



Defense-Wide Manufacturing Science & Technology (DMS&T) Program

Cold Spray (CS) Repair & Rebuild Technology

PROBLEM / OBJECTIVE

Mission readiness rates are suffering due to the lack of qualified repair processes and corrosion/wear prevention treatment to magnesium gearbox housings and aluminum parts on numerous fixed wing and rotary platforms. At any given time, 20% of the rotary wing fleet, of all services, are affected by sustainment and safety issues.

APPROACH / BENEFITS

Approach

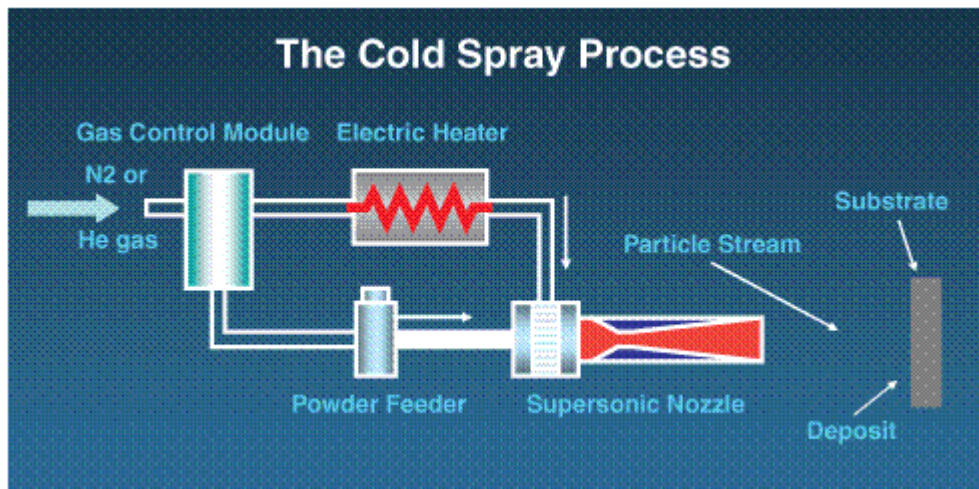
- Cold Spray (CS) is a process that deposits atomized metal via high velocity to restore components to their original state after being subjected to wear and corrosion through operational use. This is graphically illustrated in figure 1.
- Develop optimal CS process parameters for production applications that impact sustainment to multiple service platforms. Presently addressing UH-60, B-1, F-16, and F-15 candidate parts, and one UH-60 part has been qualified.
- Demonstrate an automated production system to accommodate complex shapes and define repair procedures for spray path, angle, traverse rate, working distance, nozzle size fixtures, robot programming, surface preparation, excavation shape, fill depth, finishing, and finally blending.

Objectives

- Develop production process for repaired parts which emulate OEM production processes to ensure part functionality.
- Demonstrate Cold Spray **can be used** on All Platforms – air and ground vehicles. Can also be used on other substrates (Al,Ti,steel)



Figure 1



Expected Benefits and Warfighter Impact

- Systems Benefited: H-60, H-64, H-53, CH-47 & all helicopters; fixed wing (F-35 etc), Expeditionary Fighting Vehicles (EFV), Mg gearboxes and Mg or Al parts.
- Multiple use: can be applied to other materials (i.e. Al, Ti, steel & Bronze) and used to produce other coatings (Ni, MCrAlY).
- Reduced condemnations - Aviation Missile Command (AMCOM) Storage, Analysis, Failure Evaluation and Reclamation (SAFR) Program
 - Fleet impact ~\$100M entire helicopter fleet
 - \$17.75M for H-60 alone (Sikorsky estimate)

POINT OF CONTACT

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88ABW-2013-4576

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