

Next-Generation Software Workflow for Semi-Manual and Robotized NDT

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In the past three decades, the evolution of digital NDT methods such as ultrasound and eddy current lead to significant advances in image quality, probability of detection and flaw assessment. The added capabilities have lead to improvement of inspection techniques, but it has not clearly improved the overall productivity of manual inspections to the extent that was anticipated by the industry. The advent of 3D position encoding devices and collaborative robots are promising to help further the traceability and overall productivity, still two major caveats of manual operations. Meanwhile, industrial robots were used for two decades to automate NDT in factories, involving sophisticated hardware and software means with highly-skilled automation engineers. The level of sophistication and costs involved was such that it limited the proliferation of robotized NDT, despite the ever increasing adoption of robots in many other factory tasks. One of the identified difficulties is the complexity and diversity of the commercial and custom software components to be used, some related to automation and some to NDT, without no fundamental cooperation between the two aspects. This paper proposes a next-generation, all-integrated software workflow for semi-manual and robotized NDT inspections. The position encoding and 3D metrology technologies are reviewed, as well as the latest robotic advances. A flexible software architecture is described and presented. The new workflow is demonstrated on a portable NDE 4.0 instrument platform, for corrosion-mapping application and aerospace composite testing application.