Subsonic and Transonic Problems of Supersonic Cruise Aircraft

Considerable proportions of the flight plans of supersonic cruise aircraft will be carried out at high subsonic and transonic speeds. Such aircraft must climb to high altitudes and descend at subsonic speeds, since supersonic flight at altitudes less than roughly 40,000 feet produces noise at the ground of a level which is highly objectionable. Also, such aircraft must accelerate through the critical transonic speed range. A good supersonic cruise airplane must have satisfactory aerodynamic characteristics at these lower speeds as well as at the supersonic design Mach numbers. However, at present most configurations intended for supersonic cruise usually have relatively poor characteristics at the lower speeds.

A large amount of research will be carried out to improve the aerodynamic characteristics for supersonic cruise aircraft at subsonic and transonic speeds. Problems associated with performance, stability, loads, and structural flutter will be considered. The research will be carried out at Langley primarily in the 8-foot transonic pressure, the 16-foot transonic, and transonic dynamic tunnels. An average of approximately 15 research engineers will be utilized in this research.