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Abstract: In this paper, a mobile probe for eddy current testing using inductive sensors and two optical computer mice for position determination is presented. It is a first step in developing an autonomous system that is able to detect flaws in the metallic structure of an aircraft. We present the system implemented and show results of its use to detect a rectangular flaw in a flat aluminum plate.

Authors

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Contents

I. Introduction

Non-destructive testing using eddy currents is usually applied in aeronautic, aerospace and manufacturing industries. An example of the importance of this testing method is in aeronautic maintenance, which demands an economical and sensitive test technique that will not affect the structural integrity of the material under test. The aeronautical industry, in particular, faces the additional challenge of having large areas that need to be tested, namely the fuselage and wings of aircrafts. This results in incomplete tests since it becomes cost prohibitive to do a full test due to the time it takes and the inherent labor costs. Our team has recently focused in this problem and is developing ways to achieve higher test speeds and more cost effective procedures. The ultimate goal is to create an automatic system that is capable of testing an aircraft mostly unattended. Some of the difficulties envisioned in the development of such a system are:

Non-flatness of the surfaces involved;

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- Automatic positioning of the probe over the surface to be scanned;
- Small area covered by the probe in relation to the total area to be scanned;
- Being able to detect the presence of faults which are under 1 mm and which may be several millimeters below the surface;
- Cope with potential liftoff in uneven surfaces.

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