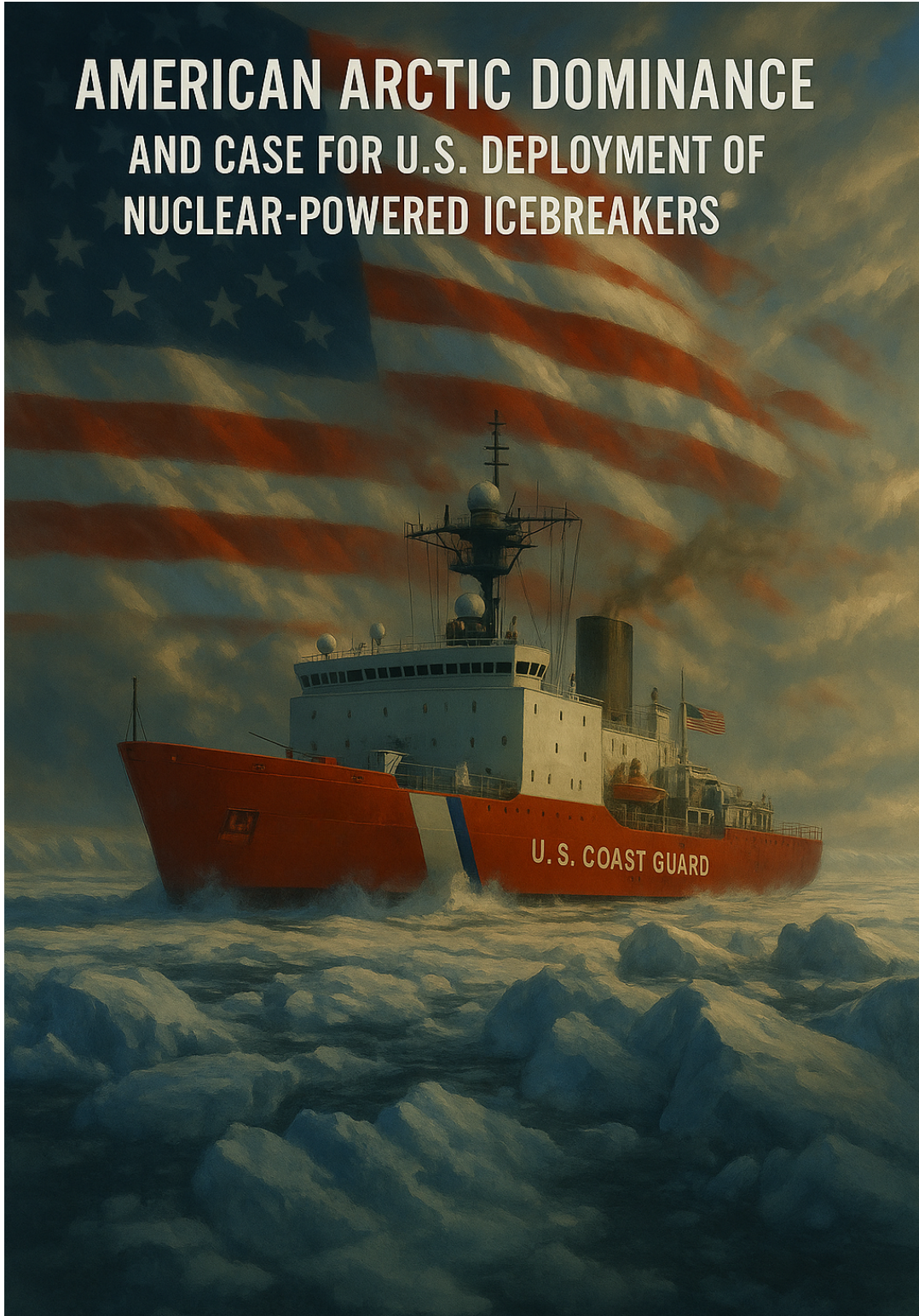


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Lightbridge

White Paper

AMERICAN ARCTIC DOMINANCE AND CASE FOR U.S. DEPLOYMENT OF NUCLEAR-POWERED ICEBREAKERS

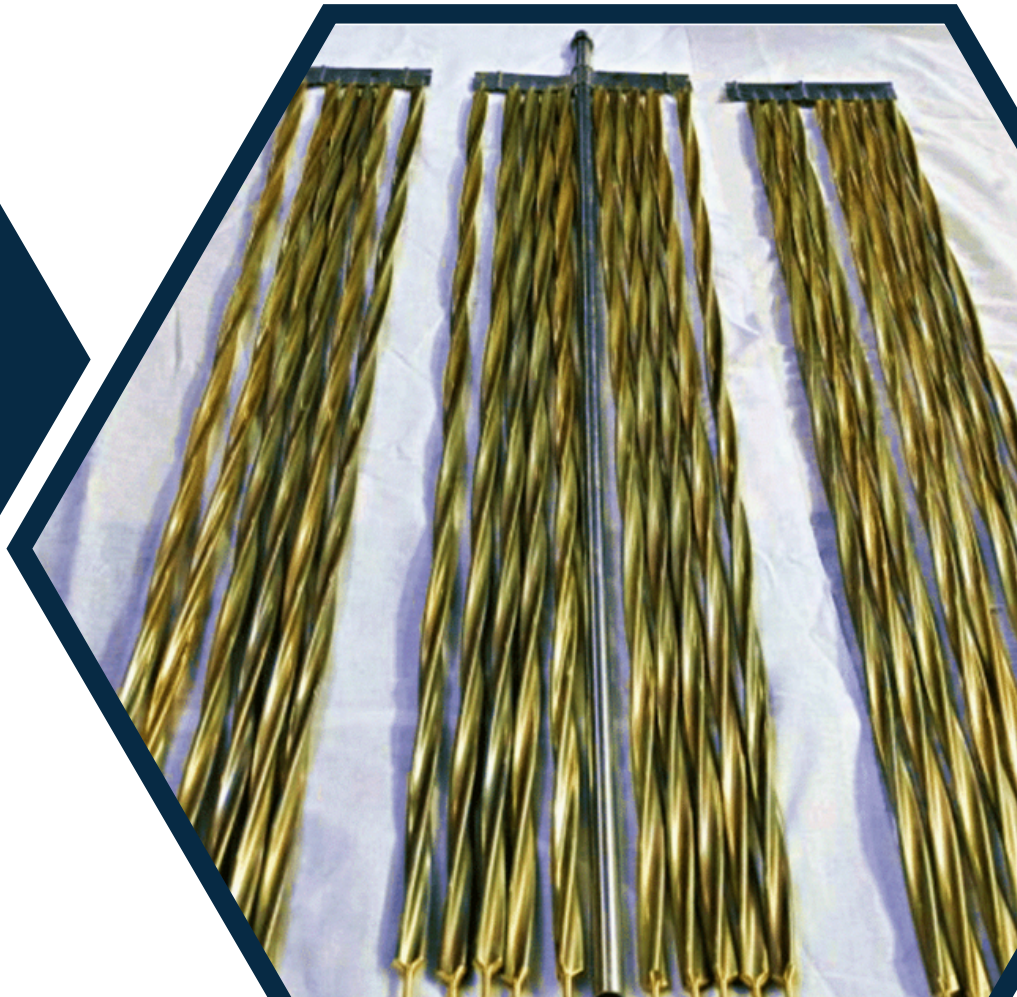


June 2025

About Lightbridge

Lightbridge Corporation (NASDAQ: LTBR) is focused on developing advanced nuclear fuel technology essential for delivering abundant, zero-emission, clean energy and providing energy security to the world. The Company is developing Lightbridge Fuel™, a proprietary next-generation nuclear fuel technology for existing light water reactors and pressurized heavy water reactors, significantly enhancing reactor safety, economics, and proliferation resistance. The Company is also developing Lightbridge Fuel for new small modular reactors (SMRs) to bring the same benefits plus load-following with renewables on a zero-carbon electric grid.

Lightbridge has entered into two long-term framework agreements with Battelle Energy Alliance, LLC, the United States Department of Energy's (DOE) operating contractor for Idaho National Laboratory (INL), the United States' lead nuclear energy research and development laboratory. DOE's Gateway for Accelerated Innovation in Nuclear (GAIN) program has twice awarded Lightbridge to support the development of Lightbridge Fuel over the past several years. Lightbridge is participating in two university-led studies through the DOE Nuclear Energy University Program at Massachusetts Institute of Technology and Texas A&M University. An extensive worldwide patent portfolio backs Lightbridge's innovative fuel technology. Lightbridge is included in the Russell 2000® Index and the Russell 3000® Index. For more information, please visit www.ltbridge.com.



American Arctic Dominance and Case for U.S. Deployment of Nuclear-Powered Icebreakers

The United States faces a developing crisis in the Arctic, where our adversaries have the advantage because, unlike the U.S., they have existing and planned nuclear-powered icebreakers, allowing them easy access to shipping routes and areas for critical mineral extraction that the U.S. cannot as easily access without nuclear-powered icebreakers. American dominance in the Arctic regions will continue to be vital to our nation and our allies, and the U.S. should take the lead in deploying nuclear-powered icebreaker ships.

Strategic Gap between the U.S. and Our Adversaries

The Arctic is rapidly growing in geopolitical and economic significance due to receding ice. New maritime routes are opening, significantly shortening global shipping lanes, and offering unprecedented access to vast untapped natural resources, including oil, gas, and rare earth minerals.

Currently, Russia holds a commanding lead with seven nuclear-powered icebreakers in operation and several more under construction, including the massive Project 22220 and Lider-class vessels, which are designed to keep Arctic shipping lanes open year-round. China also has a major program to deploy nuclear-powered icebreaker ships, even though they do not border the Arctic.

In stark contrast, the United States has zero nuclear-powered icebreakers, with only two conventionally powered heavy icebreakers in service, one of which, the aging Polar Star, was commissioned in the 1970s. By investing in its own nuclear-powered icebreaker fleet, the U.S. can begin to close this strategic gap, assert its sovereign interests, and prevent potential adversaries from monopolizing critical passages and Arctic resources.

While the U.S. is working to add new conventionally powered icebreaker ships, including contemplating the purchase of such ships from Finland, these ships will be inferior to Russia's nuclear-powered ships. The strategic advantages of nuclear propulsion are well established by the U.S. Navy's nuclear-powered submarines and aircraft carriers and their ability to project ever-present American dominance across the globe. These strategic advantages should also be extended to our nation's icebreaker fleet in the Arctic.

The Role of the U.S. Government

We believe a U.S. government program backed by Congressional authorizations and appropriations could develop a U.S. nuclear-powered icebreaker in approximately three years. Since the U.S. is already working with Finland to develop conventional icebreaker ships, this relationship could be leveraged to allow the U.S. and Finland to develop a nuclear-powered icebreaker ship platform in a timely manner into which the nuclear propulsion system could be inserted.

Lightbridge Fuel™

Lightbridge Fuel, with its advanced metallic nuclear fuel technology, presents a compelling solution for powering U.S. nuclear-powered icebreakers using a variant of High-Enriched Uranium (HEU), as in other Navy nuclear-powered ships. In fact, Lightbridge's commercial fuel design was inspired by a proven icebreaker fuel, which was specially adapted for use in commercial nuclear power plants using High-Assay Low-Enriched Uranium (HALEU) with enrichments below 20%.

Unlike traditional uranium dioxide fuel used in commercial nuclear power applications, Lightbridge's proprietary metallic fuel is mechanically robust. It offers superior performance, including a more durable mechanical construction, better heat transfer capability, and greater power density, enabling reactors to be smaller and to operate longer, more efficiently, and safely under extreme conditions ideal for the demands of an icebreaker ship in the Arctic environment.

HEU previously operated successfully for over two decades in Russian icebreakers and would reduce the need for frequent refueling, enhancing the operational range and endurance of nuclear icebreakers in remote polar regions.

Conclusion

Russia and China are leading the U.S. with regard to nuclear icebreakers in the Arctic. This puts the U.S. at a disadvantage in securing access to Arctic shipping routes and access to the region's critical mineral resources. To secure our nations' strategic advantages in the Arctic, the U.S. should embark on an expedited nuclear-powered icebreaker deployment initiative. Our nation should deploy a nuclear icebreaker fleet, the most powerful icebreaker ships in the world. The unique characteristics of Lightbridge Fuel are an ideal power source for the fleet.



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