

Oral History Disclaimer

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INTRODUCTION

Edgar Bishop Vandiver III was MORS President 1992–1993 and was elected a Fellow of MORS and Wannier Laureate in 1995. In 1984, Mr. Vandiver became the second Director of the U.S. Army Concepts Analysis Agency (CAA) in Bethesda, MD which became the Center for Army Analysis (CAA) in 1998 and moved to Fort Belvoir, VA in 1999. This interview was conducted over the course of three separate occasions: December 13, 2004, at the MORS Office, Alexandria, VA; December 30, 2004 at CAA, Fort Belvoir, VA; plus 28 March 2005 at CAA.

BOB SHELDON: Today is Monday the 13th of December 2004. It is 1600 and I am at the MORS Headquarters in Alexandria, Virginia with my colleague Mike Garrambone and our distinguished MORS Past President and Fellow of the Society, Mr. E.B. Vandiver. I'd like to start with some basic questions about your background. Where were you born and raised?

E.B. VANDIVER: I was born in Kennett, Missouri, in the boot heel of Missouri, which is the two southeastern counties that stick down into Arkansas over by the Mississippi River.

BOB SHELDON: Tell us your parents' names, and what they did for a living.

E.B. VANDIVER: My father's name is the same as mine. He was E.B. Vandiver, Jr. I'm the third. He was a businessman, in the cotton business. He owned cotton land. He owned a cotton gin. He also had an interest in movie theatres and he ran a hardware store. My mother's name was Lora Belle Fray. Fray was her maiden name. Her father had come to America from France as a small boy. He ran a lumber mill.

BOB SHELDON: Did your parents inspire you towards mathematics or engineering?

E.B. VANDIVER: My father always tried to aim me in the direction of science or engineering.

BOB SHELDON: Tell us about your early schooling.

E.B. VANDIVER: I went to the Kennett public schools up through the eighth grade. Then I went off to northern Indiana and spent four years at Culver Military Academy, graduating in the class of 1956.

BOB SHELDON: You did drill and ceremony there and all the usual military stuff?

E.B. VANDIVER: That's a bit of an understatement. *{Laughter}* Culver, in the 1950s was a junior version of the military academy at West Point.

BOB SHELDON: Other than the military courses, I assume you took some hard-core math and science courses?

E.B. VANDIVER: Culver is a college prep school. You only took four courses a year. We graduated from high school with exactly sixteen credits. Four in English, four in math, and then the rest of them could get divided up a little bit between history, language, science and maybe something else.

BOB SHELDON: Did you go to this military prep school by choice or did your parents force you there?

E.B. VANDIVER: Absolutely not by choice. *{Laughter}* I was incarcerated in a monastery, in a crusading military order, for four years. Totally against my will. I'm very close to my classmates. We're all very much in touch today, and most of us describe our experience as 'We Survived Culver.'

BOB SHELDON: Were there a lot of prior military folks teaching there?

E.B. VANDIVER: For thirty formative years, from about 1900 up into the 1930s, the Superintendent of Culver was General Leigh Gignilliat, who was an 1897 graduate of the Virginia Military Institute. He made Culver into a junior edition of VMI in the 1890s. So I like to tell people that I went to VMI in the 1890s.

BOB SHELDON: Where did you go to college?

E.B. VANDIVER: I went to the University of Missouri in Columbia. At that time the University of Missouri had a reputation of being the biggest party school in America. So I went from a monastery to Sodom and Gomorrah. *{Laughter}* And it was wonderful.

BOB SHELDON: What did you study?

E.B. VANDIVER: I started in engineering—originally mechanical engineering,

Military Operations Research Society (MORS) Oral History Project Interview of E.B. Vandiver, III, FS

Michael W. Garrambone

General Dynamics
mike.garrambone@gd-ais.com

Dr. Robert S. Sheldon,
FS

Group W, Inc
bs@group-w-inc.com

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and then chemical engineering. I was two years into the engineering curriculum, but when I was a sophomore, I took Physics—a whole year of the University Physics, and decided I liked that a lot better. So I changed my major to Physics. I graduated and got a Bachelor's Degree in Physics, and then I stayed there and got a Masters Degree in Physics.

BOB SHELDON: How did you happen to stay on for your Masters?

E.B. VANDIVER: This had more to do with my wife and future father-in-law. When I asked him for her hand in marriage, "No, no, no" her daddy said. "You can marry her, but you have to keep her in school until she graduates," and she had another year and a half of school to go. I had no intention of getting a Masters Degree, but I stayed on so I could get her graduated, because I wanted to get married. So as for the advanced degree, you can blame Patty for it.

BOB SHELDON: You were in ROTC?

E.B. VANDIVER: I was in the ROTC program, and it was branch ROTC and I was in the Field Artillery.

BOB SHELDON: You took four years of ROTC?

E.B. VANDIVER: I only took one year of basic; because of Culver I didn't have to take the required two. It was a land grant university so you had to take the first two years—everybody had to take two years of ROTC. But I got out of one of them because I got credit for Culver. I took senior ROTC and learned field artillery and went to summer camp out at Fort Sill, Oklahoma. Then when it came time to get commissioned, I put down what I wanted in order of branch preference. I put down I wanted Artillery, Infantry, or Armor as a branch. Well, I got commissioned in the Army Chemical Corps. The reason for that was at that time you could not be commissioned into the combat arms—this is 1960—if you had eyesight as poor as mine. But a few years later in Vietnam, they got a whole lot less picky about that. It's probably just as well though. If I had been commissioned into field artillery, I might have gone off and done that and then stayed in the Army.

BOB SHELDON: How was ROTC compared to your high school military academy experience?

E.B. VANDIVER: They're really not comparable. At Culver we were all spit and polish, and I was on the drill team. We had a fantastic drill team. ROTC was pretty relaxed on those kinds of standards, but the subject matter was very good and solid, and you had to learn it.

BOB SHELDON: So you were commissioned in 1960.

E.B. VANDIVER: Yes. I was commissioned in June. After I went on active duty in 1962, I really liked that, and I was first in my class at Officer's Basic Course because I was the only one that hadn't had Branch Chemical ROTC so it was all new to me. So I studied it and ended up first in the class. I was offered a regular commission, but Patty made me a different offer. You know, you can have me or the Army, but you can't have both. So I stayed with the Army in another way.

BOB SHELDON: How did you like your active duty experience?

E.B. VANDIVER: It was fabulous. I was in the Combat Developments Command (CDC), in the Chemical, Biological, and Radiological (CBR) agency. I was in studies and testing. I fell into this business with my first assignment in the Army purely by accident. When I was in junior high school, I had read an article in the *Saturday Evening Post* about military operations research. Actually it was about the Operations Research Office (ORO) at Johns Hopkins University. I got the article and we re-published it in the *MOR Journal* a few years ago. Well, I read that article and said, "This is what I want to do." Now I had no idea how to do it or anything else. So I just fell into it when I got into the Army. I was running field experiments on chemical defensive equipment, extending the results of the experiment using simulation, using test data in it. This was in 1963 and 1964, but it's as advanced as almost anything we do now. So I had a very good tour in the Army. I ran an experiment and had half the post working for me at times. I had a GS-15 who was nominally the test director and I was his Lieutenant assistant. But I was just like Radar O'Reilly. "Just sign here, Mr. Schaffer. Just sign here, you don't need to read this, just sign this

memo." *{Laughter}* And he'd sign anything I brought him.

BOB SHELDON: Can you tell us some of the variables in those tests?

E.B. VANDIVER: What we were looking at was mask leakage under field conditions. We had about a company-size unit of troops and we had a simulated tactical situation; it was either at a bivouac, or it was an attack, or it was a defense. Each test subject had a gauze mask taped over his nose and mouth. And with that on, you can breathe okay. Then we had a time where we set off an alarm and everybody had to don a mask. At that time, we released a cloud of harmless bacteria: *Bacillus globigii* (BG). Parts of Fort McClellan are probably still contaminated where I ran this test. If your mask leaked around the edge, around the periphery of it, it would collect on this gauze. Then we had a way of measuring the ambient concentration—the concentration of the bugs that were in the air—and then we would count the number of bugs on each one of these masks by culturing them and then divide it into squares and counting and developing a distribution to make a statistical estimate. You first count the bugs and then we could come up with a ratio that we would use for a leakage factor, which roughly translates into a percent leakage factor. It turned out that under rough field conditions, about 10 to 15% of the soldiers had masks that leaked. This is still a problem today—in trying to get a perfect seal on those things. Now the leakage was statistically distributed and that doesn't translate directly into casualties. But it does translate into a fair number of casualties and we made an estimate of that. We took the distribution of leakages, and then we took dosage contours from the test data from out at Dugway Proving Ground, from live agent firing, where they had measured the dosage contours. We then overlaid that onto troops in a tactical situation, and then assigned leakages to them by drawing from those distributions. From this we could compute an estimated number of casualties. This was pretty good stuff. The people up at Edgewood Arsenal who make masks came totally unglued over the thought that anybody would possibly criticize their precious mask. This was because they tested it in this chamber affixed to this copper

head, and they didn't show any leakage when they did that. But that's a little different than a live human who hasn't shaved perfectly, and whose skin is oily, and doesn't put the thing quite on right. So we were looking at operational leakage. This was an operational test so there was a giant brouhaha over the thing, and the R&D Command non-concurred with us and questioned our morals, ethics, and parentage. Then the next year everything turned around and they used it as the justification for a new mask development program. Things haven't changed a bit, guys. This was in the early 1960s.

BOB SHELDON: Was there any controversy to using human subjects for the tests?

E.B. VANDIVER: The worst that can happen to you from a large dosage of BG is it'll give you diarrhea. And these were all young, healthy males. Nobody even got sick from it as far as I know.

BOB SHELDON: They didn't complain?

E.B. VANDIVER: Of course not. We had a draft Army then. These were troops. They were from a TO&E (Table of Organization and Equipment) field unit. So no, nobody complained.

BOB SHELDON: Did you write up a report?

E.B. VANDIVER: Yes. This is one of the reports of the infamous Project SAMPLES—Phase III. This is pretty neat in that we used a lot of different techniques in one little study.

BOB SHELDON: Did you have statistics in college before you went there?

E.B. VANDIVER: I had had mathematical statistics. I had not really had a practical course in statistics. I was learning that on my own. But if you've got a Masters Degree in Physics, you have a Masters Degree in math as a lesser included offense. But I hadn't really had any practical statistics courses. I had to just learn that all on my own. But I had an S&E—an enlisted scientific and engineering person. We drafted people that had good solid scientific backgrounds and then there was a program where they could get used in technical jobs. I had a Specialist 4 who worked for me that had a Masters Degree in statistics. So he taught me the statistics—everything I needed to know. And he worked on the thing.

BOB SHELDON: A corporal taught you statistics?

E.B. VANDIVER: Yes, that's right. He had a Masters Degree in statistics and had gotten drafted.

BOB SHELDON: How many years did you spend on active duty?

E.B. VANDIVER: I spent two years and four months. I extended a little bit in order to finish up the project. We weren't quite done staffing the thing, and I wanted to see it through to the end.

BOB SHELDON: How did you decide what you wanted to do after you left the Army?

E.B. VANDIVER: I wanted to do analysis. I wanted to do this from the time I read that article in the *Saturday Evening Post* in the early 1950s, and I was doing it. So I wanted to keep doing it. Now we'd get reports from RAC, the Research Analysis Corporation, and from CORG, the Combat Operations Research Group, which both were in Washington. CORG supported the Combat Developments Command. RAC supported the Headquarters of the Army. So when it came time to get out of the Army and do something else, I applied for jobs to those two organizations, and came up to Washington and interviewed with the two. I liked CORG better. They were just forming up a big new wargaming division and I was interested in wargaming. So I came up and went to work for CORG in August 1964.

BOB SHELDON: Was that a civil service job?

E.B. VANDIVER: Oh, no, no. This was a contractor agency. CORG was a contractor for CDC. CORG had been established by ORO. The Operations Research Office at Johns Hopkins—but they didn't want to keep it. So they turned the contract over to a company up in Boston called Technical Operations, Inc. They owned the CORG contract. It had originally been about a 25 or a 30-man operation down at Fort Monroe. Then after they formed CDC in 1962, it moved up to Fort Belvoir and it expanded up to about 150. They were in the expansion phase when I happened to write a letter saying, "Hey, I'm interested in this." They saw my background and education, and said, "Come on up." I worked at Fort Belvoir just about one block from where my new building is.

BOB SHELDON: Did you move into an entry-level position or a mid-grade position?

E.B. VANDIVER: I don't know how you'd characterize it. We had a war game facility and a new wargaming division. They'd brought Dr. Bill Archer down from Canada who ran the Canadian wargaming center for the Canadian Armed Forces. The division had a blue team made of blue players that were all retired Army officers. In fact, we had two retired brigadier generals and a bunch of retired colonels, lieutenant colonels, and majors. These were all of the blue players. We had a red division which was made of retired Military Intelligence officers. These were our red team. We had controllers who were generals and colonels. And then we had an assessment branch. They did all the game design, collected the data, and did assessments. All manually done of course with accounting pads, mechanical calculators, and slide rules. That was the level of automation we had. I was in the assessments branch, but I was one of several junior people—new hires there. One of the older people from CORG was the head of that group. Martin Chase was the head of CORG at the time.

BOB SHELDON: Who were your peers at CORG?

E.B. VANDIVER: They have all left the business. Of the group that was at CORG, the only other one that was there about the same time and was not in my group was John Riente, who retired now some years ago as the DCSOPS (Deputy Chief of Staff for Operations) Technical Advisor. In fact, John worked for me right before I left CORG. Hunter Woodall came back up from running the test support down on the air assault division at Fort Benning and was there a while, and then he left and went to MITRE and from there to Headquarters DA (Department of the Army). Gene Visco came over for a while, around 1967 from RAC, and Joanne Langston was there for a while.

BOB SHELDON: How was CORG arranged?

E.B. VANDIVER: CORG was organized by subject area, but wargaming was different. Wargaming was technique organized. The other divisions were all subject matter organized. It was like combat arms and combat support and they did analysis in support of

various elements of the headquarters of Combat Developments Command.

BOB SHELDON: Did you do any chemical and biological stuff?

E.B. VANDIVER: Yes, we did. When I got there, they were just finishing up a huge study called Oregon Trail which was a reassessment of tactical nuclear warfare. They had been doing a lot of tactical nuclear gaming, and the expansion of the division was being done because of the air assault concept. A monster study at that time was called ARAME, Army Air Mobility Evaluation. It was a huge thing of wargames and historical studies. Then, you had the 11th Air Assault Division (Test) testing out of Fort Benning, and it had all the tests and experiments—this is a mammoth undertaking. I worked on airmobility—originally they called it the Air Assault Division. I worked on wargames with that. We gamed it in Korea. We gamed it in Southeast Asia and a number of other places. That project ended about early 1965 and Mr. McNamara bought the results, and the 11th Air Assault Division (Test) turned into the 1st Cavalry Division (Airmobile) and went to Vietnam that summer. The next project I was on was a huge one on chemical and biological warfare called Mandrake Root. We did wargames of chemical warfare in Europe, Korea, and in Southeast Asia.

BOB SHELDON: The first one that McNamara bought off on, what kinds of concepts that you wargamed did he buy?

E.B. VANDIVER: Wargames were just a piece of this much larger evaluation. What he bought off on was the creation of an Army Air Assault Division. The final design of the thing was based on all the tests and experiments. In the final experiments, they took the 11th Air Assault Division (Test) and it ran an exercise that ran all the way from Georgia up into North Carolina. I mean, they were doing these deep air assaults 100 miles at a time. They were screening the Corps flank and all kinds of stuff. He bought off on the Army converting the division to the Air Assault Division, and it was very expensive because the Air Assault Division design had over 400 helicopters in it. But in the end they changed it to Airmobile Division and they didn't give it as many helicopters—that is why they changed the name. It was

because it wasn't the full Air Assault design. It was less than that. It had fewer helicopters so they named it the Airmobile Division.

BOB SHELDON: Has anybody ever looked in retrospect after it was operational in Vietnam? Were there any things you were surprised by that you didn't see in the wargames?

E.B. VANDIVER: Not really. Because a couple of years later I was over in Vietnam on the evaluation of the Airmobile Division and other units. There wasn't anything really surprising that came out of that. Now there were some different things that came out of it because of the nature of the war. But we had gotten the airmobile concept pretty right. This was because it'd been so thoroughly tested and studied.

BOB SHELDON: Do you know any of the people who briefed McNamara on it?

E.B. VANDIVER: No. Other than the Generals and CDC carried the action further. You know, we're just lowly contractors down there doing studies and wargames and stuff. Your work got folded into other things. We didn't go forward with it, so I couldn't tell you anything about any of that part.

MIKE GARRAMBONE: It sounds like you got the badge for being a real combat analyst and taking part in a study in Vietnam?

E.B. VANDIVER: That was a different study. At the end of 1965, we were pretty deep into Vietnam. The buildup was going pretty well. The First Cav had gone over in the summer and the battle of the Ia Drang Valley was in November 1965. General Westmoreland asked DA to send a group over to do an evaluation of combat operations. We were getting some experience. They needed to do an evaluation to find out what needed to be changed. DA approved that study and gave it to Combat Developments Command. Combat Developments Command gave the analytical support mission to CORG. Six of us went over to Vietnam to be on-the-scene analysts. A Brigadier General was assigned to head the study—George Mabry—who is a fascinating man. He held a medal of honor from World War II. Sixty field-grade officers were assigned to the study team to be data collectors. These were majors and lieutenant colonels. The remainder of the study staff came out of an organization that already be-

longed to General Westmoreland which was called ACTIV, the Army Concept Team in Vietnam. The study stood up in early January 1966 at the ACTIV compound in Saigon with the six analysts, the 60 data collectors, and the people there in ACTIV. The study was organized around what CDC called the five functions of combat: mobility; fire support; command, control and communication; intelligence, and logistics. I was the principal analyst assigned to the command, control, and communications area. This also included organization. The major finding of the study oddly came out of my area. I did the analysis for it, finding that the infantry battalions needed another line company. They needed another rifle company added to the battalion. The requirement arose out of the nature of operations. This is the thing that was not anticipated that I told you about in the original Airmobile Division. Given the tactics that were adopted in Vietnam and the way the enemy operated, the search and destroy mission became the standard operation. The way it was conducted was that two companies would run the search and they would search toward a third company. So it's a hammer and anvil kind of thing. You'd go out somewhere to do this. It operates off of a base where you came in by helicopter, and also set up some of your fire support. Well, once you had that base, everybody had a job to do, but the base needed to be secured because it didn't take the enemy very long to discover that this was a weak point in this tactic. So if we had three companies out conducting the operation, there was nobody guarding the base, and they would attack the base.

You really needed another line company. I developed the inkling of this very early on because we found right off that the battalions were creating their own fourth line companies out of some of their heavy weapons sections that they weren't using. They used their anti-tank weapons and part of their support people and were creating these makeshift fourth rifle companies. The Marine Corps already had a fourth rifle company in their battalions. They were reporting back, they weren't having any problems of this kind, but we were. So between the experience, what people were doing, and the operational logic of the thing, you could

build up the argument that you really needed a fourth line company in the maneuver battalions.

BOB SHELDON: Did you do an apples-to-apples comparison of with and without that fourth company?

E.B. VANDIVER: We could kind of do it from some of the ones that had them and what they said, and ones that didn't and what they said. A lot of this was pretty subjective. There wasn't a lot of quantitative data in big parts of this. There was a lot of judgmental input from commanders. We had every battalion commander in the field giving us input on the thing. We had a lot of the company commanders giving us input. So this was based on operational experience and reality, and that is what went into the final briefing. General Westmoreland approved it. The request went to DA. DA approved it and started forming up the additional companies, and they were deploying over there within months: the most tangible result of a study I ever did in my life. So I claimed to have put the fourth rifle company in all of the units in Vietnam. So anybody hearing this that was in Vietnam and was in a battalion with four rifle companies in it, well, now you know why.

BOB SHELDON: Those 60 data collectors, what kinds of data did they collect?

E.B. VANDIVER: We gave them questionnaires. We would put questions on it and some of them were open-ended. You know, just sit down with a guy and get a narrative answer on the thing. Others we would have would be a kind of multiple choice where we would ask for a range of values on something. We would send one instrument out and they would collect that and send it back in and then we'd see what we'd done wrong on the thing and we'd correct it and send a new one out because we did not have time to really test these things before we put them into the field, and you always do something wrong. It was a mixture of quantitative and qualitative, but very heavy on experience. We were relying very heavily on experience, so it met with great acceptance as it went up the line.

MIKE GARRAMBONE: Where did you live when you were doing all of this?

E.B. VANDIVER: Two other analysts and I lived in an apartment down near the central market, which is right on the edge between Saigon and Cholon, Cholon being the Chinese part of Saigon. The Navy actually ran the administrative services in Saigon at the time. They had school buses that ran routes around and we had one pickup point about a block from our apartment that ran down that main drag and went down to Cholon. We could ride that bus all the way downtown and change, and take another bus and go over to ACTIV. Or we could walk it since it was about a 30-minute walk. Sometimes we'd do one, and sometimes the other.

BOB SHELDON: And the 60 data collectors went out to the field?

E.B. VANDIVER: They were in the field. They were out living with their units. There were some for infantry divisions, some for the maneuver battalions, and some for the brigades. They were associated with all the headquarters.

BOB SHELDON: Was their fulltime job data collection, or did they carry a rifle too?

E.B. VANDIVER: No, they were there to collect data, and they were mostly TDY from CONUS. When the study was over, they went back home. In the field they were armed. Everyone was. Even as civilian analysts we rarely went to the field unarmed.

BOB SHELDON: Your group came up with the most successful finding. What about the others?

E.B. VANDIVER: A lot of it had to do with the airmobile operations and the nature of them. There were a lot of little kinds of fixes that were needed in material and what we call TTP (tactics, techniques, and procedures) now. There was this raging argument about whether they ought to have 60 or 81 millimeter mortars. The same argument is going on today. *{Laughter}* There is no better answer today than there was back then, and so the answer was, "Well, we'll just use both." The problem was, you needed the big mortar because of the firepower and the lethality of it, but if you're out humping across the jungle, you can't carry more than half a dozen rounds. With the 60 millimeter mortar you can carry a lot of rounds. So they ended up having both. You carried one when you could

and brought the other one in later. The larger one could be put in a firebase and even ones of bigger sizes.

BOB SHELDON: How long were you over there doing this study?

E.B. VANDIVER: We were there four months; January, February, March, and April.

MIKE GARRAMBONE: It seems like you did this study 'from soup to nuts.'

E.B. VANDIVER: Yes, we did. It was very comprehensive. It was called ARCOV, Army Combat Operations in Vietnam. A year later they did another one called MACOV. Mechanized and Armor Combat Operations in Vietnam. Gene Visco was on that one, but I wasn't.

BOB SHELDON: The other civilians that went with you, do you know them by name?

E.B. VANDIVER: Yes. Wes Curtis was the head of our group and he was a pretty senior analyst that originally started up at AMSAA (Army Materiel Systems Analysis Agency) at Aberdeen Proving Ground. He had come down to CORG when they expanded there in the early '60s. He was pretty senior then and was the head of the group. The rest were pretty much junior analysts. One of them was a retired Major, Pohlman was his name. Then there was the three of us who were all about the same age and background. There was me, Bill Carswell, and Bill Brown. We all belonged to the same fraternity by happenstance at three different schools. It was Pi Kappa Alpha, a social fraternity. None of them are in the business anymore today, except for me.

MIKE GARRAMBONE: What do you think about combat data?

E.B. VANDIVER: Combat data, first of all, is extremely messy. You are not going to get anybody—and I'm speaking now from both experiences in Vietnam, and what we're experiencing over in Iraq and Afghanistan now—you're not going to get commanders to collect anything unless you get some very senior commander to tell them to collect it. And commanders are not going to tell them to collect it unless they think it's really important. Now, General Westmoreland asked for this study to be done so everybody cooperated. I mean, this is the Army, and the data collectors were all field-grade officers so they had credibility with the people they were out talking to. We tried to

make the instruments such that we weren't asking anybody technical questions. We were asking about operations. Operational kinds of stuff that is, and the kind that we could then analyze. Data we could do some simple statistics on or make graphical displays, and then analyze it from there. Now, we can do a lot more sophisticated things today, and indeed we are.

BOB SHELDON: Did it seem pretty calm to get back to stateside operations after being in a combat zone?

E.B. VANDIVER: It sure did. But I very quickly got into another Vietnam related study. That was on the requirements for ammunition, particularly because the use of large caliber artillery ammunition was going up at a tremendous rate. DA was balking at this and wanted them to project out into the future what ought to be their expenditure rate. Dr. Wilbur B. Payne's office in Army headquarters asked CORG to take a look to see if they could come up with some way of forecasting artillery ammunition expenditures. I ended up getting that job and put together a forecasting methodology based on the kinds of operations that were being conducted and the typical expenditures used on different missions during operations. I then compounded that to make a forecast based on what they forecast about the operational variables. I templated the artillery ammunition usage to a kind of operation, and then asked them about their operations—I didn't ask them to forecast the ammunition. I asked them to forecast the tempo of operations and the occurrence of different kinds of operations. I had to go back to Vietnam to collect data on that and I went back for three weeks in early 1967. I then made the forecast on the thing and ended up briefing this all the way to the Secretary of the Army, who was Mr. Stanley Resor.

BOB SHELDON: What were the variables you collected data on?

E.B. VANDIVER: The first thing I looked at was what the ammunition was being used for. What are we shooting? One thing we were shooting was to prepare landing zones for air-mobile operations. The frequency of air mobile operations was a big one, because we really prep these landing zones. And we used these zones on search and destroy missions when we engaged a unit. We would try to pin them

down and then pound the hell out of them. It was the rate at which we actually made contact and then engaged units—these were two templated expenditures. Battalions, just by virtue of being in the field, expended a certain amount of artillery just as background to operations. A lot of ammunition was just fired as H&I, Harassing and Interdiction fires. No target per se, they just think well, we'll fire out here and there and other places because somebody might be there. It is essentially firing at something and hoping that something or some enemy may by happenstance be there. I found that actually the bulk of the expenditures were just being fired off into nothing so to speak. I would ask the headquarters to forecast at what rate units would be going to the field and operating. From that estimate I could make an estimate on these close engagements. Then I could also make an estimate on the number of air mobile operations and getting that, compound these things to get an amount.

MIKE GARRAMBONE: Since you studied as a field artillery officer, you knew a lot about field artillery and ammunition?

E.B. VANDIVER: Oh yes, I knew a little something about our field artillery operations.

MIKE GARRAMBONE: I think one of the interesting thoughts here is certainly your experience and background—it's like the tactical guy going to the technical problem. How do you feel about this?

E.B. VANDIVER: I thought it was a pretty straightforward kind of problem to deal with.

BOB SHELDON: How many other people worked on that study with you?

E.B. VANDIVER: Me. I did it all by myself.

BOB SHELDON: And it went up to the Secretary of the Army?

E.B. VANDIVER: It went all the way to the Secretary of the Army. Dr. Payne and Abe Golub were behind it. I actually worked it for Abe and he was the one that wanted to take it up as his project.

BOB SHELDON: How long did the study take?

E.B. VANDIVER: I was doing that for about four months.

BOB SHELDON: Did you formulate a regression equation or a Lanchester attrition equation?

E.B. VANDIVER: No, I didn't do any of that. It was much more simple and deterministic than that. I later did a regression, and it showed about the same thing.

BOB SHELDON: What was your next project?

E.B. VANDIVER: After that one, I became a Branch Chief and something of a manager, and I had three or four projects.

MIKE GARRAMBONE: You were still working for CORG at the time?

E.B. VANDIVER: Right. But I moved to a new division. Actually, it was the same one, but after I finished the project, I became a Branch Chief and then I had three or four projects under me.

BOB SHELDON: What branch was that?

E.B. VANDIVER: I don't remember its name at the moment, but Don Hall was the Division Chief. He was a wonderful man. He was an older man and a fairly senior analyst. He'd been at AMSAA years earlier. I had joined him as an analyst when I came back from Vietnam, and then when I finished that project, he made me one of the Branch Chiefs. John Riente worked for me then. He had the artillery ammunition rates. Interesting what became of the ammunition rate studies. I am still doing them today at CAA. John did the first ones back in 1966 and 1967 and it was artillery estimation using simulation. But now it is on future scenarios. This isn't current operations. Then, I had operational data and I had experience data. I had all kinds of good stuff to work with. But this was now future stuff. This was combat developments. Added to that, I had another group that was building a simulation of attack helicopter operations. I also had a cost effectiveness analysis on attack helicopters and a couple of other projects.

MIKE GARRAMBONE: I've noticed you haven't mentioned the word computer once.

E.B. VANDIVER: We didn't have any.

MIKE GARRAMBONE: So when you say simulation, do you mean with machines?

E.B. VANDIVER: Now that was being done. Two simulations were being coded for computers. John Riente used the STAG (Strategy and Tactics Analysis Group) computers over in the organization that became CAA. They had an IBM 7090. I've got a picture of it

down there in the library at CAA. John would drive over to Bethesda and turn in his job and his deck of cards and they'd run it overnight and then he'd go back the next morning and pick up the printouts on the thing. This was allowed because they had excess capacity over there. Whenever we needed computer runs, we got them from STAG. We did the same thing on the helicopter simulation. We would take the deck over there and run it on the trial run and then bring it back. I don't think that thing ever did get developed. That was a typical simulation development project, like some of the ones you are probably familiar with. It had been going on a long time when I got it, and I think it was still going when I left and it may still be going on somewhere. This was going on around 1966 and 1967.

BOB SHELDON: You were in Vietnam twice for short intervals. Had you noticed a change in the political climate there between your two visits?

E.B. VANDIVER: Yes, I think by 1967 the Americans had totally overrun the place and were doing everything. They were everywhere and were doing everything. The war belonged to us by then and things were a whole lot less clear then just a year earlier.

BOB SHELDON: After this munitions study, then you were put in charge. Were any studies of consequence done under your supervision?

E.B. VANDIVER: No. Not really. We didn't have very good projects then. I should mention, though, that we did the study over in Vietnam from January through April and then we came back in May. In the fall of 1966, we went to the MORS Symposium and gave a general session presentation on what we had done over there.

BOB SHELDON: Was that your first MORS Symposium?

E.B. VANDIVER: That was my first and it was the 18th MORSS at the Kennedy School of Special Warfare at Fort Bragg, North Carolina. Bill Carswell, Bill Brown, and I each had a 20-minute general session presentation. I covered just my area, and a piece of somebody else's. We were all documented because we had to deliver a camera-ready copy. Remember that? It was prepared for the proceedings. That

was for the 18th MORSS and then they were going at the rate of two a year, so it had only been in existence nine years at that time.

BOB SHELDON: Remember your perceptions of your first MORS Symposium?

E.B. VANDIVER: I was in awe of the thing. Here we are—remember, this is 1966. I'm only 28 years old and here are all of the giants of the field, and I'm briefing a general session of the MORSS.

BOB SHELDON: That means you had a large audience?

E.B. VANDIVER: I had a whole auditorium full. We were using lantern slides. You remember what those are?

MIKE GARRAMBONE: You're going to have to tell us what lantern slides are.

E.B. VANDIVER: If you're projecting to a big audience, you've got to have something that uses a very strong illumination source. So one of the devices that was commonly used for auditoriums was the lantern projector, and the lantern slide was on a piece of glass about three inches by four inches. You put a slide in one at a time and you had this humongous bulb in the thing that would project it up big enough and bright enough, where you could read it in an auditorium. Now, there's a piece of antique technology. So, if you've got a briefing, you will have a box full of these glass slides that weighed about ten pounds.

BOB SHELDON: Did you get any technical questions from the audience?

E.B. VANDIVER: They were the usual, I thought. OR analysts asked questions about did you really ask the right questions and how do you know you needed more companies rather than more battalions? These were fairly easy to answer. But no, I didn't think I got very good questions. I was a little disappointed at that.

BOB SHELDON: Did you sit in any other working group sessions?

E.B. VANDIVER: I did go to some sessions on wargaming. I was very interested in wargaming still, and I went to see some. RAC was presenting some things they had been doing on wargaming. They were wargaming in Iran against the Soviet threat, where we're defending our loyal Iranian allies.

MIKE GARRAMBONE: This idea of wargaming has come up several times thus far. It

seems like you have a firm interest in that topic. Do you still do that?

E.B. VANDIVER: We do, but we don't do it anywhere near the same way. We do it now with the campaign simulations, but the way we do them now, they're quasi wargames. This is because we do it by phase and we interrupt and change things from phase to phase. The way CAA does campaign analysis today, I'd say they are very elaborate computer-assisted wargames.

MIKE GARRAMBONE: How would you classify the games back then?

E.B. VANDIVER: They were manual war games. A lot of them were two-sided and closed, so they were very slow. Red and blue only had their intelligence situation. Only control had ground truth. Nobody does much of that anymore. But the closed game was considered to be the preferred mode of wargaming then. It was very expensive and it was very slow. It took a lot of players and a lot of time. That's pretty much why it's gone out of style today.

MIKE GARRAMBONE: But you liked the results?

E.B. VANDIVER: Oh, yes. We liked the results because the commanders had to act on the situation that was presented to them. They didn't get ground truth.

MIKE GARRAMBONE: It sounds like you might have more dialogue about how are you thinking about doing the operation?

E.B. VANDIVER: Right. We found out "why you did what you did." You don't know everything, so you're explicitly dealing with uncertainty in this mode.

MIKE GARRAMBONE: But you were able to bring that out with the techniques you used?

E.B. VANDIVER: Yes. And that was part of the findings, too. We would identify what are the major areas of uncertainty and what the Intelligence people need to collect on in order to help us with this, that, or the other.

BOB SHELDON: Did your boss tell you to go to MORS?

E.B. VANDIVER: No. Bill Brown and Carswell knew about MORS. I didn't. So they set the whole thing up, and then we talked the management into letting us all go. I didn't know what it was, but they did since they had

had exposure to it before. Bill Brown had been an analyst in combat developments with the Transportation School at Fort Eustis, and Bill Carswell had been an enlisted scientific and engineering person up with HUMRRO, the Human Resources Research Organization. These two knew about MORS and I found out through them.

BOB SHELDON: When you were first a supervisor of your own branch, did you send your people to MORS?

E.B. VANDIVER: No, because I wasn't there very long. I tried to get to go to MORS in 1967 to brief my artillery forecasting study, but the working group chairman I sent the request into turned me down, which I've been peeved about for forty years now. That was a really good piece of work. I left CORG shortly thereafter in early 1967.

BOB SHELDON: Why did you leave CORG?

E.B. VANDIVER: The three of us that had been in Vietnam together—Bill Brown and Bill Carswell were ready to move on. Bill Brown had left and went down to Texas to work for LTV. Bill Carswell and I decided we'd just get out and start our own company, and do it all ourselves. So that is what we did. Incredibly brash thing to do, but when you're young, you can do stuff like that.

BOB SHELDON: What was the name of your company?

E.B. VANDIVER: It was Carswell Vandiver & Associates. CVA, Inc. Between 1967 and 1970, our corporate growth curve followed a perfect ballistic trajectory. It started at zero and it went to an apogee of about \$300,000 in 1968, which is about a million and a half in today's money. By 1970 it went back down to zero because the bottom fell out of this whole business in 1969 and 1970. We had some pretty good projects with Combat Developments Command. We did some cost effectiveness analysis on the TACFIRE field artillery system. TACFIRE was the first field artillery ADP system. It did technical and tactical fire control computations and could develop division and corps level fire plans and keep track of munitions inventories. Since it took about 20 years to develop and field, it was obsolete when fielded and soon replaced, a fate that befell others of

the first generation of tactical ADP systems. We did some cost effectiveness analysis on TOS, Tactical Operations System. We did some work for Headquarters DA on measures of effectiveness for Vietnam and some other things. We really did well there for a while, and then the bottom fell out, and then we had to go get real jobs. So in the summer of 1970, I came up to DA and went to work for Abe Golub who had just taken over as the Scientific Advisor to the ACSFOR, the Assistant Chief of Staff for Force Development.

BOB SHELDON: It is 27 December 2004 and we are here at the Center for Army Analysis, Wilbur Payne Hall at Fort Belvoir, Virginia to continue our second session of our oral history interview with Mr. E.B. Vandiver. You said you had recalled some stories from the 1970s.

E.B. VANDIVER: Older than that, I want to go back to my period in college. When I was in graduate school, I worked part-time for the Agricultural Research Service. I was doing multiple regression on milk production data, test data, by hand on mechanical calculators, which is extremely tedious. They had just put in the first mainframe computer at the University of Missouri and it was a Burroughs 202. The thing had vacuum tubes in it. I talked to the man I worked for there and asked if we had an account on the university computer. I asked if I could get this stuff programmed so I could do it that way. He said, "Sure, go right ahead." So I went over there and got a book of the instruction set. This is a second generation computer, possibly a first generation—I'm not sure how you differentiate them. But it had no operating system. You wrote code directly to the ALU (Arithmetic Logic Unit).

BOB SHELDON: In assembly language?

E.B. VANDIVER: No, in binary code. You were using the actual instruction set. So you were writing binary instructions directly into the arithmetic logic unit. You were programming the processor itself. So you wrote the code in binary and you had a book with the instructions set in it, and then you had a map of the drum, because this thing had a rotating magnetic drum for memory that had 4,000 locations in the main memory, each of which held a fairly long number. You had this map of the drum with all the addresses on it and so as you wrote

the code, you tried to keep the code together as close as possible on the drum so you didn't waste a lot of time spinning this thing. Once you entered the program, the people there ran the thing. It had vacuum tubes in it; they were always blowing when it was operating, so they were always going down to put new tubes in it. It was in the basement of the business school, and there was ten tons of air conditioning on the thing. They put the code into the thing using paper tape. Later on, the data went in on punch cards. So I learned very clearly exactly how a computer operates and I decided this is not very user friendly. I didn't want to mess with these things, although I wrote a program to do multiple regression and boy, we were doing regression like crazy then. But every few years after that—this was 1960 and 1961—I would check to see, "Are they user friendly enough?" The answer was always, "No" until just a few years ago. Then I decided, yes, they're not too bad now.

BOB SHELDON: Did you use statistical designs?

E.B. VANDIVER: No, this was just straight multiple linear regression. They had warehouses of data from experiments they had run over at the agricultural research station in Kansas. There they put milk cows into chambers where they controlled humidity, temperature, and their feed. Then they varied the kind of cow, they varied the temperature, they varied the humidity, and then they measured the milk production. They've been doing this for years and had mountains of this data. Well, I just about cleared out the backlog because I got this thing automated so we could look at what looked to be important. The answer turns out to be that cows give the most milk when they are happy, just like humans are, with about 70° temperature and 50% humidity, and whatever their normal diet was. *{Laughter}* But the government spent a lot of money on this.

BOB SHELDON: Was that graduate school or undergraduate school?

E.B. VANDIVER: I was in graduate school at the time. I was working part-time. In fact, the agricultural research station was co-located with the University of Missouri, their agricultural school. You had asked me about knowing statistics when I was down with the Army and

then reducing the data from the big field experiment. I didn't have any problem there because I had a Specialist 4 who had a Masters Degree in statistics. When I got up to go to work at CORG, Combat Operations Research Group in wargaming, I decided I didn't know enough probability and statistics so I went over to American University and took nine hours worth of probability theory, mathematical statistics, and stochastic processes. So this is what got me kind of up-to-speed on it. In fact, I've always gone to school a little bit here and there all the time. I must be over 300 semester hours by now. Those were the things I wanted to make up.

BOB SHELDON: We finished the previous interview with your second tour in Vietnam. You were coming back and I think you had a job change about that time?

E.B. VANDIVER: That is right. About at the end of the 1960s after President Nixon came in, the bottom fell out of the contracting market. This was because he made severe cuts in the defense budget, shifting money over to support Vietnamization. Contract money almost dried up overnight. I had my own little company then with Bill Carswell, and we were now on the descending end of the ballistic trajectory of our corporate growth curve. We hit zero about the early part of 1970, and Abe Golub was forming up the scientific advisor's office and ACSFOR had just started, and he asked me to come work for him, so I did. I started on the Army Staff on July 14th, Bastille Day, 1970, and I was in the Army headquarters for fourteen years after that.

BOB SHELDON: You came in as a fifteen? How did you get such a plum position?

E.B. VANDIVER: I started as a GS-15, which was kind of nice because Mr. Golub knew me from the work I'd done on the Vietnam stuff, and particularly for the artillery ammunition projection work, which got him a lot of favorable publicity with the Secretary of the Army. He had two GS-15 positions for his new office, and he gave me one of them. Abe was the Scientific Advisor to the Assistant Chief of Staff of Force Development (ACSFOR) in the Pentagon. It was a three-star major staff agency. It has just been recreated. That is what the G8 is today. It is a re-creation of ACSFOR. The first

ACSFOR was LTG Ace Collins who went to Europe then to be the four-star commander. The second one, who was there when I came, was LTG Bob Williams, who was an aviator and one of the pioneers in Army aviation. He was followed by LTG Hook Almquist. ACSFOR went out of business in the DA reorganization in 1974.

BOB SHELDON: What were your initial projects?

E.B. VANDIVER: One of the big ones right at the beginning had to do with fielding the TOW (Tube-launched, Optically tracked, Wire-guided missile) and Dragon missile systems—the anti-tank guided missile systems. In 1970 an infantry battalion had either six or eight 106 millimeter recoilless rifles as their anti-tank weaponry. It was apparent that, with attention going back into the threat in Europe, and the Soviet armor threat, that the recoilless rifle was really quite inadequate. The TOW and Dragon missile systems had been started years earlier to deal with armor. They were just coming up to production and the question was, “How many of these do we put into an infantry battalion?” Naturally the original position was the TOW would be a one-for-one replacement for the 106 recoilless rifle. But then a lot of people said, “Wait a minute.” Now we’ve got something that’s really capable here. Let’s put enough of them in to really do something. We had a lot of work going on with the infantry school, and they were running a tank, anti-tank simulation looking at different numbers of them to put into the infantry battalion. Later through the Assistant Vice Chief of Staff’s Office we were running Seth Bonder’s model on the same thing, with the early Bonder IUA (Individual Unit Action) model, and looking at different numbers. By the time we were done, instead of the six to replace one-for-one the 106 recoilless rifles, we ended up with 18 TOWs and 27 Dragons in the mechanized infantry battalion.

BOB SHELDON: Were the calculations for that threat-based?

E.B. VANDIVER: Oh, yes, and based on achieving a certain level of kill against an attacking Soviet armored force.

BOB SHELDON: Was this a Fulda Gap scenario?

E.B. VANDIVER: Right. It was the scenario of choice. I mean, it was at Fulda Gap. That’s where we were and that’s where the threat was.

BOB SHELDON: Did the Army purchase that many systems?

E.B. VANDIVER: Yes, they did. I mean it was accepted as the TO&E (Table of Organization and Equipment) design. How many Mech battalions they actually equipped at that rate, I’m not really certain. Because later there was another big change made where instead of the ones that just sat up on top of the M113 Armored Personnel Carriers, they put them in the vehicle that the artillery forward observers used, which had the armored hammerhead on it. So I don’t know in the end how many they had actually fielded, but they certainly set off to do it that way. Another big project I worked on in 1971 was the M60 A2 tank which was a program that had run into all kinds of terrible problems with the new turret shape and the firing of the Shillelagh Missile. It was going to be the interim missile firing tank until the MBT70 (Main Battle Tank 70) came along. Well the MBT70 never came along. The interim missile firing tank had so many problems, that they never really completed the production on it. They had all these hulls and turrets in storage. Then they decided there’s not going to be an MBT70, we probably ought to field these things. So there was a big cost effectiveness study we had done with AMSAA, the Army Materials Systems Analysis Activity that looked at fielding these. But they had so many problems that we really couldn’t recommend that you ought to do this. Because there were only going to be like three or four hundred of them total, and they were a low density item, it’d be hard to maintain them, and the Shillelagh Missile system was very expensive and a very difficult thing to make work. So we had a whole lot of reasons that we felt we should not field the things. Well, they fielded it anyway. There were only about eight battalions of them and I stayed at DA (Department of the Army) long enough to attend the meeting where they recommended that we wash them out of the inventory for all of those exact same reasons. *{Laughter}*

BOB SHELDON: What was the reason they didn't listen to you the first time around? Was it political?

E.B. VANDIVER: Yes. The Material Command was behind the thing. It'd be too embarrassing for them. It's too embarrassing to kill a program.

BOB SHELDON: So that was your first year. Two major projects like that?

E.B. VANDIVER: Yes. I had a good time. Plus we had the big field artillery studies going on. In 1972 in fielding the non-nuclear Lance, the Institute for Defense Analyses (IDA) had a study out that says this is not a good idea. The OSD PA&E was using that to try to prevent it, and we had about a year of analytical trench warfare there, but the Army position finally carried on that issue. The system was also apparently of limited capability, but it got us started thinking about deep attack and integrating that in with maneuver and prioritizing targets, and deep targets, and a lot of kinds of things that are pretty common today—but were fairly revolutionary then. I didn't actually do the studies myself. What we did from the headquarters is we'd go get somebody to do it, tell them what we wanted to do, watch the thing, and then when it's done, put it in a form where we can take it around and explain it to the people who actually made decisions.

BOB SHELDON: Who did your studies for you?

E.B. VANDIVER: It was either in Combat Developments Command, their analysts, or CORG, Combat Operations Research Group, was still there, their analysis group. The Infantry School also did studies. Some of the schools had pretty good analysis capabilities, so the infantry school the field artillery school, and air defense school did studies. Then there were analysts out at Fort Leavenworth and at AMSAA, and also defense contractors. There was also the Office of the Assistant Vice Chief of Staff of the Army and they too had contractors. There were a lot of people around to study things.

BOB SHELDON: A big problem analysts have is receiving communication down as to what's really wanted and then communicating it back up. Since you're in the middle, how did you address those challenges?

E.B. VANDIVER: That was a big job that Mr. Golub and Dr. Payne had up in Headquarters DA convincing people that they needed these studies done in the first place, and explaining the results. They had had so much grief from OSD Systems Analysis in the 1960s over McNamara's whiz kids, refusing to accept Army programs unless they had some analytical basis, that they were willing to listen. In fact, that's why Wilbur Payne's office (the DUSA (OR) office) was created, and he was brought down from OSD Systems Analysis. He was one of the whiz kids. When he became the head of the analysis in the Army he brought Abe Golub in from AMSAA, and the Army then set up the Office of the Assistant Vice Chief of Staff, and John Honig was in there and then later Hunter Woodall. This was something we needed if we were going to get our programs through OSD. Although there were a few who had different attitudes to this, by and large that was the general attitude.

BOB SHELDON: How many years were you in that position?

E.B. VANDIVER: I was in ACSFOR for four years. The most interesting year of that was 1972. That was the year of the STEADFAST Reorganization. It consumed a year of my life, pretty much. Coming out of Vietnam, the Army leadership decided that we really needed to organize differently, particularly in CONUS (Continental United States). The major commands were very unbalanced and there were some things that weren't being done that needed to be done. So the STEADFAST Reorganization started off with a couple of planning decisions that shaped it. There were then two major CONUS commands. One was CONARC, Continental Army Command, which owned all of the units and all of the training. It was humongous. Then you had Combat Developments Command, which was a mouse compared to the CONARC elephant. So one of the main things that the STEADFAST Reorganization did was re-sort Combat Developments Command and CONARC into TRADOC (Training and Doctrine Command) and FORSCOM (Forces Command), which are the organizations that have endured to this day. If you get a good sound basis for an organization, it'll usually last. Idiots will get in and change them

sometimes, ruin them sometimes. But this one was so good, it made so much sense, and you ended up with two four-star Generals who had roughly comparable commands, so now you've got two huge and powerful vested interests in keeping it this way. So it's got a lot of stability and it's been a good organization. The voids were operational testing and analysis at the headquarters level. The other part of the going-in position on STEADFAST was to create two new DA agencies—one for operational tests and evaluations, and the other one for force analysis at the headquarters DA level.

ACSFOR and Abe Golub got the action for doing the planning for the creation of this force analysis office because the Army force structure responsibility was in ACSFOR. They had a director up there that was responsible for that. The ACSFOR was responsible for specifying the force structure. Abe Golub got the action, so he gave it to me. I wrote the concept plan for this thing and briefed it to the project office. LTG Kalergis was brought in with a big project office with a lot of water-walking majors, lieutenant colonels, and colonels. So I get to do the concept plan, brief it, and then it's all approved. I did the detailed plan and the staffing for it, and all that was briefed to everybody, and that was approved. Then the decision is made to go ahead with the thing. The working name for it had been the Army Force Analysis Agency. Just as it got to the end, and they brought in the commander and designated the implementation planning group, General DePuy changed the name to the Concepts Analysis Agency. So I did all the planning for the creation of CAA. Now you won't be the first person to say this is poetic justice *{Laughter}* after all these years. So that is how CAA was created. The new agency for operational testing OTEA, became OPTEC which became test command, or whatever they are called today.

BOB SHELDON: This was happening during the force drawdown?

E.B. VANDIVER: This was happening during the big drawdown. I mean, the core structure of the Army was in free fall. I think we went down to twelve or thirteen divisions, and then came back up after that. In fact, by the time the Cold War ended, we were at eighteen

active divisions. I think the low point was thirteen in 1973.

BOB SHELDON: How did the Army staff react to creating an agency when you're in a drawdown mode?

E.B. VANDIVER: We still had a draft Army. We still had lots of people. In fact, we didn't get tight on people until way up into the 1980s. However, during the Cold War, the Army's strength was quite large. The active strength of the Army was for many years around 780,000 to 790,000 and the Army civilians were 350,000 to 400,000. We had quite a bit of manpower. That didn't get tight until later. That was about all the interesting things that happened in ACSFOR. One interesting thing, though, is that when General Abrams came in to be the Chief of Staff in the Army, after General Westmoreland's tour was up, it was 1972 or 1973. He found out everybody was working on Saturday morning. So he sent word out that—let's stop this working on Saturday mornings. Then the first Saturday after that, he sent the Secretary of the General Staff around to see who was working and found out everybody was there working. So then he sends out a message that recounts this and says, "Next Saturday I'm coming around and there'd better not be anybody here." *{Laughter}* That put an end to Saturday work.

BOB SHELDON: Was that at the headquarters?

E.B. VANDIVER: Yes, it was Headquarters Department of the Army (DA). Then he said another thing. He instituted the practice of a person who has the action carries it all the way to the top. Before that, some poor major would have the action, he'd do it all, he'd create a briefing, he'd give it to his branch chief who would then give it to his division chief. Then when he went forward with this thing, they drug this whole chain of command with them up to where they were going. And usually, a full colonel would then brief the thing, and the AO (action officer) may or may not even be in the room. So General Abrams said, "No, no, the AO carries the briefing from the bottom to the top and you don't bring the whole chain of command along with you." General Abrams did some wonderful things, but he was only there about a year and then he died. But he

made some vast improvements in headquarters DA in the short time he was there.

BOB SHELDON: Did he have an analysis background?

E.B. VANDIVER: No, he was just very smart. Very shrewd.

BOB SHELDON: You were there until 1974?

E.B. VANDIVER: In 1974 there was an opening for a super-grade in the DUSA(OR)'s office—Wilbur Payne's office. The reason was that Pete McDevitt had gone up to a job in OSD somewhere so this made an opening. I went to Mr. Golub and to Dr. Payne and told them I'd like to have that job, and Abe recommended it, and Wilbur accepted it, so I went up to Wilbur's office as a GS-16. We still had super grades then. This is in July 1974 and I was the youngest super-grade in the Army. Now I'm pretty close to being the oldest one *{Laughter}* but not quite. There are a couple others that you know. Walt Hollis has got six years on me as a super-grade. Dr. Bill McCorkle down at Huntsville has got several years on me as a super-grade. Probably five.

BOB SHELDON: DUSA(OR). What kind of work did you do?

E.B. VANDIVER: I had all of the ammunition and field artillery programs, and missile programs that were not air defense. Plus I had some of the DCSOPS force studies.

BOB SHELDON: How big was DUSA(OR)?

E.B. VANDIVER: There was Wilbur Payne, with Hunter Woodall as his deputy. There were three SES's under them, me, Dick Lester, and Dan Willard. It's about the same as it is now. Then we had a few military, and that was about it. We also had two or three secretaries. That's back when we actually had secretaries and people answered telephones. It wasn't too much. Actually Walt's office is a little bit larger because it has picked up some other things over the years.

BOB SHELDON: DUSA(OR) then was reporting at the same level as they are now?

E.B. VANDIVER: Actually it was reporting to the Under Secretary of the Army. When I was there, we had several Under Secretaries, but the one that was the most fun was Mr. Augustine. Norm Augustine. He was just an

absolute delight to work for. In 1976, he had just moved up from being the Assistant Secretary for R&D, and he moved up to be the Under Secretary. He believed that the Army didn't have enough money for acquisition so he wanted to put together this briefing so that we could go around and get more money for the Army. I ended up being the action officer on this thing, so I spent the whole year making briefing charts and flipping charts for Mr. Augustine, and got a medal for it. I got an Army Meritorious Civilian Service Medal. It's a fairly high award for making view graphs and flipping charts, but I tell you, every chart in this briefing had a whole file folder. I had a whole file cabinet that was full of this briefing, because we kept adding charts and taking them out and it was a 40-chart briefing, but it was never the same forty charts. The briefing was called Equipping the Army. What Mr. Augustine would do was he would go around to all these different people in OSD and other services, and anybody that would listen to him. He'd say, "Look, I'm putting together this briefing to go give to somebody else." He never would say who it was at the time. "Now I want you to help me here." So he would go through and immediately he has the whole audience—whoever it is, cooperating. Of course, that's his real audience, and they're telling him, "Well, Norm, no, you ought to change this chart and make this way or that way." And he accepted all suggestions. "Okay. Right. That's a great idea. Write that down." I was back there where I could flip the charts and write the notes down. And we had a chart that had these columns on it and they were filled up as a bar chart that showed the percentage of the authorized acquisition projecting what we actually had on hand. So now it was percent fill. It was tanks, and APCs and the like. They were filled up and they were green. If we briefed that one, the audience would invariably say, "No, you really ought to emphasize the part that's not there." We ought to color the top part. So Norm says, "Right, we ought to do that." Well, that's the one we would use on the next iteration. We had two versions of the authorized acquisition objective field chart—the stalactite and the stalagmite. And this went on and on for six months. When it was all done, we got almost a billion dollars

added to the Army procurement accounts over the program years. We could have gotten more, but we didn't have anything ready to buy at the time hardly. We could mostly buy stuff that we already had in production, but that's like M113s and some of the artillery pieces and helicopters. But remember, we had the big five in development and they didn't become available to be bought until the 1980s, so we were a little early for that. Mr. Augustine thought that we could have gotten a lot more money if we'd have had something to buy with it that was really sexy.

BOB SHELDON: This is during the Carter administration?

E.B. VANDIVER: It ended up being right at the end of the Ford administration and then, of course, during the Carter administration, a lot of that stuff dissipated. We went down again after that. Dr. Payne was only there about another year and a half after I arrived, and in November of 1975, he left to go down to Training Doctrine Command and head up their whole analysis activity. General DePuy went and got the old Safeguard Systems Analysis Activity, got it transferred to TRADOC, that was about three or four hundred people down at the White Sands Missile Range, and converted it to be his analysis organization. Now they're almost all missile engineers of one kind or another, but the Safeguard program was shut down otherwise they'd been out of work. So Wilbur went down there to retread these guys and make analysts out of them, OR analysts, and that became TRASANA, the TRADOC Systems Analysis Activity, that Wilbur Payne headed up. Then Dave Hardison became the DUSA(OR) and I worked for him until 1977. Abe Golub retired from the staff in 1976. Now when ACSFOR went away in 1974, Abe's office went over into DCSOPS. His new job was the DCSOPS Technical Advisor. I succeeded as the Technical Advisor in DCSOPS in March 1977. I'm a GS-17. Abe had become an eighteen, but I got it as a seventeen. Two years later the super grades went away when they created the Senior Executive Service. I'm a charter member of the Senior Executive Service. The Senior Executive Service was kind of all the same, so it's hard to tell who's what. The DCSOPS (Deputy Chief of Staff for Operations)

was LTG Shy Meyer. I was Technical Advisor to him. He was succeeded by LTG Glenn Otis and then by LTG Bill Richardson, and then at the very end by LTG Fred Mahaffey. After that I went to CAA in 1984. On the first of October 2004 I had been here at CAA for twenty years.

BOB SHELDON: Your job in 1977, was that a change in position?

E.B. VANDIVER: I had been in the secretariat in DUSA(OR) and this was back on the staff in a major staff agency. This was the office in the G3 in the Army, Operations, Plans and Training, and actually one of the main things I did was I dealt with CAA because they were a DCSOPS agency. They did most of their studies for us, so I helped get them started, and sat on the advisory groups for them. I helped take the studies around and explain them when they were done. It was the kind of a staff job that analysts do.

BOB SHELDON: Who was the head of CAA in 1977?

E.B. VANDIVER: It was MG Ennis Whitehead. After him came MG Ted Atkinson. In 1982, they civilianized the job and then came Dave Hardison, who had since then gone up to OSD came back and became the first civilian director of CAA. He stayed there until 1984 and I succeeded him.

BOB SHELDON: Was CAA at Bethesda, Maryland?

E.B. VANDIVER: Yes, it was. It had been at Bethesda since 1960, because the main predecessor organization had been there. This was STAG, Strategy and Tactics Analysis Group. There are very few people who know STAG. (One of the walls in Payne Hall has a large black and white symbol of a deer with the wording STAG nearby; that was their emblem.) There aren't very many people left around who were even in it. But there are a few. John Battilega is one person who was at STAG as a Major.

BOB SHELDON: Did you have relationships with the other analytic agencies out at White Sands or was it primarily with CAA?

E.B. VANDIVER: We had an awful lot of interaction with TRADOC because of the Cost and Operational Effectiveness Analyses (COEAs) being done. These all came through DCSOPS since DCSOPS was responsible for

them. I sat on the Study Advisory Groups (SAGs) for almost every COEA done for years there and I attended all of the Army System's Acquisition Review Council, the ASARCs, and the pre-ASARCs. Thousands of the things it seems like over the years, so it was an awful lot of work on systems acquisition. I want to go back to ACSFOR for a little. At the end of 1973 and the beginning of 1974, coming out of Vietnam, the Army recognized that the force structure was totally out of line with the operations plans. Because we had been fighting a war in Southeast Asia, the structure just really didn't match up with any of the current planned operations. So the DCSOPS asked ACSFOR to do a study on this thing. Abe got tasked, so I ended up doing it. We had a planning system that I adapted to it in which we ran wargames against the Soviet threat in Central Europe and then we rounded out the force with all the support forces, and then we matched that up against what was actually in the force structure and see what was over and what was under. The first time we did that we found 600,000 structure spaces mismatched. That is, ones that we needed but we didn't have, or we had and we didn't need. This study was called Total Force Analysis. That's essentially the way the Total Army Analysis is still being done. I mean, the literal descendant of it is TAA today; it's an unbroken chain of them. I did the first one, and I'm still doing them. We're doing TAA 13 here just starting off right now. But it's been so long ago that nobody knows that I started it, so I don't get credit or blame for it.

BOB SHELDON: When you were at DUSA(OR), you worked with Wilbur Payne. Any Wilbur Payne stories to tell?

E.B. VANDIVER: He was always saying things that were quotable. But one of my favorite ones, some contractor came in with a proposal to take some Navy missile that the Navy had decided not to buy, but they had the design, and tested it, and mounted it on a truck and used it for some kind of Army system. They cobbled together one of these type things and they'd gone and tested it, and it didn't do all that well either, but they were still trying to sell the thing. Dr. Payne's comment was, "It was a bad idea, poorly executed." *{Laughter}* There's a whole book of those things by the

way that was put together by Warren Olsen and others. But there's just no end to these unique things from Dr. Payne. He was so smart.

BOB SHELDON: How did you compete for the CAA job?

E.B. VANDIVER: I was in the SES and it's an SES position. So I just went up and talked to the DAS—the Director of Army Staff. Well, first of all I had to talk with the DCSOPS, General Mahaffey, and told him that I wanted it. He said, "We'll try and get it for you." Then I went and talked to the Director of Army Staff, who was General Lee, and told him that I wanted the job and General Mahaffey supported it. And he said, "Well, I'll check. I'll ask the Vice." The Vice who was General Max Thurman said, "Okay" so I just got it. I mean you can do that in the SES. It's a directed reassignment.

BOB SHELDON: Did the vacancy just come open and you knew it was coming?

E.B. VANDIVER: It came open in May. Dave announced in May that he would be retiring the first of October. He let me know that as soon as he knew that he was going to retire. I went around and told everybody I wanted it and they said, "Fine." Let's see, that was 1984. The Chief was General John Wickham. I was pretty close with General Wickham and also with General Max Thurman. I was on General Wickham's transition team which was headed up by Brigadier General Colin Powell.

BOB SHELDON: How large was CAA when you took charge?

E.B. VANDIVER: It was about 300. It's gone down steadily ever since I've been there. It's less than half of that now. Every year I've been here, it's gotten smaller. It peaked in the 1970s at 325. When I got there, I think it was about 280, but with college students and interns and some others there was about 300 actually in the building.

BOB SHELDON: Of those 300, what was the mix?

E.B. VANDIVER: It was about one-third, two-thirds, military to civilian. I've almost been able to keep that ratio, but I'm losing it now with military to civilian conversions. But the military were about half analysts, functional area 49s, the rest were other functional areas. They had come there for their functional expertise. There's a quartermaster, an engineer,

there's everything in the other groups. The civilians were all technical of one kind or another. They are from information technology, science, engineering, operations research, and all types of backgrounds. Except for the administrative staff, which was also a rather large organization.

BOB SHELDON: Did you also send a lot of your military folks to Fort Lee for training at ALMC (Army Logistics Management College)? Or did they come to you trained?

E.B. VANDIVER: No. The ALMC ORSA MAC I course (Operations Research/Systems Analysis Military Applications Course I) started up in—actually the first course finished in October of 1977. I remember it vividly because I was the first graduation speaker at MAC I. The DCSOPS was the proponent and the headquarters for Functional Area 49 (FA 49). I had the responsibility as the DCSOPS Tech Advisor and helped set up the MAC I course. General Meyer, the DCSOPS, was to go down to be the graduation speaker. Well at 5:00 the afternoon before, he calls my office and says, "Hey Van, old buddy, I'm supposed to go give a graduation speech tomorrow. I can't go. You go do it for me." I says, "Okay, you got any charts or anything?" He says, "No, I was just going to go talk to them about DCSOPS." *{Laughter}* I go home with a fresh pack of cigarettes and a bottle of Scotch, stayed up until midnight, wrote out my notes, and went down and gave the first graduation speech. I give one MAC I graduation address a year even today. I recently did one in December.

BOB SHELDON: What did you talk to them about?

E.B. VANDIVER: I was in DCSOPS at the time, so I talked to them about what the important things were going on in the headquarters and what were the important kinds of analysis that related to that work. And depending on where they were going after coming out of this class, what they might be getting involved with on their first ORSA job. I had no visuals or anything, just had an outline of everything.

BOB SHELDON: Are any students from the audience still in the community?

E.B. VANDIVER: General Ben Griffin, the four-star Commander of AMC—Captain Griffin was in the audience. I ended up working for

him. Just until a couple of months ago, he was the G8 and he was my boss. He has never stopped reminding people that I was his graduation speaker. *{Laughter}* But he's the only one. That was a long time ago. There ain't nobody from that time frame left on active duty now unless they're a four-star general.

BOB SHELDON: What were the challenges in your early days at CAA?

E.B. VANDIVER: The CAA, in my mind, and I had watched them for many years, had several failings, or things that I considered to be failings. They seemed to be awfully inefficient and it was very difficult to get a major force study done—it was just very slow. They didn't do very many studies and it took a long time to get them done. But that was characteristic of all analysis, by the way. It was just very difficult to do a lot of things back then that today are simple.

BOB SHELDON: You say it took a long time to get them done?

E.B. VANDIVER: I was just going to get to that. We would do a major force study and it would include a base case run of say the central front against the Soviet hordes of 90 days in Central Europe. The study would have maybe a base case and two variants of it. It would take a year to do it, and probably include a dozen people. We do things like that sometimes now with ten or twelve cases before breakfast. I mean, the change of scale is just fantastic. So it was just extremely difficult to do things. Everything was running on a humongous mainframe computer, a UNISYS 1184, and you had to put these huge card decks in, then you got these giant printouts from the thing. You were just getting the first graphics terminals coming out—they were humongous things. It was the size of that couch. I showed you the picture of them down in my museum. So it was very difficult to do things just because of the IT, the information technology aspect, but also because of very inefficient processes. I started making everybody sit down and describe—alright, you run a simulation, tell me what you had to do—you describe what you have to do to make a new case, step-by-step. What's everything you have to do? And now you start collecting data on that as you do these things. Let's find out what takes the most time, what

takes the most effort, and what introduces the most error. And whatever those three things are, let's go do something to change them. Then keep collecting data and then find out what's the next three, and just keep doing it. And eventually it will take no time, no effort, and it'll be error free. But we don't have to worry about that. We hadn't got there quite yet. Just doing that on some of our key processes made a huge difference.

BOB SHELDON: What were those three things?

E.B. VANDIVER: One of the things—it's kind of staggering to think about it now—was in using the big theater combat simulation CEM, the Concepts Evaluation Model, which was kind of a bread and butter theater combat simulation, where you could not incrementally modify a case. You had to go back and create all of the files from scratch each time you wanted another case. It's just hard to believe it could have been that way, but it was. Changing that aspect alone made a huge difference. I got there at the end of 1984. And getting this in place in '85, '86, '87 is when the revolution in IT was just coming along. PCs were coming in then. The Army starts its supercomputer network and we get an account on that. So we can batch it up, we can run two or three dozens simulation runs at a time on this thing. I used to keep data. I had charts on how many cases we would do in a year. In the late 1980s, from '85 to the early '90s, we went from maybe a couple of dozen a year to hundreds a year, and things were rolling. Those were the biggest things we were doing in the late '80s and then the Cold War ended.

BOB SHELDON: Let's backtrack to your MORS participation.

E.B. VANDIVER: The first MORSS I went to was in 1966. It was the 18th MORSS. It was after I'd come back from Vietnam. Then I went to the one in 1968 out at the Air Force Academy, when I had my own company. After that I went to work on the Army staff, I couldn't get anybody to let me go. Abe Golub wouldn't let anybody go. Wilbur was the sponsor for the thing and Hunter Woodall always went. He was the only one. Until we get up to 1979, and Hunter couldn't go and so they asked me if I would. So I finally got to go to a MORS. It was up at the Military Academy in 1979. I didn't go

again after that because DUSA(OR) locked the thing up and didn't want anybody going unless they were giving a paper, and I didn't have any. But 1982 was the year of disaster for MORS. That was the one where one of the services wouldn't send anybody to it. Several sponsors thought it had turned into a 'chowder and marching society' and really objected to the two symposia a year. It was too often and there weren't enough good papers to support it, and they really wanted it cut back to one, and MORS refused to do it. So one or two services refused to send anybody to it, and that was the two-by-four between the eyes that got their attention. Then right about that same time—and I can't remember who it was, asked me if I would like to be on the Board and I said, "Sure, why not." I was known to be quite a critic of MORS at the time. I was elected to the Board in June of 1983, and then attended the first Board meeting in December. It was a two-day Board meeting. It was just absolutely incredible. Pole-vaulting over mouse turds. It was staggering. There was still a lot of sentiment to go back to the two big symposia a year instead of the deal that had been worked out with the sponsors which was one big symposia a year, and then use special sessions to do other things. I became a member of the Board and I was a big opponent of having the two big symposia a year, although that died very hard in MORS. I don't think there's any sentiment anymore for that. I think that's all gone finally. Probably because the people who were the biggest proponents for that are finally all gone. The special meetings, of course, have continued on. I was on the Board for four years and I was the Vice President for Professional Affairs (VPPA). Then the year I would have run for President, I didn't because I was having a lot of trouble at home with one of my children, who got in all kinds of trouble and I think needed my attention so I didn't run. So I left the Board that year and then got re-elected again later, so I started all over again.

BOB SHELDON: What issues did you tackle as VP for Professional Affairs?

E.B. VANDIVER: I started the colloquium on education as a one-time thing; that's still going on.

BOB SHELDON: What was the impetus of that first one?

E.B. VANDIVER: I just thought it was something that we ought to do. I had been on the Education Committee and there really wasn't much going on there, so when I became the VPPA, I said, "Well we'll do something in education, so let's get together the people from the military academies, AFIT and the Naval Postgraduate School, and let's talk about educating people in military OR." I thought it would just be a one-time thing. We'd publish a special report and maybe three or four years later you'd do another one or something—maybe five years. But then the thing has continued. It's gone on and there has been one every year ever since.

Anyway I got back on the Board and I went exactly up the same track I went up the first time. I headed the Education Committee. I headed a couple other committees, too. I had the Management Committee. I did a special study on the pay for the staff using two or three different methods. I had a big impact on that. And then we come up to 1992, I ran for President and was elected President in 92 to 93. Then I was Past President and so I was on the Board there for about fifteen years. I'd done an awful lot of things and still do things now and then.

BOB SHELDON: The year you were President, what were the big issues?

E.B. VANDIVER: I ran on the platform of MORS not as an organization that just holds meetings, but it's a full professional society that provides a full array of professional services. I got some things started that we had been working on for a lot of years, but never got off the ground. The *Handbook of OR*, I got that started. The *Military OR Journal*, I got that started. I did the first 'State of the Society' address, and I started the Heritage Committee and the Heritage Program. I had a really neat thing. I had a one-page program that had on one sheet of paper, front and back, each committee and what their major things were they were supposed to do that year. I understand that it grew to be thirty or forty pages long and then got killed. When it was one page, it was really quite effective, and that's what I used when I went into a Council meeting or when we had a Board

meeting. Those are probably all the main things I did.

BOB SHELDON: *MOR Journal*, what was the concept behind that?

E.B. VANDIVER: The concept was that there was no good place—no good refereed journal for publishing applications of Military OR. That the *ORSA Journal*, the Operations Research Society of America really liked theory and wouldn't publish papers on practice. About the only scholarly journal that we were able to get them published was the *Naval Research Logistics* journal, but who reads that? You didn't have the right audience there. So there was a lot of sentiment, and there had been for years. I didn't originate this idea. I just made it happen. You know, let's do this. We've been talking about it forever, let's do it. Greg Parnell was the big mover. He succeeded me as President, too.

BOB SHELDON: As President of MORS, were there any controversial issues?

E.B. VANDIVER: Absolutely none. It was 1992 and 1993. The Cold War's over. Desert Shield, Desert Storm's over. We tried to figure out what the Defense Department ought to look like. It was actually a fairly calm period in the Defense Department. Relationships were pretty good with the sponsors. We had a lot of special meetings. I neglected to mention that in 1991 I ran the MORS special meeting on analysis lessons learned from Desert Shield, Desert Storm. At the end of the meeting, I had Clayton Thomas, who had a group of people who sat in on each of the sessions, brief out a summary of the meeting. This was the first special meeting Synthesis Group. So I instigated that, too. I understand they're still doing that. I invented the Synthesis Group, so that when the meeting was over, you would immediately have a product that you could publish into *PHALANX*. This is the bottom line of the meeting, and then you'd get a report later. Actually, on the special meeting on lessons learned from Desert Shield, Desert Storm, I'm not sure the report ever was published on that.

BOB SHELDON: It probably would have been classified.

E.B. VANDIVER: Yes, it was. It was held at a secret level. It was over at the Center for Naval Analyses (CNA). It was in November of

1991, so things were pretty fresh. There was quite a bit of material from all services, and that's a good sign. The report of the Synthesis Group which I had was written up. I had that put into the next *PHALANX* that came out.

BOB SHELDON: You encourage MORS participation for your folks at CAA. Do you coax them with a cattle prod or do you just let them volunteer?

E.B. VANDIVER: It's a little bit of both. I like people to go to professional society meetings. For the Army OR symposiums just down at Petersburg, Virginia, I send all the new people—I send all kinds of people because it's fairly inexpensive. MORS happens to meet in expensive places, so sending a large contingent to Monterey or to Colorado Springs is a little high. My rule is that you can go to a professional society meeting if you are presenting a paper or you have an official post, but then sometimes I let a few other people go. That gets a pretty good turnout.

BOB SHELDON: What's the origin of AORS? Does that precede MORS or did that come after MORS?

E.B. VANDIVER: I believe it precedes it. That was started by Griff Callaghan back in 1959 or 1960. When OR was really getting started good in the Army. Originally it met down at Huntsville or Rock Island, then at Duke University at the Army Research Office, which was on the Duke University campus, Durham, North Carolina. Dr. Marion Bryson was the Scientific Advisor there and he had a big interest in it. Griff Callaghan got the Army Research Office (ARO) and Dr. Bryson to sponsor the thing. It met there several years up 1973. The last one presented down at ARO was in 1973, and I know because I was the program chairman of it. Abe had picked it up—the Chief of Research and Development didn't want it anymore, so Abe Golub says he'd do it and then he turns to me and he says, "You take care of the thing." Then he says, "Make this the best AORS ever, but don't spend any time on it." So you know what that means. I spent all my Saturdays working on it. That was the last one that was held down on the campus at Duke. Because by then, the Vietnam War was going on and universities didn't want anything to do with the military, so ARO moved off of the

campus and that was the last of that. We then moved the Army OR symposium to Fort Lee, Virginia and it's been there ever since.

BOB SHELDON: What is the difference between AORS and MORS in terms of a symposium?

E.B. VANDIVER: AORS is unclassified. It is all Army. It includes a lot of stuff that you would never get to, with junior analysts and lower level kinds of work, stuff that you'd never get to see at a MORS. We encourage all the junior analysts to go to the thing to see what Army analysis is like. It's a bit of a culture sort of thing for analysts. It has since been copied by the Navy and the Air Force. AORS doesn't really compete with MORS. That was one of the first things I attended to when I got on the MORS Board of Directors. I had Hork Dimon come see me and say, "You know, the Army is giving MORS a hard time because you've got the AORS and you're trying to support that at the expense of MORS." No, it's not either. It's a totally different thing. MORS has its own failings that need to be fixed. AORS is not part of it. So in fact, at one of the early Board meetings I went to, I gave them a briefing about AORS. Here's how it's different and here's why there's really no conflict here. The other services eventually came around to the same point of view and decided, "Hey, we need something like this, too." And that's okay. Again, there's no conflict.

BOB SHELDON: Has attendance at AORS stayed stable over the years?

E.B. VANDIVER: No, it's gone down. It used to run 200 people a year for years and years. Now it's down to about 150.

BOB SHELDON: Is it still the same nature of unclassified briefings on topical areas of interest?

E.B. VANDIVER: Yes. We've had classified sessions at times and decided it was just too much hassle. We've got a lot of methodology stuff, so it's okay. It doesn't have to be classified. MORS gives us the classified stuff, anyhow.

BOB SHELDON: Let's continue on with your CAA work in the 1990s. What were the major challenges you had to face after the drawdown of the Cold War?

E.B. VANDIVER: The drawdown went on all through the 1990s. I had a big drawdown there in the early '90s and we had a lot of military officers that had to go out. They had those programs where you could get out after fifteen years. We had a lot of disruption through the years there, and we were shrinking in size. We actually reorganized to accommodate that. We reorganized it to accommodate a new way of doing business. We had done so much during Desert Shield and Desert Storm we had never done before. We had gotten so efficient at doing some of these things that it really changed the whole way we did business there. So we had a series of reorganizations, incremental reorganizations through the 1990s to reduce layering, take better advantage of the way we were actually doing things. Getting better in support of ongoing operations, which has led where we are today where I've got two analysts in Afghanistan, two in Iraq. I rotate them on six-month tours. I've got 15–20 projects going on back here supporting them. This is stuff we could only dream about ten or fifteen years ago.

BOB SHELDON: You mentioned the turnaround in computer time now. Going from 300 people down to 150, do you feel you can accomplish as much or more work than was done twenty years ago?

E.B. VANDIVER: They do more. We're flat doing more. We do a lot more with 150 than I did with 200, or even 300.

BOB SHELDON: How do you feel about the skill sets of your analysts that are working for you now as compared to twenty years ago?

E.B. VANDIVER: Much better, especially with military. They were always pretty good, and now they're superb. Civilians have just about matched them because I'm recruiting through the Presidential Management Intern Program. Skill levels are higher. Efficiency is higher. Training is better. Everything from my point of view is orders of magnitude, more capable, more professional, and more responsive than it was. But it has only taken me twenty years to get it like this, and we've still got a long way to go.

BOB SHELDON: How do you feel about your graduates of the ORSA MAC I (Operations Research/Systems Analysis Military Ap-

plications Course I) compared to those going through your graduate OR programs at Georgia Tech or elsewhere?

E.B. VANDIVER: The standard for Functional Area 49 to be fully qualified is a Masters Degree in Operations Research. So that's mostly your graduates of the Air Force Institute of Technology, the Naval Postgraduate School, Georgia Institute of Technology, and the Colorado School of Mines. This is one method, or they need a Masters Degree in a technical subject plus ALMC ORSA MAC I. So MAC I is not a substitute for the graduate degree in OR. It's MAC I plus a Masters Degree in what the regulation calls an associated subject or related subject. That includes anything technical—Math, Science, Computer Science, MBA. You've got to have a Masters in one of those things and complete MAC I. These folks do pretty good studies with this background. The ones with the Masters Degrees in OR do better on developmental things. The ones with Ph.D.s do best of all on developmental things. I've always got a fair number of military Ph.D.s, and they're the ones I usually turn to, to do something brand new. Something we haven't done before.

BOB SHELDON: We transition into the 2000s with fighting another war over in the Gulf and with Afghanistan. The analysts that you send into the field of combat, so to speak, are coming back. What do you try to grab out of them when they come back?

E.B. VANDIVER: First of all, they go back into working the reach-back analysis as they're supporting the ones that are forward. They know the theatre, and know the climate, the environment and whatnot. Some of them leave after they come back, but for the ones that do come back and stay for a while, I put them back in support of it. Plus they're working the scenarios for that part of the world and other scenarios as well. So far I've been able to send all volunteers. Some of them I had to twist their arm a little harder than others, but they all volunteered, and we've had three civilians go, too. They have to be real volunteers. Two of them went, each for three months, and the third one went for six months. Then I couldn't get anybody to go. I was trying to keep one military and one civilian with the Corps headquarters there in Baghdad, and then I couldn't get a

civilian that would stay over Christmas, so I had to put in two military—actually I had a military who volunteered who said he'd go for Christmas. I've got two different headquarters in Afghanistan, and one of those requirements goes away soon. I originally looked for people who—because we weren't established—had sharp elbows and were not bashful and would elbow their way up. I needed people who were like Max Moore, Allison Stewart, and Rob Kewley, to get these things going. Since then, we've become established and they use us. We're the working end of the thing. They brief General Casey and LTG Metz every Monday morning on their analysis. We're thoroughly part of things. So now I just make sure I send good analysts over there. And I'm still getting volunteers, real volunteers.

BOB SHELDON: The wartime applications of OR—we read about the origins of it during World War II. Would you view it as a comparable level of effectiveness to World War II or more effective?

E.B. VANDIVER: The U.S. Army didn't really have a lot of OR in World War II. It had none in the Pacific. In fact, the best OR that was done in the European Theatre was done by the historians. Guys like SLA Marshall were in the Military History Detachment so the Army didn't have much of a history with OR in World War II. Now they had a very good experience in the Korean War, because between the end of World War II and Korea, ORO was started. ORO was the Operations Research Office in Johns Hopkins University. They sent a big bunch of analysts over to Korea, including SLA Marshall. They stayed throughout the Korean War and provided lots of support, had a good reputation, and were very highly thought of. So I would say that the work we're doing now was more comparable to that, because we don't really have any baseline for World War II like the Eighth Air Force and the Navy did with OEG (Operations Evaluation Group). But it's very similar in a lot of ways—although things had moved along in a lot of ways that are very different now from World War II and Korea, too. The effects-based operations and goal structures that are put together today all have metrics on them. All the commands are using their OR analysts to help them with that. What

is effects-based? This is the kind of stuff we do anyway. So we've been very much involved in that both in Afghanistan and Iraq with several military headquarters.

BOB SHELDON: Of the OR skill sets such as statistics and math programming and simulation, which are the most useful ones that you see in your analysts?

E.B. VANDIVER: The most commonly used analytical technique both here at Fort Belvoir and over in the theaters is Microsoft Office. They are powerful tools. They have a statistical package and a map display package. They're very good because you're always manipulating a lot of data that you're collecting both here and there. Discrete event simulation is useful for a lot of problems and we use Pro Model for that. Now on a recurring analysis, we also use the theater level simulations and the standard simulations for air defense like EADSIM (Extended Air Defense Simulation). We use JICM (Joint Integrated Contingency Model) for the theater combat simulation. But a lot of things are more like, create a model. That is, create a model to fit the situation, more along the classical lines and the experience in the theater is feeding back to that, too. One of the things I tried to do and used it as a slogan is 'Putting the Operations back into Operations Research' and I think we've done a pretty good job of that.

BOB SHELDON: What advice would you give to young analysts starting a career in OR?

E.B. VANDIVER: The first thing I'd do is tell them to get over and see what a theater of operations looks like. Go to Afghanistan or go to Iraq. These things won't last forever. There's no other way to get the experience than to go to a real one. Otherwise, all you're doing is reading history. All of my Presidential Management Interns desperately want to go, but we can't send them and I queried the office up at the Secretary of the Army about sending them, and they just came totally unglued at the thought that I would send one of these Presidential Management Interns over—although they all want to go. So once I get them converted, I'll send them. But that's the first thing I'd tell them. Get over there—if you can, get over to see what an active theater of operations looks like. They're messier than hell. You've got to see it to believe it, what a mess a real war is. If

anything, I tell them, get up—get into the building [the Pentagon] and go learn what the environment is of the people who actually end up using this stuff to make decisions. That's an eye-opener, too. And so I have my strategic partners program where I go take people through, with my sponsors, into the building and it is always a very enlightening experience for them to find out this is the way the building really works.

BOB SHELDON: How long do you leave them in there?

E.B. VANDIVER: Up to a year. I try to get them at least a year, sometime two, sometimes even three. Some of them really get into it and like staying there. But one to two years. Two years is better—it's a good length of time. I've got four slots going there. And it's a fabulous educational thing. You ought to have at least a Masters Degree in a technical subject. You ought to go to the force management school, and I make everybody go to that over here at General Richard G. Trefry's school. That's the course on how the big green machine runs. I try to get all my civilians to go to the Army Management Staff College which they bill as the civilian Command and General Staff College. I've got my professional civilians up to 50% of them now have been to that. Nobody else in the Army comes close to that figure. In fact, I track those three things on the work force for both military and civilians.

BOB SHELDON: It is 1400 on the 28th of March 2005 and Mike Garrabone and I are here at the Center for Army Analysis, Wilbur Payne Hall at Fort Belvoir, Virginia to continue our third session of our oral history interview with Mr. E.B. Vandiver. As I look around the rooms here at CAA, I see many pictures of the Civil War. What's the origin of your interest in the Civil War?

E.B. VANDIVER: When I was in the first grade, it was the last year of World War II. That winter, which would've been January or February 1945, I saw the movie, *Gone with the Wind* or at least I saw most of *Gone with the Wind*, because when they got to the scene there in Atlanta where they sawed that guy's leg off without the anesthetic I had to leave the theater. That's where my original interest in the Civil War started. I thought it was called the

Silver War, but then when you're only in the first or second grade, that's close enough. But that's where my interest started and has not abated since. In fact, it has gotten worse.

BOB SHELDON: You give these Civil War history tours. Tell us about these field trips.

E.B. VANDIVER: They are staff rides. They are not field trips. There is a very distinct difference between the two.

BOB SHELDON: What is the difference?

E.B. VANDIVER: In a field trip you go out to learn about the battle or the campaign. In a staff ride you go out and use the battle or the campaign to illustrate some point in military art and science. Mine are all staff rides, they're not field trips. I had other people doing them for years. I've had people from the Chief of Military History's Office, and others like Dr. Michael Krause for example. He ran some for me, but it was always as a staff ride. We would always pick a point: here's the subject we are going to use this staff ride to talk about. We did Gettysburg a lot back then. We would also do Antietam a lot. One time we'd talk about intelligence, next time we'd talk about command and control. We'd talk about some principle or two of war and use a part on logistics or whatever subject was of interest. I just started developing my own staff rides because I never thought that anybody else ever did them exactly right. I've done a Wilderness, Spotsylvania one that I use to illustrate the birth of modern warfare. I then put a new one together on Chancellorsville, and my theme in that one is the use of maneuver to offset numerical inferiority.

BOB SHELDON: Do you have any genealogy going back to the Civil War?

E.B. VANDIVER: I have written papers on my ancestors in the Civil War. My great grandfather Vandiver, and his father, my great great grandfather Vandiver, were both in the Civil War. My great grandfather's brother was killed over in Harper's Ferry with the 7th South Carolina Infantry. My great great grandfather's brother was in the 2nd South Carolina Rifles but he left after a year or so and ran for the South Carolina House of Representatives—and was elected. I've got cousins, that is cousins by the dozens, that were in the war. And I have a

Yankee great grandfather, but don't tell anyone.

MIKE GARRAMBONE: You've kept up with history and you've had several researchers look at history for you. Two gentlemen immediately come to mind. One is Trevor Dupuy and the other one is Bob Helmbold. Bob worked for you here at CAA. He did studies involving Lanchester models. You not only thought about it, but you also had these special gentlemen research it for you. Why these gentlemen?

E.B. VANDIVER: These gentlemen put it to use. The use of historical data in military operations research is frequently spoken of but seldom done mainly because it takes a lot of work. As a rule, historians don't keep quantitative records. So if you want to take historical experience and turn it in to quantitative things, it takes hard work. Trevor's old outfit, Historical Evaluation and Research Organization (HERO), which is now The Dupuy Institute (TDI) did that kind of work for me. I still have them under contract for doing things. They did a great piece of work for me a few years back on enemy prisoner of war capture rates, and we have used that today in the support force structuring process to determine how many MPs (Military Police) you need to guard enemy prisoners of war (EPWs). So we've made very practical use on that research. I've had them do work on researching urban warfare and counter insurgencies more recently. They've turned up very useful things in these areas. I hear people say, "all you need to do is go to the historical data," like there is this bookshelf someplace, and you just go there and just reach up and grab a volume. No, it is not that way. If you want it, you have to first define your problem, and then go find the data, collect it and analyze it, and put it in a format where you can begin to use it.

MIKE GARRAMBONE: Bob Helmbold did research on various rates such as maneuvers, and rates of march in combat.

E.B. VANDIVER: Yes, he did rates of advance for me. I had him do a very comprehensive study on rates of advance and he did a lot of work on attrition kinds of formulations as well. He's doing well and lives in Arizona now where he still plays around with these topics.

MIKE GARRAMBONE: A fellow that may be on your list is Griff Callahan, the old colonel. You mentioned him earlier. He was at Harry Diamond Laboratory.

E.B. VANDIVER: He is a Professor Emeritus at Georgia Tech. He was one of the movers behind establishing what is now the Functional Area 49, career field of Operations Research Systems Analyst and he was the founder of the Army Operations Research Symposium (AORS).

MIKE GARRAMBONE: Another fellow you might know is Pete Reid from AMSAA (Army Materiel Systems Analysis Activity at Aberdeen Proving Ground, Maryland).

E.B. VANDIVER: I met Pete Reid when I worked here for a contractor back in 1966. He had long black hair and I had nice long brown hair. Mine's no longer brown and he's got none. *{Laughter}* Pete was one of the first people I met at AMSAA many, many years ago.

MIKE GARRAMBONE: Did you know Frank Grubbs?

E.B. VANDIVER: I knew Frank Grubbs but not well. Frank was with the Ballistics Research Laboratory (BRL). He was at Aberdeen for the earlier things that went on at the weapon system laboratory before AMSAA came into being. Frank stayed in BRL rather than go to AMSAA.

MIKE GARRAMBONE: He did a lot of weapons system work that we used to talk about in the ORSA MAC I taught at ALMC.

E.B. VANDIVER: Yes, he was the author of a text book that they used in MAC I. I think it was a two volume set titled Engineering Design Handbook: Army Weapons Systems Analysis. (Note 1. This was the DARCOM (U.S. Army Materiel Development and Readiness Command Pamphlet 706-101/102, November 1977/October 1979). (Note 2. The Army materiel organization name changed over time. They were first, Army Materiel Command (AMC), then it changed to Defense Readiness Command (DARCOM), then the name returned to AMC.)

MIKE GARRAMBONE: You were also a promoter of the Florida Institute of Technology (FIT) OR graduate program at Fort Lee. I think you came down for the first OR graduating class.

E.B. VANDIVER: Yes, I helped set it up when we needed a lot more qualified FA 49s. This was back in the late 1970s and early 1980s and we could not get enough quotas for fully-funded graduate school. I helped set up the FIT Program at Fort Lee for guys to work on a masters after they finished their MAC I course. A Major George Schneikert ran the MAC I course then. He was also one of the leads on getting an OR graduate program going with the Florida Institute of Technology at Fort Lee. I attended this first graduation and was fortunate to get several fine officers from this first FIT class as CAA analysts. The students first attended the 14 week MAC I course before starting their graduate program. This went for a number of years and we got lots of good FA 49s out of that program but I believe it faded away after a while.

MIKE GARRAMBONE: Tell us about your relationship with AMSAA.

E.B. VANDIVER: I have always been close with AMSAA because they provide all the systems input data that I need. That goes back, well, forever. Because they are the head of the Joint Technical Coordinating Group and publish the Joint Munitions Effectiveness Manual. This was Pete Reid's baby. So AMSAA have been and are the keepers and certifiers of all weapon system data. So, everything I use, even today, from single shot kill probability to lethal area coverage all come through AMSAA.

MIKE GARRAMBONE: I've always had problems figuring out who exactly you worked for over the years. Would you clear this up for everyone?

E.B. VANDIVER: Sure, CAA, either as the Concepts Analysis Agency or the Center for Army Analysis has always worked for Headquarters Department of the Army, and primarily for the Army staff. Now who I report to changes every few years, but it doesn't seem to make any difference. I support the same customers in the same way.

MIKE GARRAMBONE: So who do you report to, is this DCSOPS or someone else?

E.B. VANDIVER: At the moment, that is, under the latest Department of the Army reorganization, I report to the G-8, the Deputy Chief of Staff of Programs, who is LTG David F. Melcher, who is a FA 49. So the FA 49 propo-

nency is back in the Army staff and it's in the G-8. Before that, for twenty-something years, I reported to the Director of the Army Staff. Before that CAA reported to DCSOPS, before that they reported to the Assistant Chief of Staff for Force Development.

MIKE GARRAMBONE: Tell us what prompted the move of CAA from Bethesda, Maryland to Fort Belvoir, Virginia.

E.B. VANDIVER: BRAC 95, the Base Realignment and Closure Commission. CAA was sitting in a GSA leased building in Bethesda, Maryland and it was the second most expensive lease in the Army. It met the return on investment payback criteria for new construction. As a result, we got a new building out of this study. This building, Wilbur B. Payne Hall, is the house that BRAC built. We're the only organization that was ever happy with BRAC.

MIKE GARRAMBONE: Were you able to assist in the design of this building?

E.B. VANDIVER: Absolutely. The Corps of Engineers Baltimore District were the actual designers of the thing and they worked very closely with us.

MIKE GARRAMBONE: Was it pre-conceived that CAA would come to Fort Belvoir?

E.B. VANDIVER: No. What the BRAC language said was move CAA out of leased space and move them either into new or renovated facilities on an Army post in the Washington area. It turned out the only other candidate was Fort Meade, and they had renovated the old Second Army Headquarters building there. I was able to argue against that move since it would take too long, with way too much traffic to get back and forth to the Pentagon from Fort Meade, as compared to Fort Belvoir, and they agreed with that. So I got them to do the construction down here.

MIKE GARRAMBONE: I know you are going to help us identify with the name of the building. I suspect that you had to think about this and were very conscious of naming it Dr. Wilbur B. Payne Hall.

E.B. VANDIVER: I thought about it for one nanosecond. Wilbur Payne is one of the great founding fathers of military OR in the Army. He didn't start it, okay you know that. It has antecedents back to the Indian Wars, but it was Dr. Payne who really got operations research

going at high levels in the Army and institutionalized it as a solid practice. So, he's really a founding father.

MIKE GARRAMBONE: Was he interested in wargaming?

E.B. VANDIVER: Yes, he was. Wilbur liked wargaming. He really liked military history. He and I liked the same kinds of things.

MIKE GARRAMBONE: You have several rooms in Payne Hall that appear to be set up for wargames.

E.B. VANDIVER: The simulations that we're using today are really more like wargames than the last generation's simulations were. TACWAR (Tactical Warfare) and CEM (Concepts Evaluation Model) and IDAGAM (Institute for Defense Analyses Ground-Air Model) and that whole generation of simulations, you had to just turn them on and they ran the war. The current generation with JICM (Joint Integrated Contingency Model) which has been adopted pretty widely around—you really have to operate it more like a computer aided wargame because it doesn't have any high-level command and control. Somebody has to act like the theater commander and tell it what to do. CEM and TACWAR had logic in them that you just gave them the general guidance and they had rules that would try to carry that guidance out. But you really have to play in JICM like it is a wargame since it's far more of a wargame than the last generation of simulations. I think this is good because you just can't write a rigid enough rule set to do these things. It's better to have a person intervening to tell the model what to do.

MIKE GARRAMBONE: How do you interface with the Army War College?

E.B. VANDIVER: We interface very well, but remember first of all they're an educational institution. Their mission is training people. We do a certain amount of things together like look at issues through workshops and political-military games, and we assist them with those events and they participate in ours. We meet twice a year to coordinate things. We stay close in touch and help each other.

MIKE GARRAMBONE: Along the way here today we've been talking about models. And I don't know what your philosophy is

whether you want to build them, buy them, use them; what do you think is the best?

E.B. VANDIVER: Two things are best. One is, don't put a lot of money in them. If you will notice the more money that goes into a simulation development, the less likely it is to succeed. It's perfectly proportional. The worst thing you can do is pour money on a simulation development. Second is, it works best with an in-house and contractor collaboration, and one in which you take your time building it. It is best to build, test, and build some more where the government specifies the requirements while the contractor helps with the design and then the coding. You test it together and then continue in that cycle. We have been very successful and built several major large simulations following that model building mode and each project came in at just a couple of million dollars.

BOB SHELDON: Which models would those be?

E.B. VANDIVER: That's the GDAS, Global Deployment Analysis System, which is a global strategic ability deployment model. Another one is MOBCEM, which is a model of mobilization within the Continental United States. The third is FORGE which generates support force requirements. Meanwhile, several other famous projects spent tons of money and were either terminated or are still struggling.

MIKE GARRAMBONE: You talked a little bit about the tools. Where do you get your analysts, and in particular, where do you get your young analysts?

E.B. VANDIVER: Where they're coming from now? The military are supplied by the military personnel center. My civilians, I'm getting some of them now through a program known as the Presidential Management Fellows. It used to be called Presidential Management Interns but thanks to some recent events, the name 'interns' took on some bad connotations. So they changed the name of it to Presidential Management Fellows. This is a program that recruits nationally.

It is run out of the Office of Personnel Management, and they bring in about 400 or 500 a year. They got about 2,000 or more applicants nationally and they screen it down to the hundreds, and then they hold a big job fair in

Washington where agencies go and set up a booth, and the new fellows wander around and people try to sell them on coming to their organization. In fact that happens tomorrow and the next day and I'm going over to help work the recruitment. We have been recruiting this way for about five years or six years now. We've been bringing in anywhere from one to five a year. They come for two years. We send them through all kinds of training courses, which is centrally funded and give them exposure to different places. I typically send them up to the Army staff or maybe into OSD or over to the State Department for a few months. And then at the end of two years they can be non-competitively selected in the series of their choice. This has become a main source of recruiting new people. There are absolutely superb people in this program. I don't get very many, but I usually don't need all that many at the entry level. By the time they've been here with us for two years in the Fellows program, I have thoroughly "greened them." They're ready, they're all chomping at the bit, and they want to go to Iraq and Afghanistan and they're running around shouting "Hooah." This is an absolutely fabulous program. My other main source is recruiting retiring FA 49s since they got rid of the double-dip problem, I can talk them into staying because the work here is so much more fascinating than it is with contractors that they're almost willing to pay me to come work here.

MIKE GARRAMBONE: When I first met you, I came to an office like this one and you were sitting at the end of the table and you had an array of different spray cans and marked flags and such. They were all close at hand near your chair.

E.B. VANDIVER: And bells.

MIKE GARRAMBONE: Yes, bells were there also. I was thinking at the time, "What is all that paraphernalia for?" Then when you sat down, I immediately realized that was how you conducted your murder boards for your analysts to do their briefings. I figured this array of things were for you to pick up and wave in front of them as they were explaining things. Do you still do murder boards?

E.B. VANDIVER: Yes, but all that stuff is in my bookcase now. People gave me all of

those things. Bob, the one aerosol can Mike is talking about, was a can of BS repellent. *{Laughter}* Which got sprayed once in a while. And there were a bunch of bells and stuff. We would have our Analysis Review Boards (ARB) and on every project, we have a review at the beginning and one at the end. The first one is, this is what we're planning to do and at the end, this is what we did, and then there may be one or more in the middle, depending on how big or how long the project was. This is a quality assurance measure and the members of the ARB are all my division chiefs and members of the command group. It was also an information thing, so everybody knows what everybody else is doing. We finish about 120 projects a year, so we have a lot of ARBs.

MIKE GARRAMBONE: How many people do you have to do 120 projects a year?

E.B. VANDIVER: About 110 or 120 professional staff. It's up to one project or more per person per year, about where I want it to be.

MIKE GARRAMBONE: Tell us about your museum.

E.B. VANDIVER: It is a museum of CAA Analysis and Computing and contains many of those analysis things used in the Army for computing. All of the things are kind of related and are the kind of things you can put in a museum. I've got papers I've collected and many photographs. I've collected all sorts of computing artifacts. I have the first Apple Computer we had in the CAA. I've got the name plate off of the last main-frame. Couldn't keep the last mainframe, it was humongous, but I kept the name plate and photographs of it. We also have mechanical calculators and slide rules, which was the technology when I came into this business.

MIKE GARRAMBONE: You were talking about tools, and you mentioned that some of the best are from Microsoft Office. Is it because the tools are so powerful now or is it because they're easier to use?

E.B. VANDIVER: Most of what we give the analysts that we send to the theaters is on a high-end laptop. We give them a lot of memory and we give them Microsoft Office, the high end version. We give them some visual map display software, Falcon View is one we've used, and then there's one of the cartographic

products, also that's harder to use. We give them a statistical package. They can do a tremendous range of things with those tools; just the spreadsheet alone in Microsoft Office is a powerful tool in itself. If they have to make briefings, they put it over in a Power Point slide. And then if they can't do it, if they need to do some higher end statistics like analysis of variance, which they do on some things to see if we're looking real trim, they go with the statistical package. A lot of studies look at where things happen on a geographical basis. So you display it on a map background. That's what I'm giving my analysts to put in their ruck sack to take to the theater. The rule is if they can do it in a day or two, they do it themselves; if not, they send the problem and the data back to us on the secure network so we can do it here and we send it back to them. So I've got this worked out, and it is humming like a well-oiled machine. And the tool you use is what's appropriate to the problem and how much time you've got. Many times a spreadsheet's good enough. Sometimes a spreadsheet inserted on a map with just plain bars and pies is good enough. If you need means, medians and what not or box plots with whiskers, or ANOVA or a multiple regression, you can do that. If it gets bigger than that, we'll build a discrete event simulation like Jack Zeto built on the ambulance problem. The ambulance thing that Jack has done was the study that won the Payne Award last year and is an absolute classic case of real OR. We got the problem from the theater. We got the data from the theater. We built a model of it. We manipulated the model and came back with a whole range of answers under a whole range of assumptions and sent it back to the guys that asked for it. And they were so happy they could hardly stand it. So, tools, you will use what you need. If you need a hammer, use a hammer. If you need a lathe, you go get a lathe.

BOB SHELDON: How many people do you have doing reach back for Iraq?

E.B. VANDIVER: That's highly variable. We have up to about a dozen projects running at any one time on reach back; but sometimes it's less, and sometimes it's more; and sometimes they're big and sometimes little. The workload's highly variable on reach back.

MIKE GARRAMBONE: How many guys do you have in theater now?

E.B. VANDIVER: One in Afghanistan with a three-star command, actually there's two because I haven't been able to get the other one back yet. She made such an impression on LTG Banno he won't let her go. She's writing his end of tour report now. I'm only supposed to have one in Afghanistan at the three-star Headquarters. And I have two in Iraq at the three-star headquarters, but the two headquarters there are in a dispute over who should get them. So I suspect they'll end up moving to the four-star headquarters. So I have two in Iraq, one in Afghanistan.

MIKE GARRAMBONE: Are they getting enough "stick time?"

E.B. VANDIVER: We've set it up on a six month basis to "regularize" this thing. They're all six-month rotations, with three weeks of overlap. The Combat Replacement Center (CRC) time, is separate from the rotation time so it doesn't get counted in the 179 days. Everybody has to go the CRC first for two weeks and then you have to go back for a few days when you come back. The time that you use if you leave here to go there, that gets counted against your 180 days temporary duty. So we do that separate to get 180 days. We get a three-week overlap with your replacement and I'm running these as six months slots. We got them laid out for a year. I'm letting everybody bid on them. Just like the airlines do. The pilots bid on routes, so I let them bid on these tours. In the military it's not if you go, it's when you go. So you better give me your preference. The military don't want to volunteer for six month tours because it's too hard to explain to Momma, but if I make them go, that's not a problem. Anyway, I've got them bidding for it and civilians can go too, but they have to go for six months also. And I have civilians volunteering to go. Mainly it is the Presidential Management of Fellows Program (PMF) folks, who I can't send. We went up to the woman who runs the Army Interns and PMFs, and asked if it's okay if we send one of the PMFs to Iraq. She went right through the roof. I thought it was a good idea. But as soon as they convert from the program, I can send them, and I have.

MIKE GARRAMBONE: You mentioned somewhere that you do some work with ARO or was it ARI?

E.B. VANDIVER: ARI, the Army Research Institute. We've done a few things with them over the years. They do personnel stuff. Army Research Office (ARO) funds university research and what not. I used to kind of keep up with them, but I don't have much to do with either of those right now. Now there is the Army Research Laboratory (ARL) which is up in the Laboratory Command up there and is the successor to BRL, so we have a little bit to do with them now and then, but mostly with AMSAA rather than ARL.

MIKE GARRAMBONE: How about the mid-level operational folks at TRAC (TRADOC Analysis Center) or TRADOC (Training and Doctrine Command) itself?

E.B. VANDIVER: We work with all parts of TRAC one way or another: White Sands, Fort Leavenworth, CASCOM, Fort Lee, and the research office out of Monterey. We work with all of them.

MIKE GARRAMBONE: Are they kind of "feeders of information" to the level of warfare work that you look at?

E.B. VANDIVER: Yes. We get the doctrine and the organizations from TRADOC, and we put it together up at the higher level so TRADOC input is essential. AMSAA input on systems is essential. A lot of our learning about how these units are organized, and how they employ them occurs by taking part in the TRAC analyses. That is, by watching the TRAC analyses while they're developing these things. This is because a lot of information is only available in the form that TRAC has them because they haven't become doctrine yet. They're not in field manuals and TO&Es yet. The systems and ideas are out in the future. They only exist as sort of analytical products within the TRAC realm.

MIKE GARRAMBONE: Are you getting ready for the QDR?

E.B. VANDIVER: We're already in the QDR. We are in the QDR up to our eyeballs. That's my number two priority. The CAA priority number one is to always support the current operations. We already talked about that. Number two this year and this year alone is

QDR and I have a person stationed in the Army QDR Office. I have made my new technical director, Dr. Markowitz, our primary point of contact on it and he knows all about it from having participated in it from the other side. We have built a new simulation of the unit rotation concepts for our modular units. This will probably be our primary tool in dealing with most of the issues we expect to come up in this QDR. And then we have to go to all of the hundreds of panel meetings and senior leader updates and IPTs.

MIKE GARRAMBONE: You are prepared to cover a lot of turf here.

E.B. VANDIVER: Yes. But I have been through this before, this is our third QDR. This one doesn't look to be nearly so traumatic as the last two.

MIKE GARRAMBONE: The Army is unique in having a senior staff position such as the DUSA (OR). What are your thoughts on that position?

E.B. VANDIVER: This office was established by Dr. Wilbur Payne in the mid 1960s and was the vehicle by which analysis was made part of the way business is done in the headquarters.

MIKE GARRAMBONE: Although we talked about Dr. Wilbur Payne, it would be most helpful for others to better understand the importance of Dr. Payne's contributions to OR. What were some of the specific things he instigated or did over time to be so remembered?

E.B. VANDIVER: Creating a Function Area 49 for officers and instigating CAA are two fairly important ones. He was a stickler for high quality and professional work. He was a senior leader in the Department of Defense and the Operations Research community, and was instrumental in growing military analysts to perform defense work. A lot of what he did was encapsulated in the dedication plaque mounted in our entrance way.

BOB SHELDON: Do you have a parting shot about where you think military OR is going?

E.B. VANDIVER: It is very gratifying to see the extent to which analysis is now institutionalized in the Department of Defense and especially in getting back to our roots in supporting current operations. I am very proud of having been a part of this.