

## **A miniaturized GPS system for analysis of homing paths in pigeons**

H.-P. Lipp<sup>1</sup>, C. Bürgi<sup>3</sup>, S. Werffeli<sup>3</sup>, I. Steiner<sup>1</sup>, G. Tröster<sup>2</sup>, and David P. Wolfer<sup>1</sup>

<sup>1</sup>Institute of Anatomy, Division of Neuroanatomy & Behavior

<sup>2</sup>Institute for Electronics, Swiss Federal Institute of Technology, CH-8057 Zürich, Switzerland

<sup>3</sup>µ-blox AG, CH-8800 Thalwil, Switzerland

How pigeons find their way back home is still enigmatic. The experimental analysis has been impeded by the crude behavioral techniques to analyze the orientation of the birds, namely vanishing bearings at the release site and recording of homing times. Hence, future analysis requires routine recording of the homing path. Here we present a miniaturized GPS tracking system with an overall weight of 33 g, carried on the pigeon's back. It is based on the GPS chip of the company µ-blox. The chip is controlled by a microprocessor permitting data-logging for three hours in continuous mode, and up to 8 hours in energy-saving mode. After return of the pigeon, data are downloaded and analyzed using custom software. At present, we are testing a set of prototypes and expect that this GPS system will permit to re-analyze a number of classical problems in homing pigeon research. In addition, we expect that these route recorders will permit studies that require constant path tracking, such as the problem whether pigeons read continuously geomagnetic or other cues during homing, or whether they rely on a navigational strategy known as dead reckoning. SNF 3152-058822.