the research stations which the United States and the Soviet Union have maintained on the ice for years."[115]

The US Defense Advanced Research Projects Agency (DARPA) has also been developing sensors that, once placed on the ice pack, would communicate submarine surveillance data via a specially designed satellite (the experimental version of which is known as the "Glomr") to ships or ground stations.[116] Soviet nuclear-powered icebreakers have reached the North Pole on two occasions in recent years, and many Arctic and icebreaking specialists predict that regular transits of the central Polar Basin by a variety of icebreaking vessels is a likely prospect for the future; some claim that it can be done with today's technology. Eero Makinen, the President of Wartsila Arctic Inc., the Canadian subsidiary of the world's leading builder of icebreakers, has suggested that the introduction of surface warships in the central Arctic is probably inevitable once commercial activity increases. As he puts it: "Although [such ships] are of no real use to anybody, I cannot foresee the Arctic Seas with heavy commercial activities without the existence of naval fleets."[117]

Finally, the use of hovercraft (surface-effect vehicles, or SEVs) for military missions in the Arctic has long been contemplated. A DARPA study, conducted during the early 1970s at a cost of over $5 million, suggested no fewer than 37 individual military applications of such vehicles in the Arctic, ranging from armoured reconnaissance and scout vehicles to a mobile intercontinental ballistic missile platform. Preliminary designs were completed for three SEVs ranging in size from 36 to 453 metric tons, capable of carrying loads of 27 and 90 tons, respectively, over 2.4- to -3-m ice ridges, pack ice, and tundra at cruising speeds of 60 knots.[118] More recently, it was

115. Atkeson, "Arctic Could Be a Hot Spot in Future Conflicts," *Army*, January 1986, p. 14.

116. See: "Arctic ASW: Sub Hunting Beneath the Ice," *High Technology*, July 1985; "Relay Satellite Launch," *Aviation Week and Space Technology*, 28 October 1985, p. 20; and Hamlin Caldwell, "Arctic Submarine Warfare," *Submarine Review*, July 1983, pp. 11-12.

117. Makinen, "Overview of Arctic Operations in East and West," unpublished paper, January 1984, p. 12.

118. See: N. Ray Sumner, Jr., and Raymond D. Manners, "Arctic Surface Effect Vehicles," *Arctic Bulletin* 2:7, 1975, p. 33; "ARPA," *Arctic Bulletin* 1, Winter 1974, p. 133; and "Advanced Research Projects Agency," *Arctic Bulletin* 1, 1975, p. 258.