

Outcomes of the Corrosion Prognostic Health Management (CPHM) Capability and Technology Demonstrator (CTD)

John Jacob, Rob Findlay, Simon Jacob, and James Waldie, BAE Systems Australia.

Tony Trueman and Andrew Butler, Defence Science and Technology Organisation (DSTO)

Abstract (200 words max):

The operating cost of Australian Defence Force aircraft is driven partly by the need to inspect and repair airframes from corrosion damage in order to maintain their safety and airworthiness. Like the other elements of aircraft structural integrity monitoring programs (usage and fatigue), corrosion should ideally be managed under a similar regime. The CPHM CTD project was created as an initiative to determine, through detection and prediction of corrosion inhibitor depletion and pitting corrosion, whether it would be possible to manage corrosion using a similar approach. The CTD project employed a suite of sensors, installed in relatively severe and benign corrosive aircraft locations, to collect data on internal aircraft environment, coating degradation, and corrosion levels on witness plates, over a period of approximately one year on 4 of the RAAF's Hawk aircraft, under typical operational conditions. Two models were employed; one to predict atmospheric pitting corrosion of aircraft aluminum alloys, and one to predict the time to inhibitor depletion and commencement of pitting for painted external surfaces of an aircraft. The output of the CTD project provided a number of insights into the effectiveness of potentially using this approach to identify improvements to maintenance engineering analysis and maintenance decision-making.