



Environmental Spinoffs



When Apollo 8 astronaut Bill Anders snapped this historic “Earthrise” photo in 1968, he declared that “We came all this way to explore the Moon, and the most important thing is that we discovered the Earth.” NASA’s work over the past 50 years has continued to teach us about our home planet, as the Agency studies Earth from the unique vantage point of space, with 15 Earth observing satellites now in orbit. In addition to this valuable, direct observation, NASA’s missions have brought about some unexpected tools in our efforts to preserve the Earth and its resources. These benefits are in the form of spinoff technologies—innovations finding secondary use outside of their original aerospace applications—and are just some of the over 1,600 such technologies NASA has recorded.



Microspheres Clean Oil Spills

Industry scientists worked with NASA to create a unique oil remediation product: microcapsules—tiny balls of beeswax with hollow centers. Water cannot penetrate the microcapsule’s cell, but oil is absorbed right into the spheres as they float on the surface. The product can also be used on land.



Remote Sensing Aids Agriculture, Disaster Management

NASA satellite data supports a trio of spinoffs: a service that allows farmers to generate crop prescriptions; educational software designed to familiarize young farmers with geospatial technology; and a Web-based disaster management tool to help officials make informed decisions in real-time.



Solar Research Reduces Cost, Improves Efficiency of Panels

Experimental solar-powered aircraft led to the development of mass-produced, low-cost solar cells offering up to 50 percent more power than conventional solar cells. Homes across the country are now being outfitted with the energy-saving technology.



Lithium Battery Power Delivers Electric Vehicles to Market

NASA contributed engineering experience to the development of an advanced battery management system for electric cars and tested a fleet of the zero-emission vehicles, leading to a series of commercially available, purpose-built, lithium electric automobiles aimed at the urban and commuter environments.



Groundwater Remediation Cleans Industrial Zones

NASA and its partners worked to develop a solvent to remediate the groundwater at Kennedy Space Center launch facilities. The resulting technology uses iron particles in an environmentally friendly oil and water base to neutralize toxic chemicals. Non-exclusive licenses for the technology have been granted to eight companies.



Star Mapping Tools Enable Tracking of Endangered Animals

Employing a star-mapping algorithm designed for the Hubble Space Telescope, a software programmer developed a method for tracking the elusive whale shark using the unique spot patterns on the fish’s skin. The pattern-matching system has been adapted for tracking other rare and endangered animals, such as polar bears and ocean sunfish.



Voltage Control Device Conserves Electricity

Voltage controller technology gradually introduces power to electric motors, eliminating the mechanical stresses of having the device go from dormancy to full activity. It also adjusts the power usage according to the load. Common applications of this device include industrial machinery, as well as elevators and escalators.



Modeling Innovations Advance Wind Energy Industry

NASA scientist Dr. Larry Viterna developed a model that predicted certain elements of wind turbine performance with great accuracy. The model has become the most widely used method of its kind, enabling significant wind energy technologies that are providing sustainable, climate friendly energy sources today.



Nanofiber Filters Eliminate Contaminants

Efforts to improve water conservation and filtration for space travel led to the development of nanofiber filters capable of removing more than 99.99 percent of dangerous particles from water. The filters now purify drinking water on Earth and allow factories to clean and recycle water for industrial use.



Satellite-Respondent Buoys Identify Ocean Debris

NASA partnered with NOAA and private industry to develop remote sensing technologies for protecting the seas by locating derelict fishing nets. These unattended nets damage coral reefs; suffocate marine mammals, sea turtles, and birds; and remain an environmental threat for years.

For more information about NASA spinoffs, please visit spinoff.nasa.gov.