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Soggetti	Aerospace engineering Astronautics Mechanics Mechanics, Applied Materials science Application software Aerospace Technology and Astronautics Solid Mechanics Characterization and Evaluation of Materials Computer Appl. in Social and Behavioral Sciences
Lingua di pubblicazione	Inglese
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Note generali	Description based upon print version of record.
Nota di contenuto	Introduction -- Wave Propagation in Anisotropic Media -- Imaging Anisotropic Components with Ultrasonic Arrays -- Crystallographic Orientation using Ultrasonic Arrays -- The Development of an In Situ Ultrasonic Array Inspection System -- The Assessment of the Developed Inspection Capability -- Conclusion.
Sommario/riassunto	This thesis describes the development of a new technique to solve an important industrial inspection requirement for a high-value jet-engine component. The work – and the story told in the thesis – stretches all the way from the fundamentals of wave propagation in anisotropic material and ultrasonic array imaging through to device production and site trials. The book includes a description of a new method to determine crystallographic orientation from 2D ultrasonic array data.

Another new method is described that enables volumetric images of an anisotropic material to be generated from 2D ultrasonic array data, based on measured crystallographic orientation. After extensive modeling, a suitable 2D array and deployment fixtures were manufactured and tested on in situ turbine blades in real engines. The final site trial indicated an order of magnitude improvement over the best existing technique in the detectability of a certain type of root cracking. The Development of a 2D Ultrasonic Array Inspection for Single Crystal Turbine Blades should be an inspiration for those starting out on doctoral degrees as it shows the complete development cycle from basic science to industrial usage.

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