Abstract:
Composite structures are increasingly being used within the aircraft industry. To come up with the requirements of cost saving and weight reduction for new airplanes innovative design solutions as well as manufacturing approaches need to be developed.

OptiStruct enables the engineer to produce even more efficient designs by introducing optimization during the concept design stage. Hence the optimization software package HyperWorks; by using HyperMesh as Pre-Processor, OptiStruct as optimization software and HyperView for Post-Processing issues, was used to accelerate the preliminary design phase for a short term concept study of a CFRP high lift device.

Main task of the collaboration between EADS Innovation Works and Altair was a size and shape optimization of a multi spar flap structure. Therefore CFRP specific material and manufacturing issues needed to be required within the optimization process, for example laminate stacking rules and symmetry issues. Furthermore strength, stability and stiffness requirements were integrated in the optimization process.

By using HyperWorks a substantiated statement concerning the pre-design of the high lift structure could be gathered requiring a minimum of time for this project dimensioning step. Furthermore reliable results concerning the weight saving potential of the CFRP structure could be produced.

Keywords:
- Composite
- Optimization
- CFRP structure
- OptiStruct