IRISH MANUFACTURING RESEARCH

SMART EUREKA

innovation across borders

MAAS

Real world ↔ Simulation

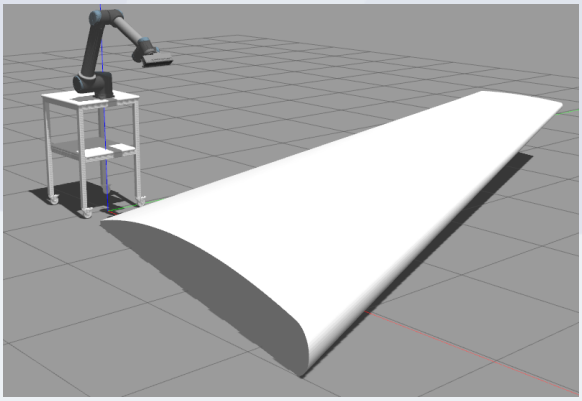
In response to the introduction of COVID-19 restrictions IMR transitioned the development of a solution for robotic scanning of large structures to a virtual environment. The simulated environment enabled IMR to continue advancing the system architecture, hardware integration and software logic.

Initial real-world experimental setup

- Rudimentary articulated robot scanning system consisting of **Xbox Kinect** as the scanning instrument, the **UR3** as the manipulator and a **trolley** as a mobile base.

Development in Simulation

- Simulation allowed the team to **work remotely** on the project as well as enabling the **rapid development of conceptual solutions**.
- UR, Kinect and trolley replaced by corresponding **URDFs** in **Gazebo** simulation environment, to replicate real-world functionality.
- Software developed using **ROS**.
  - Mobile platform motion planning
  - Articulated arm motion planning
  - Global localisation using **AprilTags**.
  - Point cloud stitching
  - Control architecture



Real-world Execution

- **ROS** allows software to be seamlessly deployed on real-world hardware.
- Mobile trolley operated by a person rather than being controlled automatically.
- Communication between trolley operator and controller via an LED and switch rather than software generated signals between mobile base and controller.