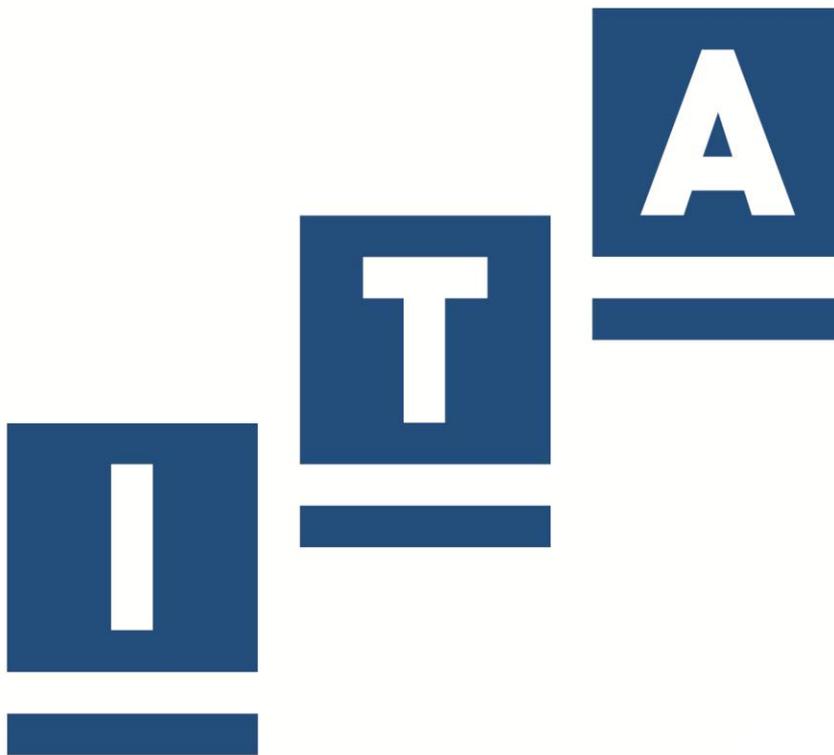


Figures and photos for “Final publishable summary report”

SATCAS - SIMULATION OF THE ASSEMBLY TOLERANCES FOR COMPOSITE AIRCRAFT STRUCTURES



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January / 2015



WP1 – Local analysis of Bolted/Riveted Joints

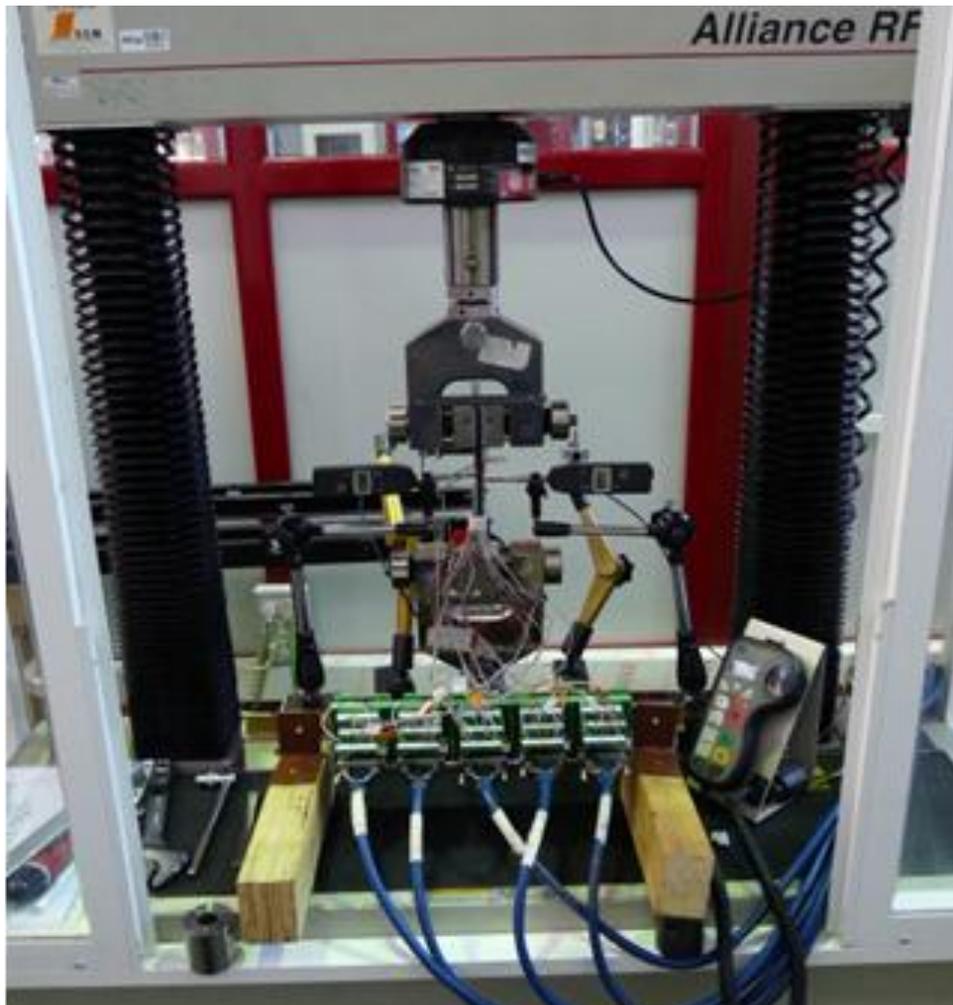


Figure 1. SLS tests setup (ITA).

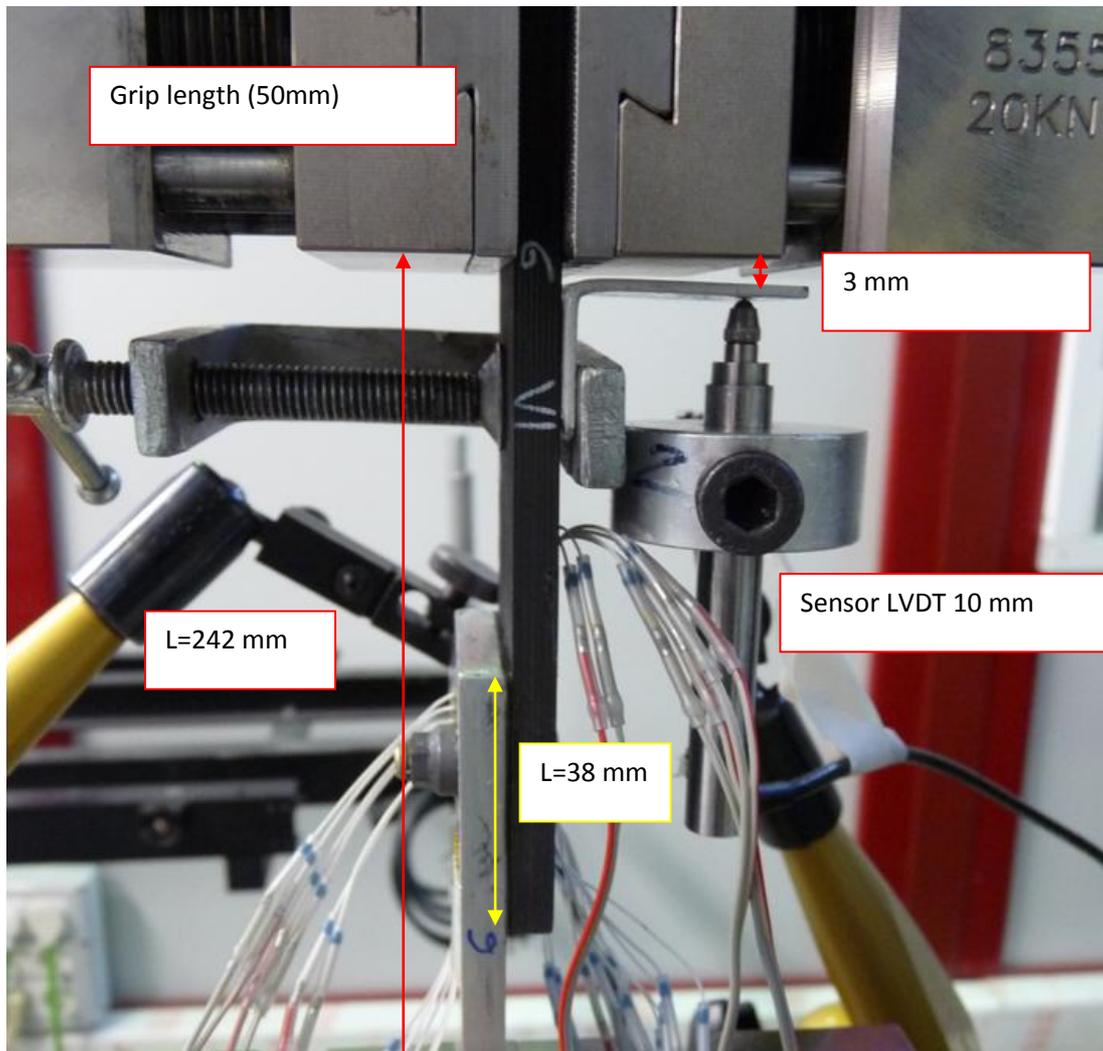


Figure 2. Detail of the SLS tests setup.

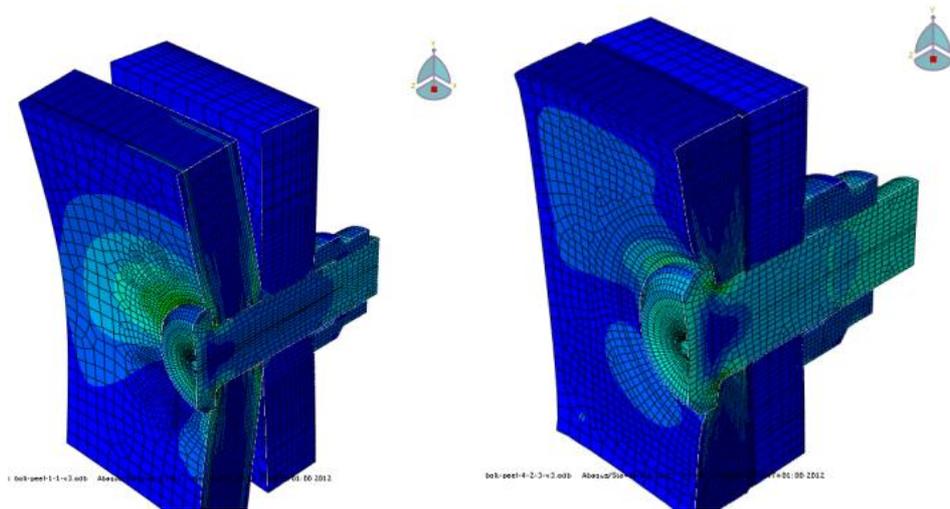


Figure 3. FE simulations with different bolts diameters and with and without sealant + shim (right and left respectively). Peel load.

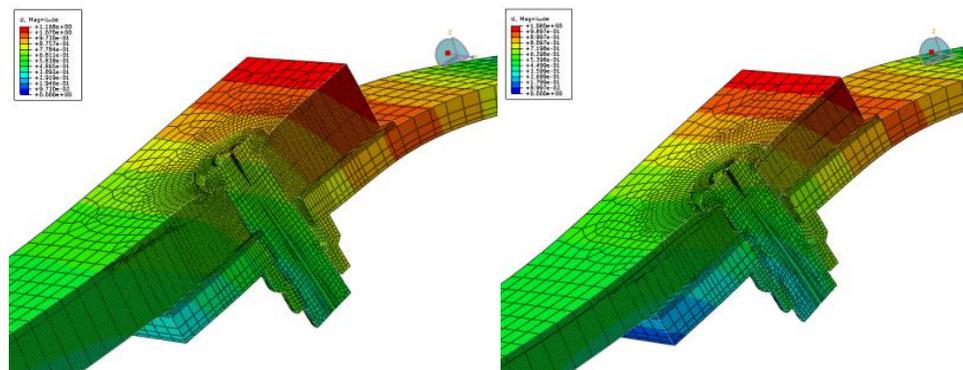


Figure 4. FE simulations for different substrates thicknesses. Shear load.

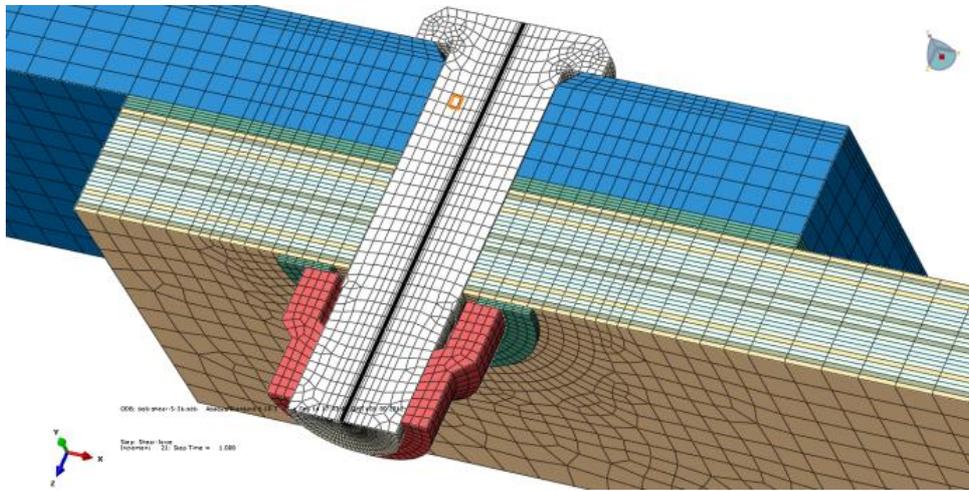


Figure 5. FE simulations with the addition of a washer. Shear load.

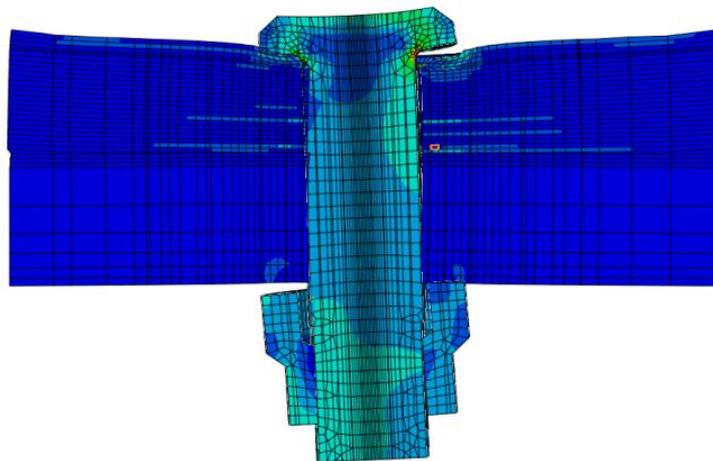


Figure 6. FE simulations for a joint with an angular deviation. Peel load.

WP2 – Simplified FEM technique for the Simulation of Bolted Joints

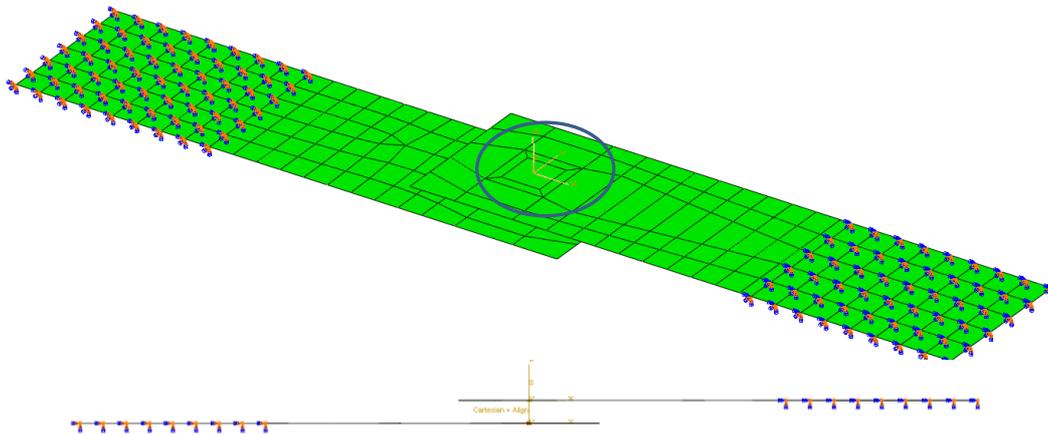


Figure 7. Utilization of connectors for the bolts representation in simple FE models.

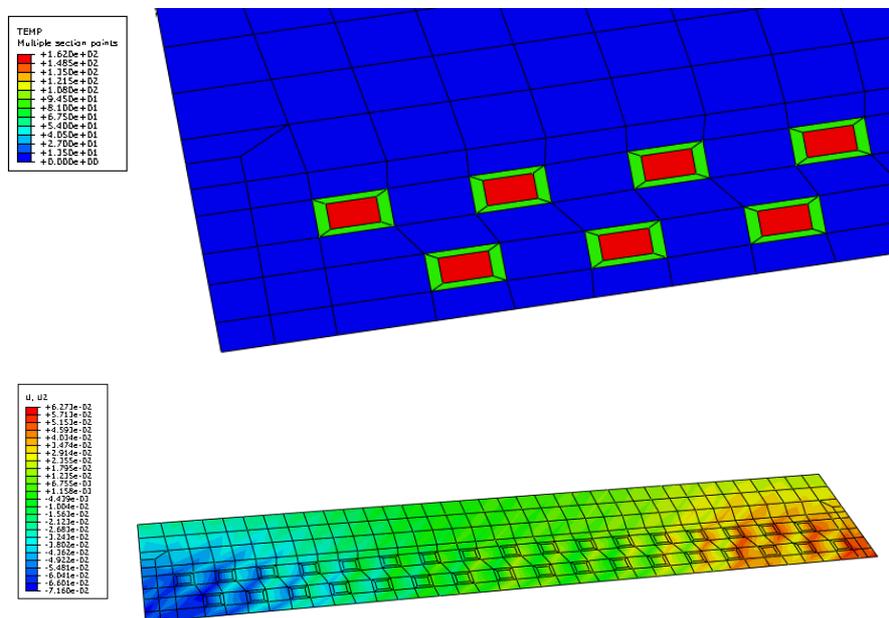


Figure 8. Validation of the strategy proposed for the introduction of the in-plane strains with a mesh similar to the ones used in the final FE models of SATCAS.

WP3 – Analysis of Assembly Tolerances – Methodology

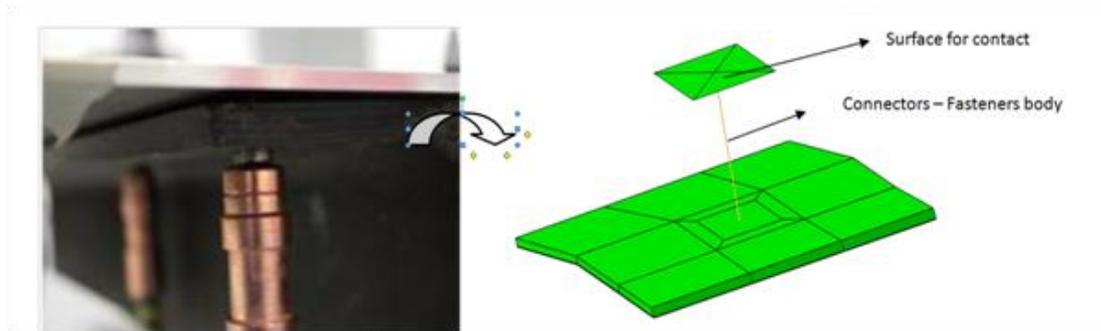


Figure 9. Representation of the temporary fasteners in the FE models.

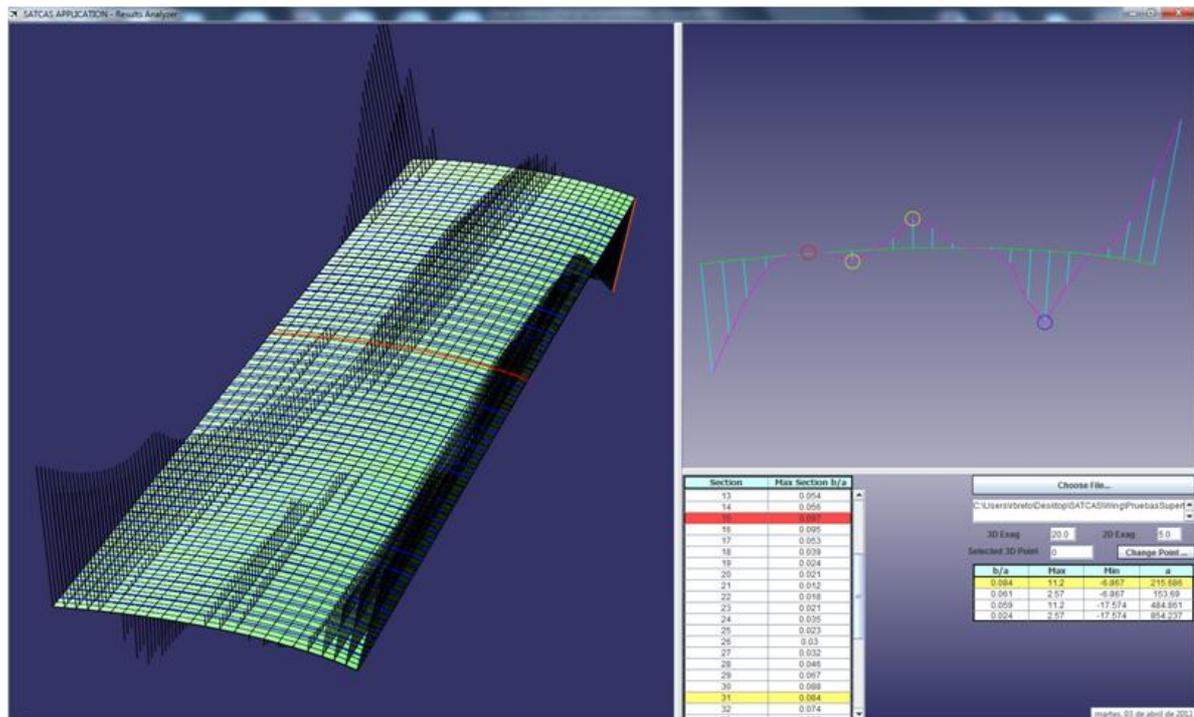


Figure 10. Output of the application developed for treatment of results.

WP4 – Experimental Validation of the Methodology

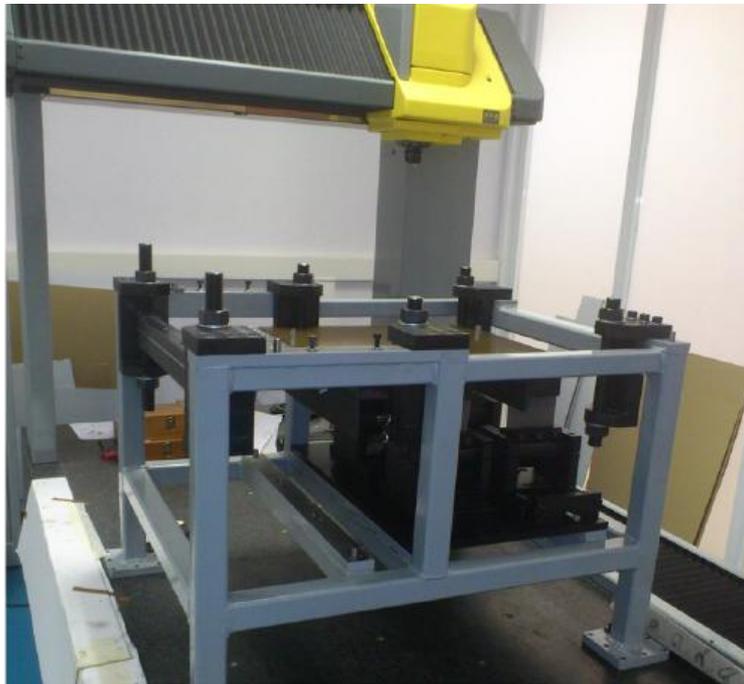


Figure 11. Validation tool.



Figure 12. Validation tool. Details of fixations and supports.

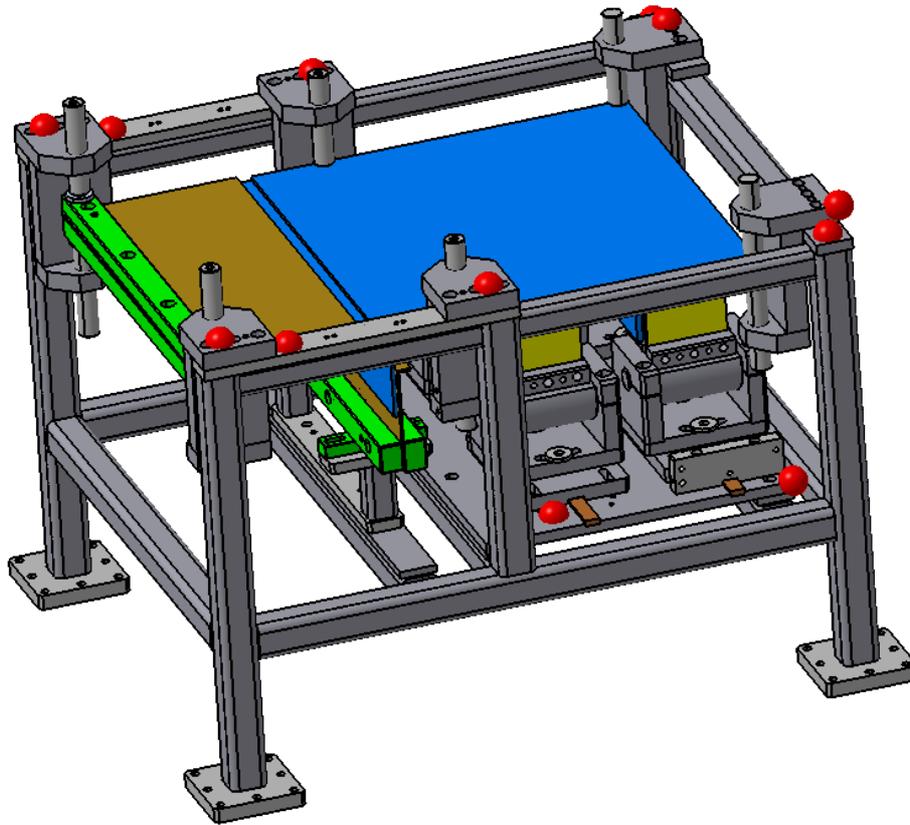


Figure 13. Validation tool 3D model.



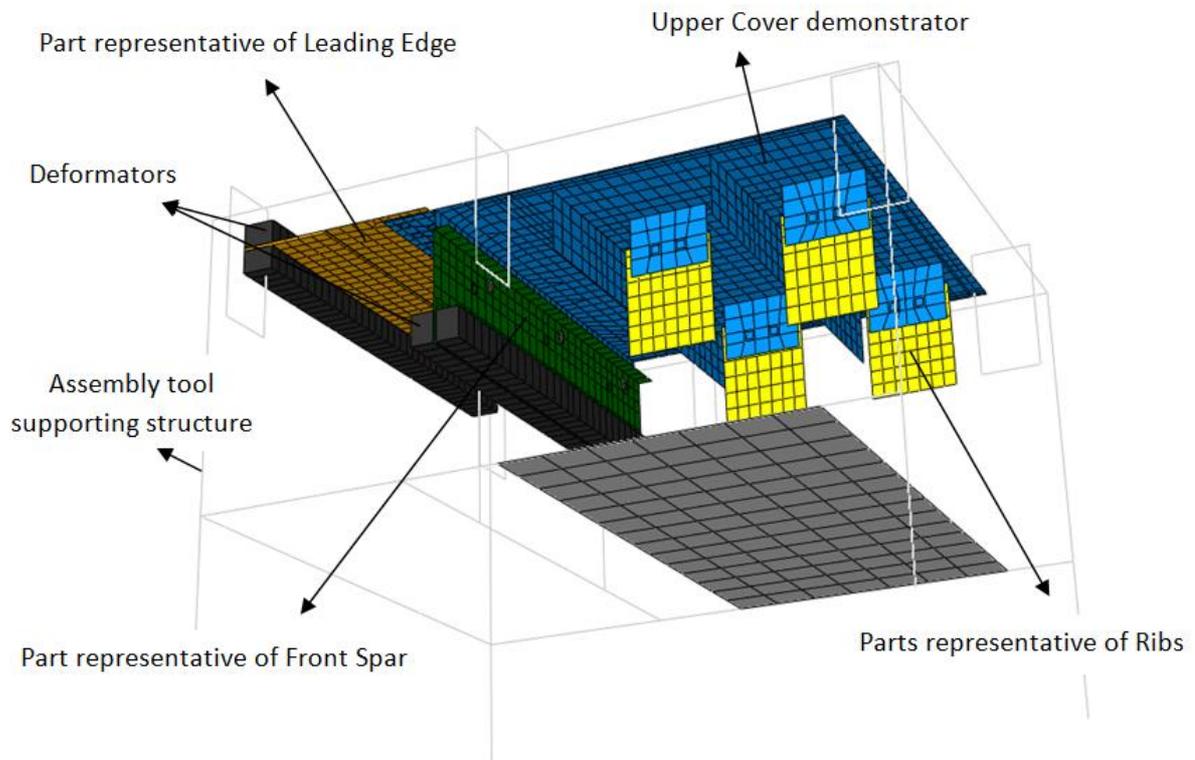


Figure 14. FE model developed for validation.

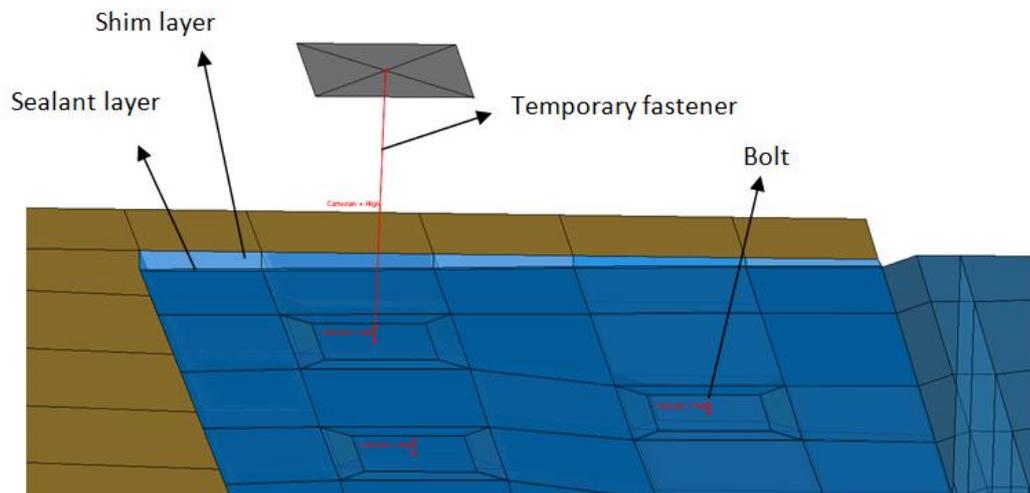


Figure 15. Detail of overlap with temporary fasteners, bolts, sealant and shim in the FE model developed for validation.

WP5 – Experimental Validation of the Methodology

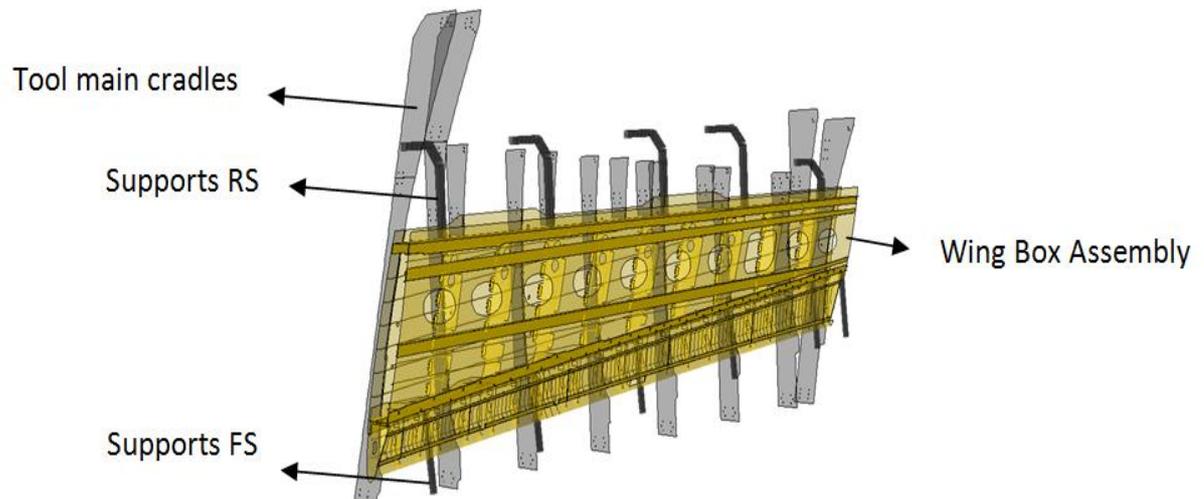


Figure 16. Main parts/elements constituting the FE model.

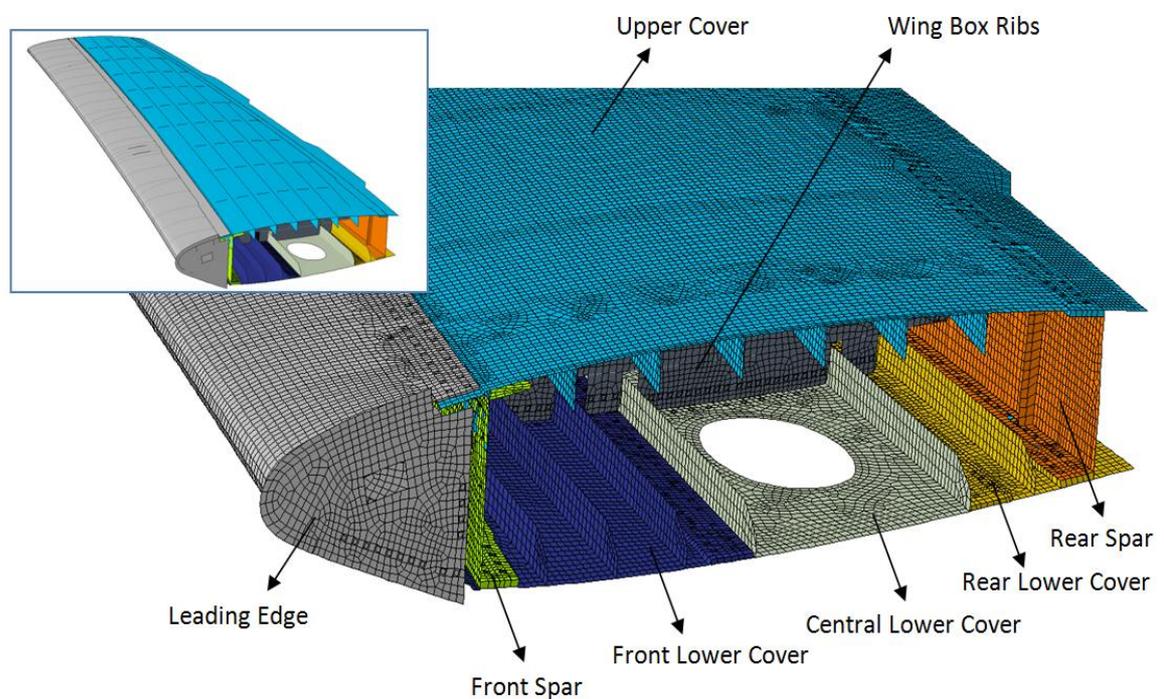


Figure 17. Main parts/elements constituting the FE model.

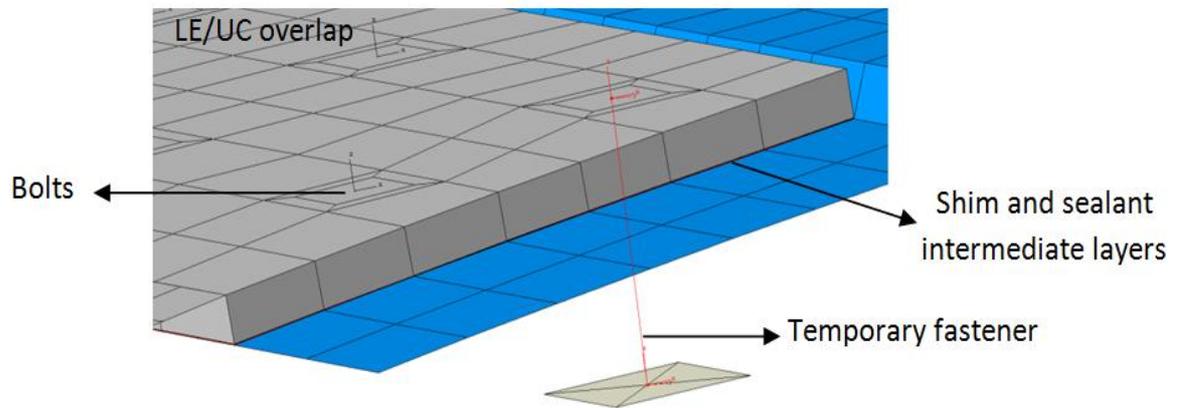


Figure 18. Detail of bolts and temporary fasteners in the FE models.

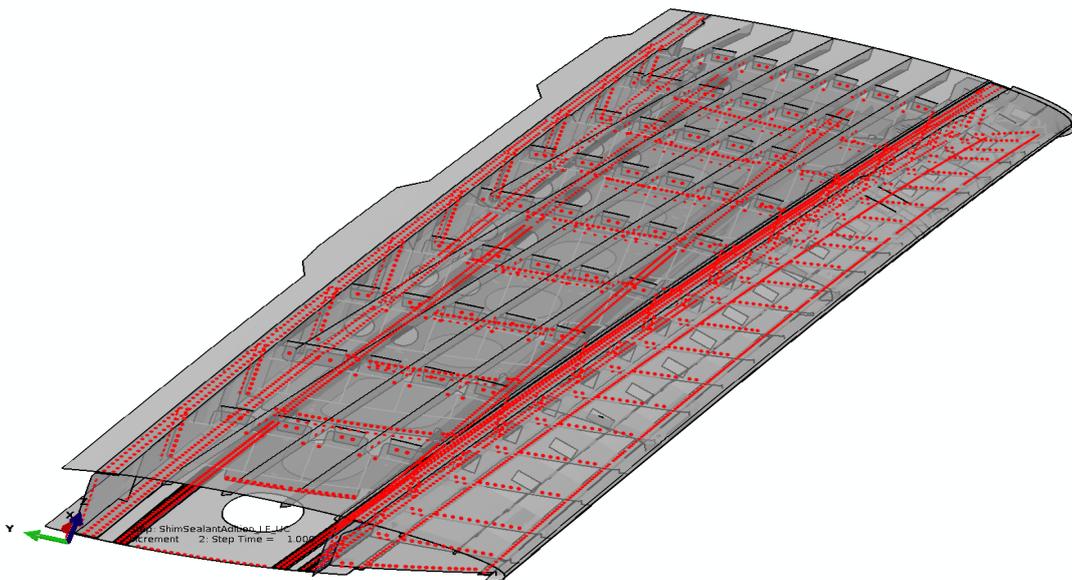


Figure 19. Elements used for the temporary fasteners & bolts in the Wing Torsion Box model.

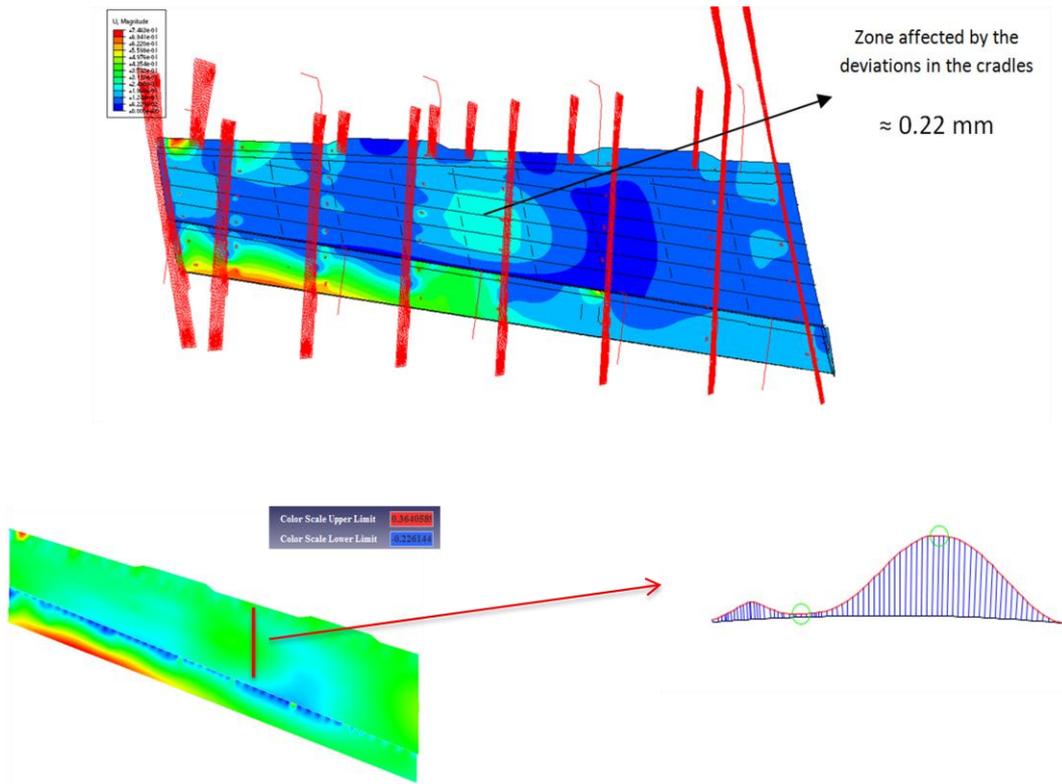


Figure 20. Displacements obtained from the FE model and profile of deviations on a section of the surface of interest.