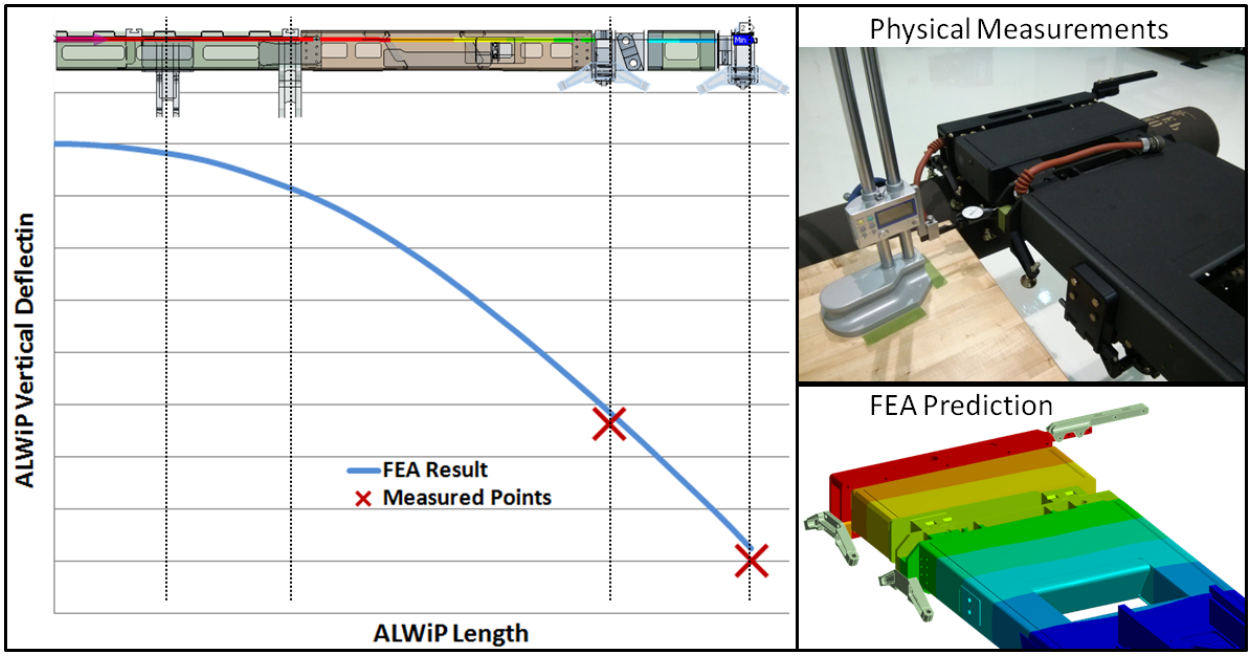
Cantine Armament Incorporated uses a robust analysis system to validate the design of every product through each stage of engineering. Once an initial design is complete, it is sent through a secondary verification process by an independent analysis group. The following report is a sample of the substantiation process we use to ensure our customers' safety and satisfaction.

Advanced Light Weight Weapons Integration Platform (ALWiP) Structural Finite Element Analysis

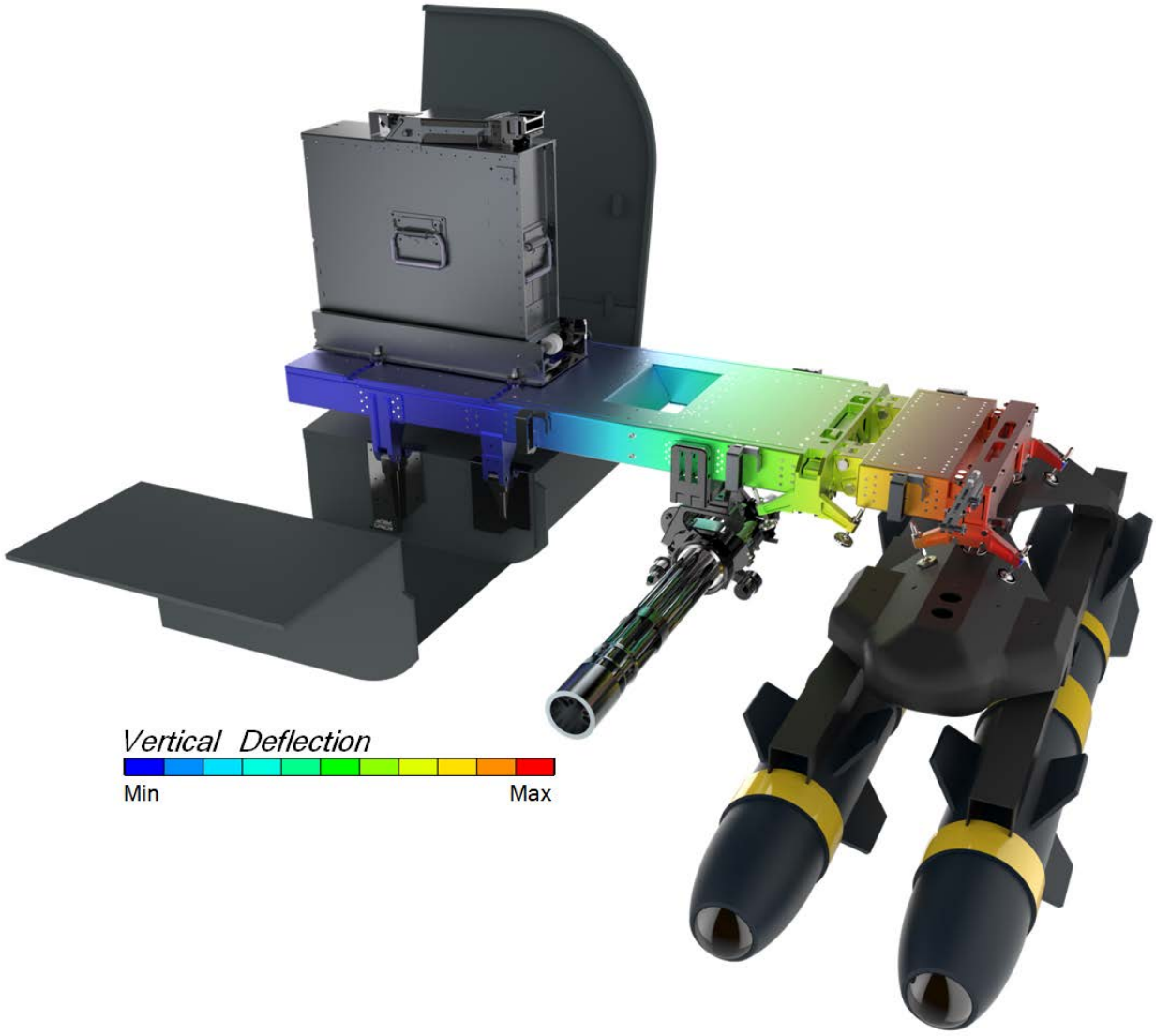
The ALWiP is a weapons mount platform that enables the weaponization of commercial helicopters for use in tactical aerial defense situations. The image above shows the ALWiP mounted on a BELL 407 helicopter in a configuration that allows for the use of Hellfire missiles and M134 Miniguns.

The genesis of the ALWiP program started as a conceptual prototype engineered by Cantine Armament Incorporated (CAI) a leader in developing and providing quality weapon systems. As part of the development process, CAI enlisted the finite element analysis capabilities of CAE Associates to aid in their evaluation of the prototype's structural integrity. Working closely with CAI, CAE Associates developed finite element models of the ALWiP to support its initial flight worthiness substantiation. The models provided vital information about the response of the hardware under operational and extreme loading conditions early in the design phase. CAI recognized the value in the use of FEA to help validate and guide the design; thereby mitigating the need to perform some of the costly and time consuming physical testing that would otherwise be necessary.

Substantial physical testing was performed on the matured design of the ALWiP, and when appropriate, the results of those tests were compared against the predicted behavior from the simulation. One such comparison is shown below in which the static deflections were measured "red X" and overlaid on the simulated response "blue line".



The good agreement between the FEA results and test data validated and established confidence in the simulation. This helped justify not only the use of this model for accurate predictions of behavior for this particular test but also others that may be much more difficult to test. For example, an emergency landing could be tested; however it may cause unrecoverable damage and be difficult to justify. This event can instead be simulated with a FEA model for little cost and a result such as the vertical deflection would be known without testing, as shown on one half of the model below.



The prototype version of the ALWiP was proven flight worthy through successful physical testing, which lead the way to a weight reduction effort and strength improving design modifications. Finite element analysis was integrated into the redesign effort to ensure that the ALWiP maintained its reliability while adhering to its strength requirements throughout the evolution of the design.

The final manufactured design of the ALWiP was flight certified and is currently operational in the field.