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Military Operations Research Society (MORS) Oral History Interview

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2017

## Frederick E. Hartman, FS Interview (MORS)

Hartman, Frederick E.

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## INTRODUCTION

**O**ral 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. Frederick E. (Fred) Hartman, FS, was President of MORS from 1996 to 1997. In 2000, he was elected a Fellow of the Society (FS) while working at the Institute for Defense Analyses (IDA). The interview was conducted on June 25, 2015 at the 83rd MORS Symposium (MORSS) in Alexandria, Virginia.

## MORS ORAL HISTORY

Interview with Mr. Frederick E. Hartman, FS; Dr. Bob Sheldon, FS, Interviewer.

*Bob Sheldon:* This is a MORS oral history interview of Fred Hartman. First of all, tell us your parents' names.

*Fred Hartman:* My parents were Jacob Benjamin Hartman and Helen Elizabeth Jones Hartman.

*Bob Sheldon:* Tell us a little bit about your parents and how they influenced you.

*Fred Hartman:* My father's family was German and emigrated from Odessa, Russia, in 1904 to settle on the Kansas side of the Missouri River from St. Joseph, Missouri, when he was a small child. My dad's parents had a berry farm and orchard near Wathena, Kansas. Dad grew up speaking German in an era prior to World War I, and struggled with English in grade school since it wasn't spoken at home. Because of his early language problems in school, he dropped out to work on the family farm when he was about 12 years old. He was a voracious reader and became a self-educated man, who was very quick with numbers.

My mother's ancestors had moved from Ohio to settle in Kansas in the 1850s and ran a sawmill along the Bear Creek. Her mother and grandmother were both of French/Indian descent from the early days of trapping and trading along the Missouri River. She grew up just outside of St. Joseph in a small town, and her mother died in childbirth during one of the flu epidemics. As a child she was shunted around between her relatives and still managed to

complete high school. As a result of her childhood, she was extremely independent and resourceful.

*Bob Sheldon:* Tell us about where you went to grade school, junior high, and high school.

*Fred Hartman:* I was born in 1943. In 1944 during the War, my father moved the family to an 80-acre farm in a remote area of the Missouri Ozarks (near the small village of Sleeper, Missouri) to get us out of Kansas City while he went to work on the construction of what was to be the Hanford Site (part of the Manhattan Project) in Hanford, Washington. During this time, the family lived in a very rural area that didn't have electricity or running water, and in many ways was like a throwback to earlier years; and sure enough, the community had a one-room schoolhouse. My older sister and I both started grade school when we were five years old and walked to the school with the youngest of my three older brothers.

My first grade year was cut short in the spring, when my brother had a falling out with the schoolmarm, who was only a few years older than he. In those days, you could teach elementary school in Missouri with little more than a high school education, so she was only about 18. As a result, he and my sister transferred to a consolidated school where my older brothers were in high school (Stoutland, Missouri) and caught the school bus. Since I was too young to attend consolidated school, I had to stay home. The following year, I started first grade in the larger school and found the class was very easy for me because of that early beginning in a one-room schoolhouse. In only one room, I could listen in on the other grades reciting during the course of the day, and because I was bored doing only what I needed to do as a first grader. I think that was a very formative time and set me up for liking school and enjoying the educational process, and went on from there. We moved back to Kansas City for a few years when I was seven, and I went to Catholic schools through eighth grade. I went to high school in Doniphan, Missouri, a small town down in the southeast part of Missouri along the Current River.

After graduating from high school, I went to the Missouri School of Mines (now called the University of Missouri at Rolla).

# Military Operations Research Society (MORS) Oral History Project Interview of Mr. Frederick E. Hartman, FS

**Bob Sheldon, FS**

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*Bob Sheldon:* How did you choose that school?

*Fred Hartman:* I chose Rolla because it was technical/engineering. I knew I wanted to get a technical degree and be an engineer, and metallurgical engineering sounded kind of neat when I was in high school since Missouri had a number of coal and iron mines in its early days. While in high school I had applied to my congressman for a service academy appointment. I ended up with an alternate appointment to the Naval Academy for the class of 1965. However, since the "principal" appointment accepted I didn't attend. When informed of the decision during the late spring of my senior year, I quickly arranged with our local bank in Doniphan to be the first person in my county to receive a student loan from the newly established Defense Education Act of 1958 student loan program and enrolled at Missouri Mines.

In 1961, I attended engineering school at Rolla. During my sophomore year, I was carrying a heavy course load, and decided that I really wanted to take another shot at attending one of the service academies. Since my congressman now based his appointments on the Civil Service Exam, I went to the Rolla Post Office early one Saturday morning and took the exam. After three intense semesters of science and engineering, I did very well. I received my first choice, got the principal appointment and went to the US Military Academy (USMA) at West Point, which had also been my first choice when I was in high school.

*Bob Sheldon:* What year did you start at West Point?

*Fred Hartman:* I entered West Point in July 1963 with the incoming class of 1967. I had a maturing experience between Rolla and West Point. Since you don't find out if you are accepted for six months or so after you write to your congressman and take the exam, I also signed up to be in the student metallurgy coop program with the Caterpillar Tractor Company. In my last semester before West Point, I went off campus to become a metallurgy intern at the main Caterpillar plant in Peoria, Illinois. That was an interesting experience that gave me some early insights into government and government contracting.

At the time, they were building large articulated rubber-tired tractors for the Department of Defense (DoD), and I got to see that program as it was coming through a very early production stage on the factory floor. I later saw the same tractors—mostly on Air Force bases after they were fielded.

*Bob Sheldon:* You had a couple of years of college before going to West Point. Did that give you a jump on your plebe year?

*Fred Hartman:* One would think so, but at West Point you start off as if you had no college. At that time, you just end up with a larger number of elective courses, since at West Point, the curriculum was fixed for the first two years, and you were allowed to choose one elective during each of the last four semesters.

Because of my coursework at Rolla, I was able to "test out" of a number of courses that I would have taken in my first two years at USMA. As a result, I was taking some elective courses with the classes ahead of me or advanced courses with other prior-college students like myself within a given department. During the four years, instead of four electives, I had eight electives, so I took four in social science area studies and four in mathematics and engineering. There was a military officer (a Rhodes Scholar) teaching in the social science department that I particularly liked, and I took a couple of courses from him. The other electives were in advanced mathematics and differential equations.

*Bob Sheldon:* Did you participate in any athletics at West Point?

*Fred Hartman:* Because I grew up on the farm, I was a crackerjack shot with my single shot 22 Remington rifle (a Christmas present when I was 10 years old). I ended up on the collegiate pistol team and went to the national matches at Camp Perry, where we took the national championship for intercollegiate pistol shooting. But that's not hard athletics. Part of the problem growing up in small towns in Missouri after we moved out of Kansas City is that there weren't a lot of organized sports teams. I mean even putting together a baseball squad and a basketball squad was tough in a small high school in Missouri.

*Bob Sheldon:* Did you choose a Branch before you graduated?

*Fred Hartman:* Yes. On the farm in Sleeper, Missouri, I watched a Piper Cub flying over our farm every few weeks as it flew the pipeline from Oklahoma to Ohio. I always would be excited, because we didn't have many aircraft flying over the Ozarks in those years, and I would run outside and wave, and the pilot would dip his wings and occasionally toss out a candy bar. I decided, "Wow, I'd really like to do that someday." Being in the Army, the perfect fit was Field Artillery (FA) as a forward observer, flying the forward observer aircraft, which was in those days the Cessna L19/0-1 Bird Dog.

The Army, however, didn't have an Aviation Branch, so aviation was a secondary specialty to your primary branch. I chose FA and selected my first tour in Korea. The underlying logic was that I needed 13 months of Army time in a combat arms branch, FA, before I could go to flight school. Vietnam was the primary manpower assignment for most of the people coming out of the class. Many in my class ended up going to Germany, hoping to have more training at the unit level before a combat tour, but some spent only a few months in Germany and then transferred to Vietnam less than a year after graduation.

My first tour was in FA in Korea, reporting the first of January 1968, and in my 13 months there experienced being fired on in a bunker up on the demilitarized zone (DMZ). One of the North Koreans, on a cold winter day, was out doing dry fire with their equivalent to our 105 mm Howitzer and ended up with a shell landing in defilade right behind the bunker (Guard Post Hendricks) that I was manning with an infantry platoon.

We were sitting there, one cold, quiet January afternoon, enjoying the bright sunshine coming in and warming up our bunker, with the second lieutenant and his platoon sergeant from the infantry unit when the lieutenant said, "Wow, that sounds like an airplane. There shouldn't be airplanes here." My live fire training at Fort Sill had tuned my ears to realize that it wasn't an aircraft at all, but it was incoming artillery, so I grabbed them both by the scruff of the neck. We dove under the map table and hunkered down, and sure enough, we heard a loud bang and sent out the platoon to scout the back side of the hill.

I ended up doing a crater analysis tracking it back to a known gun position. And the rest became history, with the intel [Intelligence] folks and others coming up to investigate. It was an interesting time, and later that year I had the opportunity to be a 105 mm Artillery Battery Executive Officer. During the last half of my year, perhaps with notoriety or infamy of that DMZ example, I was moved to a position usually held by a senior captain as the Headquarters Division Artillery (DIVARTY) Headquarters Battery Commander.

*Bob Sheldon:* You were a first lieutenant then?

*Fred Hartman:* Yes, because during those Vietnam years we were second lieutenants for a year, and then we were first lieutenants, so as soon as I made first lieutenant, I was given Headquarters Battery at DIVARTY. I wound up with an interesting experience again in that I had weather and radar units that were located on other compounds on the DMZ, and I had to fly in a helicopter—an OH-13, I believe it was—to do paymaster duties. That was a real treat for someone who wanted to go to flight school.

The other thing I found was the DIVARTY Headquarters Battery had almost a battalion's worth of trucks and administrative vehicles and special vans and so forth. That experience set me up very well for future promotions and a future career in the Army when I did well on unit inspector general (IG) inspections and vehicle roadside inspections.

*Bob Sheldon:* You left Korea and went to flight school?

*Fred Hartman:* While in Korea, I submitted my request for flight school in fixed-wing aircraft. When I left Korea, I went to flight school at Fort Stewart, Georgia, and then on to Fort Rucker, Alabama, for tactical and instrument training. At that time, very few people were being assigned to initial-entry fixed-wing because of the need for helicopter pilots in Vietnam. I went to fixed-wing training, and then while inbound to Fort Sill, Oklahoma (to fly observation training missions), I was on leave at home in Missouri when, I received a call to return to Rucker to go to the rotary-wing flight transition course. My rotary-wing training convinced me that I really wanted to fly fixed-wing aircraft,

so I volunteered to go to Vietnam and went to a multiengine fixed-wing transition course to prepare for my tour.

*Bob Sheldon:* Where did you do your flight training for fixed-wing?

*Fred Hartman:* Fort Rucker, Alabama, is where I finished up. For basic flight, I was at Fort Stewart, Georgia, flying a T-41B, a civilian-type, tricycle gear Cessna 172, with a beefed-up engine with 210 horsepower, fuel-injected—nice little aircraft. After four months there, I went to Fort Rucker and split my time with two months in the T-42 twin engine (Beech Baron) for instrument training and two months in O-1 Bird Dogs doing tactical training with short-field landings. This was a lot of fun coming down on short strips and country roads with the tall Georgia pine trees all around.

*Bob Sheldon:* What year did you go to Vietnam, and where did you go to?

*Fred Hartman:* In 1970, I was assigned to Vietnam and went to the 509th Radio Research Group, assigned to the 224th Aviation Battalion, which had five aviation companies, located all the way from Can Tho in the Mekong Delta area in the south to Phu Bai Airfield in the north (just south of Hue). I was based at the battalion headquarters at Long Thanh North, near Bearcat, about 30 or 40 miles northeast of Saigon, and not far from Vung Tau, down on the coast.

The bulk of the year in Nam was at battalion headquarters as a battalion S4 (logistics), after a short tour as motor officer in one of the aviation companies. The battalion S4 assignment was a challenge, and fortunately I had a very strong E8 (master sergeant) as the supply non-commissioned officer (NCO) at battalion level. What made it challenging is that we were the only battalion of its kind in the Army. We had not only aviation and normal Army equipment, we had intel equipment, and we were flying an aviation company with the US Navy RP-2E Neptune out of Cam Ranh Bay. Our battalion supply system had to worry about Navy supply channels, intel supply channels for our mission equipment, as well as aviation and the normal Army supply channels.

My battalion commander also appointed me as the battalion IG, so in addition to doing the supply officer duties, I was making IG visits up and down to the five aviation companies. A

little known fact is that as a separate, one-of-a-kind battalion, we had an IG slot—in this case an additional duty. That served as justification for the in-country checkout for the Bird Dog's big brother, the Beaver, because there was one "slick" U-6 in the battalion that was not mission-equipped that I could use to fly up and down the coast for both the supply and IG duties. I also did some in-country time in the Otter (U-1). Of course, the primary mission was still essential, so I flew mostly night missions in the U-8 aircraft, which was a twin-engine Beechcraft, as a primary aircraft.

*Bob Sheldon:* Were you a captain (O-3) by that point?

*Fred Hartman:* Yes, I was a captain.

*Bob Sheldon:* When did you get promoted?

*Fred Hartman:* Two years after graduation, 1969. I was promoted while I was at flight school at Fort Rucker.

*Bob Sheldon:* After a year in Vietnam, where to next?

*Fred Hartman:* I came back to the Field Artillery Advanced Course at Fort Sill, where I applied for graduate school and ended up at the Naval Postgraduate School (NPS) in Monterey.

*Bob Sheldon:* Direct from Vietnam.

*Fred Hartman:* No, my first assignment after Vietnam was to the Artillery School at Fort Sill, for the Artillery Officers Advanced Course, with time prior to the course and after the course, so it was really a full year in Oklahoma. I was there from summer 1971 to 1972. Then in July 1972, went to Monterey to enter the operations research (OR) master's degree program.

*Bob Sheldon:* Did you have any notable professors at NPS?

*Fred Hartman:* I quickly learned that every professor was notable at NPS. Because the curriculum in operations analysis, as the Navy called it at the time, was very engineering- and physics-based, we had an intensive period of two months before the school year began in September, so from July to September we took refresher courses in math and physics. One of the physics notables, Professor Peyton Cunningham, was still lecturing at that time.

I also remember during the physics introductory/refresher course that there was a videotaped lecture series, which was actually shown on film in one of the auditoriums, from

physicist Richard Feynman. The series was known as “Feynman on Physics.” I recall the basic OR text was Churchman, Ackman, and Arnoff. I just gave Annie Patenaude, FS, my copy as I downsized my office at IDA.

*Bob Sheldon:* Who were your OR professors?

*Fred Hartman:* At the time, the head of the OR department was Jack Borsting, FS, who went on to be provost before he left NPS—maybe dean of research as well, and then provost. Dave Schrady was in the department and moved along after Jack Borsting. Mike Sovereign followed in the same path. In mathematics, a number of people come to mind, because one of our texts was authored by Donald Barr and Peter Zehna, who were both my professors.

*Bob Sheldon:* Did the coursework seem easy for you compared to West Point, or harder?

*Fred Hartman:* I mentioned earlier that school came easy to me, but it had also made me a very lazy student. The influence of golf and tennis every day in the beautiful Monterey weather provided too much outside stimulation, perhaps, to keep my mind on OR. Jack Borsting told us during our first welcoming session as a class that “we would be immersed in OR” for the next two years. I didn’t come out at the top of my class; in fact, toward the end I had to really buckle down to get my degree.

*Bob Sheldon:* What was your payback tour for that?

*Fred Hartman:* Payback tour (in the Army we refer to it as a utilization tour) was to be an OR analyst at the Army Concepts Analysis Agency (CAA) in Bethesda, Maryland, now called the Center for Army Analysis and located at Ft. Belvoir, Virginia. In October 1974, when I was assigned in Bethesda, CAA was barely over a year old. The first commander was Major General (MG) Hal Hallgren. From the early days when they were standing up the organization, Hallgren’s right hand in putting the staff together and melding the organization was an Army Colonel, Joe Murphy, who ran the wargaming department.

It wasn’t until many years later when Joe Murphy was working for me as a consultant at CACI that I found out why my orders to the Arms Control Disarmament Agency as my utilization tour suddenly changed and I went to CAA. What happened was that Colonel

Murphy, who was working to find OR graduates, reviewed the files and took the opportunity to get all the Army officers graduating with OR master’s degrees that year from Tulane, Georgia Tech, and NPS, and others perhaps, but certainly those three. The branch assignment offices would flag those files and make sure that they got to go to CAA to build up the junior analyst talent right out of grad school. Later I found that individual selection of OR files was also true for Army Program Analysis and Evaluation (PA&E) under MG Max Thurman. He also recruited from OR officers and I ended up being assigned there a few years later.

That’s how I ended up at CAA in Bethesda in October 1974.

*Bob Sheldon:* Were there any big names from the Army analysis community that you worked with at CAA?

*Fred Hartman:* A number of big names, because CAA was working for the Deputy Chief of Staff for Operations and Plans (DCSOPS) at the time. Our own Dick Wiles, FS, was an O-6 (colonel) there as one of the division chiefs, and Roy Reiss, FS, was an Army lieutenant there at the time. First of all, I guess I should talk about what I did when I first got there. At NPS, my thesis advisor was Dr. James Taylor, and I had taken courses in combat modeling algorithms and Lanchester equations from him, so it was natural for me to start working for Dr. Steve Merritt, who was the model manager for the Concepts Evaluation Model (CEM). At the time, it was called the CONAF Evaluation Model, because it had been brought in from a contractor to do something called the Conceptual Army in the Field Study. It was later used in Total Force Analysis, which then became Total Army Analysis.

CEM was a theater-level combat simulation used to feed other models for analyses of the manpower levels and the mix of force structure, and also the sustainability for supplies and ammunition and so forth. After I was at CAA a month or so, Dr. Merritt got another assignment in government (a promotion), but outside of DoD, and I ended up becoming the CEM model manager as a captain. A number of the lieutenant colonels who came in as battalion-commander-experienced Vietnam veterans were used as subject matter experts (SMEs), and were

not always interested in the technical modeling and simulation (M&S) part of their job.

I had a fun time with people like General (then Lieutenant Colonel) Tom Tait, who went on to take over the Armor School, and others, who tried to understand how theater-level combat models fit into what they were trying to do in their force structure studies. During the time at CAA I put together some CEM user courses and tried to help the analysts, and was the captain they called to come and unstick them when the all-night runs of CEM would bog down at 2:00 in the morning. It took the full capacity of the UNIVAC 1108 computing power about 12 hours to run a single 180-day period of combat.

*Bob Sheldon:* The courses you took at NPS trained you for doing this kind of work at CAA?

*Fred Hartman:* They did, because we had an IBM 360 and punch cards at NPS, and that was the coin of the realm in terms of being able to do our M&S with CEM. The difference was we had better access to the main frame with the dumb terminals for the Univac 1108 at CAA than were available to us in grad school; but the principles were all the same. I had an interesting experience while at CAA, when I worked on a study that was sponsored by the Army DCSOPS Requirements Branch. A brigadier general (BG) was in charge of the authorization document system in the Army and was being challenged because they couldn't keep up with all the detailed changes coming in to update the system.

He wanted a study done by CAA to try to figure out, in his words, "how to put a tourniquet on the system," so that you could keep up and update the authorization documents and keep them current, because the Army was months behind in updating the documents. The study was called Management of Change (MOC) and the Army used "MOC windows" as a common term for more than 20 years after the study. To do that, I went back to optimization techniques, models, and network flows and graphs from NPS. I put together a humongous optimization with a network analyzer on the 1108 linked to a Calcomp 563 plotter, at the forefront of what was going on in the industry at that time. After consulting with our Sperry Univac support folks, I ended up going to the main office in Bluebell, Pennsylvania, and worked

directly with their software engineers to find the right software.

We had to get a license for a Swedish product (I've forgotten the name) for use in the United States, and with that product and the plotter, I was producing 30 feet long by three feet wide plots of all the events and activities in the existing authorization document system. It took a lot of work, obviously, not only to determine what those activities were, but to then reduce it to the input data for the system to produce the plots. Fortunately, CAA people were very cooperative in finding stretches of the hallway that didn't have doorways where we could put up the plots and do visual analysis to supplement the optimization output.

*Bob Sheldon:* Did you have to travel to the Pentagon much, or any other military installations?

*Fred Hartman:* I was frequently going back and forth to the Pentagon, particularly in the MOC study. The MOC study was well-received, and for many, many years, the term MOC Windows was a term of popular use within the Army, particularly within the Pentagon. I think that one of the things that indicate the power of your analysis and products is the longevity in terms of useful life.

I've been fortunate to have had the opportunity to get very early in my analysis career an opportunity to work on a large, hairy, thorny problem: an optimization that actually was adopted by the Army and put into practice to solve one of their big problems in keeping up with supplies and people, and then became a standard product for them. I think there are another couple of things along the way we can talk about as we go forward.

*Bob Sheldon:* How long were you there at CAA?

*Fred Hartman:* While there, I was promoted to major so I was there just shy of three years before leaving in August 1977 for the Armed Forces Staff College (AFSC) in Norfolk, Virginia, and was schooled in "Jointness." That was a very interesting tour since at that time the students served as instructors for much of the cross-service training and I taught selected courses in the Army block, to include wargaming, analysis, and costing.

*Bob Sheldon:* AFSC was a six-month tour?

*Fred Hartman:* That was six months at the time, yes, and if I back up a minute, I can explain something else that essentially directed my next assignments. During the MOC study, we ended up having courtesy calls with at least the base commanders and the people responsible for logistics and authorization documents. In US Army Europe, we went to MG DeLaune, the Deputy Chief of Staff for Resource Management (DCSRM), I believe. He had also been a Red Leg, a Field Artilleryman.

*Bob Sheldon:* Was he in Heidelberg or Stuttgart?

*Fred Hartman:* Heidelberg. And while there, I had the opportunity to brief him, and he found out, obviously, from looking at my brass, I was FA. He wanted to know about my career, what I was doing, where I was going, and I mentioned where I had been. He said, "Well, we need to get you back to Europe so you can get some time and get your legs red again with the artillery. And while you're here, I'll take half your tour and bring you into DCSRМ, and then you can go back to the Pentagon in PA&E and be my Europe Command Analyst in PA&E."

That sounded like a pretty good deal to me, so with that, I went to AFSC and was expecting to come out on orders to Europe. I didn't, and instead I was informed by FA Branch that I should "babysit" special weapons in Turkey as the detachment commander, for a small FA unit a three-day camel ride (not really, but almost) from the nearest airfield and close to the Soviet border.

Since I had already commanded a large artillery HQ company, I didn't think it would be career enhancing to go to Turkey to command a small nuclear detachment. In the end, I went directly from Staff College to Army PA&E, run by MG Max Thurman, later to be the famous General. MG Thurman went from PA&E to recruiting command and HQ Army as the Deputy Chief of Staff for Personnel (DCSPER) prior to Forces Command (FORSCOM). Among other things, he was the "Commander in Chief of Music" for Noriega in the Panama operation while he was the FORSCOM Commander. (During the operation to capture Noriega, General Thurman was being interviewed on the evening news because the Papal Nuncio who had provided sanctuary to Noriega was publicly criticizing the

loud music being played by US Forces as psy-ops outside his residence. General Thurman took the interview opportunity to reply to the Nuncio that he was in charge of music.) While I was assigned to PA&E under MG Thurman, the office reported directly to the Chief of Staff of the Army, so there was lots of visibility for the staff officers in that job. I had many opportunities to brief senior officers and, in fact, was selected to conduct resource management reviews, which were special reviews the Vice Chief of Staff of the Army had set up on a quarterly basis, for whatever the current thorny problems were. One of the problems at that time was butyl rubber gloves, as I recall, and there were other classified projects going on simultaneously.

*Bob Sheldon:* What years were you in that duty assignment?

*Fred Hartman:* I arrived in PA&E in the spring—actually, in February 1978, after the six-month tour at AFSC. Later, after MG Max Thurman went to Recruiting Command, I had the opportunity to go to work for the Deputy Under Secretary of the Army for Operations Research (DUSA[OR]) in November 1979. (At the time, it was David Hardison.) Some very good analysts came and went out of that office during the time. As a major, I was somewhat junior even to be in the Pentagon and the offices that I'd been working in. This led to a discovery that I wasn't considered by FA Branch to be field artillery qualified any longer because of my long stretch away from an artillery unit. I decided to resign my commission in 1981 and take a job in industry as an OR analyst, and continued to serve as a reserve OR single-track as my specialty in the Army Reserves.

*Bob Sheldon:* Did you encounter Wilbur Payne when you were at DUSA(OR)?

*Fred Hartman:* Wilbur Payne was a legend even at that time, as he was the first DUSA(OR) just preceding Dave Hardison, so yes, I sat on the wall a number of times in meetings with Wilbur Payne when he came back to the Pentagon from White Sands and sometimes at his office at the Missile Range. David Hardison was in the job as DUSA(OR) for about five years when he had the opportunity to go work in Office of the Secretary of Defense (OSD) for a somewhat famous civilian by the name of Walter



LaBerge. Dave Hardison was his Forces Director, so he had land, air, and sea forces as part of the office responsibilities. I think it would have been part of what today is Acquisition, Technology, and Logistics (AT&L).

David Hardison was very interested in procurement programs and the work of program managers (PMs) from an OR perspective, and had early on been very instrumental in engineering the TOW (tube-launched, optically tracked, wire-guided) antitank guided missile system program. I learned from him that the representation for the program at the time was the Greek letter tau. Mr. Hardison had one of the quickest and most innovative analytic minds of anyone I've ever met. We used to have long discussions and I was amazed that after almost 35 years of government, he could still come up with new and innovative solutions to problems.

But there were several projects that were meaningful. I think one of the most interesting things I worked on while at the Office of DUSA(OR) was a "zero-based" truck study. I still remember on a Good Friday afternoon being called into Dave Hardison's office. There was a Congress member on the Hill by the name of Representative Addabbo, and he had zeroed out the entire Army truck budget for the previous three years for want of a bottom-up analysis for justification.

Even at that time it was over a billion dollars to include the different truck procurements and all the variants the Army wanted to modernize in the wheeled vehicle fleet. Since this was fast on the heels of the Carter era, zero-based budgeting was popular as a term, a concept, and a practice. Congressman Addabbo said to the Army, "Until you do a zero-based truck study, I'm going to zero out every year's procurement for trucks." That Friday afternoon, Dave Hardison said, "Fred, if we were going to do a zero-based truck study, how would you do it?"

I responded by saying, "Well, I don't think anyone's ever done a zero-based truck study, so we can do it about any way we want to, and that will be the new standard. But we need to do one." He said, "Well, I agree with that." And he went to the Board and sketched out some of his ideas, and he said, "Well, it's 3:00 on Friday afternoon. Why don't you come in at 9:00 Monday morning and give me a study

plan on this, because we've got to do something very quickly before the next budget cycle."

I did, and we did, and I found myself making a lot of trips down the road to Fort Lee, Virginia, for meetings at the Transportation Center dealing directly with the two-star commander. We were successful in organizing and completing the study, and Congress restored the Army truck budget since we had completed the requested "zero-based" truck study in under six months that included an extensive inventory of the existing fleet.

*Bob Sheldon:* This was during the years of the "hollow force" (Army General Shy Myer's term for the force after Vietnam).

*Fred Hartman:* Yes. I don't know that I ever liked to call it that, but essentially those were tough years.

*Bob Sheldon:* You mentioned two big studies. What was the other big study you worked on?

*Fred Hartman:* This actually would qualify as one of those, but the one I had in mind came later, when I had gone to industry with CACI.

*Bob Sheldon:* What was your rationale driving you to leave active duty and go into the Reserves and industry?

*Fred Hartman:* I love the Army, I didn't want to be separated from the Army, but I realized that my primary love was doing analysis. My definitions for analysis were different from a lot of people that I went to school with, and a lot of my professors, as I liked to call analysis "quantified common sense." I think the primary value of the OR degree from NPS, and the value of that institution, is being able to get young military officers with operational experience immersed into an analytic environment. NPS provides sufficient education and technical background so that when they're back in their respective Service assignments and contractors try to sell their goods, peddle their wares, or blow smoke, the young Army officers/OR analysts know the basic science or program budget details within their service. Later, as they progress up the ranks, they are aided in making acquisition decisions, because they know enough about the underpinning science and the physics and the technology and the analysis underpinning a given system to know what is reasonable and what is not. I think there were some interesting general officers who came through during

that time who had served in key jobs or were influencing jobs in personnel systems and in procurement and other areas, who were well-served by hardcore engineering and OR degrees.

I could list a bunch of those, but I don't know if you need me to do that. Bottom line was I believe I was well equipped by NPS to go forward in my career in the Army and to be able to make a difference. A story that I side-tracked when I was working for Max Thurman was when I made the decision to get out of the Army, one of my classmates and study buddies from NPS, a Navy lieutenant supply corps type, had gone to work for CACI and was trying to recruit me there. He had a job waiting for me, and I realized that I couldn't take it without a decision by the Army to drop some of the commitment I had consecutively stacked up as a result of all the training and education I had received in the Army (for flight school and grad school and AFSC since the commitments were served consecutively). General Thurman turned down my request for release and I continued to work in the Pentagon for Army PA&E and the DUSA(OR) assignments until my commitment time was paid back. I joined CACI in the spring of 1981.

*Bob Sheldon:* What was the Reserve job you stayed in?

*Fred Hartman:* I continued on in the Army Reserve and was promoted to lieutenant colonel (LTC) while in the Reserves accumulating "good years" of service. In my Reserve assignment I was part of an intelligence unit that met in the Pentagon every Wednesday evening, and for my annual utilization tours I worked in the Pentagon in a diversity of two-week tours over the years, to include the offices of DUSA (OR), DCSPER, and DCSOPS. I had some interesting "little assignments" during my two-week annual active duty tours. I also went on duty in the Pentagon during Desert Shield/Storm.

*Bob Sheldon:* And your commercial job?

*Fred Hartman:* I went to work for CACI in 1981 and stayed approximately 10 years; it was a very interesting, entrepreneurial-based company. In fact, it used to be jokingly called "Commanders and Captains Incorporated," because they were almost exclusively former naval officers supporting Navy clients when I joined. The company had grown up with the

simulation language called SIMSCRIPT. The founders of CACI were part of the team that invented SIMSCRIPT at RAND Corporation, and when RAND completed development, the three took it private and formed CACI. Later it was picked up by the Navy, and CACI supported from Fleet Forces Command and the supply side of the Navy, which I think was then located up in Mechanicsburg, Pennsylvania.

CACI originally stood for something—California Analysis Centers, Incorporated—and then they moved to the East Coast, and they couldn't use the state, California, anymore, so it was changed to "Consolidated Analysis Centers" and eventually just CACI. The Navy connections established the first series of contracts, which grew rapidly within the Navy. The company was founded in 1962. When I went to work for them in 1981 they were probably about a \$36 million a year company; when I left there 10 years later they were approaching \$150 million. But the interesting concept of the company, much like some that are still in business today, is to reward the analysts and managers that bring in and manage the business with revenue growth and profit. They've grown significantly today, much of it by acquisition of other companies. But the original concept was that if you're a good analyst and you market something and bring it in the door, you own it. They rewarded you well with bonuses and promotions for revenue growth with profit. The previous experience I had in the military set me up very well for working in the OR study world at CACI.

My first project at CACI was to build the fly-away kits for what was then the Navy LAMPS Mark III helicopter. I was a natural with experience as an Army Aviator with OR training from NPS, and found it was the Navy version of the Blackhawk, called a Seahawk. I had an initial \$25,000 subtask under IBM, with the Navy Air PM Logistics (APML) at Naval Air Systems Command (NAVAIR) for the LAMPS Mark III program. I was able to take the IBM-built model for calculating spare parts stockage, and compare the stockage lists with a model CACI folks had built that was accepted by OPNAV as the standard, called the Availability Centered Inventory Model (ACIM).

LAMPS Mk III was an interesting program in that the prime contractor was not Sikorsky

the airframe builder, but IBM, because of the mission gear and the electronics that had to go on the ship—the computers and so forth for their mission of over-the-horizon antisubmarine warfare. The bottom line was after I went in and started doing the analysis and comparing stockage levels, I found 90 flyaway kits as part of the program buy. Each kit was to have four GE engines as “nude engines,” because they were in the packing case sitting on the ship, waiting to replace one of the two engines on the Seahawk. Instinctively I thought that was odd, so we concentrated on the flyaway kit and the sparing-to-availability calculations so as to optimize the number of engines to maintain the readiness levels. And we were able to support the optimized package with fewer engines, which went up through our APML to the PM, to reduce the number of engines from four to two. When we reduced stockage of that item by 50 percent and realized a cost savings of about \$500 million across the 90-kit requirement, we made the case that we could reduce the flyaway kit by two engines per ship. The recommended stockage levels were accepted and the PM was extremely happy with the cost savings to his program. As a result of that we had a continuing contract with NAVAIR to support the LAMPS Mark III program for the next 10 years. I eventually hired a former Navy Supply Corps Officer to run that program as I started growing and moving up in management. As an aside, the LAMPS Mark III set records in terms of readiness/availability once it was introduced into the fleet.

*Bob Sheldon:* Did you take inventory theory from Dave Schrady at NPS and use any of that math?

*Fred Hartman:* I most likely did, and I have to admit that I’m foggy on the details of who taught the course, but I used it heavily through the years.

*Bob Sheldon:* Did you write any simulation code yourself, or did you use existing models other people had written?

*Fred Hartman:* I did some myself; however, I had access to the original model builder, Andy Clark, who was still a CACI consultant. I was more the analyst doing the applications of the model, many of which required modifications or additions to the code. The answer to your

question is both. I designed and built the data for each alternative, and in one instance ended up modifying code within the model because we were optimizing on more than just cost. The Navy ship had a problem in that it was top-heavy with the change in center of gravity with the hangar deck and all the spare parts they were putting on that went into the aircraft flyaway kit. I found a way to use the ACIM code to optimize for weight and cube as well as costs. We were then able to optimize not only from the normal cost resource perspective, but also to use it to optimize based on how we position the material on board the ship as well as the center of gravity issue. Then we came out with the two numbers and did analysis to come up with an overall optimization for both cost and ship stability.

*Bob Sheldon:* Where was the CACI office where you worked?

*Fred Hartman:* In Crystal City, at one end of Crystal City, and NAVAIR was at the other end. I rented a small suite of four or five offices to be nearer the sponsor and started hiring people to work on the north end of Crystal City, in one of the newer buildings that had a favorite watering hole called Amelia’s on the first floor (Hamburger Hamlet, many years later).

*Bob Sheldon:* How many years were you at CACI?

*Fred Hartman:* I was at CACI for 10 years. Because of the entrepreneurial system I discussed, I was able to become a project manager within the first year, a vice president within three years, and then move progressively up the chain. By the time I’d been in the company six years I was an executive vice president, and the portfolio expanded, obviously, from that first starter set.

*Bob Sheldon:* Tell us about some of the major studies you did while you were at CACI.

*Fred Hartman:* After the inventory study with flyaway kits for the Seahawk, I had the opportunity to do several other studies that brought me back to the Army. And one of those, based on the optimization and the strength of what we had done back in CAA days, was to try to come up with something called an OPTEMPO (operations tempo). As General Max Thurman, my previous boss, had said, “We need to be able to find the cost of driving the family

car”—the newly fielded M-1 tank. The problem forced us into setting the operating tempo for mathematical models that were needed to optimize and find the cost. The request for the study came from the Army Financial Management (FM) and the Comptroller.

Earlier, I had worked on (as a bit player) running the CEM model for analysts on the M-1 Cost and Operational Effectiveness Analysis (COEA) at CAA. At CAA I had the opportunity to work on two significant Army COEAs, one for the Hellfire missile and one for the XM-1 tank, both of which came back as projects that I would refresh myself with in later years. The Hellfire missile was one that I got involved in with Dave Hardison when I was in DUSA (OR) because they were beginning to migrate from the Hellfire to the Hellfire Fire and Forget technology.

Now we go to the resource community, and the work I did with the resources associated with the Army and the MOC study. I was called to some meetings in the Army FM office with representatives from Army Comptroller and PA&E, and they had set up an O-6-level task force. They wanted a contractor to support them to try to solve that problem. This was about 1983, and as luck would have it, we were beginning to use IBM PCs. We knew how to use spreadsheets, although things like Microsoft Excel with the enhanced capability of today were nonexistent.

The tools were more like spreadsheet adding machines/calculators at the time. We used SuperCalc, a very early spreadsheet software package to hit the market in the early 1980s. (SuperCalc was a spreadsheet application published by Sorcim in 1980, and originally bundled [along with WordStar] as part of the CP/M [Control Program for Microcomputers] software package included with the Osborne 1 portable computer. It quickly became the de facto standard spreadsheet for CP/M and was ported to MS-DOS in 1982.)

We ended up first of all going to data that had been collected by a small business contractor from around the Army that had to do with the number of miles driven for the units during the course of the year. It turns out there was a cottage industry growing within the Army because different battalion commanders were

trying to go about collecting that data and using the data for resource forecasting, because the units needed to find ways to justify, under the zero-based budgeting and the budgeting process, the amount of money they needed to allocate to those functions in their units in the course of a year. We began to take something that was called the Battalion-Level Training Model that had to do with the miles driven for training events, and in a peacetime Army that was a significant part of the total mileage. Then we tried to find factors that would allow CACI, supporting an O-6-level working group composed of representatives from the Army Resource community and the Ops training communities, to get access to good data, and found the best way to try to display that data. I used some state-of-the-art contractors from outside of CACI, and we found ways to come up with spreadsheets to essentially build rudimentary models that would allow us to get at the resourcing for miles driven. As a result of the work we were doing at the time, the Army was able to come up with the OPTEMPO for tank battalions.

The Comptroller was Lieutenant General Ernie Piexotto, who made a lot of trips out to the Major Commands, and he had a GRiD Compass as his personal computer that he took with him—it was one of the early laptop computers. He asked me if there was any way we could reduce what we were doing with our resource calculations onto a GRiD Compass that he could take and explain what we were doing to the commanders he needed to brief. We ended up coming up with something called a Training Resource Model, where we took the good work that the Army operations and training community had done in terms of building their battalion-level training models and relate that back to the resources. In the Army, it isn't hours on the turbine engine, it's miles driven. For the M1 tank, we were successful in building the case and coming up with a cost-per-miles driven based on the data we had.

Then it became an optimization problem again to be able to show the miles driven in the context of what the Army could afford. We were to derive the 860 miles on a tank that was the OPTEMPO that they were to use in those years. Essentially, that's how we got there.

Now we have one model that has one piece of equipment in an armor battalion, the primary, the tank. But what do you do with all the other equipment; all the trucks and all the other things that go into making up an armor battalion? We ended up doing similar drills for other types of equipment, and marrying the resource side with the miles driven and the operational side for these units, and came up with something called the Training Resource Model, which became affectionately known over the years within the Army as TRM. It quickly became too large to go on a GRiD Compass, so I had an opportunity to do some research on a minicomputer called a VAX 11/780.

Essentially, at CACI I had a computer room set aside with a Harris Corp-provided VAX that we could do research on. And one of the things we tried was to take simple spreadsheet software that had been created for the micro technologies for a personal computer and move it up to an equivalent product on a midsized computer. I quickly learned that in those early days the software itself ran much more efficiently on the smaller computer than on a "mini" like the VAX 11/780.

We ended up doing some very interesting work on the software side of taking the simple spreadsheets that were formed on the micro-computer and doing virtual stacking of those in a way that one does in Microsoft Excel. We were probably a generation or a generation and a half ahead of our time, but this allowed us to produce what was originally called the Program Resource Model, which went into widespread use within the Army in the resource community. Twenty years later I was still hearing the terms MOC Windows and TRM.

In fact, after I left CACI, I had calls from FM to come back and try to help analysts understand what we did in building TRM. That was, I guess, maybe significant study number two. Another interesting project was one that had to do with Air Force and the Air Force construction costing people, then at Tyndall Air Force Base, Florida. A call came out of the blue to CACI headquarters in Rosslyn, Virginia, from an architectural engineering firm, saying, "We need to write a proposal for the Air Force to come up with a cost estimating system for the

construction folks in the Air Force for building buildings and runways for the Air Force."

*Bob Sheldon:* That would have been the Air Force Civil Engineering community.

*Fred Hartman:* Yes. I was called by our CACI Corp folks, because they knew I'd been doing this work in resourcing for the Army, and I ended up going to Houston to meet with an architectural engineering firm and put together a proposal. It happens that in order to prepare myself for that trip, I grabbed a book by Yourdon and DeMarco on structured systems design, which in 1984 was state of the art. It turns out that when I got to Houston I came down with a bug which I picked up on the flight, and confined myself to my hotel room working on my section of the proposal.

I made a couple of meetings with the rest of the project team and quickly realized that the part of the project that had to do with building the models was very different from the things they were talking about, and I needed to go back to my room and try to recover and do my work alone. I did that, and I wrote, relying heavily on the information I had pulled from Yourdon and DeMarco. It turns out that the person grading our proposal had recently taken a course from Yourdon and DeMarco on structured systems design.

Many of the things I wrote to in that part of the proposal were very familiar to the reviewer. In fact, it was interesting that when they came back and asked for clarification, and then later refinement of parts of the chapters in the overall proposal, the prime contractor asked, "What about our modeling part?" And they said, "Don't change a word. We like it the way it is." So we ended up expanding my CACI organization now into active projects with Army, Navy, and Air Force.

That turned out to be a most interesting project, because it was probably the most intense period where I had to work with a former Air Force software engineer. He was very well trained in the HQ Air Force IT [Information Technology]. I can't remember the name of the organization in the Pentagon, but they were very well respected and very well thought of, and I was able to hire two or three people from that organization. By following the structured

systems design approach, we were able to get the SMEs, the systems engineers with the construction engineers, and figure out how to build this software in order to come up with a useful product.

*Bob Sheldon:* Anything else about your CACI tour that you want to talk about?

*Fred Hartman:* As I progressed up the management ranks within CACI, I found out that I was getting further and further away from the problem solving and OR applications that I had loved so much when I was a junior analyst. After spending a great deal of time in the senior and executive vice president ranks, I found I was spending a good deal of time on legal issues, such as testifying as an intervener on the part of the government to protect the competitive bids that we had won. I decided I really needed to go back to the things I love. Although I was enjoying my time with CACI and had a lot of very good people working for me at the time, I needed to go back to my OR roots.

When I had decided to leave the active duty Army and go into industry, the plan was to learn how industry did it, and then go out and do it—doing something like our friend Seth Bonder, FS did, building a company, and then perhaps at some later time, you sell that company; and then I could go back to beloved Monterey and play golf and tennis every day again. The reality of that was as I moved forward at CACI and spent more time with the number-crunchers and the lawyers, I was getting away from my first love of OR and long-range goals.

I made a hard decision because of where I was in my professional life and age at the time. I was only a couple years shy of age 50 when I decided to go out and do something different. While still at CACI I had been recruited to serve on the Army Science Board, and one of my colleagues on the Board with an Air Force background, who had been one of the first math instructors when they opened the doors to the Air Force Academy, said, “We really ought to start a company together.”

He had recently sold a small business to an international firm, Saatchi and Saatchi, and he wanted to do something like that again. I thought that it would be neat to form a “boutique” analysis company, so we formed a company called Applied Solutions International.

ASI was aiming at more of the specialized consulting tasks that I liked to do at CACI but could no longer do as I grew, because more of my time was spent managing as opposed to letting my mind get down into the nitty gritty of problem solving.

I did some interesting work at ASI, and we had General Charlie Gabriel as one of the regulars in the company. General Gabriel was a former Air Force Chief of Staff and a 1948 alumnus of the USMA. After a few years at ASI, I was approached by the first Deputy Under Secretary of Defense (DUSD) for Readiness, Lou Finch, whom I had met through John Johnston’s network. Mr. Finch asked me if I could work with him to automate and improve the Readiness Reporting System to start doing work toward what would eventually become the Defense Readiness Reporting System (DRRS).

It turns out that as I began to divest myself from ASI and legally and financially sever the ties so that I could go to work for Lou Finch, his requirement for me changed to a large training program by the name of Joint Simulation System (JSIMS). In 1995, just as I was ready to work for DUSD Readiness as an M&S consultant for readiness, the job changed to looking at the technical specifications and program needs for JSIMS.

The JSIMS was intended to be a large training system that would pull together the training models (federates) from each of the services into one training environment so that we could do better joint training. OSD stood up the Training Council (TC), with Lou Finch as the chair, under the old Executive Council for Modeling and Simulations (EXCIMS), which was run by Dr. Anita Jones, who was then the Director of Defense Research and Engineering (DDR&E). I supported the TC as a consultant to Lou from IDA, and started working to form (with one of the GS-15s in the office) the working group under the TC.

*Bob Sheldon:* Where was that office?

*Fred Hartman:* I worked for the office of the USD (Personnel and Readiness), in Readiness and Training.

*Bob Sheldon:* Were you in the Pentagon?

*Fred Hartman:* At the time, the OSD Readiness and Training office was directed by Mike Parmentier, and I was working in the Pentagon. For the first few months, I was working from

home and going to meetings in the Pentagon as a consultant. Then the government wanted me to be affiliated with a federally funded research and development center (FFRDC) because I was getting into resource information in the program that would become “competitive sensitive.” As JSIMS was getting stood up, the services were competing their own federate programs.

I was assigned to the old IDA Simulation Center, but was working with the training people within IDA. After I was brought on as an adjunct at IDA, I had an office in the Pentagon for the next four years, until January 2000, primarily keeping up with the JSIMS program and attending the integrated program teams (IPTs) and program meetings, and coordinating with the services on their parts of the program. One of the interesting things I did in those early days as an IDA person about 1998 was to solve the intelligence piece so that we could have multiple-levels of security within the JSIMS program.

There again, as luck would have it, my background with some intel operations from going all the way back to my Army Aviation days stood me very well. I had the opportunity to chair the meeting with the Intelligence Community (IC) players, and I got to their collection of models to represent each of the functional parts of the wider IC. I chaired a panel with the IC to use something that was relatively new at that time called Radiant Mercury, and develop two separate parallel enclaves, with one-way flow to the higher level.

There were other issues along the way when it came to security. One issue was at least one of the services preferred to train unclassified. Army preferred to perform most of their training in an unclassified environment, while the Navy and Air Force preferred to train at the secret level. We ended up doing an unclassified enclave with Radiant Mercury connecting us to the upper (secret) enclave. We recommended adoption of the “one-way trusted guard,” and then from the top in the secret enclave we had another way to get to the agencies within the community that could only transmit their information at higher than secret.

*Bob Sheldon:* What was your next job after that?

*Fred Hartman:* I received an appointment to OSD under the Intergovernmental Personnel

Act (IPA) in 2000. Dr. Anita Jones moved on as the DDR&E and Dr. Delores Etter took over responsibility for JSIMS as the DUSD for Science and Technology, within AT&L. Because of the work I had done with the DUSD(R) and the Personnel and Readiness (P&R) community on JSIMS, she asked me to take a position (as they were reengineering the framework of JSIMS) as technical director for the program. I spent the next three years with JSIMS. Since there was a transition in the PM at that time, that role for me became mostly as advisor to the PEO STRI (Program Executive Officer for Simulation, Training, and Instrumentation), since Army became lead in the program and they worked with the PM team in terms of how to go forward with the program.

As the program was terminated in 2003, it became part of the OSD Training Resource actions to conduct an analysis of alternatives (AoA) to determine how to solve the existing training problem in a way that would be more effective and efficient than what we had found ourselves aiming for in JSIMS. I could go on at some length about why the JSIMS program took so long to get through test, and why it ended up failing, but I don’t know if that’s relevant to this effort.

*Bob Sheldon:* Can you do give us an abbreviated version?

*Fred Hartman:* In the end, the program had problems with cost, schedule, and decreased performance capability—a fatal combination. The software engineers in the program had set out the testing process to test each of the modules that were coming into JSIMS core individually, and then test them pair-wise with other federates in the JSIMS core. There were a lot of other interesting discussions along the way about having a common simulation engine at the center of JSIMS and making all the things compatible to work together, and that part eventually worked for most of the federates.

The problem was primarily that, as you got into integrating all the federates, the rules that we used had some significant flexibility in building their particular functional models for the services’ training federates that would go into JSIMS. It turns out that the way the Air Force model needed resolution of data in order to do the battle damage assessments from the air

side of the training essentially caused the land to federate in JSIMS to go into overload.

What was put together in planning by the systems engineers in a very fast-paced test schedule of 60 to 90 days dragged on into well over a year, so the program found itself breaking the cardinal rules in Procurement: cost, schedule, and performance. During the transition in 2000, the OSD (AT&L) with the Defense Modeling and Simulation Office (DMSO) was pushing the use of the high-level architecture (HLA). The reason I was asked to join in 2000 was to reengineer the JSIMS program in such a way that it would be at least HLA-compatible.

As the JSIMS program tailed down, I spent long hours with the Army HQ training and acquisition offices, and in fact moved my office from the Pentagon into Army spaces in Crystal City to work with the Army Resource side, but as a member of JSIMS. As the program was terminated, the OSD (P&R) asked me to come back as an IPA and lead the AoA that had been requested by PA&E. I had a wonderful opportunity to lead the Training Capabilities AoA in a short one-year period of time.

The JSIMS program was significant not only to the training community but also to M&S, since it was a \$1.2 billion program. After the program was terminated, it still had a valid Joint Requirements Oversight Council (JROC) needs requirement so we could train our forces together and conduct large joint exercises.

As the language had been crafted to require us to do an AoA, one of the things specified was that the OSD (P&R) and the Commander of Joint Forces Command (JFCOM) would jointly chair and oversee this activity. Admiral Giambastiani and Dr. David Chu both felt very strongly that this was something that they needed to be personally involved in, because of the attention from the Secretary and the Chairman. As the study manager, I had the opportunity to build the initial briefing for the senior steering group, which was made up of co-chairs Giambastiani and Chu, and had the Service Vice Chiefs as members.

At the kickoff meeting, the TC AoA had to be architected, discussed, and coordinated for briefing at the four-star level during the period August and October 2003. To my great surprise, when I did the standard Ops Research, "do

a study" in the Pentagon approach of saying, "Well, you four-stars are very busy, so we will bring you in for a kickoff meeting, and that's what you're getting today, and we'll bring you in for a program review next June when we have worked with the people who work for you to provide a series of recommendations and a product out of our AoA."

The OPNAV said, "You know, that's not enough." He said, "I can delegate this to my three-stars and to other people, but in the end, I want to be involved more than this. And I certainly don't want to delegate it to the O-6 level working with you and your AoA team." Admiral Giambastiani and Dr. Chu both strongly agreed with the Navy position. As a result, I had regular in-progress reviews (IPRs) at the four-star level during the course of the AoA from then until the following June, nine months or so.

Because of the intense schedule and the high level of visibility, I was able to recruit some notable people who were at the Senior Executive Service (SES) level from the services to be an integral part of my team. The three SES participants were Dell Lunsford from the Army, Mike Bailey from the Marine Corps, and Jeff Bradshaw, who was working in an SES technical position for the Air Force M&S Office, and who had been one of my colleagues as Deputy PM of the JSIMS program, so he understood the issues very well.

The other thing that was inserted into our AoA, again by the Navy, because it had been an effective process that had been used with their senior leadership, was to do something we called "business games." Essentially, we were doing then what is now a very current topic of conducting wargames, but doing so in a business game process. We modified our study plan after the kickoff meeting with the four-stars to set up a three-star-level business game in January 2004.

The chair was Lieutenant General Wagner, who was Admiral Giambastiani's Vice, and his three-star counterparts appointed by the other Service Chiefs, along with Dr. Paul Mayberry, who was the new DUSD (Readiness) succeeding Lou Finch. The January game was devoted to the training needs/requirement, so it was uniform-centric. In February we did another



major game with industry, where we had CEOs and CFOs and technology people from the various companies who felt they had a vested interest in the outcome of the AoA. They volunteered their time to come and participate in an intense two-and-a-half-day period of the business game and come up with an innovative business model.

In April, we had another three-star-level game that vetted the findings of the first two games and the work that had been done by the services, with the goal of getting approval to go forward. After each of these games we had briefings to the four-stars. Then, in June, I conducted the final briefing on our findings, and they were approved. Our next step from mid-June until the first of August was to write the final TC AoA, to meet our deadline date back to PA&E. As a result of that series, we were able to successfully defend and allocate over \$650 million in the next Future Years Defense Program into Joint Training and the supporting models and networks.

The bulk of that money went into the actual building of the Joint Training and Experimentation Network and much of the infrastructure. Some of the reusable infrastructure came from the Millennium Challenge, an experiment done at JFCOM, to help us do our worldwide Joint Training mission. Other pieces of it went into the two other Training Transformation (T2) programs for distributed learning run by the Joint Staff, and the Joint Assessment and Enabling Capability (JAEC) run by OSD (P&R).

My next assignment after the AoA was completed and the money was locked in was to take over JAEC. I was dual-hatted the last few months with the AoA and as the head of the Training Transformation JAEC office within P&R. I continued in that role until the end of my IPA in September 2007.

*Bob Sheldon:* I want to back up. This is during the time of Operation Iraqi Freedom. Did the current operations in Iraq impact your work?

*Fred Hartman:* We stayed out of that lane operationally and concentrated on the primary mission of Joint Training. However, much of what we accomplished in Joint Training and exercises did help us with the right training for operations in Iraq and Afghanistan. Of course, one

of the large problems in the beginning had to do with improvised explosive devices (IEDs) and with the Army's Humvees and trying to protect them. I did somewhat get involved in that OSD assignment working with some classified programs that had to do with the IEDs, and also sat in on some of the Army's program review meetings as they were trying to figure out how to come from a regular Humvee into up-armoring and going on to other vehicles. So that's a good question, and it's one that I would've moved by more quickly.

*Bob Sheldon:* You mentioned earlier that you had served on the Army Science Board (ASB). What did you do on the ASB?

*Fred Hartman:* The early 1990s timeframe found us coming home from Desert Shield/Desert Storm and embracing the Army's Force XXI doctrines for the future. Although I worked several of the summer studies, I best remember the specific topics in smaller ad hoc studies. There was one large summer study that I considered to be particularly important: looking at combat ID on the battlefield. It was directed as a result of the fratricidal incidents in the Gulf War. One of the small studies that I haven't been able to access due to classification was actually during Desert Shield, and I was one of three ASB members selected to take a quick look and make recommendations on the chemical protective gear for our soldiers—to include the masks and gloves and their suitability in hot, sandy environments. Another relevant effort was looking at the next-generation technologies for developing field artillery gun systems. Another ad hoc study that I particularly enjoyed was looking at the SME education requirements for military officers. It delved into the very strong curriculum at West Point and discussed how the military officers benefited from their strong analytic/scientific approach to overall problem solving—to include the interpersonal and leadership areas. I also recall reviewing all the Army BG positions in the Army to identify those that should be slotted specifically for OR and specific science and engineering area graduates, to allow the officer corps a more direct path to promotion beyond O-6. Another study analyzed the process for soliciting and processing new ideas/concepts/technologies in light of the rapid pace of research and development and

technological development. The problem is still current today, in that we frequently need to go outside the acquisition system to expedite urgent warfighter needs.

Up to this point I believe there were three things to recap that I thought had some enduring quality that I'd worked on over the years. One of them was the MOC study at CAA. The other was the Training Resource Model, the TRM Program budget work we did for the Army Comptroller and FM. And the third was the Training Capabilities AoA that we did for Joint Training.

We are ready to move on to the period following my IPA with P&R, when I went back to IDA. I continued to work in both training and M&S and the crossover between those. I had done some consulting from IDA as an advisor to the Joint Staff and JFCOM regarding Rapid Scenario Generation (RSG), which I had worked on while at OSD(P&R) in order to facilitate the post TC AoA move of functions into actual implementation. That program ended up being funded by the M&S Steering Committee.

The RSG highlighted one of the areas that has plagued the M&S community and wargaming for many decades—the importance of certified, reusable data for scenario building and simulation inputs. One of our major problems over the years is being able to capitalize on using that common data to its fullest capability to support M&S and training exercises, testing, analysis, and other users across the DoD at the enterprise level. Now moving on with IDA, I continued to support the Defense M&S Coordination Office (DMSCO), formerly DMSO, and worked on something called a corporate cost-cutting business plan, which is a form of strategic plan. We were able to produce a document in 2008, actually led by Army Colonel Mike Sanders, who was then the deputy at DMSCO.

We took another shot at that in 2010, and updated it, but it did not see widespread distribution. The M&S Steering Committee was beginning to cut down the frequency of meetings, and the urgency, in some of the follow-up projects. I also worked with the National Training and Simulation Association on a collaborative M&S organization which is now called the National M&S Coalition (NMSC) beginning in 2006.

The NMSC grew out of a series of meetings that we held jointly with the Congressional M&S Caucus, headed by Congressman Randy Forbes from Virginia. The Caucus and NMSC organization are still going strong. Currently I continue to support the DMSCO, and to a smaller degree the work that's being done in OSD P&R Training, under what is now the ASD (Assistant Secretary of Defense) Readiness. I moved from the Washington, DC, area to California in May 2013. And simultaneously stepped back from regular research staff to adjunct with IDA, and continue to work on projects remotely as an adjunct staff member with trips back to DC for IPRs and other meetings as needed.

*Bob Sheldon:* You live in the Monterey area now?

*Fred Hartman:* I live in Pebble Beach; my dream came true after many years of planning. From the time I left NPS as a young Army officer in 1974, it took me 39 years to make it back, but by golly, like MacArthur, I did return.

*Bob Sheldon:* Let's backtrack and talk about your involvement in MORS. When did you first go to a MORS Symposium (MORSS)?

*Fred Hartman:* The first memory I have of MORS was during the time I was at NPS studying OR in the period 1972 to 1974. After graduating and going to CAA, on two occasions I prepared papers and hoped to be able to present those at MORSS. As a captain, I was outranked in terms of being able to make the trip to wherever the MORSS was being held that year. I do remember one of the papers I did that I presented at a later MORSS almost 10 years later, which had to do with developing metamodels for combat. I think it was inspired by an article in the first issue after the combined Operations Research Society of America/The Institute of Management Sciences (ORSA/TIMS) organizations when they formed the Institute for Operations Research and the Management Sciences (INFORMS), and also from the early work with relational and hierarchical databases. I believe that was the fall 1974 or spring 1975 edition of the ORSA/TIMS Journal that talked about metamodels and how one could build virtual surfaces for the output data. I had been at CAA long enough to know some of the studies associated with the theater-level

combat model CEM. But the article described different techniques for doing metamodeling to include constructing data surfaces, and being able to get at, in principle, the idea of having a large number of model runs with representative output results. Using that data allowed the analyst to narrow down the number of large theater model runs one would actually have to make with the large model.

I saw that as an advantage because it took CEM 12 hours or so on the UNIVAC 1108 to do a 180-day combat pass. As the model manager for CEM, I would get a call at 2:00 in the morning and go in and start the machine up because we had to be able to get a run out the next day on a very hot project. And you couldn't do it during the day because it essentially soaked up all the power and storage in the machine to be able to produce the results. To me that was an advantage. When I described it to my O-6 boss in CAA, he said, "Fred, no one else is using the computer at night, and you're a captain, you can come in whenever we need you. You work 24 hours a day." And that was the end of that. But it was in fact a good bellwether, if you will, for things to come, and the way we got into doing virtual spreadsheets and other things to build models 10 or 20 years later.

*Bob Sheldon:* You presented that at MORSS. What was the reaction of the MORSS audience?

*Fred Hartman:* It was very supportive. The MORSS audience is a working group where I was then technically qualified to speak, as opposed to my state today. And the people in the audience reacted well to it, and I probably presented that in the early 1980s, because that was the other part of the story. Once I left the Army and went to work at CACI in 1981, I found that it was much easier to go to MORSS, and it was much more important for me to go to MORSS, because it allowed me to maintain my awareness of what was going on in the community and to maintain contacts that I had made while in the active duty military. One of my early presentations was on our work with sparing to improve operational availability, and our inventory modeling.

I became a regular for MORSS in 1981, and I think someone called me in 1981 or 1982 and said, "We've got a working group and the chair is not able to come, and we need help." I stepped

up, and that was the Logistics working group. One of the presenters in that session had a successful career, James Streilein. He was then at Army Materiel Systems Analysis Activity, and is now an SES and doing great things in OSD testing. He worked with me to get the Logistics working group back up and running over the next two or three years.

In the process of doing that and trying to move in and move up from working group to composite group chair and so forth, Greg Parnell got to know me and asked me if he could recommend me to serve on the Board of Directors. That happened about the 1989 timeframe. I believe that it was actually in my beloved NPS Monterey that I was voted on. Then the rest of it became history as I went up through the Board of Directors route, with more of a concentration on meeting ops, special meetings assignments and chair, and Vice President Meeting Ops, and then election to President from that side.

*Bob Sheldon:* What year was that?

*Fred Hartman:* I was President from 1996 to 1997, so that would've been in the previous year, 1995–1996. I was chair of special meetings I think the year before that, so during 1990–1991 I was working in committees that had to do with special meetings and meeting ops.

*Bob Sheldon:* I believe you were elected President at Fort Leavenworth.

*Fred Hartman:* I was. I was in friendly Army territory, and I remember it like it was yesterday, because I had gone out for a run the night before to try to get my thoughts together for the presentation that I was giving to the Board the next day. There were three of us running for election at the time, Priscilla Glasow, Jackie Henningsen, and myself, and I really did not expect to be elected. I was nearing the end of my tenure on the Board, so I was expecting to rotate off the next day.

I was quite surprised to find out the next morning after the election that I had actually been elected President. I think that reinforced for me the need for a president-elect. There were a number of us on the Board—Brian McEnany, Chris Fossett, and perhaps Jerry Kotchka by that time, who was the President following me—who were strong advocates. A number of us had talked about the need to have a president-elect

so that you did not have that situation, and we were able to push that into place. And my interviewer, Bob Sheldon, is the first MORS President who enjoyed that.

*Bob Sheldon:* I was President from 1999 to 2000, so I was President-Elect from 1998 to 1999.

*Fred Hartman:* It took several years for that idea to take shape and get approved and implemented. I was trying to understand whether or not we were actually able to put that in place during the 1996–1997 timeframe, but it must’ve been Jerry who was able to do that the following year. You were notified—that was the election that followed in 1998.

*Bob Sheldon:* What else happened during your year as President of MORS?

*Fred Hartman:* It was exciting. We had some excellent meetings. We culminated in Quantico, the first meeting ever in Quantico. Lieutenant General Van Riper was a gracious host, and we had General Krulak, who was the Commandant of Marine Corps, as our keynote. The meeting I think went very well. We had great attendance, and the Marines were an excellent host, and I look forward to going back again in 2016.

*Bob Sheldon:* Your MORS friends will want you to document your sports injury at that MORSS.

*Fred Hartman:* The memory is not necessarily perfect from all my colleagues who were there. We had checked into the little hotel right at the intersection of Route 3 and I-95, and I had a nice room, which actually had a sitting room. In those days—we’re talking 1996, when being online and AOL were quite young. I was online, propped up doing some work in the bedroom part of the suite with the telephone modem. I had signed off, but my laptop was plugged into a telephone line when I heard the phone ringing out in the other room.

I got up and ran into the other room thinking it might be someone on the Board with a question for the following day. When I got into the other room it was dark except for the red light on the phone, and I tripped over a glass coffee table enroute. I was able to catch myself with my forearms, and in the process shattered the glass and fell through the table, and was very fortunate that I only had about a two-inch gash on my left forearm. It was one of those

moments when you say, “Okay, what do you do now?” So I called the front desk, and I asked them to have someone come over—because I had wrapped a towel around my arm, which was bleeding profusely—to take a look at it. They immediately called the emergency squad. I still don’t know who called and no one has “fessed up” to it to this day. But the emergency squad came, put me on a gurney, which I thought was totally overdone, and took me to Mary Washington Hospital in Fredericksburg.

That was the beginning of about a six-hour period, until 4:00 in the morning, before I was seen. After I was seen, I had some stitches in my arm and was sent on my way, so about 5:30 or 6:00 in the morning I went outside and hailed a taxi and got back to the room and got ready for our Board meeting. Of course, following the Board meeting was the Board of Directors dinner, so that was a very long day, and then the following day I was on the platform in the theater at Quantico.

Others in the Fellows group today recall General Krulak breaking the ice as he was beginning his presentation by pointing up in the far reaches of the theater balcony and saying that “I kissed my first girl right up there.” The story of course is that General Krulak’s father was also Commandant of the Marine Corps, and General Krulak had been born at Quantico, grew up largely at Quantico, and came back to serve there many times. It was obvious that he was welcoming us into his home.

*Bob Sheldon:* Anything else from that symposium that stands out in your mind?

*Fred Hartman:* Everything went very well, other than the fact that it was very hot, and there were considerable distances between some of the buildings where we had to do our sessions. I think it went very well.

During my President year we did have some excellent special meetings. One of them was down in Tampa, “Irregular Warfare, Urban Warfare, and General Zinni.” General Zinni was actually the sponsor who brought us down, and I believe at the time he may have still been a three-star. He was the Deputy at Central Command (CENTCOM). We got very strong support from both of the combatant commanders that were there: CENTCOM and Special Operations Command.

We had notable MORSians who were experts in the irregular warfare area, to include Dean Hartley, who had done excellent work. I left that meeting very convinced that this was a topic that we would be visiting again, and sure enough, that was only five years or so before 9/11. I became convinced, based on experience that had been gained by General Zinni in Serbia, that we were talking to the best person in that area that probably existed in the United States. He had a wide spectrum of experience in different roles, working with non-government organizations and volunteer organizations in trying to figure out how to do things and pick up the pieces. We had to learn to do it all over again less than ten years later.

*Bob Sheldon:* How was your relationship with the MORS sponsors that year?

*Fred Hartman:* Oh, very good. Having spent time in the Pentagon some years before, in the Army Chief of Staff's Office, Army PA&E, and DUSA(OR), I had maintained contacts, so I still knew most of the MORS sponsors. Of course, you get to know the sponsors over the years that you're serving as a Board member before you are promoted to President. Providing strong support, parallel to this going on, Jackie Henningsen was continuing to get promotions and move forward during that time as well.

*Bob Sheldon:* During your year as Immediate Past President, do you recall much from that year?

*Fred Hartman:* Jerry Kotchka was a lot of fun to work with, and he called on me as needed, and I think we were able to move forward from my tour to Denny Baer. I think Denny Baer would probably be the best judge of whether or not my tenure as Immediate Past President was successful with Jerry. He would probably say that Jerry was—I started to use the word “untrainable,” and that is not at all true. He was a man of his own will, with strong convictions, and extremely talented, as we still see him in our Fellows meetings every year.

*Bob Sheldon:* You were voted in as a Fellow in 2000. What was your reaction to that?

*Fred Hartman:* I was thrilled. Just as I didn't expect to be President, I did not expect to be a Fellow. The early Fellows were in fact absolute giants and superb analysts, and I could go

through a long list of living and departed Fellows that I admired and tried to emulate. To be part of that group was a great honor for me, and also made me feel very humble, because my experiences following NPS were largely delving into resource analysis, AoA, and data issues for acquisition and training applications.

I left the Army and went into industry, software development, M&S, but I didn't consider myself to be in the league of the great early MORS Fellows, analysts that I had known and worked with over the years.

*Bob Sheldon:* What's your more recent MORS involvement, or continued MORS involvement?

*Fred Hartman:* I continued working with special meetings. Annie Patenaude and I collaborated and co-chaired a Training Transformation meeting in the period that I was on my IPA. I think that went very well; the Training Transformation program as a whole went very well. I talked about some of that in a MORSS briefing yesterday. Most of the contributions to MORS have been working in the background in most recent years to try to mentor people and provide advice as I can, and do whatever I could.

*Bob Sheldon:* Any parting shots?

*Fred Hartman:* I probably should've said that in more recent years, in fact until this year, with exception of a gap year when we didn't know what was happening right after sequestration, I have continued to present papers in working groups or composite groups annually. It frequently would be two or more presentations at any given MORSS on different topics, and the more recent consistently had something to do with training issues. Sometimes they were specifically with training M&S programs. Sometimes they had to do with more of a report out to the training working group as to what we were doing in OSD joint training and how that would impact them in their jobs and their services.

Going back to the basics of OR, I feel like you need to be able to decompose a given problem into bite-size pieces, and try to understand the overall context of that in a macro system. There are many people in the years since 9/11 who have worked in the counterinsurgency, counterterrorism, irregular warfare,

and urban warfare areas. Those areas have not had, much to my surprise, an organized or accepted baseline from which to begin analysis. One of the ideas I had was to work with some of the bright cognitive behavior psychology kinds of people, and with those that have worked in that area of training at IDA, like Dexter Fletcher and John Morrison. My intent was to come up with identifiable cognitive behaviors that would be translatable into the

desired traits one would need as a military officer or commander as you were in reconstruction and different types of operations, much as we saw in Operation Iraqi Freedom and Operation Enduring Freedom.

*Bob Sheldon:* As a wrap-up question, one of the things we ask is what would be your advice to people new to MORS?

*Fred Hartman:* Get involved. Roll up your sleeves and enjoy yourself while you're doing it.