

# **Implementation of an Automatic Fluorescent Penetrant Inspection System in an Aerospace Manufacturing line**

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Fluorescent Penetrant Inspection (FPI) is a well assessed non-destructive test method used in manufacturing for detecting porosity, cracks, fractures, laps, seams and other flaws of the test piece, caused by fatigue, impact, quenching, machining, grinding, forging, bursts, shrinkage or overload. The purpose of this work is to present the final results of the AUTOFPI project, a research program funded by the MANUNET initiative, in the framework of the European Union's Horizon 2020 research and innovation programme. In particular, this project was aimed to develop and test an "Automatic Fluorescent Penetrant Inspection System", a vision-based expert system for automating the inspection phase of the FPI process in an aerospace manufacturing line. The system, specifically tailored on the stringent requirements of a high volume aerospace test case, consists of a robot for part handling, a machine vision solution for detecting the defects, and intelligent software allowing real time image processing and highly reliable decision making. In particular, the system has been designed for increasing the reliability of the evaluations performed on the part, by implementing an ad-hoc designed human-machine interface and proper artificial intelligence (AI) techniques to learn from expert operators how to evaluate part quality and identify features under the UV light.