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Military Operations Research Society (MORS) Oral History Interview

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A Follow-on Interview of E.B. Vandiver, III (MORS)

Vandiver, Edgar Bishop III

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INTRODUCTION

Oral histories represent the recollections and opinions of the person interviewed and are not the official position of MORS. Omissions and errors in fact are corrected when possible, but every effort is made to present the interviewee's own words.

Edgar Bishop Vandiver, III, was President of MORS from 1992 to 1993. In 1995, he was elected a Fellow of the Society (FS). In 1995, he also received the Vance R. Wanner award given to a military operations research (MOR) professional who is deemed to have played a major role in strengthening the profession of operations research (OR). In 2012, the Military Applications Society (MAS) of the Institute for Operations Research and the Management Sciences (INFORMS) awarded him the J. Steinhardt Prize recognizing individuals for lifetime achievements in the OR field. In 1984, Mr. Vandiver became the second Director of the US Army Concepts Analysis Agency in Bethesda, Maryland, which became the Center for Army Analysis (CAA) in 1998 and moved to Fort Belvoir, Virginia, in 1999. Mr. Vandiver retired from CAA on November 1, 2012. He is the first recipient of the MORS OR Lifetime Achievement Award.

Mr. Vandiver's original MORS oral history was published in *Military Operations Research*, Volume 10, Number 3, in 2005. Given his continued contributions to MOR, follow-up interviews were initiated. The interviews were conducted on January 29, 2016, March 20, 2017, and May 10, 2017 at Fort Belvoir, Virginia.

The first follow-up interview session was conducted by Mike Garrambone, FS, and Bob Sheldon, FS, to fill in initial gaps in Mr. Vandiver's previous oral history and address Mr. Vandiver's unique perspectives from 2005 to 2016. This was conducted at the Fort Belvoir Golf Club in January 2016. Here, Mr. Vandiver addressed special events and specific CAA achievements not covered in his previous material. Reflecting on these thoughts, and wishing to flesh out additional topics of general OR interests, a second interview was conducted in March 2017. This interview was conducted by Mike Garrambone and Bob Sheldon at CAA and addressed the CAA proponents, interfacing organizations, development of analysts, interesting people and personalities, and provided fine

descriptions of historical developments in OR that only Mr. Vandiver could explain. Because he contributed to and was a major player in the development of OR, a third interview was conducted along with Dr. Michael Shurkin of RAND. This interview was conducted in May 2017 at Fort Belvoir and was to assist in gathering recent CAA and other Army organizational OR history. This interview centered on the roles and missions of other Army analytical agencies, significant studies and analytical support to Army leadership, development of models and study metrics, and the development of future analysts. Dr. Shurkin has been chartered by the Army to write Volume IV, 1995–2015 of the *History of Operations Research in the United States Army*; the previous three volumes are available online at <http://www.aors.army.mil/history.html>.

MORS ORAL HISTORY

Interview with Mr. E.B. Vandiver, III, FS. Mr. Mike Garrambone, FS, and Dr. Bob Sheldon, FS, interviewers

Bob Sheldon: It's January 29, 2016, and we're at Fort Belvoir for a follow-up oral history interview of Mr. E.B. Vandiver. Let's fill in a few blanks from your previous oral history. Please tell us when you were born.

E.B. Vandiver: September 19, 1938. A Monday morning, 7 o'clock in the morning in the front bedroom of our house in Kennett, Missouri. Dr. Paul Baldwin was the attending physician.

Mike Garrambone: This means you are 78 years old.

E.B. Vandiver: 77. I will be 78 this September. I was born at 7 o'clock on a Monday morning—just in time to go to work.

Mike Garrambone: The real question is, "How long have you been in federal service?"

E.B. Vandiver: I had 44 years of federal service and I worked five and a half more years, so I worked for 50 years.

Mike Garrambone: I believe you were an Army lieutenant somewhere in there.

E.B. Vandiver: I was. I had a little over two years of active Army duty as a Chemical Corps officer. I had seven years of Reserve Officers' Training Corps (ROTC), which is not counted in any of that, which is not a record, but it's certainly better than average. I was in school; I was in college for six years.

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Two of those, I was actually in the Army Reserves, so we could add that on to the military time. You could say it was 52 years, if you wanted to. I worked for a long time, and I am completely satisfied, and I have no desire to ever work again or to ever run anything again. I have not been paid a penny by anybody to do any work since I retired.

Mike Garrambone: I understood you knew something about field artillery?

E.B. Vandiver: I took field artillery in ROTC at the University of Missouri in the late 1950s, when we had branch ROTC. I had two years of advanced field artillery ROTC, and I went to summer camp at Fort Sill, Oklahoma. It was a very thorough program. When I finished ROTC, I was quite ready to go out and be a lieutenant in the field artillery. But then, when you got commissioned, you went to the Officer Basic Course for 20 weeks, so people that had gone to field artillery ROTC, and then took the Officer Basic Course, were extremely well trained at the company grade officer level. However, it was not to be, and I was commissioned in the Chemical Corps.

Mike Garrambone: So I take it you have fired a few shots?

E.B. Vandiver: I have spent some days on the range in a 105 battery doing every job you can do with the M101A1 Howitzer. That is, as a cannoneer unpacking ammunition, in the fire direction center, as a forward observer, and laying the battery. That's orienting the guns: you lay the battery with a surveying instrument and aiming stakes and you get all the guns pointing in the same direction. That's laying the battery. That's the first thing you do when you go into position. You're doing every job in the battery during summer camp. But I was not to be a field artillery officer. At that time, my eyesight was not good enough to be commissioned in the combat arms (infantry, artillery, armor, combat engineer, and aviation branches of the Army). They wanted 20/20 vision or something close to it. A few years later in Vietnam they got a whole lot less picky about that, but at the time they could afford to be choosy and that was the standard. I had majored in physics. The combination of poor eyesight and a scientific background education meant I was assigned to be in the Chemical Corps.

Mike Garrambone: You indicated you were going to tell us about the work that CAA did after you moved it to Fort Belvoir.

E.B. Vandiver: CAA came to Fort Belvoir in 1999. We moved there in March and we dedicated the building in May. I'd already been the Director since 1984. By 2004, I'd been the Director for 20 years, and I finally had the place running about the way I thought it should. It took all of 20 years. For those who think we ought to rotate everybody every three years to get them out of their comfort zone, and similar nonsense, they don't know that real institutional building takes time and continuity. It takes a long time to actually accomplish anything in the bureaucracy. If you stay indefinitely, nobody can out-wait you. You can eventually wear down everyone who opposes you, and you can get things done. It took me 20 years to get it going right, so for my last eight years at CAA I very thoroughly enjoyed myself, except for a lot of the crazy stuff going on in the Pentagon.

Mike Garrambone: You mentioned it took 20 years to shape or organize CAA to what you wanted. What drove you to build this desired structure?

E.B. Vandiver: It was not a matter of organization. It was more to gain agency responsiveness and quality of product. It was more a matter of culture.

There are a number of things that I want to emphasize about that period. I will talk about support to operations, because that was a really big one. But the one that I think I am most proud of was upgrading personnel and professional development. I think we have the reputation of having one of the finest professional development programs of any organization in the Army. People wanted to come to CAA. Military officers, especially those in the functional area 49, fought to come to CAA. If they had been here, they really fought to come back. I had officers there for their second and third tours. That is still going on, still happening. A lot of them stay to be civilians too. I lost numbers of personnel over time. The size of CAA declined the whole time that I was the Director. It was up near 300 when I became the Director, and by the time I left it was half that size. Other people have pointed this out to me with glee any number

of times, and "it was all my fault." But my conclusion on the thing was, if we're going to be smaller, we have to be better. To my way of thinking about organizational management, you either grow or die. That's sort of the rule in nature too—you grow or you die. If you can't grow in size, you have to grow some other way. There are lots of dimensions to growth. One way to grow is by having better people. You increase capability by improving the people you have. I adopted the philosophy that every time we had to replace someone, we wanted to replace them with somebody much better than the person that had just left. That sounds simple and easy, but it's extremely difficult to do. There is tremendous opposition to that from the lower levels of management, because they're trying to get a job done, and they want to quickly fill a position so they've got an "in-place" worker. I tried to inculcate in my managers that they were not functionaries that just did what they did, they were also part of the management of the agency, and they had to take into account how what they did affected the whole agency, not just their little piece of the thing. That's a hard thing to get across.

The professional development I had the most difficulty with was with my senior managers—my GS-15s and colonels, who of course think they already know everything. It's very hard to disabuse them of this notion, and I succeeded with some and failed with others. I would force them to do things that they really didn't want to do: take courses, go to classes. Usually the reaction I got to it was, "That was really good. I'm really glad I went to that." But there were always a few who said, "You wasted my time. I could have been here doing studies." About 80 percent of the time, I got the right reaction. I ran a speakers program where we had a speaker at least once a month to bring in all kinds of different viewpoints and try to get people to think about things differently. I moved people around internally within CAA.

I sent people off to school. I top-down loaded all long-term planning. You have to do that. No division chief would ever send anybody off for a year—"I couldn't possibly afford to do without him." But I could do that. So all long-term training: Federal Executive Institute, which was several months; War College, which

is a year; or some other things that were six months to a year, I picked them and I sent them, over the objections of my senior managers. Then, when the person came back from the course, they were much more capable than when they left. I had a kid who was a top student out of Virginia Tech in math and computer science. He had a master's degree but was totally ignorant of history and many other subjects. In fact, I had taken him to London with me for the US-UK talks. We went to Trafalgar Square and he said, "What was Trafalgar? Who was Nelson?" And the same thing with Waterloo Station, "What was Waterloo?" This is a level of historical ignorance that is truly mind-boggling. He was a very bright and capable kid. After I left, they sent him off to the Marine Corps University for a year. I saw him when he came back and he said, "I had no idea how ignorant I was," because they cover a lot of military history there. But those kinds of things, you have to assign from the top.

Mike Garrambone: While you made it a point to mentor your senior leaders at CAA, what leeway did you give them in conducting assigned studies?

E.B. Vandiver: I usually would assign my colonels and GS-15s mission-type orders. If I thought the division chiefs would not do something crazy, I would allow maximum leeway to that division chief to do good work for the Army. A good example of that type of direction was given to Andy Loerch when he formed Force Strategy Division as a colonel, and it certainly paid off.

Speaking of mentoring my colonels and GS-15s, the one that caused the most consternation, and the one I enjoyed the most, was my required reading program for senior managers. I had a management planning conference every four months. We used to go over to Harpers Ferry or we would go out to West Virginia to a place—Capon Springs—and other places up on the Blue Ridge, up to Big Meadows or Skyland. We would just go for the day and talk about, "here's where we are now," "here's what's coming up," and "here's what we ought to be focused on." For each one of those periods, I assigned a book that they had to read before we got there. Someone would then deliver some kind of book report on it and we would discuss

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it. This just caused more consternation than you can imagine.

Bob Sheldon: Can you give us some examples of those books?

E.B. Vandiver: I certainly will. I wrote a list of six of them that I just remembered right off the top of my head. The first one was *The Checklist Manifesto: How to Get Things Right* by Atul Gawande, which is a wonderful book, and a checklist is a wonderful management tool. It is a very simple book to read. We bought the books for them, and you never heard such crying and wailing, having to read a book. I had them all in the conference room this one time and handed out the book and told them, "It sounds like some of you guys haven't read a book since you were in college!" One of my colonels, a Military Academy graduate, said, "Sir, you are assuming we read books in college!" Some of the others were *The Black Swan*, a book called *Wrong: Why Experts Keep Failing Us—And How to Know When Not to Trust Them*, by David Freedman, which is very, very good. It's about why the experts are so frequently wrong, and it's about the biases that come into studies. The two biggest ones, which are a real danger in our business, are confirmation bias and choosing the data. You see it all the time, and you see it in the newspapers every day. Another book was *How to Measure Anything*, by Douglas Hubbard. It's very good and you're probably familiar with that one. Another one was *Poorly Made in China*, by Paul Midler. Usually they're management of some kind, or something that might be useful. Sometimes they're largely politically oriented, international relations. There's another one about what it's like in India today. Things like that. I don't think they continued that one after I left. Many of the other programs I instituted, they're still going on. But they got rid of that one in a hurry.

Bob Sheldon: One of the books you recommended to me was *The Boys in the Boat*, by Daniel Brown. Do you have a personal interest in that topic?

E.B. Vandiver: I both rowed and cox'd (coxswained) crew at Culver Military Academy in the 1950s, rowing on a four-oared shell for intermurals and backup cox on the junior varsity and varsity eight-oared shells. (The coxswain sits facing forward at the rear of the boat called

a shell. He steers, keeps time, and gives commands.) The shells were Pococks, the best in the world. Our coach had rowed for Princeton in the 1930s, was independently wealthy, taught fourth class (freshman) English (the hardest course I ever took), and personally funded the Culver Crew program.

Bob Sheldon: Was your experience as a coxswain good preparation for being the Director of CAA?

E.B. Vandiver: Absolutely not. When the cox gives a command, the oarsmen instantly obey. When I gave a command at CAA, it was considered an invitation to debate.

Mike Garrambone: How about a history book?

E.B. Vandiver: There were a few. I frequently had speakers cover historical titles, rather than asking people to read about it. We were going to management planning conferences, and I tried to keep those pretty much focused on management techniques. As a matter of fact, I subscribed to a service that surveyed the management literature and provided reviews. It's a lot easier to read reviews than it is to read books. I would read the reviews, and then I would pick the most interesting ones. I would also look at what the *Economist* magazine recommended, what the *Washington Post's Book Week* recommended, and I would read some of them. If I thought it was worthwhile, I'd pick that. I always read them first. There was a dozen or so over several years, maybe 15 or 20.

The second area I want to cover is support to operations and planning. I had people over in Kuwait that helped to do the planning for the 2003 campaign into Iraq. I also had an analyst up there in Baghdad supporting the headquarters starting in the summer of 2003, and this continued thereafter. We had no involvement in the original actions in Afghanistan, so CAA was not involved in what happened in 2001 and 2002. But we did get involved in 2003 and stayed involved thereafter. Our involvement included providing analysts that worked in the headquarters, doing analysis, supporting them at CAA with reachback (analytical support from their home station), and coordinating the activities of a lot of different organizations that were supporting operations by having a Friday morning operations

coordination meeting, which incidentally is still going on—in fact, there’s one going on right now over at CAA. We worked very closely with helping build up the Marine Corps’ analysis capability. Back in the beginning, the Marine Corps used to say that they had fewer analysts than the Army had analytical agencies, and actually I think it was true. But it changed over time, and they built quite a healthy capability, and I’m quite proud of having helped them do that. We rotated people and did all kinds of things. Those are the general things that have continued to this day, not in Iraq—Iraq’s gone—but there are still CAA analysts in Kabul. Later on we expanded the program to other headquarters and other theaters, beginning with an analyst to the new Africa Command that was stood up in Stuttgart. Then when they arranged the Army component of that command down at Vicenza, Italy, we put an analyst down there. Both of those programs have continued. And then we were supporting with short-term deployments to headquarters over in the Horn of Africa, and that has continued. Since I retired, they’ve expanded it into the Pacific, into a number of areas. So it changes over time, and it always has the same kind of components, the person on the scene provides analytical advice, assistance, does some little jobs, reaches back for support from CAA, which is always fairly easy to do now. It used to be difficult, but now it’s easy, relatively speaking. We do other things and rotate the analysts through there, and then when they come back to CAA, they go to the group that was supporting them to do the reachback, so they understand the situation and the command milieu. That works very well, it’s very highly developed, and it’s continuing today. We developed and published doctrine and procedures for operations research support to operations in a handbook for deployed analysts (Editor’s note: *Deployed Analyst Handbook*, 2016, is available at http://www.caa.army.mil/CAA-DAHB-30AUG2016_FINAL.pdf) and a short handbook for commanders on how to use their analysis support. We instituted a week-long training program for deployed analysts, which was institutionalized in the Army school system, and became a two-week course, which we required all deploying analysts to attend.

In July and August 2006, there was the war between Israel and Hezbollah in Lebanon. This conflict was where the Israeli Army got their heads handed to them. My deputy, Dr. Markowitz, followed the war very closely and thought that the way that they fought might be a harbinger of future kinds of warfare. So he initiated some investigations of that, and he asked me if we should do this, and I said, “Sure. Go ahead.”

Dr. Markowitz proposed a close study of the conflict to see what changes should be incorporated into the tactical pre-processor level of our two-tiered hierarchy (the COSAGE model) to represent some of the new techniques of warfare. (Note: COSAGE, the Combat Sample Generator, is a division-level [e.g., multiple brigade combat teams] stochastic simulation model used to generate weapon system-level attrition and expenditure data for use by a number of theater campaign models, including the Joint Integrated Contingency Model [JICM].) Working with the intelligence community, he had a group develop a very detailed description of the conflict describing each Israeli action by force, time, and place, and the corresponding Hezbollah counteraction. Dr. Markowitz says this wasn’t a wargame, but I say it sure looks like one.

I didn’t start this; Markowitz did. But then once he had done it, and they started bringing in results showing what these guys had done over there, they didn’t see what I saw. I looked at it and said, “It’s quite clear to me that Hezbollah had taken every single military advantage the Israel Defense Forces (IDF) possessed, and systematically developed a counter to it, one-for-one, right down the line: operational, technological, tactical.” One way or another they countered every operational advantage the Israelis had, so they were able to defeat the incursion. This is the kind of thing to which the term “hybrid warfare” was applied. I created a display: here’s the IDF’s advantage, and here’s how Hezbollah countered it. We developed these ideas into a full briefing about hybrid warfare, and we took it to everybody and his brother. It made an enormous impact.

Then we extended it to other areas and other operations. I think because of the operational mindset we had, we were able to recognize what was happening and take advantage

of it and disseminate it to other people. I think that's about all I want to say about support to operational planning because a lot of it is very highly classified, you can't really talk about the substance of it. As a result of this effort, we also got into doing wargaming. I'll talk about that a little bit more in just a minute. But putting analysts with operational headquarters and having them provide support there, having them reach back to a group at CAA, they could support them on practically a real-time basis, and then rotating analysts between those two groups, is an extremely powerful concept, and I think it's been adopted by a lot of different organizations.

We brought wargaming back to life in a big way in 2006, because we were faced with a problem we had no idea how to solve. We had a request from General Dubik (Lieutenant General James Dubik) in Iraq wanting to know about how to size the Iraqi Army and other security forces for the eventual departure of the Americans. At that time, we still planned to hold elections and then leave. How big should it be and where should it be and how should it be constituted? We basically didn't have any way of doing that in our standard way of doing analysis. So we put together a wargame to deal with that. Dr. Markowitz was a big leader in this, and we used what we had. First of all, we had a lot of knowledge of the theater; we had data on the occurrence of violent acts against the government and Americans. We had a great deal of data on that. And we had Army doctrine that had been published about how to deal with situations of this kind and we had Dr. Jim Quinlivan's research at RAND. So between knowledge of the theater, doctrine, and the data we had, we were able to construct a wargame that would have as one of its outputs, "here are the forces you need of these different kinds in these areas" and then sum it all up.

When we did the wargame, officers from the theater came from General Dubik's office and participated in the thing. We had a secure video teleconference (VTC) every night back with the command, so we had ongoing feedback. When we were done, we briefed the thing finally to LTG Dubik and the Iraqi Vice Chief of Staff, an Iraqi four-star, and a roomful of generals on a secure VTC and then it was used.

We had worked out how to answer the question posed by LTG Dubik commanding the Multinational Security and Training Command, Iraq. The question required very specific answers: how many people, how many brigades of each type, and where forces should be located by type. At the time, we didn't know it, but LTG Dubik had asked two other groups to come up with an answer. One was a standard staff estimate that he had his own headquarters do and for the third one he had convened a group of graybeards to give him an estimate. In the end, he used our work, because he said we could explain how we got all the numbers. It was briefed all the way on up to General Petraeus, not by us, but we briefed his three-star deputy by secure VTC, and then people in the theater actually gave the briefing. General Petraeus was absolutely delighted. He accepted it. He was going to come to CAA to give us a commendation for having done it, but it didn't work out that way. We got it anyway later. That was a major event in the rebirth of wargaming, and we did a long series of games on different questions in Iraq, and then we modified it and did the same thing for Afghanistan, and we're still doing wargames. So CAA's supporting a field commander is one reason wargaming came back to life, and we adapted it and made it grow and made it better as we went along. Earlier, we had used a theater wargame to train new analysts, and we had subsequently used it for some operational issues in Korea, but the Iraq games provided the major impetus.

We used wargaming for a lot of things after that and I talked at length about all the stuff when I gave the keynote address at the MORS Special Meeting on Professional Gaming in September 2015. That's only one tool, but it's one that is very useful, and that we use for quite a number of things, especially front end analysis on new things. We ended up adapting it and using it for all kinds of studies. We did wargames on the Horn of Africa. We supported the US Security Coordinator to Libya following the liberation of Libya. Things like that. So we have made use of wargaming for all kinds of analytical efforts.

I want to talk about one of the biggest studies we did in the 2000s for Base Realignment and Closure (BRAC-05). We were given extra

people for several years. We were given four extra officers that we used for two years to go scrub all the databases that would be used in a BRAC. If you're familiar with classical mythology, this was "cleaning the Augean Stables" (one of the labors of Hercules in Greek mythology). You cannot believe how bad these databases were. Every installation would have one, and then there were Army-wide ones, that were fed off of the installation ones. We found very quickly that we had to actually go survey on the ground and compare that with what was in the installation database, and what got fed into the Army database. From our survey we made the data more accurate. For example, we would go look in the Army database, and it would say, "Out at Camp Swampy, there's all of these buildings with office space, and they're all unoccupied by the government." We would then go to Camp Swampy, and ask for their database—ask their people, and they said, "No, those buildings are all occupied. We put contractors in all of them." This was very common. We spent two years scrubbing the databases and going to all the major Camp Swampys in the Continental United States, and a lot of the minor Camp Swampys, and verifying their databases. Even after all of that, I'm not convinced it was more than about 90 percent accurate, but when we started out, I don't think it was even 50 percent. So that was our going-in position. Then we provided two years of analysis support to two different groups: one was the Army BRAC-05 office and the other one was Don Tison's group on Office of the Secretary of Defense (OSD) headquarters and administrative activities. Mr. Tison was the Deputy G8 at the time. We did all the analysis for those, and in the end, when you looked at the Army recommendations compared to what was finally enacted, when you got to the very end of the road, the Army and Don Tison's group had far and away the highest number of recommendations that were supported all the way through the process. Somewhere up around 90 to 95 percent. I think the Navy was around 60 percent, and the Air Force was somewhere in between. So again, the power of analysis is in being able to credibly explain what you did, so people will understand what was done. We had good data, we had a solid methodology, and we worked on

the thing objectively. I was very proud of what we did with that difficult assignment. We also sent Mr. Rich Pedersen as a "deployed analyst" to the Pentagon, and he and his successors provided analytical support to where to put new brigades (or deactivate brigades). This use of analysis as a basis for stationing decisions has served the Army well when challenged.

Another one of the things is I've continued to emphasize all through my tenure at CAA is the quality of analysis. There are a lot of different ways to try to maintain quality. We had our famous Analysis Review Boards (ARBs), our own internal murder boards, of which there's at least two, sometimes up to four, on every project. We used to think that the most important one was the last one—the famous murder board. We finally came to realize that far and away, the most important one was the first one. Because if you don't get it straight—what you're going to do and how you're going to do it—at the outset, it's never straight thereafter. I always believed it was the last one, but it turned out I was wrong about that. The first one was the most important. It finally got to where the last one was a sort of ho-hum; they didn't pay much attention to it, because the first one was so important. We used to bring in the Sponsor to all of them, and we'd have the murder board at the end, and then we would be tearing the thing to shreds at the end, and the Sponsor was horrified. We then decided that what we would do is bring the Sponsor to the first one. That's the one where we make sure we're going to do what he wants done, and then we might bring them to an interim one, but we didn't bring them to the final one. After the final one, we put together the final briefing and we'd take that to the Sponsor.

Another way of improving quality was competing for different prizes, and preferably winning them. Now you have examples of "this is what really good analysis looks like." You can show it. So when you go to people in schools, junior analysts, who ask, "How do I know what good analysis is?" Well, here are some good examples. Look at these. The MORS Rist Prize, the Wilbur Payne Award, and there are others. I made a major push on competing for all of those, and this got to my divisions, and they wanted to have winners too. It kind of permeated down.

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I want to talk about MORS. In 2006, the office of the Deputy Under Secretary of the Army (Operations Research) (DUSA(OR)) went away, and I inherited most of its analytical functions, including being the Army MORS Sponsor. I tried to be fairly active, and maybe too much so, for the MORS office—they thought I was too active—but that’s OK. I tried to go to all of the symposia from then on, although I don’t think I made it to all of them, due to other reasons. I also want to talk about the MORS synthesis group. I had created the first synthesis group for the Analysis Lessons Learned Desert Shield/Desert Storm minisymposium, which we ran over at the Center for Naval Analyses (CNA) in November 1991. We had plenary sessions, and then we had six small working group sessions. What I wanted to do was to make the results instantly available to the community. I had a senior member, Clayton Thomas, lead a synthesis group. I had one individual for each one of the working groups, and I had a total of seven personnel for the synthesis group. They would meet at the end of each day, and they were crafting a briefing as we went along, so that at the very end, the last briefing was Clayton Thomas with the synthesis group, “Here’s what we did. Here’s what we found.” That became an article that went into the next *Phalanx*. Those were the results, instantly available to the community. I’m glad to see that has continued as a practice, but as time goes on, the natural tendency of things is to get more elaborate and become less effective. It would help if people would go back and read the results of the first synthesis group meeting in 1991. I have recommended it to people on occasion. They will see a way to do it that is fairly simple and straightforward and very effective. This can be found in the March 1992 issue of *Phalanx*, Volume 25, Number 1, titled, “Lessons Are Learned from Desert Shield/Desert Storm.”

With the demise of the DUSA(OR) office, I also inherited all of the international activities that Walt Hollis used to run, and the senior analyst reviews for the quality control and program review coordination within the Army. I created a full-time office for the international activities, with Bob Barrett and Sherry Palmer. We had a coordination meeting every Monday morning, and we went down the list of all of

the international meetings we participated in, sponsored, and what-not, including their status, just like the operations coordination meeting, so that we kept all of these events on track. We kept the participation up, and kept them focused on the things we needed them focused on. The major ones were with the UK, which was twice a year, home and away series. France, once a year there and here, same thing with Germany, same thing with Canada. And then there were still some residual Quadripartite activities, and some NATO activities and a few other things, we had to keep all of those on track. We also coordinated our MORS and Army Operations Research Symposium (AORS) activities too. There’s always a million things that need to be coordinated. They took care of that too. Bob did a fabulous job. Sherry did a great job as well, and she was telecommuting from Oklahoma and still is. Bob just recently retired.

Sometime along the late 2000s, the Chief of Staff, Operations wanted to divest himself of the Modeling and Simulation Management Office. He came to G8 and asked if they would take it, and G8 asked if I would take it on and manage it. I said, “Yes, if that’s what they wanted me to do.” So I inherited the Army Modeling and Simulation (M&S) program and their supporting activity of 40 people or so, and another building. I ended up with another building to run. I had two buildings on Fort Belvoir then, and CAA still does today. It was an old barracks building that was renovated as office space, not as a part of BRAC, but as a part of something else. Anyway, I got a fully renovated building. It was a great place for me to hide sometimes, because nobody could ever find me if I went over to the M&S building. They had plenty of empty offices there, because it was sized for a much larger organization than we actually put in there. But that took a fair amount of time and attention, and I tried to integrate it more in the support of analysis, because basically, I thought the whole M&S structure in the Army was ill-conceived to begin with and not well executed thereafter. It kind of took on a life of its own. It did require a fair amount of my time in my later years with CAA. But I think we might have done some good there too.

I also worked with Forrest Crain up in Army Materiel Systems Analysis Activity (AMSAA)

trying to create an Army Materiel Command (AMC) analysis agency comparable to the Training and Doctrine Command (TRADOC) Analysis Center (TRAC) at Fort Leavenworth. We wanted this to support all of AMC. We had some bureaucratic knockdown drag-outs in the headquarters, because there were parts of AMC totally opposed to doing this and were willing to fight to the death to prevent it. But it was such a good idea that it eventually happened anyway. It does exist in a form, not as elaborate as what we had in mind originally, but I think it will grow into that.

Mike Garrambone: Is that different from AMSAA?

E.B. Vandiver: It is "AMSAA Plus." AMSAA is still up at Aberdeen Proving Ground. But AMSAA Forward is down with AMC Headquarters in Huntsville, Alabama. It has absorbed some other related activities that are under AMSAA control. It's still AMSAA, but it's getting very close to the thing we had in mind. It's not quite as big as what we had originally wanted, but it's growing. They didn't change any names; it's still AMSAA. He's got a nice little office down there in Huntsville that provides support to them as a conduit and it does all kinds of good stuff too. That's where retired Colonel Chris Hill works. Forrest hired him to run that organization. Forrest was stealing other people from CAA to go down there. Now that Forrest has CAA, he doesn't have those people; now they belong to AMSAA. But we're all in this together, so it's okay.

In the last couple years before I knew I wasn't going to work too much longer, I tried to summarize what I thought I'd learned about different things. In 2007, I was asked to go to the International Symposium on Military Operational Research (ISMORS) in England and give the Ronnie Shephard Memorial Address. This is a formal invited lecture, the only one I've ever given, a named lecture. It was to be published too, so I wrote it. Normally I just do briefing charts and talk to them without writing text. I wrote a text for this one. I went through 33 drafts on this, all summer of 2007 out on my back deck, reading this thing out loud with the birds squawking at me and squirrels throwing acorns at me, telling me to stop, because if you're going to read a speech, it has to sound

right. The only way to get it to sound right is to read it out loud. The last 10 or 12 of these drafts were tweaks, to smooth out the transitions and make it sound right. But it was done.

We went to the ISMORS and it was at a stately English mansion out in the countryside down near Portsmouth, which had become a convention center, a meeting center. It had buildings to live in and it had the old manor house and meeting rooms and a pub. It had another building with an auditorium in it. Mike Bauman went along; he said he was going along to heckle me, but he actually went along to provide moral support. I was glad to have him there. There were a lot of young analysts from European countries, and a lot of them were young women, especially from the Netherlands and Scandinavia and Germany. When we would have our happy hour at the end of the day (at 5 o'clock they opened the pub), Mike and I would get our beers and go out on the patio at this table to drink them. A flock of these young ladies would come sit around us. Bauman said that originally he was convinced it was because we were babe magnets, but then it dawned on him that the reason they were with us is they felt safe. We're a couple of old grandfathers, and they had all these other guys around that were trying to hit on them. They were safe with us.

Anyway, I did give the talk. I had given another talk too. I gave my "A Deployed Analyst in the Vietnam War" talk, which was very well received too, just as a regular presentation. Then I gave this one at night, and I prepared for it by drinking some wine at dinner, so I think that greatly contributed to the animation with which I read this thing. It went over fairly well. It is published in its entirety in *Phalanx*, Volume 40, Number 4, in December 2007, so people will know "what did you learn out of all your career in analysis." Well, I refer them to that; a lot of it's in there. The title of it was "Keeping the Operations in Operations Research." You've heard that all through everything I've said here.

I did another briefing for a G8 management planning conference. This was around 2010, because we're coming out of Iraq, we're really drawing down fast in Iraq by then. People were talking about reshaping the Army for the future, and there was a lot of talk from the new

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administration about getting rid of all these useless overhead organizations and having nothing but warfighters left, and blah-blah-blah. In 1992, we had faced the same situation in the draw-down at the end of the Cold War and the Gulf War. In June 1992, the Chief of Staff of the Army, General Gordon Sullivan, held a summer study up at West Point for a week. There were three groups: one looking to the past, one looking at the current state of the Army, and another one looking to the future. I had the futures group. I wasn't supposed to, but the person who was supposed to couldn't come, and I was his second choice, but I got it. I had a room full of some of the Army's wild men and wild thinkers. I was locked up with them for a week, and we figured out, all right, now we can't make any kind of guess about what the future is actually going to be. You don't know that. But we do know the Army is going to get smaller, so what we can do is, we can talk about what to keep and what to discard. That's what we did. We started with the Army as big as it was, and we started coming down. We would come to break points, and we would say that, okay, at this level, the Army is capable of doing this. Then go to a lower level, now the Army is capable of doing this. All the way down to almost zero. So when you get to the absolutely irreducible minimum, at some point in there, the only thing you can keep is the institutional Army, which has the ability to create forces when you need them. This is that "worthless overhead" stuff. That's actually the most essential thing in the Army. We made a very convincing case about all of that. Flash forward to 2009 or 2010, whenever it was, and we're hearing all the same stuff again. "We've got to keep the warfighters and get rid of all this useless overhead." So I called up to the War College, to the historians up there, and got hold of Hal Nelson, who had been part of the history group when we did this. I said, "Hal, I need the report from the 1992 summer study." I had it within two days, a complete Xerox copy, they had sent to me. I built a briefing for G8 about, "Okay guys, here we go again, and here is a different way to think about this." I created a simplified version of that, kind of updated, and I gave it to the G8, and ended up briefing it all over the place, to almost everybody and his brother. I think it did a lot to stop this "Well,

we've got to get rid of all the useless overhead stuff and keep only the warfighters." I'm kind of proud of what I did on that. Then I retired.

Bob Sheldon: What have you done since your retirement? You didn't just kick back and take a long nap?

E.B. Vandiver: I retired in November 2012. Mike Bauman announced early in the year that he was going to retire, and that after he was gone, it wasn't going to be any fun. I kind of agreed with that. So I went to his retirement in May or June at Fort Leavenworth, and then he came to mine in November. We both went out at the same time. I had a few residual activities at CAA, but they petered out pretty quickly. I did get set up though to continue with CAA as an unpaid Army volunteer as the CAA historian. I have an office jammed full of papers and notebooks and stuff, so I actually pretty much hold the CAA historical archives. I also look after the CAA museum. I have several projects there. I still run the staff rides to the Civil War battlefields; I do two of those a year: The Wilderness and Spotsylvania and Chancellorsville. I've given a few lectures here and there, on one thing and another. When I'm there, I have a lot of people come by who just want to talk with me. I counsel a number of other people also. But I try to stay out of Forrest's hair, try not to meddle in the management of the place. I do better at that now than I did early on. It's not easy letting go after 28 years, and I was pretty disoriented for the first two years, but I got over it. I am thoroughly enjoying not working. I have not been paid a dollar by anybody for anything since, so that's good. I did have a special briefing I wanted to put together for people that encapsulated a lot of thoughts I had on strategic thinking and long-range planning and the value of those. I've done that, and I've briefed it around some, still give that to people now and then. I think it's a pretty nice piece of work. I would like to give that at MORS sometime, but I don't know where it would fit in. It ought to fit in someplace.

Bob Sheldon: Speaking of the Civil War, I read *The Fateful Lightning: A Novel of the Civil War*, by Jeff Shaara, and there was a part involving a character named "Vandiver" who fought under Sherman. Was this Vandiver real or fictional?

E.B. Vandiver: MG Vanderveer was real and possibly a fifth or sixth cousin. He was originally from the Vandiver homeland of Maryland/Delaware but had moved to Iowa and became a politician. Wikipedia has a good bio. There is another General Vandever in the Western Theater of similar background, but he didn't go with Sherman's gang of war criminals. Every family has black sheep.

Getting back to current day, we've got the 50th anniversary of the CAA coming up in 2023, so that's not that far away. I'm going to write a short history of CAA. I have in mind about a 20-page pamphlet, really succinct, that they could use for new people, new hires and things like that. And then I've been involved with the history of MOR in the Army, of which we're going for the fourth volume now. I'm trying to assist with that. So those are the things I still do with the Army.

With MORS, I still do what people ask me to, like Mike Garrambone and his wargaming group. I do go to the symposia, but mostly I just go to the Past Presidents lunch, because I get a free lunch out of that one. Sometimes I go to the Board of Directors dinner, just for fun. I don't do very much in MORS anymore, but I do like to do a few things. I really do like going to the Past Presidents lunch.

Mike Garrambone: How does CAA keep its history?

E.B. Vandiver: The main way we keep it is with the annual report, which is extremely valuable and which they have fallen down on since I left. That is one thing I do go harass the management about, and that is being corrected. When Dr. Shrader did the history of MOR, I just took out whichever volume he was doing, then took out the annual reports for that and said, "Here, take these. And bring 'em back." And he did. I actually wrote a couple of the appendices in one of the things. I was the only one that knew the history of the AORS, so I wrote all that stuff and got that part all documented. How does CAA keep their history? The CAA annual report is the main thing.

Mike Garrambone: The RAND Arroyo Center is affiliated with the Army, but I have no idea how.

E.B. Vandiver: It is the Army's analysis Federally Funded Research and Development

Center (FFRDC), like CNA is for the Navy and RAND Project Air Force is for the Air Force. That's the short answer.

Mike Garrambone: Do they get their work from you?

E.B. Vandiver: No. It comes out of Headquarters Department of the Army. They're supervised out of Army Program Analysis and Evaluation (PA&E), which is part of G8. They're an FFRDC, so they have a line of money, and so many professional man-years. They propose things and the Army proposes things. But that's all run out of a different office.

Mike Garrambone: You have made a point several times about the data. I think your comment was, "It's not just out there sitting on the ground."

E.B. Vandiver: There are a lot of misconceptions about going to get the historical data. People think of it as on a bookshelf somewhere, and here's the historical data you want in volume so-and-so, of this year, this one. It doesn't exist that way. There is no such thing. The historical data, if you want to go to it, it takes a lot of work on the part of historians and analysts to put it in a useable form—particularly analysis data. You have to build it as you go along. But for just the history itself, you've got the Chief of Military History, you've got the Army reports, and that's where the data are. And it has to be extracted for any particular question or thing you want to research. But again, there are a lot of misconceptions about data. Like on current operations, I'd say, "Well, what did we do about this?" And people would tell me, "Go down to the Army Operations Center. They keep all the data down there." No, they don't. They keep it for two years and throw it away. So no, they don't have any idea what happened five years ago. People that are doing current operations are doing just that. They're doing current operations. They don't care about anything that happened before. Saving history is a never-ending job. It's very difficult.

Bob Sheldon: When you were the MORS Army Sponsor, you were a zealot for oral histories. What are your thoughts about the value of capturing oral histories for MORS?

E.B. Vandiver: Everything is new and nothing is new. Everything is the same and everything changes. The more things change, the more they

are the same. People dealt with these problems before. They were as smart as we are. They were as experienced as we are. They didn't know what we know. The world had not done the things that have been done since. So there is a lot to be learned by a looking at the experience of others. I think the oral histories are basically our best way of capturing the history of MORS. I've encouraged the program in MORS. I have arranged for people to be interviewed. I have suggested people to be interviewed, so that we get different facets of analysis brought into it. Some of the guys we would not have thought of otherwise. They were not big movers and shakers in MORS, but they had very valuable experience in analysis, and they bring a different view of things. The body of oral histories we've got built up now I think gives us a pretty good history. You know, that's the data! That's the data! If you want to write a real history of MORS, a narrative chronological history, read all of those oral histories of the people that were there around that time, what was going on, what did they think about it at the time.

Mike Garrambone: I'm looking at the history of an organization, and I'm wondering, "Why doesn't every organization have a history person?"

E.B. Vandiver: Yes, you need a historian, but it doesn't need to be a full-time job. Somebody ought to have that responsibility.

Mike Garrambone: Are you talking about an OR historian?

E.B. Vandiver: I'm talking about any organization. You need to record your history. I have been very active in the church since I retired. And I don't know how many times the issue comes up about something, and someone will say, "Well, we tried that way back when." Well, who knows about that? Well, so-and-so has a history of that. So that we try to figure out what was done back then, because we don't have a really good history of that. So we're always trying to figure it out. The church building has sat there on the same piece of property now for 52 years, and there's only one person that kind of knows everything about everything was ever done with the building over time. I don't know how many times, every meeting we have spent trying to figure out, "What happened before?" If you have a proper history

program, you're recording things as you go along, with just simple logs and journals, it just makes all the difference in the world. You can go back and figure out what has happened. Annual reports are a good way to do that. So if you've got somebody that's in charge of doing that, knowing they're going to have to do that, finish that annual report at the end of the year, will have some motivation to make sure that feeder material is collected, done during the year. But we had a lot of systems in place to do that, if you did it as you went along. The key to having a good history is good record keeping.

I created a museum to keep people from throwing stuff away. That museum is now one of the coolest collections of junk you've ever seen in your life. I have some of the only view graph projectors left in existence anywhere in the Army, and most people will say, "What's a view graph projector?" Come to my museum; I kept three of them. And if anybody ever shows up with view graphs, we can project them. I also saved a 35 mm projector and our first personal computers (PCs). Some of those things are worth a lot of money. I've been working with the Army Museum System to make the CAA collection an Army Museum "holding," that it will belong to them, but it will be on our property, and it will be on their books, so nobody can come in here and say, "Who needs this old junk? Throw all that crap away." Which is what happens with stuff like that. But I've got some of the coolest stuff you've ever seen in your life. I've got one of the first Apple computers, and one of the first PCs they had at CAA, things like that. Anyway, that's another one of my projects as the historian. As a matter of fact, most of the things I've done since I've retired have had to do with history. I studied a lot of history in school. In fact, one of my minors was in history, which is pretty weird with physics and math.

Mike Garrambone: You have a Carl Builder room at CAA. What did he do?

E.B. Vandiver: Carl Builder was a very well-known RAND analyst. He was famous for being a very creative, out-of-the-box thinker. I knew him well when I was working in the Army Headquarters. When I became the Director of CAA, I started a program for distinguished visiting analysts, where I would bring in a top analyst from somewhere else to spend the year

with us, and they had to go to the ARBs. It was a part of my trying to broaden people's perspectives. The first one was Carl and he spent a year with me. I gave him a project on "How does the Army play in the development of strategy?" What he did was he used that to develop his concept of service cultures and wrote a report for me, which he turned into a book that was then published commercially. It's in several different versions and studied in the war colleges, and things like that. Carl Builder was a Naval Academy graduate of the class of 1954. He had a brother named Jim Winnefeld. Their mother had remarried and one of the brothers kept their father's name and the other one took the stepfather's name. Jim Winnefeld retired as a two-star admiral; he was Carl Builder's brother. Jim Winnefeld's son was recently the Vice Chairman of the Joint Chiefs of Staff (JCS). He did not go to the Naval Academy; he went to Georgia Tech, and is a fraternity brother of mine, my social fraternity, Pi Kappa Alpha. The Winnefeld who just retired as the Vice Chairman was Carl Builder's nephew.

Within my distinguished visiting analyst program, I also had Jerry Bracken from the Institute of Defense Analyses (IDA) for a year. I had Allan Rehm, the Soviet OR expert, come for a year from CNA. I had Richard Darilek of RAND come for what was supposed to be a year, and then it was going to be another year, then he left halfway through it. He was the last one that I had. I ran out of money to sustain the program. I couldn't keep it going. But that was one of the things that I was doing. When I got to CAA, I thought it was way too parochial. They needed to learn more about the bigger world. So that's who Carl Builder was. If you guys ever see the younger Admiral Winnefeld, he doesn't know any of that. I have not come across him, and I was trying to make contact with him but I never got around to it. I want to tell him about that, and bring him to CAA and show him the Builder room named for his Uncle Carl Builder.

Mike Garrambone: Do you ever have old guys come to the building?

E.B. Vandiver: Oh, yeah. We actually have an old guy's lunch once a year. Now we've kind of institutionalized it, making it the first Friday in November. It was November 6 last year. We decided to just always do it the first Friday in

November where that kind of works out, and we'll see how that works. We had nine or 10 come, some retired for a long time, some of them barely dragged themselves there. And we had others that wanted to come but couldn't. So we get together once a year. I'm going to try to keep that going for a while.

Mike Garrambone: I recall you modeled a famous historical battle in one of your models at CAA. What was the battle and model and what did you learn from this? (I really liked this approach and used it to choose "Drive on Metz" for wargame training)

E.B. Vandiver: We had Trevor Dupuy build a detailed historical database on two World War II battles: The Ardennes on the Western Front and the Southern Side of Kursk on the Eastern Front. We simulated the Ardennes Campaign in the Concepts Evaluation Model (CEM) theater simulation and compared it with the historical campaign. Some aspects matched well but others were different. We analyzed what was causing the discrepancy and modified the modeling to create a more accurate representation. We intended to do the same with Kursk, but current wars got priority and it wasn't done.

Bob Sheldon: What are your thoughts about how the MORS Board of Directors has evolved over recent years?

E.B. Vandiver: I'm afraid that because of the conflict of interest provisions, we no longer have the kind of Board of Directors that we used to have. If you get a government person in there, they have to take leave in order to participate, which really curtails their participation. As a consequence, we've had far more academics and contract people available because they will be supported by their institutions. The MORS oral history program is aimed at getting a history of MORS, but more broadly, it tries to get a history of "here's what was happening in OR at the time." And with the loss of a lot of the government people on that, you're losing that latter aspect. So you'll still get a good history of what's going on in MORS, but you won't necessarily get a history of what's going on in OR. We had a little bit of that problem in the beginning anyway, because we weren't getting people who weren't really very active in MORS but were very active in the community and added a different dimension. That's why I

recommended the ones like Ed Kerlin and John Shepherd and a few others. I don't think most people would have thought to interview them for the program. But they give a very valuable and different perspective.

One time on the MORS Board of Directors, we had the heads of almost all the major analysis organizations. It was the most efficient Board we ever had. People who are used to doing things say, "Let's go down the agenda and get this thing done." We would have one-day Board meetings. When I first came on the Board, Marion Williams was still the MORS President. It was his last time, and we had a two-day Board meeting. It consisted primarily of pole vaulting over the mouse turds. If you have two days to talk about things, and you have people who don't really have much responsibility for anything, they're quite willing to talk for two days. But when we had a Board in the late 1980s that had people that were used to running things, we would finish even before the day was over, and then head for the bar. Very efficient. Now you've got a lot of academics on there, so that's even worse. The more you have people that are not responsible for anything in the real world, the more they like to come to things like this and talk. I understand that Board meetings are two-and-a-half days now. There's nothing I can do about that. That's just a complaint. The agency heads can't do this anymore. And Forrest Crain, he's the MORS Army Sponsor, so he can't do anything. You can try to get to the senior people, even though we don't have that many senior people anymore in analysis. But if we did, they probably wouldn't do it, because they couldn't take leave to go do all these things.

Bob Sheldon: We could dig out the historical data, because we have you as an example of serving on the Board of Directors and President of MORS. Were you voted in as a Fellow before you became the Director of CAA?

E.B. Vandiver: I became the CAA Director in 1984 and was inducted as a Fellow in 1995. I was a MORS Fellow long before I became a MORS Sponsor in 2006.

Bob Sheldon: So by the time you became a Sponsor, you knew what was going on in MORS?

E.B. Vandiver: I had been on the Board for 12 years, two terms and then the officer years, and

then Past President, and Advisory Director. I had been on the Board 12 or 15 years before I stopped doing that. So I pretty much knew everything about MORS by then.

Mike Garrambone: But you had a window of time and you had support, so you could do those kinds of things. Participation was allowed back then.

E.B. Vandiver: It was not only allowed by the Army, it was encouraged. But then the conflict of interest provisions got stricter and stricter and stricter, and you just couldn't do anything after a while.

Bob Sheldon: This past Saturday you went to a memorial service for John Shepherd. We captured his oral history. John is one of two data points I know where an Army Operations Research/Systems Analysis (ORSA) had training in tap dancing, and the other is you. Can you talk about your tap dance training?

E.B. Vandiver: It was actually very little. For some reason, this memory is so crystal-clear. I can recount the whole episode. My sister and I were home alone in the summer of 1945 because my brother had polio. He was at Baptist Hospital in Memphis, Tennessee. We had a housekeeper who came over and fixed our meals and spent the night. But the rest of the time, my sister and I, we just ran around town together. She was five years older than me, and I was not quite seven and she was 12. I went to her piano lessons. I went to all her lessons in this, that, and the other. And one of them was tap dancing. I can only remember this one time. It was just crystal-clear, this big old two-story Victorian rambling frame house, center hall with stairway going up one side. On the left-hand side was the room that they cleared for tap dancing, and they had a table at the far end of the room with a wind-up Victrola on the thing with the big horn. I got to wind the Victrola, because it was only good for one record, one song. Then you had to rewind it. There were coat racks in the hall, and there were benches in the hall. And they were in there doing tap dancing. Lots of people back then took tap dancing. It was a very common thing for boys and girls. Of course, everybody wore taps on their shoes anyway to keep from wearing them out. When the lesson was over, my sister wanted them to try to teach me some steps, so

they did. The instructors were named Finney, a man and a wife. They taught the class and they taught me three or four different steps, which I learned, and which I would do sometimes later at home. My sister would make me line up with her and do these steps together. So now that's about the extent of it. I said I had very little, it was not much training. But there was a little bit of practice. I could have done it, but I really wasn't that interested.

Bob Sheldon: You weren't like John Shepherd who had tap and ballet?

E.B. Vandiver: No, I had no ballet but I did go to my sister's ballet classes too. She was always going around the house walking heel to toe and carrying a book on her head. And she can still walk all the way around the mall heel to toe, and I can't walk across the room that way. Because it's one of the exercises I have to do at therapy for balance. I can't get across the room.

Bob Sheldon: That background in tap dancing was useful later on in the Pentagon?

E.B. Vandiver: That, and many other skills.

Bob Sheldon: You said you had some stories about Gene Woolsey.

E.B. Vandiver: Gene Woolsey was one of the great actors of the Century—of any century. And, like many great actors, he had horrible stage fright. You wouldn't think so. But he did. He was the dinner speaker at the AORS, when Dave Hardison and CAA was putting on the symposium, sometime in the late 1970s down at Fort Lee. I was given the mission of escorting Gene Woolsey, which was pretty fascinating because he had lots of stories to tell. But he couldn't eat dinner. He couldn't eat a thing. I sat with him through dinner. When it was time for him, he got up and did his act. He would lay down on the floor, he'd jump up in the air, he'd climb up on the table, he'd scream. It was a fabulous performance. Then as soon as the thing was all over, and we would all go downstairs to hang around and drink, I had to take him out to eat. I took him to a restaurant downtown, and he had a giant steak. This was like 10 o'clock at night. He had a giant steak and he wanted to stay and talk. I had to go to bed sometime, but I was told to do whatever he wants to do. Finally, about 1:30 or 2 o'clock, he said, "Well, that's good enough. Let's turn in." So I took him back

to his place. I don't think anybody ever knew about how much he had stage fright. He just had a terrible stage fright. But I understand that's very common in the really good actors, and that they're always like that, no matter how many times they do it.

Bob Sheldon: You said there are many Army ORSAs who studied under Gene Woolsey.

E.B. Vandiver: Oh, yes, at the Colorado School of Mines. He was in economics or something like that, but had a strong OR flavor. I think you know many of the people who had his program, where people had to go out and get a real job with somebody and then actually improve their process. Judy Grange is the one I remember the most. She went to work in a machine shop. She learned how to run a drill press and a lathe and a milling machine and all that. Then she did a model of their workflow and showed how they could make it more efficient. She implemented it and it made money. That was one of the really good ones.

Gene Woolsey would call me up about every other year. "Van, I've got somebody you've got to take. This is the best student I've ever had." I said, "Okay, what's his name?" He'd give me the name. I said, "Okay, I'll put the request in." Everybody wanted to try to get the Naval Postgraduate School (NPS) graduates. So if I asked for one from Colorado Mines, they said, "Sure, you can have him." So then I had one. And then two years later he called, "Van, I've got somebody even better than last one." "Okay, what's his name?" I got him and sure enough, he was very, very good. The first one was Patrick DuBois. The second one was Bill Tarantino. And then he called, "Van, I got one you've got to take. He's better than any of the other ones." Every one of them is better than almost anybody. "Alright, I'll take him." He's the deputy here now—Steve Stoddard. He was the last one. I never heard from Gene again after that. Of course, we're getting old, and I understand he got sick. You know he was quite independently wealthy. His family owned huge ranchlands outside of Denver. He could do anything he wanted to, and he did. But those are my Woolsey stories. He loved to say outrageous things about how he loved police states, fascists, cops ought to just shoot the criminals down in the streets. But I mean, I think he just said that

for effect. On the other hand, he may have actually believed it too.

Mike Garrambone: I want to take you back to wargaming. It's certainly in vogue right now. A lot of people are funding this as a mechanism to generate innovative thinking, and there are agencies now tagged to make things happen in wargaming. You were into wargaming before wargaming was cool and you brought it to CAA. What are your thoughts about that?

E.B. Vandiver: I started in wargaming back in 1964, right here at Fort Belvoir with the Combat Operations Research Group (CORG). I was in the wargaming division with Bill Archer. It was my Deputy Markowitz who actually wanted to bring it back to CAA in the 2000s. Of course, I certainly agreed, because we had problems dealing with certain issues in Iraq that we didn't have any way of analyzing. If you have no other way on earth of dealing with a problem, wargaming is good way to try to get into the problem. We did a lot of wargaming during Iraq and Afghanistan and it stood us in very good stead and then we extended it to parts of Africa.

The primary use for it now is in front end analysis. "What is front end analysis?" OSD and JCS like to come up with planning scenarios. We want the Services to go to country X and do this, that, and the other. These are the kinds of forces you can have to do it—so many divisions, so many wings, so many ships. That's the scenario. So now let's go run it in the models and generate the detailed requirements. That's a hell of a big step from that sketchy scenario to the input data it takes to run the theater combat model. Front end analysis is the way you go from one step to the other. It is a wargame you use to design a campaign. Now you have to decide how we're going to flow the forces into the theater, where we're going to send them, what are the objectives we're going to establish over time, which forces are assigned to accomplish which tasks, how are we going to support this, what is the logistics support concept for each phase of this operation over time and in space. You work all that out in a wargame. Then you can take these ideas and put them in a combat model, run the thing, get the losses, the consumption, the movement. And then from that you can compute all of the logistics

requirements. It's a very elaborate process, but it's also very systematic and very logical. When you're done you can explain—the reason why we needed 15 truck battalions to support this thing is because of the amount of stuff that has to be moved, the distance it has to be moved, and how it supports the fight. And that works all the way back to the source, so you have an exact audit trail for every unit. The same thing is true of Total Army Analysis (TAA), which is why our requirements hold up so well in OSD. We can explain why we need everything, unlike some other Services that come in and pound on the table and say, "We need it because we need it."

Bob Sheldon: Did you bring in a lot of warfighter analysts and warfighter subject matter experts for the front end analysis?

E.B. Vandiver: Dave Knudson, the gent with the long scraggly Civil War style beard, ran the wargames for a time and now does technical support for them. He was here in CAA earlier as a captain and then a lieutenant colonel, and then a colonel, and then a GS-15. He's still here as a GS-15. He's one of these guys that found a home at CAA. We've got a lot of those here. I was up at a director's meeting the other day (I just went in to harass them) and I looked around and every one of the military there had been in CAA as a captain or major. They keep coming back.

Dave Knudson would bring in all kinds of people for these games. He brought in the Joint Staff, he brought in people from the command that will actually have to carry the thing out, from all the Services, and he crammed them all into that little wargaming room up there, which I think is a major health hazard, but that's a different issue. I think they finally put in enough of an exhaust fan to where it gets tolerable now. I had the wall moved out five feet and modified the thing before I left. Actually I didn't; I had the plan put in place, and then they did it after I left. So yes, we bring in all the players. It isn't just the Army doing it. We get everybody in. We're going to implicate everybody in the crime.

Mike Garrambone: So you use wargaming in your front end analysis? How is the sequence formed?

E.B. Vandiver: The wargame is a structured walk-through of the operation, phase by phase.

It is conducted as a wargame, because you adjust it as you go along. You can say, "That doesn't look like a very good idea. Let's try something else." For any kind of operation, you can usually come up with two or three pretty good concepts of the operation. So you play those and compare them to each other and you end up picking one, which may be a new combination. You may come up with another one in the course of it. Anyway, that's front end analysis.

On some of the smaller operations, where you don't want to set it up to run in a theater model, the wargame will be the whole analysis. And then you won't do a troop list for the thing, although it has been done in some cases. You do a very simplified, kind of TAA calculation of the logistics structure and consumption and other requirements. So if they're small enough, the wargame can be the whole thing. But if it's to be put into a theater model, then it's the necessary step in order to set up and run the theater model, and then hit the postprocessors.

Mike Garrambone: You were talking about employing theater models. I know that you built some of your own tools at CAA. How did that come about?

E.B. Vandiver: There is a long history of that. The whole history of the theater models at CAA begins with ATLAS (A Tactical, Logistical, and Air Simulation), which was built by the Research Analysis Corporation (RAC) for the Army Strategy and Tactics Analysis Group (STAG), which was the predecessor organization to CAA. ATLAS was based on the original theater combat model played at the Army War College. It had a front line between the opponents and then it had assigned warfighting sectors. The forces fought in the sectors and the front line moved. Over time, these things were derogatively called "piston" models, but there wasn't anything better at the time. So that's a later criticism. But it was very limited in the things it could do, and the assessment mechanism in it was based on World War II experience, which got increasingly out of date. It was okay originally. If you've got experience, you use it. If not, you use something different. So you come to the early 1970s and the Army wanted to do a study called the Conceptual Design for the Army in the Field (CONAF). John

Shepherd talked about this in his MORS oral history. That required a theater model that was more flexible than ATLAS. So RAC was tasked to build that model. Phil Louer was the project manager and John Shepherd was his primary programmer on the thing. They set out to build it. Then in the early 1970s, the Army panicked and withdrew the funding for RAC. Congress assaulted the federally funded research and development centers (FFRDCs), although at that time, they were called federal contract research centers. Only the Army panicked and got rid of theirs. Nobody else did. The other Services just hunkered down and rode it out. But the Army panicked and got rid of RAC. The residual program passed to a contractor, General Research Corporation. Then about the same time, CAA was stood up, and it subsumed the old STAG, and in fact was stood up in their old building on Woodmont Avenue. So the CONAF model then transitioned to CAA. This is what John Shepherd was talking about. After a while it was renamed the CEM. That's the origin of the CEM. The CEM lasted for some 20 plus years or more. Then, "everybody" said, "It's almost 20 years old. It's an antique, rusty and moth-eaten." Nonsense! It was a different model every few years. That's the kind of criticism that comes from total ignoramuses. But we heard a lot of that. And there are more than a few ignoramuses around, as you may have noticed.

Then we had the RAND Strategy Assessment System (RSAS). They were building a theater model that became JICM. It had very flexible features. It did not have rigid sectors. It ran on a network format, rather than a set of rigid sectors, and it had a lot of other desirable features. So I put \$2 million or so into bringing it up to standard and doing validation so we could use it. And some version of that is what's being used today.

We retired the venerable model CEM, but in the meantime, we had also built the Force Evaluation Model, which was a more advanced version of CEM, but it was far more complicated, data hungry, and didn't provide much of an advantage over CEM. It was used in the late 1980s for a few years.

Mike Garrambone: And these were all theater-level models.

E.B. Vandiver: Yes. These are all theater-level models, and they were all primarily designed for NATO versus the Warsaw Pact environment. I think we got pretty good at modeling that, showing how that war would go, based on all of the very happy assumptions that were being made. Although people suddenly started getting more realistic about that when a book came out—*The Third World War: August 1985* by General Sir John Winthrop Hackett—which verbally played out a scenario. That was a real eye-opener to people about “This is what would happen if we actually had to do one.” Everyone thought we’re never really going to do this. This was all sort of fiction, and the plan was we’ll fight like hell for three or four days, and then we’ll blow up the world. This was the strategy at the time: mutual assured destruction. We’ll fight like hell and give it the old college try, and then we’ll blow up the world. Then people began to think, “Maybe that’s not such a good idea. Maybe we ought to actually be able to fight them to a standstill, and then not blow up the world. That might be a better idea.” So we got serious about studying NATO and bringing in new capabilities, and we did hugely increase the capabilities. Especially during the Reagan administration, we really poured money into it. Of course that was part of the Reagan strategy, to spend them into the ground, which apparently was done with some success.

Mike Garrambone: We’re wrestling today with the difference between a campaign-level model and a theater model.

E.B. Vandiver: That’s a distinction without a difference. All theater models represent campaigns, but maybe several campaigns in a theater too, not necessarily just one campaign. In some theaters, there’s only one campaign. So it’s really just an artificial distinction.

Bob Sheldon: Getting back to history, you sponsored some history books on the history of Army ORSA written by Reg Shrader. Now there’s a follow-on version of that being worked by Dr. Shurkin from RAND. What are your thoughts about catching Army ORSA history?

E.B. Vandiver: Actually Walt sponsored the three volume *History of Army OR*. I was a major participant in it. I identified source material, people to talk to, and recommended them to Reg Shrader, an excellent professional historian.

Walt asked the Chief of Military History to do the history. The Chief of Military History said, “We don’t have anybody that can do this, but we can hire somebody to do it.” Walt said, “Okay.” So they contracted and hired Reg Shrader, whose specialty was actually the medieval church. But he was a superb historian, a professional historian. I think I was probably the main source for providing historical material, things to look at, people to interview. And I wrote a number of the appendices for some of the books. I wrote the history of the Army OR Symposiums (AORS). I did the research and wrote that piece, because I know how to do historical research too. I reconstructed the whole history of AORS, which was something of a job. In fact, there’s a funny story. The first AORS they had, they took almost verbatim notes of the thing, and the minutes are very long and very thorough, and they explain exactly why they did it, who was there, and everything that was said. And then at the end of the thing, they had a big discussion about, “Well, should we have another one of these?” They all agreed that, “Well, there’s probably enough material for one more. But then that ought to do it.” That was sometime around 1962 and it’s still going. It’s just like the MORS Education and Professional Development Colloquium, which I thought was a one-time thing when I first did it in 1986, and it is still going on.

Mike Garrambone: I am going to the MORS 2017 Education and Professional Development Colloquium at Annapolis tomorrow. You started it and I’ll be there for the 32nd EPD. I believe the Colloquium idea took.

E.B. Vandiver: While I was MORS Vice President for Professional Affairs, I thought it would be a good idea for those teaching OR and other related disciplines at the various academies, graduate schools, and civilian institutions to discuss their curricula, training interests, and programs at a MORS sponsored gathering. I was also interested in what the analytical agencies had to say about what they wanted graduates to know when they arrived on the job. I had no idea the Colloquium would catch on and continue to be an annual program with the planning requirements and status of a MORS special meeting. It is good to see that it moves each year among the educational institutions

and that it now includes student presentations, career field discussions, and special topics such as deployed analysts, useful analytical tools, and educational opportunities.

Bob Sheldon: Will there be any difference in the flavor of the ORSA history book being written now compared to the other three volumes?

E.B. Vandiver: That remains to be seen. Michael Shurkin is a very good professional historian. He listens very well; he's very attuned to our concerns in portraying things. I provided him all the source material that I know of, and recommended all kinds of interviews for him.

Mike Garrambone: Do you think the historical material is out there to be found?

E.B. Vandiver: In some ways, yes; in other ways, no. Because so much stuff takes place electronically now, it doesn't necessarily leave a lot of tangible records. This volume covers the period from 1995 to 2005. You don't want to go too close to the present, so it may be 1995 to 2010. I'm not sure of the exact time frame. You don't want to get it too current. That's why we cut off at 1995 in the earlier one, because the other stuff was too recent.

For CAA, I made sure things got documented. I've got my history of support to the theaters books. I think you've seen those. I made everybody document their tour of duty in Iraq and Afghanistan, kicking and screaming, by the way, and I kept all kinds of other records, particularly in the annual reports and the annual State of the Agency address, very pompously named, every fall. To let you know how much a creature of habit I am, I did the first one in 1992 and the last one in 2012, and never changed the format. It was kind of good, but I would add stuff and take stuff out, make some parts more elaborate or less elaborate. But each year's had the same shape. Here's what we did last year, and here's what we're going to do next year. The first thing we worked on was the Army's most important problem. What were the Army's most important problems for that year? Well, they are listed. Then you can go from that into the annual histories and find the projects that are actually related to that project. For CAA, it was very well documented. For other agencies, Shurkin tells me he's had difficulties in that some keep better records than others.

Bob Sheldon: Such as AMSAA and Leavenworth folks?

E.B. Vandiver: He's been dealing with all of those. But I don't know what he's found or what he's doing with that material.

Mike Garrambone: In a similar vein, where would you look for research done by the early agencies, like the Operations Research Office (ORO), CORG, and RAC? Where do you find the studies they did?

E.B. Vandiver: They were all archived. They are all in the Defense Technical Information Center (DTIC), or whoever DTIC is today. And they were all archived in the Defense Logistics Studies Information Exchange (DLSIE) at Fort Lee, Virginia. They were all archived in all of those repositories. When I was still working at CAA, people would occasionally ask for some old CORG study. They would call it up, print it, and send me a copy of it, at some expense. If they're all still there, I don't know. The ORO and RAC studies, they were all archived too, when RAC went out of business in 1973.

Mike Garrambone: But these are not solely logistics studies, are they?

E.B. Vandiver: No.

Mike Garrambone: They're any type of operational study or maybe even a unit history.

E.B. Vandiver: Unit histories are a different genre altogether.

Mike Garrambone: Maybe I'm thinking about organizational origins or background.

E.B. Vandiver: Every agency in the government is supposed to file an annual history with the Chief of Military History. Some do; some don't. They're kind of sketchy. I would just send them my annual report and say this is mine for the year, and that was quite adequate. But I remember when I was on the Army Staff; we all had to put in input for our annual history that went over to the Chief of Military History. I don't know what they do now.

Mike Garrambone: You did a lot of interesting things here, but sometimes you did independent in-house research. Can you tell us about some of those?

E.B. Vandiver: One of the things I did at CAA back in the early days was to establish a way for people, who said they had these great ideas for doing research that nobody would ever let them do, to get it done. What I did was establish

a CAA internal research fellow. Now you will be relieved of all duties other than this project for however long you think it's going to take, up to a year. You have to submit a proposal—a description of what you're going to do, what it's going to produce, and why you think it's useful. At the end of the thing, you have to produce a report and give a briefing on it. The first one was by Dr. Bob Helmbold, who wanted to do something on combat movement rates. He did a giant compendium of everything known about movement rates of forces in warfare. It was very useful in formulating how we represent movement in theater models. That was the first one. And then there were several others after that. (Bob Helmbold later retired and moved to Arizona, and has never been seen since.) Some were useful; others were really not. After a few years, nobody applied for independent studies anymore, so that was kind of that.

Mike Garrambone: You might have fire missions too, and special assignments?

E.B. Vandiver: If we had an urgent need for something, we didn't do the research. We just dove into it. People have a bad habit of asking us to do things we didn't know how to do. There's two ways you can respond to that. One is, "We don't know how to do that." That's a good way to get your agency killed. Or, "We think we can do it, but it will take three years and you'll have to give us a lot of money." Well, that'll get you killed too. And the third one is, "Yes, sir!" We'll do something, and it may not be very good the first time, but it will be better later. So just dive in and do it. When we first went over to Korea, when General Robert RisCassi was the Commander in Chief (CINC, an older acronym used for a four-star combatant commander) there and the four-star, we had already started with his predecessor General Lou Menetrey, whom I had already known back in the Pentagon, doing an assessment of their Operations Plan (OPLAN), because it was 20-something years old at the time, and Lou thought that would be a good idea. We kicked it around. So we did the study at the very end of 1990, and in 1991 we went over to Korea to brief it, but now Lou had left and RisCassi was there. The day we got there was the day Desert Storm began. My family is still convinced to this day that I did not go to Korea, that I had gone to

Saudi Arabia for that, and they still don't believe me. But I can document that I was actually in Korea when that went down. Anyway, we briefed RisCassi on it and he was just totally fascinated with the thing and he said, "I want to use revising this OPLAN as a way to drag this command here and the ROKs into the modern era. So I want to do a whole new OPLAN. You've done this evaluation of the old one, and it's good. I want to look at a lot of variations and a lot of different ways to do things. Can you do that? And how long would it take?" I said, "Well, since we've already done this piece of work, I think we can have something for you in about 30 days, maybe a little longer. It depends on when you need it, and how much you want done." So we kind of negotiated that. What I found out later is he had asked his internal analysts to do this job, and they told him it would take nine months. He said, "Thank you" and never asked them to do anything else for him. The lesson is this: anything a three- or four-star general asks you to do, the answer is: "Yes, sir." No ifs, ands, or buts. They don't expect perfection. They just expect you to give it your best. That's the lesson I learned a long time ago. Don't argue with them; just say, "Yes." That also works for your marriage.

Bob Sheldon: Last time we were here at CAA, you took us through your museum. Do you have any new acquisitions in your museum? Are you looking for any?

E.B. Vandiver: I would like to get some new acquisitions, but I haven't been searching because I've been out with my legs since sometime last year I could barely walk. And then I got the knee replaced, and I'm just now learning to walk all over again, which is interesting since I think this leg is a little longer than the other one. I'm having balance problems, so the short answer is "No." But I'll get back to it one of these days.

Mike Garrambone: You never seem to work in a vacuum. Obviously, you have to work with OSD and the Joint Staff. What's that like?

E.B. Vandiver: It depends entirely on who's there. Most of the time, it works very well. There have been periods where it didn't work well at all. But only one that I can really think of.

Mike Garrambone: Is it a data thing?

E.B. Vandiver: No. We had a chief analyst in OSD PA&E, the head of the thing, that really didn't believe in analysis, for a period of time. It was a little hard to deal with. But other than that, we have gradually, I think, greatly improved the way the Services interact with OSD and the Joint Staff, primarily because of the Quadrennial Defense Review (QDR) in dueling analyses. The analysis we did for the 1996 QDR pretty well sank the OSD/JS analysis. So after that, they said, "No more dueling analyses," and they established the Analytical Agenda, which I thought was a great blow for sanity and rationality. They would standardize scenarios, models, and databases. Over time that has evolved and has become the standard way of doing things. They have that whole data structure up there now that is headed by an ex-CAA guy. There's all kinds of ex-CAA people up there running this thing. Then Tom Allen was the top analyst in JS for a long time, so of course we could work great with him. Years ago, it was pretty adversarial, but now I think it's fairly cooperative. Except we had that one bad patch.

Bob Sheldon: You talked about the Carl Builder room. What will be the E.B. Vandiver room here at CAA?

E.B. Vandiver: It's going to be the room next to Forrest's office, the little parlor room. I called it the parlor because it had a couch in it and I'd go in there and nap in the afternoon. I would entertain visitors in there and if I had a visiting three- or four-star and they needed a private place, I'd give them that room. That room served all kinds of purposes. I'm going to give them all my memorabilia and stuff, and they're going to coat the walls with it—including all my MORS stuff and everything else that I want to get rid of that nobody in my family wants. At least that will be my room for a few years until somebody comes along and says, "Throw all this old junk away."

Bob Sheldon: It will go to the museum at that point?

E.B. Vandiver: Who knows. Someone will say, "Get rid of all this junk." That's why I want all this to become a holding of the Army Museum collection. Then nobody can throw it away. I've already worked out the agreement with the Army Museum. Under a holding, the

artifacts are kept and maintained by an agency, but they are under the regulations of the Chief of Military History—the Museum branch of it. They can take parts of them and use them for themselves if they want to, or they can leave them right there. Whatever. But nobody can come in and say, "Throw this old junk away." I've got two or three view graph projectors in there. There's not a view graph projector left in Washington now that I know of. When was the last time you saw a view graph projector? I asked one of my young analysts, "Do you know what a view graph projector is?" Nobody knows. I've got 35 mm slide projectors, very high end, superb optics, and expensive at the time.

Bob Sheldon: The E.B. Vandiver room will be near the Colonel James Baird conference room at CAA. Do you have any comments on Colonel Baird?

E.B. Vandiver: Jim Baird was a US Military Academy grad and a Georgia Tech-trained ORSA. He worked for me in Deputy Chief of Staff for Operations and Plans (DCSOPS) as a major and came to me as a colonel running a major division at CAA. At age 49, he died of a heart attack one Sunday evening. We named our main conference room for him.

Mike Garrambone: When I was teaching at Army Logistics Management College (ALMC, now Army Logistics University), I wondered why would they put the study of OR in the Logistics Command and at Fort Lee? Why did it end up there?

E.B. Vandiver: Weren't you on the faculty down there? When were you there?

Mike Garrambone: I was there in the 1980s. You graduated my graduate school OR class at the Florida Institute of Technology (FIT) back then. But I never figured out how OR education got into a logistics institution.

E.B. Vandiver: They had a small OR department and curriculum in ALMC that goes way back years. At least back into the 1960s, almost to the time Bunker Hall was built. They taught the course in OR that was the forerunner of Operations Research/Systems Analysis/Military Applications Course-One (ORSA/MAC-1).

Mike Garrambone: Was this for the loggies in Logistics Command?

E.B. Vandiver: Loggies like OR. They like to do inventory control. They were one of the early practitioners of OR. Remember, it's the ALMC, so in the Management division they had an OR branch that taught OR courses. Now you come along to 1977 and General Shy Meyer is the DCSOPS of the Army, and he wants to greatly increase the number of ORSAs in the Army, so we wanted to increase the ORSA throughput. We can't do it quickly through NPS and Georgia Tech, and places like that. But we can do it by sending a lot of students to MAC-1, and making it a bigger and stronger course. So that's what we did. So we had the first one of those which graduated in October 1977 and Shy Meyer was the speaker at the graduation. At 5 o'clock that afternoon, he called me. I was the tech advisor at DCSOPS at the time. He said, "Van, old buddy, I'm supposed to do the graduation speech down at ALMC tomorrow. I can't make it. Would you go do it for me?" I said, "Yes, sir." I had no idea what to do or what to say or anything. So I went home and I got a bottle of scotch and cigarettes and by midnight I had outlined my talk. So I got up the next morning and drove down there early and got to graduate the first MAC-1 course.

Mike Garrambone: So that's how it got to ALMC?

E.B. Vandiver: Yes. But the idea was, "Okay, these are shake-and-bake courses." This is not adequate. So we said that to be a fully qualified in ORSA, you have to either have a degree in OR or have a technical degree of some kind from somewhere plus attend MAC-1. That took a few years to sort out. Of course, the personnel people wanted to say MAC-1 is good enough. You don't need anything else. I said, "No, we can't have some of our brain surgeons go to medical school and some of them don't. They all have to go to medical school."

Mike Garrambone: So you had a shortage of OR folks?

E.B. Vandiver: We did, and we had a "get well" program where we had to increase the number greatly over a fairly short period of time. LTG Noah chaired the thing. I think he was the Army PA&E back then (PA&E was the proponent for ORSA at the time). We had all these categories (this was in the 1980s; I was in

CAA) when we tried to greatly increase the number of ORSAs. General Max Thurman, when he became the Vice Chief of Staff, decreed we've got to have a lot more ORSAs. That's when we scrubbed the requirements. There was no discipline in the requirements. Anybody could code for an ORSA position. And out in the commands, the commanders like to do it, because they knew they were going to get a smart kid. So you had a lot of ORSAs in the four-star and three-star command headquarters, which actually wasn't all that bad either, because they tended to be right up there with the top guys and they got valuable experience. We didn't have any control over that. And then we had all the requirements in the agencies. Because those higher-level ones had priority, they got filled first and the agencies were sucking up the deficit. So we had this expansion program. We did all kinds of things. We increased the output, the throughput through MAC-1. We supported the FIT graduate school program in ALMC. We took a bunch of technical warrants and turned them into ORSAs by sending them to MAC-1. I actually had one of those at CAA who worked out quite nicely. It was a typical Army program. We can get 10 here and we can get 30 here and we can get 15 here and six here. And you add them all up and it comes up to a pretty good number.

Bob Sheldon: The military is always accused of wanting to fight the last war and analysts have guilt by association of wanting to analyze the last war. You grew up in the Vietnam War, but your brain evolved in the 1970s.

E.B. Vandiver: Nobody wanted to analyze the Vietnam War. When it was over, everybody wanted to forget about it. I would regularly bring up during the 1970s and 1980s, "Shouldn't somebody be studying counterinsurgency?" And the answer we invariably got is, "We're never going to do that again." Well, I'm a student of history. I said, "You don't know that." "Oh yes we do. We're never going to do that again!" So the time came when we finally have one we had to deal with, we found out we don't know anything about it. We have forgotten everything that was learned in Vietnam. But fortunately, one person had continued to study it, almost all of that time, all by himself, and that was at RAND. That was Jim Quinlivan. If it

weren't for him, nobody would ever have done anything. So we were able to use Quinlivan's work, his research, as part of the basis for some of the stuff we did.

Mike Garrambone: You had talked before about Don Hall. Who was he?

E.B. Vandiver: Don Hall was my last boss at the CORG. He was the division chief and I was one of his branch chiefs.

Mike Garrambone: Was he one of your mentors?

E.B. Vandiver: Yes, he was one of my early mentors. He was a wonderful man. He had originally been a senior analyst up at the predecessor to AMSAA at Aberdeen Proving Ground and was hired by CORG to be a division chief, along with Wes Curtis who had been another division chief of the Ballistic Research Laboratory (BRL) Weapons Systems Laboratory, which later became AMSAA. It stayed in the same building the whole time and it's still there. But they renovated it very nicely.

Mike Garrambone: Pete Reid would know.

E.B. Vandiver: Yes, Pete would know the history. I think the history is pretty well laid out in the *History of Army OR*.

Mike Garrambone: Can you tell us about Abraham Golub?

E.B. Vandiver: Abe had been one of the five directors of the thing at BRL. He had been hired by Wilbur Payne when he became—it wasn't called the DUSA(OR) originally. Back in the McNamara days, the Army decided, "We've got to have some analysts of our own to fight these guys up in OSD Systems Analysis." So they created an analysis group in the Assistant Secretary of the Army for Financial Management. I forget what the exact name of it was, but they hired Wilbur Payne to come down and run the place. Wilbur hired two people to try out to see who would be his deputy, and one of them was Abe Golub from BRL. The other fellow was Dr. Dan Willard, who worked with Wilbur on the faculty with him teaching physics at Virginia Polytechnic Institute and State University (VPI). Wilbur had been a physics professor at VPI. Dan Willard was another one down there. Dan Willard was independently wealthy. His grandfather had been president of the B&O Railroad, and he had gone to Yale and got a PhD in physics and he was going

to have a career in academia. Wilbur got his PhD in physics from Tulane University. He was going to have a career in academia. Then Wilbur was hired for reasons that I don't know into OSD Systems Analysis, and the Army hired him away from OSD. And then he hired Dan Willard and Abe Golub. Well, Dan Willard was very well suited to academia. Abe Golub was a bureaucratic in-fighter. An alley fighter. So he became Wilbur's deputy and then Abe hired me to work for him. Abe became the first scientific advisor to the Assistant Chief of Staff for Force Development (ACSFOR) when it stood up.

Mike Garrambone: You mentioned Wilbur Payne a couple of times. There's a connection between Dr. Payne and LTG John H. Cushman that I'd like to explore.

E.B. Vandiver: Yes, I knew them both. LTG Cushman spoke at CAA and I recommended you invite him to speak at MORS on wargaming. I attended his session at a MORS Symposium at the US Marine Corps University at Quantico in 2010. It was an outstanding presentation.

Mike Garrambone: Yes, and we invited LTG Cushman to speak at our Heritage Session at the 81st MORS Symposium in Alexandria, Virginia. There he talked about wargames in Korea while he was the I Corps commander. He related the story of General Vessey telling him to verify those games. LTG Cushman went on to say, "They sent Dr. Wilbur Payne, a gaming expert, and Colonel Reed Davis to Korea to bless our games." This is documented in a MORS Limited Edition publication (*Operational Wargaming in Korea 1976–1978*, 81st MORS Symposium Heritage Session, 18 June 2012), but can you tell us about Dr. Payne's side of this story and his relationship with LTG Cushman?

E.B. Vandiver: The event is correct and because the games were very important and there were political ramifications about them, General Vessey wanted the games to be reviewed by well recognized and knowledgeable analysts and Wilbur and Reed went to Korea to do the review. Wilbur verified that LTG Jack Cushman was a character, and he found that Jack's wargames could be put on a sound analytical foundation. Wilbur called him "Crazy Jack" because of his passionate enthusiasms.

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Bob Sheldon: Not too many people in MORS remember Jack Walker. Can you tell us some stories about Jack Walker?

E.B. Vandiver: Jack was a West Point graduate, an engineer officer. He went into Omaha Beach at D+9. He fought all through the European campaign. After the war he went to work—I think—first for RAND, and I think he got involved in MORS through RAND. You didn't get an oral history of Jack? I think you'll find in a *Phalanx* somewhere, there's a bio of Jack. (Editor's note: See *Phalanx*, Volume 31, Number 1, March 1998.)

You guys can get me something out of the *Phalanx*. Remember my article I wrote about brainstorming? I think it was in 1994. (Editor's note: See *Phalanx*, Volume 27, Number 3, September 1994.) That's the one where I created the famous graphic of brainstorming, in which I have a graph—totally accurate—of the results of a brainstorm as a function of the IQ of the group. And this goes from zero to 200, or something like that, and this is a perfectly straight line; at the top is a brainicane, and this is just an ordinary brainstorm here in the middle, and down here you get a brain drizzle. I had names all along. I think I've got a copy of it in my office. I had a lot of fun writing this thing. You know, if you're going to get decent results out of a brainstorm, you need to get some people there that have some brains. That's the thesis. One of the guys at the Engineer Strategic Studies Group published an article in the next issue or the one after that, which proposed corollaries to my scheme. He had one over here where you got a much higher effect than you would expect out of a low IQ group, and over here you got a much lower one than you would expect. And he had really cool names for that one. One was the Edsel effect. You've got a lot of brains, but you turn up with an Edsel. And this one is you've got a bunch of dummies, but you end up with a great outcome. This was the Serendipity Effect. It was really clever. I've got a notebook with everything that I ever published in *Phalanx*, which is quite a bit of stuff.

Mike Garrambone: How do you value the FFRDCs, university affiliated research centers, and the defense contractors? With regard to CAA and MOR, how do you relate to these different types? Are they all just kinds of defense contractors, in a way?

E.B. Vandiver: I have had a lot of problems with some contractors, and I've had problems with FFRDCs over the years. But in general, I try to work with them. RAND took over the Arroyo Center from the Jet Propulsion Laboratory of Cal Tech (JPL). I got to where I worked with them very well. And I've gotten along with IDA too pretty well over the years—still do—and they do research that's useful and we engage them to do research for us. So I think that's worked out very well. Contractors—I buy contract services myself, but only certain kinds, not analysis. I didn't buy analysis from contractors. I used them to help build models, and I'll explain that "help" in a minute. And do research, like a lot of the historical research was done on contract. Any time I wanted to do historical research, I could go to Andy Marshall and he would give me the money for it, because he thought that was a fabulous thing to do too. I had money of my own to spend too, sometimes more, sometimes less. I always had projects lined up. Here's something: there's always money somewhere. There is always money somewhere. A lot of it is earmarked for this, that, or the other; and it can't be spent for anything else. So I always made sure that I had two lists and two sets of projects, that if we got a big decrease in money, these are ones we're going to eliminate. But if there was money available, here are executable ones. There is always money looking to be spent, and if you've got executable contracts, sometimes it's yours for the asking. Some years I picked up two or three million dollars. A lot of times those would be research contracts, historical research, model research areas, things like that, would be in that category of the add-ons. Now the decrements, I tried to pick things that would do the least damage if you had to cut them back. I tend to not want to eliminate anything, but decrement a whole bunch of things. If you keep things alive, there's always money somewhere. Money comes, money goes. So if you don't kill it and keep it alive, you can add money later, bring it back to life, revive it.

Bob Sheldon: You mentioned contractors helping to build models.

E.B. Vandiver: The biggest mistake a government agency can make is to want a model built, and contract for it to be built. The contractor

now has an instant incentive to never finish the damn thing, because they want to keep it going forever. "Well, wouldn't you like to have this, that, and the other?" "That would be nice." The price goes up, the schedule slips. It goes on and on. Nothing is ever really produced, so everybody gets tired of it, cancels it, and you start over again. When I wanted to build a model, and we did this in three years, and in each case, we had a contractor assist my in-house team, who's going to build this model. That assistance is going to be very substantial, but we're going to be in charge of this thing. I'm going to have two people on it, and then we're going to have this contract. And we're going to finish this thing in three years. And we got it done, because we're just going to contract one year at a time to do the next increment, and we'd have those all laid out in advance. We'd build it, we'd test it, we'd do the next increment. And when we're done, we'd have a working model. We did that first on our new transportation strategic mobility model. Then we did it on a mobilization model, and then lastly, we did it on a replacement for Force Analysis Simulation of Theater Administrative and Logistics Support (FASTALS)—the model that generates the support force. It's called FORGE (Force Generation). FORGE is still being used; Steve Peterson down the hall. Retired Colonel Steve Peterson, who is still doing TAA since he came to CAA in the early 1990s. Steve Peterson, NPS graduate both an ORSA and a School of Advanced Military Studies (SAMS) graduate, and a loggie. A fantastic combination of capabilities: ordnance and ORSA and SAMS. If you want a history of people doing analysis, building models, Steve Peterson would be a great one to get while he's still alive and not retired. He's getting up there.

Mike Garrambone: It seems to me that you're always chasing new things. What was your relationship with the research and development (R&D) and test and evaluation (T&E) communities?

E.B. Vandiver: We closely related to a lot of stuff in T&E. For one thing, Walt Hollis was so deep in T&E. That was his real area of expertise. It was through Walt that we got dragged into all kinds of T&E stuff. We would help the T&E community with analysis processes, for

the design of experiments, for analyzing the data, for running models in advance to develop test designs, things like that. But not so much here as at AMSAA and TRAC. I just got into it personally because Walt would drag me along to all these things. We didn't do much here at CAA on it ourselves, other than using the results. I still find the reluctance of analysts to want to use real data puzzling. The OR curriculum at schools got so academic, so math oriented, they really got away from its roots. These things are really supposed to represent something in the real world, rather than the fevered imaginations of some analysts. I would find analysts of my own that just didn't see any reason why we should actually be using real data. They would say, "Hey, the model works. It gives good results."

Mike Garrambone: Was there anything else that we missed in developing young analysts?

E.B. Vandiver: Well, we certainly liked the analysts that came out of Gene Woolsey's program, who knew what analysis was first-hand. If you had to understand the process up close and personal, and you had to collect your own data—Woolsey said, "Don't trust any data you didn't collect yourself." You can't really do that, but it's a hell of a good motto. I wish you could. But at least you can be careful about the data you use.

Mike Garrambone: You said that about Vietnam data. You collected your own when you were there.

E.B. Vandiver: Yes. We collected our own in 1966. It was kind of squishy, subjective stuff. Some of it was numbers and incidents and simple stuff. Histograms and frequency of occurrences, intensities, and things like that. But most of it was more subjective as to what the commanders thought about this, that, and the other. How important they thought that different things were. But you've heard my talk about deployed analysts in Vietnam. I won't go into that, although I love to give that talk. It's my favorite.

Mike Garrambone: You probably have at least one or two significant events that happened on your watch that you could tell us about.

E.B. Vandiver: Yes, first of all, going to Vietnam. That was a very significant formative event. I've told every analyst since then, "Go to a real war.

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You cannot believe what a screwed up mess it is unless you go see it for yourself." Because you read the history books, it all looks kind of neat and clean, but there ain't nothing neat or clean about any of it. It's just a God-awful mess. I think everybody that has gone to the war and come back has said, "I see what you mean."

While I was here at CAA, the most significant event was doing analysis on real operations. Desert Shield and Desert Storm served as the real breakthrough for this. I think you've read my speech about putting the operations back in operations research.

Mike Garrambone: Was that kind of an incoming Pentagon phone call one day?

E.B. Vandiver: No. It was nothing of the kind. I went over to the building and elbowed my way in. The last person they would have thought to have invited in was an analyst. But I just forced my way into it, because this is what I wanted to do. I got in early with the planning group over in DCSOPS. I told them, "Look, I have already started wargaming this scenario and we'll have results for you at the end of the week, for the first games." The group didn't meet during the week; it met on the weekends. The war started; I started them wargaming. We had already set that scenario up and had gamed it earlier in the year for Third Army in Atlanta. So I already had a leg up on it. We already had the data, the scenario, and the maps. So we started off wargaming the first week, and then we continued wargaming the second week. At the same time, I had another group bringing the theater combat model CEM up on the same scenario. By the end of the third week, I think we shut down the wargames and start running cases in CEM. By then, the DCSOPS, who was General Denny Reimer, was very taken with this. So we would go over to brief him, and he'd say, "Okay, now do this, that, and the other." Now, unbeknownst to me, he was taking our view graphs and faxing them over to General Yeosock, General Schwarzkopf's number two guy. And Yeosock was writing questions and sending them back. And then Denny would call us and, "Here's what I want you to do next." So we were supporting the theater and didn't know it. So that was the real breakthrough of putting the operations back in

operations research. I had my briefing that I did at the end of that and presented it at the MORS Symposium in June 1991.

The third one, that I almost quit over, was putting CAA under G8, that is, creating the G8 and putting CAA under it. Before that, I'd worked for the Chief of Staff's office. I had made up my mind that I was going to leave. In fact, I had already talked to some people. I had options. Then LTG Ben Griffin came out, and I told him, I'm leaving. I think G8 is a bad idea and I think putting CAA under it is a bad idea. And I'm leaving." Ben said, "Oh, don't leave over this. It isn't worth it. What can I give you so you'll stay?" I said, "Okay, I need this, I need this, I need this." He said, "Okay." I love Ben Griffin. It was because of him that I stayed. I've known him since he was a colonel.

Mike Garrambone: Who is Ben Griffin?

E.B. Vandiver: General Benjamin Griffin was the first G8. He later became the AMC commander, the four-star at AMC. This is in 2002, 2003. I used to talk to Ben Griffin when he was the AMC commander. I'd go over and take him out to lunch on his birthday. I'd say, "I'll tell you the truth. I don't want anything from you, and you can't do anything to me now. You need to talk to me and I'll tell you what I think about things." We had a great time. I still call him on his birthday every year, down in Texas, where he's out riding the range. He's a cattle rancher now. Ben Griffin was the first G8, and he put it together, and he's one of the finest leaders I have ever seen in my life. I had him do my retirement ceremony.

Mike Garrambone: For the benefit of our sister Services, can you tell us what G8 is?

E.B. Vandiver: DCSOPS was considered too big with too wide a range of responsibilities, all the way from being the backup to the Chief in the tank in joint actions, to overseeing all the force development and force structure. So they took DCSOPS and they took PA&E and they re-sorted them into a new G3 and G8. G8 was the rebirth of the Assistant Chief of Staff for Force Development (ACSFOR), which had gone away in the Steadfast Reorganization in 1972-1973, when they had to downsize the staff. Nothing ever goes away in the Army. It just goes around. Look at me. I have lived long enough now to watch the forest succession out in my

backyard. In a forest, over time the old trees die off and the undergrowth grows up and becomes the new forest. And there are certain progressions that are fairly well-known. That forest of this, this, and this will be replaced by one this; and then it will be replaced by another. Well I've been watching that going on in my backyard. And I've watched in my neighborhood. My neighborhood looks about the same as it always did. It just keeps evolving over time. But nobody's the same. It's like one of these horror movies, where everything looks the same but everybody's different. If you live long enough, you get a keen appreciation of how things change over time that you can't see in a shorter period of time. But boy you can sure see it in a long period of time. We're the last family in the development where I live that are the original owners of the house. Everybody else, they're all new. They keep turning over, and they're getting newer and newer. I just sit down on the front porch and watch it. I claim I'm the neighborhood watch. I just sit out there and watch the neighborhood.

Anyway, G8 was the re-creation of ACSFOR. I considered it a bad mistake. I don't think they've entirely corrected it yet, but they've corrected some of the worst parts of it. And I thought putting CAA under it was a terrible idea, and I still do. Forrest has made the most of it by dealing directly with the Vice Chief of Staff of the Army a good part of the time. That's more like it should be.

Mike Garrambone: I'm trying to get a feel for some of the intense things that occurred on your watch. That was one of them.

E.B. Vandiver: Yes, that was the third one—the creation of G8.

Mike Garrambone: Before that, you were aligned with the Chief of Staff. But I believe you've always worked for the Army Staff?

E.B. Vandiver: Right, and originally CAA was put under DCSOPS. Well, it was under ACSFOR. ACSFOR went away in 1974 and CAA went under DCSOPS. Then the study that Dave Hardison and I did, called the Review of Army Analysis, in 1978 recommended that CAA be put under the Chief of Staff's office to support the whole headquarters. That was accepted and that was done and we reported to the Director of the Army Staff. It used to be

the Secretary of the General Staff, then they changed to the Director of the Army Staff. It was under the Director of the Army Staff from 1979 to 2002. I think that worked very well. I stayed in touch with all of the major staff elements. I attended the Director's meetings for DCSOPS, DCSPER, DCSLOG, and R&D—their weekly staff meetings. I went to all of them. But there was just such an enormous difference between DCSOPS and the others. The others were so narrowly functional. It was useful, and we did some things for them, but we were too broad and too oriented to the DCSOPS kinds of questions. And many times the DCSOPS, when they turned it over to the DCSOPS, or whenever they turned over one of the principals, I would go to them and explain, "I'm the Director of CAA. I work for the Director of the Army Staff. And I'd like permission to attend your staff meetings." They always said, "Yes." But somehow or other, that didn't happen with Schwarzkopf when he was the DCSOPS. I had known him when he was the ADCSPER and I used to have lunch with him in the mess regularly when he was a two-star. Then he became the three-star DCSOPS, and I thought he knew, but he didn't. He thought I worked for him. That was kind of a little bit of a comedy. Anyway, we got along pretty well, in fact, we got along very well.

Mike Garrambone: I know you have done a lot of briefings. But you've also had to listen to a lot of briefings. How do you negotiate all of that hearing, that is, listening to all those briefings? I bet you've listened to thousands of briefings.

E.B. Vandiver: I would say it's more like tens of thousands, easily. Some are better than others. There is a theory that experts actually do pattern matching. And I tend to believe that. With one of my own ARBs, I can just listen for a little while, and I know whether this is good or bad or there is something wrong. If there is something wrong, it is just instantly obvious. You just get so good at this, it's almost totally unconscious. But, yes, I paid attention. Sometimes I had trouble staying awake, but that's mostly old age, not the briefing. I have trouble with the sermons at church too. Of course, the pastors always complain about people sleeping through the sermons, and my reply is, "If you

were a more dynamic speaker, nobody would be going to sleep." But, yes, that was my job, and I'm a good listener, and like to listen." Now you may think I like to talk more, but that's because you guys are making me talk. Ordinarily I'd just sit here and listen to you.

Mike Garrambone: That's our job—to extract good stuff. So, how did you negotiate all those intense presentations?

E.B. Vandiver: That's what we did. The briefings here in the agency are standardized. We don't need any creativity in briefing here. Here's what you're going to cover. We spent a long time coming up with an exact format for that thing. Me and Jim Treharne. When we finally decided on what the final thing would look like, and what the chart looked like that described it, I autographed one and framed it and presented it to Treharne and he kept it on his wall (hidden behind a plant). I about drove him nuts over that thing. But it was important. It was the same thing with me and Shedlowski on the logo for CAA, what goes on the top of the CAA briefing chart. Shedlowski and I went around; we must've made 300 different versions of that thing. Some of them were very minute changes, until I got it exactly the way I wanted it. I think I may be a lot like President Trump in that way. Apparently, he does things like this too, drives people nuts, but it's important. "Who cares what it looks like?" It makes a difference. I wanted my view graphs and my reports to be instantly recognizable as CAA and always look the same.

Mike Garrambone: What do you recommend to others that have to build and deliver these analytical briefings?

E.B. Vandiver: The key thing is what you do for your own internal briefings, and what you do for external briefings are not necessarily the same. Your internal briefings are to make sure you've responded to questions asked, you've done it using the right kind of stuff, and the results are good, and you can stand behind them. The customer, he doesn't want to hear all that. He wants to know: "Did you answer my question?" and "Can I believe this?" That's what he wants to know. So that calls for a different kind of briefing that focuses on: "Here's the questions you asked. Here's how we went about doing it - but don't spend much time on that.

And here are the answers, and here are the things we've done to make sure that these are consistent with other works, other bodies of knowledge and other data. You can trust what we've done here." That's a totally different briefing. Now a lot of analysts want to take their internal briefing and go give it to the customer. They find out that those guys don't care about the model or the data or how good the analyst is. They don't want to hear any of that. They just want to know, did you answer my questions and can I believe this. If you go in there and try to tell them, "Here's how I made this, you want to know the time, let me tell you about this clock I built." They don't want to hear that. You'll lose them within five seconds of the briefing if you start in with that stuff.

Mike Garrambone: Do you do pre-briefs here?

E.B. Vandiver: No. I never had stuff pre-briefed to me. I go to the ARB and I want to hear your briefing. I don't want to be pre-briefed on anything. That's what they do in the building (the Pentagon). All the briefings had pre-briefings. I never did that.

Mike Garrambone: What do you think about providing read-aheads?

E.B. Vandiver: I like read-aheads. It depends on what it is—not for the ARB. Not from my analysis group. For a lot of other things in the building, a lot of them get pre-briefs; they don't want to go into anything cold.

Mike Garrambone: When I briefed the AMC Commander, I saw that he already had binders full of read-aheads with him and he reads all that material before the meeting. He has his staff do all this research on a topic before it gets briefed to him.

E.B. Vandiver: RisCassi, with our first cut on what he'd asked us to do about the Korean operations, he said "This is great. Will you stand behind this?" "A hundred percent." He said, "Great. Give me another set of charts that look just like this one. Take your logo off and put mine on it." He went off to brief the SecDef. The only thing he wanted to know was, "Will you stand behind this?" Now, is this foolish? Daring? Take your choice. "We have a lot of experience doing this. This work is using our best models, our best data, and our best judgment. And, yes, we will stand behind it."

Bob Sheldon: Do you have any comments about your customers sometimes ignoring your analytic advice?

E.B. Vandiver: Yes, at times. For instance, we used to do a study called value-added analysis. Andy Loerch used to run the thing. What value-added analysis did was look at a new system, comparing it to the one it replaced, to see if the amount of money it would take to replace it provided enough of an increment of performance improvement to make it worthwhile. Well, value-added analysis said the Crusader artillery piece is an all-around bad idea, that it nowhere near provides an increment of improvement that is worth the enormous cost it takes to field the thing. We said the same thing was true about the new attack helicopter: there's no way the improvement we would get would justify the amount of money for that thing. Well, we got thrown out of PA&E and we got thrown out of the Assistant Vice Chief of Staff of the Army's office. "This is the worst analysis I've ever seen. Don't ever bring value-added back in. I don't ever want to hear the name again." Guess what? They both collapsed of their own weight. In the end, the Secretary of the Army was forced to cancel Crusader. Rumsfeld publicly humiliated the Secretary of the Army over killing the Crusader program, mainly because Rumsfeld wanted it killed, and the Secretary of the Army had gone to Congress to lobby to keep it alive. Rumsfeld found out about it. And as for the other system, the cost just got so high, it collapsed of its own weight. So, yes, and there was a period of time there where parts of the headquarters were just very anti-analysis, and I was under severe attack from a number of people who tried to replace CAA with their own analysis community. But in the end, I hung in there and those things all went away. There's nothing that beats persistence; absolutely nothing.

I was the Director of CAA for 28 years. I told you it took 20 years to make it work the way I wanted it to. And now we have this fight every three years, you've got to go do something else, get out of your comfort zone, blah, blah, blah. My opinion it's all pure horse manure. There is great value in institutional continuity in the development of very in-depth expertise. And yes, some people ought to do that job and move

on to the other things, but others ought to be more specialized and get very good at what they do. Now that's the way the system worked before we started all this rhetoric where we've got to turn everybody over every three years, which I think is a very stupid and simplistic way of looking at things.

Bob Sheldon: Were there ever studies that you thought should be declined?

E.B. Vandiver: As the Director of CAA, I alone reserved the right to refuse to do a study if requested by a general officer or Senior Executive Service (SES). I worked very hard to never say "no," as I thought that a pattern of that activity would hurt the OR community and CAA in the long run. I always emphasized working with the Sponsor to get greater clarity on the question, rather than refusing.

Michael Shurkin: In your earlier discussion of wargaming, you describe bringing it "back to life" in 2006. Had wargaming declined before then?

E.B. Vandiver: We did a lot of man-in-the-loop wargames in the late 1980s in an organization called Contingency Force Analysis at CAA. We looked at lesser contingencies. They didn't fit well in the big theater simulation so we wargamed them. We did a lot of wargames through that period for different areas of the world: the NATO flanks, different Third World countries, the defense of Hokkaido, northern Norway, things like that. In the spring of 1990 for Third Army down in Atlanta, we wargamed their developing OPLAN on going to the defense of Saudi Arabia from an invasion from Iraq. We developed the concept of the operations, we developed the forces, we set up the terrain, and we wargamed it. So when Desert Shield went down in August 1990, we started wargaming that day, because we already had everything in place. We wargamed several cases the first week, and there was a planning group that met on Saturdays over at the Pentagon. You would think that the first thing they would do would be to ask the analyst to attend, but no, that was the last thing that would occur to them. So I just elbowed my way in and attended that meeting and briefed, "Here's what we've done." And then we got a request to do different cases and different sensitivities on it, and we did. I think we did about two or three weeks of wargaming. By then I had

another group who was setting up the theater simulation model on the situation over there. When that came on, I shut down the wargame and went over to do the simulation. That was probably the last wargame we ran in CAA until the 2000s. There was another group within CAA that did the normal theater-level kind of analysis. So we brought up the situation; it was a small theater, but that's okay, we could adapt the theater model to represent it, and with imagination, we could represent it fairly well. And we ran it, and ran it over and over again up until the day before the ground war started.

Bob Sheldon: That was the CEM?

E.B. Vandiver: That was CEM. CEM was criticized for being a piston model, but so what? You don't have to line it up like the front in Western Europe or Korea. We could draw sectors to go anywhere. So as the OPLAN evolved, we would create sectors that describe that maneuver, and we even created a sector to bring in an amphibious operation. Why not? Let's have a sector out in the water. It works. So as I say, with imagination and a little creativity, we made it work.

Bob Sheldon: Was that a cold start getting back into wargaming in 2006, or did you have some people doing wargaming on the side?

E.B. Vandiver: We got back into wargaming in 2005 after Dr. David Markowitz became my new deputy. He was an avid wargamer, personally playing many of the commercially available games. In the summer of 2005, he proposed using a theater-level wargame to train the large influx of junior analysts that year who had little knowledge of the military or warfare and certainly not anything so esoteric as theater-level conflict. He adapted a commercial wargame depicting the historical Korean conflict of 1950–1953 as a training tool, setting up different courses of action, disposition of forces, threat responses, and other major factors to sensitize the trainees to the nature of theater-level warfare. They played a series of games and were preparing a new, simplified series when reality intruded. The command in Korea had developed a new OPLAN, which meant we had to run it in our theater-level simulation as part of the TAA study to develop Army support requirements. There is a large gap between an OPLAN and its simulation in a theater conflict

simulation. This gap is filled by front end analysis, which can be done in a number of ways, but as mentioned earlier, wargaming is one of the best. The wargame that was planned for a training exercise was thus employed instead to help set up the new Korean OPLAN in our theater-level simulation.

Now we come to 2006, and a number of overlapping events occurred. One was the war between Israel and Hezbollah in Lebanon in August 2006, and the other was the request by the command in Iraq responsible for equipping and training the Iraqi Army for an estimate of the needed size of the Iraqi Army after the US left. We responded to this with a series of wargames I described earlier in this interview.

Bob Sheldon: Was there a conscious effort to keep wargaming alive then to go into the front end analysis years later?

E.B. Vandiver: Yes. We ramped down completely on Iraq, and we had developed another version of it for Afghanistan, but it was quite different, because the scale is different and there are other phenomena at work. We did a lot of games for Afghanistan as well. But then that began to ramp down too. My view was, we don't have a lot of big theaters anymore. Korea—yes. We know how to do Korea. We've got a lot of strange stuff around the world. And we have a lot of OPLANS for how to deal with these things. So a good way to get into the development of an OPLAN is with a wargame doing front end analysis. Then, of course, you've got a whole new raft of planning scenarios coming out of OSD—they're for all kinds of ash-and-trash. You can run them in the theater simulation, but not immediately. Here's the way you get it from PA&E or JCS. Okay, you're to go to the Horn of Africa, and you need to support a peacekeeping operation in South Sudan, to bring in food, water, whatever, and you're allowed an end-strength of so many people, and you have a certain time frame in which to do it, and you are allowed so much in the way of combat forces for force protection. Well, that's pretty sketchy. So, okay, how are you going to do this? Where are you going to set up the lines of communication? Who's going to operate it? Who's going to secure it? How are you going to phase doing this? How many forces are going to be needed? What are the threats along the

lines of communication? What kind of forces are going to be needed to secure the lines of communication? Once we get there, how do we distribute this stuff throughout the country? What do we need to bring in to do that? Can we hire commercial trucking companies in the area to distribute it? Of course you can, but you'll lose 50 percent of it to the black market. Maybe 75 percent. Or are we going to bring in truck companies and do it ourselves? We won't lose as much, they'll still steal us blind as you go along, but you have much better chance of actually getting it out. Do we have to provide water? Do we have to bring in reverse osmosis water purification units (ROWPU) to do this, or do we bring in engineer well-drilling companies to do that. It goes on and on. So we would do the front end analysis. You can call it a wargame, but it's more like a structured time, distance, and forces development; step-by-step to figure out how to do it. There are usually alternatives. Okay, we can bring it in on this Chinese railroad, or we can bring it in by truck up out of Kenya. This was a real case, by the way. So we did several different alternatives on the thing, and we did—not a complete troop list, but kind of a manual version of TAA, calculating key requirements. We're given these distances, how many truck units do you need, or this much water that you're going to supply to this many people, how many wells or ROWPU, or whatever. In water purification circles, once a year they have a big contest among those units called the ROWPU Rodeo. I am not making this up. I was always fascinated by the ROWPU Rodeo.

Bob Sheldon: In 1990, you did wargames for a while, and then you transitioned to the simulation. Is that the same thing you currently do with front end analysis, where you do the wargame as a lead-in to the simulation?

E.B. Vandiver: Yes, it's very similar. The fact that we had done the wargames gave us everything we needed to set up the simulation. Same thing now. You do front end analysis, but you may not need to bother to set up the simulation either. It may be good enough right there. In others, it won't be. It will be the setup for the simulation.

Bob Sheldon: Your sister service, the Navy, they kept on wargaming a lot during that period of time.

E.B. Vandiver: Yes, they did. It was primarily politically motivated. Bing West up at the Naval War College was running the Global Wargames, where they would bring in all the four-stars in the world, and they would run these giant wargames, and they would end up having everybody worried about "Where are the carriers?" Actually, it was a pretty brilliant ploy on their part. Bing West is one of the really great intellectuals in the business, I think, and he is still going strong. I used to have him out every year to speak to CAA. He's a fabulous speaker.

Bob Sheldon: I want to ask a personnel question about the wargaming, both back in 1990 and 2006. Did you always strive to have a combination of the ORSAs and the people who were more warfighter-oriented?

E.B. Vandiver: We tried to get a real mixture. We tried to get experts on the area, people with great in-depth knowledge of that part of Africa or Asia, wherever we are. Ones that have real expertise in the country, the geography and that. Sometimes we get those from the State Department, we get them from the office in OSD where they deal with international matters, we get them from foreign area officers, the intel world. There are a lot of sources of that kind of expertise. We would want to get intel people in who were the ones who are knowledgeable about who are the bad guys that are in the area—sort of a hierarchy of badness of these people, and what their capabilities are. And then we would want to get a selection of operators from all of the Services: Army, Navy, Marines, Air Force, and Coast Guard, if necessary. A lot of times, the Coast Guard was necessary. And then we want to get a range of functional specialties: loggies, combat types, transportation types. When you're doing the front end analysis, all of these things are important, and nobody has more than just a piece of the thing. But when you put it all together, and they start talking through this thing, after a while you get a really good product that comes out of the process. They come away from it thinking that, "This was pretty well done." We have done lots of those for front end analysis for new scenarios for OSD and JCS. Of course, Tom Allen was our Sponsor in JCS. After they got rid of the PA&E people who didn't think we ought to do theater analysis, then we got very good

reception there too. But we had several years there when the PA&E didn't think anybody needed to do theater analysis.

Bob Sheldon: Some of the war colleges and command and staff colleges do computer-aided wargaming, where they use a simulation to help adjudicate decisions that are made. What's your impression of that?

E.B. Vandiver: We started that up at the Army War College in the late 1980s. LTG Shy Meyer, when he was DCSOPS (before that, he had been the Assistant Commandant of the Army War College), wanted to put more rigor into how the classes worked through their military problems. They have these big wargames up there, where they would have each of the seminar groups work on different parts of the problem. He thought the whole thing was sort of antiquated—the way they were doing it, and he wanted to put it on a wargaming basis. I was charged to go up and help Colonel Ray Macedonia get that started and support them in doing that. They put together a simple kind of wargame, but it served quite well as a driver for this kind of exercise, sort of academic learning kind of exercise. It kept it moving. It forced people to think more quantitatively. It forced people to think in terms of time, space, and forces. So that was considered pretty successful. I don't know what's happened to it since. I think it may have atrophied, but it worked quite well for some time.

Bob Sheldon: You said something earlier about tactical and higher-level simulations. I was under the impression that most tactical-level simulations were done at Leavenworth. Do you do tactical-level simulations here at CAA?

E.B. Vandiver: We have, yes. We've always run a two-level hierarchy. We have a tactical-level simulation that develops attrition data and other inputs that we put into the theater model. That's the COSAGE, which has been through a bazillion different versions now in 30 or more years. It's the same name, but everything else has changed. In Desert Storm, we had the only accurate forecast of how that thing was going to go down. The reason for it was the two-level hierarchy. Everybody else focused on the Republican Guard divisions. They made up a very small part of the Iraqi Army. Most of it

was like 1950s vintage Soviet forces. They didn't have night vision devices. They didn't have target acquisition devices. They had T-62 tanks. When we ran our tactical simulation, we did it two different ways. We did it for Republican Guard divisions and we did it for ordinary, vanilla-flavored Iraqi divisions. Even for the Republican Guard divisions, we hugely outmatched them. When you got to the other kinds, it was a whole generation, or maybe two generations mismatch. I mean, we could just eat them for breakfast. Republican Guards, you had to fight them, but we could fight them and beat them fairly easily. When you put all that into the tactical model, and you got the horrendous slaughtering that we could do against vanilla-flavored units, and pretty much against the Republican Guards too, and then we laid out the battlefield with our scheme of maneuver. So, okay, what happens? We fight them where we want to, at whatever force ratio we want to, and we vastly outmatch almost everybody we come up against. That's why you had Iraqi units trying to surrender to remotely piloted vehicles and helicopters. Because we were just absolutely slaughtering them. But not just on the highway of death. Our final estimate was this whole thing will last four to six days, and we will have less than 1,500 casualties to US forces. It came out to about four days, so it came out fairly close.

Michael Shurkin: The others were much more pessimistic.

E.B. Vandiver: Trevor Dupuy, the night before the ground war went down, said it would take 30 days and we would suffer 15,000 casualties. He said that on national television.

Mike Garrambone: Were you ever able to learn if your studies had an impact with the Army generals that were running the war?

E.B. Vandiver: Yes. Later, I was able to talk to LTG Yeosock at length about how useful our studies were, and how much he thought they tempered his view about how things would go. But Schwarzkopf was just still, well, around the building, they would call him "Schwarzkopf—the McClellan of the Desert." He's outnumbered. He needs reinforcements. Of course, he retorted that these people calling him that were military fairies, so it got into some good name-calling back and forth after a while.

And then we did all kinds of special studies, especially with Renee Carlucci here about shooting down the Scuds, which apparently we weren't doing, but it didn't really matter, because it kept everybody from panicking. It looked like we were, but it wasn't really, but it was close enough, because the way they were shooting them, they were within the fan of the Patriot to shoot them down. So it looked like we were knocking them down, and it calmed everybody down. The fact that we weren't actually shooting them down, to me is just sort of academic. They accomplished the purpose. Same thing with Israel and the Patriot battalion we sent over there. I don't know, maybe we actually did shoot down one or mess it up. A lot of them failed in flight. They just came apart. But anyway, we were doing analysis day-by-day on "Are we going to run out of missiles before they run out of Scuds?" And Renee was doing that. It was really cool. She had a spreadsheet that would be recalculated every day, and make a new estimate on the rate they're firing and how that's drawing down their inventory, and how we're drawing down our inventory. It was a very nice piece of work. It kept everybody kind of calm, how we will be all right, because on our side we were manufacturing new Patriot missiles at the max rate, and we were dredging them out of every unit everywhere in the world and sending them over there.

Bob Sheldon: You talked about using Trevor Dupuy to get historical data. Can you comment any more about using historical data to support your analysis?

E.B. Vandiver: We spent several years trying to clean up the Trevor historical conflict database to get it accurate. It was just so messy, it took a lot of work to do. And then several analysts tried to do different kinds of analysis with it, but we didn't have all that much luck coming up with anything very useful out of it. Trevor had his theory about how all this data affects things. Well, does it? Maybe it's actually true, and Trevor just didn't do it well. But we were not able to establish it.

Bob Sheldon: More recently, you used historical counterinsurgency data, and I think RAND used that in a study.

E.B. Vandiver: We used that information back in the one we did on sizing the Iraqi forces.

That was the only analysis available. Ever since the end of Vietnam, I would ask the building, the operations people, every once in a while, don't you think we ought to be doing something on counterinsurgency? The answer was always, "We're never going to do that again." I said, "I'm a student of history. You can't make that statement. You don't know that." "Oh yes we do. We're never going to do that again." Well, Jim Quinlivan ignored them. RAND gets some things right. They allowed him to keep playing with that. It was kind of his hobby horse. He had developed this, "How many counterinsurgents do you need per capita population in order to prevail at different levels of counterinsurgency." So we used that. That was one of the analytical pieces of this framework we put together. After it was all over and the dust had settled, a different part of RAND did an evaluation of force analysis, and they said we did it all wrong, which is typical, like the auditors who come out and shoot the wounded after the battle is over. But I considered that effort to be superficial. It was really beside the point. The question was not whether it was right. The question was whether it was useful. And the question was, "As opposed to what? What's going to get used otherwise?" And then the argument can be made, "Well yes, but it could be misleading." "No, it isn't." Because we explain exactly every step we took, everything we did, and we can vary everything in there to get sensitivities on it, if you want. There's a lot of inertia in these kinds of systems. They're not as sensitive as you might think they are.

Bob Sheldon: Let's talk about another source of data. You have the ranges in California and elsewhere. Is that data useful for support of CAA's analytical efforts?

E.B. Vandiver: The Combat Developments Experimentation Center (CDEC) data was extremely useful for tactical-level modeling. It was used throughout TRADOC and in our own CAA tactical simulations. Experiments on line-of-sight of weapons vs. targets gave us the basis for all of those calculations forever. And all the attack helicopter experiments allowed us to develop the tactics that said, "You can only break mask for so long before you have to get down." That is, for helicopters in hiding, you had to get up, you had to get a target, fire, and

get down. So we worked out all kinds of ways, when one guy pops up, finds the target, tells you, the other guy, he then pops up and fires. We got all kinds of good combat information like that. It was really very, very good work. And then we had the big experiments the Marine Corps ran, and Dick Wiles ran out of Operations Research, Inc. (ORI). It was called RECVAL, which was about combined arms combat. It had ground armor, anti-armor, infantry, attack helicopters, and A-10 Warthogs, all working together. It was huge. In fact, Walt Hollis went out there to run around the thing and said, "This doesn't look like a test. It looks like a war." It was that big. In fact, I went out and rode on an armored personnel carrier for a trial. It was a lot of fun. CDEC didn't have any forces of its own, so they had to borrow them. We had a large tank unit, actually we had the biggest part of a tank battalion from Fort Hood, Texas. It stayed there for quite a while. Now, US Army Forces Command (FORSCOM) objected violently to sending their forces to this, because it interfered with training. I talked to a couple of the company commanders, and they said, "I don't know what this test is about or what you're going to learn out of it, but this is the most fabulous training we've ever had." It was that kind of thing that led to the National Training Center at Fort Irwin, California. I think very directly the experience out at CDEC and these big tests led to what we did at the National Training Center.

Bob Sheldon: One of the things historians advise against is taking the wrong lessons from history. Do you have any comments on that?

E.B. Vandiver: Bob Scales says, "We always get accused of preparing for the last war." He says, "That's not correct. What we actually do is we prepare for the last war we liked." Which is very different. Scales could be a little caustic about these things. He is a true defense intellectual. I don't know what we're preparing to do. We're not finished fighting the last wars yet. They're still going.

Bob Sheldon: I'm going to ask another personnel question. Before you went into CAA, you were in DCSOPS. Forrest came from AMSAA to CAA. How was his training compared to yours for becoming the Director of CAA?

E.B. Vandiver: Forrest was my deputy here starting in 2002. I hired him away from Booz Allen—made an honest man out of him, and I got him into the SES as my deputy. After about a year-and-a-half, the building snatched him, and took him up to take Vern Bettencourt's place in the old tech advisor's office—"Van's old office"—which used to really piss them off that everybody still called it Van's old office. Vern went over to G6 and became an IT person. Forrest ran that office in DCSOPS quite a while during the war, dealing with a lot of the war requirements. Then when the AMSAA Director's job came open, Forrest was selected for that, I think by then General Ben Griffin, who was the head of AMC, and he wanted Forrest. So Forrest went up there to take over AMSAA. He had a pretty good background. He had three jobs on my watch. He started with me as an SES CAA deputy, left to serve on the G8 staff in the old tech advisor's job (DCSOPS), and then went on to lead AMSAA before returning to CAA. So he had pretty good training, a pretty good perspective on everything. It's kind of hard to beat it, actually.

Mike Garrambone: I am sure that with your long tenure in leading analysis you must have been accosted with ideas and methodologies that did not always support your program—perhaps they may not have had their intended or advertised merit?

E.B. Vandiver: You recall my response to you about the Quantified Judgment Methodology (QJM). That was one of about a half-a-dozen things that were kind of the bane of my existence the whole time I worked for the Army. I ran into many methodologies that sounded good on the surface, but actually had serious deficiencies in one way or another. QJM was basically a model of what Trevor Dupuy thought about warfare. It wasn't necessarily a model of anything in reality.

Models can be important but they can also bring great confusion to analysis. For example, you had the firepower scores—weapon effectiveness index/weighted unit values (WEI/WUVs), combat potential—as combat factors. They're useful if you stick close to the assumptions under which they are developed in the cases from which they're derived. But nobody ever does this, and they always end up getting

misused. So I just finally came down totally opposed to their use. When anybody would ask CAA for them, I said, "Not no, but hell no! You shouldn't be asking." Because as long as they existed, they would be grossly misused, primarily by OSD PA&E, who would invariably do a firepower score per dollar calculation, and then conclude that we needed a whole division of tube-launched, optically-tracked, wire-guided missiles or a whole division of multiple launch rocket systems, which is just absolute nonsense, because firepower scores are only good within a very narrow range around the point where they were generated. They are only good as long as that mix of systems pertains. Once you go to calculating a score per dollar, this is just nonsense. I talked about QJM, firepower scores, and M&S was also a big one. Some people believe that with models and simulations, we don't need analysis anymore. And this was widespread because people were so enamored of the graphics of these things, they didn't realize there was no underlying analysis or logic to these things. They are just making pictures. They're great for making an exercise run, but they have no validity in any analytical sense. They had a giant conference in Huntsville, Alabama, about M&S when we were really in the throes of this thing and Walt Hollis was one of the speakers. Somebody in the audience asked Walt, "Do you ever use M&S in analysis?" I considered that probably the most perverse question ever asked. Back then, the Army M&S Office was in DCSOPS. DCSOPS didn't want the thing. Nobody really wanted it. So DCSOPS eventually asked G8 if they would take it over. The G8 asked me, "Would I manage it if G8 took it?" I said, "I don't really want the thing, but if you want to bring the thing over here, yes, I will do what you want me to do." So we did. Of course, the M&S Office, knowing how critical I was of them, thought that I was trying to get a hold of it so I could murder it. But it wasn't true. I tried to give it the attention that I could. It's come along. I think we've done a reasonably good job keeping it focused on the Army and useful things. It got me more money, more people, and another building, which has a creek running through the basement. But that's another story. Yes, it does—it has a creek running through the basement.

Mike Garrabone: I visited CAA around 1987 when you were still in Bethesda and I asked about WEI/WUVs. Given their historical importance in Army analysis, can you tell us the story behind WEI/WUVs and firepower scores?

E.B. Vandiver: Before the advent of the Army's analytical community, the Army War College did staff studies for the War Department Headquarters. With the formation of the Department of Defense, the National War College was created, which occupied the Army War College building at Fort McNair while the Army War College moved to a new building at Carlisle Barracks, Pennsylvania, in 1951.

Some of the staff studies were about potential theater conflicts. A wargame was created that moved the front in sectors according to the relative combat power of the two sides. All of this was based on the experience of World War II in the European Theater of Operations. Combat power was computed using "firepower scores." These firepower scores were developed by combat-experienced officers who judged the weapon scores on an arbitrary scale set at one for the M1 Garand rifle and 8,000 for the 8-inch Howitzer. Enemy firepower scores were developed by relating those weapons to the most comparable US weapons. The weapons in a sector were summed, then weighted by their firepower scores; the ratio of power between the opposing sides was calculated, and the front moved according to a table of movement rates as a function of combat power. This table was also judgmentally developed. I believe this system was called simply the Theater War Game. RAC produced a more refined version of this for the Army War College in the 1960s called the Theater Quick Game.

The Army STAG used this game and firepower scores for theater-level conventional warfare analysis until superseded by the RAC-developed ATLAS theater model in the late 1960s. CAA inherited the STAG models and the firepower scores. When Mr. Rumsfeld became Secretary of Defense (the first time) in 1974, he called for an assessment of the relative strength of NATO and the Warsaw Pact. Mr. Dick Lester in the DUSA (OR) office under Dr. Wilbur Payne had the Army lead on this working directly with CAA. Mr. Lester spearheaded replacing

the firepower scores with new scores that took into account more factors and represented weapons for which WWII experience simply wasn't applicable (e.g., precision guided missiles and attack helicopters). The details of the calculations are well documented in CAA publications of that era. There was a large amount of subjective judgment involved, but there was also a foundation of empirically based data on weapon characteristics such as lethality, vulnerability, and mobility in the WEIs, which were summed and further modified by readiness and training factors (and others) to create the WUVs. WUV were then used to estimate combat power in a sector. At the time, this was considered a major improvement over firepower scores.

During the late 1960s and early 1970s, there were a number of efforts to develop weapon scores based on combat simulations, but these always foundered on their dependence on particular scenarios. The Soviets were not so bothered, and developed their combat potential scores using a division-level combat simulation. There were characteristics of Soviet theater combat theory that supported doing it this way. They used their scores as part of their wartime planning and command and control systems; but I digress.

There were other even more elaborate scoring systems developed later introducing many more factors for which most of the coefficients had to be judged. Mr. Dave Hardison, DUSA (OR) 1975–1980 and Director of CAA 1982–1984, derided these methodologies saying, "If you have to guess all the inputs, why not just guess the output. It is more honest, simpler, and uses less time and effort."

Similarly, there were efforts to develop methodologies for comparing weapon systems for procurement purposes by enumerating the major characteristics and weighting them to produce a single number for each system. The proponents of these methodologies always countered criticism by saying, "If you don't like the weights, you can vary them and test sensitivity." Mr. Hardison had the same reaction to these methodologies as he did to firepower score kinds of methodologies. Dr. Payne's criticism was as barbed, but more humorous. He called them, "The old a sub i, sub j game."

Neither of these kinds of methodologies has gone away yet, but the same objections still apply. They are simply guessing, with a patina of mathematics.

Mike Garrambone: It seems that the WEI/WUV and firepower scores discussion was generated from a question about AMSO. Getting back to AMSO, how has their mission evolved?

E.B. Vandiver: AMSO is primarily focused on M&S used for training and exercises. The analytical community develops and uses its M&S independent of AMSO, but analytical M&S provides the nucleus for much of the AMSO-managed M&S.

Michael Shurkin: What did AMSO bring to CAA? New capability and new resources?

E.B. Vandiver: It didn't fit well. The kinds of M&S they work with are primarily training kinds of things, used for driving exercises. It wasn't a very good fit.

Michael Shurkin: It's still with you.

E.B. Vandiver: I think it's worked out reasonably well. It hasn't really benefited either party all that much. But nobody wants the thing. It was ill-conceived to begin with. The whole M&S business was ill-conceived to begin with. And that's why none of this stuff fits anywhere. It was based on false premises to begin with, that these things have some kind of independent existence. When General Shinseki wanted to create an M&S specialty, we argued strongly against that. Just make that a subspecialty of FA-49—ORSA. And then we get the rigor of analysis to bear on the thing. "Oh, no. We're not even going to need analysis anymore once we get this M&S going."

Bob Sheldon: Maybe you could compare developing M&S to live fire testing. The Services used to do a lot of live fire testing, but now live fire testing is so expensive, we don't do much anymore. One of my favorite historical examples comes from Art Stein's oral history. After World War II, they had a couple thousand airplanes left over. Nobody needed them, so Art Stein used them for live fire testing.

E.B. Vandiver: You used to be able to fly over Aberdeen Proving Ground and see the wrecks of those. I think they hauled them all off for scrap. But that was a huge study.

Bob Sheldon: Art Stein did such a great study that his data was used for years afterward.

E.B. Vandiver: Joe Sperrazo killed 30,000 goats establishing wound ballistics data. Try to do that today.

Bob Sheldon: M&S used to be developed based on something somebody would go watch field conditions and see how weapons were actually being employed. They would observe real-life combat or field conditions and then write that into their simulation models. Now we don't get too many field conditions where we can observe real data. Your thoughts on that?

E.B. Vandiver: Read my speech about putting the operations back in operations research. I often ask the question, "What is this model a model of?" Is this a model of something in the real world? Or is this a model of the fevered imagination of somebody writing code? All too often, it's the latter. We had an air defense simulation called the COMO (COMputer MOdel) IAD (Integrated Air Defense) model, and mostly it was used for flying in all the Soviet hordes in the air. Then we'd fire all the air defense missiles, or you could use it on a much smaller scale. We had some exercises of using air defense deployed up in the northern counties of England (East Anglia and Northumberland), where they set up an air defense network to look like parts of Europe, and then flew in attackers simulating a Soviet air attack. Of course, it's all very scaled down. I tried to get our guys, "Okay, go over there and let's collect data on this thing and let's use it as a validation exercise for our simulation." The person who ran the simulation for me, who was an electrical engineer, said, "Why do we need to do that? The model works great. We get good results. Everybody is happy with them. Why would we want to do that?" With my usual management finesse, I told him, "Shut up and do it anyway!" So kicking and screaming, they go over there and they get the data, and then I made them come back, set that situation up in the simulation and run it and see how it compared with the exercise. The results were very different. But their conclusion was the simulation is right. "This is just one case, blah, blah." That's why I think the folks with the best preparation for analysis are physicists, because they

have a very keen understanding of the relationship of data to models. That's the "modelitis problem." The model works, it gives good results, everybody's happy with them. Why do we need to validate anything?

Michael Shurkin: I have a question about usage of the term ORSA. Some people are sticklers on this, saying that ORSAs are only FA-49s, and not 1515s or anybody else. Other people just use it as a general term for anybody doing OR for the Army. What do you think?

E.B. Vandiver: I think it really doesn't matter much. I prefer broader definitions. For me, if you're involved in analysis, you're an analyst. If you're an FA-49, that's fine; you're technically an ORSA. Which I also don't like that name either, but it has historical roots and it couldn't be changed. But I don't think it really matters.

Michael Shurkin: Maybe I should use the term "analysts."

E.B. Vandiver: I don't think it really matters.

Michael Shurkin: Somebody's going to jump at me for the use of the term. I'm polling people.

Bob Sheldon: Analytics is another term being used now, which is something different.

E.B. Vandiver: That's something I've tried to get them to work on here—big data and analytics. But nobody seems to understand what I'm talking about. They don't read *Business Week* and the *Wall Street Journal* either.

You can just be careful about how you use it and say "FA-49 ORSAs and people involved in analysis to get around it." Yes, some people love to nit-pick these things, especially definitions.

Bob Sheldon: Given your decades-long experiences with the Army's development of analysis and wargaming and M&S, what lessons from the historical evolution of the Army's analysis and wargaming and M&S are most relevant to today's ORSA community?

E.B. Vandiver: Two fundamental considerations apply. One: keep focused on military operations (i.e., keep analysis reality based). Two: base all analysis on real-world facts and data. I understand the latter is not always fully possible. Do as much as you can. Fifty percent is still much better than none.