INTRODUCTION

• There are 25,000 falcons in the UK alone and an estimated 10,000 radio tracking devices used for falconry [1].
• The greatest limitation with devices is the short battery life of the radio and GPS transmitters.
• The purpose of this study is to assess the feasibility of using piezoelectric generators to harness the motional energy of birds in flight.
• This will help to both extend the battery life and provide a secondary power source after the primary battery has depleted.

DESIGN

• A prototype has been developed that consists of a piezoelectric transducer integrated with a power conditioning IC and super-capacitor.
• The system is designed to retrofit onto existing tail mounts and spring clips.
• Prototype had to be comfortable and aerodynamic while in use so weight an size had to not exceed that of transmitter.

PROCESS AND PROTOTYPE

• Simulating the conditions calculated from video captured of the falcon wearing the transmitter while flying.
• Optimal positioning of the piezoelectric transducer was found to be where the covering of the steel antenna became much wider.
• Prototype added 3 g extra weight to the transmitter for a total of 10 g.

RESULTS

• The prototype has been tested by mounting onto the deck feather of the falcon’s tail.
• The generated electrical energy stored in a super-capacitor is shown in table 1.

CONCLUSION

• Theoretical feasibility study for a design specification of 2.7 cm² and 8 grams predict that it is possible to attain up to 0.28 mW.
• Falcon tail dynamics during flight has been analysed and various energy points identified.
• Successful field trial has been conducted.
• Future work entails longer flight recordings.

REFERENCES


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