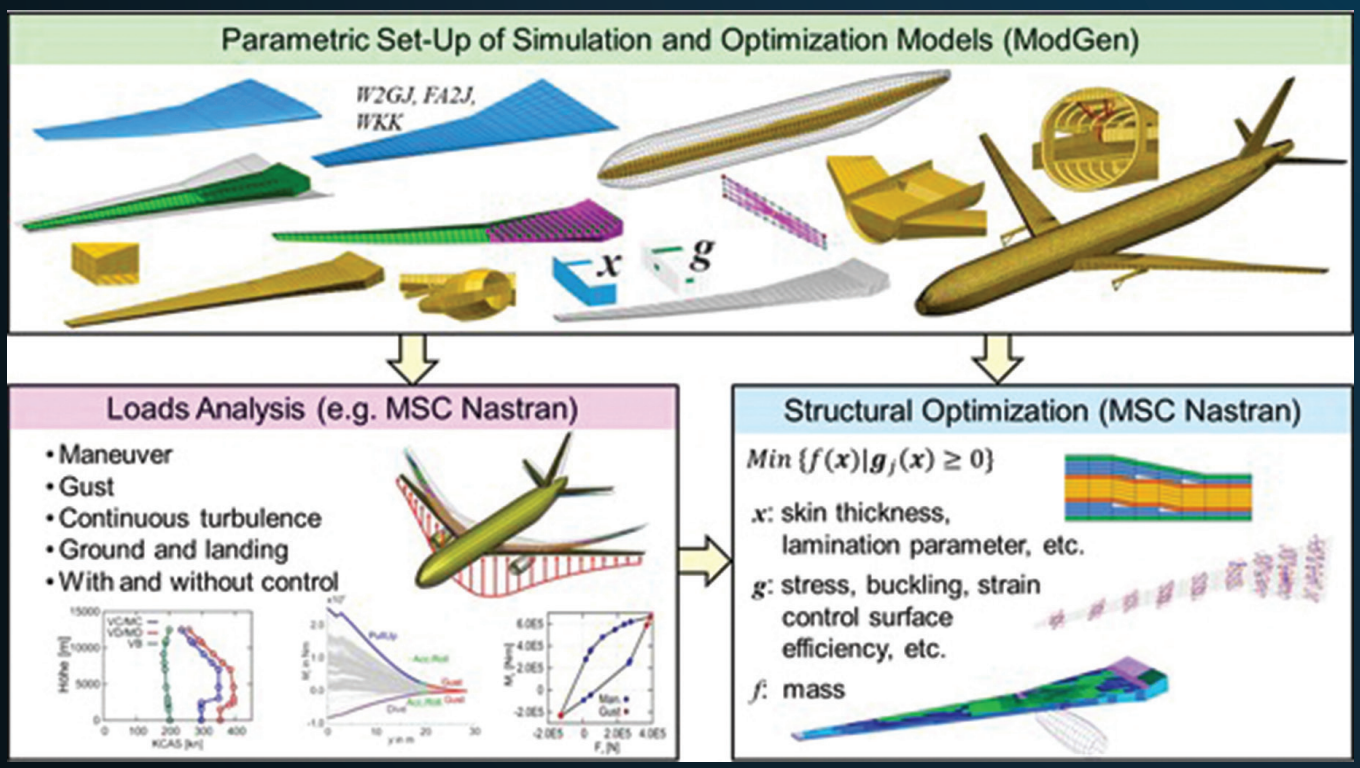
Finalists

Two finalist prizes for our inaugural MSC Nastran Award were granted to:

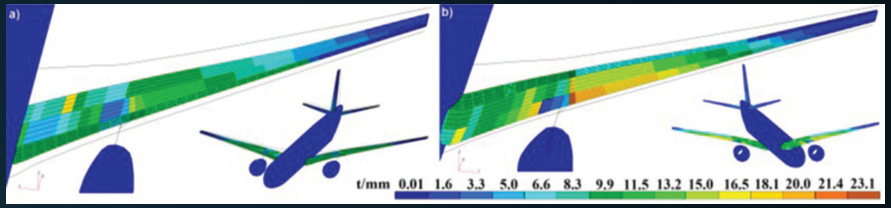
T. Klimmek, M. Schulze, M. Abu-Zurayk, C. Ilic, and A. Merle, DLR Germany

T. Klimmek, M. Schulze, M. Abu-Zurayk, C. Ilic, and A. Merle from DLR in Germany for their 2019 paper **"CPACS-MONA – An Independent and in High-Fidelity Based MDO Tasks Integrated Process for the Structural and Aeroelastic Design of Aircraft Configurations"** published at the International Forum on Aeroelasticity and Structural Dynamics, 9-13 June 2019, Savannah, Georgia, USA. The judging panel liked this classical execution of MSC Nastran in a highly parameterized aeroelastic structural design process (CPACS-MONA) for simultaneous structural and aeroelastic design of the load carrying structure of an aircraft configuration. It involved preliminary mass and loads estimation based on conceptual design methods followed by a parameterized set-up of simulation models in MSC Nastran and an optimization model. These models were then used for comprehensive loads analyses followed by component wise structural optimization. The latter took stress, strain, buckling and control surface efficiency as constraints into account. The detailed structural modelling in MSC Nastran allowed DLR to use well-established structural optimization methods. The data basis for the simulation models and the various MSC Nastran analyses were a suitable CPACS (Common Parametric Aircraft Configuration Schema) dataset.



This design process CPACS-MONA (**Mo**d Gen from DLR and **Na**stran from MSC) is also part of various high-fidelity based MDO (Multi Domain Optimization) processes developed at DLR where other disciplines like aerodynamics and overall aircraft design are involved. The DLR paper executed on three applications for CPACS-MONA:

a. An independent and stand-alone aeroelastic structural design process for the XRF1-DLR baseline configuration,
b. Investigation of a number of geometrical variations regarding the wing aspect ratio and the wing sweep, and
c. The results for the structural design of cpacs-MONA were examined within the high-fidelity based MDO approach following the so-called cybermatrix protocol



Thickness distribution of the main wing of the Airbus XRF1-DLR baseline a) upper-front-view; b) lower-rear-view.

With these three studies, complete airframe aerodynamic optimization, structural optimization, and loads analysis were run independently in parallel with a coupling due to a regular exchange of defined parameters.