National Aeronautics and Space Administration

NASA's Impact in Alaska: A Tech Transfer Perspective

You know that NASA studies our planet, our sun, the solar system, and the Universe.
But did you know about the space program's economic impact here on Earth?

In 2011, NASA invested over **$23 million** in the state of Alaska.

Since 2001, NASA's SBIR/STTR Program has invested over
$1.2 billion in companies across the country.

How NASA's SBIR/STTR Program Benefits the U.S. economy

NASA is committed to moving technologies and innovations into the mainstream of the U.S. economy, and the Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) program helps fulfill this goal.

SBIR/STTR stimulates technological innovation by encouraging small, high-tech companies—particularly minority and disadvantaged businesses—to partner with NASA to help meet its research and development needs in key technology areas. At the same time, this program strengthens small companies by enabling them to bring cutting-edge new products into the U.S. economy.

(Visit http://sbir.nasa.gov for more information on the SBIR/STTR program.)

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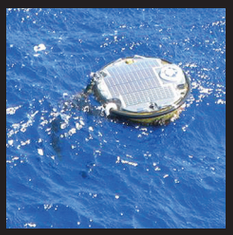
How NASA Spinoffs Benefit Alaska



Satellite-Communicating Buoys Enable High-Tech Hunting for Ocean Debris *(Wasilla)*
Airborne Technologies, Inc. (ATI) teamed with NASA and the National Oceanic and Atmospheric Administration (NOAA) to design a remote sensing system of satellites and solar-powered buoys to locate derelict fishing gear debris from open waters. Abandoned or lost fishing nets, sometimes miles long, are nearly invisible yet devastating to marine ecosystems, as they create a vertical wall of netting up to several hundred meters deep. A hazard for ships, these so-called ghost nets suffocate marine life, damage coral reefs, and if left afloat become dense balls heavy with trapped fish.

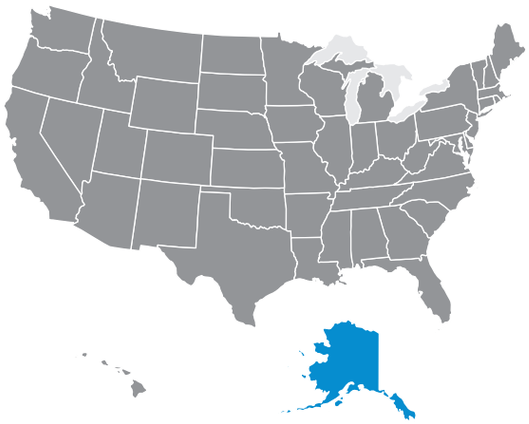
ATI designed the satellite-communicating buoys, about the size of laundry baskets, to monitor ocean currents and locate areas where floating debris is likely to converge. In addition to the buoys, satellites monitor the convergence of ocean currents to help track debris fields. With the narrowed scope, researchers then can deploy sensor-equipped aircraft to find the debris and ships to perform cleanup.

NOAA makes the buoys available to vessels of opportunity, including U.S. Coast Guard and research boats so that when crews spot nets they can tag them with buoys. The tagged nets are then easy to locate and recover. The original collaborative work has also led to the development of an unmanned aircraft system and unique complementary software designed to process ocean images to detect debris fields.

NASA Heat Pipe Technology Protects Alaskan Environment, Guards Against Ruptures *(Anchorage)*
A NASA-developed heat pipe technology is being used for construction and maintenance of the 800-mile Alaskan pipeline. Heat pipes operate as passive heat transfer devices, where a working fluid alternatively evaporates and condenses, transferring heat from one region to another. On NASA spacecraft, this technology controls the thermal extremes that can damage electronics and other systems. For the Alaska oil pipeline, heat pipes keep the ground around the pipeline frozen to prevent pipe ruptures that could spill oil.

The Alaskan permafrost soil alternatively freezes and thaws with seasonal temperature changes, causing surface dislocations. To prevent upheavals in the vicinity of the pipeline, the heat pipe system removes heat from the ground, maintaining the permafrost level during all weather conditions, assuring the load-bearing requirements of the pipeline design. Alyeska Pipeline Service Company applied heat pipes in the design of the vertical supports that hold up the four-foot diameter oil pipeline. Located within the supports, heat pipes contain anhydrous ammonia, which vaporizes below ground and rises and condenses above ground, removing heat whenever the ground temperature exceeds the air temperature. Heat is transferred through the walls of the heat pipes to aluminum radiators atop the pipes.

Heat pipes are now regularly used to enhance the dehumidification performance of conventional air conditioners. They also are used in warehouses and supermarkets where controlled temperatures and humidity are needed to preserve perishable product quality. This technology holds a place in the Space Technology Hall of Fame.



NASA actively seeks partnerships with U.S. companies that can license NASA innovations and create “spinoffs” in areas such as health and medicine, consumer goods, transportation, renewable energy, and manufacturing. When businesses leverage NASA technologies to develop new products, it not only benefits the regional economy, but significantly strengthens the nation’s competitiveness in the global marketplace.

NASA’s centers across the country have helped 22 Alaska companies develop revolutionary spinoff technologies.

Learn more about how NASA innovations benefit the public in *Spinoff*, an annual publication that highlights NASA’s most significant technology transfer successes.
(Available at: http://www.sti.nasa.gov/tto)

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Publication herein does not constitute NASA endorsement of the product or process, nor confirmation of manufacturer’s performance claims related to any particular spinoff development.

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