

**Jack P. Ruina Oral History Interview – JFK#1, 11/08/1971**  
Administrative Information

**Creator:** Jack P. Ruina

**Interviewer:** William W. Moss

**Date of Interview:** November 8, 1971

**Place of Interview:** Cambridge, Massachusetts

**Length:** 63 pages; additional 3 pages of Ruina's original briefing notes, 11/22/1961

**Biographical Note**

Ruina was the Director of the Advance Projects Research Agency of the Department of Defense from 1961 through 1963. In this interview Ruina discusses the Nike-Zeus anti-ballistic-missile-missiles; briefing President John F. Kennedy [JFK] on the Nike-Zeus missiles; JFK's comprehension of the briefing material and the type of questions he asked; Project Defender; the background and organization of the Advanced Research Projects Agency; the leadership and organization of the Department of Defense; interactions with Robert S. McNamara; competition between the military and the Defense Department on research and development and for resources and congressional funds; the period of new, advanced—but not always useful—technology; and Project AGILE and counterinsurgency efforts in Vietnam, among other issues.

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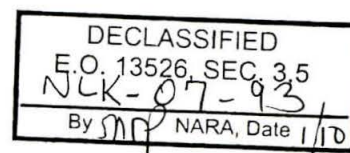
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Jack P. Ruina – JFK #1  
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9 November 1971

Memorandum for the Record

The attached three pages of notes, in red ink on lined tablet paper, were given to me yesterday, Monday the eighth of November 1971, by Dr. Jack P. Ruina. He is giving them to the John F. Kennedy Library. He told me that they are the original notes he made in preparation for a briefing of President Kennedy on the Nike-Zeus anti-ballistic-missile-missile, November 22, 1961. The briefing is described and the notes are explained in detail in Dr. Ruina's oral history interview.

I recommend that the original notes be made a part of the master copy of Dr. Ruina's interview.

*William W. Moss*

William W. Moss  
Chief, Oral History Program  
John F. Kennedy Library

①

Talk to President  
11/22/61

## General

N-7: Terminal Defense System along conventional lines

Sequence: Search - Acq, Track, Missile launch, Steering + Detonation  
↑  
Discrimination

Battery (flexible)

1 DR, 6 TTR, 12 MTR; 96 Interceptors, ZDC = ZAR + C<sub>int</sub>

System is big, complex, advanced: Measure of this is R+D costs

\* 1.2 Billion to date

\* 1.8 Billion total

but engineering is sound + competently handled

## Status

Tests of major system components at White Sands  
Ascension Island, Pt. Hogue

Kwaj tests against AICBM start May '62 + last  
for 2 years

## Nature of Limitations

Decoy Problem

- Atmospheric Sorting  
Saturation if launch before  
discrimination

Jammers

low  $\nabla$

Fully automatic N-2 (by necessity) must have  
doctrine preprogrammed for variety of  
threats

Conclusions: a) Crude Pen Aids (Decoys that unmask at 300,000 ft)  
force battery to hold fire so that intercept  
range = 20 miles or defended radius = 10 miles  
for 8 megatons

b) N-2 still suffers from early neglect of  
possible decoyed attack.

i.e. i) N-2 missile designed for 75 mile range  
ii) D.R. = afterthought

Past Scientific group Recommendations, negative. R+D proceeded because

a) Maintain option in only possible system before 1970

b) Means for ICBM + ALCBM effort.

For more concrete evaluation we matched N-7 against very specific offensive missile systems

Result, N-7 is

a) Effective against - Atlas, Titan I, Minoteman (wing)  
Polaris A-1, A-2

b) Marginal - Minoteman Mk-II nosecone  
Atlas + Titan + Pen Package  
Polaris A-3

c) Ineffective: i) Missile designed for Penetration  
ii) 100 Megatons + simple decoys

N.B. - a) lead time + costs + flexibility favors Penetration over Zeus  
b) likely Soviet action on Penetration if US proceed with Zeus.

Conclusion - N-7 expensive with limited capability but only possible system for protection of soft targets + population before 1970.

Oral History Interview

with

Jack P. Ruina

November 8, 1971  
Cambridge, Mass.

By William W. Moss

For the John F. Kennedy Library

MOSS: This is an oral history interview with Dr. Jack P. Ruina who was the Director of the Advance Projects Research Agency in the Defense Department during the Kennedy years. The date of the interview is the eighth of November, 1971, and the interview takes place in Dr. Ruina's office at MIT [Massachusetts Institute of Technology].

All right, you have this set of notes from your briefing of the President [John F. Kennedy] in Hyannis Port on. . . .

RUINA: This is not Hyannis Port.



MOSS: This is not Hyannis Port. This is in Washington?

RUINA: It was the day before Thanksgiving . . .

MOSS: Right.

RUINA: . . . in Washington.

MOSS: Okay. *And . . .*

RUINA: ~~And~~ Now, let me give you the background on how the briefing was arranged.

MOSS: Right.

RUINA: The issue came to the President and I guess the National Security Council about whether we should or should not employ an ABM. And the ABM, that was considered in that time ~~XXXXXXXX~~ was the NIKE-ZEUS.

MOSS: Right.

RUINA: And Mr. [Robert S.] McNamara, at the urging of the Army, had recommended that we go ahead with a limited deployment. Now I think this is information that I have never seen publicly mentioned. McNamara was for a limited deployment of Nike-Zeus.

MOSS: This was beyond the continuing R & D. This was actual production and deployment.

RUINA: That's right. To do some limited productions. Remember in those . . . At that time the Congress was pushing hard for any military system including Nike-Zeus. McNamara's support of the Army proposal for a limited test stand was without any enthusiasm. I know that. Because . . . He was . . . It was a kind of compromise that he was unhappy with. He wasn't a guy who would go for compromises. It wasn't a rational program. The Army's interest in the limited procurement was rather clear. They just sort of opening the door and you just start with a limited program and it deploys to a big program.

I myself went for that compromise earlier in the considerations. The Army asked me to serve of a committee with them or sit in on a committee that they had. And the committee recommended a limited deployment. Richard Morse was Chairman of that committee.

MOSS: Let me put this in point of time. This was prior to the test in the Pacific where they--at Johnson Island.

RUINA: At Kwajalein.

MOSS: Kwajalein, right.


RUINA: Now, I didn't know what, where the status of the testing program was at the time and I don't think it had a great deal of relevance because I think the technology of Nike-Zeus was never in doubt. The issue was can it, even if it does what it's intended to do, is that adequate. The fact that the missile would work and that the radar would work and the computers would work was never the question.

MOSS: Okay. The point I w<sup>L</sup>'s going to make was that as I understand it, they went ahead with a test and used a near miss to add political weight to their argument.

RUINA: Yeah. In fact Hanson Baldwin, The New York Times, wrote an article in the magazine section and I was very disgusted with that article-- I don't know what he said; I can look it up because I have a copy of it--where he starts out dramatically. He says, "Just last week, the Army had a test." --If you want to stop this thing I can get the article.



MOSS: No. That's okay. We can . . .

RUINA: Okay. As the Hanson  . . . I remember I felt very discouraged that this is the only thing that the public got of what the issue is. The technical performance was never the question. And everybody in the Department of Defense had great confidence that the Bell Telephone laboratory, which was producing this, could do the job, are a conservative operation or ~~if~~ <sup>what</sup> they said they would do, they ended up doing. And this is very different from a lot of the aerospace contractors.

MOSS: Skybolt. Yeah.

RUINA: That's right.

MOSS: Right.

RUINA: Very different from what we hear about the C5A and so on. This group has performed in the past and if they're penalized they<sup>d</sup>/do it again. The issue was given . . . Even if it worked the way it was intended to work, is that enough? Does that do anything for you in terms of real defense?

MOSS: Right.

RUINA: Okay, the Army used as a tactic--after failing several times to get deployment--used as a tactic sort of setting-up a committee, interviewing of this committee coming-up and very responsibly saying we ought to have a limited deployment. And I personally signed my name to that report; or agreed to have my to go along with the report. And I was very unhappy about it. And then I changed my mind, I must say, afterwards.

Quickly, McNamara went along with it.

MOSS: Let me get in here a minute. What makes a person like you who has reservations, go along in a situation like that?

RUINA: I guess I had reservations for going along and reservations for not going along. It seemed to me a limited deployment wouldn't have been. . . . It would have been, I guess, rather expensive; not all that expensive. And, at the same time it wouldn't have meant the full deployment and the full commitment for something which would

have cost, at that time we thought a tremendous amount, ten or fifteen billion dollars. Those are small numbers these days for a weakened ABM [Antiballistic missile system] thing. On the other hand, what made me have reservations was that this was not the real reason the Army was interested in it. And I got more worried about the opening door as being more significant than I had thought earlier. The concept of opening the door was one that I became more fearful of. I don't know what went through McNamara's mind but he accepted the limited deployment.

MOSS: Did you . . .

RUINA: And he presented that. . . . He must have presented that to the . . . I don't recall now whether, how he presented it to the president, but it was presented to the president. [Jerome B.] Jerry Wiesner, at the same time, was clearly against limited deployment. And he asked . . . He told the president that he should hear, he said, at the very least he should hear from

other people about the technical limitations. And he said other people other than himself and sort of the president-size advisory community.

At that time, I was the Director of the Advanced Research Projects Agency which had responsibility for research and ballistic missile tests. But not for the development of Nike-Zeus. This was advanced research. but I had previously been the Assistant Director of Defense Research and Engineering-- a very long title-- for air defense; where the Nike-Zeus program was my responsibility in a staff sense.

MOSS: This was previously under General Betts.

RUINA: No. I was never under Betts. I was . . . This was Assistant Director for Harold Brown. I succeeded Betts and . . .

MOSS: Right. Right.

RUINA: Okay. So that I was very familiar with the system and its shortcomings and what not. About a . . . I don't recall whether it was that morning or the day before that can you come or would you come and talk to the president about the system. And, you know, what can you say to that



except of course you'll come. I mean, no question about it. But my own style is not . . . I didn't have briefing charts handy. And I never went around giving briefings. I participated in many discussions but I wasn't a briefer. So I had no charts to give and no pictures. As long as I had a drawing board, a place to draw, either a large easel and paper or a blackboard. That was enough and I prepared these notes I believe that morning.

I went there . . . I went to the meeting and it was. . . . The people there were Jerry Wiesner and Harold Brown, who was the Director of Defense Research and Engineering and my boss, and the president. And what was very obvious was that McNamara wasn't there and wasn't invited.

MOSS: Where did it take place? In the president's office?

RUINA: This was in the president's office, yes. In fact, an interesting thing occurred. When we arrived--I believed we arrived in the morning. Yes. We came in late morning.--And we were waiting out in the room that's. . . .

That little waiting room that's or the office that's between the Cabinet Room and the President's office. And the president came out himself and said, "I'm awfully sorry that I can't meet with you people right now." Turned <sup>[KORRAH ]</sup> very informal and he said, "Chancellor Adenauer was in this morning and we're. . . . Discussions are continuing and I'll have to. . . . I hope you don't mind waiting." In fact, just then Adenauer did come in. And the whole informality with him impressed me very much as compared to my earlier meeting with a president on a business matter which was [Dwight D.]  
couple  
Eisenhower a ~~few~~ years earlier--maybe a year earlier--dealing with air defense where the proceedings were extremely formal. The President acting just the way I would act and coming out himself and telling us rather than ringing a buzzer and having some assistant come out to tell us all this.

So we came back in the afternoon. Proceeded with the discussion of this thing. It was a very lively discussion. The president interrupted constantly. Asked many questions. Got into small arguments with Jerry or Harold about one thing or another. And at one point I found myself. . . . It was so informal I found myself saying something I never thought I'd say to the president. "Please wait, if you'd only wait I'll get to that point. Be patient." It was that kind of give and take. You almost felt that a group of peers were discussing something rather than a briefing to the president. Again, contrasting tremendously to the early meeting I had with Eisenhower. In a . . . It was a Cabinet meeting, the earlier . . . Or National Security Council meeting, the earlier one.

MOSS: Let me ask you both about the breadth and the depth of his comprehension of what you were talking about. Did he seem to fully understand just what it was?

RUINA: Yeah. At that time, the issues, I think you have to put it in perspective. At that time the issues you'd discuss with Nike-Zeus were almost all technical. The question was, you know, how well would it defend? How well could one make decoys? How easy would it be for another country to make the system that would overcome this thing? The broader strategic questions, <sup>LIKE</sup> ~~on~~ impact on the arms race, were not raised for decision. They didn't really come about till about a year later. They were raised privately amongst a group of us. And then . . . And then I remember talking to Mr. [Roswell L.] Gilpatrick about this. And he was very impressed when I pointed out the arms race implications. And he asked me to write a paper. And then he disappeared from the system. And as soon as I got out of the government, I did write a paper which was presented at Pugwash [Pugwash Conference on War in Nuclear Age, Udaipur, India] meeting in India in January '64 which said, you know, we don't have ABM and let's keep it that way. And ~~at that time~~ <sup>d</sup> then the other impression is that we were <sup>t</sup> nus. But that was. . . .



MOSS: So the whole worry about the broader implications like [Herbert F.] Herb York's book, the Race to Oblivion, and so on . . .

RUINA: No. That's right, never . . .

MOSS: . . . were not really appreciated and grasped at that point.

RUINA: If they were, it was in only very small circles and highly theoretical arguments. No one ever thought this is, this has political acceptability or . . . You know, it was sort of academic. The issue that was presented to the Secretary of Defense at all times, the issue that was presented to the president at all times was that this thing isn't worth the money because it will be easily overcome.

MOSS: All right, let me ask you the affect of another school of thought there. The Herman Kahn type thing. Did this enter into it at all?

RUINA: No. Because again, Herman Kahn's analyses never took into account the technical aspects. They were also theoretical but from a different point of view. They were theoretical arguments that

can be . . . Arguments that at least I was presumed to be the expert on, or one of the experts on, dealt with the technical issues. And that was the center stage as far as I was concerned.

MOSS: Okay. So this paper that you're holding in your hand now is your rough notes prepared for this briefing.

RUINA: That's right. That's right.

MOSS: And it's largely the technical aspects of the ABM problem?

RUINA: Exactly. Let me just show you, if I can read this.

MOSS: Surely.

RUINA: The first part starts out with what the Nike-Zeus system was. According to that it was a terminal defense system. There are different types of defense systems that people talk about, mid-course and so on.

MOSS: Right.

RUINA: This is terminal defense system and it was designed along conventional lines. Again, in those days, like now, people talk about exotic systems, lazars and what not. The word lazar wasn't used but

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we had other kinds of kill mechanisms. This is along conventional lines. This sequence of events in the way the system works is first you search radar searchers and acquires; another radar works on discriminating whether the object indeed is or is not a real warhead; tracks <sup>the</sup> a real warhead; launches a missile; steers the missile; and then gives instructions for detonation; gives Command and such.

The Nike-Zeus battery . . . This is how the system works, but a battery consists of one discrimination radar. The search-acquisition radar are separate, but the battery itself, one discrimination radar, six target track radars, twelve missile track radars, ninety-six interceptors and a command center which is . . . Now I say this is flexible. These are not rigid numbers. This is what Delta-Alpha laboratories in the Army had in mind in making up this system. They had in mind a system that was big, complex and advanced. The measure . . . The measure of how big, complex and advanced it is is that it costs had cost 1.2 billion dollars only for the R&D.

MOSS: Up through November 1961.

RUINA: That's right. And it was going to be if the system were to go on, 1.8 billion total. Just for the research and development. Now, again, since then those numbers aren't as staggering. In '61 for R & D program on one system that was a staggering program. And I dare say it is probably the biggest, the whole. I'm quite sure it is. There's no program that compares to this. ~~AND YOU KNOW THAT THAT WAS THE~~

MOSS: And you feel that that was the factor that weighed most in considering whether to go ahead or not?

RUINA: Well, that was not the deployment cost.

MOSS: Right.

RUINA: That just shows you how big and complex the system was. The deployment costs would have been ten, twenty or maybe I, I don't know if I had reached them.

MOSS: Okay.



RUINA: I make a point but the engineering is sound and competently handled. That there is no question that it was being engineered well.

The Status of the Program. This is the background. The status is very . . . .  
"Tests of major system components at White Sands, Ascension Islands and Point Mugu." And I don't recall now what tests occurred at these places. But these were notes to myself so I knew that. . . .

"Kwajalein tests against AICBM start May '62," and that answers your earlier question . . .

MOSS: Right.

RUINA: ". . . and lasts for two years," as the first tests in Kwajalein had not been started.

MOSS: Right.

RUINA: And here's a mistake in my notes. I wrote "against AICBM" and it ought to be "against ICBM".

The Limitations of the system. "Nature of Limitations". First, the Decoy: The fact that atmospheric sorting is the only way we know how to handle decoys and that the Nike-Zeus couldn't wait for atmospheric sorting. It had to launch

---

ahead of time. And if you launched ahead of time  
you can easily saturate the system.

MOSS: By atmospheric sorting you mean the different  
velocities of the . . .

RUINA: That's right. Well, velocity . . .

MOSS: . . . of the deploys, of the rocket through the . . .

RUINA: ~~XXXXXXXXXXXX~~ Different behavior let's say.

MOSS: Yeah. OK.

RUINA: Velocity is only one aspect. You could make it  
go the same velocity. And in that case it's  
radar-wise they'll be different.

MOSS: Right. Right.

RUINA: "Jammers." The use of jammers. "Low cross-section,  
<sup>WAR HEADS</sup>  
~~white~~ <sup>the</sup> hand. The fact that/Nike-Zeus system is  
fully automatic, by necessity, that you can't  
have a man in the loop.

MOSS: Right.

RUINA: There isn't enough time. So that you must  
pre-program precisely what you're going to do  
and you don't have the flexibility of saying,  
"This looks a little hard and this is a little  
different." Whatever . . . Anything you  
might possible<sup>d</sup> conceive of has to be programed

into the system ahead of time. It gives you very little flexibility about what you can handle. You have to know the nature because if you knew the nature of the guys decoys ahead of time, that's one thing. But you can't on the spot, make some decision, "That's a fishy looking thing and I should or shouldn't do that".

General conclusions or technical conclusions are the crude penetration aids --that's decoys that unmask at 300,000 feet; decoys that don't penetrate very well, very far--force battery to hold fire so the intercept range is roughly twenty miles or defended radius is ten miles for eight megatons. This just tells you that penetration, crude penetration aids can be rather effective against the system.

Nike-Zeus still suffers from early neglect of possible decoyed attack. The early system was designed with no decoys in mind. Later, as they were going along, they added . . . The discrimination radar in ours, that was added and it wasn't nailed into the design. It was a little add-on and the system really suffered. It still looked like



it had that add-on. It looked like it, somewhat clobbered-up system, as far as decoys were concerned, decoy handling. In fact I said discrimination rate, that was an afterthought. And the Nike-Zeus missile was designed for 75 miles which was just the wrong range. You'd never design something for 75 miles. You'd design it for either longer or shorter. As a matter of fact, the current system, the Sprint we designed for longer and the, I mean the Spartan, and the Sprint for shorter.

Past scientific group recommendations were negative. R & D proceeded because, two things: One is to maintain option in only possible system before 1970.

MOSS: Right. Right.

RUINA: In case you're wrong, you want to do something.

And two, it's a means of learning about ICBM's and AICBM's. That is by doing this, taking this whole program seriously you learn about penetration or if we see intelligence about Soviet ABM, we'd know how to penetrate it; we'd know it's limitations and so on. I mean we wouldn't be <sup>SCARED</sup>



unduely by seeing something and we'd know how to handle it in a reasonable way.

And I said for more concrete evaluation, we matched--this was a study that I had done myself with a small group in the Defense Department--Nike-Zeus against very specific offensive missile systems. Normally people would do analyses against gedanken systems, you know, what if they did this and what if they did that. And I think that's very useful. But to lend, lend sort of credibility what I did was say, "Let's talk about what we really have in the inventory. <sup>L</sup>Let's talk about what we're really thinking of our inventory and how would that work against Nike-Zeus." Okay. That was 1960. The result was the Nike-Zeus would have been effective against Atlas, Titan I, Minuteman (Wing I)--which was the early <sup>Y</sup>Minuteman--Polaris <sup>A</sup>A1 and A2--the early polaris.

It would have been marginal against Minuteman with the Mark 11 nosecone--that was one that had a better reentry characteristic, faster. It came with . . . It reentered very

quickly--Atlas and Titans they included penetration packages. It would have been ineffective against a missile designed for penetration. We didn't have at that time any missiles designed for penetration. We would have taken any of these things and designed them. This was . . . Really designed them. This penetration package was a little ad hoc. And against the . . . The Soviets at that time had exploded a 100 megaton bomb and simple decoys. The reason the 100 megaton bomb is important is because if it was a 100 megatons you really have to kill it far away. Because the decoys can be fantastically simple to saturate the system.

Again, in conclusion, lead time and costs and flexibility favors penetration over Zeus. Likely Soviet action on penetration if U.S. proceeds with Zeus. Oh, I did have . . . Oh, on penetration, not in terms of the arms race. It was easy for them to technically solve the counter-Zeus.

MOSS: It would be easy for them to suppose what we're doing with the Zeus and. . . .

RUINA: Well, once they . . . They would know it and they would know . . . Yeah. There was such a lead time involved. Lead time crush. Nike-Zeus expensive with limited capability, but only possible system for protection of soft targets and population before 1970.

Okay. That was my story with no recommendations in it. That's the way Nike-Zeus appears to me. The . . . I said, the President asked lots of questions, and a lot of them were not broad statesmen-like questions at all. They mostly concentrated on, you know, like, "What is a TTR and what would happen if you had five rather than four?", something like that. They all seemed to be detailed. But he was just jumping around.

MOSS: Did he ask you why the configuration was in multiples of six, did he?

RUINA: No, I don't recall. I don't recall, but he could have. I mean those are the kinds of questions he was asking. But it was all the way of sort of



little probes into the, into the brief . . . into the discussion to understand it. It was an indication to me that he really was, he was with it. Very often you give briefings to high level people and you know, either because they're technically remote from the, very remote from the technical substance, or have no interest or their minds are elsewhere at the time that you sort of feel that they're not with you at all. Or occasionally they'll ask a question and it's so, you know, it's at absolutely right angles to anything you were talking about. But this wasn't the case here. And you walked away being impressed. This fellow was interested and curious in a sort of nice way, you know, grasping at every little thing he was learning. And, as I said, there was so much give and take between Wiesner and Brown and myself we were sort of no . . . There was never only one person talking; there always were two people talking if not. . . .

MOSS: All right. Was it an advocacy kind of thing?

RUINA: No.

MOSS: Or was it simply exploring the problem?

RUINA: I think everybody there sort of had the same position and the president was learning about it for the first time. He . . . It was late in the afternoon, I think--it must have been about three or four o'clock by that time--and it was, the weather was very bad. And Robert [F.] Kennedy came rushing in once or twice during this meeting and said, "You better leave now because the weather is closing in at Hyannis Port and if we don't leave now we won't make it. And the President kept delaying it. And finally he said, "I got to go".

Also, in the meantime, all this time he said to somebody or called, "Why don't we get [Maxwell D.] Max Taylor down here. He ought to <sup>MAX C</sup> ~~here~~ all this. Taylor was then the Assistant to the President on Military Matters. By the time Taylor got down, the meeting was over. But the President said, "Can you fellows come up to Hyannis Port on Friday?" So we continued it at that time. So, that ended that

that Wednesday meeting; it lasted for half-hour or forty-five minutes. It would have gone on probable for two hours the way he was interested and so on. And . . . So that ends that one. And we all went off and I'll tell you about the Friday incident.

Just as an aside, I might say that some time afterwards in only a matter of weeks, the president was asked at a press conference about Nike-Zeus and some of its limitations. And he responded on the basis of this discussion right down the line with an air of knowledge and understanding that was impressive. You would have said, "My God, I don't know how <sup>he</sup> I would really get it all". He talked about decoys and tracking and all that sort of. . . . He may have been given another little briefing before the press conference about what likely questions were apt to come-up. But he was . . . He didn't get a complete briefing of any sort like this but he may have given some hand written notes by Jerry Wiesner or somebody before the press conference,



presidents usually are. But . . . But I was rather impressed, as I say. He really learned his lesson well.

MOSS: True! Okay, now on the Friday one?

RUINA: The Friday . . . We all left . . . The plane left--one of the Air Force 707's--left Washington for the meeting up there and McNamara was on the airplane, others were on <sup>board</sup> ~~it~~ because there were going to be a lot of topics covered by the meeting. I didn't realize that. I thought we were . . . I still had the impression that just this little group was going to come up and finish the meeting.

MOSS: Yeah. I have a list of the people who were there. . . .

RUINA: Tremendous crowd.

MOSS: . . . at this point. All the way from Luther [H.] Hodges to Max Taylor.

RUINA: That's right. And also Steuart [L.] Pittman on Civil Defense.

MOSS: Right.

RUINA: Civil Defense was another important topic.

MOSS: Let's see: [Lyman L.] Lemnitzer, Hodges, McNamara, Gilpatric, [David E.] Dave Bell, [McGeorge] Mac Bundy, Elmer [B.] Staats, Wiesner, [Theodore C.] Sorensen, Harold Brown, Carl Kaysen, George [W.] Ball, Peter [S.] Jones--I don't know that name, who was he?

RUINA: I don't know that name either.

MOSS: Howard [C.] Peterson, Patterson?

RUINA: Yeah, that's right.

MOSS: Arthur [M. jr.] Schlesinger was there.

RUINA: Yeah.

MOSS: Burke Marshall, Steuart Pittman, [Kenneth P.] Ken O'Donnell, Max Taylor, Cantrell and [Robert F. Kennedy] RFK.

RUINA: Now the Civil Defense was one of the topics. Now I don't know if that . . . I think that preceeded the ballistic missile defense one. And we waited outside while Topic 1 was going on and Topic 2 went in and so on. But the . . . All that took place in the airplane was rather interesting. Let's see if I can recall. On the plane was McNamara and there was this little awkwardness about McNamara, who was my boss was coming up to present one program



while I had talked to the president clearly indicating that--without any recommendations-- but clearly in support of a different program. Also on the plane was an Air Force, Army Major . . .

MOSS: And to compound it, you had already gone along with the limited defense . . .

RUINA: That's right. But I think McNamara always knew or wasn't bothered about it that; ~~it was a problem that~~/or cared about that.

MOSS: All right.

RUINA: That's just between me and my conscience that was the other one. Somehow I felt I was a bit taken on that, but I don't think more so than at MIT.

On the plane was Major LeVan who was the Army's chief briefer on Nike-Zeus. Now you don't have him on the list.

MOSS: How do you spell the name?

RUINA: C. J. LeVan. He's an Army general now.

MOSS: L E V A N?

RUINA: L E V A N. Yeah.

MOSS: I didn't find your name on the list, either, the White House appointments register that we have.

RUINA: Is that right? Of the day . . . Of the Wednesday?

MOSS: I didn't find it either on the Wednesday or on the Friday.

RUINA: On the 22nd? Well, Wiesner may have just said I'll bring Harold Brown and one of his staff or something like that.

Well, LeVan was on the airplane, which also bothered me because it was clear that McNamara asked him to come. And LeVan was the Army chief Army briefer in . . . Always briefed everybody on Nike-Zeus. Very good. He did it very well and very smooth, highly professional. If anything, he lost a little effectiveness because he was, he's so professional in giving a briefing. You know, the questions and answers right down the line. Almost like a TV goer.

Ah, LeVan was along; and that made me worry about, you know, is this going to be a debate? Are we planning to have a debate, or what? And only for the awkwardness of it. Also, it became rather clear that the meeting

on Friday was going to be, have a different character than the meeting on Wednesday, rather than a continuation of it.

Just as an aside, when . . . I think when Civil Defense was done, you know, the door opened up and, I had been outside talking to<sup>...</sup> Bobby Kennedy was there for a short time and Mr. Kennedy Sr., Joe Joseph [P.] Kennedy was there and I was chatting with him a little bit. And I was reading a . . . I was . . . But then, it was a rainy day also, and people were playing touch football in the outside. And I came in. I remember the President turning toward Arthur Schlesinger and saying, "Arthur, I want you to write this thing up in a way that . . ." and sort of told him, you know, gave him sort of public relations aspects of how it should be presented. For what impressed me was Schlesinger's role. You know, his job, he obviously wasn't involved as much in decision making at all, but rather was there for that purpose on that issue.--I'm not suggesting it for anything else-- his job seemed to be that the fellow who would

write it up in such a way that it has a certain appearance.

The next meeting when the issue of the ABM came up, the room was filled. And I was in the, way in the back towards the door and the President was up front and I think near him somewhere was McNamara and Max Taylor up front. And discussion took place -- Jerry was there; I'm sure Jerry was there--some general discussion. Nothing like the kind of technical detail we had here. But it was about, "Is it effective" and "Isn't it effective" and "Can we wait a year" and "Why don't we wait a year" kind of discussion. It never got down to anything about how to enter into it and I don't recall if I said anything. If I did, it was minor. Somebody might have said, you know, "Ruina, how many MTR's are there?" and I may have said, twelve rather than ten, or something like that.

MOSS:

Hm. Hm.

RUINA:

I don't recall giving any kind of presentation or any detailed argumentation for anything. And the President ended up saying, sort of mixing the



limited and test ban--the limited deployment. . . .

MOSS: Yeah.

RUINA: And . . . And McNamara, I think, was just as happy that he did.

MOSS: Do you remember the grounds? Were they simply on the cost or. . . .

RUINA: A combination of cost and effectiveness. Yeah. But the discussion was a sort of a "motch-mud", it's still technical in terms of effectiveness and cost but very general grounds. And Taylor would . . . To the extent that Taylor didn't agree or did agree, it was also, he didn't have really a comprehension of the details of the system, at all.

I guess I was the only real technician in the group at that time. Jerry Wiesner, of course was, and was knowledgeable. And Harold-- I shouldn't say I was the only one--Harold Brown and Jerry Wiesner and myself, and, I guess, Le Van to a certain extent. But I don't think . . . He was more of a briefer and didn't really have. . . . If he had a good perspective and a balanced perspective about the system, it was well hidden.

Okay, that was the Nike-Zeus. That's . . .

That was the end of that.

MOSS: That was the end of it. No recurrence in the succeeding budget considerations, for instance?

RUINA: Well, the only other role that I had that was a major one didn't involve my encounter with the president at all. But later on, I proposed in our own staff operation in the Defense Department-- in Harold Brown's staff--I remember proposing <sup>that</sup> it's, that the Nike-Zeus system was an option, in the argument as I gave here, but that it was an option on a pretty old system and maybe it was time to pick up a new option. Maybe it was time to go do something. . . . Use some later technology.

That was discussed for sometime over several meetings. One of the things that was discussed is maybe we <sup>u</sup> <sup>to</sup> ought <sub>to</sub> open the door up to other contractors ~~xxxxxxx~~ besides Bell Labs. That although Bell Labs was clearly the most competent in the way of producing equipment that works; they were also so conservative that they didn't use the latest technology as freely as other companies <sup>s</sup> did. We thought

maybe if it was an open competition they would be stimulated into doing more. We then decided against that because it would seem all. . . . None of us. . . . I went through what other contractors might, we might have and it turned out there were only two that made sense, Hughs and Raytheon. And that neither of us took either of these contractors as seriously as Bell Labs. So that we would be afraid to go that way, anyway. On that basis we would just be playing and I think none of us were happy with the idea of playing games. I mean it was just a bit phony.

I think I proposed. . . . I'm quite sure that I was the one who proposed it to Harold that we ought to have the following: That several of us. . . . That he ought to assign several people around the table on the staff meeting, the job of making-up a program. What they would do at this stage, as far as ABM was concerned. ABM R&D. And I think Fred Payne was one of the people. I know [Eugene G.] Fubini was the other and I was the third. And I don't remember



what Fred Payne came up with. I remember Fubini coming up ~~with~~ with what I thought was a ~~gim~~<sup>m</sup>ick. It was a technological fix. He's saying, ~~XXXX~~ "Let's build a system that really isn't very good or do something that isn't very good because it isn't. . . . Since you can never make a good one we might as well not even try to make the best one. And if sort of even a lousy one, it would, there'd be enough sort of cause the Russians a tremendous reaction and a lot of expense and that's just as good." You get all of the benefits and not nearly the same costs. And again, those . . . That didn't appeal to me. Fubini always, is a very clever but somewhat gimmicky fellow, and this was a gimmick.

And it was at that time that I give myself credit for inventing the, what is the Nike-Zeus system now. Not that I handed it in from scratch because a lot of the technology which ~~the~~ Nike-Zeus contained was already in the air. And we had been working on ~~phasoray~~<sup>phased array</sup> radars and better interceptors, and so on. And I made up again--I had a little talking paper like this for Harold Brown's



staff meeting--where I presented the alternatives that we had. And I gave it to both Harold and later to the president's science advisory committee. And I listed--I think I can find it on paper too--the alternatives we had. And one was continue with Nike-Zeus as is. And nobody found that satisfactory. The other is to continue with Nike-Zeus but modify it so that we have had phased array radars instead of the, instead of the old radars that they had. The second option was to have phased array radars and also work on a new interceptor which would be short ranged and snappier and faster and they'd all phase in. And the third option, which I called Nike-X--just because, you know, I didn't know what to call it; and that's how the name originated--it started on that piece of paper, Nike-X, I call it N-X, was to say what if we started from scratch? You know, if we started from scratch, how would it differ from the other, from the things that we were talking about. On my outline, I had a little table

outlining each of these things. And then the program was sort of pushed up to the higher authorities and it stayed Nike-X and then the . . . When it was approved it was called . . . It stayed Nike-X in all the internal papers and then when it was approved the Army and Bell Labs changed its name to Nike-Phoenix. And they found within a few weeks that they couldn't use the word "phoenix" because another program had the name "phoenix" somewhere and it would be confusion. So they said, "Well, let's go back to Nike-X until we find a better name." And then they just never found a better name. And so, the one mark that I made in history that I can point to is I've named Nike-X, Nike-X.

MOSS: Very good! How did this all tie in with what I understand is a broader concept, Project Defender, which was . . .

RUINA: That was just working on all . . . Project Defender's main job was looking at reentry phenomena. You know, people didn't know anything about what happens when missiles reenter or

decoys reenter. Can you indeed separate one from the other? Can you indeed design reentry vehicles or decoys that can look like reentry vehicles? Can you design reentry vehicles that look like decoys? To what extent is there an overlap in the reentry characteristics? And that was a very expensive program.

The other is to look at all kinds of new technology that might have an impact. And the big thing we take credit for is getting the whole phased array radar business started, and in building the first phased array radar called ISAR, for ballistic missile defense as a trial thing, and another one was followed. And we designed, again sort of for advanced development, an interceptor--a very snappy interceptor, snappier and faster than even Sprint. I just worked on technology, that's what Defender. . . . But my involvement in all these things didn't come so much from Defender as from my short period as the Assistant Director for Nike, you know, for Air Defense which included Nike-Zeus.



MOSS: Let me ask you to describe the nature of ARPA [Advanced Research Projects Agency] as you, as you entered the Kennedy Administration? Just what was this? I get a feeling that while you were working on advanced projects, <sup>A</sup>that the line between exploratory work and the development <sup>o</sup>work is a very fuzzy one. Now, where do you leave off?

RUINA: Well, ARPA started out with a bang, you know, the history of ARPA with Sputnik. It was our answer to ~~SPUTNIK~~, one of our answers to Sputnik. And was primarily a space show. Its . . . Roy [W.] Johnson was the president, was first director and got an awful lot of publicity and a big show and so on. And then [Brig. Gen. Austin W.] Sy Betts was, who was sort of the loyal man, loyal to the system, not especially colorful but rather competent director was number two. And he was Herb York's choice. And I was the Assistant ~~D~~irector for Aid Defense and Herb asked me if I would be the Director of ARPA. And we gave some thought



to the idea of including in the job two things. One is to direct ARPA, which had its budget. And also to be his staff director for research. And that was maintain the staff responsibility for the research of the Army, Navy and Air Force, and also be the Assistant Director, or the Director of ARPA. It would be a dual responsibility. And that's the way it was presented to McNamara. By that time McNamara was the new Secretary of Defense, was Secretary designee. And . . . And I have a little piece of paper which I have--I was just looking because I have it framed; it's about this big-- McNamara had the habit of everything he asked to be done he wrote a little note. Right away. And gave it to somebody and said, you know, "This is to remind you, that's what I want. Lest there be any misunderstanding. This is your authority. And he writes with his left hand. And very scribbly. And you have . . . There was a little memo which said, "Okay Ruina Expanded responsibility for . . . Expanded concept of ARPA." Or something like that. That's the

only official piece of paper <sup>I</sup> ever got. You know, the later directors all got big things signed by the President or somebody. I never got one. But Herb gave me this little <sup>piece</sup>; I . . . Because it's such an indication of the man I just framed that little piece of paper and I had it somewhere in one of the shelves.

MOSS: Yes.

RUINA: As soon as I took the job, though, it became rather clear that it didn't really make sense from a management point of view to have a dual responsibility. You can't in a way be the staff man for the Army's program on research and the Navy's program on research, and at the same time running your own research program. Sort of competition in a way. And since I <sup>later</sup> both worked with Herb and then/Harold Brown very closely, I had enough voice in the system anyway. Given officially the title would have been a mistake. And so we all decided that in spite of the fact it was all approved to go along these lines, that we were not going to do it. And so

I just became the Director of ARPA.

And ARPA was responsible for<sup>r</sup> a variety of programs but two that stand out most significantly were the Ballistic Missile Defense Program and the Nuclear Test Detection.

MOSS: Vela?

RUINA: Vela. Yeah.

MOSS: Vela.

RUINA: Mainly, the Vela program for underground test detection--I forget what that's called, Vela Unifor<sup>m</sup>.

MOSS: And I understand there was another--in the budget submission for ~~the~~ the Fiscal Year '63 budget--the<sup>R</sup> was also a project AGILE for the . . .

RUINA: That was just starting at the time. '62, '63. Yes. And that never really played any major role. Although a lot of the defoliation things have been accredited to ARPA. And, much to my chagrin, we've been given a lot of credit by the student radicals around here. So I've been called at this place by the radicals as the architect of America's chemical and



biological warfare program. But in terms of historically, the important things we did were, and. . . . Let me put it another way, the only contacts I had with Mr. McNamara and with authorities, and like the ~~Secretary of State~~ or people on the National Security Council on anything I was doing or regarding those two programs--Nuclear Test Detection and Balistic Missile Defense--none of the other programs, that had to go above my immediate boss for anything--oh, Congress, we of course went to Congress--but I mean in terms of national issues and national debate or anything like that, only those two.

MOSS: Well how, let me ask this, how. . . How did . . . Did you know anything about the development of Harold Brown's appointment?

RUINA: Only hearsay. No one told me directly that he was. . . He was . . . He was the recommendation of Herbert York and. . . .

MOSS: York credits himself with bring<sup>ing</sup> several of you in. [John W.] You and Rubel and Fubini and [Howard A.] Wilcox. . . .



RUINA: He did, but I was. . . . I was already in the system in the sense that I was in the Air Force and ready to go. . . . I was in the Air Force as a Deputy Assistant Secretary for Research, or something like that. And I was on leave from the University of Illinois and was planning to go back. I mean, I thought it was sort of fun to be there for a year but I didn't want to stay longer. And he brought me into the system.

MOSS: How did they. . . . How did Brown divide the responsibilities out there. You have yourself, you have Rubel and Fubini and the others. . . .

RUINA: Well, and I had two jobs under Brown. Let's say it's at first as Assistant Director for Air Defense. Rubel was the Assistant Director for Strategic Weapons. So he had the offensive. Minuteman, Skybotl was his big thing; you know, Titan, Atlas, B-52s and so on. I had the defensive side. All the aid defense. Air defense at that time, Spirit, Sage, Super-Sage, the interceptors, as well as ballistic missile defense and the Ballistic Missile Early Warning

System, BMEWS. Fubini had communications and computers and a lot of technology. That's the way it was broken up. And we were split-up that way.

MOSS: What about Rubel's appointment as Assistant Secretary? Do you know the background of that?

RUINA: Yeah. Rubel was asked to be an Assistant Secretary of the Army and was considering it seriously. And one of the things was, you know, the idea of being. . . You know we didn't have presidential; we didn't have statutory appointments. ~~xx~~ The job I had was, at that time, you know, highest level Civil Service and so on. But it wasn't the statutory appointment. We weren't "honorable" and we didn't get cars and limousines and all that sort of thing. Although, later when they formed Executive Level Five in the government, you know, executive. . . . When they changed executive . . . Those jobs are now Executive <sup>level</sup> 5 jobs. But that added business of chauffeur and driver and so on, that pick you up at home and so on. We didn't have those extra little. . . . And, I guess, for a

some people those are, I suppose, you know, are important and not insignificant. Especially when you're living in that milieu. Around the university it would be a joke of some sort but there, in that milieu, in that environment, it begins to take on a value that it shouldn't. And Rubel was toying with this. And I think this ended up. . . . This idea of being made an Assistant Secretary; making that job an Assistant Secretary's job was a way of getting him to stay. And . . . And it was worked out as part of that package. And then, once it was created, when Rubel left, Fubini got it. And I must have left just at about the time which Fubini got it, as I recall. It must have been about that time.

MOSS: Let me ask you if you recall the general . . .

RUINA: I can tell you one other thing which was of interest. . . . When I left the Pentagon, I guess, somehow in the summer of '63, I went to see McNamara. It was the only time I ever saw him alone. I had seen him on many occasions, always at a meeting



with three or four or five people, but I had never seen him with just he and I in the office alone. And it was sort of interesting because he was rather friendly and, you know, usually he's very business-like and friendly a a very superficial way. And I sort of mentioned the fact that on the two issues I dealt with him on, which were the nuclear test ban and the ballistic missile defense one, that, we knew that the nuclear test ban was getting a tremendous amount of publicity and arousing tremendoud<sup>s</sup> emotion, but that in my view, the ballistic missile defense was far more important on every score that we could think of. By that time I was beginning to think much more clearly about strategic impact and the arms race and so on. All the ideas I formulated for the paper I wrote in '64--which I will probably give you a copy-- you know, were all clear to me then. And to a small community of other people--I don't want to say I was unique--but a small, very small community.



MOSS: Who were some of the other people?

RUINA: Jerry Wiesner, for example. Hans Bethe, people like that. And . . . And I said, you know, that one got all the lime light and the other was far more important as a public issue. And he agreed. He said, "Oh yeah, of course that's true." And so he reminisced a little bit about ballistic missile defense and he indicated how terribly upset he was when the army would answer some of the, you know, some of his basic questions about the system with, you know, platitudes and. . . . At one point he said, "I always get so furious at that general and he didn't remember his name, but I reminded him of the general he was talking about. His name was [Lt. Gen. Arthur G.] Trudeau. He was in the army, sort of chief for R&D or something like that, Military Chief. And he indicated his great fury at Trudeau and whenever Trudeau came up and he gave little lectures on, you know, defense or something like that. And the last thing

McNamara needed was a little lecture of platitudes and the least thing he had patience with. I was sort amused by that because of a little bit of a personality coming through. Because I never saw him socially and as--in the '63 period. I saw him afterwards but . . .

MOSS: Do you recall the difference in view between the military R&D people and the DD R&E group as being very sharp and dominant?

RUINA: Oh, tremendous. The people in DD R&E . . .  
Oh. I think on the pers . . . Not on the surface.  
when  
I mean, /they go to meetings everybody was on pretty good behavior. Occasionally Harold Brown, for example, particularly would make, would be somewhat nasty, somewhat in an immature way; but he was young. Marvin Stearn particularly would sound nasty; Marvin Stearn was Rubel's successor. But most of the time the, everybody was in reasonably good behavior in terms of. . . .  
In, I think . . . I don't know that any strong personal animosities were peeved, but I may be wrong. I may be wrong. I myself, I think, and

, and several other people disagreed very strongly. But basically, the mentality, the difference in mentality was staggering.

MOSS: How would you describe it?

RUINA: Well, I think the people in DD R&E worked through first physical things. They always asked the question, "Do we really need this thing?" And they didn't work from , you know, from the last increment up. They always asked much more basic questions. They were willing to pass over much more of the basic issues. They refused to deal with platitudes by and large. They were . . . They had a much greater personal involvement, maybe, with the rest of the outside world. I mean, the Army people had a much more sheltered existence. It's not anything basic in the human aspects of these people, but it's just one world was one that lived on the outside. For example, I had a lot of dealings with PSAC <sup>President's</sup> [Science Advisory Committee] and Wiesner and [George] Kistiakowsky. And, oh, I'd go to his <sup>place</sup> and chat with him and. . . . And sort of lived



I'd . . . The civilians in the Pentagon--at least in DD R&E--straddled two worlds, the military world, which they lived in, and the other world was the civilian world on the outside.

The newspaper people, the President's/Advisory Committee, <sup>Science</sup> Congressional people, and whatnot.

And . . . And so you didn't accept. . . . And secondly, the military people--another important difference here . . . I mean . . . Because, I think basically the DD R&E people were much better grounded in basic science. And so, whereas the military people knew a hell of a lot of the

<sup>En</sup>  
~~En~~gineering that's involved in old technology-- something like I wouldn't want to talk to General Trudeau about what's involved in designing a good rifle, I'm sure <sup>he knew that</sup> ~~if you do that~~--the concepts they had of what space was all about and about Newton's laws were just sometimes fantastic.

They were just all confused about, you know, what the basic physics was involved when it came to very new technology. They had no way of judging whether a radiation weapon makes sense or didn't. You know, <sup>since</sup> ~~since~~ we, <sup>things seem to have</sup> ~~since things have~~



come out of the blue before like jet aircraft and radar and nuclear bombs, you know, more things will come out of the blue; just do enough research and everything is possible.

MOSS: All right, but in a practical sense, even though there is this difference, you have to contend with these people for resources, for programs, or policy; and that sort of thing. How do you go about it? What happens at these meetings? What's the psychology of it, the politics of it?

RUINA: Well, I think basically, the places where that was important is either in the Secretary-- which was Secretary of Defense and there I think there was no question certainly in McNamara's case as to which line, which kind of thinking appealed to him more--and then the Congress. And interestingly enough, Herb York, who I think is probably one of the most effective people I've ever seen in Congress, would always come to Congress for appropriations, discussing appropriations by himself with maybe one or two others. And I would be with him--on two

occasions I was with him, I don't know why I was the chosen one. Oh, I was going to be the next witness. After he and I came as the Director of ARPA we sort of decided . . . He came with an assistant and some comments, a briefcase full of data.--The Air Force, I remember would come in on their appropriation, they'd have the Chief of the Air Force R&D come in with about a hundred generals and colonels in the room, you know, giving different data and different information. And very often wrong when basic questions were asked. I'm sure they were right when it came to how much money was in which program but when it came to saying, "Yeah, well how does <sup>A</sup>that gadget really work?" And, you know, they just frequently invariably embarrassing when I say they just didn't know what they were talking about. There's one particular case where I don't want to go into that. They had demonstrated a device and it was ludicrous how little the Congress knew and they knew about

what this device was. On the other hand, Herb would come in by himself. and would not give a snow job. He would talk quietly. He would talk with a kind of candor that would impress the Congress very much. And I think he was probably extremely effective. When he didn't know something he'd say, "Well I don't know this but it seem's that way," in a way that military people never do. He was human and reasonable and fantastically effective, I think. And that was a very good style. I think . . .

MOSS: How did Harold Brown compare on the Hill?

RUINA: Ah, Harold was a little cleverer than Herb in this regard. A little sharper, you know, at least the appearance of being a little sharper and cleaverer, you know. Somewhat less humble.

MOSS: A little whiz-kiddish?

RUINA: A little whiz-kiddish would be one way of putting it. But he also was very good. But I think Herb had that added bit of humility about what he knew or didn't know. A little softer, and that was. . . . Although, I must say that Harold



Brown was probably the best boss I ever had, in any job anywhere, at anytime. Let me just say that. The amount of support he gave you; the amount of interaction with him; the sense of team working together. . . . I'd say, there's nobody. . . . Herb didn't convey that as much. I was personally very friendly with Herb but he didn't. . . . There was . . . The group working in the office didn't feel as much part of a team with Herb as they felt with Harold.

MOSS: Let me ask you this. Do you have--speaking again of this military-civilian situation--do you have a personal feeling that it's very ~~original~~ <sup>CRITICAL</sup> and in a way very dangerous, this military ignorance, basic ignorance that you were describing?

RUINA: Well, it's particularly dangerous when the Congress wasn't very demanding. The Congress went along with almost anything the military asked for. And it was sort of they didn't know too much about what it was. that's how



we got, spent so much money on such stupid systems. I'm not talking about C5A's which I think are sort of basically honest mistakes, if you want to call it that. I'm talking about ridiculous research errors. Hundreds of millions of dollars going into radiation weapons and exoctic crazy things.

MOSS: <sup>SAINt</sup> SAGE?

RUINA: <sup>SAINt</sup> SAGE wasn't so crazy, that was just. . . . That engineering-wise, wasn't so advanced. But I'm talking about a thing called BAMBI. . . .

MOSS Yes.

RUINA: . . . And a <sup>program</sup> ~~thing~~ called GLIPAR(?)

MOSS: Yeah.

RUINA: Those are the kinds of, kind of nonsense that you know, it's just hard to justify on any grounds. I think the military now has to be much more on their toes with the Congress asking much more basic questions. I think the military is more sophisticated. Maybe that was part of a transistion from one era to another that was involved. A period of tremendous amount of new technology, advanced

technology. And Sputnik sort of helped that along.

MOSS: Let me shift to another subject for just a few minutes here. . . .

RUINA: See, the currency in that day was advanced technology.

MOSS: Yeah.

RUINA: The more advanced the better..

MOSS: On that point, in McNamara's appearance before Congress for the fiscal year '64 budget--I have the quote here somewhere--he said, "What we want are weapons and equipment that the fighting men can use. We're not interested in supporting the intellectually challenging but militarily useless engineering tour-de-force." And he followed this by a slight change in his description of the role of ARPA as an exploratory area, whereas the development stuff had to be solid and had to be over on the military service side. And it had to be solid before it got there.

RUINA: Yeah.

MOSS: Does this. . . . Does this ring any bells?

RUINA: Not big ones. A little bit maybe.

MOSS: Okay. I was wondering how . . . Just why he chose to use those ~~those~~ words; why he chose to come down on it so hard because it seems as though. . . .

RUINA: Well, ~~it~~ <sup>there</sup> was a lot of phoney stuff going on and maybe he chose those words just to get rid of things like the way the military came up with a . . . The Air Force kept pushing on this micro-wave radiation weapon they were pushing so hard. In fact they had a special hearing once because the Congressman from Texas, Teague, Olin [E.] Teague, called me the greatest stumbling block, he said, egg-head professor from Illinois who was the greatest stumbling block to America's ballistic missile defense act, because I did block a big program which took place, which was going to take place in Texas on the radiation weapon. Big facility was going to be built and it just seemed so asinine that I didn't approve the program or convinced my boss not to approve the program--I didn't have the authority.

I was not in line; I was a staff member--this was when I when I was in the Air Force-- and there was, and people got so upset about that that they had a special Congressional hearing on it. And so that . . . The Air Force was gun<sup>h</sup>ho on this radiational weapon, and other crasy<sup>z</sup> things like that. And maybe that was in response to such.

MOSS: We can come back to project AGILE thing in just a moment and ask you what about the inner working between ARPA on this and the JCS <sup>Krusik</sup> ~~OPERMAX~~ operation, for instance, on counter-insurgency. Was there any?

RUINA: Yes, but I must say that a lot of the details of AGILE, maybe I choose to forget them. Ah, AGILE was much the invention of one man, ~~Bill Godel~~ [William H.] Bill Godel. Godel was one of the people in ARPA--one of the senior people in ARPA--who was very enterprising, very articulate, very forceful, and very enamoured of AGILE. He pushed on it and pushed on it and pushed on and we . . .



And finally came, went into my office, and it went to Harold's and it was approved as a small program, and so on. He was so . . . . He spent all his time on <sup>on</sup> thing and he made all the arrangements and dealt with Crew, with JCS, with the military services, with the Vietnamese, with the Thais. And either because I, I never was enamoured of the program, or I choose to forget--I'm not sure I know which--I really don't remember much of the details, except. . . .

MOSS: No. I . . . . I think of things like . . . .

RUINA; I remember being deeply concerned that: . . . .

Well, there was one, I always had a worry about the war in Vietnam. And I wrote-- I had a memorandum to McNamara before his first trip--And I was worried that at that . . . . that nothing that was, that it's on a gadget issue, and all that's going to come out of it is a series of gadgets.

MOSS: This is what I was going to get at because I know of one instance in which Robert Kennedy

and the counter-insurgency, a special group of CI, was absolutely fascinated by the idea of a small, low power, high frequency transmitter that could penetrate the jungle cover. And they just couldn't come up with one. You know, I mean didn't understand they couldn't; wanted this gadget.

RUIMA: Yeah. In fact we sent out a group to make propagation measurements in the jungles-- from Stanford Research Institute. I think I think went out, and a group from HYDRO went out to make measurements.

Yeah. It was . . . The whole thing was sort of loaded with gadgets. And I remember at one time Godel testified on AGILE, or answered questions when I testified, and talked about a small rifle that somebody was talking about--a pistol-- that used little gas-powered rockets. It wasn't . . . It wasn't that you powered an explosive, that you had an explosive which pushed something on a barrell. But you

rather you lit a little rocket, a little plastic thing that went off and would very likely. . . . And the gun itself in that case was extremely cheap. A little launcher was what it was.

MOSS: A ZIP Gun.

RUINA: And these guys who built this thing--a little California group--were going to demonstrate, would go into people's office and shoot it at walls or something like that. The Congress was fantastically, for instance, taken by this gadget--~~Marvel~~ of technology.

MOSS: We're getting close to your four o'clock appointment, and I running to the end of this side of tape. Why don't we break off here.

END OF TAPE ONE