

Mid-Deck Active Control Experiment (MACE II)



SDL is member of team of researchers developing adaptive control systems for spacecraft applications. SDL demonstrated its Spatio-Temporal Filtering based control technology aboard the International Space Station. The project, **Middeck Active Control Experiment (MACE)** was managed by AFRL, Space Vehicles Directorate. The experiment was operated successfully by astronauts aboard the International space Station during the summer of 2001.

Engineers at SDL used Simulink® to develop and demonstrate its proprietary Adaptive Vibration Control technology, Spatio-Temporal Filtering. The object of the experiment was to demonstrate adaptive control algorithms to reduce vibration and to improve pointing accuracy on a flexible structure. The normal vibration on a spacecraft becomes significant due to the accuracy requirement in ballistic missile defense, which is comparable to aiming a laser beam in Los Angeles and hitting a basketball in Washington, DC.

The control hardware for the MACE II structure was based on a Digital Signal Processor (DSP). SDL's *DSPdeveloper*™, combined with Real-Time Workshop®, allowed automatic

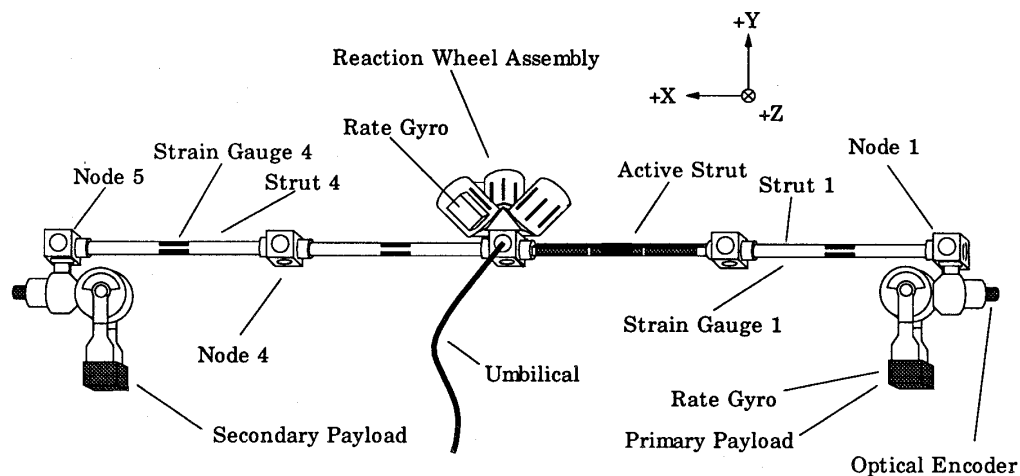
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generation of the flight code for the DSP controller from Simulink diagrams. This drastically reduced the development time and associated costs, allowing engineers to concentrate on the science associated with the development of the control algorithm.

The MACE project will lead to many military advances. Some of these include increased stability/pointing accuracy, reliability and survivability, and reduced design/validation costs required for military missions like surveillance and threat warning, target detection, and satellite communications.



In-Flight Operation on STS-67



Mid-Deck Active Control Experiment Multi-Body Platform (MBPS)



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