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Alfred S. Rhode Interview (MORS)

Rhode, Alfred S.

Military Operations Research Society (MORS) Oral History Project Interview of Alfred S. Rhode, FS

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MILITARY OPERATIONS RESEARCH HERITAGE ARTICLE

INTRODUCTION

Alfred S. Rhode, FS, served as Secretary and First Vice President of MORS in the mid-1970's.

MORS ORAL HISTORY

INTERVIEW WITH ALFRED S. RHODE, FS
October 11, 2003
Potomac, Maryland
BOB SHELDON, FS, INTERVIEWER

BOB SHELDON: Tell me where you were born and raised.

AL RHODE: I was born in Vienna in 1928 and lived in Vienna until the end of 1938. Hitler came into Vienna in March of 1938 and life started going downhill very quickly. Some of our family wound up in concentration camps. At that time, the British actually set up a program that would allow 10,000 children from Germany and Austria to come to England. A good friend of our family was the doctor who gave physicals to all the children from Vienna before they left. He told my parents about the opportunity and invited them to send me. This was a time when everyone tried anything to get out of Austria legally or illegally. An example was one of my father's brothers who tried to cross the border to Switzerland with his wife and 16-year-old son. The Swiss caught them and turned them over to the Gestapo and they wound up in a concentration camp where his wife and son were later killed and he survived the war at the Dachau Concentration camp. Although I was only ten years old, I knew what was happening. A few days later my mother took me aside and asked me if I were willing to go to England. Families with children had difficulties trying to cross borders illegally, and I knew that without me they would have a much easier time escaping. Of course, I also knew that it was possible that I might never see them again. With me gone, both my mother and father left individually. I left in December.

BOB SHELDON: How long after you left did your parents leave?

AL RHODE: My father left a couple of months after I left and my mother left about a month after that.

BOB SHELDON: In Vienna where you were raised, was that downtown Vienna?

AL RHODE: No. My father's business was in downtown Vienna and we lived walking distance from downtown. He could walk to work. I left at the end of December 1938 with the Kindertransport. There were 10,000 children who eventually went to England that way. Most of them never saw their parents again.

BOB SHELDON: Do you remember your schooling in Vienna?

AL RHODE: I went to grammar school in Vienna, which was four years. I was in my fourth year in March when the Germans marched in. The next year I was going to go to the Gymnasium which after eight years led to the University. However, Jews could no longer start at the Gymnasium. So in the fall, I started high school which I attended until I left in December.

BOB SHELDON: What kind of work did your father do?

AL RHODE: My father had a shoe business. He was an orthopedic shoemaker. A lot of WWI wounded veterans used to come to his store for special shoes. In November 1938 the business was taken away from him. The Gestapo walked in one day and said, "Give me your keys, take your coat, goodbye." That was it.

BOB SHELDON: That was before you left the country?

AL RHODE: That was before I left. I left in December and got to London right around the first of January. Within two weeks, a family who lived in the East End of London and who had a butcher store there took me into their home. They were the nicest people and treated me as a brother to their son who was a year older.

BOB SHELDON: Did you speak English?

AL RHODE: It was normal to take foreign languages. I had taken English once a week after school. You recognize words, but I could not really speak. I started school immediately, but since I could not speak, I started the first grade in London and within three months I was in fourth grade. This was 1939 and the war started in September. By that time my mother had come to England as a "domestic servant" and could not undertake anything else. England started to evacuate children from London and I too was evacuated. I wound up in Walpole St. Peters, which is in East Anglia. There the government placed us into homes. I was placed again into a butcher's home. I was very fortunate because they were again nice people. I've been very lucky. The people I lived with and dealt with were always lovely.

BOB SHELDON: A lot of allied bomber bases were in East Anglia. Were you near any of them?

AL RHODE: They were closer to the coast. I was more inland. I spent a year in

Walpole. By that time, my mother and I had papers to come to the United States. My mother was in London at that time. She had put an ad in the London newspapers. This was before the war. The British liked hiring Austrians. So my mother claimed that my father's business wasn't any good, and she had to go to work in Vienna. She was a housekeeper and she brought in certificates from cooking schools to show that she could keep house. A family hired her and brought her into London. But very specifically on her permit to come to England, it said for "domestic service only." So that's all she could do. Therefore I could never live with her. She had to be a domestic servant. I came back to London at the beginning of summer in 1940 and then we came to the United States in August 1940.

BOB SHELDON: Were you an only child?

AL RHODE: Yes. I was the only child. We had an approximate departure date, but never knew exactly when we would leave. The London Blitz had started and sailings were a military secret. We left in a blacked out ship in a convoy, and one of our convoy ships was sunk on the way. We were blacked out for three days. When we got beyond the submarine danger zone the lights were turned on.

BOB SHELDON: Did you see that ship sink?

AL RHODE: No. We heard it. We heard an explosion at night and we were told in the morning. We arrived in New York and went to Chicago, which is where some of my mother's family lived. We stayed in Chicago for three years. I went to school there until we decided to move to New York.

BOB SHELDON: That puts you up to high school. Then what?

AL RHODE: I went to CCNY, the City College of New York. I wound up valedictorian of the high school and I even had a partial scholarship, which I could not afford to use. CCNY was free, except for your books and lab fees. I had a job while I was in high school and I put some money away, which carried me through.

BOB SHELDON: What kind of job did you have in high school?

AL RHODE: I worked for a jeweler after school and in the summer. I was getting 50¢ an hour, which was great.

BOB SHELDON: What did you study?

AL RHODE: I studied civil engineering.

BOB SHELDON: What motivated you to study engineering?

AL RHODE: My mother decided I was going to be an engineer before I was born. I graduated in 1950 and applied to the government for a job. I was one of the few people in my class who was willing to go anywhere in the country. I was probably the first person in my graduating class to get a job. In 1950 the job situation for young engineers was such that if there was one job advertised in the *New York Times* on Sunday, we had a class reunion at that job on Monday.

Anyway, I had applied to the Bureau of Reclamation. And I wound up with what they called an internship and moved to California to the Central Valley Project. Within four weeks after graduation, I was in California.

BOB SHELDON: Was that a civil service job?

AL RHODE: Yes. It was a P1 position, which then became a GS5.

BOB SHELDON: What kind of engineering work did you do for them?

AL RHODE: It was an internship and you were rotated every three months. I started on construction inspection on the Delta-Mendota canal. I then moved to the Stockton Project Planning office. Three months later I was moved to the Surveys office where I helped to lay out Folsom Dam. During that year you were on probation. At the end of that period you could choose where you wanted to work if there was a vacancy in that section. I chose Project Planning and for a year I worked as a project planner.

BOB SHELDON: What kind of projects?

AL RHODE: One of the big projects was the Trinity Dam. We were doing the project planning. Our report went to Congress which appropriated the funds and the system was built.

BOB SHELDON: Where is the Trinity Dam located?

AL RHODE: Trinity Dam is between the state of Oregon and California. It is sort of on the border. It is really more than one dam. The dams that the Bureau of Reclamation built are for flood control, water supply, and power generation. The dams are on the Trinity River. I worked there for two years, but in the meantime the Korean War had been going on and I was eligible for the draft. I applied to the Air Force and I got a direct commission.

BOB SHELDON: Why the Air Force?

AL RHODE: I tried the Navy Civil Engineer Corps first, but the Navy had a requirement that you had to be 5'8' tall. So they turned me down. I was not 5'8'. So I applied to the Air Force. The Air Force didn't want you with glasses, but they waived that requirement because they wanted engineers. I took an exam and then met a board of officers and they recommended me for a direct commission as a First Lieutenant. Well, it turned out there were no vacancies for First Lieutenants. They did have a vacancy for a Second Lieutenant. I was sworn in at 12 noon on Friday and at 1:30 that afternoon I was supposed to go to the draft board to get my physical to be drafted. I took my commission and walked into the draft board and told them I was not available. The Air Force was great. I spent 2.5 years in active duty and five years as an active reservist. I was both an installations engineer and a transportation officer.

BOB SHELDON: Both of those?

AL RHODE: I went through the Air Force transportation school. It also got me interested in transportation. I went overseas to Thule, Greenland, which was both an Air Defense and a SAC [Strategic Air Command] base. One of the projects there was building the DEW [Defense Early Warning] Line. In addition to handling traffic in and out of the base, I had three C47s (DC 3) airplanes which were ski-equipped for arctic operation and I was responsible for supplying the DEW Line construction teams. I also volunteered to design the new officer's club at Thule. They were just building it, and I took the responsibility for laying it out. To do that, I had to come back to the States to buy the furniture and equipment for it. They gave me a purchase order for $100,000 and I went back to New York and spent it all.

BOB SHELDON: You exercised all your engineering skills.

AL RHODE: It was fun. I hired an interior decorator in New York. I still have the pictures of the completed job. They sent me the pictures after it was finished. I came back to the States after a year and was an installation engineer at Niagara Falls Air Force Base, which was an Air Defense Command base. One of the jobs when I was working on designing the officer's club was to lay out a small theater within the officer's club as a movie theater. To do that I came to the Army and Navy Motion Pictures Service in Washington. I spent a couple of days with them because they designed the layout for me. This gave me a chance to see Washington and I decided that when I get out of the service that I'm coming back. And that's what I did. I got off active duty on the 24th of August 1954, and on the 25th of August I was in Washington.

BOB SHELDON: What did you do in Washington?

AL RHODE: In Washington, I had re-employment rights to the government, because I was on military leave. I went to work for the Naval Research Lab as a civil engineer. The Naval Research Lab had a lot of projects going and I got into projects that had to do with civil engineering. In the meantime, I took the engineering registration exam and I became a registered engineer. At the same time, the head of the Naval Research Lab personnel office together with George Washington University set up a new program for a Master of Engineering Administration Degree. It was brand new in those days. It didn't exist before. I started that program at George Washington University at night. It took three years. While starting that program I looked around the government for other positions and I went to work for the Corps of Engineers. The Washington District used to be in Washington. Now, I understand it is in Baltimore.

BOB SHELDON: So you went from the Air Force to the Navy to the Army.

AL RHODE: Yes. There, we did a lot of civil works. For example, all the underground Pentagons or the equivalent of the underground offices. We were concerned at that time with nuclear attacks, and I designed a lot of the water supplies and sewer systems.

My boss had also come from the Bureau of Reclamation. I guess that's why he hired me. I also had to go to Camp David to set up a communications facility. Eisenhower was the President at that time. I had another project to make changes in the Detrick contaminated sewerage system. At that time, all they were doing were secret experiments. You had to get all kinds of shots. No matter where you went, you had to have a secret clearance.

BOB SHELDON: Did your academic background prepare you for that kind of work?

AL RHODE: I was a civil engineer and that's what you do. Everyday there was another project. It seemed that when you came to work, you turned around and were sent on another project. After a year a friend of mine applied to the Civil Aeronautics Administra-

tion (CAA) for a job. They needed engineers. The aviation industry was building up. This was 1995–56. My friend went to work for the CAA and asked me to come over. The move resulted in a promotion. I was brought in to work in the Special Projects Office. That office worked on international aviation. Jet aircraft were coming into operation and most airports around the world could not handle them. We had jet aircraft, but other countries really didn't. They needed longer runways. They needed better communication facilities. They needed better weather forecasting facilities. None of that existed. The special projects office was there to help. We had people in 35 countries. You name the country and we had Civil Aviation Assistance groups. We even helped to build the airport in Kandahar, Afghanistan.

BOB SHELDON: Was CAA a predecessor to the Federal Aviation Administration (FAA)?

AL RHODE: It actually became the FAA. But in those days it was CAA under the Commerce Department. The projects were funded under AID [the US Agency for International Development]. For example, every airport that was ever built in Vietnam before the Vietnam War was built during those days. That's why the military had all these airports when we moved in. We also installed UHF equipment for aircraft operation. VHF systems were used for commercial flights, but the military needed UHF. One of projects we built at that time was the ATK Airway (Ankara-Tehran-Karachi). Our spy planes needed air navigation facilities. In 1958 I became head of that office and ran it for about three years. During that time, the CAA became the FAA as an independent agency under Najeeb Halaby. Under Halaby the International Aviation Service was established and I was asked to transfer into it for Special Projects. I became the technical advisor to those 35 groups. By that time I also had my Master's degree and I was a registered engineer. Also I had started work toward a Ph.D. in Business Administration specializing in Transportation, Economics, Management, and Operations Research.

BOB SHELDON: What did you do for your Ph.D. thesis at GWU?

AL RHODE: How to set up and incorporate a consultant firm. Engineering firms could not be incorporated because a corporation could not be registered. I worked out a method that would allow incorporation. The scheme was never tried so I don't know if it would have worked.

BOB SHELDON: How did you first get acquainted with OR?

AL RHODE: When I was at George Washington University, I had an introductory course and it fascinated me. I could work out solutions to problems that in engineering were only trial and error. So I took some additional courses at the Department of Agriculture night school just to see what it was like. I was fascinated by it. I was an engineer and I wanted to mix the two disciplines into new concepts. I was also interested in economics and so my degree in business was going to be operations research, transportation, and logistics. American University, in those days, had a terrific transportation program. They had Dr. Fair as head of the Transportation Department, and also American University was the only school in this area offering a Ph.D. Also a lot of senior FAA people were teaching at American University in the transportation program. Dr. Fair had just worked for the Senate Commerce Committee on a major transportation study. He had also written a number of transportation books. At the time he was one of the top theoreticians in transportation.

BOB SHELDON: You were taking all these classes at night?

AL RHODE: Yes. In 1961 the Federal government started allowing federal employees to become Congressional Fellows. They started with allowing five federal employees. Most agencies submitted candidates and five winners were selected nationwide. It turned out that I was one of the five and became a Congressional Fellow and spent a year on the Hill. Half the time I was in the House Commerce Committee and half the time I was in Senate Commerce Committee.

BOB SHELDON: What did you do there?

AL RHODE: In those days committees had only three permanent counsels and I joined them and worked with them. The areas I worked on were primarily transportation and aviation. One of the areas was traffic accidents, and we passed the first bill which eventually led to the Highway Traffic Safety Administration. Then I went over to the Senate and worked for Senators Magnusen and Monrony. Monrony was the head of the Aviation Subcommittee. There I worked on aviation legislation. In fact, I was due to go back to the FAA and they actually wrote a letter, asking for me

to stay longer, because I was acting aviation counsel for a while. We wrote the legislation which set up the Communications Satellite Corporation (COMSAT). Bobby Kennedy came up to testify. I was one of his questioners. When I came back to FAA, the administrator who was Najeeb Halaby invited me to lunch and he and his executive assistant asked me to become the FAA Congressional Liaison officer for FAA. When the head of the agency calls you and you are a lowly GS-13, you usually jump. I turned him down in the most polite way I knew how. (***Laughter***) I was in the process of getting a Ph.D., and I was a professional, and I had seen what liaison officers do. To me they were high-priced office boys. I wanted to be in decision-making positions. I do not want to be just a carrier of the messages. From that day on my name was mud in the agency. Every time there was a vacancy that I could fill or a promotion in my division, it was never offered to me. I was just blackballed, as far as I could tell. So, I started looking around. In those days, FAA was right downtown next to the Washington monument. They were in tempos [temporary office buildings] and right next door was the Navy building. The whole block was Navy, and even the Assistant Secretary of the Navy had his office there. Franklin Roosevelt, when he was Secretary of the Navy, had his office there. For some reason, I had to go over there and there was a bridge across 17th street between the buildings so you could walk back and forth. I went across for something and I saw a position advertised for an Operations Research Analyst. Since I was not likely to get anywhere at FAA, this looked good. The position was in the Navy Supply Systems Command and was concerned with transportation and logistics and was in the Research and Development Branch of the Agency. I got the job and wound up as the head of the logistics research team. I ran that group for five years. We did the analyses for Admiral Rickover on repair parts to be carried on our nuclear submarines, the Naval Aircraft Material support, and many other logistics studies. We did studies on the Navy Stock Fund. How much money did we need? What's necessary? How do you determine requirements for naval support?

BOB SHELDON: Did you use some of your OR academic background?

AL RHODE: Oh, yes. We actually developed concepts in Inventory Theory. The techniques in those days were very rudimentary and we worked with people at the RAND Corporation developing approaches to physical inventory taking. The counts would never match the actual inventory. We did experiments to see what was the best way to control inventory. We also worked with George Washington University which had a Logistics Research group. We used a military essentiality code concept. You had to incorporate reliability concepts. We developed the Integrated Logistic Support concept which became ILS for short.

BOB SHELDON: Did you use a multi-echelon inventory system?

AL RHODE: Yes. All areas, which was the toughest problem. You know, you are talking about taking from the warehouse all the way down to the ship. We did research in that area. The military essentiality codes that I mentioned. We developed a material readiness index system. To see how ready a ship is, for example. We also went out in the field. I worked with a commander right after the Cuban Missile Crisis. Many of the destroyers at the base in Newport, Rhode Island, were not ready when they were ordered out during the Cuban Missile Crisis. They couldn't get underway because of lack of readiness. In Newport, we talked to all the skippers. It was an investigation to find out why they weren't ready. Why they couldn't get going. This is serious. The one time we needed those ships and they weren't ready.

BOB SHELDON: Did you pinpoint some specific problems?

AL RHODE: Yes. We developed approaches and it led to the military readiness reporting system. We became involved in the man-machine interface. When you designed systems, how do people interface with it? We worked with the Military Sealift Command on how to improve loading techniques. We tried helicopters. How the helicopter system can load a ship—systems.

BOB SHELDON: Were you able to apply what you were studying at American University?

AL RHODE: Yes. You are continually applying various techniques. By that time I had taken a lot of Operations Research. I felt very comfortable and enjoyed it a lot. Also, I was asked to teach at that time by some friends who I was working with. So for a year I taught at Southeastern University.

BOB SHELDON: Was this after you had your Ph.D.?

AL RHODE: No. This was while I was at the Supply Systems Command. During that time, I also took my Ph.D. comprehensives. I passed and thus got the ABD (All But Dissertation). I taught there for a year, one course in Operations Research and a couple of other courses. Another project in those days was the 3M system (Maintenance Material Management System). That was a Navy program. I was a member of the Navy research team. Basically, it was developing the studies, writing the requirements and then actually participating and going out to the depots. We also closed a couple of supply facilities while I was there. The supply system was cutting back in those days. I had to go out and evaluate them before closure. We were into almost anything. I started getting involved in MORS while I was in Supply Systems Command and worked very closely with most of the old people.

BOB SHELDON: What was the first year you went to a MORS symposium?

AL RHODE: Probably 1964. It was in Monterey at the Navy PG [Postgraduate] School. From the day I came into Supply Systems Command, I worked very closely with the PG School.

BOB SHELDON: Did you present a paper at your first MORS symposium?

AL RHODE: No. I didn't. I just went to become familiar with what was going on.

BOB SHELDON: Who invited you? Did anybody tell you to go?

AL RHODE: No. I just decided I should be involved in my profession. Before I left Supply Systems Command, I was nominated to the MORS Board. I started attending all the meetings and, at the same time, joined ORSA. I felt both organizations were important to me. The cross utilization, working back and forth with people who are in the same field, finding out what they were doing, how they were handling similar problems, was always very useful.

BOB SHELDON: Do you remember any of the briefings from your first MORS Symposium?

AL RHODE: Yes. It was on WWII. People fell asleep at it.

BOB SHELDON: But you stayed awake?

AL RHODE: Yes. The reason I am saying this is because I asked my wife to come with me. This was in the evening. They gave this lecture about the Pearl Harbor attack and what really happened, from the U. S. side. And my wife told me that half the people fell asleep.

BOB SHELDON: Your wife went with you to that first MORS Symposium?

AL RHODE: Yes. The first one I went to. I also used that as a visit to PRC (Planning Research Corporation) in Los Angeles when I was working with them. From Monterey I went down south to Los Angeles to meet with the president of PRC. CACI in those days was three people. They were Harry Markowitz, Dick Morey, and Herb Karr.

BOB SHELDON: Before they developed Simscript?

AL RHODE: They had already developed Simscript. And Herb Karr was the president. I was sitting in the office of the president of PRC. While there he received a telephone call and put his hand over the receiver and tells me this is Herb Karr calling. He wants to sell the company.

BOB SHELDON: You first came to MORS in about 1966. Did you attend regularly?

AL RHODE: Regularly. I made it a point with my boss who was the head of the Naval Supply System R&D.

BOB SHELDON: So you had been attending MORS about six or eight years when you got voted onto the Board?

AL RHODE: No. No. I got voted onto the Board in about 67 or 68. I was on the Board. I can't even remember all the jobs I had. I was Secretary for a couple of years. I moved up gradually to First Vice President and it was 99% that I was going to be the President. I just didn't feel that I should take on that position. I had left the government and no longer had a 70 hours schedule and I felt pretty good. I started becoming more active in ORSA. I went onto the executive board and wound up as Chairman-elect and Chairman of MAS (the Military Applications Section, which is now the Military Applications Society of INFORMS) for two years. From there, that continued me moving. During my tenure at MAS, we published about six monographs. I reviewed all the monographs before we published them. I was the one who laid out the subjects and invited various people to write them.

When I started out I was the Chairman of the Publications Committee. Something that has affected MORS was one of my activities as Chairman of the MORS Publications Committee. *PHALANX*, which is now a joint publication with MAS, used to be strictly a MAS publication. In 1973, the antagonism to the Vietnam war was really serious in ORSA. The Military

Applications Section was the biggest section and efforts started to be made to get rid of that "reactionary group." CNA (Center for Naval Analysis) was part of the University of Rochester. At some meeting at Rochester the anti-war people came in with someone dressed as Dr. Strangelove in a wheelchair, trying to get rid of CNA. Some of the ORSA people were of the same ilk. I was the Chairman of the Publications Committee of MORS. *PHALANX* was the publication of the Military Applications Section. I could see *PHALANX* going down the drain. So, I worked it out with ORSA and MORS that we would combine the publication and make it a joint pub. Here's the letter that I got from Clayton Thomas after I had done it. I obtained an editor, and we revamped it. For the first issue I had every copy in my house and sorted the shipping packages until we actually organized it to have it mailed from MORS as a joint publication. As the Chairman of the Publications Committee, I also published the first book of MORS.

I wound up as First Vice President, which was usually the step before becoming President. That was in 1975. We met in Annapolis. The next meeting was the meeting where a President would be elected. That meeting was in 1976 right after my heart attack and I was afraid to take on responsibilities because the doctor had scared the wits out of me. I was nominated for President, but I opted out. I continued working in MORS. I went to meetings and did make a series of presentations but no longer as a Board member.

BOB SHELDON: Do you remember any specific decisions made when you were an officer of MORS?

AL RHODE: Nothing very much that I can really think of. I participated continually in the meetings and everything that we did, but I don't think I did anything, except the publication, the newsletter, and areas that I felt that were important to the organization. Vance Wanner was the Executive Director during most of my participation.

BOB SHELDON: How did you find the MAS meetings as compared to the MORS meetings?

AL RHODE: I chaired a whole series of meetings, both in ORSA, in MAS and MORS. I really had no trouble getting people to participate. With so many years in the community I knew the people both in government and in the consulting firms and I could always count on many of them to come through.

BOB SHELDON: Was it the same folks in both MORS and MAS?

AL RHODE: Yes. I was part of this whole environment. When you are part of it, it was so simple. I'd get on the phone and ask so-and-so to give a talk. I can't remember ever having a problem. You can look through the past publications and it was no problem at all. I got involved in so many different areas.

BOB SHELDON: Getting back to your job at Supply Systems Command, did you work with any of the big names in logistics, for example, the Logistics Management Institute (LMI)?

AL RHODE: I worked with LMI and also worked with RAND. In addition to that, the Supply Systems Command sent me to MIT for a summer. I took a course in research and development management. It was a conceptual course and it is still being taught there. At that time I also met Clayton Thomas at another course that the office sent me to. I also used to lecture to foreign supply officers. They would come for training and I would lecture on research and development. That got me more interested in teaching and it worked out very nicely.

At that point, in about 1966, the Navy set up its systems analysis group. It was to be able to respond to the DOD Systems Analysis group which had been established by McNamara. All the services set up their own systems analysis group because they had no one trained to be able to respond to the "quiz kids." They would use OR techniques and the services had no idea how to respond. Clayton Thomas was in the Air Force, Admiral Bud Zumwalt set up the Navy's. Zumwalt hired me to handle support forces, manpower, and logistics. The Systems Analysis organization was broken up into warfare areas; surface, submarine, and air; and I handled warfare support across all areas.

I was hired in 1967, but it took six months for the Civil Service Commission to actually approve a super-grade candidate. Anyway, I became a super-grade. This was before the establishment of the SES [Senior Executive Service]. In January 1968 I moved into the Navy Systems Analysis organization.

BOB SHELDON: Was that in the Pentagon?

AL RHODE: Yes.

BOB SHELDON: How many people did they have doing systems analysis?

AL RHODE: About 100. We had about five or six branches. I had one branch. When I first started, it was just a few people. By the time we got through, we had built it up. The first job (1968) Admiral Zumwalt assigned to me was Diego Garcia. McNamara didn't want it. His analysts fought it tooth and nail. And we were looking at it from a logistics point of view. The need was so obvious. We developed the analyses and in the long run won the battle. Today we couldn't do without Diego Garcia.

From the time we started, it was an island with no capabilities until now it is a huge logistics and operational base. Another early study I got involved in right away was the Western Pacific Basin Study. We thought we were going to lose bases in the Western Pacific. So we did a study, base by base, and we had a large group of people from MIT and other organizations working on it. I was responsible for the Navy participation. How would we handle the loss of each individual base? What could you do? If you lost the Philippines, what do you do with the ships that are stationed there? Would you go somewhere else? Where would you station the ships? After we finished that study, the State Department started a similar study using the same analytical concepts and analyzed each of our world bases. All the services got involved in that. Another of the studies we initiated was a medical care study. The military started to be short of doctors. We began by looking at all locations where we utilized military doctors. We found that every submarine maintained a doctor on every deployment. Upon analyzing all cruises over about 20 years, we found that a doctor had only been needed once in 13 years. When we submitted our results to the CNO, a message went out removing physicians from all submarine deployments. I still have a copy of the message that the CNO sent out.

One of the things that I did when I first joined OPNAV with Admiral Zumwalt was cost analysis. Every study I looked at used different procedures. There was no independent cost analysis, or a standard methodology that everyone could accept. I discussed it with the Admiral. This was before he went to Vietnam. I felt that no cost comparisons could ever be performed. Zumwalt told me to look into it. I proceeded to discuss it with the DOD Systems Analysis. They had started a cost analysis operation in OSD. I reported back that we too needed to set up an independent cost analysis group. He agreed. For six months, I was it. Then I hired an analyst and he started doing independent cost analysis. Eventually we expanded the section and I hired Joe Kammerer to head the section. Joe had just completed his master's degree in Operations Research at Rochester. He built that group up a little bit each time, whenever we could get additional billets. Eventually that group got so big that I really felt we needed to break it off. I had enough to worry about and I didn't feel I could cover it all. So we discussed it with the Admiral and he agreed to break it off. Well, the independent cost analysis group is now a major office under the Assistant Secretary. In 1968 it was me part time and now it is a major organization under the Secretary of the Navy. You don't know what you are going to get into when you get started. Another major effort which we did jointly with the Navy and the Maritime Administration was the development of "Sea Shed." It was a project for the Deputy CNO for Logistics.

BOB SHELDON: What kind of study was this?

AL RHODE: This was a project to adapt container ships to carry large military equipment such as tanks. If you want to ship a tank, how do you use a container ship which is built to handle $8' \times 8' \times 20'$ containers? 90% of all of our cargo ships are container ships. We were first selected to do a study and we came up with a Sea Shed. This is a container about the size of three containers and slips into the container slots. It has a hinged roof which closes after it has been loaded and becomes a floor for the next level. With the Sea Sheds you can load large and heavy equipment with a crane and then you close the roof. This way oversized equipment such as trucks, tanks, etc. can be carried on existing container ships. You are able to load the ship quite rapidly and utilize container ships to transport military equipment. We were contracted to hire a Naval architect to design the Sea Sheds and then to select a small shipyard which would build four of the units. I was responsible for supervising the design and construction. At the completion of that we were hired to install the units on a ship and one of my top analysts boarded the ship and tested the units on a transatlantic voyage.

Another logistics project for OP04 was to solve one of the problems the military has in

landing in an unimproved port area when you must unload heavy equipment from ships but there are no materials handling facilities available. There again we were contracted by OP 04 to come up with a cost-effective solution. We studied the problem and recommended that we can adapt existing containerships so that they can carry their full load of cargo and act as a crane facility. We developed the requirements and then worked with the Naval architects to add the requisite offloading capability of ships moored alongside. The containership "President Monroe" was selected by the Naval Sea Systems Command to be converted and they did a feasibility study of the concept. Subsequently the ship was converted and I received the contract to actually test it. Recently I checked the internet and I understand that the Navy has 10 of these ships in inventory.

Another analysis we performed was on marine amphibious discharge operations. When Marines invade an area, they use lighters to get ashore. The problem is how quickly can they get ashore and how many lighters are needed on a ship. We did a simulation study to determine the quantity of lighters that are needed. Also we reversed the problem. If you are in charge of a landing and you have a limited number of boats, how long will it actually take if boats must be reused repeatedly? One was a planning simulation as to how many you need. The other one was, if I had X number, how do I do it? We did both simulations.

BOB SHELDON: What did you use for the objective function on the PCS study?

AL RHODE: Dollars. We minimized costs. We had the ratings of the personnel. Our problem was to determine the cost of each different rating in a move. How big is the family, what household goods are they moving? What's the average family size for each rating? What are you allowed to carry in personal goods and household goods? All of that had to be determined. We developed factors for each of the variables. The linear program was the easiest part of the analysis.

BOB SHELDON: Getting the data is the hard part?

AL RHODE: Pulling the data together was the most difficult. It was necessary to analyze the whole Navy manpower structure. Another fun project was a report on the Navy's Strategic Sealift Program. And this went to every Congressman and every Senator. It was a report that landed on their desks one morning in 1985. The report was a description with pictures of all major pieces of equipment and the major elements. We didn't know then that it would all be used in Desert Storm. This was a program with which I started to get involved in 1963 and carried through to 1990. Another problem with which I became involved was the hospital ships. Both ships which were used in both Persian Gulf wars were originally tankers which were purchased by the Navy and converted.

BOB SHELDON: What year did you finish your Ph.D.?

AL RHODE: Actually I took the comprehensive in the sixties, but I had problems with the dissertation. When I was on the Hill, the professor who was the head of my department came up to testify. I was asking the questions. I didn't mean to embarrass him and I had no idea that he couldn't answer some of them. The staff frequently prepares the questions at the hearings and you sit with your representative and you pass them on to a Congressman or to a Senator to ask the questions. And my professor could see me up on the dais. When I submitted my proposal, he absolutely refused to accept it. He made it so difficult that I finally had to go to the dean and get a whole new committee and chairman. The chairman of the new committee was Saul Gass who at the time was an adjunct professor at AU. I had worked with Saul a lot when he worked for Princeton. Originally, he was the head of the Washington office of Mathematica. Years ago, before he became a professor at University of Maryland, he was the head of the office and I had a contract with him. His boss was Oscar Morgenstern (the co-developer of Game Theory) who was at Princeton. One of the projects we worked on was an input/output model of the Navy operation.

BOB SHELDON: A Leontief Model?

AL RHODE: Yes. I worked with him on that. What we tried to do was to apply it to Navy budgeting. CNA eventually took the project over. And I don't know if they have ever done anything with it, but that was Morganstern and Saul Gass.

BOB SHELDON: What kind of thesis did you do?

AL RHODE: The thesis was the development of models determining the quantity of spare parts for commercial aircraft at their various terminals. When I started working for Zumwalt, I also started teaching at GW and I taught in the graduate school for seven years.

During all that time I was in OP 96 (the Navy Systems Analysis organization).

BOB SHELDON: What courses did you teach?

AL RHODE: I was teaching Ops Research, primarily for the master's program, but I also taught various personnel and manpower, logistics analyses and some economics courses.

BOB SHELDON: Since you taught that many years, I take it you enjoyed teaching?

AL RHODE: I enjoyed it a great deal. I would usually teach one or two courses a semester. It was always at night as an adjunct associate professor. Unfortunately I had a heart attack on the job in 1975. Doctors in those days felt that it had to do with your work and they insisted that I retire. My job was a 60–70 hours a week. I was there every Saturday. The heart attack also stopped me from teaching. When I retired the third time, I was asked to teach again and I taught for twelve years at George Mason University. There I taught Ops Research, Production and Operations Management, Logistics and just about any course in the decision sciences. I enjoyed it a lot. I also taught Production and Operations Management for one semester at Georgetown.

BOB SHELDON: Let's backtrack. Were you working for Admiral Zumwalt?

AL RHODE: Yes. When I first started out there, the two major studies were the Western Pacific Basin Study and Diego Garcia. The Western Pacific Basin Study was to determine how the Navy could handle its logistics if we were to lose our bases there. Diego Garcia was a battle between OSD (McNamara) and the Navy. Diego Garcia was a minimally inhabited island in the Indian Ocean and we really needed a good logistics base. The correspondence from OSD turned thumbs down and I was asked to make the case for the needs of a logistics base. History tells us we were successful in obtaining that base. Another item that came up in those days was the All-Volunteer Force and each service was involved in producing material. I worked together with the people from Mathematica. We did a very detailed study and eventually published a report. The study laid out, service by service, the number of people that could be obtained at different pay scales in an all-volunteer force. It looked at unemployment, salary levels in different parts of the country. The big problem was to ascertain how many men were true volunteers in the past. We provided salary vs. numbers curves for each service over the next three years.

I was told that our study was part of the evidence provided to Congress when the legislation for the All-Volunteer Force was being considered. I subsequently published a shortened version in the *Naval Logistics Quarterly*, which was a refereed journal. The editor, who was a friend of mine, told me that Ken Arrow was the referee.

BOB SHELDON: You did some regression analysis?

AL RHODE: More than that. We did a lot more than regression. But you can see, we actually came up with the salaries that had to be paid to people depending on how many you needed. We showed it service by service.

Military medical care was one of the studies that I did at OPNAV. I dealt with all three Surgeons General. One Surgeon General lived right down the street from me. One of the big problems in the military was the shortage of active duty doctors. At the same time Congress wanted to reduce the cost of medical care for military dependents. This was before they came up with Tri-Care. One way was to send the dependents to the military medical facilities because they thought it was a lot cheaper. I initiated a study with Boeing Computer Services to look at military medical care vs. civilian medical care. The Chief Scientist at OPNAV, who was also my direct boss, was Art Pennington. We both questioned what to do about medical. So when we got through doing a detailed study of the true costs, it turned out that the cost to the government was exactly the same whether you used military or civilian medical care. The reason Congress thought that it would be cheaper was because the way the government does its budgeting. They ignored the construction of hospitals, because of different budget items. They further ignored the cost of retirement of the doctors after 20 years because they considered strictly salaries. We went through a very detailed analysis and showed that the difference between the two in each case was about two cents per doctor visit. The results of that study also went to Congress, and that killed the idea of sending reservists, and particularly the retirees and their dependents to military medical care.

After I left the government, as a consultant, the group that I headed won one of three contracts for the Navy Recruiting Command. Our piece was how unemployment in different

parts of the country affects recruiting. The other contract was awarded to Duke University (Dick Morey) and another one was awarded to the Wharton School. The three groups, my group and the two universities together, developed an updated model for recruiting. The model itself was run at Duke. This work was done in the mid-eighties.

One of the studies that I did in OP96 with my branch was an analysis for the Air Force of tactical airlift. The problem was that delivery of critical parts overseas was always delayed and resulted in too much aircraft downtime. When we analyzed the problem, we found that the Air Force was using a linear program for shipping decisions which minimized cost. We changed it to a queuing model where we set waiting time for shipping not to exceed eight hours. The result took care of the problem.

I usually had about six or eight studies going at one time. One of the studies we were asked to do was to determine the number of tugs needed in every port. Do we buy the tugs, do we build the tugs, or do we lease them? And if we own the tugs do we man them with Naval personnel; do we man them with civilian contractors? Also if we lease the tugs do you use bare-boat charters or manned by contract? While I was in the Navy's Systems Analysis office, the Center for Naval Analysis did a test of manning a support ship with civilian union sailors rather than with Naval personnel.

BOB SHELDON: As an experiment?

AL RHODE: As an experiment at first. At the completion of the test we sent a team to report the results to the Commander of the Atlantic Fleet. The next morning there was a message from CINCLANT to the CNO saying don't you ever send any of those people to me again. I continued to keep working on the concept. Further analysis showed that by using civilian sailors on support ships you do not need to train new sailors every year; the ships can stay deployed the full year rather than coming home every three months, and the civilians are career personnel. Civilians only get paid when they are at sea. By the time I retired because of my heart attack, I continued as a consultant and wrote a whole series of studies on the concept. It turned out to be four volumes. The Navy submitted them to Congress and the Congressional Record refers to those studies. We now have something like 35 ships that are manned by civilians.

BOB SHELDON: Are they mostly non-combat vessels?

AL RHODE: Yes. Admiral Hughes, when he was the commander of support forces in the Atlantic, came back to Washington and told me that it was the best thing that happened to the fleet. The support ships that are built now are actually designed for manning by civilians.

BOB SHELDON: Do they give them more space?

AL RHODE: Yes. They get more space. But it really doesn't make much difference. The importance is the quality of the work plus the cost is a third of what it costs to man one with Naval personnel.

BOB SHELDON: Your study actually was used to make a decision?

AL RHODE: Major decisions. During the years that I was in the Pentagon, we prepared the CNO Program Analysis Memoranda which were briefed to the CNO Executive Council.

BOB SHELDON: The Five-Year Defense Plan?

AL RHODE: The Five-Year Defense Plan, and we wrote the policy statements for it. And actually reviewed everything and anything that anybody wanted. We had the authority to review all budget proposals. We then made the presentation to the Executive Council composed of the CNO and the 3 and 4 star Admirals. I had a third of the Navy's budget, which in those days was 35 billion dollars. My aim each year was to reduce the budget by $500 million through improvements in management.

BOB SHELDON: Did you present some of the technical results at MORS?

AL RHODE: Yes. We presented the civilian manning study and it turned out to be the top study at one conference. I also had the responsibility for the manpower in the Naval Reserve.

In manpower planning we did the requirements determination, that is, how many people do we need? How many pilots do we have to train every year to man all aircraft squadrons? We participated in developing the ship manning documents. Also the civilian manning which, of course, is a ship manning document. We analyzed the structure and total strength of the Navy. We participated in personnel planning, the cost, and losses, of personnel. We did analysis and projections to determine the loss rate and recruitment rate.

BOB SHELDON: Can you comment on any of the people working with you on those studies?

AL RHODE: Yes. The team I had in the office. I usually had three captains: an aviator, a submariner, and a surface warfare type. Usually three captains. Civilians were GS15s and 14s. Each one was really an expert analyst who was able to handle his or her area with very little help. All had Operations Research training. The officers were mostly PG school graduates. One of the officers wound up as Secretary of the Air Force years later. I had about 15 to 20 people. We had three secretaries, plus each team had its own secretary. With the way the budget year went we could usually count on being in the office late on Christmas Eve and New Year's. Most of the military heads of the Systems Analysis office, who were my bosses, wound up as CNOs or close to that position. (Carl Trost, Bud Zumwalt, Tom Hayward). One of the heads, Admiral Stansfield Turner, wound up as head of the CIA. The office was more or less the training ground for a lot of the admirals. Many had been involved at one time or another in Navy Systems Analysis.

BOB SHELDON: I guess that was the Navy's way of acknowledging that systems analysis was good training for senior leadership.

AL RHODE: Absolutely. You name the admirals and they were involved. I retired from the Systems Analysis organization in 1976, but at their request I stayed available as a contractor. The Navy proposed that I should move to Monterey as the head of the logistics department. That way I would still be a Navy employee and I could continue to work on various studies. I was not sure that with my health that I was up to such a move. They gave me an alternative suggestion. Since I had to continue to work, I could limit my hours with a consulting firm. I did that and both the CNO's office and ONR called me in on various problems.

BOB SHELDON: Which company was that?

AL RHODE: Information Spectrum Inc. We had 20 people when I joined. When I left we had 500. I understand now they have 900 and they were just sold.

BOB SHELDON: What kind of work did you do while you were with them?

AL RHODE: I continued on the same type of projects. The civilian manning studies, which I mentioned earlier, were done at the company. The Navy issued a contract to expand the civilian manning concept.

Another study that I did subsequent to joining Information Spectrum was a PCS (Permanent Change of Station). The Navy spends a huge amount of money, more so than the other services, on PCS because of the sea-shore rotation policies which the other services don't have. We developed a linear program which was provided to Congress because they wanted to cut the Navy's PCS money. One scheme they proposed was to move people in October instead of September. That way you cut the previous year's expenditure. That way you save money. When we showed them the bow wave effect of their proposal, they changed their mind.

BOB SHELDON: So that was your first retirement transition. What was your second retirement transition?

AL RHODE: The second time I retired in 1989 and actually it turned out at that time I had been very much involved in the Military Applications Section of ORSA. I was the Chairman of the Military Applications Section, which is now the Military Applications Society of INFORMS. Tom Gulledge was a member. Tom was teaching at George Mason and he was supposed to teach a summer course. He also had a contract which was going to keep him busy that summer, so that he didn't have the time to teach the course. He asked me to teach this course. I agreed. It was a basic OR course. So I said, "I've done it before, it was nothing new." I taught there one semester and before I knew it, I was an adjunct professor for 12 years. Last year, I decided I was getting too old and I stopped teaching.

BOB SHELDON: That's your third retirement?

AL RHODE: I'm in my third retirement.

BOB SHELDON: Since you have had an impact on some major decisions that were made in defense, what kind of advice would give to young analysts starting out in Operations Research?

AL RHODE: Take it seriously. Put yourself into your work. I was always 100% concerned with it. So much of the work you do eventually becomes useful. I spent a great deal of my career in developing concepts of strategic mobility. Suddenly with Desert Storm the work became extremely important and we were able to ship 6.5 million tons of cargo to the Gulf. Also seven days after the President declared the emergency we had Marines on shore with bullets in their guns. One thing I always did when I was with ISI, I let nothing out of the front door without reviewing it or discussing it

ahead of time. Before it went out, I wanted to see it. I always felt responsible. Also with the experience I had I could judge the impact more correctly.

BOB SHELDON: Let me go full circle on you. You were born and raised in Vienna. Have you gone back to visit your homeland?

AL RHODE: Once. I didn't like it. I went because I wanted to show my wife where I grew up. I showed her the grammar school that I went to. There was a plaque on the school fence. It said that this location was an assembly point for 40,000 people who went to their death in the gas chambers. I also showed her the apartment house where I lived. Around the corner from that house, there were two synagogues in 1939. All that was left were two plaques that indicated that synagogues were originally there. I went to Vienna because I wanted to see where I spent my first ten years. Once I saw, I was glad to get away. The thing is that I could understand what the people were saying. They didn't know that I understood. As far as they were concerned, we were some Americans. At first we went to a few local restaurants but I stopped going. We were staying at the Marriott hotel and we started eating all our meals there.