (DD 978). Following that assignment, he attended the National Defense University, Industrial College of the Armed Forces.

In the Joint arena, Beasley served as Acting Director of Pacific Armaments Cooperation (Asia & Southern Hemisphere) Division, Dual Use Technology Policy & International Programs, Office of the Under Secretary of Defense (Acquisition & Technology). Returning to NAVSEA, he was the Director, Combat Systems Training and Support Division, and Program Manager for the Battle Force Tactical Training System.

Beasley's military awards and decorations include the Defense Superior Service Medal, Meritorious Service Medal with two gold stars in lieu of third award, Navy Commendation Medal with gold star in lieu of second award, Navy Achievement Medal, National Defense Service Medal, Sea Service Deployment Ribbon with four stars, and Battle Efficiency and Excellence Award. Additionally, Beasley received a special commendation from the Government of Australia and Australian Defence Force for his work in international programs.

Beasley's academic achievements include a Bachelor of Science degree in Oceanography from the U.S. Naval Academy (1971); graduate of the National Defense University, Industrial College of the Armed Forces (1992); and a Master of Public Administration degree from The George Washington University (1992). He is an inducted member of Pi Alpha Alpha, the National Honor Society for Public Administrators (1993), and a graduate of the Executive Program Managers Course, Defense Systems Management College.

Beasley is married to the former Bonnie Ann Huber of Baltimore, Md. They have five children and recently moved from Orlando, Fla., to Potomac Falls, Va.

a simulation system that will support the 21st century warfighter's preparation for real-world contingencies. By interfacing to real go-to-war systems, JSIMS will provide warfighters a view into the simulation world that mirrors that of the real world.

The second part captures the JSIMS Technical Vision: a single, distributed, seamlessly integrated simulation environment.

Once the team came up with a credible vision, they turned their attention to the mission. "We see our mission as twofold," says Air Force Lt. Col. Gaylord "Gus" Liby, the JSIMS User Advocacy Director. "One is to deliver the core software that everybody is going to use and reconfigure for their specific needs; and the other part is the overall development of the entire enterprise effort."

To ensure JSIMS is being developed as a single system, Beasley and his team proposed an "enterprise effort" — a collaborative development effort that focuses on building one system to satisfy all requirements. "The word 'enterprise' is so critical in this," says Beasley. "We engage everyone at the same time in an IPT [Integrated Product Team] process; all the partners are engaged and empowered, and are working the same issues, trying to come up with a common solution."

To advance this enterprise effort the JSIMS team, in effect, established a "conglomerate" called the "JSIMS Enterprise." Comprised of National, Joint, and DoD organizations, executive agents, and development agents, the JSIMS Enterprise, in reality, is a large conglomerate of government and industry partners across a wide range of interests.

Although the word "enterprise" is not a term normally associated with the government or military, the JSIMS Enterprise most certainly meets the primary definition of "enterprise": *a project undertaken that is important or difficult, or that requires boldness or energy.* In addition to TRW, which is the JSIMS prime contractor as well as several subcontractors, the JSIMS Enterprise suffers no

lack of bold energetic partners from all walks of DoD:

Joint. In the Joint arena, enterprise partners include the Joint Staff, the Joint Program Office, and the U.S. Atlantic Command Joint Warfighting Center.

Army. On the Army side, partners include the Deputy Chief of Staff for Operations (DCSOPS), Simulation Training and Instrumentation Command (STRI-COM), and Operational Test and Evaluation Command (OPTEC).

Air Force. Air Force partners include the Program Executive Officer for Airlift, Trainers, Modeling and Simulation; Air Staff Command and Control; Electronic Systems Center; Air Force Combat Climatology Command; and Air Force Operational Test and Evaluation.

Navy. On the Navy side, enterprise partners include the Chief of Naval Training, N7; the Naval Sea Systems Command, PMS430; Space and Naval Warfare Systems Command (SPAWAR), PMW131; Oceanographer of the Navy (N096); Operational Test and Evaluation Force; and Naval Doctrine Command.

Marine Corps. The Marines also participate in the JSIMS Enterprise, represented by the Marine Corps Combat Development Command, the Marine Corps Systems Command, and the Marine Corps Test and Evaluation Activity.

As with all successful programs, Beasley and his team have a plan. They call it the Enterprise Management Plan a comprehensive set of overarching management guidelines and strategies that establish the structures, processes, and concept of operations for the JSIMS Enterprise.

DoD. Finally, the enterprise partnership includes members from key research, intelligence, and information organizations across DoD: Defense Intelligence Agency, Defense Information Systems Agency, Defense Modeling and Simulation Office, Defense Advanced Research Projects Agency, National Reconnaissance Office, National Security Agency, and National Imagery and Mapping Agency.

To illustrate the role of the JSIMS Enterprise, Liby uses the Vikings as an analogy. "If you take a look at the Vikings, free men who sailed the world voluntarily, they sacrificed self-interest for the good of all. They wanted to be involved and reap the benefits of contributing to a new world."

In the same way, Liby points out, the players in the JSIMS Enterprise are realizing the benefits of being contributors in the JSIMS effort, not bystanders as is usually the case in traditional Joint programs where the players don't really have a choice.

Beasley has this to say about the critical role of the JSIMS Enterprise. "It removes some of the Service parochialism and puts it into more of a domain aspect. That is where we can see some of the consolidation. We're seeing some of the melding of cultures among Services."

As with all successful programs, Beasley and his team have a plan. They call it the Enterprise Management Plan – a comprehensive set of overarching management guidelines and strategies that establish the structures, processes, and concept of operations for the JSIMS Enterprise.

The architecture they envision will be filled with Core and Common Services, Utilities, and Mission-Space Objects. Key to that architecture will be a common simulation engine, including the system software JSIMS needs to run on commercially available, open architecture computer hardware and networks.

To allow an ongoing simulated exercise to be viewed and monitored among local



Supporting the Way We Fight

computer stations as well as geographically dispersed computer sites across states or countries, JSIMS exercises will be fully distributed using the High Level Architecture (HLA), which is part of the common simulation engine.

True Interoperability

JSIMS will also support Unified Combatant Commands, Services, and Joint Task Force training in all phases of military operations (i.e., mobilization, deployment, employment sustainment, redeployment, and operations other than war).

These elements could be composed to create a simulation capability in order to support Joint or Service training, rehearsal, or educational objectives.

For JSIMS to work, Beasley explains that each Service must contribute their core areas of expertise. The Army, if left to their own devices with no outside program, for example, would have to build a simulation to meet 21st century warfighter needs. Obviously such a system would have to include a fairly robust representation of air power, such as A-10s or “tank killers” as well as high-cover F-15/F-16 or, eventually, F-22 capabilities.

He goes on to explain that if the Army had no other outside resources to depend upon, they would have to build all of the air-power representation themselves. Not only would they have to build the air power, but also some modicum of naval shore-fire support and some modicum of intelligence support to play into how they actually do business.

Says Beasley, “The win-win of JSIMS comes in at this point, where they [Army] don’t have to build the air power, the mission-space objects, the A-10s, the F-15s, the F-16s, and the F-22s. They don’t have to build the overhead resources or intelligence resources. They don’t have to build the ship representation for shore-fire support. They don’t have to build all these other externalities. Those elements are not in their domain. They are not in their core competencies.

“What you see here are the different pieces coming together,” he continues. “The Army concentrates on their domain and their core competencies; each of the individual Service and Agency partners do the same.”

The JSIMS Program Office puts it this way. “In the real world, airmen will give

you a great battle plan and tell you how to win the war with air power. But then a soldier gets involved and says, ‘Well, that’s great, but let me talk to you about a little bit of the realities.’ And in the end you have a plan that is stronger than any one of the individual inputs would have been. And that,” they conclude, “is the best method – the method that we’ve chosen to use.”

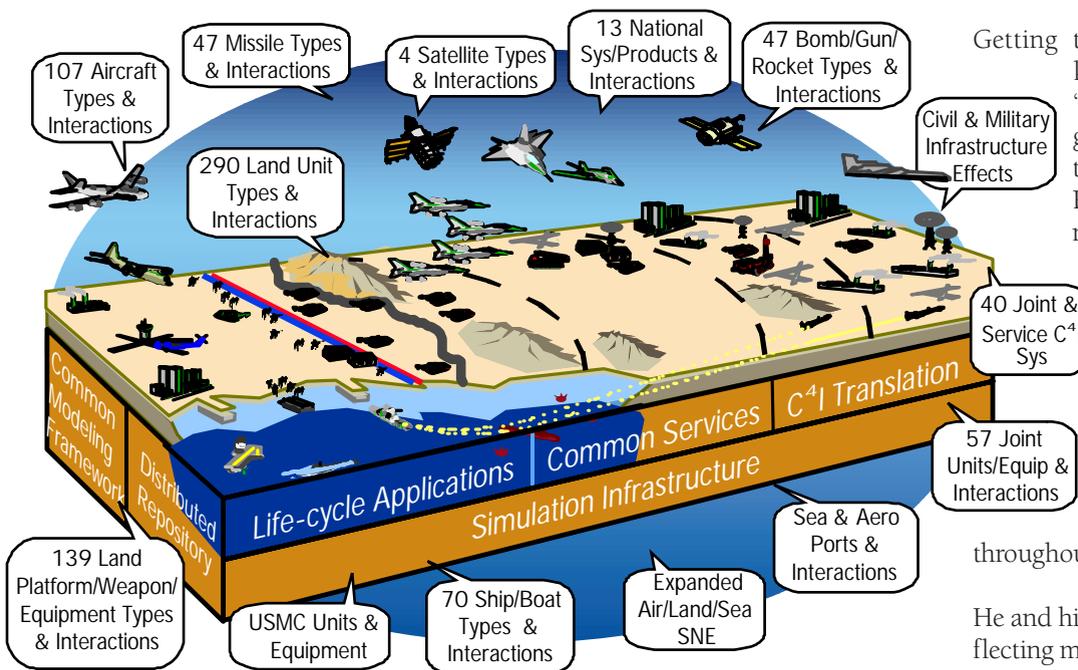
Ultimately, JSIMS, as the core architecture, will represent the richest repository of simulated warfare data and intelligence for every subscriber, according to Beasley, because it will bring in the best parts from each Service or Agency. “But each part must subscribe to the core architecture,” he cautions, “because otherwise it doesn’t mean anything.”

JSIMS — A Joint Program

Beasley talks about the difficulties of managing Joint programs, an inherently difficult challenge for any program manager. “When you go into a Joint arena, the Services still tend to look at management with a jaundiced eye, perhaps because of a perception that you’re working outside of your realm. You can’t possibly anticipate my Service’s needs because you’re outside my Service culture.’ So from that aspect alone, I approached the job with some trepidation.”

Getting the right help, Beasley acknowledges, was akin to an “entrepreneurial startup program.” But eventually he pulled together a staff to run the Joint Program Office: 15 officers, representing all the Armed Forces; a civilian staff; and a contract support staff. “When I came on board, none of that was in place. So it’s been a challenge – but fun – something I’ve enjoyed immensely and had the opportunity to do on a couple of other occasions throughout my career.”

He and his team have big objectives, reflecting marked improvement from previous methods of conducting Joint warfare training.



JSIMS Enterprise—Balanced, Joint Synthetic Battlespace

“And that’s a key point,” says Beasley, “that makes us different from any other Joint programs. Typically, in the past, Joint programs have been, quote, ‘given the authority’ or at least the budget to go execute the mission. As a result of that, sometimes they move out without bringing all the Services along with them. What we’re talking about here,” he emphasizes, “is *buy-in*.”

Beasley explains that if the JSIMS team held all the funds and managed all the development programs, the Services would have no other recourse than to look to the program office for representation. “Although attempted by other program offices in the past, this way of doing business really hasn’t worked very well because those with the funds and authority haven’t fully exercised what the Services needed, what they wanted, or what they thought they needed.”

He attributes this lack of buy-in to cultural biases and an end product that was not satisfactory either as a Joint tool or as an individual Service representation tool.

Under JSIMS, Beasley emphasizes, each of the Services and Agencies retain their own funding to ensure that their needs are met with regard to their requirements, and also to develop those elements into the Joint Service needs that are accurate representations of their individual Service (core) areas of expertise.

Commonality, Compatibility Key
JSIMS will provide users in every Service common software. This commonality will allow JSIMS to be run on commercially available equipment in an open architecture format. Toward that end, Beasley and his team are building JSIMS using the latest technologies and designing it to allow technological breakthroughs in the future to be smoothly integrated into the current system.

It will use compatible hardware, support personnel, and procedures to produce a simulation exercise. Exercise planners, he explains, will build their own scenarios by selecting elements from the JSIMS Modeling and Simulation Resource Repository (JMSRR). These

In the real world, airmen will give you a great battle plan and tell you how to win the war with air power. But then a soldier gets involved and says, Well, that’s great, but let me talk to you about a little bit of the realities. And in the end you have a plan that is stronger than any one of the individual inputs would have been.

elements – Space, Air, Land or Sea – form the Joint Simulation Training Environment, and allow rapid scenario generation to support quick-reaction mission rehearsals.

“The warfighting domain is built on a common foundation,” says Beasley. “So when the Army pulls up a simulation, they’re using the same foundation as the Air Force and the Navy. That hasn’t occurred in the past. As the DoD, we’ve been paying for people to rebuild the wheel, if you will. That will stop.”

JSIMS is a new simulation training tool designed for a new era in the global military mission. Including planning and rehearsal capabilities, it offers total interoperability of Joint training simulation, combining C4I, logistics, and doctrine into a worldwide team event.

JSIMS and its family of programs will replace the current Joint Training Confederation at Initial Operational Capability (IOC) in 2001, and will continue to improve capabilities through Final Operational Capability (FOC) in 2003.

TRW — Prime Contractor

On Dec. 2, 1996, the TRW team was selected as the prime integration and development contractor for JSIMS. The



The Joint Simulation Training Environment

project will prove a management challenge, with TRW juggling layers of other defense contractors and high-level government officials. Although TRW is the prime developer of the JSIMS Core and responsible for integration of product contributions, the JSIMS system is being developed by multiple prime contractors, all representing the various warfare domains (e.g., Land, Air and Space, Maritime, and Intelligence).

Beasley acknowledges that his team has, in many respects, burdened TRW with an enormous amount of responsibility for interfacing all the parts coming in. In essence, he explains that TRW has two responsibilities. The first is to deliver the common foundation, or the core software. The second is to integrate the efforts (and the products) of six different contractors and subcontractors so that the whole thing works when it's all put together.

Beasley emphasizes that the outside world has been very dominant in shaping how TRW organizes, how they interface, and how they do business. "In every instance," he says, "they [TRW] have stood up to the challenge, but it's been an especially hard road for them to travel.

"This has been a tremendous management challenge for TRW," he continues, "that probably rivals the space shuttle and NASA-type development. But at NASA, they typically have a single product manager and single-source funding, which we do not. Because of that, this is a very unique challenge for industry to be able to deal with the Services and Agencies in the manner in which we are ... It's really a new challenge for industry and something that they haven't seen before, nor have we. We're learning together as we move forward within the context of the JSIMS Enterprise."

As the project comes together, the JSIMS team must also deal with leaders from across all Services, as well as the Intelligence community and defense-industry partners. An OSD review team oversees the program, but each player in the JSIMS program also has someone to answer to

along traditional acquisition lines of authority.

"It's really a collaboration of all the member Services and the Intelligence community," says Air Force Maj. Dennis Verpoorten of the JSIMS Program Office in Orlando, Fla. "It's not like your regular program office. We're all trying to work together and ensure that the Warfighting Center will be compliant with all the Services. Everyone has to be able to see what's on the battlefield."

Challenges, Benefits

For the defense acquisition community, this collaborative effort marks a whole different way of doing business.

"People are used to certain contracts progressing in a certain way, in that you do not let a contract until you have a very detailed A-spec in place," Beasley said. "Under Acquisition Reform, the contractor helps develop that with you."

Program management and trying to run a conglomerate, Beasley says, are continuous challenges. "Managing JSIMS has been an interesting study in dynamics, in Service cultures, and bringing together efforts that link more on a moral plane than they do on a resource plane."

The benefits of JSIMS, once fully operable, are worth the tremendous effort Beasley and his team are putting into making DoD's warfare simulation training truly Joint. Twenty-first century commanders can look forward to some big advantages that give them that extra edge on the battlefield.

JSIMS is uniquely designed for simultaneous global use. Commanders around the world, on land or at sea, will participate in the same exercise at the same time, as can their geographically dispersed local forces. In today's environment of limited and ever-shrinking resources, this capability substantially lowers travel costs and makes more training events economically feasible.

Further, JSIMS will also provide unprecedented interoperability among

global users. This fully supports Joint Vision 2010's need for simulations that are interconnected globally, creating a near real-time interactive simulation super-highway between forces in every theater.

The result: Future battle simulations will be perceived consistently by all participants and provide valid interactions among commanders. All participating forces will train in a common synergistic environment of terrain, oceans, atmosphere, and space; and they'll interact directly in seamless integration with other forces in a realistic environment.

JSIMS will be richly detailed in its representations. It will simulate all forces – friendly, enemy, and neutral military and civilian. It can provide training in every variable of combat environment – terrain and buildings, climate and weather, smoke, day and night. And it enables modelers to develop new battlefield conditions and updated contingencies for wargames with future capabilities.

JSIMS will make simulation, especially at command levels, more adaptable immediately and more accommodating into the foreseeable future as the global political picture, military weapons and organizations, and operational procedures evolve.

Finally, JSIMS will give commanders a few added benefits that will, most certainly, add up to a few dollars saved:

- Interface through real-world, go-to-war C4I systems.
- Sharing of Service and staff capabilities.
- Greater inter-Service compatibilities.
- Reduced Operations and Maintenance (O&M) costs.
- Two-thirds reduction in simulation support personnel.

All of these advantages will significantly enhance realism and improve training effectiveness.

All In the Family

When Beasley retired late last year, not only did he leave behind the JSIMS team,

he left behind his “family.” But he took away, however, some valuable lessons in cooperation. Beasley likens his role within the JSIMS Joint Program Office to an authority figure in a large family. It was his job to keep the peace and keep things moving

“Within a conglomerate, within a family, you have to have trust,” Beasley said. “I might have the authority, but if you don’t do this in a collaborative effort and if you do it autocratically, you lose the trust of your different family partners.

“Now this is a family. And like most families, we scrap a lot. But we’re still trying to maintain that factor of trust, or to rebuild it, because there is always ebbing

and flowing of those different factors that make up an enterprise.”

Looking Ahead

JSIMS is not yet fully designed and built. Phase I—outlining the processes and procedures of the \$0.7 billion venture—was recently completed. But within two years, parts of the system will be up and running.

Beasley points out that JSIMS is a big part of building and implementing the capabilities outlined in Secretary of Defense William S. Cohen’s Joint Vision 2010. Ultimately, he says, it will provide the military and its commanders – from the Pentagon to the Pacific, from Rhein-Main to Riyadh – the advantages of realistic, interactive, more

cost-effective training than previously ever possible.

Editor’s Note: In compliance with the JSIMS Memorandum of Agreement, the program is rotated among the Services, with the Air Force fulfilling the role of permanent acquisition lead.

On Aug. 26, 1998, Army Col. James R. Taylor became the JSIMS Program Manager. After a short transition period, Navy Capt. Drew Beasley retired from active duty on Nov. 1, 1998. Currently, he is employed by SIR, Inc., in Arlington, Va.

For more information on JSIMS, contact Army Maj. Dennis Verpoorten at (407) 384-5516 or visit the JSIMS Web site at <http://www.jsims.com> on the Internet.

WHAT'S NEW?

1997-1998 DSMC Research Fellows Report *Simulation Based Acquisition — A New Approach*

Convincing program managers that Simulation Based Acquisition (SBA) is a smarter way of doing business is the goal of the 1997-1998 DSMC Research Fellows Report. The report defines SBA, explains its strengths, and describes forces that encourage its use. It also includes best practices and guidance for implementing SBA – a new way of doing business that couples rapid advances in simulation technology with process change.

Fully digitized Military Research Fellows Reports, 1994 through 1998, are available on the DSMC Web site at <http://www.dsmc.dsm.mil/pubs/mfrpts/mrflist.htm> on the Internet. Hard copies may be requested by faxing the DSMC Distribution Center: Commercial (703) 805-3726; DSN 655-3726.

