Brüel & Kjær
BEYOND MEASURE

SENSORS AND AMPLIFIERS HELP DCTA LAUNCH THE VLS-1 ROCKET

When DCTA needed flight data from the VLS rocket, Brüel & Kjær sound and vibration sensors provided the input to the on-board telemetry system.

CHALLENGE

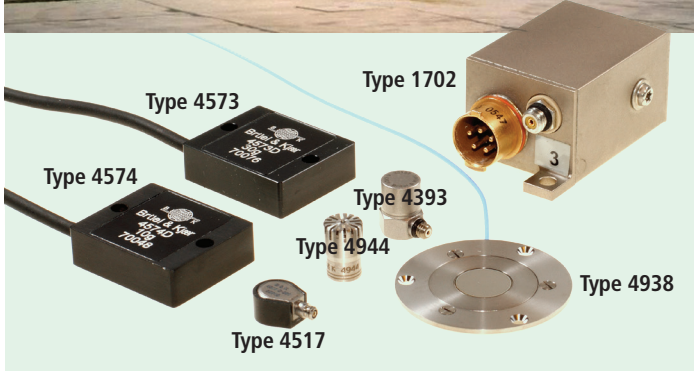
During launch, the demands placed upon a rocket, its payload and the launch pad are huge; from extreme vibration and intense acoustic load, to pyro-shocks from explosive rocket stage separations. To ensure such parameters do not exceed design criteria, on-board telemetry systems measure critical noise and vibration parameters.

SOLUTION

For structural vibration measurements, DCTA used 40 shear accelerometers featuring low weight and excellent electrical insulation. Static vibration measurements defined the X-Y-Z flight positions of the launcher, and required high thermal stability. Shock measurements were performed up to 4 kHz. For charge accelerometers, Charge Amplifier Type 1702-X is tested against the relevant MIL standards for temperature, humidity, vibration, shock and EMC. Lift-off noise measurements used ¼-inch microphones specially designed for high-level, high-frequency measurements. Flight noise was measured using surface microphones on the outside of the launcher. Finally, DCTA uses Brüel & Kjær calibration systems for all transducers.

CONCLUSION

With accurate data, analysts could determine the relationship between internal and external noise transmission, and validate the attenuation material used to reduce both acoustic and vibration noise. For the engine, data is used to investigate the effect of noise, and to understand in detail the influence of noise on the thermal protection.



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