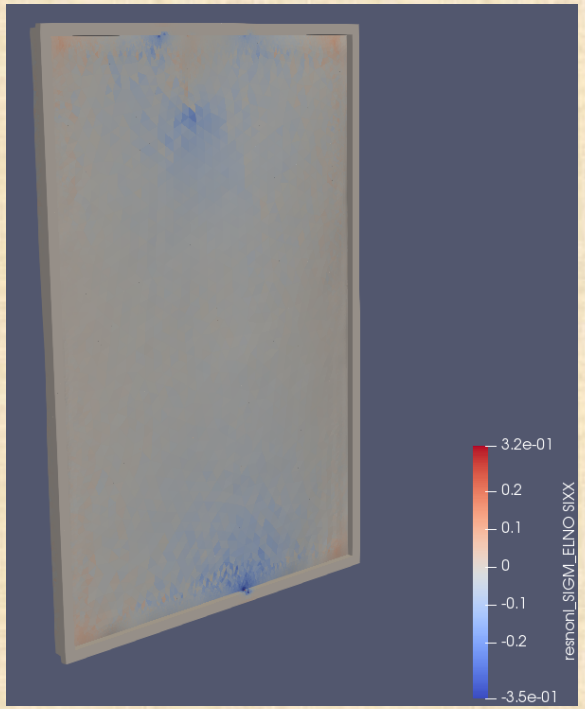
Mona Lisa's Digital Twin

identifying the mechanical properties of the panel combining experimental data and advanced finite-element modelling



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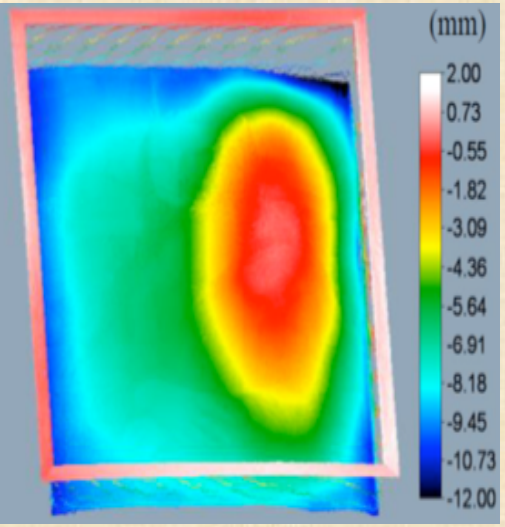
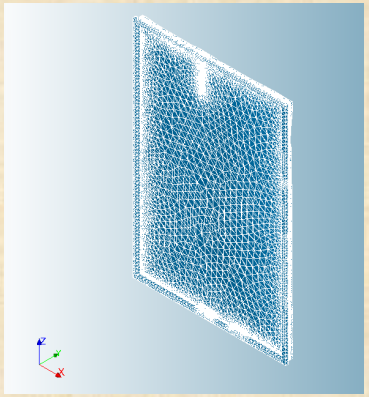




The Digital Twin

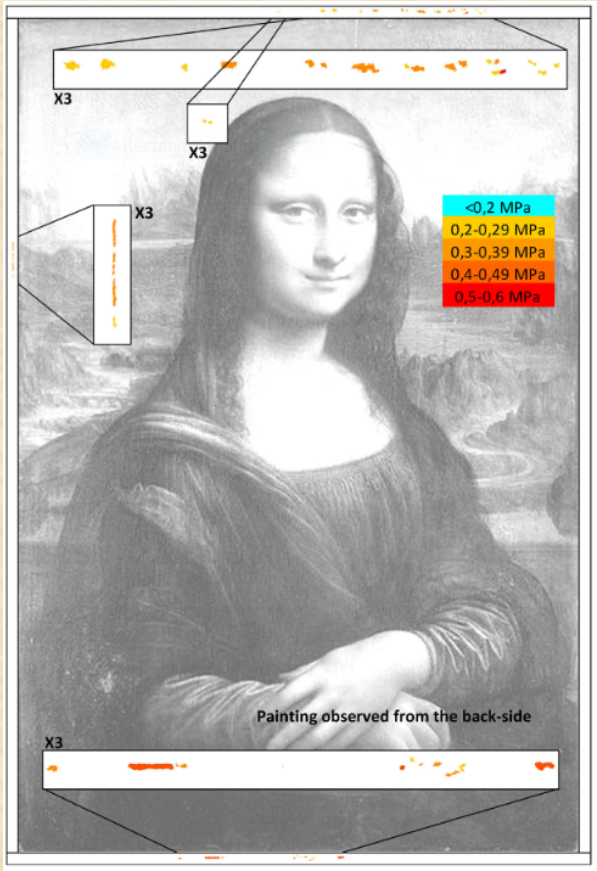
1.Acquisition of the ***object's shape*** through optical methods and reconstruction of a three-dimensional geometrical model.

2.Enrichment of this model with additional entities defining the ***boundary conditions***.

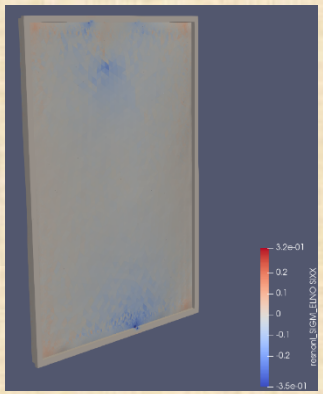
3. Acquisition and treatment of ***experimental measurements*** from load cells and displacement transducers.

4.Construction of the ***numerical model*** using the finite-element method (FEM).

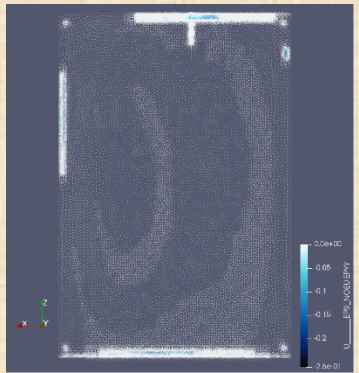
5.Iterative optimization procedure, through Nelder-Mead (downhill simplex) scheme, for the ***calibration*** of the mechanical characteristics.



Provide Information for Conservation



Assess the complex interaction and contacts dynamic between panel and chassis.
In the figure the stress state generated by the monolateral contact with friction



Assess the effect of inserting a layer of a viscoelastic polymer foam for protective purposes between the panel and the chassis (in figure the deformation of the viscoelastic foam 6 months after the load application).