

# Licensing Opportunity

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## Inexpensive One-Step Rapid Manufacturing of Metal and Composite Parts and Prototypes

### Advantages

- Parts suitable for performance testing under actual operating conditions
- Rapid one-step manufacture
- Capable of creating composite materials with sharp interfaces
- Provides methods to reprocess and refurbish worn and damaged parts

### Invention

A one-step rapid method for the manufacture of 3D prototype parts using the original sample material [U.S. Patents 6,203,861 & 6,526,327].

### Background

Tools, machine parts and materials require extensive testing before large scale production can begin. Often, prototypes are constructed for examination and testing. These prototypes must be made quickly, without the aid of full scale production equipment (as running an entire assembly line for a potential part would be extremely costly and uneconomical). Unfortunately, current methods of rapid manufacturing, such as stereo-lithography, make use of soft tools, molds and castings which create plastic-type fabricated parts. These parts come with many inherent problems since they are not constructed of the same materials for which the actual part will be, serving well for spatial studies but not for functionality tests. Alternate methods have tried to correct these problems, but require numerous steps for fabrication, are costly and time-consuming.

Scientists and engineers at UCF have developed a one-step method for the rapid manufacture of metal and composite parts. This method makes use of a high powered laser applied to either powder or wire which is used to create the part or prototype. The materials are fed onto an XYZ moveable stage which then generates the prototype layer-by-layer. The intensity and shape of the laser beam can be tailored to the user's specific needs with various optics and beam splitters. This is a one-step method that works with a variety of metals and ceramics, it can create composite materials as well as sharp interfaces. Moreover, these parts are created in such a manner that they are suitable for performance testing under the actual operation conditions.

### Application

The technology can be utilized for the rapid manufacturing of metal, ceramic or composite prototypes and parts for testing. It can also be used for refurbishing and fixing localized damage to parts. The method would be of interest to any tool and parts manufactures in any industry (automotive, aerospace, appliance, engineering, etc.) which have a need for rapid prototype creation. The one step method would save both time and money when creating 3D prototypes.

### Lead Inventor

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### Selected References

Jacob, Paul / Rapid Prototyping and Manufacturing: Fundamentals of Stereo Lithography / Society of Manufacturing Engineers / December 1992

Carol Y. Wang / Rapid Manufacturing / [www.csa.com/discoveryguides/rapidman/overview.php](http://www.csa.com/discoveryguides/rapidman/overview.php) / September 2002

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