

PROJECT

SWISSMODICS

Development of a Sensor with Wide Spectrum Sensitivity for Monitoring of Damage and Defects In Composite Structures

Funding: European (Horizon 2020)

Duration: Jul 2020 - Jun 2023

Status: Ongoing

Total project cost: €923,172

EU contribution: €923,172



Call for proposal: H2020-CS2-CFP10-2019-01

[CORDIS RCN : 229556](#)

Objectives:

Shocks on a composite structure of an aircraft can propagate and generate delamination at a distant place. There is currently no other method than regular inspection of the structure to detect these delamination, which requires to immobilize the aircraft. The SWISSMODICS project ambitions to answer the lack of efficient diagnostic tools by providing a miniature, ultra-thin camera to be incorporated in the composite structure of an aircraft where delamination risk to occur. This will considerably facilitate diagnostic and reduce immobilization time, even allowing in-operation diagnostic.

The SWISSMODICS project will develop a camera sensitive to X-ray, visible and infrared light. This will be achieved by creating a monolithic detector made of a CMOS pixel array with configurable pixels to the specificity of each wavelength range, covalently bonded to an absorber with areas sensitive to these 3 different wavelength ranges. The detector will be tested on a panel of section of fuselage in composite, with delamination defects representative of real defects.

The work will be executed by a consortium of 3 companies with complementary competences. CSEM, in Switzerland will develop the CMOS integrated circuit. G-ray, also in Switzerland, will develop the absorber with areas sensitive to different wavelength ranges and will perform wafer to wafer covalent bonding between the CMOS wafer and the absorber wafer. Finally, Almay, a French engineering company with experience in composites for the aeronautical applications, will provide guidance and will integrate and validate the detector on composite structures with defects.

This new sensor will be a breakthrough in non-destructive testing and will open the door to "intelligent" composite structures. In aeronautics, it will not only reduce immobilization time but also enable to reduce the security margin on composite parts thanks to continuous monitoring, resulting in economy of weight and fuel.

Parent Programmes:

[H2020-EU.3.4. - Horizon 2020: Smart, Green and Integrated Transport](#)

Institute type: Public institution

Institute name: European Commission

Funding type: Public (EU)

Lead Organisation:

Csem Centre Suisse D'electronique Et De Microtechnique Sa - Recherche Et Developpement

Address:

Rue Jaquet Droz 1
2002 Neuchatel
Switzerland

EU Contribution: €470,172

Partner Organisations:

Almay Technologies

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86300 CHAUVIGNY
France

EU Contribution: €52,375

G Ray Nanobonding Sarl

Address:

ROUGES TERRES 61
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Switzerland

EU Contribution: €400,625

Technologies:

Composite materials
Composite fuselage sections

Development phase: Research/Invention

Sensor technologies
Integrated sensors for structural components

Development phase: Research/Invention

Vehicle design and manufacturing, Other

STRIA Roadmaps: specified

Transport mode: Air transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Safety/Security

Geo-spatial type: Other