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HIGH PRECISION MACHINES

COMPOSITES & AUTOMATED SOLUTIONS

COAST

Composite Optical Automated Surface Tracking

COAST is the next generation of integrated measurement technology for automated composite layup

- Measure composites surfaces with real-time defect detection and operator rework tracking
- Reduced cycle times up to 28% from Human Visual Inspection and 14% from In-Line Inspection
- Custom design for seamless AFP machine integration
- Best-in-class capabilities for contoured surfaces
- Tracks and compares fabrication results

COAST is the first composite measurement technology proven to be capable of measuring Automated Fiber Placement material defects on contoured surfaces

COAST is poised to transform AFP quality specifications, shifting from a ply-by-ply approach to a holistic 3-dimensional perspective. This new perspective, made possible by In-Process Inspection technology, aligns composite quality more closely with the true physical properties of the material under study.

OPTICAL COHERENCE TOMOGRAPHY (OCT)

While existing technologies like Line Laser Triangulation (LLT) have shown promise for planar composite surfaces, they fall short when it comes to detecting defects on contoured surfaces. COAST bridges this gap by introducing OCT technology to composites, maintaining superior signal quality even as AFP machine heads rotate to fabricate contours. Advantages of OCT technology over LLT technology include:

- Lower angle sensitivity
- More tunable depth of focus
- 500x (or more) sampling per point
- More consistent surface reflectivity between materials

REAL-TIME DETECTION:

- Gaps
- Overlaps
- Missing tows
- Ply boundaries
- Ply angularity/orientation
- Topical features
- Tow splices
- Bridging

COAST KEY FEATURES

These capabilities enable:

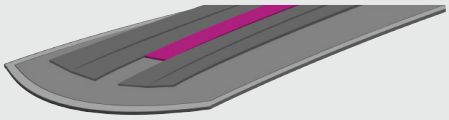
- Increased OEE productivity
- Robust to AFP environmental impacts during layup
- Volumetric benchmarking and manufacturing allowable development like gap underfill and density modeling
- Scans highly contoured parts without sacrificing resolution
- High fidelity and robust surface quality on specular, low-contrast materials
- Comprehensive machine accuracy, variability, and part characterization

SUPERIOR PERFORMANCE

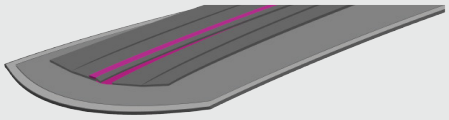
When an AFP machine head rotates 20 degrees to create a contour, the LLT signal degrades from 100% quality to 78%, whereas the OCT signal only degrades from 99% to 95%. This signal quality difference becomes more significant with increased machine head rotation, demonstrating the superior performance of COAST. The precise 3D point cloud generated by COAST serves as input for defect detection algorithms, enabling AFP manufacturers to monitor process variability and identify the probability and location of material defects like never before.

STATISTICALLY QUALIFIED TO CAPTURE:

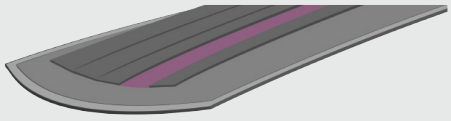
TOW ENDS AT 106 MM/SEC



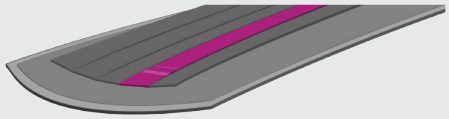
GAPS AT 593 MM/SEC



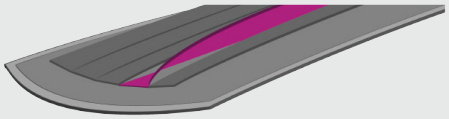
MISSING TOWS AT 339 MM/SEC



SPLICES AT 339 MM/SEC



TWISTS AT 339 MM/SEC



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