



Parallel Robotic Drilling System for Automated Aerospace Manufacturing

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

Introduction

Automation in aero structure manufacturing processes will bring benefit from cost and lead time savings and improved quality.

This project will target automatic drilling in assemblies such as aircraft control surfaces.

Current Problem



Manual drilling in typical control surface assembly stations make use of a three stage process, where a separate drill fixture is required for each stage. This has a high cost in both man-hours and tooling and requires additional setup time for each stage.

Applying robotic solutions to current manual assembly stations is not feasible without incurring large cost.



Project Objective

The objective of this project is to replace the manual effort of drilling a typical control surface, with an unique automatic Parallel Kinematic Robotics solution, having high accuracy, speed and force.

Proposed Solution and Benefits

The project will develop new parallel kinematic robot system having high accuracy, speed and force, to work on the current assembly fixtures.



- a.No changes to current process and fixtures
- b.Light weight, compact and easy moving
- c.Manual operations allowed
- d.Lower cost

Potential Impact and Outcome

- ❖ High tech solutions to aero structure manufacture in the UAE
- ❖ Cost saving in drilling and the solution can initially be applied to typical control surfaces
- ❖ Establishing technology excellence in robotic automation in the UAE;
- ❖ Educating and training a new generation of UAE based engineers on frontier technologies.