

## **Analysis of the Impact of Enhanced FOD Inspection for the Aircraft Manufacturing Process**

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**Abstract:** Fighter jet assembly is a complex process that involves joining thousands of parts of varying sizes while using tools that go through the hands of many aircraft assembly personnel. Foreign object debris (FOD) is any object alien to an aircraft assembly component. Visual inspection techniques, which are limited by line-of-sight and consume 5-10% of shift time, are currently used to detect FOD. A fighter jet assembly line with 26 stations experiences FOD approximately every 5.46 hours.

This project analyzes the impact of a FOD inspection system, which utilizes X-ray technology and image processing techniques. A discrete event simulation was developed to evaluate the enhanced system's effect on assembly. Results proved the key was to detect FOD items earlier in the assembly process, decreasing the labor hours required per aircraft; and improving the quality of aircraft upon delivery by reducing FOD present post assembly, allowing for cost savings of \$3.6M annually.

**Keywords:** Aircraft Assembly, Foreign Object Debris, FOD, X-Rays, Non-Destructive Evaluation, Discrete-Event Simulation