

Project Data

Production R&D Development Project#: FF-LIFT-021617-A-002 Date#: 2/16/17 Company: #####

Title & Goal

Title: Aircraft Engine Aluminum Fan Case – Bolt Hole Repair

Goal: Scale-up (from MRL4) and demonstrate (to MRL7), a weld repair addressing elongated/corroded bolt holes in aircraft engine aluminum alloy fan case flanges while meeting mechanical property requirements.

Problem / Needs

Business Case

Impact

Corrosion on aluminum aft fan case bolt holes, flanges, and inner diameter surfaces has led to a high volume of departure records (DRs) – DRs document conditions on parts that do not meet requirements. DRs that cannot be addressed by blending, reaming, metal spraying and bushing repairs lead to scrap cases and cost pressure. There is a need to weld-repair fan case flanges.

Problem/Statement

Aluminum alloys are widely used to make cases in the “fan/booster” section of aircraft engines – newer engines are moving to composite cases but considerable aluminum alloy cases are still in use. As an example, the CFM56-5B engine that powers the Airbus A318/A319/A320/A321 and Boeing 737 aircraft, uses an aluminum fan case. Fan cases have hundreds of bolt holes for mechanical fastening; due to galvanic action and service loads, bolt holes can get elongated or corroded. As cycles accumulate, holes have to be “plugged” and re-drilled. The company has developed a technology (to MRL4) that addresses weld-repair of elongated/corroded bolt holes. A plan to demonstrate full-scale repair and meet mechanical property requirements can deliver this technology to MRL7.

Figure 1



Deliverables

Financials

Difficult-to-source spares is driving the need to repair scrap cases on CFM56-5B. Estimated cost impact is over \$1M annually. The company foresees this project budget at approximately \$400k. The company will provide 50% cost share.

Deliverables

Primary deliverable for this project would be weld-repair process demonstration on a CFM56-5B case repair that produces acceptable microstructure/hardness, acceptable case distortion, and one that meets mechanical property requirements.