- Ford engineers are developing a highly flexible, first-of-its-kind, patented technology to rapidly form sheet metal parts for low-volume production applications

- Once fully developed, the technology will allow for lower costs and ultrafast delivery times for prototypes – within three business days versus conventional methods that take anywhere from two to six months

- Automotive applications include prototyping, concept vehicles and vehicle personalization; other applications include aerospace, defense, transportation and appliance industries

DEARBORN, Mich., July 3, 2013 – Continuing to lead the way in technology and advanced manufacturing, Ford Motor Company is developing a new form of manufacturing technology that has the potential to reduce costs and delivery time for sheet metal parts needed in smaller quantities.

The development is based on Ford Freeform Fabrication Technology (F3T), a unique, patented manufacturing process developed at the Ford Research and Innovation Center. Through this process, a piece of sheet metal is clamped around its edges and formed into a 3D shape by two stylus-type tools working in unison on opposite sides of the sheet metal blank. Similar to a digital printer, after the CAD data of a part are received, computer-generated tool paths control the F3T machine to form the sheet metal part into its final shape to the required dimensional tolerances and surface finish.

“The technology behind F3T is yet another example of Ford leading

in the advanced manufacturing space," said John Fleming, executive vice president, global manufacturing and labor affairs. "As we forge ahead with cutting-edge technologies in manufacturing like flexible body shops, robotics, 3D printing, virtual reality and others, we want to push the envelope with new innovations like F3T to make ourselves more efficient and build even better products."

Currently, traditional stamping processes are energy-intensive, and it often takes several months for the first part to move from concept to production. While traditional processes remain the most efficient method for high-volume stamping, efficiencies for low-volume production can be achieved with the flexibility F3T provides. Benefits of F3T include:

- **Low cost:** Geometric-specific forming dies are completely eliminated, along with the high cost and long lead time associated with die engineering, construction and machining

- **Fast delivery time:** The technology aims to enable the delivery of a sheet metal part within three business days from the time the CAD model of the part is received. With the current technology, parts are delivered anywhere from two to six months using conventional methods – up to approximately 60 times longer than the potential turnaround time for F3T

- **More flexibility:** Once fully developed, F3T will help to improve the vehicle research and development process, allowing for more flexibility in quickly creating parts for prototypes and concept cars. Currently, creating a prototype die can take six to eight weeks, and developing a full prototype vehicle usually takes several months and up to hundreds of

thousands of dollars. F3T could produce sheet metal parts for prototypes in just days for essentially no cost

F3T has the potential to allow for greater personalization options, adding the ability for buyers to customize vehicle bodywork. F3T is also expected to have broad applications outside of the automotive industry, including use in the aerospace, defense, transportation and appliance industries.

The project is part of a three-year, $7.04 million U.S. Department of Energy grant to advance next-generation, energy-efficient manufacturing processes. Led by Ford, other collaborators include Northwestern University, The Boeing Company, Massachusetts Institute of Technology and Penn State Erie. Five innovative manufacturing projects were awarded a total of $23.5 million by the Department of Energy in March to advance clean manufacturing and help U.S. companies increase their competitiveness.

“The F3T sheet metal forming process is one of many advanced manufacturing technologies under development at Ford,” said Randy Visintainer, director of Ford Research and Innovation. “We developed this process during the past four years for small-scale applications in a laboratory setting, and the DOE award enables us to scale the process for larger applications and a full prove-out for manufacturing feasibility.”