Interview with Hans Mark
August 4, 1999

Goldberg: This is an interview with Dr. Hans Mark, director of Defense Research and Engineering in the Office of the Secretary of Defense. This interview is being conducted in the Pentagon on August 4, 1999, at 10:00 a.m. Conducting the interview are Alfred Goldberg and Ronald Landa.

Dr. Mark, I would like to start by asking you to give us a brief recital of your educational background and professional career prior to 1977.

Mark: That will take half an hour at least, I just had my 70th birthday.

Goldberg: Brief is three minutes.

Landa: Just prior to 1977.

Mark: I came to this country in 1941 as a refugee from Europe. I went to public schools in New York, PS 92 in Brooklyn, and then Stuyvesant High School. In 1947, following graduation from high school, I got into the Naval Reserve midshipmen's program and went to the University of California in Berkeley. I spent three and a half years in Berkeley. I didn't stay the course in the midshipmen's school because in 1949 Louis Johnson decided that the Navy didn't need any more officers, so we were all told "Thank you very much." Thus, I was never on active duty. I did continue to work on things of interest to the Navy because I went to graduate school at MIT and there hooked up to a program sponsored by then-Captain Rickover on measuring neutron cross-sections for the structural components of the nuclear propulsion reactors for submarines. I got out of MIT with a Ph.D. in 1955 and went to work at the University of California's nuclear weapons laboratory at Livermore. I was there from 1955 to 1969 with a short break for a leave of absence at MIT. Then in

1969 I went to work at the NASA Ames Research Center, where I was director for eight and a half years. In 1977, I joined the Department of Defense as under secretary of the Air Force and director of the National Reconnaissance Office. When John Stetson left as secretary of the Air Force I took his place and was here until February 1981. I left the Pentagon in March 1981 and was picked up by the Reagan administration to become deputy administrator of NASA. I spent almost four years in that position. I moved to Texas in 1984 as chancellor of the University of Texas system. In 1992 when I left that position I joined the faculty at the University of Texas at Austin as a professor of aerospace engineering. I did that from 1992 to 1998. Since July 1998, I have been on a leave of absence from that position to serve again here in the Pentagon.

Goldberg: We are very much interested in your tenure as under secretary and secretary of the Air Force. What were the circumstances of your appointment as under secretary in 1977?

Mark: The connection came when Harold Brown became secretary of defense. I had known Harold since the 1940s; he was at the Bronx High School of Science and I was at Stuyvesant. We were on mathematics teams and things like that and Harold already had a reputation as child prodigy. I met him once or twice in 1943 or 1944. Then when I went to work at Livermore at the University of California Nuclear Weapons Laboratory, Harold was a division leader and interviewed me for a job in 1954 or 1955. In 1977 I think he wanted somebody who was not political and whom he had known for a long time. He'll probably tell you he made a terrible mistake bringing me to the Pentagon! Gene Fubini was the one who called me about the job. I never talked to Harold until I got here. Harold had Gene Fubini do a lot of the personnel work. I had known Gene for a long time, too.

Goldberg: Did you get to do much talking with him?

Mark: Yes, I did. I met Gene probably in the early 1960s.

Goldberg: He was a frequent presence here over the years.

Mark: He was a wonderful guy.

Goldberg: What were your major responsibilities as under secretary?

Mark: My major responsibility was to run the National Reconnaissance Office. The secondary responsibility was to see to it that the Air Force had a good space establishment, a good way of getting into space and organizing itself to do things in space. In the case of the National Reconnaissance Office we were very fortunate because President Carter wanted to do SALT II and wanted to get it through the Senate. I was able to persuade people at the State Department, including Spurgeon Keeny of the Arms Control and Disarmament Agency, that we would have to buy a lot of new satellites in order to do the monitoring and verification of the SALT II Treaty. We almost doubled our annual budget during my term as director of the NRO because of all the new things that we started. Those satellites are all still flying, so looking back on it; it was a satisfying thing to do.

In connection with space operations of the Air Force, I visited the North American Air Defense Command (NORAD) in 1977. General James Hill was the commander in chief of NORAD at the time. Dave Jones [Air Force Chief of Staff] was trying to shut down NORAD and both General Hill and I thought that this was a bad idea. Hill and I met in the office of the commandant of the Air Force Academy. In that meeting, sometime in 1977, we cooked up the notion that the Air Force ought to have the Space Command. General Hill then just pushed it through the Air Force establishment after some detours. One thing

led to another and we were both around and things happened. We had to build a facility to house the new command. Peterson AFB in Colorado Springs was the logical place. We also needed a satellite control center, which is now the Schriever Air Force Base. That was an interesting maneuver because the location of the satellite control facility wound up as a competition between Kirtland AFB and Colorado Springs. I preferred Colorado Springs because I wanted the Command near the Air Force Academy. I thought the intellectual atmosphere was important, and also the mountain was there. It was the logical place to put it. Senator Gary Hart was head of the Military Construction Subcommittee of the Senate Appropriations Committee. I called him and told him I wanted it at Colorado. I told him that Kirtland had lots of federal land there and they would say we didn't need to pay for the land. If he could get me a tract of a couple hundred acres free we could put it in Colorado. Two days later he got the deal cut, and that's why it's there. The Space Command wasn't established until 1982, after I left.

That was also an interesting story, because I moved over to NASA in 1981. When the director of the Jet Propulsion Laboratory resigned in 1982, I thought it would be a good idea to get Lew Allen to take the job. I had known Lew forever, too. I met him when he was a major at Los Alamos in 1958 or 1959 when we were both working on the Argus program. I persuaded him to become the next director of the Jet Propulsion Lab. This was on his retirement as Air Force Chief of Staff in 1982. Just before he retired I visited him and asked him to support the creation of the Space Command. He thought it was not a bad way to leave the military, and so he agreed. And that's how we got the Space Command. Jim Hill and Lew Allen made it happen.

Goldberg: The Air Force tried that 20 years earlier and got shot down.

Mark: Yes. I had two other priorities when I became secretary. One was to enhance air transport. We were losing bases overseas. We stretched the C-141 fleet and built 50 new C-5s and got the C-17 started. I made the recommendation for McDonnell-Douglas to build the C-17 but there was a delay in this program when the decision was made later on to build 50 more C-5's.

Goldberg: Given your background, you were obviously the point man in the secretary's office even when you were under secretary for technical matters, weapons systems, and all the rest.

Mark: We did Stealth, for example.

Goldberg: You were involved in a lot of it; you strongly supported the B-1.

Mark: And the B-2. I got into a big fight with Harold Brown and Bill Perry over that. I even wrote it up recently because the first time both the B-1 and the B-2 were used in combat was in Kosovo, so I sat down and wrote the history. Basically what happened was this: it was a fairly complicated argument. I had known about Stealth, because in 1970 Ben Rich and Kelly Johnson came to see me at Ames. Ben was Kelly's brilliant assistant. They came to see me with a funny looking airplane with corners on it. They wanted us to do wind tunnel tests. I told Kelly that I didn't think it would fly very well because it was designed according to Maxwell's equations rather than the Navier-Stokes equations. Kelly said if we hung a big enough engine on it it would fly. So we did the wind tunnel tests. We built two small stealth airplanes between 1970 and the time I got to the Pentagon in 1977. Probably around 1978 Bill Perry called me and said to come down to his office, he wanted to show me something. He said it was "super-duper, destroy before reading, secret". He told me about "stealth" and I told him I knew all about it. He asked me where was the leak

and I said we had done the testing at Ames long ago and it was done in the open, before we knew if it would work. We did the F-117 and I was very strongly in support of that program.

The next question was should we build a stealth bomber, and the answer was yes. The argument I had with Bill was over which one. Lockheed had the concept, basically a large F-117. Their view was that we knew it worked and they wanted to build a larger one and call it the bomber. They would need more tankers because the airplane had a very low Lift to Drag ratio, as long-range airplanes go. They said they would do it for us by 1985-86 and that was the point. The other stealth concept was Jack Northrop's old "flying wing."

Goldberg: I remember seeing that fly over Washington.

Mark: You remember the XB-49? We built two of them, one with jet engines and one with turboprops, and both of them crashed. By 1977 or 1978 we had done fly-by-wire systems so we could build unstable airplanes and fly them, like the F-16, which is unstable. I advocated the Northrop version. The trouble with that was that it couldn't be deployed until the '90s and Perry and Brown wanted something sooner. My advice to them was to build the B-1 because they were not going to get a stealth airplane they could afford without building a lot more tankers. I also had another problem with it--that a large airplane had to be flexible. If you build an airplane whose radar cross-section is made small by the facets of design, when it bends it defeats the purpose of the facets. We had this technical argument. I finally went a bit off the reservation and went to some of my Air Force friends and asked for their help getting the B-1 program going again. Gene Fubini was aware of

everything I did, so Harold knew what I was doing. He didn't fire me, so I am guessing that he coppered his bets.

Goldberg: When you say your Air Force friends, whom do you mean?

Mark: Generals Tom Stafford and Kelly Burke, the men who were in the research and development shop.

Goldberg: People in uniform.

Mark: Yes. We promoted the B-1 successfully. There was a blip because in early 1981. Perry persuaded Mr. Weinberger, who had become secretary of defense, that they could skip the B-1 and go to the B-2 directly. That was in 1981. Tom Reed and I mobilized all the former secretaries of the Air Force to lobby Congress to pass the B-1. Finally it was done, and we deployed it in 1985. I was at Reese AFB when General Benny Davis flew the first B-1 to that base where they would be bedded down. Of course, I also pushed the B-2 very hard, the Northrop version of the airplane, which I thought was the right way to go. The new secretary of the Air Force, Verne Orr, who assumed office in 1981, decided to go with that on our advice. That was very controversial. During the1980s there were several attempts to shut the B-2 program down, and I wrote newspaper columns about this issue. The most amusing thing was that the New York Times carried an article, "Shut Down the B-2." They always wanted to shut down every thing we tried to build! I wrote a letter to them saying that shutting down the B-2 program was a bad idea and they refused to print that letter. I called Bill Perry and said if he signed the letter with me they would print it, so he did and he also got Toni Chayes to sign it. So the Times did print it. Finally, on the B-2, just as the debate was going on in 1992 about how many we should build, I wrote a column for the Dallas Morning News about how we needed 100 or more. We

distributed all these articles to members of Congress. Unfortunately in 1997 we failed, so we are still sitting here with too few bombers.

Goldberg: They are still kicking that around. What about cruise missiles?

Mark: I had an argument with Perry over that, also. The argument hinged on how we managed the program. I didn't think it should be managed out of OSD, so the Joint Cruise Missile Project Office, JCMP or "Jicampoo" it was called at the time, headed by Admiral Walt Locke, ran it. With Perry I had a long argument, which I finally won, basically having to do with a cruise missile fired out of a torpedo tube having to look different from one carried on a bomb rack on a B-52. I guess when I was secretary I got to select Boeing to build the air launch cruise missile. I remember the press conference we had. I was a very strong supporter of the program, it was a very good idea, but I argued with the way we were managing it. It was wrong to manage it out of OSD.

There is another story connected with that. In early 1984 Mr. Weinberger wanted me to run the SDIO and I had the same argument with him in the very beginning. I was deputy administrator of NASA and talked to Mr. Weinberger three or four times. I said I would be happy to come over if he made me the special assistant to the secretary of the Air Force and made the secretary the director of the program. He had procurement authority, the authority to make deals with the other services, and I would run it for him. Mr. Weinberger said he could not do that, that politically the program had to report to him. We debated it back and forth and I said that at the very least, if he ran it out of OSD, he should put a general in charge. That's how Jim Abrahamson got the job. He was working for me at the time, running the space shuttle program at NASA. I told him there was something more important for him to do.

Goldberg: Why did you turn down Mr. Weinberger's offer to work for him?

Mark: It wouldn't work.

Goldberg: Did it work?

Mark: No.

Goldberg: Would it have worked the other way, technically as well as otherwise?

Mark: It would have been far better and we would be ahead technically now.

Landa: How about politically?

Mark: I can give you a copy of the letter I wrote to Mr. Weinberger presenting the argument.

Goldberg: We would be pleased to have it as a basic historical source.

Mark: I basically told him that by doing it the way he intended he would heighten the profile to the point where his head would be shot off by the large number of vigorous opponents. It should be a regular Air Force procurement along with fifty other things and he ought to do it right with someone in charge who knows how to do those things. I frankly came to the conclusion that they were doing a political program and not something they really wanted to make work. That was not my game. I like to make things that worked.

Goldberg: It was too high a profile to put down under the secretary of the Air Force.

Mark: Yes, but the trouble was that this is what prevented it from becoming a program that was serious in an engineering sense. The resources were not properly mobilized.

Goldberg: There were always a lot of doubts about it from the very beginning and a great deal of criticism.

Mark: I never had any doubt that we could make it work. We just did a test yesterday. We could have done that five or ten years ago if we had managed it as an engineering project rather than as a propaganda project.

Goldberg: Its proponents would proclaim that the propaganda worked. They have been claiming it ever since.

Mark: I suspect that also may be true. It is not inconsistent with doing it that way. The main point is that we are now much closer to having a defense against ballistic missiles that works.

Goldberg: Harold Brown doesn't think that it was the chief reason that the Soviets went under.

Mark: It was one of the reasons. They obviously went under for a number of reasons. The importance of the SDI was that Gorbachev thought it much more important than it really was. So the Reykjavik summit, where Reagan just said "No," bless him, when Gorbachev wanted him to shut down SDI, was a triggering event. But there were a lot of other things. I think the really important thing that happened was that the Soviets themselves lost confidence in their own system, because they never believed we would not only last as long as we did but also have the staying power to sit and fight them, in shooting wars if necessary, and in other ways. Harold is right on that score, it was a cumulative thing, and SDI was one of many items. However, it was the one I was working on so it was important to me.

Goldberg: They came to recognize that the real contradictions were in their own system rather than ours. It took a long time, but they got there.

What were the circumstances of your appointment as secretary? We want to talk about these matters whether you were under secretary or secretary, doing a lot of the same things in both jobs. When Stetson left and you were appointed secretary, was there any question about that?

Mark: Not that I know about.

Goldberg: It was just a normal progression?

Mark: I wrote a little note to Harold saying I would prefer to stay as under secretary because I thought the NRO was more important than anything I could do as secretary.

Goldberg: That's what Pete Aldridge thought, too.

Mark: I suggested somebody here in the building and gave him a couple of names, but he called me up a week later to give me the job. I said, "Yes, sir." I stayed on as the head of the NRO for a few months. Then Bob Hermann came in to take over.

Goldberg: Did you experience any change in your outlook from under secretary to secretary?

Mark: Probably not.

Goldberg: You encountered a lot of other issues and problems. The budget is always with us, and always a major problem. During the Carter administration it got a lot of attention because of proposed cuts.

Mark: Actually, we did very well, because the Russian invasion of Afghanistan broke it loose. I was acting secretary in April 1979 and wasn't confirmed for a couple of months. I served until March 1981, almost two years. I lined up the priorities, mainly the bomber, the air transport, and the space command, those three things I pushed. In September I made a speech to the Air Force Association where I said that. I can give you a copy of that

speech. I tried to do those three things for the next two years. One was related very much to the NRO, so I added air transport and bombers to the list.

Goldberg: What was your view, at the time, of the talk about the military being a hollow force? It especially applied to the Army but presumably it had some relationship to the other services also. Did you think the military was really a hollow force?

Mark: I don't ever remember hearing that term in the Carter administration.

Goldberg: It was being used. General Meyer had come in in 1979 as chief of staff of the Army. Did you feel the Air Force was a hollow force?

Mark: No, anything but. We were fielding the F-15 and F-16; we were really going great guns. I had a lot to do with both of those airplanes.

Goldberg: In assigning priorities, in allocating funds, where did you put your priority--on force structure, modernization, readiness? You had all of them confronting you and had to make choices. What was your feeling about it? You did make remarks about readiness during this time. Of course, you were for modernization.

Mark: The budget priorities I had were the bombers and things like GPS [global positioning system]. I stuck GPS into the Air Force budget four years running over much opposition. When I was secretary I refused to sign off on the budget unless GPS was in it. That is about the only power that the secretary has over the budget. Allen didn't feel like arguing with Harold to win that one, so the GPS was in the budget. There was support for space systems like the Schriever facility and the bombers.

Goldberg: What about force structure and readiness?

Mark: And the transports, also. We did budget for stretching the C-141s, for instance. The Air Force doesn't really have the kind of "readiness problems" that others have, and

so I never worried much about it. The air forces have to deploy quickly and did, and so I certainly never put that specifically on the same list with the other things.

Goldberg: What about force structure, the size of the force? I ask the question because Harold Brown told us that of the three, the services usually put readiness last and generally go to force structure and modernization. The readiness they figure they can take care of later on, but they want to have the forces and the weapons for them.

Mark: That's about right. I would say that the Air Force is a special case in terms of readiness because it is easier for them to maintain readiness than it is for the Navy or the Army. In the case of the Air Force, the officer corps goes to war, they are the ones who shoot. The officer corps are pros and are ready by definition. Then there are issues of maintenance, logistics, etc., and the truth is that it is an easier job for the Air Force to do those than for the other services.

Goldberg: The Navy air people are usually only the officer corps and they represent an elite also.

Mark: Yes, but they depend on aircraft carriers, and there's a problem if the crew is short, and they have a much longer logistics tail.

Goldberg: The Air Force has to rely on airfields abroad.

Mark: We've figured out a way to beat that--the B-2 deployed out of Missouri.

Landa: Just one big airfield.

Goldberg: Given your experience at NASA, it was natural that you would want to handle space matters for Defense, and you did, presumably. What was the outcome of that? What about the satellites? The space shuttle?

Mark: The first thing I did was to get Harold to sign a paper saying that the Air Force is the executive agent for space in the Defense Department. That's been kind of diluted now, but it certainly was important then. The satellite systems we created are still working, they are still there; I guess they are still classified so I can't talk about them, but in the Gulf War they were decisive. That's the best way I can say it. The truth is that not much has happened since that is really new. Part of the reason is the Challenger accident. I tried to get the Air Force to adopt the shuttle as a launch vehicle and build a launch facility on the West Coast. It was like pushing a noodle up a hill. Neither NASA nor the Air Force wanted to collaborate. NASA didn't want to have a connection with the military, or to accommodate military payloads. They did everything they could in Houston to frustrate the military. The military didn't want it because they wanted to control their own launch vehicles. The correct solution was, I think, to build a few shuttles for the military, and I tried, but failed.

Goldberg: So they were made dependent on NASA.

Mark: It was the dependence on NASA that killed it. When I moved over to NASA I made myself terribly unpopular by forcing NASA to have the Air Force mission support element at Houston, and we built their classified mission control center for the shuttle. We actually flew a few flights. As long as Verne Orr was secretary I was able to prevail on that, but Pete Aldridge was bitterly opposed to that whole thing. I fought with Pete over Verne's policies for a long time. The Challenger accident, then, sealed the fate of the whole idea of working with NASA. It is interesting--when Pete realized that he wasn't getting anywhere with Verne, he came to me and asked to fly on the shuttle.

Goldberg: He didn't get to do it.

Mark: No, because of the Challenger accident. I had a couple of shuttle models painted blue with Air Force markings on them on my conference table when I was secretary, much to the chagrin of the Air Force folks. You remember Abbott Greenleaf? He was one of the smartest men in the Air Force. He came in and looked at the model and asked if it was a Polish bomber. I asked him what he was talking about. He said it had the bomb bay doors on the top and flew upside down. The argument over the launch vehicles was a big one. And the Air Force since then has stunted itself. They adopted the EELV, an expendable launch vehicle, with a Russian engine, and it is not as capable as the Titan IV. They did that primarily to avoid having to use NASA technology for their launch vehicle. It is a mess.

Goldberg: Everybody knows that the real war in Washington has always been between the services, not with the Soviets.

Mark: I lost that one and Pete prevailed, much to my chagrin. The Challenger accident gave them the excuse to get off the shuttle entirely. Now I am pushing slowly to get them back on the shuttle. Of course, Jack Dailey sitting over at NASA makes all the difference. We didn't have someone with that influence over there on my watch.

Goldberg: Were you involved with any of the NATO issues?

Mark: No.

Goldberg: Not at all, on the Pershing?

Mark: I was gone by then.

Goldberg: There was some discussion on it before then. The decision came right afterward.

Mark: I stayed away from that. I didn't know much about it.

Goldberg: How about the neutron bomb?

Mark: That was before the Pershing, I think.

Goldberg: Also before.

Mark: I knew about the neutron bomb when I was at Livermore, in the 1960s. I never had much use for it.

Goldberg: Do you think Sam Cohen, the Rand physicist, was really the man who did? He claims to be the father of the neutron bomb.

Mark: I never heard of him. I know we worried about how to enhance neutron yields and X-ray yields. But I left Livermore in 1969 because they began to worry about how many angels can dance on the head of a pin. Nuclear bombs make a big bang, a big pressure wave, a heat pulse, and kill people. I found it not useful to try to do anything that requires refinements such as neutron or X-ray enhancements.

Goldberg: Did the Russians ever use them for other purposes? There was talk about using nuclear devices for huge construction projects.

Mark: Yes, and they surely could be done. We thought about this as well. There were even plans to build a sea-level.

Goldberg: Did you have any connection at all with Desert One, the Iran hostage situation?

Mark: Let me tell you the story there. I think Charlie Gabriel was the deputy chief of staff for operations in the Air Force in December 1979--maybe it was still Andy Anderson. The hostages were taken around Thanksgiving, if I remember correctly. Charlie came in to see me at one of the regular weekly briefings. He said, " We're going to go rescue them." I said, "Fine, that's the right thing to do." Then he talked to me about the plan, which had to do with having helicopters coming in from aircraft carriers in the Arabian Sea and C-130s

from Egypt meeting in Iran somewhere and then going for the hostages in Teheran. I told him I didn't think that would work. The problem was with the helicopters. Ames is the helicopter center at NASA, so I had some experience with that. In fact, during the height of the Vietnam War in the early '70s we were losing more helicopters in Vietnam to failures than to battle damage. We did a lot of work with the Army at Ames on how to prevent that. So I said if they wanted six helicopters in working order at Desert One, and were only flying eight, I could predict that they would not make it but lose a couple on the way. I told him about our experience in Vietnam with respect to these statistics. Then I heard nothing more about it and figured they had dropped the idea and had taken my advice. One of the things I did was to talk about it, as I didn't think anything was classified about it. Between my conversation with Charlie Gabriel and Desert One I had a couple of newspaper interviews. I was at Keesler Air Force Base in Biloxi, Mississippi for a speech, and after my talk a young lady reporter asked me what we were going to do about the hostages. I gave her the spiel about the president's policy of negotiation and that I supported that approach. Then she asked about going in with helicopters and picking them up. I said that had been considered but rejected. This story appeared in the local Biloxi paper. So about two or three days before they went into Desert One Harold called all the service secretaries in for a briefing and told everyone the plans. I told Harold that I had advised Charlie Gabriel months before that it would never work, and that I had talked about it publicly.

Goldberg: That hadn't been picked up?

Mark: Yes, the Pentagon public relations people did pick up the story. Harold said it was great cover. So I was the inadvertent cover. As you know, we didn't get six airplanes

there, only five. We had a direct communications link for the White House and Carter called off the mission. The final part of the story is that I got to know Charlie Beckwith slightly when he retired in Texas. He was the commander at Desert One.

Goldberg: "Chargin' Charlie?"

Mark: I had on an occasion to ask him what he would have done if he hadn't had his communication link to the White House. He said he would have gotten as many people out as he could with what we had. One reason I have problems with the way we use our communications capability is that it sometimes tends to prevent smart people on the ground who know the business from doing what has to be done. I think he would have gotten some people out. It would have been a victory to have rescued 10 out of those 50 people.

Goldberg: Everything has been centralized. If you talk with State Department people overseas, they say they don't have any powers at all. Everything is done back here in Washington because of the instant communications.

Mark: We did it to ourselves. The transparent communications system we have came out of the nuclear weapons business, because the law is written in such a way that we have to have it, and that is appropriate. However, in other situations, supreme commanders should exercise self-control and let the people go ahead. It's another of my unpopular views.

Goldberg: Were you involved in Afghanistan in any particular way?

Mark: 1979. Sure, I used it to get the B-1 going again.

Goldberg: Anything else?

Mark: No.

Goldberg: When you came into office, what was your view of the Soviet threat?

Mark: Remember, I'm a refugee from Europe. There were two big political evils in this century, one was fascism, and one was communism. I was a super cold warrior and had been shot at by the Nazis and members of my family fled Russia after the communist coup d'etat in 1917, so I had no use for either of them.

Goldberg: You felt that the threat was very evident and had to be coped with?

Mark: No question. Both facism and communism had to be killed. There was no doubt about that in my mind. I breathed a sigh of relief when Ronald Reagan came into office because he said that the Soviet Union was an "evil empire" and we had to kill it. But I'm not here because of my political views. I'm here because people sometimes listen to me about technology. They would never have hired me if I had been involved in politics under Carter, and even today, I think.

Goldberg: What was your view of the incidence of interservice rivalry and competition during the time you were serving as under secretary and secretary?

Mark: First, I think there are strong and legitimate arguments for having separate military services. Both the functions and the traditions on which they are built are different. If you are going to go out and get shot at, traditions are very important. To minimize that is a real mistake. I think interservice rivalry is very useful and if the people in OSD have the intelligence to use it then the results are really awesome. By and large, we have used it; the people sitting in OSD have been smart enough to take advantage of it. Every once in a while you have to sit on one of the services and remind them we do not have infinite money. But my current boss, Jack Gansler, is a master at doing that and he does it well. In the BMDO [Ballistic Missile Defense Organization] right now we have a rivalry going

between the Army and the Navy on the theater missile defense program. That's fine. I don't have any problem with that. I know that a lot of people do a lot of hand-wringing over that, but I don't. I use it whenever I can.

Goldberg: What is your view of the proper relationship between OSD and the services? This has been a problem for 50 years now and will continue to be, no doubt. People have very strong views on the subject.

Mark: My instinct is to strengthen the services. The function that OSD performs tends to be important when budgets are tight, but not otherwise. In war, OSD contributes little to the effort and the military commanders-in-chief have the action. That is, the services then collaborate, they have always done that. I don't think that OSD ought to be big, but it's obviously important politically. We have, in fact, substantially reduced the number of people in OSD in this administration. The all-important function of the secretary of defense is to select the top military leaders, the chiefs of the services and our commanders-in-chief around the world.

Goldberg: But in recent years the services have complained very strongly and bitterly about the excessive role that the civilians, meaning OSD and the White House, are playing in making decisions about military operations.

Mark: I'm afraid that on that score I have to agree with the civilians, but you don't need a big staff to do what the civilian should do. What you need is a thorough realization that in the end military actions serve a political purpose and therefore the political leadership has the say-so. By and large, the senior military people believe that. We don't have a very real problem there. Every once in a while someone like General Singlaub comes along and there is some dissension, but the system is pretty good at weeding them out. I want to

see strong military services and a small OSD with relatively few functions that are well defined and performed. We ran a reduction in force when Secretary Cohen came in with his Defense Reform Initiative (DRI). Instead of just cutting back each of the organizations in DDR&E we wanted to eliminate one and strengthen others. We did just that. What were the criteria? We eliminated an outfit called Test System Engineering and Evaluation. We had the Office of Testing and Evaluation in DoD that is a statutory organization and we had the service testing operations, why did we need another one? So I wanted to do away with it. There were screams and moans, but we did it, and reduced our organization by 30 people.

Goldberg: So one of the key functions that you would retain overall is A&T, acquisition and technology. Do you consider that an important function for OSD to have?

Mark: No, let me be clear. The acquisition and technology function in OSD is not a management line function. The services are the people who do both technology and acquisition. Our job is to "oversee" that. It has taken me a while to learn what that means. It really means to manage by exception, to adjudicate disputes, but not to muck with it. There are service agencies or defense agencies, and I am not one who has much use for defense agencies. I was offered the job of heading one of them and turned it down. I don't think outfits like the Defense Logistics Agency do a lot of good.

Goldberg: How about ARPA?

Mark: That is a special case. It's small, and that is very different. It doesn't muck very much with the services and doesn't interfere with legitimate functions of the services.

Goldberg: It performs an important technical function.

Mark: Yes, a very important technical function.

Goldberg: How did you feel about the Goldwater-Nichols Act, which presumably increased the functions and powers at the upper levels, especially the Joint Chiefs of Staff, but to a certain extent OSD also?

Mark: I was here both before and after Goldwater-Nichols. A good thing is that the commanders in chief around the world now have a role in the budget process.

Goldberg: Secretary Weinberger claimed that they did before, too, under him.

Mark: Different secretaries have different relationships with the commanders in chief. But now there is a statute that says they have a strong voice, and I think that's all to the good. The weakening of the services is not good, so it's a mixed bag, in my judgment.

Goldberg: You think the services have really been weakened?

Mark: The service secretaries have certainly been weakened, and the chiefs of staff have been weakened compared to the commanders in chief, so at the upper level, the services have been weakened, yes.

Goldberg: Interesting. I had a conversation with General Krulak, the Marine commandant, and put this to him the same way. He said no, that in his case a lot of the unified commanders come to him first before they go to the Joint Chiefs or elsewhere. On the other hand, others have told me they have indeed been hurt.

Mark: It's a mixed bag. I think that there are too many civilians in the Pentagon, and that is true of the services as well as OSD.

Goldberg: You had an ally on that. Graham Claytor felt the same way on this issue, and he saw it from both sides. Were you involved in base closings?

Mark: Of course. That's a perennial. The best story I can tell you there is that Harold Brown asked me to close four bases when I was secretary: Loring AFB in Maine,

Rickenbacker in Ohio, Goodfellow in Texas, and Blytheville in Arkansas. I had just gotten the job as secretary and so I saluted and said, "Yes, sir." I started working with the Hill. I went to see Senator Muskie and he said, "No way, no how are you going to close this base in Maine, Arostook County depends on it."

Goldberg: Loring Air Force Base and potatoes is what they had up there.

Mark: Something like that; I was a loser from the beginning on that one because of Senator Muskie's influence. Then I went to see Senator Bumpers of Arkansas. He had no use for Defense at all, but when it came to that base he went after me. So that one was not shut down either. Rickenbacker Air Force Base actually was shut down because the people in Columbus wanted it as a civilian airport, so that one was easy. I went to see John Glenn, an old friend of mine from NASA days, and his first reaction was, "You can't do that to me." But the people had a plan so it was all right. I went to see Senator Tower about Goodfellow. He said they had a lot of AF bases in Texas so maybe it was not a bad idea. I did not know him at the time and so I went along with him when he said, "Sure." I also expressed my sincere thanks to Senator Tower. A few days later I got a call from Harold, who said there was an intelligence school at Fort Devens in Massachusetts and he thought I should transfer that to Goodfellow AFB. I said, "It looks to me like John Tower has gotten to you." And he said, "Yes, he doesn't screw around with little guys like you, he goes directly to the top." So we transferred the intelligence school to Goodfellow and it is still there. Recently we shut down Bergstrom Air Force Base in Austin. It was a nice base and is an even nicer civilian airport now. It was somewhat the same situation as Columbus, Austin needed a new airport and the community support to move.

Goldberg: Did you get involved in the SALT treaty much?

Mark: Through the NRO I did. I used to go up to the Hill with [Admiral Bobby] Inman to testify on whether we could monitor and verify the SALT II treaty. (Inman headed the NSA at the time.) The encryption of telemetry was a big issue. John Glenn was on the Senate Foreign Relations Committee at the time and Inman and I would testify in closed hearings. John Glenn was bitterly opposed to SALT II for some reason. Usually the hearings were short and Inman did most of the talking. I didn't know much about the issues except when it came to one particular satellite. John was not so much on top of the policy part of it but he knew the technology, so we always wound up in a colloquy and everybody else would be sitting there with glazed eyes. At the hearing, John brought in scrolls of telemetry records and taped them to the wall. He said to me that since I knew how to read the encryptions could I tell him what a particular signal on the tape was. I said, "That's probably noise." He asked me how I knew, and I said I didn't know for sure. Pretty soon, one senator after another walked out of the hearing. I had fun with that.

Goldberg: Were you involved with the missiles, the MX and the basing?

Mark: I thought that all the basing arguments were stupid. The only reasonable thing to do was fixed silo basing. So I delegated that entire problem to Toni Chayes. I never did a thing about it. Then the Reagan administration did the right thing and put them in fixed holes. I supported that move. If people were really worried about a Soviet first strike, then launch our missiles on warning. The whole thing was just a game, how many angels could dance on the head of a pin!

Goldberg: It was taken very seriously for a considerable period of time. It was a major issue.

Mark: I never testified on it because I could not honestly say that the basing modes meant anything. I never went to any of the meetings on it. Toni was bright and wanted to do it, so I gave it to her.

Goldberg: As secretary and under secretary, do you think you were kept well informed by the military?

Mark: Certainly.

Goldberg: They weren't holding anything back from you?

Mark: No. I think they always told me what they thought I had to know. I had an enormous advantage, I knew a lot about airplanes; I would go flying with them. Nine times out of ten I could tell when they were not being straight and kid them about it.

Goldberg: Were you in the operational loop?

Mark: Occasionally. Obviously, I was not in the statutory sense in the operational loop. I got into operational areas primarily when they had accidents, when they had problems where knowledge of the airplane meant something. For example, Bob Dixon started Red Flag during the time I was in the Pentagon.

Goldberg: What was Red Flag?

Mark: Red Flag was combat exercises we used to do and still do at Nellis in Nevada. The idea is that it is as realistic as it can be, and we take a few extra losses of airplanes in order to prepare pilots for combat.

Goldberg: Dixon was TacAir?

Mark: Yes. We make the sacrifices in order to save lives when the shooting starts. Dixon had the Vietnam numbers, which were very compelling. We would lose 15 to 20 percent of the pilots the first two days of the war and then it would level off. That's because that was

realistic training for the rest of the men who didn't get shot down. Dixon said why don't we try to get that training beforehand, that is, before the shooting starts. We were just beginning to fly F-16s at the time and in the course of a few weeks we lost six or so planes. Something was wrong, and we discovered that the aerodynamic model of the airplane on the flight computer was wrong and the pilots therefore lost control of the airplane, not because of combat risks but because of malfunction. So I got involved in those types of things, and continued to get involved after I left the Pentagon. I was on a number of accident boards. Also, (the late Admiral) Don Engen chaired a committee a few years ago to look at the Air Force safety situation. This is operational and I was on that committee. We had a problem with cracks in the C-141 fuselage and I went on a few flights to watch this. Anyway these were the things I was concerned about.

Goldberg: I asked the question of previous secretaries to make the point that they did get cut out of the operational loop. But it depended in part on who they had working in their office. If they had a military assistant with good connections they would know what was going on.

Mark: I never tried to get into the pure operational loop. Maybe that's one reason they asked me to get into it. Whenever something happened I was asked by the chief or vice chief or someone to get into it. It wasn't something I asked to do. I got the intel briefings and all that, but it wasn't my job to run operations.

Goldberg: To what extent were you involved in the selection of senior military people?

Mark: On that I horned in very strongly twice.

Goldberg: Not as often as John Lehman did later on.

Mark: I don't pretend to be as smart or as powerful as John Lehman. I got involved twice. Once was because of the NRO experience and the fact that the Air Force did not have any general officers who had made careers in space operations. I think maybe two times I refused to sign out a promotion list. I did this because I had asked the chief to put in the instructions to the board to put people who were space-qualified on the list to get a star. When the list appeared without anyone space-qualified people on it, it went back. That's how Don Cromer and Nate Lindsey received their first stars. Later on, after I left office, Tom Moorman, Dirk Jamieson, and a number of others got their stars. Cromer, I guess, retired as a three-star. That was one time I interfered. The other time was when we had to pick a new commander of the Air Force Systems Command when AI Slay (I think) retired. I had a conversation with Lew Allen. I was still under secretary, but I had some leverage. My candidate was Robert T. (Tom) Marsh. He didn't have wings and that was a problem. I had been to the Air Force Academy and discovered that they had a requirement that cadets had to fit in an F-16 cockpit. I told Lew that two-thirds of the officers in the Air Force were not fliers. I said we ought to have a leavening of Air Force Academy graduates in that group as well as among the pilots. If you have that requirement you lower the number. He agreed, so we waived the requirement, and as a consequence the Academy began to win football games, because all of a sudden they had larger people.

Goldberg: And that wasn't a motivation?

Mark: No, I didn't care about football. It was an unintended consequence. The other thing that happened was that shortly after that conversation I went to Lew and told him that Tom Marsh, who at the time was a three star running the ESD (Electronic Systems Division),

was retiring. I thought that we needed a four-star who wasn't rated to serve as a role model for non-rated officers and that Tom was the man. Lew agonized over that for weeks. Lew himself was not a fighter pilot and he felt uncomfortable with people like Bob Dixon.

Goldberg: There was criticism about his getting the job in the first place.

Mark: Yes. That was because Harold wouldn't take Ellis and Dixon didn't want it. That's how that happened.

Goldberg: Dixon didn't want it?

Mark: I was delegated to go to Langley and explore with Dixon whether he wanted to be chief.

Goldberg: That's surprising. I wasn't aware of that. I knew him when he was a colonel.

Mark: I had a conversation with Dixon about that same time, because people figured he would talk to me. He was a very intimidating man. I went to his office; he looked at me and asked me if I was honest. I said, "Well, generally that's for other people to decide." He went on and on and I finally said, "Would you be willing to become chief of staff of the Air Force?" and he said, "I don't want to fool around with all those politicians." This went on for a while, and I finally told him he was a cop-out. I wanted an answer and if it was no, I was out of there. Basically, he kicked me out of the office. When Dixon retired in San Antonio he came to the parties I hosted for retired generals when I was chancellor at the University of Texas. I got to be very good friends with him. He was a very bright man. I helped to get him the Collier trophy for Red Flag, because I thought that really was a major contribution.

Goldberg: How about Marsh?

Mark: Tom was never a candidate to be Chief. However, he finally did wind up as head of Systems Command.

Goldberg: Wasn't he the first non-rated Air Force general to get four stars?

Mark: Absolutely the first non-rated AF general to get four stars. As I have said before, I initiated Tom's promotion and his assignment. Now, Jake Smart was not a pilot either and he made four stars.

Goldberg: He commanded a bomb group in Italy, didn't he?

Mark: No, he was the operations officer. He planned the Ploesti raid. He was not a pilot. No, that's not right, I am thinking of Bozo McKee.

Goldberg: Yes, McKee was an aerial observer but was actually with the ground forces rather than the Air Force.

Mark: Excuse me. I did Jake an injustice. He planned and commanded that raid.

Goldberg: He's a very fine man. He would be about 90 now.

Mark: Jake was associate deputy administrator of NASA when I ran Ames and I worked with him at the time.

Goldberg: I ran into him when he was at NASA. He told me he was writing a history over there and that it was the hardest thing he ever did. I sympathized with him. We would like to talk now about people you worked with or who worked for you. We could start with Stetson, who was a political appointee.

Mark: John is a very bright guy, unusually astute. For example, he predicted that Iran would fall and the Shah would be kicked out, and he did some other things like that, out of the blue. He's not in good shape now. I was on the board of directors of a company in

Chicago and I used to visit him there. We had a good relationship. He and Harold were like oil and water, it never worked.

Goldberg: How about you, you got along well with him, didn't you?

Mark: Yes.

Goldberg: How about your chiefs of staff, Jones and Allen?

Mark: I had known Allen since 1958; 20 years later he is chief of staff and I was secretary. He was a major at Los Alamos at the time [1958] and I was working with him on the Argus experiment. So we actually worked on the same scientific things. I had a very good relationship with him and after he retired as chief of staff he went to work for me at NASA, as director of JPL. That is a funny story. It came about when Bruce Murray quit as director of JPL. I explored the possibilities with Allen in 1982 that he should succeed Murray. His first reaction was that his wife, Barbara, would never move to California. But soon he got interested in the idea and accepted the offer. I came over before he actually was due to retire and asked him to do something really great before he left. I asked him to sign the order creating the Space Command. I do not know whether he signed it or whether he asked. That's how it happened.

Goldberg: So you had a first-rate relationship with him.

Mark: Absolutely.

Goldberg: How about Jones?

Mark: I never served with him as secretary, it was always under secretary. One of the things I do is write thank you letters when I visit a base or contractors. I learned that at NASA. The first time I visited a base I wrote out the letters and sent copies to Jones. He called and asked me why I did that? I asked what was wrong with that. He said it was a

bad thing, that I was supposed to be doing other things. I didn't have a great relationship with him.

Goldberg: When he was chairman of the Joint Chiefs did you have much to do with him?

Mark: No. We were polite, but I didn't mix very well with him.

Goldberg: How about Harold Brown?

Mark: I have an enormous amount of respect for Harold. He is probably the smartest man I know. He has an exceedingly efficient and fast mind. He has problems with "what if" situations. I got crosswise with him mostly on things like that.

Goldberg: Who raised the "what if," Brown or you?

Mark: Both.

Goldberg: So in Desert One, for instance, he didn't think much about "what if?"

Mark: Yes. We had something called the Armed Forces Policy Council at the time and we got into more debates than agreements. I would be the loyal opposition in a way. But I always deferred to him. It was not like Jones, Harold is a man of great substance. So is Bill Perry. But I argued with both of them, with Harold mostly over the question of contingency planning. In Bill's case, I felt very comfortable with him but he was uncomfortable with me. We had some very fundamental disagreements. I think it has to do with the fact that Bill had a much broader outlook than I have on the functions of the DoD.

Goldberg: He's a very mild mannered man, isn't he?

Mark: Yes. So the arguments I had with him had to do mostly with what was the function of a department of war, what we call the Department of Defense. I think Bill was uncomfortable with the thought that ultimately, our job is to kill people. I have known him

for a long time, too, because his company was right across the street from Ames. During the years I was at Ames we had a number of arrangements with him. I remember one spacecraft on which we helped him with the gravity gradient design that was intended to stabilize the spacecraft. Both Harold Brown and Bill Perry are great men who made critically important contributions to our national security and to our victory in the cold war.

Goldberg: There were two under secretaries of defense, Charles Duncan and Graham Claytor. Did you have much to do with either of them?

Mark: I had much to do with Charles. I got to know him quite well. Later when I moved to Texas I got to know him really well. Both he and Graham were very good people.

Goldberg: Did you have much to do with them?

Mark: With Duncan, yes; with Claytor not so much.

Goldberg: How about the policy people, Resor and Komer, did you have much to do with them?

Mark: Resor lived down the hall from the Air Force offices on the fourth floor. He called me in one day just after the job had just been created. He was a former secretary of the Army, and I was also a service secretary. He asked me about what I was doing and I told him, and that I enjoyed it. He said he didn't know what he was supposed to do. He wasn't happy. And I didn't have much to do with Komer either. I liked him, but we didn't intersect very much. Komer's concern was mostly NATO, and I didn't have much to do with that.

Goldberg: He succeeded Resor as under secretary. Are there any other OSD officials you dealt with particularly during this period under Brown?

Mark: Yes, Russ Murray. I fought like hell with him. I liked him personally, but I had more fights with him than anybody else.

Goldberg: Did you have anything to do with Jim Wade during this period?

Mark: No. I first met Jim in 1957 or '58 at Livermore. He was a military detailee there. I can't place him exactly during the Carter years because I don't know what he was doing then.

Goldberg: He was around for years, then, before, and later on. How about other officials in your own office, people you dealt with?

Mark: Toni Chayes.

Goldberg: She became under secretary. Did you find her competent?

Mark: Exceedingly competent, very astute politically, and I thought wrong on almost every issue that ever came up between us. However, her arguments were always strong and well thought out. I came to respect her and I liked her very much. We used to argue over the ABM treaty and she said I had better stop talking or the White House would get wind of what I thought. I said I was not tied to the job and if they didn't like what I thought they could kick me out. She was good, and she did things that I didn't want to do, such as the basing of the MX and personnel problems. She was very good at those things.

Goldberg: So she did a good job as far as you are concerned?

Mark: No question. I got her a medal above the one she was supposed to get when we left the Pentagon in 1981.

Goldberg: How about military?

Mark: I got along very well with most of them. I'm having dinner with Harry Goodall tonight. He was my first military assistant when he was a colonel. He ended up with three stars and commanded our Air Forces in Southern Europe. Tom Moorman was one of my military assistants and he became vice chief.

Goldberg: His father was a general, too.

Mark: Yes, Tom's father was head of the Air Force Academy.

Goldberg: It pays to work for the secretary.

Mark: Perhaps, Karen Rankin also got one star, she was a brigadier when she was retired. Karen served as a major in my office. They were all first class people.

Goldberg: That's true in OSD, too, they do very well. How about the other service secretaries?

Mark: Probably the most interesting relationship I had was with Jim Woolsey, who was under secretary of the Navy. Graham Claytor, when he was secretary, was always several levels above where I was sitting; he was very good and substantive. I liked Cliff Alexander, but didn't have much to do with him. We had an under secretary's club, including Under Secretary of the Army, Walt LeBerge, Woolsey, and me. I had known Walt for years before, and now he is on the faculty of the University of Texas.

Goldberg: He's a nice man.

Mark: He has an office in our lab at the university. He's deputy director for our Institute for Advanced Technology. He's doing well and he is working with us on electro-magnetic guns.

Goldberg: Did you have much to do with George Brown?

Mark: I had a lot to do with him earlier on, because I had to do with the airborne laser lab. Have you seen the written history of that that?

Goldberg: Who put that out, NASA?

Mark: No, the Air Force. The author of the book, Airborne Laser - Bullets of Light, is Dr. Robert Duffner, the historian of the Air Force Phillips Laboratory. I wrote the foreword.

That's a story you really need to write about, the story of the Airborne Laser Laboratory (ALL). George was head of Systems Command when we started this thing. I got involved early on with the wind tunnel testing. The ALL was a KC-135 in which we mounted a carbon dioxide laser. Then I was secretary when we shot down those five sidewinders. The thing really worked. That's why we have the airborne laser now.

Goldberg: Did you have any dealings with the White House?

Mark: Yes, mostly over the NRO question. There was a colonel over there, Bob Rosenberg. The issues were mostly about verification of SALT II. I knew Brzezinski because we both came to the United States at about the same time as refugees from Europe. He stayed with my future wife's parents in Hayward, California as a guest for a few weeks while visiting California, and so I knew him quite well. I worked with Rosenberg and with Vic Uttgoff a good bit. This was low-level stuff.

Goldberg: How about Congress?

Mark: Yes, a lot with Congress.

Goldberg: Did you spend a lot of time with congressional matters?

Mark: Yes, base closures, but mostly with NRO. I spent a lot of time down in the secret room under the Capitol dome where all the testimony went on. I got to know people like Bradley, for example, very well. He was on the Intelligence Committee at the time. I hope the Democrats have sense enough to nominate him. I'm not going to vote in the next election because George Bush is also a close friend. He was a fundraiser for the University in west Texas when I got to Texas in 1984. He also ran a little oil company on university land if I remember correctly and he used to pay us royalties. So I had a lot to do

with Bradley, and Tower later on. I got to know Gary Hart quite well. I knew Diane Feinstein from California days but she came later, but she came afterwards.

Goldberg: So you probably spent a considerable amount of time altogether on congressional relations.

Mark: Probably more than the average secretary, because of the NRO connection. Generally speaking, most of the connections I had with Congress were through the NRO.

Goldberg: How much time do you reckon you spent on budget matters?

Mark: Probably about half, I guess.

Goldberg: Half of all your time?

Mark: Yes. I include program formulation. If you just mean the DRB and all that stuff the answer is not a hell of a lot. But if you count the briefings and visits to the contractors it is half time.

Goldberg: Budgets always are involved in that sort of thing. You left in 1981 and had activities after that at NASA and the University of Texas. Was Norman Hackerman still around when you got there?

Mark: He is a neighbor in Austin now, and still plays tennis.

Goldberg: That's pretty good for a man of 90.

Mark: He was partly responsible for my getting the chancellor's job. He was president of UT Austin and of Rice University and a friend of the family. He knew my father. My father was a chemist, as was Hackerman, they were colleagues. In 1984 when I was about to leave NASA, he had announced his retirement as president of Rice and I had thought I would like to be the head of a university. I went to see him and talked to him about it and asked if I could be a candidate to succeed him. He said I was not nearly smart enough to

be president of Rice. But then he said he knew a job I could do. He told me that the chancellor's job at the University of Texas was vacant and so I applied for that. He had it well calibrated.

Goldberg: Did you enjoy it?

Mark: It was good fun.

Goldberg: Why did you step down from that?

Mark: I served as chancellor for eight years and that many years is a half-life. I always like to step down before I get fired. The product of the last six years is my book on celestial mechanics (Adventures in Celestial Mechanics – John Wiley & Co. 1998). I'm probably the only person who has ever sat in this chair the DDRE whose immediate prior activity was to write a book like that.

Goldberg: I can believe that. What impelled you to come back here to DDR&E?

Mark: I guess there are two reasons. One is that I always wanted to do another stint in Washington, particularly in the Defense Department. I was always mucking around with committees here and so on. During the first four years of the Clinton administration I was persona non grata, because I had argued with Bill Perry in the Carter administration. Also John Deutch had no use for me, although I supported John for the presidency of MIT. John is also a very important contributor to our national security with whom I had some disagreements. He is a very important man.

Goldberg: A very tough character.

Mark: Yes. Nothing ever happened there, but when William Cohen came into office, I got a call from Gary Hart asking me if I wanted to go into DoD. Hart said that Cohen was a friend of his and he asked me what I would like to do. I said I didn't need the job, so I

would do whatever they needed. I got a call from Cohen's office, but I have never met Mr. Cohen.

Goldberg: Still?

Mark: No, never. This job isn't terribly important any more.

Goldberg: Not as important as the under secretary job, which has been elevated very high. But this is a major technical and scientific job here in the Department of Defense.

Landa: Prior to coming to Defense, you had a lot of contact in Livermore with Defense.

Mark: Yes, I was a consultant out there.

Landa: In what way did your experience in Defense change your ideas about how things operated in the department? What did you learn from your experience as under secretary?

Mark: We do pretty well, overall. Generally speaking, our political leadership has known how to use the military properly. I wanted to come back and serve a bit one more time, that's all. I don't have anything left to prove, so I make myself as useful as I can.

Goldberg: Are you satisfied with your work now?

Mark: Yes, of course. Even though I haven't met Cohen, I'm still busy.

Goldberg: But that's quite significant, I think, and a bit surprising.

Mark: I'm not surprised. He has surrounded himself with people he trusts and knows, and they are all smart. What can I tell him?

Goldberg: One of the problems with past secretaries has been that they surrounded themselves with people they knew and felt were smart. They didn't do the job very well because they considered themselves a palace guard and everyone else a competitor.

Mark: I have a lot to do with John Hamre, and Jack Gansler; both are very good people. I can't fault them at all.

Goldberg: I guess the real line is Gansler.

Mark: He's an engineer, he knows what he's talking about. I get into more details than he does, but he is certainly a good transmission line. I sit in on the DRBs and all the meetings.

Goldberg: And the secretary is often not so much concerned with technical matters. Some, like Harold Brown who has the background, or Perry, were able to do it, but most of the other secretaries have not had that capacity.

Mark: I have no problem, I just mentioned it.

Goldberg: Are there any other questions we should have asked?

Landa: We should have read the books you gave us first.

Mark: I sent the celestial mechanics book to John Hamre when I first came here and told him that this is what I've been doing for the last six years. He sent me back a note saying that he had read it very carefully, colored in all the pictures, but he couldn't understand all the equations. John has a very piquant sense of humor.

Goldberg: I'm not surprised. Thank you very much, this has been very helpful and will be a major reference source. We have about a hundred of these interviews now, and we find it an extremely helpful collection.