

1. Record Nr.	UNINA9910829831103321
Titolo	Health monitoring of aerospace structures [[electronic resource]] : smart sensor technologies and signal processing // edited by W.J. Staszewski, C. Boller, and G.R. Tomlinson
Pubbl/distr/stampa	West Sussex, England, : Hoboken, NJ, : J. Wiley, c2004
ISBN	1-280-26942-1 9786610269426 0-470-09283-1 0-470-09286-6
Descrizione fisica	1 online resource (288 p.)
Altri autori (Persone)	StaszewskiW. J BollerC (Christian) TomlinsonGeoffrey R
Disciplina	629.134/6 629.1346
Soggetti	Airplanes - Inspection Airframes - Deterioration Space vehicles - Inspection Detectors
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Health Monitoring of Aerospace Structures; Contents; List of Contributors; Preface; ACKNOWLEDGEMENTS; 1 Introduction; 1.1 Health and Usage Monitoring in Aircraft Structures - Why and How?; 1.2 Smart Solution in Aircraft Monitoring; 1.3 End-User Requirements; 1.3.1 Damage Detection; 1.3.2 Load History Monitoring; 1.4 Assessment of Monitoring Technologies; 1.5 Background of Technology Qualification Process; 1.6 Technology Qualification; 1.6.1 Philosophy; 1.6.2 Performance and Operating Requirements; 1.6.3 Qualification Evidence - Requirements and Provision; 1.6.4 Risks 1.7 Flight Vehicle Certification 1.8 Summary; References; 2 Aircraft Structural Health and Usage Monitoring; 2.1 Introduction; 2.2 Aircraft Structural Damage; 2.3 Ageing Aircraft Problem; 2.4 LifeCycle Cost of

Aerospace Structures; 2.4.1 Background; 2.4.2 Example; 2.5 Aircraft Structural Design; 2.5.1 Background; 2.5.2 Aircraft Design Process; 2.6 Damage Monitoring Systems in Aircraft; 2.6.1 Loads Monitoring; 2.6.2 Fatigue Monitoring; 2.6.3 Load Models; 2.6.4 Disadvantages of Current Loads Monitoring Systems; 2.6.5 Damage Monitoring and Inspections; 2.7 Non-Destructive Testing
2.7.1 Visual Inspection 2.7.2 Ultrasonic Inspection; 2.7.3 Eddy Current; 2.7.4 Acoustic Emission; 2.7.5 Radiography, Thermography and Shearography; 2.7.6 Summary; 2.8 Structural Health Monitoring; 2.8.1 Vibration and Modal Analysis; 2.8.2 Impact Damage Detection; 2.9 Emerging Monitoring Techniques and Sensor Technologies; 2.9.1 Smart Structures and Materials; 2.9.2 Damage Detection Techniques; 2.9.3 Sensor Technologies; 2.9.4 Intelligent Signal Processing; 2.10 Conclusions; References; 3 Operational Load Monitoring Using Optical Fibre Sensors; 3.1 Introduction; 3.2 Fibre Optics
3.2.1 Optical Fibres 3.2.2 Optical Fibre Sensors; 3.2.3 Fibre Bragg Grating Sensors; 3.3 Sensor Target Specifications; 3.4 Reliability of Fibre Bragg Grating Sensors; 3.4.1 Fibre Strength Degradation; 3.4.2 Grating Decay; 3.4.3 Summary; 3.5 Fibre Coating Technology; 3.5.1 Polyimide Chemistry and Processing; 3.5.2 Polyimide Adhesion to Silica; 3.5.3 Silane Adhesion Promoters; 3.5.4 Experimental Example; 3.5.5 Summary; 3.6 Example of Surface Mounted Operational Load Monitoring Sensor System; 3.6.1 Sensors; 3.6.2 Optical Signal Processor; 3.6.3 Optical Interconnections
3.7 Optical Fibre Strain Rosette 3.8 Example of Embedded Optical Impact Detection System; 3.9 Summary; References; 4 Damage Detection Using Stress and Ultrasonic Waves; 4.1 Introduction; 4.2 Acoustic Emission; 4.2.1 Background; 4.2.2 Transducers; 4.2.3 Signal Processing; 4.2.4 Testing and Calibration; 4.3 Ultrasonics; 4.3.1 Background; 4.3.2 Inspection Modes; 4.3.3 Transducers; 4.3.4 Display Modes; 4.4 Acousto-Ultrasonics; 4.5 Guided Wave Ultrasonics; 4.5.1 Background; 4.5.2 Guided Waves; 4.5.3 Lamb Waves; 4.5.4 Monitoring Strategy; 4.6 Piezoelectric Transducers
4.6.1 Piezoelectricity and Piezoelectric Materials

Sommario/riassunto

Providing quality research for the reader, this title encompasses all the recent developments in smart sensor technology for health monitoring in aerospace structures, providing a valuable introduction to damage detection techniques. Focussing on engineering applications, all chapters are written by smart structures and materials experts from aerospace manufacturers and research/academic institutions. This key reference: Discusses the most important aspects related to smart technologies for damage detection; this includes not only monitoring techniques but also aspects r
