

What Were Those Torpedos on the Kursk?

From the EIR Alert, Europe

Russian President Vladimir Putin gave an immediate pardon, on Dec. 9, to American businessman and just-convicted spy Edmond Pope. The pardon represented further reasoned efforts by Presidents Putin and Bill Clinton, as in the case of the sinking of the Russian submarine the *Kursk*, to prevent an adversarial relationship from hardening between Russia and the United States. The two Presidents had discussed Pope's Moscow conviction by phone on Dec. 8—as they had immediately discussed the *Kursk* sinking on Aug. 14, when it threatened a full nuclear crisis.

New evidence has kept the issue of how the *Kursk* was destroyed, simmering between the two nations. On Dec. 6, Norway's TV-2 reported that a U.S. nuclear submarine did arrive damaged in Bergen, Norway on Aug. 17, fresh from the site of the sinking of the *Kursk*, as Russia had asserted; and a Norwegian Rear Admiral confirmed that Norwegian interceptor aircraft had to chase off Russian planes which were entering Norway's airspace in pursuit of the American sub.

And, Pope's conviction for espionage involved his acquisition of data about an extraordinarily potent Russian torpedo, known as the "Shkval" design, two dozen of which had been installed on the *Kursk*, as well as on other hulls of Russia's much-reduced submarine fleets. Russia's defense budget has fallen, as its economy has been looted during the 1990s, to less than 5% of the defense spending of the United States. In 1991, Russia had about 180 nuclear submarines in action, and now less than half that number. But, during the second half of the 1990s, they were equipped with a "super-torpedo" which NATO has neither been able to match, nor to copy. Pope was convicted of purchasing documentation about the "Shkval" from Prof. Anatoly Babkin, himself also convicted of espionage and then freed, though not allowed to leave Moscow.

The "Shkval" ("Storm") torpedo travels through the water at speeds variously reported at 200-300 miles per hour, four to five times the speed of any torpedo fired from NATO submarines; fast enough, in exercises, to accomplish the "kill" of a submarine or surface ship before the NATO commander even knows that it is under attack. The "Shkval" can be fired from distances up to 7-8 miles, and at water depths to 400 meters. The breakthrough did not come from any advanced computer hardware or software, as witness the fact that inten-

sive NATO-nation study groups have been unable to replicate it. Rather, it is the fruit of actual discovery of physical principles in hydrodynamics, beginning nearly 40 years ago with the work of Mikhail Merkulov at the Hydrodynamics Institute in Kiev, Ukraine, and continued by Soviet and then Russian scientists. In that, it is a reminder of the remaining great potential strength of Russia and Ukraine, ruined as they have been economically—the broad and fruitful Riemannian scientific tradition of their technical elites.

German Reports

The most informative general coverage of the characteristics of the "Shkval" appeared in the German daily *Frankfurter Allgemeine Zeitung* on Dec. 8. German intelligence expert Udo Ulfkotte wrote that for years, America has been seeking the secret of the Russian super-torpedo, first displayed at military exhibits in 1995. According to *International Defense Review*, American researchers intensified work at the Naval Undersea Warfare Center in Newport, Rhode Island, where they have made progress on a comparable torpedo technology, but lack the long-term technological experience to develop it.

The problem involves what is called cavitation, a process accompanying all motion of solid objects through water.

The friction of the layer of water lying against the moving body's surface (1,000 times the drag of air resistance) increases its drag in proportion to the cube of the object's speed; so, each improvement in propulsion technology produces a smaller and smaller increase in underwater speed. Cavitation, the formation of bubbles and pockets of air around the underwater object, has always been seen as a second barrier to speed, because the propeller of the ship or torpedo cannot generate propulsion to the extent it is surrounded by air. Cavitation also generates pressure causing "pitting" erosion of the metal surface of propellers and hulls.

The breakthrough begun at Merkulov's Ukraine NII-24 research center in the 1960s, was to view cavitation not as a menace to propulsion, but an aid to it. Under certain conditions, *supercavitation* replaces ordinary cavitation: A single giant bubble, or supercavity, envelops the entire moving object. Paradoxically, a *less streamlined nose and shape for the torpedo* at higher speeds, seems to be required. When the body, moving through the water, is encased in a supercavity of air, like a shock front, the frictional drag of the water disappears everywhere except at the nose of the torpedo. An Indian scientist familiar with the concept, Rudra Pratap of the Indian Institute of Science in Bangalore, was quoted, "Now, if you ask me why, I would not be able to answer. It is complicated, and I am not sure if the fluid mechanics community understands it yet."

The question, offering also the possibility of supersonic submarine travel in the future, is a useful matter for U.S.-Russian strategic cooperation.