



**General Austin Betts, USA
1960-1961**

Interview: December 23, 2003

Interviewer: Please state your name and when you started at ARPA as Director.

Betts: Well, my name is Austin Betts and I'm a retired Lieutenant General, U.S. Army. But I served from '59 to '60. It was a little more than a year's actual time in office even though the numbers might indicate otherwise.

I: There were some interesting circumstances in you taking over that office. Can you tell us about that?

Betts: Well, the most interesting thing is that they did search the industry for someone that they felt was strong in research but also had a good experience with major systems. They found the name, Dr. Critchfield—George Critchfield I think it was, on the West Coast. Convair—pretty sure it was Convair. And he came to Washington with the agreement that he was going to continue to be paid by Convair but he would keep himself out of the picture if there was a program that involved his company.

Apparently that had been done with some other fairly senior people and he thought that it was all quite natural and it wasn't going to be a problem. But in his first interview with the press, the press decided that they were going to make it a problem and they gave him a very rough time at the end of which he went to the Secretary and he said, "If that's the way they're going to treat me here, I don't want this job." And he went back to the West Coast.

So the Director of Defense Research and Engineering was then Dr. Herb York—Herbert York. He had been the scientific director for ARPA when it was originally created so he knew what was going on and when the Secretary called him and said that the President had told him - or the White House had told him - to get a replacement for Critchfield and get one that was not controversial. I was on the Office of the Secretary of Defense staff at that time in the office of the Director of Guided Missiles. I was the Deputy Director. That seemed like a job

that would give me knowledge of what was going on in ARPA and the big missile program, as it did. Herb York turned to me and said, "You're going to be Director of ARPA." And I saluted and said, "Yes, sir," but my guidelines from Herb were to play a steady-as-you-roll kind of direction because ARPA was the target of Army, Navy and Air Force, all of whom would like to have it go away. It was kind of natural that my first mission would be to defuse those battles. And I think I accomplished that. I certainly went to see the key people with whom ARPA was involved in each of the three Services. I asked for their continued support, assured them that we are not trying to take over their programs, and apparently it worked.

While I don't get credit for starting a lot of research programs, I don't believe that was the mission that Herb York wanted me to fulfill.

I: Let's go back a little bit and set the stage for you coming in there when ARPA under Roy Johnson had been given a mission and succeeded pretty much.

Betts: Well, Roy Johnson, he came into his last year there with a proposed five hundred million dollar budget. And that was not the Secretary's view of the scene at all. The Secretary was determined and used the Office of the Director of Guided Missiles to turn as much of the missile program back to the Services as he felt could be done without continuing the conflict. When Roy Johnson found out that that was the case and he was not able to lobby to get it changed, he just was very, very disappointed and he left ARPA feeling disappointed. And some of the ARPA staff shared that disappointment. They had built up capabilities and expected to go ahead with them. So I think the ARPA staff was a little bit resentful in my coming in there with a decreased program and with a steady-as-you-go kind of guidance. But they were good people. Bill Bidell and Larry Guys and they're fine people and we worked it out; got to have an amicable situation.

I: Let's have some further context and just talk about why ARPA was formed. We started it in response to the Soviets and it succeeded.

Betts: Well let's go back. The response to the Soviets triggered the conflict among the Services because they all wanted to get up there with something that would match what the Soviets had done. Well, let's go back a little. There's a real issue here that I think has been lost over the inequities. The Air Force had two big ballistic missile programs. One of them was the Atlas; the other was the Titan. The Titan was good old tried and true multistage weapon to get the range that they wanted...intercontinental. The Atlas was a different design all together. It was single stage but it got its ability to do the same thing by the fact that it was a very thin-skinned missile that would collapse if it wasn't full of fuel or if it wasn't supported. And that way it was light enough that with just one stage they could accomplish the same thing. They actually started the Titan program because they were concerned that the Atlas might not work, being a completely new technology.

When the Atlas proved successful, they wanted to kill the Titan. Well, then lobbyists dashed in and the politicians dashed in and I remember the

famous meeting we had in the Pentagon with Colonel Red Whetsal who was the project manager for the Titan in there defending the Titan program. And the thing that impressed me was when he wound up his talk, he said, "Besides, if you kill the Titan program now, it'll only save four hundred million dollars," which sort of gives you an idea of what was going on. And they kept the Titan program going. And of course, later on when we did anything with space it was nice to have that capability. But the Soviets right from the beginning had a brute force approach to this with the multiple stages and they had a very big missile. They must have had space in mind when they first designed that system. But that was not the case in the Air Force because the Air Force was working to keep the costs down and have an intercontinental ballistic missile.

Well that's the background of why ARPA was formed. The Navy had a missile called the Vanguard. They were quite convinced that they could handle the space program with that missile. But unfortunately for them, it failed at a crucial test occasion and they wanted more money to keep going and McElroy was Secretary of Defense at that time. And he decided that he would just take that program away from the Services and put it in an OSD—that's Office of the Secretary of Defense—entity that would handle it. He created ARPA on that basis. He also put into ARPA a few research programs that were not service-oriented but were more basic; nuclear test detection, for example, and materials programs. So the success or failure of any single missile program really had no impact on the Secretary's concept of why he wanted ARPA. And of course by the time I was tagged to get into ARPA, my mission was to keep it going with the programs it already had and try to stay out of controversy and try to come to good terms with the Air Force, Navy and Army, who did our work for us. ARPA did not have a structure of contract employees. We would make up the tasks and give them to the Services and ask them to do the task for us which was an issue in itself because the people at working level in the Services would put those aside in order to get their own work done.

I consider that one of my major missions was to get the people in charge to recognize that if they continued to fail ARPA, they would be digging their own grave because we would just create competing contractual staff, which certainly wasn't in the interest of the Secretary of Defense.

I: There were two levels of controversy you were trying to deal with, well not controversy but unsettling waters if you will, and that was one, with the branches of the Armed Services...

Betts: That's right.

I: And the other was with the ARPA staff. Their morale had to have been a little bit shaken.

Betts: Well, it was shaken because they had the same picture of great futures that Roy Johnson had. I found them very willing to recognize the facts of life and I can't say that's true with the employees that were in IDA [Institute for Defense Analysis]—the support technologists—but since most of those were recruited from outside and went back to their companies, I didn't see that as a big problem.

I: How did the ARPA staff respond to Critchfield saying the heck with it and then bringing in somebody from the Office of the Secretary of Defense?

Betts: Well, I believe that they kind of felt that they'd been mistreated but actually they were good people. I had been working with them from my position as the Deputy Director of Guided Missiles and knew them personally so that whether it was my good looks or my reputation as a cooperative guy, they accepted me, at least they certainly did on the surface. I never had any feeling that they resented me. Thank goodness.

I: You're credited with stabilizing the organization at that point in time. Talk a little bit about that.

Betts: Well, I think that that was my primary assignment from Herb York who was the Director of Defense Research and Engineering. Herb knew of the controversies of course and he recognized the type of publicity we were getting in the press as divisive, so that his instructions to me were to calm things down, keep the work going, and from time to time he would assign some new tasks. Not big ones, but I felt that it was not my responsibility to seek out new research programs. Jack Ruina, when he came in after me, knew very well that that was what he wanted to do and I'm sure that he had agreement with the authorities that he was going to do that. But I was a kind of the steady-as-you-go sort of fellow and it worked out.

I: And so in the early days, was ARPA responding pretty much to Presidential information or filtered through the Secretary or how?

Betts: I believe that the key pressures on the White House and on defense came from the President's Science Advisory Committee because in reading the history of that period they're mentioned time and again as the source of the pressures that came from the White House. They were a bunch of very, very top flight people. Killian was the chairman then as I remember and certainly a highly respected scientist out of MIT.

I: Let's talk about the relationship you had with the different branches of the Armed Services. Didn't they view ARPA, at that point in time, of, if not competition, of stealing their thunder or robbing their pot?

Betts: I think they felt that we were using money that they could use and that there was no real reason why ARPA should continue to exist. I did not get a lot of animosity when I went to the Services to discuss programs, but it took awhile before they were coming around to being a hundred percent cooperative. And I believe that they ultimately came to understand that ARPA could serve a very important role doing research and development and not being Service in orientation could do it without starting battles amongst the elements involved. But I never felt from my contacts with the Services that they resented me. They had some misgivings about whether there should be an ARPA but I got full cooperation from them.

Ultimately even from the working levels of the Services where we had to

get our contract work supported.

I: I'm curious about that. Each branch of the service had their own R&D, right?

Betts: That's right.

I: At what point did ARPA start to define itself as being broader than an individual branch?

Betts: Well, the concept, creating ARPA, gave them that charter right from the beginning; that they were not a fourth branch of the Services, but rather one who would support work that did not have a clear mission in one of the Services. I think it was understood that the Secretary wanted the agency and no one in the Services could fight it openly. If they did have problems with the lower levels not cooperating, that was the clear mission that Herb gave me to try to work out. And I think I worked fairly successfully with those problems.

I: So on one hand it was smoothing ruffled feathers.

Betts: That's right.

I: Were there points of conflict on the other hand?

Betts: I don't remember any serious ones. Once the big decisions had been made to move the big missile programs back to the Services, it took the heart out of the problem so that I don't really feel that they couldn't handle that more or less graciously.

I: In looking at ARPA when you took it over, were there any bureaucratic, structural, changes you had to make?

Betts: Well the big change was we would not go on forever using people from industry hired on the IDA payroll so we slowly proceeded to shift to the civil service staff and that took time because, by and large, the really good scientists did not want to work for the government. The contract mechanism suited them fine because they had a lot more flexibility and they could argue with their bosses about salary and things of that sort. But, it was a real job to get the right kind of people in there and I believe we did get some very good scientists who came in to run the programs.

I: Was the structure of Director, maybe Assistant or Associated Director and then program manager already in place when you walked in or was that your invention?

Betts: That was pretty much in place and functioning when I came on board. I didn't have to create any new capabilities.

I: You mentioned that there were some other projects; that once the missile project went away that there were some other projects that ARPA had already in its pot.

Betts: Well, the one when they created it they worried about the big missile controversy. But in order to keep a research flavor they took programs that

weren't of that nature. They gave ARPA a materials science program that was essentially basic research. And they gave them the job of the nuclear test detections they called VELA, and my mind doesn't function right at the moment. I don't remember the other ones that came in but those were the two big ones that went on indefinitely. They had ballistic missile defense technology. They didn't have the deployment kind of program but since each of the Services felt they wanted to be the ballistic missile defender, witness the programs, that did get supported by the Services, shooting at satellites and things of that sort. All the far out programs were, well found in their basic research in ARPA. And basic research is probably not the right word. It's the initial development ideas and the technology to support the development that would flow from that.

I: So that two-pronged anti-ballistic defense, on one hand, and offense, on the other hand, was already in place?

Betts: Yes. That was one of the things that they took that from the Army and moved that into ARPA.

I: Was that the source of Army animosity?

Betts: I think so. Yes, because as I said before none of the Services thought that ARPA was really necessary. It was more a political requirement than a technical requirement. And I don't know that we couldn't have gotten along without, but I do believe in retrospect that it was wise and it has proved to be a place where defense can do some pretty far out thinking and not be pushed down by operating elements of the Services who didn't see any use for the ideas that were put forth.

I: That's interesting. This year's DARPA Tech theme is called, "Bridging the Gap" which seems to be what you're talking about, bridging this gap from idea and concept to implication field applications.

Betts: I think that was the fundamental strength of ARPA but they had a role to play and once it became institutionalized and the Services accepted it I think that they had played that role very well.

I: Was there a progression with the branches accepting ARPA?

Betts: If so I don't remember specifics along that line. I'm sure there was. I know that I was called before the Secretary of the Army on one occasion and told that I wasn't being a very good Army officer and I told them that I felt that my mission was to satisfy the Secretary of Defense, not the Secretary of the Army. I thought surely that would kill any future promotion I had in the Army but it didn't.

I: Did you ever have to testify to Congress?

Betts: Oh, sure.

I: What was that like?

Betts: Well I had many sessions with the Congress. Some of them just very amicable and they were seeking information which we furnished. But, in the big

fighters, the missile fighters, at one point the powers-that-be established a committee in the Senate called the "Senate Preparedness Subcommittee" and a fellow named Lyndon Johnson was the chair of that committee. But on that committee was a very outspoken Democrat whose name slips me at the moment but that's probably because I disliked him. And nevertheless we did run into some very abrasive hearings on occasion. Most of the hearings the Congress are honestly trying to get information; know what's going on. I always said to the staff, "Tell them the truth and you'll never have to worry about remembering what it was you told them. If you start distorting things, you've got to remember that distortion in the future." But I had good relationships.

I: One of the phrases I've heard from another director far after you, was, "What ARPA does is the technological truth and let the chips fall where they may."

Betts: I felt when I was there that that was essentially what the Secretary and Dr. Herb York wanted from ARPA. Matter of fact, Herb wanted an entity that he could turn to and get an unbiased answer from the inter-Service point of view. ARPA furnished that very well. We did not wear the uniform of any one of the Services. Nevertheless, after about a year in that job I persuaded Herb York that really, the job should not be filled by someone in uniform because no matter how objective one might try to be, there would be occasions when the controversy was such that no matter how you, the Director, would present the picture, part of it would be ignored because it was Service-oriented. And Herb agreed with that and that's why I was Director only a year. I think he could have kept me on longer if he'd wanted to but there was a good job for me in the Atomic Energy Mission as the Director of Military Applications.

I: I want to go back a little bit about taking over ARPA; I get the impression that ARPA was living on borrowed time at that point.

Betts: I think it was. I think that the Secretary felt that it was there to solve an immediate problem and not very much thought had been given to it on a long term basis. But as Roy Johnson faced up to the realities that he was not going to get a five hundred million dollar program, then people began to think more in terms of a long term capability. Certainly the ARPA staff began to look for things that would not be controversial among the Services and things that were not covered very well.

I don't remember specifically Herb ever discussing with me whether or not I thought that ARPA should last forever. But I do know that in my own feeling was that this was a useful contribution. As a matter of fact, that's why I recommended to Herb that we bring Jack Ruina in as Director because that would give it more of a continuing flavor than to have a military Director who would be expected to leave in a couple years. I know Jack didn't stay forever by any means, but he could have stayed longer if he'd wanted to. And they're fortunate he was succeeded by some very good people.

I: Did the ARPA directive actually change during that point in time?

Betts: Not to my knowledge, but I don't know.

I: One of the things that impresses me is how much foundation, technologically and bureaucratically, was laid during that period. How much foundation was there for actual projects that developed in the future?

Betts: During my one year, I don't believe that we did anything that would have laid big foundations for big future programs. I felt that, matter of fact Herb York made it very clear that he wanted me to play a kind of steady-as-you-go role and not pick up any controversy on any major programs. I believe that Jack Ruina felt no such restriction. But, he may have, I don't know. But I do know we laid out a plan that transitioned into a civil service structure so that we could minimize our demand for IDA support and that's the way it worked out.

I: So VELA was already going on when you took it over?

Betts: VELA was. Yes, it was not going on when Johnson created ARPA but it was one of the programs that were given to him and I don't believe that it had a predecessor. But I don't remember the origin of VELA. It was there when I came aboard and had a very good director who eventually became the Vice President for Research for the General Motors Corporation, Bob Froth.

I: I've got a list of projects here and I don't know whether they were going on or what. DEFENDER?

Betts: DEFENDER was the ballistic missile defense effort. And that was one of the major programs that he at that time took away from the Army. Eventually that went back to the Army. At least the more development aspects of it went back to the Army.

I: But ARPA was doing what?

Betts: Doing the more fundamental development of technology.

I: Feasibility study?

Betts: Feasibility and some hardware development.

I: I have a name here I ran across. Nick Christofilos?

Betts: Nick was a scientist on the ARPA staff. Part of their—as I remember, their civil service structure. I don't think he was in IDA. But Nick had a lot of ideas and was a very interesting guy; I'll put it that way.

I: I have a quote here that says "Wild at the time, but a lot of the things he thought about, we're doing that."

Betts: I think that, one has to give him the credit for having vision that at the time people thought was screwball, or approximation thereof.

I: Like what?

Betts: Well, I really don't remember. I remember that pattern but I don't remember the specifics about what Nick was pushing for.

I: I don't know whether he was into particle beams or lasers or SDI or anything like that or ...?

Betts: I don't remember.

I: Well, the reason I brought up his name was because DARPA now identifies DARPA projects as being "DARPA hard," that if the branches of the military have a hard problem it's because DARPA had a hard problem. Was that air developing sense back then?

Betts: If it was I don't identify it. Although, fundamentally that's what ARPA was created for—to handle things that were not clearly Service-oriented. And we pretty much kept to that.

One could argue that the underground testing could have been given to any one of the Services but all the Services were interested in the results as a national problem. It's not a Service problem.

I: That was before any test ban treaty wasn't it? Or was it a detection device to find out what the Soviets were doing, wasn't it?

Betts: That's right. It was an intelligence device.

I: Did it have any in those early days?

Betts: Oh they had a network that could pick up explosions of a reasonable size all around the world. As a matter of fact, when I was in the succeeding job as Director of Military Applications, I took the Joint Committee on Atomic Energy on an airplane trip around the world visiting test detection sights. It was a well established capability.

I: I want to go back to Christofilos for a minute and talk about DARPA hard, DARPA creativity.

Betts: Well, you're getting back to the fundamentals now. The kinds of people that you bring on board are brought on board for their creativity. I wouldn't say that's all of the ARPA staff by any means but there were guys there that had vision. And I think Nick Christofilos was one of them. Another one was Bill Godel. Bill's creativity tended to be in the intelligence arena. But, I don't remember specifics of what Bill proposed or did. I know he got into some difficulties because his ideas were a little wild but he was a very bright guy.

I: What about ARPA challenge? What would an ARPA challenge be as opposed to ARPA hard?

Betts: Well that's nomenclature that didn't exist in my day, but I would say, there were things that I did in the Army in a subsequent position as Director of the Army Research and Development program and those ideas would have been appropriate to have been in ARPA.

I: Do you remember your first encounter you may have had with ARPA going into the office addressing the staff? Did you go in and try to explain what was happening to them?

Betts: I think they knew very well what was happening because it was pretty open and I'm sure that I discussed it with them in staff meetings. I don't remember a specific major event when I read them the riot act from top to bottom. As I remarked I already was on good terms with those people because in my prior assignment as Deputy Director of Guided Missiles I was working with them and some of the staff problems. I think they knew exactly what was going on.

I: Do you remember any specific instances where you have smoothed any of the ruffled feathers with one of the branches?

Betts: I remember visiting the Service people that were involved in research development and who were supporting the ARPA programs. And now I'm meeting them in administrative approach. But I don't remember any specific meetings where I had to do fast talks and persuade them that we were not a threat.

I: What about with Herb York?

Betts: My relations with Herb were very good. I had known him before I got into that position. I had great respect for him. He's a very, very bright guy. One of the blessings of my whole career is I have been under people who were smarter than I was and I could learn from them. Back in the Army the Deputy Head of the Manhattan District, Major General Kenneth D. Nichols was very, very bright and was a mentor of the first caliber. And Herb was one and Norris Bradbury, the director of Los Alamos Laboratory was another one, and Oppenheimer. When Oppenheimer left Los Alamos he did not go to a military position but later he was carried as part of the Advisory Committee. Whenever anything about the Army would come up, he would call me over and we would talk man to man on a very good friendly basis. And Oppenheimer supported, for example, the development of the gun projectile for Army delivering an atomic weapon on the battlefield. Because he felt that it was inherently rugged whereas the implosion system of the bomb would not be, well... would not take the kind of shock that an artillery shell would have to sustain. But, Oppenheimer was a very, very bright guy.

Of course there were many of them at Los Alamos that I worked with and found out that there are a lot of people out there smarter than I was. The important thing to do was learn what you could from them.

I: What was the mood of the country like back then?

Betts: I don't remember specifically having problems with the mood of the country. My hearings with the Congress will be an example and most of them were quite amicable but, Symington—is the name I was trying to think of before—on the Senate Preparedness Subcommittee. He was a Democrat and very much inclined to go after the witnesses and see if he couldn't embarrass them. He had a whole hearing once on speeches that I had made about missiles. He didn't like the fact that I had actually quoted him in the speech in a kind of a derogatory way. So we had a hearing to ask me who it was that gave those opinions.

That was before I was Director of ARPA. That was in the missile area. But aside from the political aspect I don't think that we were under attack from the Congress.

I: I'm just thinking of the mood of the country in terms of Soviet threat. They launched Sputnik. We knew they had nuclear capability. Cuba had just become a problem.

Betts: Well, I never felt associations that I had with the ordinary civilian or even military colleagues was, aimed at a program, I'll put it that way. There were concerns and they came out in the hearings but that's a question that I don't think I could answer equivocally because I don't remember specifically having to face people that thought that we were all goofed up and not doing what we supposed to be doing, except for Senator Symington. And that was political, purely political. He had nothing to really counter what we were doing.

I: So there wasn't a sense that we'd had this technological surprise and we'd better get off our butts?

Betts: The press were the ones that gave us the problem that, how come the Soviets could do this? And as I explained, it goes back to the Atlas/Titan decisions that were made. If we had not had the Titan it would have been longer before we recovered.

Of course the Red Stone that was used for that tiny little beeper, that was a way to get something up there immediately, but that was not a solution for a long term space program.

I: That was a funny story you told earlier about Von Braun's response to Sputnik. Tell me again.

Betts: Well, his response was that we could have done it. We, the Army, could have done it because they did have more or less a brute force approaching the Red Stone missile. And actually when the Vanguard attempt to put something in orbit failed, he came up with the, me and his team came up with this—there was a code name for it that slips me at the moment—but it was a little beeper that just went around the world sending out a signal. I don't even think it was a voice signal; I think it was just a beep—beep—beep—beep.

I: It was about the size of a grapefruit, wasn't it?

Betts: I think so.

I: In terms of DARPA's success after you were able to stabilize it, get it below the radar screen, the press radar screen at that point in time, was there anything that you see as being keys to success that followed?

Betts: I don't identify any specific thing though I think that we played kind of a transition role in the year that I was there. And I know that Ruina started moving in more new programs but I don't identify anything in the ARPA program that was unusual, given that we were transitioning to a longer term capability.

I: Do you think if circumstances had been slightly different that ARPA would have gone away?

Betts: I think if the Secretary had not been solidly behind it, the Service might have been able to kill it. They certainly surreptitiously tried to do that but none of them dared make direct attacks because the Secretary was strongly in favor of what he wanted to do. That's as I see it.

I: And the sense was that Eisenhower was also, because he empowers the Secretary.

Betts: Well that's right. And I think Eisenhower supported the missile program generally. I know I was part of a team that went over and briefed him one time. We were told, this was when I was in the Director of Guided Missiles Office, that the President wanted to have a complete picture of the missile program in a one-hour briefing. The first time that we ever did it, we went over with two viewgraph screens and we would go from one to the other trying to feed him more information than he could possibly absorb. And we only had an hour to do it. But, it was an interesting experience.

I: What did he say?

Betts: Thanked us. No, he was gracious, a gracious guy, and we had done what he had asked to be done. I do think that using the two screens, we were able to present to him in a short period of time a fairly comprehensive picture of what was important in the missile program.

I: He was able to say, "Well, get going."

Betts: He was. He was supportive. He was supportive.

I: I've always been curious. He gave this very peculiar farewell speech. Do you remember that at all?

Betts: I remember his concern about lobbyists influencing national decisions. And his words "military industrial complex" reflected that concern. But then I think whoever has been at that level recognizes that there are always the lobbyists that are trying to protect some interest and it's not vicious as much as it's just a problem that one has to deal with. I experienced that in my own position in the Guided Missile Office and later when I was Army Director of Military Applications. Rather in the Atomic Energy Commission. But the politicians would reflect what the lobbyists were selling to them and of course one objectively had to counter some of this without going head to head with powerful politicians. It's a sporty course.

I: We started to talk about Freeman Dyson and you said you had opportunities to meet him.

Betts: I worked with him on some advisory committees and I don't remember which ones because I, once I retired I was right before advisory committees and the Army got me in a couple of them. A major one was the Army Scientific Advisory Committee which I stayed on until my wife got so sick that I didn't dare

stay away from her that much and I resigned from them. But there were a lot of good people on that Committee.

I: I interviewed Dyson with their project Orion which was this idea of using atomic bombs to propel spaceships.

Betts: I remember Orion.

I: Tell me about that.

Betts: Well, that's it. They touted it as the way to go and it was just going to bang, bang, bang. Much smarter to work into a little reactor that puts out a steady stream of propulsion.

I: He was going to launch a ten-story building; I think that's what he said.

Betts: Well I'm sure it could be done although I'm not quite sure why it should be done.

I: On either side of ARPA did you maintain relationships with the Services?

Betts: Well, ARPA was not directly involved in the nuclear weapons development but obviously they were interested in what the weapons development people in that field could do if it was in air defense at one point it was very seriously considered that NIKE-Zeus would have the nuclear warhead because you can make up for a lot of errors in accuracy if you had a big enough bang. It introduced other problems and was eventually dropped, but yes, I had the great opportunity to interact with people in ARPA and people in the Services all the way through. Even when I was Director of Army Research and Development we were doing things in coordination with the Navy and the Marines. We were actually doing some of the Marine's R&D work for them and they were participating. One of the prizes I have on my bookshelf is a little plastic circle with the Marine crest inside and thanks for services rendered from the Marine Commandant. I show that to my Marine friends and tell them I'm not really an anti-Marine.

I: Generally, were the ARPA folks a different breed than the R&D people in the Services?

Betts: I don't think so. I think that they tended to be a little bit more freewheeling because they weren't...I'll back up just a little bit. As I remarked before, one of the problems the Army had: the Army Chief of Research and Development did not have charge of the decision about what we would do. The requirements were the responsibility of combat development's command. So that matching capabilities with desires was between staff elements and that was not good. The Navy and Air Force avoided anything like that, but eventually the Army came around to the point where they created a Director of Acquisition and that Director had both R&D and production commitments.

The Army is very conservative. Always has been very conservative. Part of it is that they'd never get the big money that Navy and Air Force got. So some of the conservatism was forced on them by lack of funds to do what they wanted

to. Nevertheless they're inherently conservative. Even in politics.

I: You said something about freewheeling. What did you mean by that? That the ARPA folks were freewheeling.

Betts: Well, they didn't have an agency telling them what, well, what requirements they should be meeting. They were able to think in terms of the application as well as the development capability to meet that application. That was what I meant by freewheeling. And the Army R&D for example, I could not start any new programs as Chief of Research and Development without having a clear cut requirement towards which we would be working. So I was not freewheeling. At basic research level you could be quite freewheeling of course. But as you get further into the development process one had to have a requirement against which the work was being done.

I: So basically the pot of money with no strings attached was...

Betts: That was the thing that, of course, to get money ARPA had to have an identifiable capability. But they did not have a fighting Service individual who would tell them what they could or couldn't do by way of developing a new program. And that's the strength from point of view of a technical man or woman who had an idea that they wanted to develop. In ARPA they simply had to condense their Director and sometimes the Director of Defense Research and Engineering depending on the size of the effort.

I: ARPA has a terrific track record but it's still the only agency of its kind in the world. Why is that?

Betts: Well I think it's because there wasn't some kind of a crisis that forced somebody else to create similar one. Actually, I think that the space people have been able to stay, civilian space, been able to play that kind of role. There isn't another element of government telling NASA what they can develop and what they can't, which gives them the chance to be responsible for their own basic research; their own development of the new technology and point it towards a very vague target. ARPA had that problem, had that capability, as Army Chief of Research and Development I did not have. I was pretty well guided by the requirements established by the Director of Operations and Army General Staff.

I: That's when I thought up the difference between technological cutting edge and technological fuzzy edge.

Betts: That's a good difference. ARPA could certainly work to the technological fuzzy edge if it had a pretty clear idea what they wanted to do. Military Services are more restricted.

I: Is it a uniquely American organization?

Betts: The best of my knowledge. I don't know of any other country that has one similar.

I: Why is that?

Betts: I believe it's because we're generally wealthier. That it's a luxury. Not a luxury in that we don't need it. One can't make a case that we don't have to have ARPA. One can certainly make a case that it has done very well and has successes that probably would not have occurred if ARPA didn't exist. But don't ask me what their successes are, that's back somewhere in my mind.

I: ARPA has been able to play this incredibly large role on a really large playing field.

Betts: Well that's true but that's a function of money. They've been given the funds to do or to carry out a good, strong program. Right after Johnson found out that he couldn't do the five hundred million dollar space program that he anticipated doing ARPA took a different view of things. Money is the driving factor that determines just what you can do, typically, in your own home.

I: In playing this enormously large role in the geopolitical sense, ARPA has also played a huge role in science.

Betts: Well, they've had successes and the scientists in the Services tend to envy them because they are not restricted by not-so-technically-educated people as, the Army sciences, for example, are working for uniformed people, very few of whom are Ph.D.s. And because they got a military career, it's a different environment. I think.

I: Does ARPA opens up doors and allow these people with vision and energy to just explore.

Betts: Well certainly that is the ARPA role - to push technology to its limits and not be limited by military people who don't necessarily have the same vision as a scientist would have. Not that there aren't some visionary people in the military. But I've just been through a book called Boyd. If you ever want to explore that problem, he was a fighter pilot that created some new maneuvers. Very successful. But he had a very, very difficult time persuading the Service to take them on as policy. I haven't finished the book, but my wife has, so I know what's in it and I have a couple of fighter pilot friends in the Air Force here, retired, who have read the book and are very much in accord with what the lesson is. And the lesson is that very advanced thinking is not favored in the military Services unless there's a champion at a higher level who insists that they be favored. If a Colonel above, and this individual, Boyd, was a Lieutenant Colonel, if a Colonel above is convinced that this is going to be the greatest thing since sliced bread he'll support it and recognize that it's going to enhance his stature. Whereas if the Colonel's not quite sure it's going to fly his reaction would be to say "slow that down, because we have our ground rules all laid out for us and I'm not going to risk my career." He might not voice that, but that's what's in his mind. He's not going to risk his career if things don't pan out. But Boyd is a very good lesson in what happens when somebody who is very bright, very innovative runs up against bureaucracy. And the great thing about ARPA/ DARPA is that they're free of the stultifying affects of bureaucracy, even though anybody in the government department has to deal with some of it to get his money.

I: What if something that ARPA supports doesn't pan out?

Betts: Their reputation is such that they take it in stride, unless it got so big and pricey and controversial, but they've got a good track record in that regard.

I: So they don't have to worry about necessarily a career being derailed or...

Betts: Well I think they have. I think they have to be careful with innovative things, but that's just prudence and that prudent leadership will handle that aspect of it.

I: Because by nature they explore some far out things.

Betts: I know that. We're working on some at the Southwest Research Institute, the idea is little robots and things of that sort that we have been experimenting with. But, they're not necessarily supported by Army, Navy or Air Force requirements but they're bright ideas that may very well be supported. Matter of fact I think one of them that does have some Army support to search problems in a place like Afghanistan or Iraq when you go into a house and you don't want to go around that corner for fear there's some guy there with an AK-47, you send the robot around to see if it's clear. So there are some very sensible uses for the kind of thing that DARPA is developing.

I: Are they entered in the DARPA Grand Challenge?

Betts: I don't know. I don't know. There are people here I think who could tell you, but I don't know.

I: Were there any moments in looking back when you took over the directorship that were particularly tough?

Betts: Well I think that the first moments that, I felt were tough were when the ARPA staff would complain about not getting adequate support from the military department with which they were dealing at the time. And I had do a very diplomatic shuffle with the service in question knowing that they were not gung ho about the existence of ARPA; knowing that they had been directed to give us support, but that was the primary problem that I had to deal with to gain that support without increasing their antagonism.

I: Were there any lighter moments?

Betts: I'd expect so, but they don't stick in my mind the way the tougher ones do.

I: Maybe a breakthrough in any particular area?

Betts: I don't remember any breakthroughs in the one year that I was there. I'm sure that there were some later, because again, we were of the steady-as-you-go function and to me a breakthrough would be to get through a Congressional hearing without having somebody tear at me.

I: So you were the captain that righted the course.

Betts: I think that I can be given credit for that. Certainly ARPA was in a lot

better shape to continue and with regard to the relationships with the Congress and with the Services much more an acceptable, continuing capability. I think that that's what Herb York wanted of me and I feel that that's what I gave him.

I: If you were to look back how would you define yourself during that period?

Betts: I would say that I was a facilitator and just that; that I was to calm the ruffled waters, get the show on the road, keep the organization going and do what I could administratively to strengthen the ARPA staff for a perpetual mission. I felt that as capable as were the IDA people and they were, there were some very good people in that staff that it was not going to work for in the long pull. The Congress wouldn't allow us to be that freewheeling to bring people in from industry, using them, and then turning them back. IDA was a very important mechanism to ARPA's initial success.

I: But it just wasn't cozy with the industry.

Betts: Well, that's the problem.

I: Anything else you'd like to add?

Betts: I think you've milked me dry. Well, twenty years ago I think we could have had a much more a scintillating discussion, but the memory tends to go.