

Executive Summary

The effects of climate change are slowly opening Arctic sea lanes that have previously only been accessible by specialized marine cargo and research vessels. Scientists predict that by 2030 the region will experience ice-diminished summers and expect an increase in commercial shipping, resource development, research, tourism, and strategic focus. The 2009 *US Navy Arctic Roadmap* outlines the Navy's action items from FY10-14, one of which is the investment in weapons, platforms, sensors, command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR). This goal can only be achieved by acquiring the right capability at the right cost and right time to meet combatant commander requirements for the region. The goal of this project was to develop an Arctic capable surface combatant to meet the Navy's future mission requirements.

The ACS will be a continental US (CONUS) based platform and conduct extended, independent operations in the opening Arctic waters. Its overarching objective will be to provide a US Navy presence in the region to secure vital national interests. The vessel's operational profile was determined from climatic conditions and emerging concerns of the Navy. It is assumed that the ACS's operations will be primarily conducted during the summer and fall when ice conditions allow for increased maritime traffic.

The ACS will be the US Navy's looking glass into a currently opaque region and with its organic assets, increase the awareness of the Arctic maritime domain. Major mission areas include C4ISR, Surface Warfare (SUW), Search and Rescue (SAR), and Humanitarian Assistance and Disaster Relief (HADR). To accomplish these missions, the ACS hull was designed to the American Bureau of Shipping (ABS) Polar Class 4 rules and guidelines, enabling the vessel to operate independently in the Arctic year-round. The design incorporates a flexible Mission Bay capable of housing up to 10 twenty foot equivalent units (TEU) and either a hovercraft or landing craft. A 30 ton boom crane and cargo elevator on the starboard side loads and unloads the Mission Bay. The diesel Integrated Power System (IPS) and Zonal Electrical Distribution System (ZEDS) provides an efficient and redundant shipboard power architecture, enabling a range of over 17,500 nautical miles. Azipod propulsion has become standard in polar capable ships and was selected for the design because of its reliability and superior maneuvering characteristics. The ACS, while providing persistent ISR, can also project power through its MK-110 57mm main gun, 24 MK-41 Vertical Launch Cells, and two embarked MH-60R helicopters. Extra weight and space margin leave open the possibility of installing a higher power 3D air radar and a sonar suite. Due to the harsh Arctic environment, three enclosed polar lifeboats were placed onboard, providing adequate capacity for all crew and embarked personnel.

As a class of six ships, the ACS will persistently monitor commercial and military traffic in the Arctic, direct humanitarian and disaster response operations, project offensive power when necessary and adapt to the changing environment. The ACS will be a flexible surface combatant designed to fulfill the Navy's emerging requirements for an Arctic presence.