their merchant ships is in the full-time employ of its government, they're configured in ways to permit them to exploit their merchantman. The Soviets over time could have merchantmen constantly deployed in the course of their normal and peaceful trade so that there would be a stream of replenishment ships available, whenever the war broke out.

R. Are they as up on the techniques of replenishment at sea as the U. S. Navy?

Z. The Soviets were notoriously poor in this field until recent years. In recent years they have come up rapidly, and in my last pasture statement for the Congress as I discussed the 15 warfare areas as one in which I concluded we still had a superiority, but it was modest. The Soviets were ahead in 10 of the 15.

R. Now, what have we left out? Are mines detectable, the presence of mines detectable, or are they fairly invulnerable once they're in?

Z.. Both sides have a capability to detect mines through various devices, but the ability to sweep them is very difficult, and there are some kinds of mines that we think are pretty close to impossible to sweep for both sides. Now, the Soviets have a stockpile of mines that must be a thousand times larger than what the free world has.

R. We're the ones that need them, presumably. What are they mining?

Z. What the Soviets would do is seek to mine every harbor in Europe and in our own.

R. Now here's what comes next, maybe. In view of what you said about the nature of the war, what is the implication about the kinds of things we need the most and the kinds of things they need the most, both in platforms and weapons. The two Navies should ideally be configured differently, right?

Z. That's correct. And this takes you back, Bob, to that paper we did together in which we discussed, first, how the U. S. Navy ended World War II; how the Soviet Navy, having to come from behind, optimized against it; and they achieved a very creditable capability to cut our sealines. They went first after that one of our four missions - sea-control mission.

R. And that's basically submarines?

Z. They went after it first with submarines, then with the surface ships with cruise missiles on them, and land-based aircraft with cruise missiles on them, and the acquisition of the bases to get those surface ships and submarines and aircraft spread out and better able to deal with us on the World oceans. But what they lagged behind us on was the capability to

project power, that is, to have amphibious forces and sea-based air that could project against other nations, and they are now in the process of correcting that by beginning to build their carrier fleet and with a fairly respectable amphibious capability. Now, what we had to begin to do as the Soviets got to the point, where as I have suggested, they have a much greater than 50 per cent probability of being able to cut our sealines, we had to begin to re-optimize our forces at the budget levels that we could afford, cutting down on our projection capability, which is the most useable form of our power for the normal kinds of crisis management situations.

R. And the one that NATO depends on.

Z. And the one that NATO depends on us for and Japan, and have had to put more and more of our assets into concentrating on defeating that Soviet sea-cutting capability. This has meant that the nature of the deck-load on carriers has had to change as we have reduced the number of strike aircraft and have increased the number of ASW aircraft. Put another way, we used to have some that would concentrate on ASW and CBSs and another set that would concentrate on strike and projection. We can no longer afford to have the CVA and CBSs as two separate categories as we've

dropped from 24 headed for 12, and we've had to make the carrier capable of first dealing with the battle to control the seas and then, if we end up winning control of the seas, to be able to project its power.

R. Let me get one concept straight in my head. A principle of not the No. 1 tool you used to maintain control of the seas against the Soviet submarines is anti-submarine capability. Not certainly for the middle of the ocean.

Z. That's correct. Air, surface, and sub-surface capability to deal with...

R. with the submarines.

Z. Since the nature of the submarine has changed, it isn't as simple as that anymore, however. It used to be just an ASW problem, but once the submarines began to cruise missiles, it then became an anti-air war situation, too; for those submarines that get their cruise missiles off, you've got to be able to deal with the cruise missiles.

R. And they can fire a cruise missile submerged?

Z. That's right.

R. They don't have to surface to do that.

Z. Not all of them are capable of it, but the Charlie-class submarine is and the Soviets are going in for more and more of that capability.

R. Do we have any such capability? But then we don't need it the way they need it.

Z. We do not yet. When we get our Harpoon missile started to deploy in 1975, after we've taken care of significant number of surface ships, we will begin to encapsulate it and put it in a torpedo tube of the submarine and it can be fired from under water.

R. Attack submarine?

Z. Right. Now, as you read Project 60, everything that was done in that was done having in mind the fact that we had to re-optimize against this Soviet capability and what we needed was large numbers of platforms. We had to have more sonar platforms, and more submarine-killing devices in more parts of the world than we could afford at the very high .....

R. What you imply now, by what you've said about it at the beginning about the political situation, is that we need to have the capability of forces at every straight - you named half a dozen, at least, at the ; in addition, forces sufficient to convoy whatever needs to be convoyed across the ocean. Does that generally describe it?

Z. In addition to the forces at the straights and convoying, we've got to have the forces to protect the high value striking forces themselves, that is, the aircraft carrier, which would be used in a more strategic role. That is, they wouldn't stay right with the convoys, they would be operating in random parts of the ocean, partly to survive and partly where their airpower is needed the most.

R. This does mean very large numbers, doesn't it?

Z. That's correct. As far as the United States' Navy ought to have the larger number of ships rather than the smaller number. That is why our job is so much tougher because we ...

R. Are you talking about the kind of range; for example, in the course of a conventional war that was not just a Naval war, was a general war, like how many convoys, for example, in what kind of number range. How many convoys would be operating at the same time?

Z. I can't give you specific numbers, Bob, without looking at some assumptions, but it ranges...

R. It would be several.

Z. It would be scores in order to keep a war going, and it would be hundreds of convoys in order to keep the economy going.

R. Was it that many in World War II that were all going at the same time?

Z. No. Not at any one time. At any one time, I should think 20 would be a well guess.

R. So, you'd have 20 separate convoys at which you'd need escorting vessels.

Z. And that figure goes up dramatically in the years ahead as the oil it's bringing from the Middle East goes from 15 per cent to 50 per cent.

R. I think it is important to make the numbers argument there. If you want to go on about numbers, I think this might be a good place to do it.

Z. The hall of our analyses showed, going back to era of Secretary of Defense McNamara, when I was Executive Assistant to the Secretary of the Navy, that there was much more payoff for numbers of platforms than there was for having some superior capability in the individual platform, such as the advantage of nuclear propulsion. And although Navy calculations could make a case that some fraction of the carrier task forces should have nuclear-propelled escorts in order to be able to react very rapidly for crisis management situations, and although there was general agreement that you got an order of magnitude improvement for the submarine as it went from conventional to nuclear propulsion, it was quite clear that one should restrain the

investment in nuclear propulsion for other kinds of ships. The Soviet calculations apparently come out the same way and they have never built a nuclear propelled surface warship. And they haven't even made all their submarine fleet nuclear propelled in order to be able to afford two-and-a-half times our number.

R. You certainly don't need any of that for convoy duty, do you?

Z. The convoy will always have fuel.

R. And after the convoy gets safely to where it's going, you can resupply there anyway.

Z. That's right. You run up against reams and reams of Rickover theology to demonstrate in terms why this is crazy, but I know of no responsible analyst who has examined the thing and no responsible decision-maker who has examined the thing who doesn't agree that we need larger numbers of ships than we can afford if we make everything nuclear propelled.

R. What is the money difference there? What's the money difference between our nuclear escort and a conventional one?

Z. The patrol frigate, which the Navy is now trying to build, which will carry

close to the same military capability in terms of sensors and weapons that the nuclear frigate will carry, costs one-fifth. So you can afford five patrol frigates for one nuclear frigate.

R. Can one of the conventional frigates serve as an escort for a nuclear carrier?

Z. They are being built with a speed that will not permit, in theory, constant high-speed escort of nuclear-propelled carriers. In actual fact, however, the destroyer escorts that were built under the same theory have been able, about 98 per cent of the time, to do the job. Now, in addition, of course, we're building the 963-class destroyers which are larger destroyers - fossil fuel - and these will have 100 per cent capability to escort carriers. They are about eight-thousand tons.

R. Now, is it possible to say, maybe by leafing through some of the Project 60 material, that when you on July 1st, 1970, where did you find the biggest holes in this thing that needed plugging up the most rapidly, and what particular things needed to be done most?

Z. I knew quite a bit about what the situation was because I had had the period, from 1962 to 1965 working for Paul Nitze, to observe and analyze

many of the studies that were being done and to examine Navy programs, and then after a one-year period of playing with the equipment in fleet exercises at San Diego, back to the analytical world as Director of Systems Analyses, where for two more years until 1968, I had examined war outcomes, fleet exercises, and all the rest. It was quite clear to me that the Navy was over optimized in favor of Admiral Rickover's programs. That is, we had put far too much money into his very costly, very effective platform, and had not put nearly enough money into the replacement of the rapidly diminishing escort fleet and other kind of surface ships. The examination of the various studies that I did during the month before I took over, re-confirmed all of these insights, and therefore it was clear to me in kicking off Project 60 and confirmed by the very capable officers who worked on Project 60, that we had to begin to throttle back on the expenditures of the high cost ships in order to develop larger numbers of the lower cost ships. However, it was also clear that there would be a period of about two years for this transition to take place.

R. You want to explain that in some detail? Concepts are hard to get a hold of.

Z. Once one gets an idea as to a new type of ship or weapons' system, it

takes several years to work it through the system. The first one has to get the approval of everybody within the Executive Branch. The second one has to get it approved as a concept by Congress by getting small amounts of money to do the research and preliminary development work. Third, there was a vast amount of bureaucracy involved in the DSARC process which leads to all kinds of wrangling over specific ship characteristics and in which

R. What process?

Z. It's called the DSARC process (Defense System Acquisition Review Council) and everybody in the building has a horse-holder who sits on it, both in OSDN and the service whose weapons' system is being examined and after all the calculations have been done and all the best analytical work has been done within the service, and every aspect of the ship's characteristics gets scrubbed by that system, and there are many, many battles and so that takes a long time, and then everybody who loses in that council runs over and gets their favorite Congressman or Senator to start being nasty towards that weapons' system when you come up to defend it on the Hill. As a specific example, the patrol frigate which

originally was supposed to have been in, I guess the 1972 budget, didn't actually get money appropriated for it until the 1975 budget just passed. We lost three years. The sea-control ship still hasn't made it as a result of Admiral Rickover's continuing wars against it. So that during this first period my theory was let's increase the amount of ship construction money and buy the kinds of things that we've got

R. No new designs.

Z. and then as you begin to get through the system the new types of ships: the patrol frigate, the sea-control ship, the hydrofoil craft - begin to spend more money for those.

R. What did you have going as of July 1st, 1970?

Z. The only thing that one could easily elect to do was to try to get the fourth nuclear-propelled carrier, and it took us one year extra because it was so unpopular on the Hill, and to speed up the numbers of nuclear-attack submarines.

R. Did you have that destroyer thing going on yet?

Z. That was already going - the 963 program had already been signed, sealed and delivered. The contract was signed the day before I took office. But I was asked

R. So, there was no desire to expedite that one.

Z. That's right. You couldn't. The only choice you had was to go for the fourth nuclear carrier under this larger amount of money we were going to put into ship construction by reducing the number of ships we had operating, and more nuclear submarines. It was at that point I called Rickover in and got him to agree that if I went from three submarines a year to five that when we got to the point where we were ready to start building conventional ships, he would support dropping down to two, the net being that he would, during my four years, have a larger number of subs that way than he would the other way. Admiral Rickover gave me his solemn commitment and when I sent for him to collect on the deal two years later, had no recollection of it.

R. LHA was already .

Z. That's right. Now, I had to make the decision. The LHA was such an extensive ship and Litton was...