Rapid Fabric Cutter

Design a micro-array mechanical cutter for a “unit order” apparel enterprise

A consortium of representatives from Government, academe, and industry are working to make a significant improvement in the apparel design/supply chain. New enterprise technology is being developed which will result in “just-in-time” supply of custom fit (CF) clothing items. In the full extension of the concept, customers’ fit and fashion requirements are satisfied soon after specifying and ordering.

A key element in the supply chain is automatically cutting out “unit orders” (UO) of clothing items from computer generated fashion designs. Current UO technology (eg: http://www.lacent.com; http://www.rdlasercutters.com) approaches today’s “mass cut” technology of about 10 UO’s per $ of investment. Typically this technology provides a means to reflect a coherent light beam from a CO2 laser to a focusing head which is rapidly moved (up to 8ft/sec) by robotic servo sub-systems across an “X-Y” plane above a web of apparel material. The head focuses the laser energy downward, cutting the fabric.

A revolutionary design concept is desired for high productivity cutting that is accessible to small businesses, which would enable them to participate in the CF supply chain. An order of magnitude increase in productivity is projected to be required; and manufacturing system complexity and capital must be significantly lower than today’s technology to enable small business entry.

A number of advanced cutting concepts have been proposed but your team has received venture funding to focus on how to design an array of mechanical micro-cutters positioned across a moving fabric web that could respond to a computer based apparel pattern design system. Each micro cutter would independently actuate when signaled by the CAD system according to the custom pattern. Design the micro cutter and rationalize the key “life”/cost tradeoff of the cutters in the context of an overall cutting system that could afford participation in the overall enterprise at reasonable economic value.