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Strategic Defense: A Challenge for C^3I

Robert A. Rosenberg

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Robert A. Rosenberg

Major General Robert A. Rosenberg is Vice Commander in Chief for the North American Aerospace Defense Command (NORAD) and Assistant Vice Commander for the U.S. Air Force Space Command (SPACECOM). A graduate of the U.S. Naval Academy in Annapolis, he holds a master's degree in aerospace engineering from the Air Force Institute of Technology and is a graduate of the Industrial College of the Armed Forces, Washington, D.C. In 1972 he joined the Air Staff where he worked with Congress on aircraft and missile procurement and research, development, testing, and evaluation. General Rosenberg then joined the Office of Space Systems, Office of the Secretary of the Air Force, where he served until assigned to the National Security Council, the White House, in 1976. Returning to the Pentagon in 1980 as Assistant Chief of Staff for Studies and Analyses, Headquarters U.S. Air Force, General Rosenberg directed studies on weapon systems utility and cost-effectiveness. He assumed his present duties on 1 September 1983.

The North American Aerospace Defense Command (NORAD), is responsible for the defense of North America. The Aerospace Defense Command (ADCOM) is the U.S. component of NORAD. I thought I would show you the framework of our collective mission areas — air defense, missile defense, and space defense — to explain what we have, our capabilities and limitations, and what we plan to do about it in the future.

NORAD is the only joint bilateral command in North America. It's a U.S./Canadian command that has existed for almost 27 years. Its charter originally came out of both governments' recognition of the need to defend North America against the threat of Soviet long-range aviation — the kind of thing we worried about before the invention of ballistic missiles. That relationship has continued in the era of the ballistic missile and the innovation of space systems that also present potential threats to North America. NORAD is staffed with Canadian Forces personnel as well as U.S. Army, Navy and Air Force people. Colorado Springs is also the home of the U.S. Aerospace Defense Command and the Air Force's new Space Command.

My boss, the NORAD Commander-in-Chief, reports to the President of the United States and the Prime Minister of Canada through two defense chains-of-command (figure 1). He is responsible for providing the Prime Minister and the President warning of an attack against North America, and an assessment of where that attack is going — what assets in North America it is targeted against. In the case of unilateral U.S. actions that do not involve our joint agreement with Canada, he is also the Commander-in-Chief of Aerospace Defense Command, which is one of the unified and specified commands under Title 10, U.S. Code. If we go into an air defense operation regarding a threat from Central America or Cuba, the Canadian government could well choose

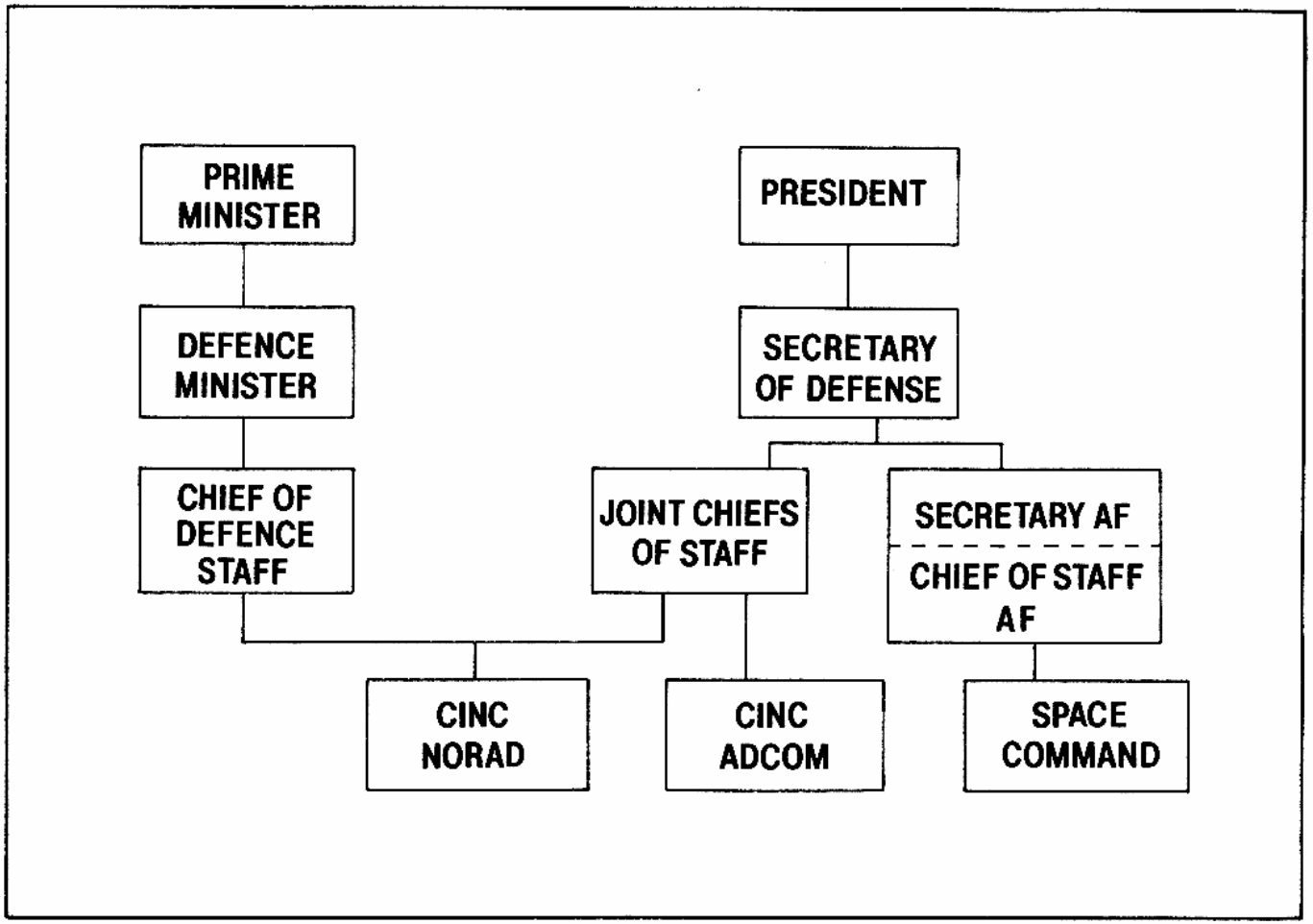

Figure 1. Command Relationships

not to participate. In such a case, ADCOM would be responsible for the operation. Finally, as a major command with the United States Air Force, my commanding officer is Commander of Space Command. Established in September 1982, Space Command is responsible for training and equipping forces to support the unified and specified commands and the military services.

Let me make a point of clarification. People often wonder how the Army, Navy and Air Force interrelate with the unified and specified commanders — CINCPAC, CINCLANT, CINCEUR, CINCSAC, CINCMAC, and CINCADCOM. The military departments or services — Army, Navy, Air Force and Marine Corps — as organizations don't fight wars. They provide the forces that do to the unified and specified commands. So in the case of the Air Force Space Command, where the commander reports to the Secretary of the Air Force through the Chief of Staff, Space Command's job is to procure, own, operate and support all the warning sensors and space systems that the Air Force uses to support the NORAD, ADCOM or one of the other unified and specified commands.

The numbers are classified, but figure 2 gives you the relative magnitude of what's been going on in the U.S. strategic defense business over the years. You'll notice a very steep rise on the rollercoaster after World War II, when the major threat to North America was Soviet long-range aviation — the heyday of air defense interceptor squadrons. We had over 2600 air defense interceptors. The nation was ringed with surface-to-air missiles and anti-aircraft weaponry. We had Texas towers, we had EC-121s. A lot of money was invested in defense.

Then came the McNamara era. A very difficult question was asked: why have an air defense if you're not going to have a missile defense? Does it make any sense? The decision makers of that day decided the answer was "no" and we came down the rollercoaster. One of the unfortunate outcomes was that as we dismantled our air defense capability, we dismantled our ability to warn of a bomber or cruise missile attack against North America as well.

One little rise is associated with the abortive attempt to start a strategic defense system once before — the money invested in the Safeguard system. Another upturn can be attributed to four things. One is the computer errors at NORAD in 1979 and 1980, when our warning computers erroneously generated indications of an attack against North America. The Strategic Air Command began posturing its nuclear offensive forces for survivability, getting ready to launch the B-52s, FB-111s and KC-135 tankers. NORAD actually did flush some of its air defense interceptors for survivability.

Those false warnings concerned other nations a great deal. Are the people in the American defense community trigger happy? That was the bad news. As a result, forty investigative bodies came out to Colorado Springs to help us. The good news, and the second reason for the reemphasis in strategic defense was that these incidents resulted in the CINCNORAD being called before several government operating committees, the Senate and the House armed service committees, and the defense appropriations subcommittees to explain what happened and how NORAD worked. And that exposure, we think, had a lot to do with why Congress over the past few years has been very supportive of strategic defense. They discovered the limitations of our strategic warning systems and our defense capabilities. People had forgotten about defense, they didn't realize that much of it had disappeared. Those Congressional hearings, which were nationally televised, brought a lot of attention to the NORAD mission and the need to modernize our forces.

I think the third factor was that early in President Reagan's term, when he came up with the strategic modernization program, he didn't treat strategic modernization as a triad, he treated it as a quadrad. He said one of the key things to modernize was our strategic defense capability, not just our offensive nuclear delivery capability of ICBMs, SLBMs and bombers.

Lastly, I'd cite the President's announcement of his Strategic Defense Initiative on March 23, 1983, when he told the American people that we would pursue technology in a focused manner, so that in the future we might decide to bring that technology together to provide a strategic defense for North America. This will bring defense back into the game in balance with our offensive capability, and allow us to reduce the large nuclear armaments that exist on both sides.

Back in the early 1960s (figure 3), we had over 2,600 interceptors, plus Bomarc surface-to-air missiles and air defense batteries. Today we have drawn down to the point where all we have is a very small number of air defense interceptors, and they are

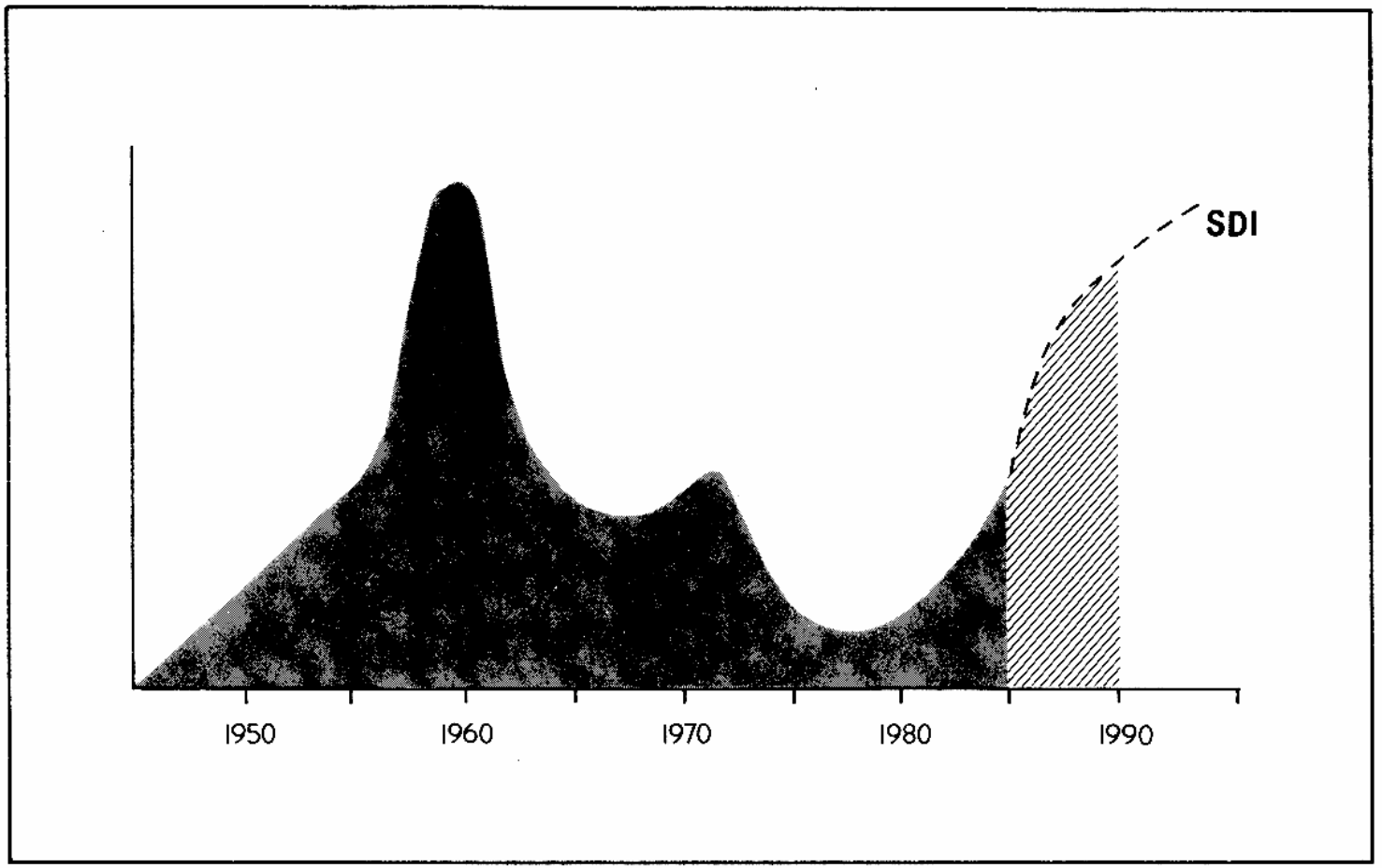

Figure 2. Expenditures

SYSTEM	EARLY 1960s	TODAY
INTERCEPTORS	2,612	285
BOMARC	439	0
ADA BATTERIES	274	0
LONG RANGE RADARS	286	85
DEW LINE RADARS	81	31
PICKET SHIPS	11	0
GAP FILLER SHIPS	137	0
CONTROL CENTERS	68	7
EC-121	77	0
AWACS	0	8
MANPOWER	207,000	37,000

Figure 3. Air Defense

rather ancient in terms of capability: Canadian F-101s, F-106s in the Air National Guard, and F-4s and F-106s in the active Air Force. For example, the 106s and 101s can use nuclear air-to-air missiles, which are rather archaic — we and Canada both want to get them out of the inventory as soon as possible. The Canadians don't want nuclear air-to-air weapons being used over their territory anyway. Since the threat mostly would come from the north, that's the most likely place for them to be used. In highlighting the reductions since the 1960s, I'm not saying that the drawdown was imprudent under the circumstances that existed at the time, but we certainly need to do something about it now. In fact, steps have been taken with the introduction of the F-15 and the Canadian CF-18.

I want to tell you that there is a Soviet air-breathing threat — the new Blackjack bomber. It's a prime example of technology transfer, very much like the B-1B only a little larger. Why are we concerned about this? We have focused all our arms control negotiations over the last couple of decades on the ballistic missile threat, but the Soviets have not just been sitting around ignoring the opportunities. They also have in production a new version of the Bear, called Bear-H. They're not retrofitting an old airplane, they're building a new one: a cruise missile carrier now in operational test and evaluation. In the very near future, we expect to see operational squadrons of Bear-Hs armed with cruise missiles. In addition, with the continued Backfire production, we also expect it to have a cruise-missile-carrying capability; and the new Blackjack could certainly be designed from the ground up as a cruise missile carrier.

Student: What do you mean by air-breathing threat?

Rosenberg: There's a space threat: fractional orbital bombardment systems and space-to-space or space-to-earth weaponry. The ballistic missile threat is a rocket that comes up either out of the water or off the land and goes exoatmospheric. An "air-breathing" threat uses a conventional jet- or propeller-driven engine that flies in the dense atmosphere. We call it air-breathing because its engines use air like a car does, mixing air and fuel.

You may recall Chairman Andropov's statement that if we dared put ground-launched cruise missiles (GLCMs) and Pershing IIs in Europe, the Soviets would hold at risk, in kind, the U.S. homeland. We're not sure exactly what he meant, but one thing he may have been meaning is to increase the submarine-launched cruise missile threat — one more outstanding example of the Soviets' technology transfer. You may be familiar with the Tomahawk, the Navy cruise missile. The Navy version can be launched from either submarines or surface ships, and there is an Air Force version that is launched from B-52s. The Soviets have that technology, and what Mr. Andropov may well have meant is that in the near future we will see Soviet submarines with cruise missiles aboard off the coast of North America.

Figure 4 depicts our ability to see flying objects — air-breathing objects — flying into North America. Every day about 1700 aircraft come into North America, and most of them file a flight plan. The patterns show how far our radars can see a flying object above 10,000-feet altitude. For instance, we use Northwest Orient's Flight 51 flight plan that says, "I will be coming down on a great circular route, flying this course." The Joint Surveillance peacetime air surveillance and traffic control radar system, jointly operated by the FAA and the Department of Defense, monitors that traffic. As long as that object enters our radar within plus or minus a specific number of minutes from when he said he was going to be there, at plus or minus a given thousand-feet altitude, he's identified as legitimate. It might even be a Soviet passenger liner, but he's identifed as legitimate as long as he stays on his flight plan. If one of those 1700 objects misses its time or altitude window, we send out air defense interceptors to see who and what it is, visually identify it, make sure it's not a threat to North America, and help it get back on its flight path.

Now the problem with our surveillance capability is that cruise missiles are designed to fly at an altitude between 200 and 1000 feet. The dark blotches in the figure show how far the radars in North America can see if an object is flying at 500 feet — basically there are lots of gaps in coverage. Now, if the Soviets were to promise that, on attacking North America with cruise missiles, they would file a flight plan for each one and guarantee to fly at 10,000-feet altitude, it would be great — we would know the Russians were coming, we would have lots of strategic and tactical warning — but that's not the way the system is built.

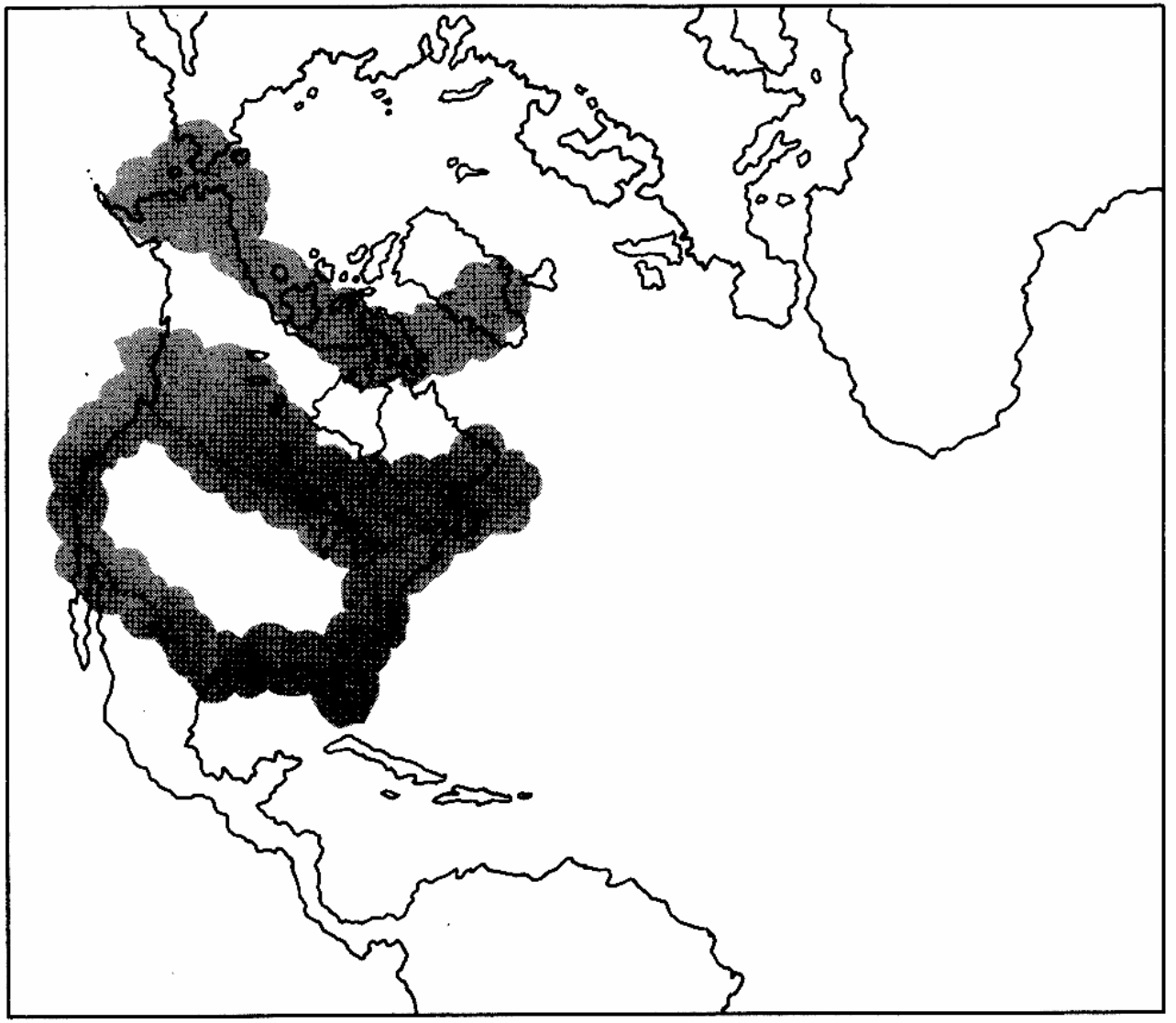

Figure 4. Atmospheric Early Warning

Student: What does the map look like for 30,000 to 40,000 feet?

Rosenberg: The lighter patterns would extend out farther. The circles around each radar site are a function of line of sight out to the altitude. These are overlapping circles built for 10,000-foot visibility.

These are the radar horizons — lighter for an object flying at 10,000-feet altitude, darker to show how far our radars can see if they are looking for an object flying at 500 feet. For someone flying at 500 feet straight into Patrick Air Force Base, we'll see him shortly before he drops his weapons over Patrick. If he flies at 10,000 feet, we'll see him 10 minutes before he gets there. It's just a matter of how far the radar can see, given how high off the earth the object is flying.

Student: So this kind of radar defense is useless for cruise missiles.

Rosenberg: Unless the enemy targets his cruise missiles to guarantee that they fly over the dark blotches, right.

We're trying to do something about that. We have in test a program called Over-the-Horizon (OTH) backscatter radar. Without getting into too much technical detail, OTH does not operate like a conventional radar, which has the problem of not being able to see very far if an object is close to the earth. The OTH radar uses one transmitter to bounce radar energy off the ionosphere back to the earth where it can see objects at all altitudes, and then the energy bounces back up, off the ionosphere, and down into a separate receiver. That radar very rapidly scans back and forth and up and down over a very broad area, and can detect any object that penetrates the airspace over a couple of thousand miles off the coast of North America. Instead of spotting an invader two minutes away from Florida as with our current radar, we would see it several hours beforehand.

Moreover, individual radars become very expensive when you put hundreds of them around the coast of North America, because each one has to have people to operate it, maintain it, fix broken pieces and run the communications. The advantage of this OTH system is that, with one site on the east coast and one on the west coast, we have continuous surveillance at all altitudes out to about 2000 miles off the coasts.

Student: Why don't you have a third one that would sweep over the Arctic Ocean?

Rosenberg: Good question. We worked very hard on that. The problem is that the physics didn't favor us. The ionosphere is a relatively stable electromagnetic belt when we're looking out to the east and west, but over the poles the Aurora Borealis does weird things to it, changing the electromagnetic sphere very badly. When OTH looks north it sometimes is faced with very unpredictable ionosphere behavior and radar signal clutter. It just doesn't work reliably.

We have a lot of gaps up to the north, but we also have in our program a modernized Distant Early Warning line called the North Warning System (figure 5) that will have much improved low altitude radars. The North Warning System will have conventional radars to provide a very dense tripwire fence all across northern Canada. It will not allow a cruise missile or a bomber to come in at low altitude without being seen. This requires about 50 radars — it's an expensive approach, and we want to minimize the need for that kind of coverage.

Student: Well, if you can reach as far north as you do with those two flanks — it looks like you're up to about 75 or 80 degrees north — how about one radar oriented north at the airbase in North Dakota? Wouldn't that cover Canada with a half-doughnut that would seal it up?

Rosenberg: The Aurora is still the problem there. By the time you get far enough south so that the Aurora doesn't bother you, you no longer have a warning system.

Student: Is there any special reason why the south is open?

Rosenberg: We do have programmed coverage to the south. As a command we are very concerned to make sure we are enough years ahead of the threat so that we can cope with it when it comes (figure 6). We are looking at where we would locate a south-looking OTH fan, given the potential for ground-launched missiles arriving from Latin America or Cuba or submarine-launched cruise missiles from the south. We are in the process of selecting a location for a future OTH site in the central United States. In addition, to cover the far northern staging bases for

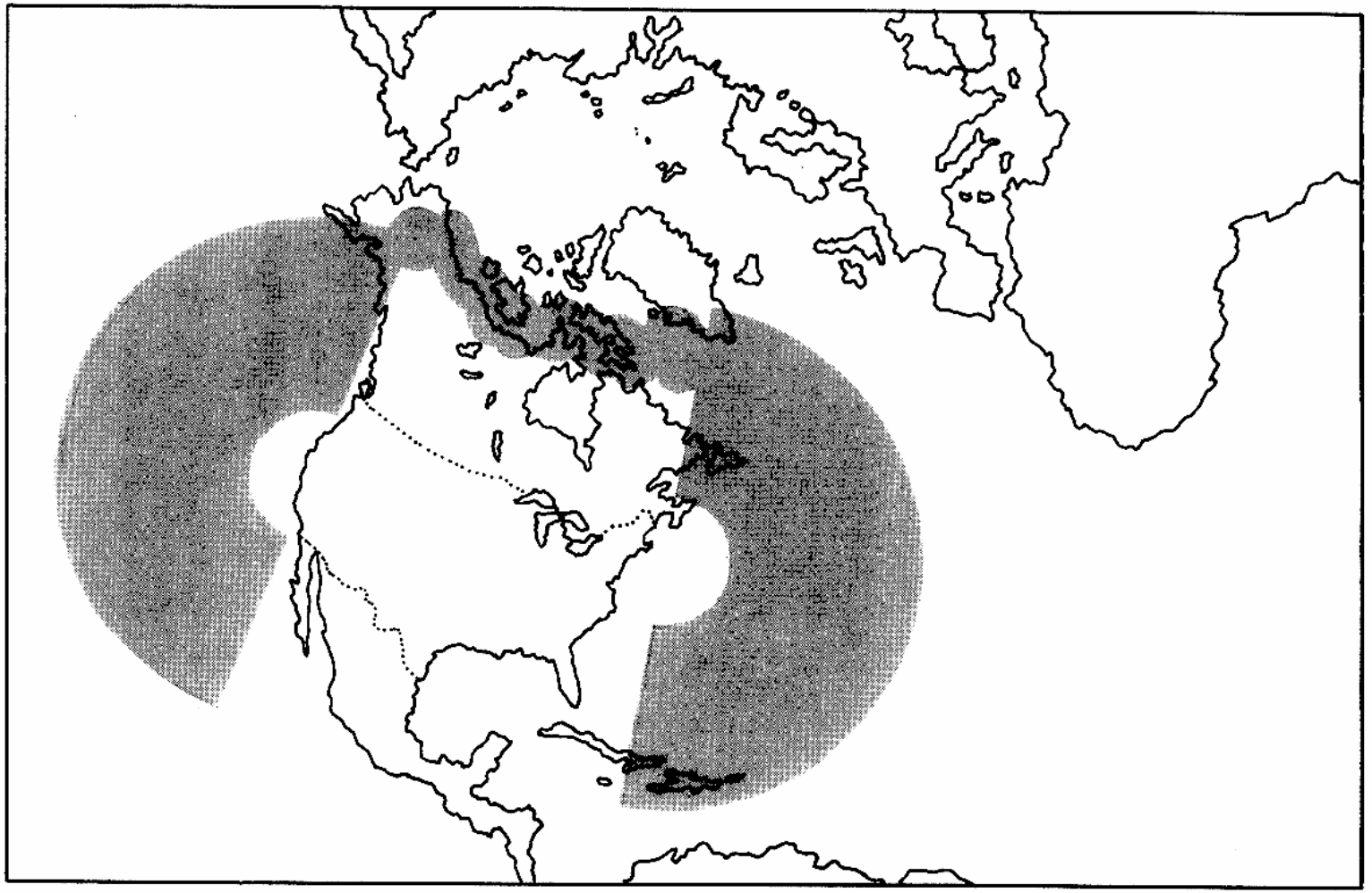

Figure 5. Atmospheric Early Warning

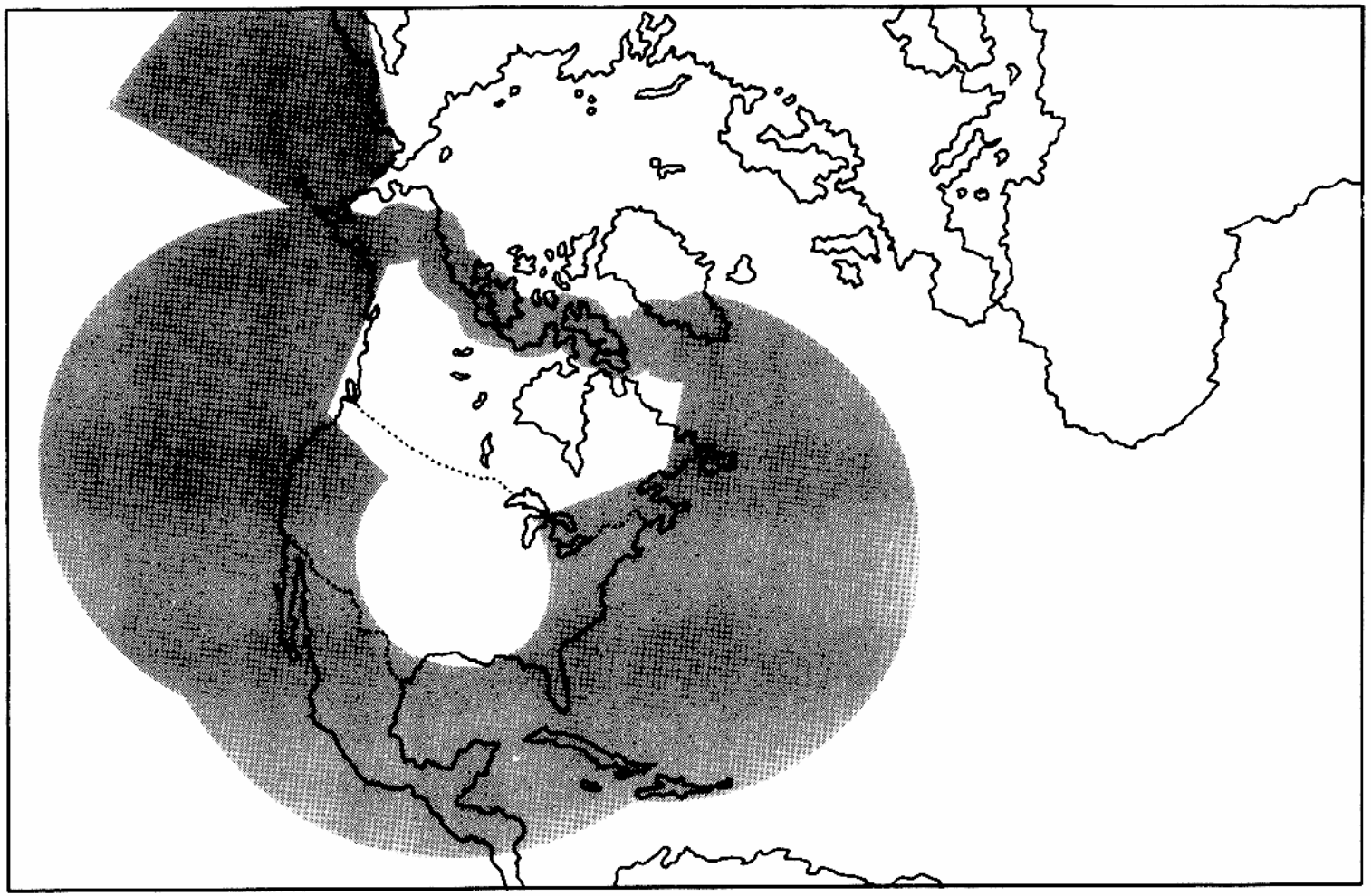

Figure 6. Atmospheric Early Warning

Soviet long-range aviation, we are considering putting an OTH radar in Alaska. It would look west and provide early warning of an attack against Alaska.

Now, to be sure, the skies are not completely open. Today we have 30 NORAD alert sites around North America with aircraft on five-minute alert. Because our number of air defense interceptors is limited, they are focused on peacetime surveillance. If one of the 1700 aircraft penetrating the North American Air Defense intercept zone is unidentified, we will launch a pair of interceptors to go out and make a visual identification on it and make sure it's not in trouble. One of the reasons it may be an unknown is that it's an airliner that can't stay on course or on altitude; one of our jobs in peacetime air surveillance is to get out there and, if necessary, help the crew make a safe landing at the nearest airfield.

In the day-to-day peacetime mode we have two aircraft sitting on five-minute alert at each of 30 sites. As we go to heightened defense conditions in a crisis, all aircraft assigned operationally to NORAD get ready to fly and we disperse them to many bases around North America for their own survivability. So we have many more than just 60 aircraft available for what we call a damage-limiting mission. Against a Soviet cruise missile or bomber attack, we would use our limited resources to stop as many of them as we could. With our present radars, with the limited warning time and the limited time to track them as they're entering North America, we don't expect to be able to do very much today.

But the situation will be better when we have the full-up system. It will be operated out of region operations control centers (ROCCs) (figure 7). The peacetime air sovereignty mission and the damage-limiting mission in wartime are battle-managed out of separate regions within North America: two on the east coast of the U.S., two on the west coast, two in Canada and one in Alaska. Air battle management and air sovereignty control are conducted within those regions, and only monitored from NORAD headquarters. The full-up system will consist of OTH backscatter radar fans on both coasts, the North Warning System across the top, and potentially a south-looking system in the future, combined with our Airborne Warning and Control Systems, the AWACS aircraft. These kinds of warning fans will allow us to generate radar coverage far out over the ocean. From a command and control standpoint, the NORAD Cheyenne Mountain Complex (NCMC) will be able to recognize a raid before it happens.

During lunch we were talking about the problem of Admiral McDonald and the British admiral who wants to change the NATO rules of engagement for the antiship mission — if a captain knows the enemy is attacking him, he doesn't want to wait until a cruise missile hits his ship before he shoots*. Well, among the 1700 aircraft that come into North America every day, the NCMC will be able to assess how long it would be before any potential enemy aircraft-launched cruise missiles could strike targets in North America. Computer-assisted analysis would tell us whether there is a sufficient number of unknowns out there to represent a threat to North America. If so, first we would flush our AWACS aircraft to send them toward the general area from which the threat is coming. We would also send out our air defense interceptors to look at those unknowns — it's essential to have a person in the loop — and identify it for real: "Yes, that is a threat," or "No, that isn't a threat." With this kind of system, we feel that from a command and control standpoint, we'll be able to provide the National Command Authority warning and assessment of an unfolding air-breathing attack against North America.

Student: What does the AWACS add to this process? And how close is the full-up system to reality?

Rosenberg: The system will be operational in the early '90s. It's being built a piece at a time. For example, the OTH will have three 60-degree sections. The top 60-degree segment has been tested and fielded. Interestingly enough, its transmitter is located near Moscow, Maine. We will be installing 60-degree segments one at a time over the next several years. Some of our 30-some AWACS today are designated for NORAD use, and we are modernizing our air defense interceptor force with F-15, F-16, and CF-18 aircraft which are much more capable than the older aircraft we had.

*Adm. Wesley L. McDonald, Commander-in-Chief, Atlantic and Atlantic Fleet, Supreme Allied Commander, Atlantic; and Adm. William Stavely, Commander-in-Chief for the English Channel. "NATO Issue: When to Let Its Ships Fire," *The New York Times*, April 2, 1984.

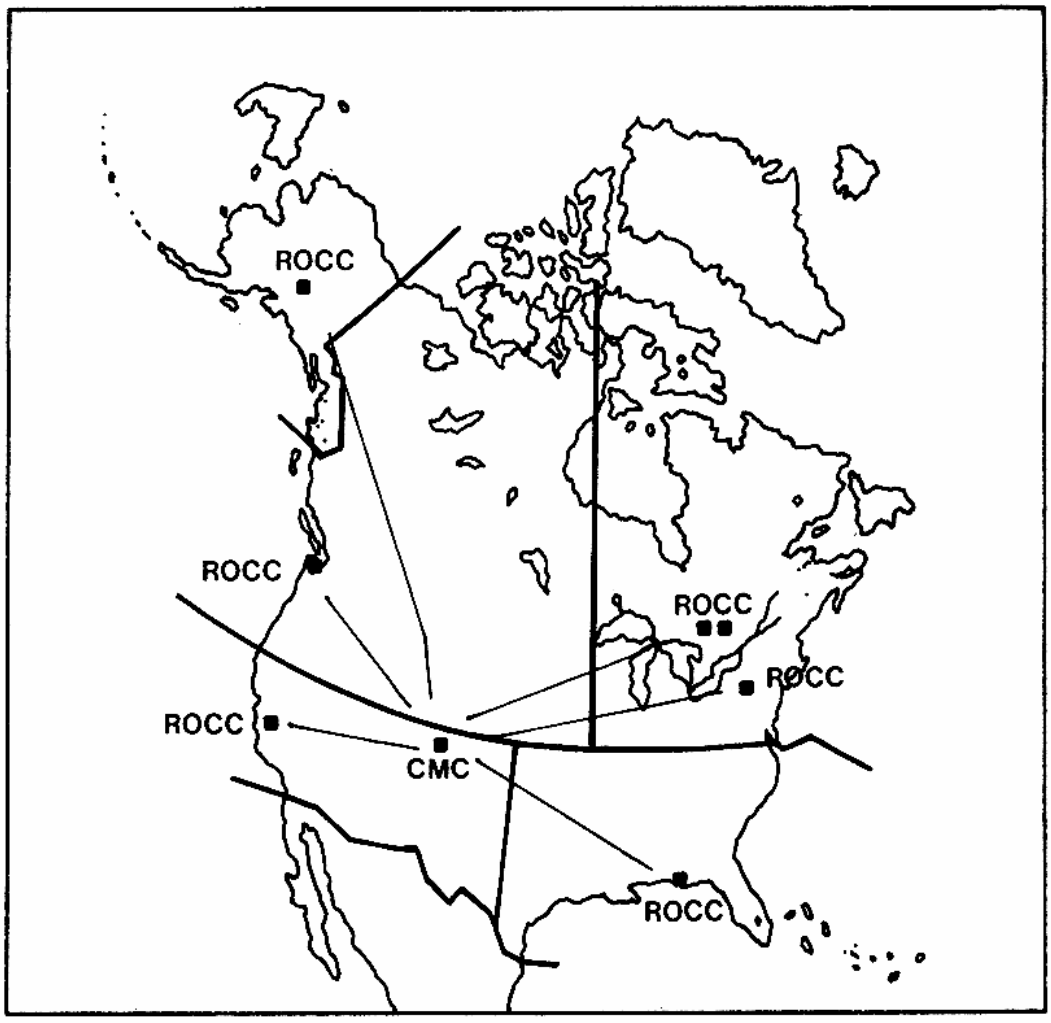

Figure 7. Airspace Control

Now what does AWACS contribute? The only real hardened region operations control center that we have is in North Bay, Canada — it sits under 600 feet of granite under a mountain. These ROCCs are soft to nuclear attack; they are principally for peacetime air surveillance and control of traffic in and out of North America on a day-to-day basis. We would use them for battle management as long as they survive, but after that the battle management control of defense over any one of the separate regions would be handed over to an AWACS control aircraft in that region.

Why do we do it that way? Well, in peacetime, on a day-to-day basis, it's a lot less expensive to operate and maintain a ground facility than it is to keep an airplane in orbit 24 hours a day. If we tried to do the daily region operation control center job with an AWACS, it would take 3 AWACS just to man one orbit. To circle North America that way would take about 75 AWACS, and that's a lot of support cost. As a result, we only use them in the survivable mode, flushing them, getting them in orbit to support the warfighting mission.

Ultimately we hope to address the issue of survivability, which is serious for all aspects of our critical C^3 nodes in this country. Fixed ground facilities are vulnerable. For example, we have under joint Air Force/Navy development a space-based radar/infrared (IR) platform (figure 8). We do not expect to field it until the mid-1990s because of the technology involved. This system will provide a fence around North America, permitting us to track bombers and cruise missiles from origin and provide for fleet defense.

Student: The last map and the range it covered, and what you're showing here, raise a question. What is being done to take into consideration data received from AWACS that are not under NORAD's control or are beyond NORAD's control, or from other sensor surveillance devices?

Rosenberg: Well, first of all, the Joint Chiefs of Staff designated AWACS aircraft for NORAD. As we increase our readiness, these would come under our operational control. In an attack, all remaining AWACS in North America come under NORAD control.

Now, to answer your question about other sensors. Both in our air defense mission and in our missile tactical warning mission, we don't rely on immediate tactical warning indicators — a radar screen lighting up and somebody saying there's something there. At our battle management command post in Cheyenne Mountain, all sorts of intelligence is coming in 24 hours a day: strategic indicators, strategic intelligence, everything that CIA, NSA, DIA and the other intelligence agencies are reporting. We have a combined operations/intelligence center, so that when the screen lights up with a launch out of Plesetsk in the Soviet Union, chances are that X hours or Y days before that took off (I don't want to be precise) we knew exactly what it was and, based on strategic indicators when we saw it lift off the pad, we knew it was not a threat to North America. The same with the air-breathing threat, we had better know. That's the way it operates.

Student: As you cover the various facilities, would you say a word about their survivability? You're talking primarily about warning of the initial attack, but most of the facilities with the exception of the AWACS are fixed-base facilities.

Rosenberg: Fixed and non-survivable.

Student: Right, and even the satellite-based ones, though they're not fixed, are potentially very vulnerable. What do those match, and what does the coverage look like on the second sweep?

Rosenberg: In a post-attack mode there may be no remaining warning systems for air attack against North America, except for the surviving AWACS aircraft and the surviving interceptors. That's it. Cheyenne Mountain itself is a centralized battle management command post, probably the hardest nuclear-hardened command post in the free world. We will be around longer than anybody else in the free world.

Student: But because that facility is built into the mountain rather than under it, even that may not survive.

Rosenberg: It may not survive a direct ICBM attack. But we have what we call the Rapier — Rapid Emergency Recovery — team, a mobile, miniaturized

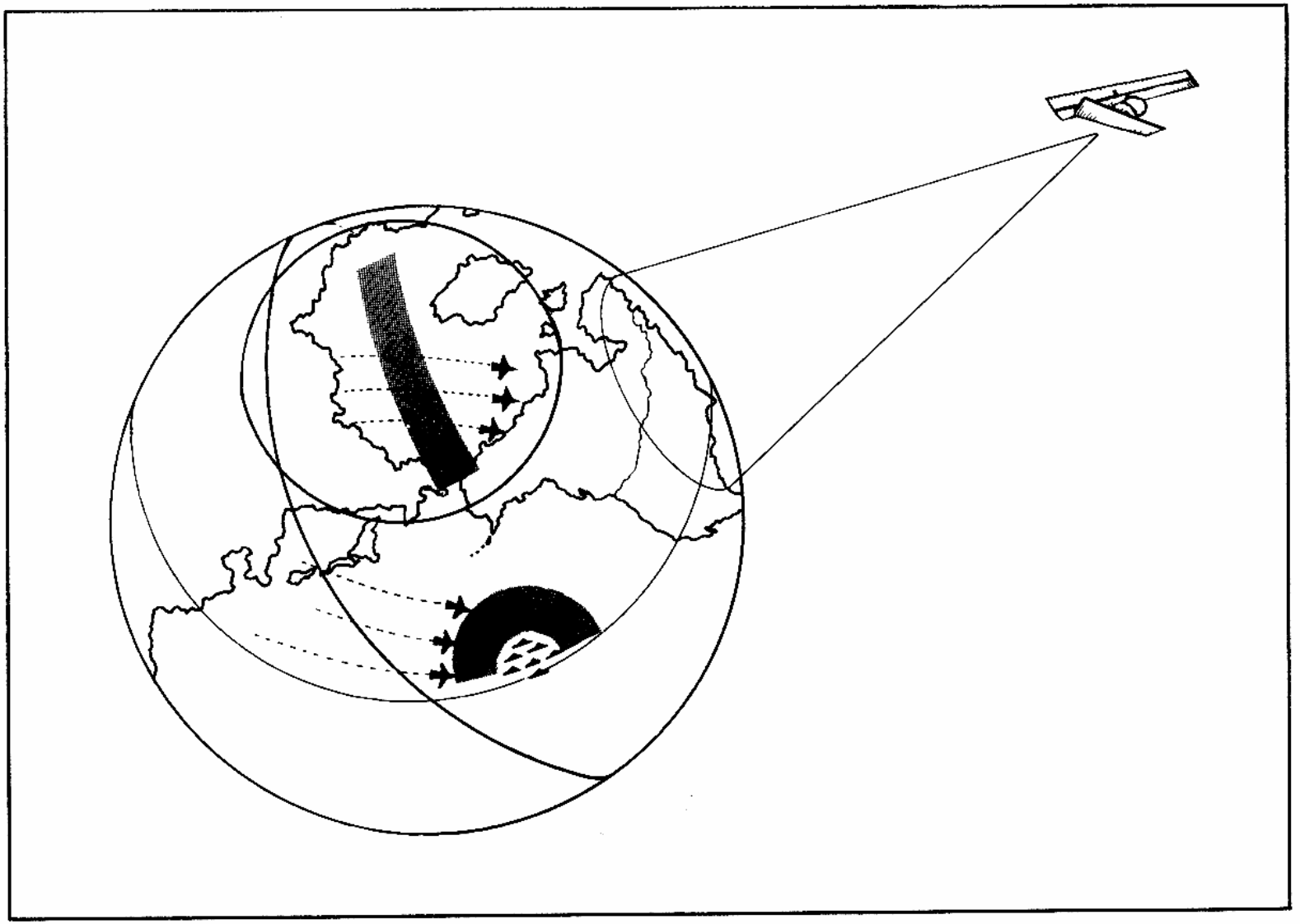

Figure 8. Space-Based Radar

version of the command post in Cheyenne Mountain. At heightened defense conditions it will travel out to unidentified locations in the Rocky Mountains and button up during a nuclear attack to avoid destruction and keep the communications equipment from being burned out.

Student: I don't want to derail you too much, but as you talk about the various missions of NORAD, perhaps you could say a couple of words about the air, missile, and space missions.

Rosenberg: The vulnerability of fixed ground stations for air battle management is one reason we're looking at the space-based radar system. Satellites can be very survivable. It is only that we have not designed them to be survivable in the past. As a matter of fact, they are probably the most survivable element of our space systems, which consist of launch facilities, satellites, control stations, and users. That gets back to the concept of "surviving" — the function rather than the pieces of hardware. Unless hit in a direct ascent nuclear attack by a Soviet Galosh ABM missile, for example, satellites are probably the most survivable systems we have. It's our launch facilities and our large command and control stations that are vulnerable. We are going to mobile systems, and the space-based radar/IR system would be designed from the ground up so that its function and the links to its users are built to be survivable. Mobile command and control facilities will help to ensure their survivability. The technology is there to build survivable satellite systems. In the past this country has not chosen to do so. That's one of the reasons the Air Force in September 1982 established the Air Force Space Command. It's the first time we have had an operational command to work these problems.

While we're very concerned about submarine- and air-launched cruise missiles, we're even more concerned about the ballistic missile threat because of the short timelines involved. With Yankee and Delta submarines (each with 16 launch tubes) sitting off the coastline, the flight time to critical targets in North America is 8 to 15 minutes. That's a very short time for the Commander-in-Chief of NORAD to provide tactical warning and attack assessment to the President, and for the President in turn, based on consultations with the Secretary of Defense and the Chairman of the Joint Chiefs, to make the appropriate response. That's 8 minutes flight time to Washington, D.C., and about 15 minutes flight time to SAC headquarters, and anywhere between 8 and 15 minutes to attack any one of our SLBM or bomber bases. It takes longer, however, to attack any of our ICBMs, because even though their silos are relatively soft in terms of modern technology they are still hard enough to withstand an SLBM attack. Thus there is a second threat, 30 to 35 minutes later, when Soviet land-based intercontinental ballistic missiles can strike our strategic retaliatory ICBMs.

Student: With our Pershing and cruise missiles becoming operational in Europe, the latest in Italy, have we seen any appreciable increase in Soviet activity in the Atlantic?

Rosenberg: Yes. We see them doing things that, frankly, don't make sense to me. They have, for example, brought Deltas out of their sanctuary up north and put them where they are quite vulnerable to our ASW forces, and that doesn't make sense. We think it was a political signal saying, "Get your SLCMs and Pershings out of Europe," but we didn't do anything about it because we have a very credible warning system and they know that.

Now, how do we cope with that threat? How do we get warning to the National Command Authority in that short time and how does it all add up to deterrence? Well, if the Soviets believe we have a credible warning system — they will be persuaded that there is no such thing as a surprise attack, and that 8 to 15 minutes is, in fact, enough time for the President to make a retaliatory decision.

I'm going to show you the systems we use to do that, but I'll start by saying that we do it 500 times a year. Every time there is a missile or space launch anywhere in the world, be it one of our own, Soviet, French or whoever, NORAD makes an assessment as to whether North America is under attack. It sounds silly to say that we do it even for our own launches, but, you see, the missile warning system doesn't know that that's a space shuttle taking off from Cape Kennedy. There are Yankee submarines sitting off the coast, and it just might be a missile coming up out of the water from a Soviet submarine.

The point is, we don't just do paper exercises, we actually use these systems on an average of 500 times a year. I remember when I first joined NORAD six months ago. I went through my training as the Vice Commander in Chief to make the assessment for the President, and my boss went off TDY to Europe.

Since it's daytime in the Soviet Union when it's nighttime in the United States, we often do our assessments at two in the morning. One evening at 0200, the phone went off, and again at 0220, at 0240, at 0300. The Soviets were doing a series of firings off a single submarine. But you get used to it, and you learn to get very wide awake when that telephone goes off.

Now, how do we do the assessments? We use what we call dual phenomenology. The last thing we at NORAD want to do is start World War III by telling the National Command Authority that the missiles are coming. So, number one, it is not an automated system. There are people in the loop 24 hours a day. But we do use computers and technical systems to collect the data for us, and one of those is what is called the Satellite Early Warning System, which consists of three satellites 22,000 miles above the earth. Two of them are over North America, looking out over the broad ocean area of the Atlantic and the Pacific, providing overlapping coverage of the submarine-launched ballistic missile threat. A third satellite looks down over the eastern hemisphere and the Soviet ICBM fields. Those satellites are looking and listening 24 hours a day. And they and their data links are reasonably survivable. They do use large ground stations, which are very vulnerable. We have a modernization program underway, now that we have an operational Space Command that advocates survivability features for space systems, and we're developing mobile systems. We will also have much better communications links to make this system work, not just before the attack, but in the postattack or second-strike phases as well.

Student: Why can't satellites be used for surveillance the way radar is used? If we have such incredible coverage with satellites, why can't you use them to detect intercepts or missiles?

Rosenberg: Well, we think we can. It's a matter of packaging technology. Looking upward from the surface, we have big radars that can use megawatts and megawatts of power to drive them, because they're sitting on the ground. The Ballistic Missile Early Warning System radar at Thule, Greenland, has, I believe, some six diesel generators each producing over two megawatts of power. That much power is pretty tricky to stuff into a satellite. That's fundamentally the issue: how much can you do from space, how small an object can you see, how much power can you put up there, and how big can an antenna be? If you can get a great big ear up there, that helps because you have to overcome the signal propagation problems from earth to space by having enough sensitivity in your antenna and your receivers to pick up the energy, no matter what part of the spectral band it's in.

Student: Don't you have an additional problem, in that the larger the satellite becomes, the more vulnerable it is?

Rosenberg: No, not really. As I said before, the satellite itself is probably the least vulnerable portion of the space system. A big fixed ground station to control it is a lot more vulnerable. There are techniques we can use to reduce the signature of a very large satellite. There are ways to reduce IR signatures, radar signatures, optical signatures — and all of those things can be applied to space systems just as they can to planes and cruise missiles.

Student: I still see a problem. You said they can defend against everything except a nuclear warhead. But it seems to me that if the Soviets are really about to launch the war to end all wars, they would have few qualms about attacking satellites.

Rosenberg: Well, wouldn't that be excellent warning? Think about that. If they attack our warning systems in space, that certainly is warning.

Student: But what about the cost effect? Why do we spend all this extra money to build satellite systems that would be unable to avoid attack?

Rosenberg: I think that's a worthwhile question. Let me describe the approach we are taking, which is our evolving space strategy. First, the military is becoming more dependent on space every day as a force multiplier. The Global Positioning System will provide unprecedented weapons delivery accuracy for our land, sea and air forces. Our MILSTAR satellite system is going to have tremendous communications throughput. Today 70 percent of the Defense Department's worldwide long-haul communications go by satellite. It's economical to use space as a medium, and satellites are becoming much more valuable as our eyes and voices to keep track of what the Soviets are doing. If we make those satellites valuable enough, the Soviets will feel that the

only way they can succeed in an attack against NATO or the United States is to destroy those satellites, because if they don't destroy them, we'll know what they're doing and we'll be able to posture our forces to resist them. Our objective is to make the satellites so survivable that if the Soviets try to destroy them, they will fail — and will also have given us warning. Meanwhile we will be able to use those eyes and voices to posture our forces.

Conceptually this is not unlike the strategy of the nuclear offensive triad. By making it so difficult for the Soviets to effectively attack and destroy all three legs of our nuclear offensive forces, we deter them from trying at all, because they know that if they try to knock out one, they are not going to succeed against the other two. We are building the same approach into our space systems. It will take them literally days to weeks to wipe the skies clean of our space systems.

When I speak of survivability, I am not talking about immortality. We think survivability simply has to last long enough to deter the bad guy from using his capability. The more precise ground-based radar systems — and they are more precise because all the big diesels put out a lot of energy and very precisely track things — are used by CINCNORAD to determine precisely where the weapons are headed in North America, and make an assessment for the National Command Authority. Are our nuclear fields under attack? Are our cities under attack? Are our command and control facilities under attack? What's under attack? We tell the President what's happening. We have nothing to do with launching retaliatory forces, as in *War Games*, with some cigar-chewing, four-star general pushing a button. That's the National Command Authority's job and the Strategic Air Command's job.

Student: The satellite-based system: is that the infrared launch detection system?

Rosenberg: That's correct.

Student: And does that system include any attack assessment or characterization capability, or just warning?

Rosenberg: It's a warning system. It is not an attack characterization system now, though in the future it will be. We are building improvements to that system (I can't discuss the details) that will provide at least a rough attack characterization capability. Right now we just have rough azimuth — a rough idea of where it's going. We would know from the early warning satellite whether a missile is headed for North America or not, but not what city, missile field or command and control facility it's going to hit.

Student: Do the Soviets have infrared coverage of our fields?

Rosenberg: I can't discuss intelligence information on the other side.

We're also concerned about the missile threat from submarines, and for that we have additional ground-based radar fans that currently are located at Otis, Beal, McDill and Eglin Air Force Bases (figure 9); you can also see the remains of the old Safeguard system at Concrete, North Dakota. The perimeter acquisition radar system up there is now part of our attack assessment and characterization capability. You asked earlier why we left the fan off the south against the air-breathing threat; similarly there is not yet any fan toward the south for the submarine-launched ballistic missile threat. But we are putting additional radar fans down south, because of the potential future threat of Soviet submarine-launched ballistic missile systems in the South Atlantic or the South Pacific.

In the space defense arena we have two jobs and a third job coming: surveillance, protection, and in the future, negation. There are over 5,200 objects in space today that we can see (only a few hundred of them are live satellites). Each day we take about 20,000 observations of those objects with non-survivable earth-based sensors that someday will be replaced by a survivable space-based surveillance system. We have to keep track of that, and that fundamental catalog, the only one in the free world, is used, you might say, by the traffic cops of space. We use it to let owners and operators of satellites know where other objects are, in case they accidentally or purposely are going to bump into one of the objects. We simulate a launch of the shuttle through this catalog of 5200 objects; it is up to us to tell NASA, "Don't launch now; wait, because you're going to come within three miles of a Soviet rocket

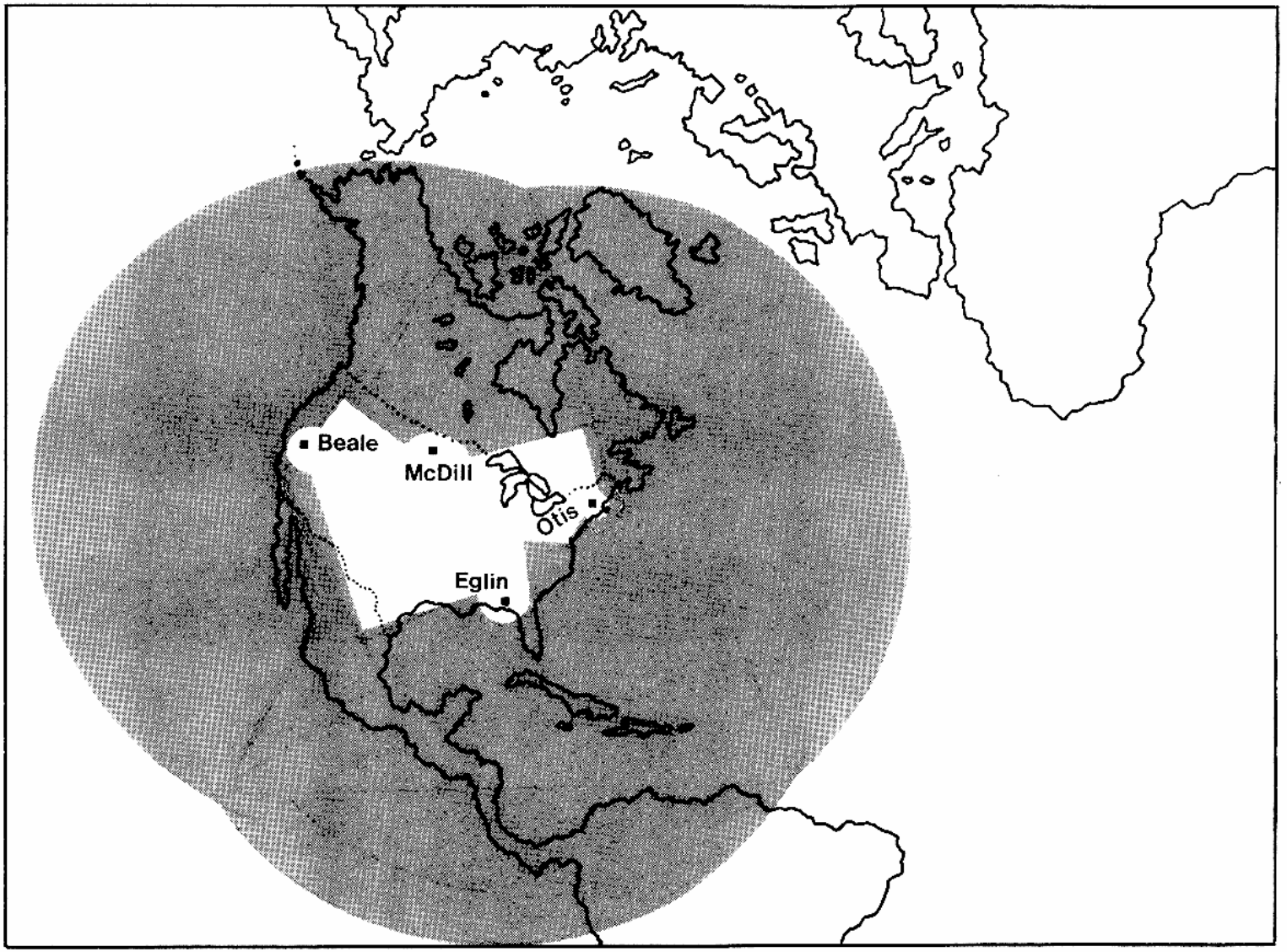

Figure 9. SLBM Coverage

body." On STS-4, we told them they were going to come within 8 miles of a Soviet rocket body, and they felt comfortable with that, so they went ahead and launched on time and on schedule. On one of the manned space missions a few years ago an astronaut lost a Hasselblad camera; we keep track of that camera, we know where it is. There's a space glove up there, an astronaut's glove; now why are those important? You think, well, space is so terribly big, but it isn't so big when you're flying in a shuttle going 20,000 miles an hour in one direction, and an 8-ounce glove is flying 20,000 miles an hour in the other — immovable object meets irresistible force, and you're in big trouble.

We also keep track of radio frequency interference. Right now we are moving a satellite system from one location to another in space. We ran the catalog of 5200 objects against where we wanted to put that satellite, and we found that within two degrees was an INTELSAT and a Soviet communications satellite. We have been exposed to the World Administrative Radio Conference (WARC) and all the problems associated with that bureaucracy. We decided not to put the satellite where we originally wanted it. Instead we're going to park it two degrees further away, so we won't have any radio frequency interference problem.

Oettinger: You have mentioned a mix of Air Force and NASA, the FAA and so on. In peacetime, who pays for sorting out airlines? What's the budgetary situation behind that?

Rosenberg: We pay for it.

Oettinger: So it's a military budget?

Rosenberg: We have to do it for everybody because it serves multiple purposes. For example, take the cataloging. We will be watching a Soviet low-earth orbiting satellite and all of a sudden it starts to tumble. We are the primary source keeping track of all foreign objects in space, so we will know when that Soviet satellite begins to tumble. As it gets closer to the dense portion of the earth's atmosphere — it's like a stone thrown across the water — it starts skipping and moving around, we will begin to see its orbit decay, and we know when that body reenters.

Now, to the missile warning centers, to all the sensors that are out there looking for nuclear reentry vehicles, the reentering satellite could look like a warhead coming in. We let the Soviets know it's not a warhead. We tell ourselves it's not a warhead. We let everybody know that it's a Soviet satellite that is decaying and coming back to earth: "North America is not under attack, Europe is not under attack, nobody is under attack." That's a very important correlative function. You've got to do it. Maybe NASA wants it for space shuttles, but since the Defense Department rides on space shuttles, who's going to pay for it? It's included in the budget of the Air Force Space Command, which is responsible for training and equipping forces to support the unified and specified commanders as well as training and equipping forces to support the NORAD commander's mission.

McLaughlin: Weren't the surveillance radars combined in 1960 with the Federal Aviation Act?

Rosenberg: Yes, in the form of the Joint Surveillance System. Those radars are jointly operated by the FAA and the military.

Oettinger: Are they on two budgets?

Rosenberg: The operations and maintenance budget is paid for by the FAA, but when the controllers went on strike they had no problem because we were operating them anyway. A lot of the GCI (Ground Controlled Intercept) operators were military types, too.

The second mission area is protection. We use that catalog of 5,200 space objects to keep very precise track of where our critical national security assets are flying in space. When we see a Soviet antisatellite (ASAT) launched, our computers calculate whether or not it is going to intercept one of our satellites. The booster the Soviets use to launch their ASAT is also used to launch several different kinds of satellites. So when it first lifts off the pad, and we see it on our satellite early warning system, we can't say that's an ASAT, because we don't know yet. They launch four different kinds of satellites off that same SL-11 booster. When we identify it as an ASAT, we provide advisory notices to certain critical U.S. satellite owner/operators who can take action to defend themselves.

Finally, I'll cover the negation mission, which is associated with the U.S. anti-satellite program. This is not militarization of space, it's deterrence. It's

defending our right of self-protection. People often express concern over our ASAT program and the military use of space. The military has been using space since 1956. We militarized space a long time ago. We are pursuing an ASAT program to try to deter hostilities in space, not encourage them. You know the executive branch has a constitutional responsibility to protect the citizens. The Senate ratifies all treaties. Well, we have treaties that guarantee U.S. flag carriers the right of free passage on the high seas, and we have a United States Navy that trains and equips forces that are under the operational control of CINCPAC and CINCLANT, the two operational unified commanders, who are armed. Now, I'm not trying to justify space warfare, but I want you to understand that the Navy doesn't go around shooting people on the high seas. They're there to guarantee freedom of the high seas, and to deter potential aggressors from acts of piracy against U.S. flag carriers. Now, we have a U.N. Outer Space Treaty that guarantees U.S. flag carriers the right of free passage through space, and we have billions of dollars of commercial communications and other satellites up there. Congress ratified that treaty and there's no way to enforce it. There are also threatening Soviet satellites today; they are integral to the Soviet war-fighting machinery. To permit Soviet space systems to operate in space to support weapons delivery against U.S. and NATO forces without being able to negate them is relatively dangerous.

To sum up my views about the negation mission, the Soviets have a demonstrated capability: the only operational ASAT in the world, and a laser capability that is a threat as well. They are fielding a 300,000-pound, low-earth-orbiting space platform, much larger than our shuttle, which could become an ominous space-based anti-satellite weapon in the future. We can argue intellectually for years over the nuclear arsenal balance of power — they have more nukes than we have, and so on. But I can assure you that the moment the Soviets can unilaterally put out our eyes and voice in space, the nuclear balance of power and the command and control that goes with it will instantaneously tip. That's what the U.S. anti-satellite program is about — to assure that they don't establish unilateral space superiority.

Student: I'm curious where you draw the line between the militarization of space, so called, and the deterrence role. You compared the deterrence role on the high seas with a space deterrence capability. Yet in the past, acts of piracy have degenerated into acts of war on the high seas. You could make the argument that providing a deterrent in space could degenerate into acts of war in space.

Rosenberg: But not having a deterrent capability could encourage that. As I said, we are very dependent on space, for our economic as well as our military well-being. Suppose we have no defenses there. If the Soviets shoot down one of our critical national security satellites, what do we do — nuke the trans-Siberian railroad? That's a horrible choice.

Student: Yet those who criticize sending more of this kind of hardware up into space do have a point: that is one of the frontiers where we don't have weapons, we want to limit that.

Rosenberg: We do have weapons...

Student: Right, but not as many.

Rosenberg: No. My point is this: today the Soviets can target U.S. forces in real time far beyond the organic capability of our own forces. There is an imbalance there. They can strike, using certain kinds of space systems that they have operational today, and we cannot allow them that sanctuary. They're able to conduct warfare using space systems as an integral part of a military operation, while we say, "Let's have an ASAT Treaty." We can't. We can't retaliate in kind.

Student: Let me refocus the question. How do you keep this from mushrooming until there are tons and tons of weapons in space? If you establish a policy to keep them from mushrooming, how do you keep them from proliferating?

Rosenberg: Well, I would hope our policy about where we do and don't have weapons is in our national security interest, not in the interest of arms control. For too long this country has been driven by arms control for arms control's sake, instead of arms control for the sake of enhancing our national security. When I was part of the Carter negotiating team on Anti-Satellite Treaty, I recommended to the President that it was impossible to monitor and verify an anti-satellite treaty. My judgment, based on my

knowledge of our intelligence capability and what the Soviets can and can't do, is that it is virtually impossible, without on-site verification, to adequately monitor a treaty that will be in our national security interest as well as in the Soviet's interest. No, I don't want to mushroom weapons in space. I think you'll find that, as a class, folks in uniform are more for arms control than almost anybody else.

Student: I'm not accusing you of that, but it seems like such a difficult dilemma, I'm curious to know how to handle it.

Rosenberg: Well, I wish we had a solution to it. But if we are to pursue the President's Strategic Defense Initiative successfully over the next several years — assuming that we can find technologies for the space-based portions of that layered strategic defense system — I think we will certainly need some kind of capability to prevent Soviet interceptors from killing the space-based portion. By then satellites will become extremely valuable, and they will be very worthwhile targets to go after. We will have to be able to keep the Soviet interceptor from killing our space platform. It can't stop that weapon from being there, but it is there for defensive, not offensive, purposes. I don't,mean that defensive weapons are any cleaner or better than offensive weapons are. But I feel it's essential that we add a space-based element to the Strategic Defense Initiative, and it's in our national security interest to be able to deny the Soviets the ability to kill that space-based element.

Student: How are you going to deny them that capability?

Rosenberg: With defensive weaponry.

Student: But how? If they have a space mine, or something that's using neutron, particle beam or laser weapons, unless your satellites are hardened against that, you're not going to be able to prevent it. And if your satellites are hardened against it, then why do you need ASAT?

Rosenberg: Well, ASAT is not a single device, it's a whole family.

Student: I'm talking about a system to go and destroy other space-based objects.

Rosenberg: Well, hardening may not, in a particular circumstance, be an adequate solution. Hardening in and of itself, against certain types of pulse beam weapons that have been conceived of, is not going to hack the course. What I need is a defensive weapon to shoot back with.

Student: But you're dead. At that point it's instantaneous, and there's nothing you can do.

Rosenberg: Well, if all I had in space was one element —

Student: There is nothing you can do about the particular things that have been hit. The issue is, does it make any difference whether you have a defensive system up there or not? Are you better off spending your money on the ground defending what's going on down here? In other words, isn't ASAT just useless?

Rosenberg: Well, that's certainly your conclusion to draw. I hope you've done an objective analysis to reach it.

Student: I'm really playing devil's advocate, and I'm looking for a response, because it seems to me that once the destruction is instantaneous it doesn't matter any more, and you're not achieving anything by putting up all those billions of dollars worth of hardware.

Rosenberg: But a ground-based system can only provide a terminal defense, and that's not an adequate solution. I'm going to give you some hypothetical numbers, they're not accurate. Let's assume the Soviets choose to launch 1,000 ballistic missiles against the United States. Each of those carries 10 warheads. At a certain point it's no longer 1,000 objects coming up into space, it has become 10,000, plus decoys and things to take out the defense. A lot of this stuff gets a free ride during this portion of flight because there are kinds of decoys that burn up in the terminal phase. There are the 10,000 incoming objects plus some unknown number. Now, if the terminal defense job is to cope with this, that's an extremely tough job — to stop 10,000 plus perhaps another 25,000 objects. But if we have a space-based element developed through the Strategic Defense Initiative program that can take care of a portion of this...

Student: But, that's not ASAT.

Rosenberg: No, it's not ASAT. But our discussion started back at the point where I said we were going to have this potentially, as part of the strategic defense program, and needed to make sure that the Soviets could not destroy it. That was my point, and I understood you to say, "Why waste money on that? Put it all on the ground." And I am telling you that the geometry and Kepler's laws don't allow you to put it on the ground and do a decent job.

Student: Unless you do specific ground-based defense of some of your missile locations where possible, you won't be able to defend everything, but you'll defend some of it.

Rosenberg: You as a citizen are entitled to that belief. My Commander-in-Chief says that what he hopes for this country — and I genuinely support him, not only because he's my Commander-in-Chief — is that we will pursue technologies that will minimize the ballistic missile threat, not against our offensive weapons but against our nation and its people. I believe the technology can be pursued that can bring us to that point in the future. We're not just talking about a point defense of Peacekeeper, or of an SLBM base, or of some of the vulnerable warning systems I talked about. What the President has asked the Defense Department to pursue is a system that provides far more protection for the country than that, so that, in fact, we can reduce the offensive nuclear arsenals of both sides. The reason we can't reduce those arsenals earlier is that, if we have your very limited defense system, what's to protect us against the Soviets cheating and breaking out? If all I have is a very limited defense system, and I have agreed to eliminate a major part of my offensive nuclear force, and the Soviets have promised they will too but they won't allow on-site inspection, and then they break out and we have only a very limited defense capability — that's nuclear blackmail. Because we need to pursue a "layered" defense program, including space-based elements of the strategic defense, we've got to make sure that the Soviets do not have the capability to destroy our space-based assets. That takes anti-satellite technology — passive, active, different kinds.

Student: Are you saying that ASAT is a defensive weapon?

Rosenberg: ASAT can be either offensive or defensive. Recall what I said before about the U.S. Navy. It is armed but does not go around shooting at other people. Yet the very presence of its offensive weapons deters warfare on the high seas. I'm saying that we have as yet no way of preventing the Soviets from establishing unilateral space superiority and denying us our eyes and voice in space. Nor do we have the capability to deny them use of the warfighting space capability that supports their armed forces. The Soviets do have a capability to deny our use of warfighting space support. If we get into a shooting war, you bet ASAT is an offensive weapon; there is no such thing as a defensive bullet when you're at war. The purpose is to deter warfare by showing the enemy that you are prepared to fight and win. I won't be apologetic, that's what I am paid for as a military man — to defend all of you. And I can't defend you with both hands tied behind my back, because that does not frighten the Soviets in the least.

Student: You seemed to be saying that when Soviets shoot down our satellites it's offensive, but when we shoot down Soviet satellites, that's defensive. I was having trouble swallowing the idea.

Rosenberg: If the Soviets try to shoot down one of our satellites, and I shoot back at them to prevent them from doing it —

Student: If you shoot at their missile, I'll accept that it's a defense.

Rosenberg: It depends on what it is. As I told you, they are building a launch platform that can carry 300,000 pounds to low earth orbit, which is assessed to be more than adequate for a space-based weapon. The platform might be used to attack our satellites and I would need an anti-satellite capability to prevent them from executing their mission.

Student: The scientific community, of course, has been split on whether or not ballistic missile defense (BMD) is feasible. One critic has said this scenario would be like trying to shoot down a garbage can over Los Angeles or New York, and some of the

community has said that offense will always overwhelm defense. On the other side some believe that with existing and new technology it can be a viable thing. What are your views on this?

Rosenberg: Well, you know Oppenheimer said Teller didn't know what he was talking about, and today we have an H-Bomb, even though it was impossible. I know Edward's equations were wrong the first time around, but nonetheless the impossible device was built, for good or bad. It may seem unfair of me to say so, but for scientists to say that it's impossible to do x, y or z by the year 1995 or the year 2000 is irresponsible.

Oettinger: But in fairness, back in the 1950s, there is an official Air Force history that quotes General Tom Power as saying, "We sold them the sizzle and not the steak." So that cuts both ways.

Rosenberg: I don't think the President is selling sizzle. The big debate going on is, "You can't build it tomorrow," and the President didn't say we were going to build it tomorrow. The point is, we never believed man could fly, except in a balloon. No one thought we would have a 747 today. Back in 1945, a lot of irresponsible scientists would say it's impossible to have a 747 or a B-1 that can penetrate Soviet defenses. The bottom line is, I am very optimistic that in fact the technological base is there to draw from.

I think the most serious issues we face are not those of putting space-based elements up there that can see everything coming. I don't think that's difficult. I think the Army BMD has demonstrated very adequately its capability to see and track things in the terminal phase. I think the difficult issues to work are battle management and discrimination of objects. Space is full of garbage that includes not only warheads we really want to stop, but a lot of junk we don't want to waste any bullets on. We're bound to have some kind of limits on our defensive capabilities; we're not going to have an endless supply of bullets, so we want to use them wisely.

I believe that technology base exists. It's a matter of computer technology, computer packaging, software packaging — and most assuredly it doesn't exist today. But that's why we have a Bobby Inman down in Texas to compete with the Japanese. That's why DARPA (Defense Advanced Research Projects Agency) is pouring all kinds of money into advanced computer technology. Bubble memories are on the horizon; they're not 50 years in the future.

Student: How practical is the President's suggestion that, once we've invented this equipment, we make it available to the Soviet Union? In particular, given our present sensitivity about transporting computer technology, and especially, I assume, the software designs of computers, how do you assess the practicality of doing that?

Rosenberg: To give a sensible answer, I'd have to know more about where our technology is headed. It is a technology program today. I don't know what pieces of it would or would not be in our mutual national interests to give them. We did entertain that sort of idea a few years ago when we were talking about the comprehensive test ban treaty — sharing our seismology equipment.

Student: I just wanted a first-cut judgment by you as a person who understands equipment, whether this would be feasible.

Rosenberg: I think it could be, but I must admit I haven't given it much thought. I wouldn't want to make a snap judgment as to just how far we could go.

Student: You said that by increasing the warning time we can enhance deterrence. What is the interplay there? You said it might give the NCA the necessary time to order a response. It might give the NCA enough time to take those measures in dispersal, so that we could then absorb the blow. If we could absorb the blow, we would still have enough facilities functioning in the nuclear environment to make some assessment of what the damage has been, and that capability, plus the ability to retaliate, is deterrence. I felt there was some ambiguity in what you said.

Rosenberg: Unless I can stop the SLBM in its boost phase, we are limited by its 8- to 15-minute flight time. That's the law of physics, that's the way it works, it's the same for SLBMs as for ICBMs. Now, if I have elements of a strategic defense system

that can deny that 8- to 15-minute flight even on some of the missiles, if I can deny an attacker his SLBM capability so that he has to depend on more distant standoff systems, then that would increase warning time. I can't give you an architecture for what this strategic defense system looks like. We are only now pursuing technologies, so I don't have an answer for you. But let's presume we find a technology that focuses on doing away with the short launch capabilities of an SLBM and forces an aggressor to launch from his homeland. That would increase warning time from 8 to 15 minutes to 25 to 40 minutes.

Student: Okay, but what should you do with that time? I wish you would talk a little bit about that, and not so much about knocking down missiles. At lunch you mentioned that if you were going to knock off the NCA you would do it with a suitcase, rather than with a ballistic missile. What do you do with that time? Presumably you're talking about a transattack retaliation, rather than a launch out from under.

Rosenberg: I'm not prepared to say what the National Command Authority does with the time it has. My boss's job, and my job in his absence, is to provide tactical warning and attack assessment of where those missiles are going, and whether they are a threat to North America, and we do that very rapidly. As I said, we exercise it for real about 500 times a year. The deliberative process, however, is one that I'm not prepared to address in this environment.

I don't want to belabor this uninvented strategic defense system; I didn't come here to sell you the Strategic Defense Initiative. I came to talk about our capabilities and limitations in tactical warning and attack assessment for a missile, cruise missile or bomber attack.

I think it's important to remember that once upon a time we had a thing called nuclear superiority: we had something like 1,050 ICBMs and the Soviets had virtually nothing. Today that ratio has crossed over, the Soviets are still gaining. They're gaining with very accurate pointing systems and relatively large yield systems that have the ability to destroy our retaliatory forces. As a result of Soviet superhardened silos and very hardened command and control facilities, the effectiveness of our offensive nuclear arsenal has dimished to the point where it cannot hold at risk those things the Soviets hold most dear. So deterrence is eroding rapidly. That's the rationale for the strategic modernization program we have underway: Trident modernization, the B-1, the Advanced Technology Bomber, and the Peacekeeper missile. The whole approach that's being taken with the Strategic Defense Initiative is not to continue to allow proliferation of offensive nuclear weapons, but to try to get to a point where strategic defense is meaningful enough that we can bring the Soviets to the bargaining table — because they will recognize the futility of fielding 30,000 warheads to continue the Mutual Assured Destruction approach we've had over the years — and get both sides to draw down their arsenals to only the levels that are necessary to protect themselves against Third World threats.

Let me belabor that. I don't know how long deterrence will last the way it is without any defense system, but I'll tell you about a couple of threats that my boss and I worry about every day. One of them is a crazy threat, a Khaddafi-type threat. You know, about the best the boss can do in that kind of case is tell the National Command Authority, "Here comes one." Even more serious than the crazy terrorist threat is what I call inadvertent (or advertent) attack — it's not an accident. A Yankee boatload of 16 tubes comes heading toward North America, and the Washington-Moscow hot line lights up, and a message comes through from Chernenko that says, "Mr. President, it's a crazy sea captain, he got the code, he launched them, we are not responsible, we didn't do it, don't retaliate, after they land and you clean things up, we'll agree to mutual retribution. Don't do anything; it was all an accident." And in fact it wasn't an accident. It's the leading edge of a decapitation attack. With a strategic defense program — not a 100-percent leakproof program, just a reasonable strategic defense program — those two threats will disappear forever. And those are the threats I worry about very much today.

McLaughlin: In sharing technology with the Soviets, if we gave them our uncompleted BMD plans today, how long would it take them to build it, if they could? And would they believe them or not?

Rosenberg: I don't think Larry's proposal was to give them plans.