



(z' out)  $\vec{v} = 2 \times 10^6 \hat{j} \text{ m/s}$

On frame S' (Ship):  $\vec{E}' = 1 \times 10^6 \hat{k} \frac{\text{V}}{\text{m}}$   
 $\vec{B}' = 1.0 \hat{j} \text{ T}$

So, the fields observed in S:

$$\begin{aligned} \vec{E} &= \vec{E}' - \vec{v} \times \vec{B}' \\ &= (1 \times 10^6 \hat{k}) - (2 \times 10^6 \hat{k}) \\ &= (1 \times 10^6 \hat{k}) - (2 \times 10^6 \hat{k}) \\ \vec{E} &= -1.0 \times 10^6 \hat{k} \text{ V/m} \end{aligned}$$

$$\begin{aligned} \vec{B} &= \vec{B}' + \epsilon_0 \mu_0 \vec{v} \times \vec{E}' \\ &= (1.0 \hat{j}) + \epsilon_0 \mu_0 (-2 \times 10^6 \hat{j}) \\ \vec{B} &= 0.99998 \hat{j} \text{ T} \end{aligned}$$