Final Technical Report
NASA Grant NGL - 33-010-054
for
SONIC BOOM RESEARCH

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The results from sonic boom research conducted under NASA Grant NGL-33-010-054 are detailed in the publications listed below. This research had the following goals: 1) minimization of the sonic boom of SST generation aircraft; 2) prediction of the distortion of the sonic boom signature by atmospheric turbulence; 3) prediction of the amplification that occurs at a caustic, known as the superboom. Despite advances in these areas, further research is required in several of them and is being conducted under NASA Grant NGR-33-054-203, along with other studies.

As a result of research on this grant it is now a routine matter to determine the aircraft area distribution required to minimize various sonic boom signature parameters for given aircraft weight, length, flight altitude, Mach number, and volume; this minimization includes a reasonable latitude in the choice of the front-to-rear shock strength ratio. We now understand the basic phenomena that cause distortion of sonic booms by atmospheric turbulence and can, on a single event basis, predict signature waveforms that agree reasonably well with those measured by the NASA. We have been able to make qualitative predictions about the magnitude of the superboom, particularly that associated with threshold operations, and can scale these results to other flight conditions by the basic nonlinear similitude.
SONIC BOOM PUBLICATIONS


