RARE EVENT ANTICIPATION AND DEGRADATION TRENDING FOR AIRCRAFT PREDICTIVE MAINTENANCE

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In recent years the concept of predictive maintenance in complex technical systems is gaining popularity. It is designed to help determine the condition of in-service equipment in order to predict when maintenance should be performed. This approach promises cost savings over routine or time-based preventive maintenance, because actions are performed only when warranted. To the date there exist several successful application of the concept in the different areas of technology including US navy cost reduction for maintenance [1], increase of safety and reliability of distributed power systems [2] and automated search for faults in power systems [3]. In this study we examine problem of the effective aircraft maintenance in operation.

Predictive maintenance for aircrafts involves data collection, handling and processing. In this paper we describe two approaches for aircraft failure anticipation illustrating them applied to two 'prove-of-the-concept' examples from real aircraft operations. The goal of the ongoing project in Airbus is to develop a full support automated system for the early warnings for possible costly faults.

In order to build up such a system several problems should be considered. The first is a multidimensional data trending to be able to trace the known degradation processes.

And the second is a problem of rare event prediction to be able to anticipate some specific families of faults.

Classical statistical approaches are ineffective for low frequency and high consequence events because of their rarity. In this paper we try to adapt existing approaches for rare event prediction.

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