

Background: Design modeling for complex contoured composite structures is complicated by the affect of fiber angle changes when going around geometric features in a complex (non-flat) part. This angle change has the effect of changing the composite material properties. Secondly, to make composites for shaped parts it is often necessary to 'dart' material so material does not overlap. Thirdly, it is desirable to capture the angle changes and use them in analysis. Lastly, transferring the ply patterns to automated manufacturing centers is for ply cutting and pattern lay-up is needed for accuracy and efficiency. This SOW defines software that can help the GSFC design team establish composite designs, and provide for automated manufacturing, and assist with analysis for these complex shaped composite structures.

Requirements:

Provide composite design software with the following capabilities:

Perform draping simulation and generate fiber angle/fiber paths based on imported CAD design geometry. Capable of identifying areas of wrinkling, bridging, etc. (graphically report the information) based on the user's set allowable.

Allow development of composite ply cut patterns and output these patterns to automated ply cutting machines.

Take given composite ply cut patterns and define ply edge position for a given geometry, adjusted ply layer by ply layer to the total part thickness, and provide the ability to produce a laser projection file for laser projection systems to use in complex shaped part manufacturing.

Provide a method to take given fiber angles for a given Pro engineer created geometry and interface with finite element modeling for property modification and predictions.

Provide one year of software maintenance, support and upgrades

Provide at least 3 days of training at GSFC, travel included.

Period of Performance:

Install software on GSFC servers, and provide training by 30 Sept 2014

Delivery

NASA/GSFC

Building 5

Greenbelt, MD 20771