Automated Robotic Nut plate Installation in Aerospace Manufacturing

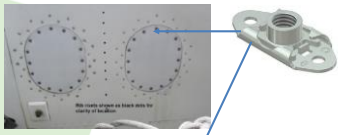
Dongming Gan, Cesare Stefanini, Jorge Dias, Lakmal Seneviratne
Khalifa University Robotics Institute

Introduction

- Aerostructure assemblies make extensive use of nut plates, for the ease of assembly and disassembly of panels and covers.
- This is normally a manual process and this project aims to automate the nut plate installation task using robotic solutions..

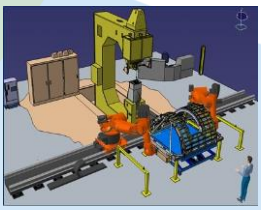
Nut Plate Installation Problem

- Nut plates are currently installed manually in a multistep process. There are thousands of nut plates on a large aerostructure and consumes many man-hours.
- Nut plate installation steps
  - Locate the position of the nut plate
  - Drill, countersink and debur fixing holes
  - Apply sealant
  - Position and fasten to the structure



Robotic Solution for Nut Plate Installation

❑ Advanced Robot Arm, sensing systems and control systems



Impact and Outcomes

- ❖ Cost savings in nut plate installation
- ❖ Providing high tech solutions to automation of aero structure manufacture
- ❖ Establishing technology excellence in robotic automation
- ❖ Educating and training a new generation of engineers on frontier technologies.