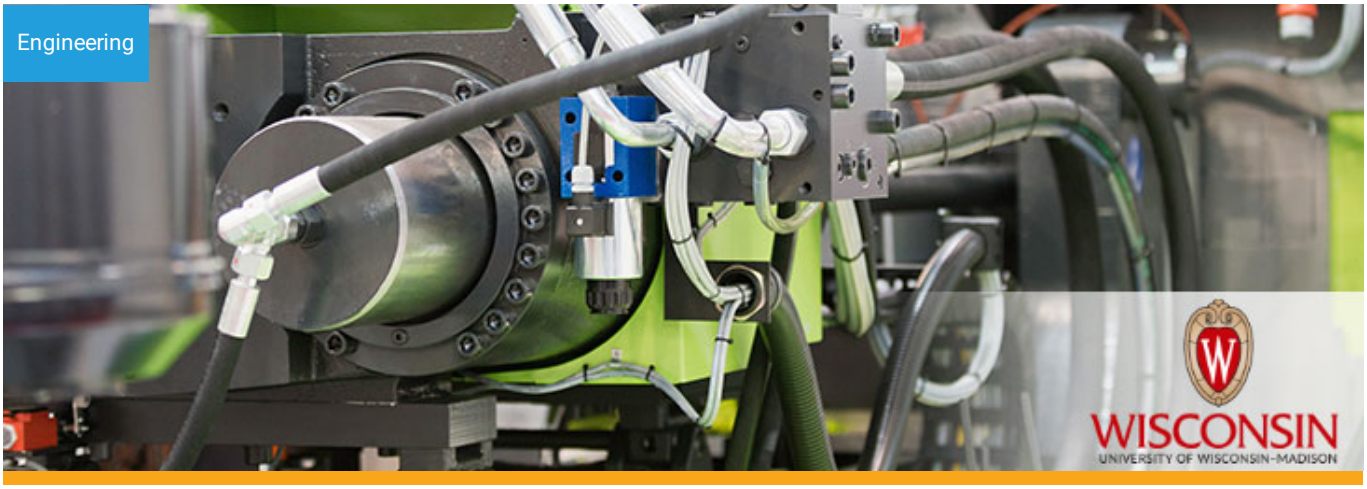
Engineering




# Radial 3-D Printer for Improved Prototyping Efficiency

View U.S. Patent No. 8,778,252 in PDF format.

**WARF: P120012US01**

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**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a radial 3-D printer system that eliminates many of the disadvantages associated with linear motion 3-D printing systems.**

## Overview

3-D printing, or rapid prototyping, makes use of additive manufacturing to produce a 3-D object. Additive manufacturing is the transformation of a virtual design into a physical object by creating successive layers of horizontal cross sections until the model is complete.

Common methods of rapid prototyping employ linear motion mechanisms that move in the Cartesian directions: x, y and z. Fabrication and drive mechanisms associated with linear methods can be costly or difficult, especially for large or very small systems. The fabrication process normally is slow and limited by the speed that the carriage holding the printhead(s) can be maneuvered. A new method of 3-D printing is needed to alleviate the disadvantages associated with liner motion systems.

## The Invention

UW–Madison researchers have developed a non-Cartesian mechanism for 3-D printing. The mechanism comprises a tool movement assembly with an arm extending radially from a first axis to a printhead location; an actuator system that independently controls the rotation, translation and revolution according to control signals; and a printhead attached to the arm at the printhead location that receives control signals to direct a printed volume of material toward the printing surface. The 3-D printing mechanism may further include a system for translating conventional CAD files into the coordinate structure of the present invention.

## Applications

- Fused deposition prototype modeling for thermoplastics and possibly metals or concrete

## Key Benefits

- More efficient and accurate than current methods
- Simple architecture eliminates complexity and cost seen in linear systems.
- More reliable control; helps eliminate places where mechanical losses can occur
- Scalable and flexible
- Multiple printheads on a single arm increase throughput.
- Reduced interference when multiple, independent printheads move over the printing surface
- Mechanically reduces collision areas between the arms
- System may work with conventional 3-D printheads.



## Stage of Development

A prototype rotation platform has been built and the software controls have been written.

**Tech Fields**

- Engineering : Additive manufacturing

For current licensing status, please contact Michael Carey at mcarey@warf.org or 608-960-9867