PROJECT FACTSHEET

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PriSe

Assessment of innovative techniques for direct printing of thermal and strain sensors onto spacecraft parts.

Inspiration

Many different sensors have to be installed onto spacecrafts to follow their behaviour either during assembly integration and testing (AIT) or during missions thousands of kilometres from the Earth. Several hundreds of sensors are typically needed on one spacecraft and their installation is demanding, taking high tolls on time and price.
In order to reduce the burden of the manufacturing process, the plan is to evaluate techniques for direct printing of thermal and strain sensors onto spacecraft parts, which will be chosen during the project.

Innovation

With the PriSe project, LIST researchers and their partners will focus on developing a complete structure for thermal and strain sensors using different deposition techniques, such as inkjet printing, aerosol jet deposition and spray coating. The sensor structure will consist of insulation layer, conductor and encapsulation layer. After the initial phase, during which technical requirements will be defined and application scenarios identified, the most suitable manufacturing technology and materials to use for both types of sensors will be selected. Finally, the demonstrators will be developed, fabricated and their performance characteristics will be tested.
LIST team involved in the project is specialized in the process and materials development, testing and characterisation. They will pilot the qualification of materials and processes and will work closely with the LuxSpace and European Space Agency (ESA) teams to define the application cases and demonstrators that offer the highest complexity reduction and time savings. Working out of LIST laboratories in Luxembourg, they will execute various deposition methods, microstructural, mechanical and electrical characterization of the sensor layers and analyse their functional behaviour in broad temperature (-75 °C – 175 °C) and strain (up to 3 %) ranges.

Impact

The developed direct printing technology of thermal and strain sensors on selected demonstrators will enable higher level of automation as well as faster and less expensive integration process for spacecraft manufacturers in specific application cases.
In the course of the project the partners intend to work on a development plan for the investigated technologies, allowing them to be evaluated for the future cases, including non-space applications such as RFID.

Partners
LuxSpace (LU)

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European Space Agency

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