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STAR WARS: THE EXPERTS DEBATE THE ISSUES

Six half-hour radio programs on the Strategic Defense Initiative,
aired initially on public radio stations in May and June 1985.

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PROGRAM ONE

NARRATOR: Nuclear war; the prospect is terrifying. We know it would bring death and devastation as never before. And yet our only defense against it is the fragile hope that those who possess these weapons will not dare to use them. This balance of terror between East and West means that safety from nuclear attack depends upon the capacity both sides have to threaten what is called Mutual Assured Destruction. Is there any alternative?

The hope of finding one prompted President Reagan to call for a new effort to develop a defensive shield against nuclear attack. In an address to the nation in March of 1983, he called on the scientific community to come up with a technological solution to this dilemma:

I call upon the scientific community in our country -- those who gave us nuclear weapons -- to turn their great talents now to the cause of mankind and world peace, to give us the means of rendering these nuclear weapons impotent and obsolete. Tonight, consistent with our obligations of the ABM [Anti-Ballistic Missile] Treaty and recognizing the need for closer consultation with our allies, I am taking an important first step. I'm directing a comprehensive and intensive effort to define a long-term research and development program to begin to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles.

NARRATOR: Since that speech, the President has launched a long-term multi-billion dollar project, officially known as the Strategic Defense Initiative, or unofficially, "Star Wars." But why only now are we making such a major effort to build defenses against nuclear attack? Professor Sanford Lakoff teaches political science at the University of California at San Diego. He's affiliated with the university's new Institute on Global Conflict and Cooperation. Dr. Lakoff points out that we've been concerned about defense ever since the Soviets first tested their atomic bomb.

SANFORD LAKOFF: The effort to develop ABM defenses goes back thirty years. That's when the Soviets first developed their ICBMs and we decided we would try to develop interceptors of our own. We did develop one system called the Nike Zeus, but President Eisenhower decided not to deploy it because he didn't really think it would be very effective. Then in the 1960s, there was another version of the Nike developed, and Secretary [of Defense Robert] McNamara thought about deploying it, but once again it was not really thought likely to prove very reliable. It was too easy to saturate the missile system and to use decoys against it. So in 1972, we persuaded the Soviets to enter into an agreement to limit the deployment of ABM systems. Both sides were allowed to have one system. They were allowed to keep the one that they had already built around Moscow and we put one up around a missile base in North Dakota.

In any case, the ABM Treaty was thought important because it allowed both sides to agree to limit offensive weapons. Unfortunately, since 1972 there hasn't been an awful lot of progress in the limiting of offensive nuclear weapons and some people now see the new defensive system as a substitute for arms control.

NARRATOR: The president's proposal is much more ambitious than any previous defensive project. It calls for a system so robust that it would render nuclear weapons in his words, "impotent and obsolete." He has ordered that \$25 billion be spent on research during the balance of the 1980s and that's

just to investigate the feasibility of various technologies. This research is now underway in such national laboratories as those at Los Alamos and Livermore, and in the research divisions of private defense contractors. Already, this program is stirring considerable controversy among the experts. The scientists who are best able to assess the technical prospects disagree sharply about whether the project can possibly succeed.

Among the leading figures in this debate are two California physicists, Dr. Sidney Drell and Dr. Lowell Wood. Dr. Drell is associate Director of the Stanford Linear Accelerator and a MacArthur Fellow. Dr. Drell, who will be interviewed in our next broadcast, contends that a leakproof defense will never be possible because a determined opponent will always be able to find through or around it. Dr. Wood, whom we'll hear from today, is a senior research physicist at the Lawrence Livermore Laboratory. He supports the president's program and is himself making major contributions to one of its possible components, the x-ray laser. He is optimistic about the possibility that the nation's scientific community can come up with practical technologies that would satisfy the president's objective. In this program, Dr. Wood will be interviewed by Professor Lakoff.

SANFORD LAKOFF: Dr. Wood, you're involved in this research effort that goes under the heading of the Strategic Defense Initiative. What exactly are we talking about when we talk about this initiative, and do you think that it's really important for the country to proceed with it?

LOWELL WOOD: The Strategic Defense Initiative, as it's been enunciated by the president, is concerned with providing the country a defense against nuclear attack carried on intercontinental ballistic missiles. This is the most fearsome type nuclear attack because it comes so swiftly and it comes in devastatingly large quantities. At the present time the Soviet Union, for instance, has several thousand million tons of chemical explosive equivalent sitting on intercontinental ballistic missiles at over a dozen missile fields scattered across the Soviet Union. That amount of nuclear explosive power if uniformly distributed across the United States would render it totally uninhabitable, not just for reasons of fallout but independently for reasons of blast and heat.

This country at this present time has no -- not a slight, but no -- defense against this type of attack, be it from the Soviet Union or anywhere else. We are defenseless against strategic nuclear attack. And it is because of the magnitude of the attack which can be leveled against the United States and the severity of the effects, that I believe it is appropriate for the United States to consider whether there is any other alternative for it, for the Soviet Union, for the other nations of the world, than to continue to live under this nuclear Damoclean sword.

SANFORD LAKOFF: Granted that all of this will take many years to figure out, that there is at least theoretically a possibility of what's been called a leakproof defense because, presumably, even if a few of the warheads that you describe should get through, they could cause pretty horrendous damage . . .

LOWELL WOOD: I personally don't have a huge amount of interest in defending just the military assets of this country. I don't believe that I would be working, or certainly not working in a very serious fashion, on strategic defense or working in support of the Strategic Defense Initiative if I didn't believe that it had a great deal of promise for defending the country as a whole, for defending the civilian population very specifically, as well as,

for instance, our retaliatory forces, our bomber bases, our missile fields, etc. As far as the leakproofness of defense, I believe that it's much too early to say with any degree of technical confidence, either pro or con. My personal supposition, suspicion, expectation is that a leakproof defense probably is technically feasible. That it might even be technically feasible with the means which are currently under development.

SANFORD LAKOFF: When we talk about those means, we're talking presumably about weapon systems and sensors that would operate in three distinct modes, or at least in three distinct phases of ballistic missile flight. These are usually described as the boost phase, the midcourse phase, or sometimes the post-boost and then the midcourse phase, and then finally a terminal phase. I wonder if you would agree that the boost-phase intercept is the most important phase because it's then that you get the missiles when they're easily detectable and before they're separated into decoys and warheads.

LOWELL WOOD: The boost phase, that is to say the phase during which the missile is rising out of its silo, rising up to the atmosphere and gaining very high speed in the upper fringes of the atmosphere and the lower portion of what is properly called space, is at once the most attractive and the most challenging portion of the strategic defense battle space for the defense. It is attractive for the reasons that you stated. The missiles are remarkably vulnerable to attack. They are tagged or highlighted by their own exhaust and in an extremely spectacular and unavoidable fashion. They are coming basically from known locations. They are relatively slowly moving, certainly as they're rising through the atmosphere; a number of other features, independent, salient features which make them extremely attractive targets for both nuclear and non-nuclear means of destroying them. At that point also, instead of ten thousand nuclear warheads and hundreds of thousands of decoy objects, there's only something of the order of a thousand, fifteen hundred, two thousand missiles. So they're small in number as well. It is challenging for the defense to attack the offensive in boost phase, or to throw up a shield in the boost phase, simply because the boost phase is over relatively quickly (a matter of a few minutes at the present time -- the boost phase in some Soviet missiles extends on out to five or ten minutes, but on a twenty-year time scale it's quite certain that that phase could be reduced to a period of the order of a minute) and also necessarily the boost-phase battle must be conducted over the territory of the aggressor nation; that is to say, the nation which has launched the ballistic missiles, which has commenced the strategic war. The advantage of distance as well as surprise perhaps in those circumstances then goes to the offense, the owner of the missiles which are being attacked. And that's primarily the reason why boost phase is, in some senses at least, the most challenging of the three phases of strategic defense.

SANFORD LAKOFF: It's usually said that there are two basic technologies that would be used in boost phase, or types of technologies: the so-called directed energy weapons and the kinetic weapons, apart from microwave weapons, which are still evidently in the early phases of development. Do you think that both or either of those is the most promising?

LOWELL WOOD: It's really very difficult to tell at the present time, because the research is in such a relatively early stage, which technologies will be most effective in any of the aspects of strategic defense, any of the phases of strategic defense as you've labeled them. It may well be that the most promising technologies in any of these phases, or perhaps even all of them, are yet to be fully appreciated or realized, or perhaps haven't even been

suggested yet. But, as things appear at the present time in this quite early stage of development of strategic defenses, the primary means of conducting strategic defense, the means of effecting strategic defense are indeed as you described: directed energy and directed matter. In directed energy one thinks of laser beams of one type or another, perhaps beams of microwaves; and with respect to directing streams of matter, one thinks primarily of very high-performance, perhaps smart bullets of one type of another. Perhaps even very small interceptor missiles whose job is to detect the ICBM as it's being launched, to fly to it and merely strike it with the entire missile -- a missile which might be perhaps the size of a baseball bat -- to strike it head-on and thus destroy it because of the very high speed with which the interception would take place, perhaps three to ten miles per second. The destruction of the aggressor object, in this case in the boost phase it's the entire ballistic missile -- the rocket plus the warheads which are carried on top of it will be affected, as we see it at the present time, by directed energy and by directed matter. A nuclear explosive might be detonated at the upper edge of the atmosphere and used to generate radiation beams, energy beams of one type or another, and with those beams being aimed towards aggressor ballistic missiles, hundreds of thousands, perhaps even tens of thousands of kilometers away. These radiation beams, of course, would propagate to the speed of light, or essentially at the speed of light, so in a very small fraction of a second later, they would have traversed the intervening distance and be striking the aggressor ballistic missiles as they rose over their owner's territory.

SANFORD LAKOFF: What about the countermeasures that an offense might use to thwart a defense of this sort? For instance, if you've got laser systems that are deployed in space, presumably they would be vulnerable to the kind of techniques that have been suggested like space mines, or for that matter, ASAT [anti-satellite] weapons. Don't you have to worry about these systems operating in very sensitive environments, very hostile environments? Do you think that, apart from their theoretical feasibility, that you could go from that to an operational system, given the fact that you have an adversary in there trying to thwart you?

LOWELL WOOD: Space-based defenses have no basis in administration policy or in statements by responsible officials, and one of the reasons for this, I believe, is that there is a very significant problem with respect to the survivability of offensive or defensive or any kind of national assets in space, because of the relative ease with which they can be attacked from the ground, or attacked by other means which can be launched into space and immediately used to conduct an attack against, for instance, space battle stations of one type or another. However, it is not clear that space battle stations are easy meat by any means. They may well have effective means for self-defense, for defense of each other of an active nature, or they may be passively defended by such means as being extremely distant -- maybe a hundred thousand kilometers away from the earth. They may be shielded very effectively. They may be hidden by being very small in size and having suppressed signatures, to use technical jargon -- that is to say, very hard to see, invisible radiation and infrared and radar, or whatever. They may be decoyed so that instead of seeing ten objects that you're interested in destroying up there, you may see ten thousand and merely not have time to destroy ten thousand because you can't tell which is the real ten, or they may be sufficiently cheap in some respects so that it costs more to destroy them than it did to put them up there. This represents a very important consideration in the entire offense/defense

argument; namely, the side which is least expensive per unit of military effectiveness will ultimately win. If a unit of defense costs less than the countervailing unit of offense, the defense wins, and vice versa. So it is really a quite complicated question and not one which can be at all simply answered as to whether a strategic offense or a strategic defense assets can survive in space. But the very people who say that strategic offense will win, because strategic defensive assets will die in space, have pointed out that strategic offensive assets must fly through space where they too might be exceedingly vulnerable. Whether they are boosters, whether they are MIRV [multiple Independently-targetted Reentry Vehicle] buses, or whether they are reentry vehicles, they too must transit the potentially very hostile environment.

SANFORD LAKOFF: You mentioned the possibility that the defense might use nuclear explosions, at least in the terminal phase. What about the possibility that the offense might try to clear out any defensive systems, including those that are popped up by what are called precursor nuclear explosions? Does that, again, represent in your view a real threat to the defense ?

LOWELL WOOD: Rather than threat, I would say it represents a constraint within which a realistic defense must necessarily operate, just as gravity is a constraint, cost is a constraint, military feasibility is a constraint. The prospect, and I believe it's an exceedingly realistic prospect, that the offense would use nuclear explosives in any and all ways in which they might possibly break through the defense, bore under it, tunnel over it, these are all considerations with which a realistic defense must cope. And in the planning which is being done for strategic defense by the United States at the present time, the various ways in which nuclear explosives might be used -- precursor bursts, generation of directed energy, generation of directed matter -- all of the ways in which nuclear explosives, and for that matter non-nuclear means, could be used to break the defense, are being considered. And that is one of the sieves, one of the gauntlets which must be run, for any proposed strategic defense technology before it's going to be taken seriously. Everybody realizes that, all serious people realize that.

SANFORD LAKOFF: During the midcourse phase, I gather that the likelihood is that a great many decoys will be unleashed, and in fact that even warheads might be disguised within decoys. Doesn't this put a terrific stress, a terrific burden on the system for tracking, sensing, discriminating these? Are you equally confident that those problems may be solvable?

LOWELL WOOD: Oh, I believe that strategic defense, if it is to be considered really robust and reliable, must have the capability of arguing in a credible fashion that each of the three phases of the strategic defense battle can be completely, 100 percent successful -- that the means of destroying boosters in boost phase are sized and operated in such a fashion so that no matter what the offense does that you can destroy 100.0 percent of all of the missiles in boost phase. And then the midcourse battle must be sized so that you assume that all of the missiles succeeded in making it through boost phase, but you can still destroy all of the decoys if necessary, but certainly you can destroy all of the RVs [reentry vehicles] in midcourse. And then in the terminal phase, you must assume that all of the RVs made it through boost phase, all of them made it through midcourse, and you must size your systems so that you will succeed in destroying all those incoming RVs in terminal phase. I believe that if you have a strategic defense system that has that set of features -- that each one of the three phases independently can do the job --

that you can say that you indeed have a very robust strategic defense. I believe that it's feasible -- stressing, challenging, probably expensive, but technically feasible -- to attain that level of capability.

SANFORD LAKOFF: If your requirements are that strict, don't you run into the problem that you can't really test a system like this? How can you be sure that under battle conditions, it would function in that 100% way?

LOWELL WOOD: That, of course, is an extremely interesting question. It is one, strictly speaking, which does not need to be answered because the purpose of any military system really is to endow the diplomats and the politicians in the country that owns them with the means of encouraging, stimulating, if necessary coercing, the behavior of other politicians and other diplomats and other nations to do more or less what they wish. In the case of strategic defense its purpose is to convince the owners of strategic offensive systems that it will not pay to launch an attack, that an attack will be defeated and that those who launch the attack will then have to cope with the consequences of that defeat. So, strictly speaking, it is not necessary for a strategic defense system to be tested in a full-up fashion in order to be highly effective. It is, to borrow a very hackneyed phrase, perceptions, not realities that count. The reality never need be investigated. We have never investigated the reality of either our strategic offensive system or the Soviets', but we believe that ours would work, we believe that the Soviet one would work. Maybe not perfectly, but to an extent such that we aren't interested in trying at all in finding out whether ours work or theirs work. Strategic defensive systems have the same basic character.

SANFORD LAKOFF: You mentioned before that these systems might defend against missiles launched by submarine. It's sometimes suggested that submarine-launched missiles, or sea-launched missiles for that matter, could be sent on a depressed trajectory and therefore would escape at least space-based defenses. Are you suggesting that the defensive system that we're talking about would be able to intercept even missiles launched on a depressed trajectory, and let me, while I'm at it, throw in air-launched cruise missiles as well? Do you think they could be defended against by the same systems?

LOWELL WOOD: Depressed trajectories essentially permit the offense to fly missiles over shorter ranges, shorter periods of time, at lower altitudes. Those trajectories are amenable to interception by means which are either popped up from the ground or pre-deployed in space. They do not pose a different quality threat. It is different only in some of its parameters -- technical parameters -- which I don't believe are particularly significant. However, it is the case that if the U.S. is to be defended against ballistic-missile attack, it is sure they must defend not only against ballistic missiles which are land-based, but which are submarine-based. The Soviet capability in this respect is so great already that the U.S. must assume that a missile attack would come from all directions, not just over the North Pole, but would come from the north Pacific, the north Atlantic, the south Pacific, the south Atlantic, the Gulf of Mexico; essentially from all directions. So a strategic defense system must take that into account.

SANFORD LAKOFF: Right now we're engaged in a program that's supposed to last about five years, to ascertain which of these systems might be best to develop and then the estimate of the Fletcher Committee is that it would be another decade or so in which these systems would be developed and then there might be deployment sometime soon after the year 2000. Does that seem a realistic guess in your view?

LOWELL WOOD: It needs to be very thoroughly understood that the time scales are completely politically driven as they're discussed at the present time, and as they're likely to be any time in the foreseeable future. That is to say, the time scales on which our strategic defense system could be erected by the United States are much shorter than the time scales which anybody is discussing in public at the present time. The Fletcher Commission and other groups have been told of definite plans with details behind them for commencing the erection of strategic defenses on a five-year time scale; others on an eight- or ten-year time scale. And for completing the erection of these first-phase strategic defenses on ten- to fifteen-year time scales from the present time. Let us say commencing it in five to ten, completing in ten to fifteen. The Congress and the administration, even in the first very tentative steps that were taken this past year to commence looking at strategic defense, said that they did not want to even consider doing this job on a technology-limited scale, but they would run at a slower pace, a pace which is determined by political and budgetary considerations, not by scientific and technological ones.

SANFORD LAKOFF: Given the expenditures and given the fact that we have certain advantages in science and technology, do you think it is realistic to suppose that at some point, if we do succeed in this effort and we do so well before the Russians succeed, that we could and would share the technology with them?

LOWELL WOOD: I do not believe, if we extrapolate current trends, the United States will necessarily come in ahead of the Soviet Union in strategic defense. The Soviet Union has been deploying a strategic defense for many years in the European USSR. That system is much more capable than anything that the United States has or ever did have in the way of defense against ballistic missile attack. But the Soviet tortoise, by moving very purposefully and very steadily towards strategic defense goals, may well come in front of the United States here, which dithers and naps and cavorts and plays by the roadside while the race is being conducted. I don't believe there's any objective reason to believe that the United States will be asked by the Soviet Union to share strategic defense technology. I am afraid that the shoe will be on the other foot.

NARRATOR: You've been listening to Professor Sanford Lakoff interviewing Dr. Lowell Wood, senior research physicist at the Lawrence Livermore Laboratories in Livermore, California. Dr. Wood is a strong supporter of President Reagan's Strategic Defense Initiative and believes a defense against nuclear attack can be achieved. In our next broadcast we will examine the views of a leading critic of the project, Dr. Sidney Drell.

PROGRAM TWO

. . . impotent and obsolete. Tonight, consistent with our obligations of the ABM Treaty, recognizing the need for closer consultation with our allies, I'm taking an important first step, I am directing a comprehensive and intensive effort to define a long-term research and development program to begin to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles. This could pave the way for arms control measures to eliminate the weapons themselves. We seek neither military superiority nor political advantage. Our only purpose, one all people share, is to

search for ways to reduce the danger of nuclear war. My fellow Americans, tonight we're launching an effort which holds the promise of changing the course of human history. There will be risks and results take time, but I believe we can do it. As we cross this threshold I ask for your prayers and your support. Thank you, good night and God bless you.

NARRATOR: In the two years since the president made that speech, we are not much closer to coming up with a technological defense against nuclear weapons. Ten aerospace study teams have been awarded \$1 million each and scientists are at work, but right now we don't even have an idea of what a defense system would look like, although there are a lot of theories. It is agreed that some way would have to be found to intercept an incoming missile in flight. To accomplish this, scientists have suggested various high-tech solutions, such as lasers, particle beams or projectiles that can be aimed through space at moving objects. Even the most basic decisions have not been made, such as whether the system would be ground-based or space-based, perhaps on a satellite. The goal is to develop a layered defense system -- one that's designed to destroy enemy nuclear missiles during each phase of their flight. In this way, it is hoped that a leak-proof defense could be achieved. Although the president called upon the nation's scientific community to develop a defense against nuclear weapons, scientists knowledgeable about weapons systems are deeply divided on the question of whether such a defensive shield is a practical possibility. Some believe that with enough investment and with enough research it will prove feasible. Others think the goal is a dangerous illusion.

On our last broadcast one of those in favor of the program, Dr. Lowell Wood, was interviewed by Dr. Sanford Lakoff, professor of political science at the University of California at San Diego. Dr. Wood thinks we should move forward at the fullest possible speed to develop this defense system. Today, Professor Lakoff discusses the Star Wars program with Dr. Sidney Drell, a physicist who is the associate director of the Stanford Linear Accelerator and the holder of a MacArthur Fellowship. He does not share Dr. Wood's optimism.

SANFORD LAKOFF: Dr. Drell, you're the co-author of a recent book called, The Reagan Strategic Defense Initiative: A Technical, Political, and Arms Control Assessment. I'd like to ask you to help us understand, what's involved in the various technologies that are being talked about. First of all, this is supposed to involve what's called the layered defense. Why is a layered defense so important?

SIDNEY DRELL: Well, the president in his famous Star Wars speech called for a nationwide defense that would render nuclear weapons impotent and obsolete. That meant that we're talking about a defense that has to be essentially 100 percent perfect if it will meet such goals. One nuclear weapon after all is a weapon of mass destruction. It is recognized that no single technology can meet such a very high standard of effectiveness, and so in striving for a near-perfect defense . . . I say "near perfect" because all technicians recognize there is no such thing as a perfect defense, but for highly effective or even or near perfect defense, the idea is to rely on successive layers, each of which will intercept a sizeable fraction of the incoming warheads, and so the idea is that if the first layer can remove 90 percent of the threat -- that threat measured in today's numbers is between 8,000 and 9,000 nuclear warheads that the Soviets have on their strategic or intercontinental systems facing us, and since we will be talking only about the defense against

ballistic missiles, not aircraft or cruise missiles, which are in the atmosphere, we recognize that the Soviet number is still about 8,000 in that category. Now if you remove 90 percent of those, that leaves 800. If you had a second layer that were able to remove another 90 percent, then that would leave only 80. If you had a third layer that removed another 90 percent, you would end up with only 8 landing. So that is the idea, to have a layer.

SANFORD LAKOFF: You indicate in your book that the first phase -- the interception in what's called the boost phase -- is the most important. Why is that?

SIDNEY DRELL: The new technical developments that have rekindled interest in ballistic missile defense have been the technical advances that make it possible to think about intercepting the missiles during the first few minutes of their orbit, when their engines are burning and they are under power or thrust. The reason that is very important -- the reasons -- are several. First of all, the missile is most vulnerable at that time. The thin skin of the booster engine is a relatively soft and relatively easy as well as a large target. Also, while the engines are burning you have an enormous signal -- the flame, the heat, the infra-red radiation from the engine -- which you can focus on and pick up the target easily. The second reason that the boost phase is important is that while the missile is all together as one unit, if you destroy it, if you disrupt its burn, which is equivalent to destroying it as a threat, then you are at one moment destroying all of the warheads it carries and all of the decoys, which may number in the hundreds, and thereby removing a lot of the targets, or the possible targets for successive layers to handle.

SANFORD LAKOFF: What's wrong with the systems? Let's assume that they could be designed and could be deployed, even if it would take say 300 or 400 laser battle stations, or alternatively some pop-up system using an x-ray laser, what technical arguments are there for thinking that it might not be a good investment?

SIDNEY DRELL: I think that problems, at least as I see them, between these concepts and an effective operational system, these problems arise from operational limitations, not technical ones. Technically, I'm confident that, with enough effort, brain power, and resources thrown at it, one can build very bright lasers, or one can in principal build x-ray lasers. I should emphasize we are many, many orders of magnitude away now from an operational system and we're still learning basic physics, but I don't see that one can't do it -- I don't want to be a naysayer. The issue as I see it, is that the problem is one of operational difficulties. What will a determined opponent who wants his offense to be an effective deterrent, a retaliatory force -- what will he do to counter your system?

SANFORD LAKOFF: What will he do?

SIDNEY DRELL: There are a number of options he has, and it's my judgment the options available to the offense are easier and less expensive than the defensive system, and that certainly is a determinant in my thinking.

SANFORD LAKOFF: Give us a specific idea of what a defender might do as a way of counter-measures.

SIDNEY DRELL: Against a chemical laser in space, the best counter-measure would be (a) to harden the booster so that one has to increase the energy to deliver. This can be done in various ways, without a great waste of payload.

Secondly, he can redesign his boosters so that they burn more rapidly at higher thrust, reduce the burn time to a minute or less. This then reduces the time available and makes less practical the engagement when one goes through it numerically. And third, he can arrange his missiles to fly on depressed trajectories or he can change much of his threat to cruise missiles and aircraft that don't arise out of the atmosphere. As far as the pop-up systems are concerned, you're here talking about a system which must be deployed near to the Soviet mainland in order to even see the booster before it burns up because of the curvature of the earth. Again, if fast-burn boosters are introduced, the missile can complete its burn and begin its deployment of individual warheads of which there'd be a larger number and which are harder to destroy because they're harder objects, even at the top of the atmosphere, and thereby put such a system effectively out of business, or at least make it so difficult that the number you would need, the hair trigger you would need for computers to launch this without any human intervention, make the system when you look at it in detail really quite a fantasy. So it's really not a "yes/no." It is a matter of looking at the counter-measures in detail, looking at the complexity of the system in detail and coming to some judgment, whether this is a winner or a loser.

SANFORD LAKOFF: What about the idea that you mentioned in your book that there might be what are called "precursor nuclear explosions." In other words, that somebody ready to launch nuclear missiles, might try to destroy the defensive system by exploding a nuclear weapon in their vicinity.

SIDNEY DRELL: Thank you for reminding me that I failed to mention that for the systems in space, one of the greatest problems is their own vulnerability. They themselves are on stations, they themselves are very large, fragile, complex, refined, technical systems, and they themselves are more vulnerable than the ICBMs they're shooting at. Furthermore, to the point of your question, one can disturb the atmosphere by high-altitude precursor nuclear bursts which will heat the air, raise the atmosphere to higher altitudes and further delay the ability of these systems to operate.

SANFORD LAKOFF: But isn't it true that it's at least theoretically possible to develop laser-imaging techniques so that you don't have to depend just on infra-red detection? In other words, aren't there counter counter-measures that can be developed, than can identify these targets?

SIDNEY DRELL: Remember we're talking about counter-measures, counter counter-measures, and the like, but the end result has got to be that you have a system, that the first time it's operating in a nuclear-disturbed environment is going to give you a complete protection. Because this is a system which is going to have hundreds of sensors and battle stations. It's going to have a computer and battle-management problem which is so severe that it's far beyond any experience we have now, and this has been high-lighted by supporters in the Fletcher panel and elsewhere of this system, as perhaps the most difficult of all the challenges facing the concept of Star Wars. In fact that is what makes the boost-phase intercept so important. If you remove 90 percent of the boosters and only 100 are left, that 100 can still give you many tens of thousands of objects, but if you don't remove 90 percent you're dealing with hundreds of thousands, if not millions of objects, which you have only tens of minutes to destroy.

SANFORD LAKOFF: But one of the configurations has the battle management systems and the sensors way up in geosynchronous orbit where under certain circumstances they might be clear of anti-satellite weapons -- we're not sure --

but at any rate, it's conceivable that they could be free to operate in that kind of environment, couldn't they? I mean, couldn't you get around some of the problem in that way?

SIDNEY DRELL: Let me say that the development of Star Wars, of a defense, requires an ability to shoot down many objects on many different paths to which many counter-measures have been adopted in a few minutes. And that problem is much harder than the problem of shooting a satellite down out of a geosynchronous orbit where it's like a duck in a shooting gallery on a fixed path and you have lots of time. And it's one of the fundamental difficulties that if you're going to develop a Star Wars defense along the way you're going to develop very powerful ASAT, or anti-satellite capabilities. Remember, in mid-course your sensors and your kill mechanisms, your platforms, whatever you're using, have to be survivable throughout the engagement for twenty minutes. They themselves may be the direct object of the attack. One of the ICBMs launched by the enemy may be designed not to land on your territory but to destroy or disrupt the operation of the system. The basic point is that no one can say the system can't work or can work at this point; one can say that as we see it now, unless there are severe restraints on the offense, reductions in numbers and limits of technology, the opportunities for the offense to respond to the defensive developments seem relatively simple, relatively inexpensive, and therefore one is getting in a competition which seems technically, let alone its implications for the ABM Treaty and arms control, but technically they seem in my judgment still to be quite a loser. And so I can see doing the research and development which we have been doing for the last decade, and which I support. In fact, I can see improving our program, but within the treaty restraints and guided by learning technology and physics rather than oriented toward a system when we are so far away from anything practical. When we don't understand basic physics enough yet of x-rays lasers, and the like, although they are very interesting problems to design systems, and when if we unilaterally move in this area, we are challenging, the minute we go to demonstrations, as we would have to, the very treaty -- the ABM Treaty -- which is our one major arms control achievement, and which is the fundamental basis of the present U.S./Soviet strategic relationship.

SANFORD LAKOFF: What happens to those missiles that survive the boost-phase intercept and the midcourse intercept? What are the techniques for getting them at the end of their flight when they're close to impacting?

SIDNEY DRELL: Well, as they reach the end of their flight, they re-enter the atmosphere and at that point friction due to running into all the molecules in the atmosphere, once you're at altitudes below sixty or seventy miles, begins to play an important role, and so the decoys are stripped away; they're slowed down, they're burned up. Only very well designed re-entry vehicles are going to re-enter the atmosphere and come down. So you now have a filter to remove the uninteresting targets and if the number of warheads then is reduced to a small number in terminal phase, the more traditional means of ABM (that is interceptive missiles and either nuclear or non-nuclear explosions, depending upon how close you get to them) can be thought of as defending you. But again, remember, the problem is much easier, but you've lost if any warhead gets through and lands on your city. If your terminal defense is defending hardened military targets, of course the problem is different; a missile in an underground silo hardened to withstand the shock, the vibrations, the impact of thousands of pounds per square inch overpressure of the nearby nuclear explosion, to defend such a target you can defend at much lower altitudes, much nearer the target. Also, your defense will be effective if it's only 50

percent or 60 percent effective, rather than totally effective because you don't mind losing some of the missiles. You just want to make sure a large number survive for your deterrent capability. So the standards of performance are much lower.

SANFORD LAKOFF: Isn't that system too vulnerable -- just as was said at the time of the ABM Treaty -- because so many of the sensors, the radars, are ground-based. I mean couldn't an enemy saturate them, or do you believe in what's called "leveraged" defense as an answer to that?

SIDNEY DRELL: I think that the most likely kind of defense that we might deploy today is a hard-site defense, a terminal defense of hard military targets in which your standard of effectiveness is not 100 percent but maybe 50 percent, or in that neighborhood, and in which you only have to defend a very small threat. Whether that is the best way for the United States to ensure the survivability of our ICBM force and silos or whether other means, such as Midgetman -- having single warhead missiles, each one of which is a lower value target than a big MX -- is the best way, I don't think we know the answer to. And I think it is there that we have the greatest need for focused research and development within the ABM Treaty, to see whether it is in our interest or not to deploy some hardsite defense, or even to seek a treaty modification to allow that. I'm not convinced it's the right thing. I'm convinced we need a well-focused research program, but that's very different from a Strategic Defense Initiative because there we are now looking at the new technologies for a nation-wide defense and that means pushing the battle further away because defending a city, even in the terminal phase, requires engagement to be much further away so that a missile about to be intercepted which can detonate -- it's called salvage fusing -- won't destroy the city. So the area of engagement is different for the terminal defense as well as for mid-course and boost-phase, so it's a very different problem to think about whether it's in our interest or not to have hard-site defense. That's a question we should answer, but it's nothing to do with Star Wars.

SANFORD LAKOFF: But isn't there an area of agreement between critics like yourself and some of the advocates of Star Wars in the sense that they're talking about a defense transition, they're saying that there may be certain technologies like the terminal defense technologies that could be deployed in an intermediate time period and that would be a step towards the forward development of the system. Aren't you in effect in agreement with them ?

SIDNEY DRELL: Well, first of all, there's always some point to be clarified when we talk about the Star Wars proposal because the president called for a nation-wide defense to transcend deterrence. Many of the people in the Defense Department, and indeed the defense program submitted by Undersecretary de Lauer in March, is talking about something totally different. They're talking about enhancing deterrence by having some partial defense. Now, if that's what we're talking about now, one has to be careful to avoid making what I call "the fallacy of the last move," and that is if indeed the only thing to be done were to build some limited hardsite defense, then that would complicate an attacker's plan, and I can see virtue to that, but at the same time, you are making steps that might threaten or decrease the opponent's deterrence. He's going to make his step, and his steps may include building more missiles to make sure his deterrence stays as robust as ever. It may include modifying his missiles to make them harder to destroy, and it will certainly include him moving out with ABMs also, because he can't wait for us to move five years down the road and then once he sees what we're going to do

at that point, begin to react. He will react right away. I remind you that every other time we have started trying to put terminal defenses to decrease the effectiveness of the threat, that threat has just grown more robust to overpower that defense. That was true with the first Soviet move for an ABM defense around Moscow which led us to MIRV, or multiply the number of warheads on our forces. And it's true, indeed, when the Russians built an extensive air defense system; we did not abandon our bombers and say there's a defense against them. We improved our bombers. We have now loaded them with air-launch cruise missiles to make sure we can overpower. So my concern is that moving in this direction without an arms control basis and negotiation and understanding is going to trigger an arms race as the counter-measures, the counter counter-measures proceed, and as each country does what the president said himself in his speech, namely work through modernization to maintain our capacity to deter and our capacity for flexible response. And so I see this program making sense as an R&D program and whether in the future it makes sense as a terminal defense, I don't know, but certainly only in the context of an arms control treaty. In fact, it was the president's own under-secretary of defense for research and engineering, Dr. Richard de Lauer, who said several months after the president's speech, "with unconstrained proliferation, no defensive system will work." And that is our problem. We have that at the moment. We must first build the understanding in the arms control basis before there could be any value I see for ABM.

SANFORD LAKOFF: What about the idea, though, that the Russians are after all behind us in technology, especially the computer technologies and the sensor technologies that we're talking about here, and therefore if we want to persuade them, so to speak, to agree to serious arms control, then it makes sense to push these technologies in which we have an advantage if only to get them to be more of a mind to work out an arms control agreement?

SIDNEY DRELL: Well, I'm a physicist and you're a political scientist and I must say as a simple physicist I've yet to see that line of reasoning lead to that result. I've only seen these moves stimulate the Russians to push the technologies to catch up as soon as they can and they have every time. In their own inimitable style they seem to do it with bigger systems and often with more systems, and we end up less secure, and so I don't see that leading to a safer world. In fact we're in a world which is so insanely over-armed with nuclear weapons that are basically, as President Eisenhower said back in 1956, really weapons of suicide, I think this getting there first, or having more, in no way serves our national security needs. And so I think that's an argument that's been tried, and in my mind has failed, but I'm prepared for a counter-example.

SANFORD LAKOFF: What's your view of the value of this program, the cost that will be involved, the likelihood that it will succeed?

SIDNEY DRELL: I have reviewed the earlier research and development program we've had in ABM technology which has been running at about a billion dollars a year. I can see a robust program, within treaty restraints, which is in our national security interests, running perhaps at 1.5 to 2 billion dollars a year, and includes such important facets as making our satellites in space more survivable and improving surveillance, because that's good for gaining information from space, for command and control and many things of that sort. What I'm concerned about is that as the defense buildup towards this figure of twenty-five billion dollars over five years goes on, we're going to be in the position of making demonstration tests of new defense concepts, and that idea

was the most troublesome aspect because that will bring us into conflict with the ABM Treaty. Now, unless the country makes clear that we really are talking about a research program within the ABM Treaty, not just for now, as the Defense Department says, but within the ABM Treaty, I fear that it would be a normal Russian reaction, it would be our reaction to them that if they see us building up to that level and moving toward demonstrations and with the presidentially-stated goal to move away from the ABM Treaty, they themselves will be in a position to move out of their present program to a higher level, to abrogate the ABM Treaty and the first casualty will be the ABM Treaty. And so with this money build-up, I can't see getting very far without some demonstrations which will indeed threaten the continuing viability of the ABM Treaty. Which is, after all, the basis of our current strategic relationship with the Soviet Union. It is a Realpolitik approach to avoiding war and building a fundamental relation with them, and I'm not willing to abandon arms control and the Treaty when I don't have a replacement. I think it's irresponsible to say there is something better out there when you can't technically define the path there and even if with your technical optimism you can't operationally define the path there. One could technically define the path of putting the man on the moon, because that was a technical problem. The moon was not going to duck, the moon was not going to hide, it was not going to run away. And this is an operational problem without restraint. The Russians are going to modify their force. They're going to make it larger if they want to, they're going to avoid coming out of the atmosphere, they're going to make it harder, they're going to threaten our system. It's an operational problem and until you can understand how to manage the operational factors as well as your technical progress, it's irresponsible to abandon a path which has worked, however fragilely, in the hope of some illusionary "city on a hill" that's free of the nuclear threat.

PROGRAM THREE

NARRATOR: Nuclear war is a horrible prospect. With 50,000 nuclear weapons aimed at the United States and the Soviet Union, we're both in a precarious position. Are we trapped in this terrible situation? The best minds have tried to find a way out of this dilemma, to try to make us all secure in this most insecure of worlds. We've been relying on the concept of mutually assured destruction to defend ourselves from nuclear war. The fragile hope that neither side will launch a nuclear attack for fear of retaliation. While we depend on MAD, as it's called, we've made various attempts at arms control agreements with the Soviet Union. Dr. Sanford Lakoff is a political science professor at the University of California at San Diego.

SANFORD LAKOFF: Ever since we negotiated the Limited Test Ban Treaty with the Soviets we've been anxious to see if we couldn't go beyond that to limit the actual development and deployment of weapons. In 1972 we succeeded in SALT I. SALT I was a treaty by which the U.S. and the Soviets both agreed to limit their offensive nuclear weapons, but that treaty was accompanied by the treaty to limit deployment of defensive systems -- the ABM Treaty, and the two are tied together. The reason was that if both sides were free to develop defensive systems, then they would have to be free also to develop offensive systems to overcome the ABMs or the defensive systems. Neither one of them had much confidence at that time that the ABM was really a feasible system, and that was one reason they agreed to enter into the treaty. But the other reason was that they both recognized that it would mean a futile arms race -- a

race to develop ABMs and a race to develop offensive weapons that would circumvent the ABMs, and so the hope was that once they had the ABM Treaty in place, SALT I would limit the weapons at least to some degree, then it would be followed by SALT II and you would get further limitations and finally you'd get real reductions of weapons, but neither side would have to fear that it wouldn't have enough to deter the other side's attack -- to retaliate, in other words, in the event of an attack. That was the whole basis of the ABM Treaty and its linkage with SALT I.

NARRATOR: Many people feel that arms control negotiations will never give us the security and safety that we seek. In March of 1983, the president announced a new plan to solve the dilemma of the nuclear threat. In his now famous "Star Wars" speech, the president proposed a new effort to develop a technological defense against nuclear attack.

I call upon the scientific community in our country; those who gave us nuclear weapons, to turn their great talents now to the cause of mankind and world peace, to give us the means of rendering these nuclear weapons, impotent and obsolete. Tonight, consistent with our obligations of the ABM Treaty, and recognizing the need for closer consultation with our allies, I'm taking an important first step. I am directing a comprehensive, and intensive effort, to define a long-term research and development program to begin to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles. This could pave the way for arms control measures to eliminate the weapons themselves. We seek neither military superiority nor political advantage. Our only purpose, one all people share, is to search for ways to reduce the danger of nuclear war. My fellow Americans, tonight we're launching an effort which holds the promise of changing the course of human history. There will be risks and results take time, but I believe we can do it. As we cross this threshold, I ask for your prayers and your support. Thank you, good night, and God bless you.

NARRATOR: Since that speech, the president has launched a long-term multi-billion dollar project, officially known as the Strategic Defense Initiative. No one knows what will come out of this research effort and no one knows how much it would cost or if such a defense system is even possible. What many experts are worried about, however, is not the technological feasibility of such a defense system, but how it will affect our relations with the Soviet Union. Would an effort at defense only trigger the development and deployment of more offensive weapons? Would it destabilize the already fragile relationship between east and west? Would it make any further progress towards arms control and disarmament impossible? Two people who are deeply concerned with this issue are Professor William Van Cleave and Ambassador Philip Farley. Professor Van Cleave is the director of the Defense and Strategic Studies Program at the University of Southern California. His belief is that the arms control treaties that we have had with the Russians are largely useless. Ambassador Farley is a senior research associate at the Center for International Security and Arms Control at Stanford University. Farley is the former Ambassador to the SALT I talks. In this broadcast, Ambassador Farley will be interviewed by Professor Sanford Lakoff. He teaches political science at the University of California at San Diego. He is also an associate of the University's new Institute on Global Conflict and Cooperation. In our next broadcast, we'll hear from Professor Van Cleave.

SANFORD LAKOFF: Ambassador Farley, I'd like to ask you some questions about the implications of the president's Strategic Defense Initiative, alias Star Wars, for arms control. In particular, what do you think this project will do with respect to our treaty that we entered into with the Russians in 1972 to limit the use of anti-ballistic missiles?

PHILIP FARLEY: It would be possible to go some distance in carrying out the president's Strategic Defense Initiative consistent with the treaty. The treaty does permit research in this field and, with some exceptions, engineering development to improve the permitted anti-ballistic missile systems. However, because of the very special nature of the president's proposal, which envisages anti-ballistic missile components which are deployed in space, you cannot go very far within the terms of the treaty. Therefore, if the United States proceeds unilaterally it will raise very serious questions as to how long that treaty can survive. In the first place, to develop space-based components of anti-ballistic missile systems is specifically forbidden by the treaty unless there is discussion and agreement on the development activities and probably amendment of the treaty to permit those developments to go ahead in a way that which would frustrate the purposes of the treaty.

SANFORD LAKOFF: What is so important about the ABM Treaty that we should be concerned about it? Isn't it a good idea after all to get whatever defenses we can?

PHILIP FARLEY: I believe that in the whole strategic field one has to look not just at good intentions, but what the result is of pursuing a particular weapons system. And this whole question of what would be the results of trying to develop a defense against ballistic missile attack is the basic question that was examined both by the United States, and I think it's very clear, by the Soviet Union, at the time each of us reached a separate decision to try to limit very tightly the development and deployment of ABM systems. On the United States' side, both in the Johnson administration and then in the first year of the Nixon administration, there were very intensive studies of what we could expect to result from pursuing ABM development and deployment. And we reached a pretty clear conclusion in each of those administrations, that to pursue ABM would be futile, would be destabilizing -- that is, complicate the strategic relationship between the United States and the Soviet Union and make it more likely that there would be recourse to nuclear in a crisis. So it would be futile because the technology then as now did not exist for an effective ABM defense, destabilizing because it would accelerate the arms race, and make the chances of nuclear weapons ever being used somewhat greater and then astronomically costly.

SANFORD LAKOFF: But isn't it true that the ABM Treaty does allow for the deployment for one system for each side, so presumably there is recognized in it that the systems, while they may not be totally effective, do have some value or merit, isn't that so?

PHILIP FARLEY: That's a question that goes very directly to what we are now contemplating under the President's proposal. The treaty limits what can be deployed both as to numbers and to kind. As to numbers, it says you can only deploy 100 missiles. As to kind, it says you cannot deploy an ABM system which is so laid out, deployed, that it is trying to protect the whole territory and population of a country. It can only be in a very narrow and circumscribed area to protect either land-based ICBMs or the control posts and centers of authority which govern the use of strategic forces. And this was for one very common-sense reason. You can hope with what are called dedicated

defenses, that is defenses keyed directly to a military or related target, to achieve something. The reason is of course that those targets are hard. They're not vulnerable to anything but a direct strike. That's a very direct difference from targets which involve things like people and houses and all the accouterments of civilization, technical and other. Those are things which if even one nuclear weapon explodes in the vicinity will be just devastated and you cannot avoid by any defense that has even been envisaged so far a protection of that kind of resource of civilization against nuclear weapons. Nuclear weapons are just too powerful.

SANFORD LAKOFF: What danger might there be in the erosion of the ABM Treaty?

PHILIP FARLEY: From an arms control point of view, its primary purpose is to make limitation of offensive missiles possible. What we and the Soviets found as we approached SALT negotiations, first in 1968 at the end of the Johnson administration, then in 1969 when the Nixon administration came into office, and concluded -- it wanted to go ahead with SALT negotiations -- was because of the inter-relationship of offensive and defensive weapons, it wasn't possible to formulate sensible proposals to limit offensive missiles if we had to face the prospect of penetrating a defensive missile screen on the other side. If we see Soviet defenses being built up, as we did in the late 1960s with a very limited but nevertheless real ABM defense system around Moscow, if we faced those, we had to be prepared to penetrate them so that we would maintain our retaliatory threat against the Soviet Union having recourse to nuclear weapons. That was very high priority, I can tell you, in American defense planning. It was the primary reason why we decided we had to develop and deploy MIRVs -- the multiple independently targetable re-entry vehicles which would just overwhelm any Soviet ABM defense. There's a long history of how wise that program was, but I was there at the time and we saw an impelling rationale as we looked at the Soviet ABM defenses. We understood just from the Soviets and from such independent analyses as we could make in the government that the Soviets viewed the prospect that we would respond with a technically much more sophisticated and efficient ABM of our own, they saw that their retaliatory deterrent was also to be threatened. And so we independently came to the conclusion that if we wanted to limit those offensive threats to each other, we had to start by at least putting a ceiling on the ABMs on each side so that we could then with confidence undertake a limitation of our offensive systems. That is explicitly stated not just in the negotiating history but in the preamble to the ABM Treaty, which says we do these limitations on ABMs to make it possible to get ahead with the business of reducing the offensive arsenals with which we threaten each other.

SANFORD LAKOFF: Does it follow from what you've said about the reasons we developed the ABM Treaty that any future possibility for limiting offensive arms is tied to the issue of whether we and the Soviet Union would resume efforts to develop a ballistic missile defense?

PHILIP FARLEY: It's always hard to give a categorical answer for all time to something like that, but I think it is quite clear that in the common ground that has been established with the Soviet Union -- and you can't have arms control unless you find some common ground -- one of the basic premises on which we proceed is that we want to limit offensive systems because those are the direct threat which we pose to each other and that the dynamics of our strategic relationship are such that if we do not limit our defensive systems respectively we will be compelled to maintain present or higher levels of offensive weapons.

SANFORD LAKOFF: The spokesmen for the Reagan administration have often said the Soviets have taken advantage of the SALT Treaties in order to engage in a major buildup of their strategic forces, at least with respect to throw-weight, where they have an advantage over us. And they have resisted our entreaties in the START negotiations to agree to cut back with respect to the throw-weight of their missiles. Might there not be some possibility of a trade-off here? The Soviets have asked us to consider negotiations to limit what they call the militarization of space. Might we not be able to trade off the possibility of agreeing to some limits in that regard, especially since the weapons systems are not yet developed, in exchange for Soviet willingness perhaps to agree to cut back on missile strength?

PHILIP FARLEY: I think there is some trade-off possibility here. I have to say, without wanting to get us into it, that there are other programs on the two sides which are not comparable, or the more fancy word, symmetrical, where you are going to have to find trade-offs too. But I do believe that what you have said is an important one. Now if you are going to limit the militarization of space, you are going to make quite difficult the concept of the Strategic Defense Initiative, which does appear to require some military components of that ABM system operating in space, continuously or at least at the time that the system goes into operation. But I would myself consider that to be a relatively small price to pay if it made it possible to get ahead with this business of reducing the offensive arsenals of the two sides and breaking through this crux that you've identified -- that the Soviets do have larger missiles, greater throw-weight, and therefore something which is potentially an advantage for them that you would want to have limits on in any deal that was going to survive over time. It's interesting, however, that one of the responses of the Soviets to the proposal for the strategic defense program has been to say, if you're going to go ahead with getting a real ABM, the first thing you're going to have to recognize is that we're not going to give up one ounce of throw weight, because we will need that for penetration aids, for putting more warheads in our missiles, for simply overwhelming your ABM. And this is indeed the logic that we accepted with the Russians in 1968/69.

SANFORD LAKOFF: As someone who has had long experience with the arms control process as well as with the formulation of our national security policy, what do you say to people who argue that the arms control process really hasn't worked? That in effect it has preserved the arms race and merely limited it to a very small extent.

PHILIP FARLEY: I don't think that the fault has been with the arms control process. What has been done in a serious joint effort with the Soviets to achieve and carry out arms control agreements has been sound in itself. The difficulty is that we and the Soviets are still overall much more suspicious and competitive in the nuclear weapons relationship between us and we have difficulty therefore in pursuing these measures on which we make beginnings. We negotiate a limited test ban in 1963. Here it is twenty-one years later in 1984 and we have not yet had the skill and nerve to complete the comprehensive test ban which was supposed to be what we were taking a first step toward. We negotiated SALT I in 1972. When we negotiated in 1978 the SALT II Treaty, we lost our nerve and wouldn't ratify it, and yet ironically our military men insisted to the Reagan administration in 1981 that because that treaty was more advantageous to us than the Soviets, we should continue honoring it in a de facto way as we are continuing to do -- not as a favor to the Soviets, but as a favor to us. So we have got to have the vision and courage to proceed with arms control rather than constantly becoming fascinated by new weapons

which complicate the process and keep us from the bargaining table.

SANFORD LAKOFF: Given all the difficulties that you have just acknowledged in the arms control process and given the fact that when we're talking about defensive weapons, we're not primarily talking about nuclear weapons but non-nuclear weapons which are designed, as the president said, to save lives rather than avenge them, what's wrong with proceeding in this direction?

PHILIP FARLEY: There's nothing wrong with it if it will work, and when I say if it will work it will do three things, if it will actually do what it says, which is defend us and that is still far from being shown to be possible. On the contrary, the most thoughtful technical people in and out of the government all say that they see no prospect for a defense which will protect people, cities, civilization. You can see the possibility of protecting weapons, but that hardly is what the president was talking about. Secondly, if it works it must work to make the chance of nuclear war less and so far the imperfect defenses are simply designed to make it more likely that in a crisis each side will feel that if it doesn't strike first, it's going to be in a disadvantageous position because the imperfect defenses would only be worth something after the other side had been weakened by receiving the first strike. If it's going to work it has to work in the sense of making arms control -- removing the basic threat of the offensive missiles -- more likely, and that is not going to happen if the first result of starting to deploy defenses is going to be a multiplication of offensive weapons to overwhelm those defenses. And unfortunately, even if the miracle happened and we found an ABM defensive system that offered some promise of protecting our people and our civilization, not just our weapons, you couldn't get it overnight. So that the first thing each side would have to do would be still to continue to maintain its deterrent. So we would go through a very long and uncertain period when the whole pressure of the ABM was on maintaining the offensive systems. It's going to postpone the day when it becomes possible for the two sides to reduce, not maintain or increase, their offensive systems.

SANFORD LAKOFF: But is there a realistic way that we and the Soviets could agree to a verifiable freeze, you might say, on research on this area? After all, aren't we going both to be developing better radar systems, better communications systems, better laser systems? Isn't it necessary for us to maintain something like the Strategic Defense Initiative simply in order not to be caught in case the Soviets should develop such an ABM system?

PHILIP FARLEY: I think a prudent national policy requires two things. One is a research program designed not just to hedge against Soviet breakout, although that has some importance, but also against the unknown, for positive as well as negative reasons. We favor that in the book which we have produced recently here at Stanford on the president's Strategic Defense Initiative, which has tried very hard to look at the promise as well as the dangers of going ahead. And we think a carefully designed and restrained research program is important, and we recommend it go ahead at much the levels which it has in recent years -- a billion to a billion and a half dollars a year -- which is not a trivial program at all. The second thing that has to be done, however, is to avoid moving ahead in programs like that to engineered and tested developments which put you over a point of no return for verification if you decide those things are more destabilizing, more dangerous than they are beneficial. And that's a question which is very hard to understand and decide in advance, but nevertheless it's very important that you don't let the technology make up your mind for you. That's why this research program, which

is the prudent and wise thing to do, has to be very carefully protected from going over those points of no return in development. And that is what the ABM Treaty proscribes. There's no restriction on research. You can't control that. There is a restriction on development and testing, first because that could be the point of no return for verification and limitation, and second because those are the points where you can hope to see what each of us is doing and thus devise possible, either permitted activities or limited activities if it turns out to be in the mutual interest. That means one other thing in a prudent course of carrying out the Strategic Defense Initiative which we're committed to, and that is that we do it regularly with informal discussion, formal exploration with the Soviet Union of the implications of the development programs that are contemplated by the two sides.

PROGRAM FOUR

NARRATOR: Nuclear war -- everyone is afraid of that prospect. Some even fear it's inevitable. How remote is the possibility of an attack in a world where there are 50,000 nuclear warheads ready to be launched at a moment's notice? Our worst fears are fueled by the fact that we are essentially defenseless against a nuclear attack. The only thing that keeps us safe is the hope that the other side is reluctant to launch any nuclear weapons for fear of retaliation. This slim, totally psychological defense has prompted the president to call for a defense that is more concrete; a defense based on science and technology. The president announced this new effort in what's now called his "Star Wars" speech in March of 1983. Since then a long-term multi-billion dollar project has been launched to investigate the various alternative possibilities. There is great argument as to whether the technology will ever be available to render nuclear weapons useless and obsolete. But there's a deeper and perhaps more urgent argument. Should we actively pursue a defense system of any kind? Would an effort at defense only trigger the development and deployment of more offensive weapons? Would it destabilize the already fragile relationship between East and West? Would it make any further progress towards arms control and disarmament impossible?

On our last broadcast, Professor Sanford Lakoff, who teaches political science at the University of California at San Diego, discussed these questions with Ambassador Philip Farley. He represented the United States at the SALT I negotiations and is co-author of a book called The Reagan Strategic Defense Initiative. He argues that this program threatens to undermine the prospects for arms control. Professor Lakoff is an associate of the University of California's new Institute on Global Conflict and Cooperation. Today he will interview Dr. William Van Cleave, who teaches international relations and is the director of the Defense and Strategic Studies Program at the University of Southern California.

SANFORD LAKOFF: Let me begin with the same question that I asked Ambassador Farley, which is what effect do you think the Strategic Defense Initiative will have on the ABM Treaty?

WILLIAM VAN CLEAVE: Well, I think the way to put that, Sandy, is that I think that events in the Soviet Union are more likely, in point of time, to have an effect on the ABM Treaty than the Strategic Defense Initiative. It seems to me from what I see going on in the Soviet Union that the Soviet Union is already disregarding the ABM Treaty, and I believe those events are more likely to impact on it sooner than the Strategic Defense Initiative will.

SANFORD LAKOFF: Do I understand you to be saying, then, that because of the Soviet violations, the ABM Treaty is largely a dead letter despite the fact that it is formerly observed ?

WILLIAM VAN CLEAVE: I believe it is largely a dead letter, yes.

SANFORD LAKOFF: Is there any purpose served, in your opinion, by renegotiating it or strengthening the treaty, or do you think we should simply abandon it?

WILLIAM VAN CLEAVE: Well, I don't think this administration is going to abandon it. It certainly wouldn't do it unilaterally unless it's prepared to demonstrate that the Soviet Union has violated it in more ways than it's already announced, particularly until it's prepared to demonstrate the Soviet Union is in fact in the process of deploying ABMs. Now certain Department of Defense officials have testified to that effect in Congress, but to date the president of the United States has stopped short of coming out saying anything like that. My guess is that there will be studies and analyses of ways that the treaty might be renegotiated, depending upon what progress is made in the Strategic Defense Initiative, I believe.

SANFORD LAKOFF: Would you explain that? Why do you think that progress in the Strategic Defense Initiative has a bearing on the ABM Treaty?

WILLIAM VAN CLEAVE: Well, the Strategic Defense Initiative, as you know, could come in several parts. It could include a ground-based terminal defense component, for example, or highly vulnerable ICBMs and other strategic retaliatory forces. It could include a space-based component. The ABM Treaty clearly rules out space-based, air-based, or mobile ABM systems and if we move to the point where those systems have to be thoroughly tested, then something will have to be done about the ABM Treaty.

SANFORD LAKOFF: Do you think it would be a good idea to proceed with these developments?

WILLIAM VAN CLEAVE: Yes, I think it would be a very good idea to proceed with those developments. You want some reasons -- okay. Well, in my own view, strategically, defense has been a missing component that's logically required by officially established American strategic doctrine and objectives. That doctrine and those objectives have been reaffirmed by successive administrations. This doctrine has as a heavy component efforts to limit the damage in the event of nuclear war and to strengthen deterrence by the ability to do that. To date we rely on offensive forces, coercion, reciprocal restraint, and I believe we need a defensive component as well. In limited terms, SALT I, of which the ABM Treaty is part, was supposed to accomplish the major objective of providing for the survivability of American deterrent forces, and we were willing at that point of time to trade a nascent American ABM system in return for offensive limitations that would do that, with the further presupposition that if we did limit ABM it would reduce the incentives on the other side or on both sides to build up our offensive forces, and none of those have occurred. To the contrary, exactly the opposite has occurred. Our deterrent forces are very vulnerable today. The situation is far less stable today than it was in 1972 and defense could help restabilize the situation far more than any arms control agreements have been able to do so or will be able to do so in my point of view.

SANFORD LAKOFF: Do I understand you to be saying in effect that we should rely rather on our own offensive and defensive capabilities than on any arms

control treaty process?

WILLIAM VAN CLEAVE: Well, arms control was supposed to be a means to certain national security ends. It was supposed to help provide for the survivability of deterrent forces or supposed to promote strategic stability. It was supposed to contribute to damage limitation and the like. If arms control agreements manifestly have not done those things, which is clearly the case, we don't need to give up those objectives, which are good objectives. If one values those objectives, then one ought to seriously entertain defense programs that might accomplish those objectives and do so far more effectively than agreements can do.

SANFORD LAKOFF: You've recently written an important paper which discusses the successes and failures of arms control. Are there successes in your opinion, and if so, could they be built on in this case?

WILLIAM VAN CLEAVE: The record of the past fifteen years, in which we have been most intensely involved in arms control and pursuing it constantly, has been a record of nothing but failure. Arms control has not accomplished any of the objectives which we sought originally through arms control. The trends during that fifteen years have been decidedly adverse to the security of the United States. In fact, the military balance has changed more dangerously during this period of arms control than any other time in our history. What has happened is that American arms have been cut back and constrained and Soviet arms have increased. Instead of promoting parity, it's promoted Soviet superiority. Instead of promoting stability the situation is far less stable. Instead of promoting enhanced survivability of deterrent forces, it's caused the vulnerability of those forces. Instead of relieving us of the need to do things, I believe we need to do far more today than we needed to fifteen years ago. So all of the trends have been adverse. I don't think anyone can seriously argue the United States has benefited, or the United States' national security has benefitted from the agreements that we have today.

SANFORD LAKOFF: Can you conceive of any agreement that might be negotiated with respect to either offensive or defensive systems that would be stabilizing and beneficial?

WILLIAM VAN CLEAVE: Well, one can conceive hypothetically in the abstract of certain agreement of that type. Had the Soviet Union accepted some positions the United States advanced in the past, during both SALT I and SALT II, then the situation might well have been improved. But the nub of the matter today is that I cannot think of an agreement that meets two criteria: (a) it's helpful and (b) it's negotiable -- simply because the Soviet Union will not allow arms control to interfere with the pursuit of strategic doctrine objectives and that includes the maintenance and increase of superiority over the United States. The situation's gotten to the extent now that unless we take measures of our own to stabilize the situation and produce survivable forces -- I can't think of an effective arms control [agreement] that could possibly do that.

SANFORD LAKOFF: Let me ask you about the Soviet attitude on these things. The Soviets have recently reopened, or offered to reopen, negotiations with us and the one thing that they've said they particularly want to get on the table is what they call the militarization of space. Do you think that this is a recognition on their part that this is a serious threat to them, or is it rather a cover, a smokescreen for just getting back into the negotiations?

WILLIAM VAN CLEAVE: It's clearly an attempt merely to derail an American program or more than one American program. I think it's an attempt to derail the Strategic Defense Initiative early on as well as to prevent the United States from developing an effective anti-satellite defensive system. Space is already militarized. It's militarized mostly by the Soviet Union. Since 1980 the Soviet Union has doubled its own space budget and is now spending in excess of \$23 billion a year on space. The Soviets launch every year four to five times the number of spacecraft the United States launches, and 75 percent of those are purely military. So the Soviet Union is proceeding in space. What we know about Soviet programs over the years, I think, is that the best indicator of Soviet programs is Soviet strategic doctrine and strategic objectives and the programs generally follow those. Soviet strategic doctrine as well as the Soviet notion of effective strategic superiority requires -- in fact it demands -- a heavy defensive component. The Soviet Union is working very hard on that defensive component on land today in a variety of active and passive ways, and if space appears to the Soviet Union to hold promise, they're certainly going to move into it and I think they already are.

SANFORD LAKOFF: Some of the analysts of the Strategic Defense Initiative on our side have said that it would confer strategic advantage to us. Do you agree with that?

WILLIAM VAN CLEAVE: Well, that depends upon who does what and who gets there first with the most and what the relative systems are like. I believe it would be an advantage to us because it would provide a means of helping defend this country and the major assets of the country. In fact, you might you look at the Strategic Defense Initiative as arms control. We want to stabilize deterrence and if we can create uncertainties in the mind of a potential attacker through a space-based defense system or a ground-based defense system, it seems to me to strengthen deterrence. We always wish to limit damage in the event of war and certainly a defensive system that intercepts enemy warheads would do that, and finally, we've always wanted reductions in arms control. Now nobody today seriously believes that the Soviet Union will entertain voluntary reductions of any significance, but if a defensive system can destroy 50 percent or more of Soviet warheads, that's a greater reduction than I've heard talked about in arms control terms.

SANFORD LAKOFF: Yes, it is to be sure, but isn't it also true that one of the counter-measures that one takes with respect to a defensive system is to build up the number of warheads you use so as to overwhelm the system? Wouldn't this run counter to the President's effort to reduce strategic weaponry?

WILLIAM VAN CLEAVE: No, I don't think so, and I think history shows this to be the case. As you will recall, one of the major arguments for the ABM Treaty was that by limiting defenses then the two sides would limit offenses. Instead, we limited defenses and Soviet offenses grew far beyond anything expected, and what it did was it created a opportunity for the Soviet Union. We agreed not to defend our retaliatory forces, thereby the Soviet Union went ahead and did what was necessary to make them vulnerable. Had we at that time said we're not going to permit you to make our retaliatory forces vulnerable, we'll take whatever measures are necessary, we may well have dissuaded them by showing them the cost and the uncertainty of success were both too great to do it.

SANFORD LAKOFF: Some people say as a criticism of the Strategic Defense Initiative that what it does is to trigger yet another round in the arms race. Might it not inspire the Soviets with a certain fear, especially fear of

advanced American technology and leave them to try to develop other systems that might get around our defenses?

WILLIAM VAN CLEAVE: It might, and it might not. I don't think anybody at this point of time can tell, but we know that every time when we did decide to forego defenses the threat has gotten worse and our own situation has gotten far more perilous. The Soviet Union's certainly going to go into space if they feel they can do it technically and if they feel it's going to be effective, they'll certainly do that. The other thing I'd like to comment on here, Sandy, is the term "arms race" has become a term that's a motive and used for debating, but it isn't an accurate term. There hasn't been an arms race. The United States defense spending in the 10 years after we signed SALT I declined by an average rate of 2-1/2 percent per year while Soviet defense spending expanded. The United States has 8,000 fewer nuclear warheads than we did fifteen years ago, not because any arms control agreement required that, because we did it unilaterally, and we have about half the megatonnage in our stock pile that we had at its peak. The United States -- arms are always controlled in the West -- political processes control arms, public opinion controls them, our budgeting process controls them, and none of those things have any play in the Soviet Union to any appreciable extent, and the Soviet Union has been engaged in history's largest arms buildup. The question therefore of what the Soviet Union might do to react to a defensive system in the United States seems to me to be not a very important question. The real question is: do we need the defensive system? Will it help us accomplish our strategic objectives and will it in fact promote the objectives that we originally looked to arms control to promote? And my answer to both of those is affirmative.

SANFORD LAKOFF: The administration right now is contemplating the possibility of resuming arms control negotiations with the Soviet Union on the basis that our strategic modernization efforts have put us in the position where we can negotiate from strength and they've established what's called an umbrella approach, which includes the possibility of some sort of discussion, at least, of limiting our defensive as well as offensive weapons. Do you think the administration is pursuing a sensible course in this way?

WILLIAM VAN CLEAVE: It's sensible in the respect that politically the administration is certainly constrained to follow arms control negotiations with the Soviet Union. It's not sensible if the administration seriously expects the Soviet Union to give us agreements that will help solve the strategic problems that the Soviet Union has worked so hard to create for us.

SANFORD LAKOFF: In particular, do you think that there might be any way that we could trade off limitations on defensive systems in exchange say for Soviet agreement to cut back on the throw-weight of their heavy missiles?

WILLIAM VAN CLEAVE: That's what we tried to do in SALT I with the ABM Treaty and the Interim Offensive Agreement and it didn't work at that time. What happened is we traded away our defense and we got an expansion of their offense, so I'm not very optimistic about anything like that happening.

SANFORD LAKOFF: Let me press you a bit on that, if I may. It's clear now that even those who were in favor of the ABM Treaty feel that much has happened in the technology of defensive systems, and even if one doesn't go to very exotic systems, if one's talking about terminal defenses of hard points, there seems to be very widespread agreement on all sides that such systems may be feasible. It's clear also, I think, that the Soviets are concerned about the president's announcement of high priority for this program, and therefore

don't you think there may be some concern that the Soviets will feel that might lead them to be more willing to undertake some sort of compromise with us? In other words, isn't the situation different now than it was when the ABM Treaty was first negotiated?

WILLIAM VAN CLEAVE: Conceivably that might become the case once we get enough advancement in the Strategic Defense Initiative and are putting enough money in it that the Soviets see that we're really serious about doing something. I don't think the Soviets are persuaded just because the president's announced a system and put some R&D money into it that it's necessarily an American strategic system. I think the Soviet Union, on the contrary, can see that without exception every strategic force modernization program which the United States has engaged in in recent years has been difficult to get through Congress, has invariably been delayed and stretched out and has invariably had unilateral arms control conditions put on it by Congress. The more likely possibility is that if we try to get some agreement that would trade limits on the Strategic Defense Initiative, limits on defense, or limits on offense, we would end up exactly as we did with SALT I. We would be the ones who were constrained and they would not be constrained. Space-based defense is like anti-satellite systems; it could be developed and deployed under the guise of legitimate space programs and space missions and I think we can count on the Soviet Union doing exactly that, knowing that we couldn't verify it, or if we did verify it, it would be too late to react to it, and I think we'd be putting ourselves in an extraordinarily risky situation to go down that line.

SANFORD LAKOFF: I take it then that means you don't really foresee the possibility also of an anti-satellite weapon treaty?

WILLIAM VAN CLEAVE: No, I don't and I think here so far the administration has shown very good sense on this. The Soviet Union wants a moratorium at a time when they already have not only one anti-satellite system [ASAT] operational, but at least four, while the United States has none. Also, I think the administration understands that since you can't really separate the technologies between the SDI and the ASAT, that any moratorium on the ASAT would be interfering with developments in the Strategic Defense Initiative, and finally be impossible to verify.

SANFORD LAKOFF: Dr. Van Cleave, what is your assessment of the general tenor and effect of the efforts that have so far been made to achieve arms control?

WILLIAM VAN CLEAVE: First of all, the evolution of the process of arms control over the years seems to have lost sight of the original objectives for arms control, and arms control agreements now seem not designed to improve strategic stability, to improve survivability, to reduce damage in the event of war, and the standards of success therefore have diminished over the years curiously enough. The standard of success for arms control today seems to be the mere reaching of an agreement, without much regard for whether or not that agreement really does contribute to the strategic arms control objectives that we desired, or to achieve some kind of freeze or limits or reductions without much regard again for the consequences of those in terms of the initial objectives of arms control. So in a sense arms control has become diminished in terms even of its own objectives today. Nonetheless, the phenomenon that we have is that, politically, commentators in arms control tend to be too careless about the reality of arms control and overstate dramatically the advantages of obtainable agreements which are few, if any, and equally to overstate dramatically the costs, risks, or dangers or non-agreement. It seems to me that we ought to get back to a far more objective look at arms control. One

other thing I might add is that taking the strategic arms limitation talks, we've limited the wrong things. We limited defense instead of offense, and even in trying to limit offense, we tried to limit launchers, which is really a meaningless unit of limitation, and we can't even find what a launcher is anyway. But any time you limit things, the tendency is to go to bigger and larger and more capable things, and you don't thereby reduce capability overall, you in fact destabilize the situation by concentrating capability on fewer and fewer systems and fewer and fewer aim points, I think we ought to do something to get away from that, because it doesn't contribute to anything in terms of strategic logic or arms control either.

SANFORD LAKOFF: You mentioned the difficulties in accepting the rationale for the kind of arms control negotiations we've had, and you've asked us to think in more objective terms, but, as you no doubt are well aware, there is a popular fear both here and in Europe of the possible dangers of nuclear war. Do you think that pursuing a balanced program of offense and defense would effectively provide the conditions which would assuage people's fears, or might it propel us more in the direction of a war-fighting approach to nuclear weapons?

WILLIAM VAN CLEAVE: I'd say several things on that. First of all, there is absolutely no evidence whatsoever that arms control had done anything to reduce either the probability or the risks of nuclear war, and, as I said, in the time we've been most intensely involved in arm control (and the United States has tried everything it could possibly try on arms control, everything that anybody advocates today in terms of initiatives and the like has already been tried and pursued by the United States and proven not to work at all), the danger of war's increased during this period because the Soviet Union has been unconstrained or we've been constrained. If you're going to reduce the likelihood of nuclear war and reduce its scope, scale, violence, and the consequences if it occurs, I do believe that the best approach is a balanced offensive/defensive capability in line with our current doctrine and strategic objectives. The problem here is, I think, a matter of public education. For some reason the leaders today don't wish to articulate as clearly as they should the elements of American strategic doctrine as it has evolved over the past ten years and been affirmed and reaffirmed by successive administrations. That doctrine can be castigated by being called a war-fighting doctrine, but deterrence depends upon being able to threaten something. And being able to threaten something means planning on how to use and target your nuclear forces and that's what's called a war-fighting doctrine. But there isn't any way to separate deterrence from that besides the fact that, again, if deterrence fails we don't wish to make a self-fulfilling prophesy of the worst possible case. We wish to extend every possible effort we can to limit damage and still safe-guard American political and military interests, and every administration since the nuclear age began has affirmed and reaffirmed those particular purposes, and it does no good to try and sign it with a pejorative term such as nuclear war-fighting.

SANFORD LAKOFF: Dr. Van Cleave, you were among the very few people in the strategic defense community who strongly opposed the ABM Treaty. Now that there is an effort to restore the emphasis on strategic defense, do you feel vindicated ?

WILLIAM VAN CLEAVE: I wish I didn't feel vindicated because I sincerely wish that the events had gone the other way, and that I had been proved wrong, but unfortunately events didn't go that way and in that sense I guess I do feel vindicated because in 1972 I was the only officially called witness called

before the Senate to testify against the SALT I interim offensive agreement and the ABM agreement. I was in a very small minority at the time. Since then, I believe, most of the serious students of the problem have come to share my view. But at the time, I testified that Soviet programs and American arms control objectives were just not compatible, and that these agreements didn't accomplish those objectives. As a matter of fact, if you recall, even the United States government officially appended a unilateral statement saying that if those agreements weren't followed within five years by more complete and satisfactory arms agreements, the U.S.'s supreme interests would be jeopardized. And that's what happened. I said that under these agreements and the likely courses of action of the two sides, that U.S. forces would become increasingly vulnerable and that the Soviet Union would have the opportunity to seek strategic nuclear superiority over the United States, while the United States would practice unilateral constraint far beyond what was literally required by the terms of the agreements. I forecast that those would be the likely things to happen, and that's exactly what did happen.

PROGRAM FIVE

NARRATOR: The president of the United States has called upon his greatest scientific minds to give us a technological way to defend ourselves against nuclear attack. In March of 1983 Ronald Reagan launched a long-term multi-billion dollar project officially known as the Strategic Defense Initiative. Because of the possibility of using defensive weapons in space, the press soon dubbed the project "Star Wars." We have attempted to find ways to defend ourselves from nuclear war before, but nothing has ever approached this in scope. President Reagan wants a system so powerful that it would render nuclear weapons impotent and obsolete. However, there's a lot of controversy surrounding this project. Many critics simply don't think that this system is now or ever will be technologically possible. But more often the debate has centered on whether we should be pursuing this course of action at all. On the face of things it seems like a good idea to defend ourselves from nuclear attack. We all want to feel more secure. But many experts believe that our problems with the Star Wars defense system are not only technical. They are also strategic problems. What will the Soviet Union do while we try to make their weapons obsolete?

Professor Sanford Lakoff teaches political science at the University of California at San Diego and is affiliated with the Institute on Global Conflict and Cooperation. He has interviewed two prominent scholars on this subject: Dr. John Holdren and Fred Hoffman. Hoffman was the director of the Future Security Strategy Study Panel. This was a study directed by the National Security Council and the White House. It researched the policy and strategic implications of the Reagan Defense Initiative. Dr. Holdren is a professor of energy and resources at the University of California at Berkeley. He is a MacArthur Fellow and an expert in assessing issues in science and technology and arms control. Dr. Holdren will be interviewed in today's broadcast. In our next broadcast we will hear from Fred Hoffman.

SANFORD LAKOFF: Dr. Holdren, I wonder if you could tell us what your opinion is of the likely impact of the president's Strategic Defense Initiative on our national strategy. Let me explain what I'm trying to get you to address is the question that's posed by the president when he and his supporters say that we could move from reliance on offensive weapons and the threat of retaliation

to a much better situation in which we could defend ourselves against nuclear attack.

JOHN HOLDREN: Well, I think the president's goal, while understandable and appealing in philosophical terms, is at the present time and for the foreseeable future impractical, and that the consequences of pursuing that goal at the present time or in the near future are going to be exactly the opposite to what the president hopes and intends. That is, I think the pursuit of the goal will make us less secure, it will result in an offense/defense arms race in strategic nuclear weaponry that will make what we have seen up until the present time look like a school picnic by comparison. We're going to have more weapons and more dangerous weapons.

SANFORD LAKOFF: The supporters of the Strategic Defense Initiative say that it will get us on the road to what they call a defense transition so that we can rely on what they sometimes call mutual assurance survival rather than mutual assured destruction. Do you anticipate that there could be any such major shift of doctrine and of basic structure in the nuclear arms race?

JOHN HOLDREN: If such a change in structure in the direction of mutually assured survival were to come along, we would have to consider ourselves fortunate indeed, but there is simply no prospect that it could come about as a result of the kinds of approaches and technologies that the president has advocated, in fact, again, I think just the opposite. Everything we know from the history of the nuclear arms race, everything we know about the reactions of the Soviets to what we do and our reactions to what they do, suggests that the results of pursuing this technology will be a reduction in our security, an increase in the hair-trigger postures on both sides, an increase in the fear of a preemptive first strike by the other side.

SANFORD LAKOFF: Would you explain why you think that, let us say, the Soviets would react in the way you describe to an effort on our part to deploy defensive weapons? In other words, what specific technologies would force them, say, into a hair-trigger response?

JOHN HOLDREN: If one thinks about the likely consequences of deploying defenses against intercontinental ballistic missiles in particular, because that's what the president has mainly been talking about, what you immediately discover is that the line between defensive weapons and offensive weapons is not nearly as clear as one would first suppose. If you deploy a set of defensive weapons, this looks to your adversary very much like a part of a first-strike posture because if you have powerful offensive weapons and you have your own society protected by a defense, then you're in a much better position to initiate a nuclear strike against the other side should that appear to be desirable, especially in a time of increasing crisis. But it goes even deeper than that. If you ask what is likely to happen as the result of deploying an imperfect defense -- a leaky defense -- and we know that whatever miracles technology might provide, the defense will always be leaky, what you immediately discover when you think about this is that a leaky defense is going to be much more effective against the depleted, ragged, retaliatory strike of the other side after you've whopped the other side with your first strike. Your leaky defense is going to be much more effective in that circumstance than it would be against a highly coordinated orchestrated surprise attack by your adversary. And what that says is that if both sides have leaky defenses, they will have achieved only one thing -- an increase in their own incentive to strike first in a time of crisis, and an increase in their adversaries' incentive to strike first in a time of crisis, because the leaky defense magnifies

the advantage that goes to the side that fires first. And that's a terribly stupid thing for us to do.

SANFORD LAKOFF: Is there a qualitative difference between the system we're talking about now and the ABM system that both sides are allowed to deploy right now? In effect, that is a leaky defense of a sort. Why would it be much different to go beyond the allowable ABM system to one that would be more elaborate?

JOHN HOLDREN: What each side is presently permitted under the Anti-ballistic Missile Treaty signed in 1972, is a single, very limited anti-ballistic missile defense for a single city or installation in their country -- either a missile field or a city can be defended. Initially each side was allowed two, and they reduced by agreement subsequently to one each; the United States has presently deployed nothing. There's a very tight limit on the number of interceptors on the number of radars on the size of that whole system, so that basically it does not pose the sort of first-strike threat that a much larger system would pose, and because it is strictly limited it does not pose the destabilizing offense/defense arms race threat that the possibility of unlimited expansion of so-called defensive weapons on both sides would entail.

SANFORD LAKOFF: But if we are concerned about deterrence and if, let us say, we're talking about a limited deployment of what are called the terminal weapons systems, terminal defenses to protect missile installations, wouldn't it be a good idea to put those in, not as a way of changing the whole system, but simply of reinforcing deterrence? I have in mind particularly the European missiles which are presumably vulnerable right now to some sort of Soviet attack. Wouldn't it reinforce stability? Wouldn't it reinforce confidence? What do you think?

JOHN HOLDREN: Well, first of all, it's important to make a distinction between what the president proposed, which was a ballistic missile defense that would protect populations, that would protect cities, and the much more limited idea of so-called terminal defense of nuclear forces against attack by the nuclear forces of the other side. These are very different systems, they're very different concepts and they have to be analyzed separately. The question of whether the more limited case -- that terminal defensive nuclear forces might make sense -- is closely tied to whether or not one has in effect controls on the offensive forces of each side. If each side is constrained from expanding its offensive nuclear forces, much of which it has targeted on the offensive nuclear forces of the other side, if those offensive forces are constrained, then it makes a good deal of sense to contemplate a very limited, terminal, point defense of nuclear forces as a way to increase stability, because it makes a first-strike less attractive. And that of course is what we want to do. We want to take whatever steps we can to make a first-strike by either side unattractive and in the case that the offensive forces are limited, you can accomplish that with a limited defense. If, however, the offensive forces are not strictly limited by means of a viable agreement, then the attempt to deploy even these limited point defenses is likely to stimulate an offense/defense arms race because an unconstrained offense always has an incentive to build up a bit to compensate for whatever defenses the other side may have put in the way. And the problem that led to the signing of the ABM Treaty in 1972 was the recognition on both sides that in this sort of race, the offense has an enormous intrinsic advantage. That whatever defense you put in, if the offense is not limited it can expand sufficiently to overwhelm that defense at a cost small compared to what the defense spent.

SANFORD LAKOFF: So, you would not necessarily be opposed to an agreement on both sides to continue research and possibly even deploy terminal defenses, provided that it was connected to limitations on offensive arms. Is that right?

JOHN HOLDREN: That is correct. I think that deployment of very limited point defense of nuclear forces is an interesting and potentially useful possibility if and only if it is accompanied by strict and durable controls on offensive forces. If we had those strict and durable controls now in force, then I would think that we ought to pursue with some vigor and interest the possibility of a limited point defense. The main remaining danger would then be that the nature of the technology associated with these limited point defenses might evolve in directions that made them closer to, or made them appear to be closer to, an attempt to develop a society-wide defense, which again, as appealing as it is in theory, turns out in practice to have the very undesirable effect of changing first-strike incentives in a way that make us less safe.

SANFORD LAKOFF: You're arguing that they would increase the chances of war because they would promote a strategic instability, if I understand what you're saying, so that the other side might perceive that we were gaining a potential military advantage, that indeed we might use the defensive system in order to initiate an attack. Is that correct?

JOHN HOLDREN: It's even worse than that. The problem is even if the other side does not think the construction of the system itself is an indicator of perverse intentions, in terms of trying to gain superiority or the possibility of a successful first-strike, what will happen once each side has such a defense in place is that when a crisis arises, for whatever reason, quite possibly entirely independent of the central nuclear forces and the space defenses, when that crisis arises each side contemplating what the presence of the defense means will understand that its incentives to strike first have been increased by the presence of the defense. In other words, at the present time, one of the most dangerous characteristics of the nuclear arms race is that we are deploying weapons that have a combination of high accuracy and short flight time, which together push decision makers in the direction of thinking in a time of crisis, it's going to be a disaster in any case, but if I go first it won't be as big a disaster as if I go second. So we're already pushing with a variety of developments in the direction of increasing first-strike incentives in time of crisis. And whatever the motivation, and whatever the initial perceptions behind the deployment of a defense, it's going to add in time of crisis to those first-strike incentives, because it will be more effective -- a defense will -- if it's used by the side that strikes first. This is true in more ways than simply the phenomenon that a leaky defense works better against a retaliation than against a highly coordinated first strike. It's also true because if you strike first, you can use some of these same weapons to suppress the defense of the other side. In other words, if we were to build a set of powerful space-based lasers, particle beams, what have you, and were to use those as part of a first-strike, or if the Soviets were to do the same in retaliation, they would not only use those so-called defensive weapons to try to knock out the retaliation of the other side, they would use those weapons to attack the defenses of the other side and increase the effectiveness of their first strike. This too adds to this phenomenon. Another thing that adds to it is the fact that in a time of crisis, the preliminary deployment of defensive systems, which each side would be sure to undertake to try to maximize its ability to protect itself, would be likely to

be perceived by the other side as preliminary to the initiation of a first strike.

SANFORD LAKOFF: Let me ask you about the Soviet response to this initiative. It's often said that they're paranoid and perhaps for some good reasons. They've been invaded, they've suffered great loss of life, and they're very defense conscious. They even have a civil defense program, which at least in principle is more than we have. Isn't it true that the Soviets have tried to develop their own ABM system, to upgrade it, and isn't it likely that they're going to be doing research in this direction, possibly to break out of the ABM Treaty?

JOHN HOLDREN: First of all, I think there's no question that the Soviet Union has been conducting research on anti-ballistic missile systems and has been trying to upgrade the very limited one they have. Although within the limits of the ABM Treaty as far as we know for sure, there is one particular instance of a radar under construction in the Soviet Union that some people think is a violation of the ABM Treaty; others think it isn't. But in any case, on the whole, the Soviets have pursued their research program within the limits of the present treaty. The United States has done so also. On both sides, we can be sure that research is going to continue. Neither side will ever abandon research in this area because they must make worst case assessments about what the other side might be thinking about and try to protect themselves. Research is an insurance policy against unpleasant surprises. The thing that really develops dangerous situations is deployment, to push forward out of the research phase and into the deployment of new systems. And we have no evidence that the Soviets are up to that and we have a lot of reason to think that they will find it in their interest to refrain from deployment, if they can get us to refrain. This is the reason they agreed to the ABM Treaty in 1972, and there has been no fundamental change in the relative advantages, the relative leverage of offense or defense that made that treaty make military sense not to mention political sense in 1972. It's still in the Soviets' interest to have an anti-ballistic missile treaty to limit the deployment of these kinds of systems because to do anything else would be to commit themselves to an exceedingly expensive and basically open-ended arms race which could not make either side more secure, which could, however, give each side enormous economic difficulties and which could, because of the specific characteristics of the weapons deployed, make all of us much less safe. They see that, I think, as clearly as most people in the United States see it, and that is where the basis for agreement lies.

SANFORD LAKOFF: But isn't there a kind of asymmetry in the fact that on our side the president has called for this Strategic Defense Initiative? We've budgeted something like \$26 billion for research, and the argument that's being developed by the president and by his supporters is that we do have a technological advantage and we should exploit it. And on the other side, the Soviets are saying that they're worried about the militarization of space. In other words, it doesn't seem as though we have exactly the recognition that they do, or is it simply that they don't want to get into this race on economic grounds rather than because they're ill-equipped for them on technological grounds?

JOHN HOLDREN: Well, I was careful to say that most people in the United States recognize that it's in the mutual interest of both sides to avoid this arms race in space. It's perfectly clear that the Reagan administration does not, at the present time, take that position, and my own view is that the

president and his advisors believe that the technological advantage of the United States in these kinds of weapons should be exploited, that we should push the Soviets into an expensive arms race that they don't want, on the supposition that pushing them in this way will weaken them and make them less able to act against our interests in other ways and in other parts of the world. I happen to think that strategy is profoundly wrong, that it's extremely dangerous that the United States' technological advantage will not be long-lived in this area -- any more long-lived than it has been in other areas. We, for example, developed multiple independent re-entry vehicles five years ahead of the Soviets. This was the point where we started to figure out how to put three, five, ten, even 14 warheads on a single missile. We refused to negotiate with the Soviets to limit these multiple warheads in the SALT I negotiations at the end of the 60s because we had a technological advantage. And Richard Nixon and Henry Kissinger said why should we give up something in which we have such an enormous lead? The result: the Soviets five years later developed the same technology, they built it in far larger quantities than we had built it, and this became the basis for the window of vulnerability, and all this agonized hand-wringing about what in the world are we going to do now that the Soviets have all of these multiple warheads, accurate, powerful, on their land-based missiles? We're going to find the same thing is true in Star Wars. The Soviets are behind, but they'll catch up and we'll be sorry.

SANFORD LAKOFF: Are you suggesting that the likely Soviet response to the beginnings of deployment on our part would be to develop defensive systems of their own, or would they, do you suppose, rather go toward systems that would be designed to destroy our defensive systems?

JOHN HOLDREN: I think the Soviets will both develop their offensive forces further in response to our defense and they will try to deploy a defense of their own. The Soviets are much too cautious to fail to pursue both pathways. They'll pursue both vigorously, they'll spend as much money as they have to, no matter what damage they may suffer elsewhere in their economy, to keep up. They have said they will do it, and everything they've done throughout the history of the arms race indicates that they are prepared to make enormous sacrifices to avoid the United States gaining what they perceive to be an intolerable superiority. They are, by the way, in a superb position to make the offensive improvements needed to overwhelm our defenses. We wring our hands, for example, about the so-called throw weight advantage of the large Soviet inter-continental missiles. The throw weight means the total amount of weight that they can loft into a ballistic trajectory in the direction of the other country. And yet so far that throw weight advantage has not amounted to much because the Soviets have been restricted, under the SALT II Treaty, which they're observing even though the United States has not ratified it, from using that full throw weight by putting fifteen, twenty, even thirty warheads on a single SS-18 intercontinental ballistic missile. It has the capability to take twenty or thirty warheads. And, of course, if we break out of the Anti-ballistic Missile Treaty and deploy a defense, you can be sure that the Soviets will immediately cease to observe the SALT II limits, and we'll be looking at SS-18 missiles with twenty or thirty warheads on each one instead of the ten to which they're limited under present agreements. They can do that rather cheaply. Warheads are cheap compared to building the missiles themselves. They've already got the missiles. Similarly, we can expect to see an enormous emphasis on cruise missiles in the Soviet offensive buildup if we deploy a space-based defense, because the cruise missiles will not be vulnerable to that space-based defense and we are in no position to try to

defend ourselves against a massive Soviet cruise missile attack. Again, if we set off this sort of race, we're going to be sorry.

SANFORD LAKOFF: How would you assess the impact of the Reagan initiative on the situation in Europe? What is the reaction of our European allies and what's it likely to be if we reach the deployment stage?

JOHN HOLDREN: I think most of our European allies, most people in those European NATO countries, would prefer to see a continuation of the arms control regime in which both sides are limited in their ballistic missile defenses. There are a couple of reasons for that attitude. One is that the independent nuclear deterrence of the French and the British depend on, for their ability to serve as a retaliatory deterrent force, on the capacity to penetrate the presently very limited Soviet system. If Soviets are stimulated by the United States to break out of the ABM Treaty, and if the United States breaks out, the French and the British will either have their deterrence greatly reduced in value or they'll have to spend enormous amounts of money to be able to keep pace with the increasing defenses of the Soviets. Secondly, I think, many Europeans are deeply concerned about the possibility that a nuclear war might be fought under some circumstances and limited to Europe, and that the thinking on the part of the United States and the Soviet Union that it might be possible to limit a nuclear war to Europe, in part through effective defenses over the United States and over the Soviet Union, would actually increase the chance that such a war would take place. It would reduce the political and psychological barrier toward the use of nuclear weapons by the super powers in a European conflict. They're very much afraid of that.

SANFORD LAKOFF: If you had the ear of the president and his policy makers at this point, what policy would you recommend with respect to the defensive systems, not just in terms of their impact on arms control negotiations, but in terms of this general proposition that we seem to be stuck with the idea of mutual deterrence? Is it your view that we can't do very much about the fact that there is a system, if you like, of mutual assured destruction, or is there some way that we could pursue the defensive policies and integrate them with an arms control strategy that would at least relieve some of the danger that we're now under?

JOHN HOLDREN: Well, in the first place, I think I would say to the president of the United States, I agree with you that mutual assured destruction is an unsatisfactory situation. The trouble is that no one has thought of a replacement for it. It's like what Winston Churchill used to say about democracy: it's the worst form of government except for all the rest. Deterrence as we have it now is the worst form of maintaining your national security except for anything else we've been able to think of. There is no option. There is no alternative to deterrence at the present time. What I would suggest to the president to the United States and to the leadership of the Soviet Union, what should be done is that we should immediately take a series of steps designed to reduce the chance that these enormous arsenals accumulated on both sides will actually be used. It is much more important at this point to think about reducing the probability than it is to think about reducing the sizes of the arsenals themselves. Because if we cut them in half they would still represent more than enough to blow up industrial civilization several times over. If we cut them by a factor of ten, they would still represent enough nuclear weapons to destroy civilization as we know it. So we have to think first about how to reduce the chance that these things will be used, and then we have to move deliberately and intelligently in the direction of

getting rid of the most dangerous, most destabilizing of these weapons. That is, look toward reductions that focus on the weapons that contribute most to the chance of use. I think there are lots of specific ways to do that. I think one of the first things that we should agree to do is to obtain a mutual moratorium on the pursuit of anti-satellite weaponry and the reason we should do that is not only that anti-satellite weapons are not in the interests of either side, because the functions that satellites presently pursue are benign and stabilizing functions, reconnaissance in which each side can assure itself that the other side is not doing anything terribly malicious, but also because the pursuit of anti-satellite weapons is so closely related to the pursuit of ballistic missile defense weapons that the two can scarcely be separated and right now the fact that there is no agreement on anti-satellite weapons represents the most gaping loophole in the Anti-Ballistic Missile Treaty of 1972 that we now have. If, for example, we had a ASAT Treaty there would be no question about the questionable Soviet radar at Abalakova. It would be a violation of an anti-satellite treaty if not of an ABM treaty, and the Soviets would have to take it down. This general principle holds across a wide variety of the technologies that are relevant for ballistic missile defense.

SANFORD LAKOFF: But isn't that a case of locking the barn door after the horse is stolen? The Russians have a deployed anti-satellite system. We're in the midst of developing our own, and even if we were to, as you say, declare a moratorium on these specific ASAT systems, what prevents either side from undertaking research on laser systems, for example, which could be used as ASAT weapons?

JOHN HOLDREN: A couple of points: both the United States and the Soviet Union presently have or are very close to anti-satellite weapons of quite limited capacity. It is very much worth stopping that process before it goes further. The present generation of weapons in the Soviet system is extremely crude -- the United States' less so -- they are not threatening to a large variety of the most valuable satellites. If we allow this process to go on much further, all the satellites will be threatened and the ABM Treaty will be threatened as well. The present capabilities don't threaten the ABM Treaty. Secondly, both sides, of course, will continue to do research up to a point on weapons technologies of all varieties. But what agreements are most effective at stopping is the stage of testing and the stage of deployment. Those are very observable activities; you cannot deploy something on a large scale without it being detected, you cannot test on a large scale without it being detected, and because of that detectability it means verifiability, it means both sides can be confident that the other side is not close to having something usable. None of this research can lead to a usable weapons system without extensive testing. And we can stop that testing and so we can prevent our security from being undermined further by having greater anti-satellite capabilities deployed and by having them so intertwined with ballistic missile defense that we lose the ABM Treaty as well.

SANFORD LAKOFF: Is it then your general position that the prospects for further arms control, the prospects for cutting down not only the numbers of offensive weapons but the most dangerous of these weapons, will be impaired by a failure to reach some sort of understanding with the Russians with respect to defensive systems?

JOHN HOLDREN: Yes, I absolutely believe that the prospects for any constructive arms control are completely and irretrievably tied to a restraint on ballistic missile defense and on space weapons of all kinds. Without

restraint on anti-satellite weapons, ballistic missile defense, space weapons of all kinds, we are going to have a runaway offensive nuclear arms race. There is simply no question about it.

SANFORD LAKOFF: The supporters of the president's Strategic Defense Initiative sometimes argue that we need this defensive system, and the Soviets ought to respect that, because they know that our missiles are strictly there for deterrent purposes, whereas their missiles are designed for the sake of military advantage. How do you respond to this argument?

JOHN HOLDREN: In the first place I think there is absolutely no basis in either theory or experience for the proposition that there's a basic asymmetry in the way the two sides look at their nuclear forces. The two sides use different language, but on both sides for years, the military and political decision-makers have been supporting the buildup of a nuclear war-fighting capability on the basis that a credible nuclear war-fighting capability is essential to deterrence. Both sides say they don't really intend to use this war-fighting capability, but if they didn't have it their deterrent posture would not be credible. It is extremely important, furthermore, to understand that the Soviets cannot now and never will take seriously assurances that the United States does not plan to attack the Soviet Union with nuclear weapons, in part because it has always been an official element of the NATO posture that we reserve the right to use nuclear weapons first in response to an overwhelming conventional Warsaw Pact attack on Western Europe. We have said that deterrence requires the understanding that the United States will, if necessary, use its nuclear weapons before the Soviet Union has used nuclear weapons in the event of such a conventional attack, and we have said explicitly that the credibility of that posture requires our willingness to escalate, not only, that is, to initiate the use of battlefield nuclear weapons, but to escalate to higher and higher levels. Our position has been that if the Soviets do not believe the United States is prepared to do that, they will not be deterred in Europe. So how in this situation can we say out of the other sides of our mouths to the Soviets, well of course you know we won't use our nuclear weapons against you and so you don't have to worry about our defense? It's a completely inconsistent position.

PROGRAM SIX

NARRATOR: The president of the United States has called upon America's greatest scientific minds to give us a technological way to defend ourselves against nuclear attack. In March of 1983, Ronald Reagan launched a long-term multi-billion dollar project officially known as the Strategic Defense Initiative. Because of the possibility of using defensive weapons in space, the press soon dubbed the project "Star Wars." We have attempted to find ways to defend ourselves from nuclear war before, but nothing has ever approached this in scope. President Reagan wants a system so powerful that it would render nuclear weapons impotent and obsolete. However, there's a lot of controversy surrounding this project. Many critics simply don't think that this system is now or ever will be technologically possible. But more often the debate has centered on whether we should be pursuing this course of action at all. On the face of things it seems like a good idea to defend ourselves from nuclear attack. We all want to feel more secure. But many experts believe that our problems with the Star Wars defense system are not only technical. They are also strategic problems. What will the Soviet Union do while we try to make

their weapons obsolete?

Two leading figures in the debate are Dr. John Holdren and Fred Hoffman. We interviewed Dr. Holdren on our last broadcast. He thinks that the Strategic Defense Initiative will have the ultimate effect of making us more insecure because it will force the Russians to build up their nuclear arsenal. Today, we'll hear from Fred Hoffman. He was the director of the Future Security Strategy Study panel. This was a study directed by the National Security Council and the White House. This study researched the policy and strategic implications of the president's Defense Initiative. In this broadcast, Mr. Hoffman is interviewed by Dr. Sanford Lakoff, a professor of political science at the University of California at San Diego, and an associate of the University's new Institute on Global Conflict and Cooperation.

SANFORD LAKOFF: Mr. Hoffman, you were the director of something called the Future Security Strategy Study panel, would you tell us what that was?

FRED HOFFMAN: Yes, it was one of two studies directed by the White House, by the National Security Council after the president's March 23, 1983, speech in which he enunciated the Strategic Defense Initiative.

SANFORD LAKOFF: And how would you distinguish the work of that panel from the other so-called Fletcher panel?

FRED HOFFMAN: The Fletcher panel was asked to review the technologies available for the development of strategic defenses and we were asked to review the policy and strategic implications of possible defense deployments.

SANFORD LAKOFF: Mr. Hoffman, in your opinion, what are the implications for strategy of the Strategic Defense Initiative?

FRED HOFFMAN: Well to begin in answering that question, I think we need to take stock of where we are in the process. And where we are, as the president explicitly said, and as others involved in the program have said repeatedly, is in the relatively early stage of a rather long research and development program. Where we are not is at the point of making decisions about deployment or non-deployment of defenses. That is not the issue that was posed by the president. That being the case, what we need to do, I think, is two things. First, someone needs to give policy guidance to the research and development program. Secondly, it's necessary to think about the decision for deployment that we will face in the future as a consequence of the research and development program, and in effect decide how to think about defenses, how we ought to evaluate defenses, their role and their strategic implications. And the second of these, of course, was the thing that we were primarily concerned with in my panel. There is a third aspect, and that is that future events, even events in the distant future, have a way of casting a shadow into the present, and they produce policy consequences immediately, even if we're quite a ways from a deployment, and someone needs to deal with those policy consequences, those immediate policy consequences.

SANFORD LAKOFF: What do you say to those opponents of the SDI who argue that even embarking on the research and development program is going to make us less secure rather than more secure because it will stimulate a continuation of an offensive arms race?

FRED HOFFMAN: In my own view, that's based on a very much over-simplified model of interaction between the U.S. and Soviet Union for which I believe there is very little good evidence. Most of the evidence suggests that the Soviets, when they do react, react in much more complex ways than are

generally suggested by most simple action/reaction models. I think, for example, it's very difficult to explain the Soviet missile buildup that occurred from the mid-60s essentially to the present in such terms. And it ought to give pause to application of that kind of a model in the future. Among the things that we did try to deal with, and it's not an easy subject to deal with, are the consequences for Soviet program policies of a decision to go ahead with the R&D program and possibly future deployments, and they are by no means unambiguous or easy to plot. In effect, they depend, to a very great extent, on Soviet projections about the program and about its consequences. And those are by no means very clear at this point.

SANFORD LAKOFF: You may have seen the article that's appeared in Foreign Affairs by the so-called "Gang of Four," led by former Secretary [of Defense] McNamara, in which they argue that the Soviets might interpret the deployment of a defensive system (and I think they're talking not just about a terminal defense system, but one that would be, if not spaced-based, active in space on the pop-up basis) and they argue in that article that such a system would not be leak-proof, would not be effective against a full-scale attack, but that it would be relatively effective against a ragged second strike. Therefore, the Soviets could interpret that as an effort to gain a strategic superiority, strategic advantage over them, and it might trigger their response on a use-them-or-lose-them basis in the event of a crisis. How do you respond to that general argument?

FRED HOFFMAN: Well, the first response is to ask for more explicit characterization of what the Soviet incentives would be. The notion that Mr. McNamara and his co-authors take as governing is the ability of the United States to limit the damage to our civilian population. They say the Soviets cannot live with that. But any decision-maker, Soviet or American, if he's contemplating the choice between conducting a preemptive strike and not striking is going to compare the consequences to him of the two circumstances. Now if the only thing that defenses did were to protect population, then you might be able to make that argument, but the kind of defenses that we were talking about in our panel and that might be a result of the kind of strategic defense R&D program that I've been talking about, would not be that kind of defense. They would inevitably reduce the ability of the Soviets to accomplish their military tasks. The tasks that are important to the Soviets. What's important to the Soviets is not the destruction of U.S. civilians, but the preservation of the Soviet Union. That's the thing that concerns them. And if we could deny them the ability to improve their situation by a preemptive strike through defenses, that is to say if we could reduce the vulnerability of our military targets through defenses, then at the very least there's an offsetting factor that would have to enter the Soviet calculation and that is never considered by Mr. McNamara and, as a matter of fact, is very seldom considered in this kind of argument about the effective defenses. The fact is that defenses do two things simultaneously, at least the kind of broad area defenses that are being talked about. One is they reduce the vulnerability of population, the second is they reduce the vulnerability of military systems. And let me say that my own model of a Soviet attack (and it's not my model, but it's one that I think arises from the work of a lot of people who think about Soviet strategy, and there's no basis for a definitive judgment on this), but that model suggests that the primary Soviet objective will be what targets that they consider to be military targets. The consequences of a very large-scale attack if that's the kind they choose to conduct on such military targets would be very, very intensive collateral damage to civilian targets. Now that's a very

different thing from saying that the Soviets have as a primary objective the targeting of civilian population. And that's certainly, if the Soviets take seriously the notion of nuclear winter that, in effect, rules out the extensive targeting of cities, except as a suicidal matter for them, and the one thing that I think everyone is agreed on is that the Soviet leadership is not suicidal.

SANFORD LAKOFF: Let me pursue that a bit further with you. You've indicated that they've done some research in this direction and indeed you could argue that their air defense system is already an important strategic defense system. Do you suppose, though, that what's concerning them is that they would lose out in a technological race with the U.S., especially given our lead in computers and other devices that are necessary in this complex system?

FRED HOFFMAN: I don't know that it's a question of their losing out on a once-and-for-all basis. That's not at all the way I would view this. I think they do see it as an area of relative U.S. advantage and strong U.S. advantage, and I believe they view the thing as an on-going competition, and so they prefer to channel the competition into areas where they have greater advantage in terms of resource use, technology, and especially political questions. And I think they see this as an area in which they will possess advantages in none.

SANFORD LAKOFF: I realize that you're not a technical expert, as you indicated before on the technologies, but in making some judgments about the strategic value of these systems, you obviously have to make some assumptions about the technical feasibility and countermeasures. Again, wouldn't the Soviets be well advised, if they can't keep up with us technologically, to emphasize counter-measures such as space-mines or possibly anti-satellite weapons that could be used against any system that we might choose to deploy in space, or that might possibly be a pop-up system?

FRED HOFFMAN: Very definitely, yes. I would expect the Soviets to pursue whatever countermeasures appeared promising to them. I do not view the competition between offense and defense as one that will be foreclosed once and for all by some gigantic leap on the part of the defense. There are serious questions that need to be resolved about some of the elements under consideration in the Strategic Defense Initiative, and among them I think it's very clear the possible vulnerability of space-based systems is a very pressing one. My own reading of the technical judgments on this suggests much more that it's an area of competition than one in which the answer is very clear at this point. I think it's a question of how inventive, imaginative and technically accomplished this side is in pursuing its objectives. And there are also tactical considerations once the technologies have been developed. So I don't think this is the kind of thing you can answer on a once-and-for-all basis. Overall it seems to me, on the basis of my reading of what the technologists have said, that the pendulum appears to be swinging to the advantage of defenses against ballistic missiles, and I would contrast that, by the way, in the situation in the case of air defense, where it seems to me the pendulum is swinging the other way. Where that leaves us is very difficult to say at this point, but it seems to me that the kinds of questions that raises can only be answered in terms of both technical research and development and continuing operational research and development.

SANFORD LAKOFF: From what you just said, is it fair to conclude that you think it may well be possible that we will go through a defense transition in which we can escape the need to rely on retaliation and think more seriously

about the role of defensive systems?

FRED HOFFMAN: I think that that is a possibility and I also think that it's very much in the strategic interest of the United States and the West to try to proceed in that direction, because it seems to me that the handwriting is on the wall with respect to the utility of a strategy of nuclear retaliation of a massive and indiscriminate sort with respect to its strategic utility for the West.

SANFORD LAKOFF: Could I ask you elaborate a bit on that last statement?

FRED HOFFMAN: Well, in part, I think I've already indicated my basis for that. Simply that it's very clear that reliance on the threat to massively destroy Soviet society, when the consequence would be very obviously the destruction of U.S. society, undermines the credibility of our guarantees against Soviet attack to our allies, and it's undermining popular public support in this country for those programs. People simply feel uncomfortable in the hostage situation and they're looking for other answers. They will find those answers, I believe, in unilateral disarmament if we can't provide any other form of answer. Is there any way, do you suppose, that we could proceed on the basis of an understanding with the Soviet Union, possibly explicit agreements so that we wouldn't jeopardize the ABM Treaty, for example, by developing defensive systems, and so that both sides would not feel that the other side was about to gain some advantage that would be irretrievable?

FRED HOFFMAN: Let me preface that by saying that the only deployment of the SDI kinds of defenses that are being considered in the Strategic Defense Initiative that I believe could be conducted under the ABM Treaty as it now exists is the deployment of a defense against theater ballistic missiles. Any other deployment, I believe, would require at the very least a reopening of the ABM Treaty. Now one could consider various kinds of modifications to the treaty, and I must say I've not thought through specific forms of modification. Much more to the point, one could consider different modes of restraint on offensive forces that might lead to a situation in which the threat of massive and indiscriminate destruction was at least reduced and modified perhaps if only by eliminating the ballistic missile element of that threat and its immediacy, its compression of time, as some people have referred to it, for decision making. One can conceive of moving in those directions. My problem is that I believe that the preferred Soviet tactic at the moment is simply to stop the SDI through political means rather than to try to explore the possible mutual benefits in it. And only if they become convinced that they can't do that will they, I believe, begin seriously to consider what the directions of their own interests are, and it will be a difficult choice for them, partly because of the great political benefits they are now deriving from the current situation.

SANFORD LAKOFF: Do you foresee any possibility of a trade-off in which the Soviets would agree to offensive limitations in response to our agreement not to deploy defensive systems without due notification?

FRED HOFFMAN: I think I would disqualify myself on trying to predict what the Soviet negotiating strategy would be, and I think that's the way in which you would have to address it. I have tried to think through what their long-term incentives might be, but I think any near-term treaty, or any near-term negotiating position that they offer, is going to be dominated primarily by questions of negotiating tactics rather than by long-term strategic terms. And I'm not sure I'm a good person to predict that.

SANFORD LAKOFF: Let me see if I can rephrase the question. Let's not put it in terms of negotiation but in terms of Soviet strategy. You've indicated that in your view Soviet strategy would be ill-served by our continuation of the Strategic Defense Initiative. Is there any way in which you could foresee a possibility of a confluence of strategic interests between the U.S. and the Soviet Union involving some combination of offensive and defensive systems?

FRED HOFFMAN: I think I would have to say in the near-term, very little chance. Only if they were absolutely convinced that they could not substantially affect U.S. deployments of either defensive or offensive systems by political measures would they begin to consider actual restraints perhaps in terms of major reductions in their own nuclear forces. And attempts to move away from the situation in which the West felt massively threatened by a nuclear destruction. I think that is going to be a hard position for them to contemplate giving up on.

SANFORD LAKOFF: But aren't there trade-offs that have to be made if you're contemplating the balance of your own investments in various strategic and tactical forces, and aren't the Soviets likely to be concerned from an economic point of view now about the possible cost to their own strategic modernization programs, say in conventional weapons, of having to go head-to-head on a defensive race?

FRED HOFFMAN: That's always a possibility. I have some hesitancy about that for two reasons. The first is historical. I believe if you go back to some of the things that we, the United States, the United States government, were projecting in the sixties, we were projecting an economic slow-down and very great pressure on the Soviet defense budget. We were half right. There has been an economic slow-down. There has been very little evidence of pressure on the Soviet military budget. So the sensitivity of their level of military spending to economic pressure is at least not what we thought it was then. And I would be loath to make the same mistake again. Secondly, it is the case that for them as well as for us, that spending on what we call strategic nuclear systems is a rather small portion of the total military spending. It's less true for them than for us, partly because their manpower costs are less than ours, but it's still true to a substantial extent for them. And so the leverage through purely resource-related things is questionable to me.

SANFORD LAKOFF: Let me turn that question around and ask you as an economist who has been assistant secretary of the Budget Bureau, what do you think about the possible implications of investments in strategic defense on our own defense budget situation, given the fact that that budget has come in for some pinch, some constraint in view of the problems we're facing now with the budget deficit? Don't you suppose in the foreseeable future, if this program should cost what some people have estimated it may cost, that is to say hundreds of billions, perhaps even a trillion dollars, that sooner or later there would be conflict even within the Pentagon over whether to spend the money on this sort of thing, or on other strategic and conventional systems?

FRED HOFFMAN: The answer is that's a very real concern. It's a major concern, I think, to many people in the Pentagon. Luckily, I suppose, it's not an immediate concern, in the sense even if one were to contemplate relatively early deployments, those deployments of SDI-related technologies would not occur for several years. The so-called trillion dollar deployments, which I think are a questionable reality in terms of the cost estimation, would not only not begin very quickly, but they would be spread over a long period of time. Having said that, if the defense budget remains tight, if the

percentage of GNP that we put into our national security declines over time, I think it will be very difficult to support any major new investment program, certainly the Strategic Defense Initiative included. If, on the other hand, we manage to stabilize the percentage of GNP going into defense, then I think that such deployments might well fit into the budget.

SANFORD LAKOFF: It's sometimes said that the terminal defenses and other aspects of the SDI are appropriate for hard-point defense but not for area or population defense. Do you think that distinction makes sense?

FRED HOFFMAN: No. Even if you take the terminal defenses that are being contemplated in the SDI, those defenses if they work out, if the R&D is successful, will provide a very large radius of protection. When you contemplate deploying those defenses, it's almost inevitably going to be the case that the protection of military targets will also provide overlapping protection for civilian targets, for cities located near them. It will therefore be possible simultaneously to protect against attacks on military targets and to reduce the collateral damage that attacking those targets would have produced in the population centers. That's a very different kind of problem from one in which the enemy is trying to inflict civilian casualties by concentrating massive numbers of RVs on city centers.

SANFORD LAKOFF: Would it be fair to conclude that you would be rather unhappy if, whether for reasons of negotiations, or for political reasons, or for economic reasons, we were to significantly slow down or abandon the Strategic Defense Initiative?

FRED HOFFMAN: Yes. The track record of arms control agreements and arms control negotiations with respect to our security has not been comforting to date. I believe, in contrast, the prospects for effecting long-term Soviet incentives that are offered by the Strategic Defense Initiative are very promising and I would hate to see the one given up for the other.

NARRATOR: You've been listening to an interview with Fred Hoffman. He was the director of the Future Security Strategic Study panel. Dr. Hoffman discussed the strategic implications of the president's Defense Initiative with Dr. Sanford Lakoff of the University of California at San Diego.

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