UDC 629.735.017

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PERFORMANCE PROBLEMS OF AVIONICS VISUALIZATION OBSERVATION IN NEW AIRCRAFTS GENERATION

Visual Inspection is the single most frequently-used aircraft inspection technique, but is still error-prone. This project follows previous reports on fluorescent penetrant inspection (FPI) and borescope inspection in deriving good practices to increase the reliability of NDI processes through generation of good practices based on analysis of the human role in the inspection system.

Inspection in aviation is mainly visual, comprising 80% of all inspection by some estimates, and accounting for over 60% of AD notices in a 2000 study. It is usually more rapid than other NDI techniques, and has considerable flexibility. Although it is usually defined with reference to the eyes and visible spectrum, in fact Visual Inspection includes most other non-machine-enhanced methods, such as feel or even sound. It is perhaps best characterized as using the inspectors' senses with only simple job aids such as magnifying loupes or mirrors.

Visual inspection can range in level from the pilot's walk-around before departure to the detailed examination of one section of floor structure for concealed cracks using a mirror and magnifier.

Human factors studies of industrial inspection go back to the 1950's when psychologists attempted to understand and improve this notoriously error-prone activity.

Thus, in Search, the operator functions as a low-level detector of indications, but also as a high-level cognitive component when choosing and modifying a search pattern. It is this ability that makes humans uniquely useful as self-reprogramming devices, but equally it leads to more error possibilities. As a framework for examining inspection functions at different levels the skills/rules/knowledge.

Within this system, decisions are made at the lowest possible level, with progression to higher levels only being invoked when no decision is possible at the lower level.

The objective in improving decision-making is to reduce decision errors. There can arise directly from forgetting imperfections or standards in complex inspection tasks or indirectly from making an incorrect judgment about an imperfection's severity with respect to a standard. Ideally, the search process should be designed to improve the conspicuity of rejectable imperfections (nonconformities) only, but often the measures taken to improve conspicuity apply equally to nonrejectable imperfections. Reducing decision errors usually reduces to improving the discriminability between imperfection and a standard.