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## Applications within the company

As part of this work, a broad review was conducted of different experimental design practices within the company. This has included stages of the product lifecycle such as computer based aircraft design, materials synthesis and supply chain design.



Traditionally many areas of the company use a 'one factor at a time' approach, although this is changing. A number of more formal techniques are used, including designs for optimisation using physical and computational experiments. These more formal methods can give a better understanding of the effects of different factors and how they interact. They can also be used to 'screen' factors in order to understand their relative importance.

## Computer Based Structural Design Application

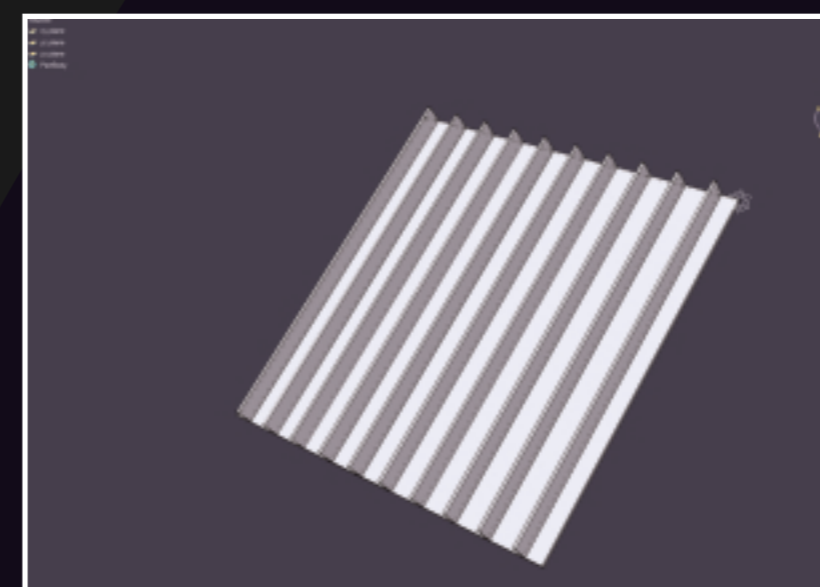
In particular, experimental designs are being investigated for the automated selection of skin stiffening methods for aircraft wings. This is in order to understand how to best use computationally expensive information from analysis tools.

## Structured methods for understanding problems

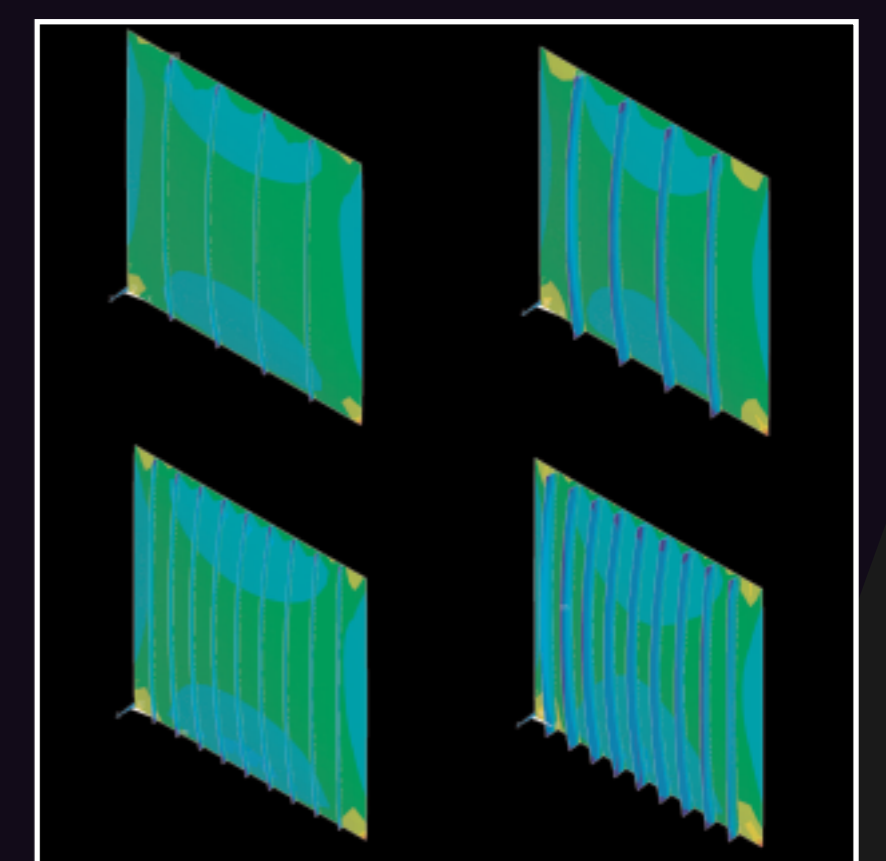
BAE SYSTEMS uses experimental designs throughout the lifecycle of a product. This technology allows the company to understand particular design problems through a structured experimental process. There are many different types of user from engineers and scientists through to systems analysts.



There are three different types of stiffening method, and each can be designed using a given number of variables. This represents three different design problems, each of which has a different number of variables that can be changed.



will this allow the engineer to understand the effect of different variables through a visual model, but it will also allow an automated optimisation system to suggest optimal solutions to the problem.



In order to select the appropriate stiffening method an experiment is designed to screen for the method that shows most promise for a given set of loading conditions. This method is then further investigated using an experimental design suitable for producing a response surface. Not only

Using a toolset biased towards the companies current and expected future software packages, a system has been created which is capable of designing and running the experiments in an automated manner. The process is designed to be relatively modular such that components can be reused in further analyses, thereby reducing the workload associated with creating a new analysis.

