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US and Soviet Major Surface Warships, 1964-85: The Perspective of Inventory Value

An Intelligence Assessment

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An Intelligence Assessment

Information available as of 1 January 1982 has been used in the preparation of this report.

This paper was prepared by
, Office of Soviet Analysis. It was coordinated with the National Intelligence Council and reviewed by the Office of the Chief of Naval Operations, Office of Net Assessment, OP 96-N, Washington, D. C.

Comments and queries are welcome and may be addressed to

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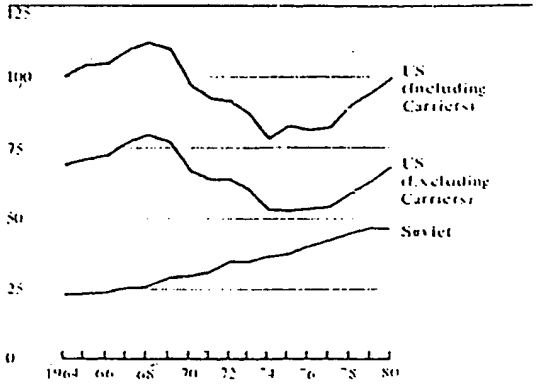
Preface

The use of military-economic data in comparisons of US and Soviet forces has in the past emphasized resource flows (in terms of annual defense expenditures) to the military sector. Such a description of defense activities is incomplete, however—just as annual income may not adequately describe an individual's net worth. To determine whether a dollar valuation of inventories could provide more comprehensive comparisons, a pilot project to study one type of force was undertaken. This paper presents the project results—a dollar valuation of the US and Soviet inventories of major surface warships during the period of 1964-80 (with a projection through 1985)—and compares trends in such values to trends for two other strength indicators: number of ships and tonnage. Although the intervening years for all three measures are shown in charts, the text discussion focuses on the benchmark years of 1964, 1980, and 1985.

Some of the comparisons in this paper exclude large aircraft carriers (these cases are clearly noted). Large carriers are unique to the US side and have a disproportionately large impact on measurements involving cost and size. Inclusion of carriers more accurately reflects the reality of the US force, while exclusion permits analysis of forces having a greater degree of comparability.

Figure 1
Trends in Inventory Value of US and Soviet Major Surface Warships



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US and Soviet Major Surface Warships, 1964-85: The Perspective of Inventory Value

Key Judgments

The inventory value of Soviet major surface warships doubled between 1964 and 1980, while that of the United States—after considerable fluctuation—returned to the 1964 level. Soviet inventory value, which was less than one-fourth that of the United States in 1964, reached nearly one-half the US value by the start of the 1980s. If aircraft carriers are excluded, Soviet stock value was about one-third that of the United States in 1964 and about 60 percent by 1980

The steady rise in the inventory value of the Soviet major surface warship fleet reflects increases in number (from 108 ships to 129), size (the average tonnage jumped from 4,900 to 6,300 tons [1]), and complexity. Much of the stock value growth was due to the acquisition of some two dozen guided-missile cruisers and two small aircraft carriers

The US inventory value rose slightly during the mid-1960s, then fell drastically between 1968 and 1976 as the Navy deactivated all the destroyers and frigates and most of the cruisers and aircraft carriers of the World War II era and all the frigates built during the 1950s. The value of stocks began to rise again in the late 1970s, with an extensive force modernization program and the start of a force buildup. Over the entire 1964-80 period the number of ships declined from 308 to 189, but average tonnage rose from 8,300 to 10,700 tons and overall technological sophistication increased substantially. If carriers are excluded, fleet size dropped from 284 units to 176, while average tonnage increased from 4,300 to 5,600 tons.

Between 1964 and 1980 the US fleet was rejuvenated, with the average (mean) ship age declining from about 15 years to less than 13. Over 235 units were retired and 118 new ones obtained, and about 35 of the older ships remaining in service underwent a major conversion or modernization. In contrast, the Soviet fleet grew older—from less than 11 years to over 15 years on the average. The Soviets retired only 50 ships while adding 71, and fewer than 20 of the older ships completed a major conversion or modernization

[1] All tons in this publication are long tons, full load displacement

During the first half of the 1980s, the United States plans to expand its major surface warship force greatly, with the bulk of new units to be missile frigates. The Navy will probably acquire a new nuclear-powered aircraft carrier, as well as new classes of highly sophisticated missile cruisers—equipped with the Aegis air defense system—and missile destroyers. The Soviet Union is expected to modernize but not to expand its force. The total number of ships is likely to decline slightly by 1985 as fewer but generally larger and more advanced ships replace a greater number of smaller, obsolescent units. The Soviet Union is expected to deploy its first two nuclear-powered surface warships (the first unit became operational in 1981), but the appearance of a large aircraft carrier is not expected until after mid-decade. As a result, the inventory values of both sides will rise substantially, but the United States will greatly increase its lead in numbers of ships and will probably somewhat increase its lead in inventory value.

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Introduction

This paper looks at the force levels and the inventory value (measured in constant 1980 dollars) of US and Soviet aircraft carriers and surface combatants of more than 3,000 tons full-load displacement.[1] The discussion focuses on the Brezhnev era from 1964 through 1980, and presents a near-term outlook through 1985. The values were calculated using mid-year order-of-battle data that exclude reserve ships and US Coast Guard vessels and include ships undergoing conversion or modernization. US ship values are based on the prices paid for the ships by the US Navy and converted to 1980 dollars by means of price indexes. A parametric model, described in the appendix, was used to estimate the dollar costs of Soviet ships as if they had been built in US shipyards in the years when they were actually built in the Soviet Union. On both sides the costs of converted or otherwise substantially upgraded ships were adjusted to reflect the changes in weapons and sensors. All costs are averages for specific classes of ships. Costs of aircraft and ordnance are excluded.

Value is expressed in constant dollars so that the magnitudes and trends described reflect real changes in inventory size, composition, and sophistication and not the effects of inflation. Values are not depreciated for age—ships carry their initial cost, adjusted only for upgrading, throughout their useful lives. These inventory values represent what it would have cost in 1980 at US dollar prices for labor, materials, and other inputs to buy a force of the same size and with the same characteristics as those ships in active service at any given time during the period.

In this study, all ships on both sides carry their present US ship type designators consistently over the entire time period of 1964-85. This means, for example, that if ships now regarded as destroyers were formerly classified as frigates, they are treated here as if they were always classified as destroyers.

Inventory value is not an adequate basis for judging the ultimate effectiveness of US or Soviet naval forces. Such judgments are highly dependent on scenarios and involve many other considerations, such as force composition, tactical concepts, military doctrine, readiness, morale, command and control capabilities, and weapons and sensors capabilities in light of developments in naval warfare on the opposing side.

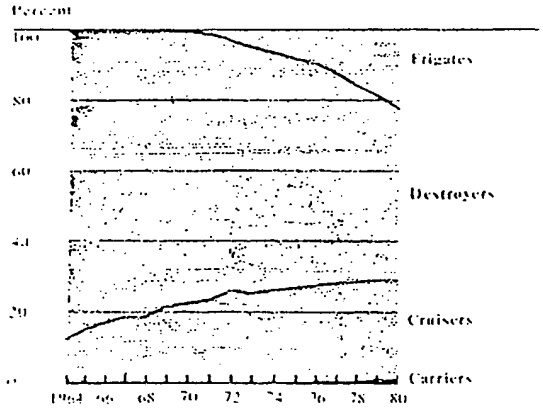
Transformation of the Soviet Fleet

During the period of 1964-80, the Soviet surface fleet was transformed from what had been basically a coastal defense force into a force with increased "blue water" or open-ocean capabilities. This transformation grew from the effort to develop what Adm. S. G. Gorshkov, Commander in Chief of the Soviet Navy, has termed a "balanced navy." In the mid-1960s, the major surface warship fleet numbered 108 cruisers and destroyers, augmented by a large force of minor surface combatants. The Soviet Navy had no aircraft carriers and no significant amphibious capabilities, and it had conducted only limited surface operations outside home waters. Its chief mission was to protect the Soviet Union against nuclear strikes by Western ballistic missile submarines and aircraft carriers. Secondary missions included denying the sea to enemy naval forces in the maritime approaches to the Soviet Union, cutting enemy sea lanes of communication, and supporting the seaward flanks of ground forces. The principal instruments for carrying out these missions were attack submarines and shore-based aviation—not the surface fleet.

[1] It also includes some three dozen US ships displacing between 1,000 and 3,000 tons, which were in active service at the start of the period and were considered at that time as open-ocean major surface combatants. All but two were retired by the mid-1970s.

[2] A detailed treatment of ship size, value per ton, and unit value of US and Soviet major surface warships is available upon reques.

Figure 2
Composition of Soviet Major Surface Warship Fleet*



*In active naval service

Between 1964 and 1980, the Soviet Navy acquired 71 new major surface warships, resulting in a net increase of 21 units. The emphasis was on missile-armed combatants, especially cruisers. During this period the Soviet Union introduced its first aviation ships (helicopter cruisers and small aircraft carriers), built a force of open-ocean missile frigates, and had its first nuclear-powered surface warship almost ready to deploy. The Soviet major surface warship force was much more technologically advanced in 1980 than in 1964, and its composition had changed substantially (see figure 2). Average tonnage increased, jumping from 4,900 to 6,300 tons, because new units tended to be bigger than the ships they replaced, and several large obsolescent cruisers were kept in service.

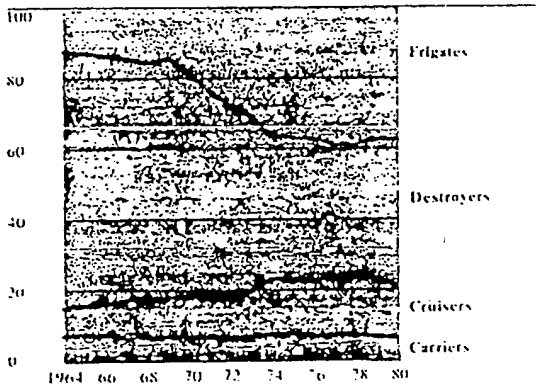
As a result of these developments, the Soviet Navy has shifted its emphasis to forward deployment as it pursues its missions. To the traditional missions it has added the peacetime role of projecting the Soviet presence overseas, both showing the flag with port calls and deploying units to potential crisis areas in times of heightened tension. Nevertheless, the surface fleet is still less important to the Soviets than naval aviation and attack submarines.

The US Fleet

In contrast, the United States in the mid-1960s was already an established naval power, emphasizing carrier battle groups and other surface forces capable of sustained operations in distant ocean areas. The Navy had 308 major surface warships—some nuclear powered—most of which were destroyers designed to escort the 24 large aircraft carriers. The wartime missions of the surface fleet, then as now, included destruction of Soviet cruise missile and ballistic missile submarines, projection of air power and amphibious forces overseas, control of the seas in areas of importance to the United States, and securing sea lanes of communication. In peacetime it has the mission of naval presence overseas.

In 1964, many US major surface warships completed during or shortly after World War II were approaching obsolescence. As part of a major modernization effort, during the period of 1969-80 the Navy deactivated all of the World War II–vintage destroyers and frigates, most of the cruisers and carriers built during the war, and all frigates built during the 1950s—a total of more than 235 ships. At the same time, it began a major shipbuilding program that is still continuing. Between 1964 and 1980 the US Navy obtained 118 new major surface warships, half of which were nonmissile frigates acquired during the late 1960s and early 1970s. The new ships also included four large aircraft carriers—underscoring the Navy's continuing orientation toward attack carriers—as well as over a dozen missile cruisers, a large new class of nonmissile destroyers, and the first units of a large new class of missile frigates. Figure 3 shows the overall change in composition. A number of the new aircraft carriers and cruisers are nuclear powered

Figure 3
Composition of US Major Surface Warship Fleet[a]



[a] Units in active service.

Overall, the US fleet in 1980 stood at 189 ships—119 ships below the 1964 level—including 13 aircraft carriers, and its numerical advantage over the Soviet force was cut by more than half (see table 1). The modernized US force, however, had technology greatly superior to that of 1964 and was substantially changed in composition. As in the Soviet fleet, the larger average size of US ships—up from 8,300 tons to 10,700 tons—reflected acquisition policies favoring the replacement of retired ships with larger units. The US surface fleet continues to rely on carrier-based attack aircraft as its primary offensive instrument, while the Soviet Union, lacking such capabilities, has emphasized cruisers and antiship missiles carried on a variety of surface warships

Inventory Value

The inventory value of Soviet major surface warships doubled between 1964 and 1980, while that of the United States—after considerable fluctuation—was the same in 1980 as in 1964 (see figure 1). As a result,

Table 1

Order of Battle:
US and Soviet Major Surface Warships[a]

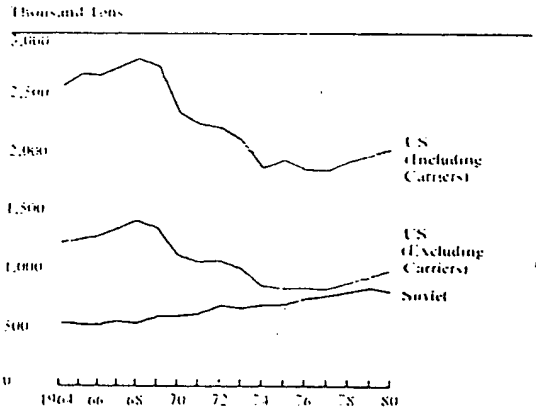
	Soviet		US	
	1964	1980	1964	1980
Total	108	129	308	189
Carriers	0	2[b]	24	13
Cruisers	14	36	24	27
Destroyers	94	63	224	79
Frigates	0	28	36	70

[a] As of midyear.
[b] These small Soviet carriers operate only vertical takeoff and landing (VTOL) aircraft.

Soviet inventory value, which had been less than one-fourth that of the United States in 1964, reached nearly one-half by the start of the 1980s. Since cost is highly correlated with weight, a great US advantage in tonnage contributed in large part to the substantially higher US inventory value. Most of the tonnage differential was due to aircraft carriers (see figure 4); if carriers on both sides are excluded, Soviet inventory value rose from roughly one-third that of the United States in 1964 to about 60 percent in 1980

For both sides, the trends in inventory value shown in figure 5 reflected the trends in numbers of ships, total tonnage, and the cost impact of technology change. The Soviet inventory value rose because the USSR had more and, on the whole, larger ships with a generally more advanced technology. The US inventory value in 1980 was roughly the same as it had been in 1964, despite sharp declines in both tonnage and force size, because the fewer ships were generally larger and embodied a much higher level of advanced—and costly—technology

Figure 4
Trends in Tonnage of US and Soviet Major Surface Warships



Both sides experienced a similar shift in composition of inventory value, with cruisers and frigates gaining at the expense of destroyers (see figure 6). The composition of Soviet inventory value was more like that of the United States in 1980 than it was in 1964, reflecting the Soviet fleet's relatively recent acquisition of open-ocean frigates and small aircraft carriers. The outstanding difference was the much larger share of carriers on the US side

Types of Ships: A Closer Look

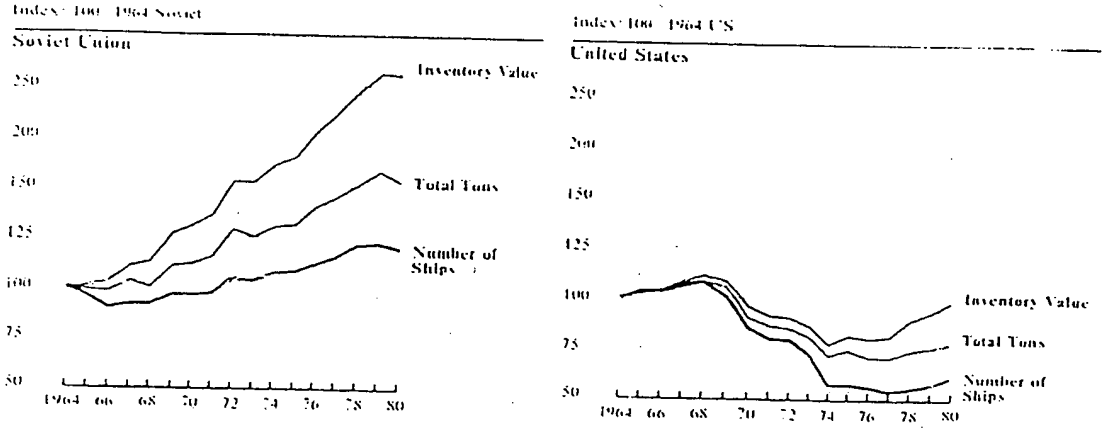
Aircraft Carriers. Much of the continuing US lead in overall inventory value is attributable to the great disparity in the inventory value of the carrier forces of the two countries—US carrier inventory value in 1980 was nine times that of the Soviet Union (see figure 7). This disparity is due to the difference in carrier force size and ship characteristics

In 1964 the United States maintained a force of 24 aircraft carriers, many of which had been built during World War II. By 1980 the force had been reduced to 13, including three nuclear-powered units. The United States had retired from service 15 carriers of World War II vintage and added four new ones, including two with nuclear power. The new carriers are twice the size of those they replaced and the cost per ton is much higher, particularly for the nuclear-powered Nimitz class. The two oldest units—over 30 years of age—were extensively modernized, with a corresponding increase in inventory value. The United States now has a smaller force of bigger, greatly improved individual units to fulfill the carrier-based airstrike mission. As a result, despite the force reduction, US carrier inventory value in 1980 about equaled that in 1964. All US carriers operate conventional takeoff and landing (CTOL) aircraft, including the latest high-performance naval intereceptor and attack aircraft.

The Soviet Union had no aircraft carriers in 1964. The first, the conventionally powered Kiev, did not appear until 1976, and by 1980 only two such ships were in service. This class represents the second generation of Soviet aviation ships, following the helicopter-carrying Moskva class of cruisers, which appeared during the 1960s. Kiev-class ships operate only vertical takeoff and landing (VTOL) fighter aircraft. Although the US Navy designates them as carriers, their capabilities do not approach those of modern US carriers. Kiev-class ships are much smaller—only about half as large as the newer US ships—and lack the specialized equipment needed to operate advanced CTOL fighter and attack aircraft. Unlike US carriers, they are also heavily armed combatants. There are indications the Soviets are developing a large CTOL-capable carrier, although it is not expected to be operational until the second half of the 1980s

Cruisers. The United States enjoyed a 2-to-1 advantage in cruiser inventory value in 1964, but that lead was cut sharply by 1980; by then, Soviet cruiser inventory value had risen about 150 percent and that of the

Figure 5
Trends in Inventory Value, Force Size, and Tonnage of US and Soviet Major Surface Warships



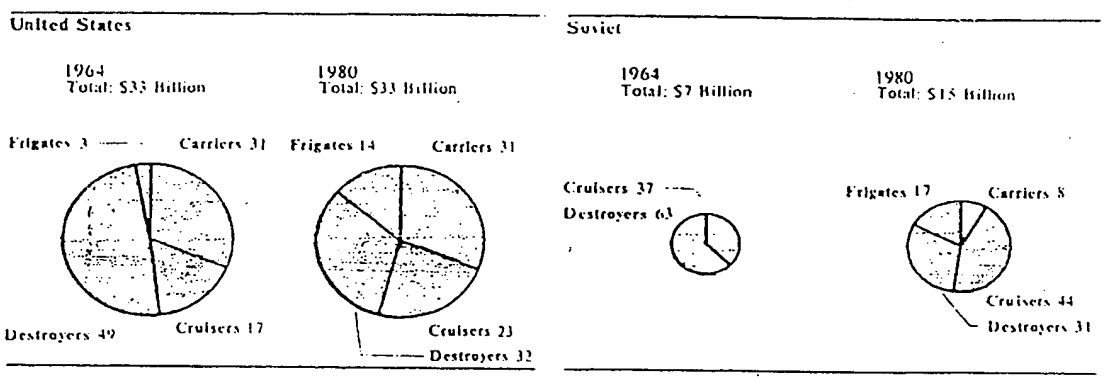
United States had risen just over 30 percent (see figure 8). While the number of US cruisers increased from 24 to 27, the Soviet cruiser force jumped from 14 to 36 units. At the same time, US cruiser tonnage fell 20 percent (new US cruisers were generally smaller than those that were retired), while Soviet cruiser tonnage doubled. The Soviet Union surpassed the United States in number of cruisers and cruiser tonnage in the early 1970s and by 1980 had opened a considerable lead in both force size and tonnage

Most of the Soviet lead in cruiser tonnage and force size is accounted for by obsolescent ships. Unlike the United States, the Soviet Union has retained a number of older cruisers—mainly large, armored, big-gun platforms—to serve as gunfire support or command units. The United States remained ahead in inventory value, largely because it has eight relatively more expensive nuclear-powered missile cruiser

During the 1964-80 period, the United States upgraded its cruiser force by adding 15 missile cruisers and retiring 12 older units. Six of the new ships were nuclear powered, joining two pre-1964 nuclear-powered units. In addition, 12 older ships underwent conversion or modernization to upgrade their capabilities

The Soviet Union added 25 missile cruisers in the 16 years after 1964. All were still conventionally powered in 1980 (a large nuclear-powered missile cruiser—the Soviet Navy's first nuclear-powered surface warship—was undergoing sea trials). Only a few ships had been modernized and only three old cruisers were retired. The new construction included two units of the Moskva class of missile helicopter cruisers, the Soviet Navy's first aviation ship

Figure 6
Percentage Composition of Inventory Value of US and Soviet Major Surface Warships, 1964 and 1980



Values are given in constant 1980 dollars

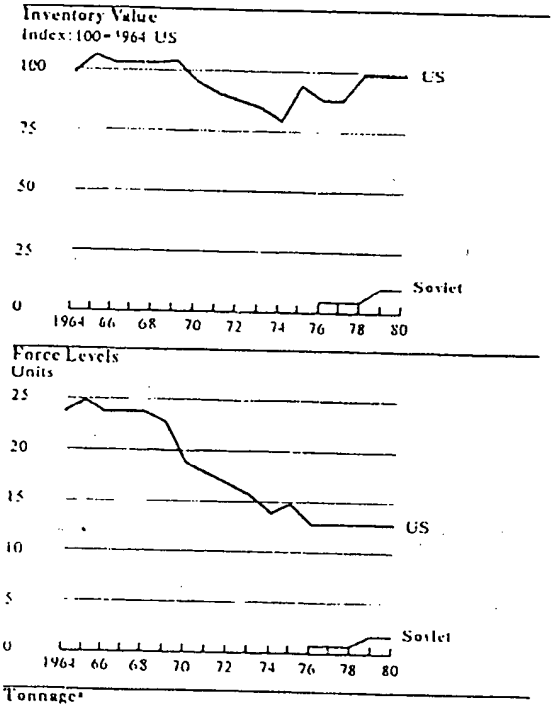
Destroyers. The inventory value of US destroyers was cut by more than half between 1968 and 1974, as the United States retired most of the World War II–vintage ships, but recovered to about two-thirds of its 1968 value by 1980 as the result of a force buildup in the late 1970s. Soviet destroyer inventory value changed little during the period (see figure 9). As a result, the large US lead in destroyer inventory value—more than 3 to 1 in 1964—nearly vanished in the mid-1970s but rose again to about 2 to 1 by 1980.

During the period, the United States deactivated more than 175 destroyers and acquired 31; the new ships were mostly larger units—all without missile armament—acquired in the late 1970s. In addition, 22 older vessels were upgraded (over half of them were converted to carry missiles). By 1980 the destroyer fleet was down to 79 units from 224 units in 1964, and tonnage was down by nearly one-half. The drop in destroyer inventory value was less severe because the new ships were larger than the retired units and most of them had relatively costly gas turbine propulsion

The Soviet Union deactivated over 45 obsolescent destroyers in the 16 years after 1964, while adding 16 new missile destroyers and upgrading 17 older ships in conversion. As a result, the size of the force dropped from 94 to 63 units, while destroyer tonnage fell by one-fourth. Inventory value stayed up, however, largely because of the higher costs of the new vessels with gas turbine propulsion

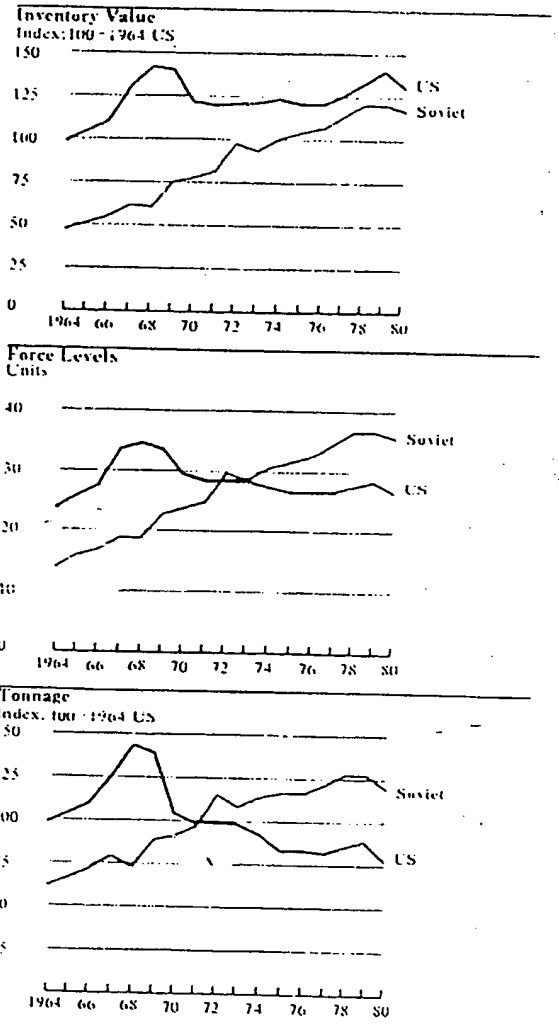
Frigates. US frigate inventory value nearly quadrupled between 1964 and 1980, remaining considerably above the fast-growing Soviet frigate inventory value. In 1980 the US value was about 80 percent higher (see figure 10). The United States maintained a greater lead in force size and tonnage than in inventory value because many of the new US frigates were built very economically

Figure 7
Trends in Indicators of US and Soviet Carrier Strength



*Based on full-load displacement

Figure 8
Trends in Indicators of US and Soviet Cruiser Strength



US figures include battleship New Jersey in 1968 and 1969

Figure 9
Trends in Indicators of US and Soviet Destroyer Strength

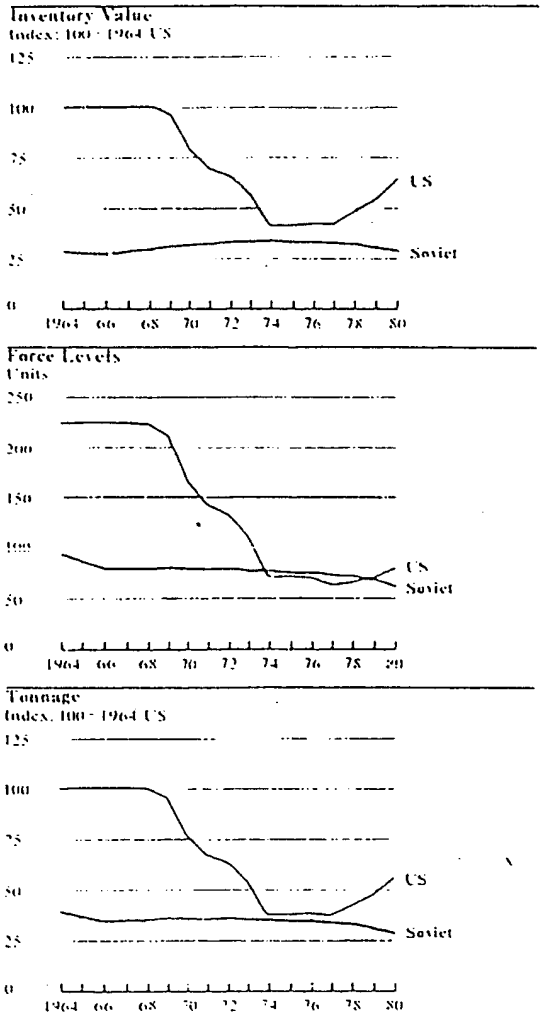


Figure 10
Trends in Indicators of US and Soviet Frigate Strength

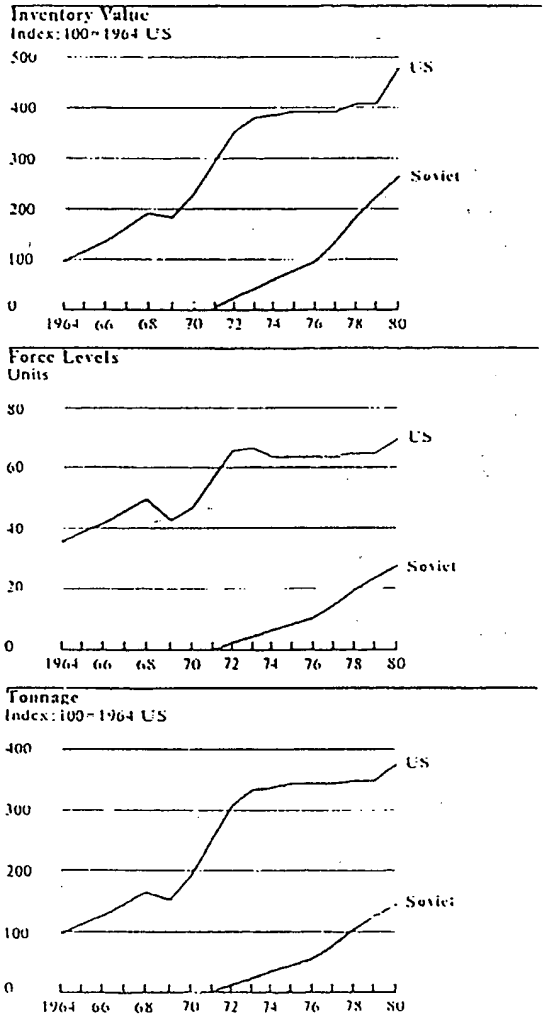
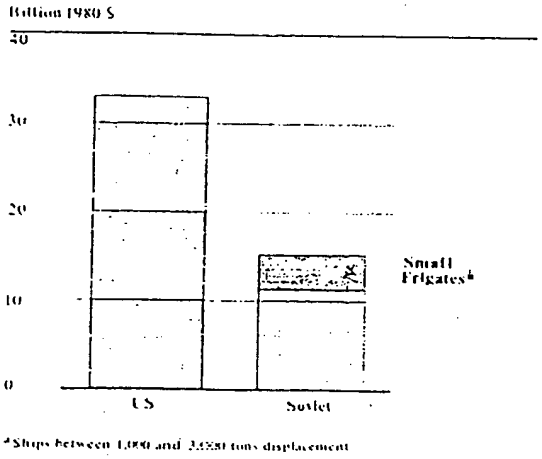


Figure 11
Inventory Value of US and Soviet Major Surface Warships and Small Soviet Frigates, 1980



[a] Ships between 1,000 and 3,000 tons displacement

Since 1964 the United States has acquired 57 non-missile frigates and 11 missile frigates and retired 34 older vessels. As a result, the US force nearly doubled in number (from 36 to 70 units), and its tonnage nearly quadrupled. No ships underwent conversion upgrading, since only two of the 70 frigates in service in 1980 had been built before 1964. The Soviet Union added 28 missile frigates and some 70 small frigates to its Navy during the period of 1971-80. The missile frigates are comparable in size to the newest US frigates and are intended for open-ocean mission

The USSR has a number of small frigates—ships from 1,000 to 3,000 tons displacement—that are primarily dedicated to coastal defense, although they are capable of open-ocean operations. The US Navy has almost no ships of this size. The Soviet small frigates are not included in this inventory comparison, but even if they were the United States would retain a sizable lead in inventory value, as shown in figure 11.

Table 2

Average Age of US and Soviet Major Surface Warships [a]

Years

	1964	1980
Aircraft Carriers		
US	15.2	19.4
Soviet	[b]	3.0
Cruisers		
US	20.9	14.2
Soviet	12.7	13.5
Destroyers		
US	15.9	13.2
Soviet	10.4	21.3
Large Frigates		
US	13.1	9.6
Soviet	[b]	3.9
Total Major Surface Combatants		
US	15.1	12.5
Soviet	10.7	15.1

[a] Average age is based on the age of the original hull, even though a number of ships have undergone conversions between 1964 and 1980. Ships undergoing conversion during the period were included in the calculations of ship age averages.
[b] The Soviet Navy had no aircraft carriers or large frigates in 1964

Age of the Forces

In 1964 the Soviet major surface warship fleet was considerably younger on average than the US force, but by 1980 the United States had the younger force—the average age of Soviet ships grew from 11 to 15 years, while that of US ships fell from 15 to less than 13 years (see table 2). The United States phased older ships out much more rapidly than did the Soviet Union, and it built more new units. In 1980 the Soviet force contained at least three dozen obsolescent cruisers and destroyers (many of which face retirement over the next several years). Among the units built before 1964 and still in inventory in 1980, fewer than a third had completed a conversion or other major upgrading. In contrast, the United States in 1980 had virtually no ships facing retirement, and about half of its older ships had been converted or otherwise substantially modernized

Figure 12
Projected Force Levels of US and Soviet Major Surface Warships

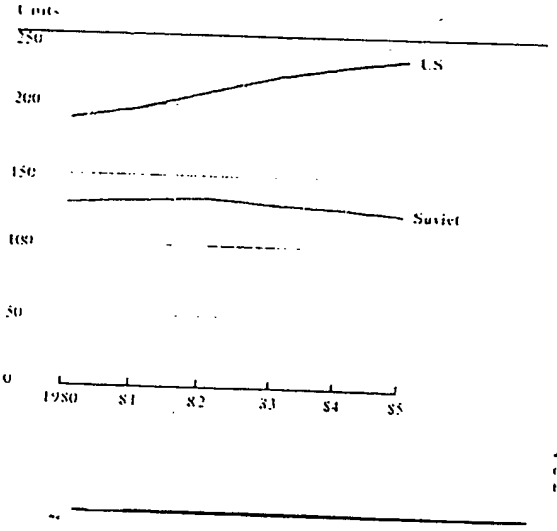
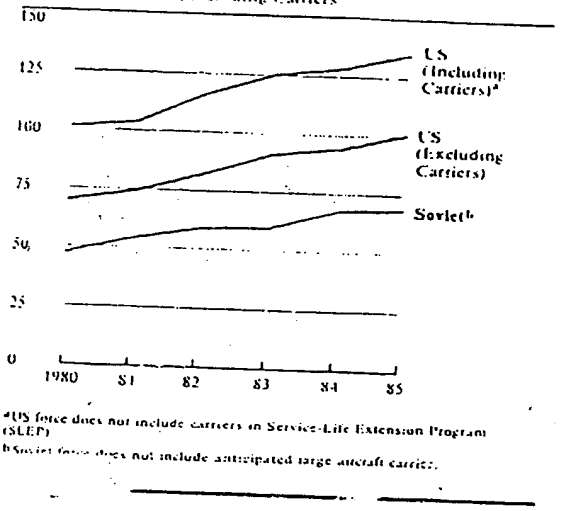


Figure 13
Projected Trends in Inventory Value of US and Soviet Major Surface Warships



[a] US force does not include carriers in Service-Life Extension Program (SLEP).
[b] Soviet force does not include anticipated large aircraft carrier.

Outlook

In 1980 the United States had almost no obsolescent major surface warships, so that virtually all of the ships to be acquired through 1985 will be net additions to the fleet. By 1985 the US force is projected to total about 235 ships, up from 189 units in 1980 (see figure 12). New units will include:

- One nuclear-powered large aircraft carrier.
- One nuclear-powered missile cruiser, which became operational in 1981.
- The first two of the new missile cruisers equipped with the Aegis air defense system.
- Two antisubmarine warfare destroyers.
- Four units of a new missile destroyer class.
- About 35 missile frigates

In addition, two reactivated and modernized battleships are expected to be operational by mid-decade. The new nuclear-powered missile cruiser is the last nuclear-powered surface combatant that the US Navy has planned to obtain. Surface warships (other than carriers) will in the future be equipped with gas-turbine propulsion, a trend which began in the mid-1970

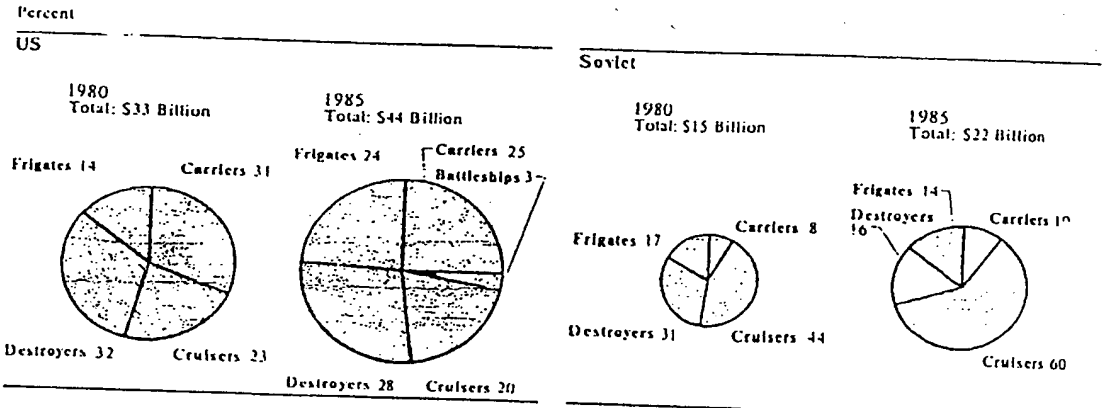
The Soviet Navy had a relatively large number of obsolescent units in 1980 and is likely to retire more units by 1985 than it acquires. Consequently, the Soviet force is expected to decrease slightly, from 129 units in 1980 to under 125 by 1985. By then, the Soviet Union is likely to have obtained:

- Two more small aircraft carriers.
- Two units of a new class of nuclear-powered missile cruisers (this count includes the one that became operational in 1981).
- About 15 conventionally powered missile cruisers, comprising three new classes.[1]
- Five missile frigates, including one unit of a new clas

[1] NATO has designated two of the new cruiser classes as destroyers.

[a] US force projections are based on the *Five-Year Defense Program: Fiscal Year 1983 Budget Submission*, dated 16 October 1981

Figure 14
Percentage Composition of Inventory Value of US and Soviet Major Surface Warships, 1980 and 1985



Values are given in constant 1980 dollars.

The 1985 US force shown here does not include a carrier in Service Life Extension Program. Soviet cruisers include two classes that NATO has designated as destroyers. If the NATO designation is used, the share of cruisers in 1985 is 48 percent and that of destroyers is 28 percent.

By the mid-1980s the US major surface warship fleet will probably be nearly twice the size of the Soviet force.* Both fleets, but particularly the Soviet force, will be substantially upgraded as the trend toward technologically more sophisticated ships continues on both sides. Soviet—but not US—ships will generally be larger than in 1980. Consequently, the inventory value of both forces will rise considerably, but the United States will probably somewhat enhance its advantage in inventory value. As before, US carriers will account for much of the difference (see figure 13).

For both navies, the acquisitions projected through 1985 will produce a considerable shift in the composition of inventory value, with the trends continuing toward frigates for the United States and cruisers for the USSR (see figure 14). The US force will increase somewhat in average age, as virtually no ships will be deactivated, and the Soviet force will become slightly younger, as retirements outnumber new units. As a result, the average age of both fleets probably will be roughly comparable by 1985 (see table 3

* This count of the US force excludes one aircraft carrier undergoing service life extension. The count of the Soviet force excludes a large aircraft carrier now being developed, which is projected to become operational after mid-decade.

Table 3

Years

Projected Average Age of US and Soviet Major Surface Warships [a]

	1980	1985
Aircraft Carriers		
US	19.4 [b]	22.3
Soviet	3.0	5.3
Battleships		
US	[c]	42.5
Soviet	[c]	[c]
Cruisers		
US	14.2	16.7
Soviet	13.5	12.4
Destroyers		
US	13.2	17.2
Soviet	21.3	22.8
Large Frigates		
US	9.6	10.6
Soviet	3.9	7.8
Total Major Surface Combatants		
US	12.5	14.7
Soviet	15.1	14.1

[a] Average age is based on the age of the original hull, even though a number of ships have undergone conversions between 1964 and 1985. Ships undergoing conversion during the period were included in the calculations of ship age averages.

[b] Excludes carrier in the Service-Life Extension Program.

[c] The US and Soviet Navies had no battleships in service in 1980; the Soviet Navy will have no battleships in 1985.

Appendix

Methodology for Costing Soviet Ships

Under the sponsorship of the Joint CIA/DIA Military Costing Review Board, a major analytic effort was begun in 1977 to study the dollar cost of constructing Soviet major surface combatants in US shipyards.

The computer-based model was designed to cost Soviet surface combatants in the 1,500-to-12,000-ton (full-load displacement) range. It calculates only the basic ship cost—the costs of weapons and sensors, reflecting Soviet equipment quality and based on the costs of US analogs, are estimated separately and added to the basic ship cost. The model costs a ship on the basis of Soviet design practices and construction schedules. Moreover, Soviet ship design characteristics and US shipyard practices in the 1950s, 1960s, and 1970s were incorporated into the model to take into account the effect of technological changes over time. For each ship class, two cost estimates are generated: a lead-ship cost, embracing the higher costs associated with the first of a kind, and a follow-ship cost, reflecting the lower unit costs associated with "learning curve" experience. The model produces costs in constant 1979 dollars. A price index was used to move the costs into 1980 dollars.