

A PATH FOR COMPOSITE MATERIALS DEVELOPMENT

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The author will present his view of how to move beyond the current state of the art in composites for large commercial transports by using these as a starting point to outline a path for the development and maturation of new materials, tools, and processes for aerospace. Technology areas such as nanomaterials, modeling, quality control, and scale-up will be discussed in some detail with a focus on how these need to be matured or adapted for aerospace usage and how they address the persistent need for improved performance at reduced weight. Ongoing work in several technologies will be presented relative to how they fit into the maturation of next-generation composites and tools for developing new composite materials. Scale-up will be illustrated by examples in modeling moving up from material-property-level requirements to system-level performance and moving down to micro and submicron level. These illustrations will be used to show an approach for effectively moving between scales in modeling, testing, fabrication, and design. Links between large-scale part fabrication and the development of new or improved materials and processes will be shown and examples of how the proposed approach can help to drive improved performance and manufacturing efficiency will be given.