An electrically-driven propulsor unit is operating inside a constant-area wind tunnel of cross-sectional area $A$ as shown. The upstream velocity and pressure are some known $V_1$, $p_1$. The propulsor unit has a known thrust $T$. The density $\rho$ can be assumed to be constant everywhere (low speed flow). Assume the channel walls are effectively frictionless, with $\tau = 0$.

a) The exit station 2 is sufficiently far behind the propulsor so that the propulsor’s high-velocity slipstream jet can mix out, making the exit velocity $V_2$ effectively uniform. Determine this $V_2$.

b) Determine the pressure difference $p_2 - p_1$, and also the total pressure difference $p_{o2} - p_{o1}$. Hint: First identify the overall resultant force vector $\vec{R}$. 

\[ V_2 \]