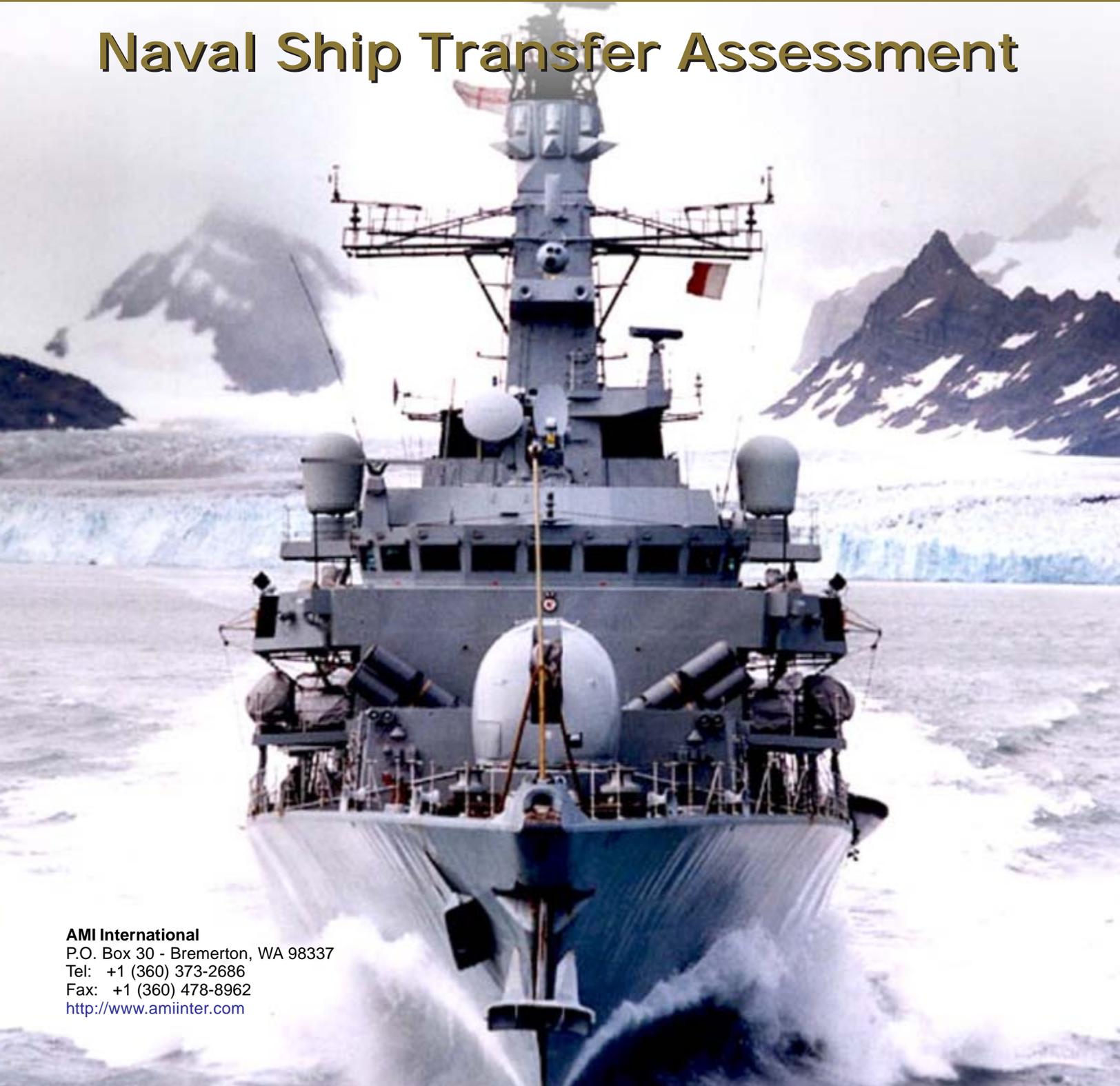




Naval Ship Transfer Assessment



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Contributors

AMI International has been assisting naval industry and governments in their international projects since 1984. We provide comprehensive naval intelligence reports and focused advisory services to our clients. AMI's clients include the world's leading navies, naval shipbuilders, and naval equipment manufacturers.

Specializing in naval issues, AMI tracks the naval industrial activities of each of the 151 countries operating an ocean-based navy. AMI focuses its attention on the future plans and projections of 65 of these navies and applies its analysis to answering the needs of governments, navies, shipbuilders and naval equipment manufacturers. No other company offers the naval community the depth and insight in the naval marketplace that is available with AMI International.

AMI International's analysts [Patrick Bright](#), [Robin Keil](#) and [Rick Dorn](#) created this Naval Ship Transfer Assessment in order to provide a comprehensive look into the future of the used ship market. This report forms a basis from which Government and Navy clients will be able to best determine the roadmap for the re-capitalization of their fleets. Additionally, for our naval shipbuilder and naval systems clients, this report serves as a forecasting tool to better determine how and where these transfers will occur.

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Executive Summary

The general complexity and high-cost of contemporary naval ships, together with their inherent long life (up to 40 to 50 years), creates the motivation for the transfer of used naval ships from one nation to another. The factors that have driven the used naval ship transfer market over the last several decades include:

- The end of the Cold War and the desire for a peace-dividend.
- The re-capitalization of naval fleet assets after the fall of the Berlin Wall.
- The resulting continuous decline in naval ship new construction funding since the mid 1980s.
- Changes in global threats and the global economy.

These changes that have occurred the last two decades have had a profound impact on the size and make-up of many of the world's fleets, and subsequently the increased activity in the transfer of used naval vessels.

Faced with the reality of used naval ship transfers, both recipients and transferors seek to gain some advantage in these transactions. Used naval ship transfers serve:

- To enhance political relations.
- To ensure inter-operability between two nation's naval fleets.
- To support or further security assistance from one nation to another.
- To cement a naval new construction export contract.

While the political and defense relations impact of naval used ship transfers is positive in almost every respect, its economic impact on worldwide naval shipbuilding is negative. It serves to reduce demand, increase competitive rivalry worldwide, and therefore places a significant financial demand on nations desirous of maintaining a strategic naval shipbuilding industrial base. For example, since the late 1990s, three of the five leading European naval new construction export nations have witnessed significant declines in export orders: United Kingdom, and to a lesser degree Germany and France.

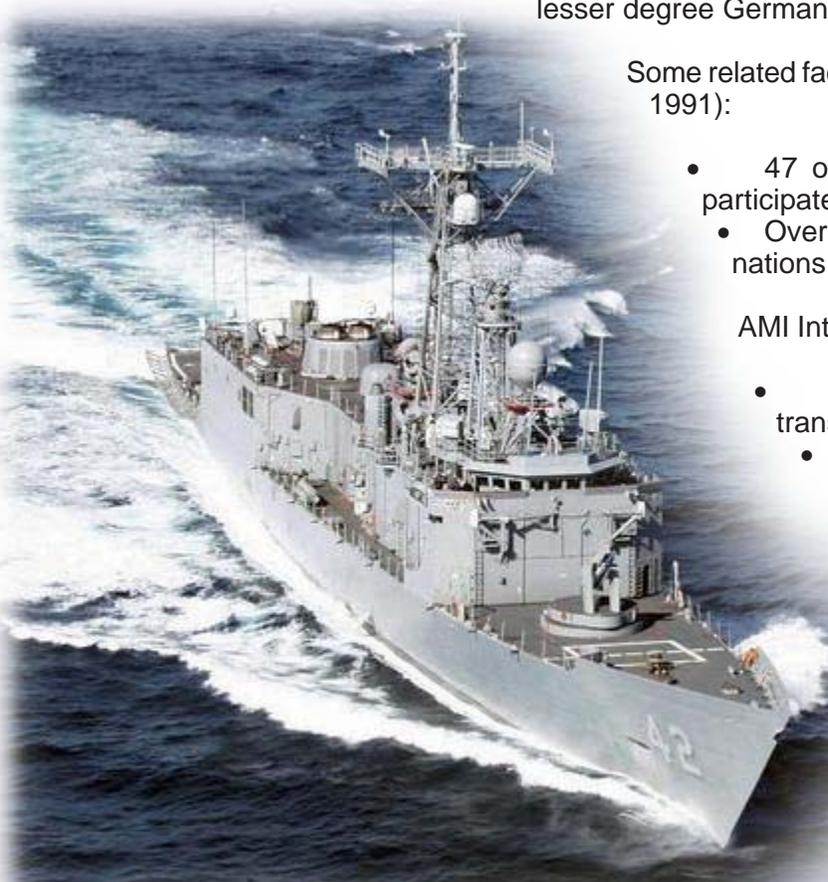
Some related facts on the used naval ship transfer market include (since 1991):

- 47 of the 151 ocean based navies of the world have participated in the transfer of used naval vessels since 1991.
- Over 500 vessels have been transferred between these 47 nations since 1991.

AMI International's forecast:

- AMI anticipates a significant increase in activity in the transfer of used naval vessels over the next decade.
- AMI forecasts a significant demand in Frigates and Fast Attack Craft sized vessels that will drive specific transfers in these market segments.

AMI estimates that the naval used ship transfer market is valued at approximately US\$8 - 12 Billion for the 10 year period between 2005 and 2014.



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Introduction

Purpose of This Report

AMI International created this Naval Ship Transfer Assessment in order to provide our Government and Navy clients a basis from which to determine the best way ahead for the re-capitalization of their fleets. Additionally, for our naval shipbuilder and naval systems clients, this report serves as a forecasting tool to better determine how and where these transfers will occur.

The report examines the major considerations that drive the 151 ocean-based navies into choosing between used naval vessel versus new construction in fulfilling the re-capitalization needs of their respective fleets. Highlights include industrial, financial and market forces used in determining how navies will fulfill their future fleet requirements. Additionally, this report assesses the prospective suppliers as well as recipients in the market place, and contains a detailed breakdown on possible transfers and procurement options for individual countries and ship types.

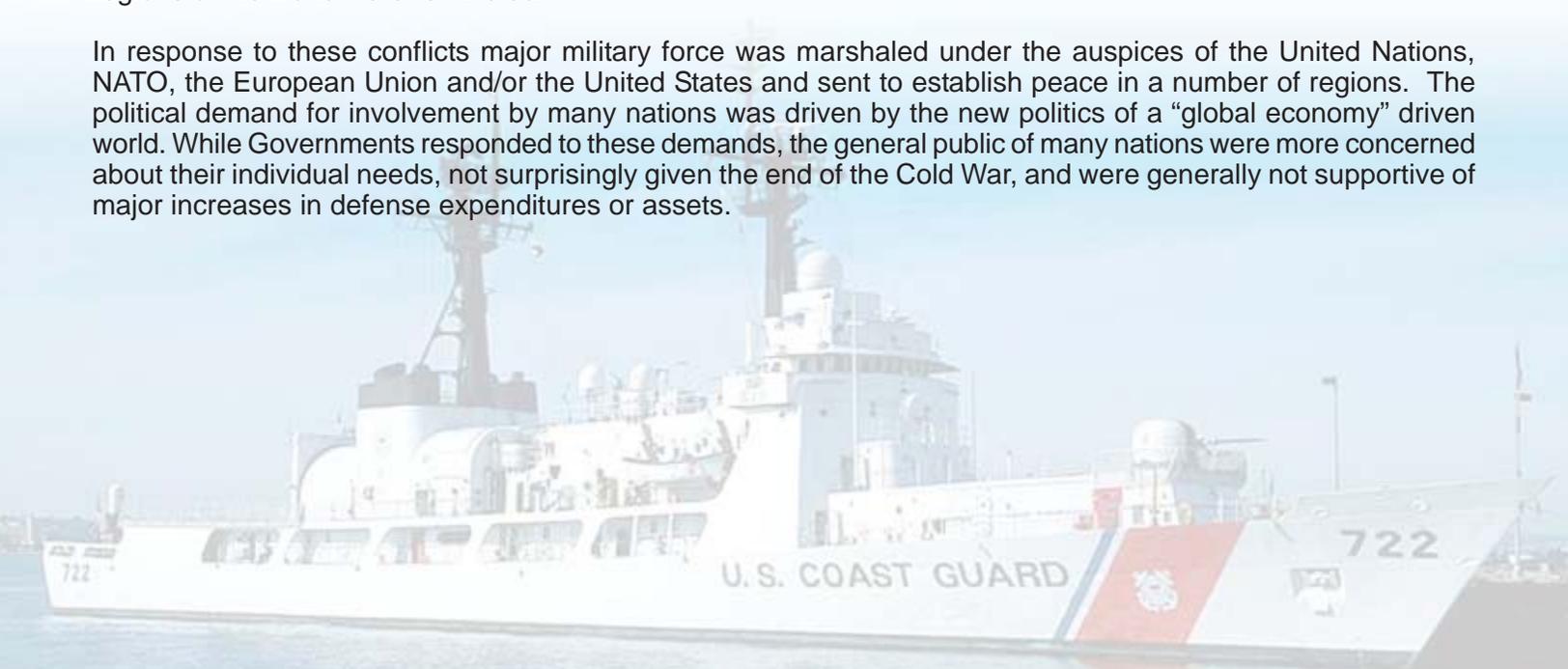
Today's Environment

As stated in the Executive Summary, significant changes brought about by the end of the Cold War along with other changes in global threats and the global economies have had a profound impact on the size and make-up of many of the world's fleets, and subsequently the increased activity in the transfer of used naval vessels.

The end of the Cold War brought about major political shifts worldwide that significantly impacted almost every nation. Subsequently, the armed forces of the world were compelled to reflect the realities of the new post Cold War political landscape. As a consequence, "Peace Dividend" became the buzzword of the decade and generally defense budgets worldwide became smaller. Both North Atlantic Treaty Organization (NATO) as well as former Warsaw Pact nations found themselves looking for opportunities to reduce their operational defense assets in order to fulfill this demand for a peace dividend in terms of reduced defense procurements and defense assets operating costs.

However, the 1990s did not bring worldwide peace and the pay-out of the peace dividend was short-lived. Underlying long-term regional conflicts, long stymied by the bi-polar influences of NATO and the Warsaw Pact, began to surface and take center stage in the minds of a nation's public. Further, underlying desires for regional hegemony in some nations also found the opportunity to be acted upon. The result was that numerous conflicts in many regions of the world were re-kindled.

In response to these conflicts major military force was marshaled under the auspices of the United Nations, NATO, the European Union and/or the United States and sent to establish peace in a number of regions. The political demand for involvement by many nations was driven by the new politics of a "global economy" driven world. While Governments responded to these demands, the general public of many nations were more concerned about their individual needs, not surprisingly given the end of the Cold War, and were generally not supportive of major increases in defense expenditures or assets.



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Therefore, these conflicts, unexpected and unplanned for by politicians and not generally supported by local constituents, made the expression “do more with less” very real for most armed forces.

The prolonged occurrence of these regional conflicts, as well as the current War on Terrorism, declared by the United States, has prompted many countries to reevaluate their country’s contribution to peacekeeping operations. During the course of this re-evaluation most are taking the opportunity to also restructure their naval forces in an effort to better meet the future needs of their nation.

The Environment’s Impact on Naval Ship Transfers

These reviews, for the most part, have not generated any increases in funding or additional political support for re-capitalization efforts of naval forces.

Rather, a result of their review has been that some members are seeking to limit their support to specific capabilities within a naval reaction force vice giving broad support. The goal continues to be reducing the overall size of their fleet and the corresponding expenditures. For example, the Netherlands decided to give up its maritime air patrol capability but committed to improving its area anti-air warfare contribution.

The first consequence of this process of reducing fleet sizes has meant there has been a steady flow of very capable warships of all types made available since 1991. As can be seen in the figure below, the average number of ships transferred each year has been approximately 50. The spike in ship transfers in 1996 reflects the creation of the Ukrainian Navy after separation from the Commonwealth of Independent States (CIS) and receipt of naval vessel transferred from the Russian Navy. If we isolate the Ukrainian receipts from the rest of the transfers we see average annual transfers of approximately 40 ships per year, with an overall downward trend in since 1993.

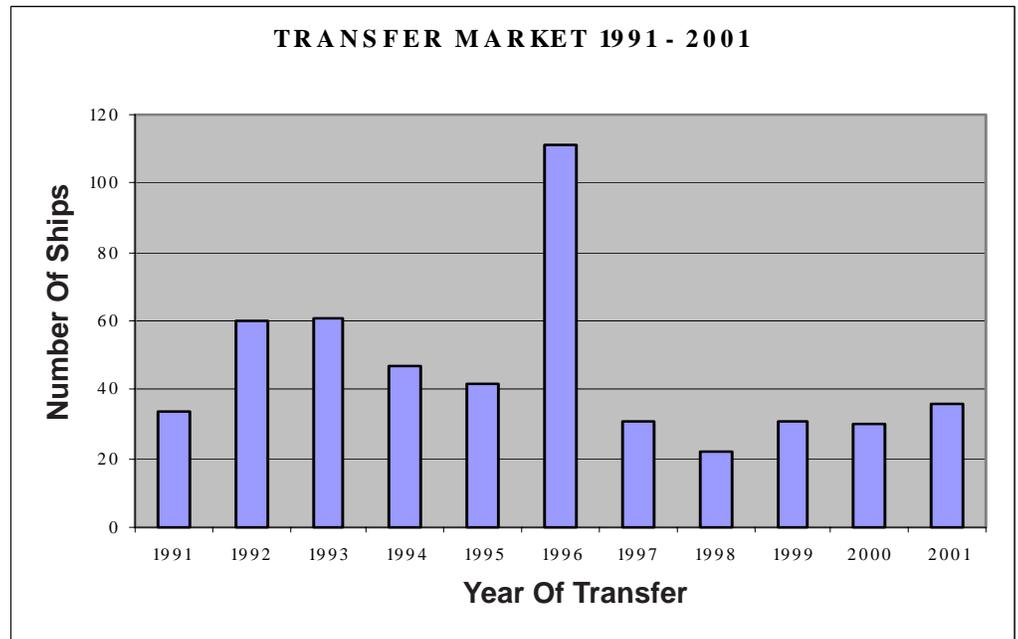


Figure 1 – Past Naval Ship Transfer Market

Factors Driving Naval Ship Transfer Market

Transferors

Strong Support for New Construction
The economic stimulus advantages of naval new construction by industrialized nations drive the payoff and disposal of costly-to-operate fleets assets.

European naval niche missions
Several European navies are beginning to give up mission areas in order to focus their resources for greater efficiency.

Changes in perceived threat
Some navies are beginning to re-shape their fleets based on changes in perceived threats.

Recipients

Lack acquisition capability
Numerous nations have lost the ability to effectively acquire new construction vessels, even though they have the ability to build naval vessels.

Lack complex naval construction skills
Some nations have yet to fully create complex naval combatant construction capabilities. These nations are generally selective in what types of used vessels they will procure (e.g. submarines).

Lack economic and/or industrial ability
Most of the world’s 151 ocean-based navies lack the economic and/or industrial ability to acquire and build naval vessels, yet these nations have perceived needs.

However, AMI’s assessment suggests that this downward trend in the availability of used ships is shifting. There is a new wave of ships that are being retired early and being offered on the world used ship market meeting the corresponding demands by many of the world’s 151 ocean-based navies whose fleets require re-capitalization.

Figure 2 - Factors Driving Naval Ship Transfer Market

As can be seen by this decline in new construction efforts in conjunction with a corresponding immediate demand for re-capitalization of many of the world's navies, the used international market is becoming a very attractive option. The graphic below depicts the 80% decline in Surface Combatant commissionings worldwide from 1982 through 2001. This graph also demonstrates the current upswing in surface combatant commissionings through 2010, suggesting that a corresponding number of additional used ships will become available on the international market.

At the end of 1996 there were approximately 17,500 ships afloat in the 151 navies around the world. It is anticipated this large number will become smaller as more ships are decommissioned than are built as a result of the large number of ships that will be older than forty years at the turn of the century. Additionally, today's warship is significantly more complex, and therefore more expensive, than those being replaced. As a result, new construction programs today seldom replace existing classes on a one-for-one basis.

As the larger naval powers of the world continue with their re-capitalization efforts, the smaller navies will likewise continue to plan their own re-capitalizations albeit in much more politically and economically constrained situations. Of the 151 ocean-based navies, approximately eighty-five can be considered "coastal navies." That is, due either to their political situation, economic condition, and/or limited resources, they generally have neither the shipbuilding capacity nor the technological know-how to

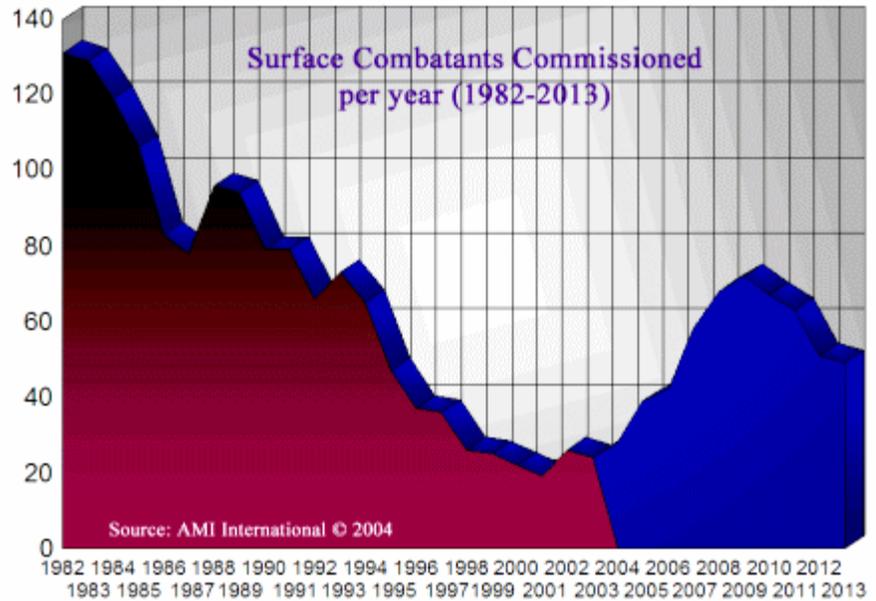


Figure 3 - Surface Commissionings 1982-2013

successfully start and finish any major naval new construction procurement of their own. These navies are more or less forced down the road of holding existing forces for an inordinate period of time, initiating limited modernization programs (i.e. engineering upgrades), and into buying younger used vessels to replace older used vessels.

Even though every navy of the world faces their own political realities, there continues to be, and always will be, a major push for the maintenance of their respective national fleets, whether it be through new construction programs, the procurement of used vessels, or the modernization of the existing fleet. Worldwide, there are about seventy navies, which are actively planning re-capitalization efforts for the next twenty years. In total, there is a requirement each year for approximately one hundred forty new naval vessels (over 100 tons) worth about US\$30 billion annually.

No matter what the requirements are, a navy must take one or more of the following actions to meet its nation's needs.

- First is the capitalization through the procurement of new vessels, whether constructed indigenously or by a foreign source.
- The second option is the continuance of modernization programs of an existing fleet; and
- The third option is through the procurement of used vessels, the focus of this report.

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Keeping this in mind, this report will concentrate on the following areas:

- **Fulfilling a Navy's Requirements:** Discusses the general trends of the naval market and the primary factors that will determine the probability of which direction a Navy will take in its re-capitalization efforts.
- **Predicting the Re-capitalization Ability of a Fleet:** A discussion of the factors that must be taken into consideration by every navy before making their recommendations to the Ministry of Defense.
- **Procurement of New Ships:** A discussion as to why a navy makes the decision to procure new vessels as a way of re-capitalizing its fleet.
- **Modernization of Existing Vessels in Inventory:** A discussion of why a navy will continue to modernize its own naval forces, vice re-capitalizing the existing fleet through the procurement of new ships or used ships from the international market.
- **Procurement of Used Ships from the International Market:** Discussion on why a navy will focus its efforts on procuring naval vessels from the used international market vice the procurement of new ships or the continued modernization of its existing fleet. Further, this section discusses the cost and impact factors of a navy that procures naval vessels from the used international market.
- **Historical and Prospective Suppliers:** A very limited number of navies maintain their ships well enough as well as decommission them early enough for the ships to be of any value to another navy. This section reviews the current and future suppliers of used ships for the international market.
- **Historical and Prospective Recipients:** A short review of those countries generally constrained to accept used ships.
- **Assessment – By Vessel Type:** This presents a detailed breakdown, by ship class, of those ships that will likely be made available on the used ship market in the next ten years. Associated with the text is an Excel listing of the individual ships with some characteristic information.



1.0 Trends and Predictive Factors

1.1 Trends in Worldwide Naval Procurement

Prior to beginning the analysis of a navy's particular requirements, it will help to outline the broad political and economic features of the current environment as they impact on naval new ship construction.

As previously mentioned, the end of the Cold War created major political shifts. Rather than continuing with a world dominated by two super powers that threatened each other with nuclear destruction, today, each country and its leaders are pursuing their own defense policies.

Across the European continent, the North Atlantic Treaty Organization (NATO) as well as the former Warsaw Pact nations have elected to reduce their operational defense assets. With the belief that a peace dividend should be realized, and the perception that the need for heavily armed forces had diminished; most nations have found it hard to justify a continuous re-capitalization of its armed forces, including naval forces. Due to these beliefs, general support for a modern navy has been eroding.

Some countries, recognizing the change in circumstances as an opportunity, have chosen to develop a more self-reliant policy for defense. These countries have conscientiously chosen to develop their own defense industry and to seek a well-balanced naval force that ensures safety for their country as well as establishing themselves as a regional power. Countries that have elected to take this path include Japan, South Korea, China, India, Singapore and Turkey. It is important to observe that apart from Turkey all other regional aspirants are found in Asia.

A direct result of these changed priorities is a leveling off in naval spending in Europe and a growing naval budget in the Asia-Pacific region.

In fact, within the next five years, the Asia-Pacific region will become the largest market for naval new ship construction surpassing both the USA and Europe.

The remainder of the navies of the world have begun to shift their primary naval mission from war-fighting to Economic Exclusion Zone protection, which is deemed to be more important to the nation. Essentially, countries have redirected their efforts as the issues of economic security and resource allocation take on more of a prominence in defense planning. Many nations today, ranging from developed to developing have begun to shift their national priorities to fulfill the following objectives:

- Participate and expand their benefits from the growth of the global economy.
- Expand the protection of their resources (internal and external)
- Protection of their Exclusive Economic Zone (EEZ) resources.
- Maximize their security in a regional sense either by contributing to a larger coalition force (NATO, UN) or by establishing/maintaining an independent credible force.
- Assert influence where possible (regionally or globally).

Almost every ocean-based country views the importance of a modern navy, in fulfilling the new world objectives, as fundamental. Major factors influencing this thinking are:

- 75% of the Earth's surface is ocean.
- The majority of world trade is ocean-based.
- Ships are still the most-cost effective mode of transportation
- Sea routes must be protected to ensure continuous flow of trade goods
- Each country's Exclusive Economic Zone (EEZ) is a potentially large economic resource.
- Maritime warfare has a long and well-documented history.
- Sea power is still a paramount requirement to meet many of the objectives in the world today.
- Sea power is often perceived as a reflection of a nation's maturity and prestige.

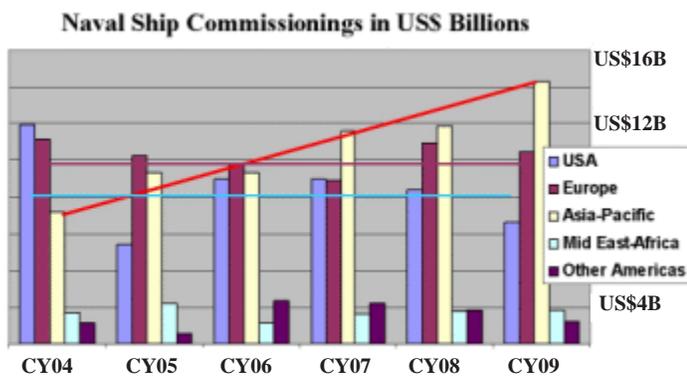


Figure 4 - Market of the Future

1.2 Predicting the Re-Capitalization Abilities of a Fleet

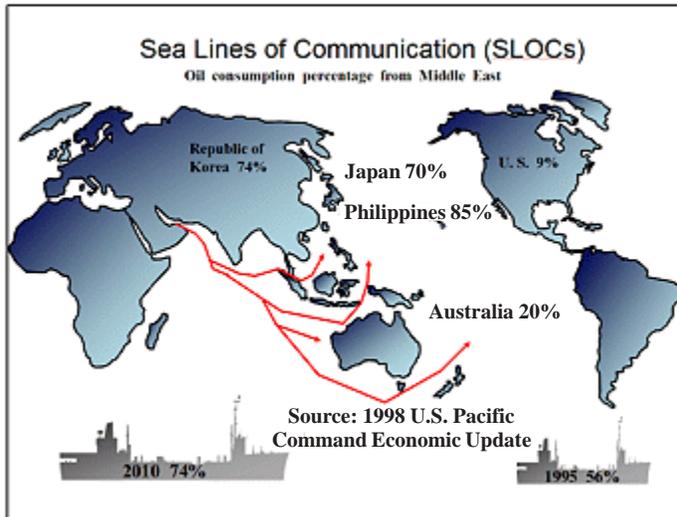


Figure 5. The importance of protecting Sea Lines of Communication (SLOC) is evidenced by the flow of oil from the Middle East to Asia and the United States.

It must also be understood that even in the new era, nations still realize the importance of a modern navy, and even more so, the development of an indigenous shipbuilding capability and the economic benefits that it brings. The primary drivers affecting the supply and demand for naval new construction vessels in the world today include:

- Changes in the global security environment that impact the need for more/less national defense capabilities, or restructuring of existing defense capabilities.
- Shift in perceived mission. Be it from blue water to littoral war-fighting and/or to ocean management and EEZ protection.
- An increase in the number of countries with an indigenous shipbuilding capability, e.g. United Arab Emirates.
- Expansion of existing indigenous shipbuilding capabilities, e.g. Singapore's ability to build LSTs and frigates.
- Availability of surplus naval units from larger navies that are currently re-capitalizing.
- The economic strength of a country and the ability to fund a defense budget large enough to support the maintenance of indigenous industrial capabilities required for a modern navy.
- Significant competitive rivalry in naval ship export contracts.

Particular circumstances that have a major impact on a navy's re-capitalization effort vary from country to country.

- The country's geo-political perceptions of the importance of a navy in meeting its priorities and objectives. This is directly reflected in the political and financial commitment.
- The ability of the country's navy to accurately identify naval force requirements based on the country's priorities and objectives.
- Economic importance of the indigenous shipbuilding capability or repair capability.
- The balanced development and maintenance of the required naval industrial capability to design, construct, and maintain the naval force level identified by the navy.
- The navy's commitment to operational proficiency (trained, professional, maintained).

Each of the world's 151 ocean-based navies is subject to these key factors. However, as the importance of each factor differs for each navy, the resulting requirements for new fleet assets are unique for each country. The next section proposes a model for predicting a navy's requirements for new fleet assets, an effort to move from the general to the particular.

1.2.1 Case Study in Fleet Re-capitalization

AMI International has developed criteria over the past decade to assist in determining the likelihood of which particular route a nation will choose in its re-capitalization efforts. The five factors that have a major effect on a nation's decision include:

- National commitment and supportive policy.
- Economic ability and commitment.
- Investment in technology/industrial capability.
- Establishment and maintenance of infrastructure.
- Operational proficiency.

In order to give the reader a better understanding of the application of these factors for determining a navy's re-capitalization ability, this subsection will discuss the five countries below. It must be noted that while these criteria are general in nature and that specific circumstances will undoubtedly play a role, it is the combination of these factors that will help establish an answer:

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Figure 6 – Re-capitalization Factors

Metrics	Japan	Brunei	Bangladesh	South Africa	Brazil
National Commitment	***	***	*	***	*
Economic Ability	***	***	*	**	*
Tech/Industrial Capability	***	*	*	*	**
Support/Infrastructure	***	**	*	**	**
Operational Proficiency	***	**	*	**	*
Role of the Navy	Blue water	EEZ	EEZ	Regional	Regional

*** High, ** Moderate, * Low level of commitment and/or ability

As evidenced in the table, Japan overall has the highest level of commitment for the re-capitalization of its fleet through the procurement of new platforms. There is a continuous commitment from the government and general population to maintain a modern navy. Additionally, Japan realizes the strategic importance of a modern shipbuilding industry and the benefits that it receives from such an endeavor. Japan will not only procure new naval platforms, but, will also realize the benefit from indigenous construction of its entire fleet within its own borders. Further the Japanese Navy has the infrastructure to maintain the operational capabilities of its fleet through modern maintenance facilities and highly trained personnel. Japan has elected to build a blue water capable fleet that can travel around the world and participate in operations wherever the government decides it is necessary.

Brunei and South Africa have the national commitment to maintain an appropriately sized navy, however, they consciously have made the decision not to develop the technical and industrial capacity to build their own navy. Therefore, these navies are excellent candidates for export sales of new ships. However, it is extremely expensive to build and maintain a navy with only new construction vessels, therefore, these nations will use a mixture of new vessels, used vessels from the international market, as well as modernization programs for their existing inventory. Brunei has chosen to focus its efforts in the protection of its EEZ. South Africa in contrast has decided to become a regional

power. As such it is acquiring a broader range of ship types than Brunei to include submarines.

Bangladesh and Brazil sit at the opposite end of the spectrum with a low level of commitment to re-capitalization of the fleet. The majority of their respective fleets are procured through the international market of used vessels. However, it must be noted that even though both navies are currently primary recipients of the used vessel market, their situations are considerably different. Bangladesh on the one hand, has a stagnant economy and industrial base, whereas Brazil has an expanding economy and is improving on its industrial base and shipbuilding industry.

The key factor is that there is a greater commitment by the Brazilian government, although it is slow in maturing. Bangladesh has little economic resources for such an endeavor and situated next to a major naval power its primary focus must remain on protecting its EEZ. Brazil will continue to be a dominating regional force.

The capability of the infrastructure to handle major maintenance issues can also come into play in the country's decision to modernize its fleet rather than acquire new ships. Without an infrastructure in place then new ships or used ships are about the only options.



Italian Aircraft Carrier Conte diCavour under construction, November 2003

Photos Courtesy Of:

- Cover: United Kingdom MOD
- Page 3: Netherlands MOD
- Page 4: United States DoD
- Page 5: United States Coast Guard
- Page 8: United States DoD
- Page 11: Italian MOD

2.0 Fulfilling a Navy's Requirements

As discussed in the previous section, each navy will re-capitalize its respective fleet in one of three manners that best fits the nation's ability based on the five factors examined above. Re-capitalization options include the procurement of new ships, modernization of existing vessels in inventory, procurement of used vessels from the international market, or a combination of the three.

2.1 Procurement of New Ships

As discussed earlier in this report, the procurement of new vessels as part of a re-capitalization effort requires the right combination of commitment and ability of a nation to carry out such a task. The most important factor influencing the number and type of ships that will be acquired is the role of the navy. There are four roles that will be discussed.

2.1.1 Small Coastal Navies

For the majority of countries the naval force performs the duties of a coast guard and as a consequence generally has no need of a variety of ship types including mine countermeasure vessels, submarines, large auxiliaries, large amphibious ships or large surface combatants. Approximately eighty-five countries fall into this "small coastal" navy category.

While a number of these countries have a large EEZ to patrol, they have yet to establish the national commitment necessary or to have dedicated the necessary economic resources that would generate a regular re-capitalization program. As a result, those countries with some minimal shipbuilding capacity may buy new small patrol craft or boats from local shipbuilders on an irregular basis, but, for the most part, these countries are recipients of second hand ships, either purchased from or donated by larger navies after political reflection.

2.1.2 EEZ Focused Navies

The next category of navies to be considered is that of those with a strong focus on their responsibility for patrolling their EEZ. These countries have an established navy and generally a regular, if limited, budget to maintain their navy. However, the navy of these countries is not so large that a regular budget has been established for the acquisition of new ships. Hence, the acquisition of new ships is a very serious political and economic issue. All six re-capitalization factors must be weighed carefully in predicting the outcome. If the budget can be found or indigenous shipbuilding capabilities can be enhanced then new construction will be preferred, however, the majority of ships will be acquired used.

SMALL COASTAL			
Albania	East Timor	Jamaica	St. Vincent
Angola	El Salvador	Kenya	Samoa
Anguilla	Equatorial Guinea	Kiribati	Senegal
Antigua	Eritrea	Latvia	Seychelles
Bahamas	Estonia	Lebanon	Sierra Leone
Barbados	Faroe Islands	Lithuania	Slovenia
Belize	Falkland Islands	Madagascar	Solomon islands
Benin	Fiji	Maldiv Islands	Sudan
Bermuda	Gabon	Malta	Surinam
Serbia/Montenegro	Gambia	Marshall Islands	Syria
Cambodia	Georgia	Mauritania	Tanzania
Cameroon	Ghana	Mauritius	Togo
Cape Verde	Grenada	Micronesia	Tonga
Comoros	Guatemala	Mozambique	Trinidad
Congo, Republic of	Guinea	Myanmar	Turks, Caicos
Cook islands	Guinea Bissau	Namibia	Tuvalu
Costa Rica	Guyana	Nicaragua	Vanuatu
Cuba	Haiti	Palau	Virgin Islands
Cyprus, Republic of	Honduras	Panama	Yemen
Djibouti	Iceland	Papua New Guinea	
Dominica	Iraq	St. Kitts/Nevis	
Dominican Republic	Ivory Coast	St. Lucia	

Figure 7 - Small Coastal Navies

EEZ FOCUS			
Algeria	Ecuador	New Zealand	Tunisia
Bahrain	Finland	Nigeria	Ukraine
Bangladesh	Ireland	Oman	Uruguay
Belgium	Korea, North	Peru	Venezuela
Brunei	Kuwait	Philippines	Vietnam
Bulgaria	Libya	Qatar	
Colombia	Mexico	Romania	
Croatia	Morocco	Sri Lanka	

Figure 8 - Navies with an EEZ Focus

2.1.3 Regionally Focused Navies (Alliance Participation)

The third category to be addressed is labeled Regional – Alliance Participation. All of these countries have greater or lesser shipbuilding capability, but the important factor is that a naval defense industry has been established in the country. For this reason there is a much greater propensity for these navies to acquire new ships turning government spending directly into jobs. However, while these navies may acquire more ships over a period of time than the EEZ-focused navies, much like their brethren they often lack a regular budget line in their budget for new acquisition.

REGIONAL - Alliance Participation			
Argentina	Indonesia	Pakistan	South Africa
Brazil	Iran	Poland	Sweden
Chile	Israel	Portugal	Taiwan
Denmark	Malaysia	Saudi Arabia	Thailand
Egypt	Norway	Singapore	Turkey
Greece			United Arab Emirates

Figure 9 - Regionally Focused Navies

In predicting the outcome of new ship versus used, special attention needs to be paid to two aspects. As mentioned before the nations captured in this category are simply a picture of the moment, it does not reflect whether their national requirements are moving their navy towards another category or not. The second aspect is the country's infrastructure. For example, since the end of the Cold War, the requirement for Portugal as a member of NATO to conduct Atlantic patrols with its submarines or its major surface combatants, has disappeared. As a member of NATO it still participates in joint operations but its national requirements vice its NATO requirements are all EEZ focused. As such the nation is reluctant to expend funds on new ships other than Offshore Patrol Vessels (OPV), which can benefit its limited infrastructure. Portugal is a prime candidate for used ships other than OPVs. Singapore illustrates the case of a navy that is moving towards blue water capability with an infrastructure seeking to grow. Singapore will only be buying new ships.

2.1.4 Global/Blue Water Navies

The fourth and last category is labeled – Blue Water – Global. This includes countries that are presently sailing the world over and those that have the capability. These nations have the full ability to re-capitalize their fleets on a continuous basis due to the right circumstances. As an example, many European naval powers, the United States, Japan, and Korea possess the entire

realm of capabilities and commitments that are required to maintain a modern fleet, regardless of the economic circumstances. Political support, a developed economy, investment in technology, infrastructure, and understanding the fundamentals of naval procurements are prerequisites for successful naval procurements of new vessels.

GLOBAL Forward Presence	BLUE WATER
France	Australia
United Kingdom	China
United States	Canada
	Germany
	India
	Italy
	Japan
	Korea, South
	Netherlands
	Russia
	Spain

Figure 10 - Global/Blue Water Navies

For more details on the procurement of new ships as a method of re-capitalization, consult AMI International's "Worldwide Naval Projections Report™".

2.2 Modernization of Existing Vessels in Inventory

The second method in the re-capitalization options, it was concluded that some nations would use several methods in order to maintain a modern fleet, including the modernization method. Most navies, whether global, blue-water, EEZ or coastal perform some type of modernization effort to extend the lives of their respective fleets. No nation is exempt as funding limitations are virtually an issue for all military and naval forces.

However, navies fund modernization programs for different reasons. Some of the driving factors that lead a navy to modernize its existing fleet include:

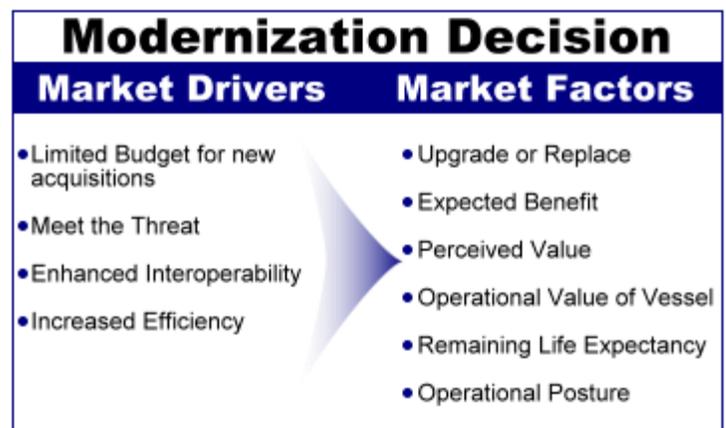


Figure 11 - Modernization Decision

2.2.1 Budget Limitations

Budget limitation is probably the most significant factor in any naval procurement. Persistent severe budget limitations are a major factor in driving a navy to a modernization solution vice a new ship procurement solution. No navy is exempt from this reality and if a modernization effort is chosen over the new or used ship procurement alternatives, budgeting will also be considered in the degree of modernization, i.e. whether specific systems on a vessel are left untouched, overhauled, upgraded or actually replaced with a substitute or more capable system.



Venezuelan Lupo Class Frigates
undergoing modernization at
Northrup Grumman
(Ingalls Shipbuilding)

driver in any modernization effort, and will generally include faster computer systems for more efficient use of sensor and weapon systems. Another form of increased efficiency is redesigning or re-equipping the ship in order to reduce the manning level. The ability to replace with ease a large portion of a combat or electronic system as well as the corresponding platform changes or reduce manning will be a major factor in whether a sea service will modernize or explore other procurement alternatives such as new or used ship acquisition.

2.2.2 Meet the Threat

Most modernization efforts are concentrated in this category as navies typically modernize in order to stay abreast of current and future changes that are taking place in the naval warfare arena, or changes in a navy's mission requirements associated with a geopolitical shift or evolving threat. As an example, many navies today are incapable of defense against the most modern anti-ship missiles or torpedoes that have entered the market in recent years. Additionally, nations such as Singapore and South Korea continue to change their respective naval requirements as a result of perceived evolving threats directly resulting in the acquisition of additional capabilities.

2.2.5 Case Study in Modernization

As stated above, most navies perform some form of modernization effort in order to extend the service lives of their respective fleets to the maximum extent possible. There is however, one exception to the rule, Japan. The shipbuilding industry in Japan is considered extremely important to the national economy (as evidenced by the Commitment/Ability table) due to the significant naval force requirements of Japan. For this reason, the Japanese Government is fully committed to keeping an active naval shipbuilding program in force. The result is that one ship class immediately follows its predecessor keeping the industry fully active. This conscious decision to maintain a steady flow of new construction obviates the need for modernization of the existing fleet. As an example most Japanese naval vessels decommission at the 20-25 year anniversary as originally planned when built.

2.2.3 Enhanced Interoperability

Modernization efforts to extend the life of a naval vessel usually include interoperability issues. However, in some cases, such as sea services of regional, blue-water or global stature, interoperability becomes a crucial issue. Most of these navies operate with other organizational or ad hoc alliances and require some type of modernization effort to ensure interoperability is achieved. As an example, new NATO navies such as Poland or Romania had to undergo significant modernization efforts to operate with NATO's existing members. Additionally, every navy also faces internal interoperability issues as it modernizes with equipment from various suppliers.

Metrics	Role of the Navy	Modernization Programs
South Africa	Regional	Warrior Class FAC
Brunei	EEZ	Waspada FAC Class
United States	Global	Oliver Hazard Perry Class Frigate
United States	Global	Ticonderoga Class Cruiser

Figure 12 - Example Modernization Programs

2.2.4 Significant Increases in Efficiency

A final factor that must be considered in any modernization effort is the ability to increase efficiency at all levels. Efficiencies must be considered a major

South Africa, as a regional navy for example, has modernized its Warrior class Fast Attack Craft (FAC) program in the past in order to extend the lives of its FAC force until suitable replacements could be acquired. Funding limitations was the primary motivator in this endeavor as the South African Government was

attempting to fund a new submarine and frigate program at the same time.

Brunei, with an EEZ focus, funded the modernization of the Waspada class FAC in order to address perceived shortfalls in the Navy's ability to defend its EEZ and offshore oil platforms. Rather than funding being the issue, Brunei began to perceive an evolving threat in the Spratly Islands region due to operations by the Chinese and Philippine Navies close to its vital offshore oil platforms.

The United States, as a global navy, has proven that naval budgets are not limitless. Even with the technological and economic prowess that it possesses, the United States Navy also continues to utilize the modernization method to extend the service lives of its vessels. Unlike South Africa and Brunei, the United States Navy utilizes the modernization method due to all four factors listed above (budget limitations, meeting the threat, enhanced interoperability, and significant increases in efficiency).

As evidenced by the example in Figure 12, most navies regardless of size or sophistication typically perform some type of modernization effort in order to extend the lives of their current naval inventory.

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Norwegian Storm class patrol boat transferred to the Latvian Navy.

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2.3 Procurement of Used Vessels from the International Market

As the third option, the nations that are generally able to re-capitalize their respective fleets by procuring new vessels, are usually in a position to offer their used vessels on the international market. Many nations do not have all the pieces of the puzzle to procure new vessels from foreign sources and will usually be the recipients of used vessels from the used international market. These navies generally lack some or all of the following criteria listed below:

- Political support at the national level does not exist (it is not wholly understood as to what benefits a navy may provide to the country).
- An economy that is not developed or is not stable for any length of time.
- Little incentive for investment in military technology.
- No support for the development of a modern shipbuilding industry.
- The navy has little or no experience of the new ship procurement process.
- The navy has a very limited infrastructure to maintain the fleet, train its personnel, and operate proficiently.

2.3.1 Examples of Used Ship Procurements

The navies that match the criteria as listed above include many of the 151 ocean-based navies, which are primarily located in the Pacific, Africa, South America and some of the new ex-Soviet states establishing their own naval force. However, for purposes to better understand the fundamentals of this marketplace, the following examples present the issues within the context of various navies in very different circumstances.

2.3.1.1 Latvia

Latvia is an example of a “coastal navy”. Its naval force is presently comprised exclusively of used ships that have been for the most part donated by other Baltic navies. It has a desire to develop its navy and over time to acquire a number of vessels to replace the ones presently in use. The Navy will have a very limited budget to work with as well as an inexperienced procurement team. As the country is seeking entry both into the European Union as well as into NATO, it is likely that a number of used ships will be made available either at a moderate price or as previously, simply donated from at least one of the member nations. However, in order to gain experience in the procurement process it is well possible that the relatively inexpensive patrol boats for the coast guard may be acquired through the common international Request for Proposal process.

2.3.1.2 Bangladesh

As described earlier, the Bangladeshi Navy generally fulfills its capital ship requirements from the used international market. The Bangladeshi Navy is not a very high priority for the government or the populace due to severe economic conditions and other internal problems. This lack of priority correlates to a lack of understanding of what the navy means to the nation in general and more specifically, what the development of the shipbuilding industry would do for the navy and nation as a whole.

The Bangladeshi Navy also has an inadequate infrastructure to support naval operations. Logistics and personnel training are considered poor at best, and make the service even less viable. In essence, Bangladesh will continue to be dependent on the used international market to meet its hull number obligations. In this case, the term hull number obligations is preferred over basic naval requirements, since the country’s navy has a strong responsibility for providing humanitarian assistance after the frequently catastrophic storms that assault the country and only afterwards can concern itself with EEZ issues and the protection of its sea lines of communications.

2.3.1.3 Brazil

While the situation in Brazil is quite different from that of Bangladesh, the country still fulfills most of its capital ship requirements for the used ship international market. Economically and politically, Brazil has developed a more solid foundation for the future of its navy. Although the Brazilian Navy is currently very dependent on the used vessel market, it has been successful in integrating

the vessels into the Brazilian Navy. Additionally, the infrastructure is much more mature allowing for sustained logistics and training, which translates into fulfilling more of its operational needs.

Further, the Brazilian Navy does enjoy more support from the government and general populace, as evidenced by extensive programs that have taken place over the past decade. Brazil has invested heavily in the nuclear program, high technology and in the development of its shipbuilding industry. Although limited in economic resources, there is an understanding of what indigenous high-tech and the shipbuilding industry can do for the nation as a whole.

Brazil will continue to move ahead with its indigenous shipbuilding programs, with its primary limitation being economic. The Brazilian Navy has a rudimentary idea of how to establish a naval procurement program, as evidenced by the nuclear and conventional submarine programs, even though both are still progressing slowly. It can be envisioned that in a couple of decades, the Brazilian Navy will be building the majority of its own naval force, becoming less reliant on the used international market.

The table below lists some of the capital vessels that Brazil and Bangladesh procured through the used international market:

Country	Vessel Class	Vessel Type	Transferring Country	Total Units Transferred
Brazil	Clemenceau	Aircraft Carrier	France	1
Brazil	Colossus	Aircraft Carrier	France	1
Brazil	Broadsword (Type 22)	Frigate	United Kingdom	4
Brazil	Papa (Garcia)	Frigate	United States	4
Brazil	Newport Class	LST	United States	1
Brazil	Ceara (Thomaston)	LSD	United States	2
Bangladesh	Salisbury (Type 61)	Frigate	United Kingdom	1
Bangladesh	Leopard (Type 41)	Frigate	United Kingdom	2
Bangladesh	Osman (Jianghu I)	Frigate	China	1

Figure 13 - Examples of Used Vessel Procurements



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Brazil, Bangladesh, and other nations that utilize vessels from the used international market procure these vessels through various programs. Transfer policies and criteria differ from nation to nation, and on a case-by-case basis. These vessels can be provided as economic assistance or can be purchased or leased. The conditions of the transfer are considered on a case-by-case basis depending on the receiving navies requirements.

2.3.2 Cost Comparison between New and Used Vessels

As in the procurement of any military equipment, some of the major considerations that need to be evaluated are price and financing terms, life cycle costs, modernization and integration expenses, training for the receiving nation and improvements in infrastructure in order to realize delivery of foreign equipment. In the case of used vessels these considerations are usually measured by comparing the costs with the acquisition of new vessels.

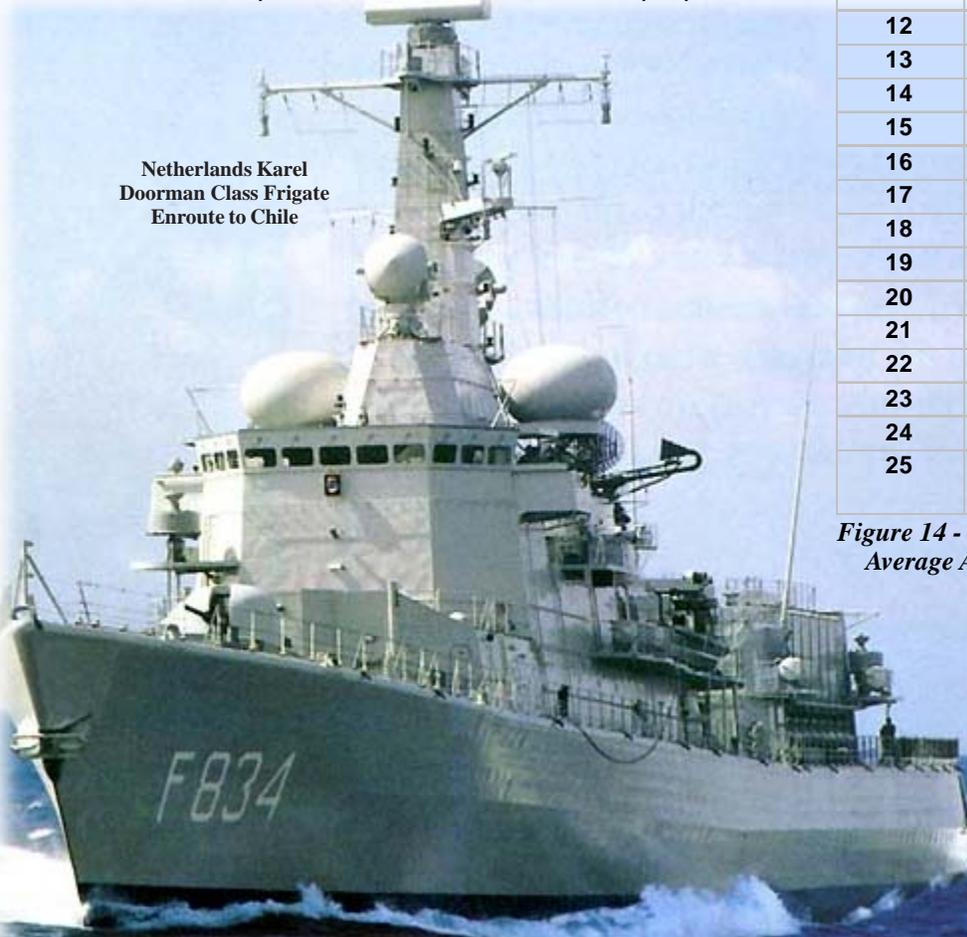
The following graph illustrates the typical costs associated with a new construction vessel (frigate size) over its life span, which for demonstration purposes,

will be estimated at 25 years. The cost for such a frigate is approximately US\$949 million over the 25-year life span, after integration. It must be noted that these costs will change on a case-by-case basis.

Year	Annual Cost	Cumulative Cost	Major Cycles
-5	12	12	Detail Design
-4	80	92	Construction
-3	80	172	"
-2	80	252	"
-1	50	302	Fleet Introduction
1	18	320	Annual O&M Costs
2	18	338	"
3	18	356	"
4	18	374	"
5	18	392	"
6	18	410	"
7	18	428	"
8	18	446	"
9	18	464	"
10	35	499	Major/Complex Overhaul
11	25	524	Annual O&M Costs
12	25	549	"
13	25	574	"
14	25	599	"
15	25	624	"
16	30	654	"
17	30	684	"
18	30	714	"
19	30	744	"
20	30	774	"
21	35	809	"
22	35	844	"
23	35	879	"
24	35	914	"
25	35	949	End-of-Life/Payoff

Figure 14 - O&M: Annual Operations and Maintenance Costs Average Annual Life Cycle Costs For a New Construction Frigate (in Millions)

The next table illustrates the typical costs associated with a used vessel (frigate size) over a 15-year life span. The cost estimates for the used frigate assumes that the vessel is in good condition, has been overhauled before transfer, and only a limited modernization package is performed in order to bring the vessel to within standards of interoperability with the other vessels of the receiving navy.



Netherlands Karel Doorman Class Frigate Enroute to Chile

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Year	Annual Cost	Cumulative Cost	Major Cycles
-1	70	70	Purchase/Reactivation
1	55	125	Introduction
2	35	160	Modernization
3	35	195	Annual O&M Costs
4	35	230	"
5	35	265	"
6	35	300	"
7	35	335	"
8	40	375	Minor Overhaul/Upkeep
9	35	410	"
10	35	445	"
11	35	480	"
12	35	515	"
13	35	550	"
14	35	585	"
15	35	620	End of Life/Payoff

Figure 15 - O&M: Annual Operations and Maintenance Costs Average Annual Life Cycle Costs For a Used Frigate (in Millions)

In comparing the new versus used status, it can be concluded that the used vessel is nearly equal to that of the new vessel when considering overall costs that include procurement, operations and maintenance from program conception. The primary differences between procuring a new versus used vessel reside in the following areas:

- There is a much higher initial capital outlay for new construction that is not typical of a used vessel.
- There is at least a eight to ten-year delay in receiving a new vessel from concept to delivery (taking into account concept design, specification development, and parliamentary approval) where as a used vessel can be delivered in around one year.
- A used vessel with a shorter operational life expectancy will require replacement much sooner than that of a new vessel.

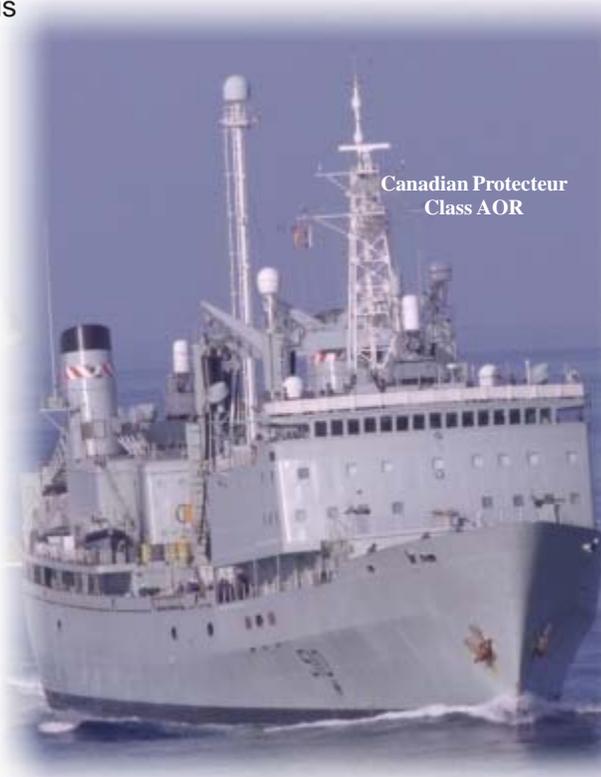
It must also be noted that O&M costs will typically be higher for a used vessel than in the case of a new more efficient vessel, however, this is generally countered by the fact that a recipient navy has a much slower

operational tempo than the originating source. A further factor in holding down costs is it can be assumed that recipient navies typically have lower personnel costs as well.

From an equipment vendor's point of view it is most important to realize first, that the navy acquiring a used ship has selected a ship as close as possible to meeting all its requirements. Secondly in valuing the ship it is valued at its new purchase price not its original. The direct consequence of this perspective is that it is extremely rare that any significant further investment will be made in the ship. For example, a used frigate acquired for \$70 million and intended to remain in the fleet for approximately 15 years, will unlikely receive a new missile system, associated launcher and sensor suite or any other major system upgrade.

Why would a navy invest another 25% of the original cost or even 15%? The ship was selected for matching the navy's needs not for being a base platform from which to build on. The case is even stronger when the receiving navy has accepted the ship as a grant.

Of course it is always buyer beware. Vessels in poor condition upon receipt will impose significantly higher costs associated with longer and more complex overhauls, more extensive modernization efforts, and yearly upkeep costs. Costs can also rise dramatically if the receiving navy makes the decision to extend the service life beyond the initial 15 years. This then falls within the debate of choosing to undergo modernization rather than the acquisition of new or used ships.



2.3.3 Impact of Ship Transfers

Another major consideration that must be taken into account when transferring a used vessel from one to another is what impact the new vessel will have on the receiving navy, especially in regards to a smaller or less technically developed navy.

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Some of the major considerations are:

- **Interoperability:** In many cases, vessels introduced into smaller navies will have completely different weapon, sensor and communication systems than what is currently in inventory.
- **Logistics Support:** In some cases, the receiving navy will receive equipment that is currently not in inventory forcing alternative support structures for the newly introduced equipment.
- **Personnel Training:** Training on different equipment, like logistic support, can prove to be cumbersome when operating different systems and maintaining qualified personnel.
- **Infrastructure:** A major issue when introducing vessels from a foreign source into a receiving navy. Problems that may arise typically include basing issues, such as proper shore power, pier space, harbor depth, and other class specific requirements etc.

As has been pointed out, accepting or purchasing used ships in order to re-capitalize a country's fleet carries its own associated costs and may in the long run prove to be more expensive than either of two other options presented.

Therefore all navies, whether their budget is large or small, must calculate the costs and evaluate the benefits associated with each re-capitalization option: purchase new ships either built indigenously or abroad, modernize an existing class of ships, or seek ships from the international used ship market.

Should the decision be made to seek ships from the international used ship market, the next question to be asked is, who is offering the right ship(s)? The next chapter will present a short history of the primary suppliers of used ships.

Photos Courtesy Of:

Page 14:	Northrup Grumman Ship Systems
Page 15:	Latvian MOD
Page 16:	German Navy
Page 17:	Netherlands MOD
Page 18:	Rick Dorn Personal Collection
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3.0 Historical and Prospective Suppliers

3.1 Historical Suppliers

In order to establish a base for the historical and future used naval vessel market, it must be realized that what was once primarily a United States/European supplied market will in the future become a more decentralized market with several new entrants.

From 1989 through 2003, the majority of used naval vessels that became available to recipient navies originated from the United States or the European continent including Russia. The United States along with Germany and the United Kingdom exported the majority of used vessels that appeared on the international market. Many of the Russian vessels formed the core of fledgling navies created after the breakup of the Soviet Union. These vessels were exported in large numbers due to the political shift from the end of the Cold War to a new political landscape, which equated to more restrained defense spending, and thus smaller navies and smaller future procurement plans for new vessels. The general trend through the 1990s in the United States and Europe was for less numbers of sophisticated vessels to replace larger numbers of aging ships, a trend that continues today.

These circumstances led to a glut of used vessels in the United States and Europe that became available for resale to smaller and younger navies. As discussed previously, while the inventory reduction made after the Cold War was due to the desire for a "Peace Dividend," today the European nations have chosen to reduce the size of their fleets still further, in some cases by focusing on a particular capability as their contribution to a coalition force, in others simply to reduce the demands on the budget. This second wave of ships will continue the United States/European export trend, however it is expected to slow considerably after the current re-sizing is completed within the next three years.

The following is a list of navies that have been the primary suppliers of used naval vessels on the international market.

- Germany – After the reunification of Germany, the German government was forced to cut many of the older and more costly East German Navy vessels. This resulted in a large ship transfer effort in the early 1990s.
- France – In 1997 France began transferring used naval vessels to developing countries under various surplus arms programs.
 - Netherlands – The Government of the Netherlands and the Royal Netherlands Navy (RNIN) use the sale of used naval vessels as a tool of diplomacy and relationship building. They further ensure the strength of their naval industrial base by ensuring continuing construction of leading naval designs.
 - Russia – After the break-up of the Soviet Union, Russia found it difficult to justify the large numbers of vessels in inventory. This resulted in a large sell off worldwide.
 - United Kingdom – The United Kingdom carefully balances it's used ship transfers towards the objective of ensuring British naval industry export sales.
 - United States – The United States uses it's ship transfers as a form of Security Assistance and ensuring interoperability with important allied navies.



3.2 Prospective Suppliers

As the aforementioned countries continue to build new ships, albeit at a significantly reduced tempo, these historical suppliers of used naval vessels will remain in the business in the future as well. In fact there will be a new European entrant, Spain. But the total number of ships offered by these countries will decrease each year and in fact there may be years when very few or no new ships enter the used ship market at all.

Bucking the trend in achieving the peace dividend, there are a handful of nations that are increasing their respective fleets in order to meet their new perceived threats while at the same time expanding their own industrial bases in order to become more self-sufficient in the naval shipbuilding arena. These very nations have

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had in the past or currently have indigenous construction programs underway. As these re-capitalized fleets begin entering service, decommissioned vessels could very well end up in the used international market as alternatives to the traditional suppliers of the past. These nations may include:

- Korea
- Singapore
- India
- China
- Turkey

Since 1990 the world's new naval ship construction market has altered significantly and the new entrants as can be seen will be coming primarily from Asia. Today the South Korean shipbuilding industry is a world leader and the nation has already commenced selling or donating small ships to other Asian navies. There is even rumor of their first submarines being transferred to Indonesia later in this decade.

The next country that should be mentioned is Singapore. Certainly the size of their navy will mean that there will not be many ships offered but the quality of their ships will mean that they will be sought after.

In fact because Singapore has a small navy it may well be selling its ships well before they would normally decommission in order that new contracts for new shipbuilding can be signed to support and maintain their naval ship construction expertise.

Another new entrant will be India. After decades of neglect the naval shipbuilding industry has commenced a revival. While it will take some time to establish a reputation for well-built ships, should the Indian Navy continue to receive a reasonable budget for ship acquisition, simply the size of re-capitalizing their navy will mean that there will be a time in the next decade when a number of ships could be put on the market.

China simply by the size of its navy and its re-capitalization requirements will have ships to offer. As these ships become equipped with more original Western equipment or licensed produced versions they will attract more attention. Commercially, China has become a major shipbuilder meeting international standards; the naval shipbuilding reputation is still catching up.



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Turkey has aspirations of developing a fleet comparable to any in the Mediterranean. The professionalism of the fleet is comparable, the critical factor today is a stable and growing economy able to sustain a stable defense budget. Once the economy has strengthened the Turkish fleet will be a formidable force in the Mediterranean and of a size that will require continuous re-capitalization, bringing its older ships on to the used ship market.

Two other countries not listed above but that still should be discussed are Japan and Taiwan. Both countries have modern fleets with a significant indigenous shipbuilding capability. Both nations regularly decommission naval vessels that could be of use on the international market, however, are restricted from selling military equipment due to political reasons (whether self-imposed or otherwise).

Japan is slowly modifying its defense policies and assuming a larger role within coalition operations, that is, it is moving towards taking up its appropriate role within the international community. At some point within the next decade it is likely that the present restrictions on Japan defense industry participation in the world market and their permission to export will be lifted. It is possible that simultaneously the Japanese Self-Defense Force will be allowed to sell ships in the new and used ship market. If and when this occurs, the used ship market will no longer be dominated by the United States and Europe, it will belong to Asia.

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Page 20: United States DoD
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4.0 Historical and Prospective Recipient Nations

4.1 Historical Recipients

As discussed in an earlier chapter, a lack of commitment and a supportive policy, limited economic ability, limited investment in technology/industrial capability, limited infrastructure, lack of operational proficiency, and the role a navy has to play and combinations thereof will ultimately define a navy's acquisition strategy. The limit of a nation's self-sufficiency and commitment will be the determining factor on how reliant a recipient navy will be on the international used ship market for its future procurements.

The eighty-five "small coastal" navies have been and will continue to be recipients of used ships. Most of these navies have neither the budget, the procurement expertise, the commitment to the navy, nor, and most importantly, the requirement to expend funds on new ships. Their requirements are met very well with used ships. The one exception to this generalization may be the case of small patrol craft.

For the navies that fall within the categories of "EEZ Focus" or "Regional", they will continue to use the used ship market to fulfill certain gaps in their expertise. There are, however, some countries that are or will be developing their own shipbuilding capability and likely be accessing the used ship market less frequently. Romania and Ukraine are two countries that have shipbuilding capabilities and should, in the future, be able to meet most if not all of their navies' requirements. Bulgaria will likely try to follow in their footsteps. The real problem for these three countries will be to establish a secure industrial base that will be supported by regular defense budget line items or that will be recognized as a quality supplier by the international market and therefore make up the lack of national expenditures with exports, just as the German naval industry has done for decades. Certainly, one-time investments can improve the technical expertise and capability of a shipyard. The real difficulty, and the Australian naval defense shipbuilding industry is an excellent case study, is to maintain the expertise year after year. There is a certain prestige and economic benefit in building one's own ships but unless the long-term requirement exists it will be a boom and bust industry. South Africa recognized this issue and decided that it would be more economically beneficial to the country to have a rich offset program associated with its new acquisition programs rather than to develop a shipbuilding expertise that would be lost in a few years.

The "Blue Water" and "Global" are suppliers not recipients of used naval ships. The one exception is

Turkey and as discussed in the previous chapter the Turkish Navy is building more and more of its own ships.

4.2 Prospective Recipients

The recipient nations of the past are with the few noted exceptions likely to remain the recipients of the future. However, there are several nations that are likely to join the list of recipient nations that in the past were primarily buyers of exclusively new ships. Indeed they will, over time, likely become even more dependent on the used international market. The nations that are becoming prospective recipients are being prompted by two main factors.

First, there are those nations that were self-sufficient in the past. They had a developed and competent naval shipbuilding capability, but the reduction in total number of new naval vessels contracted each year as well as the shipyard's inability to make up the difference with export sales has made it impossible to maintain the expertise and a profitable yard. The naval shipyards have been forced to close their doors. Canada, for example, decided that it could no longer support its naval shipbuilding industry. There may be some small coast guard ships and others vessels built to commercial standards but its naval expertise is disappearing and therefore the navy will become increasingly dependent on the new and used foreign markets. Belgium is another example.

Second, there are those countries that through a review of their defense requirements have reduced their budgets to the point that used ships will become the norm and new ship construction will be the exception. Kenya has no shipbuilding capability but has been able to procure all new naval vessels from foreign sources. However, reduced funding in recent years suggests that the used market may become a reality in the near future.

Portugal is already discussing used ships for a replacement of its Comandante João Belo class light frigates and other ship classes may soon be included. Kuwait has simply postponed acquisition of new ships as an economic savings but may eventually be forced to follow this route.

Last but not least, there are nations, such as Libya, that have been under international embargo for a number of years (embargo lifted in early 2003) that will be looking to upgrade its existing force, however, limited funding will restrict future procurements to used vessels or possibly a mixture of all three methods (new vessels, used vessels, and modernization programs).

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Those nations that will likely become the new prospective recipients of the future include:

- Canada
- Kenya
- Kuwait
- Libya
- New Zealand
- Oman
- Portugal

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