Process to Part Inspection of Composites

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Traditional robotic inspection methods involve a part being scanned for defect detection within the working envelope of an industrial robot, whose path is determined by offline path planning or online teaching software. The process of moving the part from storage to a robotic cell and back to storage can be labour intensive, result in additional time-costs between manufacturing and deployment and could result in damage to the part. This is a particular concern for composite materials, as low velocity impacts experienced during the movement phase may result in Barely Visible Impact Damage resulting in defects that can be difficult to detect with Ultrasonic Testing or may occur during movement after testing and have the potential to develop into critical delaminations, cracks or holes. With the advent of collaborative robots (Cobots) and concurrently the increased real time capabilities of many robotic systems, robotic platforms are becoming safe and flexible enough to operate without a safe-working envelope and where there is a degree of uncertainty in the operating environment. The opportunity to pivot the inspection paradigm, such that the inspection process is taken to the part is already seeing commercial success. This presentation will demonstrate a prototypical vision-guided, flexible process to part inspection for defect detection routines applied to a composite wing sample.