

of aircraft configuration, flight procedures and compatible land-use measures, to produce maximum noise abatement for expenditures made.

A \$200,000 contract for the performance of Phase I of the systems project has just been let by the Aerospace Industries Association, on behalf of aircraft manufacturers, and the Air Transport Association on behalf of the U.S. scheduled airlines. Completion of Phase I of this systems analysis is anticipated within the next six to eight months. If Phase I establishes a feasible computer model, Phase II of the project will be carried out at a further cost to the industry of approximately \$1-million.

It is evident that, even in the substantial absence of legal regulation of aircraft noise, the aviation community in the United States has exercised responsible and effective initiative, and has made substantial gains, in the alleviation of aircraft noise.

The airlines, in particular, and at tremendous costs, have devoted their energies and resources to this objective. As noted in the Harris Report,² the U.S. airlines in the beginning delayed introduction of jets for more than two years in consideration of noise abatement factors.

Predating the industry's ultimate introduction of the turbofan engine, more than \$50-million was spent on research and development to perfect in-flight noise suppressors, for the first jet engines. From the beginning, noise suppressors were installed on commercial jet engines, in contrast to military jet aircraft which were operated without suppressors and even with after-burners which intensified noise emission. By 1962, the airlines had installed noise suppressors on 325 jet aircraft at a cost of a quarter-million dollars per aircraft—a total of \$73-million for the industry. By 1965, the airlines had invested nearly \$150-million in the installation of noise suppressors. In addition to this original cost, it cost the airlines approximately \$10,000 per aircraft per month to operate the suppressors, because of increased weight and drag and reduced speed—a total for the industry of \$36-million per year.

The subsequent fanjet engine as a replacement for the turbojet engine was designed and developed for the very purpose of reducing noise, and did in fact significantly reduce noise levels from jet operations. The quieter fanjets were substituted for turbojet engines in the aircraft orders of all U.S. airlines. One airline even replaced all turbojet engines in its existing aircraft at a cost of \$1-million per aircraft. The industry thereafter at huge expense redesigned and refitted the fanjet engine itself to further reduce its noise output.

Apart from these industry measures to alleviate noise at the source, the burden of extensive airport improvements throughout the United States in the interest of noise abatement has been borne by the airlines. For example, the airlines serving New York's Kennedy Airport have agreed to pay more than \$11-million at that airport alone for runway extensions required, not for operational reasons, but solely for noise abatement.

Finally, the aviation community has provided significant leadership to both industry and government efforts to alleviate aircraft noise. Industry acoustical and noise research personnel are recognized as "the most active" in the field. The Society of Automotive Engineers, which includes numerous aviation industry representatives, has pioneered the technical study of aircraft noise standards and abatement procedures and the development of refined noise measurement criteria. SAE studies, in fact, have been adopted by the Federal Government as the basis for present FAA proposals for establishing maximum aircraft noise levels for certification. Industry acousticians, engineers, operations officers and legal counsel have also served as expert noise advisors to the White House Jet Aircraft Noise Panel, in its comprehensive government-industry noise alleviation program.

While significant accomplishments in aircraft noise alleviation thus have been attained without legal regulation, the airlines industry is nevertheless concerned with the continuing problem of aircraft noise. We accept and support the principle of Federal regulations designed to bring about more effective noise alleviation in all fields, and also alleviation of sonic boom.³

² House Report No. 36, 88th Congress, 1st Sess. 24 (1963), "Investigation and Study of the Aircraft Noise Problem."

³ The Administrator's explanatory letter says, "... we believe that noise does include sonic boom." This is a highly questionable proposition—in either physics or law. However, the airlines would agree that the authority of the Administrator should be extended to sonic boom now even though the power would be hypothetical for the present.