

Abstract (250 word limit)

Industrial Scale-Up and Production of Vertically Aligned Carbon Nanotubes for Next Generation Nano-Enhanced Composites

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N12 Technologies, Inc. (N12), the commercial provider of a leading nanotech-based solution for strengthening composites, partnered with the University of Dayton Research Institute (UDRI), developer of the world's largest roll-to-roll nanomaterial reactor, to enable high-volume production of an interlaminar reinforcement product, NanoStitch®.

NanoStitch® is made from vertically aligned carbon nanotube (VACNT) sheets that are applied to conventional prepregs as a "drop-in" material, requiring no changes to downstream fabrication. NanoStitch® acts as an interlaminar reinforcement improving shear, fatigue, compression, and damage tolerance properties. The only problem was the product was originally produced on small-scale equipment.

UDRI developed the 60" Nano-Adaptive Hybrid Fabric (NAHF-X) System, which was built to synthesize nanomaterials on continuous substrates up to 5 feet wide. The NAHF-X system was compatible with manufacturing VACNTs.

The ensuing partnership between UDRI and N12 was logical. The result was the largest industrializeable process for manufacturing VACNTs also suitable for composite reinforcement. Hundreds of thousands of square meters of annual production must be reached to meet the demands of aerospace, automotive, and consumer goods. Other nano-based products that failed to make it to market cost as much as the price of gold. Partnering enabled production at a sufficiently low cost to promote widespread usage.

This partnership was aided by investment from Jobs Ohio (JO) the Institute for Advanced Composites Manufacturing Innovation (IACMI). The current IACMI/JO project is focused on increasing production scale while maintaining uniform quality. This talk will describe the technology, impact on performance, and the status of scale up for manufacturing.