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Arend Reid Interview (MORS)

Reid, Arend

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INTRODUCTION

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

Mr. Arend "Pete" Reid was Chief of the Combat Support Division, Army Materiel Systems Analysis Activity (AMSAA), from 1982 to 1996. He was appointed to the Senior Executive Service (SES) in 1982 and given the Presidential Rank Award in 1989 for Meritorious Executive. Mr. Reid was inducted into the Army Operations Research/Systems Analysis (ORSA) Hall of Fame in October 2008. The interview was conducted on May 2, 2009, with Mr. Reid and Mr. Bill Dunn, FS, in Fallston, Maryland; participating via telephone were Mr. Mike Garrambone in Dayton, Ohio, and Dr. Bob Sheldon, FS, in Burke, Virginia. This article includes both an interview of Mr. Reid as well as his remarks at the MORS Heritage Session at the 70th MORS Symposium at Fort Leavenworth, Kansas, June 20, 2002.

Bill Dunn: It's May 2, 2009, and I'm in Fallston, Maryland to interview Pete Reid. Mike Garrambone and Bob Sheldon are with us on the telephone. Pete, tell us how you got the nickname "Pete"?

Pete Reid: I just adopted it because people didn't pronounce my real name, Arend, correctly.

Bill Dunn: Why Pete? Why not Bill or Bob?

Pete Reid: Why not? Just out of thin air.

Bill Dunn: You didn't have an uncle or a friend or a hero on TV?

Pete Reid: No. [Laughs] I just went back to college my sophomore year and said, "Call me Pete Reid." They were all greatly relieved to not have to try to pronounce my first name.

Bill Dunn: What did your parents call you?

Pete Reid: My dad occasionally did call me Pete. My mother continued to call me my given name, which she did pronounce correctly, by the way, and she was a personal friend of the Arend whose name was assigned to me. The friend's name was Arend Antonius Yakaminus Korteweg.

Bill Dunn: Have you ever met any other Arends?

Pete Reid: Actually yes, there's one in our church. Cal Ripken's younger brother has a son named Arend. He is named for their Dutch grandfather.

Bill Dunn: I don't remember anybody but you with that name.

Pete Reid: Well it probably wouldn't stick with you.

Bill Dunn: Where were you born and what were your parents' names?

Pete Reid: I was born in Richmond, Indiana, at home. My mother's name was Madge and my father's name was Wayne.

Bill Dunn: Tell us about your early years. What schools did you go to?

Pete Reid: I went to the public schools in Richmond. I walked to kindergarten and the first four years of elementary school. Then we moved to the country just outside Richmond on a small farm. I walked to fifth and sixth grades, which was probably a half mile away. I rode the school bus to junior high and also to senior high school in Richmond.

Bill Dunn: What did your parents do?

Pete Reid: My father did calculations concerning the speeds of automated drilling equipment for the National Automated Tool Company (NATCO) in Richmond. He would calculate the rate at which the tool should be fed into the materials and drilled or shaped, and also the rate of speed of the drill bits. A lot of the equipment was used during World War II (WW II) and then subsequently a lot of their equipment became part of the Marshall Plan. The NATCO tools were used by the automotive industry worldwide. My mother was the chairman of the Red Cross in Richmond for 15 years, including all of the WW II years. Both before and afterward, she was a school teacher. Before she graduated from college she was hired to teach English in the public schools in Indiana at the high school level and then in later years she became an elementary school teacher and also an art teacher.

Bill Dunn: Was your father an engineer?

Pete Reid: He was not a college graduate. He went to Earlham College for two years and then dropped out. He learned enough to use a slide rule and understand the calculations having to do with machines that were manufactured by the NATCO.

Bill Dunn: Having your dad familiar with slide rules and such, did that pique your interest as far as following in that line?

Military Operations Research Society (MORS) Oral History Project Interview of Mr. Arend "Pete" Reid

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Pete Reid: I think everyone in the 1940s and 1950s was familiar with slide rules. I don't know whether it was the fact that my father gave me a couple of slide rules. Whether it was the fact that he used them was an influence or not, I can't say.

Bill Dunn: Did it spark an interest in physics or engineering or mathematics?

Pete Reid: I used to enjoy going to visit his companies (during WW II my father worked at a tool and component manufacturing company in Dayton, Ohio), and see the sorts of things that they did. I just assumed that everybody did that sort of thing. Both parents and my grandmothers were very influential in telling me that I would be going to college. The only question was where. I had a scholarship offer at the University of Cincinnati, but I elected to go to Purdue. The cost for one semester's tuition for an in-state student at Purdue at that time was \$65 per semester. I thought the \$1,000 cost they charged an out-of-state student was out of sight.

Bill Dunn: How far was Purdue from Richmond?

Pete Reid: It was about 140 miles to West Lafayette, Indiana. I hitchhiked about 100 times. I would never dream of doing it today.

Bill Dunn: Those were the good old days.

Pete Reid: Yes. All the kids hitchhiked for the first couple of years until they got cars.

Mike Garrabone: What did you study in high school that led you to get into a fine school like Purdue, and when did you graduate?

Pete Reid: The choices in high school were academic or otherwise, so I just took the academic coursework. I had high school chemistry and physics and I especially enjoyed mathematics. I graduated in 1951 from Richmond Senior High School.

Bill Dunn: What did you choose as a major at Purdue?

Pete Reid: I started out in aeronautical engineering and changed to air transportation engineering, which is essentially industrial engineering oriented to the aviation industry. Remember there were a lot of pretty bright people there the same time I was, people like Gene Cernan and Neil Armstrong and not too many years before was Amelia Earhart. In fact the author of *Cheaper by the Dozen*,

Frank Gilbreth, lived in a house on campus. The brightness sort of rubbed off on the other students.

Bill Dunn: Your diploma was in air transportation engineering?

Pete Reid: Right.

Bill Dunn: Did they have an operations research (OR) curriculum there at the time?

Pete Reid: I don't recall if they had any. The first time I came across a school that had courses that were called OR was after I was working at Aberdeen Proving Ground (APG). Johns Hopkins had it in their McCoy College and I took some of their courses.

Bill Dunn: Were there any courses in industrial engineering that were similar to ORSA (Operations Research/Systems Analysis) that you remember?

Pete Reid: Practically everything that has to do with engineering is similar to ORSA.

Bill Dunn: Good answer. When you were finishing at Purdue, did they have a job fair or a placement service?

Pete Reid: They had an excellent placement service. I took part in many interviews. I chose to go with the Kawneer Company in Niles, Michigan. All of you have touched Kawneer products thousands of times. Every time you go to an aluminum glass store front, you're opening a door that was probably built by Kawneer. There are very few exceptions. Look at the kick plate and you'll see K-a-w-n-e-e-r. The name comes from the Kaw River just west of Missouri, near where the original factory was built. Then it moved to Michigan. At the time I was with Kawneer, they had contracts with almost all of the major airplane and helicopter manufacturers because the company had invented the process of bonding curved surface honeycomb panels.

Honeycomb is a structural body that is extremely lightweight and is used in a great many applications: in airfoil, wing, fuselage and floor plate in aircraft and helicopters. It's also used in other things like walls around Link trainers, but the biggie is their wonderful invention of a very simple method of curved surfaces bonded in honeycomb panels. They had contracts with Republic, Boeing, Vertol, Piasecki, Sikorsky, Martin and other aircraft manufacturers.

Bill Dunn: What was your job there?

Pete Reid: I was a trainee. I was only there for a few months before the Army called. I almost caused a wildcat strike one morning when I picked up a part that needed to be reworked and carried it over to the rework bench. That was not a good thing for a person who did not belong to the union to do. You had to go get a union member to carry that part over. They saw the wisdom of not going out on strike, but they threatened to. I carried the part back and let the union guy carry it back over.

Bob Sheldon: What kind of training were they giving you?

Pete Reid: Anything in their manufacturing process, really, anything that an industrial engineer would do. They also had aluminum anodizing capabilities. One of the large aircraft manufacturers invented the process of anodizing aluminum. Kawneer got licensed to do anodizing in exchange for curved surface honeycomb panels work that they did for that aviation company. So I worked on anodizing and I worked on the machining of the honeycomb panels.

Ironically, I learned later that the material used that allowed the panels to be glued to a curved aluminum surface was made by Bloomingdale Rubber Company right here in Harford County, Maryland.

Bill Dunn: How long were you with Kawneer?

Pete Reid: From early February through April 1956. I would've been there a bit longer except that I had to have an appendectomy. I was in the hospital having my appendix out the day that I graduated from college in January 1956.

Bill Dunn: Did you get a letter in the mail that said, "Please report to a military induction"?

Pete Reid: Right. My draft board was very fair. They told everybody they would give you four years to go get a college degree and after that they would draft you ... and that's what they did. I knew one classmate who didn't hear from them so he went in and asked. It turned out that they had lost his information behind their file cabinets. He was drafted a couple of weeks after he went in and asked about it. Otherwise, he would never have gone on active duty, I guess. They had lost him completely.

I took a train to St. Louis and I had basic training at Fort Leonard Wood, Missouri. At the

end of basic training, they sent some of the people with engineering degrees to White Sands Missile Range, New Mexico, and some of them to Rock Island Arsenal, Illinois. I was sent to APG, Maryland. I had never heard of it at the time, but they told me how to find it, and find it I did.

Bill Dunn: Did you have any choice in that or they just selected it for you?

Pete Reid: No choice that I'm aware of.

Bill Dunn: What was your military occupational specialty (MOS)?

Pete Reid: My MOS was actually that of an aeronautical engineer.

Bob Sheldon: With your aeronautical background, did you ever think about joining the Air Force instead of the Army?

Pete Reid: I don't remember whether I did or not. Actually I was in Naval Reserve Officer Training Corps (ROTC) for a while. We had some interesting people running that operation. Chief petty officers regard themselves as rulers of the earth. I didn't like it, so I dropped out of that.

Bill Dunn: After you were drafted in the Army, did you ever give any thought to try to be an officer?

Pete Reid: Yes I did, and I learned through my time at Aberdeen that the GIs got the better assignments. It was awfully hard for a lieutenant to get an assignment at the Ballistic Research Laboratory (BRL). For GIs with an engineering degree or a degree in physics and math it was easy, very easy. BRL just wanted them to be assigned to the scientific and professional series of jobs and they had many such jobs.

We were in a whole company of young men who had degrees in engineering, physics, and math—well over 100 in the barracks area where I stayed, and the lieutenants that were there were very few in number. One company commander had to run the company. He was never allowed to go into BRL and work even though he had an engineering degree. He really envied those of us who were able to do it, so it was an easy choice for me to remain a GI.

Mike Garrambone: What did you work on as an engineer?

Pete Reid: I was assigned to a Special Weapons Evaluation Branch and we had the responsibility for what you may have heard about

as high fragmentation weapons. High fragmentation weapons provided very energetic, very small fragments. They manifested themselves in air delivered ordnance, bomblets, small bomblets, and artillery shells. They also work on the metallurgy for the field artillery shells to break up into extremely small high energy fragments.

As Wilbur Payne used to point out, almost all of us back in the beginning worked on nuclear weapons and I was one of those who did. I worked on the Honest John trivariate fuze burst point distribution. It was one of the first job assignments I had. I also was on the study called The Future Role of Guided Missiles. The best tutor that I ever had, Roger Willis, led that and many other studies in the BRL Weapons Systems Laboratory. I worked on the comparison of the Lance missile and the F-4C tactical aircraft. I noticed that the artillery people were working with targets that were described as arbitrarily chosen (size) rectangles, circles, and lines, and I started worrying about what they would really look like on the battlefield. I got some maps and started plotting the various units on the maps.

The Continental Army Command (CONARC) liaison officer, Colonel Larry Lingerer came by, poked his head in my office one day and saw that I had maps up on the wall. I'd stand on top of my desk and work on them with a grease pencil, and he became interested. He was a combat arms officer stationed at Aberdeen representing CONARC, and it got so he would stop by at the end of his workday. Every day he'd come by at about 4:30 and he and I would work together on the deployments and we created the first set of what we called target arrays. They were the first set of realistic target arrays for use in the evaluation of field artillery systems and we created one set for non-nuclear weapons and a totally separate set for nuclear weapons.

The deployments were grouped differently out of respect to the fact that nuclear weapons can cause a lot of damage even when they're fractional yields and used at safe distances from friendly troops. Later, after I was off active duty I started traveling to other places to get more help. I went to CONARC and found a wargaming group there that was doing some interesting

things. I went to Fort Sill, Oklahoma and we developed a whole bunch of tools for analysts of artillery weapons to use—we improved on the arbitrary methods they had been using before that.

Bill Dunn: BRL was one of the leaders in computer development. What computers did you use there at BRL?

Pete Reid: The first computer, the Electronic Numerical Integrator and Computer (ENIAC), was developed at the University of Pennsylvania under the supervision of some of the wizards in BRL. You can see parts of it on display here and there, and they put parts of it at the Smithsonian. When I arrived in 1956 they were on the second generation of a mainframe, the Ordnance Discrete Variable Automatic Computer (ORDVAC). I used that for a lot of calculations. You had to punch what they called IBM cards with instructions and certain people knew how to wire up the analog parts and machines to cause it to do the calculations you wanted it to do. I was using that machine to do various and sundry things like calculating nuclear safety distances.

It was just great anticipation. Every morning you would rush into work to see whether or not they had gotten your problem run overnight. The only time you got any running time on the machine was overnight. They used the daytime to do maintenance work and so on. So you'd hurry in there in the morning to see whether or not you had a stack of paper there in the little bins where you got output. Then you knew that your problem had run that night and you could look at it and decide what to run the next night. That was quite an exciting time, the simple act of getting in there and finding out whether or not your problem was in there.

Bill Dunn: Did you have to punch your own cards or did you have some key punch people that helped you out?

Pete Reid: We had keypunch people. If you were in a big hurry, you could do it yourself. We had our own keypunch machines in our building. They had a whole section of keypunch ladies in the building where the computers were housed.

Bob Sheldon: What was your military rank when you were enlisted?

Pete Reid: When I finished my tour of active duty I was Specialist 5, the equivalent of Sergeant. I started out at E-1. All you soldiers will know what that means. I started out at the very bottom.

Bob Sheldon: What kind of paycheck did you bring home as a Specialist 5?

Pete Reid: I don't remember exactly. I played in a dance band to supplement the income and my wife always had a job. She actually worked for the laboratory chief as his secretary for more than a year. We had been married before I went on active duty, in fact, prior to my last semester of college. One of the company sergeants was just leaving when I got there and he was kind enough to let me buy all his furniture for \$100. The first thing my wife did when she arrived was throw almost all of that away.

We rented a house in Aberdeen. She drove out with some furnishings and bought some more later. We lived in Aberdeen for a while and then we moved into Wherry/Capehart housing. The Wherry and Capehart housing initiatives addressed the demand for military housing during the Cold War. Wherry and Capehart were senators who caused a bunch of housing to be built on military installations and we lived in an apartment on post until a few months after I got off active duty. They allowed civilians to live there too. Our first child, our son, was born while we were living on post.

Bob Sheldon: What kind of music did you play with your band?

Pete Reid: Contemporary dance music. I played saxophone and clarinet.

Mike Garrambone: When did you get out of the service?

Pete Reid: May 1958.

Bill Dunn: Did BRL ask you to stay?

Pete Reid: It was hard to find an available position at the time. They offered me a job doing what I was already doing as an ordnance engineer, so they originally called me an ordnance engineer. Then they abolished that job category and I took an all-day test to qualify as a mechanical engineer. I passed that and very soon after I became a mechanical engineer.

Bill Dunn: What grade level was that when you started?

Pete Reid: I started as a GS-9. They gave me credit for the time I had worked there on active duty, so I got a good position when I started.

Mike Garrambone: Were you still in the Special Weapons Evaluation Branch?

Pete Reid: Yes, that's true. I was a mechanical engineer from GS-9 through GS-13. I made GS-13 in 1963.

Bill Dunn: You moved up basically a grade a year?

Pete Reid: Yes, I was promoted pretty rapidly. Then I was named the Chief of the War Games Branch and I had that job through 1968 at the GS-14 and 15 levels.

Bill Dunn: When you switched over from enlisted to civilian, were you doing the same jobs?

Pete Reid: Exactly the same jobs, things that I created really.

Mike Garrambone: What was going on in the world there in 1958? Were there wars going on and were there people looking at weapons systems?

Pete Reid: We had a lot of stuff going on in Quemoy and Matsu. They are little islands off the coast of Formosa, now Taiwan, which the Chinese mainland field artillery was hitting every day. We were asked things like what kind of weapons are needed to counter their daily bombardment. The inhabitants actually offered to swim over there and make measurements on the mainland of the Chinese artillery positions. I don't know that they ever actually did that. Then of course you had conflicts going on everywhere. We had troops put ashore in Lebanon during the time I was on active duty. We worked constantly on what was perceived as the Soviet Union threat to Western Europe.

Bill Dunn: Did BRL send any civilian analysts or data collection people forward?

Pete Reid: I'm not aware of BRL sending anybody until 1966. Some of my people went over to Israel and did some experiments with captured Soviet equipment and with Israeli equipment, most of which had been furnished by us. Then I led teams that went over there in several subsequent deployments following the Yom Kippur War and their 1978 incursion into Lebanon. Some more stuff was captured. I know that the BRL had people over there from 1966 on and I don't recall that anyone was deployed in

conflict areas, except Vietnam. We had people in Vietnam collecting both materiel damage data and soldier wound data. I was not part of that.

Bill Dunn: Did you do any Vietnam analysis at BRL?

Pete Reid: I was still working in field artillery and wargaming, and one of the big tasks that we had during that time was the Red Leg (later called Legal Mix) study. This was a new study that happened every five years or so to determine the best choice of field artillery weapons, cannon, missiles, etc. One of the scenarios that we chose to develop had to do with the Ia Drang battle that Lieutenant Colonel Hal Moore's battalion became involved in. We had a whole bunch of guys from Fort Sill come to Aberdeen and work in our wargaming rooms.

We had a good facility for wargaming with special panels for mounting maps, but we did not have really good maps in that area of Vietnam. We had a little bit of the Ia Drang Valley itself that we wanted to study, but we didn't have the surrounding terrain very well. We actually moved what we referred to as a potato shaped section of Ia Drang Valley and put it in another part of Vietnam and built a scenario around that for evaluating contributions of field artillery. We also had deployments and scenarios written for higher aggregations of conflict in central Europe.

We had several scenarios that we evaluated as part of the Red Leg studies. It turned out that Red Leg was an Air Force code word, so we were required to change the name. Fort Sill changed the name to the Legal Mix X studies where "X" denotes the number of the study they were working at the time, i.e., Legal Mix 1, Legal Mix 2, etc. Because I had come up in the field artillery support weapons side of BRL, I was involved in all of those as time went on.

Mike Garrambone: Could you describe for us what you mean when you say wargaming? Is it more of a map exercise or a simulation or guys working at the table?

Pete Reid: Early on it was more of a map exercise. Later on it became both a map exercise and simulation. I'll talk more about simulation later.

Bill Dunn: Were there many military in the leadership positions at BRL when you were there?

Pete Reid: The commander of BRL was a colonel for years, and after I came on as a civilian I wrote recommendations for military positions pointing out that we needed people with combat experience working on the problems we had. We got four majors and one lieutenant colonel on my staff that assembled not too many years after I took my first civilian job there, and then we became the Weapons Systems Laboratory. The BRL also had a civilian Technical Director.

Mike Garrambone: Were you there for the transition from BRL to the establishment of the Army Materiel Systems Analysis Agency?

Pete Reid: Yes.

Mike Garrambone: How did that take place? Did you change jobs and titles during that?

Pete Reid: I changed titles. I didn't change jobs. I changed from Chief of the War Games Branch and Weapons Systems Laboratory of BRL to Chief of the Tactical Operations Analysis office of AMSAA in 1968.

Bill Dunn: Why was AMSAA set up?

Pete Reid: Fundamentally, General Bunker, the deputy at Army Materiel Command (AMC) headquarters, wanted a systems analysis capability reporting directly to him and responsive to him. The original thought had been to have one group at Aberdeen, one group at Fort Monmouth, and one group at Rock Island and/or Warren, Michigan. I wasn't part of the politics part, but as I understand it the folks at Fort Monmouth and Rock Island turned in enormous requirements for staffing and funding that General Bunker balked at, so he said, "Let's do it all at Aberdeen." He caused a bunch of spaces to be transferred from BRL to set it up and there was some more in-fighting within the BRL as to who was going to be running it. I stepped the Chief Scientist at AMC and he said, "It shall be Dr. Joe Sperrazza."

Once that was settled there was another hiccup having to do with a proposed Aberdeen Research and Development Center (RDEC) and they were offering Joe the job of running it. It would have included the Weapons Systems Laboratory and Human Engineering Laboratory and a couple of other parts. Joe said no, he wanted to run AMSAA. But there was eventually an Aberdeen RDEC set up and AMSAA became a part of it for a very brief while. Except

for that, we reported directly to the AMC commander starting in 1968.

Bill Dunn: Did all of the Weapons Systems Laboratory move to become AMSAA? And did everyone move or was it voluntary?

Pete Reid: Nobody changed a desk. The only difference was there wasn't anything voluntary about it. There was some competition for some of our staff with the Federal Aviation Administration (FAA) in Atlantic City. The national association having to do with the FAA was advertising in our area and they attracted some of our bright people who went up there, one of whom (Don Scheffler) I worked with very closely in BRL and I still correspond with him almost every day. He became the inventor of the Easy Sabre air reservation system. Easy Sabre was the grandfather of all of the commercial aviation reservation systems, so when you book your ticket you're going through the granddaughter of Don Scheffler's invention.

Mike Garrambone: We were talking about some of the transitions.

Pete Reid: The only thing that was different was the people who were in the Weapons Systems Laboratory who were working strictly on vulnerability were transferred over to the Terminal Ballistics Laboratory of BRL, so we did lose some very knowledgeable people there.

Bill Dunn: Dr. Sperrazza was the first director. Was there some discussion about whether it should be led by a civilian or a military?

Pete Reid: Not to my knowledge.

Mike Garrambone: How big of an organization was it at the time?

Pete Reid: The initial strength was about 130.

Mike Garrambone: That's a sizable organization, a lot of brainpower.

Pete Reid: Yes. Maximum strength was about 430-440.

Bill Dunn: How many of those were military?

Pete Reid: Remember the Limited Warfare Laboratory (LWL)? That organization became part of AMSAA when they broke up the LWL, and they had a lot of enlisted men, I mean a lot compared to what we'd normally have. They probably had 10 or 15 enlisted men. I think at one time we had seven colonels. Now we're lucky to get one. In fact the only active duty person we have is our deputy director today at AMSAA, only the one. The most military we

ever had in the organization surely didn't exceed 30-35.

Bill Dunn: How did you grow your civilian analysts?

Pete Reid: A lot of greening programs. We would send them to places like Fort Benning and arranged for them to drive armored personnel carriers and fire infantry weapons. They would go to Fort Knox and they were allowed to fire tank main guns and machine guns. We would send them to Fort Sill where they were allowed to take part in firing battery training. We set up our own courses for wearing protective masks right outside the area where we had our offices in Aberdeen. People wear protective masks for long periods of time and perform various tasks. We had them take some of the courses that are offered.

I took courses at Fort Huachuca, Arizona—sensor management and that sort of thing. We sent people all over to take courses. We had a wonderful ordnance museum in Aberdeen. I took young employees to the museum many times and I had them watch tapes of combat. They had a wonderful library of tape from WW II. The only problem is we see the huge difference in tapes from WW II compared to tapes from Korea or Vietnam. You can see the progress of development of the telephoto lens, so when the cameraman is being subjected to opposing fire, with the advent of the telephoto lens the camera stays on the action a lot longer than it did in WW II. As soon as there were any weapons firing in the area, the camera went down in the foxhole with everybody else. So you got to see more of the action, especially from Vietnam.

The museum at Aberdeen is one of the things I'm afraid they're going to move down with the Ordnance School. Believe me, the rest of us used those facilities a lot more than the Ordnance School ever dreamed of using it, but it's their argument that they need to have access to it. It used to be a wonderful resource for industry also. They would come in and see how things were done, and they were always interested in the way the Germans built their automotive and weapons systems.

They had a great display. We got a pretty good guy in there running it. The original curator, Mr. Jarrett, had collected most of the stuff

himself on the battlefield. In fact he kept part of the collection on his farm about 15 miles away when he ran out of space at Aberdeen. That's a great resource for greening as are all of the various Army Training and Doctrine Command (TRADOC) schools around the country.

Bill Dunn: Did you have a co-op program to attract analysts?

Pete Reid: We did. We had a lot of students come from as far away as Nevada during the summer. Most of you know Warren Olsen and his brother Al. Warren Olsen is a South Dakota kid and came to work for me from his school in Minnesota. Mainly of course they were from the local area, from Pennsylvania, Maryland, some from Virginia, but we always had jobs for bright kids to come work in the summer.

Mike Garrambone: Tell us about your early work with modeling and simulation.

Pete Reid: My group built the first division-level combat simulation that we had, really emphasizing the weapons performance attributes that you want to be able to study.

Mike Garrambone: When did that occur?

Pete Reid: That would've been in the vicinity of 1969 or 1970 and the actual development went on for a couple of years.

Bill Dunn: What was the name of that simulation?

Pete Reid: Division Level (DIVLEV) simulation.

Mike Garrambone: Was it an in-house development?

Pete Reid: Yes. Morgan Smith came to me and said he had talked to Dr. Sperrazza who had agreed that I could choose people from the staff across AMSAA that I wanted to work on developing it. Basically I got my way and I was given the people I asked for. They were people who knew how to conceptualize things and represent physical processes with mathematical formulas and do it in an understandable way and develop techniques in ways such that people could come on board and could understand them. That was very important for the soldiers who took part later to be able to easily understand what it was we were emulating, and how.

We built it and Dr. Sperrazza, the senior staff, and all the division chiefs in AMSAA came in for seven consecutive Saturdays and

reviewed all of that stuff in great detail. I mean all of that stuff, every assumption, everything that we did. About three to four hours for seven consecutive Saturdays. They were not reimbursed for any of that. They just came in and did it and made some good comments and we'd go back and do rework.

Mike Garrambone: You had your own computer department and code guys to work this all together?

Pete Reid: I'm a great believer in having the analysts also doing the coding so that they understand cause and effect very well.

Mike Garrambone: That's outstanding!

Pete Reid: It was then. I can't do it anymore, but that's what I had. I had the people who developed the methodology do the coding. We did not ask for, and never got, any help in coding.

Mike Garrambone: It sounds like you had every piece of the game that you needed to do this. It's hard to get all those together at one place.

Pete Reid: Yes it is, very hard.

Mike Garrambone: You had either fantastic supporters or mentors or something.

Pete Reid: I did and we also had staff stability. Unlike most other organizations, AMSAA always had very low turnover. I enjoyed having the people who did the building blocks of how things were going to be represented and emulated—all the physical processes. I had them for years.

Bill Dunn: How long did the runs take?

Pete Reid: We could keep up in real time. We always had to have orders sent out to company and battery level, sometimes even finer than that. As soon as they sent them, within a couple hours we would get them back. The biggest problem was the computer was over in a different building; we would run over there—it was half a block away.

Bob Sheldon: Tell us about those teams that you deployed with to Israel. How many guys were on the team, their skills, and what kinds of stuff you did?

Pete Reid: I had people who did vulnerability work and a couple of retired armor officers. Following the 1973 War, we went into the Golan where there were literally hundreds of British, French, and Russian combat vehicles littering the battlefield despite the best efforts of the Israelis to police them up and take them into

depots to take them apart. We got there while the vehicles were still out there and we were able to visit hundreds of combat vehicles right where they had been killed, and in many cases determine the shot that killed them. We had to identify what kind of weapon it was, which was fairly easy; we measured the angle of attack and we noted internal damage. We divided into teams including one former armor officer and one civilian, so I was on a team that had one of each. We made all those measurements and in the evening we would go back to the Kibbutz where we stayed. We would summarize all our work and get it down to the embassy for shipment back to the United States.

Bob Sheldon: Did you compare the data you collected from combat vehicles there to your results from the test range?

Pete Reid: That was the objective. If Mike Garrambone were to go over to the archives on Wright Patterson Air Force Base (WPAFB), Ohio, there is an organization there, the Survivability/Vulnerability Information Analysis Center (SURVIAC), that has kept the records with all the photographs and all the measurements we made from the 1973 War—hundreds and hundreds of tanks and many other combat vehicles. They have either my original photographs and forms or a good copy of all of them.

Mike Garrambone: It sounds like you had more irons in the fire there besides getting your own data. Were you into battle damage assessment?

Pete Reid: Absolutely.

Mike Garrambone: You could call it exploitation. You could call it design or redesign. Were you doing all those kind of things with that information you were gathering?

Pete Reid: The battle damage repair came along a little bit later and that was more an initiative of Joe Sperrazza and John Kramar that certainly took advantage of all of our data and measurements. The Israelis became tremendous at field repairs. Some of our maintenance people just shake their head at the speed at which the Israelis could exchange a tank transmission in the field. The Self Propelled (SP) 175 mm gun and the SP 8-inch Howitzer had a common chassis. They changed from one caliber to the other in the field at blinding speed when they began

running short of ammunition in one area and still needed the cannon.

The Israelis became extremely good at combat expedients, battle damage repair, etc., and you'd see them recycle their tanks, plug holes, and get them back in the line. People, in general, think that the tube-launched, optically-tracked, wire-guided (TOW) anti-tank rocket system we had, was used in the conflict. It wasn't. It was used during the war of attrition that occurred after the conflict and I had access to all those records. They had a phenomenal hit rate with 32 TOW missiles that they fired after the formal part of the 1973 War was over.

There was still a lot of action going on and it was going on even while those of us who were collecting battlefield damage were up there. There were daily exchanges of artillery and other things going on. They would sometimes move us around depending on their anticipation that certain areas were going to be hit, and they were very good at that.

Mike Garrambone: It seems like you would also have an opportunity there to look at performance of the weapons that caused the damage. Were you collecting data that was useful for that?

Pete Reid: Everything that we recorded reflected on the performance of weapons systems. It was not just target vulnerability. It was also the performance of the weapons that hit them.

Bill Dunn: As a civilian, were you getting hazardous duty pay over there?

Pete Reid: Not only was I not getting hazardous duty pay, but the per diem rate for a civilian was way less than it was for a soldier. The military guys, the active duty guys on my team, were getting three or four times as much per diem as I was. I couldn't even pay my hotel bill when I was living in Tel Aviv with the per diem I got. *[Laughs]* I should've gone in and asked for an adjustment of some kind, but I didn't do it. I think I got \$25 a day and the hotel bill was \$27 a day, which included breakfast.

Bill Dunn: Did you have to sign away your rights for insurance when you were in a war zone?

Pete Reid: I don't remember it ever coming up. It was just a case of going over and doing

what seemed like the right thing to do. I have no recollection of insurance issues.

Bill Dunn: Were you involved in 73 Easting? It was the armor battle during the Gulf War (1991) between primarily the Army 2nd Armored Cavalry Regiment and the Iraqi Republican Guards Tawakalna Tank Division who were in prepared positions at 73 Easting. It was named for a Universal Transverse Mercator north-south coordinate line (an "Easting"), measured in kilometers and readable on Global Positioning System (GPS) receivers. After the battle, COL Mike Krause from Army Center of Military History went over there and surveyed every location, every hull, every shot azimuth, every battle damage assessment, and "reconstructed" the Battle of 73 Easting. COL Don Holder, who later retired as a Lieutenant General, was the 2nd Armored Cavalry Regiment (ACR) commander. CPT H. R. McMaster, currently Major General (2012), was the troop commander. It sounds like the kind of work AMSAA might have been involved with.

Pete Reid: We didn't have anything to do with it. No one asked for us.

Bill Dunn: Any other work with the Israelis?

Pete Reid: In 1976 I convinced the Israelis to let us have some historical data to use in checking out our wargame methodology. They wanted to know what the wargame methodology was, and I went over there to brief them. Every corps commander, the armor corps and the artillery corps, came and sat in on day after day of greatly detailed briefings. The US Army liaison officer at the embassy kept coming to me and saying, "These guys don't want to hear all this." I said, "Look, this is what they asked for."

Some of the highest ranked guys in the Israeli Defense Forces (IDF) sat there for hours and listened to my guys briefing our methodology. It paid off because they put a six-month effort together with their chief historian, several combat arms officers, and one really competent OR guy named Dr. Adam Shefi, a PhD in systems analysis from Stanford. One of the people who came over and helped in the subsequent wargame that used their historical input was Ehud Barak. He not only became the IDF senior commander but also the Prime Minister of Israel for a while and is still in competition for

it every time they vote for a new prime minister. He had been a tank battalion commander under General Adan during the 1973 War and had gone into El Arish without any artillery support and got waxed. In fact General Adan himself came up and spent a day with us while we were doing that reconstruction. When we have had an opportunity to explain our methodology, we have had the attention of some pretty good people.

Bill Dunn: How was the validation of your simulation results compared to what the Israelis had actually seen on the battlefield?

Pete Reid: We were able to reconstruct some of the battles primarily from the Golan region and produce the same casualty rates (as a function of time) as had occurred in the real battles. It was amazing. I was so pleased, and it all hinged on our ability to represent the effects of suppressing fire; the effects of suppression really paced the battle and we were able to do that.

One more thing about the Israelis: When we came back from the 1978 review of the Israeli incursion into Lebanon, my team wrote up the weapons performance report and of course the guys at TRADOC wrote up the remaining stuff. General Max Thurman, then the Vice Chief of Staff of the Army (VCSA), said he didn't want to publish it the way it was written, so he turned to the Army War College to have it recast. They put our weapons performance stuff in as it had been written. That became part of the final report.

One of the things that General Thurman objected to was that the Israelis used a lot of their propaganda language in characterizing that conflict, and the US team used the same language. You might be interested to know that the three Israeli brigade commanders who led the three task forces into Lebanon in that conflict were all at Harvard University the day before they led off the battle. They flew to Israel and off they went with their brigades into the Bekaa Valley, and to the east and west.

But there was a massive Israeli propaganda effort. If you can remember they sent some senior people over here to be interviewed on television and so on. I know Nati Sharoni, once the chief of the artillery corps, was one of them. "We're just going to go so far. We're not going to go all the way into Beirut," this and that

and the other thing, and I guess you remember how that actually turned out. So they were still on their propaganda bit when the team went over to interview them and collect information without their support. We didn't get nearly the access to the materiel damage in that instance as we had in previous conflicts. In my opinion, our financial support and foreign military sales should provide for efficient access to performance in combat. Our Department of State has objected to such an arrangement. We somehow find ways to allow the politicians to influence that.

Mike Garrambone: You took on studies for other folks like TRADOC Analysis Center (TRAC). Who else?

Pete Reid: I'll mention two main ones that we did for Wilbur when TRADOC did not have a division-level wargame capability. One of them was a second echelon interdiction study, and another was a counter-battery study, and we did both of those in concert with the German army.

Mike Garrambone: Who was at TRAC at the time?

Pete Reid: Wilbur Payne was there. Wilbur was the Director and Aquim Pavel was his German counterpart, Colonel Pavel. We had in-process reviews every couple of months and they both sat in on every single one of them.

Mike Garrambone: Did you ever get tasks from AMC headquarters?

Pete Reid: Yes, especially when they set up a battlefield systems integration director. One main job that I did for them was look at the role of TOW in a brigade scenario and we used DIVLEV for that. Major General Ira Hunt was the director of that element of AMC headquarters.

Mike Garrambone: What about the Department of Army (DA) staff? Did they tap you for anything?

Pete Reid: They did constantly. When Dr. Payne was on the Army staff he was constantly asking us to do this and that. Even the Office of Secretary of Defense (OSD) staff did when Leonard Sullivan was there and General Bonesteel. They gave birth to the F-4C versus Lance study on contributions to land warfare. They came up and actually spent hours poring

over the maps and overlays that we created. I'm a great believer in highly visible means of conveying information and there's no better way to illustrate what you're doing in a wargame than having those map overlays and showing people exactly what assumptions were made and how you carried out the scenario.

We also did a study that was initiated by the North Atlantic Treaty Organization (NATO) and the DA staff to look at the roles of things like the Multiple Launch Rocket System (MLRS). Greg Ogden was on the DA staff and asked me to take on this study along with NATO countries.

Around 1980, General Jim Drummond came to run AMSAA for a while in between civilian directors. He had been the chairman of the Combat Developments Department at Fort Sill when this study requirement first came up and he told DA that his on-going workload was such that he could not work on it. When he came to AMSAA he found out that I was in the middle of working on it, so that was fun. We set up a scenario. The Germans set up a larger unit scenario at their facility within the Industrieanlagen-Betriebsgesellschaft mbH (IABG), Ottobrunn, Germany, south of Munich. In any case, we were on the telephone with them daily so that we could keep the progress of the two simulations going apace, and the German Army sent several officers to Aberdeen to participate directly.

We had a German colonel and two or three captains from his staff working in our game room. I had set up this really nice office with a very nice desk for the German colonel across the hall. I worked on cleaning it myself and he had a secretary and all the accoutrements. But he insisted on being in the game room the whole time he was there. It turned out the guy was a huge help in the game. We had combat arms officers from every NATO country, including Denmark and Canada. We ran that game and it turned out to be a great way to illustrate the counter-artillery capability of the MLRS system, and it helped the United States to sell many NATO countries on buying that system. It was a good job to work on.

Mike Garrambone: DIVLEV was doing that?

Pete Reid: Yes.

Bill Dunn: So you were Chief of the Tactical Operations Analysis (TOA) office up until when?

Pete Reid: Until 1982. Then I was promoted to the Senior Executive Service (SES) and Chief of the Combat Support Division, but the TOA office remained a part of that division.

Bill Dunn: What things did your new division do?

Pete Reid: That had been Keith Myer's job, Combat Support Division, and we added some things. I had the responsibility for all the communications, electronics, survivability, chemical-biological, automotive mobility, plus tactical operations.

Bill Dunn: Keith Myers moved up to be the Director of AMSAA.

Pete Reid: Right. When he became Director I took his division, combined with my former TOA Office.

Bill Dunn: It sounds like there were some different things in there that you hadn't necessarily done before.

Pete Reid: I had experience with respect to the sensors. I had worked on target acquisition systems almost my whole career.

Bill Dunn: And the chemical part?

Pete Reid: I had done some work on chemical in a "What if?" study. What if the Soviets opened up conflict with a bunch of wide area chemical weapons in a land battle in Europe, how well were we prepared? You can well imagine what the answer to that was. I had done that part of the work. I wasn't unfamiliar with chemical, but the chemical that came with the division was also wrapped up in the survivability branch that was moved into the division. Keith didn't have that survivability branch. That was moved in when we restructured after he became director.

Bill Dunn: And you kept the wargaming part?

Pete Reid: I kept the wargaming and merged that with command and control. I thought the answer to some of the command and control materiel issues would be solved through the understandings developed during wargaming. I would have to say that has not come to fruition to this day. I think when Charlie Todd was in TRAC, he was doing some experiments at Fort Hood that supported some of the modeling of command and control processes that probably has come closer to what needed to be done there than anything else I've seen. It's unfortunate

that Charlie left TRAC like he did, and nobody really picked it up very well.

Mike Garrambone: When I met you, you were looking at other people's models and I was using the Corps Battle Analyzer (CORBAN) simulation. You guys gave me a technical assessment of models, including verification, validation, and accreditation (VV&A). Was that part of your business or you were just being a nice guy?

Pete Reid: For many years Walt Hollis frequently asked me to review TRADOC model development because he controlled some of the purse strings in funding their model development work. A couple of times a year I would go in and brief him on my recommendations for funding. He always accepted my recommendations.

Mike Garrambone: You were a member of the Army Model and Simulation Executive Council (AMSEC)?

Pete Reid: Not a member. The main role I had was advising Walt on what he ought to fund. He had several million bucks under the Army Model Improvement Program that he could send out to TRADOC and other agencies for this and that model development and they would always come in with requests for more than he had, so he'd ask me for advice on where to send the money. I had a small team with two guys from AMSAA, Erwin Atzinger and Tom Nolan, and whoever we could get from TRAC. We would go listen to the Engineer School and/or the people from Waterways Experiment Station who always had good ideas. Every TRADOC center submitted proposals for simulation development. TRADOC was always very cooperative in providing details, and we always included TRADOC analysts in the reviews.

We would go listen to their proposals. We would have meetings at some central location, although I found the Waterways facility to be central more often than it should have been. They just did a great job of hosting us down there and I liked their catfish. I would go do that about three times a year and I would have occasion to brief Mr. Hollis on it two or three times a year and then he would make his decisions on what to fund. So I think probably my knowledge of CORBAN probably came from doing some of that.

Mike Garrambone: It seems like you were working on developing better capabilities in all the models.

Pete Reid: Better understanding of the replication of the physical processes. Constantly trying to have things more readily understood when we were trying to emulate. Make sure the analysts are able to interpret simulation results in light of the inputs.

Bill Dunn: I remember one in particular that Mr. Hollis had asked you to do, to look at theater-level simulations.

Pete Reid: True. I think he was stimulated by the fact that he found that the Intelligence community had spent millions of dollars having contractors develop models that nobody can understand. I soon found out why he felt that way. I think they spent \$15 million on that one simulation. He had me go look at that and I decided that they had really done nothing of value. \$15 million was a heck of a lot of money for model development back then. Probably a drop in the bucket today; but boy, it was a lot of money.

Mike Garrambone: Were you in charge of the joint munitions organization and also publishing information on algorithms?

Pete Reid: No. I was not in charge of the Joint Munitions Effectiveness Manuals (JMEMs). The Director of AMSAA is the chairman of the Joint Technical Coordinating Group for Munitions Effectiveness (JTTCG/ME) and produced the orange manuals. I have never worked in that group. I have supported that group in various and sundry ways but I haven't been a part of it.

Mike Garrambone: I got the impression that the algorithms and the data might have fallen in your bailiwick.

Pete Reid: No, not in my bailiwick. I'm interested in them and I actually had a contract since I retired to write up some of those model descriptions for them, and I think they're available online. I was mainly a technical editor in that role. I went out, got the model developers to write up their descriptions, and then I tried to make them more understandable.

Mike Garrambone: When did you get to your first MORS Symposium (MORSS)?

Pete Reid: It would have been in San Diego. I went to it because of the colonel running BRL at the time. Charlie Ostrom wanted me to write

a paper for him to deliver based on experience he had in Korea as an ordnance officer. I developed a paper for him to give, but at the last minute he decided he couldn't go. He wanted me to go and give the paper. I think it was after Dave Hardison left the BRL, so it was probably about 1963. At that time the symposia were run by the Navy pretty much exclusively. I went to it and I gave that paper, but I didn't find it to be a very interesting bunch to tell you the truth.

Mike Garrambone: You started presenting more papers thereafter.

Pete Reid: Maybe two or three times. I remember going with Morgan Smith to a MORSS up in Rhode Island at a Navy installation. I haven't been to very many MORSS. You got me into one MORSS out at Fort Leavenworth.

Mike Garrambone: That was a very interesting heritage session. I'm really glad you came.

Pete Reid: AMSAA became 40 years old last October and I have been working on trying to write a history of the organization that came before AMSAA in 1968. Some guys within AMSAA have been trying to write what went on during the last 40 years.

Bill Dunn: Did you go to any other societies like the Operations Research Society of America?

Pete Reid: I almost never missed an Army Operations Research Symposium (AORS) at Fort Lee, Virginia. Back when I first started going to AORS, there were working groups. You would have a general session and then you would split off in working groups for about a day-and-a-half, and then the working groups would come back and report to the general session. In more recent years Walt Hollis changed that and dropped one day of the meeting for reasons of economy, so you don't have this interaction.

You get a lot of young people in those working groups giving papers and you have a chairman who is going to put the thing together in a common theme. It's a useful thing to have the synthesis presented back to the general session, but we don't have that anymore. If I were running things I would somehow recreate that even at the cost of not having it for as long as it used to be. I chaired AORS working groups probably 15 times and took part in every aspect of AORS meetings at one time or another. I did

papers for the general sessions. I would always give a paper in my working group and so on.

Mike Garrambone: One of the things that you're emphasizing was getting your own data. What are your thoughts on that?

Pete Reid: I think that's the way to understand it. Keith Myers spent a lot of the earlier part of his career out in the field doing arena tests, firing artillery shells inside a ring of witness boards and then counting fragment strikes in those witness boards. He also spent a lot of time looking at the effects of the environment (examples would be twigs, grass, snow, etc.) on bullets and fragments en route to a target. I assembled a team to measure terrain microstructure so that the effects on small fragments could be determined. Then there are the opportunities you have to collect wound data. We have, I think, more than 7,000 cases of soldier wounds that were collected in Vietnam and in a few other places. Then you've got the battle damage to materiel that most of us have participated in at one place or another. I think it's invaluable to your own understanding of how your job ought to be carried out as an analyst. Get your hands on the stuff, hands on the actual performance of the systems.

Mike Garrambone: The other thing that goes with that is you had a lot of resources at AMSAA. Tell us how you felt about having the ability to talk to folks.

Pete Reid: Access to the firing tables and vulnerability people in BRL and people at the Ordnance School for maintenance issues is extremely important. I think it is often overlooked by people who are trying to make decisions about what pegs ought to go in what holes around the Army. It's invaluable to have right-next-door access to people who are working daily doing engineering and other work that supports the Army's betterment. The museum was a valuable asset, especially for greening.

We used to have the Foreign Science and Technology Center (FSTC) at Aberdeen. Then it was moved to Washington and now down to Charlottesville, Virginia. I would still go down to Charlottesville, right up until the time I retired, to share information with them. It was much easier to get information from them when they were located at APG. It made the whole job a lot easier.

APG has a very unique ability to land the C-5 aircraft with whatever foreign materiel has been collected wherever in the world. There aren't very many places where that can be done and they still have a little branch of the FSTC organization there. All the equipment that was captured in Grenada came into APG, for example, and there was some very interesting stuff there, and equipment comes out of the Middle East into there all the time. You can go out and kick the tracks and climb up on top and look through the sights and so on and so forth, look at where the weapons strikes have been if it had been damaged in combat. It's very helpful to be able to do it right there where you're working.

Bill Dunn: Base Realignment and Closure (BRAC) is going to put some more agencies, e.g., the Communications and Electronics Command (CECOM), into APG.

Pete Reid: Yes, we will get communications and electronics.

Bill Dunn: So that may even further enhance what you're talking about.

Pete Reid: I think it will help, yes.

Mike Garrambone: Do you think it would be a good idea to put more military billets at APG?

Pete Reid: Absolutely. I mentioned that we only have one active duty guy. Dr. Crain is a retired Army infantry officer by the way.

Mike Garrambone: It sounds like you want one of every branch.

Pete Reid: That would be good. We used to have that; certainly every kind of combat arms. We also had people from transportation. Gosh, we had one colonel of transportation. Matter of fact we've had a couple of them. Obviously we've had ordnance people, but right now (2009) we have only one active duty military at AMSAA.

Mike Garrambone: Do you have liaisons from the schools or from TRAC?

Pete Reid: No. There are liaisons on post but not within AMSAA.

Mike Garrambone: What about liaisons from the allied officers?

Pete Reid: No, not at AMSAA. We have had foreign exchange analysts at AMSAA and we've sent people. I had an officer in my office from Israel for two years. We've had Australians from six months to one-year assignments. We've had people from England for usually two-year

assignments. We've had people from South Korea for six-month to one-year assignments, and we've sent people to all those places.

We had a lot of distinguished visitors. I remember a Major Garrambone. He would come to see me and I always enjoyed his visits.

Mike Garrambone: Just an aside here, as I recall you saw your name on one of my slides at the meeting as being a co-conspirator.

Pete Reid: You were always very good at giving credit when not that much credit was due.

Mike Garrambone: It was by association.

Pete Reid: You made one trip around the country, Mike, and you had about 40 names on your charts.

Mike Garrambone: That's true. They always ask you, "Has so-and-so seen this?" so I thought I'd cut it off early and say, "These are the guys that have seen it."

Pete Reid: Right. You did a very thorough job of that.

Mike Garrambone: What would you tell new guys trying to come down the road?

Pete Reid: Well basically when I've had the opportunity to do that, I've given them examples of the kinds of things they'd get an opportunity to work on. At a place like AMSAA you get a chance to influence just about every Army program and some programs in the other services.

Mike Garrambone: Anything that they especially need to do to prepare?

Pete Reid: Go get a good degree in physics. That's what I go for mainly, people with degrees in physics. Engineering degrees, math degrees, physics. Those are the areas I'm interested in terms of college preparation. The rest of it you sort of learn on the job. I had great mentors. Roger Willis, I mentioned before, was just tremendous. I used to have conversations with Dave Hardison almost every Saturday. I had frequent conversations with Wilbur Payne. I had frequent conversations with Walt Hollis. I was lucky enough to meet Walt Hollis while I was still fairly young, and it was a good idea to pay attention to what he said. Walt was in the fire control business at Frankford Arsenal when I first met him. My Weapons Systems Laboratory chief, Morgan Smith, told Walt to come see me after General Bunker had told Walt that he wanted an analysis of the eye hazard from

laser range finders in night sensors and range finders that Walt was proposing to develop.

So Walt came to see me, and we did a back of the envelope look at what the hazards were to the soldier's eye when those things were deployed on the battlefield. We went to brief General Bunker who said, "Fine, but I want a more comprehensive study. Back of the envelope isn't good enough." He said, "I can envision being called in before the Congress sometime in the future and being accused of destroying the vision of thousands of soldiers. I want to know if that's really likely to happen." So that led to him directing all of the project managers to send money to me to do a greatly detailed study of the risk of eye damage due to the employment of lasers on the battlefield, not laser weapons, a coincidental laser thing.

We evaluated about 20 different systems, mainly night vision devices and range finders ultimately to the cost of millions of dollars. We'd take each one and brief it usually to General Bunker, and he would then approve the fielding of the system. We showed him that the probability that a soldier would get laser energy into his eye in a specific scenario was maybe 0.00000001, i.e., the probability that he was threatened by a reflection off some drop of moisture on a leaf. Then General Bunker was happier. That was all started in conversations between Walt Hollis and General Bunker.

Then when Walt moved on to Monterey to the Combat Developments Experimentation Center (CDEC), I had many occasions to go visit him because I was always interested in the work that was being done out there. When General Elmer Ochs, who was Walt's boss, became the first director of the Operational Test and Evaluation Agency, OTEA, he asked Walt to come to OTEA too. Walt frequently would call me and want me to come down to Northern Virginia or he would come up and discuss problems. I did that and then later on when there was a vacancy at OTEA, Walt asked me to be the technical director there until they hired a permanent person. I did that. Often when they renewed the CDEC contract they would call on me to be part of the contract team to come in and review all the contract proposals and make a recommendation as to who should be hired. So I went out to Sacramento. They usually had it at the depot

in Sacramento. I'd spend a couple of weeks there every couple of years. I was on that team along with Marion Bryson and Walt and one or two of his colonels from CDEC reviewing those contract proposals, so I did a lot of that. I was in the Review of Army Analysis Extended. Walt and E. B. Vandiver ran that study. I wrote two of the chapters of that report. Lieutenant Colonel Dave Maddox, later General Maddox, was also a member of that review.

Bill Dunn: You're kind of a unique case, at least in the oral histories that I've done, in that you've basically been at the same location for your whole ORSA career.

Pete Reid: Except the fact that if you add up all my travel and look at the nights away from home, it's 50 percent of my career. Every time I sensed that Walt Hollis was going to call and ask me to do one more thing, I'd go back and check. I'd been away from home half the nights that I worked. One time Walt wanted me to take the operational test job at Fort Hood and I had just been reorganized at AMSAA with a new set of subordinate technical leaders. John McCarthy became the AMSAA director and said, "Good grief. Why can't somebody like Hank Dubin run the Fort Hood test group for a while?"

Bill Dunn: I see in your résumé you had a six- or seven-month assignment at OSD.

Pete Reid: Yes, for the Department of Defense reorganization—the Goldwater-Nichols Act. I ran that study. I had all the services working for me. We succeeded in getting the only paper signed off on by all the service secretaries.

Bill Dunn: How did you get selected to be the person to run that?

Pete Reid: Walt Hollis. He had one of his SESs who said he wanted out, so Walt called AMSAA and said, "How about having Pete Reid come down and do it?" I was actually working for the Army senior staff for that on behalf of all the service secretaries. I had interaction with all of them.

Bill Dunn: You were physically located in the Pentagon for seven months?

Pete Reid: Right where that airplane went through south parking on 9/11 is where my office was.

Bill Dunn: What are you doing these days? I know you're on the Friends of Harford (Harford County, Maryland).

Pete Reid: Friends of Harford Board of Directors. I started their website and now it's been taken over by a guy who does more detailed work than I'm interested in doing, but we have a lot of interaction. I was on the Army Alliance up through the time we got Fort Monmouth settled in our favor and then I resigned. I'd been on it for nine years. That was enough. I do some work in support of a local soup kitchen. Rachael and I are both lay members of the annual Methodist conference. We go to those meetings, come back, and tell everybody what happened.

I have had some consultant contracts during the time since I've been retired, and there's one right now having to do with writing up the contributions of TRAC and AMSAA field deployment teams to the Iraq and Afghanistan conflicts. This will entail illustrating the benefits to the organization and to the Army and to the individuals and so on. That may or may not happen. It's been in progress for some time, initiated by Mike Bauman. I did a contract where we looked at the Bosnia materiel lessons learned and I worked directly with the AMSAA staff on that. I did a contract along with Ray Pollard for John Lockard at OSD Test and Evaluation (T&E), on industry T&E best practices.

That was an extremely interesting task. We visited some of the best in American industry, Motorola, Boeing, Cummins Engine, half a dozen other places. That was good. We got their ideas for best practices of T&E. I did a task for the JTCG/ME having to do with writing up textual description of their many models that are used to support that operation, which have now found their way on to the Internet.

Bill Dunn: How about the Defense Science Board or Army Science Board?

Pete Reid: I did a lot of work with them when I was still working full time; I haven't since. I worked with them rather extensively probably eight or 10 times over the years, on their summer studies.

Bill Dunn: I've been on the receiving end of those quite a few times, but I've never been on the Board itself. Anything else that you'd like to get off your chest?

Pete Reid: I'd just emphasize that in my view AMSAA is doing just as well today as I thought we did back years ago. Forrest Crain is doing a great job. The enthusiasm there is high. Spirits

are good. They have a lot of great tasks and have a bright future. I'm always impressed whenever I go in there. I write the alumni newsletter for AMSAA. I put that out twice a year, and I go in there to collect the information. I'm always impressed by what's going on and how well they're doing. I think that Forrest has been a godsend for them. He does a great job. He has a very competent staff.

I think it is especially important to emphasize that little is accomplished by individuals in this business. Teams of people with a range of talents provide the keys to success.

Bill Dunn: Forrest brings the warfighter focus to the table.

Pete Reid: Yes. He's one of the few.

Mike Garrambone: Sum up what you think about your ORSA career.

Pete Reid: Hey, I loved it! Very fortunately I have a very supportive wife. Rachael never complained about all the time I spent away from home.

The following transcript is from the MORS Heritage Session at the 70th MORS Symposium at Fort Leavenworth, Kansas, June 20, 2002. Mr. Reid was asked to describe the history of ORSA at the Aberdeen Proving Ground.

Mike Garrambone: Let's start off with our first speaker, Mr. Pete Reid. Mr. Reid is definitely an Army guy, no question about it. He is well schooled, the kind of individual that went to all the "right places." He spent some time at the BRL; he's a wargamer, a former Chief of AMSAA's Combat Operations Division. He has "stick time" as Acting Technical Director at Army OTEA. You ladies and gentlemen remember OTEA—ah yes, there are many of you in this room, that's cool. And he has been a consultant ever since he retired in 1996. He has been a long-time member of MORS. He has presented many technical papers. He is definitely an analyst, certainly well respected in the community, and has had the occasion to save my butt from time to time; he was definitely a mentor to many other analysts. At this point, I'm going to ask Mr. Reid to come forward and tell us about ORSA at Aberdeen Proving Ground. Sir, the stage is yours.

Pete Reid: Thank you very much Mike. I see many of you are Methodists because you are seated in the back rows [*group laughter*]. This

was fun getting some information together for this meeting. Kind of hard to find people who were around in the beginnings of Systems Analysis at Aberdeen, but it did start before the 1920s. I believe the first practitioner was Lieutenant Robert Kent. Kent was assigned to the Proving Ground during World War I to assist in carrying out developmental tests of weapons. He visited battlefields to study weapons' successes and problems, and he carried out sequences of "test-model-test" a few decades before that term became popular. Later, as a civilian, Dr. Robert Kent served as associate director of the BRL.

In the early days, there were Terminal Ballisticians, Ordnance Corps people, who worked with the medical community, and extended analysis beyond delivery accuracy. They brought in animals as surrogate targets to help learn about soldier survivability. Early work on soldier survivability continued into the ground combat vehicles. Later it expanded to especially emphasize aircraft, and they literally had the third largest aircraft fleet in the world at Aberdeen. Then they began to do the component vulnerability and survivability work in the 1940s and 1950s. Morgan Smith was kind of the leader of that work in what was initially called the Ordnance Engineering Laboratory of the BRL. Morgan presented his paper on aircraft passive defense in 1951, and used a Soviet combat airplane as an example of putting one massive component in front of another, spaced such that you would have a better chance of not having two control wires cut with one fragment, etc. This knowledge has been transferred over the years to every airplane built in this country, and most of the combat aircraft used by our friends.

I thought I'd share a few quotes. Sir Isaac Newton said, "If I have seen further, it is by standing on shoulders of giants." I had a great time for more than 40 years at Aberdeen, and the best thing I did was hire a lot of bright people. I always made it a policy to find people who were a heck of a lot smarter than I was to have around, and I have always reaped the benefits of that idea.

Dave Hardison had a comment that hung on my wall for years, "It is possible to make infinite amounts of progress without accomplishing

anything." Mr. Vandiver honors the Center for Army Analysis (CAA) Study Directors each year, after they have completed what they set out to do. The CAA recognizes how hard it is to satisfactorily complete a study task. I also remember Wilbur Payne stating that "most of us started in this business working with nuclear weapons." If you were around in this business 40 or 50 years ago, you probably were working on nuclear weapons in one way or another. I worked on evaluation of the Honest John trivariate fuze performance and on the selection of nuclear yields for several missiles.

Roger Willis, my first boss at the BRL, said, "We can do anything." One thing that was said about Roger Willis by our staff, by knowledgeable people in the Pentagon, and elsewhere in Washington, was that he literally carried the entire BRL on his shoulders, in terms of gathering funding for projects and so on. I just benefited greatly by having him as my first boss there. He was a skilled mathematician who understood theories and applications as well as anybody; he was a relentless worker, and he had combat experience across several battlefields during World War II. One of the important studies that Roger led was called the "Future Role of Guided Weapons."

Herb Weiss was the first Chief of the Ordnance Engineering Laboratory, and he also became the first Chief of the Weapons Systems Laboratory in the early 1950s. He soon left and went to Northrop, I think. Then Frank Grubbs became the Chief of that laboratory. Some of the notable people who were in the laboratory were Floyd Hill, who many of you I'm sure know; Art Stein; Fred King on Air Defense; and Morgan Smith, who became the third Chief of the Laboratory. I had a group in the Weapons Systems Laboratory called the War Games Branch. We also had the classical surface-to-air, armor, infantry, aircraft, and artillery branches, and we had a ground vehicles branch.

The Army Materiel Systems Analysis Agency was formed out of the BRL Weapons Systems Laboratory at the direction of Army Materiel Command in 1968. Joe Sperrazza was chosen as the first Director, followed by Keith Myers; then John McCarthy; and now Dave Shaffer [Dave was the Director at the time of this presentation in 2002; the Director at the time of

this publication, in 2012, is Dr. William Forrest Crain].

Somebody decided that you couldn't have a Class II organization called an Agency; you had to call it an "Activity." I think the same guy who made that decision, years later told me I had to take the eagle off the top of my flagstaff because I was not a commissioned officer. So after we'd been in existence for a few years, in approximately 1972, we changed our name from Agency to Activity. We started out with 130 people, at our peak we were up to a little more than 420 people, and then in 2002, we went back down to a little under 200.

In 1976, a few slight changes occurred. My organization title went from War Games to Tactical Operations, and we broadened the scope of what we did. We added logistics; we added reliability, availability, maintainability (RAM) and all the other "ilities." We added a group that went to the field to find out how well the equipment was performing once it was issued to troops. Systems analysis included battlefield environment, combat simulation, model validation, test design and evaluation, combat data collection, and "greening." Also many of you, I know, are very familiar with the JTTCG/ME, the Joint Technical Coordinating Group for Munitions Effectiveness. The director of AMSAA is the chairman of the JTTCG/ME.

Today (2002), AMSAA has an SES technical director, the JTTCG/ME office, and these line divisions: Strategic and Operational Support, Close Support, Close Combat, Logistics Analysis, Acquisition and Industrial Base, and Management. Some of the key areas of research today are simulation-based acquisition and of course all the virtual reality work that backs up the force modeling and other aspects leading to the decision on what's the best thing for investments. Regarding modeling improvements, the ACQUIRE model was developed by the night vision people at Fort Belvoir, Virginia, and they probably had help from the Navy and Air Force on certain sensor capabilities. AMSAA is adding a front end to that model (2002) to facilitate its use by the JTTCG/ME.

Following are a few examples that illustrate the kinds of work, and the scope of tasks at AMSAA.

AMSAA completed a study of the "Balkans, Lessons Learned" in the materiel arena. That information is very hard to find unless a dedicated team of knowledgeable people is granted access while a conflict is happening, or very soon after. AMSAA did have a team deployed throughout the areas of operations during the first Gulf War (and during the current conflicts in the Greater Middle East). The library at Fort Leavenworth, for example, has a lot of historical lessons learned about what happened tactically and so on, but very, very thin resources for looking at "Materiel Lessons Learned" from the Balkans.

The Physics of Failure program is hard to sell for some reason. The Department of Defense could save literally billions of dollars by studying what is going to fail when you put component A with component B, using material C, with interface Y, and so on, before choosing a specific design. There are databases available to know what works and what doesn't work, but not enough people are taking advantage of these. This can be applied all the way from design through developmental and operational testing, yet not enough of it gets done. There is some work on the mechanical aspects of Physics of Failure at Aberdeen Test Center. There are two big centers of knowledge here. One is at the University of Maryland Center for Advanced Life Cycle Engineering (CALCE) and another at the University of Iowa. The University of Maryland emphasizes electronic systems; Iowa covers mechanical systems.

Another major area of research is spares planning. Every time AMSAA has been asked to analyze the plans for provisioning spare parts for a new system, the project manager and manufacturer of that system have agreed the results saved costs, cut down on total number of needed spares, and improved operational availability.

Now I just wanted to spend a couple of minutes going through some of my personal experiences. Soon after I became a civilian at Aberdeen, I was dispatched to Redstone Arsenal, Alabama, to spend some time with some of the giants of missile development: Bill McCorkle, Henry Diem, Rex Powell, and Art Poe. I just happened to be there during the time of the parade celebrating our first successful satellite launch. I was there when Dr. Von Braun took

the stage in the center of Huntsville, Alabama. He observed, "We've got a new form of moonshine up above." Herman Kahn, who surely most of you will recognize as one of the geniuses of our time, ran a seminar at his place up at Croton-on-Hudson, New York. I was fortunate to take part, and that led to many years of exchanges where I was the main beneficiary. I spent a lot of time with Walt Hollis, and one of my most fun times with him was in Brussels for a week. We had dinner together six straight evenings. He'd order one thing, I'd order the other, and then we'd share half and half. We ordered the same meal at the same small family-operated restaurant every evening, and then we would go over the day's discussions. I spent a lot of nights with Wilbur Payne, sometimes until dawn, on my back porch while listening to fish splash in the channel out behind the house. Another hero of mine is Larry Linderer. When I was a GI at Aberdeen, one of the studies I worked on was called 'The Future Role of Guided Weapons', and I quickly found that the target areas that were being used to evaluate performance of various concepts were just arbitrarily sized squares, rectangles, straight lines, and circles, having nothing to do with the battlefield, or any semblance of the real estate a unit on the battlefield might occupy. I had no training in doing this, but I started putting things down on a map. Colonel Larry Linderer was the CONARC (Continental Army Command, a predecessor of the Army Training and Doctrine Command [TRADOC]) Liaison Officer to Aberdeen Proving Ground. He passed my office door one day and noticed I was standing on a desk, writing on a map, and he came in and looked at it and helped me fix it. We used the resultant methodologies in joint studies comparing the contributions of aircraft and artillery, notably a comparison of the Lance and the F-4C. The Office, Secretary of Defense tasked the latter study to the BRL. Ritz Hare was another fabulous guy who helped me. In his first job at the Operations Research Office of Johns Hopkins he shared an office with Dr. Wilbur Payne. Later we had contracts with a company, Operations Research, Incorporated, which Ritz went on to work with. Still later he joined the faculty of the University of North Dakota, Fargo. I had him come to Aberdeen one summer

and he helped build the DACOTAH model, "Dreadfully Accurate Computing of Tice and Hare." Jerry Tice was a young mathematician on our staff. DACOTAH then became the background for the Combined Arms Team (CAT) Training Simulator that was used by TRADOC for years.

When bomblet artillery rounds were being fielded, we were concerned about personnel targets hearing the sound events, many seconds before the bomblets would reach the ground. We wanted to know how much cover the target personnel could obtain before the explosion. In other words, could they hear the weapons signatures and take effective cover in such things as ditches and foxholes, or could they get under other kinds of cover, and significantly degrade the bomblet performance? We wanted to measure how well they might recognize the sound signatures of those rounds opening. The Safety Officer wouldn't let us do it at Aberdeen, but they did let us do it at Jefferson Proving Ground, Indiana. I stupidly took sound recorders into the impact area. We didn't have any remote way to turn them on, so we turned them on when the Range Control Officer told us splash (bomblet release from the carrying artillery shell) was about to occur, and then ran back to a tower and jumped in behind some sheets of tin roofing material, and waited for the event to happen. We got a lot of sound signatures and time measurement that way. We turned the project over to the Human Engineering Laboratory; they had good instrumentation, and did a good job of it. There were artillery firings that we were collecting signatures on at Jefferson, and later I observed some 4.2-inch mortar rounds at Aberdeen. If the artillery rounds had been as far long as those mortar rounds were short, I would not be able to give you this briefing today.

Now we will talk about assignments to battlefields. I volunteered to collect the weapons effects data following the 1973 War in the Middle East along with a few other guys from AMSAA, one from the Naval Postgraduate School, and another from Fort Knox. And that was a good project to work on. In one part of the effort, we got to look over 800 damaged tanks—Soviet, British, and US manufactured. One British Centurion had 31 holes in it. There

was no way to know which impact killed it, or whether 31 holes all occurred in a few hours, a few weeks, or any set period of time. It did appear that the tank had been a target in more than one battle. So the data that you make the most out of are the targets with only one or two penetrations. It was interesting, and I got to do a lot of other things while I was in the Middle East. You will often hear people say what a champ the tube-launched, optically-tracked, wire-guided (TOW) Missile System was in the 1973 Middle East War. In fact, not one single TOW round was fired during the 1973 Middle East War. Thirty-two of those rounds were fired after the war was declared to be over, mainly for training, but some during the continuing war of attrition. The TOW was not delivered over there in time to take part in the war.

The BRL had one of the world's few large digital computers. We had the first such computer, ENIAC (Electronic Numerical Integrator And Computer), but it had been turned off by the time I arrived on the scene in 1956. I worked with the ENIAC successors. The fun thing to do, when you got over to the office early in the morning, perhaps before dawn, was to see whether or not you had a successful computer run from the night before. It was nothing like submitting a problem and looking at the results seconds later, as we do today. It was like submitting a problem and keeping your fingers crossed that you got a successful run by next morning. Joy only occurred about two or three times a week. So things moved at a slower pace at the time. It did force the analysts to think through the solution boundaries so as to conserve the use of the computers for the more likely possibilities. That may have helped to create better analysts.

I got to do a lot of riding around in helicopters at the machine gun course at Fort Rucker, Alabama, and along with a bunch of friends through the Mitla and Gidi passes in the Sinai. There used to be a group out at Fort Ord, California, the Combat Developments Experimentation Center (CDEC); probably there is no one here to remember that, but Mr. Hollis would remember it very well. They trained to fly combat operations at night. I'll tell you, it was really scary to ride with those guys. They

had no night vision equipment at that time. They relied on whatever moonlight and their knowledge of the terrain at Fort Hunter Liggett, California. They would fly UH-1 gunships with the skids down at the treetop level.

I also worked on some source selection tasks, some of which were fun, as was some of the Federal Executive Institute training.

I first met Mike Garrabone, your session co-chair at the Joint Command, Control, and Communications Counter Measures (C3CM) test facility at Kirtland Air Force Base, New Mexico. I worked on the group for Materiel Lessons Learned for the Grenada operation. I'm going to talk about that just briefly in a second. I spent a summer (1979) in England at the Royal Armament Research and Development Establishment. We were working on a US problem with electronic warfare, because they had the only large scale combat model that included communications jamming and other electronic representations at that time. It is probably still true today (2002).

Generating lessons learned is very valuable. Here are some Grenada Lessons Learned examples. The boxes in which the machine gun bullets were packed were made of cardboard. As soon as they got wet, the boxes fell apart, and bullets spilled all over. Grenada is formed largely from coral. As the wheeled vehicles drove across the terrain, the coral constantly tore up the rubber tires. It is important to note that in the radiotelephone handsets, that black plastic stuff breaks up very easily when it is slammed down in haste. I had a passionate plea from a sergeant at the Ranger Battalion at Fort Lewis, Washington who said, "When you get mud on a zipper, you cannot close your zipper. Please put buttons back on the fly."

At that time, Dr. Payne was running things out at White Sands. For a couple of years TRADOC had no division-level combat models, so he came to us and asked us to do some studies using AMSAA's division-level model. We did a couple of studies for him including the Mine-Countermine Study and the Second Echelon Interdiction Study.

I learned much from S. L. A. Marshall, our most well-known military historian. Maybe the most important thing he passed on to me was that participants in a firefight forget 50 percent

of the important details within three days. Don't count on interview information months after a conflict. Be there and collect valuable information on the battlefield.

We worked on Integrated Intelligent Vetrronics, or VINT², kind of a corrupted acronym. It is a system for displaying positional, battlefield environment, and friend-or-foe information in the fighting compartment of combat vehicles or aircraft along with the health of the vehicle. An Army Science Board invented the concept in the 1970s. The Army Research Institute carried out some relevant experiments in following years. I understand that within the last few years someone re-started this idea.

I was reading *Research & Development* (R&D) magazine one time and I found that the Natick Laboratories in Massachusetts had some geomorphologists who obviously were underemployed. I asked my brightest young staff member to please run up there and see if we could find out whether they could tell us how much of the earth's crust might be defined according to intervisibility differences. So if we run a study on one swatch of terrain, we will then know how generally applicable that study might be. Natick had a stereo plotter, and with our \$100,000 they did a lot of data collection and analysis, to include flying some airplanes over East Germany in order to take the terrain samples that we wanted.

There was a message called "Kerwin Sends" when "Dutch" Kerwin was the Vice Chief of Staff of the Army. He said "Alright, get with it and include the environment in your studies." I kept his telegram on my wall right alongside quotes from people for years, and we signed him on as a consultant many years later. I took him around to see that I had kept his message. I was delighted when Walt Hollis asked us to produce an update on how well Army studies organizations were complying with "Kerwin Sends", so we did that also. And we were pleased to tell Dr. Hollis [he holds an honorary doctorate from Northeastern] that all the Army Studies Groups were doing a good job of addressing battlefield environments.

Now for some personal observations. It is useful to do things that give you a visualizing

result but I found some people do that graphical thing and say, "Gee whiz, it looks great", but they don't have any real logic behind it. There were a lot of reconstructions of a CDEC test, for example, by a certain national laboratory. It turns out they had nothing in there that made force-on-force combat sense; all they were doing was emulating the flow of battle in the CDEC experiment. Not good. There were no representations of physical processes that could be changed so as to learn something about alternatives such as weapons accuracy, range or lethality or slight changes in tactics. We did learn a lot about things from doing our studies based on map analyses. We had a lot of good consultants. General Julian Ewell urged us to add more detailed modeling of tactical aircraft in our ground combat models, which we did. We found that it is awfully hard to get the detail you need in order to prove that your force-on-force models are a faithful way to predict how a combat event may turn out by looking at historical records. It is awfully hard to do. We were successful in getting some of that. It is awfully hard to get details, time, space, and losses—with their causes. I spent a lot of time in Israel collecting that sort of combat information. As I mentioned earlier, I learned a lot from S. L. A. Marshall, a leading Army historian, who supported AMSAA as a consultant. He stated that soldiers who do the most interesting things are very busy and they often report inaccurate details.

I have bumped elbows with a great bunch of people over the years. I mentioned Roger Willis earlier as my first boss, and the one who set me on a path that I stayed on for a lot of years. There are lots of people from Fort Leavenworth and many from White Sands—I just can't mention them all here. Also there are the Israelis, who helped to supply detailed combat data. General Mordecai Gur, who was the Israeli Defense Forces Chief of Staff in 1974, gave us permission to try to replay some of the 1973 Middle East battles, so as to allow us to evaluate the adequacy of our combat model. Later, that same combat information was transferred to Seth Bonder, who used it to verify some of his modeling for a specific study, and to CAA where Bob McQuay used it as well. Ehud Barak was the head of the Israeli state

until General Sharon replaced him a couple of years ago. Barak was an armor battalion commander in the 1973 Middle East War, and as a colonel, he spent 2½ months in AMSAA's wargame facility in 1974. Currently (2012), Barak is serving as Israeli Defense Minister. Bren Adan is a general officer in whose division Barak served; he came to AMSAA for a few days to help with the combat data analyses.

I want to mention Rafael Eitan because he became a Chief of Staff later on, but when I first ran into him, he was the Commander of the Rafael Division in the Golan Heights. My first exposure with him was when he came along in his Jeep and took the rifle that one of my guards was carrying. The kid had to relieve himself and he set his rifle down. Eitan noticed he was separated from his rifle, so he took it. I had to go over to his headquarters that evening and persuade him to let us have the rifle back. If you go to the restroom while you're on duty as a guard in the Israeli Army, you don't let go of your rifle.

I have known Walt Hollis in various incarnations. He worked seventeen years at Frankford Arsenal and several years at CDEC as the Chief Scientist. I served with him on source selection tasks several times when he was at CDEC. Then when General Ochs was reassigned from CDEC Commander to the newly formed Operational Test and Evaluation Agency, or OTEA, he brought Walt in there as his Chief Scientist. Then finally he got a job that he has been able to hold onto in the Pentagon.

Now a bottom line concerning combat data collection. If you are ever assigned to go collect combat data, make sure your questions pass the "so what" test. Will having the answer make a difference, that is, would any action be taken as a result of having the answer to the question? About 99% of the questions people ask, they may get the answer, but nothing would be done as a result. It would be better to not bother soldiers by asking those dumb questions. Only ask the ones that are germane. Every time we have gone to the Middle East to collect data, and we've done it four times now going back to the 1968 War, the Israelis are demanding quid pro quos. They know that at the working level it is not a problem, but the

politicians get involved, and they delay our access to information for months. Actually in the 1978 War it was delayed for about ten months before we finally got over there. I know that the delay in access to the information that is useful made much of the "data collection" time and effort that was spent after that battle essentially irrelevant. The team never got access to

most of the people who could provide useful information. The foreign military sales contracts ought to provide a means to avoid all of that stuff, but they don't.

Finally, when it comes to motivating, mentoring, and convincing your staff, make a record for playback over and over: Yes you can, yes you can, ... YES YOU CAN!