(EXAMPLE) [A-3-4]

Image of X-43 (source: NASA)

A high-speed aircraft is flying at 10 km altitude with 750 km/h cruising airspeed. On a surface of the wing, temperature and pressure are measured: $-45\ ^{\circ}\mathrm{C}$ and $2.8 \times 10^{4}\ \mathrm{N/m^{2}}$, respectively. Calculate the corresponding airspeed at this point on the surface of the wing. This is obviously not incompressible subsonic flow field but let us assume this still can be assumed as isentropic. Also, let us assume the flow field still can be assumed as calorically perfect ideal gas of air.