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Third World Submarines

The proliferation of submarines may be a threat to established navies and regional stability, but to arms manufacturers it is a market opportunity

by Daniel J. Revelle and Lora Lumpe

During the spring of 1993, Iran put the first of its new Russian-built Kilo-class submarines through sea trials in the Persian Gulf. Its presence raises the specter of an Iranian attempt to close the Strait of Hormuz, the narrow waterway through which a fourth of the world's oil now passes.

Throughout the cold war, the U.S. Navy's highest priority mission was to engage Soviet nuclear-powered submarines in a global game of hide-and-seek. As that threat has faded, conflicting priorities have emerged. On one hand, the U.S. Navy is concerned about the threat that growing Third World naval forces pose to its ability to operate in coastal waters around the world. On the other hand, concern about the fate of the cold war industrial base is creating pressures for the U.S. to join former allies and enemies in supplying advanced diesel-powered attack submarines to developing countries.

More than 20 developing countries currently operate over 150 diesel attack submarines. North Korea has 25 such vessels, India 18, Turkey 15, Greece 10, Egypt 8, Libya 6 and Pakistan 6. Many of these boats are obsolescent, poorly maintained or operated by ill-trained crews. Others, however, could be a match for many vessels in the navies of the industrial world.

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Third World nations have purchased their most advanced vessels from Russia and western European countries, both of which have a submarine manufacturing base far in excess of their own needs. Hans Saeger, sales director for the German submarine builder HDW, has estimated that NATO countries have the capacity to build 19 vessels a year, although NATO members generally purchase only two or three. The incentive to employ the remaining capacity is strong.

Germany in particular is a major exporter of submarines. Its sales are of exceptional concern because they frequently involve the transfer not only of vessels but also of production equipment and know-how for building submarines. Such "coproduction" deals promote sales, but they also lead to an increase in the number of nations competing to sell submarines, thus making proliferation even more difficult to contain. Germany has made coproduction agreements with South Korea, India and Argentina—the last has been licensed to produce two additional submarines for reexport.

Russia looks to weapon sales as a source of desperately needed hard currency. The Russian navy stated several years ago that it intended to continue producing two diesel submarines a year, keeping one for itself and selling the other for ready cash. Soviet customers have included Libya, North Korea, India and Algeria. More recently Iran purchased two of the Kilo boats with the option to buy a third.

Other nations are in the business, too. France has supplied its Daphne and more modern Agosta models to Pakistan. China has sold somewhat outdated Romeo-class submarines to North Korea and Egypt. Sweden is marketing submarines to Malaysia and is looking for other sales in South Asia. The Netherlands is considering the sale of 10 submarines to Taiwan in what is expected to be the last big sale of the century. Britain, meanwhile, is selling off four new Upholder-class diesel boats that its fleet no longer has the money to support, even offering to lease them complete with mercenary crews.

Although the U.S. Navy has purchased only nuclear-powered attack submarines since the 1960s, the U.S. government recently gave approval for domestic production of diesel vessels. In a 1992 report to Congress, the navy argued: "Construction of diesel submarines for export in U.S. shipyards would not support the U.S. submarine shipbuilding base and could encourage future development and operation of diesel submarines to the detriment of our own forces." Nevertheless, in April 1994 the State Department gave Ingalls shipyard in Pascagoula, Miss., the go-ahead to produce HDW's Type 209 under a license from the German firm. Egypt wants to buy two of these boats but cannot afford to purchase them directly from Germany. The vessels built by Ingalls will be bought using U.S. military aid, which may be spent only on weapons of American manufacture.

Once this new production line is in place, economic considerations will probably generate pressure to make further sales to developing countries. Taiwan and Saudi Arabia are the next like-

ly customers for U.S.-made Type 209 vessels.

As shrinking military budgets add to economic woes, arms manufacturers are aggressively seeking to expand their markets. Submarine merchants have targeted nations bordering on the Gulf of Oman, the Mediterranean, the Arabian Sea and northern Indian Ocean, the South China Sea, and Pacific waters near the north Asian coast. If successful, their sales campaign could pose serious risks to international stability.

Even a handful of modern, well-maintained diesel submarines could have made a significant difference in the Persian Gulf War. If Saddam Hussein had bought six modern vessels "and positioned three of them on either side of the Strait of Hormuz, that would have complicated matters," according to U.S. vice admiral James Williams. "One diesel sub can make a great difference to how you drive your ships," he asserts.

During the Falklands/Malvinas war, a single Argentine Type 209 managed to elude 15 British frigates and destroyers and the antisubmarine aircraft of two carriers. The San Luis maneuvered into torpedo range of the British fleet and launched three torpedoes, although all three shots were unsuccessful. Early in the conflict a British submarine sank the Argentine cruiser General Belgrano with two straight-running torpedoes of a design that dated to World War II.

Both the U.S. and British navies are developing active antitorpedo weapons for the turn of the century, but at present evasion and electronic countermeasures are the only way to avoid a torpedo already in the water. Courtesy of the industrial nations, most Third World navies now have advanced torpedoes that can home in on a ship and explode just underneath its keel for maximum damage.

Some also possess submarine-launched antiship missiles. The U.S. has sold the Harpoon missile to Israel, Pakistan and others, and the French are marketing a submarine-launched version of the Exocet missile.

The deadliness of submarine-launched weaponry makes early detection and destruction of attacking submarines a crucial factor in antisubmarine warfare (referred to as ASW). Submarines in general are obviously much more difficult to detect than are surface ships or aircraft. Diesel attack submarines can be very quiet. When moving slowly, they can rely for days on battery power, eliminating engine noise or any need to surface or snorkel for air.

Diesel submarines have a relatively short range, and so they tend to inhabit littoral waters rather than the mid-ocean depths. Indeed, most developing countries have only a few vessels deployed defensively near their own coastlines, leading some analysts to deride them as mere "intelligent minefields." Nevertheless, the task of tracking and destroying these submarines can be complex and fraught with pitfalls.

Swedish, German, Italian, Russian and South Korean shipyards are developing air-independent propulsion (AIP) systems, which eliminate the need for frequent snorkeling and may enable a vessel to remain at depth for up to a month.

The "shallow" areas that usually harbor diesel submarines may be as deep as 300 meters, giving a vessel plenty of space to hide. At the same time, the bottom is close enough that false sonar echoes can mask a boat's location, much as "ground clutter" can hide low-flying aircraft from radar. Ships, oil rigs and sea life can add noise in coastal waters, further complicating the ASW operator's job. Magnetic anomaly detectors, used to find submarines in the open ocean, can be especially confounded by the clutter of a shallow seafloor and the "magnetic garbage" that litters the coastal plain.

To detect submarines and determine their location, ASW operators must catalogue other sound sources in the region where submarines might travel and map thermal, depth and salinity profiles and bottom conditions that can affect the path of acoustic emissions and sonar returns [see "The Amateur Scientist," page 90]. The U.S. Navy has only begun to turn its attention to this problem for waters such as the Persian Gulf, which was free of submarines until 1992. At that time, Iran acquired its first Kilo boat, and the U.S. assigned two Los Angeles–class nuclear-powered attack submarines to patrol and map the area.

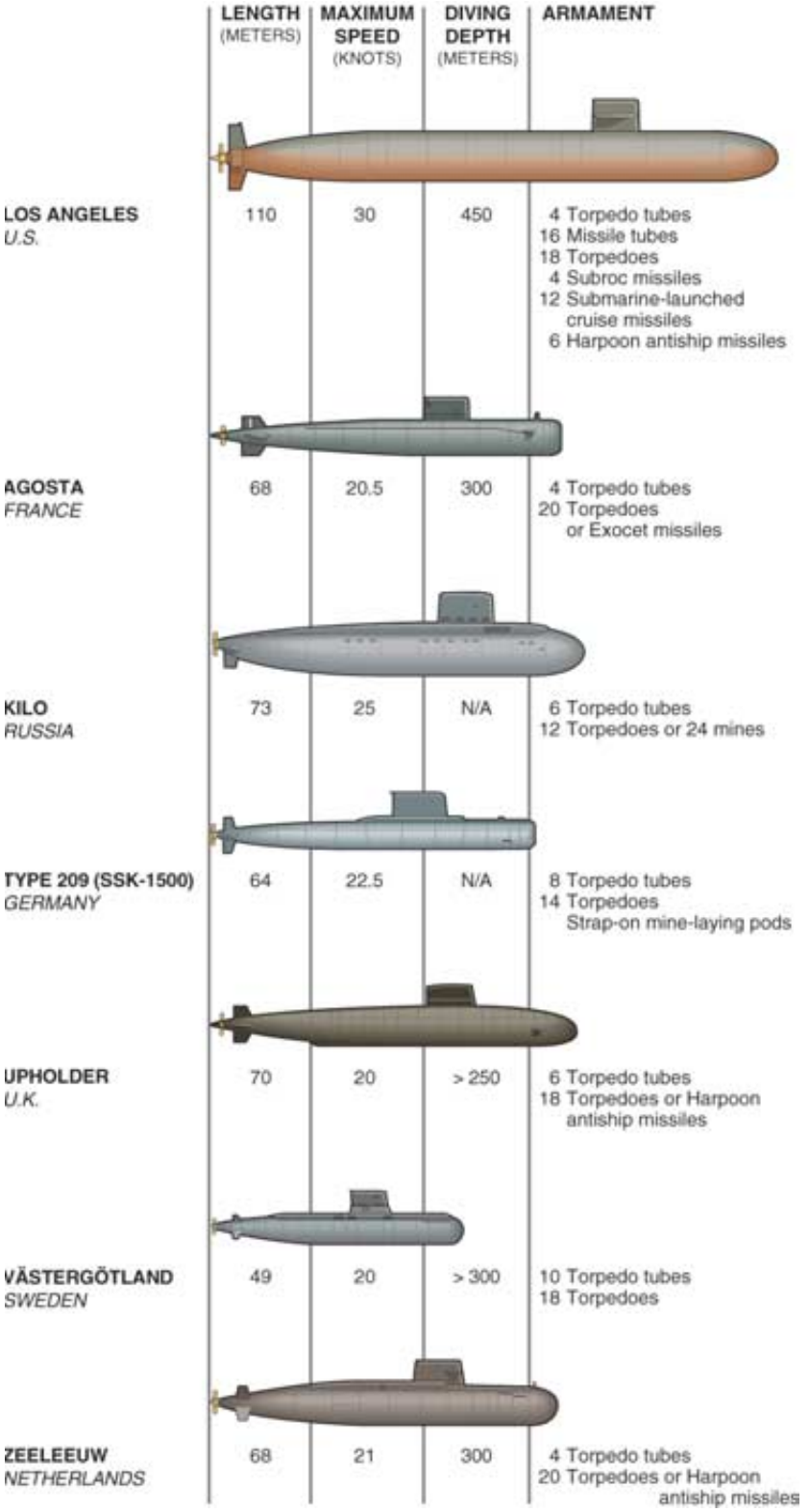
Although diesel submarines have many advantages when deployed under appropriate conditions, they are not without weaknesses. Their engines make more noise than do nuclear reactors and cannot drive a submarine as fast. When running at high speed under electric power, a submarine can deplete its batteries in a few hours. Even at slower speeds it must still approach the surface to take in air every four to 10 days, depending on the submarine's capabilities and the captain's willingness to risk running out of power to avoid detection. Consequently, ASW forces can prevail by blanketing an area with vessels and aircraft. Admiral Henry Mauz, U.S. Atlantic commander in chief, explains, "If you don't let him snorkel, you hold him down. Pretty soon he can't work—it's too hot, too steamy, too much carbon dioxide and monoxide."

The newest submarine designs aim to reduce these liabilities. The Kilo and Type 209, for example, emit much less noise when snorkeling than do their predecessors. Moreover, Swedish, German, Italian, Russian and South Korean shipyards are developing air-independent propulsion (AIP) systems, which eliminate the need for frequent snorkeling and may enable a vessel to remain at depth for up to a month. Sweden has tested and incorporated into its next-generation design an AIP system using a Stirling engine, an external combustion engine that does not burn fuel explosively and is thus much quieter than a standard gasoline or diesel engine. Other designs may use liquid oxygen and high-efficiency combustion systems, or chemical fuel cells with up to five times the net energy density of lead-acid batteries.

Most submarine fleets fielded by Third World countries do not currently present an insuperable threat to naval

Attack Submarines for Sale

Diesel-powered attack submarines now being sold to developing nations are smaller and slower than are the superpowers' nuclear versions (such as the U.S. Los Angeles–class vessel pictured immediately below). Nevertheless, they pose a significant threat to shipping and to naval forces that might wish to intervene in regional conflicts.



operations. U.S. Navy representatives point out that "only a relatively small proportion of the ocean is less than 1,000 feet deep, and most of that is less than 30 miles from shore. Controlling the deeper water," they contend, "guarantees battle group operation safety and 'bottles up' potential threats in restricted shallow water areas, where they are more susceptible to mines and other forces, while ensuring the sea lanes of communication remain open."

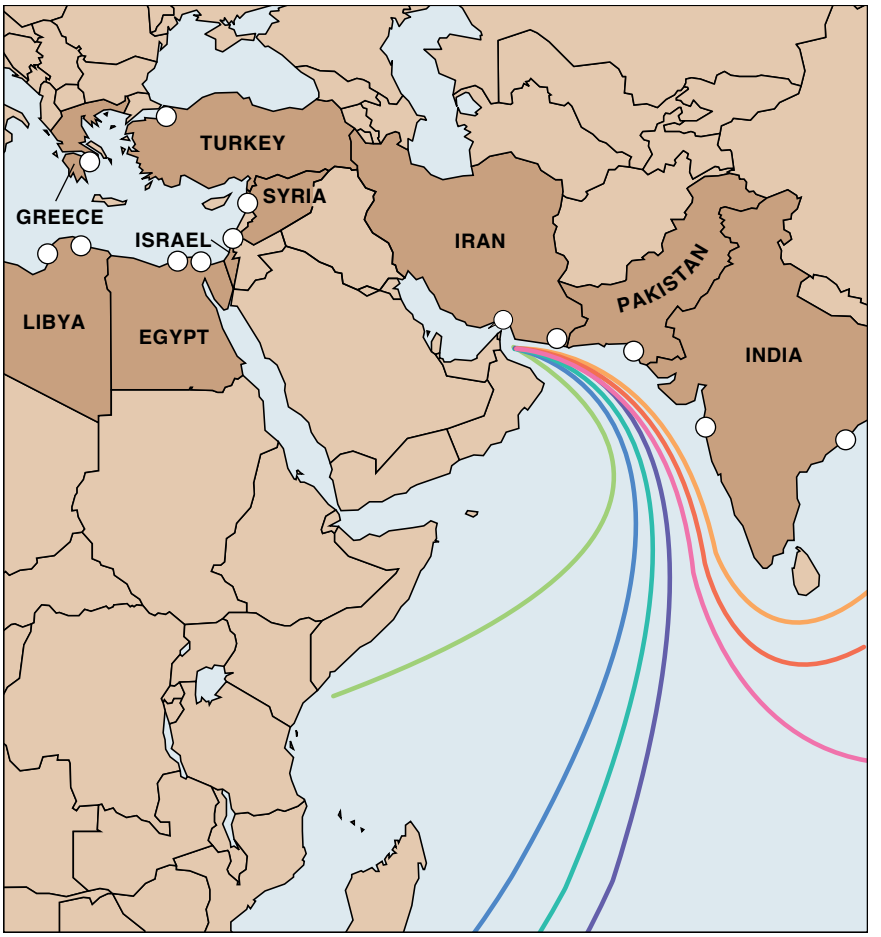
The new Kilos, to be based in southern Iran, are regarded by one U.S. intelligence official as so easy for U.S. aircraft to find and destroy that eliminating them would be little more than a "live fire exercise." Less capable submarines do not necessarily pose a serious danger even in large numbers. North Korea's fleet, for example, consists of antiquated Chinese-built Romeo-class vessels, a type the Soviet Union stopped selling in 1960. Libya's submarine crews have a reputation for being poorly trained, and their boats are so shoddily maintained that only one or two out of six may be operable—not one has routinely gone to sea since 1985.

Faced with this mixed situation, the U.S. Navy has taken two contradictory positions. In its posture statement the service pledges to "ensure we maintain the ASW edge necessary to prevail in combat along the littoral," thus implicitly acknowledging that its current ASW forces are adequate to meet existing and near-term threats. At the same time, officials are justifying a new nuclear attack submarine program and several new helicopter, sonar, radar, torpedo and ship defense projects based in large part on the peril that could arise from diesel submarines in shallow water.

Indeed, the dangers that submarine fleets of the developing world present to U.S. forces will increase if nations continue to export more advanced and stealthy diesel submarines and weapon systems. Are there ways to limit the spread of the submarines?

It is difficult to convince exporters that halting the sale of submarines to the Third World would be in their best interests, but the idea of forgoing potential sales is not unprecedented. In 1987, when Western countries became sufficiently alarmed about ballistic missile proliferation, they managed to put aside their financial interests to limit the sale of missiles and related technology. The Missile Technology Control Regime (MTCR) bars the transfer of missiles, equipment or know-how that could lead to widespread proliferation.

Missiles were an object of special concern because they could penetrate enemy defenses and were highly suitable for surprise attack—destabilizing characteristics also shared by submarines. Attack submarines in the hands of rogue states raise the specter of terrorism against commercial shipping and could also wreak havoc against major-power forces attempting to operate in littoral waters. As with the MTCR, the best way to stop the spread of submarines to potentially hostile regimes is to control the export of these weapons worldwide. Routine sales of ballistic missile capabilities are no longer considered a legitimate commercial opportunity for nations to exploit. The same can be done for submarines.The market may not be such a large one for the developed countries to give up. Modern submarines cost too much for most countries—Pakistan, for example, would pay $233 million for each of three Agosta 90 models it is seeking to purchase from France. But China is competing with France for the Pakistani sale. Both countries are offering generous financing packages that reduce the profitability of the deal. In today's buyers' market, cash-paying customers are few. In the U.S. deal with Egypt, the revenues that Ingalls shipyard would receive are U.S. taxpayer dollars, already required to be spent on U.S. goods and services.



PERSIAN GULF has been the site of submarine operations since 1992, when Iran received its first submarine from Russia and built a base at Bandar Abbas. The U.S. then assigned two Los Angeles–class nuclear-powered attack submarines to patrol and map the area. Roughly a quarter of the world's oil passes this single maritime choke point.

Diesel Submarines in Third World Countries

Nearly two dozen developing nations currently possess diesel-powered attack submarines. Many of these countries are seeking to expand or modernize their fleets, and a handful of additional nations intend to join the submarine club. Meanwhile a growing set of exporters (including some former and current submarine buyers) is competing for the developing nations' business. The U.S., which has not made diesel submarines for about 30 years, is about to reenter the export market.

IMPORTERS	HAVE	PLAN
ALGERIA	2	–
CHILE	4	–
COLOMBIA	2	–
CUBA	3	–
ECUADOR	2	–
EGYPT	8	2–6
GREECE	10	–
INDONESIA	2	–
IRAN	2	–
ISRAEL	3	2
LIBYA	6	–
MALAYSIA	–	?
PAKISTAN	6	3
PERU	9	–
PHILIPPINES	–	?
SAUDI ARABIA	–	?
SINGAPORE	–	?
SOUTH AFRICA	3	–
SYRIA	3	–
TAIWAN	4	4
VENEZUELA	2	–

CO-PRODUCERS	HAVE	PLAN
ARGENTINA	4	4
BRAZIL	4	3
CHINA	45	–
INDIA	18	6
NORTH KOREA	25	–
SOUTH KOREA	4	8
TURKEY	15	7

EXPORTERS
CHINA
FRANCE
GERMANY
NETHERLANDS
RUSSIA
SWEDEN
U.K.

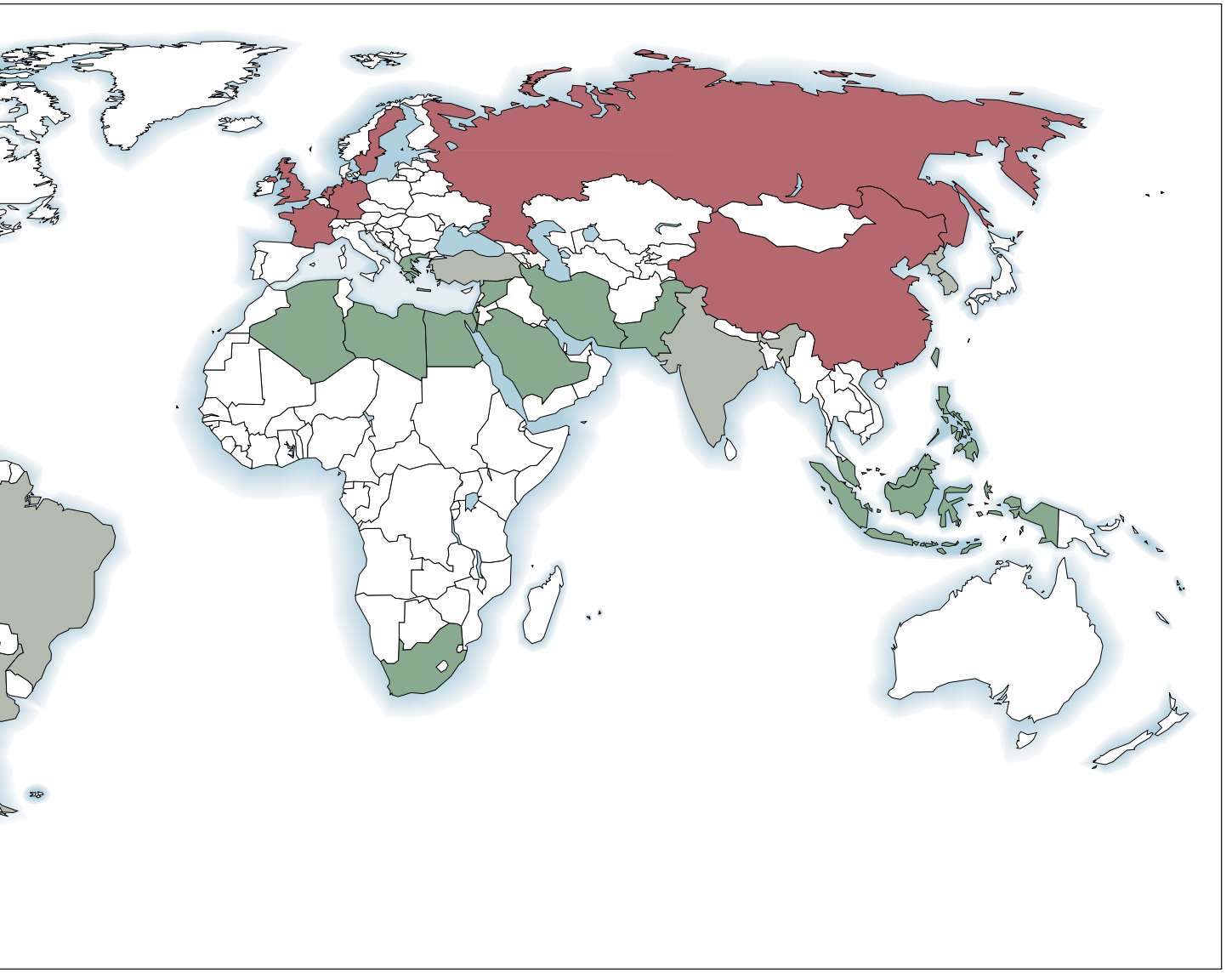
PRIMARY SOURCE: International Institute for Strategic Studies

Many submarine sales involve agreements to license the designs and technology for building the boats. Thus, the purchaser may become independent and may even compete with the original seller for future orders. Brazil, Argentina, South Korea and India, all former submarine purchasers, have produced some of their own vessels. It was precisely such proliferation of production capabilities that spurred formation of the MTCR. The developed countries may similarly wish to act before losing control of the world trade in submarines, along with the market itself, to Third World submarine producers.

Submarine exports are sometimes justified on the basis of the need to preserve the defense industrial base, but the capabilities that are preserved may not be all that useful for a modern nation's own defense. Germany has sold Type 209 submarines for nearly 20 years, but there is not a single Type 209 in the German navy. Of greater aid in maintaining a submarine industrial base in Germany and Sweden are current domestic construction orders for submarines with air-independent propulsion systems, which will provide work through the late 1990s. For the U.S., production of diesel vessels in Mississippi would not help maintain nuclear submarine production in Virginia and Connecticut, although it would help keep Ingalls afloat. Instead it would create a production line whose output the U.S. Navy is interested neither in purchasing nor in seeing proliferated around the globe.

A good step toward eventual control of submarine exports might be to restrict the sale of advanced submarine-launched weapons, such as modern torpedoes and antiship cruise missiles. These weapons, a single one of which can sink a large surface vessel, are particularly destabilizing. Furthermore, the U.S. could set an example by stopping the export of Harpoon missiles. These antiship weapons allow a submarine to attack a target such as an aircraft carrier from as far away as 90 miles, well beyond the reach of its inner defenses.

Missile and torpedo sales valued in the hundreds of thousands of dollars may be easier for governments to resist than submarine sales worth hundreds of millions. Whereas even the most basic torpedo can sink a ship, more modern weapons, which are faster, stealthier, longer range and better guided and which can defeat modern countermeasures, could place naval forces in imminent peril. By limiting sales of undersea ordnance to the most basic types, exporters would limit the threat from existing boats. An agreement restricting coproduction or sale of submarine production technology would be another



logical move toward cessation of submarine exports in general.

Countries that purchase submarines would be expected to object to restrictions on their availability. An outright ban on sales would affect neighbors and enemies equally, however. An effective international agreement could prevent naval arms races before they begin.

Given the long lifetime of submarines and other advanced weapons, exporting them even to countries that are now staunch allies is a risky business. Iran had six German Type 209 submarines on order at the time of its fundamentalist revolution. Had those weapons been delivered, Iran would likely have used them to great effect against Kuwaiti and Iraqi oil shipments during the Iran-Iraq war and could have turned them against the U.S. fleet when it intervened to protect those deliveries. Although Third World submarines do not pose an overwhelming threat at present, continued sales of modern submarines and munitions have led to real and serious proliferation risks.

Submarine-producing countries need to look beyond short-term commercial interests to long-term security necessities and organize a regime whereby the sale of advanced submarines is slowed or halted entirely.

FURTHER READING

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