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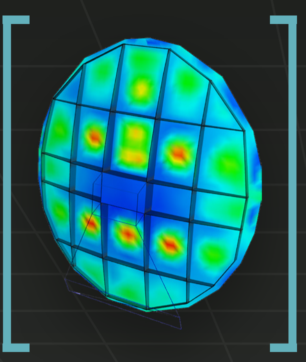
Vibroacoustic Simulation of Payloads & Launch Vehicles

6 Ways on How Pre-Test Simulation with VA ONE Ensures Your Mission's Success

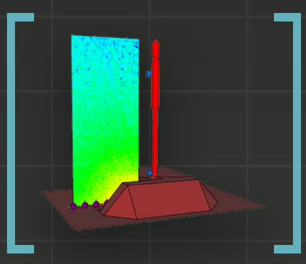
Launch Vehicle Modeling

Payload Modeling



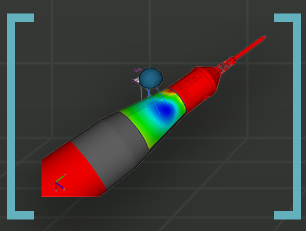
1

Apply SEA, Hybrid, and FE methods to assess the strength of acoustically sensitive structures during launch, flight, and deployment by **validating Sound Pressure Levels, dynamic stresses, accelerations, strain, and forces** across the full frequency spectrum.



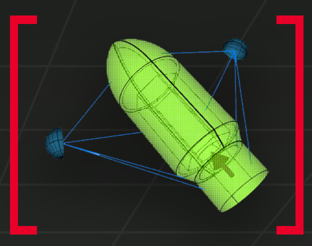
2

Use Ray Tracing to accurately simulate liftoff acoustic load on the fairing, enabling **full-frequency analysis of complex models with minimal computational cost.**



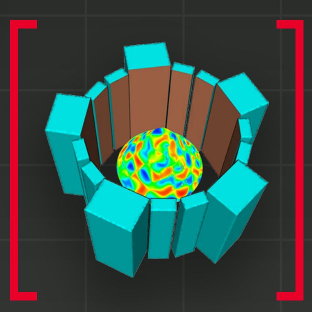
3

Analyze Aero-Vibroacoustic (AVA) effects during ascent phase by coupling vibracoustic simulation with CFD to **account for pressure fluctuations,** characterized by Wavenumber-Frequency Spectrum.



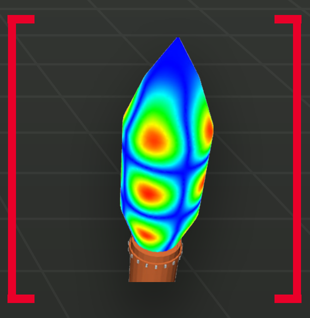
4

Predict high-frequency shock effects on space components using VA ONE's Shock Module, SEA capabilities, and Virtual Modal Synthesis and Simulation (VMSS) to **ensure component integrity during rocket separation.**



5

Prepare for your on-site DFAT® by simulating a diffuse acoustic field, testing different speaker configurations, and delivering **pre-test structural qualification**—without needing specialized acoustic reverberation rooms and **avoiding the risks and costs of transporting** sensitive components to remote test facilities.



6

Simulate diffuse acoustic fields to pre-qualify spaceflight hardware, **assess structural integrity**, and optimize designs early in the design cycle.

When developing space technologies, payloads must adapt to varying vibroacoustic conditions across different launch vehicles, while vehicles must minimize stress on payloads. Virtual vibroacoustic simulations enable combined analysis of both **predicting real-world performance and ensuring successful testing.** These pre-test simulations help you optimize sensor placement, fine-tune test conditions, and minimize the risk of under- or over-testing hardware.

Looking for ways to meet global space standards more easily, reduce physical testing, and accelerate design cycles? Discover how simulation of high-frequency acoustic stress, shock loads, and full-system dynamics with VA ONE can drive your space project's success.

Discover Our Software

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