Harold Brown, Oral History Interview - JFK#3, 5/9/1964
Administrative Information

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Biographical Note
Brown, Director of Defense Research Engineering in the Department of Defense from 1961-1965 and Secretary of Defense from 1977-1981, discusses antiballistic missile programs, nuclear-armed aircraft, defense department appropriations, and radar systems, among other issues.

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Harold Brown - JFK#3

Table of Contents

Third of Six Oral History Interviews

with

Harold Brown

May 9, 1964

For the John F. Kennedy Library

INTERVIEWER: The last time we were talking about the antiballistic program, and I think the last word we had was that you had tried to indicate the development in somewhat chronological order of the problem as it involved you, and the President [John F. Kennedy] participated in it.

BROWN: Yes, I believe I mentioned last time the problem was already a very live one in 1961, and had been for some years, because for at least a year and a half or so the Army had been trying to get release of production money for Nike Zeus which would have constituted either a decision to deploy or as a first part of a decision to deploy.

In 1961, when the administration came in, the problem was looked at again, and it was decided no to procure long lead time items. All that happened before I arrived on the scene. I believe it was a decision which the President made himself.

Then in the fall of 1961, the question came up again, and there was discussion which involved the President. I believe I listed last time some of the alternatives which existed for us. It was decided not to deploy, but to complete the research and development and to carry out the testing which had been planned for the Nike Zeus system, and also to expedite the new technologies which might lead to better systems, that is, phased array technology, and the higher acceleration, interceptor

missile technology, to at least lay out designs of such things. This was not the formal

decision to develop a Nike X system. That did not come until the following year, that is, until November of 1962.

INTERVIEWER: Could you indicate what these two concepts mean, of phased array and of higher acceleration interceptor?

BROWN: Phased array radar system is one which contains a number of individual elements, individual antennas, you might call them, whose electrical phases can be adjusted relative to one another, so that they can point a beam in one direction or in another direction, without actually moving the little antennas. You can set up an interference pattern between two pieces of the antenna, such that together they produce a beam whose direction can be rapidly moved without mechanical motion of the antenna. Furthermore, because there are many, many elements, hundreds of elements in the phased array antenna, one can set up a number beams, multiple beams at the same time. The result is that you can track a number of targets at the same time, a very large number, up in the hundreds, simultaneously and accurately, and you can also move the beam from one direction to another rather rapidly, because you are not limited by mechanical motions of parts. You can do it electrically instead.

INTERVIEWER: Does this help in discrimination as well as tracking?

BROWN: No, not particularly, because discrimination

if you are only trying to tell something about one object, you can tell without a phased array antenna. It does, however, reduce the effectiveness of autronic counter-rays, because you have a large number of beams, and if one beam is jammed, it does not affect the others. Whereas with a standard radar, with a single beam, jamming anywhere in that field of view will jam the whole thing.

Because you can get more rapid or because you get continuous tracking, you can probably do better discrimination, but this is not true in principle; it is only true in practice. So by using a phased array radar, one gets around the traffic handling limitations and makes saturation of the radar by the offense very much more difficult, because you can handle hundreds of objects without losing track of any of them.

The more rapid acceleration of an interceptor missile has the advantage that one can hold one's fire until later, and by holding one's fire until later, one can learn more about the objects before deciding to fire at them.

The discrimination of objects, which is really another way of trying to measure their weight or size, is accomplished most readily—and that is not very readily—by noticing their interaction with the atmosphere. Well, the atmosphere gets denser as you come down towards the ground, and as a result the longer one is able to wait before having to decide to shoot at something, the more one is likely to know about its weight.

INTERVIEWER: How can you tell weight?

BROWN: You can't measure it directly, but you can measure it indirectly, or you have a chance of measuring it indirectly. In principle, well, the ways to do it are as follows: first of all by seeing how rapidly an object slows down as it comes through the atmosphere, one can get an idea of its weight per unit area. Actually what one measures is the quantity which is called beta, and which is equal to the weight divided by the drag coefficient times the area of the object. In other words, this is a measure of the aerial density.

INTERVIEWER: The object you determine by radar?

BROWN: You measure the position of the object by radar and by measuring how rapidly it slows down, one determines this quantity, which is the weight divided by the drag coefficient times the area. Now, measuring the area is a much more difficult job, because radar is not a light beam. You are not actually measuring the visible area of something. It tends to tell you, the cross section that you measure tends to tell you more about the shape of the object than it does about its size. It will tell you, for example, whether it has sharp corners, but that does not tell you what size it is.

So the problem is indeed to measure the area, and there are some ideas and how to do this, but there are not any very good, or there are not yet any very successful ways of doing it

[-5; there is no page 4-]

for sure. One way is to try to measure its radar cross section at two different frequencies, because if you measure it at two different frequencies, the difference gives you an idea, the difference in the cross sections of two frequencies gives you an idea of the object's size.

A second way has to do with the size of the ionized wake which is produced as the object goes through the atmosphere. A object can have a big radar cross section and still be of a rather small cross sectional, actual cross sectional area. But in that case the weight which it produces is as one would expect it to be, rather smaller, and should therefore show up as a smaller radar cross section of the wake.

Well, there are a number of ideas of this kind and I know that they all worked roughly. The question is how quantitatively do they work, because one has to measure the weight fairly accurately of the object in order to know whether to shoot at it or not. An object which weighs a thousand pounds must be shot at. An object that weighs a hundred pounds is less dangerous, but perhaps still ought to be shot at. But if there is an uncertainty of a factor of two or three in the weight measurement, then this means that you may have to shoot at two or three times as many objects as you would otherwise have to, and this can run out of ammunition.

In other words, if one says arbitrarily for example that below 250 pounds, which is a reasonably number for this, or a

reasonable value for this number, one would not have to shoot. Then an uncertainty of a factor of two means that you might have to shoot at objects weighing 125 pounds. An uncertainty of a factor of four in weight, which is I think not unreasonable, means you might have to shoot at objects weighing sixty-odd pounds.

INTERVIEWER: This placed a great premium on the enemy's developing a multiple warhead capability.

BROWN: No, merely on his developing a decoy capability since if you have to shoot at an object, you have to shoot at it whether it is a warhead or not, whether it is a warhead or whether it is a decoy. To take an example, if a payload is 5,000 pounds, and the offense puts in the payload a thousand pound warhead, leaving—I forget what I said—about 4,000 pounds over, he can also put in many other lighter warheads, or he can put in decoys. You have to shoot at them all, because you don't know whether they are warheads or decoys. Well, this is the difficulty of the antiballistic missile problem, and it is the reason why so far we have not deployed a ballistic missile defense system. One can analyze the outcome of such a combat with a certain amount of confidence and tell how much the offense has to pay, and how much the defense has to pay in order to have a certain outcome. At the moment things still look relatively unfavorable to the defense. The defense, as I said before, has to spend several times as much money as the offense in order to avoid keeping its casualties going up beyond

30 percent.

INTERVIEWER: Can you trace the origins of these two conceptual improvements, the phased array radar and higher acceleration interceptors?

BROWN: I can trace the later stages of the development, and I will trace them backwards. In the fall of 1952, it was decided that these were fully worth developing as part of a new system, the Nike X.

INTERVIEWER: The fall of 1962.

BROWN: That is right. In the fall of 1961, they were both still ideas, good ideas, but unproven in the sense that there had not yet been a large phased array radar system operating satisfactorily. It was between late 1961 and late 1962 that the EPAR, the experimental phased array radar, actually operated and showed that this could be made to work in these sizes and frequencies.

INTERVIEWER: Do you recall whether necessity was the mother of invention here, or whether invention preceded necessity? How did the concept like the

phased array get going? Was it because you had a need for it, or because it became independently technologically feasible?

BROWN: Well, people had talked about phased arrays before this for a long time, and I think small ones were known to be feasible.

INTERVIEWER: Had it ever been used in the antiaircraft

[-8-]

mode?

BROWN: No, it had not in any of the ground-to-air missile systems. There had been some work in the Navy on a so-called TIFAN radar, which was not equivalent, but did use some of the same ideas. If I remember correctly, the TIFAN radar scanned in one dimension, but not in two dimensions, and it, of course, was aimed at aircraft. But it had not operated. It had been designed, and some complement tests had been done.

I think it is very hard to judge whether this was a technology that was prosecuted for its own sake and then later adopted for a system, or whether it was inspired by a system. I think that I would say that some of the technology was done for its own sake. But it was only with the idea of tracking small objects at great distances, whether in space or in reentering ballistic missiles that the large phased array radars were built, which proved out the principle in a way adequate for us to decide to use it for Nike X.

INTERVIEWER: You stated this in a rather impersonal way. Do you recall if there was any protagonist for this concept, be it an individual or service or an institution?

BROWN: The work on the EPAR radar was supported by the Advanced Research Projects Agency, and not everyone outside of ARPA really believed that something of that sort could be made to work. The Bell System people, of course, who had worked on the previous Nike systems, and indeed are in charge

[-9-]

of Nike X system, as well as having designed the Nike Zeus, had never tended to think in those terms. They had always thought in terms of mechanical scanning. The Lincoln Laboratory people, who probably knew more about radars than anyone else in the world as a specialized thing, had some real doubts about the phased array radar concept, and so I suppose it was some of the people in ARPA who really pushed through the idea. Once it began to work, of course, others came around. But I never regarded this as one of the most strongly personalized tests—that is, not the phased array part of it.

INTERVIEWER: I asked you a question last time which seems to me was only a one-way street. I asked you if people became sympathetic to the Nike X system because they had decided against the Nike Zeus system. Does it work the other way, the people decide against the Nike Zeus system because it looked like there might be something better to buy if one waited?

BROWN: It made the decision easier, but I don't think that was the fundamental reason for that decision. Had there been no Nike X, I think the decision on the Nike Zeus would have been exactly what it was.

INTERVIEWER: Well, you come up through December 1961.

BROWN: Going backwards, yes. Before that time, before December of 1961, the ZEMAR, that is the Zeus Multiple Array Radar concept, was principally thought about as a hard point defense. A hard point defense of course doesn't really

[-10-]

defend civilian populations, but it could defend hard command posts, it could defend missiles, hardened missiles, except that it is probably too expensive to be used in the latter.

INTERVIEWER: That is not necessarily associated with the fallout shelter?

BROWN: No, it is not associated with the fallout shelter, except that anything you are defending that is that hard automatically is protected against fallout. A command post that is hardened, say, to a thousand psi or even a hundred psi is automatically a good fallout shelter. It has to have thick enough walls to keep fallout radiation from penetrating at any point.

Now, as I go back to 1960, when I was outside of the government but still concerned with the Nike Zeus project, I think that the phased array radar high acceleration missile concept stops being associated with ABM ideas in my own mind, at least, and I think that all we had at that time, in 1960, say, were criticisms—well, were understandings of the limitations of the Nike Zeus system, and what it could do and what it could not do.

INTERVIEWER: Where did you fall in these? What was your—who were you working for as a consultant?

BROWN: In 1960 I guess I was a member of the Antiballistic Missile Panel of the President's Science Advisory Committee, and I am sure that on more than one occasion in 1960

[-11-]

and in 1959, I think I became a member of that panel in 1958, we pointed out these limitations and most of us, not all of us, recommended against deployment of Nike Zeus.

It is really remarkable, in my opinion, how far the analysis of the antiballistic missile program problem has come since 1958, or even since 1961. The technical problem and the effectiveness problem, that is, the problem of calculation of the ballistic missile-antiballistic missile duel has come enormously far since those days, with the result that we have prospectively a much better system, a very much better penetration aids program, that is, offensive program, a very much better understanding of the interactions between the two, and the same dilemma that we had five years ago, shall we deploy an antiballistic missile system.

I think in the end it may have to be decided on very, very general grounds—namely, is it worth spending fifteen or twenty billion dollars to make the difference between 50 percent casualties and 25 or 30 percent casualties in the United States, in the event that a war comes? To answer this question, you have to make either an explicit or implicit judgment as to how likely a strategic war is, and then a judgment as to the value of the difference between 50 percent and 25 percent casualties, and a corresponding difference in industrial damage.

INTERVIEWER: We have had an improvement in our own penetration aids program?

[-12-]

BROWN: Yes, I would say that that has been an even more remarkable improvement, because that is something that is incorporated, has been and is being, and will be incorporated into the force. It is not merely an option for deployment based on a research and development program. It is a research and development program that has produced a change in the deployed force. It is one of the few things of which it can be said that that was able to be done within a few years, that is, between 1961 and now. The development has been done, and the deployment has taken place.

INTERVIEWER: Does this include changes in targeting within…

BROWN: No, I have not said anything about that. That is important, but it is quite different.

INTERVIEWER: It is not relevant to this?

BROWN: No, I don't believe it is, because what you do is you deploy penetration aids on a fraction of the system. Actually, [redacted] some of our big liquid fuel missiles, and some kinds of penetration aids, such as reduced cross section vehicles on all the Minutemen beginning with Wing 2, and also some decoys on a certain fraction of the Minuteman force. Then you target these against those places where defense might be present. Actually, there are almost no such places at the moment, so I think we are ahead of threat here.

INTERVIEWER: Did you have any penetration aids program in 1961?

BROWN: It was strictly a research and development program in 1961, and I believe it was started in 1961 with about $20 million of emergency funds.

[redacted]

INTERVIEWER: To what extent has the President been involved in this phase of the ABM problem?

BROWN: I think he was aware of it, but the issue never got quite so big in size, so it was never taken to him for decision. That one was fought out much more within the Defense Department, and the issue insofar as there was an issue really had more to do with what fraction of the force, if any, penetration aids should be installed on. The Strategic Air Command people did not believe that ballistic missile defenses were likely enough to be worth it to be necessary at

this time—and I am now speaking of, say, 1962—to be putting on penetration aids, because every time you put on a penetration aid, it is one more thing that can go wrong. I agreed that there were not defenses at that time, but believed also that we should put penetration aids on anyway, so that we should not be surprised later, and we did with a fraction of the force.

INTERVIEWER: Did it trade off payload here that they would have opposed?

BROWN: In principle there is a tradeoff in payload, but once you have more than enough range, you can add this payload without changing anything. The other thing that you could do, of course, is put in a slightly bigger warhead, but there is not going to be a different warhead for every individual missile, because its range is different. So it didn't cost anything in payload, particularly, but it did cost some money and it did cost some additional complexity.

INTERVIEWER: Well, after the decision was made not to release funds for long production items for Nike Zeus, then what was the development?

BROWN: Well, that decision was made, as I say, a number of times. It was made in 1960. Then it was made again in the spring of 1961, and then again

it was made in the fall of 1961, and then in the fall of 1962 the decision was made that Nike Zeus would never be deployed, and we would work on Nike X. That is where we stand now. This fall, fall of 1964,

[-15-]

there will be considerable of whether to deploy Nike X, but I don't think that the question will be settled one way or another this fall.

INTERVIEWER: How have the developments gone of these two critical components of the system?

BROWN: Well, they are not to the point where they can be tested. In fact, the decision in all probability will have to be made before they can be tested, but I think we know enough to know they will work, just as we knew enough about Nike Zeus to know that it would work, I would say back in 1960. The question then is not will it work, but assuming it works, is it worth the money to deploy it?

INTERVIEWER: Was there a lot of anguish in 1962, in the fall of 1962, when it was decided never to deploy Zeus?

BROWN: No, I think the big fight had taken place in 1961.

INTERVIEWER: The President made the decision not to deploy Zeus?

BROWN: Yes, based on the Secretary of Defense's [Robert S. McNamara] recommendation, the President made the decision not to procure long lead time items in 1961, and in effect that indicated that Zeus would probably not be deployed.

Another attempt was made in 1962, though. General Taylor [Maxwell D. Taylor], in November of 1961, was the President's Military Assistant, you will remember, and I think he spoke eloquently

[-16-]

then of the reasons for deploying Zeus, and I think there were some good reasons. Again in 1962, but the reasons in 1962 were less persuasive, because by that time we understood what Nike X would do, and were perfectly clear that it would work—that it would be much better, if it did work, and so the question is would you start an interim deployment of Nike Zeus and change it over to Nike X as quickly as you could. That was the Army's actual proposal in 1962. The decision was not to do that for the few extra years of protection, since it was not very much protection, because of the deficiencies Nike Zeus, were not worth having.

INTERVIEWER: This was decided at Hyannis?

BROWN: Yes, that was decided then, and then reaffirmed in January of 1963, if I remember correctly. I remember a long session here with Secretary McNamara before Thanksgiving of 1962, in which Nike Zeus and Nike X were compared. Then I remember a session I had with the Joint Chiefs down in the tank at about the same time, at which I showed the comparison between Nike Zeus and Nike X.

INTERVIEWER: By the tank, you mean what?

BROWN: That is where the Joint Chiefs meet, hold their biweekly or triweekly meetings, down in the basement—I am sorry, on the second floor is where it is, of this building.

When they were making up their own recommendations on antiballistic missile deployment…

[-17-]

INTERVIEWER: What were their views? Did they differ from the Secretary's?

BROWN: Well, they differed from each other. The Chief of Staff of the Air Force recommended against any deployment. The Chief of Staff of the Army and the Chairman of the Joint Chiefs were in favor of deploying Zeus, to be followed by X, as soon as X could be retrofitted. I am not sure what the Chief of Naval Operations said. I believe he was in favor of deployment, of limited deployment.

INTERVIEWER: Why wasn't this considered sensible?

BROWN: Why wasn't what considered sensible?

INTERVIEWER: The limited deployment followed by retrofitting?

BROWN: Well, it would have cost you about three or four billion dollars more, with that three or four billion dollars requiring to be spent immediately, and it would have provided a very, very small amount of protection against any sophisticated attack during that time.

Then there was another reason, which is one which I think I appreciated better than most people, which is once you start deploying something, it is very, very hard to change. All of the effort would have gone into getting the bugs out of Nike Zeus, and there would have been very little effort left over for developing Nike X.

INTERVIEWER: In terms of manpower, contractor skills?

[-18-]

BROWN: Yes, including ingenuity. Well, then the President approved the

recommendation of the Secretary of Defense on the day after Thanksgiving of 1962.

INTERVIEWER: Were you present at that meeting?

BROWN: Yes, I was there, and General Taylor was there too.

INTERVIEWER: How did a decision like this take place? Was it done over the course of time, or did the President open up the meeting by saying, "I have decided this. Are there any objections?"

BROWN: It was done by the Secretary of Defense presenting a draft memorandum from himself to the President on the subject in hand, which was continental defensive forces, and laying out the arguments. Then if I remember correctly, in this case General Taylor expressed his views, the President would then ask those others present whom he wanted to ask questions of his questions, and then he would announce his decision, which was tentative in some cases and final in others. If I remember correctly, he made a tentative decision on the Nike Zeus non-deployment, and Nike X development, at this meeting the day after Thanksgiving of 1962 at Hyannis Port. Then before the budget finally went in in January of 1963, there was another meeting over at the White House in which he reaffirmed this decision.

INTERVIEWER: Was there much of a colloquy that you remember with the military people?

BROWN: Well, General Taylor was there again at that meeting, and I think again he expressed his view that our offensive and defensive forces were unbalanced, and the way to rebalance them was to deploy Nike Zeus; that although it gave only limited protection, it gave some. General Taylor of course is a very thoughtful and logical person, and he always presents his arguments very reasonably, because he is a reasonable man, so that discussions with him never are heated and seldom emotional.

INTERVIEWER: Were the other chiefs present at those meetings?

BROWN: Not at the ones I was at. I think there was a separate meeting on the budget at Palm Beach that December at which I was not present, and in which I think they may have advanced their individual views.

INTERVIEWER: Do you have any feeling about the relationships Taylor had with the other chiefs, or Lemnitzer [Lyman L. Lemnitzer] before him?

BROWN: I didn't see Lemnitzer operate with the other chiefs, so I don't have

any views on that question. I have seen General Taylor operate with the other chiefs, and I think that I would say that he does not tell the others what to do. He does try to present his individual and personal views

[-20-]

in such a way as to at least make an attempt to harmonize the views of the others. He does not always succeed, but he will I think try to take a view aside from Service views, which the other chiefs by and large find it very difficult to do. I think on more than one occasion I have seen him present, well, I have seen a situation where the other chiefs come in with firm views which they have from their staffs or from their Service positions, and these could be views which if presented unanimously could cause a fair amount of trouble for the Secretary of Defense and for the President. By and large they will be narrowly military, or in the cases of which I am thinking, they will sometimes be narrowly military. I have seen General Taylor put forth a view that he had obviously thought out for himself, and it would be a more broadly considered position on his part. He would bring them around, or at least one or two of them around, so that I think he has saved a good many situations this way. I prefer not to give any examples, because I am not sure I can remember them accurately. But I can think of two or three cases, I know there are two or three cases where he has pushed the others into thinking about the question from the beginning, and as a result they have come out with different conclusions than the one they went into the meeting with. I suppose that is a very good way for a Chairman of the Joint Chiefs to operate. It is not the only way, of course. A Chairman can try to impose his views on everyone else.

[-21-]

INTERVIEWER: How did he get along with the President?

BROWN: Well, of course, I was presently at an infinitesimal fraction of the encounters that they had with each other, even after Taylor became Chairman of the Joint Chiefs and before then, of course, I assume he had even more private meetings with the President. But it was perfectly clear that President Kennedy respected General Taylor's intellect and military judgment. Taylor always felt free to speak up what his own views were. I don't think he was trying to conform them to anyone else's.

INTERVIEWER: How did the President get along with the other chiefs?

BROWN: I saw him less with the other chiefs, and so I would not want to draw any conclusions. I think that he did not know as much about the military as, say, President Eisenhower [Dwight D. Eisenhower] knew when he came in, and so it always seemed to me that he tended to be a little wary of them in their presence. I don't think he placed very great weight on what they said as individuals, although I think he felt he had to pay some attention to what they represented.

INTERVIEWER: You did quote him as having something to say about General Power [Thomas S. Power].

BROWN: Yes, yes, yes.

INTERVIEWER: Do you recall any other remarks, either flattering or derogatory?

[-22-]

BROWN: I don't think that remark was either flattering or derogatory.

INTERVIEWER: Or objective.

BROWN: I don't think so.

INTERVIEWER: What did Taylor mean when he said he thought that our offensive weapons were receiving over-emphasis?

BROWN: Well, what he meant was if you consider the effect on limiting damage in the United States as one objective, and the effect of assuring destruction of the Soviet Union in case of a thermonuclear war as another objective, we had taken case of the second very much better than we had taken case of the first. Of course, the first, damage limitation, can be accomplished to a degree both by offensive and by defensive weapons, that is, by knocking out enemy nuclear capability before it is launched, as well as by trying to intercept it after it is launched. But taking all of these things together, he was saying that the percentage of our effort going into defensive expenditures was smaller than optimum, even for a fixed total amount.

INTERVIEWER: I have never fully understood how we could carry out a damage limiting strategy if we avoided the option of striking first.

BROWN: Well, it depends on how a war goes. If the Soviets launched every one of their offensive systems, keeping none in reserve, and launched every one simultaneously, then if

[-23-]

we were not striking first, we could not limit damage very much by our counter force strikes. But we certainly have no intention of launching our forces in that way. We intend to keep some in reserve, and even if the Soviets did not intend to, it would be impossible for them to launch everything at once. Therefore we can reduce damage to a degree, an unknown degree, by striking at their residual forces. Those residual forces may be 10 percent of the total, it may be 95 percent of their total.

INTERVIEWER: Why would it be impossible for them to launch all of their forces at

once?

BROWN: Well, because, for example, their bombers can't all take off simultaneously within one second or ten seconds or even ten minutes of each other. Simultaneously means, if one is talking about whether you can launch everything close enough together so that ballistic missiles can't prevent them from being launched, it means within 15 minutes.

INTERVIEWER: The other part of that proposition is if they tried to launch as much of their force as possible, they would give us more strategic warning?

BROWN: No, I think that may be true of their aircraft and conceivably it is true of some of their soft missiles, which of course are not in silos, but it is not true of a hardened missile force or a submarine force.

INTERVIEWER: Then there is also the consideration of their making an attack on Western Europe.

[-24-]

BROWN: Yes, but before we talk about that, I want to speak about one more thing. It would also, of course, depend on how much more damage we could prevent to the U.S. by blunting. Of course, it depends also on what their first strike was launched at. If it was launched at cities, and got off before we could strike, then of course much of the damage to the U.S. population would be done. If it were launched at U.S., or to the extent that it were launched against U.S. offensive forces, then it does that much less damage to the cities. That is, putting it another way, there is a tendency, small or large, to reserve one's attacks on cities, one's full attacks on cities until one sees how the previous attacks have come out. To the extent that that tendency is followed, of course blunting attacks are more successful in reducing damage to one's self, since they are aimed at the residual forces, which are the forces held in reserve for counter value attacks.

Now, as to the attack on Europe, if the Soviets were to attack Europe without attacking the U.S., and the U.S. were to decide to respond with the thermonuclear attack against the Soviet Union, it could well be primarily against strategic forces, and thus reduce damage on the U.S.

So to that extent you can conceive of a U.S. strike first situation. Now, these may be unlikely, but they are certainly conceptually possible.

INTERVIEWER: Back to the ABM problem, could you tell me

[-25-]

something about the congressional participation? What kinds of pressure were there?

BROWN: There was never a congressional drive in favor of antiballistic missiles of a magnitude comparable to congressional support for manned strategic aircraft, perhaps because the Army is the antiballistic missile agency, and the Air Force the manned strategic aircraft proponent.

INTERVIEWER: What are you implying by that?

BROWN: What I am saying by that is that there is some combination of willingness to apply pressure on Congress, willingness to try to get Congress to come to one's aid and a willingness of Congress to do so which seems to be much larger for the Air Force than it is for the Army. This is not to say there was not some congressional pressure for Nike Zeus deployment. I supposed Senator Thurmond [Strom Thurmond] was the principal proponent of Nike Zeus deployment. You will remember that he called for a closed Senate session of the whole Senate at which he presented some of his reasons. But the Congress never responded affirmatively to his or other proposals to put in several hundred million dollars to start the Nike Zeus program, above the administration budget, as they did in the case of manned aircraft on a number of occasions, and are still doing.

INTERVIEWER: You testified on the ABM problem?

BROWN: Oh, yes.

INTERVIEWER: In Appropriations hearings?

BROWN: Well, in posture hearings and Appropriations hearings. I have done it and expect to continue to do it as part of authorization and appropriations hearings every year.

INTERVIEWER: Has Thurmond bored in on you?

BROWN: Yes, he has asked me several times to explain my position, and I have done it, as I have done it during these talks. I don't feel that he has ever attacked me personally as being the man who stopped it from being deployed. This is, after all, a decision that has been made by two presidents and three secretaries of defense on numerous occasions.

INTERVIEWER: What accounts for the better position of the Air Force on Capitol Hill?

BROWN: I think this goes back a long way. I think it goes back well into the late '40s, 1947, 1948, back to the days of the 70 Group Air Force. The Air

Force has been the glamour service, and I think this has impressed many congressmen. But this is outside of my field. I am just expressing a non-expert opinion. I think the Air Force has devoted a good deal of effort to this to gaining this support. It has a long history of doing it. Stuart Symington [Stuart Symington, II], when he was Secretary of the Air Force, appealed over the head of the Secretary of Defense and the President to the Congress. The Air Force has always cultivated influential relationships. The Air Force has, I think, made an appeal as a glamorous service. It has impressed, and I think rightly impressed, congressmen with

[-27-]

the importance of strategic warfare, as the way—well, as the area in which we can't afford to fall behind.

Finally, I think it has been somewhat less restrained—let me rephrase that. It has always been more willing to go over the heads of its legally constituted superiors to the Congress. I think that probably comes from the fact that the Air Force is a less restrained service. It is younger as a service. The people in it, senior people in it have seen it emerge to a position of equality or dominance for a period there, from being part of another service, from being part of the Army. In the period of the '30s and '40s they fought hard to give it autonomy, subsequently to give it independence, and after that to give it dominance, and they succeeded.

Of course, the pendulum has swung back a ways now, but this history of increasing prominence and success, and less tradition, or younger tradition, I think has made senior Air Force officers more willing to, or less willing to be bound by decisions of civilian superiors.

INTERVIEWER: Can you give some examples of this?

BROWN: It is going on right now. It has been going on for years. General LeMay [Curtis E. LeMay], when the decision went against the B-70, or when the Secretary of Defense declined to approve $50 million in the 1965 budget for advanced manned penetrating system development, didn't hesitate to send people up to the Hill, Air Force people up to Capitol Hill to lobby against those

[-28-]

decisions, and got Congress at one point to direct money to be spent on on the so-called RS-70 system. He was doing what he thought was right, and I think there is just no question that he is legally entitled to do so. But a similar situation in the Army, I think, would not have been met in the same way, because I think the senior Army people are more inhibited in carrying an appeal over the heads of the Secretary of Defense and the President to the Congress. I am not saying they are right and the Air Force is wrong. I am just making an observation. The Navy does a little differently. The Navy, I think, by and large, does not make open appeals. It does it covertly, and has a long tradition of cultivating friendships on the Hill in private, and it has its advocates. It is less attached to the cause célèbre than the Air Force is.

INTERVIEWER: Well, this being your basis, I wonder if we could move to consideration of the RS-70, then to be TFX and finally to the nuclear carrier?

BROWN: All right. The B-70 was a program which had had its ups and downs. It had more or less been decided against in 1959, and again in 1960 it had been cut way back. In fact, it had been effectively reduced to component development.

Then in the fall of 1960, during the presidential campaign, a tentative decision was made and announced to reinstitute a program, but without making a decision for

[-29-]

deployment. The decision was announced to go back to a substantial development program. But the money for that was never released, so in January and February of 1961, the new administration—this was before I arrived—was faced with a decision as to what to do. The decision that was made at that time was to have a three aircraft prototype program with no deployment, no production. It was believed three aircraft prototype program could be carried out with a total cost of $1.3 billion.

INTERVIEWER: This is the B-70?

BROWN: This is the XB-70. XB means experimental bomber. That X means just an experimental aircraft, not a production item. Most of that $1.3 billion had already been spent, but of that five or six hundred million dollars remained. This was the way things went along until—well, this was the decision. Things went along that way until the following spring.

INTERVIEWER: This was for the revised Kennedy-Eisenhower budget?

BROWN: Yes, the fiscal 1962 budget.

INTERVIEWER: This was a quick decision.

BROWN: Yes. That fall the corresponding budget was put in for the XB-70, but in October of 1961, the Air Force based on some suggestions that people in my own office had made to them, started to look at what they called the reconnaissance

[-30-]

strike concept, but we asked them to think about what an aircraft could do that a missile could not do, and come up with some answers to that question. They did think about it, and they came up with a briefing in October of 1961, on what they then called the RS-70, which

was different in idea from the B-70. The B-70 had just been a conventional bomber with one or two or three great big bombs in it which would be carried over to a predetermined target and dropped on it.

The idea of the RS-70 was to put in many smaller bombs, missile launched, actually, so as to give one better effectiveness for the system. It doesn't really take a 50 megaton bomb to put most military targets out of commission. This would allow you to attack many targets. It also added such concepts as a side-looking radar to give you good resolution, good bombing accuracy, so that you might be able to get by with very small yield, very small nuclear yield, and also some other concepts which were really just ideas.

INTERVIEWER: What is a side looking radar for?

BROWN: A side looking radar is a radar which sends out pulses over a period of about a second, and reconstructs from the returns of those pulses a very accurate picture of what it sees. In effect, by sending out pulses over a period of a second, it makes the aircraft act as an antenna as long as the distance of the aircraft goes in a second, which is of the order with a Mach 3 aircraft of 3,000 feet. Well, with a 3,000

foot virtual antenna you can get very good resolution.

INTERVIEWER: For the purpose of plotting your position?

BROWN: Well, you can use it for that, but the real purpose was to give you a very good picture of the target. If you have a 25 foot resolution, you can probably tell one target from another quite well. If you have a 500 foot resolution, you have a much harder time doing that.

INTERVIEWER: What kinds of targets would they be that this would be effective on?

BROWN: That is not a question that one asks of the radar. That is a question one asks about the system, and the idea was to attack individual hardened sites with sufficient accuracy to knock them out, hardened missile sites.

INTERVIEWER: In other words, you could discriminate between two sites in a complex?

BROWN: Yes. Not only that, you could tell—well, supposedly you could tell what was a missile site by looking at it on the radar, even if you had never seen it before.

This was stretching feasibility I think beyond a point where it could be reasonably stretched, but this was the kind of claim that was made for it. In fact, the claim was even

made for it that it could tell mobile missiles on trucks or on trains, and tell if they were missiles and strike them. A more reasonable claim wew

[-32-]

before the strike. In other words, this was supposed to be good for a situation where you knew there was a missile within a certain ten mile circle, but you didn't know just where. Also it was claimed that the presence of the aircraft would enable you to tell afterwards whether you had successfully attacked the target or not.

INTERVIEWER: After launch?

BROWN: After impact, you could see whether the crater that you had left included the target. I think that had a certain—to a degree that probably is true.

Well, there was this enormous collection of claims for the aircraft, supportable, dubious, and ridiculous, which gradually evolved between the time the first presentation was made to the Secretary of Defense in October, and the time at which it was presented to Congress, actually to the House Armed Services Committee, on the House Armed Services committee's request, after someone in the Air Force had informed them that there was such a briefing.

They went up and they presented this. The committee decided that this presentation was worth $300 million, and put that money in the bill. They put it in originally directing it be spent, which did lead to a fairly nasty executive-legislative conflict of can the legislative direct that money be spent for something even if the executive does not want to spend it for that?

[-33-]

Well, there was a whole series of hearings by that committee which I didn't participate in. I guess that was before the authorization of the requirement that money be authorized for research and development before it was appropriated, and was added to the bill.

INTERVIEWER: Was that fiscal 1964?

BROWN: No, that took place in connection with—the first time that happened was in the fiscal 1964 appropriation. This was the fiscal 1963 appropriation. But I did testify at great length before the House Defense Appropriations Subcommittee on this question, and they reduced the amount of money to about $50 million, which is what I said…

INTERVIEWER: Did they put it in the Senate bill?

BROWN: No. It was put in the authorization bill. Even though this was research

and development money, and if I remember correctly there was no authorization for research and development required at that time, the House Armed Services Committee put into the authorization bill the money and the direction that it be used. The Senate went along and the bill passed, although the Senate did change the wording from directing Secretary of the Air Force to spend the money, to language which removed the attack on executive prerogative. But then the money had to be appropriated after having been authorized. That is when I spent my time with the House Defense Appropriations Subcommittee. They appropriated only

[-34-]

$52 million of the three hundred and some odd million which was authorized, on the basis that the instrumentation required had not been developed. There was no proof that it could be developed. This money was to help develop it.

Interesting enough, after the money had been appropriated for this, the Air Force, since it was clear there was not going to be a big RS-70 program, got very much less interested in the question of whether any of the things which they had said they could do and would do as far as the RS-70 were feasible, and so I think although that money has been used, it has been incorporated into the XB-70 program to try to get the airplane to fly, and very little of it in the end has been used for developing side-looking radar of this resolution.

INTERVIEWER: The XB-70 program has been continued all the time.

BROWN: That is right. It has stayed the Defense Department-Administrative program.

INTERVIEWER: Well, it has required in the end $200 million of additional funding, and the program has been reduced to two aircraft, from three. The first aircraft is a year and a half late. It was supposed to fly in December of 1962. It will probably fly this summer. But the big question was never really about the aerodynamic capabilities—that is to say, whether you

[-35-]

can fly a Mach 3 aircraft. It was whether the crew of a manned aircraft, whether the avionics, the side-looking radar, the bombing system, the navigation system, the air launched missiles could be accurate enough, resolution good enough, and the crew quick enough at assimilating the information and trying to find unknown targets to make a system a success.

The questions are still unanswered, because as I say, when it became clear there was not going to be a $10 billion RS-70 program, the Air Force suddenly got very much less interested in answering the questions. I think that they are going to come up again in connection with the advanced manned penetration system. But the whole question of technical feasibility, the human capability is still an unanswered one. There is an antecedent unanswered one which McNamara insists on having answered first, and which is really the very first question, and that is, what is that you are going to do with this that you can’t do

better or as well or cheaper in other ways? There is the damage assessment mission. There is the precise attack which is a very accurate attack mission. There is the mission of finding targets you did not know about. There is the mission of finding mobile targets.

Well, one has to weigh all of these against the following criteria: can they be done at all? Can you do them in other ways? How expensive is it to do them in other ways? How important is it to do them? Until those questions are

[-36-]

answered, any such program is unlikely to be approved for very large expenditures.

INTERVIEWER: Do I understand that your office pushed the Air Force into generating this concept but you have never been satisfied with their defense of it?

BROWN: I think that is accurate as an appraisal of the situation. We were the ones that said to them, "You have to find something that the aircraft"—the only justification for manned bombers, aside from diversity of the force, which is some justification, but not much, is to find things that it can do that missiles can't do. They took off from that point to try to come up with the answers. I don't think they have come up with acceptable answers yet, but I think that they should keep trying.

INTERVIEWER: You explicitly decided against their dropping big bombs?

BROWN: No, I think that is a separate question. I think that they decided if dropping big bombs on predesignated targets was the game, that airplanes were not necessarily the best way to do that.

INTERVIEWER: They decided that?

BROWN: Yes.

INTERVIEWER: What was the President's role in these considerations?

BROWN: Well, there was the famous Rose Garden

[-37-]

session with Mr. Vinson [Carl Vinson] in which President Kennedy is alleged to agreed with Mr. Vinson that he would spend of the order of $50 million on the program, thus saving one sixth of Mr. Vinson's face, and Vinson had put in $300 million dollars, I guess. In return, Vinson agreed to withdraw or to recede from the language which he had put into his bill, which directed the administration to spend the money.

INTERVIEWER: How did he get an opportunity to recede?

BROWN: The Senate took out the language in their version of the authorization bill, and it went to conference. The Senate included the money in the authorization but with different language.

INTERVIEWER: This would have been when, in the spring of 1962?

BROWN: This was in the spring of 1962, probably in about April of 1962.

INTERVIEWER: The sniping has continued, hasn't it?

BROWN: What do you mean by sniping?

INTERVIEWER: The congressional…

BROWN: Oh, there are a lot of congressmen who are still mad that the B-70—well, there are very few congressmen who will stand up for the B-70, but for the wrong reason, because it has not flown, and the program is obviously a lemon. That is not really quite fair. The issue is the same as it was. What good is the manned aircraft, and the issue never

was can a manned Mach 3 aircraft fly, although as it turns out now, that is not the best platform to use. The Air Force in thinking about new manned bombers now is not thinking of Mach 3 high-flying aircraft. They are thinking of probably a variable sweep aircraft that can fly low and be less vulnerable that way.

But the real issue is as it has been. One of the things that a manned aircraft can do better than a ballistic missile system launched from the U.S. or from a submarine, is it feasible to do these technically? How much does it cost and is it worth it? Those remain the issues, but as I say most congressmen have become disillusioned with the B-70 but they are still for manned aircraft, and to that extent the argument persists and will come up again next year. It did come up again this year in connection with advanced manned penetrating system, and will come up again next year when the Air Force asks for quite a lot of money to do this, as I assume they will.

I think it has left quite a bit of bad feeling between some congressmen and civilian officials of the Defense Department, probably the more so because these congressmen, many of them recognize that the outcome of the B-70 program has made them look bad, even though if you penetrate one layer deeper it is clear that the arguments they have made—while they may be wrong, they are not proven wrong by the fact that the B-70 fabrication of the aircraft has been unsuccessful.

INTERVIEWER: Whose fault is this?

BROWN: Whose fault is this?

INTERVIEWER: Is there any fault that the prototype has been delivered?

BROWN: Well, the contractor really underestimated the fabrication problem, which shows that programs can go off the track, badly for non-fundamental reasons, but that pushes them off the track just as badly.

The Congress, as I say, contains many people who are very unhappy still, principally members of the Armed Services Committee of the House, and to a lesser extent some of the members of the Armed Services Committee of the Senate. But I think the senators, well, Senator Russell [Richard B. Russell, Jr.] and Senator Symington, Senator Saltonstall [Leverett Saltonstall] don't feel nearly so strong about that. I think they recognize that there are some fundamental questions here that the Air Force has not answered.

The Appropriations Committees, particularly the House Appropriations Committee, although they feel as many people feel that it is a mistake to rely entirely on missiles, has not adopted personal attitude. They do not feel that their personal honor is involved. Inevitably I have become the focus of some of the congressional feeling on some of these, since I have been the one that has often been been used to defend the Secretary of Defense's position in this matter, which I think is a completely defensible position.

[-40-]

INTERVIEWER: Who has been boring in on you?

BROWN: Oh, I guess people like—not Mr. Vinson, himself. He has always been very gentlemanly about this. But Mr. Hebert [F. Edward Hébert], Mr. Hardy [Porter Hardy, Jr.], Mr. Rivers to some degree, Mr. Bray [William, G. Bray], Mr. Arends [Leslie C. Arends]. The issue always presented is one of me versus General LeMay. The outcome is a peculiar one. I think General LeMay and I agreed on many of the questions. I don't think we—and many of the factors, and I think we disagree on the conclusions. But by and large I would be willing to spend more money on this than I think the Secretary of Defense is willing to spend, although far less than General LeMay wants to spend. So General LeMay does not regard me as his opponent here. If anything he regards me as, if not an ally, at least someone who is sympathetic.

INTERVIEWER: Do they attack you on grounds of competence?

BROWN: No, of age, and they always put the money in in the House Armed Services Committee, and the House always votes the authorization. The Senate goes along, and then the Appropriations Committees take out most of the money. Then the administration does not spend it, or does not spend the rest, so that I suppose this gives the Congress a valve with which it can let off steam. It is

unfortunate perhaps that that steam can't be used to propel the country rather than run a steam whistle.

[-41-]

INTERVIEWER: How have the attacks on age been formed? Do you remember anything in particular about those?

BROWN: Well, Mr. Bray annually makes a statement and annually makes a speech when this issue comes up, and he says, "Who are you going to believe, the Chief of Staff of the Air Force who knows all about these matters with his military experience, or a 33-year-old scientist who has never heard a shot fired in anger?" I stayed 33 for three years in Mr. Bray's speeches. They always get the money put in in that legislation and then it never gets spent. It really is a tremendous waste of effort on everyone's part. It is a sad example of the way in which the executive-legislative division creates heat rather than light.

INTERVIEWER: Is this the only issue in which you have felt that?

BROWN: Oh, no, it happens all the time. I think this is just an example, but it is the one which touches me personally most closely. There are dozes of things like this. The TFX is like this. I would not quite put the nuclear carrier in this class. I think that there has been a genuine exposure of different points of view.

INTERVIEWER: This may be a good place to take an aside and ask your views on the general problem of contractor performance, how well they have carried out their responsibilities.

BROWN: I don't think there is a general statement that

[-42-]

one can make. I think that there are a few good contractors, and that even the good ones fall down fairly often, and that most contractors find it hard being responsible. They don't like to take responsibility. In this I don't think they are very different from government officials or military men or anyone else. But I think that the Bell Telephone Laboratories performance on the Nike Zeus was outstanding. There is no question about it. They performed about that they said and about the time they said for about the price they said. I think that the North American performance on the B-70 has been singularly poor. They didn't think about it enough before they made their promises, and then they didn't take strong enough action and they got into trouble. The Douglas performance on Skybolt was pretty poor. I think that their inability to estimate costs and difficulties in advance is something that characterizes all but a very few contractors.

INTERVIEWER: What have you done to improve this performance?

BROWN: It is too early to tell how well it will succeed, but I think quite a lot of work has been done in incentive contracting in research and development. I don't think it has produced the result it should because the research and development contract is only a small part of the total and a contractor can still buy in on the research and development contract, that is, underbid, even if he knows it is

[-43-]

going to lead to a penalty, even if he knows it is going to lead to a zero fee, and expect to recoup on the production. But I do believe that such things as project definition, which force the contractor and the service to think out in detail what the problems are going to be of the development, how long the development should take, how much it should cost, force them to prove out the component technologies before they go into a big engineering or operating systems development, or showing some success.

INTERVIEWER: Is this an innovation of McNamara's?

BROWN: It has happened in the last three years, yes. I think we were the ones in this office who pushed it.

INTERVIEWER: What does it really mean?

BROWN: It means what I have just said. Before you commit to a full scale development, you first go through a period of some months in which you detail the development in terms of cost, time, milestones, and so on, and assure yourself that the technologies have developed to the point where they can be put together in a system. You arrive at a schedule and cost and performance figures which can be made the basis of an incentive contract. This way the Secretary of Defense knows when he makes a decision what he is making a decision about, that is, it avoids putting him in a position of deciding to go ahead with this $500 million project which then turns out to cost $1.5 billion, and had he but known, he would not have

[-44-]

approved it.

INTERVIEWER: Can you give me an example of where this has paid off?

BROWN: The Titan III is an example, and the Titan III is a $800 million program, although we are pretty sure it will cost a billion. But we defined it well enough beforehand to know that it would cost about $800 million to a billion to develop, and by virtue of having defined it that well, we laid out a matrix, we laid out a program which the contractor has been able to follow, and the contractor knew he was supposed to follow. I think in the end it may slip some period and it

may cost some more, but we will know what we are starting from when we do this. Titan III is an example.

INTERVIEWER: Well, this leaves us, if we have time, to talk about the TFX and the nuclear carrier.

BROWN: I think we had better defer that until next time. I have some people waiting now, and those are long stories.

[END OF INTERVIEW #3]

Harold Brown Oral History Transcript – JFK #3
Name Index