National Aeronautics and Space Administration

NASA's Impact in Kansas: 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 **$4.5 million** in the state of Kansas.

Since 2001, NASA's SBIR/STTR Program has invested over
$3 million in **3 Kansas companies**
and more than **$1.2 billion** nationwide.

How NASA's SBIR/STTR Program Benefits Kansas

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.

The list to the right highlights Kansas businesses that received SBIR/STTR contracts from NASA since 2001. **(Visit http://sbir.nasa.gov for more information on the SBIR/STTR program.)**

NASA SBIR/STTR Companies in Kansas

III-N Technology, Inc.	Manhattan
KalScott Engineering, Inc.	Lawrence
NanoScale Corporation	Manhattan

kansas

KANSAS

How NASA Spinoffs Benefit Kansas

On the Wing: A Business Class Jet *(Wichita)*
NASA and the Cessna Aircraft Company have had a long, beneficial relationship. Starting with use of supercritical wing technology developed by NASA in the 1970s, Cessna has repeatedly relied upon NASA's expertise and test facilities.

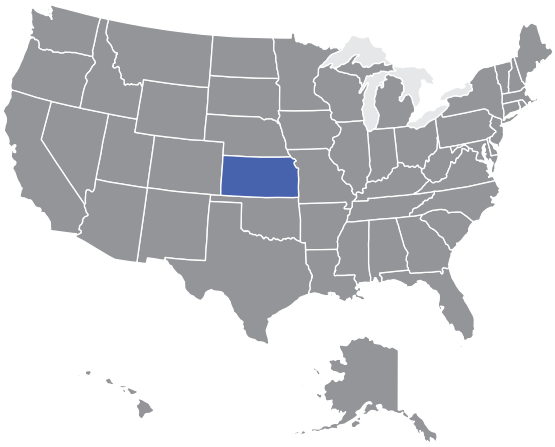
NASA and the Cessna Aircraft Company collaborated on the design of a highly swept, second-generation supercritical wing—capable of Mach 0.92 and a cruising altitude of 51,000 feet. A supercritical airfoil enhances an airplane's performance at speeds near Mach 1 where it can experience mixed subsonic and supersonic airflow over the wing. As the airflow goes supersonic, the supercritical wing's upper surface flattens to minimize the effect of the shock wave. With NASA's help, the Cessna plane became the fastest commercially built business aircraft in the U.S., combining cruising speed with true intercontinental and transatlantic range. Cessna's aircraft was recognized as the top aeronautical achievement in the U.S. for 1996.

Aviation Design Software Speeds Development *(Lawrence)*
NASA and DARcorporation made the art of designing a general aviation aircraft easier and less expensive through their collaborative development of a computer-aided design (CAD) tool. This CAD system helped aircraft design engineers to quickly evolve an aircraft from a paper design or a series of spreadsheets to a finished product, reducing design and development time by 50 percent.

The system was geared toward individuals taking the home-built approach, small manufacturers of general aviation airplanes, as well as students and others interested in the analysis and design of aircraft. DARcorporation's CAD system, which featured ten discrete modules, enabled users to take an existing design and make small changes to just one part of the aircraft and then rapidly determine the impact that modification had on other aspects of the design.

More Efficient Business Jets *(Wichita)*
Both the Learjet 31 and its larger and heavier companion the Learjet 55C feature NASA-developed winglets, the nearly vertical extensions of the wing designed to reduce fuel consumption and improve plane performance. Winglets are lifting surfaces that operate in the vortex, or air whirlpool, that occurs at an airplane's wingtip. This complex flow of air creates drag; the winglet's job is to reduce the strength of the vortex and substantially reduce drag.

The winglet generates its own lift, producing forward thrust like a boat sail. The combination of reduced drag and additional thrust provides significant improvement in fuel efficiency. Winglets are particularly effective on jets that operate at high altitudes (above 45,000 feet). At such altitudes, where the air is thinner, the drag reduction afforded by the winglets is more pronounced. Learjet, Inc. was the first manufacturer to use the NASA winglet design in their production aircraft.



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 17 Kansas 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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