

MORPHO FINAL CONFERENCE



Verification of surface preparation of scarf repair by laser-based cleaning and spectroscopy technologies

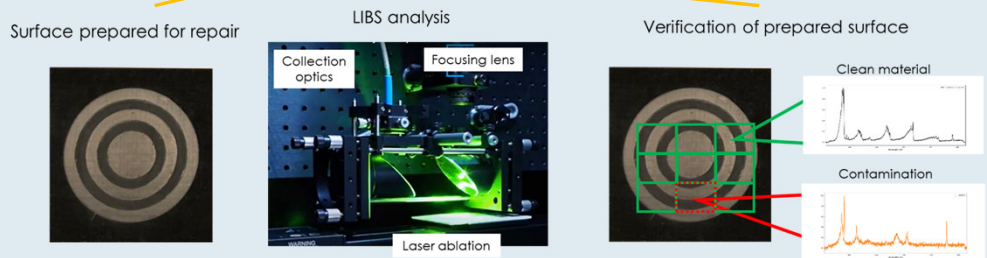
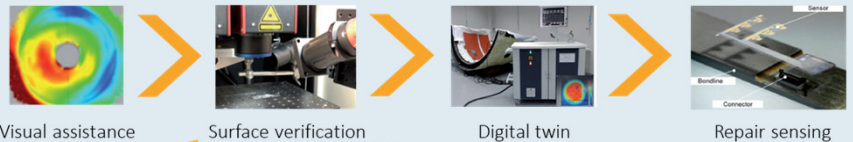
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GENEX Project - New end-to-end digital framework for optimized manufacturing and maintenance of next generation aircraft composite structures

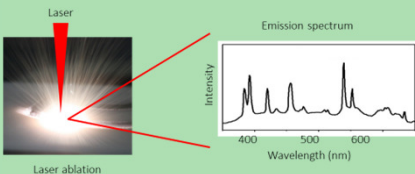
The main goal is to develop a novel end-to-end digital twin-driven framework providing: a holistic approach covering the whole value chain of composite parts, from design, material, and manufacturing to operation, MRO, and EOL to support the next-generation digital aircraft transformation



Digitally-assisted repair processes & tools

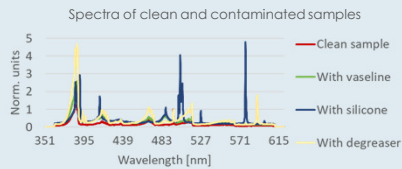
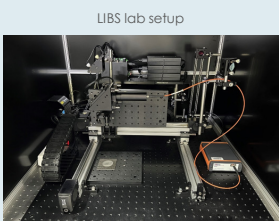


LIBS (Laser-Induced Breakdown Spectroscopy)



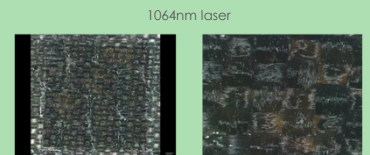
- Spectroscopic technique for chemical analysis
- Analysis of plasma generated during laser ablation

LIBS tests



- A lab setup was developed to carry out LIBS tests and to integrate the components
- Discrimination between clean and contaminated samples was demonstrated

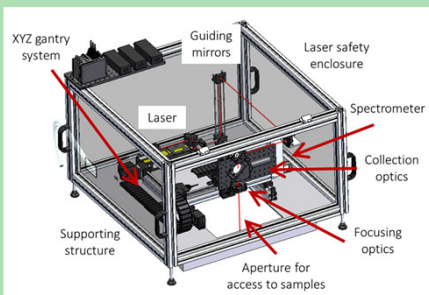
Laser cleaning tests



- Laser cleaning of contaminated samples was investigated using several parameters such as wavelength, power density, etc
- Cleaning with IR (1064nm) laser was achieved

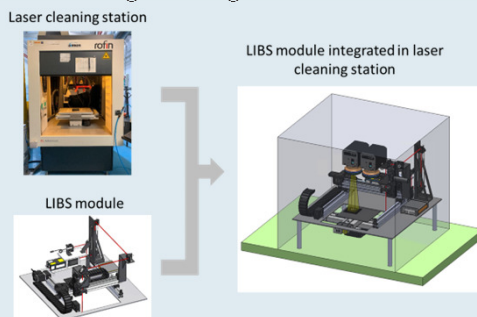
Out-of-the-lab LIBS module

The design-freeze of an out-of-the-lab LIBS system has been reached and the assembly and final validation will take place soon



LIBS coupled with laser cleaning

The LIBS module was designed to operate inside the laser cleaning station to enable the combination of both technologies in a single workstation



Summary

- Laser cleaning and LIBS-based discrimination between clean and contaminated samples were demonstrated
- A developed out-of-the-lab LIBS module will soon be validated
- A LIBS module concept was conceived and developed to both operate as stand-alone system and integrated within a laser cleaning station

Outlook

- Finalize and validate the LIBS module as stand-alone system and coupled with laser cleaning