



New web-based technology assesses health of civil, mechanical and aerospace structures

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Understanding how cars, planes, bridges and other structures handle vibrations and dynamic loads can be critical to their design and performance. Los Alamos researchers have developed a revolutionary new way to measure the response of civil, mechanical and aerospace structures to dynamic loads and analyze their structural health.

Known as Video-Based Dynamic Measurement & Analysis (ViDeoMAgic), this technology takes a video of a vibrating structure and extracts high-spatial-resolution (pixel-level) structural vibration/dynamics information, such as displacement time histories, natural frequencies, damping ratios and mode shapes.

Unsupervised machine learning algorithms then analyze those dynamic responses and extract the structure's dynamics properties (resonant frequencies, damping & mode shapes) from the video data — which in turn can be used to assess the system's health (with respect to damage and defects).

This technology's high fidelity, *in situ* damage detection of civil, mechanical and aerospace structures enables identification and remedy of incipient damage *before* it becomes critical and leads to costly repairs, delays and even deaths.

Yongchao Yang of the Lab's National Security Education Center's Engineering Institute led the Laboratory team of David Mascareñas, Charles Dorn and Charles Farrar, and Garrett Kenyon of the Information Science group.

Related links:

[Video-Based Dynamic Measurement & Analysis \(ViDeoMAgic\)](#)

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