

**Condition:**

When a projectile, such as a jet plane, passes through the earth's magnetic field, does an electric current get generated in the projectile? I do not sense that current when I fly in a plane.

**Solution:**

Yes indeed. We do observe an induced emf when moving perpendicular to the magnetic field. Let's assume that our plane travels at some  $50 \text{ ms}^{-1}$  and the length of its wings to be  $30 \text{ m}$ . The vertical component of Earth's magnetic field is around some  $4 \times 10^{-5} \text{ T}$

Roughly, the induced emf is given by

$$e = -B l v = -50 \times 30 \times 4 \times 10^{-5} \Rightarrow e = -0.06 \text{ V}$$

You must be an amazingly sensitive *bot* in order to detect that very small voltage. If you cling to the wings somehow and want to feel the current, we could make use of Ohm's law. But, the amperes would be further worse. Our body resistance is about  $10^5 \Omega$

$$I = \frac{0.06}{10^5} = 0.6 \mu\text{A}.$$