

Systems Engineering Approach to PHM in Aerospace

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ABSTRACT

Systems engineering approaches to PHM are established by first capturing the right data. Understanding prominent component failure modes and their system level effects allows engineers to target necessary sensing feedback to enable precise prognostics algorithm development. For many commercial aircraft, however, requirements for PHM are either not identified or not prioritized in advance of entry into service (EIS). As the design of aircraft systems evolve, adding sensors is essential to comply with baseline performance requirements, such as robust operation throughout the design envelope, fault detection via built-in test (BIT), and safety via backup and protective controls. Conversely, weight reduction efforts during aircraft systems design often result in lean sensor architectures. Incorporating PHM requirements early in the aircraft design process will enable more robust sensor architectures and enhance PHM capabilities.

This presentation will review design considerations for commercial aircraft systems as they relate to PHM; including sensor provisioning and BIT functionality. Examples of prognostics algorithm development for legacy system architectures will be discussed. The future of designing aircraft systems for PHM will also be explored.