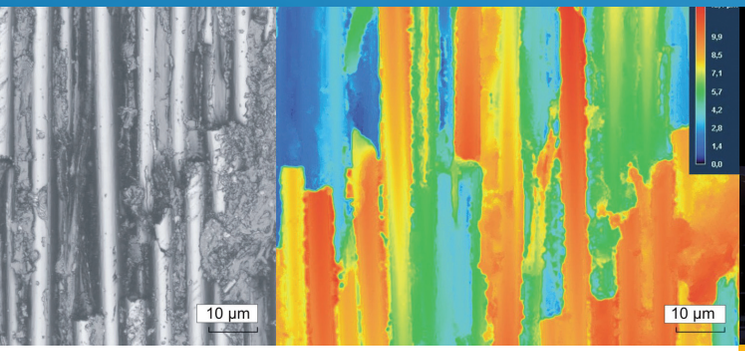
ABOUT ENCOMB



Two-dimensional (left) and three-dimensional (right) microscopic image of CFRP surface topography.

As a medium-scale European project funded within the 7th Framework Programme, ENCOMB brings together leading experts in aeronautics research and development from nine European countries. Driven by central drawbacks within the aeronautics industry, ENCOMB aims at providing advanced non-destructive testing methods for reliable quality assurance of adhesive bonding of CFRP structural components.

Coordinated within the Fraunhofer Society, this research-based project covers a broad expertise with regard to physical and chemical material and surface characterisation.

For information on our publications, upcoming events, and available results visit our webpage.

www.encomb.eu

COORDINATION

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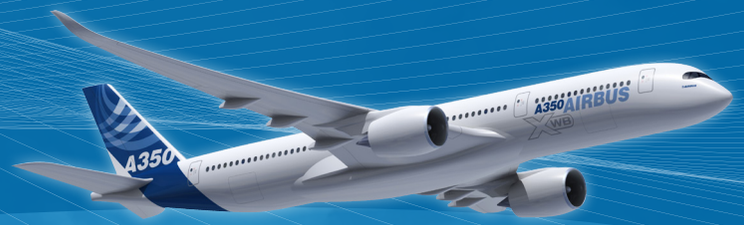
The project is endorsed by

EASN – The European Aeronautics Science Network



EXTENDED NON-DESTRUCTIVE TESTING OF COMPOSITE BONDS

Optimum bonding solutions for light-weight aircraft structures

ENCOMB

SEVENTH FRAMEWORK PROGRAMME

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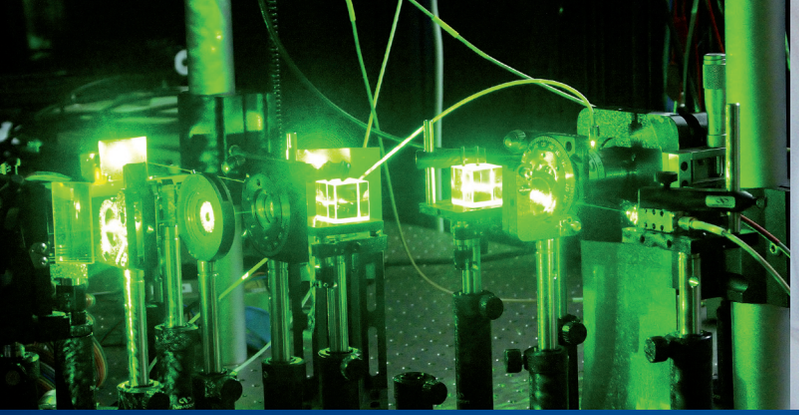

WHO WE ARE

Fraunhofer IFAM

Fraunhofer IZFP

AIRBUS AN EADS COMPANY

EADS

LTSM UNIVERSITY OF PATRAS

University of BRISTOL

RECENDT RESEARCH CENTER NON DESTRUCTIVE TESTING

ENEA AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE

NATIONAL ACADEMY OF SCIENCES OF UKRAINE Usikov INSTITUTE OF RADIOPHYSICS AND ELECTRONICS

EPFL ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Agilent Technologies

IMP PAN GDAŃSK

cnrs dépasser les frontières

easn Technology Innovation Services

OUR GOALS

Even though composite materials are already used in the manufacturing of structural components in aeronautics industry a consequent light-weight design of CFRP primary structures is limited due to a lack of adequate quality assurance procedures for adhesive bonding – which is the optimum technique for joining CFRP light-weight structures. Hence, the primary objective of ENCOMB is the identification, development, and adaptation of methods suitable for the assessment of adhesive bond quality.

The performance of adhesive bonds depends on the physico-chemical properties of both adherend surfaces and adhesives. Therefore, a set of advanced non-destructive testing techniques is applied and adapted to the characterisation of CFRP bonded structures and the state of adherend surfaces before bonding.

The successful implementation of a reliable quality assurance concept within manufacturing and in-service environments will provide the basis for increased use of light-weight composite materials for highly integrated aircraft structures thus minimising rivet-based assembly. The expected weight savings for the fuselage airframe are up to 15 percent. The resulting reduction of fuel consumption and hence reduced aircraft operational costs and CO_2 emissions will present a major step towards the greening of air transportation.

WHAT WE DO

- Identification of factors influencing adhesive bond quality
- Characterisation of adherend surfaces
- Characterisation of adhesive bonds
- Screening, adaption & validation of advanced NDT techniques
- Development of a quality assurance concept
- In-line & in-service quality control
- Dissemination of knowledge
- Training