Sponsor Background: Alcore Corporation originated in the 1960's as the leader in providing high-quality, lightweight structural honeycomb materials to the aerospace, nuclear and marine markets. Our products make aircraft lightweight without compromising the strength of the airframe. Using proprietary process, we convert aluminum foil into corrosion resistant, high strength honeycomb which we machine into complex shapes and very close tolerances. We supply both military and commercial aircraft in fixed-wing and rotary applications.

Project Goal: The team will build autoclave-cured composite jet engine components; specifically thrust reversing blocker doors. This project bridges the gap between the design as created on CAD, and the routine production of the finished part. While the designers are very specific about what materials are used and in what geometry, the specifics of the manufacturing process are left to the part manufacturer. The transition from the theoretical drawing to the physical part is the work product (and career) of composite engineers. This project will present the team with a real jet engine component and have them create the processes to take it from the Catia model to a quality-approved physical part.

They will design the layout the composite skin sections, Alcore will cut them on our prepreg cutter. Then the team will lay them up and work out the autoclave cure cycle to create a properly laminated composite skin structure. The skins will be inspected using ultrasonic NDT to validate proper lamination. If time allows, the team will then bond the composite skins to honeycomb core to make a finished component.

Project Framework: The team will design the cut pattern for each layer of carbon fiber composite material. Alcore will provide the cut material as a "kit", which the team will lay the cut prepreg sheets up on a Alcore-supplied tool and vacuum bag them. They will then work out the autoclave cycle temperature & pressure profile to create a properly bonded composite skin.

Benefits to Alcore: This project will be the basic R&D in support of our forward integration into finished subassemblies. We expanding production and buying autoclave capacity to forward integrate into this market segment.

Follow-On Plans: Alcore will use the process learning documented by the team as the basis of our forward integration into producing finished aircraft components.