

AMES: Superfinishing of Cutting Tools and Aerospace Components: Phase II

Team Composition: ME/MET, MSE

Sponsor: GE Aviation



Project Description: The performance of cutting tools and aerospace components are affected by the surface texture of the part. It is believed that honing and other superfinishing processes applied to cutting tools could also be utilized on aerospace components. Honing and/or superfinishing of cutting tools is can result in improved cutting tool performance leading to longer tool lifetimes, higher metal removal rates, and lower production cost



due to a more robust process. A strategy to superfinishing aerospace airfoil components (titanium and Inconel) while maintaining leading and trailing edge contours should improve aerodynamic performance resulting in improved specific fuel consumption (SFC) and lower component lifecycle cost. As a continuation from last year's AME project, this project will evaluate various methods to hone cutting edges and polish carbide cutting tools to improved performance and evaluate which processes may also be effective for superfinishing components used in aerospace applications. Specific areas of emphasis for this year's phase II project include: review/optimize DOE test parameters to produce more gradual (linear) tool wear; inspect all cutters before edge treatment and before wear experiments; increase sample size to improve experimental signal: noise ratio; run experiments using single flute cutter design; and leverage findings on a limited study with multi-flute cutters.