

BREVET DE TECHNICIEN SUPERIEUR

MAINTENANCE ET EXPLOITATION DES MATERIELS

AERONAUTIQUES

EPREUVE U2 : ANGLAIS

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HEALTH CHECK

The USA's Defense Advanced Research Projects Agency aims to develop a system that can ask an airframe or engine how it really feels.

GRAHAM WARWICK / WASHINGTON DC

Today's maintenance industry - airframe and engines, civil and military - is built around the principle of regular inspections at intervals determined during design and testing to provide the best chance of detecting and repairing damage before it becomes critical. That could change, if a programme launched by the US Defense Advanced Research Projects Agency (DARPA) succeeds in demonstrating technology to interrogate an airframe or engine and determine its fitness.

[...]

DARPA aims to develop technology to manage the fleet based on individual and actual aircraft capability, and not on a statistical basis. At the heart of the concept is the fact that damage begins with microstructural changes before a detectable crack has formed, and evolves with time and use in a predictable way. "The programme will attempt to identify the physics of failure and the evolution of damage, and predict what comes next," says Christodoulou.

At any point in an airframe or engine's life the system will make a prediction of its near-term capability - "in 10, 100 or 1,000 cycles, not tens of thousands", Christodoulou says - based on failure physics and damage evolution models.

"The models are imperfect, and will not capture all events, so we will modulate the prediction with interrogation technology that will provide us with state awareness." In other words, sensors will indicate whether the models are overestimating or underestimating the life remaining on an airframe or engine component.

Instead of a time - or cycle-based maintenance regime determining whether an aircraft can fly or not fly, operators will be able to operate aircraft to the best of their current capabilities. A military commander, for example, could elect to continue flying an aircraft within a restricted speed and altitude profile until repairs can be performed. "The system would enable a local commander to decide which aircraft are most capable of a mission and which are restricted, when on paper they are all the same," says Christodoulou.

A prognosis system integrates several elements: physics-based damage evolution models; global and local state-awareness sensors; and more effective use of existing flight and maintenance history databases.

**Source: FLIGHT INTERNATIONAL
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TRAVAIL A EFFECTUER

1 - Traduction en français 10 points

Traduisez en français les passages grisés

- titre et sous-titre
- depuis la ligne 1 « Today's maintenance industry... » jusqu'à la ligne 11 « ...and determine its fitness »
- depuis la ligne 35 « Instead of a time - or cycle-based maintenance regime... » jusqu'à la ligne 50 " maintenance history databases".

2 - Essai en anglais 10 points

Do you think that the principle of « regular inspections at intervals » is satisfactory ?
What is your feeling about the "prognosis system" presented in the article?

280 à 300 mots. Indiquer le nombre de mots utilisés à la fin du travail.

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