

Specifications for an Automatic Ceramic/Metal Tape Feed and
Lamination System for a Helisys 2030H LOM™

1. Description/Background

This requirement is for the procurement of an automatic ceramic/metal tape feed and lamination system for a rapid prototyping layered object manufacturing® system (Helisys 2030H LOM™) that is being used at NRL. The 2030H LOM™ as purchased has automatic handling capability only for specialized paper. Tapes of green ceramic and metal powders must be laid up by hand and laminated by hand. Automatic feeding and lamination will lead to a much more consistent product and increase the maximum component build size from 2 to 64 square inches. This unique system will be used in research programs at NRL in rapid prototyping innovative devices using novel designs and developing materials.

2. General Requirements

- The system must work in conjunction and interface with a Helisys 2030H LOM™
- The system must be able to automatically handle sheetstock of green ceramic or metallic tapes
- The system must be able to automatically laminate tapes to a build without using thermocompression

The system to be supplied must consist of all the components necessary to implement the designs and functions itemized in the requirements. The automatic ceramic tape feed and lamination system must meet or exceed the following specific requirements:

3. Specific System-LOM Interface Requirements

- The system must be able to be coupled to and synchronized to work with a Helisys 2030H LOM™
- The system must be able to interface with the 2030H LOM™ LOMslice software
- The system must have the option to pause itself and the 2030H LOM to allow decubing 'on the fly'.

4. Specific Tape Feed and Handling System Requirements

- The system must be able to handle automatically 8" x 8" sheetstock of green ceramic or metallic tapes that can vary in thickness from 0.001 to 0.012 inches
- The system must be able to employ variable tape pickup pressures
- The system must be able to ensure that a sheet, but only one sheet, has been collected for lamination

- The system must come with an interchangeable roller system so that 4" x 4" and 6" x 6" sheetstock can be used

5. Specific Lamination System Requirements

- Lamination must be done automatically via solvent welding using lamination assist solvents
- The lamination system must be able to handle different lamination assist solvents
- The lamination system must be able to have the capability of adjusting the amount of lamination assist solution put down on the sheetstock
- Lamination must be done by via a roller to ensure a coating void of air bubbles and excess pockets of solvents.
- Lamination pressure must be adjustable and no heat should be needed to achieve total conformation of the laminated layer to the build
- The system must come with a starting kit of 250ml of lamination assist solvent as well as an additional 1 gallon of lamination assist solvent and 5 additional application rollers

6. Physical System Requirements

- The system must be a stand alone unit that can be rolled away from the 2030H LOM so that when paper prototypes are desired, the 2030H LOM's automatic paper feed system can be placed back into operation
- The system must have its own internal air compressor

7. Vendor Requirements

- The vendor must provide on-site installation including 2030H LOM modifications and system set-up
- The vendor must provide an one inch stack of 8" by 8" sheetstock of zirconia green ceramic tape (0.010 inches thick) for a complete on-site system check
- The vendor must provide one day training on-site for the system when it is fully operable and furnish a training video and manual
- The vendor must provide 24 inches of partially-stabilized yttria-doped zirconia sheetstock (0.01" thick by 8" x 8") for use in their system
- The contractor must certify that their automatic ceramic/metal tape feed and lamination system for a Helisys 2030H LOM™ shall perform as described in the above requirements. All capabilities must be demonstrated during the initial installation and will be reviewed prior to final acceptance of the system. The government reserves the right to refuse any variance from these specifications.